

CITY OF NAPLES, FLORIDA

AGREEMENT (PROFESSIONAL SERVICES)

Bid/Proposal No. 041-12

Contract No. _____

Project Name Basin III Stormwater Improvements

THIS AGREEMENT (the "Agreement") is made and entered into this **16th Day of May, 2012** by and between the **City of Naples**, a Florida municipal corporation, (the "CITY") and **Mitchell & Stark Construction Co, Inc**, A Florida corporation, **6001 Shirley Street, Naples, FL 34109** , (the "CONTRACTOR").

WITNESSETH:

WHEREAS, the CITY desires to obtain the services of the CONTRACTOR concerning certain services specified in this Agreement (referred to as the "Project"); and

WHEREAS, the CONTRACTOR has submitted a proposal for provision of those services; and

WHEREAS, the CONTRACTOR represents that it has expertise in the type of professional services that will be required for the Project.

NOW, THEREFORE, in consideration of the mutual covenants and provisions contained herein, the parties hereto agree as follows:

ARTICLE ONE CONTRACTOR'S RESPONSIBILITY

1.1. The Services to be performed by CONTRACTOR are generally described as **the construction of stormwater and water main improvement within Basin III Stormwater Drainage Improvements** and may be more fully described in the Scope of Services, attached as **Exhibit A** and made a part of this Agreement.

1.2. The CONTRACTOR agrees to obtain and maintain throughout the period of this Agreement all such licenses as are required to do business in the State of Florida, the City of Naples, and in Collier County, Florida, including, but not limited to, all licenses required by the respective state boards and other governmental agencies responsible for regulating and licensing the professional services to be provided and performed by the CONTRACTOR pursuant to this Agreement.

1.3. The CONTRACTOR agrees that, when the services to be provided hereunder relate to a professional service which, under Florida Statutes, requires a license, certificate of authorization or other form of legal entitlement to practice such services, it shall employ or retain only qualified personnel to provide such services.

1.4. CONTRACTOR agrees to employ and designate, in writing, within 5 calendar days after receiving its Notice to Proceed, or other directive from the CITY, a qualified licensed professional to serve as the CONTRACTOR's project manager (the "Project Manager"). The Project Manager shall be authorized and responsible to act on behalf of the CONTRACTOR with respect to directing, coordinating and administering all

aspects of the services to be provided and performed under this Agreement.

1.5. The CONTRACTOR has represented to the CITY that it has expertise in the type of professional services that will be required for the Project. The CONTRACTOR agrees that all services to be provided by CONTRACTOR pursuant to this Agreement shall be subject to the CITY's review and approval and shall be in accordance with the generally accepted standards of professional practice in the State of Florida, as may be applied to the type of services to be rendered, as well as in accordance with all published laws, statutes, ordinances, codes, rules, regulations and requirements of any governmental agencies which regulate or have jurisdiction over the Project or the services to be provided and performed by CONTRACTOR. In the event of any conflicts in these requirements, the CONTRACTOR shall notify the CITY of such conflict and utilize its best professional judgment to advise CITY regarding resolution of the conflict.

1.6. The CONTRACTOR agrees not to divulge, furnish or make available to any third person, firm or organization, without CITY's prior written consent, or unless incident to the proper performance of the CONTRACTOR's obligations hereunder, or in the course of judicial or legislative proceedings where such information has been properly subpoenaed, any non-public information concerning the services to be rendered by CONTRACTOR hereunder, and CONTRACTOR shall require all of its employees, agents, subconsultants and subcontractors to comply with the provisions of this paragraph. However, the CONTRACTOR shall comply with the Florida Public Records laws.

1.7. The CONTRACTOR agrees not to employ or offer to employ any Elected Officer or City Managerial Employee of the CITY who in any way deals with, coordinates on, or assists with, the professional services provided in this Agreement, for a period of 2 years after termination of all provisions of this Agreement. For purposes of this paragraph, the term "Elected Officer" shall mean any member of the City Council. For purposes of this paragraph, the term "City Managerial Employee" shall mean the City Manager, the Assistant City Manager, the City Clerk, and any City department head or director. If the CONTRACTOR violates the provisions of this paragraph, the CONTRACTOR shall be required to pay damages to the CITY in an amount equal to any and all compensation which is received by the former Elected Officer or City Managerial Employee of the CITY from or on behalf of the contracting person or entity, or an amount equal to the former Elected Officer's or City Managerial Employee's last 2 years of gross compensation from the CITY, whichever is greater.

1.8. The CONTRACTOR agrees not to provide services for compensation to any other party other than the CITY on the same subject matter, same project, or scope of services as set forth in this Agreement without approval from the City Council of the CITY.

1.9. Except as otherwise provided in this Agreement, the CONTRACTOR agrees not to disclose or use any information not available to members of the general public and gained by reason of the CONTRACTOR's contractual relationship with the CITY for the special gain or benefit of the CONTRACTOR or for the special gain or benefit of any other person or entity.

ARTICLE TWO CITY'S RESPONSIBILITIES

2.1. The CITY shall designate in writing a project coordinator to act as the CITY's representative with respect to the services to be rendered under this Agreement (the "Project Coordinator"). The Project Coordinator shall have authority to transmit instructions, receive information, interpret and define the CITY's policies and decisions with respect to the CONTRACTOR's services for the Project. However, the Project Coordinator is not authorized to issue any verbal or written orders or instructions to the CONTRACTOR that would have the effect, or be interpreted to have the effect, of modifying or changing in any way whatever:

- (a) The scope of services to be provided and performed by the CONTRACTOR;
- (b) The time the CONTRACTOR is obligated to commence and complete all such services; or
- (c) The amount of compensation the CITY is obligated or committed to pay the CONTRACTOR.

Any such modifications or changes ((a) (b) or (c)) shall only be made by or upon the authorization of the CITY's city manager as authorized by city council in the enabling legislation or in the CITY's procurement policies.

2.2. The Project Coordinator shall:

- (a) Review and make appropriate recommendations on all requests submitted by the CONTRACTOR for payment for services and work provided and performed in accordance with this Agreement;
- (b) Arrange for access to and make all provisions for the CONTRACTOR to enter the Project site to perform the services to be provided by the CONTRACTOR under this Agreement; and
- (c) Provide notice to the CONTRACTOR of any deficiencies or defects discovered by the CITY with respect to the services to be rendered by the CONTRACTOR hereunder.

2.3. The CONTRACTOR acknowledges that access to the Project Site, to be arranged by the CITY for the CONTRACTOR, may be provided during times that are not the normal business hours of the CONTRACTOR.

ARTICLE THREE TIME

3.1. Services to be rendered by the CONTRACTOR shall be commenced subsequent to the execution of this Agreement upon written Notice to Proceed from the CITY for all or any designated portion of the Project must be completed **within 175 days of the Notice of Proceed.**

3.2. Should the CONTRACTOR be obstructed or delayed in the prosecution or completion of its services as a result of unforeseeable causes beyond the control of the CONTRACTOR, and not due to its own fault or neglect, including but not restricted to acts of God or of public enemy, acts of government or of the CITY, fires, floods, epidemics, quarantine regulations, strikes or lock-outs, then the CONTRACTOR shall notify the CITY in writing within 5 working days after commencement of such delay, stating the cause or causes thereof, or be deemed to have waived any right which the CONTRACTOR may have had to request a time extension.

3.3. No interruption, interference, inefficiency, suspension or delay in the commencement or progress of the CONTRACTOR's services from any cause whatsoever, including those for which the CITY may be responsible in whole or in part, shall relieve the CONTRACTOR of its duty to perform or give rise to any right to damages or additional compensation from the CITY. The CONTRACTOR's sole remedy against the CITY will be the right to seek an extension of time to its schedule. This paragraph shall expressly apply to claims for early completion, as well as claims based on late completion.

3.4. Should the CONTRACTOR fail to commence, provide, perform or complete any of the services to be provided hereunder in a timely and reasonable manner, in addition to any other rights or remedies available to the CITY hereunder, the CITY at its sole discretion and option may withhold any and all payments due and owing to the CONTRACTOR until such time as the CONTRACTOR resumes performance of its obligations hereunder in such a manner so as to reasonably establish to the CITY's satisfaction that the CONTRACTOR's

performance is or will shortly be back on schedule.

ARTICLE FOUR COMPENSATION

4.1. The total compensation to be paid the CONTRACTOR by the CITY for all Services shall not exceed **\$1,028,637.17** and shall be paid in the manner set forth in the "Basis of Compensation", which is attached as **Exhibit B** and made a part of this Agreement.

ARTICLE FIVE MAINTENANCE OF RECORDS

5.1. The CONTRACTOR will keep adequate records and supporting documentation which concern or reflect its services hereunder. The records and documentation will be retained by the CONTRACTOR for a minimum of five 5 years from the date of termination of this Agreement or the date the Project is completed, whichever is later. The CITY, or any duly authorized agents or representatives of the CITY, shall have the right to audit, inspect and copy all such records and documentation as often as they deem necessary during the period of this Agreement and during the 5 year period noted above; provided, however, such activity shall be conducted only during normal business hours. If the CONTRACTOR desires to destroy records prior to the minimum period, it shall first obtain permission from the CITY in accordance with the Florida Public Records laws.

ARTICLE SIX INDEMNIFICATION

6.1. The CONTRACTOR agrees to indemnify and hold harmless the City from liabilities, damages, losses and costs, including, but not limited to, reasonable attorneys' fees, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of the CONTRACTOR and persons employer or utilized by the CONTRACTOR in the performance of the Contract.

ARTICLE SEVEN INSURANCE

7.1. CONTRACTOR shall obtain and carry, at all times during its performance under this Agreement, insurance of the types and in the amounts set forth in the document titled General Insurance Requirements, which is attached as Exhibit C and made a part of this Agreement.

ARTICLE EIGHT SERVICES BY CONTRACTOR'S OWN STAFF

8.1. The services to be performed hereunder shall be performed by the CONTRACTOR's own staff, unless otherwise authorized in writing by the CITY. The employment of, contract with, or use of the services of any other person or firm by the CONTRACTOR, as independent contractor or otherwise, shall be subject to the prior written approval of the CITY. No provision of this Agreement shall, however, be construed as constituting an agreement between the CITY and any such other person or firm. Nor shall anything contained in this Agreement be deemed to give any such party or any third party any claim or right of action against the CITY beyond such as may otherwise exist without regard to this Agreement.

ARTICLE NINE WAIVER OF CLAIMS

9.1. The CONTRACTOR's acceptance of final payment shall constitute a full waiver of any and all claims, except for insurance company subrogation claims, by it against the CITY arising out of this Agreement or otherwise related to the Project, except those previously made in writing and identified by the CONTRACTOR as unsettled at the time of the final payment. Neither the acceptance of the CONTRACTOR's services nor payment by the CITY shall be deemed to be a waiver of any of the CITY's rights against the CONTRACTOR.

ARTICLE TEN TERMINATION OR SUSPENSION

10.1. The CONTRACTOR shall be considered in material default of this Agreement and such default will be considered cause for the CITY to terminate this Agreement, in whole or in part, as further set forth in this section, for any of the following reasons: (a) failure to begin work under the Agreement within the times specified under the Notice(s) to Proceed, or (b) failure to properly and timely perform the services to be provided hereunder or as directed by the CITY, or (c) the bankruptcy or insolvency or a general assignment for the benefit of creditors by the CONTRACTOR or by any of the CONTRACTOR's principals, officers or directors, or (d) failure to obey laws, ordinances, regulations or other codes of conduct, or (e) failure to perform or abide by the terms or spirit of this Agreement, or (f) for any other just cause. The CITY may so terminate this Agreement, in whole or in part, by giving the CONTRACTOR at least 3 calendar days' written notice.

10.2. If, after notice of termination of this Agreement as provided for in paragraph 10.1 above, it is determined for any reason that the CONTRACTOR was not in default, or that its default was excusable, or that the CITY otherwise was not entitled to the remedy against the CONTRACTOR provided for in paragraph 10.1, then the notice of termination given pursuant to paragraph 10.1 shall be deemed to be the notice of termination provided for in paragraph 10.3 below and the CONTRACTOR's remedies against the CITY shall be the same as and limited to those afforded the CONTRACTOR under paragraph 10.3 below.

10.3. The CITY shall have the right to terminate this Agreement, in whole or in part, without cause upon 7 calendar day's written notice to the CONTRACTOR. In the event of such termination for convenience, the CONTRACTOR's recovery against the CITY shall be limited to that portion of the fee earned through the date of termination, together with any retainage withheld and any costs reasonably incurred by the CONTRACTOR that are directly attributable to the termination, but the CONTRACTOR shall not be entitled to any other or further recovery against the CITY, including, but not limited to, anticipated fees or profits on work not required to be performed.

ARTICLE ELEVEN CONFLICT OF INTEREST

11.1. The CONTRACTOR represents that it presently has no interest and shall acquire no interest, either direct or indirect, which would conflict in any manner with the performance of services required hereunder. The CONTRACTOR further represents that no persons having any such interest shall be employed to perform those services.

ARTICLE TWELVE MODIFICATION

12.1. No modification or change in this Agreement shall be valid or binding upon the parties unless in writing and executed by the party or parties intended to be bound by it.

**ARTICLE THIRTEEN
NOTICES AND ADDRESS OF RECORD**

13.1. All notices required or made pursuant to this Agreement to be given by the CONTRACTOR to the CITY shall be in writing and shall be delivered by hand or by United States Postal Service Department, first class mail service, postage prepaid, return receipt requested, addressed to the following CITY's address of record:

**City of Naples
735 Eighth Street South
Naples, Florida 34102-3796
Attention: A. William Moss, City Manager**

13.2. All notices required or made pursuant to this Agreement to be given by the CITY to the CONTRACTOR shall be made in writing and shall be delivered by hand or by the United States Postal Service Department, first class mail service, postage prepaid, return receipt requested, addressed to the following CONTRACTOR's address of record:

**Mitchell & Stark Construction Co, Inc
6001 Shirley Street
Naples, FL 34105
Attn: Brian Penner, CEO**

13.3. Either party may change its address of record by written notice to the other party given in accordance with requirements of this Article.

**ARTICLE FOURTEEN
MISCELLANEOUS**

14.1. The CONTRACTOR, in representing the CITY, shall promote the best interest of the CITY and assume towards the CITY a duty of the highest trust, confidence, and fair dealing.

14.2. No modification, waiver, suspension or termination of the Agreement or of any terms thereof shall impair the rights or liabilities of either party.

14.3. This Agreement is not assignable, in whole or in part, by the CONTRACTOR without the prior written consent of the CITY.

14.4. Waiver by either party of a breach of any provision of this Agreement shall not be deemed to be a waiver of any other breach and shall not be construed to be a modification of the terms of this Agreement.

14.5. The headings of the Articles, Exhibits, Parts and Attachments as contained in this Agreement are for the purpose of convenience only and shall not be deemed to expand, limit or change the provisions in such Articles, Exhibits, Parts and Attachments.

14.6. This Agreement constitutes the entire agreement between the parties hereto and shall supersede, replace and nullify any and all prior agreements or understandings, written or oral, relating to the matter set forth herein, and any such prior agreements or understanding shall have no force or effect whatever on this Agreement.

Sec. 14. 7. The CONTRACTOR shall comply fully with all provisions of state and federal law, including without limitation all provisions of the Immigration Reform and Control Act of 1986 ("IRCA") as amended, as well as all related immigration laws, rules, and regulations pertaining to proper employee work

authorization in the United States. The CONTRACTOR shall execute the Certification of Compliance with Immigration Laws, attached hereto as **Exhibit “D”**.

**ARTICLE FIFTEEN
APPLICABLE LAW**

15.1. Unless otherwise specified, this Agreement shall be governed by the laws, rules, and regulations of the State of Florida, and by the laws, rules and regulations of the United States when providing services funded by the United States government. Any suit or action brought by either party to this Agreement against the other party relating to or arising out of this Agreement must be brought in the appropriate Florida state court in Collier County, Florida.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement for the day and year first written above.

ATTEST:

CITY:

CITY OF NAPLES, FLORIDA,
A Municipal Corporation

By: _____
Tara A. Norman, City Clerk

By: _____
A. William Moss, City Manager

Approved as to form
and legal sufficiency:

By: _____
Robert D. Pritt, City Attorney

CONTRACTOR:
Mitchell & Stark Construction Co, Inc
A Florida Corporation

By: _____
Its _____

Witness

(CORPORATE SEAL)

General Contract (not Architects/Engineers)

EXHIBIT A

SCOPE OF SERVICES

General Conditions: General conditions of the project are included in EXHIBIT A, A-1

Technical Specifications: Technical specifications are included in EXHIBIT A, A-1.

Plan Specifications: Plan specifications are included in EXHIBIT A, A-1.

ADDITIONAL REQUIREMENTS:

Equipment, Materials & Supplies: The Contractor shall designate a location for the storage of equipment, materials and supplies at or near the construction site. The City may allow for the temporary storage of equipment, materials and supplies at the City's storage yard location on Riverside Circle and/or locations within the right-of-way along Broad Avenue South and the beach ends.

Excavated Materials: Excavated materials will be hauled away by the Contractor to a location designated by the Contractor at the Contractor's cost.

Truck Routes: Truck Route included within EXHIBIT A illustrates preferred (green) and prohibited (red) truck routes throughout the City. The Contractor shall comply.

Change Allowance: This line item has been created to address unforeseen conditions arising during the construction project. Any disbursements from this line item shall be in accordance with Section 01028 of the Technical Specifications.

EXHIBIT A

GENERAL REQUIREMENTS

GR-1 SUMMARY / SCOPE OF WORK

The work will involve the installation of pipes, structures and drainage improvements, as well as the re-grading of roadway swales within street right of ways in certain designated areas of the Basin III Stormwater System, all lying within the City of Naples.

GR-2 DEFINITIONS

The terms used in these General Requirements are defined in the "STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT" prepared by Engineers Joint Contract Documents Committee, EJCDC No. C-700 (Formerly 1910-8), 2007 Edition.

GR-3 ABBREVIATIONS

Reference in the technical specifications to the specifications or requirements of technical societies, associations, organization" or bodies shall mean their most current specifications. These groups are identified in the technical specifications by the following abbreviations:

AASHTO	American Association of State Highway and Transportation Officials
ANSI	American National Standards Institute, Inc.
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
FDOT	Department of Transportation - State of Florida
UAM	Utility Accommodations Manual
EJCDC	Engineers Joint Contract Documents Committee

GR-4 USE OF PUBLIC STREETS

The use of public streets and roads shall be such as to provide a minimum of an inconvenience to the public and to other traffic. Any earth or other excavated materials spilled from trucks shall be removed by the contractor and the streets and roads cleaned to the satisfaction of the owner.

GR-5 MAINTENANCE OF TRAFFIC

All safety precautions shall be taken and all traffic controls shall be furnished satisfactorily to the CITY and/or government agencies having jurisdiction, where partial or complete obstruction of highways, roadways, streets, drives or sidewalks is required in the performance of the work.

1. In advance of construction, the Contractor will submit a Maintenance of Traffic (MOT) plan to the City for each improvement project which will include detailed information on the phasing of work such that street traffic flow is maintained and residents are allowed usable driveway access to their homes at all times. The MOT will be based on the criteria provided by FDOT index 619, 621 and 623.
2. The Contractor will consult with the City and inform the City in advance of all construction phases in order to adequately coordinate operational aspects of this plan. The City will maintain final control over the specific times and operational traffic detours as may be required for construction. During traffic maintenance operations the Contractor shall provide suitably qualified traffic flagmen and operation personnel without language handicap and with ability to communicate and direct traffic flow on the job at all times. The Contractor will obtain the necessary approvals from local jurisdiction for any weekend or after hours work.

EXHIBIT A

GR-6 JOBSITE INSPECTIONS

The Contractor shall provide access to the project jobsite for the City and their representative as requested for inspection.

The authorized representatives and agents of the Environmental Protection Agency, South Florida Water Management District and Controlling State and Local Pollution Control Agencies shall be permitted to inspect all work, material and other relevant data records.

GR-7 CONTRACTOR'S ON THE JOB REPRESENTATIVE

The Contractor shall provide and maintain suitably qualified supervisory personnel at the project site during working hours for the duration of construction. This person will be expected to have operational control, direct knowledge and understanding of the ongoing construction activity and be able to communicate without language handicap.

GR-8 ROCK EXCAVATION

Material to be excavated hereunder in trenches, ditches, subgrades, water bodies, etc. shall include earth, rock or any other material encountered in excavating to the depth and extent indicated on the drawings and herein specified. No adjustment in the contract price will be made on the account of the absence or presence of rock, shale, masonry or other materials. In the case of any change order in writing by the Engineer in the quantity of excavation, the excavation involved shall be unclassified; the value shall be determined and the contract price will be adjusted as provided in the General Conditions.

GR-9 DAMAGE TO FRONT YARDS, LANDSCAPING, IRRIGATION SYSTEMS & DRIVEWAYS

The Contractor is advised that this project will involve work within the Rights of Way (ROW). Hardscape features including (but not limited to) landscaping, mailboxes, driveways and irrigations systems may be impacted by construction. The following conditions shall apply during construction:

- 1. Inventory of existing conditions:** Prior to commencement of construction activities, the Contractor will conduct a detailed inventory of the location of hardscape items within and adjacent to the construction zone. Of particular note will be residential yards lying adjacent to and along the project area. A video documentary is required for this inventory and will be kept by the Contractor for the duration of the project, and copies are to be provided to the Engineer and the representatives of the City. This material will be used as reference to verify that all work done is kept within the project limits and that any adjacent areas temporarily affected by this construction are fully restored to original conditions at the completion of work. If, as a result of changed conditions brought about by the new improvements, certain changes to residential yards, including grading, driveway configurations, tree and shrub locations, become unavoidable, the Contractor will notify the Engineer for instruction and approval to proceed.
- 2. Damage To Items Outside Project Limits:** There is no construction work located outside of City owned rights of way or easements; therefore, the Contractor will be responsible for damage to all items lying outside the project limits and street right of way areas. This includes all landscaping. Damage shall be repaired and/or replaced, surfaces re-graded and restored to original conditions at the completion of work.
- 3. Damage To Items Within Project Limits:** The project work zones include areas considered to be residential front yards. While located in the City ROW, private property owners are responsible for irrigation systems, sod, driveways, decorative lighting and mailboxes, among other things. The Contractor will be responsible for re-installation, replacement or repair of any damage to these items, unless otherwise directed by the Engineer. These items shall NOT be covered by the lump sum, fixed landscape item with the bid tabulations.

EXHIBIT A

It is noted that the project work zones may include trees and other landscaping that the City considers undesirable or desirable. Throughout this contract, the Contractor and the City's Engineer shall coordinate on the preservation, removal, or removal and replacement of landscaping within the ROW. The City's Project Engineer shall have final authority in this matter. A lump sum fixed cost has been added to the bid tabulation to address these landscape items that typically will include trees, shrubs, bushes, and other decorative vegetation. Sod, mulch and other ground cover in NOT included in this bid item and shall be included in other bid items as determined by the contractor.

GR-10 DAMAGE TO UTILITIES AND EXISTING STRUCTURES

The Contractor will note that all utilities are not shown on the plans.

There exists underground Potable Water, Re-use Water, Irrigation, Sanitary Sewer, TV cable, Fiber-optic Lines, Telephone Lines, Power lines and associated utility facilities within the project limits. The Contractor shall adhere to Sunshine One Call and Florida Statute for the marking of utility locations throughout the project. Where utility conflicts exist, each utility owner shall be contacted by the contractor well prior to conflict resolution. The construction plans show the approximate location of known potable water, irrigation water and sanitary sewer conflicts. These known conflict locations are remedied per the plans. If unknown utility conflicts exist, each utility owner shall be contacted and the Project Engineer, Contractor and Utility Owner shall remedy the unknown conflict at the time of discovery. Work may be done under this contract's Unforeseen Allowance category, or by the utility owner. Coordinate all work by the utility owner so that the progress of construction will not be hampered.

The following utility owners are required to relocate their utility line given due notice by the City:

- ✓ Florida Power & Light
- ✓ Comcast Cable
- ✓ TECO Gas
- ✓ Embarq Telephone

Information shown on the Drawings as to the location of existing utilities has been prepared from the most reliable data available to the Engineer. This information is not guaranteed, however, and it shall be the Contractor's responsibility to determine the location, character and depth of any existing utilities.

The Contractor will exercise extreme caution to eliminate any possibility of any damage to utilities lying within, and traversing, the project limits, as a result of construction activities. The Contractor shall hold the City harmless, and will be responsible for, and make good for all damage caused, by his construction operations to the above described utilities. The Contractor will be similarly responsible for all damage to any buildings, facilities, pavement or other existing structures which may be encountered, whether or not shown on the drawings, which lie beyond the limits of this Contract.

GR-11 ADJUSTMENT OF GRADES AND LOCATION

Adjustments of grades and locations shown on drawings may be necessary to conform to actual field conditions identified by the Contractor during the field location of utilities, to maintain cover over existing utilities or unavoidable conditions. Such adjustments shall be considered part of the job conditions and no extra compensations will be allowed for such changes, except where specifically otherwise noted in the plans or specifications. Such adjustments must be approved by the Engineer prior to being executed.

GR-12 CHEMICALS

EXHIBIT A

All chemicals used during project construction, or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification, must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with instructions.

GR-13 SAFETY AND HEALTH REGULATIONS

The Contractor shall comply with the Department of Labor Safety & Health Regulations for construction promulgated under the Occupational Safety & Health Act of 1970, (PL 91-596) and under Section 107 of the Contract Work Hours & Safety Standards Act (PL 91-54).

All equipment furnished and installed under this contract shall comply with Part 1910, Occupational Safety & Health Standards & Amendments thereto.

GR-14 PERMITS AND FEES

Construction in County or State Department of Transportation rights-of-way and construction in wetlands and navigable water bodies will be governed by applicable County, State and Federal permits. All conditions set forth on the permits shall be a part of the contract and they shall be attached by addendum.

1. Unless otherwise specified, the Contractor shall obtain and pay for all permits and licenses related to his work, except as otherwise provided herein. Permits already acquired are:
 - a. South Florida Water Management District Environmental Resource Permit
 - b. A City of Naples Building Permit is NOT required for this job.
2. Additional permitting that may need to be obtained by the Contractor may include, but not limited to:
 - a. Stormwater Pollution Prevention Plan (SWPPP) and NPDES construction permits (the SWPPP is included within the construction plans and may be used by the contractor)
 - b. Collier County Right of Way Permits
 - c. Equipment transport permits
 - d. Dewatering permits
 - e. Others not provided herein.
3. The Contractor will be issued copies of all permits obtained by the CITY. The contractor is responsible for posting a copy of the permits at the site and maintaining them at all times during construction. The Contractor shall be responsible for familiarizing himself with the permits and shall abide by the permit conditions at all times.

GR-15 AIR AND WATER POLLUTION PREVENTION PROCEDURES

A. Water Pollution Control

Construction procedures shall include temporary pollution control measures to ensure that soil erosion which might cause water pollution is kept to a minimum. Such measures may consist of construction of berms, dikes, dams, drains and sediment basins, or use of fiber mats, woven plastic filter cloths, gravel mulches, quick growing grasses, sod, bituminous spray and other erosion control devices or methods.

1. Prior to the start of construction, the Contractor shall submit, for acceptance, his schedules for accomplishment of temporary erosion control and his plan for disposal of waste materials or other potential sources of pollution.
2. If temporary pollution control measures are ordered by the Engineer, the work shall be accomplished under the respective item of work subject to the limitations as defined in the contract's general provisions. If the work is such that no quantities or prices were given in the contract, the work shall be covered by a change order submitted by the Contractor and approved

EXHIBIT A

by the Owner. Should the parties be unable to agree on unit prices, or if this method is impractical, the Engineer may instruct the Contractor to proceed with the work by day labor or other means consistent with Article 11.01.A, 11.01.B of the General Conditions.

3. In the event that temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls in a timely manner, then such work to be performed by the Contractor shall be at his own expense.
4. In case of repeated failures on the part of the Contractor to control erosion pollution, right is reserved to the Engineer to employ outside assistance to provide the necessary corrective measures. Such incurred costs, plus related engineering costs, will be charged to the Contractor and appropriate deductions made from the Contractor's progress payments.
5. All erosion control features installed by the Contractor shall be acceptably maintained by the Contractor during the duration of construction.

B. Other Water Pollution Controls

1. At the conclusion of the work, all waterways, major drainage ditches and other drainage flow conveyances shall promptly be cleared by the Contractor of false work, piling, debris, or other obstructions placed during construction.
2. The Contractor will exercise caution with the placement of barriers and erosion control devices so as not to block, or otherwise render inoperable major drainage ditches and other drainage flow conveyances during the duration of construction.

C. Conflict with Other Controls

In the event of conflict between these requirements and pollution control laws, rules or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply.

GR-16 REFERENCE POINTS

The Contractor shall locate and reference the project survey control network and establish bench marks at appropriate intervals along the line of the project for use by the Contractor in establishing horizontal and vertical controls necessary for the construction. If the Contractor or subcontractor destroys these locations, the Contractor shall re-establish these points.

The Contractor's stakeout work shall be included in the contract unit price for the various items of work to which it is incidental.

GR-17 ENGINEERING LAYOUT REQUIREMENTS

The Contractor shall provide construction layout and staking. The work shall include performing all calculations required and setting all stakes needed, such as offset stakes, reference point stakes, slope stakes and other reference marks or points necessary to provide lines and grades for construction of all improvements.

1. **All elevations shown on the civil plans are referenced in NGVD 1929.** All staking work will be done in accordance with approved civil plans in NGVD 1929 Datum.
2. The Contractor shall be responsible for the placement and preservation of adequate ties and reference to all control points, whether established by him or found on the project, necessary for the accurate reestablishment of all base lines or centerlines shown on the Plans.

EXHIBIT A

3. Swale construction: The Contractor shall provide grade stakes in the field showing proposed swale locations, design and constructed conditions with cut and fill marks. Staking shall be sufficiently spaced to capture all design features but no greater than a 25 foot grid. These stakes will be removed after acceptance of final grades by the Engineer or the City's representative.

GR-18 REFERENCE TO OTHER SPECIFICATIONS

Reference to F.D.O.T. Specifications shall mean the State of Florida Department of Transportation Standard Specifications for Road and Bridge Construction dated January 2007. Where F.D.O.T. Section cited contains references to other Sections, they shall also be included as though cited herein. Where F.D.O.T. Specifications refer to the "Engineer", "Engineer of Tests", or "Division of Tests", it shall be understood to mean the Engineer of the OWNER as such in the Agreement. Where F.D.O.T. Specifications refer to the "Department", it shall mean the Engineer of Record. In case of conflict between the referenced F.D.O.T. Specifications and the Contract Documents, **the Contract Documents shall govern.**

Reference to A.A.S.H.O. and A.S.T.M. are to the latest editions of published Tests of the American Association of the State Highway and Transportation Officials and the American Society for Testing Materials, respectively.

GR-19 SUBMITTALS

1. Submittals to the City will include, as a basis for approval of the use of materials for incorporation in the work, the following items:
2. Shop Drawings for all proposed materials, structures and piping.
3. Schedule of Construction activities.
4. Maintenance of Traffic plans as specified in GR-5.
5. Copies of all permits obtained by the Contractor.
6. Survey as-builts as specified in GR-20.
7. Product data and manufacturer's information on specific equipment proposed to be incorporated into the work.
8. Landfill delivery tickets.
9. Rip rap delivery tickets.
10. Water Quality monitoring and any test results as required by permits.
11. Laboratory test results and delivery tickets for borrow fill material.
12. In-place field density tests.
13. Soil permeability tests to establish Hydraulic Conductivity (K-ft/sec) at retention swales as specified in GR-20.
14. Tags from grass seed bags.
15. Soil ph tests.
16. Documentations of any official compliance Notice of Violations, as well as documented evidence of submittals or paperwork submittals to resolve these issues consistent with permit requirements.

GR-20 AS-BUILT RECORDS

At the end of the project, the Contractor will submit to the City a certified as built site survey showing coordinates and elevations of the completed work.

1. At the conclusion of the work, all as-built information will be referenced in NGVD 1929.
2. The as-built survey will locate and identify the elevation of all drainage structures and inlets. Information to be provided will include grates and inverts.

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3. Swale Cross-sections: Final as-built retention swale configuration and cross-sections will be provided at the completion of the work. A minimum of three (3) cross-sections will be provided for each swale; to be located across both ends and across the swale mid-point. Maximum cross-section spacing under any circumstance will be based on a twenty-five (25) foot interval.
4. The Contractor shall provide eight (8) signed and sealed surveys, including design and constructed features and benchmarks. One (1) CD will be submitted including as-built designs.
5. Swale Soil Conductivity Tests: Contractor will provide permeability tests (K-ft/sec) to establish the hydraulic conductivity of soils underlying roadside swales. Tests will be carried out at a minimum of three (3) separate locations for each improvement ID. Test locations will be established in consultation with the Engineer.

GR-21 CONTROL OF MATERIALS

The Control of Materials shall conform to F.D.O.T. Specifications, Section 6.

GR-22 LIMITATION OF OPERATIONS

Limitation of operations shall conform to F.D.O.T. Specifications in Section 8-4.1 through 8-4.7.

GR-23 MEASUREMENT AND PAYMENT

Measurement and Payment shall conform to F.D.O.T. Specifications, Section 9 unless otherwise set forth in the Technical Specifications. In case of conflict between the referenced F.D.O.T. Specifications and the Contract Documents, **the Contract Documents shall govern.**

GR-24 PROTECTION OF WORK

The Contractor and its agents shall take reasonable precautions and maintain reasonable safeguards to protect the SITE DEVELOPMENT WORK against loss or damage including, without limitation, bracing and reinforcing where necessary and providing guards, locks, fences, signs, barricades, lights and such other warning and security devices where appropriate.

**CITY OF NAPLES
BASIN III – PHASE 2 STORMWATER IMPROVEMENTS – AREA 3
TECHNICAL SPECIFICATIONS**

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SECTION 01010
SUMMARY OF WORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Description of Work
- B. CONTRACTOR's Use of Site
- C. Work Sequence
- D. CITY Occupancy
- E. Protection of Existing Utilities

1.2 DESCRIPTION OF WORK

- A. General: The Work to be done under this Contract is shown on the drawings and specified in Contract Documents.
- B. The Work includes:
 - 1. Furnishing of all labor, material, superintendence, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies, product certifications, inspections, services and other means of construction necessary or proper for performing and completing the Work.
 - 2. Sole responsibility for adequacy of plant and equipment.
 - 3. Maintaining the Work area and site in a clean and acceptable manner.
 - 4. Maintaining existing facilities in service at all times.
 - 5. Protection of finished and unfinished Work.
 - 6. Repair and restoration of Work or existing facilities damaged during construction.
 - 7. Furnishing as necessary proper equipment and machinery, of a sufficient capacity, to facilitate the Work and to handle all emergencies normally encountered in Work of this character.
 - 8. Furnishing, installing, and protecting all necessary guides, track rails, bearing plates, anchor and attachment bolts, and all other appurtenances needed for the installation of the devices included in the equipment specified. Make anchor bolts of appropriate

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size, strength and material for the purpose intended. Furnish substantial templates and shop drawings for installation.

- C. Implied and Normally Required Work: It is the intent of these Specifications to provide the CITY with complete operable systems, subsystems and other items of Work. Any part or item of Work, which is reasonably implied or normally required to make each installation satisfactorily and completely operable, is deemed to be included in the Work and the Contract Amount. All miscellaneous appurtenances and other items of Work incidental to meeting the intent of these Specifications are included in the Work and the Contract Amount even though these appurtenances may not be specifically called for in these Specifications.
- D. Quality of Work: Regard the apparent silence of the Contract Documents as to any detail, or the apparent omission from them of a detailed description concerning any Work to be done and materials to be furnished as meaning that only the best general practice is to prevail and that only materials and workmanship of the best quality are to be used. Interpretation of these specifications will be made upon this basis.

1.3 CONTRACTOR'S USE OF SITE

- A. In addition to the requirements of the Supplemental Terms and Conditions, limit use of site and premises for work and storage to allow for the following:
 - 1. Coordination of the Work under this CONTRACT with the work of the other contractors where Work under this CONTRACT encroaches on the Work of other contractors.
 - 2. CITY occupancy and access to operate existing facilities.
 - 3. Coordination of site use with CONSULTANT.
 - 4. Responsibility for protection and safekeeping of products under this CONTRACT.
 - 5. Providing additional off site storage at no additional cost to the CITY as needed.
- B. Use of Premises: Contractor shall confine all construction equipment, the storage of materials and equipment and the operations of workers to the Project Site and land and areas identified in and permitted by the Contract Documents and other lands and areas permitted by law, rights of way, permits and easements, and shall not unreasonably encumber the Project site with construction equipment or other material or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or any land or areas contiguous thereto, resulting from the performance of the Work.

1.4 WORK SEQUENCE

- A. Construct Work in stages to accommodate the CITY's use of premises during construction period and in accordance with the limitations on the sequence of construction specified. Coordinate construction schedules and operations with CONSULTANT.

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- B. Coordinate Work of all subcontractors.

1.5 CITY OCCUPANCY

- A. Provide means to permit CITY to occupy premises during entire period of construction if necessary or requested. Cooperate with the CITY's representative in all construction operations to minimize conflict, and to facilitate CITY usage.
- B. Conduct operations with the least inconvenience to the general public.

1.6 PROTECTION OF EXISTING UTILITIES

- A. In case of damage to existing utilities caused by construction activities, contact the owner of the utility or appropriate City department (Water or Wastewater) immediately. Repair any damage to existing utilities caused by construction activities in coordination with or as directed by the owner of the utility.

Contractor shall locate all existing roadways, railways, drainage facilities and utility services above, upon, or under the Project site, said roadways, railways, drainage facilities and utilities being referred to in this Sub-section as the "utilities". Contractor shall contact the owners of all Utilities to determine the necessity for relocating or temporarily interrupting any Utilities during the construction of the Project. Contractor shall schedule and coordinate its Work around any such relocation or temporary service interruption. Contractor shall be responsible for properly shoring, supporting and protecting all Utilities at all times during the course of the Work. The Contractor shall conduct his work at all times such that adequate drainage is provided and shall not interfere with or block existing drainage facilities such as gutters, ditches, storm drains, or other drainage appurtenances. Existing fire hydrants adjacent to the project shall be kept accessible for fire apparatus at all times and no material or equipment shall be placed within 25 feet of any hydrant.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

- A. Starting Work: Start Work within 10 calendar days following the date stated in the Notice to Proceed and execute with such progress as may be required to prevent delay to other contractors or to the general completion of the project. Execute Work at such items and in or on such parts of the project, and with such forces, material and equipment, as to complete the Work in the time established by the Contract. At all times, schedule and direct the Work so that it provides an orderly progression to completion within the specified time for completion. The Contractor shall obtain all necessary building permits prior to commencement of work. The Contractor shall become totally familiar with the requirements of all permits prior to start of work.

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- B. Intent of Contract Documents: It is the intent of the Contract Documents to describe a functionally complete project (or portion thereof) to be constructed in accordance with the Contract Documents. Any work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result shall be supplied whether or not specifically called for. When words which have a well known technical or trade meaning are used to describe work, materials or equipment, such works shall be interpreted in accordance with that meaning. Reference to standards specifications, manuals or codes of any technical society, organization or association or to the laws or regulations of any governmental authority having jurisdiction over the Project, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, law or regulation in affect at the time the Work is performed, except as may be otherwise specifically stated herein.

If before or during the performance of the Work Contractor discovers a conflict, error or discrepancy in the Contract Documents, Contractor immediately shall report same to the Engineer in writing and before proceeding with the Work affected thereby shall obtain a written interpretation or clarification from the Engineer. Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to Contractor with the Contract Documents before commencing any portion of the Work.

Drawings are intended to show general arrangements, design and extent of work and are not intended to serve as shop drawings. Specifications are separated into divisions for convenience of reference only and shall not be interpreted as establishing divisions for the Work, trades, subcontracts, or extent of any part of the Work. In the event of a discrepancy between or among the drawings, specifications or other Contract Document provisions, Contractor shall be required to comply with the provision which is the more restrictive or stringent requirement upon the Contractor, as determined by the Engineer. Unless otherwise specifically mentioned, all anchors, bolts, screws, fittings, fillers, hardware, accessories, trim and other parts required in connection with any portion of the Work to make a complete, serviceable, finished and first quality installation shall be furnished and installed as part of the Work, whether or not called for by the Contract Documents.

- C. Investigation and Utilities: Contractor shall have the sole responsibility of satisfying itself concerning the nature and location of the Work and the general and local conditions, and particularly, but without limitation, with respect to the following: those affecting transportation, access, disposal, handling and storage of materials; availability and quality of labor; water and electric power; availability and condition of roads; work area; living facilities; climatic conditions and seasons; physical conditions at the work-site and the project area as a whole; topography and ground surface conditions; nature and quantity of the surface materials to be encountered; subsurface conditions; equipment and facilities needed preliminary to and during performance of the Work; and all other costs associated with such performance. The failure of Contractor to acquaint itself with any applicable conditions shall not relieve Contractor from any of its responsibilities to perform under the Contract Documents, nor shall it be considered the basis for any claim for additional time or compensation.
- D. Schedule: The Contractor, within ten (10) calendar days after receipt of the Notice of Award, shall prepare and submit to the Engineer, for review and approval, a progress

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schedule for the Project (herein "Progress Schedule"). The Progress Schedule shall relate to all Work required by the Contract Documents and shall provide for expeditious and practicable execution of the Work within the Contract Time. The Progress Schedule shall indicate the dates for starting and completing the various stages of the Work.

The Progress Schedule shall be updated monthly by the Contractor. All monthly updates to the Progress Schedule shall be subject to the Engineer's review and approval. Contractor shall submit the updates to the Progress Schedule with its monthly Applications for Payment noted below. The Engineer's review and approval of the submitted Progress Schedule updates shall be a condition precedent to the City's obligation to pay Contractor.

- E. Submittals and Substitutions: Contractor shall carefully examine the Contract Documents for all requirements for approval of materials to be submitted such as shop drawings, data, test results, schedules and samples. Contractor shall submit all such materials at its own expense and in such form as required by the Contract Documents in sufficient time to prevent any delay in the delivery of such materials and the installation thereof.

Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular supplier, the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other suppliers may be accepted by the City if sufficient information is submitted by Contractor to allow the City to determine that the material or equipment proposed is equivalent or equal to that named. Requests for review of substitute items of material and equipment will not be accepted by the City from anyone other than Contractor and all such request must be submitted by Contractor to the Engineer within thirty (30) calendar days after Notice of Award is received by Contractor.

If Contractor wishes to furnish or use a substitute item of material or equipment, Contractor shall make application to the Engineer for acceptance thereof, certifying that the proposed substitute shall perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The application shall state that the evaluation and acceptance of the proposed substitute will not prejudice Contractor's achievement of substantial completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with the City for the Project) to adapt the design to the proposed substitute and whether or not the incorporation or use by the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service shall be indicated. The application also shall contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs for redesign and claims of other contractors affected by the resulting change, all of which shall be considered by the Engineer in evaluating the proposed substitute. The Engineer may require Contractor to furnish at Contractor's expense additional data about the proposed substitute.

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If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to the Engineer, if Contractor submits sufficient information to allow the Engineer to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedures for submission to and review by the Engineer shall be the same as those provided herein for substitute materials and equipment.

The Engineer shall be allowed a reasonable time within which to evaluate each proposed substitute. The Engineer shall be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without the Engineer's and the City's prior written acceptance which shall be evidenced by either a Change Order or an approved Shop Drawing. The City may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

- F. Daily Reports, As-Builts and Meetings: Unless waived in writing, the Contractor shall complete and submit to the Engineer on a weekly basis a daily log of the Contractor's work for the preceding week in a format approved by the Engineer. The daily log shall document all activities of Contractor at the Project site including, but not limited to, the following:
1. Weather conditions showing the high and low temperatures during work hours, the amount of precipitation received on the Project site, and any other weather conditions which adversely affect the Work;
 2. Soil conditions which adversely affect the Work;
 3. The hours of operation by Contractor's and subcontractor's personnel;
 4. The number of Contractor's and subcontractor's personnel present and working at the Project site, by subcontract and trade;
 5. All equipment present at the Project site, description of equipment use and designation of time equipment was used (specifically indicating any down time);
 6. Description of Work being performed at the Project site;
 7. Any unusual or special occurrences at the Project site;
 8. Materials received at the Project site;
 9. A list of all visitors to the Project site; and
 10. Any problems that might impact either the cost or quality of the Work or the time of performance.

The daily log shall not constitute nor take the place of any notice required to be given by Contractor to the City pursuant to the Contract Documents.

Contractor shall maintain in a safe place at the Project site one record copy of the Contract Documents, including, but not limited to, all drawings, specifications, addenda, amendments, Change Orders, Work Directive Changes and Field Orders, as well as all written interpretations and clarifications issued by the Engineer, in good order and annotated to show all changes made during construction. The annotated drawings shall be continuously updated by the Contractor throughout the prosecution of the Work to accurately reflect all field changes that are made to adapt the Work to field conditions, changes resulting from Change Orders, Work Directive Changes and Field Orders, and all concealed and buried installations of piping, conduit and utility services. All buried

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and concealed items, both inside and outside the Project site, shall be accurately located on the annotated drawings as to depth and in relationship to not less than two (2) permanent features (e.g. interior or exterior wall faces). The annotated drawings shall be clean and all changes, corrections and dimensions shall be given in a neat and legible manner in a contrasting color. The "As-Built" record documents, together with all approved samples and a counterpart of all approved shop drawings shall be available to the Engineer for reference. Upon completion of the Work and as a condition precedent to the Contractor's entitlement to final payment, these "As-Built" record documents, samples and shop drawings shall be delivered to the Engineer by Contractor.

Contractor shall keep all records and supporting documentation which concern or relate to the Work hereunder for a minimum of five (5) years from the date of termination of this Agreement or the date the Project is completed, whichever is later. The City, or any duly authorized agents or representatives of the City, shall have the right to audit, inspect and copy all such records and documentation as often as they deem necessary during the period of this Agreement and during the five (5) year period noted above; provided, however, such activity shall be conducted only during normal business hours.

- G. Contract Time and Time Extensions: Should Contractor be obstructed or delayed in the prosecution of or completion of the Work as a result of unforeseeable causes beyond the control of the Contractor, and not due to its fault or neglect, including but not restricted to acts of God or of the public enemy, acts of government, fires, floods, epidemics, quarantine regulation, strikes or lockouts, Contractor shall notify the City in writing within forty-eight (48) hours after the commencement of such delay, stating the cause or causes thereof, or be deemed to have waived any right which Contractor may have had to request a time extension.

No interruption, interference, inefficiency, suspension or delay in the commencement or progress of the Work from any cause whole or in part, shall relieve Contractor of his duty to perform or give rise to any right to damages or additional compensation from the City. Contractor expressly acknowledges and agrees that it shall receive no damages for delay. Contractor's sole remedy, if any, against the City will be the right to seek an extension to the Contract Time; provided, however, the granting of any such time extension shall not be a condition precedent to the aforementioned "No Damage For Delay" provision. This paragraph shall expressly apply to claims for early completion, as well as to claims based on late completion.

- H. Changes in Work: The City shall have the right at any time during the progress of the Work to increase or decrease the Work. Promptly after being notified of a change, Contractor shall submit an itemized estimate of any cost or time increases or savings it foresees as a result of the change. Except in an emergency endangering life or property, or as expressly set forth herein, no addition or changes to the Work shall be made except upon written order of the City, and the City shall not be liable to the Contractor for any increased compensation without such written order.
- I. Claims and Disputes: A claim is a demand or assertion by one of the parties seeking an adjustment or interpretation of the terms of the Contract Documents, payment of money, extension of time or other relief with respect to the terms of the Contract

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Documents. The term "Claim" also includes other disputes and matters in question between the City and Contractor arising out of or relating to the Contract Documents.

The responsibility to substantiate a Claim shall rest with the party making the Claim.

Claims by the Contractor shall be made in writing to the City within forty-eight (48) hours after the first day of the event giving rise to such Claim or else the Contractor shall be deemed to have waived the Claim. Written supporting data shall be submitted to the City within fifteen (15) calendar days after the occurrence of the event, unless the City grants additional time in writing, or else the Contractor shall be deemed to have waived the Claim.

The Contractor shall proceed diligently with its performance as directed by the City, regardless of any pending claim, action, suit or administrative proceeding, unless otherwise agreed to by the City in writing. The City shall continue to make payments in accordance with the Contract Documents during the pendency of any Claim.

- J. Other Work: The City may perform other work related to the Project at the site by the City's own forces, have other work performed by utility owners or let other direct contracts. If the fact that such other work is to be performed is not noted in the Contract Documents, written notice thereof will be given to Contractor prior to starting any such other work. If Contractor believes that such performance will involve additional expense to Contractor or require additional time, Contractor shall send written notice of that fact to the City within forty-eight (48) hours of being notified of the other work. If the Contractor fails to send the above required forty-eight (48) hour notice, the Contractor will be deemed to have waived any rights it otherwise may have had to seek an extension to the Contract Time or adjustment to the Contract Amount.

Contractor shall afford each utility owner and other contractor who is a party to such a direct contract (or the City, if the City is performing the additional work with the City's employees) proper and safe access to the site and a reasonable opportunity for execution of such work and shall properly connect and coordinate its Work with theirs. Contractor shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of the Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this paragraph are for the benefit of such utility owners and other Contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between the City and such utility owners and other contractors.

If any part of Contractor's Work depends for proper execution or results upon the work of any other contractor or utility owner (or the City), Contractor shall inspect and promptly report to the Engineer in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results.. Contractor's failure to report will constitute an acceptance of the other work as fit and proper for integration with Contractor's Work.

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- K. Compliance with Laws: Contractor agrees to comply, at its own expense, with all federal, state and local laws, codes, statutes, ordinances, rules, regulations and requirements applicable to the Project, including but not limited to those dealing with taxation, worker's compensation, equal employment and safety (including, but not limited to, the Trench Safety Act, Chapter 553, Florida Statutes); and Asbestos-containing materials. If contractor observes that the Contract Documents are at variance therewith, it shall promptly notify the Engineer in writing.
- L. Assignment: Contractor shall not assign this Agreement or any part thereof, without the prior consent in writing of the City. If Contractor does, with approval, assign this Agreement or any part thereof, it shall require that its assignee be bound to it and to assume toward Contractor all of the obligations and responsibilities that Contractor has assumed toward the City.
- M. Permits, Licenses and Taxes: Pursuant to Section 218.80, F.S., the City will pay for all permits and fees, including license fees, permit fees, impact fees or inspection fees applicable to the work through an internal budget transfer(s). Contractor is not responsible for paying for permits issued by The City of Naples, but is responsible for acquiring all permits.

All permits, fees and licenses necessary for the prosecution of the Work which are not issued by the City shall be acquired and paid for by the Contractor unless otherwise noted.

- N. Termination for Default: Contractor shall be considered in material default of the Agreement and such default shall be considered cause for the City to terminate the Agreement, in whole or in part, as further set forth in this Section, if Contractor: (1) fails to begin the Work under the Contract Documents within the time specified herein; or (2) fails to properly and timely perform the Work as directed by the Engineer or as provided for in the approved Progress Schedule; or (3) performs the Work unsuitably or neglects or refuses to remove material or to correct or replace such Work as may be rejected as unacceptable or unsuitable; or (4) discontinues the prosecution of the Work; or (5) fails to resume Work which has been suspended within a reasonable time after being notified to do so; or (6) becomes insolvent or is declared bankrupt, or commits any act of bankruptcy; or (7) allows any final judgment to stand against it unsatisfied for more than ten (10) days; or (8) makes an assignment for the benefit of creditors; or (9) fails to obey any applicable codes, laws, ordinances, rules or regulations with respect to the Work; or (10) materially breaches any other provision of the Contract Documents.

The City shall notify Contractor in writing of Contractor's default(s). If the City determines that Contractor has not remedied and cured the default(s) within seven (7) calendar days following receipt by Contractor of said written notice, then the City, at its option, without releasing or waiving its rights and remedies against the Contractor's sureties and without prejudice to any other right or remedy it may be entitled to hereunder or by law, may terminate Contractor's right to proceed under the Agreement, in whole or in part, and take possession of all or any portion of the Work and any materials, tools, equipment, and appliances of Contractor, take assignments of any of Contractor's subcontracts and purchase orders, and complete all or any portion of Contractor's Work by whatever means, method or agency which the City, in its sole discretion, may choose.

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If the City deems any of the foregoing remedies necessary, Contractor agrees that it shall not be entitled to receive any further payments hereunder until after the Project is completed. All monies expended and all of the costs, losses, damages and extra expenses (including Engineer and attorney's fees) or damages incurred by The City incident to such completion, shall be deducted from the Contract Amount, Contractor agrees to pay promptly to the City on demand the full amount (including appeals) and interest thereon at the maximum legal rate of interest until paid. If the unpaid balance of the Contract Amount exceeds all such costs, expenditures and damages incurred by the City to complete the Work, such excess shall be paid to the Contractor. The amount to be paid to the Contractor, shall be approved by the Engineer, upon application, and this obligation for payment shall survive termination of the Agreement.

The liability of Contractor hereunder shall extend to and include the full amount of any and all sums paid, expenses and losses incurred, damages sustained, and obligations assumed by The City in good faith under the belief that such payments or assumptions were necessary or required, in completing the Work and providing labor, materials, equipment, supplies, and other items therefore or re-letting the Work, and in settlement, discharge or compromise of any claims, demands suits, and judgments pertaining to or arising out of the work hereunder.

If, after notice of termination of contractor's right to proceed pursuant to this Section, it is determined for any reason that Contractor was not in default, or that its default was excusable, or that the City is not entitled to the remedies against Contractor provided herein, then Contractor's remedies against the City shall be the same as and limited to those afforded Contractor under "Completion" section below.

- O. Termination for Convenience and Right of Suspension: The City shall have the right to terminate this Agreement without cause upon seven (7) calendar days written notice to Contractor. In the event of such termination for convenience, Contractor's recovery against the City shall be limited to that portion of the Contract Amount earned through the date of termination, together with any retainage withheld and reasonable termination expenses incurred, but Contractor shall not be entitled to any other or further recovery against the City, including, but not limited to, damages or any anticipated profit on portions of the Work not performed.

The City shall have the right to suspend all or any portions of the Work upon giving Contractor not less than two (2) calendar days' prior written notice of such suspension. If all or any portion of the Work is so suspended, Contractor's sole and exclusive remedy shall be to seek an extension of time to its schedule in accordance with the procedures set forth in the Contract Documents. In no event shall the Contractor be entitled to any additional compensation or damages. Provided, however, if the ordered suspension exceeds six (6) months, the Contractor shall have the right to terminate the Agreement with respect to that portion of the Work which is subject to the ordered suspension.

- P. Completion: When the entire Work (or any portion thereof designated in writing by the City) is ready for its intended use, Contractor shall notify the Engineer in writing that the entire Work (or such designated portion) is substantially complete and request that the Engineer issue a Certificate of Substantial Completion (or Certificate of Partial

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Substantial Completion). Within a reasonable time thereafter, the City, Contractor and Engineer shall make an inspection of the Work (or designated portion thereof) to determine the status of completion. If the City and Engineer do not consider the Work (or designated portion) substantially complete, the Engineer shall notify Contractor in writing giving the reasons therefore. If the City and Engineer consider the Work (or designated portion) substantially complete, the Engineer shall prepare and deliver to Contractor a Certificate of Substantial Completion (or Certificate of Partial Substantial Completion) which shall fix the date of Substantial Completion for the entire Work (or designated portion thereof) and include a tentative punchlist of items to be completed or corrected by Contractor before final payment. The City shall have the right to exclude Contractor from the Work and Project site (or designated portion thereof) after the date of Substantial Completion, but the City shall allow Contractor reasonable access to complete or correct items on the tentative punchlist.

Upon receipt of written certification by Contractor that the Work is completed in accordance with the Contract Documents and is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Engineer will make such inspection and, if he finds the Work acceptable and fully performed under the Contract Documents, he shall promptly issue a final Certificate for Payment, recommending that, on the basis of his observations and inspection, and the Contractor's certification that the Work has been completed in accordance with the terms and conditions of the Contract Documents, that the entire balance found to be due Contractor is due and payable. Neither the final payment nor the retainage shall become due and payable until Contractor submits: all data establishing payment or satisfaction of all obligations, such as receipts, releases and waivers of liens, arising out of the Contract Documents, to the extent and in such form as may be designated by the City. The City reserves the right to inspect the Work and make an independent determination as to the Work's acceptability, even though the Engineer may have issued his recommendations. Unless and until the City is completely satisfied, neither the final payment nor the retainage shall become due and payable.

- Q. Warranty: Contractor shall obtain and assign to the City all express warranties given to Contractor or any subcontractors by any materialmen supplying materials, equipment or fixtures to be incorporated into the project. Contractor warrants to the City that any materials and equipment furnished under the Contract Documents shall be new unless otherwise specified, and that all Work shall be of good quality, free from all defects and in conformance with the Contract Documents. Contractor further warrants to the City that all materials and equipment furnished under the Contract Documents shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturers, fabricators, suppliers or processors except as otherwise provided for in the Contract Documents. If, within one (1) year after final completion, any Work is found to be defective or not in conformance with the Contract Documents, Contractor shall correct it promptly after receipt of written notice from the City. Contractor shall also be responsible for and pay for replacement or repair of adjacent materials or Work which may be damaged as a result of such replacement or repair. These warranties are in addition to those implied warranties to which the City is entitled as a matter of law.
- R. Supervision and Superintendents: Contractor shall plan, organize, supervise, schedule, monitor, direct and control the work competently and efficiently, devoting such attention

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thereto and applying such skills and expertise as may be necessary to perform the work in accordance with the contract documents. Contractor shall be responsible to see that the finished work complies accurately with the Contract Documents. Contractor shall keep on the Work at all times during its progress a competent resident superintendent, who shall not be replaced without prior written notice to the Engineer except under extraordinary circumstances. The superintendent shall be Contractor's representative at the Project site and shall have authority to act on behalf of Contractor. All communications given to the superintendent shall be as binding as if given to the Contractor. The City shall have the right to direct Contractor to remove and replace its Project superintendent, with or without cause.

- S. Protection of Work: Contractor shall fully protect the Work from loss or damage and shall bear the cost of any such loss or damage until final payment has been made. If Contractor or any one for whom Contractor is legally liable for is responsible for any loss or damage to the Work, or other work or materials of the City or the City's separate contractors, Contractor shall be charged with the same, and any monies necessary to replace such loss or damage shall be deducted from any amounts due Contractor.

Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

Contractor shall not disturb any benchmark established by the Engineer with respect to the Project. If Contractor, or its subcontractors, agents or anyone for whom Contractor is legally liable, disturbs the Engineer's benchmark, Contractor shall immediately notify The City and Engineer. The Engineer shall reestablish the benchmark and Contractor shall be liable for all costs incurred by The City associated therewith.

- T. Emergencies: In the event of an emergency affecting the safety or protection of persons or Work or property at the Project site of adjacent thereto, Contractor, without special instructions or authorization from the City or Engineer is obligated to act to prevent threatened damage, injury or loss. Contractor shall give Engineer written notice within forty-eight (48) hours after the occurrence of the emergency, if Contractor believes that after the occurrence of the emergency, if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If the Engineer determines that a change in the Contract Documents is required because of the action taken in response to an emergency, a Change Order shall be issued to document the consequences of the changes or variations. If Contractor fails to provide the forty-eight (48) hour written notice noted above, the Contractor shall be deemed to have waived any right it otherwise may have had to seek an adjustment to the Contract Amount or an extension to the Contract Time.
- U. Project Meetings: Prior to the commencement of Work, the Contractor shall attend a preconstruction conference with the Engineer and others as appropriate to discuss the Progress Schedule, procedures for handling shop drawings and other submittals, and for processing Applications for Payment, and to establish a working understanding among the parties as to the Work. During the prosecution of the Work, the Contractor shall attend any and all meetings convened by the Engineer or the City with respect to the Project, when directed to do so. Contractor shall have its subcontractors and

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suppliers attend all such meetings (including the preconstruction conference) as may be directed by the City or Engineer.

- V. Traffic Control Plan: A traffic control plan to support the Contractor's operations shall be submitted at least 72 hours prior to commencing work that shall conform to the Florida Department of Transportation's "Manual on Traffic Control and Safe Practices" which shall be obtained by the Contractor at his expense.
- W. Hours of Work: Work within the travelled way of the project shall commence no earlier than 7:00 a.m. local time and be completed no later than 7:00 p.m. local time. Hours of work may be altered at any time at the discretion of the City.
- X. Tax Exemption: The City of Naples is exempt from the payment of sales or use tax. The tax exemption certificate number is: 85-8012621645C-0.

PART 4 SAFETY

- A. Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
 - 1. All employees on the Work and other persons and/or organizations who may be affected thereby;
 - 2. All the Work and materials and equipment to be incorporated therein, whether in storage on or off the Project site; and
 - 3. Other property on Project site or adjacent thereto, including trees, shrubs, walks, pavements, roadways, structures, utilities and any underground structures or improvements not designated for removal, relocation or replacement in the Contract Documents.
- B. Contractor shall comply with all applicable codes, laws, ordinances, rules and regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. Contractor shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of underground structures and improvements and utility-owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation or replacement of their property. Contractor's duties and responsibilities for the safety and protection of the Work shall continue until such time as the Work is completed and final acceptance of same by The City has occurred.
- C. Contractor shall designate a responsible representative at the Project site whose duty shall be the prevention of accidents. This person shall be Contractor's superintendent unless otherwise designated in writing by Contractor to The City.

END OF SECTION

SECTION 01026

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Explanation and Definitions
- B. Measurement
- C. Payment
- D. Schedule of Values

1.2 EXPLANATION AND DEFINITIONS

- A. The following explanation of the Measurement and Payment for the Bid Schedule items is made for information and guidance. The omission of reference to any item in this description shall not, however, alter the intent of the Bid Schedule or relieve the CONTRACTOR of the necessity of furnishing such as a part of the Contract. Measurement and payment for all Contract Items shall made be in accordance with this section or as modified by the Supplemental Terms and Conditions.

1.3 MEASUREMENT

- A. The quantities set forth in the bid form are approximate and are given to establish a uniform basis for the comparison of bids. The CITY reserves the right to increase or decrease the quantity of any class or portion of the work during the progress of construction in accord with the terms of the Contract.

1.4 PAYMENT

- A. Make payment for the items listed on the Bid Schedule on the basis of the work actually performed and completed, such work including but not limited to, the furnishing of all necessary labor, materials, equipment, transportation, clean up, restoration of disturbed areas, and all other appurtenances to complete the construction and installation of the work as shown on the drawings and described in the specifications..
- B. Unit prices are used as a means of computing the final figures for bid and Contract purposes, for periodic payments for work performed, for determining value of additions or deletions and wherever else reasonable.

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1.5 SCHEDULE OF VALUES

- A. Approval of Schedule: Submit for approval a preliminary schedule of values, in duplicate, for all of the Work. Prepare preliminary schedule in accordance with the General Conditions. Submit preliminary schedule of values within 10 calendar days after the Effective Date of the Agreement. Submit final schedule of values in accordance with the General Conditions.
- B. Format: Utilize a format similar to the Table of Contents of the Project Specifications. Identify each line item with number and title of the major specification. Identify site mobilization, bonds and insurance. Include within each line item, a direct proportional amount of CONTRACTOR's overhead profit.
- C. Revisions: With each Application for Payment, revise schedule to list approved Change Orders.

PART 2 PRODUCTS

Not Used

PART E EXECUTION

3.1 MEASUREMENT AND PAYMENT

- A. Make payment on the basis of work actually performed completing each item in the Bid, such work including, but not limited to, the furnishing of all necessary labor, materials, equipment, transportation, cleanup, and all other appurtenances to complete the construction and installation of the work to the configuration and extent as shown on the drawings and described in the specifications. Payment for each item includes compensation for cleanup and restorations. Cost of cleanup and surface restorations (including pavement replacement) will be considered as the percentage retained in accordance with the Contract Documents, and complete payment will not be made until cleanup, restorations and as-builts are completed.
 - 1. Mobilization: Payment for mobilization will be made for at the Contract lump sum price. This shall include all costs associated with mobilizing equipment and material to site and shall also contain performance and payment bond premiums and insurance.
 - 2. Maintenance of Traffic: Payment for maintenance of traffic in accordance with the CITY Maintenance of Traffic Policy will be made for at the Contract lump sum price. This item includes material and labor for all maintenance of traffic needed to complete the work, including commercial material for driveway maintenance.
 - 3. Preconstruction Audio/Video Recording: Measurement and payment for pre-construction audio/video recording shall be made at the contract LUMP SUM price. The work includes that necessary to document existing conditions on public and private property. The CONTRACTOR shall provide color videos showing pre-construction site conditions of all public and private property within the scope of construction. The videos shall be DVD format indicating on the disc cover the date,

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job title and location where the video was taken. The videos shall be clear and shall thoroughly document all existing structures and landscaping. Two copies of DVD (including original) shall be delivered to the City for review. Construction on private property shall not commence until the City has reviewed and approved the audio-video recording. The CONTRACTOR may be required to restore private properties to conditions better than existing, at no additional cost to the City, if the CONTRACTOR fails to sufficiently document existing conditions.

4. Stormwater Pollution Prevention Plan Implementation: Payment for implementing the Stormwater Pollution Prevention Plan in accordance with the Construction Plans and all NPDES Permitting requirements will be made at the Contract lump sum price.
 - i. This price includes, but is not limited to the use of hay bales, temporary swales, settling ponds, silt screens, and other appropriate methods as necessary to prevent soils and sediment from entering such areas. Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, public and private on- and off-site storm sewer inlets protectors, and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the CITY.
5. Permitting (Dewatering Permit, NPDES): Payment for submitting and obtaining Dewatering and NPDES Permits will be made at the Contract lump sum price.
 - i. This price includes preparing the applications, paying any associated fees and submitting the package and all associated drawings and requirements needed to obtain the permits to the appropriate governing agencies.
6. Utility Locates via Potholing: Payment for locating utilities will be made at the Contract lump sum price for locating utilities including labor, material, equipment and incidentals necessary to determine the horizontal and vertical location, type and size of an existing utility underground regardless of depth. Price is to also include potholing, soft dig, excavation locating, backfilling, pavement repair, cleanup, sodding, and all appurtenances. This item will also include locating the existing 10" force main along 8th St S between station 0+50 and 10th Ave S.
7. Abandonment, Removal/Disposal of Existing Pipes: Payment for abandonment removal and disposal of the existing storm concrete pipes not incidental to construction of new facilities, and that are delineated to be removed will be made at the Contract price per linear foot. Payment for removal and disposal of Asbestos-containing Cementitious pipe to achieve the utility conflict avoidance indicated on plans and per direction of the City Engineer will be made at the Contract price per linear foot. Payment for abandonment using grouting method of the existing stormwater pipes will be made at the cubic yard (of grout furnished) unit price.
 - i. This item includes the excavation, grout-fill, removal, safe handling and proper disposal of all excavated material required for the installation of the new storm drainage system. Existing pipe and structures may include asbestos cement, plastic, reinforced concrete, metal, concrete, sand, limerock, earthen fill, etc. and shall be abandoned or removed and disposed of as directed by the Engineer. All costs associated with this shall be included within this item. This item also

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includes the protection of structures or obstructions that are to remain in place, such as utilities, pavement, buildings, sewers, meters, drains, pipes, poles, etc. and , full restoration of the property above the pipes, plugs and incidentals required to grout the existing stormwater pipe in place.

- ii. Handling and disposal of asbestos containing cementitious pipe shall be performed in accordance with the Asbestos Work Plan as detailed in Section 02051 of the Specifications.
8. Sod Restoration: Payment for sod restoration will be made at the Contract unit price per square yard of sod replaced (sod type varies) for the following areas:
- 5 ft along the back of the reconstructed gutters along 8th Street S and 8th Ave S matching existing type of sod.
 - 5 ft on each side of the centerline of sanitary and water mains to be deflected, matching existing type of sod.
- i. This item includes all labor and materials required for removing and disposing existing sod and replacing sod within the limits specified above using like material; and repair and restoration of irrigation systems.
 - ii. This item does not include sod outside the limits specified above. Sod outside the limits specified above damaged during construction shall be restored to existing conditions matching existing type of sod, at no additional compensation. Sod associated with relocation of private utilities shall be included in the Utility conflict avoidance pay item.
9. Road Restoration: Payment for furnishing and performing road restoration activities will be made at the Contract per square yard price for milling, Type B Stabilization, Optional Base Group 6 and, Type S-III Surface Course; and Contract Lump sum price for Brick Paver/Concrete Crosswalks Restoration and for Striping and signage.
- i. Payment for restoration of street pavement surface and base will be made at the appropriate Materials and installation shall be per FDOT specifications.
 - ii. All pavement surface and base shall be replaced in accordance with the detail and typical cross sections shown on the Plans.
 - iii. All right-of-way restoration shall conform to the typical cross section and detail shown on the Plans.
 - iv. This item includes, but is not limited to restoration of all necessary pavement (and brick pavers) and crosswalk striping, signs, bituminous material tack coats, fire hydrant reflective markers and any other items required to restore the road to its operational level. Striping and signage shall be restored to existing conditions as recorded in the Pre-construction Audio/Video Recording.

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10. Concrete Valley Gutter Restoration: Payment for furnishing and installing the valley gutter (match existing) will be made at the appropriate Contract unit price per lineal foot of curb/gutter installed in the reconstruction of the valley gutter adjacent to the northbound lane along 8th St. S and the valley gutter adjacent to the eastbound lane along 8th Ave S between 7th St. S and 8th St. S.
 - i. Contractor shall repair and restore to existing conditions with like materials, at no additional compensation: driveways, hardscape and landscape areas, fence lines, sidewalks, mailboxes, irrigation systems, fire hydrants, sanitary sewer and water services, and other surface materials not specifically designated in the Bid that result damaged during construction.
11. Driveway and Swales Restoration: This item includes work required to improve or create new roadside swales for drainage within the City right-of-ways. Swales are to be constructed in accordance with direction by the Project Engineer in order to avoid negative impacts to the City or property owners (i.e. landscaping, or other appurtenances).
 - i. This item includes excavation, finish grading, driveway repair/replacement using like material per Project Engineer, placement of sod, and watering of sod (if not automatically irrigated). While the majority of the project requires Floratam/St. Augustine sod replacement, other sod types (i.e. Zoysia, Bermuda, Bahia, etc.) may be present sporadically throughout the project. Sod species shall match that of the fronting residential property.
12. Sidewalk Removal and Replacement (5' wide x 4" thick): Payment for new and/or replacement of concrete sidewalk due to installation of drainage or utility pipes will be made at the appropriate Contract unit price per lineal foot of concrete sidewalk installed in the work. This item includes all necessary measures to comply with ADA requirements, including, but not limited to providing detectable warning surfaces on ramps.
13. Furnish & Install Reinforced Concrete Drain Pipe: Payment for furnishing and installing concrete drain pipes (various sizes) will be made at the Contract unit price per lineal foot for the pipe in place. This item includes, but is not limited to clearing and disposal of trees and bushes, all necessary fittings, labor, equipment and materials for the furnishing and laying of the pipe, signs, maintenance of traffic, dewatering, excavation of all material encountered, including rock; disposal of excavated material not used for backfill, removal of street pavement surface, removal of existing pipes (if replacement of existing storm drain pipes is indicated on Plans); pipe bedding, bedding material, backfilling, sheeting, compaction and protection of existing facilities.

The construction area contains privately owned property such as irrigation systems, mailboxes and monuments within the rights-of-way that may not be marked on the plans. It will be the Contractor's responsibility to inspect the construction area and understand existing site conditions in conjunction with proposed construction requirements. The Contractor is responsible for budgeting for the removal, repair, and/or replacement of these privately owned items within the right-of-way that may be impacted by construction operations. These costs should be included within this item

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This item includes, but is not limited to, mailboxes, monuments, private irrigation systems, fences, columns, decoration, lighting, etc

Layout and configuration of drainage pipes shown on plans may be modified at no extra cost based on existing utilities field located by the Contractor, so that conflicts are avoided while keeping the minimum separations to storm and utility pipes specified on plans.

14. Furnish and Install Ditch Bottom Inlets (Type C): Payment for furnishing and installing standard precast catch basins will be made at the unit price per ditch bottom inlet acceptably installed.
 - i. This item includes all excavation, backfilling, compacted gravel or crushed stone bedding, sheeting, shoring, dewatering, concrete work and reinforcing, protection of adjacent facilities, inlet frames and grates, removal and disposal of existing inlets (if replacement of existing ditch bottom inlets is indicated on Plans) and all excavated material in excess of the needs for backfill; and all fittings and materials required to connect the inlets to existing concrete pipes (including acceptable replacement of segments of existing pipes adjacent to the new structure).
 - ii. All ditch bottom inlets shall conform to the inlet details shown on the Plans.
 - iii. Location and configuration of ditch bottom inlets shown on plans may be modified at no extra cost based on existing utilities field located by the Contractor, so that conflicts are avoided while keeping the minimum separations to storm and utility pipes specified on plans. Contractor shall submit shop drawings for approval prior to purchasing.

15. Furnish and Install Storm Manholes: Payment for furnishing and installing standard precast storm manholes will be made at the unit price per storm manhole acceptably installed.
 - i. This item includes all excavation, backfilling, compacted gravel or crushed stone bedding, sheeting, shoring, dewatering, concrete work and reinforcing, protection of adjacent facilities, inlet frames and grates/rims, removal and disposal of existing storm manholes (if replacement of existing storm manholes is indicated on Plans) and all excavated material in excess of the needs for backfill; and all fittings and materials required to connect the manholes to existing concrete pipes (including acceptable replacement of segments of existing pipes adjacent to the new structure).
 - ii. All junction boxes shall conform to the junction box detail shown on the Plans.
 - iii. Manhole top elevations shown on plans are approximate and should be adjusted to match final pavement elevations. Adjustments of grades shown on drawings may be necessary to conform to actual field conditions. Such adjustments shall be considered part of the job conditions and no extra compensation will be

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allowed for such changes. Such adjustments must be approved by the Engineer prior to being made.

- iv. Location and configuration of storm manholes shown on plans may be modified at no extra cost based on existing utilities field located by the Contractor, so that conflicts are avoided while keeping the minimum separations to storm and utility pipes specified on plans. Contractor shall submit shop drawings for approval prior to purchasing.
16. Furnish and Install Special Structure S-035: Payment for furnishing and installing this pre-cast or cast-in-place doghouse will be made at the Contract lump sum price.
- i. This structure will be constructed on top of the existing 72" RCP pipe. The top of the 72" pipe will be cut or otherwise removed down to elevation to be approved by the Engineer during shop drawing review.
 - ii. Contractor shall provide shop drawings signed and sealed by a professional engineer. Adjustments to the elevations shown on plans may be necessary to conform to actual field conditions located by the contractor.
17. Modify Existing Drainage Structures (Inlets/Manholes): Payment for furnishing and installing modifications to existing drainage inlets or storm manholes will be made at the Contract unit price per each structure acceptably modified. This item includes connecting new pipes to existing structures and removing connections to existing storm pipes. Connections will be added by core boring (size varies) the structure walls. Connections will be eliminated by plugging (size varies) the opening in the structure wall using brick and mortar.
- i. This item includes all excavation, backfilling, compacted gravel or crushed stone bedding, sheeting, shoring, dewatering, concrete work and reinforcing, protection of adjacent facilities, finished grading and all work required for a full, operable and complete installation.
18. Conflict Boxes: Payment for furnishing and installing standard precast Type "J" storm manholes will be made at the Contract unit price per conflict box acceptably installed. (Note: Actual number of conflict boxes will be determined after contractor has located the exact location of existing utilities and coordinated with the City Engineer and the Utility Companies)
- i. This item includes all excavation, including rock, backfilling, compacted gravel or crushed stone bedding, sheeting, shoring, dewatering, concrete work and reinforcing, protection of adjacent facilities, inlet frames and rims.
 - ii. All junction boxes shall conform to the junction box detail shown on the Plans.
 - iii. Water line deflections, if needed, will be paid separately as part of Utility Conflict Avoidance.
 - iv. Location and configuration of conflict boxes shown on plans may be modified at no extra cost based on existing utilities field located by the Contractor, so that

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conflicts are avoided while keeping the minimum separations to storm/utility pipes and the minimum unobstructed flow clearance (sump if needed) specified on plans. Contractor shall submit shop drawings for approval prior to purchasing.

- v. Top elevations shown on plans are approximate and should be adjusted to match final pavement elevations. Adjustments of grades shown on drawings may be necessary to conform to actual field conditions. Such adjustments shall be considered part of the job conditions and no extra compensation will be allowed for such changes. Such adjustments must be approved by the Engineer prior to being made.
19. Utility Conflict Avoidance: Payment for furnishing and installing a complete conflict crossing (pipe diameter varies) will be made at the appropriate Contract unit price per conflict crossing including pipe, fittings, valves, joint restraints, concrete work, excavation, including rock, backfilling, compaction and incidentals necessary for a complete installation as shown on the Drawings and as specified herein. This item includes:
- i. Coordination with City of Naples Utilities Department, replacement of sanitary and water lines within conflict box, by-pass pumping (for sanitary), detectable tape, cleanup, and other work for complete installation, as well as providing all necessary tests, including, but not limited to bacteriological samples, pressure tests, infiltration/exfiltration testing, etc. (Note: the City of Naples Utilities Department will make the hot taps. Contractor is responsible for all other costs).
 - ii. The 4" thick protective concrete pad and extra base material per typical section shown on plans; conversion of galvanized water services into polytube, conversion of water pipes in conflict to C900 and DIP; removal and disposal of existing pipes (other than AC pipes); and all improvements and restoration of sanitary manholes impacted by the conflict resolution efforts.
 - iii. Horizontal deflections of water mains not indicated on plans but requested by the City Engineer.
20. Furnish and Install Gate Valves: Payment for furnishing and installing gate valves (various sizes) will be made at the appropriate Contract unit price per each gate valve acceptably installed. This price shall all labor, equipment and materials, dewatering, excavation of all material encountered, including rock, thrust blocks, valve pads, valve box riser and fittings, compaction, removal of excess materials and protection of existing facilities.
- i. Contractor to submit shop drawings for approval prior to purchasing.
 - ii. This item does not include gate valves not shown on plans that may be requested by the City Engineer as part of the remedy of conflicts. These will be included in the Utility Conflict Avoidance pay item.
21. Connect 6" C900 to Existing 8" Water Main: Payment for furnishing and installing this connection located just north of 8th Ave S will be made at the Contract lump sum price.

22. Layout Survey and Final As-Built survey: This item includes construction layout and staking and final As-builts. Payment for executing these activities shall include, but not be limited to performing all calculations required and setting all stakes needed, such as offset stakes, reference point stakes, slope stakes and other reference marks or points necessary to provide lines and grades for construction of all improvements. The Contractor shall be responsible for the placement and preservation of adequate ties and reference to all control points, whether established by him or found on the project, necessary for the accurate reestablishment of all base lines or centerlines shown on the Plans. Also, as required by the SFWMD permit, place monumentation on the control structure for reference.

At the end of the project, the Contractor will submit to the City a certified as built site survey showing coordinates and elevations of the completed work. The as-built survey will locate and identify the elevation of all drainage structures and inlets. Information to be provided will include grates and inverts. Final as-built swale swale configuration and cross-sections will be provided at the completion of the work. A minimum of three (3) cross-sections will be provided for each swale and each detention area; to be located across both ends and across the swale mid-point. Maximum cross-section spacing under any circumstance will be based on a twenty-five (25) foot interval.

23. Allowance for Unforeseen Conditions: Refer to Section 01028 (Change Order Procedures) of the Technical Specifications.
24. Landscaping Allowance: It is understood that landscaping exists within the City rights of way. Landscaping may include a variety of well established trees of large sizes, as well as small shrubs and flowers. From time to time existing landscaping may be located within the area of proposed construction. Therefore, the Contractor and Project Engineer will communicate and otherwise coordinate on impacts to existing landscaping. Where landscaping cannot be protected and must be removed (as determined by the Project Engineer), the Project Engineer shall determine if landscaping replacement is necessary. The Project Engineer may request a quote from the Contractor to replace landscaping with similar size and species. This item has been established as a fixed amount to be used through authorization of the Project Engineer to replace landscaping.
- B. Prior to submitting first monthly Application for Payment, Contractor shall submit to Engineer, for review and approval, a schedule of values based upon the Contract Price, listing the major elements of the Work and the dollar value for each element. After its approval by the Engineer, this schedule of values shall be used as the basis for the Contractor's monthly Applications for Payment.
- C. Prior to submitting first monthly Application for Payment, Contractor shall submit to The City a complete list of all its proposed subcontractors and materialmen, showing the work and materials involved and the dollar amount of each proposed subcontract and purchase order. The first Application for payment shall be submitted no earlier than thirty (30) days after the Commencement Date.

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- D. If payment is requested on the basis of materials and equipment not incorporated into the Project, but delivered and suitably stored at the site or at another location agreed to by the City in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that the City has received the materials and equipment free and clear of all liens, charges, security interests and encumbrances, together with evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the City's interest therein, all of which shall be subject to the City's satisfaction.
- E. Contractor shall submit two (2) copies of its monthly Application for Payment to the Engineer on or before the 25th day of each month for work performed during the previous month. Invoices received after the 25th day of each month shall be considered for payment as part of the next month's application. Within ten (10) calendar days after receipt of each Application for Payment, the Engineer shall either:
1. indicate his approval of the requested payment;
 2. indicate his approval of only a portion of the requested payment, stating in writing his reasons therefore; or
 3. return the Application for Payment to the Contractor indicating, in writing, the reason for refusing to approve payment.

In the event of a total denial and return of the Application for Payment by the Engineer, the Contractor may make the necessary corrections and resubmit the Application for Payment. The City shall, within thirty (30) calendar days after the Engineer's approval of an Application for Payment, pay the Contractor the amounts so approved. Provided, however, in no event shall the City be obligated to pay any amount greater than that portion of the Application for Payment approved by the Engineer.

- F. The City shall retain ten (10%) of the gross amount of each monthly payment request or ten percent (10%) of the portion thereof approved by the Engineer for payment, whichever is less. Such sum shall be accumulated and not released to the Contractor until final payment is due.
- G. Monthly payments to Contractor shall in no way imply approval or acceptance of Contractor's work.
- H. Contractor agrees and understands that funding limitations exist and that the expenditure of funds must be spread over the duration of the Project at regular intervals based on the Contract Amount and Progress Schedule. Accordingly, prior to submitting its first monthly Application for Payment, Contractor shall prepare and submit for the Engineers review and approval, a detailed Project Funding Schedule, which shall be updated as necessary and approved by the City to reflect approved adjustments to the Contract Amount and Contract Time. No voluntary acceleration or early completion of the Work shall modify the time of payments to Contractor as set forth in the approved Project Funding Schedule.

3.2 PAYMENTS WITHHELD

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- A. The Engineer may decline to approve any Application for Payment, or portions thereof, because of subsequently discovered evidence or subsequent inspections. The Engineer may nullify the whole or any part of any approval for payment previously issued and the City may withhold any agreement between the City and Contractor, to such an extent as may be necessary in the City's opinion to protect it from loss because of:
1. Defective Work not remedied;
 2. Third party claims filed or reasonable evidence indicating probable filing of such claims
 3. Failure of Contractor to make payment properly to subcontractors or for labor, materials or equipment;
 4. Reasonable doubt that the Work can be completed for the unpaid balance of the Contract Amount;
 5. Reasonable indication that the Work will not be completed within the Contract Time;
 6. Unsatisfactory prosecution of the Work by the Contractor; or
 7. Any other material breach of the Contract Documents.
- B. If the unsatisfactory conditions are not remedied or removed, the City may, after three (3) days written notice, rectify the same at Contractor's expense. The City also may offset against any sums due Contractor the amount of any liquidated or unliquidated obligations of Contractor whether relating to or arising out of this Agreement or any other agreement between Contractor and the Engineer.

3.3 FINAL PAYMENT

- A. The City shall make final payment to Contractor within thirty (30) calendar days after the Work is finally inspected and accepted by both the City and the Engineer in accordance with Section 20.1 herein provided that Contractor first, and as an explicit condition precedent to the accrual of Contractor's right to final payment, shall have furnished the City with any and all documentation that may be required by the Contract Documents and the city.
- B. Contractor's acceptance of final payment shall constitute a full waiver of any and all claims by Contractor against the City arising out of this Agreement or otherwise relating to the Project, except those previously made in writing and identified by Contractor as unsettled at the time of the final Application for Payment. Neither the acceptance of the Work nor payment by the City shall be deemed to be a waiver of the City's right to enforce any obligations of Contractor hereunder or to the recovery of damages for defective Work not discovered by the Engineer at the time of final inspection.

END OF SECTION

SECTION 01028

CHANGE ORDER PROCEDURES

1.01 SCOPE

A. **This Section describes the procedures for processing Change Orders by the Professional and the Contractor.**

1.02 CHANGE ORDER PROCEDURES

A. Change Proposed by Professional: The Professional may issue a Proposal Request to the Contractor which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications and a change in Contract Time for executing the change. The Contractor will prepare and submit an estimate within ten (10) days.

B. Change Proposed by Contractor: The Contractor may propose a change by submitting a request for change to the Professional, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other Contractors.

C. Contractor's Documentation:

1. Maintain detailed records of Work completed on a time and material basis. Provide full information required for evaluation of proposed changes, and substantiate costs of changes in the Work.
2. Document each quotation for a change in cost or time with sufficient data allowing evaluation of the quotation.
3. On request, provide additional data to support computations:
 - a. Quantities of products, labor, and equipment
 - b. Taxes, insurance and bonds
 - c. Overhead and profit
 - d. Justification for any change in Contract Time
 - e. Credit for deletions from Contract, similarly documented
4. Support each claim for additional costs, and for Work completed on a time and material basis, with additional information:
 - a. Origin and date of claim
 - b. Dates and times work was performed and by whom
 - c. Time records and wage rates paid
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

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- D. Construction Change Directive:** The Professional may issue a document, approved by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. The document will describe changes in the Work, and will designate method of determining any change in Contract Sum or Contract Time. The change in Work will be promptly executed.
- E. Format:** The Professional will prepare five (5) originals of the Change Order using the *Change Order Form*.
- F. Types of Change Orders:**
- 1. Stipulated Sum Change Order:** Based on Proposal Request and Contractor's fixed price quotation, or Contractor's request for a Change Order as approved by the Professional.
 - 2. Unit Price Change Order:** For pre-determined unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work which are not predetermined, execute Work under a Construction Change Directive. Changes in Contract Sum or Contract Time will be computed as specified for Time and Material Change Order.
 - 3. Time and Material Change Order:** Submit itemized account and supporting data after completion of change, within time limits indicated in the Standard Form of Agreement Between the Owner and the *Contractor*. The Professional will determine the change allowable in Contract Sum and Contract Time as provided in the Contract Documents. The Contractor shall maintain detailed records of Work accomplished on Time and Material basis and shall provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
- G. Execution of Change Order:** The Professional will issue Change Orders for signatures of parties as provided in the Standard Form of Agreement Between the Owner and the Contractor. Final execution of all Change Orders requires approval by the Owner.
- H. Correlation of Contractor Submittals:** The Contract shall promptly revise *Schedule of Values* and the *Application for Payment* forms to record each authorized Change Order as a separate line item and adjust the Contract Sum. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust time for other items of Work affected by the change and resubmit. Promptly enter changes in Project Record Documents.

END OF SECTION

SECTION 01045

CONNECTIONS TO EXISTING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General Requirements
- B. Submittals
- C. Scheduling of Shutdown

1.2 RELATED SECTIONS

- A. Section 01110 - Summary of Work
- B. Section 01500 - Construction Facilities and Temporary Controls
- C. Section 01570 – Traffic Regulations and Public Safety
- D. Section 02575 – Repair and Restoration of Pavement, Sidewalk, etc.

1.3 GENERAL REQUIREMENTS

- A. Be responsible for all connections to existing systems, cutting, fitting and patching, including attendant excavation and backfill, required to complete the work or to:
 - 1. Make its several parts fit together properly.
 - 2. Uncover portions of the work to provide for installation of ill-timed work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace work not conforming to requirements of Contract Documents.
- B. Coordination: Before connection is performed, verify and provide for any pipe restraint that may be required for the new connection. Perform all cutting, fitting or patching of the Work that may be required to make the several parts thereof join in accordance with the Contract Documents. Perform restoration with competent workmen skilled in the trade.
- C. If changes to a “looped” water distribution system occurring during construction result in dead ends to any new or relocated water mains, connect such dead ends to the nearest water main. In cases where no nearby water main is available, provide a flushing device in coordination with the CITY at no additional cost to the CITY.

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- D. Improperly Timed Work: Perform all cutting and patching required to install improperly timed work, to remove samples of installed materials for testing, and to provide for alteration of existing facilities or for the installation of new Work in the existing construction.
- E. Limitations: Except when the cutting or removal of existing construction is specified or indicated, do not undertake any cutting or demolition, which may affect the structural stability of the Work or existing facilities without the CONSULTANT's concurrence.
- F. City of Naples Damage Prevention Policy: This policy has been put in place to avoid damage to CITY underground utilities. A minimum distance of five feet (5') horizontally and eighteen inches (18") vertically must be maintained away from CITY utilities. Any and all variations from this order must be approved by the Water or Wastewater Department. **Before commencement of any excavation, the existing underground utilities in the area affected by the work must be marked by Sunshine State One Call after proper notification to them by either calling 80014324770 or emailing www.callsunshine.com. Before commencing excavation for the work, potholing of all potential conflicts must be performed.** All lines in conflict must be physically located by the contractor and verified by CITY Locate Department personnel before performing work. Utilities under concrete or pavement may require soft dig vacuum locates which also is the contractor's responsibility to perform. All utilities will be field marked per Sunshine State One Call's statutes and guidelines. For line verification or any other information concerning locates, please call the Locate Department at 239 - 213-4717 during normal business hours. For line verification or emergency locates after hours, call emergency number 239 213-4717. **In the event the potholing and/or vacuum soft dig does not locate the marked utility, work must be stopped and the affected utility owner contacted.** Failure to comply with this policy and obtain required signature(s) may result in delay or denial of permit.

The Contractor will be required to take every precaution to guard against any or all damages to existing structures, pipe lines, and equipment of the City water, sewer, or reuse system from any cause whatsoever in the prosecution of the work. All work shall be planned and executed in such a manner by the Contractor as to absolutely insure the regular and continuous operation of the waterworks system insofar as same may be affected by the Contractor's operations; and the sequence of operations of the Contractor in providing for and executing the work shall be at all times subject to the approval of the Engineer of Record and City, insofar as the operation of the abovementioned system may be affected. Such approval of the EOR shall in no way relieve the Contractor of his responsibility for providing all and adequate means of guaranteeing the continuous, uninterrupted operation of the City utility systems. Any damage done to any City main or facility shall be reported to Public Works immediately by calling 253-5813 and 213-4717. Any such damage shall be the direct responsibility of the Contractor and such damage shall be restored, replaced, or repaired per City direction by the Contractor at no expense to the City. See also Section 01500, 1.8.B.

1.4 SUBMITTALS

- A. Submit a written request to the CONSULTANT well in advance of executing any cutting or alteration which affects:

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1. Work of the CITY or any separate contractor.
 2. Structural value or integrity of any element of the project or work.
 3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
 4. Efficiency, operational life, maintenance or safety of operational elements.
 5. Visual qualities of sight-exposed elements.
- B. Include in request:
1. Identification of the work.
 2. Description of affected work.
 3. The necessity for cutting, alteration or excavation.
 4. Effect on work of the CITY or any separate contract, or on structural or weatherproof integrity of work.
 5. Description of proposed work:
 - a. Scope of cutting, patching, alteration, or excavation.
 - b. Trades who will execute the work.
 - c. Products proposed to be used.
 - d. Extent of refinishing to be done.
 6. Alternatives to cutting and patching.
 7. Cost proposal, when applicable.
 8. Written permission of any separate contractor whose work will be affected.
- C. SUBMIT WRITTEN NOTICE TO THE CONSULTANT DESIGNATING THE DATE AND THE TIME THE WORK WILL BE UNCOVERED.

1.5 SCHEDULING OF SHUTDOWN

- A. Connections to Existing Facilities: If any connections, replacement, or other work requiring the shutdown of an existing facility is necessary, schedule such work at times when the impact on the CITY's normal operation is minimal. If shutdown involves the water distribution or transmission system, provide notice to the CITY at least two (2) weeks prior to the proposed shutdown, including date, time and anticipated length of interruption of service. Overtime, night and weekend work without additional compensation from the CITY, may be required to make these

EXHIBIT A

connections, especially if the connections are made at times other than those specified. The connection of new or existing pipelines is prohibited from starting until CONTRACTOR assures that the system can receive the new flow.

- B. Interruptions of Service: Perform cut-ins into lines at a time approved in writing by the CITY. Whenever it is required to turn off valves which may interrupt the water supply of residents or businesses, notify all concerned parties or agencies with personal contact, door hangers or written notice at least forty-eight (48) hours in advance of such cut-off, after having obtained the approval of the CITY. Provide a copy of the written notice to the CITY by fax. ONLY CITY PERSONNEL MAY OPERATE CITY-OWNED VALVES. Maintain water service to existing connections during construction, under any and all conditions and at no additional cost to the CITY. Thoroughly clean and swab all pipe and fittings for cut-ins with a concentrated solution of calcium hypochlorite.
- C. Request for Water System Shutdowns: When plans call for connection to existing water distribution facilities or the CONTRACTOR plans to shut down existing utilities or where damage to such facilities is likely in order to complete construction of items under this contract, furnish the CITY with a written request for connection and shutdown valving plan. The CITY will identify the locations of all water valves needed to isolate the point of connection in the event that the existing facilities are damaged while making the connection. Identify in the request the valves, bypass piping, portable pumper trucks or any other means which the CONTRACTOR proposes to use in order to provide effective shutdown of the system. Include in a connection and shutdown schedule details of shutdown time and duration. Begin no connections, or construction where shutdown of or damage to existing utilities may occur, prior to CITY approval of the connection and shutdown plan and schedule.
- D. Request for Wastewater Diversion: Submit a request for each diversion necessary during construction to the CITY and the CONSULTANT sufficiently in advance of any required diversion. Identify in the request the valves, bypass piping, portable pumper trucks or any other means which the CONTRACTOR proposes to use in order to provide effective shutdown of the system. Include in a connection and shutdown schedule details of shutdown time and duration. Begin no connections, or construction where shutdown of or damage to existing utilities may occur, prior to CITY approval of the connection and shutdown plan and schedule.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Comply with specifications and standards for each specific product involved.

PART 3 EXECUTION

3.1 INSPECTION

- A. Inspect existing conditions of projects, including elements subject to damage or to movement during cutting and patching.

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- B. After uncovering work, inspect conditions affecting installation of products, or performance of the work.
- C. Report unsatisfactory or questionable conditions to the CONSULTANT in writing; do not proceed with work until the CONSULTANT has provided further instructions.

3.2 PREPARATION

- A. In cases where service to utility customers is interrupted, provide adequate equipment with backup onsite to assure prompt restoration of service.
- B. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of work.
- C. Provide devices and methods to protect other portions of project from damage.
- D. Provide protection from elements for that portion of the project that may be exposed by cutting and patching work, and maintain excavations free from water.
- E. Material Removal: Cut and remove all materials to the extent shown or as required to complete the Work. Remove materials in a careful manner with no damage to adjacent facilities. Remove materials that are not salvageable from the site.

3.3 PERFORMANCE

- A. Execute cutting and demolition by methods that will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.
- B. Execute excavating and backfilling by methods which will prevent settlement or damage to other work.
- C. Employ original installer or fabricator to perform cutting and patching for:
 - 1. Weather-exposed or moisture-resistant elements.
 - 2. Sight-exposed finished surfaces.
- D. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.
- E. Restore work, which has been cut or removed; install new products to provide completed work in accord with requirements of contract documents.
- F. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- G. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:

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1. For continuous surfaces, refinish to nearest intersection.
2. For an assembly, refinish entire unit.

3.4 PAVEMENT RESTORATION

- A. Restore all pavement or roadway surfaces in accordance with Section 02575 – Pavement Repair and Restoration.
- B. Restore, replace or rebuild existing street paving, including underdrains, if any are encountered, where damaged, using the same type of construction as was in the original. Be responsible for restoring all such work, including subgrade, base courses, curb and gutter or other appurtenances where present. Obtain and pay for at CONTRACTOR's expense such local or other governmental permits as may be necessary for the opening of streets and be satisfied as to any requirements other than those herein set forth which may effect the type, quality and manner of carrying on the restoration of surfaces by reason of jurisdiction of such governmental bodies.
- C. This section does not describe the construction of new road surfaces or the complete resurfacing of existing pavements.
- D. In all cases, the CONTRACTOR will be required to maintain, without additional compensation, all permanent replacement of street paving, done by him under this Contract for a period of 12 months after the acceptance of the Contract, including the removal and replacement of such work wherever surface depressions, cracking, or underlying cavities result from settlement of trench backfill.
- E. Perform all the final resurfacing or repaving of streets or roads, over the excavations made and be responsible for relaying paving surfaces of roads that have failed or been damaged at any time before the termination of the maintenance period on account of work done by him. Resurface or repave over any tunnel jacking, or boring excavation that settles or breaks the surface, repave to the satisfaction of the CITY and at the CONTRACTOR's expense. Conform backfilling of trenches and the preparation of subgrades to the requirements of excavation and backfilling of pipeline trenches.
- F. Where pipeline construction crosses paved streets, the CONTRACTOR may elect, at no additional cost to the CITY, to place the pipe by the jacking or boring or tunneling method in lieu of cutting and patching of the paved surfaces.

END OF SECTION

SECTION 01051

ALIGNMENT AND GRADES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General
- B. Surveys
- C. Datum Plane
- D. Protection of Survey Data

1.2 GENERAL

- A. Construct all work in accordance with the lines and grades shown on the Drawings. Assume full responsibility for keeping all alignment and grade.

1.3 SURVEYS

- A. Reference Points: The CITY will provide reference points for the work as described in the General Conditions. Base horizontal and vertical control points will be designated by the ENGINEER and used as datum for the Work. Perform all additional survey, layout, and measurement work.
 - 1. Keep ENGINEER informed, sufficiently in advance, of the times and places at which work is to be performed so that base horizontal and vertical control points may be established and any checking deemed necessary by ENGINEER may be done, with minimum inconvenience to the ENGINEER and at no delay to CONTRACTOR. It is the intention not to impede the Work for the establishment of control points and the checking of lines and grades set by the CONTRACTOR. When necessary, however, suspend working operations for such reasonable time as the ENGINEER may require for this purpose. Costs associated with such suspension are deemed to be included in the Contract Price, and no time extension or additional costs will be allowed.
 - 2. Provide an experienced survey crew, including a Professional Land Surveyor, an instrument operator, competent assistants, and any instruments, tools, stakes, and other materials required to complete the survey, layout, and measurement of work performed by the CONTRACTOR.

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1.4 DATUM PLANE

- A. All datum indicated or specified refer to the North American Datum 1983/1990 (NAD83/90 datum), of the United States Coast and Geodetic Survey and are expressed in feet and decimal parts thereof, or in feet and inches.

1.5 PROTECTION OF SURVEY DATA

- A. General: Safeguard all points, stakes, grade marks, known property corners, monuments, and benchmarks made or established for the Work. Reestablish them if disturbed, and bear the entire expense of checking reestablished marks and rectifying work improperly installed.
- B. Records: Keep neat and legible notes of measurements and calculations made in connection with the layout of the Work. Furnish copies of such data to the ENGINEER for use in checking the CONTRACTOR'S layout. Data considered of value to the City Manager or designee will be transmitted to the City Manager or designee by the ENGINEER with other records on completion of the Work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittals
- B. Inspection Services
- C. Inspection of Materials
- D. Quality Control
- E. Costs of Inspection
- F. Acceptance Tests
- G. Failure to Comply with Contract

1.2 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1 and the individual material sections. Submit manufacturer's Certificates of Inspection, descriptive literature, catalog data, illustrations, principle dimensions, materials of construction, specifications, installation instructions, and related information.
- B. Certificate Submittals: Furnish the ENGINEER authoritative evidence in the form of Certificates of Manufacture that the materials and equipment to be used in the Work have been manufactured and tested in conformity with the Contract Documents and this Manual and Specifications. Include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

1.3 TESTS AND INSPECTIONS

- A. City's Access: At all times during the progress of the Work, and until the date of final completion, afford the City Manager or designee and ENGINEER every reasonable, safe, and proper facility for inspecting the Work at the site. The observation and inspection of any work will not relieve the CONTRACTOR of any obligations to perform proper and satisfactory work as specified. Replace work rejected due to faulty design, inferior, or defective materials, poor workmanship, improper installation, excessive wear, or nonconformity with the requirements of the Contract Documents, with satisfactory work at no additional cost to the City. Replace as directed, finished or unfinished work found not to be in strict accordance with the Contract, even though such work may have been previously approved and payment made therefore.

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The City of Naples, its respective representatives, agents and employees, and governmental agencies with jurisdiction over the Project shall have access at all time to Work, whether the Work is being performed on or off the Project site, for their observation, inspection and testing. Contractor shall provide proper, safe conditions for such access. Contractor shall provide Engineer with timely notice of readiness of the Work for all required inspections, tests or approvals.

If the Contract Documents or any codes, laws, ordinances, rules or regulations of any public authority having jurisdiction over the Project requires any portion of the Work to be specifically inspected, tested or approved, Contractor shall assume full responsibility therefore, pay all costs in connection therewith and furnish Engineer the required certificates of inspection, testing or approval. All inspections, tests or approvals shall be performed in a manner and by organizations acceptable to the Engineer and The City of Naples.

If any Work that is to be inspected, tested or approved is covered without written concurrence from the Engineer, such work must, if requested by Engineer, be uncovered for observation. Such uncovering shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness to respond to such notice. If any Work is covered contrary to written directions from Engineer, such Work must, if requested by Engineer, be uncovered for Engineer's observation and be replaced at Contractor's sole expense.

The City shall charge to Contractor and may deduct from any payments due Contractor all engineering and inspection expenses incurred by the City in connection with any overtime work. Such overtime work consisting of any work during the construction period beyond the regular eight (8) hour day and for any work performed on Saturday, Sunday or holidays.

Neither observations nor other actions by the Engineer nor inspections, tests or approvals by others shall relieve Contractor from Contractor's obligations to perform the Work in accordance with the Contract Documents.

- B. Rejection: The City's Manager or designee has the right to reject materials and workmanship which are defective or require correction. Promptly remove rejected work and materials from the site.
- C. Inferior Work Discoveries: Failure or neglect on the part of the City Manager or designee to condemn or reject bad or inferior work or materials does not imply an acceptance of such work or materials. Neither is it to be construed as barring the City Manager or designee at any subsequent time from recovering damages or a sum of money needed to build anew all portions of the Work in which inferior work or improper materials were used.

Work not conforming to the requirements of the Contract Documents shall be deemed defective Work. If required by Engineer, Contractor shall as directed, either correct all defective Work, whether or not fabricated, installed or completed, or if the defective Work has been rejected by Engineer, remove it from the site and replace it with

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undefective Work. Contractor shall bear all direct, indirect and consequential costs of such correction or removal (including, but not limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby, and shall hold the City harmless for same.

If any portion of the Work is defective, or Contractor fails to supply sufficient skilled workers with suitable materials or equipment, or fails to finish or perform the Work in such a way that the completed Work will conform to the Contract Documents, Engineer may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Engineer to stop the Work shall not give rise to any duty on the part of the City or Engineer to exercise this right for the benefit of Contractor or any other party.

Should the City determine, at its sole opinion, it is in the City's best interest to accept defective Work, the City may do so. Contractor shall bear all direct, indirect and consequential costs attributable to the City's evaluation of and determination to accept defective Work. If such determination is rendered prior to final payment, a Change Order shall be executed evidencing such acceptance of such defective Work, incorporating the necessary revisions in the Contract Documents and reflecting an appropriate decrease in the Contract Amount. If the City accepts such defective Work after final payment, Contractor shall promptly pay the City an appropriate amount to adequately compensate the City for its acceptance of the defective Work.

If Contractor fails, within a reasonable time after the written notice from the City or Engineer, to correct defective Work or to remove and replace rejected defective Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any of the provisions of the Contract Documents, the City may, after seven (7) days written notice to Contractor, correct and remedy any such deficiency. To the extent necessary to complete corrective and remedial action, the City may exclude Contractor from any or all of the Project site, take possession of all or any part of the Work, and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Project site and incorporate in the Work all materials and equipment stored at the Project site or for which the City has paid Contractor but which are stored elsewhere. Contractor shall allow the City and its respective representatives, agents, and employees such access to the Project site as may be necessary to enable the City to exercise the rights and remedies under the paragraph. All direct, indirect and consequential costs of the City in exercising such rights and remedies shall be charged against Contractor, and a Change Order shall be issued, incorporating the necessary revisions to the Contract Documents, including an appropriate decrease to the Contract Amount. Such direct, indirect and consequential costs shall include, but not be limited to, fees and charges of engineers, architects, attorneys, and other professionals, all court costs and all costs of repair and replacement or work of others destroyed or damaged by Contractor shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by the City of The City's rights and remedies hereunder.

- D. Removal for Examination: Should it be considered necessary or advisable by the City Manager or designee, at any time before final acceptance of the Work, to make

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examinations of portions of the Work already completed, by removing or tearing out such portions, promptly furnish all necessary facilities, labor, and material, to make such an examination. If such Work is found to be defective in any respect, defray all expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the cost of examination and restoration of the Work will be considered a change in the Work to be paid for in accordance with applicable provisions of the Contract.

If the City or Engineer consider it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at the City's or Engineer's request, shall uncover, expose or otherwise make available for observation, inspection or tests as the Engineer may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is defective, Contractor shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction (including, but not limited to, fees and charges of engineers, architects, attorneys and other professionals), and the City shall be entitled to an appropriate decrease in the Contract Amount. If, however, such Work is not found to be defective, Contractor shall be allowed an increase in the Contract Amount and/or an extension to the Contract Time, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction.

- E. Operation Responsibility: Assume full responsibility for the proper operation of equipment during tests and instruction periods. Make no claim, other than provided in the Contract Documents, for damage that may occur to equipment prior to the time when the City Manager or designee accepts the Work.
- F. Rejection Prior to Warranty Expiration: If at anytime prior to the expiration of any applicable warranties or guarantees, defective equipment is rejected by the City Manager or designee, repay to the CITY all sums of money received for the rejected equipment on progress certificates or otherwise on account of the Contract lump sum prices, and upon the receipt of the sum of money, City Manager or designee will execute and deliver a bill of sale of all its rights, title, and interest in and to the rejected equipment. Do not remove the equipment from the premises of the CITY until the City Manager or designee obtains from other sources, equipment to take the place of that rejected. The City Manager or designee hereby agrees to obtain other equipment within a reasonable time and the CONTRACTOR agrees that the CITY may use the equipment furnished by the CONTRACTOR without rental or other charge until the other new equipment is obtained.

1.4 INSPECTION OF MATERIALS

- A. Premanufacture Notification: Give notice in writing to the ENGINEER sufficiently in advance of the commencement of manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. When required, notice to include a request for inspection, the date of commencement, and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, ENGINEER will arrange to have a representative present at such times during the manufacture or testing as may be necessary to inspect the materials, or will notify CONTRACTOR that the inspection will be made at a point other than the point

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of manufacture or testing, or that the inspection will be waived. Comply with these provisions before shipping any materials. Such inspection will not constitute a release from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

- B. Testing Standards: Conduct tests of electrical and mechanical equipment and appliances in accordance with recognized, applicable test codes.

1.5 QUALITY CONTROL

A. Testing

1. Field and Laboratory

- a. Provide personnel to assist the ENGINEER in performing the following periodic observation and associated services.
 - (1) Soils: Observe and test excavations, placement and compaction of soils. Determine suitability of excavated material. Observe subgrade soils and foundations.
 - (2) Concrete: Observe forms and reinforcement; observe concrete placement; witness air entrainment tests, facilitate concrete cylinder preparation and assist with other tests performed by ENGINEER.
 - (3) Masonry: Sample and test mortar, bricks, blocks and grout; inspect brick and block samples and sample panels; inspect placement of reinforcement and grouting.
 - (4) Structural Steel: Verify that all welders are certified; visually inspect all structural steel welds; mechanically test high-tensile bolted connections.
 - b. When specified in Divisions 2 through 16 of the Contract Documents, provide an independent laboratory testing facility to perform required testing. Qualify the laboratory as having performed previous satisfactory work. Prior to use, submit to the ENGINEER for approval.
 - c. Cooperate with the ENGINEER and laboratory testing representatives. Provide at least 24 hours notice prior to when specified testing is required. Provide labor and materials, and necessary facilities at the site as required by the ENGINEER and the testing laboratory.
 - d. When an independent electrical testing agency is specified in the Contract Documents, provide a member of the National Electrical Testing Association to perform inspections and tests.
2. Equipment: Coordinate and demonstrate test procedures as specified in the Contract Documents and as required during the formal tests.

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3. Pipeline and Other Testing: Conform to test procedures and requirements specified in the appropriate Specification Section.
4. Testing of Gravity Sanitary Sewer Lines
 - a. Watertight Construction: It is imperative that all sewers and force mains, manholes, and service connections be built watertight and that the CONTRACTOR adhere rigidly to the specifications for material and workmanship. Since all of the water and sewage in the lines will be treated at the treatment plant, special care and attention must be given to securing watertight construction. After completion, the sewers or sections thereof will be tested and gauged. If infiltration or exfiltration is above the limits specified, the sewer construction work will be rejected.
 - b. Cleaning: Exercise care during construction of the manhole to see that materials do not enter the sewer line. Keep the invert and shelf of the manhole clean of all mortar, broken brick, sand, or any other materials falling into the manhole. Immediately remove such material. Maintain this condition until final acceptance of the work. Prior to testing of gravity sanitary sewer lines, clean the lines using appropriate tools.
 - c. Gravity Sewers -Visual Inspections: On completion of each block or section of sewer, or at such other times as the City Manger or designee may direct, the block or section of sewer is to be cleaned, tested and inspected. Each section of the sewer is to show, on examination from either end, a full circle of light between manholes. Each manhole, or other appurtenance to the system, shall be of the specified size and form, be watertight, neatly and substantially constructed, with the rim set permanently to design position and grade. All repairs shown necessary by the inspection are to be made; broken or cracked pipe replaced, all deposits removed and the sewers left true to line and grade, entirely clean and ready for use.
 - d. Infiltration Limits: Provide the equipment necessary to check the lines for infiltration or exfiltration as directed by the City Manager or designee, before they are put in service. Infiltration in excess of ffty (50) gallons per day inch-mile of sewer will result in having the CONTRACTOR go over the lines, ascertain where the leakage exists, and repair the lines to the extent necessary to bring the infiltration down within acceptable limits. Observable inflow is not permitted.
 - e. Exfiltration Limits: The length of sewer subject to an exfiltration test shall be the distance between two (2) adjacent manholes. Close the inlets of the upstream and downstream manholes with watertight plugs and the test section filled with water until the elevation of the water in the upstream manhole is two (2) feet above the crown of the pipe in the line being tested, or two (2) feet above the existing groundwater in the trench, whichever is higher. A standpipe may be used instead of the upstream manhole for providing the pressure head when approved by the City Manager or designee. Measure exfiltration by determining the amount of water required to maintain the initial water elevation for one (1) hour period from the start of the test. The maximum allowable leakage, including manholes,

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shall be 50 gallon per inch for diameter per mile of pipe per day.

- f. Air Testing: Air testing shall be required if, in the opinion of the City Manager or designee, conditions are such that infiltration measurements may be inconclusive. Conduct the test in the presence of the City Manager or designee and conform to the following requirements:
 - (a) Test pressure shall be 3.5 psi increased by the groundwater pressure above the top of the sewer.
 - (b) Pressure loss from shall not exceed 0.5 psi during the required testing time.
 - (c) Testing time in minutes shall be calculated as $0.625 \times$ nominal pipe size (inches).

B. Reports

1. Certified Test Reports: Where transcripts or certified test reports are required by the Contract Documents, meet the following requirements:
 - a. Before delivery of materials or equipment submit and obtain approval of the ENGINEER for all required transcripts, certified test reports, certified copies of the reports of all tests required in referenced specifications or specified in the Contract Documents. Perform all testing in an approved independent laboratory or the manufacturer's laboratory. Submit for approval reports of shop equipment tests within thirty days of testing. Transcripts or test reports are to be accompanied by a notarized certificate in the form of a letter from the manufacturer or supplier certifying that tested material or equipment meets the specified requirements and the same type, quality, manufacture and make as specified. The certificate shall be signed by an officer of the manufacturer or the manufacturer's plant manager.
2. Certificate of Compliance: At the option of the ENGINEER, submit for approval a notarized Certificate of Compliance. The Certificates may be in the form of a letter stating the following:
 - a. Manufacturer has performed all required tests
 - b. Materials to be supplied meet all test requirements
 - c. Tests were performed not more than one year prior to submittal of the certificate
 - d. Materials and equipment subjected to the tests are of the same quality, manufacture and make as those specified
 - e. Identification of the materials

1.6 COSTS OF INSPECTION

- A. CITY's Obligation: Initial inspection and testing of materials furnished under this Contract will be performed by the City Manager or designee, or inspection bureaus without cost to

EXHIBIT A

the CONTRACTOR, unless otherwise expressly specified. If subsequent testing is necessary due to failure of the initial tests or because of rejection for noncompliance, reimburse the CITY for expenditures incurred in making such tests.

B. CONTRACTOR'S Obligation: Include in the Contract Price, the cost of all shop and field tests of equipment and other tests specifically called for in the Contract Documents, except those tests described above under "CITY'S Obligation". The City Manager or designee may perform tests on any material or equipment furnished under this Contract at any time during the Contract. If tests performed by the City Manager or designee result in failure or rejection for noncompliance, reimburse the CITY for expenditures incurred in making such tests. Tests performed by the City Manager or designee shall prevail in determining compliance with Contract requirements.

C. Reimbursements to the CITY:

1. Materials and equipment submitted by the CONTRACTOR as the equivalent to Those specifically named in the Contract may be tested by the City Manager or designee for compliance. Reimburse the CITY for expenditures incurred in Making such tests on materials and equipment that are rejected for noncompliance.
2. Reimburse the CITY for all costs associated with Witness Tests that exceed 5 Calendar Days per kind of equipment.

1.7 ACCEPTANCE TESTS

A. Preliminary Field Tests: As soon as conditions permit, furnish all labor and materials and services to perform preliminary field tests of all equipment provided under this Contract. If the preliminary field tests disclose that any equipment furnished and installed under this contract does not meet the requirements of the Contract Documents, make all changes, adjustments and replacements required prior to the acceptance tests.

B. Final Field Tests: Upon completion of the Work and prior to final payment, subject all equipment, piping and appliances installed under this Contract to specified acceptance tests to demonstrate compliance with the Contract Documents.

1. Furnish all labor, fuel, energy, water and other materials, equipment, instruments and services necessary for all acceptance tests.
2. Conduct field tests in the presence of the ENGINEER. Perform the field tests to demonstrate that under all conditions of operation each equipment item:
 - a. Has not been damaged by transportation or installation
 - b. Has been properly installed
 - c. Has been properly lubricated
 - d. Has no electrical or mechanical defects

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- e. Is in proper alignment
 - f. Has been properly connected
 - g. Is free of overheating of any parts
 - h. Is free of all objectionable vibration
 - i. Is free of overloading of any parts
 - j. Operates as intended
3. Operate work or portions of work for a minimum of 100 hours or 14 days continuous service, whichever comes first. For those items of equipment that would normally operate on wastewater or sludge, plant effluent may be used if available when authorized by ENGINEER. If water cannot properly exercise equipment, conduct 100-hour test after plant startup. Conduct test on those systems that require load produced by weather (heating or cooling) exercise only when weather will produce proper load.

C. Failure of Tests: If the acceptance tests reveal defects in material or equipment, or if the material or equipment in any way fails to comply with the requirements of the Contract Documents, then promptly correct such deficiencies. Failure or refusal to correct the deficiencies, or if the improved materials or equipment, when tested again, fail to meet the guarantees or specified requirements, the City Manager or designee, notwithstanding its partial payment for work and materials or equipment, may reject said materials or equipment and may order the CONTRACTOR to remove the defective work from the site at no addition to the Contract Price, and replace it with material or equipment which meets the Contract Documents.

1.8 FAILURE TO COMPLY WITH CONTRACT

A. Unacceptable Materials: If it is ascertained by testing or inspection that the material or equipment does not comply with the Contract, do not deliver said material or equipment, or if delivered remove it promptly from the site or from the Work and replace it with acceptable material without additional cost to the CITY. Fulfill all obligations under the terms and conditions of the Contract even though the City Manager or designee fail to ascertain noncompliance or notify the CONTRACTOR of noncompliance.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART1 GENERAL

1.1 SECTION INCLUDES

- A. General Requirements
- B. Related Sections
- C. Temporary Utilities
- D. Temporary Construction
- E. Barricades and Enclosures
- F. Fences
- G. Security
- H. Temporary Controls
- I. Traffic Regulation
- J. Field Offices and Sheds

1.2 RELATED SECTIONS

- A. Section 01010 -Summary of Work
- B. Section 01045 -Connection to Existing Systems
- C. Section 01570 -Traffic Regulations and Public Safety
- D. Section 02530 -Groundwater Control for Open Cut Excavation
- E. Section 02575 -Pavement Repair and Restoration
- F. Section 02650 -Laying and Jointing Buried Pipelines

1.3 GENERAL REQUIREMENTS

- A. Plant and Facilities: Furnish, install, maintain and remove all false work, scaffolding, ladders, hoistways, braces, pumping plants, shields, trestles, roadways, sheeting, centering forms, barricades, drains, flumes, and the like, any of which may be needed

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in the construction of any part of the Work and which are not herein described or specified in detail. Accept responsibility for the safety and efficiency of such works and for any damage that may result from their failure or from their improper construction, maintenance or operation.

- B. First Aid: Maintain a readily accessible, completely equipped first aid kit at each location where work is in progress.
- C. Safety Responsibility: Accept sole responsibility for safety and security at the site. Indemnify and hold harmless the CITY and the City's Manager or designee, including the ENGINEER, for any safety violation, or noncompliance with governing bodies and their regulations, and for accidents, deaths, injuries, or damage at the site during occupancy or partial occupancy of the site by CONTRACTOR'S forces while performing any part of the Work.
- D. Hazard Communication: Furnish two copies of the CONTRACTOR'S Hazard Communication Program required under OSHA regulations before beginning on site activities. Furnish two copies of amendments to Hazard Communications Program as they are prepared.

1.4 TEMPORARY UTILITIES

- A. Water: Provide all necessary and required water without additional cost, unless otherwise specified. If necessary, provide and lay water lines to the place of use; secure all necessary permits; pay for all taps to water mains and hydrants and for all water used at the established rates.
- B. Light and Power: Provide without additional cost to the CITY temporary lighting and power facilities required for the proper construction and inspection of the Work. If, in the ENGINEER'S opinion, these facilities are inadequate, do NOT proceed with any portion of the Work affected thereby. Maintain temporary lighting and power until the Work is accepted.
- C. Heat: Provide temporary heat, whenever required, for work being performed during cold weather to prevent freezing of concrete, water pipes, and other damage to the Work or existing facilities.
- D. Sanitary Facilities: Provide sufficient sanitary facilities for construction personnel. Prohibit and prevent nuisances on the site of the Work or on adjoining property. Discharge any employee who violates this rule. Abide by all environmental regulations or laws applicable to the Work.

1.5 TEMPORARY CONSTRUCTION

- A. Bridges: Design and place suitable temporary bridges where necessary for the maintenance of vehicular and pedestrian traffic. Assume responsibility for the sufficiency and safety of all such temporary work or bridges and for any damage that may result from their failure or their improper construction, maintenance, or operation. Indemnify and save harmless the CITY and the CITY'S representatives from all

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claims, suits or actions, and damages or costs of every description arising by reason of failure to comply with the above provisions.

1.6 BARRICADES, LIGHTS AND ENCLOSURES

- A. Protection of Workmen and Public: Effect and maintain at all times during the prosecution of the Work, barriers, lights and enclosures necessary for the protection of workmen and the public. Perform all work within the City right-of-way in strict accordance with the CITY Maintenance of Traffic Policy and other applicable statutory requirements.
- B. Provide suitable barricades, lights, signs and watchmen at excavation sites and all other places where the Work causes obstructions to normal traffic or constitutes in any way a hazard to the public.

1.7 FENCES

- A. Existing Fences: Obtain written permission from property owner(s) prior to relocating or dismantling fences that interfere with construction operations. Reach agreements with the fence owner as to the period the fence may be left relocated or dismantled. Install adequate gates where fencing must be maintained. Keep gates closed and locked at all times when not in use.
- B. Restoration: Restore all fences to their original or better condition and to their original location on completion of the Work.

1.8 SECURITY

- A. Preservation of Property:
 - 1. Preserve from damage, all property along the line of the Work, in the vicinity of or in any way affected by the Work, the removal or destruction of which is not called for by the Drawings. Preserve from damage, public utilities, trees, lawn areas, building monuments, fences, pipe and underground structures, and public streets. Note: Normal wear and tear of streets resulting from legitimate use by the CONTRACTOR are not considered as damage. Whenever damages occur to such property, immediately restore to its original condition. Costs for such repairs are incidental to the Contract.
 - 2. In case of failure on the part of the CONTRACTOR to restore property or make good on damage or injury, the City Manager or designee may, upon 24 hours written notice, proceed to repair, rebuild, or otherwise restore such property as may be deemed necessary, and the cost thereof will be deducted from any moneys due or which may become due the CONTRACTOR under this Contract. If removal, repair or replacement of public or private property is made necessary by alteration of grade or alignment authorized by the City Manager or designee and not contemplated by the Contract Documents, the CONTRACTOR will be compensated, in accordance with the General Conditions, provided that such property has not been damaged through fault of the CONTRACTOR or the CONTRACTOR'S employees.
- B. Public Utility Installations and Structures:

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1. Public utility installations and structures include all poles, tracks, pipes, wires, conduits, vaults, valves, hydrants, manholes, and other appurtenances and facilities, whether owned or controlled by public bodies or privately owned individuals, firms or corporations, used to serve the public with transportation, gas, electricity, telephone, storm and sanitary sewers, water, or other public or private utility services. Facilities appurtenant to public or private property that may be affected by the Work are deemed included hereunder.
2. The Contract Documents contain data relative to existing public utility installations and structures above and below the ground surface. Existing public utility installations and structures are indicated on the Drawings only to the extent such information was made available to, or found by, the ENGINEER in preparing the Drawings. These data are not guaranteed for completeness or accuracy, and the CONTRACTOR is responsible for making necessary investigations to become fully informed as to the character, condition, and extent of all public utility installations and structures that may be encountered and that may affect the construction operations.
3. Before starting construction, identify and mark all existing valves and maintain access to the valves at all times during construction.
4. Contact utility locating service sufficiently in advance of the start of construction to avoid damage to the utilities and delays to the completion date. See Section 01045, 1.3.F for additional information.
5. If existing utilities are damaged during the Work, immediately notify the owner of the affected utility. In coordination with or as directed by the owner, remove, replace, relocate, repair, rebuild, and secure any public utility installations and structures damaged as a direct or indirect result of the Work under this Contract. Costs for such work are incidental to the Contract. Be responsible and liable for any consequential damages done to or suffered by any public utility installations or structures. Assume and accept responsibility for any injury, damage, or loss that may result from or be consequent to interference with, or interruption or discontinuance of, any public utility service. See Section 01045, 1.3.F for additional information.
6. At all times in the performance of Work, employ proven methods and exercise reasonable care and skill to avoid unnecessary delay, injury, damage, or destruction to public utility installations and structures. Avoid unnecessary interference with, or interruption of, public utility services. Cooperate fully with the owners thereof to that end.
7. Provide notice to the City Manager or designee of any proposed connections to existing utilities, interruptions of service or shutdowns in accordance with Section 01045. Give written notice to the owners of all public utility installations and structures affected by proposed construction operations sufficiently in advance of breaking ground in any area or on any unit of the Work, to obtain their permission before disrupting the lines and to allow them to take measures necessary to protect their interests. Advise the Stormwater, Streets and Traffic Department and Police and Emergency Services Department of any excavation in public streets or the temporary

EXHIBIT A

shut-off of any water main. Provide at least 24 hours notice to all affected property owners whenever service connections are taken out of service.

- C. **Work on Private Property:** Work on this project will require operations on private property, rights of way or easements. The City Manager or designee has secured the appropriate easements or rights of entry from the affected property owners. Comply with all easement or rights of entry provisions. Conduct operations along rights-of-way and easements through private property to avoid damage to the property and to minimize interference with its ordinary use. Upon completion of the Work through such property, restore the surface and all fences or other structures disturbed by the construction as nearly as possible to the preconstruction conditions. Do not remove any material from private property without the consent of the property owner or responsible party in charge of such property. Hold the CITY harmless from any claim or damage arising out of or in connection with the performance of work across and through private property.
- D. **Miscellaneous Structures:** Assume and accept responsibility for all injuries or damage to culverts, building foundations and walls, retaining walls, or other structures of any kind met with during the prosecution of the Work. Assume and accept liability for damages to public or private property resulting therefrom. Adequately protect against freezing all pipes carrying liquid.
- E. **Protection of Trees and Lawn Areas:**
 - 1. Protect with boxes, trees and shrubs, except those ordered to be removed. Do not place excavated material so as to cause injury to such trees or shrubs. Replace trees or shrubs destroyed by accident or negligence of the CONTRACTOR or CONTRACTOR'S employees with new stock of similar size and age, at the proper season, at no additional cost to the CITY. If required by contract Documents, provide preconstruction audio-video recording of project in accordance with the Technical Specifications.
 - 2. Leave lawn areas in as good condition as before the start of the Work. Restore areas where sod has been removed by seeding or sodding.

1.9 TEMPORARY CONTROLS

- A. **During Construction:**
 - 1. Keep the site of the Work and adjacent premises free from construction materials, debris, and rubbish. Remove this material from any portion of the site if such material, debris, or rubbish constitutes a nuisance or is objectionable.
 - 2. Remove from the site all surplus materials and temporary structures when they are no longer needed.
 - 3. Neatly stack construction materials such as concrete forms and scaffolding when not in use. Store pipe to be incorporated into the Work in accordance with AWWA

EXHIBIT A

standards. Promptly remove splattered concrete, asphalt, oil, paint, corrosive liquids, and cleaning solutions from surfaces to prevent marring or other damage.

4. Properly store volatile wastes in covered metal containers and remove from the site daily.
5. Do not bury or burn on the site or dispose of into storm drains, sanitary sewers, streams, or waterways, any waste material. Remove all wastes from the site and dispose of in a manner complying with applicable ordinances and laws.

B. Smoke Prevention:

1. Strictly observe all air pollution control regulations.
2. Open fires will be allowed only if permitted under current ordinances.

C. Noises:

1. In accordance with the CITY'S or COUNTY'S Noise Ordinance, maintain acceptable noise levels in the vicinity of the Work. Limit noise production to acceptable levels by using special mufflers, barriers, enclosures, equipment positioning, and other approved methods.
2. Supply written notification to the City Manager or designee sufficiently in advance of the start of any work that violates this provision. Proceed only when all applicable authorizations and variances have been obtained in writing.

D. Hours of Operation:

1. Operation of construction equipment is only permitted Monday through Saturday, 7:00 AM to 7:00 PM. Obtain written consent from the City Manager or designee for operation of construction equipment during any other period.
2. Do not carry out non-emergency work, including equipment moves, on Sundays without prior written authorization by the City Manager or designee.

E. Dust Control:

1. Take measures to prevent unnecessary dust. Keep earth surfaces exposed to dusting moist with water or a chemical dust suppressant. Cover materials in piles or while in transit to prevent blowing or spreading dust.
2. Adequately protect buildings or operating facilities that may be affected adversely by dust. Protect machinery, motors, instrument panels, or similar equipment by suitable dust screens. Include proper ventilation with dust screens.

F. Temporary Drainage Provisions:

1. Provide for the drainage of stormwater and any water applied or discharged on the site in performance of the Work. Provide adequate drainage facilities to prevent damage to the Work, the site, and adjacent property.

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2. Supplement existing drainage channels and conduits as necessary to carry all increased runoff from construction operations. Construct dikes as necessary to divert increased runoff from entering adjacent property (except in natural channels), to protect the CITY'S facilities and the Work, and to direct water to drainage channels or conduits. Provide ponding as necessary to prevent downstream flooding.
 3. Maintain excavations free of water. Provide, operate, and maintain pumping equipment. Dewater trenches in accordance with Sections 02350 and 02650.
- G. Pollution: Prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities. Do not permit sanitary wastes to enter any drain or watercourse other than sanitary sewers. Do not permit sediment, debris, or other substances to enter sanitary sewers. Take reasonable measures to prevent such materials from entering any drain or watercourse.

1.10 TRAFFIC REGULATION

- A. Parking: Provide and maintain suitable parking areas for the use of all construction workers and others performing work or furnishing services in connection with the Contract, to avoid any need for parking personal vehicles where they may interfere with public traffic or construction activities.
- B. Access: Conduct Work to interfere as little as possible with public travel, whether vehicular or pedestrian. Provide and maintain suitable and safe bridges, detours, or other temporary expedients for the accommodation of public and private travel. Whenever it is necessary to cross, obstruct, or close roads, driveways, and walks, whether public or private, give reasonable notice to owners of private drives before interfering with them. Such maintenance of traffic will not be required when the CONTRACTOR has obtained permission from the owner or tenant of private property, or from the authority having jurisdiction over the public property involved, to obstruct traffic at the designated point. The Contractor may be allowed to restrict traffic for short periods of time provided that he first contacts the City Stormwater, Streets and Traffic Department, County, and/or Florida DOT for their restrictions and also provided that adequate traffic control devices are placed in accordance with applicable City, County, and/or State Ordinances.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

EXHIBIT A

SECTION 01510
PRE-CONSTRUCTION AUDIO-VIDEO RECORDING

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. The work specified in this section includes the requirements for pre-construction audio-video recordings necessary to document existing conditions on public and private property.

PART 2 PRODUCTS

- A. The Contractor shall provide color videos showing pre-construction site conditions of all public and private property within the scope of construction. The videos shall be DVD format indicating on the label of the disc, the date, job title and location where the video was taken. The videos shall be clear and shall thoroughly document all existing structures and landscaping. The construction record shall be taken by a responsible commercial firm known to be skilled and regularly engaged in the business of pre-construction color audiovideo documentation. The audio portion of the recording shall begin with a complete description of the beginning point of the construction scene, i.e. job name, street, direction of travel, direction of view. The video portion shall continuously show the time (hour, minute, and second) and date. All taping shall be done during daylight hours with sufficient sunlight to properly illuminate the surrounding area. Taping shall not be done during inclement weather conditions. Taping on heavily traveled streets or roads may require the use of police escort at the option of the Engineer. If police escort is required, all costs shall be borne by the Contractor.
- B. Two copies DVD's (including the original) shall be delivered to the City Manager or designee for review. The construction record video shall be made no more than 30 calendar days prior to construction start date.

PART 3 EXECUTION

3.1 INSPECTION

- A. Construction on private property shall not commence until the City Manager or designee has reviewed and approved the audio-video recording.

3.2 PERFORMANCE

- A. The Contractor may be required to restore private properties to conditions better than existing, at no additional cost to the City, if the Contractor fails to sufficiently document existing condition.

3.3 AREA OF COVERAGE

- A. Video coverage shall include all surface features located within the zone of influence of construction supported by appropriate audio coverage. Such coverage shall include, but not be limited to, existing driveways, sidewalks, curbs, pavements, ditches, mailboxes, landscaping, culverts, fences, signs and headwalls within the area covered.

END OF SECTION

EXHIBIT A

SECTION 01570

TRAFFIC REGULATION AND PUBLIC SAFETY

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. General Requirements
- B. Traffic Control
- C. Public Safety

1.2 RELATED SECTIONS

- A. Section 01500 – Construction Facilities and Temporary Controls
- B. Section 02230 – Roadway Crossings by Open Cut
- C. Section 02575 – Pavement Repair and Restoration

1.3 GENERAL REQUIREMENTS

- A. Perform all work within CITY rights-of-way in strict accordance with the CITY's Maintenance of Traffic Policy and other applicable statutory requirements to protect the public safety.
- B. Be responsible for providing safe and expeditious movement of traffic through construction zones. A construction zone is defined as the immediate areas of actual construction and all abutting areas which are used by the CONTRACTOR and which interfere with the driving or walking public.
- C. Remove temporary equipment and facilities when no longer required, Restore grounds to original or specified conditions.
- D. The requirements specified herein are in addition to the plan for Maintenance of Traffic as specified in Section 02230.

1.4 TRAFFIC CONTROL

- A. Include as necessary precautions, not to be limited to, such items as proper construction warning signs, signals, lighting devices, marking, barricades, channelization, and hand signaling devices. Be responsible for installation and maintenance of all devices and requirements for the duration of the Construction period. All design, application, installation, maintenance and removal of all traffic control devices and all warning devices and barriers which are necessary to protect the public and workmen from hazards within the project limits shall be as specified in the State of Florida, Manual of Traffic and Highway Construction, Maintenance and Utility Operations. The standards established in the aforementioned Manual constitute the minimum requirements for normal conditions. Additional traffic control devices, warning devices, barriers, or other

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safety devices shall be required where unusual, complex, or particularly hazardous conditions exist.

- B. Provide notice, at least five (5) working days prior to construction, to the State or CITY Department of Transportation of the necessity to close any portion of a roadway carrying vehicles or pedestrians so that the final approval of such closings can be obtained at least 48 hours in advance. At no time will more than one (1) lane of roadway be closed to vehicles and pedestrians. With any such closings make adequate provision for the safe expeditious movement of each.
- C. Be responsible for notifying Police, Fire, and other Emergency Departments whenever construction is within roadways and of the alternate routes. Provide monthly status reports to these Departments, as a minimum.
- D. Be responsible for removal, relocation, or replacement of any traffic control device in the construction area that exists as part of the normal pre-construction traffic control scheme.
- E. Immediately notify the CITY of any vehicular or pedestrian safety or efficiency problems incurred as a result of the construction of the project.
- F. Be responsible for notifying all residents of any road construction and limited access at least 72 hours in advance.

1.5 PUBLIC SAFETY (DURING CONSTRUCTION, ALTERATION OR REPAIR)

- A. In areas of high vehicular traffic, provide a safe walkway around the work area.
- B. Use barricades or other barriers to prevent any possibility of injury to the public caused by the CONTRACTOR's work.
- C. Keep walk areas around the work areas clean of sand, stones, and any other material that could cause a pedestrian accident.
- D. Barricade work areas left overnight. Install flashing warning lights in areas required by the CITY.
- E. Unless an approved detour is provided at any open cut crossings, a minimum of one-way traffic will be maintained during the daylight hours and two-way traffic at night. All traffic detours will be restricted to limits of the Right-of-Way with necessary flagmen and/or marking devices. These detours shall be approved by the CITY. Detour of traffic outside of the Right-of-Way will be considered with the approval of local governmental agencies and private concerns involved.
- F. Crossing and Intersections: Do not isolate residences and places of business. Provide access to all residences and places of business whenever construction interferes with existing means of access. Maintain access at all times. If pavement is disturbed, a cold mix must be applied at the end of the day.
- G. Detours
 - 1. Construct and maintain detour facilities wherever it becomes necessary to divert traffic from any existing roadway or bridge, or wherever construction operations block the flow of traffic. The location of all detours will require prior approval of the CITY.
 - 2. Furnishing of Devices and Barriers: Furnish all traffic control devices (including signs), warning devices and barriers. Costs of such devices shall be incidental to construction and included in unit prices bid.
 - 3. Maintenance of Devices and Barriers: Keep traffic control devices, warning devices and barriers in the correct position, properly directed, clearly visible and

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clean, at all times. Immediately repair replace or clean damaged, defaced or dirty devices or barriers as necessary.

- H. Flagmen: Provide certified flagmen (flaggers) to direct traffic where one-way operation in a single lane is in effect and in other situations as may be required. Radios may be required if flagmen cannot maintain contact with each other.
- I. Utilize all necessary signs, flagmen, and other safety devices during construction.
- J. Perform all work with the requirements set forth by the Occupational Safety Health Administration.

PART 2 PRODUCTS

NOT USED.

PART 3 EXECUTION

NOT USED.

END OF SECTION

EXHIBIT A

SECTION 01710

CLEANING

PART I GENERAL

1.1 SECTION INCLUDES:

- A. General Requirements
- B. Disposal Requirements

1.2 GENERAL REQUIREMENTS

- A. Execute cleaning during progress of the work and at completion of the work.

1.3 DISPOSAL REQUIREMENTS

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 DURING CONSTRUCTION

- A. Execute daily cleaning to keep the work, the site, and adjacent properties free from accumulations of waste materials, rubbish, and windblown debris, resulting from construction operations.
- B. Provide onsite containers for the collection of waste materials, debris and rubbish. All waste materials including containers, food debris and other miscellaneous materials must be disposed of daily in onsite containers.
- C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.2 FINAL CLEANING

- A. Requirements: At the completion of work and immediately prior to final inspection, clean the entire project as follows:
 - 1 Thoroughly clean, sweep, wash, and polish all work and equipment provided under the Contract, including finishes. Leave the structures and site in a complete and finished condition to the satisfaction of the ENGINEER.
 - 2 Direct all subcontractors to similarly perform, at the same time, an equivalent thorough cleaning of all work and equipment provided under their contracts. Remove all temporary structures and all debris, including dirt, sand, gravel, rubbish and waste material.

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- 3 Should the CONTRACTOR not remove rubbish or debris or not clean the buildings and site as specified above, the OWNER reserves the right to have the cleaning done at the expense of the CONTRACTOR.
- B. Employ experienced workers, or professional cleaners, for final cleaning.
 - C. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
 - D. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.
 - E. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces. Polish surfaces so designated to shine finish.
 - F. Repair, patch, and touch up marred surfaces to specified finish, to match adjacent surfaces.
 - G. Replace air-handling filters if units were operated during construction.
 - H. Clean ducts, blowers, and coils, if air-handling units were operated without filters during construction.
 - I. Vacuum clean all interior spaces, including inside cabinets.
 - J. Handle materials in a controlled manner with as few handlings as possible. Do not drop or throw materials from heights.
 - K. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly-painted surfaces.
 - L. Clean interior of all panel cabinets, pull boxes, and other equipment enclosures.
 - M. Wash and wipe clean all lighting fixtures, lamps, and other electrical equipment that may have become soiled during installation.
 - N. Perform touch-up painting.
 - O. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.
 - P. Remove erection plant, tools, temporary structures and other materials.
 - Q. Remove and dispose of all water, dirt, rubbish or any other foreign substances.

3.3 FINAL INSPECTION

- A. After cleaning is complete the final inspection may be scheduled. The inspection will be done with the OWNER and ENGINEER.

END OF SECTION

EXHIBIT A

SECTION 01750

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

Requirements for preparation, maintenance and submittal of project record documents. The Contractor's attention is specifically directed to Part 3.2.8. of this Section, which requires use of a Florida licensed surveyor to sign and seal all record drawings.

1.2 RELATED SECTIONS

- A. Section 01051 – Alignment and Grades
- B. Section 01400 - Quality Control

1.3 SUBMITTALS

- A. General: Provide all submittals as specified. Final disbursement of project monies shall not occur until or unless said "record drawings" are submitted to the satisfaction of the City.
- B. At Contract close out, two (2) sets of signed and sealed Record Drawings for the potable water system, non-potable irrigation water system, and/or wastewater system to be conveyed shall be submitted to the City.
- C. Provide electronic submittal as specified in Part 3.2.8 of this Section.

1.4 REQUIREMENTS (For City Capital Projects Only) Contractor shall maintain at the site for the City one record copy of:

- A. Drawings
- B. Specifications
- C. Addenda
- D. Change orders and other modifications to the Contract
- E. Design Engineer's field orders or written instructions
- F. Approved shop drawings, working drawings and samples
- G. Field test records

PART 2 PRODUCTS

(not used)

PART 3 EXECUTION

3.1 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Project record documents shall be stored in Contractor's field office or other location

EXHIBIT A

approved by the City apart from documents used for construction.

- B. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
- C. Make documents and samples available at all times for inspection by the City.

3.2 RECORDING

A. General

1. Record Drawings shall accurately depict the constructed configuration of all potable water, non-potable irrigation water and/or wastewater systems or portion(s) thereof. All revisions to City staff approved construction drawings shall be precisely identified and illustrated on the Record Drawings. All Record Drawings of utility systems or portion(s) thereof that are not being conveyed to the Board shall bear, on the cover sheet, a prominently displayed DISCLAIMER, in bold lettering at least one-quarter (1/4) inch high, stating: "All on-site potable water, non-potable irrigation and/or wastewater systems shall be owned, operated and maintained by the private owner(s) and/or the master condominium/homeowners' association, successors or assigns" (or other comparable private ownership).
2. Label each document "PROJECT RECORD" or similar text in neat, large printed letters.
3. Survey information can be obtained as needed by the use of 2-inch PVC labeled pipes installed over underground improvements by the contractor during construction. This method is an adequate process for obtaining record information.
4. Record information in red ink.

B. Record Drawings

1. The Record Drawings require signed and sealed as-built information, including above and below ground improvements including underground piping, valves and ductbanks, by a Florida Licensed Land Surveyor.
2. The Record Drawings shall identify the entity that provided the record data.
3. Drawings shall be referenced to and tie-in with the state plane coordinate system, with a Florida East Projection, and a North American Datum 1983/1990 (NAD 83/90 datum), and with United States Survey Feet (USFEET) units, as established by a registered Florida surveyor and mapper.
4. Files shall be also submitted in Drawing File (DWG) format in AutoCAD Release 2004 or later version.
5. Record drawings shall be submitted to the City staff within 60 days of the final construction completion date.
6. The following items shall be accurately depicted in vertical and horizontal directions on the Record Drawings:
 - a) All associated rights-of-way and utility easements whether shown on the Contract Drawings, found during construction or added during the Work.

EXHIBIT A

- b) Sewer system inverts, pipe slopes, manhole rims and run lengths.
 - c) Sewer lateral locations stationed from the nearest downstream manhole.
 - d) Sewer main stub extension inverts at both ends, pipe slope, run length and location.
 - e) Tie-ins to all valves, air release assemblies, fire hydrants, manholes, blowoffs, etc.
 - f) Top elevations of treatment plant structures and tanks.
 - g) Manhole center for sanitary sewers and storm sewers as related to utility improvements.
 - h) Pipe changes in direction or slope.
 - i) Buried valves, tees and fittings.
 - j) Pipe invert, or centerline, elevations at crossing with other pipe.
 - k) Invert, or centerline, elevations and coordinates of existing exposed pipe at crossing with underground pipe installed under this project.
 - l) Other horizontal and vertical record data pertinent to completed Work.
7. Each pipe elevation shall be clearly identified as to whether it is top of pipe, centerline of pipe or invert of pipe.
 8. For City Capital Projects only, Record Drawings shall indicate all deviations from Contract Drawings including:
 - a) Field changes.
 - b) Changes made by Change Order.
 - c) Details, utilities, piping or structures not on original Contract Drawings.
 - d) Equipment and piping relocations.
- C. Specifications and Addenda (For City Capital Projects Only)
- Legibly mark each Section to record:
1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.
 2. Changes made by Field Order or Change Order.
- D. Shop Drawings (For City Capital Projects Only)
1. Keep one copy of the final, approved shop drawing with the Record Documents.
 2. Record documents should include all shop drawing information submitted. Additional information submitted during the review process should be filed with the appropriate submittal.

END OF SECTION

EXHIBIT A

SECTION 02050

DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: All work necessary for the removal and disposal of structures, foundations, piping, equipment and roadways, or any part thereof including masonry, steel, reinforced concrete, plain concrete, electrical facilities, and any other material or equipment shown or specified to be removed.
- B. Basic Procedures and Schedule: Carry out demolition so that adjacent structures, which are to remain, are not endangered. Schedule the work so as not to interfere with the day-to-day operation of the existing facilities. Do not block doorways or passageways in existing facilities.
- C. Additional Requirements: Provide dust control and make provisions for safety.
- D. Related Work Specified in Other Sections Includes:
 - 1. Section 01045 - Connection to Existing Systems
 - 2. Section 02110 - Site Clearing
 - 3. Section 02051 - Asbestos Work Plan

1.2 SUBMITTALS

- A. Provide all submittals, including the following, as specified in Division 1.
- B. Site Inspection: Visit the site and inspect all existing structures. Observe and record any defects that may exist in buildings or structures adjacent to but not directly affected by the demolition work. Provide the City Manager or designee with a copy of this inspection record and obtain the ENGINEER'S and the City's Manager or designee approval prior to commencing the demolition.

1.3 QUALITY ASSURANCE

- A. Limits: Exercise care to break concrete well for removal in reasonably small masses. Where only parts of a structure are to be removed, cut the concrete along limiting lines with a suitable saw so that damage to the remaining structure is held to a minimum.

PART 2 PRODUCTS

Not Used

EXHIBIT A

PART 3 EXECUTION

3.1 EXAMINATION OF EXISTING DRAWINGS

- A. Available drawings of existing structures and equipment will be available for inspection at the office of the ENGINEER.

3.2 PROTECTION

- A. General Safety: Provide warning signs, protective barriers, and warning lights as necessary adjacent to the work as approved or required. Maintain these items during the demolition period.
- B. Existing Services: Undertake no demolition work until all mechanical and electrical services affected by the work have been properly disconnected. Cap, reroute or reconnect interconnecting piping or electrical services that are to remain in service either permanently or temporarily in a manner that will not interfere with the operation of the remaining facilities.
- C. Hazards: Perform testing and air purging where the presence of hazardous chemicals, gases, flammable materials or other dangerous substances is apparent or suspected, and eliminate the hazard before demolition is started.

3.3 DEMOLITION REQUIREMENTS

- A. Explosives: The use of explosives will not be permitted.
- B. Protection: Carefully protect all mechanical and electrical equipment against dust and debris.
- C. Removal: Remove all debris from the structures during demolition and do not allow debris to accumulate in piles.
- D. Abandoned Pipelines: Fill all abandoned pipelines using grout in accordance with Section 03310.
- E. Access: Provide safe access to and egress from all working areas at all times with adequate protection from falling material.
- F. Protection: Provide adequate scaffolding, shoring, bracing railings, toe boards and protective covering during demolition to protect personnel and equipment against injury or damage. Cover floor openings not used for material drops with material substantial enough to support any loads placed on it. Properly secure the covers to prevent accidental movement.
- G. Lighting: Provide adequate lighting at all times during demolition.

EXHIBIT A

- H. Closed Areas: Close areas below demolition work to anyone while removal is in progress.
- I. Material Drops: Do not drop any material to any point lying outside the exterior walls of the structure unless the area is effectively protected.
- J. Chemicals: All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with manufacturer's instructions or government regulations as applicable.

3.4 ASBESTOS-CONCRETE (AC) PIPE

- A. Existing asbestos-containing cementitious (AC) water main pipe needing deflection or removal during the course of construction of the storm water improvements must be removed and replaced with Ductile Iron Pipe (DIP). Replace the AC pipe with DIP for a distance of 10 feet each way from the centerline of the pipe under construction or 5 feet beyond the length of AC pipe exposed by trench excavation, whichever is greater. The City will require manifest documentation from the disposal facility showing proper disposal has occurred.
- B. Refer to Section 02051 Asbestos Work Plan for further details.

END OF SECTION

EXHIBIT A

SECTION 02051

ASBESTOS WORK PLAN: REPAIR, REMOVAL AND MAINTENANCE OF ASBESTOS-CONTAINING CEMENTITIOUS PIPES

ASBESTOS WORK PLAN

The following work plan is for the repair, removal and maintenance of asbestos cement pipe (AC). This work plan should be considered as minimal guidelines for the disturbance of the material. The Contractor shall utilize all appropriate controls and work practices necessary to protect workers, people in the vicinity of the work area, and the environment, regardless of the inclusion or exclusion of this work plan. Contractor questions should be resolved prior to the start of the abatement project. The primary concerns and considerations of these work practices is the protection of human health and the environment, as well as to minimize the Owner's and Contractor's liability exposure before, during and after the abatement process.

GENERAL

The City of Naples, shall employ: referred to as the Contractor, for the purpose of repair, removal and maintenance of AC pipe.

INDEMNITY

The Contractor shall indemnify, defend and save the Owner harmless from liabilities, damages, losses and costs, including, but not limited to, reasonable attorney's fees, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of the of the Contractor and persons employed or utilized by the Contractor in the performance of the work associated with the project. The Contractor shall defend on behalf of the

Owner, severally, or Owner and Contractor jointly, any claim or action for or arising out of the foregoing. The monetary limitation on the extent of indemnification pursuant to this paragraph shall be \$ 1 million per occurrence. The Contractor shall indemnify, defend and save the Owner harmless against all damages, losses, and claims resulting from the activities, or lack of activities associated with the project. The Contractor

shall defend on behalf of the Owner, severally, or Owner and Contractor jointly, any claim or action for or arising out of the foregoing.

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REGULATIONS, CODES AND STANDARDS

The Contractor shall comply with all regulations, codes and standards. These shall include, but are not limited to:

1. Title 29, Code of Federal Regulations, Section 1910.134 and 1926.1101. Occupational Safety and Health Administration (OSHA), US Department of Labor.
2. Title 40, Code of Federal Regulations, Part 61, Subparts A and M, National Emission Standards for Hazardous Air Pollutants. US Environmental Protection Agency (EPA).
3. State of Florida's Administrative Code 62-204.800. US EPA National Emission Standards for Hazardous Air Pollutants (NESHAPS) Asbestos Regulations (40 CFR 61, Subpart M).
4. State of Florida, Chapter 62-257, Florida Administrative Code.
5. Florida Statutes, Chapter 469, Licensing Requirements (Exemptions 469.002)
6. State of Florida, City of Naples codes and ordinances as applicable.

CONTRACTOR STAFFING

1. All work will be supervised by a qualified individual meeting the requirements of a *Competent Person** and possessing the following minimum qualifications and training:

- Satisfactory completion of an Asbestos Abatement Project Supervisor course
- Medical examination for respirator use
- Fit test for respirator type
- Training in the maintenance, repair and removal of AC pipe

* A Competent Person, is capable of identifying existing asbestos hazards at the work place, determine if a Negative Exposure Assessment (NEA) exists, is qualified to train other workers, and has the authority to take prompt corrective measures to eliminate a hazardous exposure. In addition the competent person must be trained in a training course which meets the criteria of EPA's Model Accreditation Plan (40 CFR 763) for supervisor.

2. Any direct contact with AC pipe will be performed by qualified workers possessing the following minimum qualifications and training:

- Satisfactory completion of an OSHA Class II Worker course **

EXHIBIT A

- Medical examination for respirator use
- Fit test for respirator type
- Training in the maintenance, repair and removal of AC pipe

**Class II Training Requirements must be met for work involving building materials including roofing, flooring, siding materials, ceiling tiles or transite panels training shall include at a minimum the elements in paragraph 29 CFR 1926.1101 (k) (9)(iv)(A) and specific work practices and engineering controls set forth in paragraph (g). It shall include hands-on training and it is to be at least 8 hours in length. Annual refresher course work is required. The length of time for the refresher training is not specified.

3. Personal Protective Equipment (PPE) for each worker will include hard hat, steel toed shoes, disposable protective clothing, respiratory protection and high visibility reflective vests. Respirators shall be fitted with a P-100 filtering cassette. (The use of disposable protective clothing, and respiratory protection will be determined by the establishment of a Negative Exposure Assessment and continual personnel air monitoring).

WORK PROCEDURES

Controlling Government Regulation:

OSHA's Construction Industry Standard for Occupational Exposure to Asbestos Subpart Z, 29 CFR 1926.1101 Asbestos.

Work-Task Assumptions/Requirements of the Employer at Project Work-Site:

Prior to commencing the demolition and removal of the A-C pipe, the contractor has:

- _ (1) Determined by thorough inspection the existence and the extent of any ACM.
- _ (2) Given written notice to appropriate governmental agency at the beginning of abatement activity.
- _ (3) Conducted an Initial Exposure Assessment (IEA) test plan or baseline report, which complies with the criteria in Paragraph (f)(2)(iii) of the above referenced controlling government regulations (section), and which demonstrates that the employees' exposure to airborne asbestos fibers during removal of the Asbestos-Cement (A-C) pipe is expected to be consistently below the Permissible Exposure Levels (PELs) i.e... exposure must be less than 0.1 fiber/cubic centimeter (cc) of air for an eight (8) hour time-weighted average limit (TWA), and less than 1.0 fiber/cc of air as averaged over a sampling period of thirty (30) minutes, all as determined by the method prescribed in Appendix A to the referenced section, or by an equivalent method, and

EXHIBIT A

therefore, the employer intends to do the A-C pipe removal through the use of Negative Exposure Assessments (NEAs).

Procedures for Removal of Asbestos-Cements (A-C) Pipe, Also Commonly Referred to as Transite Pipe This work activity is identified as a Class II asbestos removal activity by OSHA's Subpart Z, 29 CFR 1926.1101, with the A-C pipe removal is being done utilizing a valid Negative Exposure Assessment (NEA).

Preparation

Establish a regulated work area (RWA) using barricade tape.<Provide a hand/face wash station at the entry point to the RWA.<Post asbestos-warning signs at the RWA entry point.<Establish a waste loadout area attached to the RWA.<Once an RWA is established and work begins, no access should be permitted without the required personal protective equipment.

Prior to commencing work a ten day NESHAP notification (DEP Form 62-257 .900(1)

Effective 10-12-08) must be submitted the Florida Department of Environmental Protection (FDEP) office located at the following address:

FDEPAir Resource Management

2295 Victoria Avenue, Ste 364

P.O. Box 2549

Fort Myers, Florida 33902-2549

The form can be accessed online at:

[http://www.dep.state.fl.us/air/rules/forms/asbestos/dep62_257_900\(1\).pdf](http://www.dep.state.fl.us/air/rules/forms/asbestos/dep62_257_900(1).pdf)

Air Monitoring and Sampling of Exposure to Airborne Asbestos Fibers:

As the work begins the competent person (or third party consultant) must conduct and record objective data to confirm the Initial Exposure Assessment (IEA), and that the specific job-site work activity confirms the findings of the IEA, and that the PELs are not being exceeded for this work activity.

CITY
TECHNICAL SPECIFICATIONS

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ASBESTOS WORK PLAN
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EXHIBIT A

Excavation:

1. Machine excavate to expose A-C pipe.
2. Hand excavate areas under pipe where cuts/breaks are planned.
3. Excavation operations should be carefully executed so that pipe damage does not occur prior to removal.

Abandonment of AC Pipes

1. AC pipes can be abandoned in-place. The procedure for abandonment of pipes in place includes filling the section of pipe with a grout/cement slurry. The location of the pipes should be recorded on the master drawing of the right-of-way.
2. At no time will bursting, crushing, grinding or pulverizing of the AC pipe be conducted.

AC Pipe Removal:

1. All pipe cutting or breaking operations require adequate wetting with potable water to prevent A-C materials from being crumbled by hand pressure and to keep the asbestos fibers from becoming air-borne (friable).
2. Plan pipe cuts/breaks as necessary to accommodate the size/weight of pipe being removed.
3. Use a hammer or wheel-type pipe cutter (or equivalent tool) to make the initial cut and drain the pipe of residual liquids. If gas powered cutters are to be used they should be connected to a HEPA filtered vacuum and used in a manner that will not create elevated airborne fibers. If a gas powered cutter is utilized that is not connected to a HEPA filtration system, the work area should be contained to prevent the release of airborne fibers. In addition, a sufficient supply of water shall be applied to the cut point to further prohibit the release of asbestos fibers. A layer of 6 mil polyethylene should be placed beneath the cut point to contain the debris that will be generated. The debris shall be collected and treated as asbestos-containing waste.
4. Remove pipe sections at joint collars by breaking them with a sledgehammer, or cutting them with a wheel-type pipe cutter (soil-pipe cutter).
5. Where pipe re-connection is required, trim pipe ends in a manner that will not cause asbestos fibers to become airborne. Any debris that is generated shall be collected and treated as asbestos-containing waste.
6. When applicable, remove pipe sections from trench in an "intact" condition. Wet and containerize waste materials as you go. Using lifting straps and methods that do not damage the pipe remove the material from the trench.
7. WASTE PIPES: The pipe should be placed in a leak tight waste container. An alternative option would be to wrap each section of pipe with two layers of 6 mil polyethylene. For both options water should be applied to each section of pipe before it is contained.
8. Identify A-C materials and stock-pile the waste in a designated load-out area with the following label warnings: (The label must also identify the generator of the AC Pipe waste).
DANGER Contains Asbestos Fibers-Avoid Creating Dust

Cancer and Lung Disease Hazard

EXHIBIT A

Transportation of Asbestos Waste

9. All asbestos-containing waste shall be transported to a class I landfill in leak tight containers. Each shipment must be properly marked with the following notation:

DANGER Contains Asbestos Fibers Avoid Creating Dust Cancer and Lung

Disease Hazard

10. All asbestos-containing waste shall be disposed of in a timely manner at a class I landfill. All waste must be disposed of within a 30 day period from the time of removal. A waste shipment record must be provided for each shipment.

References:

1. Underground Contractors Association of Illinois Best Practices for Removing Asbestos Cement Pipe

Acknowledgement of Requirements

Signed: _____

Firm: _____

Date: ____ / ____ / ____

END OF SECTION

EXHIBIT A

SECTION 02110

SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for clearing of all areas within the Contract limits and other areas shown, including work designated in permits and other agreements, in accordance with the requirements of Division 1.
- B. Related Work Specified in Other Sections Includes:
 - 1. Section 02050 – Demolition
 - 2. Section 02222 - Excavation - Earth and Rock
 - 3. Section 02223 - Bedding and Backfilling
 - 4. Section 02400 - Restoration by Sodding or Seeding

1.2 DEFINITIONS

- A. Clearing: Clearing is the removal from the ground surface and disposal, within the designated areas, of trees, brush, shrubs, down timber, decayed wood, other vegetation, rubbish and debris as well as the removal of fences.
- B. Grubbing: Grubbing is the removal and disposal of all stumps, buried logs, roots larger than 1-1/2 inches, matted roots and organic materials.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PROTECTION OF EXISTING UTILITIES

- A. Prior to site clearing, locate and mark all existing utilities in coordination with the CITY and other affected owners. Protect all existing utilities and markings from damage. In case of damage to existing utilities caused by construction activities, contact the owner of the utility or appropriate CITY department (Water or Wastewater) immediately. Repair any damage to existing utilities or markings caused by construction activities in coordination with or as directed by the owner of the utility.

3.2 TREE REMOVAL

- A. Tree Removal Within Property Limits: Remove trees and shrubs within the limits of construction unless otherwise indicated.
 - 1. Remove trees and shrubs to avoid damage to trees and shrubs designated to remain.

EXHIBIT A

2. Grub and remove tree stumps and shrubs felled within the limits of construction to an authorized disposal site. Fill depressions created by such removal with material suitable for backfill as specified in Section 02223.
- B. Tree Removal Outside Property Limits: Do not cut or damage trees outside the limits of construction unless shown to be removed or unless written permission has been obtained from the property owner. Furnish three copies of the written permission before removal operations commence.
- C. If the landowner desires the timber or small trees, cut and neatly pile it in 4 ft. lengths for removal by the owner; otherwise, dispose of it by hauling it away from the project site. If hauled timber is of merchantable quality, credit shall accrue to the CONTRACTOR.

3.3 TREES AND SHRUBS TO BE SAVED

- A. Protection: Protect trees and shrubs within the limits of construction that are so delineated or are marked in the field to be saved from defacement, injury and destruction.
 1. Work within the limits of the tree drip line with extreme care using either hand tools or equipment that will not cause damage to trees.
 - a. Do not disturb or cut roots unnecessarily. Do not cut roots 1-1/2 inches and larger unless approved.
 - b. Immediately backfill around tree roots after completion of construction in the vicinity of trees.
 - c. Do not operate any wheeled or tracked equipment within drip line.
 2. Protect vegetation from damage caused by emissions from engine-powered equipment.
 3. During working operations, protect the trunk, foliage and root system of all trees to be saved with boards or other guards placed as shown and as required to prevent damage, injury and defacement.
 - a. Do not pile excavated materials within the drip line or adjacent to the trunk of trees.
 - b. Do not allow runoff to accumulate around trunk of trees.
 - c. Do not fasten or attach ropes, cables, or guy wires to trees without permission. When such permission is granted, protect the tree before making fastening or attachments by providing burlap wrapping and softwood cleats.
 - d. The use of axes or climbing spurs for trimming will not be permitted.
 - e. Provide climbing ropes during trimming.
 4. Remove shrubs to be saved, taking a sufficient earth ball with the roots to maintain the shrub.

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- a. Temporarily replant if required, and replace at the completion of construction in a condition equaling that which existed prior to removal.
 - b. Replace in kind if the transplant fails.
5. Have any tree and shrub repair performed by a tree surgeon properly licensed by the State of Florida and within 24 hours after damage occurred.

3.4 CLEARING AND GRUBBING

- A. Clearing: Clear all items specified to the limits shown and remove cleared and grubbed materials from the site.
1. Do not start earthwork operations in areas where clearing and grubbing is not complete, except that stumps and large roots may be removed concurrent with excavation.
 2. Comply with erosion, sediment control and storm management measures as specified in Division 1.
- B. Grubbing: Clear and grub areas to be excavated, areas receiving less than 3 feet of fill and areas upon which structures are to be constructed.
1. Remove stumps and root mats in these areas to a depth of not less than 18 inches below the sub-grade of sloped surfaces.
 2. Fill all depressions made by the removal of stumps or roots with material suitable for backfill as specified in Section 02223.
- C. Limited Clearing: Clear areas receiving more than 3 feet of fill by cutting trees and shrubs as close as practical to the existing ground. Grubbing will not be required.
- D. Dispose of all material and debris from the clearing and grubbing operation by hauling such material and debris away to an approved dump. The cost of disposal (including hauling) of cleared and grubbed material and debris shall be considered a subsidiary obligation of the Contractor; the cost of which shall be included in the prices bid for the various classes of work.

3.5 TOPSOIL

- A. Stripping: Strip existing topsoil from areas that will be excavated or graded prior to commencement of excavating or grading and place in well-drained stockpiles in approved locations.

END OF SECTION

SECTION 02151

SHORING, SHEETING AND BRACING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Work required for protection of an excavation or structure through shoring, sheeting, and bracing.
- B. Related Work Specified In Other Sections Includes:
 - 1. Section 02222 - Excavation - Earth and Rock
 - 2. Section 02223 - Backfilling

1.2 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. CONTRACTOR's Submittals: All sheeting and bracing shall be the responsibility of the CONTRACTOR to retain qualified design services for these systems, and to be completed with strict adherence to OSHA Regulations. Submit complete design calculations and working drawings of proposed shoring, sheeting and bracing which have been prepared, signed and sealed by a Licensed Professional Engineer experienced in Structural Engineering and registered in the State of Florida, before starting excavation for jacking pits and structures. Use the soil pressure diagram shown for shoring, sheeting and bracing design. ENGINEER's review of calculations and working drawings will be limited to confirming that the design was prepared by a licensed professional engineer and that the soil pressure diagram shown was used.

1.3 REFERENCES

- A. Design: Comply with all Federal and State laws and regulations applying to the design and construction of shoring, sheeting and bracing.
- B. N.B.S. Building Science Series 127 "Recommended Technical Provisions for Construction Practice in Shoring and Sloping Trenches and Excavations.

EXHIBIT A

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Do work in accordance with the U.S. Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54), and the Florida Trench Safety Act. The CONTRACTOR shall also observe 29 CFR 1910.46 OSHA's regulation for Confined Space Entry.

PART 2 PRODUCTS

2.1 MANUFACTURERS AND MATERIALS

- A. Material Recommendations: Use manufacturers and materials for shoring, sheeting and bracing as recommended by the Licensed Professional Engineer who designed the shoring, sheeting, and bracing.
 - 1. Wood Materials: Oak, or treated fir or pine for wood lagging.

PART 3 EXECUTION

3.1 SHORING, SHEETING AND BRACING INSTALLATION

- A. General: Provide safe working conditions, to prevent shifting of material, to prevent damage to structures or other work, to avoid delay to the work, all in accordance with applicable safety and health regulations. Properly shore, sheet, and brace all excavations which are not cut back to the proper slope and where shown. Meet the general trenching requirements of the applicable safety and health regulations for the minimum shoring, sheeting and bracing for trench excavations.
 - 1. CONTRACTOR's Responsibility: Sole responsibility for the design, methods of installation, and adequacy of the shoring, sheeting and bracing.
- B. Arrange shoring, sheeting and bracing so as not to place any strain on portions of completed work until the general construction has proceeded far enough to provide ample strength.
- C. If ENGINEER is of the opinion that at any point the shoring, sheeting or bracing are inadequate or unsuited for the purpose, resubmission of design calculations and working drawings for that point may be ordered, taking into consideration the observed field conditions. If the new calculations show the need for additional shoring, sheeting and bracing, it should be installed immediately.

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- D. Monitoring: Periodically monitor horizontal and vertical deflections of sheeting. Submit these measurements for review.
- E. Accurately locate all underground utilities and take the required measures necessary to protect them from damage. All underground utilities shall be kept in service at all times as specified in Division 1.
- F. Driven Sheeting: Drive tight sheet piling in that portion of any excavation in paved or surface streets City collector and arterial streets and in State and County highways below the intersection of a one-on-one slope line from the nearest face of the excavation to the edge of the existing pavement or surface.
- G. Sheeting Depth: In general drive or place sheeting for pipelines to a depth at elevation equal to the top of the pipe as approved.
 - 1. If it is necessary to drive sheeting below that elevation in order to obtain a dry trench or satisfactory working conditions, cut the sheeting off at the top of the pipe and leave in place sheeting below the top of the pipe.
 - 2. Cut off sheeting not designated as "Sheeting Left in Place". The cut ends of sheeting left adjacent to the pipe will be paid for as "Sheeting Left in Place".
 - 3. Do not cut the sheeting until backfill has been placed and compacted to the top of the pipe.
- H. Sheeting Removal: In general, remove sheeting and bracing above the top of the pipe as the excavation is refilled in a manner to avoid the caving in of the bank or disturbance to adjacent areas or structures. Sheeting shall be removed as backfilling progresses so that the sides are always supported or when removal would not endanger the construction of adjacent structures. When required to eliminate excessive trench width or other damages, shoring or bracing shall be left in place and the top cut off at an elevation 2.5 feet below finished grade, unless otherwise directed.
 - 1. Carefully fill voids left by the withdrawal of the sheeting by jetting, ramming or otherwise.
 - 2. No separate payment will be made for filling of such voids.

END OF SECTION

EXHIBIT A

SECTION 02210

PIPE REMOVAL AND ABANDONMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Removal and abandonment of piping and appurtenances, wholly or in part, as required to complete Work as shown on the Drawings and specified in this Section.
- B. Related Work Specified in other Sections Includes:
 - 1 Section 01045 -Connection to Existing Systems
 - 2 Section 02050 - Demolition
 - 3 Section 02051 - Asbestos work Plan
 - 4 Section 02222 -Excavation-Earth and Rock
 - 5 Section 02223 -Bedding and Backfilling
 - 6 Section 03310 -Concrete, Masonry Mortar and Grout

1.2 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Submit the following:
 - 1. Proposed methods for pipe removal and abandonment;
 - 2. Equipment proposed to be used to do pipe removal and abandonment work;
 - 3. Resume of pipe grouting subcontractor;
 - 4. Pipe removal and abandonment schedule/sequence.
- C. If a detour is required, submit a traffic control plan for approval to City Manager or designee and/or the Florida Department of Transportation as described in Section 01570.

1.3 SITE CONDITIONS

- A. General
 - 1. Prior to any work, a proper and approved maintenance of traffic plan (MOT) shall be submitted to the engineer and the City.
 - 2. Execute pipe removal and abandonment so that there is no injury to persons or damage to adjacent buildings, structures, equipment, materials, piping, wiring, pavement, fences, trees, guardrails, and other adjacent improvements. Execute demolition and abandonment so that access to facilities that are in operation and to residences and businesses is free and safe.

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3. Execute pipe removal and abandonment so that interference to vehicular traffic and personnel traffic does not exceed scheduled interference. Do not place rubble, excavation, piping, or other materials removed on roadways, drives, or sidewalks that are to remain in service.

PART 2 -PRODUCTS

2.1 TEMPORARY MATERIALS

- A. Provide temporary fencing, barricades, barriers, piping, valves, pumps, power and controls, and water necessary to meet the requirements of this Section.
- B. Temporary fencing, barricades, barriers, and enclosures shall be suitable to the purpose intended.

2.2 REPAIR AND REPLACEMENT MATERIALS

For repair or replacement of existing facilities or improvements to remain, use materials identical to, or equal to, materials used in existing work when new.

PART 3 -EXECUTION

3.1 GENERAL

- A. Conduct pipe removal and abandonment as shown and specified in the Contract Documents.
- B. Conduct pipe removal and abandonment so that existing equipment, piping, wiring, structures, and other improvements to remain are not damaged. Repair or replace equipment, piping, wiring, structures, and other improvements damaged at no additional cost to the City.
- C. Do not remove equipment, piping, wiring, structures, or other improvements not shown or specified to be removed. If equipment, piping, wiring, structures, or other improvements not shown or specified to be removed is removed, replace equipment, piping, wiring, structures, or other improvements at no additional cost to the City.

3.2 DISCONNECTIONS

- A. Prior to starting pipe removal or abandonment, check underground and exposed existing utilities, piping, and equipment within the limits of pipe removal or abandonment. Prior to starting, check underground and exposed existing utilities, piping connected to and associated with existing pipe to be removed or abandoned. Verify the following:
 1. Piping is inactive (abandoned);
 2. Other utilities which may be in conflict have been permanently or temporarily

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disconnected, if required:

- B. Do not proceed with salvage or demolition if piping is active or utilities have not been disconnected.

3.3 ABANDONMENT

- A. The Contractor shall, as described on the Drawings and as may be directed by the City, abandon in place storm pipes per Section 03310 -Concrete, Masonry Mortar and Grout.
- B. The method of installation shall be able to meet the requirement of completely filling the existing stormwater pipe and any voids adjacent to the lines. The method shall adequately provide for the removal and legal disposal of existing sewer materials in the system. The method shall provide for the release of air. When intermediate points are required to be constructed for the abandonment of the system, they shall be a part of the abandonment project process. The grout mix designed shall be approved by the Engineer prior to beginning operation.
- C. Each section of stormwater pipe to be abandoned shall be plugged with a cement mortar mix at least two pipe diameters in thickness. A PVC grout/vent tube shall be grouted in place at the top of the pipe during installation of the cement mortar plug. The grout/vent tube shall not extend more than 4 feet past the cement mortar plug into the line to be abandoned. The vent tube shall be extended at least 3 feet above the invert of the line. An approved grout mix shall be continuously pumped through grout tube until grout mix returns out of vent tube. The head pressure needed to make cement return through the vent tube shall be maintained for at least 10 minutes after return occurs.
- D. Equipment:
 - 1. The materials shall be mixed or delivered in equipment of sufficient size and capacity to provide the desired amount of grout material for each stage in a single operation. The equipment shall be capable of mixing the grout at densities required for the approved procedure and shall also be capable of changing density as dictated by field conditions any time during the grouting operation.
 - 2. Mixers and Pumps -The grout shall be delivered to the injection point at a steady pressure with a non-pulsating centrifugal or triplex pump. Means shall be provided to increase or decrease the water-cement ratio. The system shall mix the grout to a homogeneous consistency. Means of accurately measuring grout component quantities, pumping pressures, and volumes pumped shall be provided.
 - 3. Pressure Gauges -CONTRACTOR shall provide one pressure gauge at the point of injection and one pressure gauge at the grout pump. Grouting shall not proceed without appropriate calibrated gauges in place and in working order. Pressure gauges shall be equipped with diaphragm seals, have a working range

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between 1.5 to 2.0 times the design grout pressure, and have an accuracy within 0.5 percent of full range. Pressure gauges shall be instrument oil filled and attached to a saddle-type diaphragm seal to prevent clogging with grout.

E. Grouting:

Once grouting operations begin, grouting shall proceed uninterrupted from bulkhead to bulkhead. Grout placement shall not be terminated until both of the following conditions have been met, unless otherwise approved by the City: a) The estimated volume of grout to fill the line has been injected; and, b) grout has been expelled from the furthest vent or bulkhead. Bulkheads and temporary vents shall not be removed until the grout has set.

F. Testing and Sampling:

1. Take four test specimens for each 50 cubic yards of grout or for each four hours of placing.
2. Test in accordance with ASTM C109 except:
 - a. The specimens shall be 3 inch by 6 inch cylinders covered after casting to prevent damage and loss of moisture. Moist cure specimens for a period up to 7 days prior to a 28-day compressive strength test.
 - b. Do not oven dry specimens that are load tested. Specimens may be tested at any age to monitor compressive strength. The material may require special handling and testing techniques.

G. The CONTRACTOR may remove the pipe in accordance with the Paragraph 3.04 in lieu of abandonment if acceptable to the City. Such removal, however, will be paid at the same price for pipe abandonment.

H. All work under this Section shall comply with City, State and Federal regulations.

3.4 REMOVAL AND DISPOSAL

- A. The Contractor shall, as described on the Drawings and as may be directed by the City, remove the following existing utility improvements:
- B. The pipe removal and disposal shall include all valves, fittings and appurtenances.

3.5 SALVAGE OF EQUIPMENT, PIPING, AND MATERIALS

- A. Remove items identified on the drawings or specified to remain the property of the City. Do not damage equipment, piping, and materials to be salvaged.

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- B. Following removal of equipment, piping, and materials to be salvaged, place equipment, piping, and materials in a location within the City limits as designated by the City.

3.6 REPAIRS

Repair structural elements, equipment, piping, conduit, and other improvements to remain that are damaged during demolition. Use workers specifically qualified in trade, or trades, involved to repair damaged work.

3.7 DISPOSAL

- A. Remove and dispose of all equipment, piping, and materials from the jobsite not specifically designated to be retained by the City.
- B. Contractor shall not accumulate or store debris from demolition on the project site
- C. The disposal of the piping, manholes and appurtenances shall be in accordance with City, State and Federal laws.

3.8 BACKFILLING

- A. Backfill excavations, trenches, and pits resulting from abandonment and removal according to Section 02223 -Backfilling.
- B. Backfill of the pipe trenches shall be according to the City details for pipe trench backfill. Pipe trenches for removed pipes that were within 3 horizontal feet of the edge of pavement shall be backfilled according to the detail for the type of roadway.

3.9 CLEANUP AND CLOSURE

- A. Following pipe abandonment or removal, clean-up areas where other work is to be done as specified in this Section, or Sections applicable to work to be done.
- B. Following pipe abandonment or removal, clean-up areas where no other work is to be done under this Contract. Remove debris and rubbish, temporary facilities, and equipment. Level surface irregularities to eliminate depressions. Leave work in a neat and presentable condition.
- C. In locations where a pipe to be abandoned or removed connects to manhole or inlet that remains in service, the Contractor shall install a suitable plug at the manhole/inlet to eliminate the connection.

END OF SECTION

SECTION 02222

EXCAVATION - EARTH AND ROCK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for performing opencut excavations to the widths and depths necessary for constructing structures, pipelines and conduits including excavation of any material necessary for any purpose pertinent to the construction of the Work.
- B. Related Work Specified In Other Sections Includes:
 - 1. Section 02110 - Site Clearing
 - 2. Section 02151 - Shoring, Sheeting and Bracing
 - 3. Section 02223 - Bedding and Backfilling
 - 4. Section 02530 - Groundwater Control for Open Cut Excavation
 - 5. Section 03310 - Concrete, Masonry Mortar and Grout

1.2 DEFINITIONS

- A. Earth: "Earth" includes all materials which, in the opinion of the ENGINEER, do not require blasting, barring, wedging or special impact tools for their removal from their original beds, and removal of which can be completed using standard excavating equipment. Specifically excluded are all ledge and bedrock and boulders or pieces of masonry larger than one cubic yard in volume.
- B. Rock: "Rock" includes all materials which, in the opinion of the ENGINEER, require barring, wedging and/or special impact tools such as jack hammers, sledges, chisels, or similar devices specifically designed for use in cutting or breaking rock for removal from their original beds and which have compressive strengths in their natural undisturbed state in excess of 300 psi. Boulders or masonry larger than one cubic yard in volume are classed as rock excavation.

1.3 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Engage the services of a Professional Engineer who is registered in the State of Florida to design all cofferdam and sheeting and bracing systems which the CONTRACTOR feels necessary for the execution of his work. Submit to the ENGINEER a signed statement that he has been employed by the CONTRACTOR to design all sheeting and bracing systems. After the systems have been installed, furnish to the ENGINEER an additional signed statement that the cofferdams and sheeting and bracing systems have been installed in accordance with his design.

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- C. If a detour is required, submit a traffic control plan for approval to City Manager or designee and/or the Florida Department of Transportation as described in Section 01570.

1.4 SITE CONDITIONS

- A. Geotechnical Investigation: A geotechnical investigation may have been prepared by the CITY and ENGINEER in preparing the Contract Documents.
 - 1. The geotechnical investigation report may be examined for whatever value it may be considered to be worth. However, this information is not guaranteed as to its accuracy or completeness.
 - 2. The geotechnical investigation report is not part of the Contract Documents.
- B. Actual Conditions: Make any geotechnical investigations deemed necessary to determine actual site conditions.
- C. Underground Utilities: Locate and identify all existing underground utilities prior to the commencement of Work.
- D. Quality and Quantity: Make any other investigations and determinations necessary to determine the quality and quantities of earth and rock and the methods to be used to excavate these materials.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 GENERAL

- A. Clearing: Clear opencut excavation sites of obstructions preparatory to excavation. Clearing in accordance with Section 02110, includes removal and disposal of vegetation, trees, stumps, roots and bushes, except those specified to be protected during trench excavation.
- B. Banks: Shore or slope banks to the angle of repose to prevent slides or cave-ins in accordance with Section 02151.
- C. Safety: Whenever an excavation site or trench is left unattended by the CONTRACTOR or when an area is not within 100 feet of observation by the CONTRACTOR, the excavation site or trench shall be filled and/or, at the OWNER's discretion, protected by other means to prevent accidental or unauthorized entry.

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Such protection shall include barricades and other protection devices requested by the ENGINEER or OWNER, including temporary fencing, snow fencing, or temporary "structure" tape. Such safety items shall not relieve the CONTRACTOR of any site safety requirements or liabilities established by Federal, State and local laws and agencies, including OSHA, but is intended as additional safety measures to protect the general public.

- D. Hazardous Materials: If encountered, take care of hazardous materials not specifically shown or noted in accordance with Section 01500.
- E. During excavation and any site work, storm water pollution prevention measures shall be taken to ensure that water quality criteria are not violated in the receiving water body and all state and local regulatory requirements are met.

3.2 STRUCTURE EXCAVATION

- A. Excavation Size: Provide excavations of sufficient size and only of sufficient size to permit the Work to be economically and properly constructed in the manner and of the size specified.
- B. Excavation Shape: Shape and dimension the bottom of the excavation in earth or rock to the shape and dimensions of the underside of the structure or drainage blanket wherever the nature of the excavated material permits.
- C. Compaction: Before placing foundation slabs, footings or backfill, proof roll the bottom of the excavations to detect soft spots.
 - 1. For accessible areas, proof roll with a ten wheel tandem axle dump truck loaded to at least 15 tons or similarly loaded construction equipment.
 - 2. For small areas, proof roll with a smooth-faced steel roller filled with water or sand, or compact with a mechanical tamper.
 - 3. Make one complete coverage, with overlap, of the area.
 - 4. Overexcavate soft zones and replace with compacted select fill.

3.3 TRENCH EXCAVATION

- A. Preparation: Properly brace and protect trees, shrubs, poles and other structures which are to be preserved. Unless shown or specified otherwise, preserve all trees and large shrubs. Hold damage to the root structure to a minimum. Small shrubs may be preserved or replaced with equivalent specimens.
- B. Adequate Space: Keep the width of trenches to a minimum, however provide adequate space for workers to place, joint and backfill the pipe properly.
 - 1. The minimum width of the trench shall be equal to at least 3.5 feet or the outside diameter of the pipe at the joint plus inches for unsheeted trench or 12

EXHIBIT A

inches for sheeted trench, whichever is greater. Conform the trench walls to OSHA Regulations.

2. In sheeted trenches, measure the clear width of the trench at the level of the top of the pipe to the inside of the sheeting.

C. Depth:

1. Excavate trenches to a minimum depth of 8 inches, but not more than 12 inches, below the bottom of the pipe so that bedding material can be placed in the bottom of the trench and shaped to provide a continuous, firm bearing for pipe barrels and bells.
2. Standard trench grade shall be defined as the bottom surface of the utility to be constructed or placed within the trench. Trench grade for utilities in rock or other non-cushioning material shall be defined as additional undercuts backfilled with crushed stone compacted in 6-inch lifts, below the standard 8-inches minimum trench undercut. Backfill excavation below trench grade not ordered in writing by the ENGINEER with acceptable USCS Class I, II or III (see Section 02223, 2.1.C) embedment material to trench grade and compact to density equal to native soil.
3. In stable trenches, where the soil is neither wet, yielding, nor mucky, trench Bottom may be either native undisturbed soils of USCS Class 11, III, or IV, or thoroughly compacted USCS Class I, II, or III material from three inches (3") to six inches (6") depth to provide a stable, continuous support for the pipe system. In USCS Class V soil areas, foundation bedding is required. All foundation bedding shall be USCS Class I material. In no case shall pipe be bedded on solid rock. See Section 02223, subsections 3.2 and 2.4 for more information on bedding.

D. Unstable or Unsuitable Materials: If unstable or unsuitable material is exposed at the level of the bottom of the trench excavation, excavate the material in accordance with the subsection headed "Authorized Additional Excavation".

1. Material shall be removed for the full width of the trench and to the depth required to reach suitable foundation material.
2. When in the judgment of the ENGINEER the unstable or unsuitable material extends to an excessive depth, the ENGINEER may advise, in writing, the need for stabilization of the trench bottom with additional select fill material, crushed stone, washed shell, gravel mat or the need to provide firm support for the pipe or electrical duct by other suitable methods.
3. Crushed stone, washed shell and gravel shall be as specified in Section 02223.
4. Payment for such trench stabilization is included in the cost of linear foot of pipe.

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- E. Length of Excavation: Keep the open excavated trench preceding the pipe or electrical duct laying operation and the unfilled trench, with pipe or duct in place, to a minimum length which causes the least disturbance. Provide ladders for a means of exit from the trench as required by applicable safety and health regulations.
- F. Excavated Material: Excavated material to be used for backfill shall be neatly deposited at the sides of the trenches where space is available. Where stockpiling of excavated material is required, the Contractor shall be responsible for obtaining the sites to be used and shall maintain his operations to provide for natural drainage and not present an unsightly appearance.
- G. Water: Water: Allow no water to rise in the trench excavation until sufficient backfill has been placed to prevent pipe flotation. Provide trench dewatering in accordance with Section 02530.

3.4. EXCAVATION FOR JACKING AND AUGERING

- A. Jacking and Augering Requirements: Allow adequate length in jacking pits to provide room for the jacking frame, the jacking head, the reaction blocks, the jacks, auger rig, and the jacking pipe. Provide sufficient pit width to allow ample working space on each side of the jacking frame. Allow sufficient pit depth such that the invert of the pipe, when placed on the guide frame, will be at the elevation desired for the completed line. Tightly sheet the pit and keep it dry at all times.

3.5 ROCK EXCAVATION

- A. Rock Excavation: Excavate rock within the boundary lines and grades as shown, specified or required.
 - 1. Rock removed from the excavation becomes the property of the CONTRACTOR. Transport and dispose of excavated rock at an off site disposal location. Obtain the off site disposal location.
 - 2. Remove all shattered rock and loose pieces.
- B. Structure Depths: For cast-in-place structures, excavate the rock only to the bottom of the structure, foundation slab, or drainage blanket.
- C. Trench Width: Maintain a minimum clear width of the trench at the level of the top of the pipe of the outside diameter of the pipe barrel plus 4 feet, unless otherwise approved.
- D. Trench Depth: For trench excavation in which pipelines or electrical ducts are to be placed, excavate the rock to a minimum depth of 8 inches below the bottom of the pipe or duct encasement. Provide a cushion of sand or suitable crushed rock. Refill the excavated space with pipe bedding material in accordance with Section 02223. Include placing, compacting and shaping pipe bedding material in the appropriate Contract Items.

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- E. Manhole Depths: For manhole excavation, excavate the rock to a minimum depth of 8 inches below the bottom of the manhole base for pipelines 24 inches in diameter and larger and 6 inches below the bottom manhole base for pipelines less than 24 inches in diameter. Refill the excavated space with pipe bedding material in accordance with Section 02223. Include placing, compacting and shaping pipe bedding material for manhole bases in the appropriate Contract Items.
- F. Over-excavated Space: Refill the excavated space in rock below structures, pipelines, conduits and manholes, which exceeds the specified depths with 2,500 psi concrete, crushed stone, washed shell, or other material as directed. Include refilling of over-excavated space in rock as part of the rock excavation.
- G. Other Requirements: Follow, where applicable, the requirements of the subsections on "Trench Excavation" and "Structure Excavation".
- H. Payment: Rock excavation, including placing, compacting and shaping of the select fill material, is included in the cost of linear foot of pipe.

3.6 FINISHED EXCAVATION

- A. Finish: Provide a reasonably smooth finished surface for all excavations, which is uniformly compacted and free from irregular surface changes.
- B. Finish Methods: Provide a degree of finish which is ordinarily obtainable from blade-grade operations, except as otherwise specified in Section 02223.

3.7 PROTECTION

- A. Traffic and Erosion: Protect newly graded areas from traffic and from erosion.
- B. Repair: Repair any settlement or washing away that may occur from any cause, prior to acceptance. Re-establish grades to the required elevations and slopes.
- C. It shall be the CONTRACTOR's responsibility to acquaint himself with all existing conditions and to locate all structures and utilities along the proposed utility alignment in order to avoid conflicts. Where actual conflicts are unavoidable, work shall be coordinated with the facility owner and performed so as to cause as little interference as possible with the service rendered by the facility disturbed. Facilities or structures damaged in the prosecution of the work shall be repaired and/or replaced immediately, in conformance with current standard practices of the industry, or according to the direction of the owner of such facility, at the CONTRACTOR's expense.
- D. Other Requirements: Conduct all Work in accordance with the environmental protection requirements specified in Division 1.

3.8 AUTHORIZED ADDITIONAL EXCAVATION

- A. Additional Excavation: Carry the excavation to such additional depth and width as authorized in writing, for the following reasons:

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1. In case the materials encountered at the elevations shown are not suitable.
 2. In case it is found desirable or necessary to go to an additional depth, or to an additional depth and width.
- B. Refill Materials: Refill such excavated space with either authorized 2500 psi concrete or compacted select fill material, in compliance with the applicable provisions of Section 02223.
- C. Compaction: Where necessary, compact fill materials to avoid future settlement. As a minimum, unless otherwise specified or directed, backfill layers shall not exceed 6-inches in thickness for the full trench width and compaction shall equal 95% of maximum density, or 98% if under paved area of roadway, as determined by using ASTM D 1557. Compaction density tests shall be made at all such backfill areas with spacing not to exceed 100 feet apart and on each 6-inch compacted layer.
- D. Payment: Additional earth excavations so authorized and concrete or select fill materials authorized for filling such additional excavation and compaction of select fill materials will be paid for under the appropriate Contract Items or where no such items exist, as a change in the Work.

3.9 UNAUTHORIZED EXCAVATION

- A. Stability: Refill any excavation carried beyond or below the lines and grades shown, except as specified in the subsection headed "Authorized Additional Excavation", with such material and in such manner as may be approved in order to provide for the stability of the various structures.
- B. Refill Materials: Refill spaces beneath all structures, pipelines, or conduits excavated without authority with 2500 psi concrete or compacted select fill material, as approved.
- C. Payment: Refill for unauthorized excavation will not be measured and no payment will be made therefor.

3.10 SEGREGATION STORAGE AND DISPOSAL OF MATERIAL

- A. Stockpiling Suitable Materials: Stockpile topsoil suitable for final grading and landscaping and excavated material suitable for backfilling or embankments separately on the site in approved locations.
- B. Stockpile Locations: Store excavated and other material a sufficient distance away from the edge of any excavation to prevent its falling or sliding back into the excavation and to prevent collapse of the wall of the excavation. Provide not less than 2 feet clear space between the top of any stockpile and other material and the edge of any excavation.
- C. Excess Materials: Be responsible for transport and disposal of surplus excavated material and excavated material unsuitable for backfilling or embankments at an off site disposal location secured by the CONTRACTOR. Contractor shall be responsible

EXHIBIT A

for the proper disposal of all AC pipe/couplings and shall comply with all Federal, State, and local regulatory agencies accordingly.

3.11 REMOVAL OF WATER

- A. Water Removal: At all times during the excavation period and until completion and acceptance of the WORK at final inspection, provide ample means and equipment with which to remove promptly and dispose of properly all water entering any excavation or other parts of the WORK.
- B. Dry Excavations: Keep the excavation dry.
- C. Water Contact: Allow no water to rise over or come in contact with masonry and concrete until the concrete and mortar have attained a set and, in any event, not sooner than 12 hours after placing the masonry or concrete.
- D. Discharge of Water: Dispose of water pumped or drained from the Work in a safe and suitable manner without damage to adjacent property or streets or to other work under construction.
- E. Protection: Provide adequate protection for water discharged onto streets. Protect the street surface at the point of discharge.
- F. Sanitary Sewers: Discharge no water into sanitary sewers.
- G. Storm Sewers: Discharge no water containing settleable solids into storm sewers.
- H. Repair: Promptly repair any and all damage caused by dewatering the Work.

END OF SECTION

SECTION 02223
BEDDING AND BACKFILLING

PART 1 GENERAL

1.1 SUMMARY

- A. **General Requirements:** Backfill all excavation to the original surface of the ground or to such other grades as may be shown or required. For areas to be covered by topsoil, leave or stop backfill (12) inches below the finished grade. Obtain approval for the time elapsing before backfilling against masonry structures. Remove from all backfill, any compressible, putrescible, or destructible rubbish and refuse and all lumber and braces from the excavated space before backfilling is started. Leave sheeting and bracing in place or remove as the work progresses.
- B. **Equipment Limitations:** Do not permit construction equipment used to backfill to travel against and over cast-in-place concrete structures until the specified concrete strength has been obtained, as verified by concrete test cylinders. In special cases where conditions warrant, the above restriction may be modified providing the concrete has gained sufficient strength, as determined from test cylinders, to satisfy design requirements for the removal of forms and the application of load.
- C. **Related Work Specified In Other Sections Includes:**
 - 1. Section 02110 - Site Clearing
 - 2. Section 02222 – Excavation – Earth and Rock

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. ASTM D 1557 - Standard Test Methods for Moisture-Density Relations of Soil and Soil-Aggregate Mixtures Using 10 lb Rammer and 18 in Drop

PART 2 PRODUCTS

2.1 BACKFILL MATERIAL - GENERAL

- A. **General:** Whenever trenches are in or across driveways, paved areas or streets, the Contractor shall be responsible for any settlement which occurs within one (1) year of preliminary acceptance. Refer to Collier County Utilities Standards and Procedures Ordinance Section 9.1.2 for laying and backfilling requirements.

Backfill with sound materials, free from waste, organic matter, rubbish, boggy or other unsuitable materials. Acceptable backfill shall not contain rocks or stones larger than 2 inches in size.

- B. **General Materials Requirements:** Conform materials used for backfilling to the requirements specified. Follow common fill requirements whenever drainage or select fill is not specified. Determine and obtain the approval of the appropriate test method where more than one compaction test method is specified.

- C. **Classification of Approved Embedment Materials:** Embedment materials listed here include a number of processed materials plus the soil types defined according to the Unified Soil Classification System (USCS) in ASTM D2487. These materials are grouped into 5 broad categories according to their suitability for this application.
 - 1. **Class I:** Angular, 0.25 inch to 1.5 inch (6 to 40 mm) graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed shells and crushed stone. (Note: The size range and resulting high void ratio of Class I material makes it suitable for use to dewater trenches during pipe installation. This permeable characteristic dictates that its use be limited to locations where pipe support will not be lost by migration of fine grained natural material from the trench walls and bottom or migration of other embedment materials into the Class I material. When such migration is possible, the material's minimum size range should be reduced to finer than 0.25 inch (6 mm) and the gradation properly designed to limit the size of the voids. An alternative to modifying the gradation is to use a geotextile fabric as a barrier to migration to fines.)

 - 2. **Class II:** Coarse sands and gravels with maximum particle size of 1.5 inches (40 mm), including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil Types GW, GP, SW and SP are included in this class. (Note: Sands and gravels, which are clean or borderline between clean and with fines, should be included. Coarse-grained soils with less than 12 percent, but more than 5 percent fines are neglected in ASTM D2487 and the USCS, but should be included. The gradation of Class II material influences its density and pipe support strength when loosely placed. The gradation of Class II material may be critical to the pipe support and stability of the foundation and embedment, if the material is imported and is not native to the trench excavation. A gradation other than well graded, such as uniformly graded or gap graded, may permit loss of support by migration into void spaces of a finer grained natural material from the trench wall and bottom. An alternative to modifying the gradation is to use a geotextile fabric as a barrier to migration of fines.)

 - 3. **Class III:** Fine sand and clayey (clay filled) gravels, including fine sands, sand-clay mixtures and gravel-clay mixtures. Soil Types GM, GC, SM and SC are included in this class.

4. **Class IV:** Silt, silty clays and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil Types MH, ML, CH and CL are included in this class. (Note: Use caution in the design and selection of the degree and method of compaction for Class IV soils because of the difficulty in properly controlling the moisture content under field conditions. Some Class IV soils with medium to high plasticity and with liquid limits greater than 50 percent (CH, MH, CH-MH) exhibit reduced strength when wet and should only be used for bedding, haunching and initial backfill in arid locations where the pipe embedment will not be saturated by groundwater, rainfall or exfiltration from the pipe. Class IV soils with low to medium plasticity and with liquid limits lower than 50 percent (CL, ML, CL-ML) also require careful consideration in design and installation to control moisture content, but need not be restricted in use to arid locations.)

5. **Class V:** This class includes the organic soils OL, OH and PT as well as soils containing frozen earth, debris, rocks larger than 1.5 inches (40 mm) in diameter and other foreign materials. Do not use these materials for bedding, haunching or backfill.

2.2 SELECT BACKFILL

- A. **Materials for Select Backfill:** Use clean gravel, crushed stone, washed shell, or other granular or similar material as approved which can be readily and thoroughly compacted to 95 percent of the maximum dry density obtainable by ASTM D 1557.

1. **Allowed Materials:** Grade select backfill between the following limits:

U.S. Standard Sieve	Percent Passing By Weight
2 inch	100
1-1/2 inch	90-100
1 inch	75-95
1/2 inch	45-70
#4	25-50
#10	15-40
#200	5-15

2. **Unallowed Materials:** Very fine sand, uniformly graded sands and gravels, sand and silt, soft earth, or other materials that have a tendency to flow under pressure when wet are unacceptable as select backfill.

2.3 COMMON ON-SITE BACKFILL

- A. **Materials for Common Backfill:** Material from on-site excavation may be used as common backfill (fill) provided that it can be readily compacted to 90 percent of the maximum dry density obtainable by ASTM D 1557, and does not contain unsuitable material. Select fill may be used as common fill at no change in the Contract Price.
- B. **Granular Materials On-Site:** Granular on-site material, which is fairly well graded between the following limits may be used as granular common fill:

U.S. Standard Sieve	Percent Passing by Weight
2 inch	100
#10	50-100
#60	20-90
#200	0-20

- C. **Cohesive Materials On-Site:** Cohesive site material may be used as common fill.
 - 1. The gradation requirements do not apply to cohesive common fill.
 - 2. Use material having a liquid limit less than or equal to 40 and a plasticity index less than or equal to 20.
- D. **Material Approval:** All material used as common fill is subject to approval. If there is insufficient on-site material, import whatever additional off-site material is required which conforms to the specifications and at no additional cost.

2.4 UTILITY PIPE BEDDING

- A. **Gradation for Small Piping:** For pipe 18 inches or less in diameter, use pipe bedding of material 90 percent of which will be retained on a No. 8 sieve and 100 percent of which will pass a 1/2-inch sieve and be well graded between those limits.
- B. **Gradation for Large Piping:** For pipe larger than 18 inches in diameter, use the same pipe bedding material as specified for smaller pipe or use a similar well graded material 90 percent of which will be retained on a No. 8 sieve and 100 percent of which will pass a 1-inch sieve.
- C. Provide a minimum of six (6) inches bedding material under all gravity sewer piping. In areas where poor soil conditions or rock exist, provide a minimum of six (6) inches of pipe bedding material under water or force main pressure pipe.

PART 3 EXECUTION

3.1 PRECAST MANHOLE BEDDING

- A. Bedding Compaction: Bed all precast manholes in well graded, compacted 12-inch layer of crushed stone. Compact bedding thickness no less than 6 inches for precast concrete manhole bases.
- B. Concrete Work Mats: Cast cast-in-place manhole bases and other foundations for structures against a 2500 psi concrete work mat in clean and dry excavations.
- C. Bedding Placement: Place select fill used for bedding beneath precast manhole bases, in uniform layers not greater than 9 inches in loose thickness. Thoroughly compact in place with suitable mechanical or pneumatic tools to not less than 95 percent of the maximum dry density as determined by ASTM D 1557.
- D. Use of Select Fill: Bed existing underground structures, tunnels, conduits and pipes crossing the excavation with compacted select fill material. Place bedding material under and around each existing underground structure, tunnel, conduit or pipe and extend underneath and on each side to a distance equal to the depth of the trench below the structure, tunnel, conduit or pipe.

3.2 PIPE BEDDING AND INITIAL BACKFILL

- A. Placement: Place backfill for initial pipe backfill from top of bedding to 1 foot over top of pipes in uniform layers not greater than 8 inches in loose thickness. Tamp under pipe haunches and thoroughly compact in place the backfill with suitable mechanical or pneumatic tools to not less than 98 percent of the maximum dry density as determined by ASTM D 1557.
- B. Foundation Bedding: Place bedding, to a depth specified by the City Manager or designee, as a foundation in wet, yielding or mucky locations. Construct foundation bedding by removal of the wet, yielding or mucky material and replacement with sufficient Class I material to correct soil instability.
- C. Stone Placement: Do not place large stone fragments in the pipe bedding or backfill within 2 feet over or around pipelines, or nearer than 2 feet at any point from any casing pipe, conduit or concrete wall.
- D. Machine Compaction: Machine Compaction of initial backfill is prohibited unless adequate cover as deemed by the City Manager or designee is provided. In no case shall adequate cover be less than 12 inches.
- E. Unallowed Materials: Pipe bedding containing very fine sand, uniformly graded sands and gravels, sand and silt, soft earth, or other materials that have a tendency to flow under pressure when wet is unacceptable.

3.3 TRENCH BACKFILL

- A. General: Backfill trenches from 1 foot over the top of the pipe, from the top of electrical duct bedding or as shown to the bottom of pavement base course, subgrade for lawns or lawn replacement, to the top of the existing ground surface or to such other grades as may be shown or required.
- B. Materials: All backfill material shall be acceptable dry materials, and shall be free from cinders, ashes, refuse, vegetable or organic material, boulders, rocks, or stones, or other deleterious material which in the opinion of the City Manager or designee is unsuitable.
- C. Depth of Placement - Place trench backfill in uniform layers not greater than 12 inches in loose thickness and that can be thoroughly compacted in place using suitable mechanical or pneumatic equipment to not less than 98 percent of the maximum dry density as determined by ASTM D 1557.
- D. Depth of Placement - Undeveloped Areas: In nondeveloped areas and where select fill material or hand-placed backfill are not specified or required, place suitable job-excavated material or other approved backfill in lifts not exceeding 12 inches in loose thickness. Lifts of greater thickness may be permitted by the City Manager or designee if the CONTRACTOR demonstrates compliance with required densities. When the trench is full, consolidate the backfill by jetting, spading, or tamping to ensure complete filling of the excavation. Mound the top of the trench approximately 12 inches to allow for consolidation of backfill.
- E. Compaction: Compact backfill as a percentage of the maximum density at optimum moisture content as determined by the standard proctor test, ASTM D698 as demonstrated in the following table:

Area	(Mod.) ASTM D1557
Around and 1' (Min) above top of pipe	98
Remaining Trench	98
Pavement Sub-Grade and Shoulders (Last 3' of Fill)	98
Base Material and Pavement	98
Adjacent to Structures (Areas not Paved)	98
Under Structures	98
Sub-Base	98

- F. Density Tests: Density tests will be made at the request of the City Manager or designee. Deficiencies will be corrected at the expense of the CONTRACTOR.

EXHIBIT A

- G. Dropping of Material on Work: Do trench backfilling work in such a way as to prevent dropping material directly on top of any conduit or pipe through any great vertical distance.
- H. Distribution of Large Materials: Break lumps up and distribute any stones, pieces of crushed rock or lumps which cannot be readily broken up, throughout the mass so that all interstices are solidly filled with fine material.

3.4 STRUCTURE BACKFILL

- A. Use crushed stone underneath all structures, and adjacent to structures where pipes, connections and structural foundations are to be located within this fill. Use crushed stone beneath all pavements, walkways, and railroad tracks, and extend to the bottom of pavement base course or ballast.
 - 1. Place backfill in uniform layers not greater than 8 inches in loose thickness and thoroughly compact in place with suitable approved mechanical or pneumatic equipment.
 - 2. Compact backfill to not less than 95 percent of the maximum dry density as determined by ASTM D 1557.
- B. Use of Common Fill: Use common granular fill adjacent to structures in all areas not specified above. Select fill may be used in place of common granular fill at no additional cost.
 - 1. Extend such backfill from the bottom of the excavation or top of bedding to the bottom of subgrade for lawns or lawn replacement, the top of previously existing ground surface or to such other grades as may be shown or required.
 - 2. Place backfill in uniform layers not greater than 8 inches in loose thickness and thoroughly compact in place with suitable equipment, as specified above.
 - 3. Compact backfill to not less than 90 percent of the maximum dry density as determined by ASTM D 1557.

3.5 COMPACTION EQUIPMENT

- A. Equipment and Methods: Carry out all compaction with suitable approved equipment and methods.
 - 1. Compact clay and other cohesive material with sheep's-foot rollers or similar equipment where practicable. Use hand held pneumatic tampers elsewhere for compaction of cohesive fill material.

EXHIBIT A

2. Compact low cohesive soils with pneumatic-tire rollers or large vibratory equipment where practicable. Use small vibratory equipment elsewhere for compaction of cohesionless fill material.
3. Do not use heavy compaction equipment over pipelines or other structures, unless the depth of fill is sufficient to adequately distribute the load.

3.6 FINISH GRADING

- A. Final Contours: Perform finish grading in accordance with the completed contour elevations and grades shown and blend into conformation with remaining natural ground surfaces.
 1. Leave all finished grading surfaces smooth and firm to drain.
 2. Bring finish grades to elevations within plus or minus 0.10 foot of elevations or contours shown.
- B. Surface Drainage: Perform grading outside of building or structure lines in a manner to prevent accumulation of water within the area. Where necessary or where shown, extend finish grading to ensure that water will be carried to drainage ditches, and the site area left smooth and free from depressions holding water.

3.7 RESPONSIBILITY FOR AFTERSSETTLEMENT

- A. Aftersettlement Responsibility: Take responsibility for correcting any depression which may develop in backfilled areas from settlement within one year after the work is fully completed. Provide, as needed, backfill material, pavement base replacement, permanent pavement, sidewalk, curb and driveway repair or replacement, and lawn replacement, and perform the necessary reconditioning and restoration work to bring such depressed areas to proper grade as approved.

3.8 INSPECTION AND TESTING OF BACKFILLING

- A. Sampling and Testing: Provide sampling, testing, and laboratory methods in accordance with the appropriate ASTM Standard Specification. Subject all backfill to these tests.
- B. Correction of Work: Correct any areas of unsatisfactory compaction by removal and replacement, or by scarifying, aerating or sprinkling as needed and recompaction in place prior to placement of a new lift.
- C. Testing Schedule:
 1. Compaction Schedule
 2. Optimum Moisture Content (Proctor Test)

END OF SECTION

SECTION 02230

ROADWAY CROSSINGS BY OPEN CUT

PART 1 GENERAL

1.1 SCOPE OF WORK

Provide all labor, materials, equipment, supervision and incidentals required to install the pipeline as shown on the drawings in City streets by method of open cut.

Note: Open cutting of existing pavement will generally not be allowed, but may be considered under one or more of the following conditions:

1. Subsurface obstructions including rock;
2. Extreme high water table;
3. Limited space for jack and bore pits;
4. Condition of roadway surface - including imminent resurfacing and rebuilding, provided inspection and approval beforehand is made by the affected Transportation Department; or
5. Extreme economic hardship is proven with adequate supportive data.

1.2 SUBMITTAL

- A. Submit shop drawings to the ENGINEER for review.
- B. Before starting work, submit to the City Stormwater, Streets and Traffic Department, with copy to the ENGINEER, a detailed schedule of his operations a minimum of fourteen (14) days prior to beginning work for approval. This shall include, but not be limited to, type and extent of temporary paving, and drawings and lists describing materials and traffic control methods to be used. Approval shall not relieve the CONTRACTOR of his obligation to provide a safe and proper crossing.
- C. If a detour is required, submit a traffic control plan for approval to the City Stormwater, Streets and Traffic Department, County, and/or the Florida Department of Transportation.
- D. Submit a plan for maintenance of traffic in accordance with Index 600 through 650 of the Florida Department of Transportation Specifications.

EXHIBIT A

PART 2 PRODUCTS

2.1 MATERIALS

- A. Use materials specified in other applicable portions of this Specification.

PART 3 EXECUTION

3.1 GENERAL

- A. Trench dimensions for open cutting of road crossings are shown on the Standard Details.
- B. Where possible, limit the completion of the open-cut road crossing to a 24-hour period. Perform all work in accordance with the approved traffic control plan.
- C. Notify City Stormwater, Streets and Traffic Department forty-eight (48) hours in advance of starting construction.

3.2 INSTALLATION

A. Temporary Roadways

1. For temporary roadways required for traffic relocation use materials meeting the requirements of the FDOT. Use temporary roadways when crossing a state highway right-of-way or at the direction of the ENGINEER.
2. Maintain temporary roadways in good condition throughout their use.
3. Maintain drainage through all existing ditches by the use of culvert pipe as necessary.
4. Submit drawings indicating the type and location of temporary roadways for approval prior to beginning work.
5. Provide all necessary barricades and signs where detours are permitted as required to divert the flow of traffic. Notify Collier County DOT and ENGINEER in advance of planned detours. While traffic is detoured, expedite construction operations to minimize the period of detour.
6. Perform and complete all work at the roadway crossing in a manner fully satisfactory to the City Stormwater, Streets and Traffic Department.

B. Maintenance of Traffic

1. The requirements specified herein are in addition to the plan for Maintenance of Traffic as specified in Section 01570.

EXHIBIT A

2. Furnish during construction and any subsequent maintenance within State secondary road right-of-ways and City streets, proper signs, signal lights, flagmen, and other warning devices for the protection of traffic all in conformance with the latest Manual on Uniform Traffic Control and Safe Streets and Highways, and the Florida Manual of Traffic Control and Safe Practices for Street and Highway Construction, Maintenance and Utility Operations. Information as to the above may be obtained from FDOT Division engineers. The ENGINEER, City Engineer, or FDOT Manager of the right-of-way or their representatives reserves the right to stop any work for non-compliance.
 3. Take precautions to prevent injury to the public due to open trenches. Night watchmen may be required where special hazards exist, or police protection provided for traffic while work is in progress. Be fully responsible for damage or injuries whether or not police protection has been provided.
 4. Unless permission to close a City street is received in writing from the proper authority, place all excavated material so that vehicular and pedestrian traffic may be maintained at all times. Repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety satisfactory to the ENGINEER if the CONTRACTOR's operations cause traffic hazards.
 5. Be fully responsible for the installation of adequate safety precautions, for maintenance of the channelization devices, and for the protection of the traveling public.
 6. Maintain at all open cut crossings, a minimum of one-way traffic during the daylight hours, and two-way traffic at night.
- C. Installation of Pipeline
1. Meet the requirements of the applicable portions of this specification for pavement removal, sheeting, shoring and bracing, excavation and backfill, and dewatering.
 2. Install the pipe in accordance with Division 2 of these Specifications.
 3. Backfill the trench in accordance with the requirements of Section 02223.
 4. Replace pavement in accordance with Section 02575 of this Specification.

END OF SECTION

NO TEXT FOR THIS PAGE

EXHIBIT A

SECTION 02236

SIGNAGE AND MARKING

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work Included: Furnish all labor, materials, equipment and methods to install, repair, and place into operation traffic signs, street signs, pavement marking and striping, and reflective pavement markers as required to return the roadway within the project limits back to existing functional conditions.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Traffic Signs, Street Signs, Paint Striping
 - 1. Traffic paint and marking materials: Conform to requirements of the following sections of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction:

	<u>Section</u>
a. Traffic Paint	971-12
b. Glass Spheres (for Reflective Traffic Paint)	971-14
c. Thermoplastic Traffic Stripes	711
 - 2. Traffic and information signs: Conform to requirements of Section 700 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.
- B. Reflective Pavement Markers
 - 1. Reflective pavement markers: As specified in Section 706 of FDOT Standard Specifications and have overall dimensions of 4" x 4" x 79" with a 30 degree reflective face. Adhesive shall be pressure sensitive 100% solids .120" thick. Minimum application pressure shall be 60 p.s.i. Minimum shear stress shall exceed 10 p.s.i. at 70 degrees F.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Roadway traffic markings, striping and site pavement marking for traffic regulation and parking: Conform to requirements of Sections 710 and 711 of the Florida Department of

EXHIBIT A

Transportation Standard Specifications for Road and Bridge Construction as amended and Traffic Operations Standard Index Nos. 17346, 17352 and 17355.

- B. Sign work: Comply with applicable portions of Section 700 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction and Traffic Operations Standard Index No. 11864.
- C. Install reflective pavement markers in accordance with manufacturer's recommendations at the locations and dimensions shown on the Drawings and at fire hydrant locations. Pavement markers at fire hydrants shall be blue-blue.
- D. Contractor shall give written notification to Engineer a minimum of 48 hours prior to beginning any roadway striping work.

END OF SECTION

SECTION 02275

NPDES REQUIREMENTS

FOR CONSTRUCTION ACTIVITIES IMPACTING MORE THAN ONE ACRE

PART 1 GENERAL

1.1 DESCRIPTION

- A. This Section describes the required documentation to be prepared and signed by the CONTRACTOR before conducting construction operations, in accordance with the terms and conditions of the National Pollutant Discharge Elimination System (NPDES) Stormwater Permit, as required by Florida Administrative Code (F.A.C.) Chapter 62-621.
- B. The CONTRACTOR shall be responsible for implementation, maintenance and inspection of stormwater pollution prevention control measures in accordance with F.A.C. Chapter 62-621 including, but not limited to, erosion and sediment control, stormwater management plans, waste collection and disposal, off-site vehicle tracking, and other practices shown on the Drawings and/or specified elsewhere in this or other specifications. The stormwater pollution prevention control measures shall include protection of offsite public and private stormsewer facilities potentially impacted during construction. Stormwater facilities include streets, inlets, pipes, ditches, swales, canals, culverts, control structures, and detention/retention areas.
- C. The CONTRACTOR shall prepare and review implementation of the Stormwater Pollution Prevention Plan (SWPPP) in a meeting with the City Manager or designee prior to start of construction.

1.2 UNIT PRICES

- A. Unless indicated in the Unit Price Schedule as a pay item, no separate payment will be made for work performed under this Section. Include cost of work to be performed under this Section in pay items of which this work is a component.

1.3 REFERENCE DOCUMENTS

- A. ASTM D3786 – Standard Test Method for Hydraulic Bursting Strength for Knitted Goods and Nonwoven Fabrics
- B. ASTM D4632 – Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

EXHIBIT A

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 NOTICE OF INTENT (NOI)

- A. Fill out, sign and date a Notice of Intent to Use Generic Permit for Stormwater Discharge from Large and Small Construction Activities, (FDEP Form 62-621.300(4)(b)). Submit the signed copy of the NOI to the City Manager or designee. The City Manager or designee will submit the completed form to the FDEP along with the required permit fee.

3.2 CERTIFICATION REQUIREMENTS

- A. On the attached OPERATOR'S INFORMATION form, fill out the name, address and telephone number for the CONTRACTOR, persons or firms responsible for maintenance and inspection of erosion and sediment control measures, and all Subcontractors.
- B. The CONTRACTOR and Subcontractors named in the Operator's Information form shall read, sign and date the attached CONTRACTOR'S/SUBCONTRACTOR'S CERTIFICATION form.
- C. The persons or firms responsible for maintenance and inspection of erosion and sediment control measures shall read, sign and date the attached EROSION CONTROL CONTRACTOR'S INSPECTION AND MAINTENANCE CERTIFICATION form.
- D. Submit all forms to the City Manager or designee before beginning construction.

3.3 RETENTION OF RECORDS

- A. Retain a copy of the SWPPP at the construction site and at the Contractor's office from the date that it became effective to the date of project completion.
- B. At project closeout, submit to the City Manager or designee all NPDES forms and certifications, as well as a copy of the SWPPP. Stormwater pollution prevention records will be retained by the City Manager or designee for a period of three (3) years from the date of project completion.

3.4 REQUIRED NOTICES

- A. The following notices shall be posted from the date that the SWPPP goes into effect until the date of final site stabilization:

EXHIBIT A

1. A copy of the submitted NOI and a brief project description, as given in the SWPPP, shall be posted at the construction site and at the CONTRACTOR's office in a prominent place for public viewing.
2. Notice to drivers of equipment and vehicles, instructing them to stop, check and clean tires of debris and mud before driving onto traffic lanes. Post such notices at every stabilized construction exit area.
3. Post a notice of waste disposal procedures in an easily visible location on site.
4. Notice of hazardous material handling and emergency procedures shall be posted with the NOI on site. Keep copies of Material Safety Data Sheets at a location on site that is know to all personnel.
5. Keep a copy of each signed certification at the construction site and at the CONTRACTOR's office.

REQUIRED FORMS FOLLOW

OPERATOR'S INFORMATION

Owner's Name and Address:

City Utilities Department

380 Riverside Circle
Naples, Florida 34102
(239) 213-4717

Contractors' Names and Addresses:

General Contractor:

Telephone:

Site Superintendent:

Telephone:

Erosion Control and
Maintenance Inspection:

Telephone:

Subcontractors' Names and Addresses:

Phone: _____

Phone: _____

CONTRACTOR'S / SUBCONTRACTOR'S CERTIFICATION

I certify under penalty of law that I understand the terms and conditions of Florida's National Pollutant Discharge Elimination System (NPDES) Construction General Permit that authorizes storm water discharges associated with activity from the construction site identified as part of this certification, and that I have received a copy of the SWPPP.

Signature: _____
Name: (printed or typed) _____
Title: _____
Company: _____
Address: _____

Signature: _____
Name: (printed or typed) _____
Title: _____
Company: _____
Address: _____

Signature: _____
Name: (printed or typed) _____
Title: _____
Company: _____
Address: _____

**EROSION CONTROL CONTRACTOR'S
INSPECTION AND MAINTENANCE CERTIFICATION**

I certify under penalty of law that I understand the terms and conditions of Florida's National Pollutant Discharge Elimination System (NPDES) Construction General Permit that authorizes storm water discharges associated with activity from the construction site identified as part of this certification, and that I have received a copy of the SWPPP.

Signature: _____
Name: (printed or typed) _____
Title: _____
Company: _____
Address: _____
Date: _____

**STORM WATER POLLUTION PREVENTION PLAN
INSPECTION AND MAINTENANCE REPORT**

Project: _____
 Contractor: _____
 Inspector: _____
 Date: _____

CONTROLS	LOCATION	SEDIMENT HEIGHT	PROBLEM DESCRIPTION	MAINTENANCE REQUIRED	REPAIRED BY / DATE

END OF SECTION

SECTION 02276

EROSION AND SEDIMENTATION CONTROL

PART 1 GENERAL

1.1 DESCRIPTION

- A. The work specified in this Section consists of designing, providing, maintaining and removing temporary erosion and sedimentation controls as necessary. The Contractor shall exercise extreme care to minimize contamination of rainfall run-off from the site. All necessary provisions and care shall be taken to insure compliance with the Water Quality Standards of the State of Florida, more particularly the South Florida Water Management District (SFWMD). The Contractor shall make himself familiar with Chapter 17-3, "Water Quality Standards," of the Florida Administrative Code (F.A.C.). Compliance for protection of State Waters and/or jurisdictional areas require the use of hay bales, temporary swales, settling ponds, silt screens, and other appropriate methods as necessary to prevent soils and sediment from entering such areas. Prior to commencement of work , the Contractor shall submit a plan of action and a list of materials he plans to use for sedimentation/erosion control to the City for approval.
- B. Temporary erosion controls include, but are not limited to rip rap channels, road stabilization, grassing, mulching, setting, watering, and reseeding onsite surfaces and spoil and borrow area surfaces and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the CITY.
- C. Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, public and private on- and off-site storm sewer inlets protectors, and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the CITY.
- D. If required by regulation or CITY, CONTRACTOR is responsible for providing an approved Erosion Control Plan for effective temporary erosion and sediment control measures during construction or until final controls become effective.

1.2 REFERENCE DOCUMENTS

- A. South Florida Building Code and Standard Building Code.

EXHIBIT A

PART 2 PRODUCTS

2.1 EROSION CONTROL

- A. Sodding and Seeding is specified in Section 02400.
- B. Rip Rap Channel.
- C. Road Stabilization.
- D. Netting - fabricated of material acceptable to the City Manager or designee.

2.2 SEDIMENTATION CONTROL

- A. Temporary Sediment Trap.
- B. Sediment Fence.
- C. Bales - clean, seed free pine needle or cereal hay type.
- D. Netting - fabricated of material acceptable to the City Manager or designee.
- E. Filter Stone - crushed stone conforming to Florida Department of Transportation specifications.
- F. Concrete Block - hollow, non-load-bearing type.
- G. Concrete - exterior grade not less than one inch thick.

PART 3 EXECUTION

3.1 EROSION CONTROL

- A. Minimum procedures for grassing are:
 - 1. Scarify slopes to a depth of not less than six inches and remove large clods, rock, stumps, roots larger than 1/2 inch in diameter and debris.
 - 2. Sow seed within twenty-four (24) hours after the ground is scarified with either mechanical seed drills or rotary hand seeders.
 - 3. Apply mulch loosely and to a thickness of between 3/4 inch and 1-1/2 inches.
 - 4. Apply netting over mulched areas on sloped surfaces.

EXHIBIT A

5. Roll and water seeded areas in a manner which will encourage sprouting of seeds and growing of grass. Reseed areas that exhibit unsatisfactory growth (less than 70 percent coverage). Backfill and seed eroded areas, removing eroded material from effected drainage facilities.

B. Minimum procedures for rip rap channel are:

1. Clear the foundation of all trees, stumps, and roots.
2. Excavate the bottom and sides of the channel 30 inches below grade at all points to allow for the placement of riprap as shown in the typical cross-section in the Standard Details.
3. Install extra strength filter fabric on the bottom and sides of the channel foundation, placing the upstream fabric over the downstream fabric with at least a 1 foot overlap on all joints. The fabric is to be securely held in place with metal pins.
4. Place riprap evenly to the lines and grades shown on the drawings and staked in the field. Place riprap immediately following the installation of the filter fabric.
5. Riprap shall meet the specification for F.D.O.T. Class 2 Riprap.
6. Restore all disturbed areas in accordance with a vegetation plan submitted in advance and approved by the City Manager or designee.

C. Minimum Procedures for road stabilization are:

1. Clear roadbed and parking areas of all vegetation, roots and other objectionable material.
2. Provide surface drainage.
3. Spread 6 inch course of lime rock evenly over the full width of road and parking area and smooth to avoid depressions.
4. After grading, seed or resod all disturbed areas adjoining roads and parking areas conforming to existing conditions prior to construction.

3.2 SEDIMENTATION CONTROL

- A. Install and maintain silt dams, traps, barriers, and appurtenances as required. Replace deteriorated hay bales and dislodged filter stone.
- B. Minimum requirements for sediment trap:

EXHIBIT A

1. Clear, grub and strip the area under the embankment of all vegetation and root mat.
2. Clear retention area to elevation as approved by the City Manager or designee.
3. Use fill material free of roots, woody vegetation and organic matter. Place fill in lifts not to exceed 9 inches and machine compact.
4. Construct dam and stone spillway to dimensions, slopes and elevations shown.
5. Ensure that the spillway crest is level and at least 18 inches below the top of the dam at all points.
6. Stone used for spillway section - Class "B" erosion control stone.
7. Stone used on inside spillway face to control drainage - #67 washed stone.
8. Extend stone outlet section to vegetated road ditch on zero grade with top elevation of stone level with bottom of drain.
9. Ensure that the top of the dam at all points is 6 inches above natural surrounding ground.
10. Stabilize the embankment and all disturbed area above the sediment pools as shown in the vegetation plan.

C. Minimum requirements for sediment fence:

1. Construct sediment fence on low side of topsoil stockpile to prevent sediment from being washed into the drainage system. Fence to extend around approximately 70 percent of the perimeter of the stockpile. Fence must be unobstructed so as to maintain a minimum of 75 percent of its design flow rate.
2. Locate posts down slope of fabric to help support fencing.
3. Bury toe of fence approximately 8 inches deep to prevent undercutting.
4. When joints are necessary, securely fasten the fabric at a support post with overlap to the next post.
5. Filter fabric shall be of nylon, polyester, propylene or ethylene yarn with extra strength – 50 pounds per linear inch (minimum) - and with a flow rate

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of at least 0.30 gallons per foot per minute. Fabric should contain ultraviolet ray inhibitors and stabilizers.

6. Post to be 4-inch diameter pine with a minimum length of 4 feet.

D. Minimum Requirement for stormwater facilities protection

1. Public and private stormsewer facilities, both on and offsite, shall be protected at all inlets affected by construction. Stormsewer facilities include streets, inlets, pipes, ditches, swales, canals, culverts, control structures, and detention/retention areas.
2. Grated drop inlets shall be rapped with filter fabric in a manner that allows removal of accumulated sediment from the fabric before removing the grate.
3. Curb inlets shall be protected from sediment, turbid water from stormwater or dewatering activities; also construction debris, concrete mix and rinsate, and any other pollution.
4. Stormwater runoff entering such stormsewer inlets and stormwater detention/retention facilities with a turbidity greater than 50 NTU shall be considered to be in non-compliance with these regulations.

3.3 PERFORMANCE

- A. Should any of the temporary erosion and sediment control measures employed fail to produce results which comply with the requirements of the State of Florida, immediately take steps necessary to correct the deficiency at no expense to the CITY. Sedimentation or turbid water violations to stormwater facilities on or offsite shall require the contractor to remove all sediment from the affected facilities.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 02400

RESTORATION BY SODDING OR SEEDING

PART 1 GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

- A. The work in this section consists of furnishing all labor, material and equipment to restore all areas disturbed during construction to match preconstruction conditions. Establish a stand of grass within the areas disturbed by furnishing and placing grass sod where required, or by seeding and mulching areas not requiring sod.

1.2 REFERENCE DOCUMENTS

- A. Use materials conforming to the requirements of Florida Department of Transportation Standard Specifications for Road and Bridge Construction as follows:
 - 1. Section 570 – Grassing (by Seeding)
 - 2. Section 575 – Sodding
 - 3. Section 981 – Grassing and Sodding Materials
 - 4. Section 982 – Commercial Fertilizer
 - 5. Section 983 – Water for Grassing

1.3 SUBMITTALS

- A. Submit certifications and identification labels for all sodding supplied in accordance with General Conditions.

PART 2 PRODUCTS

2.1 SODDING

- A. Types: Sod may be of either St. Augustine or Argentine Bahia grass or as that disturbed, as established prior to construction. Use well matted sod with roots. When replacing sod in areas that are already sodded, use sod of the same type as the existing sod.

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- B. Provide sod as required in accordance with Florida Department of Transportation Specifications 575 and 981. Furnish sod equal to and similar in type as that disturbed. Place and water in accordance with FDOT Specifications Section 575.
- C. Use sod in commercial-size rectangles, preferably 12-inch by 24-inch or larger, except where 6-inch strip sodding is called for.
- D. Use sod that is sufficiently thick to secure a dense stand of live grass. Use sod that is live, fresh and uninjured at the time of planting, having a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. It shall be reasonably free of weeds and other grasses. Plant sod as soon as possible after being dug, and shade and keep moist from the time it is dug until it is planted.
- E. Handle sod in a manner to prevent breaking or other damage. Do not handle by dumping from trucks or other vehicles. Use care at all times to retain the native soil on the roots of each sod roll during stripping and handling. Sod that has been damaged by handling during delivery, storage or installation will be rejected.
- F. Swales: Place sod to the proper grade and cross section in all flow areas to ensure the design flow of water in the ditch. In excavating for the placement of sod, provide a minimum of 3 inches of undercut.

2.2 FERTILIZER

- A. Supply chemical fertilizer in suitable bags with the net weight certification of the shipment. Fertilizer shall be 12-8-8 and comply with Section 982 of the FDOT Standard Specification for Road and Bridge Construction.
- B. The numerical designations for fertilizer indicate the minimum percentages (respectively) of (1) total nitrogen, (2) available phosphoric acid and (3) water soluble potash, contained in the fertilizer.
- C. The chemical designation of the fertilizer shall be 12-8-8, with at least 50 percent of the nitrogen from a nonwater-soluble organic source. The nitrogen source may be a unreaformaldehyde source provided it is not derived from a waste product of the plastic industry.

2.3 EQUIPMENT

- A. Spread fertilizer uniformly at the specified rate.

2.4 NETTING

- A. Netting is fabricated of material similar to Geoscope Landscape Fabric or Engineer of Record approved equal.

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2.5 SEEDING

- A. Seed all unpaved areas disturbed during construction that do not require sod. Complete all seeding in conformance with FDOT Specifications Sections 570 and 981. Mulch and fertilize the grassed areas shall be mulched and fertilized in accordance with FDOT Specifications.
- B. Provide mulch material free of weeds. Mulch shall be oat straw or rye, Pangola, peanut, Coastal Bermuda, or Bahia grass hay.
- C. All seeds must have been tested within 6 months of planting. Submit a seed bag tag with final payment requests from each type or mixture of seed used. Seed mixtures shall be chosen to insure the development of the planting during the season or planting, and to insure future growth and permanence.

2.6 TOPSOIL

- A. Topsoil stockpiled during excavation may be used. If additional topsoil is required to replace topsoil removed during construction, it shall be obtained off site at no additional cost to the CITY. Topsoil shall be fertile, natural surface soil, capable of producing all trees, plants, and grassing specified herein.

2.7 MULCH

- A. Furnish small grain straw mulch. Apply mulch at a rate of 1.5 tons per acre, corresponding to a depth not less than 1-inch or more than 3-inches according to texture and moisture content of mulch material. Apply asphalt emulsion at a rate of 150 gallons per ton of straw to anchor the straw applied.

2.8 WATER

- A. It is the CONTRACTOR'S responsibility to supply all water to the site, as required during seeding and sodding operations and through the maintenance period and until the work is accepted. Make whatever arrangements may be necessary to ensure an adequate supply of water to meet the needs for the work. Furnish all necessary hose, equipment, attachments, and accessories for the adequate irrigation of lawns and planted areas as may be required. Water shall be suitable for irrigation and free from ingredients harmful to plant life.

2.9 SOIL IMPROVEMENTS

- A. Apply lime at the rate of 1 to 1.5 tons per acre. Apply 10-10-10 commercial fertilizer at the rate of 800 pounds per acre and work well into the top inch of topsoil.

PART 3 EXECUTION

3.1 SOD BED PREPARATION

- A. Clear areas to be sodded and/or seeded of all rough grass, weeds, and debris, and bring soil to an even grade.
- B. Thoroughly till soil to a minimum 4-inch depth.
- C. Bring area to proper grade, free of sticks, stones, or other foreign matter over 1-inch in diameter or dimension. The surface shall conform to finish grade, less the thickness of sod, free of water-retaining depressions, the soil friable and of uniformly firm texture.

3.2 INSPECTION

- A. Verify that soil preparation and related preceding work has been completed.
- B. Do not start work until conditions are satisfactory.

3.3 SOD HANDLING AND INSTALLATION

- A. During delivery, prior to planting, and during the planting of sod areas, protect the sod panels at all times from excessive drying and unnecessary exposure of the roots to the sun. Stack sod during construction and planting so as not to be damaged by sweating or excessive heat and moisture.
- B. After completion of soil conditioning as specified above, lay sod panels tightly together so as to make a solid sodded lawn area. On mounds and other slopes, the long dimension of the sod shall be laid perpendicular to the slope. Immediately following sod laying, roll the lawn areas with a lawn roller customarily used for such purposes, and then thoroughly water.
- C. Place sod at all areas where sod existed prior to construction, on slopes of 3 horizontal to 1 vertical (3:1) or greater, in areas where erosion of soils will occur, and as directed by the ENGINEER. On areas where the sod may slide, due to height and slope, the ENGINEER may direct that the sod be pegged, with pegs driven through the sod blocks into firm earth, at suitable intervals.

3.4 USE OF SOD ON ROADWAY PROJECTS

- A. In accordance with the FDOT District One Standard Practice, establish permanent green grass at the completion of roadway construction and maintenance work. The following shall apply to all restoration involving State or City roadways:
 - 1. Use sod in lieu of seed and mulch on all roadways with urban (raised curb) typical sections.

EXHIBIT A

2. One inch water per week shall be required for a minimum of four (4) consecutive weeks for the purpose of establishing sod. This can be waived during construction, if and only if there is a minimum of one inch of rain per week on all sod on the project.
3. Placed sod on slopes 1:3 or greater. Stake sod on slopes 1:2 or greater.
4. On all curves with superelevation, place sod from the edge of pavement to the toe of slope on the downhill side(s) for the entire length of the superelevated roadway. On multi-lane divided rural facilities, place sod in the median and on the inside of the curve in the superelevated areas. This does not apply to reverse crowns.
5. Use sod for all projects with less than 10,000 square yards grass area.
6. On tangent sections and on outside of curves, use sod between the edge of pavement and a point 4 feet beyond the shoulder break point.
7. The entire width of sod should not exceed 15 feet from the edge of pavement.
8. Sod is to be used to eliminate narrow seed and mulch areas. Sod areas less than 6 feet in width.
9. Place sod around drainage structures as per the standard Indexes and extend to the edge of pavement.

3.5 SOD MAINTENANCE

- A. The sod shall produce a dense, well-established growth. Repair and re-sod all eroded or bare spots until project acceptance. Repair to sodding shall be accomplished as in the original work.
- B. Perform sufficient watering to maintain adequate moisture for optimum development of the seeded and sodded areas, and no less than 1.5 inches of water per week for at least 2 weeks. Thereafter, apply water for a minimum of 60 days as needed until the sod takes root and starts to grow or until final acceptance, whichever is latest.

3.6 GUARANTEE

- A. Guarantee a live and vigorous stand of permanent grass at the time of acceptance of the work consisting of 80 percent minimum coverage for seeded grass areas with no bare spots greater than 5 square feet.

3.7 CLEANING

- A. Remove debris and excess materials from the project site.

END OF SECTION

SECTION 02523

SIDEWALKS, DRIVEWAYS AND CURBS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Sidewalks, sidewalk ramps, driveways, curbs and drive approaches complete with concrete materials, concrete curing compounds, joint materials, field quality control and appurtenances.

1.2 REFERENCES

- A. Reference Standards: Conform the work for this Section to the applicable portions of the following standard Specifications.
 - 1. ASTM - American Society of Testing and Materials
 - 2. AASHTO - American Association of State Highway and Transportation Officials
 - 3. FDOT - Florida Department of Transportation - Standard Specifications for Road and Bridge Construction.
 - 4. FAC - Florida Accessibility Code.
 - 5. ADAAG - American with Disabilities Act Accessibility Guidelines
 - 6. UFAS - Uniform Federal Accessibility Standards

1.3 SUBMITTALS

- A. Reports: Written permission for the use of all local disposal sites Furnish copies to the ENGINEER.
- B. Test Reports:
 - 1. Thickness and Compressive Strength: Provide the ENGINEER with two (2) certified copies of the test results. Perform the tests by a laboratory approved by the ENGINEER.

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1.4 JOB CONDITIONS

A. Environmental Requirements:

1. Temperature: Comply with the requirements for concrete installation due to outside ambient air temperatures as specified under Article 3.3.1 of this Section.

B. Protection:

1. Protection Against Rain: Comply with the requirements for protecting new work against damage from Rain, as specified under Article 3.3.1 of this Section.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Concrete: Use 2,500-psi concrete except as modified herein.
- B. Ready-Mixed Concrete: Use ready-mixed concrete that conforms to ASTM C94, Alternate 2.
- C. Water: Use water for mixing and curing concrete reasonably clean and free from oil, salt, acid, alkali, chlorides, sugar, vegetable, or other substances injurious to the finished product. Waters from sources approved by the local Health Department as potable may be used without test. Test water requiring testing in accordance with the current Method of Test for Quality of Water to be Used in Concrete, AASHTO T-26.
- D. Concrete Curing Compounds: Use white membrane curing compound for curing concrete that conforms to AASHTO M148, Type 1 clear, or Type 2 while per FDOT Section 925.
- E. Premolded Joint Filler: Use fiber joint filler that conforms to ASTM D1751. Use filler of the thickness, as specified herein, or as directed by the ENGINEER.
- F. Steel Hook Bolts: Use hook bolts that conform to ASTM A706, or for Grade 60 of ASTM A615, A616, or A617. Use 5/8-inch diameter hook bolts self-tapping.
- G. Joint Sealant: Use hot-poured type joint sealant that conforms to ASTM D1190.

PART 3 EXECUTION

3.1 CONTRACTOR'S VERIFICATION

- A. Excavation and Forming: Prior to the installation of any concrete, examine the excavation and forms for the proper grades, lines, and levels required to receive the new work. Ascertain that all excavation and compacted subgrades are adequate to receive the concrete to be installed.
 - 1. Correct all defects and deficiencies before proceeding with the work.

- B. Existing Improvements: Investigate and verify location of existing improvements to which the new work is to be connected.
 - 1. Making necessary adjustment in line and grade to align the new work with the existing improvements must be approved by the ENGINEER prior to any change.

3.2 PREPARATION

- A. Forms: Use wood or metal forms, straight and free from warp, clean, and sufficient strength to resist springing during the process of depositing concrete against them.
 - 1. Use full depth of the concrete forms.

3.3 INSTALLATION

- A. Sidewalks, Sidewalk Ramps, Driveways and Driveway Approaches: Construct all sidewalks and sidewalk ramps four (4) inches thick except at driveways and alleys. Construct thickness of the sidewalks six (6) inches at driveways and alleys. Construct sidewalks five (5) feet wide unless otherwise noted on the Plans, and slope 1/4-inch per foot towards the center of the road. Normally, sidewalks will be located within the right-of-way, parallel the property lines, at a distance of 1-foot from the property line.
 - 1. Construct alleys, driveways and approaches six (6) inches thick. Construct the width of the driveways and driveway approaches as shown on the Plans or as directed by the ENGINEER.

 - 2. Asphalt sidewalks/bikeways/access paths/paths where authorized shall be constructed to specifications established by the City, but shall be no less than six inches (6") of compacted limerock base over a stabilized subgrade, primed and surfaced with a minimum of one inch (1") of Type II asphaltic concrete.

- B. Removal of Existing Curb for Sidewalk Ramps and Driveway Approaches: Conform construction of sidewalk ramps within street intersections where curbed pavement existing to the current FDOT Roadway and Traffic Design Standards.**
1. Saw cut, to full depth of pavement, and remove a minimum of an 18-inch wide curb and gutter section where there is no proper curb drop for the sidewalk ramp or driveway approach. When mountable curbs are present, remove a 24-inch wide curb and gutter section for the construction of sidewalk ramps, as specified above.
 2. Remove curb and gutter as determined by the ENGINEER in the field but remove curb and gutter at least as wide as the proposed sidewalk ramp plus 1-foot on each side.
 3. Replace the removed curb and gutter section with materials, equal to what was removed and seal joint with hot poured rubber asphalt.
- C. Install 5/8-inch diameter self-tapping hook bolts, in the existing concrete pavement as indicated on the Plans prior to placing concrete for the removed curb and gutter section.**
- D. Placement of Forms: Use wood forms, straight and free from warp, of nominal depth for sidewalk sections less than 25 feet in length.**
1. Stake forms to line and grade in a manner that will prevent deflection and settlement.
 2. When unit slab areas are to be poured, place slab division forms such that the slab division joints will be straight and continuous.
 3. Set forms for sidewalk ramps to provide a grade toward the centerline of the right-of-way in accordance with current standards. Use a uniform grade, except as may be necessary to eliminate short grade changes.
 4. Oil forms before placing concrete. Leave forms in place at least 12 hours after the concrete is placed. Place forms ahead of the pouring operations to maintain uninterrupted placement of concrete.
 5. The use of slip form pavers can be allowed when approved by the ENGINEER in lieu of the construction system described above.
- E. Joints: Construct transverse and longitudinal expansion and plane-of-weakness joints at the locations specified herein, or as indicated on the Plans or as directed by the ENGINEER.**
1. Place the transverse expansion joints for the full width and depth of the new work. Use transverse expansion joints placed against an existing pavement

EXHIBIT A

- a minimum of six (6) inches deep but no less than the thickness of the concrete being placed.
2. Conform longitudinal expansion joints to the requirements as transverse expansion joints.
 3. Construct joints true to line with their faces perpendicular to the surface of the sidewalk. Install the top slightly below the finished surface of the sidewalk. Construct transverse joints at right angles to the centerline of the sidewalk and construct longitudinal joints parallel to the centerline or as directed by the ENGINEER.
 4. Place transverse expansion joints, 1/2-inch thick, through the sidewalk at uniform intervals of not more than 50 feet and elsewhere as shown on the Plans, or as directed by the ENGINEER.
 5. Place expansion joints, 1/2-inch thick, between the sidewalk and back of abutting parallel curb, buildings or other rigid structures, concrete driveways and driveway approaches. When directed by the ENGINEER, place the expansion joint between sidewalks and buildings 1-foot from the property line and parallel to it.
 6. Form plane-of-weakness joints every five (5) feet. Form joints by use of slab divisions forms extending to the full depth of the concrete or by cutting joints in the concrete, after floating, to a depth equal to 1/4 the thickness on the sidewalk. Construct cut joints not less than 1/8-inch or more than 1/4-inch in width and finish smooth and at right angles to the centerline on the sidewalk.
- F. Placing and Finishing Concrete: Place all concrete on a prepared unfrozen, smooth, leveled, rolled and properly compacted base. Place concrete on a moist surface with no visible water present.
1. Deposit the concrete, in a single layer to the depth specified. Spade or vibrate and compact the concrete to fill in all voids along the forms and joints. Strike off the concrete with a strike board until all voids are removed and the surface has the required grade and cross section as indicated on the Plans, or as directed by the ENGINEER.
 2. Float the surface of the concrete just enough to produce a smooth surface free from irregularities. Round all edges and joints with an edger having a 1/4-inch radius.
 3. Broom the surface of sidewalks, driveways and approaches to slightly roughen the surface.
 4. Texture the surface of the sidewalk ramps with a coarse broom transversely to the ramp slope, and coarser roughen than the remainder of the sidewalk. Contract the ramp slope in color (using a brick-red dye or approved equal)

from the remainder of the sidewalk. Comply with minimum color contract and slope requirements from FAC, UFAS, ADAAG, Local Government Standards, or as directed by the ENGINEER.

- G. Curing: After finishing operations have been completed and immediately after the free water has left the surface, completely coat and seal the surface of the concrete (and sides if slip-forming is used) with a uniform layer of white membrane curing compound. Do not thin the curing compound. Apply the curing compound at the rate of one gallon per 200 square feet of surface.
- H. Barricades: Place suitable barricades and lights around all newly poured sidewalks, sidewalk ramps, driveways, driveway approaches and curb and gutter sections in order to protect the new work from damage from pedestrians, vehicles and others until the concrete has hardened.
 - 1. Leave barricades in place for a minimum of two (2) days, except for driveway approaches and curb and gutter sections. Leave barricades in place for a minimum of three (3) days.
 - 2. Remove and replace any concrete that suffers surface or structural damage at no additional cost.
- I. Protection:
 - 1. Against Rain: Protect new concrete from the effects of rain before the concrete has sufficiently hardened. Have available on the job site at all times enough burlap or 6-mil thick polyurethane film to cover and protect one day's work. Stop work and cover completed work when rain appears eminent. As soon as the rain ceases, uncover the concrete and burlap drag the surface where necessary. Apply curing compound to any areas where the compound has been disturbed or washed away.
 - 2. Against Cold Weather: If concrete is placed between December 15 and February 15, have available on the site sufficient amount of clean, dry straw or hay to cover one (1) day's production. If the temperature reaches 40 degrees F and is falling, place the hay or straw 12 inches thick, immediately after the curing compound is applied.
 - 3. Concrete Temperature Limitations: Do not place concrete when the temperature of the concrete at the point of placement is above 90 degrees F.
- J. Cleanup: After the concrete has gained sufficient strength, but no sooner than within 12 hours, remove the fixed forms and backfill the spaces on both sides with sound earth of topsoil quality. Compact, level and leave backfill in a neat condition.

- K. Gutters and Curbs: Construct gutters and curbs in accordance with Section 520 FDOT Standard Specifications for Road and Bridge Construction, latest edition, including supplements.

3.4 FIELD QUALITY CONTROL

- A. Concrete Delivery Ticket: Use a ticket system for recording the transportation of concrete from the batching plant to point of delivery. Issue this ticket to the truck operator at the point of loading and give to the ENGINEER upon delivery.
- B. Concrete Delivery Rejection: Remove concrete not permitted for inclusion in the work by the ENGINEER from the site. Rejection of concrete will be determined through Field Quality Control and elapsed time from mixer charging to delivery.
- C. Concrete Testing at Placement: Perform tests of each batch of concrete delivered, each 50 cubic yards, or whenever consistency appears to vary. The sampling and testing of slump, air content and strength will be performed at no cost to the CITY.
 - 1. Sampling: Secure composite samples in accordance with the Method of Sampling Fresh Concrete, ASTM C172.
 - 2. Slump Test: Test in accordance with ASTM C143. Use the least slump possible consistent with workability for proper placing of the various classifications of concrete.
 - a. Place structural concrete for walls and slabs, by means of vibratory equipment, with a slump of four (4) inches.
 - b. A tolerance of up to 1-inch above the indicated maximum will be allowed for individual batches provided the average for all batches or the most recent ten (10) batches tested, whichever is fewer, does not exceed the maximum limit.
 - 3. Air Content: Determine air content of normal weight concrete in accordance with Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method, ASTM C23 1, or by the volumetric method, ASTM C 173, for each strength test.
 - 4. Compressive Strength: Make two (2) strength tests of three (3) samples each for each 50 cubic yards, or fraction thereof, of each mix design of concrete placed in any one (1) day.
 - a. Handling Samples: Mold and cure three (3) specimens from each sample in accordance with Method of Making and Curing Concrete Test Specimens in the Field, ASTM C31. Record any deviations from the requirements of this Standard in the test report.

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- b. **Testing:** Test specimens in accordance with Method of Test for Compressive Strength of Cylindrical Concrete Specimens, ASTM C39. Test one (1) specimen at seven (7) days for information and test two (2) at 28 days for acceptance. Use the average of the strengths of the two (2) specimens tested at 28 days. Discard results if one (1) specimen in a test manifests evidence of improper sampling, molding or testing, and use the strength of the remaining cylinder. Should both specimens in test show any of the above defects, discard the entire test.
 - c. **Acceptance of Concrete:** The strength level of the concrete will be considered satisfactory so long as the averages of all sets of three consecutive strength test results equal or exceed the specified 28-day strength and no individual strength test results falls below the specified 28-day strength by more than 500 psi. If the strength test is not acceptable, perform further testing to qualify the concrete.
 - d. **Concrete Temperature:** Determine the temperature of concrete sample for each strength test.
- D. Reductions due to deficiencies in thickness or compressive strength are additive, that is, if an area is deficient by 3/8 inch and under strength by 200 psi, the total reduction is 20% plus .02% or .40% reduction.

END OF SECTION

SECTION 02530

GROUNDWATER CONTROL FOR OPEN CUT EXCAVATION

PART 1 GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

- A. This section provides for furnishing all permits, labor, materials, equipment, power and incidentals for performing all operations necessary to dewater, depressurize, drain and maintain excavations as described herein and as necessary for installation of pipeline and appurtenances. Included are installing, maintaining, operating and removing dewatering systems and other approved devices for the control of surface and groundwater during the construction of pipelines and appurtenances, open cut excavations, directional drilling. Included also are protecting work against rising waters and repair of any resulting damage.

1.2 CONTRACTOR'S RESPONSIBILITY

- A. It is the sole responsibility of the CONTRACTOR to identify groundwater conditions and to provide any and all labor, material, equipment, techniques and methods to lower, control and handle the groundwater as necessary for his construction methods and to monitor the effectiveness of this installed system and its effect on adjacent facilities.
- B. Operate, maintain and modify the system(s) as required to conform to these Specifications. Upon completion of the Construction, remove the system(s). The development, drilling and abandonment of all wells used in the dewatering system shall comply with regulations of the Florida Department of Environmental Protection and the governing Water Management District.
- C. Assume sole responsibility for dewatering systems and for all loss or damage resulting from partial or complete failure of protective measures and any settlement or resultant damage caused by the dewatering operation.

1.3 PLANS AND OTHER DATA TO BE SUBMITTED

- A. Prior to commencement of work, submit complete drawings, details and layouts showing the proposed dewatering plans in sufficient detail (i.e., general arrangements, procedures to be used, etc.) so as to allow the ENGINEER to evaluate the proposed dewatering systems. Include the following, as required by the CONTRACTOR's proposed operation:
 - 1. Names of equipment suppliers.
 - 2. Names of installation subcontractors.

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3. Plan for dewatering at access shafts and control of surface drainage.
4. Plan for dewatering for cut-and-cover excavations, or otherwise controlling groundwater.
5. Eductor system layout and details.
6. Deep well locations and details.
7. Well point system layout and details.
8. Installation reports for eductors, deep wells and well points.
9. Water level readings from piezometers or observation wells, and method of maintenance.
10. As part of his request for approval of a dewatering system, demonstrate the adequacy of the proposed system and well point filler sand by means of a test installation.

PART 2 PRODUCTS

- A. Select equipment including but not limited to pumps, eductors, well points and piping and other material desired.

PART 3 EXECUTION

3.1 DEWATERING EXCAVATIONS

- A. Obtain all permits necessary for dewatering operations and file a copy of all such permits with the City Manager or designee and ENGINEER.
- B. Furnish, install, operate and maintain all necessary equipment for dewatering the various parts of the Work and for maintaining free of water the excavations and such other parts of the Work as required for Construction operations. Dewatering system should provide for continuous operation including nights, weekends, holidays, etc. Provide appropriate backup if electrical power is primary energy source for dewatering system.
- C. Continue dewatering in all required areas, until the involved work is completed, including the placing and compaction of backfill materials.
- D. Provide a uniform diameter for each pipe drain run constructed for dewatering. Remove the pipe drain when it has served its purpose. If removal of the pipe is

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impractical, provide grout connections at 50-foot intervals, and fill the pipe with clay grout or cement and sand grout when the pipe has served its purpose.

3.2 DEWATERING TRENCH

- A. Dewatering Excavation Plan: Develop an excavation dewatering plan that considers site ground and groundwater conditions, the type and arrangement of the equipment to be used and the proper method of groundwater disposal. Prepare the dewatering plan before beginning excavations below groundwater. Maintain one copy of the dewatering plan at the project site to be available for inspection while all dewatering operations are underway.
- B. Do not lay any pipeline in a trench in the presence of water. Remove all water from the trench sufficiently ahead of the pipeline placing operation. The ENGINEER shall have full and final authority to require dewatering of the trench to ensure a dry, firm bed on which to place the pipeline. As a minimum, maintain water levels at least 6 inches below the bottom of the trench. Continue to dewater trench until trench backfilling operations have been completed.
 - 1. If a dry trench bottom has not been obtained with usual methods of trench dewatering, then the order to excavate below grade and place sufficient select fill material, crushed stone, or 2500 psi concrete over the trench bottom may be given.
 - 2. If all efforts fail to obtain a stable dry trench bottom, and it is determined that the trench bottom is unsuitable for pipe foundation, present an alternate system for stabilization to the Engineer of Record for approval by the City Manager or designee on a case-by-case basis.
- C. Removal of water may be accomplished by pumping in connection with well point installation as the particular situation may warrant.
- D. If the soils encountered at the trench grade are suitable for the passage of water, without destroying the sides or utility foundation of the trench, sumps may be provided at intervals at the side of the main trench excavation. Use pumps to lower the water level by taking their suction from said sumps.

3.3 REQUIREMENTS FOR EDUCTOR, WELL POINTS OR DEEP WELLS

- A. Eductor, well points or deep wells, where used, must be furnished, installed and operated by a reputable CONTRACTOR regularly engaged in this business, and approved.

3.4 DURATION OF DRAINAGE

- A. In areas where concrete is to be placed, carry out the foundation drainage so that the required lowering of the water table will be effected prior to placing reinforcing

steel. Keep foundation beds free from water to the same levels for 3 days after placing concrete.

3.5 PROTECTION OF STRUCTURES

- A. Provide adequate protection for all structures to avoid damage to concrete.
- B. Operate construction equipment over completed concrete slabs or structures only with approval. Rubber tire equipment heavier than 5 tons and crawlers heavier than 7 tons will require adequate load spreading by sand fill or other means.

3.6 DISCHARGE OF WATER

- A. Do not discharge pumped drainage water into the sanitary sewer system or inhibit pedestrian or vehicular traffic with the groundwater control system.
- B. Discharge pumped drainage water into the storm sewer system or drainage ditch by direct means (i.e., discharge hose to inlet, burying header, etc.). Monitor the discharged water to determine that soil particles are not being removed.
- C. Conform all discharge to current South Florida Water Management District and City Department of Stormwater, Streets and Traffic rules, regulations, procedures and regulatory permits and if discharged into receiving waters, shall not exceed 29 N.T.U.'s above background.

3.7 REPAIR OF DAMAGE

- A. Assume full responsibility for all loss and damage due to flooding, rising water or seepage resulting from dewatering operations in any part of the work. Repair any damage to partially completed work from these or other causes, including the removal of slides, repair of foundation beds and performance of any other work necessitated by lack of adequate dewatering or drainage facilities.

END OF SECTION

SECTION 02575

REPAIR AND RESTORATION OF PAVEMENT, SIDEWALK, ETC.

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required and remove and replace pavements over trenches excavated for installation of pipelines as shown on the drawings and/or specified herein.

1.2 GENERAL

- A. Repair all damage, as a result of work under this project, done to existing pavement, driveways, paved areas, curbs and gutters, sidewalks, shrubbery, grass, trees, fences, utility poles, utility pipe lines, conduits, drains, catch basins, or stabilized areas or driveways and including all obstructions not specifically named herein, in a manner satisfactory to the ENGINEER. Include in the bid price, the furnishing of all labor, materials, equipment, and incidentals necessary for the cutting, repair, and restoration of the damaged areas unless pay items for specific types of repair are included in the Bid Form.
- B. Keep the surface of the backfilled area of excavation in a safe condition and level with the remaining pavement until the pavement is restored in the manner specified herein. All surface irregularities that are dangerous or obstructive to traffic are to be removed. Conform the repair to applicable CITY or State requirements for pavement repair and as described herein.
- C. The CITY reserves the right to require soil bearing or loading tests or materials tests, should the adequacy of the foundation or the quality of materials used be questionable. Costs of these tests shall be the responsibility of the CITY, if found acceptable; the costs of all failed tests shall be the responsibility of the CONTRACTOR.
- D. Make all street and road repair in accordance with the details indicated on the drawings and in accordance with the applicable requirements of these Specifications and meeting the permit requirements and approval of the governing Department of Transportation agencies.
- E. Replace pavement or roadway surfaces cut or damaged in equal or better condition than the original, including stabilization, base course, surface course, curb and gutter or other appurtenances. Obtain the necessary permits prior to any roadway work. Provide advance notice to the appropriate authority, as required, prior to construction operations.
 - 1. Roadway Restoration (within City Department of Transportation & jurisdiction): Perform restoration in accordance with the requirements set forth in the "Right-of-way Utility Construction Activities Policy" and these Standards. Obtain prior approval

EXHIBIT A

from the City Stormwater, Streets and Traffic Department for the materials of construction and method of installation, along with the proposed restoration design for items not referred or specified herein.

- a. Where existing pavement is to be removed, mechanical saw cut the surface prior to trench excavation, leaving a uniform and straight edge parallel or perpendicular to the roadway centerline with minimum disturbance to the remaining adjacent surfacing. Provide minimal width of cut for this phase of existing pavement removal. Limerock from a FDOT approved pit shall be on the job site during open cutting. When the specified compacted limerock base is greater than six inches (6"), the base shall be constructed in two (2) or more lifts.
- b. Immediately following the specified backfilling and compaction, apply a temporary sand seal coat surface to the cut areas. For this temporary surfacing, provide a smooth traffic surface with the existing roadway and maintain until final restoration. Ensure that surfacing remains for a minimum of ten (10) days in order to assure the stability of the backfill under normal traffic conditions. Thirty (30) days following this period and prior to sixty (60) days after application: remove the temporary surfacing and perform final roadway surface restoration.
- c. In advance of final restoration, remove the temporary surfacing and mechanically saw the existing pavement straight and clean to the stipulated dimensions, if needed. Following the above operation, proceed immediately with final pavement restoration in accordance with the requirements set forth by the City.
- d. No layer shall be greater than two inches (2") when compacted. Where a surface course is constructed to a thickness greater than two inches (2"), construct it in approximately equal layers, each not exceeding two inches (2").
- e. Where necessitated by traffic conditions, lay mixture in strips in such manner as to provide for the passage of traffic. Where the road is closed to traffic, mixture may be laid to the full width, by machines travelling in parallel.

2. Conform work within the rights-of-way of public thoroughfares which are not under jurisdiction of City to the requirements of the Governmental agency having jurisdiction or the Florida Department of Transportation, if no governmental agencies have jurisdiction. Work within State Highway right-of-way shall be in full compliance with all requirements of the permit drawings, and to the satisfaction of the Florida Department of Transportation.

1.3 QUALITY ASSURANCE

- A. Applicable provisions of the latest version of the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction", and Supplemental Specifications hereunder govern the work under this Section. The Florida Department of Transportation will hereafter be referred to as FDOT

EXHIBIT A

PART 2 PRODUCTS

1.1 MATERIALS

- A. Use materials for flexible base pavement and base course as specified in the latest version of the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction.

PART 3 EXECUTION

3.1 CUTTING PAVEMENT

- A. Cut and remove pavement to straight edges, 6 inches outside each edge of proposed trench to avoid pavement damage during installation of the new pipelines and appurtenances and for making connections to existing pipelines.
- B. Before removing pavement, mark the pavement for cuts nearly paralleling pipelines and existing street lines. Cut asphalt pavement along the markings with a jackhammer, rotary saw, or other suitable tool.
- C. No pavement shall be machine pulled until completely broken and separated along the marked cuts.
- D. The pavement adjacent to pipeline trenches shall neither be disturbed nor damaged. If the adjacent pavement is disturbed or damaged, irrespective of cause, remove the damaged pavement replace it at CONTRACTOR'S expense

3.2 GENERAL RESTORATION

- A. Restore, replace or rebuild existing street paving, driveways, sidewalks, etc., using the same type of construction as was in the original. Be responsible for restoring all such work, including sub-grade and base courses where present. Obtain and pay for such local or other governmental permits as may be necessary for the opening of streets. Meet any requirements other than those herein set forth which may affect the type, quality and manner of carrying on the restoration of surfaces by reason of jurisdiction of such governmental bodies.
- B. In all cases, maintain, without additional compensation, all permanent replacement of street paving, done by him under this Contract until accepted by the City Manager or designee, including the removal and replacement of such work wherever surface depressions or underlying cavities result from settlement of trench backfill.
- C. Complete all the final resurfacing or re-paving of streets or roads, over the excavations and relay paving surfaces of roadbed that have failed or been damaged prior to acceptance by the City Manager or designee. Conform backfilling of trenches and the preparation of sub-grades to the requirements of Section 02223.

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- D. Do all re-paving or resurfacing in accordance with Florida Department of Transportation Specifications, to which the following requirement of trench backfill will be added: Where pipeline construction crosses paved areas such as streets, backfill the top 24 inches of trench below the road bases or concrete slabs with compacted A-4 or better material that will provide a bearing value of not less than 75 when tested by the Florida Department of Transportation Soil Bearing Test Methods. All open cuts through paved areas shall be repaved within 48 hours at least with cold patch.

3.3 PRIME AND TACK COATS

- A. Apply bituminous prime and tack coats on the previously prepared base course in accordance with Section 300 of the FDOT Specifications.

3.4 WEARING COURSE

- A. Use plant-mixed hot bituminous pavement to the thickness indicated in the drawings conforming to Type III asphaltic concrete in accordance with Section 331 of the FDOT Specifications (2000 Edition). The requirements for plant and equipment are specified in Section 320 and the general construction requirements for asphaltic concrete pavement are contained in Section 330 of the FDOT specifications.

3.5 TESTING

- A. Perform all field-testing at an independent laboratory employed by the CITY. Test and certify all materials by the producer. Repeat tests of sub-grade or base not meeting specified compaction at the CONTRACTOR'S expense.

3.6 MISCELLANEOUS RESTORATION

- A. Restore sidewalks, cut or damaged by construction, in full sections or blocks to a minimum thickness of four inches. Restore concrete curb or curb gutter to the existing height and cross section in full sections or lengths between joints. Concrete shall be as specified on the drawings. Restore grassed yards, shoulders and parkways to match the existing sections with grass seed or sod of a type matching the existing grass.

3.7 CLEANUP

- A. After all repair and restoration or paving has been completed, remove all excess asphalt, dirt, and other debris from the roadways. Check and clean all existing storm sewers and inlets of any construction debris.

END OF SECTION

SECTION 02607

MANHOLES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing sewer manholes and all other appurtenances for a complete installation. Provide precast reinforced concrete manholes conforming to ASTM C478 in accordance with the Standard Details.
- B. Related Work Specified in Other Sections Include:
 - 1. Section 02608 – Concrete Coatings
 - 2. Section 05540 – Metal Castings

1.2 REFERENCE

- A. Codes and standards referred to in this Section are:
 - 1. ASTM C 76 - Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
 - 2. ASTM C 478 - Specification for Precast Reinforced Concrete Manhole Sections
 - 3. ASTM C 32 - Specification for Sewer and Manhole Brick (Made for Clay or Shale)
 - 4. ASTM C 443 - Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets [Metric]

1.3 SUBMITTALS

- A. Shop Drawings: Submit shop drawings of sewer manholes as specified in Division 1.
- B. Quality Control: Submit shop and field test reports of concrete samples tested in an approved laboratory.

1.4 DELIVERY, STORAGE AND HANDLING

- A. General: Take every precaution to prevent injury to the manhole sections during transportation and unloading. Unload manhole sections using skids, pipe hooks,

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rope slings, or suitable power equipment, if necessary, and keep the sections under control at all times. Do not allow the manhole sections to be dropped, dumped or dragged under any conditions. Follow applicable requirements specified in Division 1.

- B. **Damaged Section:** If any manhole section is damaged in the process of transportation or handling (see Section 2.3.C below), contact the Public Utilities Wastewater Department for visual inspection. If the Wastewater Department deems it necessary to reject the manhole section, reject and immediately remove such sections from the site, and replace the damaged manhole sections at no increase in Contract Amount.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers are listed below. Other manufacturers of equivalent products may be submitted.

- 1. **Preformed Joint Sealing Compound:**

- a. Ram-Nek, as manufactured by K.T. Snyder Company, Inc., Houston, TX
- b. Kent-Seal, as manufactured by Hamilton Kent, Toronto/Ontario Canada

- 2. **Frame and covers as manufactured by U. S. Foundry, 420-C-ORS.**

2.2 MATERIALS

- A. **Concrete, Steel Reinforcement and Aggregates, and Foundation:** Provide reinforced concrete, cementitious materials, aggregates and steel reinforcement conforming to the requirements of ASTM C 478, with 4000 psi concrete, Grade 40 reinforcement bars, Type II cement, and a minimum wall thickness of 8 inches. All manholes shall be constructed upon a foundation consisting of no less than twelve inches (12") of crushed stone. The excavation shall be kept free of water throughout construction and shall not be backfilled until inspected.
- B. **Manhole Frames and Covers:** Provide manhole frames and covers as shown on the Standard details. Castings for manhole frames, covers and other items shall conform to the ASTM Designation A48, Class 30. Castings shall be true to pattern in form and dimensions and free of pouring faults and other defects in positions which would impair their strength, or otherwise make them unfit for the service intended. The scating surfaces between frames and covers shall be machined to fit true so the frames and covers do not shift under traffic conditions or permit entry of storm water from flooding. Lifting or "pick" holes shall be provided, but

shall not penetrate the cover. The words SANITARY SEWER, as well as CITY OF NAPLES, FLORIDA shall be cast in all manhole covers except those owned by a private party. All manhole frames and covers shall be traffic bearing unless otherwise specified. Frames and covers shall be fully bedded in mortar to the correct finished grade elevation with materials shown in the Detail Drawings.

- C. **Preformed Joint Sealing Compound:** Provide preformed joint sealing compound for joining manhole sections.
- D. **Concrete Protective Liner:** Provide concrete protective liner conforming to Section 02608.
- E. **Pipeline Connections to Manhole:** Provide neoprene boots with type 316 stainless steel clamps of a design approved by the City Manager or designee for joining sewers to manhole riser sections equal to OR-N-Seal as manufactured by the Decker Corporation or Engineer of Record approved equal. Fill the unfilled portion of the connection with mortar or concrete to guarantee a watertight seal. Where required or shown on the plans, connection to existing sewer shall be made in a manner which will maintain existing flow on a continuous basis. Where flow cannot be maintained, interruption of service shall be minimized such that no bypass of sanitary sewage to any natural waterway or storm drain occurs, nor shall such interruption create a public health hazard by sewage backup or overflows.
- F. **Doghouse Manholes:** Doghouse manholes over existing sanitary sewer pipes are permitted, and in a number of instances, preferred. Provide a concrete base a minimum of 8 inches thick, with proper reinforcing rods to prevent cracking. Pour concrete base upon a 12-inch base of gravel. Precast manhole rings may be set in the concrete over the existing pipe. Concrete should then be used to form both the bench and to seal the pipe entrances, both inside and especially outside. Once dry, remove the top of the pipe in the manhole. Special provisions may be required at the City Manager's, or designee's, discretion.
- G. **Standard Manholes:** The standard manhole shall be 4 feet or more in depth measured from the base of the cover frame to the top of the concrete footing and shall be of the concentric cone type, as shown in the Standard Details. If the manhole is 4 feet or less in depth, it shall be classified as a "Shallow Manhole" as specified below.
- H. **Shallow Manholes:** The shallow manhole shall be 4 feet or less in depth measured from the base of the cover frame to the top of the concrete footing and shall be of flat top construction, as shown in the Standard Details.
- I. **Manhole Inverts:** Form manhole inverts from concrete having a minimum 28 day compressive strength of 2500 psi, and as shown in the Standard Details. Inverts for "straight-through" manholes may be formed by laying the pipe straight through the manhole, pouring the concrete invert, and then cutting out the top half of the pipe, provided that a 0.1 foot drop is maintained across the manhole. Construct curved inverts of concrete, as shown in the Standard Details, and form a smooth,

even, half pipe section. Precast inverts may be used, however, no large "bowls" shall be permitted in the center of the manhole. To alleviate this problem, grout the invert to form a smooth, uniform invert as shown in the Standard Details. Maintain a 0.1 foot drop across the manhole.

- J. **Inflow Protectors:** In all manholes, install an inflow protector manufactured from a high-quality 304 stainless steel with a consistent thickness of not less than 18 gage. The inflow shall have a deep-dish bowl design with no less than 8 inches in depth to allow easy and unobstructed removal of the manhole cover. The manhole inflow protector is to be manufactured with a one-piece rubber gasket installed at the factory for a tight, consistent fit. The rubber gasket is to be designed to securely wrap around the entire leading edge of the inflow protector at the point where it comes in contact with the manhole frame and cover. The wrap around rubber gasket is to be manufactured to a width of no less than 3/8 inches, consistent on top and bottom of the leading edge of the inflow protector. The gasket shall be no more than 3/32 inches thick. The insert removal handle shall be manufactured of a high-quality stainless steel for strength and durability. The handle is installed in such a way that it does not interfere with the installation or removal of the manhole lid. The insert handle will be manufactured to withstand a minimum pull force of 500 pounds before it fails or separates from the insert. The inscription "PROPERTY OF CITY OF NAPLES UTILITIES" shall be etched, at the base of the handle frame, to provide a long-lasting identification marker for the CITY. The inflow protector shall be as manufactured by Sewer Shield, Inc., Maitland, FL, or an approved equal.
- K. **Chimney Seals:** Install a minimum of two (2) precast concrete riser rings or two (2) or more precast concrete rings and a layer of brick and mortar or HDPE riser rings with Cretex (or City approved equal) chimney seals between manhole and cast iron frame. Each concrete ring shall be set in a bed of mortar to insure a proper bond and seal between successive concrete rings. On road overlay projects that raise the elevation of the road grade, the manhole shall be raised with mortar instead of riser rings.

2.3 SOURCE QUALITY CONTROL

- A. If requested by the City Manager or designee, at least three cylinders shall be taken each day that manhole sections are cast, with batch samples to be designated by the laboratory representative. At least one set of cylinders will be taken from each 9 cubic yards of concrete used in manhole section construction. These samples will be tested for strength. If the samples fail to meet specified minimum concrete strength requirements, all manhole sections manufactured from the concrete from which the cylinders were made will be rejected.
- B. The City Manager or designee reserves the right to core manholes either at the job site or point of delivery to validate strength of concrete and placement of steel.

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If cores fail to demonstrate the required strength or indicate incorrect placement of reinforcing steel, all sections not previously tested will be considered rejected until sufficient additional cores are tested, at no increase in Contract Amount, to substantiate conformance to these requirements.

- C. Components of the manhole shall be free of fractures, cracks, and undue roughness. Concrete shall be free of defects, which indicate improper mixing or placing, and surface defects such as honeycomb or spalling. Cracks or broken ends due to improper handling will not be acceptable. No lift holes will be allowed except in rise and corbel sections. These holes shall not penetrate the wall and shall be filled with non-shrink grout after installation.

PART 3 EXECUTION

3.1 INSTALLATION

- A. **Lifting Holes:** Grout lifting holes through the structure with non-shrink grout equal to embeco No. 167 by Master Builders or an Engineer of Record approved equal.
- B. **Precast Base:** Provide a precast base of not less than 8 inches (see Detail Dwg.) in thickness with a minimum dimension across the precast base of 72 inches poured monolithically with the bottom section of the manhole walls, reinforced, with a minimum 28-day compressive strength of 4,000 psi.
- C. **Joining Manhole Sections:** Join precast sections using Ram-Nek or Kent-Seal plastic joint sealing compound and trimmed prior to grouting. The first construction joint shall be not less than 2 feet above the base slab. Use tongue and groove joints suitable for the flexible gasket. Use non-shrink grout inside and outside for sealing between manhole precast sections. Grout shall be of a type acceptable to the City Manager or designee and designed for use in water. Seal all openings and joints watertight.
- D. **Top Termination:** Terminate manhole tops at such elevations as will permit laying up grade rings under the manhole frame to make allowances for future street grade adjustments.
- E. **Drop Connections:** Manufacture drop connections, where required on precast manholes, with the manhole elements at the casting yard. Drop manholes shall be constructed per the City Standard Details.
- F. **Internal Protection:** Provide internal protection for all manholes by either of the following:
 - 1. Sewpercoat, calcium-aluminate mortar blend coating system (see Section 02608 Concrete Coatings), or

2. IET Coating system – surface preparation shall include pressure washing at 5,000 psi, dry abrasive blasting with black beauty steel slag and application of the IET coat at three (3) different intervals to a total thickness of 125 mils (see Section 02608 Concrete Coatings).
3. Interior surfaces of recast manholes can be coated with three coats of a coal tar epoxy coating to a minimum dry film thickness of 30 mils with Amercoat No. 78, Kop-Coat Bitumastic No. 300-M, or Engineer of Record approved equal in accordance with coating manufacturer's recommendations.

Install the coating systems per manufacturer's recommendation and completely protect the structure from corrosion. The liner or coating systems must extend and seal onto manhole ring, seal onto and around pipe openings, and any other protrusions, completely cover the bench and flow invert. Provide a five (5)-year unlimited warranty on all workmanship and products. The work includes the surface preparation and application of the coating or liner system, and shall protect the structure for at least five (5) years from all leaks and from failure due to corrosion from exposure to corrosive gases such as hydrogen sulfide.

Repair internal coating of existing manholes cored during tie-in of new sewers by applying approved coating material as listed above in accordance with the manufacturer's recommendations. If existing manhole has an internal coating other than that listed above (e.g. epoxy coating), sandblast the interior of the existing manhole and apply an approved coating in accordance with the manufacturer's recommendations.

- G. Coal Tar Epoxy Exterior Coating: Coat all manhole, wet well, and valve vault exteriors with two (2) coats of coal tar epoxy to a minimum thickness of 8 dry mils.
- H. Care shall be exercised during construction of the manhole to see that materials do not enter the sewer line. The invert and shelf of the manhole shall be kept clean of all mortar, broken brick, sand, or any other materials falling into the manhole. Such material shall be immediately removed. This condition shall be maintained until final acceptance of the work. Prior to testing of gravity sanitary sewer lines, the lines shall be thoroughly cleaned, using standard pressure rodding techniques. See Section 01400 1.5.A.4. for further information on gravity sewer line and manhole construction and testing.

END OF SECTION

SECTION 02610

POLYVINYL CHLORIDE (PVC) GRAVITY SEWER PIPE

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required, and install PVC gravity sewer pipe and appurtenances as shown on the Drawings and as specified herein.

1.2 SUBMITTALS DURING CONSTRUCTION

- A. Submittals during construction shall be made in accordance with Section 01340, Shop Drawings, Working Drawings, and Samples.
- B. Submit to the ENGINEER not less than fourteen (14) calendar days after the date of the Notice to Proceed, a list of materials to be furnished, the names of suppliers and an expected schedule of delivery of materials to the site.
- C. Furnish in duplicate to the ENGINEER sworn certificates that all tests and inspections required by the Specifications under which the pipe is manufactured have been satisfied.

1.3 INSPECTION AND TESTS

- A. All pipe and accessories to be installed under this Contract shall be inspected and tested at the place of manufacture by the manufacturer as required by the Standard Specifications to which the material is manufactured.
- B. In the event that any of the test specimens fail to meet the applicable standards, all pipe presented by such tests shall be subject to rejections. The CONTRACTOR may furnish two additional test specimens from the same shipment or delivery for each specimen that failed and the pipe will be considered acceptable if all of these additional specimens meet the requirements of the applicable standards.
- C. Pipe which has been rejected by the ENGINEER shall be removed from the site of the work by the CONTRACTOR and replaced with pipe which meets these specifications.
- D. Other testing requirements specific to the type of pipe are included under the appropriate Paragraph in Part 2, below.

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PART 2 PRODUCTS

2.1 POLYVINYL CHLORIDE (PVC) PIPE

- A. Polyvinyl chloride (PVC) gravity sewer pipe and fittings 4-inch through 12-inch diameter shall conform to ASTM D-3034, "Type PSM Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings," DR 26. If any portion of a gravity sewer has less than four feet of cover, the entire run shall be constructed of AWWA C-900 DR 18 or thicker wall pipe.
- B. The pipe shall be joined with an integral bell and spigot type rubber gasketed joints. Each integral bell joint shall consist of a formed bell with a rubber gasket. Flexible gasketed joints shall be elastomeric compression types conforming to ASTM F1336, ASTM D3201 and ASTM F477. Joints shall permit contraction, expansion and settlement, and yet maintain a watertight connection. Joints shall be tested in accordance with ASTM D3212.
- C. Pipe shall be furnished in standard laying lengths not exceeding 20 feet and shall be colored green in accordance with the Utility Location and Coordination Council Uniform Color Guide.
- D. All fittings and accessories shall be furnished by the pipe supplier and shall have bell and/or spigot configurations compatible with the pipe.

PART 3 EXECUTION

3.1 LAYING POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

- A. Polyvinyl Chloride (PVC) gravity sewer pipe shall be laid in accordance with the instructions of the manufacturer, Section 02223 and ASTM D-2321, "Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe." Bell holes shall be excavated so that after installation only the pipe barrel shall bear upon the trench bottom. Proper selection and placement of bedding and backfill materials are necessary to minimize deflection of the pipe diameter. No blocking under the pipe will be permitted. For gravity sewers 12 inches in diameter and larger, Laser leveling shall utilize two (2) laser beams to check gradient and deflection. One laser beam shall be positioned 1-1/2 inches or less from the inside top of pipe. The second laser beam shall be positioned 2 inches or less from the inside bottom of pipe. Both beams must hit the target for the entire run of pipe being installed between manholes.

For pipelines less than 12 inches in diameter, a single laser level beam shall be utilized and centered inside the pipe.

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- B. Use care in handling and installing pipe and fittings. Storage of pipe on the job site shall be done in accordance with the pipe manufacturer's recommendation and with approval of the ENGINEER. Under no circumstances shall pipe or fittings be dropped either into the trench or during unloading. The interior of the pipe shall be kept clean of oil, dirt, and foreign matter, and the machined ends and couplings shall be wiped clean immediately prior to jointing.
- C. Use a PVC pipe cutter where necessary to cut and machine all PVC pipe in the field. A "full insertion mark" shall be provided on each field cut pipe end. Field-cut pipe shall be beveled with a beveling tool made especially for plastic pipe. Bevels shall be in accordance with the manufacturer's requirements.
- D. Each length of pipe and fitting shall be marked with the nominal size, the SDR designation, the name of the manufacturer or his trademark, and the date of manufacture.
- E. Rubber gaskets shall be marked with manufacturers identification sizes and proper insertion direction.
- F. Pipe stubs for all manhole connections shall not exceed 2 feet in length unless otherwise shown on the drawings. Install caps where required.
- G. Each time the work on the sewer is halted, the ends of the pipe shall be sealed to prevent foreign material from entering the pipe.

3.2 TESTS FOR GRAVITY SEWERS - GENERAL

- A. Gravity sewers shall be required to pass a leakage test before acceptance. Leakage tests shall be as described in Section 02676.
- B. All polyvinyl chloride and fiberglass sewer pipe shall be subject to deflection testing assuring that the maximum deflection of 5% has not been exceeded. Any pipe failing this test is subject to removal and replacement at the CONTRACTOR's expense. Do not use pipe rounders.

3.3 TELEVISION INSPECTION

- A. All sanitary sewer gravity lines shall be televised in accordance with Section 13511.

END OF SECTION

SECTION 02622

POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing buried PVC pipe, fittings and appurtenances.
 - 1. Provide PVC pipe and fittings complete with all necessary jointing facilities and materials, specials, adapters and other appurtenances required for installation in and completion of the pipelines to be constructed.
 - 2. Provide plain end or rubber gaskets (push-on or mechanical joint) of the types, sizes and classes shown or specified.
- B. Related Work Specified In Other Sections Includes:
 - 1. Section 02630 - Buried Ductile-Iron Pipe and Fittings
 - 2. Section 02650 - Laying and Jointing Buried Pipelines
 - 3. Section 02675 – Disinfection
 - 4. Section 02676 - Leakage Tests

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. ASTM D3034 - Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
 - 2. ASTM F679 - Polyvinyl Chloride (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings
 - 3. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. through 12 In., for Water Distribution
 - 4. AWWA C905 - Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14 In. through 36 In.
 - 5. AWWA C907 - Polyvinyl Chloride (PVC) Pressure Fittings for Water - 4 In. through 8 In.

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6. ASTM D2321 - Underground Installation of Flexible Thermoplastic Sewer Pipe
7. ASTM F477 - Elastomeric Seals (Gaskets) For Joining Plastic Pipe
8. ANSI A21.10 - Ductile-Iron and Gray-Iron Fittings 3 inches through 48 inches, for Water and Other Liquids
9. ANSI A21.11 - Rubber-Gasket Joints for Ductile-Iron and Gray Iron Pressure Pipe and Fittings
10. Uni-Bell B-11

1.3 SYSTEM DESCRIPTION

- A. Gravity Sewer Pipe - PVC pipe shall be of the integral wall bell and spigot joint type, which meets or exceeds all requirements set forth in ASTM D3034, latest revision. Minimum wall thickness shall conform to ASTM SDR 26. PVC pipes used for gravity sewers shall be green in color. Fittings shall be made of PVC plastic as defined by ASTM SDR 26 1784, latest revision. Flexible gasketed joints shall be compression type conforming to ASTM D3201, latest revision. Joints shall have elastomeric joint gaskets and shall conform to ASTM F477, latest revision. Lubricant and gaskets are to be supplied with the pipe by the manufacturer of the pipe. Other types of lubricants are prohibited. At all conflict crossings using 4"-12" substitute C900 PVC, Class 200, DR 14 and for PVC pipe 14" and larger use C905 PVC, Class 235, DR 18.
- B. Force Main Pipe – PVC pipe meeting the latest revision of AWWA C900 or AWWA C905 shall be provided. For installation of 4" – 12" pipe, the pressure class shall be 150 with a DR of 18. For installation of 14" – 24" pipe, use pressure class 165, DR 25, meeting or exceeding the requirements of Uni-Bell B-11. PVC pipes used for force mains shall be green in color. Outside diameters shall be equivalent to ductile iron pipe of the same nominal size. Pipes shall be marked with the manufacturer's name, nominal size, type of plastic, and pressure rating. Joints between successive lengths of straight PVC pipe shall be compression type using a single elastomeric gasket, per ASTM C-3139 and F477. Lubricant and gaskets are to be supplied with the pipe by the manufacturer of the pipe. Other types of lubricants are prohibited. Fittings shall be ductile iron (see Section 02630, 2.4.B). Restraint shall be provided for horizontal or vertical alignment changes using uni-flange type collars, epoxy coated, with high strength, low alloy hardware, and shall be EBAA "Megalug," "Uni-flange," Romac "Grip Ring," Sigma, Tyler, or Star restraint. (see also Section 2.1.L.) Fittings above 8 inch shall conform to the standards in Section 02505, until such time that C900 rated fittings in sizes larger than 8 inch are available. PVC pipe direct buried beneath roadways, parking lots or parking lot entrances shall meet AWWA Specification C900 or C905, latest revision. All 4" to 12" pipe in such locations shall be a minimum of Class 200, DR 14, and all 14" to 24" pipe shall be a minimum of Class 235, DR 18. Pressure

Class 250 ductile iron pipe may be used instead of PVC in these locations if approved by the City Manager or designee.

- C. Potable, Raw and Non-Potable Irrigation Water Main Pipe - PVC shall conform to AWWA Specification C900 or C905, latest revision. All 4" to 12" pipe shall be a minimum of Class 150, DR 18 and all 14" to 24" pipe shall be a minimum of Class 165, DR 25 and shall meet or exceed Uni-Bell B-11. All potable water pipe shall bear the seal of the National Sanitation Foundation (NSF) for potable water pipe. All pipe shall be marked with the manufacturer's name, nominal size, type of plastic and pressure rating. All PVC pipe used for potable water lines shall be predominately blue in color. Underground PVC pipes used for potable water lines shall be solid-wall blue pipe, will have a co-extruded blue external skin, or will be white or black pipe with blue stripes incorporated into, or applied to, the pipe wall. PVC pipes used for raw water shall be white in color. PVC pipes used for non-potable irrigation, reclaimed or reuse water shall be purple in color. Pipe O.D. shall be equivalent to cast iron pipe of the same nominal size. See Section 2.1.L for joint restraint information. PVC pipe direct buried beneath roadways, parking lots or parking lot entrances shall meet AWWA Specification C900 or C905, latest revision. All 4" to 12" pipe in such locations shall be a minimum of Class 200, DR 14, and all 14" to 24" pipe shall be a minimum of Class 235, DR 18. Pressure Class 250 ductile iron pipe may be used instead of PVC in these locations if approved by the City Manager or designee. Fittings shall be ductile iron (see Section 02630, 2.4.A). For PVC service mains within a development that is 4" or greater, use above specifications. For PVC water service lines less than 4", use Class 200 ASTM D2241 3" PVC, or schedule 40 2" or smaller PVC. When going under roads, service lines 2" and smaller shall be encased in schedule 80 PVC a minimum of twice the nominal outside diameter of the carrier pipe; for 3" and larger under roads, use Class 200 6" PVC casing. All fittings for use with PVC pipe 2 1/2" and smaller shall be manufactured of PVC in accordance with the same specifications as the PVC pipe of the same size; fittings shall have bell ends with elastomeric gaskets which conform to the same dimensions, tolerances, and specifications as the PVC pipe.
- D. Provide pipe of the various sizes and classes as specified in the schedule or shown. Restrain all pressure pipe joints.
- E. Construct concrete encasements only with written permission from the Water Director.

1.4 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Submit the following shop drawings:
1. Pipe joints, fittings, sleeves and cleanouts. Where special designs or fittings are required, show the work in large detail and completely describe and dimension all items.

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2. Fully dimensioned drawings of piping layouts, including fittings, couplings, sleeves, cleanouts, valves, supports and anchors. Label pipe size, materials, type, and class on drawings and include the limits of each reach of restrained joints. Provide cross sections showing elevations of cleanouts, pipes, fittings, sleeves, and valves.
 3. Catalog data for pipe, joints, fittings, sleeves, harnessing and cleanouts.
- C. Quality Control: Submit certificate of compliance for pipe, fittings, gaskets, coatings, specials, sleeves and cleanouts in accordance with this Section.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle all pipe, fittings and appurtenances as specified in Division 1 and Section 02650.

PART 2 PRODUCTS

2.1 MATERIALS

- A. PVC Pipes and Fabricated Fittings: PVC pipe and fabricated fittings shall be made from virgin PVC resin that has been compounded to provide physical and chemical properties that equal or exceed cell class 12454-B as defined in ASTM D1784, and shall qualify for a hydrostatic design basis of 4,000 psi (27.58 MPa) at 73.4°F (23°C) per the requirements of PPI TR-3.
- B. Fittings for Pressure Pipe: Provide all fittings meeting the requirements of Section 02630, except for PVC pipe 2 ½" or smaller, in which case use specifications above.
- C. Joints and Fittings for Gravity Sewer Pipe: Provide all fittings meeting the requirements of ASTM D 3034 and ASTM F 679. Provide joints that are a molded integral part of the pipe section. Do not use joints or couplings furnished loose. Provide joints with elastomeric gasket joints.
- D. Joints for Pressure Pipe: Provide pipe with bell ends in accordance with AWWA C900 and AWWA C905. Provide joints with elastomeric gasket joints.
- E. Elastomeric Gasket Joints: Provide elastomeric gasket joints in accordance with ASTM F 477.
- F. Rubber Gasket Joints: Provide mechanical joints meeting the requirements of ANSI A21.11.

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- G. Color: Provide pipe made of 100 percent of the color specified. Provide green sewer or force main pipe. Provide blue potable water pipe. Provide white raw water pipe. Provide purple non-potable irrigation, reclaimed or reuse water pipe.
- H. Pipe Marking: Provide mark on each pipe at internals of 5 feet or less to designate compliance with applicable ASTM or AWWA specification.
- I. Temporary Bulkheads: Provide temporary bulkheads at the ends of sections where adjoining pipelines have not been completed and are not ready to connect.
 - 1. Remove all temporary bulkheads when they are no longer needed.
- J. Date of Manufacturer: Provide pipe and fitting manufactured no earlier than 12 month period proceeding the date of the Agreement.
- K. Wall Thickness for Pressure Pipe:
 - 1. 4 through 12 inches diameter – provide AWWA-C900 DR 14, Class 200 for pressure pipe installed under pavement.
 - 2. 14 through 24 inches diameter – provide AWWA-C905 DR 25, PR 165 for pressure pipe installed under pavement.
- L. Restraining Devices: Restraining joints shall be placed at all bends, tees, plugs, reducers, and other fittings to provide lateral support, and shall conform to the City Standard Details. Concrete thrust blocks shall only be utilized if approved by City Utilities. Restrained joint shall be capable of deflection during assembly. Deflection shall not exceed the manufacturer recommendations. Tee head bolts and nuts for restrained joints shall be manufactured of Corten-A, high strength, low alloy, corrosion resistant steel.
 - 1. Joint restraint devices for ductile iron mechanical joint fittings to PVC pipe shall be EBAA Iron Sales, Series 2000PV, Uniflange, Sigma, Star, Tyler, Lok-Type or Tr-Flex manufactured by U.S. Pipe Co., Lok-Fast or Lok-Ring manufactured by American Cast Iron Pipe Co., or Romac Industries.
 - 2. Bell joint restraint devices for PVC push joint pipe shall be EBAA Iron Sales, Series 1600 for C900 pipe and Series 2800 for C905 pipe or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install all buried PVC pipe and fittings in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1 and Section 02650.

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3.2 LEAKAGE TESTING

- A. Cleaning: Flush clean and test all pipes after installation.
- B. Testing: Test pipes for leaks and repair or tighten as required.
- C. Procedures: Conduct tests in accordance with Section 02676.

3.3 DISINFECTION

- A. General: Disinfect all pipelines that are to carry potable water before they are placed in service as specified in Section 02675.

3.4 SCHEDULES

- A. Refer to the Schedules contained in Section 02650 Laying and Jointing Buried Pipelines for information on the piping that is to be constructed using the pipe materials and methods specified herein.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 02630

DUCTILE IRON PIPE (DIP) AND FITTINGS

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required, and install ductile iron pipe, fittings and appurtenances as shown on the Drawings and as specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02650 - Laying and Jointing Buried Pipe

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Commercial Standards: (Latest Revision)

1. ANSI/AWWA C104/A21.4 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
2. ANSI/AWWA C105/A21.5 Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids.
3. ANSI/AWWA C110/A21.10 Ductile-Iron Fittings, 3 in. Through 48 Inches, for Water and Other Liquids. (C110 2-48 inches).
4. ANSI/AWWA C111/A21.11 Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
5. ANSI/AWWA C115/A21.15 Flanged Ductile-Iron Pipe with Threaded Flanges.
6. ANSI/AWWA C150/A21.50 Thickness Design of Ductile-Iron Pipe.
7. ANSI/AWWA C151/A21.51 Ductile-Iron Pipe, Centrifugally Cast for Water or Other Liquids.
8. ANSI/AWWA C153/A21.53 Ductile-Iron Compact Fittings, 3 inches through 16 inches, for Water and Other Liquids.
9. AWWA C600 Installation of Ductile Iron Water Mains and Their Appurtenances.

1.4 CONTRACTOR SUBMITTALS

- A. Shop Drawings: Submit shop drawings of pipe and fittings in accordance with the requirements in the General Conditions, the requirements of the referenced standards and the following supplemental requirements as applicable:
 - 1. Certified dimensional drawings of all valves, fittings, and appurtenances.
 - 2. In all cases, a line layout to indicate the limits of each reach of restrained joints or of concrete encasement shall be supplied. (NOTE: Obtain CITY Utilities Department approval of all proposed concrete encasement of ductile iron pipe.)
- B. Certifications: Furnish a certified affidavit of compliance for all pipe and other products or materials furnished under this Section of the Specifications, which indicates that all tests have been made and that all results comply with the requirements of AWWA C151, including but not necessarily limited to the following:
 - 1. Acceptance Tests.
 - 2. Hydrostatic Tests.
 - 3. Low Temperature Impact Tests.
- C. Additional Documentation: Upon request, furnish foundry records in the form of written transcripts.
- D. All expenses incurred for certification, testing, and data submittal shall be borne by the CONTRACTOR or the Supplier.

1.5 QUALITY ASSURANCE

- A. Inspection: All pipe shall be available for inspection at the place of manufacture prior to shipping in accordance with the provisions of the referenced standards. Notify the ENGINEER in writing not less than 10 calendar days prior to the shipping of the pipe.
- B. The ENGINEER shall be given access to all areas where manufacturing and testing is performed and shall be permitted to make all inspections necessary to confirm manufacturer compliance with these Specifications.
- C. Tests: Except as modified herein, all materials used in the manufacture of the pipe shall be tested in accordance with the requirements of the referenced standards as applicable.
- D. Provide data on material tests at no additional cost to the CITY.

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- E. In addition to those tests specifically required, the ENGINEER may request additional samples of any material including lining and coating samples for testing by the CITY. Furnish the additional samples at no additional cost to the CITY.

1.6 CORROSION PROTECTION

- A. If specifically approved by City Utilities for use, provide exterior protection for underground ductile iron pipe and fittings, steel pipe, and pre-stressed concrete cylinder pipe within areas of severe corrosive conditions (dump areas, swamps, marshes, alkaline soils, cinder bed, etc.). This shall be accomplished by the installation of polyethylene encasement (minimum eight (8) millimeters thick) through the area of concern in accordance with AWWA C105. The soil test evaluation to determine the necessity for extra protection in suspect areas shall be those set forth in ANSI Standard A21.5. Additionally, where other existing utilities are known to be cathodically protected, ductile iron pipe crossing said utility shall be protected for a distance of 20 feet to each side. If ductile iron pipe is to be installed parallel to and within 10 feet of cathodically protected pipe, then protection shall be provided for the entire length. Do not install steel pipe in severe corrosion areas.

PART 2 PRODUCTS

2.1 GENERAL

- A. Protective Lining for Water Mains: Cement mortar lined ductile iron pipe shall conform to ANSI/AWWA C151 and C104, subject to the following supplemental requirements. The pipe shall be of the diameter and class shown, shall be furnished complete with rubber gaskets as indicated in the Contract Documents, and all specials and fittings shall be provided as required under the Contract Documents.
- B. Protective Lining for Force Mains and Sewers: Where lining is shown, specified or required, for the protection of pipelines carrying sewage from corrosive gases, line the pipe using protective ceramic epoxy coating or polyethylene lining in accordance with the manufacturer's written instructions. For ceramic epoxy lining, abrasive blast clean pipe and fittings to a near white surface to SSPC SP-10 and provide 40 mils minimum of dry film thickness of ceramic epoxy lining using Protecto 401 coating as manufactured by Vulcan Painters and certified by U.S. Pipe and Foundry. For polyethylene lining, provide Polybond Plus (60 mils minimum thickness) as manufactured by American Cast Iron Pipe, or Engineer of Record approved equal.
- C. Handling and Storage: Handle the pipe by using wide slings, padded cradles, or other devices designed and constructed to prevent damage to the pipe and its lining. The use of equipment or handling, which might injure the pipe and its lining, will not be permitted. Stockpiled pipe shall be suitably supported and shall

be secured to prevent accidental rolling. Assure that all other pipe handling equipment and methods is acceptable to the ENGINEER.

- D. Laying lengths: Maximum pipe laying lengths shall be 20 feet.
- E. Finish: The pipe shall have smooth dense interior surfaces and shall be free from fractures, excessive interior surface crazing and roughness, in accordance with ANSI/AWWA C104.
- F. Closures and Correction Pieces: Provide closures and correction pieces as required so that closures may be made due to different headings in the pipe laying operation and so that correction may be made to adjust the pipe laying to conform to pipe stationing shown on the Drawings or line layouts where applicable.

2.2 PIPE DESIGN CRITERIA

- A. General: Ductile Iron pipe shall be designed in accordance with the requirements of ANSI/AWWA C150 as applicable and as modified in this Section.
- B. Pipe Wall Thickness for Internal Pressure: The pipe shall be designed with a net thickness to withstand the design internal pressure in accordance with the hoop stress formula. In addition to the requirements of the Section, the minimum wall thickness shall be in accordance with the minimum thickness wall depicted in table 50.5 of ANSI/AWWA C150.
- C. Potable, Raw and Non-Potable Irrigation Water Mains:
 - 1. Ductile Iron Pipe shall be a minimum pressure Class 250 and will be accepted in any diameter for use within the water distribution system.
 - 2. All aboveground potable water main pipe shall be painted Federal Safety Blue. All aboveground raw water main pipe shall be painted white. All aboveground non-potable irrigation, reclaimed or reuse water main pipe shall be painted Pantone Purple 522C. The pipe wall thickness shall not be less than that required by a working pressure of 250 psi in laying condition Type 4 "B" with 5-foot cover in conformance with ANSI Standard A21.50.
- D. Force Mains and Gravity Sewers:
 - 1. Ductile Iron Pipe shall be a minimum pressure Class150 and will be accepted in any diameter for use within the wastewater collection system.
 - 2. Ductile iron pipe for Gravity Sewer applications is not permitted unless the ENGINEER can demonstrate that C900 PVC pipe, Class 150 or 200, cannot be utilized from a structural standpoint.

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3. All aboveground force main pipe shall be painted Safety Green. The pipe wall thickness shall not be less than that required by a working pressure of 150 psi.

2.3 MATERIALS

- A. Ductile Iron Pipe: Pipe materials shall conform to the requirements of ANSI/AWWA C151.
- B. Adapters to connect ductile iron pipe or fittings to pipe or fittings of dissimilar materials shall be supplied by the CONTRACTOR in accordance with ASTM specifications and the pipe manufacturer recommendations, and as approved by the ENGINEER.
- C. Water Mains:
 1. All water mains shall contain cement for mortar lining conforming to the requirements of ANSI/AWWA C104. Cement for mortar lining shall be Type II or V. A fly ash or pozzolan shall not be used.
 2. All Ductile Iron buried water main pipelines shall have blue stripes applied to the pipe wall. Stripe width shall comply with AWWA standards. The stripes shall be applied by one of the methods described below:
 - a. Pipes striped during manufacturing of the pipe shall have continuous stripes that run parallel to the axis of the pipe located at no greater than 90 degree intervals around the pipe and that will remain intact during and after installation of the pipe.
 - b. Pipes striped during installation shall incorporate blue tape or blue paint. The tape or paint shall be applied in a continuous line that runs parallel to the axis of the pipe and that is located along the top of the pipe.
 3. All pipe with an internal diameter of 24" or greater, tape or paint shall be applied in continuous lines along each side of the pipe as well as along the top of the pipe.
- D. Force Mains and Gravity Sewer:
 1. All Ductile iron pipe used within the wastewater system shall be lined with polyethylene in accordance with ASTM D1248. Pipe and fittings shall be lined as specified herein. Each piece of pipe shall bear a marking denoting the class to which it belongs. Pipes shall have green stripes applied to the pipe wall and shall conform to standards above.

2.4 SPECIALS AND FITTINGS

A. Fittings for Potable, Raw, Non-Potable Irrigation, Reclaimed and Reuse Water Systems:

1. Fittings shall conform to the requirements of ANSI/AWWA C153/A21.53 or ANSI/AWWA C110/A21.10 for diameters 3 inches through 48 inches, and shall have a minimum pressure rating of 350 psi for pipe sizes 6 inches through 24 inches and 250 psi for sizes larger than 24 inches. Ductile iron fittings shall be double cement lined, seal coated inside and outside with an asphaltic material in accordance with AWWA C104 as specified.

B. Fittings for Wastewater System:

1. Fittings in direct contact with wastewater 8 inches in diameter and smaller, shall be interior coated with a 12 mil thickness of coal tar epoxy coating. Pipe and fittings, for force mains 10 inches in diameter and larger, shall be interior coated with either a 20 mil to 40 mil thickness polyethylene as specified above or a 12 mil thickness of coal tar epoxy coating in conformance with ASTM 1248. Pipe and fittings shall have an outside asphaltic coating as specified in AWWA Standard C151. Each piece of pipe shall bear a marking denoting the class to which it belongs.

2.5 DESIGN OF PIPE

A. General: The pipe furnished shall be ductile iron pipe, lined as specified, with rubber gasketed joints.

B. The pipe shall be designed, manufactured, tested, inspected, and marked according to applicable requirements previously stated and except as hereinafter modified, shall conform to ANSI/AWWA C150 and ANSI/AWWA C151.

C. Pipe Dimensions: The pipe shall be of the diameter and class shown. The minimum wall thickness for each pipe size shall be as specified herein or shown on the Drawings.

D. Fitting Dimensions: The fittings shall be of the diameter shown and class specified.

E. Joint Design: Ductile Iron pipe and fittings shall be furnished with mechanical joints, push-on joints and flanged joints as follows:

1. For buried pipe applications, unless otherwise indicated, mechanical and push-on joints shall conform to ANSI/AWWA C111/A21.11, with the minimum pressure rating of 350 psi, and shall be as manufactured by U.S. Pipe Co. (Tyton Joint), Clow Corp. (Super Bell-Tite Joint), or American Cast Iron Pipe Co. (Fastite Joint), Alltite, Star, or Engineer of Record approved equal. Restrained joint shall be capable of deflection during assembly.

- Deflection shall not exceed the manufacturer recommendations. Tee head bolts and nuts for restrained joints shall be manufactured of Corten-A, high strength, low alloy, corrosion resistant steel.
2. For above-ground or buried vault applications, unless otherwise indicated, flanged joints shall conform to ANSI/AWWA C115/A21.15, with the minimum pressure rating of 250 psi. All above-ground fittings shall be painted blue.
 3. Use manufactured, labeled gasket lubricant for push on joints with trade name and pipe manufacturer name, other lubricants are prohibited.
 4. Nuts and bolts for flanged joints shall be 304 stainless, as specified by the CITY, and conform to ANSI/AWWA C111.
- F. Restraining Devices: Restraining joints shall be placed at all bends, tees, plugs, caps, reducers, and other fittings to provide lateral support and to prevent pipe joints and fittings from pulling apart under pressure, and shall conform to the City Standard Details (see Typical Conflict Crossings Detail Drawing). Concrete thrust blocks shall only be utilized if approved by City Utilities or as shown on the Detail Drawings, and shall have a minimum compressive strength of 3,000 psi at 28 days. Do not disturb soil in the thrust block area prior to pouring concrete. Both concrete thrust blocks and restrained joints or tie rods must be used when, in the judgment of the Engineer of Record, the nature and criticality of the installation is such as to require positive assurance of stability. Fittings and pipes shall be wrapped with 8 mil thick polyethylene prior to pouring concrete, so that no concrete comes in direct contact with the surface of the fitting or pipe. Concrete shall cure a minimum of 7 days prior to placing the line under pressure. Contractor shall not backfill around thrust blocks until approval is obtained from the City Field Inspector. See Section 02650 page 10 for more information on thrust blocks.
1. Joint restraint devices for ductile iron mechanical joint pipe and ductile iron mechanical joint fittings to ductile iron pipe shall be EBAA Iron Sales, Series 1100 Megalug (R), Uniflange, Romac Industries, Sigma, Lok-Type or Tr-Flex manufactured by U.S. Pipe Co., Lok-Fast or Lok-Ring manufactured by American Cast Iron Pipe Co., or Star Restraint.
 2. Bell joint restraint devices for ductile iron push joint pipe shall be EBAA Iron Inc., Series 1700 Megalug (R) for bell restraint.
 3. Restrained push-on joints for push joint pipe shall be U.S. Pipe and Foundry, TR Flex, McWane Inc., Super-Lock, American Cast Iron Pipe Company, Lok-Ring or Flex-Ring.
- G. For bell-and-spigot ends with rubber gaskets, the clearance between the bells and spigots shall be such that when combined with the gasket groove configuration and the gasket itself will provide watertight joints under all operating conditions when properly installed. Require the pipe manufacturer to submit details complete with significant dimensions and tolerances and also to submit performance data indicating that the proposed joint has performed satisfactorily under similar conditions. In the absence of a history of field performance, the results of a test program shall be submitted.

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- H. Gaskets shall be a Buna N, Neoprene, or a Nitril-based rubber product approved by the City Manager or designee. Gaskets shall have clean tips unless otherwise specified. Elastomeric gaskets conforming to ASTM F-477 shall also be acceptable.
- I. Shop-applied interior linings and exterior coatings shall be applied evenly to the nominal thickness specified. Holiday free cement is not possible to manufacture. Exterior coatings: asphalt coating for buried pipe or primed pipe cannot be furnished holiday free.

2.6 CEMENT-MORTAR LINING

- A. Cement-Mortar Lining For Shop Application: Except as otherwise provided herein, interior surfaces of all ductile iron pipe shall be cleaned and lined in the shop with cement-mortar lining applied centrifugally in conformity with ANSI/AWWA C104. Ductile-Iron pipe fittings need not have the cement-mortar lining applied centrifugally. The lining machines shall be of a type that has been used successfully for similar work. Every precaution shall be taken to prevent damage to the lining. If lining is damaged or found faulty at delivery site, the damaged or unsatisfactory portions shall be repaired in the field in accordance with ANSI/AWWA C104.
- B. The nominal wet lining thickness shall be as follows:

Nominal Factory Nominal Replacement		
Nominal Pipe Diameter (in.)	Applied Lining Thickness (in.)	Lining Thickness (in.)
3-12	1/8	1/8
14-24	3/16	3/16
30-64	1/4	1/4

- C. Protection of Pipe Lining/Interior: All shop-applied cement mortar lining shall be given a seal coat of asphaltic material in conformance with ANSI/AWWA C104.

2.7 EXTERIOR COATING OF PIPE

- A. Exterior Coating of Buried Piping: The exterior coating shall be an asphaltic coating approximately 1 mil thick, conforming to ANSI/AWWA C151.

2.8 CORROSION PROTECTION

- A. If specifically approved by City Utilities for use, exterior protection shall be provided for underground ductile iron pipe and fittings within areas of severe corrosive conditions. This shall be accomplished by the installation of polyethylene encasement through the area of concern. The soil test evaluation to determine the necessity for extra protection in suspect areas shall be those set forth in ANSI Standard A21.5. Additionally, where other existing utilities are

EXHIBIT A

known to be cathodically protected, ductile iron pipe crossing said utility shall be protected for a distance of 20 feet to each side. If ductile iron pipe is to be installed parallel to and within 10 feet of cathodically protected pipe, then protection shall be provided for the entire length. Steel pipe shall not be installed in severe corrosion areas.

PART 3 EXECUTION

3.1 INSTALLATION OF PIPE

- A. **Handling and Storage:** Carefully handle and protect all pipe, fittings, etc., against damage, impact shocks, and free fall and in accordance with ANSI/AWWA C600. Do not place pipe directly on rough rocky ground, but in such instances support the pipe in a manner that will protect the pipe against injury whenever stored at such trench site or elsewhere. Do not install any pipe where the lining or coating show defects that may be harmful as determined by the ENGINEER. Repair such damaged lining or coating, or furnish and install a new undamaged pipe.
- B. Repair or replace all pipe damaged prior to Substantial Completion or during warrantee period.
- C. Inspect each pipe and fitting prior to installation to insure that no damaged portions of pipe are installed.
- D. Before placement of pipe in the trench, thoroughly clean each pipe or fitting of any foreign substance that may have collected therein, and keep the pipe clean at all times thereafter. For this purpose, close the openings of all pipes and fittings in the trench during any interruption to the work.
- E. **Pipe Laying:** Install the pipe in accordance with ANSI/AWWA C600.
- F. Lay pipe directly on the bedding material. Refer to the Collier County Utilities Standards and Procedures Ordinance Section 9.1.2 for laying and backfilling requirements. No blocking will be permitted, and the bedding shall be such that it forms a continuous, solid bearing for the full length of the pipe. Make excavations as needed to facilitate removal of handling devices after the pipe is laid. Form bell holes at the ends of the pipe to prevent point loading at the bells or couplings. Make excavations as needed outside the normal trench section at field joints to permit adequate access to the joints for field connection operations and for application of coating on field joints.
- G. Where necessary to raise or lower the pipe due to unforeseen obstructions or other causes, the ENGINEER may change the alignment and/or the grades. Such change may be made by the deflection of joints, by the use of bevel adapters, or by the use of additional fittings. However, in no case shall the deflection in the joint exceed 70 percent of the maximum deflection recommended by the pipe

manufacturer. No joint shall be misaligned any amount which will be detrimental to the strength and water tightness of the finished joint.

- H. Pipe and Specials Protection: Protect the openings of all pipe and specials with suitable bulkheads to prevent unauthorized access by persons, animals, water, or any undesirable substance. At all times, provide means to prevent the pipe from floating.
- I. Pipe Cleanup: As pipe laying progresses, keep the pipe interior free of all debris. Completely clean the interior of the pipe of all sand, dirt, mortar splatter and any other debris following completion of pipe laying, pointing of joints, and any necessary interior repairs per ANSI/AWWA C600 and C602 prior to testing and disinfecting the completed pipeline. For pipe larger than 12" diameter, utilize a polyurethane foam plug "Poly Pig" to remove all debris from main.

3.2 RUBBER GASKETED JOINTS

- A. Rubber Gasketed Joints: Immediately before jointing pipe, thoroughly clean the bell end of the pipe, and place a clean rubber gasket in the bell groove. Carefully clean the bell and spigot end of push-on joint pipe, and lubricate with a vegetable-based lubricant or per manufacturer's recommendation. Insert the spigot end of the pipe section into the bell of the previously laid joint and telescope into the proper position. Do not tilt the pipe to insert the spigot into the bell.

3.3 INSTALLATION OF PIPE APPURTENANCES

- A. Installation of Valves: Handle all valves in a manner to prevent any injury or damage to any part of the valve. Thoroughly clean and prepare all joints prior to installation. Adjust all stem packing and operate each valve prior to installation to insure proper operation.
- B. Install all valves so that the valve stems are plumb and in the location shown on the Drawings.
- C. Mechanical joints consisting of bell, socket, gland, gasket, bolts, and nuts shall conform to ANSI Standard A21.11. Bolts and nuts shall be high strength, low alloy, Cor-Ten, T-Head Type having hexagonal nuts. Bolts and nuts shall be machined through and nuts shall be tapped at right angles to a smooth bearing surface. Single sealed gasket push-on type joints shall conform to the requirements of ANSI A21.11 and shall be Tyton, Fastite, Superbelltite, Alltite, or Engineer of Record approved equal.
- D. Mechanical joint retainer glands may be used to restrain mechanical joint pipe and fittings to the plain end of ductile iron pipe and fittings when used in conjunction with thrust blocks of reduced size. The Utilities ENGINEER must approve thrust block size. Maintain joint flexibility.

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3.4 TESTING AND DISINFECTION

- A. Test completed water or force main pipeline in accordance with Section 02676. Disinfect completed water pipeline in accordance with Section 02675.

END OF SECTION

SECTION 02650

LAYING AND JOINTING BURIED PIPELINES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Installation of all underground pipelines. Provide pipeline materials, coatings and linings as specified and pipe of the types, sizes and classes shown or specified. Furnish and install the potable water piping system, complete, tested, and ready for operation. Submit Certificate of Inspection from manufacturer stating materials furnished have been inspected at the place of manufacturer, conform to the requirements of these specifications, and have been tested as specified.

1. Use proper and suitable tools and appliances for the safe and convenient cutting, handling, and laying of pipe and fittings.
2. Use suitable fittings where shown and at connections or where grade or alignment changes require offsets greater than those recommended and approved.
3. Lay all underground pipelines not supported on piles or concrete cradle in select fill bedding material.
4. Close off all lines with bulkheads when pipe laying is not in progress.

B. Related Work Specified in Other Sections Includes:

1. Section 02222 - Excavation - Earth and Rock
2. Section 02223 - Backfilling
3. Section 02530 - Groundwater Control for Open Excavation
4. Section 02620 - High Density Polyethylene (HDPE) Pipe and Fittings
5. Section 02622 - Polyvinyl Chloride (PVC) Pipe and Fittings
6. Section 02630 - Ductile Iron Pipe (DIP) and Fittings
7. Section 02676 - Leakage Tests
8. Section 02675 - Disinfection

1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. ASTM D 2774 - Practice for Underground Installation of Thermoplastic Pressure Piping
2. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances
3. ASTM A 307 - Specification for Carbon Steel Bolts and Studs, 60000 psi Tensile
4. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, C25, 125, 250, 800
5. ASME B16.21 - Nonmetallic Flat Gaskets for Pipe Flanges
6. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
7. AWWA C115/A21.15 - Flanged Ductile-Iron Pipe With Threaded Flanges
8. Uni-Bell - Handbook of PVC Pipe

1.3 DELIVERY, STORAGE AND HANDLING

- A. General: Deliver, store and handle all products and materials as specified in Division 1 and as follows:
- B. Transportation and Delivery: Take every precaution to prevent injury to the pipe during transportation and delivery to the site.
- C. Loading and Unloading: Take extreme care in loading and unloading the pipe and fittings.
 1. Work slowly with skids or suitable power equipment, and keep pipe under perfect control at all times.
 2. Under no condition is the pipe to be dropped, bumped, dragged, pushed, or moved in any way that will cause damage to the pipe or coating. Pipe shall not be skidded or rolled against pipe already on the ground.
- D. Sling: When handling the pipe with a crane, use a suitable sling around the pipe.
 1. Under no condition pass the sling through the pipe. Interior of pipe is to be kept free of dirt and foreign matter at all times.

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2. Use a nylon canvas type sling or other material designed to prevent damage to the pipe and coating.
 3. When handling reinforced concrete pipe or uncoated steel or ductile iron pipe, steel cables, chain or like slings are acceptable.
- E. **Damaged Piping:** If in the process of transportation, handling, or laying, any pipe or fitting is damaged, replace or repair such pipe or pipes. All cracked, damaged, or defective pipe, and indentation of more than 10 percent of the wall thickness in depth, shall be rejected and removed at once from the work and replaced with new acceptable pipe at no cost to the City.
- F. **Blocking and Stakes:** Provide suitable blocking and stakes installed to prevent pipe from rolling.
1. Obtain approval for the type of blocking and stakes, and the method of installation.
- G. **Storage for Pipes and Gaskets:** When long-term (more than one week) storage with exposure to direct sunlight is unavoidable, pipe should be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excessive heat accumulation (Uni-Bell PVC Handbook). Pipe shall not be stored close to heat sources or hot objects such as heaters, fires, boilers, or engine exhaust. Store gaskets for pipe joints in a cool place and protect gaskets from light, sunlight, heat, oil, grease, or ozone until installed. Store gaskets in a sealed container (such as a vented drum).
1. Do not use any gaskets showing signs of cracking, weathering or other deterioration.
 2. Do not use gasket material stored in excess of six months without approval.

1.4 FIELD CONDITIONS

- A. **Repair of Sanitary Sewers and Services:** Rebed, in compacted select fill material, sanitary sewers which cross over the new pipe or which cross under the new pipe with less than 12 inches clear vertical separation. Compact the bedding to densities required for new pipeline construction and extend bedding below the sewer to undisturbed earth. Reconstruct sewers damaged by pipeline construction.
1. Furnish and install all materials and do all work necessary for the reconstruction or repairs of sanitary sewers and services.
 2. Provide pipe for reconstruction of sanitary sewers and services meeting the appropriate specification requirements.

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3. Provide pipe of the same size as the existing sewer or when the same size is not available, use the next larger size of pipe. Obtain approval of joints made between new pipe and existing pipe.

PART 2 PRODUCTS

- A. The materials allowed for buried sewer pipes are PVC, HDPE or Ductile Iron Pipe.

PART 3 EXECUTION

3.1 PREPARATION

- A. Dry Trench Bottoms: Lay pipe only in dry trenches having a stable bottom.
 1. Where groundwater is encountered, make every effort to obtain a dry trench bottom in accordance with Section 02530.
 2. Perform trench excavation and backfill in accordance with Sections 02222 and 02223.

3.2 INSTALLATION

- A. General: Install all piping in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1. Where pipe deflections are used, use any of the following guidelines: for deflections, do not exceed 80 percent of the maximum deflection limits shown in AWWA C600, or use the deflections shown in the tables below, or deflect not more than 80% of the pipe manufacturer's recommendations. Gravity systems will contain no deflection. For restrained lengths, see Typical Conflict Crossings Detail Drawing – for fittings not included in detail drawing, refer to Collier County Detail Drawing G-10. For thrust blocks, each fitting and pipe shall be wrapped with 8 millimeter thick polyethylene prior to pouring concrete, so that no concrete comes in direct contact with the surface of the fitting or pipe; concrete shall cure a minimum of 7 days prior to placing the line under pressure.
 1. Arrange miscellaneous pipelines, which are shown in diagram form on the Plans, clear of other pipelines and equipment.
- B. Code Requirements: Provide pipeline installations complying with AWWA C600 for iron pipe, AWWA Manual M11 for steel pipe, ASTM D 2774 for thermoplastic pressure piping, and as modified or supplemented by the Specifications.
- C. Pipe Laying - General:
 1. Thoroughly inspect all pipe for damage (including the gasket, pipe spigot bevel, gasket groove, and sealing surfaces) and cleanliness. If found to be

defective, tag, remove and replace pipe with satisfactory pipe or fittings at no additional charge to CITY. Clean the interior of the bell, gasket, and spigot of the pipe to be jointed with a rag to remove any dirt or foreign material before assembling.

2. In preparation for pipe installation, placement (stringing) of pipe should be as close to the trench as practical on the opposite side of the trench from the excavated material. The bell ends of the pipe should point in the direction of the work in progress.
3. Generally, lay all pipe with bells pointing ahead.
4. Carefully place all pipe, pipe fittings, valves and hydrants into trench by means of a derrick, ropes or other suitable tools or equipment in such a manner as to prevent damage and check for alignment and grade.
5. Make adjustments to bring pipe to line and grade by scraping away or filling in select fill material under the body of the pipe.
6. Wedging or blocking up the pipe barrel is not permitted.
7. Bring the faces of the spigot ends and the bells of pipes into fair contact and firmly and completely shove the pipe home.
8. As the work progresses, clean the interior of pipelines of all dirt and superfluous materials of every description. If necessary, a heavy, tightly woven canvas bag of suitable size shall be placed over each end of the pipe before lowering into the trench and left there until the connection is made to the adjacent pipe.
9. Keep all lines absolutely clean during construction. Prevent contaminating materials from entering the water main during storage, construction, or repair.
10. Lay pipelines accurately to line and grade.
11. During suspension of work for any reason at any time, even for a lunch break, a suitable watertight stopper or plug shall be placed in the end of the pipe last laid to prevent mud or other material from entering the pipe. Also, the pipe shall be secured to prevent it from being dislodged.
12. All valves and fittings on the customer side of any fire line past the backflow preventer, and all valves and fittings within 50' (fifty feet) of a saltwater or estuary body of water, shall be field coated with Koppers Bitumastic No. 300-M or Amercoat No. 78, or Engineer of Record approved equal product, prior to backfilling; coat all exterior surfaces and all uncoated nuts, bolts, glands, rods, and other parts of joints.

D. Pipe Laying - Trenches:

1. Carefully lay all pipelines in trench excavations piece by piece using suitable tools or equipment on select fill bedding (refer to Collier County Utilities Standards and Procedures Ordinance, Section 9.1.2), concrete cradle, or other foundations as shown, specified, or ordered in writing. Give the pipe a firm bearing along its entire length. Any pipe which has its grade or joint disturbed after laying shall be taken up and relaid. Prevent damage to materials, protective coatings and linings. The backhoe method of assembly may be used to assemble pipe of intermediate and larger sizes. The plain end of the pipe should be carefully guided by hand into the bell of the previously assembled pipe. The bucket of the backhoe may then be used to push the pipe until fully seated via a pipe sling only! Direct contact between the backhoe bucket and pipe shall not be permitted. The pipe can also be pushed into the bell using a bar and block. If undue resistance to insertion of the spigot end is encountered or if the reference mark does not reach the flush position, disassemble the joint and check the position of the gasket. If the gasket is twisted or pushed out of its seat, inspect the components, repair, or replace damaged items, clean the components, and repeat the assembly steps. Be sure the pipe is in proper alignment during assembly. If the gasket was not out of position, check the distance between the spigot end and the reference mark and relocate the mark if it is out of position.
2. Do not dump or drop pipe or pipe materials into trench.
3. Properly secure the pipe against movement and make the pipe joints in the excavation as required.
4. Carefully grade and compact pipe bedding.
5. Bell Holes:
 - a. Cut out bell holes for each joint as required to permit the joint to be properly made and allow the barrel of the pipe to have full bearing throughout its length.
 - b. Thoroughly tamp bell holes full of select fill material following the making of each joint to provide adequate support to the pipe throughout its entire length.
6. Curved Alignment: In special cases where curved alignment is required on pressure lines, the deflection of alignment at a joint shall not exceed the appropriate permissible deflection as specified in the following table. These values indicate the maximum permissible deflection for eighteen foot (18') lengths as noted. Gravity systems shall contain no deflections. Any deflection greater than the allowable deflection shall be made with appropriate fittings.

TABLE 1

Pipe Deflection Allowance – Polyvinyl Chloride (PVC) Pipe
Maximum Permissible Deflection, Inches

<u>Size of Pipe, Inches</u>	<u>Push-On-Joints, Inches</u>
4	23
6	16
8	12
10	9
12	8

TABLE 2

Pipe Deflection Allowances – Ductile Iron (DI) Pipe
Maximum

<u>Size of Pipe</u>	<u>Joint Deflection In Degrees</u>	<u>Deflection in Inches – 18ft. Length</u>
4	5	19
6	5	19
8	5	19
10	5	19
12	5	19
14	4	15
16	4	15
18	3	11
20	3	11
24	3	11
30	3	11
36	3	11
42	3	12*
48	3	12*
54	3	12*

*20 ft. length for 42", 48", and 54" DI pipe

- E. Other Foundations: Install pipelines laid on other types of foundations as specified for such other foundations or as ordered in writing.

- F. **Field Cuts of Pipelines:** For shorter than standard pipe lengths, make field cuts in a manner producing a cut square and perpendicular to the pipe axis. Remove any sharp, rough edges which otherwise might injure the gasket. Ductile iron pipe may be cut using an abrasive pipe saw, rotary wheel cutter, guillotine pipe saw, milling wheel saw, or oxyacetylene torch; for push-on joint connections the cut end shall be beveled to prevent gasket damage during joint assembly. PVC pipe shall be cut square with a fine-toothed hand or power saw or other cutter or knife designed for use with plastic pipe; prior to cutting, the pipe shall be marked around its entire circumference or a square-in vise shall be used to ensure the pipe end is cut square; remove burrs by smoothing edges with a knife, file, or sandpaper.; bevel the cut end of the pipe using a pipe beveling tool, wood rasp, or portable sander to prevent damage to the gasket during joint assembly; a factory finished beveled end should be used as a guide to ensure proper beveling angle and correct depth of bevel; round off any sharp edges on the leading edge of the bevel with a knife or file.
- G. **Procedure for sealing cut ends and repairing field damaged areas of polyethylene lined pipe and fittings is as follows:**
1. Remove burrs caused by field cutting of ends or handling damage and smooth out edge of polyethylene lining if made rough by field cutting or handling damage.
 2. Remove oil or lubricant used during field cutting operations.
 3. Areas of loose lining associated with field cutting operation must be removed and exposed metal cleaned by sanding or scraping. For larger areas, remove loose lining and dirt, then roughen bare pipe surface by scratching or gouging with a small chisel to provide an anchor pattern for the epoxy. It is recommended that the polyethylene lining be stripped back by chiseling, cutting, or scraping about 1 inch (1") to 2 inches (2") into well adhered lined area before patching. This ensures that all areas of undercutting have been removed. Be sure to roughen an overlap of 1 inch (1") to 2 inches (2") of polyethylene lining in area to be epoxy coated. This roughening should be done with a rough grade emery paper (40 grit), rasp, or small chisel. Avoid honing, buffing, or wire brushing since these tend to make surface to be repaired too smooth for good adhesion.
 4. With area to be sealed or repaired clean and suitably roughened, apply a thick coat of a two-part coal tar epoxy such as Madewell 1104 or City approved equal. The heavy coat of epoxy must be worked into the scratched surface by brushing. Mixing and application procedure for the epoxy must follow the epoxy manufacturer's instructions.
 5. It is important that the entire freshly cut, exposed metal surface of the cut pipe be coated. To ensure proper sealing, overlap at least 1 inch (1") of the roughened polyethylene lining with this two-part epoxy system.

H. Ductile Iron Pipe Mechanical Joints:

1. Assembly: In making up mechanical joints, center the spigot in the bell.
 - a. With a wire brush just prior to assembly of the joint thoroughly brush 8 inches outside of spigot and inside of bell with which the rubber gasket comes in contact. Remove all oil, grit, tar (other than standard coating) and other foreign matter from joint.
 - b. Brush lubricant over the gasket just prior to installation. (Note: There is only one rubber gasket size for each diameter of pipe.)
 - c. Press the gasket into place within the bell and move the gland into position, bolts inserted, and the nuts tightened finger tight.
 - d. Tighten the nuts with a torque wrench so that the gland is brought up toward the pipe evenly. Torque wrenches shall be set as specified in AWWA C111. Spanner type wrenches not longer than specified in AWWA C111 may be used with the permission of City Manager or designee.
 - e. Prime all bolts by dipping with a bituminous coating, except the threads. Coat threads immediately prior to installation of nuts.
 - f. Tighten all nuts 180 degrees apart alternately in order to produce equal pressure on all parts of the gland.

2

TABLE F.3

<u>Bolt Size</u> <u>(Inches)</u>	<u>Torque</u> <u>(ft. lbs)</u>
5/8	45 - 60
3/4	75 - 90
1	-100-120
1-1/4	-120-150

3. Remaking of Joints: If effective sealing is not obtained at the maximum torque listed above, disassemble and reassemble the joint after thorough cleaning.

I. Ductile Iron Pipe Rubber Gasket Joints:

1. Assembly: In making up the rubber gasket joint, brush the gasket seat in the socket thoroughly with a wire brush and wipe the gasket with a cloth.

- a. Place the gasket in the socket with the large round end entering first so that the groove fits over the bead in the seat.
 - b. Apply a thin film of lubricant (AWWA C600) to the inside surface of the gasket that will come in contact with the entering pipe.
 - c. Brush the plain end of the pipe to be entered thoroughly with a wire brush and place it in alignment with the bell of the pipe to which it is to be joined.
 - d. Exert sufficient force on the entering pipe so that its plain end is moved past the gasket until it makes contact with the base of the socket to make the joint.
2. Positioning: Before proceeding with backfilling, feel completely around the joint using a feeler gauge to confirm that the gasket is in its proper position.
- a. If the gasket can be felt out of position, withdraw the pipe and examine the gasket for cuts or breaks.
 - b. If the gasket has been damaged, replace it with a new one before re-installing the pipe.
3. Optional Mechanical Joints: Use mechanical joint fittings that meet the requirements of Section 02630 with the rubber gasket joint pipe when specified or when rubber gasket fittings are not available.
- J. Temporary Bulkheads: Provide temporary bulkheads at the ends of sections where adjoining pipelines have not been completed, and in connections built into pipelines where adjoining pipelines or structures have not been completed and are not ready to be connected.
1. Remove bulkheads encountered in connecting sewers or structures included in this Contract, or in pipelines or structures previously built, when they are no longer needed or when ordered.
- K. Dead-End Lines, Temporary Blow-Off Assemblies, and Thrust Blocks: Dead-end water lines shall be temporarily ended with a blow-off as shown in City Standard Details. After full bore flush, replace with a fire hydrant meeting the requirements of Section 02645. If an automatic flushing valve unit is necessary, it must be approved by the City Manager or designee, and must be in accordance with the automatic flushing valve Detail Drawing; a meter must be installed just before the automatic flushing valve unit between the line size gate valve and the 2" curb stop. Wastewater line dead-ends shall be installed with a terminus thrust block as shown in the Detail Drawings. See Section 02630 page 7 for more information on restraining joints and concrete thrust blocks.

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- L. Sleeve Type Couplings: For sleeve type couplings, equally tighten diametrically opposite bolts on the connection so that the gaskets will be brought up evenly all around the pipe.
 - 1. Torque Wrenches: Do the final tightening with torque wrenches set for the torque recommended by the coupling manufacturer.
- M. Concrete Encasement: Concrete encasement shall be constructed in accordance with City Standard Details when:
 - 1. A potable water main crosses at a depth that provides less than 18 inches clear distance from sewer lines. Encase the sewer main unless specifically approved by City Utilities. Encasement shall extend a minimum 10 feet on each side of the point of crossing. Pressure test both pipelines to 150 psi after the concrete has properly cured.
 - 2. A water main running parallel to a sewer line provides less than 10 feet separation from sewer line, in which case City approval will be required. Encase the sewer main unless specifically approved by City Utilities.
 - 3. The ENGINEER has ordered the line encased. NO POTABLE WATER MAIN SHALL BE ENCASED IN CONCRETE UNLESS SPECIFICALLY AUTHORIZED BY THE CITY MANAGER OR DESIGNEE.

The points of beginning and ending of pipe encasement shall be not more than 6 inches from a pipe joint to protect the pipe from cracking due to uneven settlement of its foundation or the effects of superimposed live loads.

- N. Valve Box Setting: Install valve boxes vertical and concentric with the valve stem. Place a Gate Box Aligner (USA Bluebook Stock #MC-75181) over the valve stem in order to help keep valve box aligned during backfilling.
 - 1. Adjust valve-box to final grade at the time designated by the City Manager or designee.
 - 2. Build a reinforced collar, as shown in the standard details, 18 inches by 18 inches by 6 inches with 2, #4 reinforcing bars around the valve box head in pavement, flush to grade of top of box. Similar collar shall be poured flush with grade and top of unpaved areas.
 - 3. Satisfactorily reset any valve box that is moved from its original position, preventing the operation of the valve.
 - 4. Replace any valve box that has been damaged.
- O. Identification:

1. **Metallized and Non-Metallized Warning Tape:** For PVC and DIP pipe (other than gravity sewer pipe and laterals) to be installed, 3-inch detectable marking tape, of appropriate color and appropriate warning statement, shall be placed along the entire pipe length, with metallized warning tape used for PVC pipe and non-metallized warning tape used for ductile iron pipe. In all cases, marking tape shall be installed two feet (2') below grade or one-half the pipe's bury, whichever is less, during backfill operations (refer to Manual Section 1 – 1.1 and 2.2.1). For wastewater force mains and reclaimed water mains, identification tape shall be installed at two depths: directly on top of the pipe as well as at the location mentioned above. All PVC pipe, PVC fittings, and identification tape shall be color-coded per the following: blue for potable water, white for raw water, pantone purple for reclaimed water, and green for wastewater. Metallized tape shall be Terra Tape D as manufactured by Reef Industries, Inc., Houston Texas (800)231-6074 and Allen Systems, Inc., Wheaton, IL (800)323-1749 or Engineer of Record approved equal. HDPE pipe installed by horizontal directional drilling will not be required to be marked with metallized warning tape, but shall be marked with two 12 gage copper tracer wires (see Section 02300, 3.5), or Engineer of Record approved wire.
 2. **Tracer Wire for Locating:** Mark with 10 gage copper tracer wire all non-ductile-iron laterals, force mains, gravity mains, water mains, and water service lines.
 3. **Electronic Markers:** Place 3M Magnetic Ball Markers at lateral ends, cleanouts, connections to the gravity system, before and after lift stations, connections to force main, next to valve boxes, in meter boxes, at all fittings and change of direction along water and wastewater pipes, and along water and wastewater pressure pipe intervals no greater than every 100 feet. For service lines, place 3M Magnetic Ball Markers at water service line connection to water main and at intervals no greater than every 100 feet. Place 3M Magnetic Ball Markers 6 inches above pipe, and hand backfilled one foot (1') above ball to prevent damage or movement during subsequent backfilling. Burial depth shall not be less than two feet (2') nor more than six feet (6'). Markers shall be the appropriate Omni Marker Model 161 or 162 as manufactured by 3M Telecom Systems Group or City approved equal. Contractor shall install all tape and marker balls as specified.
- P. **Separation From Other Pipe Systems:**
1. **Parallel Water and Sewer or Non-Potable Lines:** Sanitary sewer lines, storm sewers or force mains shall be separated from water mains by a minimum clear vertical distance of 18 inches and a horizontal distance of 10 feet. Non-potable, reclaimed or reuse water mains shall be separated from water mains, gravity sewers or force mains by a minimum clear vertical distance of 18 inches and a horizontal distance of 5 feet center to center or 3 feet outside to outside. When this standard cannot be maintained, the sewer or non-potable line shall be concrete encased for a distance of 10

feet each way from the water line and any other conduit, with a minimum vertical clearance of 12 inches being provided at all times. See also Section 1 - Design Criteria, Subsection 1.2.3.

2. **Crossing Water and Gravity Sewer or Non-Potable Lines:** Water mains crossing over a sewer or non-potable water line shall be (bottom of water main to top of sewer) separated by at least 18 inches unless local conditions or barriers prevent an 18 inch vertical separation. All crossings with vertical clearance less than 18 inches shall be made using sewer or non-potable pipe thickness Class 200 AWWA C900 PVC pipe for a distance of 10 feet on each side of the crossing. The gravity sewer pipe in these locations shall be backfilled with USCS Class I bedding stone to a height of 6 inches above the crown of the pipe. When water mains cross under a sewer, both mains shall be constructed of C900 Class 200 PVC pipe with joints equivalent to water main standards for a distance of 10 feet on each side of the point of crossing with no intermediate joints. Additionally, a section of water main pipe shall be centered at the point of crossing. See also Section 1 – Design Criteria, Subsection 1.3.

Q. Aerial Crossings:

1. Obtain necessary construction permits for ditch or canal crossings from appropriate authorities. Contractor shall not begin work on any ditch or canal crossing until a copy of the approved permit is received from the Engineer of Record. The work shall be subject to an additional requirement of the governing authority. Pipes spanning elevated pier crossings shall be flanged ductile iron Pressure Class 350 pipe conforming to AWWA C115, C150 & C151. Pipe spanning on piers spaced further apart than normal pipe length of 18 or 20 ft. shall be multiple length pipe with interior flanged joints with a rubber gasket pipe such as Clow "Long-span Pipe", Flanged US Pipe, Flanged American Pipe or City approved equal. Concrete piers shall conform accurately to the bottom $\frac{1}{3}$ to $\frac{1}{2}$ of the pipe. Piping along walls shall be supported by approved wall brackets with attached pipe rolls or saddles or by wall brackets with adjustable hanger rods. For piping supported from the ceiling, approved rod hangers of a type capable of screw adjustment after erection of the pipeline and with suitable adjustable concrete inserts or beam clamps shall be used. The pipe wall thickness and flanged joints shall be designed to safely span the elevated piers under working pressure without exceeding the allowable stresses and conform to AWWA C150. Limit pipe deflection at center of span with pipe full of water to $\frac{1}{720}$ of span length. Provide expansion joints for between above ground and below ground wastewater lines. See also Section Design Criteria, Section 1.1.
2. Flanges shall conform to AWWA C150 and C115. All bolts and nuts used in aerial crossings shall be stainless steel. Gaskets shall be full faced or recessed "O-Ring" type to prevent leaks in pipe under stress in the aerial crossing.

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3. Outside surface of all pipe, flanges or spool pieces shall be shop coated with zinc primer, High Build Epoxy protective coat and a finish coat of polyurethane high gloss. Color shall be Federal Safety Blue for potable water mains and Pantone Purple 522 C for non-potable irrigation water mains. Raw water mains shall be painted white and sewer force mains shall be painted green.
4. Install operating valves or other flow regulating devices on each shoreline or at a safe distance from each shoreline to prevent discharge in the event the line is damaged.
5. Install supports for all joints in pipes utilized for aerial crossings and to prevent overturning and settlement. Expansion jointing is specified between above ground and below ground sewers and force mains.
6. Ditch banks and bottoms shall be restored to the original condition or as required by the Permitting agency, whichever is more stringent.

3.3 FIELD QUALITY CONTROL

- A. Whenever water, sewer, or reuse lines are in or across streets, driveways, or paved areas, the Contractor shall be responsible for any trench settlement which occurs within one year from the time of preliminary acceptance. Testing: Test pipelines in accordance with Section 02676.
 1. Test valves in place, as far as practicable, and correct any defects in valves or connections.
 2. Gravity Sewer Lines: Test in accordance with Section 02676
- B. Inspection: Clean, inspect, and examine each piece of pipe and each fitting and special for defects before it is installed.
 1. Cut away any lumps or projections on the face of the spigot end or the shoulder.
 2. Do not use any cracked, broken, or defective pieces in the work.
 3. If any defective piece should be discovered after having been installed, remove and replace this piece with a sound piece in a satisfactory manner at no increase in Contract Amount.

3.4 CLEANING

- A. General: Thoroughly clean all pipe before it is laid and keep it clean until it is accepted in the completed work. If necessary, a heavy, tightly woven canvas bag

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of suitable size shall be placed over each end of the pipe before lowering into the trench and left there until the connection is made to the adjacent pipe.

- B. Removal of Materials: Exercise special care to avoid leaving bits of wood, dirt, and other foreign particles in the pipe. If any particles are discovered before the final acceptance of the work, remove and clean the pipe.

3.5 DISINFECTION

- A. General: Disinfect all pipelines that are to carry potable water in accordance with Section 02675.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 02675

DISINFECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Disinfection of all pipelines, tanks, structures, conduits and equipment that are to store, handle or carry potable water. Furnish all labor, water, chemicals and equipment, including taps, corporation stops, temporary pumps and other items necessary to perform the Work, except as otherwise specified.

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. AWWA C651 - Disinfecting Water Mains
 - 2. AWWA C652 - Disinfection of Water-Storage Facilities

1.3 QUALITY ASSURANCE

- A. Disinfection Standards: Disinfect in accordance with AWWA C651 for water mains and AWWA C652 for water storage facilities and equipment.
- B. Chlorinated Water Disposal: Dispose of old highly chlorinated water in accordance with applicable regulations.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 FLUSHING

- A. After coordination with the CITY Water Distribution Section, perform all flushes, pigging or swabbing, disinfection and post flushes in the presence of Water department personnel. Fill all water lines with potable water, pig or swab (optional at the discretion of the City or Engineer of Record), and perform a line flushing (full bore flush). All lines larger than 12 inches in diameter shall be pigged to clear debris prior to flushing. Use a swab-type pig for HDPE pipe. Use a 5- to 7-lb. density poly-jacketed bullet style pig for all other pipe material. Under no

circumstances is a pig or swab considered reusable. A section of pipe shall be inserted in the gap specified in the jumper shown in the Standard Details to connect the new construction to the existing facilities for the purpose of accomplishing the full-bore flush. Immediately after completion of the flush, remove the connection. The facilities shall be capped and returned to the jumper connection shown in the Standard Details until final connection is permitted by City Manager or designee at the completion of construction and after finalization of all test procedures and bacterial clearance for new water facilities.

3.2 WATER MAIN DISINFECTION

- A. Following acceptable pressure testing, disinfect all sections of the water distribution system and receive approval thereof from the appropriate agencies, prior to placing in service. Provide advance notice of 48 hours to the City Manager or designee before disinfecting procedures start. The disinfection shall be accomplished in accordance with the applicable provisions of AWWA Standard C651, "Disinfecting Water Mains" and all appropriate approval agencies.
- B. The disinfecting agent shall be free chlorine in aqueous solution with sustained concentration for 48 hours of not less than 50 parts per million. After 48 hours, if chlorine solution contains at least 25 parts per million of chlorine, the line may then be flushed and samples taken at various points. Chlorine may be derived from Chlorine gas, or 70% (high test) calcium hypochlorite (HTH or Perchloron, or equal). Administration may be by any of the several methods described in AWWA Standard C651 as proposed by the CONTRACTOR and approved by the ENGINEER. Proposals as to method must be made prior to commencement of the disinfection process.
- C. Following contact with chlorine solution, the system shall be thoroughly flushed out. Schedule water sampling in coordination with the CITY Utilities Department. The CITY Utilities Department will obtain all water samples for analysis.
- D. If samples do not demonstrate satisfactory results, the line shall be flushed and a resample taken. If the samples fail on the second attempt, redisinfection per AWWA standards must be repeated until two satisfactory samples are obtained. The period between samples must be a minimum of 24 hours.
- E. After approval of the samples, and before placing the system in service, perform another flushing of the water lines to remove any stagnant water.

3.3 DISINFECTION PROCEDURES FOR TANKS

- A. Disinfect potable water storage tanks and equipment in accordance with AWWA C652, Method 2 or 3, using sodium hypochlorite.

EXHIBIT A

1. In Method 2, spray method, spray the entire interior surface of the tank with chlorinated water containing 200 mg/l of available chlorine. After spraying, allow the tank to stand at least two hours before filling with fresh water.
- B. After disinfection, allow the tanks and equipment to overflow until the chlorine residual is approximately 2 mg/l.

3.4 BACTERIAL SAMPLE POINTS

- A. For the purpose of new water main construction, bacterial sampling points shall be positioned at the beginning of each new system, at 1000-foot intervals and all dead ends unless otherwise directed. These sampling points will be utilized by Utilities personnel for water main bacterial clearance procedures. See Section 1 Design Criteria, Section 1.10 for more information. At the completion of the project, when authorization is given by the City Manager or designee, permanent sampling points shall remain every 3000 feet or one at 2/3 of the length from the point of connection to the CITY system if the line is less than 3000 feet long. All others shall be removed down to the main and properly capped by the CONTRACTOR. The permanent sampling points shall be constructed as shown in the Utility Detail Drawings. City staff will review the permanent sampling point locations during final plans review.
- B. Appropriately located fire hydrants will be utilized for sampling points. Under this circumstance, the Contractor will be solely responsible for maintaining the hydrants in a satisfactory environment for conducting the bacterial testing.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 02676

PRESSURE AND LEAKAGE TESTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Testing for any signs of leakage in all pipelines and structures required to be watertight.
 - 1. Test gravity sewers and drain lines by infiltration/exfiltration testing.
 - 2. Test all other pipelines with water under the specified pressures.
- B. Operation of Existing Facilities: Conduct all tests in a manner to minimize as much as possible any interference with the day-to-day operations of existing facilities or other contractors working on the site.

1.2 PERFORMANCE REQUIREMENTS

- A. Written Notification of Testing: Provide written notice when the work is ready for testing, and make the tests as soon thereafter as possible.
 - 1. Personnel for reading meters, gauges, or other measuring devices, will be furnished.
 - 2. Furnish all other labor, equipment, air, water and materials, including meters, gauges, smoke producers, blower, pumps, compressors, fuel, water, bulkheads and accessory equipment.

1.3 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances
 - 2. AWWA C605 - Underground Installation of PVC Pressure Pipe and Fittings for Water

1.4 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Testing Report: Prior to placing the sewer system in service submit for review and approval a detailed report summarizing the leakage test data, describing the test procedure and showing the calculations on which the leakage test data is based.

EXHIBIT A

1. Reference Sewer Line Data

a. For Low Pressure Testing

- (1) The length and diameter of the section of line tested (MH to MH), including any laterals.
- (2) A complete description of the test procedure, including:
 - (a) Trench backfilling and sewer cleaning status
 - (b) Type of plugs used and where
 - (c) Depth of sewer, and ground water pressure over sewer pipe
 - (d) Stabilization time period and air pressure
 - (e) Actual air test pressures used if ground water is present
 - (f) The time allowed by specifications
 - (g) The actual test time
 - (h) The air pressure at beginning and end of test
- (3) The name of the inspector/tester and the date(s) and time(s) of all testing performed, including any retesting.
- (4) A description of any repairs made.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 LEAKAGE TESTING

- A. All new sewer and water pipelines installed shall be tested for leakage. The test used will be Hydrostatic Testing for pressure lines and Infiltration/Exfiltration Testing for gravity lines. Tests to be performed will be indicated by the ENGINEER and witnessed by the ENGINEER and the City Manager or designee.

EXHIBIT A

1. Flushing

- a. Flush all mains to remove all sand and other foreign matter. The velocity of the flushing water shall be at least 4 fps. Flushing shall be terminated at the direction of the ENGINEER. Dispose of the flushing water without causing nuisance or property damage.
- b. Install temporary flush out connections on all dead end water mains at the locations shown on plans and in accordance with the Collier City Standard Details.

2. Hydrostatic Testing for DIP and PVC Pipelines:

Perform hydrostatic testing of the system as set forth in the following, and conduct said tests in the presence of the City Manager or designee and other authorized agencies, with 48 hours advance notice provided.

Piping and appurtenances to be tested shall be within sections between valves unless alternate methods have received prior approval from the City Manager or designee. Testing shall not proceed until concrete thrust blocks are in place and cured, or other restraining devices installed. Thoroughly clean and flush all piping prior to testing to clear the lines of all foreign matter. While the piping is being filled with water care shall be exercised to permit the escape of air from extremities of the test section, with additional release cocks provided if required.

Perform hydrostatic testing with a sustained minimum pressure of 150 psi for a period of not less than two (2) hours. If sustained pressure goes 5 psi above or below 150 psi during the first two (2) hours, the test fails (AWWA regulation). After two (2) hours, use the AWWA formula if less than 5 psi to determine whether test fails. Testing shall be in accordance with the applicable provisions as set forth in the most recent edition of AWWA Standards C600 for Ductile Iron Pipe and C605 for PVC Pipe. The allowable rate of leakage shall be less than the number of gallons per hour determined by the following formula:

$$L = \frac{SD(P)^{1/2}}{133,200}$$

Where,

- L = Allowable leakage in gallons per hour;
- S = Length of pipe tested in feet;
- D = Nominal diameter of pipe in inches;
- P = Average test pressure maintained during the leakage test in pounds per square inch

$$\text{For 150 psi, } L = (9.195 \times 10^{-5}) SD$$

The testing procedure shall include the continued application of the specified pressure to the test system, for the one-hour period, by way of a pump taking supply from a container suitable for measuring water loss. The amount of loss shall be determined by measuring the volume displaced for the said container.

Should the test fail, repair the fault and repeat the test until results are within the established limits. Furnish the necessary labor, water, pumps, and gauges at specified location(s) and all other items required to conduct the required testing and perform necessary repairs. All visible leaks and cracked pipe, fittings, valves, pipe couplings, and the like shall be repaired or replaced regardless of the amount of leakage.

General - All sanitary sewers and associated service lines shall be constructed watertight to prevent infiltration and/or exfiltration. Since all the water and sewage in the lines will be treated at the treatment plant, special care and attention must be given to securing watertight construction. Gravity sewer visual inspections – on completion of each block or section of sewer, or at such other times as the Engineer of Record may direct, the block or section of sewer is to be cleaned, tested, and inspected. Each section of the sewer is to show, on examination from either end, a full circle of light between manholes. Each manhole, or other appurtenance to the system, shall be of the specified size and form, be watertight, neatly and substantially constructed, with the rim set permanently to design position and grade. All repairs shown necessary by the inspection are to be made, with broken or cracked pipe replaced, all deposits removed, and the sewers left true to line and grade, entirely clean and ready for use. See Section 01400 1.5.A.4. for further information on gravity sewer line and manhole testing.

3. Hydrostatic Testing for HDPE Pipelines:

Perform hydrostatic testing of all HDPE pipelines as set forth in the following, and conduct said tests in the presence of the City Manager or designee and other authorized agencies, with 48 hours advance notice provided.

Provide all labor, equipment and material required for testing the pipeline upon completion of installation, pipe laying and backfilling operations, and placement of any required temporary roadway surfacing.

Disinfect all HDPE potable water mains prior to testing in accordance with the requirements of Section 02675 – Disinfection.

Test pipelines at 150 psi.

Field test all HDPE pipelines for leakage in accordance with manufacturer's recommendations for the size and class of pipeline installed. Unless other procedures recommended by the manufacturer are approved by the City Manager or designee, pressure test the pipeline as follows:

- a. Fill pipeline slowly with water. Maintain flow velocity less than two (2) feet per second.
- b. Expel air completely from the line during filling and again before applying test pressure. Expel air by means of taps at points of highest elevation. Following completion of the testing, the taps shall be tightly plugged unless otherwise specified.
- c. Apply initial test pressure and allow to stand without makeup pressure for two (2) to three (3) hours, to allow for diametric expansion or pipe stretching to stabilize.
- d. After this equilibrium period, apply the specified test pressure and turn the pump off. The final test pressure shall be held for not less than two (2) hours.
- e. Upon completion of the test, the pressure shall be bled off from the location other than the point where the pressure is monitored. The pressure drop shall be witnessed by the City Manager or designee at the point where the pressure is being monitored.

Allowable amount of makeup water for expansion of the pipeline during the pressure test shall conform to Table III, Test Phase Make-up Amount, contained in the manual "Inspections, Test and Safety Considerations" published by the Plastics Pipe Institute, Inc.

If any test of pipeline installed exceeds the amount of makeup water as allowed above, locate and repair the cause of leakage and retest the pipeline, without additional cost to the CITY. Repair all visible leaks regardless of the amount of leakage.

4. Force Main Pressure Testing: All force mains shall be subject to pressure testing at the following standards:

<u>System Operating Pressure</u>	<u>Test pressure</u>	<u>Duration</u>
50 PSI or less	100 PSI	2 hours
Greater than 50 PSI	150 PSI or 2 times the operating pressure, whichever is greater.	2 hours

Allowable leakage on force mains shall be computed utilizing the standards for water loss in conformance with AWWA C600, the latest revision thereof. Following the hydrostatic and leakage tests, all wastewater force mains constructed under this contract shall be flushed to remove sand, loose dirt, and other debris. Flushing velocity shall be a minimum of 2.5 fps. Flushing shall continue until clean water flows from the force main; however, the Contractor shall endeavor to use the minimum amount of flushing water required to complete the work. Absolutely no direct connections shall be permitted to a potable water system for the purpose of obtaining flushing water for wastewater force mains; the potable water supply shall be protected with an air gap or reduced pressure principle backflow prevention assembly approved by the Department. Temporary blowoffs may be required for the purpose of flushing the force main. The Department shall be notified at least 72 hours prior to flushing wastewater force mains. Blowoffs and drainage piping used for flushing shall not be discharged to any wastewater gravity sewer or pumping station wet well.

5. Infiltration/Exfiltration Testing for Gravity Lines

The allowable limits of infiltration or exfiltration for the entire system, or any portion thereof, shall not exceed a rate of 50 gallons per inch of inside pipe diameter per mile of pipe per 24 hours. No additional allowance shall be made for house service lines. Any part of or all of the system shall be tested for infiltration or exfiltration, as directed by the ENGINEER or as required by the City Manager or designee. The procedures and limitations for conducting infiltration/exfiltration tests shall be established at the pre-construction conference on a project-by-project basis. Air testing of gravity sewer mains may be required. All testing shall be run continuously for 24 hours, unless the City Inspector can visually verify that this test duration is not required due to the observed infiltration/exfiltration rate. The amounts of infiltration or exfiltration shall be determined by pumping water into or out of calibrated drums, or by other methods approved by the Public Works Division, such as in-line V-notch weirs. Where infiltration or exfiltration exceeds the allowable limits specified herein, locate and repair the defective pipe, joints or other faulty construction at no additional cost to the CITY. If the defective portions cannot be located, remove and reconstruct as much of the work as is necessary in order to conform to the specified allowable limits. All visible leaks shall be repaired regardless of the amount of leakage. Provide all labor, equipment and materials required and conduct all testing required under the direction of the ENGINEER.

- a. Infiltration: Prior to testing for infiltration, the system shall be pumped out so that normal infiltration conditions exist at the time of testing. The cumulative results of the entire collection system results shall not be a satisfactory method for gauging infiltration compliance. Each sewer section between manholes must permit infiltration no greater than the maximum allowable, as specified above.

- b. **Exfiltration:** The exfiltration test, when required due to groundwater levels, will be conducted by filling the portion of the system being tested with water to a level 2 feet above the top of the pipe being tested or 2 feet above the existing groundwater in the trench, whichever is higher.. Plugs shall be used to close the upstream and downstream manhole inlets. The cumulative results of the entire collection system results shall not be a satisfactory method for gauging exfiltration compliance. Each sewer section between manholes must permit exfiltration no greater than the maximum allowable, as specified above. Exfiltration shall be measured by determining the amount of water required to maintain the initial water elevation for the one (1) hour period from the start of the test. The maximum allowable leakage, including manholes, shall be 50 gallons per inch of inside pipe diameter per mile of pipe per day.

6. **Low Pressure Air Testing**

Contractor shall conduct air testing in accordance with ASTM specifications:

- a. **ASTM C-828** – for clay pipes.
- b. **ASTM C-924** – for concrete pipes.
- c. **ASTM F-1417** – for plastic pipes.

When low pressure air testing of gravity sewer mains is specifically required, or if in the opinion of the Engineer of Record, conditions are such that infiltration measurements may be inconclusive. all testing shall be run continuously for 24 hours, unless the City Inspector can visually verify that this test duration is not required due to the observed infiltration/exfiltration rate.

When air testing is specifically required, after completing backfill of a section of gravity sewer line, conduct a Line Acceptance Test using low pressure air. The test shall be performed using the below stated equipment, according to state procedures and under the supervision of the ENGINEER and in the presence of the City Manager or designee, with 48 hours advance notice.

- d. **Equipment:**
 - (1) Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.
 - (2) Pneumatic plugs shall resist internal bracing or blocking.
 - (3) All air used shall pass through a single control panel.

- (4) Three individual hoses shall be used for the following connections:
 - (a) From control panel to pneumatic plugs for inflation.
 - (b) From control panel to sealed line for introducing the low-pressure air.
 - (c) From sealed line to control panel for continually monitoring the air pressure rise in the sealed line.

e. Procedure:

All pneumatic plugs shall be seal tested before being used in the actual test installation. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. Air shall be introduced into the plugs to 25 psi. The sealed pipe shall be pressurized to 5 psi. The plugs shall hold against this pressure without bracing and without movement of the plugs out of the pipe.

After a manhole-to-manhole reach of pipe has been backfilled and cleaned and the pneumatic plugs are checked by the above procedure, the plugs shall be placed in the line at each manhole and inflated to 25 psi. Low-pressure air shall be introduced into this sealed line until the internal air pressure reaches 4 psi greater than the average back pressure of any ground water that may be over the pipe. At least two (2) minutes shall be allowed for the air pressure to stabilize. After the stabilization period (3.5 psi minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of the line being tested shall be termed "Acceptable", if the time required in minutes for the pressure to decrease from 3.5 to 2.5 psi (greater than the average back pressure of any ground water that may be over the pipe) is greater than the time shown for the given diameters in the following table:

<u>Pipe Diameter In Inches</u>	<u>Minutes</u>
8	4.0
10	5.0
12	5.5
16	7.5
18	8.5
24	11.5

Time in Minutes = 0.472 D
 D = Diameter of pipe in inches

In areas where ground water is known to exist, install capped pipe adjacent to the top of the sewer lines. This shall be done at the time of the sewer line is installed. Immediately prior to the performance of the Line Acceptance Test, the ground water shall be determined by removing the pipe cap, and a measurement of the height in feet of water over the invert of the pipe shall be taken. The height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings. (For example, if the height of water is 11-1/2 feet, then the added pressure will be 5 psi. This increases the 3.5 psi to 8.5 psi, and the 2.5 psi to 7.5 psi. The allowable drop of one pound and the timing remain the same).

If the installation fails to meet this requirement, determine the source of the leakage and repair or replace all defective materials and/or workmanship, all at no additional cost to the CITY.

3.2 LEAKAGE TESTS FOR STRUCTURES

- A. Structure Leakage Testing: Perform leakage tests of manholes, wet wells, tanks, vaults and similar purpose structures before backfilling, by filling the structure with water to the overflow water level and observing the water surface level for the following 24 hours.
 1. Make an inspection for leakage of the exterior surface of the structure, especially in areas around construction joints.
 2. If visible leaks appear, repair the structure by removing and replacing the leaking portions of the structure, waterproofing the inside, or by other methods approved.
 3. Water for testing will be provided by the CITY at the CONTRACTOR'S expense.

END OF SECTION

EXHIBIT A

SECTION 02720

STORM SEWERS AND STRUCTURES

PART 1 GENERAL

- 1.01 Work Included: All labor, materials, equipment and methods to construct, repair, and place into operation a storm drainage system including excavation, bedding, cast-in-place concrete formwork, and backfill as shown in the Civil Drawings and/or as specified and/or as directed in the field.
- 1.02 References: Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction, latest Edition.

PART 2 MATERIALS

- 2.01 Reinforced Concrete Pipe: ASTM C-76, Class III with Wall Type B reinforcement; inside nominal diameter as shown on Drawings; bell and spigot end joints. Pipe joints shall be rubber gasket joints conforming to Sections 941 and 942 of FDOT Standard Specifications. The use of lifting holes in circular pipe 30" in diameter and less shall not be allowed.
- 2.02 Bituminous-coated Corrugated Metal Pipe: Meet requirements of Section 943 or Section 945 of FDOT Standard Specifications.
- 2.03 Perforated Polyvinyl Chloride (PVC) Pipe: Conform to ASTM D-2729.
- 2.04 Mortar used for constructing and plastering manholes, drop inlets and junction boxes: In accordance with ASTM Specifications Serial Designation C-270. Contractor shall have option of using either a portland cement/hydrated lime mixture or a portland cement mixture with masonry cement added for improved workability; however, the same materials must be used throughout the project. Mortar materials shall be proportioned by volume and shall be as follows:
1. One (1) part Type I Portland Cement – ASTM C-150
 2. Three (3) parts Aggregate (sand) – ASTM C-144
 3. The addition of masonry cement (ASTM C-91) will be permitted to improve workability of mortar.
- 2.05 Reinforcing Bars: Deformed reinforcing steel conforming to Specifications for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement (ASTM A-615), for concrete reinforcement. All bars shall be lapped and placed in accordance with ACI requirements and specifications.

EXHIBIT A

PART 3 INSTALLATION

3.01 HANDLING

- A. Load and unload pipe and accessories by lifting with hoists or skidding in a manner that will avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against pipe already on the ground.
- B. In distributing material at the site of the work, unload each piece near where it shall be laid in the trench.

3.02 LAYING PIPE

- A. Complete trenching and backfilling as specified. Inspect sewers when line is completed and backfill has been placed to a depth of one foot over the pipe. Complete backfill only after approval of each section has been given for line and grade.
- B. Remove and relay faulty sections of line rejected by Engineer.
- C. Exercise care to insure pipe is carefully centered so laid storm sewer will have a uniform invert.
- D. The laying of pipe in the finished trench shall be started at the lowest point of the trench and proceed upgrade. When bell and spigot pipe is used, the bell shall be laid upgrade. If tongue and groove pipe is used, the grooved end shall be laid upgrade.
- E. Keep pipe joints clean at all times, and use no pipe in the work which does not conform to specifications.
- F. Place a suitable stopper in end of pipe last laid at all times when pipe-laying operations are not in process (including lunch hours), to prevent water, mud or other foreign materials from entering the pipe. Insure all construction conforms to Section 430 of FDOT Standard Specifications.

3.03 JOINTING PIPE

- A. Joint all pipe by rubber gasket O-ring joints installed in strict accordance with recommendations of pipe manufacturer.
- B. Corrugated metal pipe joints shall consist of bolted galvanized metal connecting band installed with neoprene gasket.
- C. Joints shall be designed to limit movement due to expansion, contraction and normal settlement.

EXHIBIT A

3.04 CATCH BASINS, STORM SEWER MANHOLES AND CONCRETE HEADWALLS

- A. Construct junction boxes, storm sewer manholes, and concrete headwall at location and to depth indicated on drawings and in accordance with details shown on Civil Plans. Excavate and backfill in accordance with applicable sections of specifications. Concrete for the catch basins, storm sewer manholes and concrete headwalls, shall develop a compressive strength of 3000 psi in 28 days. Seal joints between walls and incoming and outgoing pipes with portland cement mortar to form a watertight joint. Cut off all pipes with junction boxes, storm sewer manholes, and concrete headwalls flush with the face of the structure and grout broken ends of these pipes with portland cement mortar to a smooth uniform covering with no steel exposed. All structures shall conform to Sections 400, 415 and 425 of FDOT Standard Specifications.
- B. Construct grated inlets and junction boxes to elevations and dimensions shown on the Drawings. Include any reasonable adjustment and realignment of the grate necessary, or installation on inlet grates. Secure frames in mortar struck smooth inside and out.

3.05 CAST –IN-PLACE CONCRETE FORMWORK

- A. Formwork materials will be wood, plywood or other materials that will not adversely affect the concrete and will facilitate placement of concrete to the shape, form line, and grade indicated. Plywood will be new, waterproof, synthetic bonded, exterior type, manufactured especially for concrete formwork and shall conform to Plyform Class I, B-B EXT, of PS-1, and shall be edge sealed. Lumber will be construction grade Douglas Fir, or Southern Yellow Pine
- B. Formwork will conform to the dimensions as shown on the Drawings and shall be substantial and sufficiently tight to prevent leakage. Forms shall be properly braced or tied so as to maintain position and shape. Plumb and string lines shall be installed before concrete placement and shall be maintained during placement. Such lines shall be used by CONTRACTOR'S personnel and shall be in sufficient number and properly installed. During concrete placement, the CONTRACTOR shall continually monitor plumb and string line form positions and immediately correct any deficiencies.
- C. Contractor may reuse forms only if in good condition and only if acceptable to the CITY'S representative. Reused forms shall be thoroughly cleaned and may require light sanding between uses to obtain a uniform surface texture on all exposed concrete surfaces. Forms shall not be reused if they have developed defects that would affect the surface texture of exposed concrete. Exposed concrete surfaces are defined as surfaces, which are permanently exposed to view.
- D. Form Construction: All vertical surfaces of concrete members shall be formed, except where placement of the concrete against the ground is indicated. Not less than 1-inch of concrete shall be added to the indicated thickness of a concrete member, where concrete is permitted to be placed against trimmed ground, in lieu of forms.

EXHIBIT A

- E. Form Tolerances: Acceptable variations from plumb shall not exceed ¼ inch in any 10 foot (10') length, non cumulative and there shall be no offsets or visible waviness in the finished surface. All other tolerances shall per allowed by ACI 117- Standard Tolerances for Concrete Construction .

3.06 IRON CASTINGS

- A Casting shall conform to latest revision of the ASTM Specifications for Class 30 Grey Iron. They shall be cast in a closed mold with controlled sand and be true to pattern. Casting shall be free from blow holes and porosity, well cleaned, with fine and sharp edges ground smooth. All circular frames and covers shall be machines (on lathe) bearing surfaces to prevent rattling under traffic. All manhole covers shall have "Storm Sewer" cast thereon. Casting shall be as manufactured by USF, with numbers as shown on the Drawings, or equal. All square and rectangular frames, covers and grates shall be individually fitted as sets and installed as sets in the field.
- B Manufacturer shall provide Letter of Guarantee for a period of 15 years. Upon request of Engineer, manufacturers shall also furnish an independent testing laboratory's report of castings supplied. Frame and cover surfaces shall be machines and any tendency to rattle, as determined by tests before or after installation, will be sufficient cause for rejection of the frame and cover.

END OF SECTION

SECTION 02900

CONSTRUCTION AND RESTORATION SCHEDULE

PART 1. GENERAL

1.1. SCOPE OF WORK

- A. The work includes that necessary to restore work areas in a timely manner.

PART 2. PRODUCTS

2.1. NOT USED

PART 3. EXECUTION

3.1. It is the intent of the City that the Contractor restores all work areas in a timely manner so as to minimize inconveniences to the general public and residents. As such, the following are minimum requirements for the project restoration.

3.2. The contractor shall:

- A. Limit construction activities to within one city block at any given time. Make sure only one intersection at a time is blocked.
- B. Backfill all trenches at the end of each work day
- C. Restore water supply to the houses on the same day of interruption
- D. Perform all required testing of the sanitary sewer system within one week of installation of the main line and services and prior to final paving installation
- E. Install base material within one week of all main and service installation
- F. Begin final restoration per approval of the project Engineer.
- G. Complete the following within two weeks of the start of construction on a city block:
 - i All services shall be connected
 - ii All driveways shall be constructed
 - iii The street shall have a hard, dust-free driving surface. Payment for restoration items will not be made until the work has been accepted and approved by the City, including restoration on private property.
 - iv All storm water piping, structures and swales constructed to finish grade.

END OF SECTION

SECTION 02999

RESTORATION AND MISCELLANEOUS WORK AND CLEANUP

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. This Section includes operations that cannot be specified in detail as separate items but can be sufficiently described as to the kind and extent of work involved. Furnish all labor, materials, equipment and incidentals to complete the work under this Section.
- B. The work of this Section includes, but is not limited to, the following:
 - 1. Restoring of sidewalks, driveways, curbing and gutters.
 - 2. Crossing utilities.
 - 3. Relocation of existing water lines, low pressure, gas lines, telephone lines, electric lines, cable TV lines and storm drains as necessary, all as shown on the drawings.
 - 4. Restoring easements and rights-of-ways.
 - 5. *Cleaning up.*
 - 6. Incidental work.

1.2 WORK SPECIFIED UNDER OTHER SECTIONS

- A. Complete all work in a workmanlike manner by competent workmen in full compliance with all applicable sections of these Specifications.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Materials required for this Section shall be of at least the same type and quality as materials that are to be restored. Where possible, reuse existing materials that are removed and then replaced, with the exception of paving.

PART 3 EXECUTION

3.1 RESTORING OF CURBING, FENCES, AND GUARD RAILS

- A. Protect existing curbing. If necessary, remove curbing from joint to joint and replace after backfilling. Replace curbing that is damaged during construction with curbing of equal quality and dimension.

3.2 CROSSING UTILITIES

- A. This item shall include any extra work required in crossing culverts, water courses, drains, water mains, and other utilities, including all sheeting and bracing, extra excavation and backfill, or any other work required for the crossing, whether or not shown on the drawings.

3.3 RELOCATIONS OR REPLACEMENT OF EXISTING GAS LINES, TELEPHONE LINES, ELECTRIC LINES, CABLE TV LINES AND DRAINAGE CULVERT

- A. Notify the proper authority of the utility involved when relocation or replacement of these lines is required. Coordinate all work by the utility so that the progress of construction will not be hampered.
- B. Reference all side drains, side ditches, swales, and storm sewers as to grade and location prior to construction, maintain them during construction, and repair them as necessary after construction. Where drainage structures are disturbed and must be replaced, the minimum size replacement shall be twelve inches (12"). All drainage culverts installed shall have mitered ends in conformance with the City Standard Details. Place the culvert to the specified elevations and regrade or reshape the swale and road shoulders that have been disturbed or damaged during construction.

3.4 PROTECTION AND RESTORATION OF PROPERTY

- A. Protection and Restoration of Property: During the course of construction, take special care and provide adequate protection in order to minimize damage to vegetation, surfaced areas, fences, and structures within the construction right-of-way, easement or site, and take full responsibility for the replacement or repair thereof. Immediately repair any damage to private property created by encroachment thereon. Should the removal or trimming of valuable trees, shrubs, or grass be required to facilitate the installation within the designated construction area, this work shall be done in cooperation with the City and/or local communities which the work takes place. Said valuable vegetation, removed or damaged, shall be replanted, if possible, or replaced by items of equal quality, and maintained until growth is re-established. Tree limbs which interfere with equipment operation and are approved for pruning shall be neatly trimmed and the tree cut coated with a tree paint. Topsoil damaged in the course of work shall be replaced in kind with suitable material, graded to match existing grade. Following construction completion, the work area along the route of the installation shall be finish grade to

EXHIBIT A

elevations compatible with the adjacent surface, with grassing or hand raking required within developed areas.

- B. Existing lawn surfaces damaged by construction shall be re-graded and re-sodded or re-seeded. These areas shall be maintained until all work under this Contract has been completed and accepted.

3.5 CLEANING UP

- A. Remove all construction material, excess excavation, buildings, equipment and other debris remaining on the job as a result of construction operations and shall render the site of the work in a neat and orderly condition.
- B. Work site clean-up shall follow construction operations without delay and in accordance with Section 01710.

3.6 INCIDENTAL WORK

- A. Do all incidental work not otherwise specified, but obviously necessary for the proper completion of the Contract as specified and as shown on the drawings.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 03310
CONCRETE, MASONRY MORTAR AND GROUT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Cement, sand, aggregate admixtures and water for use in concrete, masonry mortar and grout.

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
1. ASTM C 91 - Masonry Cement
 2. ASTM C 144 - Aggregate for Masonry Mortar
 3. ASTM C 150 - Portland Cement
 4. ASTM C 207 - Hydrated Lime for Masonry Purposes
 5. ASTM C 270 - Mortar for Unit Masonry
 6. ASTM C 231 - Air Content of Freshly Mixed Concrete
 7. ASTM C 404 - Aggregate for Masonry Grout
 8. ASTM C 476 - Grout for Masonry
 9. ASTM C 780 - Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
 10. ASTM C 1019 - Sampling and Testing Grout
 11. CRD C-619 - Specification for Grout Fluidifier.
 12. CRD C-621 - Specification for Non-Shrink Grout.
 13. Brick Institute of America Research Report No. 15
 14. ACI 530.1/ASCE 6-92 - Specifications for Masonry Structures

EXHIBIT A

1.3 SUBMITTALS

- A. Provide all submittals, including the following, as specified in Division 1.
- B. Product Data and Information: Submit the following:
 - 1. Furnish notarized certificates of manufacture as evidence that the cement conforms to the specified requirements. Include mill-test reports on the cement.
 - 2. Furnish notarized certificates to verify that the hydrated lime and aggregates meet the specified requirements.
 - 3. Furnish laboratory tests as evidence that the air content and masonry mortar compressive strength meet the requirements of ASTM 270 Type N and that the efflorescence tendency meets the requirements of the wick test in Brick Institute of America Research Report No. 15.
 - 4. Furnish laboratory tests as evidence that the masonry grout compressive strength is equal to or greater than 2,500 psi at 28 days.

1.4 DELIVERY, STORAGE AND HANDLING

- A. General: Deliver, store and handle all mortar and grout materials as recommended by the manufacturers and as specified in Division 1 (and as follows:)
- B. Cement: Store cement in weathertight buildings that will exclude moisture and contaminants. Do not use cement that has deteriorated from storage.
- C. Hydrated Lime: Store hydrated lime in weathertight buildings which will exclude moisture and contaminants.
- D. Aggregates: Keep aggregates clean and free from all other materials during transportation and handling. Stockpile aggregate in a manner to prevent segregation.

PART 2 PRODUCTS

2.1 CEMENT

- A. Portland Cement shall be of a standard brand and shall conform to the requirements of ASTM C150-latest edition, except as hereinafter stated. One bag of cement shall be considered as weighing 94 pounds. Type I shall be used unless higher cement is specified, in which event Type III shall be used. For Type I, the maximum amount of tricalcium silicate shall be 60 percent. Cement may be shipped either in paper or cloth sacks and the package shall have the brand and

EXHIBIT A

name of manufacturer plainly marked on the outside. All cement shall be stored in weatherproof buildings in such a manner as will prevent absorption of moisture by the lower layers. Shipment shall be segregated by lot for identification. Type I cement which has been in storage more than 90 days shall be re-tested before use. Where carload shipments are used, a certificate from an approved testing laboratory shall be submitted prior to use of such cement on the job.

2.2 AGGREGATE

A. Fine Aggregate:

1. **Composition:** Fine aggregate shall consist of natural sand and shall be graded from coarse to fine within the following limits shown in the table below. Sand failing to meet the minimum requirement for material passing the Number 50 and/or Number 100 Sieve may be used, provided other satisfactory inorganic fine materials are added. If two sands are used, each must be mixed, after separate weighing, in proportions approved by the City Manager or designee.

U.S. Standard Square Opening Sieve	Percent of Total By Weight Passing	
	Minimum	Maximum
No. 4	97	100
No. 8	80	100
No. 30	25	75
No. 50	10	30
No. 100	2	10
No. 200 (By Washing)	0	4

2. **Stockpiling:** Fine aggregate shall be stored on a well-drained site, which has been cleared, grubbed and cleaned. Stockpiles shall be built up so as to prevent segregation of large and small particles.
3. **Unsuitable Materials in Fine Aggregate:** Not more than one percent (1%) by weight of clay lumps or soft, disintegrated or coated grains shall be present in the fine aggregate. It shall also be free from foreign material such as dirt, wood, paper, burlap, or other unsuitable material. When tested in accordance with AASHTO T-21-27, it shall show a color not darker than standard. When tested for mortar strength in accordance with AASHTO T-71-38, the fine aggregate shall have a tensile strength at three (3) days (Type III), or at seven (7) days, (Type I); not less than 95 percent of that developed by mortar having the same water-cement ratio and consistency, made of the same cement and graded Ottawa Sand having a fineness modulus of 2.40, plus or minus 0.05.

B. Coarse Aggregate:

1. **Composition:** Coarse aggregate shall consist of crushed stone. It shall be washed to remove clay, loam and dust. At his/her discretion, the City Manager or designee may waive the washing requirement for stone having a loss of not more than thirty per cent (30%) when tested in accordance with the provisions of AASHTO T-96-38.
2. **Unsuitable Material in Coarse Aggregate:** The coarse aggregate shall not contain more than the following percentages of deleterious material:

Soft Fibrous, Disintegrated Particles (Weight)	3.0%
Clay Lump (Weight)	0.2%
Finer Than No. 200 Sieve (Weight)	0.5%
Flat or Elongated Particles (Count)	10.0%

When subjected to AASHTO Test T-96-38, the aggregate shall have a loss not greater than sixty-five percent (65%). Aggregate shall be free from loam, wood, leaves, or other foreign material.

3. **Gradation:** For unreinforced foundations, for paving or for other unreinforced mass concrete, the gradation of coarse aggregate shall be as shown in Table 1. For reinforced footings, reinforced walls over 6" in thickness, ordinary floor slabs and similar structures, the gradation shall be as shown on Table 2. For handrails, reinforced walls, thin reinforced floor slabs electrical conduit encasement, and similar construction, the gradation shall be as shown on Table 3.

Table 1	
Percent Passing Square Opening Sieve	Percent By Weight
2-1/2 inch	100
2 inch	95 – 100
1 inch	35 – 70
1/2 inch	10 – 30
No. 4	0 – 5
Table 2	
Percent Passing Square Opening Sieve	Percent By Weight
1-1/2 inch	100
1 inch	90 – 100
1/2 inch	25 – 60
No. 4	0 – 10
No. 8	0 – 5

Table 3	
Percent Passing Square Opening Sieve	Percent By Weight
1 inch	100
¾ inch	90 – 100
3/8 inch	20 – 55
No. 4	0 – 10
No. 8	0 – 5

4. Stockpiles: Stockpiles shall be constructed in layers not exceeding three feet (3') in height, and material shall be deposited in such manner as to prevent segregation of coarse and fine materials. Each type of aggregate shall be placed in a separate stockpile. Stockpile sites shall be cleared, grubbed and drained before using.

2.3 HYDRATED LIME

- A. Provide hydrated lime meeting the requirements of ASTM C 207.

2.4 WATER

- A. Water shall be clean and free from salt, oil or organic substances. Laboratory tests shall be made to determine suitability of any water for use in concrete unless it is secured from a public water supply.

PART 3 EXECUTION

3.1 CONCRETE PROPORTIONING

- A. Concrete aggregate shall be proportioned by weight. When the sources of supply shall have been determined by the CONTRACTOR and approved by the Engineer, the mix shall be set by an approved testing laboratory. Mix shall be designed for a "slump" suitable for the character of structure in which the concrete is to be incorporated. All concrete shall be as specified herein.
- B. After a suitable design mix has been approved by the Engineer, it shall not be changed so long as materials of the same characteristics are used in the mix. Within the limits of the various cement factors shown above, the mix shall be varied until the homogenous workable mixture, suitable for the class of structure intended, has been obtained.

3.2 CONCRETE MIXING

- A. Concrete mixing shall be by means of a modern batch mixer equipped with an accurately operating water measuring device and an automatic time locking device.

EXHIBIT A

- B. Where a central batching plant is not operated, each mixer must have available an approved portable weighing device for use in proportioning. Each batch shall be mixed for one and one-half (1½) minutes after charging has been completed, and during such mixing period, that drum shall operate with a peripheral speed of not less than one-hundred and fifty-three (153), nor more than two-hundred and twenty-five (225) feet per minute. The number of revolutions per minute shall be between fourteen (14) and twenty (20). Retempering concrete or use of concrete in which initial set has taken place will not be allowed. Transit mixed concrete from an approved batching plant and suitable truck mixer may be as approved by Engineer of Record.

3.3 PIPE GROUT

- A. Mix lean grout for backfilling the space surrounding the pipe sections in tunnel or other areas as specified or directed in the proportion of 1 part Portland cement to 12 parts sand by volume.
- B. Mix grout to a consistency that can be pumped into the pipe. Use a grout fluidifier to reduce water quantity and improve workability.

3.4 TESTING

- A. Masonry Mortar: Make and test specimens for preconstruction and construction evaluation of masonry mortar in accordance with the requirements of ASTM C 780.
- B. Masonry Grout: Make and test specimens for preconstruction and construction evaluation of masonry grout in accordance with the requirements of ASTM C 1019.
- C. Concrete shall contain cement, coarse aggregate, and fine aggregate meeting the Specifications contained in previous paragraphs of this Part. Unless otherwise specified or shown in the plans, the design strength of the several elements included in the plans shall be:
 - 1. Four thousand (4,000) pounds minimum compressive strength per square inch at twenty-eight (28) days for all piers, reinforced walls, floors, slabs, precast structures and other special sections where specifically shown on the plans or Standard Details.
 - 2. Two thousand five hundred (2,500) pounds minimum compressive strength per square inch at twenty-eight (28) days for all blocking, reinforced footings, for retaining walls not subject to hydrostatic pressure, or where specifically shown on the plans or shown in the Standard Details.

END OF SECTION

SECTION 03410

PRECAST CONCRETE STRUCTURES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Furnish all materials, labor, and equipment and construct manholes, wet wells, valve pits, meter pits, and accessory items, consisting of precast sections as shown on the Drawings and as specified herein.
- B. The forms, dimensions, concrete, and construction methods shall be approved by the ENGINEER in advance of construction.
- C. These specifications are intended to give a general description of what is required, but do not purport to cover all of the structural design details which will vary in accordance with the requirements of the equipment as offered. It is, however, intended to cover the furnishing, shop testing, delivery, and complete installation of all precast structures whether specifically mentioned in these specifications or not.
- D. The supplier of the precast manholes, wet wells, valve pits, meter pits, and accessory items shall coordinate his work with that of the CONTRACTOR to the end that the unit will be delivered and installed in the excavation provided by the CONTRACTOR, in accordance with the CONTRACTOR's construction schedule.
- E. Coordinate the precast structures fabrication with the equipment supplied to achieve the proper structural top slab openings, spacings, and related dimensions for the selected equipment frames and covers. The top slabs, frames, covers, and subsurface structures shall be capable of supporting a live load of 150 pounds per square foot.

1.2 SUBMITTALS

- A. Submit to the ENGINEER, as provided in the General Conditions, shop drawings showing details of construction, reinforcing and joints.
- B. Shop Drawings
 - 1. Content
 - a. Dimensions and finishes
 - b. Estimated camber

EXHIBIT A

- c. Reinforcing and connection details
 - d. Anchors
 - e. Lifting and erection inserts
 - f. Other items cast into members
2. Show location of unit by same identification mark placed on member.
 3. Include design calculations.
- C. Manufacturer's Literature: Manufacturer's recommended installation instructions.
- D. Manufacturer's certificates of material conformance with specifications.
- E. Test Reports: Reports of tests on concrete.
- F. Testing
1. Manholes and Valve Vaults: Four (4) concrete test cylinders shall be taken for every 50 cubic yards (cu. yds) for each type of precast structure.
 2. Pump Stations: Four (4) concrete test cylinders shall be taken for each pump station wet well. Four (4) concrete test cylinders shall be taken for each pump station's top and bottom slabs.
 3. Certification: The supplier shall provide the certified results of testing (7 day, 28 day) for the test cylinders stated herein. Random test cylinders may be taken at any time by the ENGINEER at the CITY's expense.

1.3 INSPECTION

- A. The quality of all materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by the ENGINEER, or the City Manager or designee. Such inspection may be made at the place of manufacture, or at the site after delivery, or at both places, and the sections shall be subject to rejection at any time on account of failure to meet any of the Specification requirements; even though sample sections may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to the job shall be marked for identification and shall be removed from the job at once. All sections which have been damaged after delivery will be rejected, and if already installed, shall be repaired, if permitted and accepted by ENGINEER, or removed and replaced, entirely at the CONTRACTOR's expense.
- B. At the time of inspection, the sections will be carefully examined for compliance with ASTM C478 designation and these Specifications, and with the approved

EXHIBIT A

manufacturer's drawings. All sections shall be inspected for general appearance, dimension, "scratch-strength", blisters, cracks, roughness, soundness, etc. The surface shall be dense and close-textured.

- C. Imperfections may be repaired, subject to the approval of the ENGINEER, after demonstration by the manufacturer that strong and permanent repairs result. Repairs shall be carefully inspected before final approval. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi at the end of 7 days and 5,000 psi at the end of 28 days, Epoxy mortar may be utilized for repairs subject to the approval of the ENGINEER.

PART 2 PRODUCTS

2.1 PRECAST CONCRETE WET WELLS AND VALVE VAULTS

- A. Precast submersible pump station wet wells shall consist of precast base, precast wet well sections, and top cover slab. Precast valve vaults shall consist of precast base, sidewalls and top slab. Concrete shall be air entrained at the time of delivery and shall have a minimum compressive strength of 4,000 psi at the end of 28 days.
- B. Joints between precast concrete sections shall be set by plastic shims and fitted with non-metallic non-shrink grout as shown on the drawings.
- C. The top slab sections shall be fitted with watertight hatches. The frames and covers will be sized for the openings shown on the drawings.
- D. The various precast sections should have the inside dimensions and minimum thickness of concrete as indicated on the drawings. All precast and cast-in-place concrete members shall conform to the Building Code Requirements for Reinforced Concrete ACI 318.
- E. A vent pipe shall be furnished and installed as shown on the drawings.
- F. Fillets shall be provided and installed in the wet wells as shown on the drawings.
- G. Precast structures shall be constructed to the dimensions as shown on the drawings and as specified in these Specifications.
- H. Type II cement shall be used except as otherwise approved.
- I. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of each precast section.
- J. Sections shall be cured by an approved method and shall not be shipped until the minimum 7-day compressive strength has been attained.

EXHIBIT A

- K. Each pre-cast section manufactured in accordance with the drawings shall be clearly marked to indicate the intended pump station installation location. The CONTRACTOR shall be responsible for the installation of the correct pre-cast sections in their designated pump station locations.
- L. Paint all exterior surfaces with two coats of coal tar bitumastic, each coat to be 9 mils each. All interior surfaces of valve vaults shall be coated with two coats of coal tar epoxy (9 mils each).

2.2 PRECAST CONCRETE SECTIONS FOR CIRCULAR WET WELLS

- A. Wet wells shall meet the requirements of ASTM C478, Specification for Precast Reinforced Concrete Manhole Sections, with the exclusion of Section 10(a), except as modified herein. Cement shall meet the requirements of ASTM C150-74, Specification for Portland Cement, Type II. Concrete shall meet the minimum requirement for 4000 psi concrete. Minimum wall thickness shall be 8 inches or 1/8 the inside manhole diameter as shown, whichever is greater. The required minimum strength of concrete shall be confirmed by making and testing three standard cylinders at seven days. Rings shall be custom made with openings to meet indicated pipe alignment conditions and invert elevations. Submit shop drawings, consisting of manufacturers' standard details of various sections for approval prior to placing order for wet wells. Drawings of individual wet wells showing invert elevations, pipe sizes and similar details will not be required.

- B. Joints

Form joint contact surfaces with machined castings. Surfaces shall be exactly parallel with nominal 1/16 inch clearing and the tongue equipped with a proper recess for the installation of an O-ring rubber gasket. Gaskets shall meet the requirements of Specification for Joint for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets. "RAM-NEK" sealing compound conforming to Federal Specification SSS-00210 (GSA-FSS), Sealing Compound, Preformed Plastic, for Expansion Joints and Pipe Joints may be used in lieu of O-ring rubber gaskets. If joints are sealed with "RAM-NEK" sealing compound the recess in the tongue for an O-ring gasket may be omitted.

- C. Wet Well Liners and Coatings

Coat or line the interior of all wet wells with one of the following CITY approved systems:

1. SewperCoat Lining System
2. IET Coating System

3. Koppers Bitumastic

Furnish, install, test and inspect liners and coating in accordance with manufacturer's recommendations, and in accordance with Section 02608 "Concrete Coatings". Extend coating and liner and seal onto wet well hatch frame, around pipe openings and other protrusions to prevent contact of wet well surface with corrosive sewer gases. Provide factory or field applied bituminous or epoxy sealer exterior coatings. If exterior coating is factory applied, CONTRACTOR shall provide field touch-up as required.

2.3 PIPE CONNECTIONS AT STRUCTURES

- A. Where pipes are to extend into or through structures from the exterior, provide flexible connections (mechanical or push-on type joints) at the exterior wall face.
- B. For pipes passing through structural walls, install wall pipes with water stops where the location is below the surface of the ground or at any point where fluid levels will exceed that elevation. Neoprene sleeves with watertight caulking and 316 Series SS stainless steel clamps will be suitable at other locations.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Control ground water to provide firm, dry subgrade for the structure, and prevent water rising on new poured in place concrete or grouted joint sections within 24 hours after placing. Guard against flotation or other damage resulting from ground water or flooding.
- B. Place a 12-inch layer (minimum thickness) of crushed stone or shell as specified under Section 02223 as a foundation for the wet well base slabs, valve pits, and meter pits.
- C. Provide backfill material around the wet well and above the pipe bedding as specified in Section 02223.
- D. Precast bases, conforming to all requirements of ASTM C478 and above listed requirements for precast sections, may be used. Set the base in place on a thoroughly compacted crushed stone sub-base and adjust grade for the correct structure elevation.
- E. Do not set the station into the excavation until the installation procedure and excavation have been approved by the City Manager or designee.
- F. The base may be cast-in-place concrete as specified in Division 3, placed on a thoroughly compacted crushed stone sub-base. Shape the tops of the

EXHIBIT A

cast-in-place bases to mate with the precast barrel section, and adjust in grade so that the top slab section is at the approximately correct elevation.

- G. Set the precast concrete structure sections so as to be vertical and with sections in true alignment with a 3 inch maximum tolerance to be allowed. Fill the outside and inside joint with a non-shrink grout and finish flush with the adjoining surfaces. Allow joints to set for 24 hours before backfilling. Backfill in a careful manner, bringing the fill up evenly on all sides. If leaks appear in the structures, caulk the inside joints with lead wool to the satisfaction of the ENGINEER. Install the precast sections in a manner that will result in a watertight joint.
- H. Plug holes in the concrete sections required for handling or other purposes with a non-shrinking grout or by grout in combination with concrete plugs.
- I. Where holes must be cut in the precast sections to accommodate pipes, cutting shall be done by core drilling prior to setting them in place to prevent any subsequent jarring which may loosen the mortar joints.

END OF SECTION

SECTION 05540
METAL CASTINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Miscellaneous ferrous and nonferrous castings.

1. This classification includes wheel guards, valve boxes, manhole frames and covers, manhole steps, stop plank grooves, brackets and supports for piping and gutter inlets, floor drains, cleanouts and special malleable iron castings and inserts.

1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. ASTM A 27/A27M - Specification for Steel Castings, Carbon for General Applications
2. ASTM A 47 - Specification for Ferric Malleable Iron Castings
3. ASTM A 48 - Specifications for Gray Cast Iron Castings
4. ASTM A 148/A148M - Specifications for Steel Castings
5. ASTM A 536 - Specifications for Ductile Iron Castings
6. ASTM B 26/B26M - Aluminum
7. ASTM B 148 - Aluminum Bronze Sand Castings
8. ASTM B 584 - Manganese Bronze

PART 2 PRODUCTS

2.1 WORKMANSHIP

A. Provide castings accurately made to the approved dimensions, and plane or grind castings where marked or where otherwise necessary to secure flat and true surfaces. Make allowance in the patterns so that the specified thickness is not reduced. Provide manhole covers which conform to the details shown and which are true and seat at all points. Supply castings showing the name of the

EXHIBIT A

manufacturer and the country of manufacture. No plugging or welding of defective castings will be permitted.

2.2 WEIGHTS

- A. Reject castings with a weight which is less than the theoretical weight based on required dimensions by more than 5 percent. Provide facilities at the site for weighing castings in the presence of the ENGINEER, or furnish invoices showing true weights, certified by the supplier.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Erect all castings to accurate grades and alignment, and when placing in concrete carefully support castings to prevent movement during concreting.

3.2 PAINTING

- A. Deliver all manhole castings to the job site unpainted. If painting is specified, clean metal castings thoroughly before painting. Give manhole frames and covers and valve boxes one coat of primer and two coats of an approved asphaltum varnish or other approved coating at the point of manufacture. Paint all other castings as specified in the City Standard Details.

END OF SECTION

UTILITIES PROVIDING SERVICE

WATER AND SEWER:
CITY OF NAPLES UTILITY DEPARTMENT
380 RIVERSIDE CIRCLE
NAPLES, FL 34102
PHONE: (239) 213-4745

GARBAGE COLLECTION:
CITY OF NAPLES SOLID WASTE
50 RIVERSIDE CIRCLE
NAPLES, FL 34102
PHONE: (239) 213-4700

TELEPHONE:
CENTURYLINK
3940 PROSPECT AVE., UNIT 101
NAPLES, FL 34104
DEB CORBIN
PHONE (239) 263-6211

FIRE CONTROL DISTRICT:
EAST NAPLES FIRE DISTRICT
4798 DAVIS BLVD
NAPLES, FL 33962
PHONE (239) 774-7111

ELECTRIC:
FLORIDA POWER & LIGHT COMPANY
26430 OLD US 41 RD
BONITA SPRINGS, FL 34135
ROBINSON ZAFRA
PHONE (239) 947-7370

GAS SERVICE:
TECO PEOPLES GAS
5901 ENTERPRISE PARKWAY
FORT MYERS, FL 33905
BROCK DANIELS
PHONE (239) 896-0812

CABLE TELEVISION:
COMCAST CABLE
301 TOWER ROAD
NAPLES, FL 34113
MARK COOK
PHONE (239) 707-3998

EMERGENCY SERVICES:
CITY OF NAPLES POLICE AND FIRE DEPARTMENT
355 RIVERSIDE CIRCLE
NAPLES, FL 34102
(239) 213-4844

DATA:
FPL FIBERNET
P O BOX 430
FORT MYERS, FL 33902
EDDY LOPEZ
PHONE (305) 505-6811

CONSTRUCTION PLANS FOR BASIN III PHASE 2 STORMWATER IMPROVEMENTS

MAYOR

JOHN F. SOREY III

VICE MAYOR

GARY B. PRICE II

COUNCIL MEMBERS

DOUG FINLAY
TERESA HEITMANN
BILL BARNETT
SAM J. SAAD III
MARGARET "DEE" SULICK

CITY MANAGER

A. WILLIAM MOSS

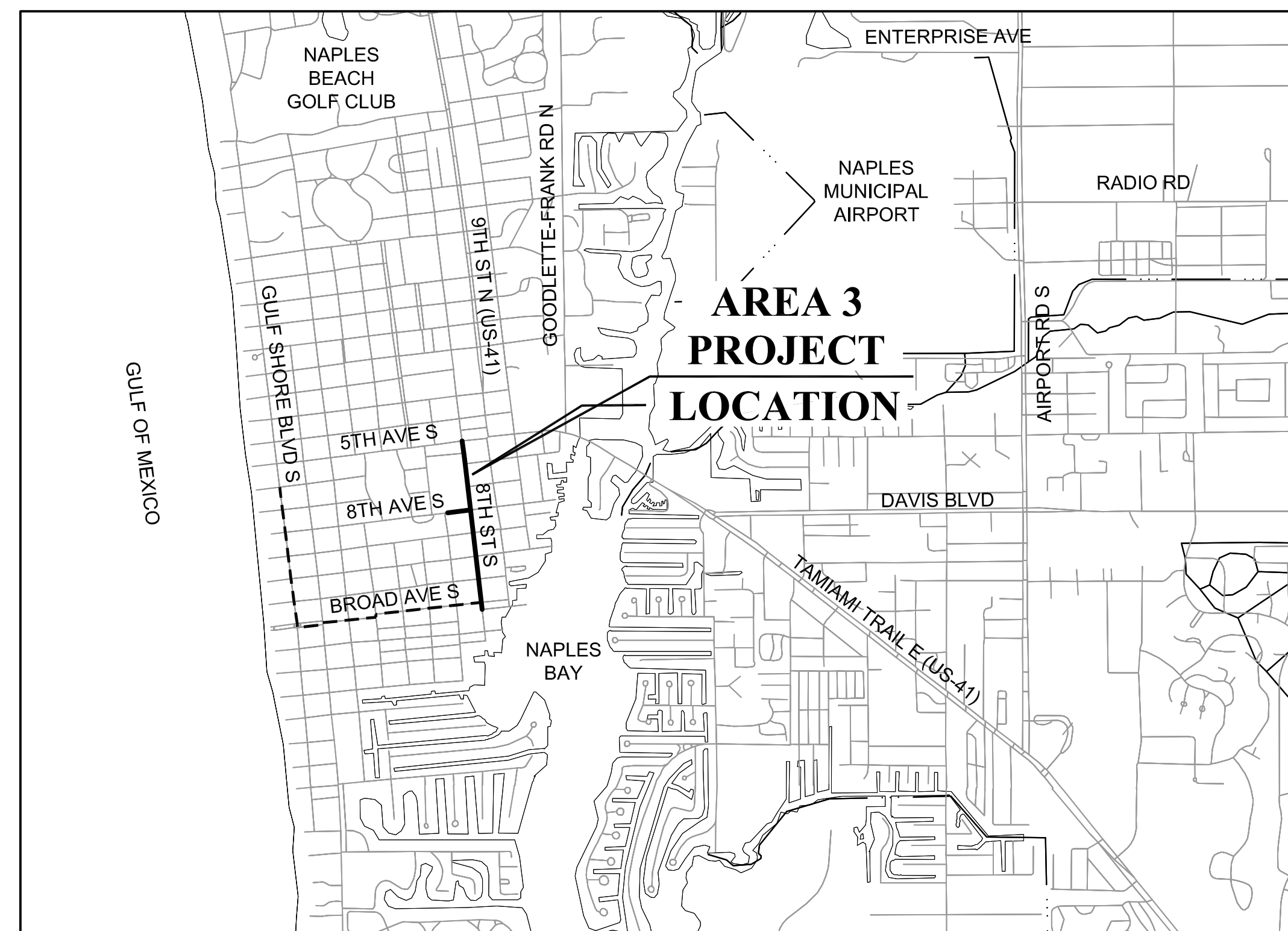
SECTION 3,4, 9, 10, TOWNSHIP 50 S, RANGE 25 E NAPLES, FLORIDA

INDEX OF PLANS

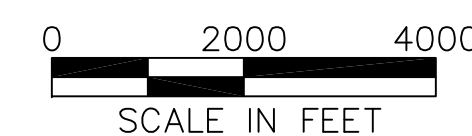
SHEET NO.	DESCRIPTION
C01	COVER
C02	ABBREVIATION, LEGEND AND NOTES
C03	AERIAL MAP
C04	EXISTING DRAINAGE MAP
C05	EROSION CONTROL PLAN
C06	SITE PLAN
C07	PROPOSED DRAINAGE PLAN
C08-C12	BROAD AVE S PLAN AND PROFILES
C13-C16	GULF SHORE BLVD S PLAN AND PROFILES
C17-C20	8TH ST S PLAN AND PROFILES
C21	8TH AVE S PLAN AND PROFILE
C22	13TH AVE S AND 5TH ST S GRADING PLAN
C23-C25	BROAD AVE S CROSS SECTIONS AND DETAILS
C26	GULF SHORE BLVD S CROSS SECTIONS AND DETAILS
C27	AREA 3 CROSS SECTIONS AND DETAILS
C28-C29	DRAINAGE DETAILS

ATTACHMENTS:

- R01-R03 CITY OF NAPLES UTILITY DETAILS
- R04-R08 FDOT DETAILS



LOCATION MAP



MARCH, 2012



2122 JOHNSON STREET
P.O. BOX 1550
FORT MYERS, FLORIDA 33902-1550
PHONE (239) 334-0046
FAX (239) 334-3661
E.B. #642 & L.B. #642

REGISTERED PROFESSIONAL ENGINEER
FLORIDA LICENSE NO. 69121

RICARDO ACOSTA, PE

DATE

SHEET NUMBER

C01

AREA 3 SET

ABBREVIATIONS

Table with two columns: Abbreviation and Full Name. Includes items like AC (ACRE), AL (ALTERNATE), and W (WATER MAIN).

SYMBOLS

Table of symbols for various infrastructure elements: GATE VALVE, TREE ASSEMBLY, REDUCER, BLOW OFF, FIRE HYDRANT, FIRE HYDRANT ASSEMBLY W/ GATE VALVE, MITERED END SECTION, MANHOLE W/ NUMBER, PLUG VALVE, IRRIGATION SERVICE (DOUBLE), IRRIGATION SERVICE (SINGLE), SEWER SERVICE (DOUBLE), SEWER SERVICE (SINGLE), WATER SERVICE (DOUBLE), WATER SERVICE (SINGLE), HEADWALL, DRAINAGE INLET, THROAT INLET, FLARED END SECTION.

HATCH PATTERNS

Table of hatch patterns for landscape and site features: WETLAND, UPLAND BUFFER, UPLAND PRESERVE, INDIGENOUS AREA, NATURAL AREA, FILTER MARSH, EXISTING LAKE, EXISTING LAKE TO BE FILLED, PROPOSED LAKE, LITTORAL SHELF AREA, COMPENSATING LITTORAL PLANTING AREA, RIPRAP / GRAVEL, BRICK PAVERS.

LINETYPES

Diagram showing existing vs proposed line types for various utilities: RIGHT-OF-WAY LINE, CENTER LINE, LAKE MAINTENANCE EASEMENT, PUBLIC UTILITY EASEMENT, DRAINAGE EASEMENT, WETLAND BOUNDARY, FORCE MAIN, SANITARY SEWER, WATER MAIN, IRRIGATION MAIN, RE-USE MAIN, PERMETER BERM, FENCE LINE, SILT FENCE, BULKHEAD, STRUCTURAL BUFFER.

GENERAL NOTES:

- 1. ELEVATIONS ARE REFERENCED TO NATIONAL GEODETIC VERTICAL DATUM (N.G.V.D.) OF 1929.
2. THE LOCATION OF EXISTING UTILITIES, PAVEMENT, VEGETATION, AND MISCELLANEOUS IMPROVEMENTS ARE APPROXIMATE ONLY...
3. ANY PUBLIC LAND CORNER WITHIN THE LIMITS OF CONSTRUCTION IS TO BE PROTECTED...

PAVING, GRADING AND DRAINAGE NOTES:

- 1. LENGTH OF STORM DRAIN PIPES ARE APPROXIMATE AND ARE MEASURED FROM CENTER OF STRUCTURE.
2. CONTRACTOR SHALL NOTIFY THE OWNER AND CONTACT ALL UTILITY COMPANIES FOR LOCATIONS OF EXISTING UTILITIES IN THE AREA 72 HOURS (MIN.) PRIOR TO COMMENCING CONSTRUCTION.

SIGNING AND PAVEMENT MARKING NOTES:

- 1. ALL SIGNING AND PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE 2010 FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, FDOT ROADWAY AND TRAFFIC DESIGN STANDARDS (LATEST EDITION)...

FLORIDA DEPARTMENT OF TRANSPORTATION STANDARD DETAIL NOTES:

ALL REFERENCES TO FLORIDA DEPARTMENT OF TRANSPORTATION STANDARD INDEXES ARE FROM THE 2010 FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT) DESIGN STANDARDS (ENGLISH UNITS). THESE INDEXES WERE PREPARED BY OR AT THE DIRECTION OF FDOT AND WERE FURNISHED TO JOHNSON ENGINEERING, INC.

THE DESIGN STANDARDS REFERENCED WITHIN THIS PLAN SET HAVE BEEN INCORPORATED HEREIN VERBATIM AS SET FORTH WITHIN THE ABOVE REFERENCED FDOT DESIGN STANDARDS.

NOTICE TO ALL CONTRACTORS

IT'S THE LAW IN FLORIDA 2 BUSINESS DAYS BEFORE YOU DIG CALL SUNSHINE 811
STATE, COUNTIES & CITIES ARE "NOT" PART OF THE ONE CALL SYSTEM. THEY MUST BE CALLED INDIVIDUALLY.

WATER LINE NOTES:

- 1. ALL DEFLECTIONS OF CITY PRESSURE MAINS SHALL BE ACCOMPLISHED WITH DUCTILE IRON PIPE.
2. ALL DEFLECTIONS OF WATER SERVICES SHALL BE ACCOMPLISHED WITH POLYBUTYLENE.
3. THE ENDS OF ALL CAPPED IRRIGATION AND POTABLE WATERLINES SHALL BE MARKED WITH ELECTRONIC MARKERS AND 2'x4" STAKES 5' IN LENGTH WITH 2' ABOVE GROUND.

SANITARY SEWER / FORCE MAIN NOTES:

- 1. ALL PIPE LENGTHS ARE APPROXIMATE AND ARE MEASURED FROM CENTER OF STRUCTURE OR FITTINGS.
2. ALL GRAVITY SEWER LINES SHALL BE PVC (SDR-26) UNLESS NOTED OTHERWISE.
3. MANHOLE TOP ELEVATIONS ARE APPROXIMATE AND SHOULD BE ADJUSTED TO FINAL PAVEMENT ELEVATION.

SEPARATION OF WATER AND SEWER LINES

Table detailing horizontal and vertical separation of pipelines. Includes sections for HORIZONTAL SEPARATION OF PIPELINES, VERTICAL SEPARATION OF PIPELINES, and ALTERNATE CONSTRUCTION with specific distance and construction requirements.



2122 JOHNSON STREET
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FORT MYERS, FLORIDA 33902-1550
PHONE (239) 334-0046
FAX (239) 334-3661
E.B.#. 6642 & L.B.#. 6642

RICARDO ACOSTA, P.E.
FL License No. 69121

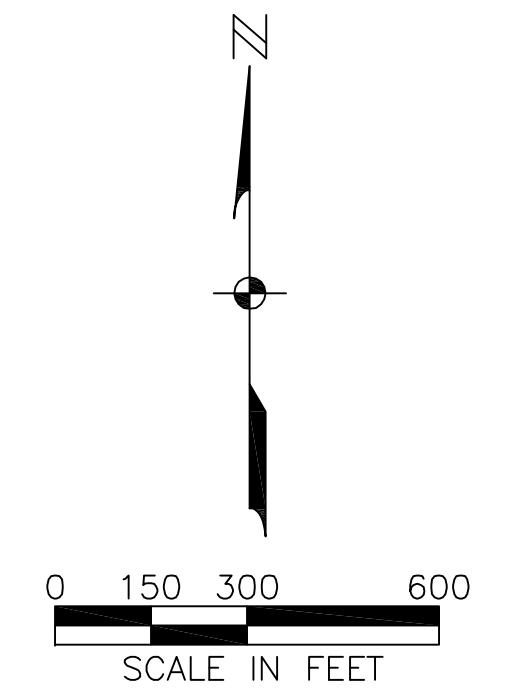
CITY OF NAPLES

BASIN III PHASE 2
STORMWATER IMPROVEMENTS
NAPLES, FLORIDA

Table for REVISIONS with columns for NO, DESCRIPTION, DATE, and SCALE. Includes project info like DATE: JAN, 2012 and PROJECT NO. 20098079-000.

ABBREVIATION, LEGEND AND NOTES

SHEET NUMBER
C02



CITY OF NAPLES

**BASIN III PHASE 2
 STORMWATER IMPROVEMENTS
 NAPLES, FLORIDA**

NO.	DESCRIPTION	DATE

DATE: JAN, 2012
 PROJECT NO. 20098079-000
 FILE NO. 3, 4, 9, 10-50-25
 SCALE: 1" = 300'

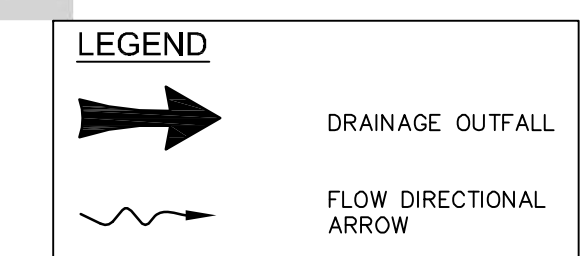
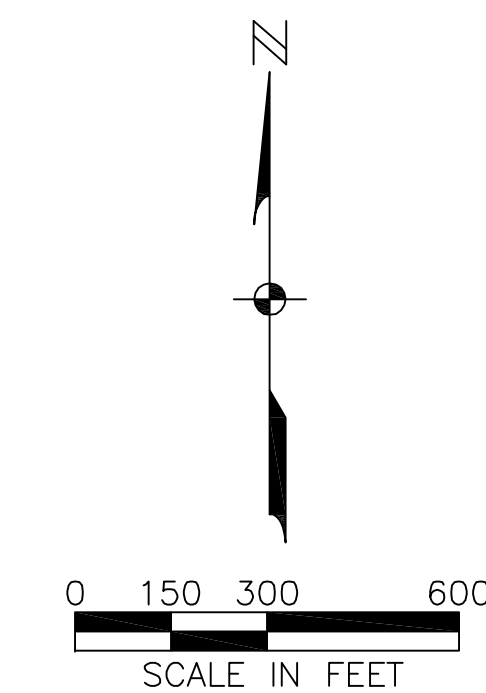
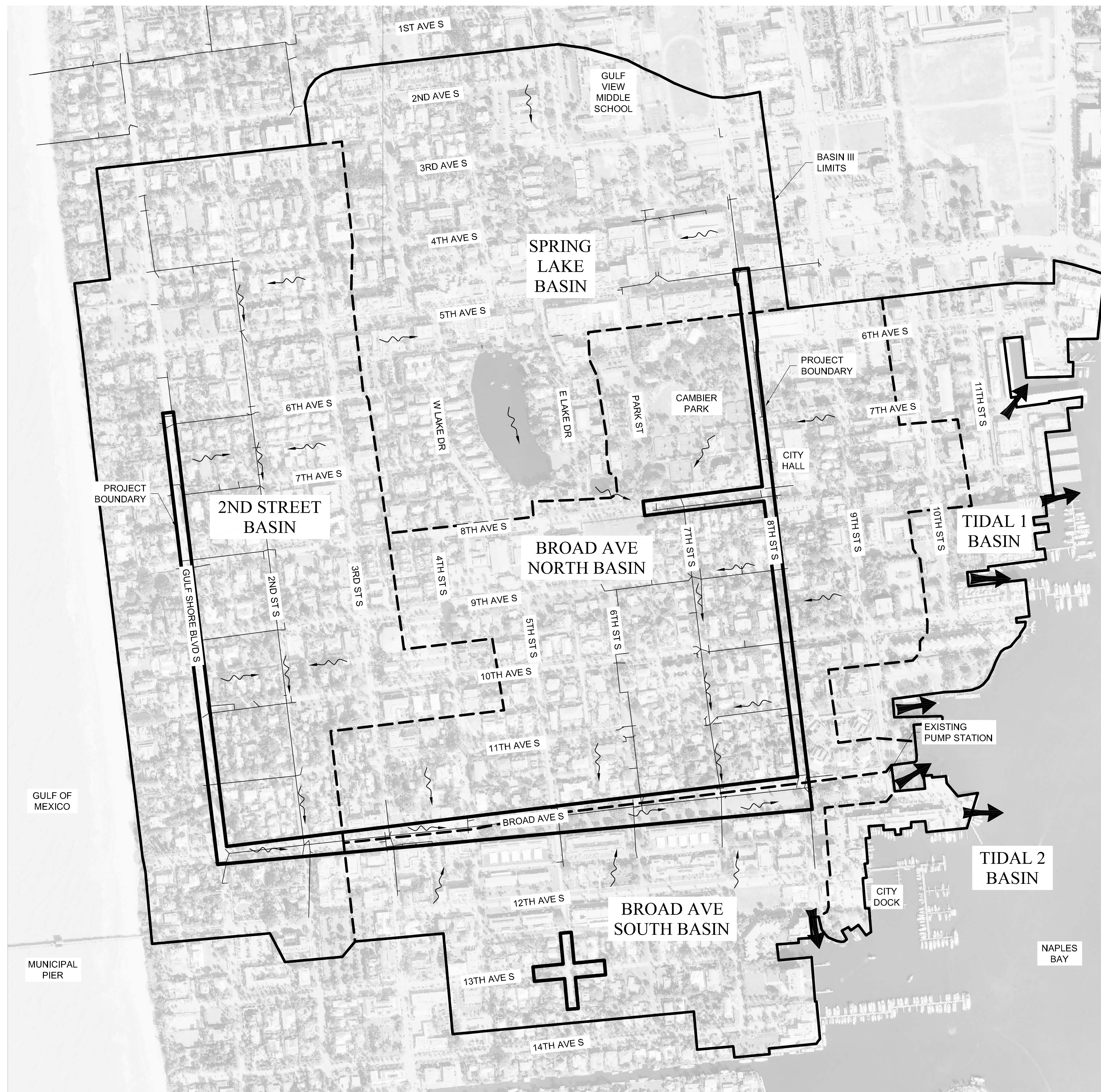
AERIAL MAP

SHEET NUMBER

C03

* PROJECT BOUNDARY SHOWN AT RIGHT-OF-WAY LINE FOR REFERENCE ONLY. SEE TYPICAL ROAD SECTIONS FOR ACTUAL PROJECT LIMITS.

NOTE:
 AERIAL FLIGHT DATE: JANUARY, 2010



NOTE:
AERIAL FLIGHT DATE: JANUARY, 2010

JOHNSON ENGINEERING
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CITY OF NAPLES

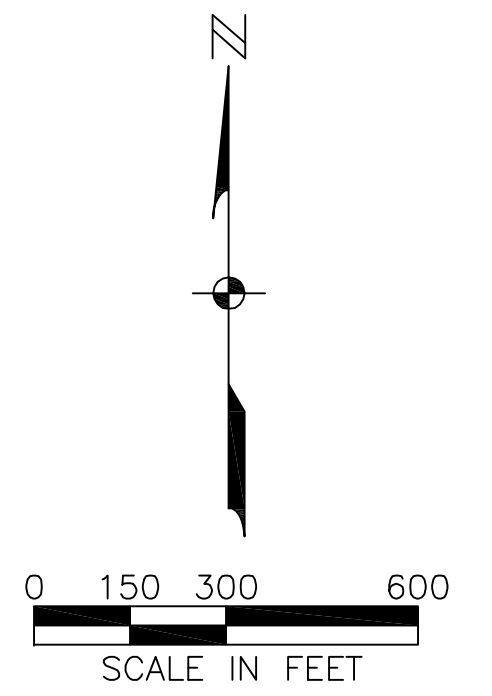
**BASIN III PHASE 2
STORMWATER IMPROVEMENTS
NAPLES, FLORIDA**

NO.	DESCRIPTION	DATE

DATE: JAN, 2012
PROJECT NO. 20098079-000
FILE NO. 3, 4, 9, 10-50-25
SCALE: 1" = 300'

EXISTING DRAINAGE MAP

SHEET NUMBER
C04



CITY OF NAPLES

**BASIN III PHASE 2
 STORMWATER IMPROVEMENTS
 NAPLES, FLORIDA**

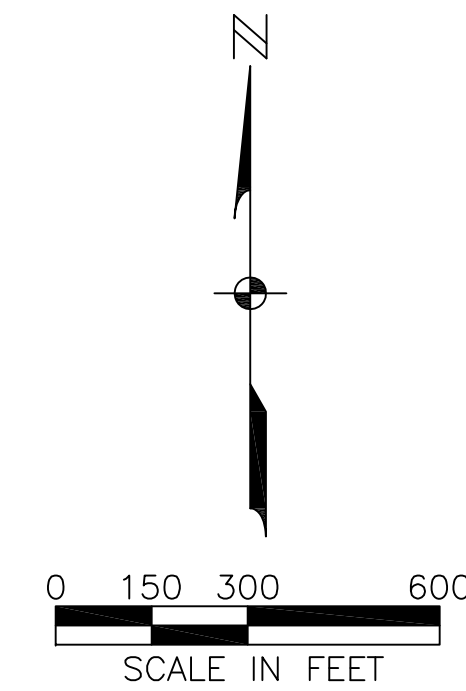
NO.	DESCRIPTION	DATE

DATE: JAN, 2012
 PROJECT NO. 20098079-000
 FILE NO. 3, 4, 9, 10-50-25
 SCALE: 1" = 300'

EROSION CONTROL PLAN

SHEET NUMBER
C05

NOTE:
 EXISTING INLETS TO BE PROTECTED
 WITH SAND BAGS OR FILTER FABRIC
 WHERE APPROPRIATE.
 AERIAL FLIGHT DATE: JANUARY, 2010



JOHNSON
ENGINEERING

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FAX (239) 334-3661
E.B. #642 & L.B. #642

RICARDO ACOSTA, PE
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CITY OF NAPLES

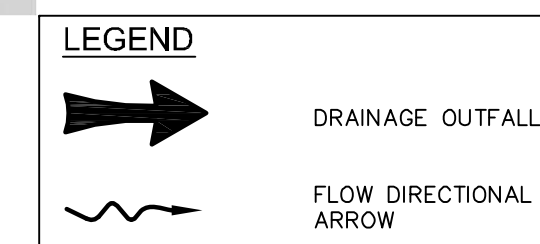
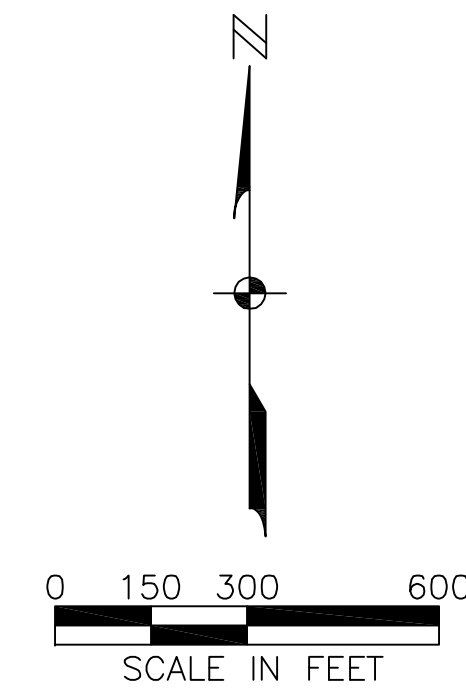
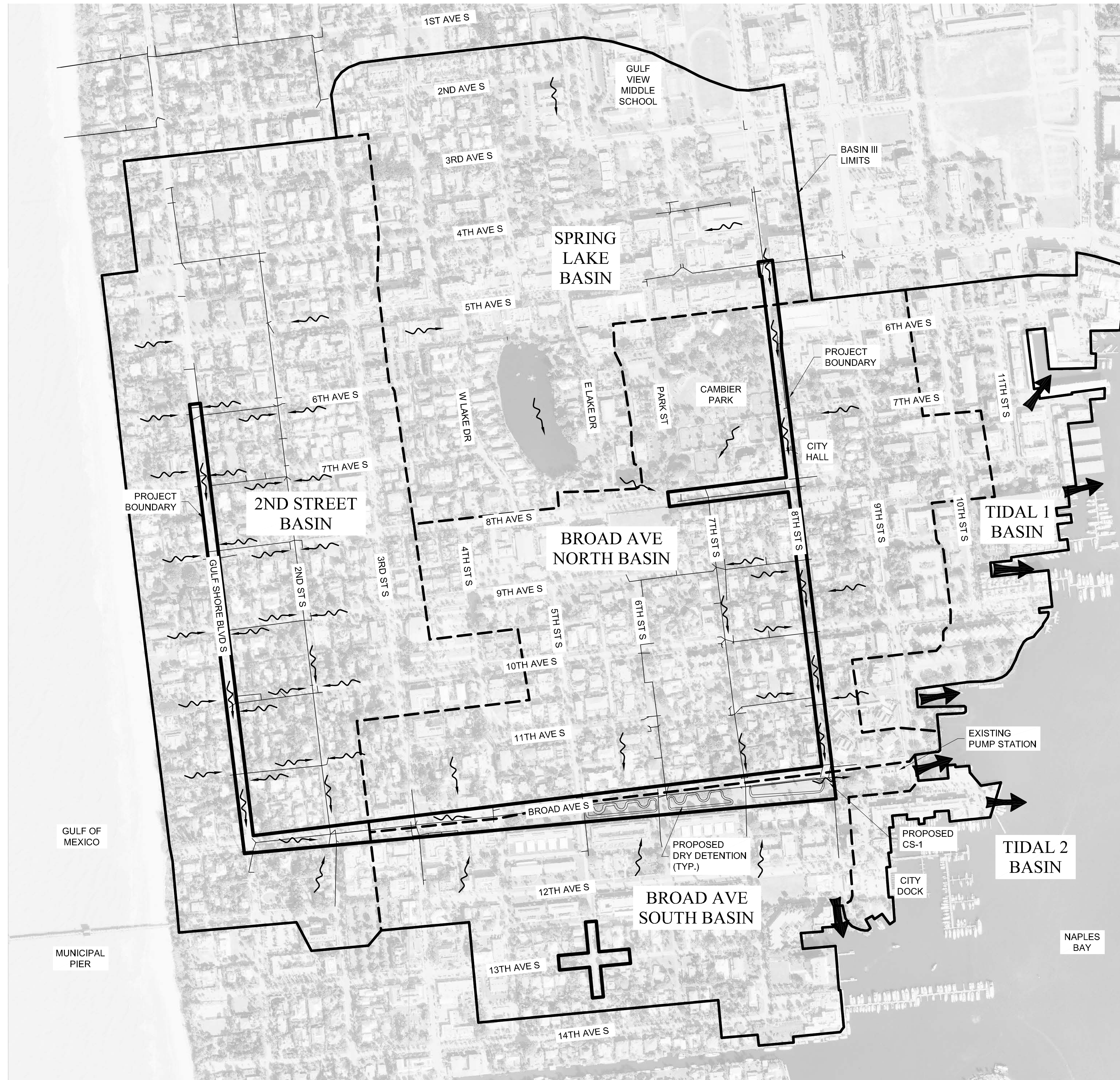
BASIN III PHASE 2
STORMWATER IMPROVEMENTS
NAPLES, FLORIDA

NO.	DESCRIPTION	DATE

DATE: JAN, 2012
PROJECT NO. 20098079-000
FILE NO. 3,4, 9, 10-50-25
SCALE: 1" = 200'

SITE PLAN

SHEET NUMBER
C06



NOTE:
AERIAL FLIGHT DATE: JANUARY, 2010

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CITY OF NAPLES
BASIN III PHASE 2
STORMWATER IMPROVEMENTS
NAPLES, FLORIDA

NO.	DESCRIPTION	DATE

DATE: JAN, 2012
PROJECT NO. 20098079-000
FILE NO. 3, 4, 9, 10-50-25
SCALE: 1" = 300'

PROPOSED DRAINAGE PLAN

SHEET NUMBER
C07

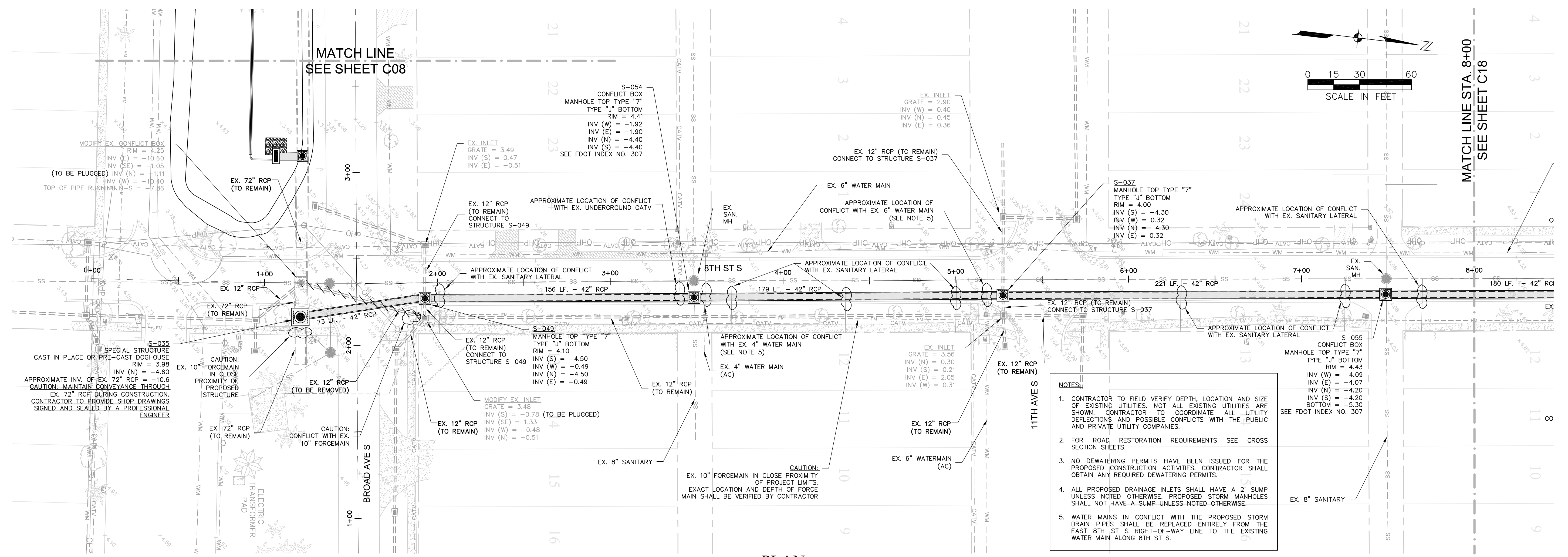
NO.	REVISIONS DESCRIPTION	DATE

DATE: JAN, 2012
 PROJECT NO. 20098079-000
 FILE NO. 3, 4, 9, 10-50-25
 SCALE: 1" = 30'

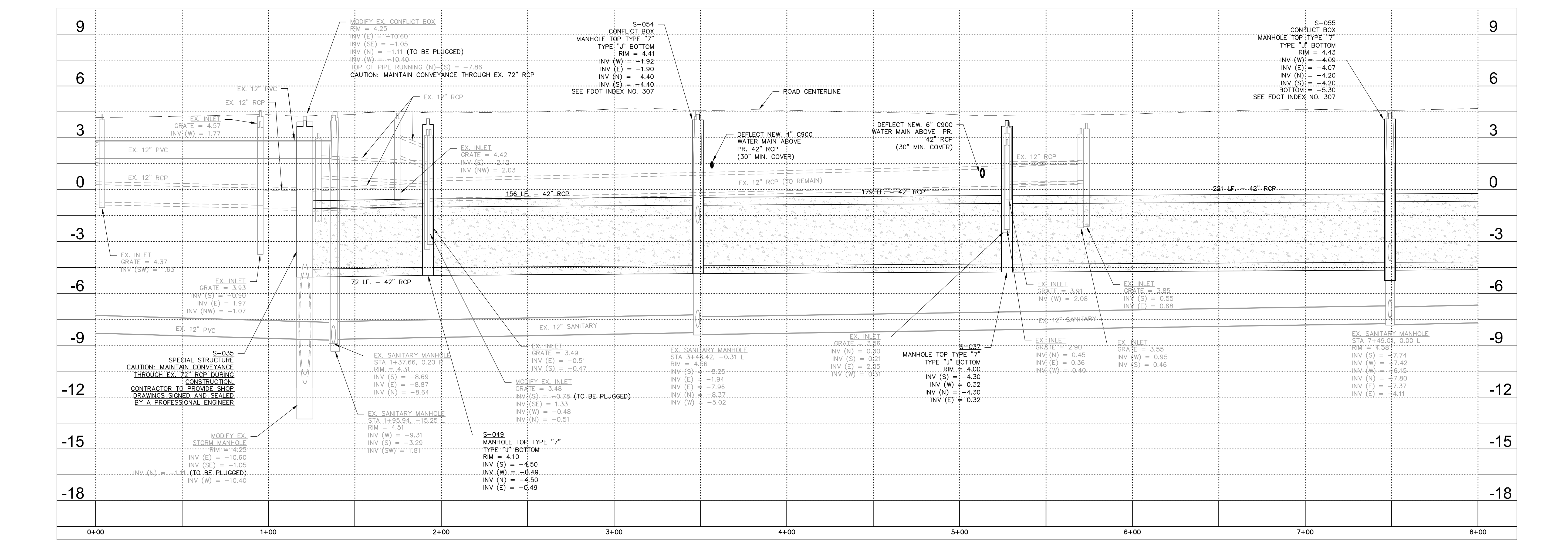
8TH ST S PLAN AND PROFILES

SHEET NUMBER

C17



PLAN
 SCALE: HORIZ. 1" = 30'



PROFILE
 SCALE: HORIZ. 1" = 30'
 VERT. 1" = 3'

NOTE: ALL ELEVATIONS SHOWN ARE N.G.V.D. 1929

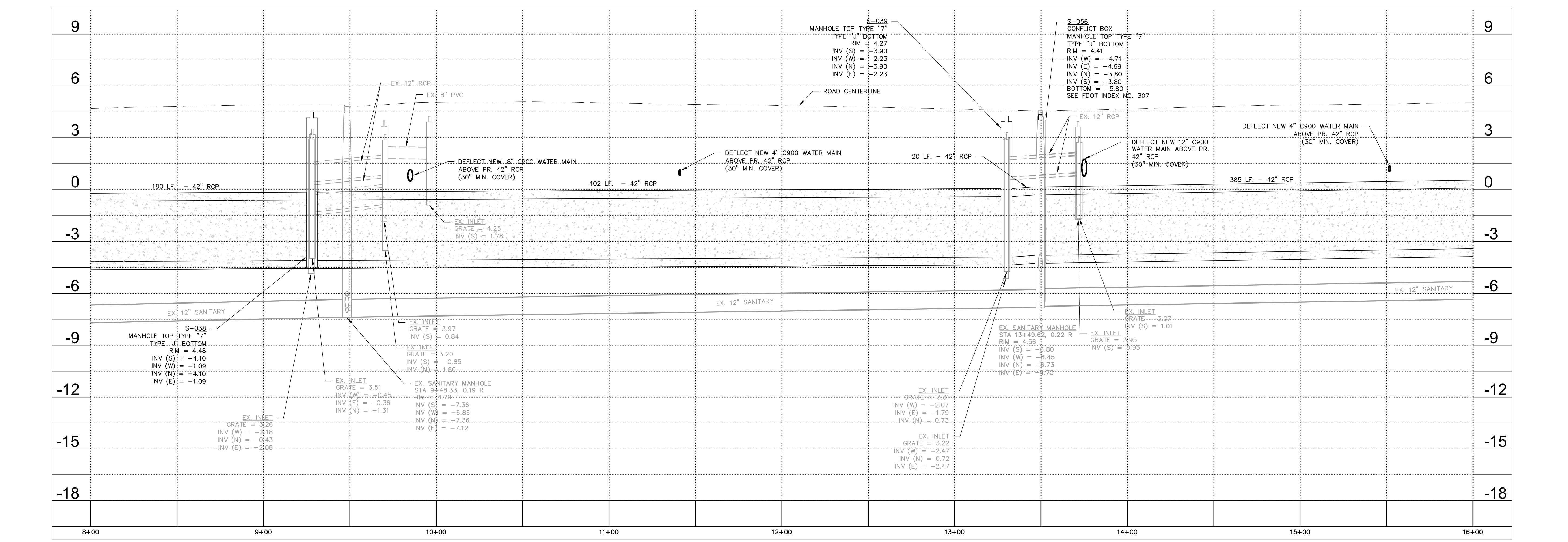
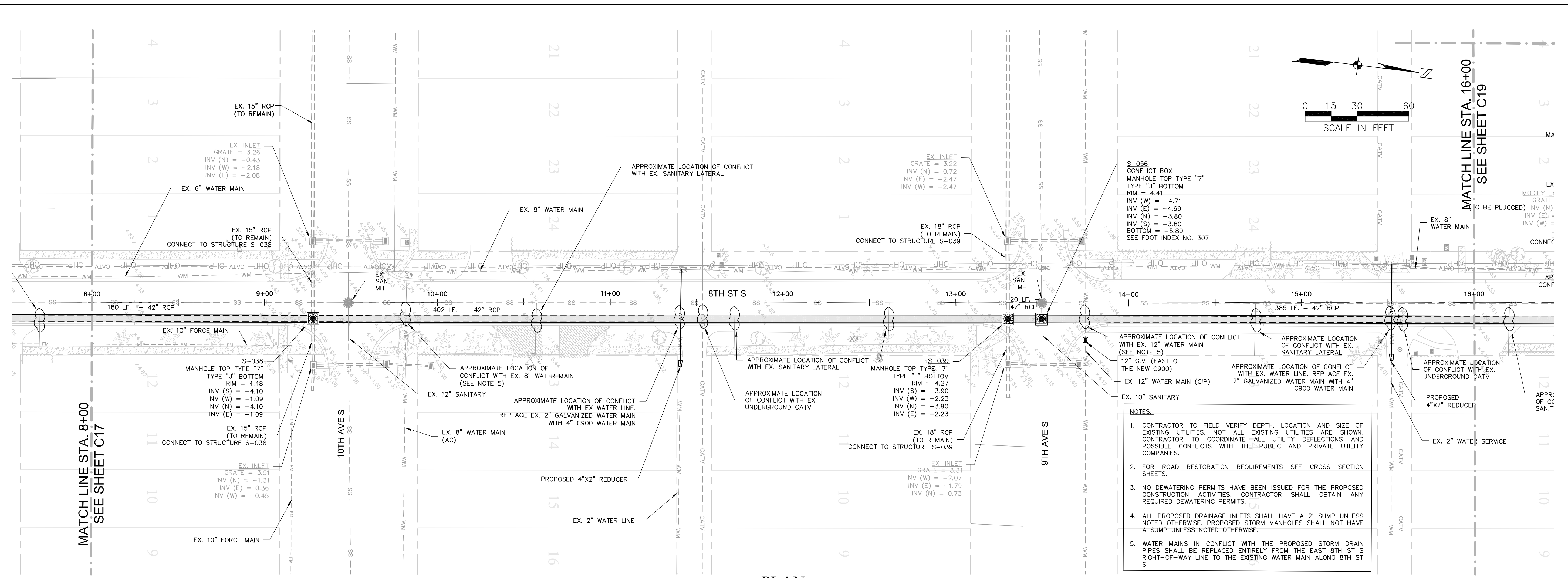
NO.	DESCRIPTION	DATE

DATE: JAN, 2012
 PROJECT NO. 20098079-000
 FILE NO. 3, 4, 9, 10-50-25
 SCALE: 1" = 30'

8TH ST S PLAN AND PROFILES

SHEET NUMBER

C18



NOTE: ALL ELEVATIONS SHOWN ARE N.G.V.D. 1929

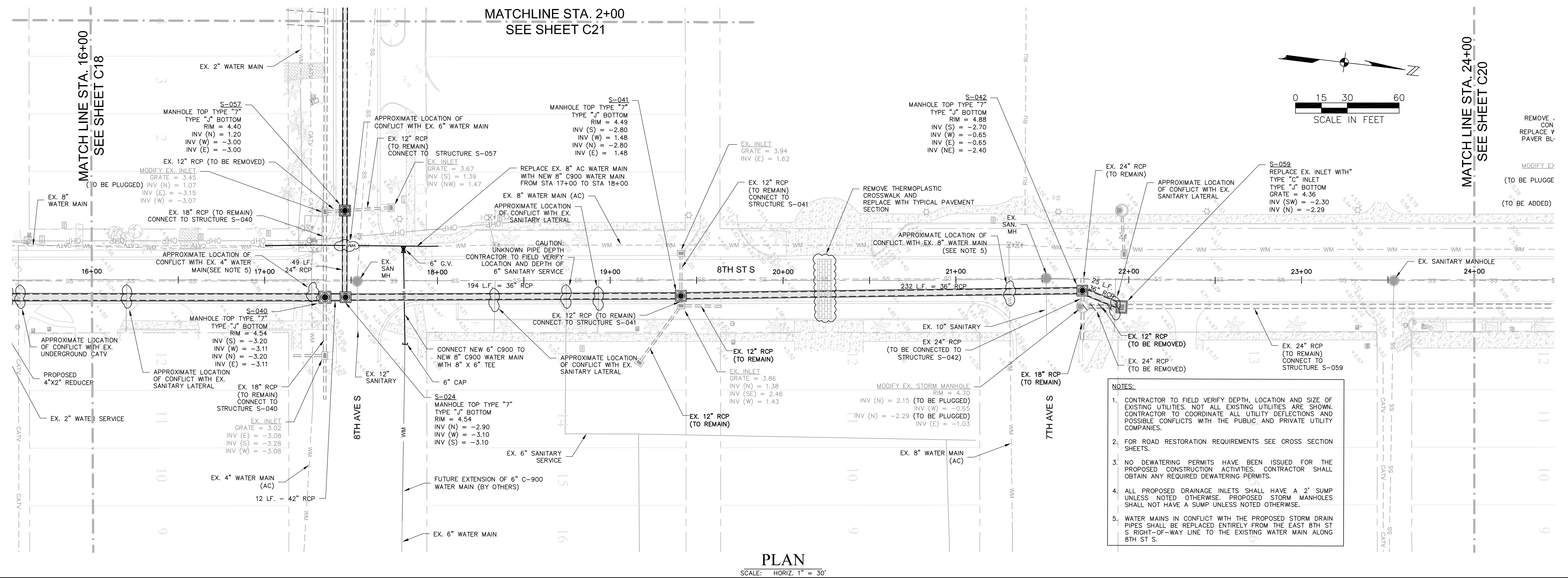
NO.	DATE	DESCRIPTION

DATE: JAN, 2012
 PROJECT NO. 20098079-000
 FILE NO. 3, 4, 9, 10-50-25
 SCALE: 1" = 30'

8TH ST S PLAN AND PROFILES

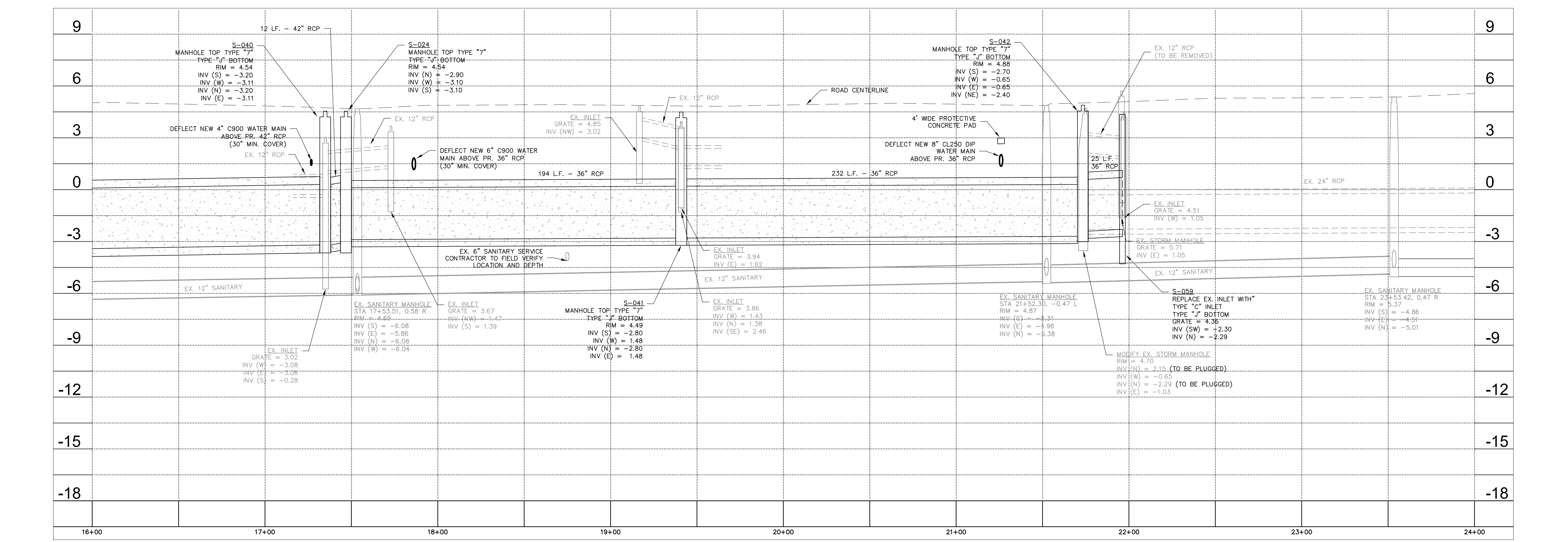
SHEET NUMBER

C19



PLAN
 SCALE: HORIZ. 1" = 30'

- NOTES:**
- CONTRACTOR TO FIELD VERIFY DEPTH, LOCATION AND SIZE OF EXISTING UTILITIES. NOT ALL EXISTING UTILITIES ARE SHOWN. CONTRACTOR TO COORDINATE ALL UTILITY DEFLECTIONS AND POSSIBLE CONFLICTS WITH THE PUBLIC AND PRIVATE UTILITY COMPANIES.
 - FOR ROAD RESTORATION REQUIREMENTS SEE CROSS SECTION SHEETS.
 - NO DEWATERING PERMITS HAVE BEEN ISSUED FOR THE PROPOSED CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL OBTAIN ANY REQUIRED DEWATERING PERMITS.
 - ALL PROPOSED DRAINAGE INLETS SHALL HAVE A 2' SUMP UNLESS NOTED OTHERWISE. PROPOSED STORM MANHOLES SHALL NOT HAVE A SUMP UNLESS NOTED OTHERWISE.
 - WATER MAINS IN CONFLICT WITH THE PROPOSED STORM DRAIN PIPES SHALL BE REPLACED ENTIRELY FROM THE EAST 8TH ST S RIGHT-OF-WAY LINE TO THE EXISTING WATER MAIN ALONG 8TH ST S.



PROFILE
 SCALE: HORIZ. 1" = 30'
 VERT. 1" = 3'

NOTE: ALL ELEVATIONS SHOWN ARE N.G.V.D. 1929

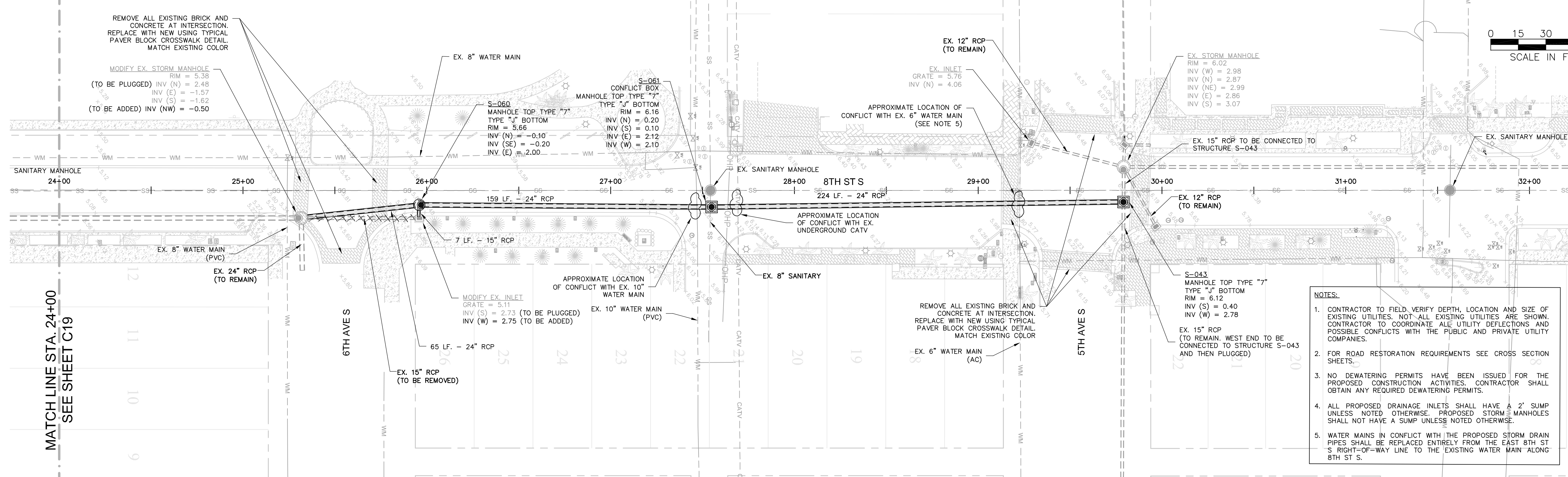
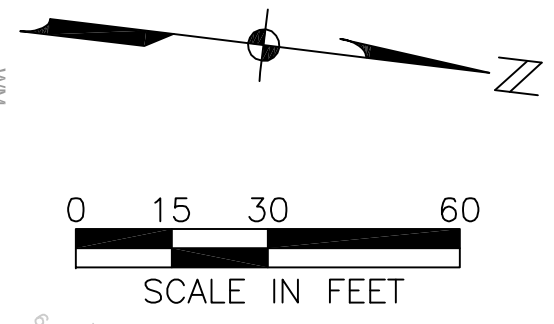
NO.	DESCRIPTION	DATE

DATE: JAN, 2012
PROJECT NO. 20098079-000
FILE NO. 3, 4, 9, 10-50-25
SCALE: 1" = 30'

8TH ST S PLAN AND PROFILES

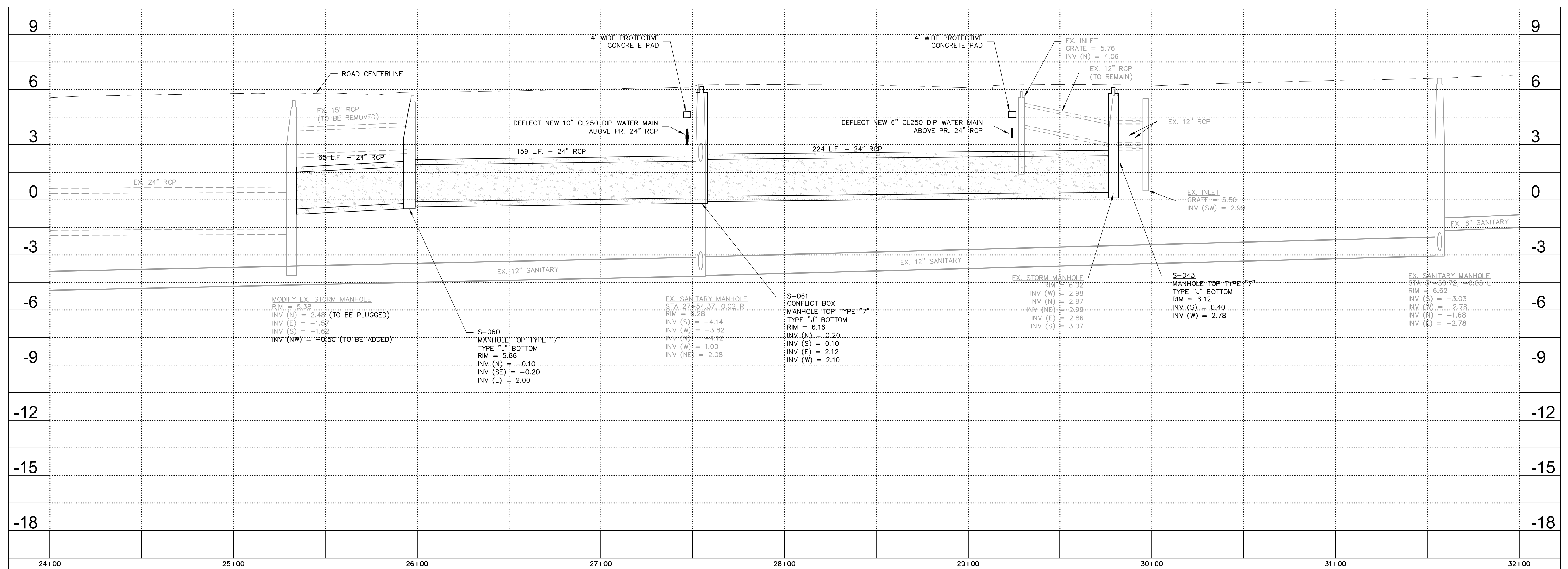
SHEET NUMBER

C20



- NOTES:**
1. CONTRACTOR TO FIELD VERIFY DEPTH, LOCATION AND SIZE OF EXISTING UTILITIES. NOT ALL EXISTING UTILITIES ARE SHOWN. CONTRACTOR TO COORDINATE ALL UTILITY DEFLECTIONS AND POSSIBLE CONFLICTS WITH THE PUBLIC AND PRIVATE UTILITY COMPANIES.
 2. FOR ROAD RESTORATION REQUIREMENTS SEE CROSS SECTION SHEETS.
 3. NO DEWATERING PERMITS HAVE BEEN ISSUED FOR THE PROPOSED CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL OBTAIN ANY REQUIRED DEWATERING PERMITS.
 4. ALL PROPOSED DRAINAGE INLETS SHALL HAVE A 2' SUMP UNLESS NOTED OTHERWISE. PROPOSED STORM MANHOLES SHALL NOT HAVE A SUMP UNLESS NOTED OTHERWISE.
 5. WATER MAINS IN CONFLICT WITH THE PROPOSED STORM DRAIN PIPES SHALL BE REPLACED ENTIRELY FROM THE EAST 8TH ST S RIGHT-OF-WAY LINE TO THE EXISTING WATER MAIN ALONG 8TH ST S.

PLAN
SCALE: HORIZ. 1" = 30'



PROFILE
SCALE: HORIZ. 1" = 30'
VERT. 1" = 3'

NOTE: ALL ELEVATIONS SHOWN ARE N.G.V.D. 1929

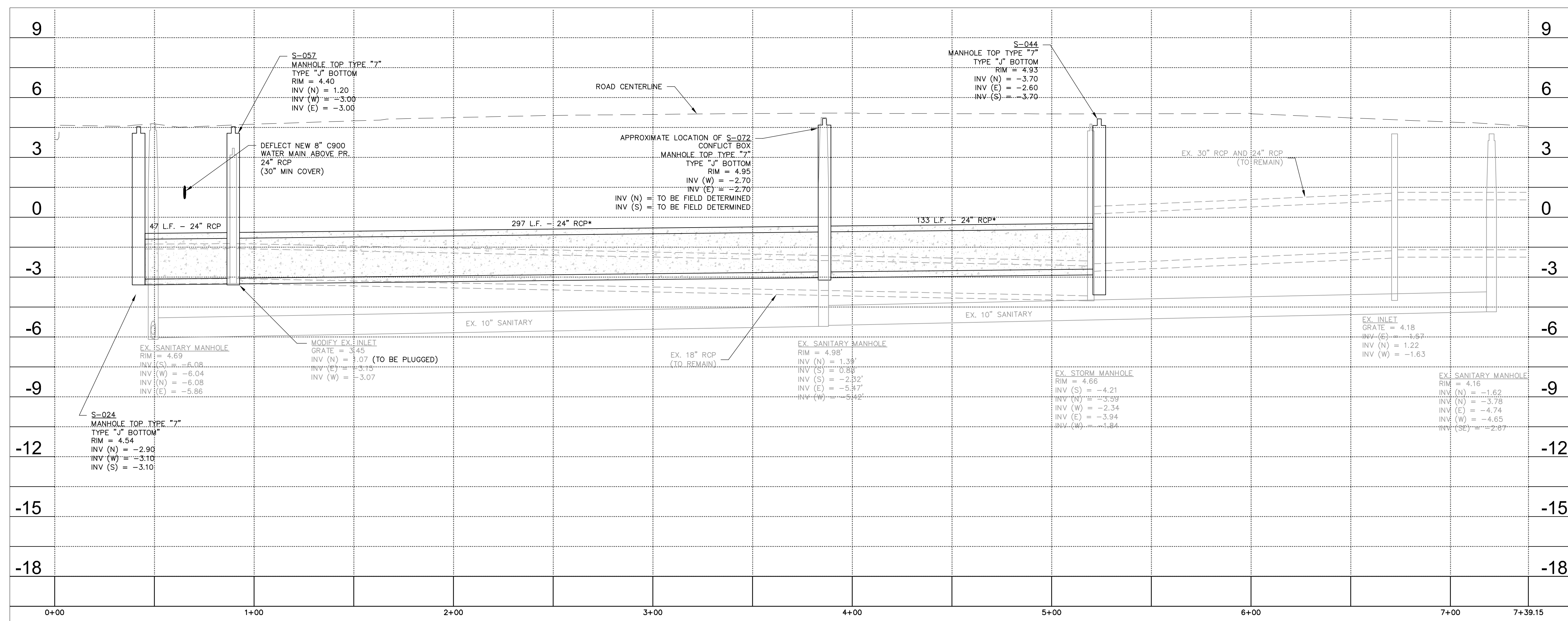
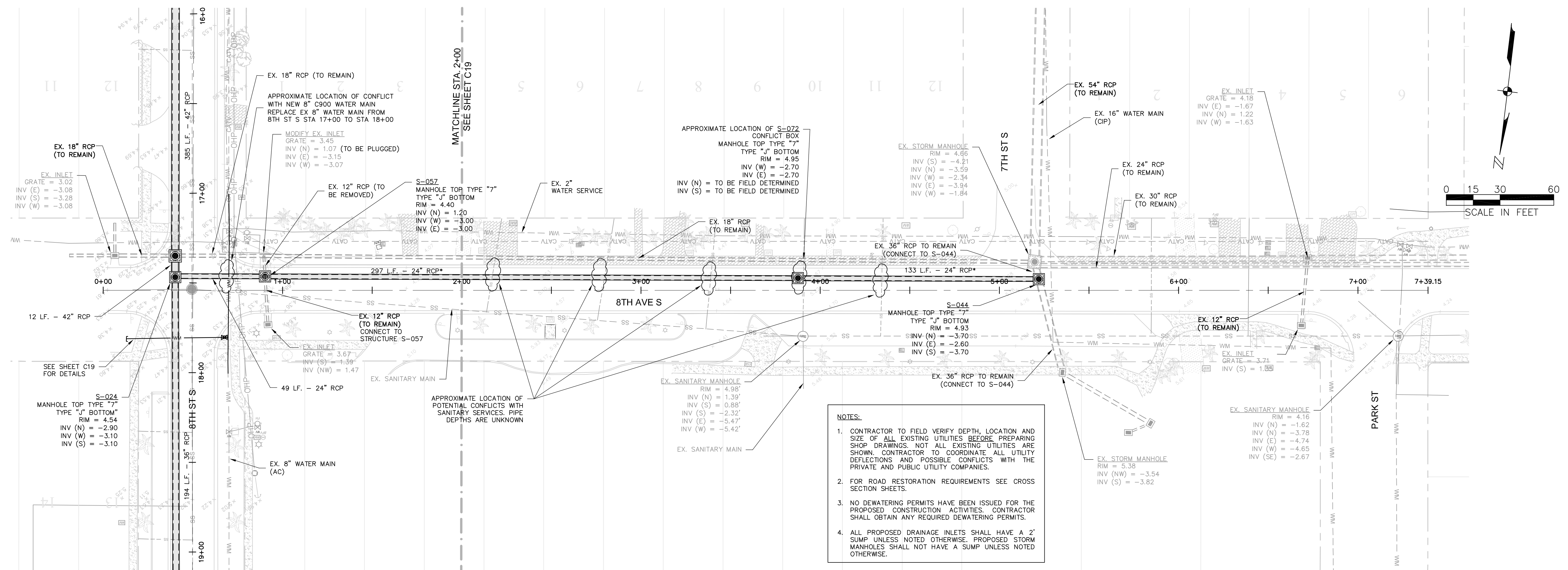
NO.	DATE	DESCRIPTION

DATE: JAN, 2012
PROJECT NO. 20098079-000
FILE NO. 3, 4, 9, 10-50-25
SCALE: 1" = 30'

8TH AVE S PLAN AND PROFILE

SHEET NUMBER

C21



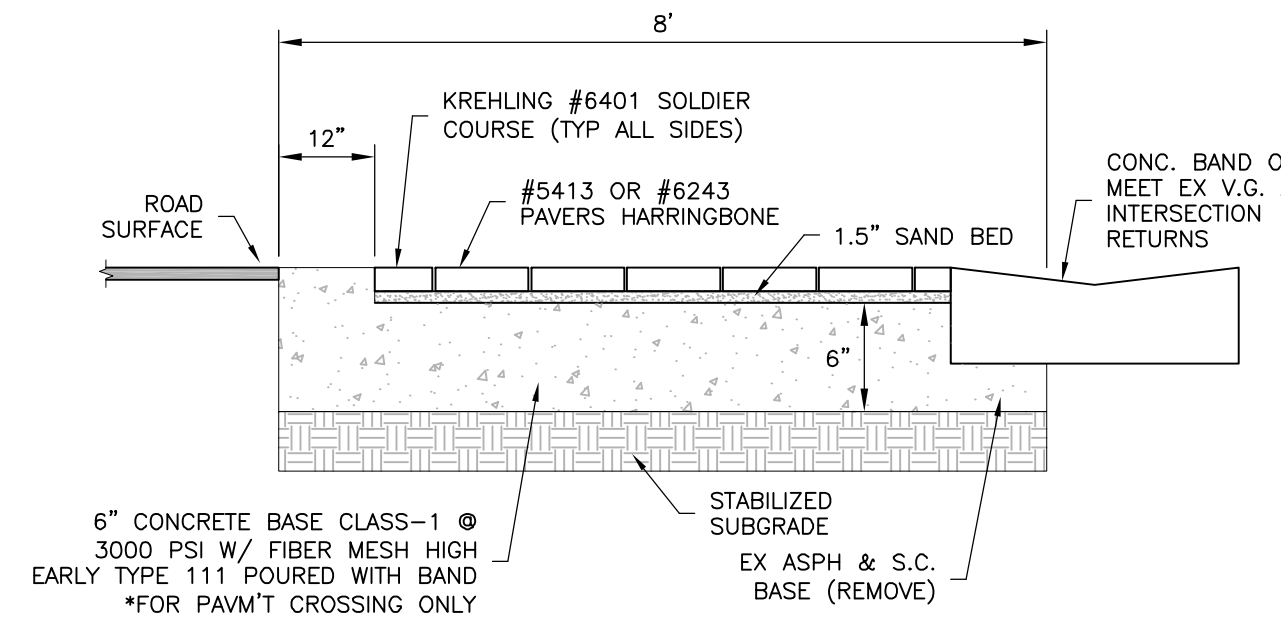
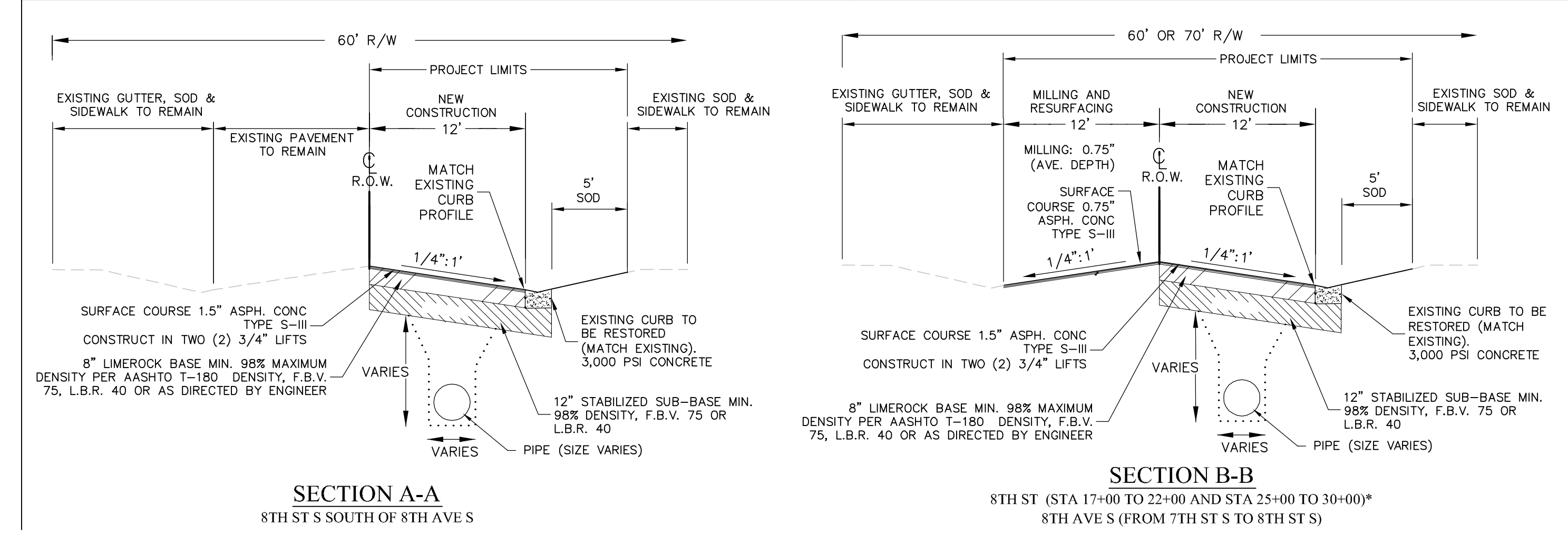
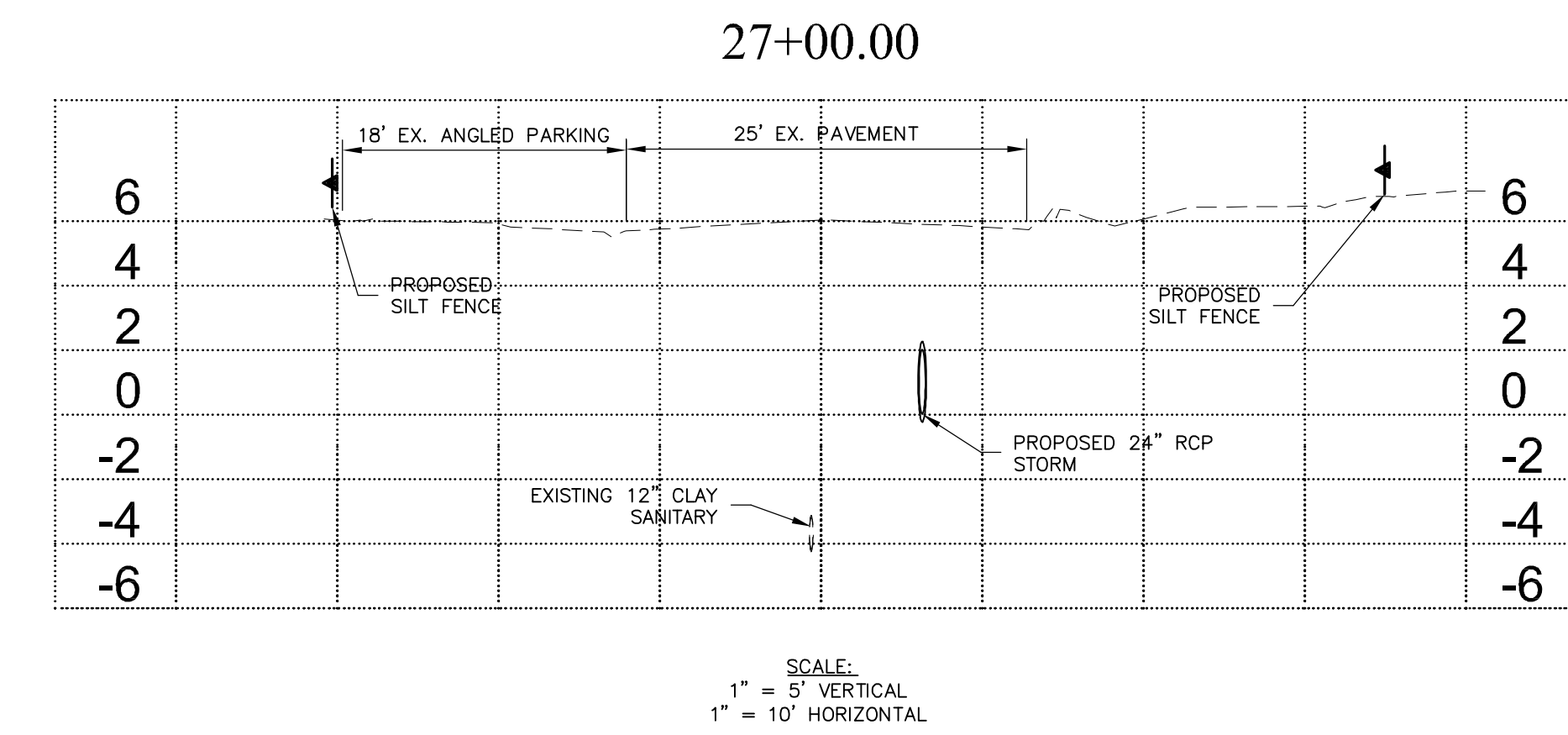
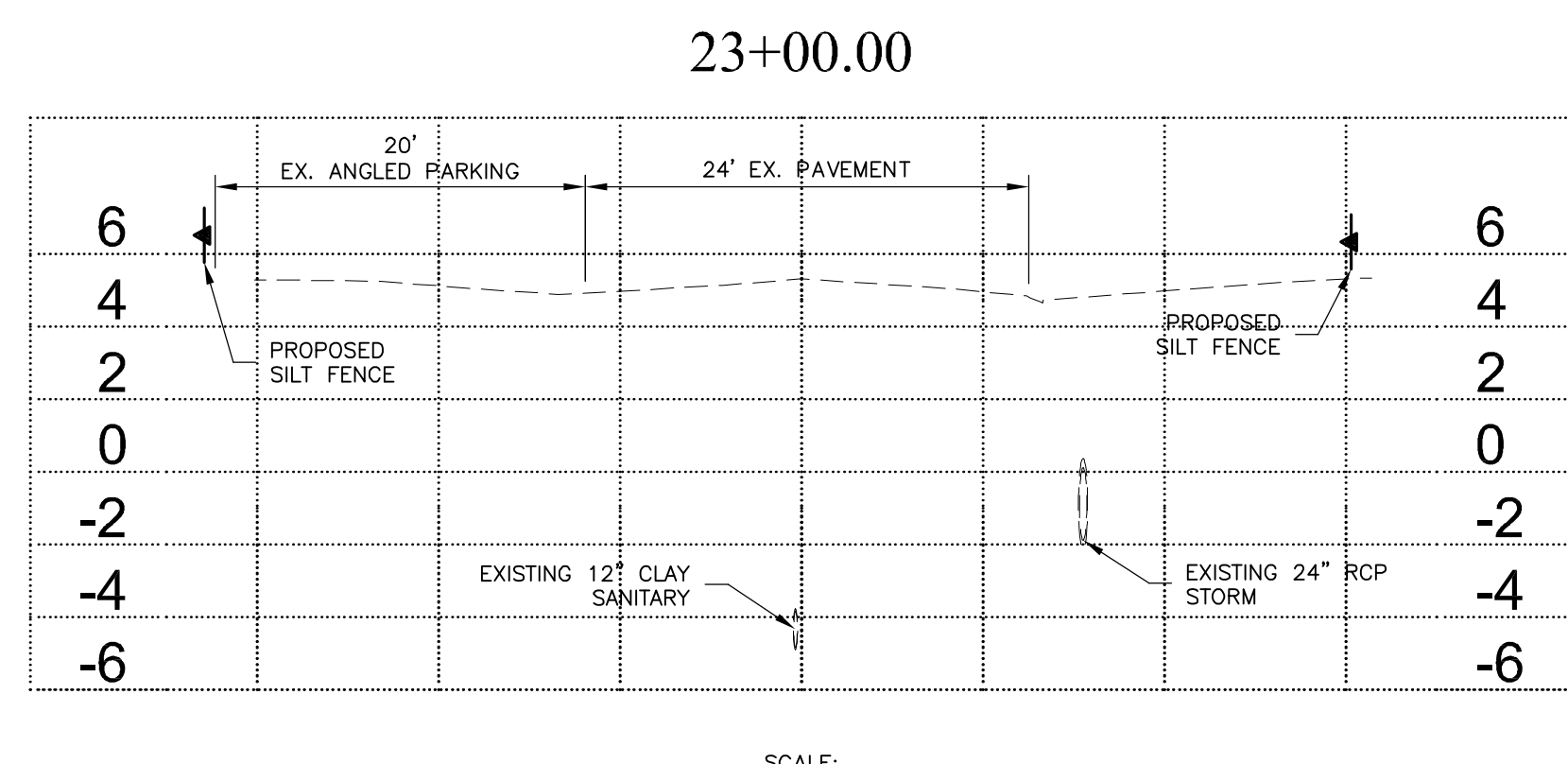
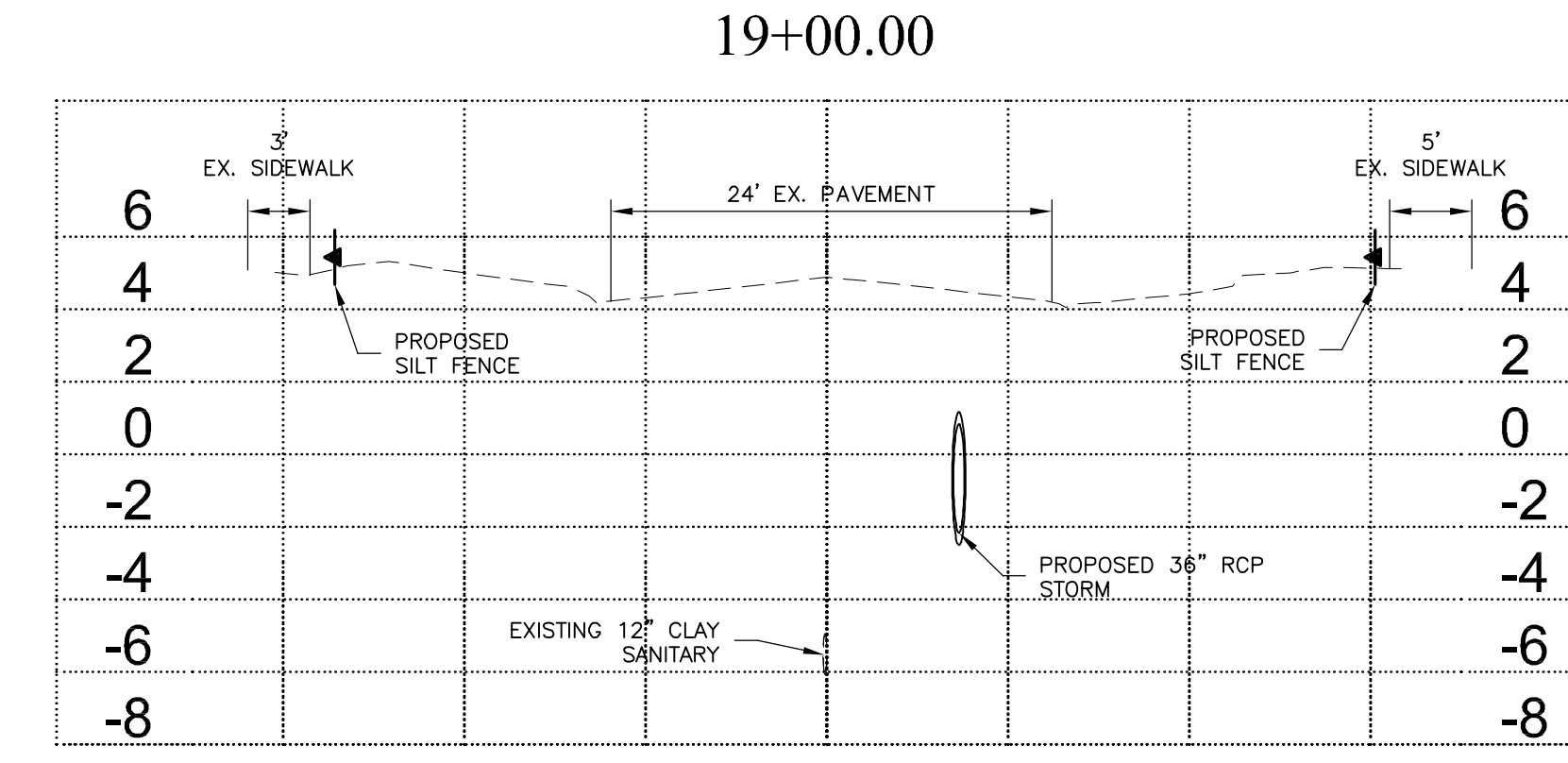
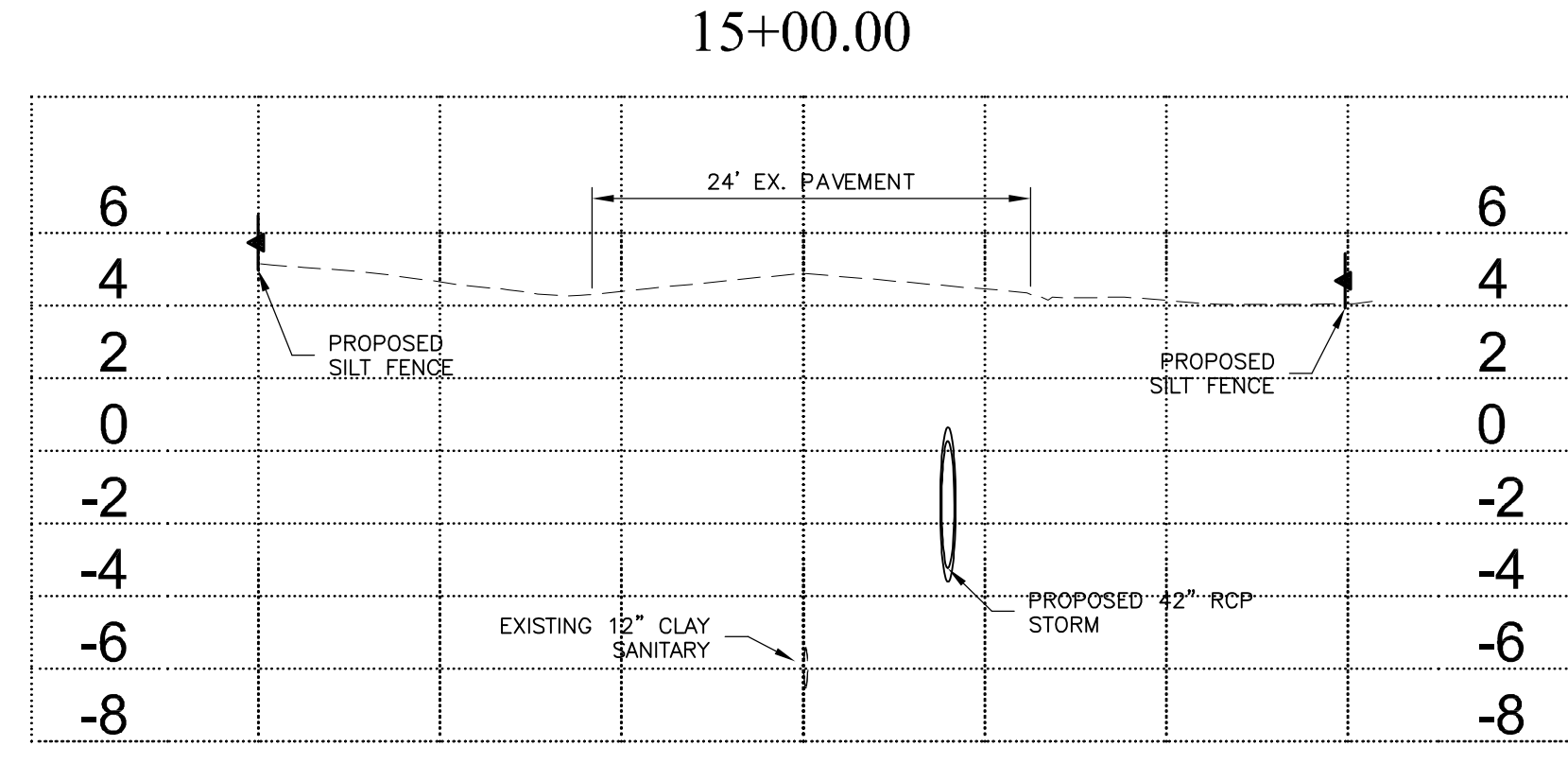
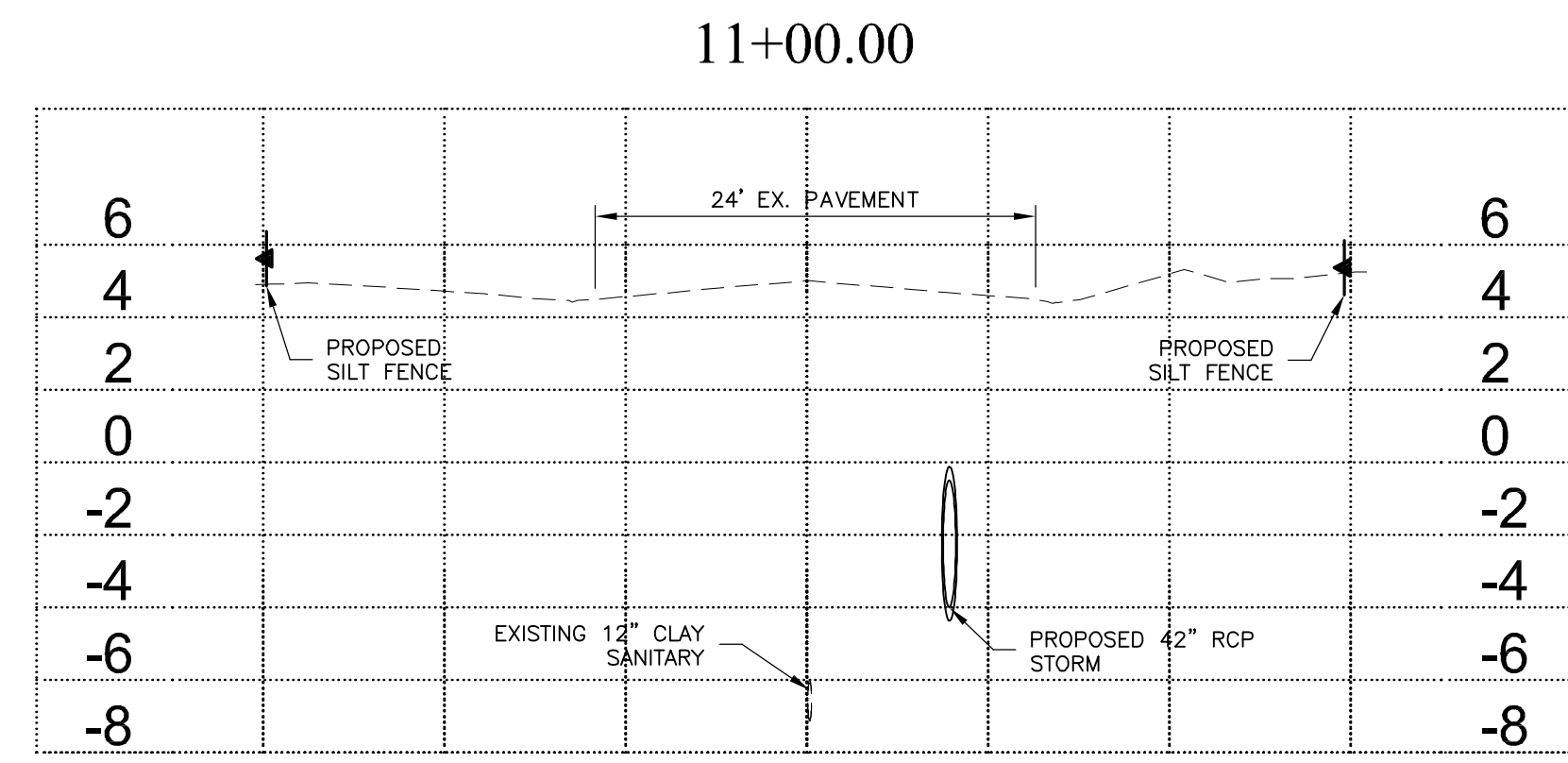
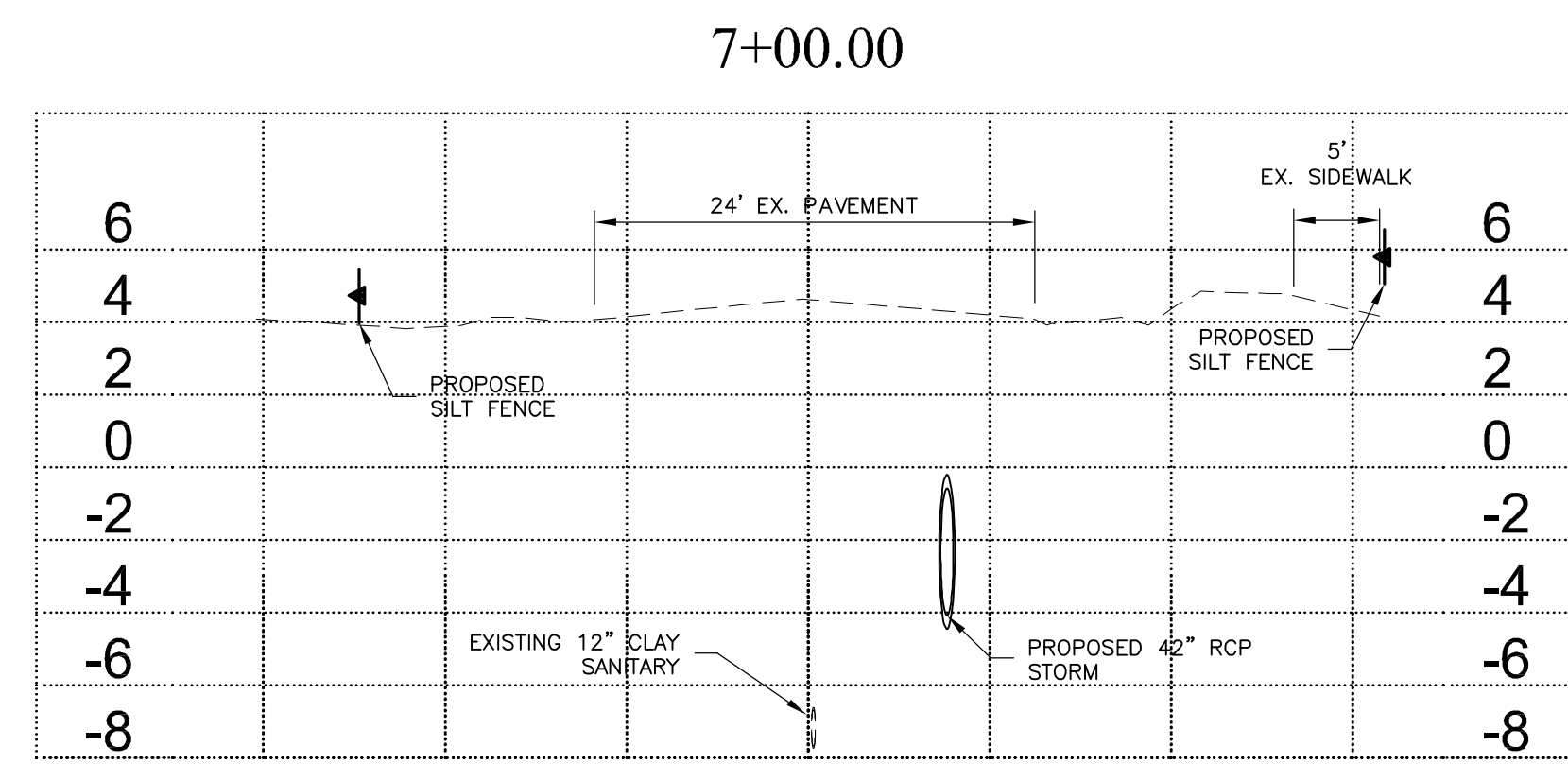
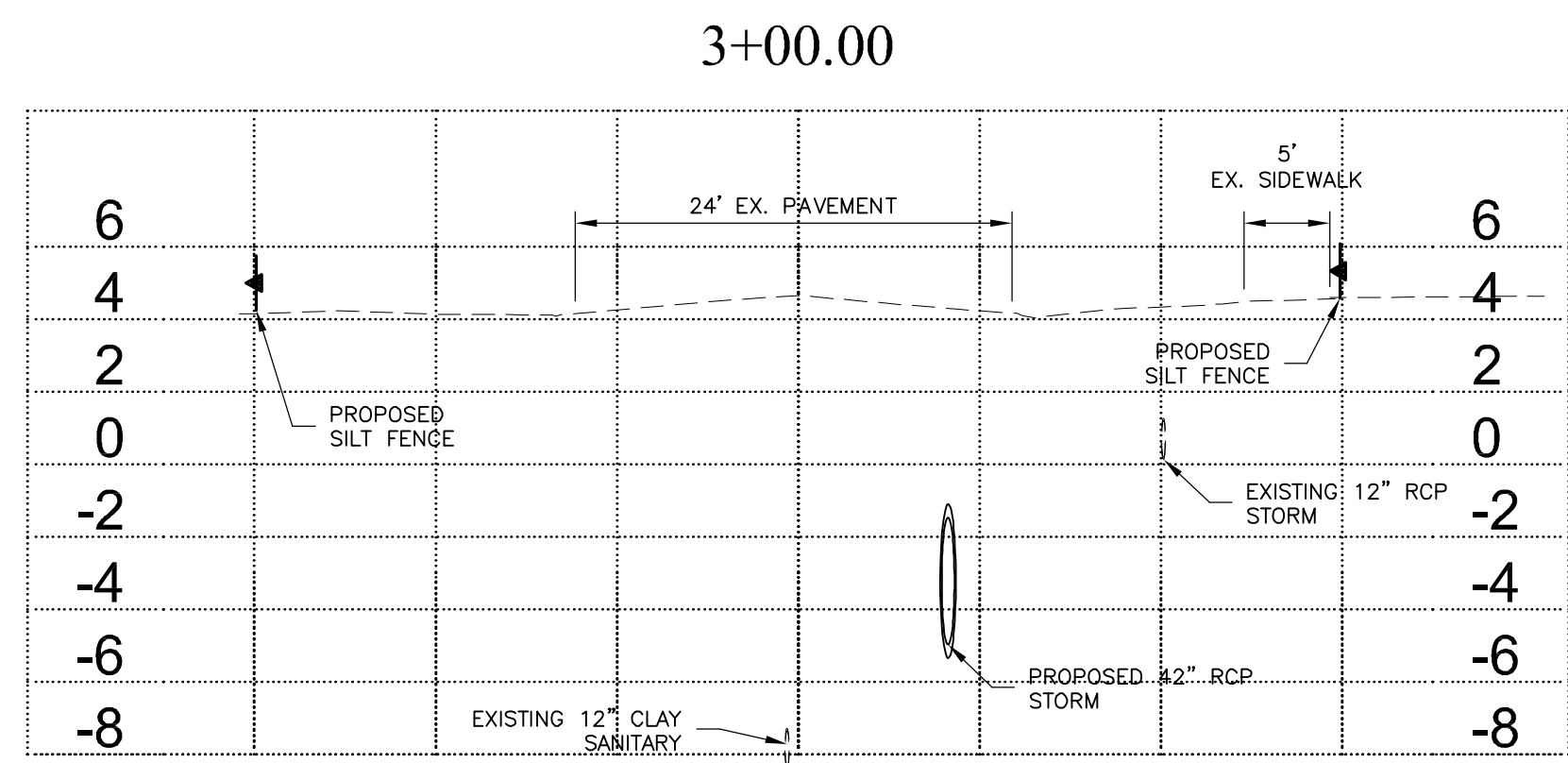
NO.	REVISIONS DESCRIPTION	DATE

DATE: JAN, 2012
PROJECT NO. 20098079-000
FILE NO. 3, 4, 9, 10-50-25
SCALE: As Shown

AREA 3 CROSS SECTIONS AND DETAILS

SHEET NUMBER

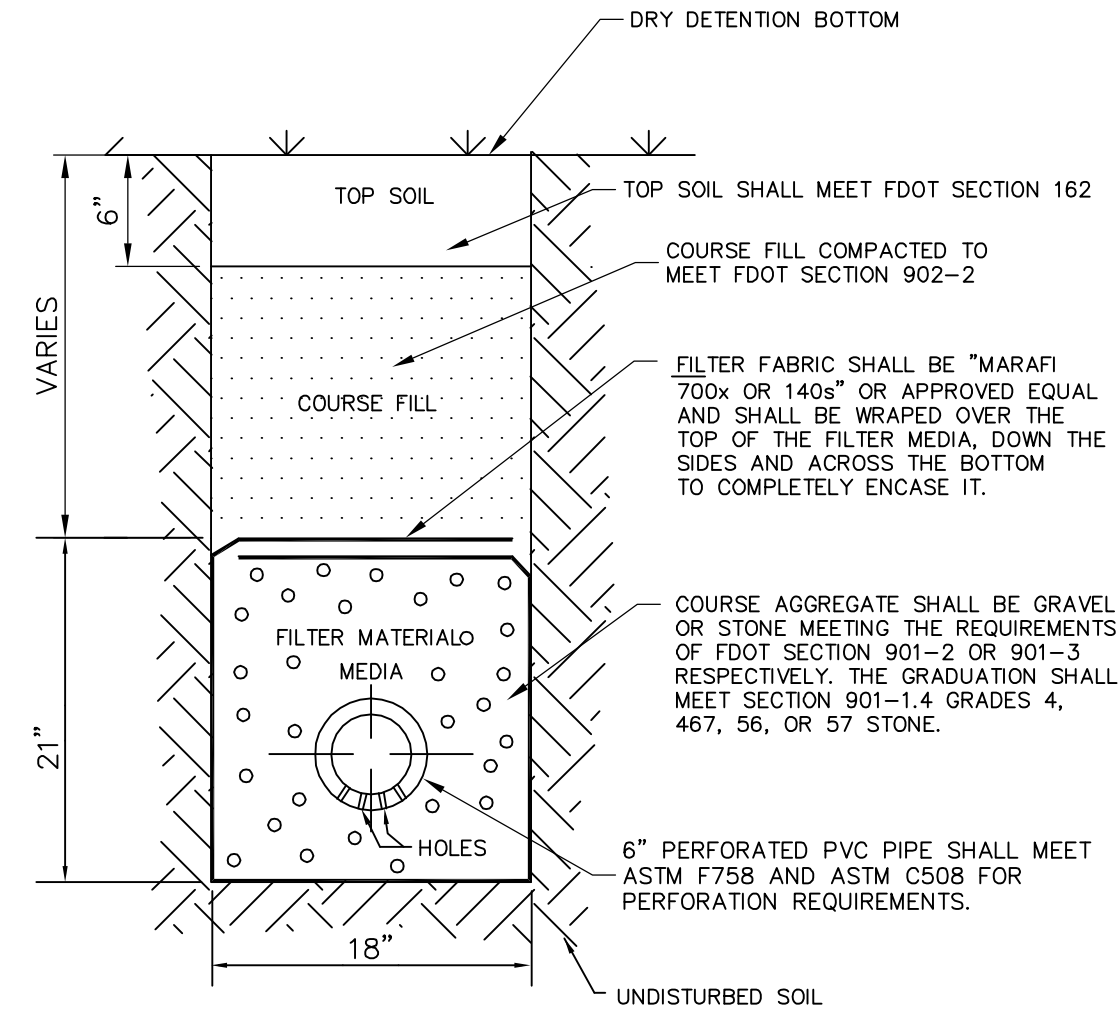
C27



* OUTSIDE OF PAVM/T AREAS REPLACE CONC. BASE W/ 4" OF COMPACTED L.R. CONC. BAND TO BE THE SAME DIMENSIONS AS ABOVE.
COST OF BASE, BOTH CONC. IN ROAD & LIME ROCK OUTSIDE OF ROADWAY TO BE INCLUDED IN THE BRICK PAVEMENT/CONCRETE CROSSWALK RESTORATION.

- LEGEND**
- MILLING AND RESURFACING:
MILLING: MILL EXISTING ASPHALT PAVEMENT (0.75" AVERAGE DEPTH)
RESURFACING: TYPE S-111 (SEE TYPICAL SECTIONS BELOW)
 - AREAS FOR PAVEMENT RESTORATION
 - PAVER BLOCK CROSSWALK RESTORATION

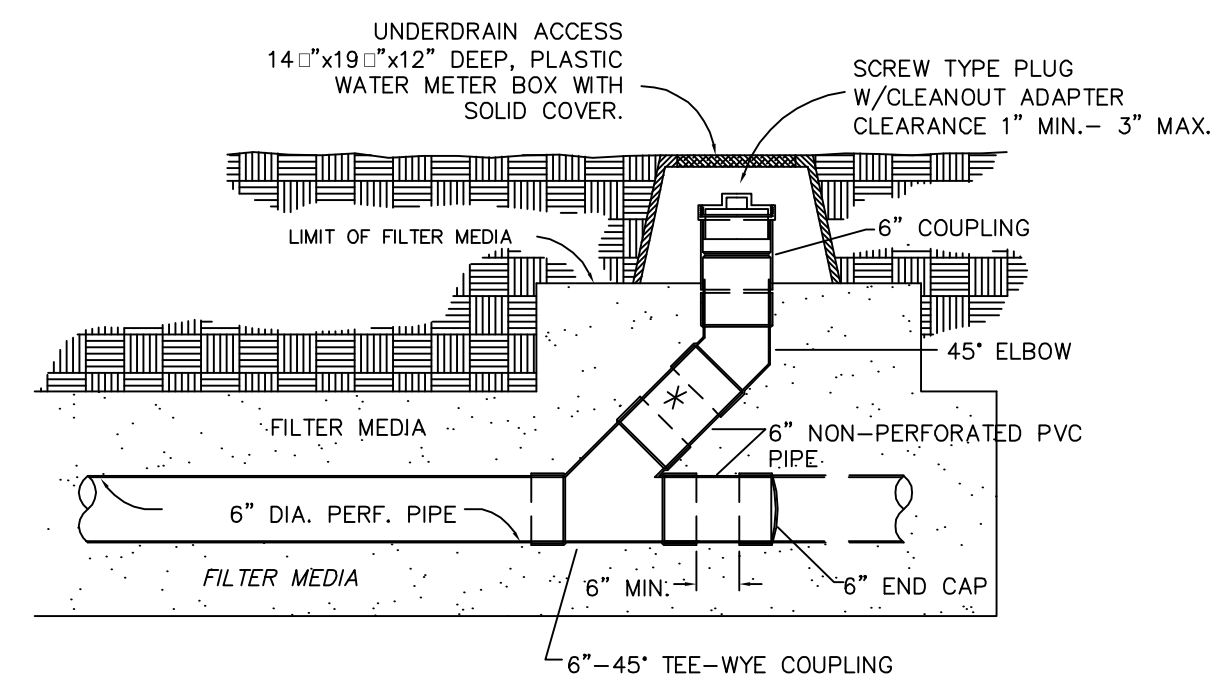
* STORM PIPES ARE NOT PROPOSED BETWEEN STA 22+00 AND 25+00. MILL AND RESURFACE ONLY.
THIS SECTION IS NOT APPLICABLE FOR PAVER BLOCK CROSSWALKS.



NOTE: MINIMUM PIPE SLOPE OF 0.30%

TYPICAL UNDERDRAIN TYPE I INSTALLATION

N.T.S.

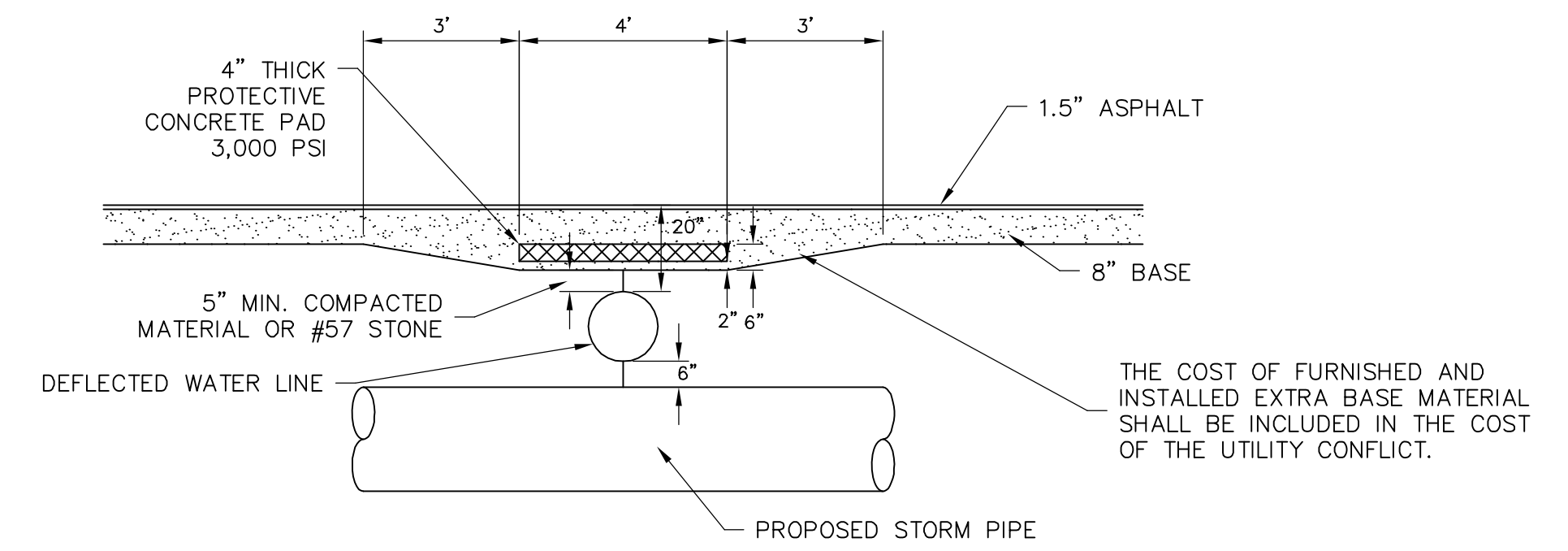


NOTES: ALL PIPE AND FITTINGS TO MEET ASTM F758-82 SPECIFICATIONS.
 300' MAXIMUM DISTANCE BETWEEN CLEANOUTS

*COUPLING PIPE LENGTH TO BE FIELD ADJUSTED.

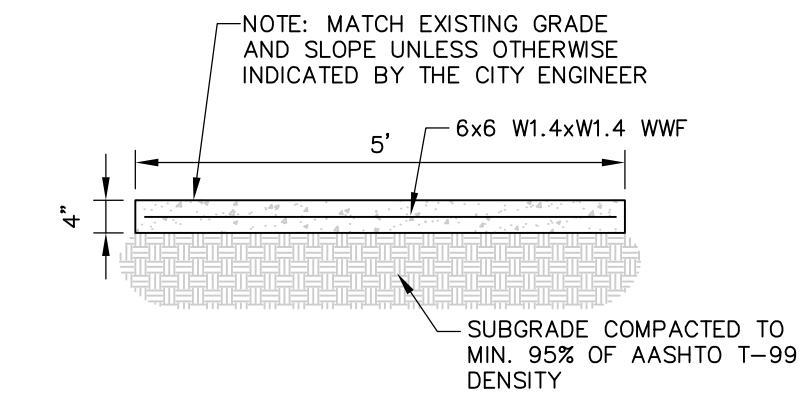
UNDERDRAIN CLEANOUT DETAIL

N.T.S.



PROTECTIVE CONCRETE PAD

SCALE: 1" = 3'



NOTE: CONCRETE TO BE 3,000 PSI WITH CONTRACTION JOINTS AT 5' INTERVALS.

SIDEWALK DETAIL

N.T.S.

NO.	DESCRIPTION	DATE

DATE: JAN, 2012
 PROJECT NO. 20098079-000
 FILE NO. 3, 4, 9, 10-50-25
 SCALE: As Shown

DRAINAGE DETAILS

SHEET NUMBER

C29

NO.	DESCRIPTION	DATE

DATE: FEBRUARY, 2010
PROJECT NO. 20098079-000
FILE NO. 3, 4, 9, 10-50-25
SCALE: As Shown

CITY OF NAPLES
UTILITY DETAILS

SHEET NUMBER

R01

DEEP LATERAL (OVER 6' DEEP)

STANDARD LATERAL (UNDER 6' DEEP)

NOTE: HOUSE SERVICE SEWER SHALL BE INSTALLED AT GRADE OF NOT LESS THAN 1/8" PER FOOT NOR MORE THAN 1 3/4" PER FOOT.

THIS DETAIL CONSTITUTES A PORTION OF A CONTRACT. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS BEFORE BEGINNING WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF NAPLES.

FOR: UTILITIES ENGINEERING DIVISION	CITY OF NAPLES
DATE: April 1998	SHEET: # 1
DRAWN: TWS	DIR: SEWER
SCALE: N.T.S.	DWG. LATERAL

Typical Multi-Service Sewer Connection

NOTE:

- ALL P.V.C. SANITARY GRAVITY SEWER PIPE SHALL BE ASTM D 3034 SDR 35
- 6" FITTINGS & PIPE FOR DOUBLE SERVICE

THIS DETAIL CONSTITUTES A PORTION OF A CONTRACT. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS BEFORE BEGINNING WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF NAPLES.

FOR: UTILITIES ENGINEERING DIVISION	CITY OF NAPLES
DATE: April 1998	SHEET: # 3
DRAWN: TWS	DIR: SEWER
SCALE: N.T.S.	DWG. SEWER1

Multi-Service Lateral/Cleanout

NOTE: ELECTRONIC MARKERS SHALL REMAIN IN POSITION AFTER THE BUILDING PLUMBER HAS COMPLETED THE SERVICE TIE IN.

NOTE: HOUSE SERVICE SEWER SHALL BE INSTALLED AT GRADE OF NOT LESS THAN 1/8" PER FOOT NOR MORE THAN 1 3/4" PER FOOT.

THIS DETAIL CONSTITUTES A PORTION OF A CONTRACT. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS BEFORE BEGINNING WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF NAPLES.

FOR: UTILITIES ENGINEERING DIVISION	CITY OF NAPLES
DATE: April 1998	SHEET: # 4
DRAWN: TWS	DIR: SEWER
SCALE: N.T.S.	DWG. SEWER2

Standard Pre-Cast Manhole

NOTE:

- INTERIOR AND EXTERIOR SURFACES SHALL BE DOUBLE COATED WITH AN ACCEPTABLE BITUMINOUS OR EPOXY SEALER.
- MANHOLE LID & FRAME MUST PASS STATIC WATER INFILTRATION TEST.
- THIS REQUIREMENT WILL BE APPLIED TO ALL MANHOLE MODIFICATIONS AND INSTALLATIONS.
- FLOW LINE CHANNELS SHALL BE CLAY BRICK HAVING A MIN. OF 2" POURED CONC. OR 2" GROUTED FINISH. 0.1" DROP ACROSS MANHOLE.

THIS DETAIL CONSTITUTES A PORTION OF A CONTRACT. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS BEFORE BEGINNING WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF NAPLES.

FOR: UTILITIES ENGINEERING DIVISION	CITY OF NAPLES
DATE: April 1998	SHEET: # 5
DRAWN: TWS	DIR: SEWER
SCALE: N.T.S.	DWG. PCASTMH

Shallow Manhole

NOTE: INTERIOR AND EXTERIOR SURFACES SHALL BE DOUBLE COATED WITH AN ACCEPTABLE BITUMINOUS OR EPOXY SEALER.

NOTE: FLOW LINE CHANNELS SHALL BE CLAY BRICK HAVING A MIN. OF 2" POURED CONC. OR 2" GROUTED FINISH. 0.1" DROP ACROSS MANHOLE.

THIS DETAIL CONSTITUTES A PORTION OF A CONTRACT. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS BEFORE BEGINNING WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF NAPLES.

FOR: UTILITIES ENGINEERING DIVISION	CITY OF NAPLES
DATE: April 1998	SHEET: # 6
DRAWN: TWS	DIR: SEWER
SCALE: N.T.S.	DWG. SHALOWMH

Manhole Cut-In

REPLACE EXISTING 8" VCP WITH A 20' JOINT OF 8" PVC PIPE CENTERED EQUI-DISTANCE EACH SIDE OF MANHOLE C/L.

PROVIDE 1/2 PIPE SECTION OF 8" PVC THROUGH MANHOLE.

STANDARD PRE-CAST MANHOLE BASE.

EXISTING VCP.

GROUT AS REQUIRED.

THIS DETAIL CONSTITUTES A PORTION OF A CONTRACT. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS BEFORE BEGINNING WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF NAPLES.

FOR: UTILITIES ENGINEERING DIVISION	CITY OF NAPLES
DATE: April 1998	SHEET: # 7
DRAWN: TWS	DIR: SEWER
SCALE: N.T.S.	DWG. MH-CUTIN

Drop Manhole

8" MIN. LINE SIZE

4" MIN.

CONC. DAM.

1/4" PIPE DIA.

8" MIN. LINE SIZE

CONC. ENCASUREMENT

INVERT CHANGE 2'-0" OR MORE.

12" CRUSHED ROCK BASE

6"

8"

THIS DETAIL CONSTITUTES A PORTION OF A CONTRACT. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS BEFORE BEGINNING WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF NAPLES.

FOR: UTILITIES ENGINEERING DIVISION	CITY OF NAPLES
DATE: April 1998	SHEET: # 8
DRAWN: TWS	DIR: SEWER
SCALE: N.T.S.	DWG. DROP-MH

Standard Manhole Cover Detail

NOTES: U.S.F. TYPE 420 KD ASTM-A48 CLASS 30 GREY CAST IRON TOP OF COVER TO BE FLUSH IN PAVED AREAS, 2 1/2" ABOVE UNFINISHED GRADE.

FINISH FRAME AND COVER WITH ONE COAT ASPHALT PAINT.

2 NON-PENETRATING PICK HOLES

2" 22 3/4"

MACHINED SURFACES

"O" RING SEAL IN A DOVE-TAIL GROOVE

2" 20 5/8"

24 1/2"

36"

7"

THIS DETAIL CONSTITUTES A PORTION OF A CONTRACT. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS BEFORE BEGINNING WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY OF NAPLES.

FOR: UTILITIES ENGINEERING DIVISION	CITY OF NAPLES
DATE: April 1998	SHEET: # 9
DRAWN: TWS	DIR: SEWER
SCALE: N.T.S.	DWG. MHCOVER

THIS DRAWING CONTAINS DETAILS DESIGNED BY, STANDARD TO, AND FURNISHED BY CITY OF NAPLES UTILITIES ENGINEERING DIVISION SAID DETAILS WERE NOT DESIGNED BY JOHNSON ENGINEERING.

NO.	DESCRIPTION	DATE

DATE: FEBRUARY, 2010
PROJECT NO. 20098079-000
FILE NO. 3, 4, 9, 10-50-25
SCALE: As Shown

CITY OF NAPLES
UTILITY DETAILS

SHEET NUMBER

R02

NOTES:

- BEDDING & HAUNCHING MATERIAL SHALL NOT CONTAIN ORGANICS OR ROCKS OVER ONE INCH

FOR: UTILITIES ENGINEERING DIVISION	CITY OF NAPLES
DATE: April 1998	SHEET: # 8
DRAWN: TWS	DIR: UTILSTDS
SCALE: N.T.S.	DWG. TRENCH

NOTES:

- ALL PROCTOR AND DENSITY TESTS SHALL BE TAKEN BY A CERTIFIED LABORATORY
- ALL TESTS SHALL BE COMPLETED AND MEET MINIMUM DENSITY REQUIREMENTS PRIOR TO ADDITIONAL BACK-FILLING
- ORDINANCE 82-91 REQUIRES A R.O.W. PERMIT FOR ALL WORK WITHIN PUBLIC ROADS. THE R.O.W. PERMIT REQUIREMENTS SHALL SUPERSEDE THIS DETAIL.

FOR: UTILITIES ENGINEERING DIVISION	CITY OF NAPLES
DATE: April 1998	SHEET: # 2
DRAWN: TWS	DIR: UTILSTDS
SCALE: N.T.S.	DWG. PAVDFILL

NOTES:

- ALL PROCTOR AND DENSITY TESTS SHALL BE TAKEN BY A CERTIFIED LABORATORY
- ALL TESTS SHALL BE COMPLETED AND MEET MINIMUM DENSITY REQUIREMENTS PRIOR TO ADDITIONAL BACK-FILLING
- ALL BACKFILL MATERIAL REQUIRES APPROVAL BY PROJECT ENGINEER

FOR: UTILITIES ENGINEERING DIVISION	CITY OF NAPLES
DATE: April 1998	SHEET: # 1
DRAWN: TWS	DIR: UTILSTDS
SCALE: N.T.S.	DWG. BACKFILL

THIS DETAIL CONSTITUTE A GENERALIZATION. ENGINE REQUIREMENTS SHALL PREVAIL OVER THIS DETAIL.

FOR: UTILITIES ENGINEERING DIVISION	CITY OF NAPLES
DATE: April 1998	SHEET: # 10
DRAWN: TWS	DIR: SEWER
SCALE: N.T.S.	DWG. MENTRSEC

PIPE SIZE	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND
8"	74	31	15	7
10"	87	36	17	9
12"	100	41	20	10
16"	123	51	24	12
20"	143	59	29	14
24"	162	67	32	16
30"	184	76	37	18
36"	207	86	41	20

NOTES:

- ON BENDS AND TEES, EXTEND THRUST BLOCKS FULL LENGTH
- PLACE BEARDS IN FRONT OF ALL PLUGS BEFORE POURING THRUST BLOCKS
- FOUR THRUST BLOCKS AGAINST UNDISTURBED SOIL WHERE TRENCH WALL HAS BEEN DISTURBED. EXCAVATE LOOSE SOIL AND EXTEND THRUST BLOCKS TO UNDISTURBED SOIL.
- IN BACK FILLING, ANY ROCK ENCOUNTERED SHALL BE REMOVED AND REPLACED WITH ACCEPTABLE MATERIAL.
- BACK FILL MATERIAL SHALL NOT INCLUDE ROCK OR BOLLERS.
- THRUST BLOCK AREAS BASED ON SOIL BEARING LOAD OF 2000 P.S.F. AND LINE PRESSURE OF 150 P.S.F. 1'-1"
- ALL CONCRETE SHALL BE MINIMUM 3000 PSI

FOR: UTILITIES ENGINEERING DIVISION	CITY OF NAPLES
DATE: April 1998	SHEET: # 9
DRAWN: TWS	DIR: UTILSTDS
SCALE: N.T.S.	DWG. DEFLECT

PIPE SIZE	TEES	90° BEND	45° BEND	22 1/2° BEND	VALVES & PLUGS
4"	1	1	1	1	1
6"	3	4	2	1	3
8"	5	7	4	2	5
10"	8	12	6	3	9
12"	12	16	9	5	12
16"	16	20	12	7	16
20"	24	28	17	10	24
24"	34	34	24	13	34

NOTES:

- ON BENDS AND TEES, EXTEND THRUST BLOCKS FULL LENGTH
- PLACE BEARDS IN FRONT OF ALL PLUGS BEFORE POURING THRUST BLOCKS
- FOUR THRUST BLOCKS AGAINST UNDISTURBED SOIL WHERE TRENCH WALL HAS BEEN DISTURBED. EXCAVATE LOOSE SOIL AND EXTEND THRUST BLOCKS TO UNDISTURBED SOIL.
- IN BACK FILLING, ANY ROCK ENCOUNTERED SHALL BE REMOVED AND REPLACED WITH ACCEPTABLE MATERIAL.
- BACK FILL MATERIAL SHALL NOT INCLUDE ROCK OR BOLLERS.
- THRUST BLOCK AREAS BASED ON SOIL BEARING LOAD OF 2000 P.S.F. AND LINE PRESSURE OF 150 P.S.F. 1'-1"
- ALL CONCRETE SHALL BE MINIMUM 3000 PSI

FOR: UTILITIES ENGINEERING DIVISION	CITY OF NAPLES
DATE: April 1998	SHEET: # 6
DRAWN: TWS	DIR: UTILSTDS
SCALE: N.T.S.	DWG. THRSLBK2

MINIMUM BEARING AREAS IN SQUARE FEET FOR THRUST BLOCKS

PIPE SIZE	TEES	90° BEND	45° BEND	22 1/2° BEND	VALVES & PLUGS
4"	1	1	1	1	1
6"	3	4	2	1	3
8"	5	7	4	2	5
10"	8	12	6	3	9
12"	12	16	9	5	12
16"	16	20	12	7	16
20"	24	28	17	10	24
24"	34	34	24	13	34

NOTES:

- ON BENDS AND TEES, EXTEND THRUST BLOCKS FULL LENGTH
- PLACE BEARDS IN FRONT OF ALL PLUGS BEFORE POURING THRUST BLOCKS
- FOUR THRUST BLOCKS AGAINST UNDISTURBED SOIL WHERE TRENCH WALL HAS BEEN DISTURBED. EXCAVATE LOOSE SOIL AND EXTEND THRUST BLOCKS TO UNDISTURBED SOIL.
- IN BACK FILLING, ANY ROCK ENCOUNTERED SHALL BE REMOVED AND REPLACED WITH ACCEPTABLE MATERIAL.
- BACK FILL MATERIAL SHALL NOT INCLUDE ROCK OR BOLLERS.
- THRUST BLOCK AREAS BASED ON SOIL BEARING LOAD OF 2000 P.S.F. AND LINE PRESSURE OF 150 P.S.F. 1'-1"
- ALL CONCRETE SHALL BE MINIMUM 3000 PSI

FOR: UTILITIES ENGINEERING DIVISION	CITY OF NAPLES
DATE: April 1998	SHEET: # 5
DRAWN: TWS	DIR: UTILSTDS
SCALE: N.T.S.	DWG. THRSLBK1

LEGEND

- PLAIN OR REINFORCED CONCRETE (3000 psi minimum)
- CAREFULLY TAMPED BACKFILL (95% Proctor; 70% Relative Density)
- COMPACTED GRANULAR MATERIAL (85-95% Proctor; 40-70% Rel. Density)
- FINE GRANULAR MATERIAL (<85% Proctor; <40% Relative Density)
- LIGHTLY CONSOLIDATED BACKFILL

THIS DETAIL CONSTITUTE A GENERALIZATION. ENGINE REQUIREMENTS SHALL PREVAIL OVER THIS DETAIL.

FOR: UTILITIES ENGINEERING DIVISION	CITY OF NAPLES
DATE: April 1998	SHEET: # 4
DRAWN: TWS	DIR: UTILSTDS
SCALE: N.T.S.	DWG. BEDDING

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NO.	REVISIONS DESCRIPTION	DATE

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 SCALE: As Shown

CITY OF NAPLES
 UTILITY DETAILS
 SHEET NUMBER
R03

60' ROAD R.O.W.

FOR: UTILITIES ENGINEERING DIVISION
DATE: April 1998
DRAWN: TWS
SCALE: N.T.S.

CITY OF NAPLES
2-Lane Local Street
60' Roadway
SHEET: # 16
DIR: UTILSTDS
DWG. STREET60

SOD DROP INLET PROTECTION

AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PERMANENTLY STABILIZED, THE TEMPORARY EROSION CONTROL MEASURES WILL BE REMOVED AND PERMANENT SOD LAID AROUND THE DROP INLET.

FOR: UTILITIES ENGINEERING DIVISION
DATE: April 1998
DRAWN: TWS
SCALE: N.T.S.

CITY OF NAPLES
Sedimentation Control
SHEET: # 14
DIR: UTILSTDS
DWG. DRANAGE2

TEMPORARY SEDIMENT TRAP

FOR: UTILITIES ENGINEERING DIVISION
DATE: April 1998
DRAWN: TWS
SCALE: N.T.S.

CITY OF NAPLES
Sedimentation Control
SHEET: # 13
DIR: UTILSTDS
DWG. DRANAGE1

120' ROAD R.O.W.

FOR: UTILITIES ENGINEERING DIVISION
DATE: April 1998
DRAWN: TWS
SCALE: N.T.S.

CITY OF NAPLES
4-Lane Major Collector
120' Divided Highway
SHEET: # 20
DIR: UTILSTDS
DWG. STRET120

100' ROAD R.O.W.

FOR: UTILITIES ENGINEERING DIVISION
DATE: April 1998
DRAWN: TWS
SCALE: N.T.S.

CITY OF NAPLES
2-Lane Minor Collector
100' Divided Highway
SHEET: # 19
DIR: UTILSTDS
DWG. 2STRT100

100' ROAD R.O.W.

FOR: UTILITIES ENGINEERING DIVISION
DATE: April 1998
DRAWN: TWS
SCALE: N.T.S.

CITY OF NAPLES
4-Lane Major Collector
100' Roadway
SHEET: # 18
DIR: UTILSTDS
DWG. 1STRT100

PIPE RESTRAINT SCHEDULE

PIPE SIZE IN INCHES	RESTRAINED PIPE LENGTH IN FEET (1)			
	90°	45°	22-1/2°	11-1/4°
4	23	9	5	2
6	32	13	6	3
8	41	17	7	4
10	50	21	8	5
12	59	25	9	6
14	67	29	10	7
16	75	33	11	8
18	83	37	12	9
20	90	41	13	10
24	105	49	15	12
30	125	59	18	15
36	145	71	21	18

PIPE SIZE IN INCHES	RESTRAINED PIPE LENGTH IN FEET (1)	
	TEE (3)	REDUCER (4)
6 x 4	0	40
6 x 6	34	72
8 x 4	0	72
8 x 6	55	74
10 x 6	3	74
12 x 4	0	122
12 x 6	31	75
12 x 12	95	
18 x 6	0	153
18 x 8	44	107
18 x 12	134	
18 x 8	0	157
18 x 12	88	108
18 x 18	152	
20 x 10	20	161
20 x 16	120	77
20 x 20	170	
24 x 12	37	187
24 x 18	132	109
24 x 24	204	
30 x 16	78	213
30 x 20	138	185
30 x 30	252	
36 x 18	94	259
36 x 24	170	191
36 x 36	298	

NOTES:

- RESTRAIN ALL PIPE JOINTS WITHIN THE DISTANCE SHOWN ON THE TABLES MEASURED FROM THE POINT OF CONNECTION.
- ISOLATION VALVES SHALL BE TREATED AS DEAD ENDS WITH RESTRAINT ON BOTH SIDES OF THE VALVE.
- RESTRAINT IS FOR BRANCH OF TEE. IF BRANCH SIZE IS NOT ON TABLE, USE NEXT LARGEST BRANCH.
- RESTRAINT IS FOR LARGE DIAMETER SIDE OF REDUCER. IF REDUCER SIZE IS NOT ON TABLE, USE NEXT SMALLER REDUCER (SMALL END).
- THIS SCHEDULE IS TO BE USED FOR DUCTILE IRON AND PVC PIPE.

FOR: UTILITIES ENGINEERING DIVISION
DATE: April 1998
DRAWN: TWS
SCALE: N.T.S.

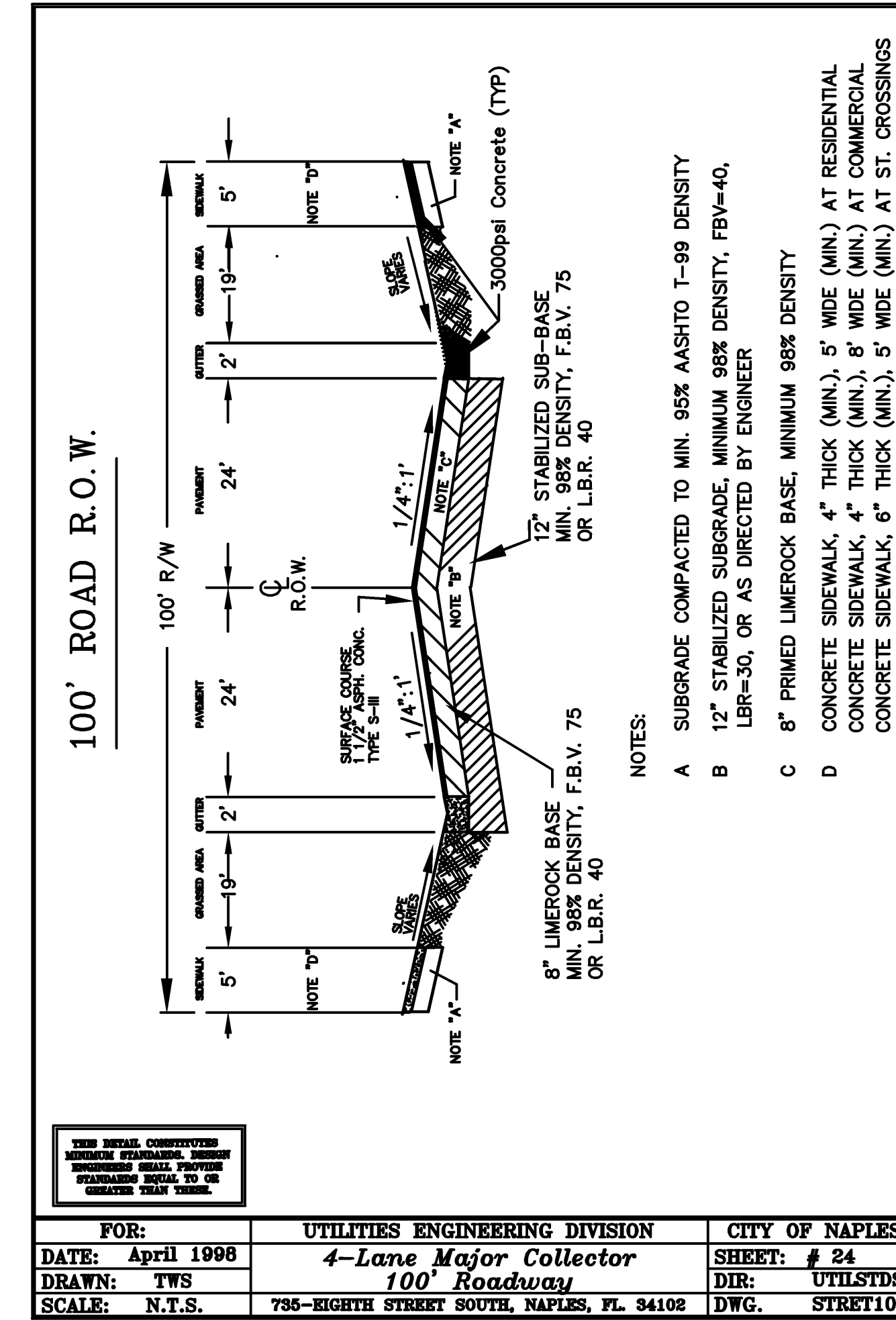
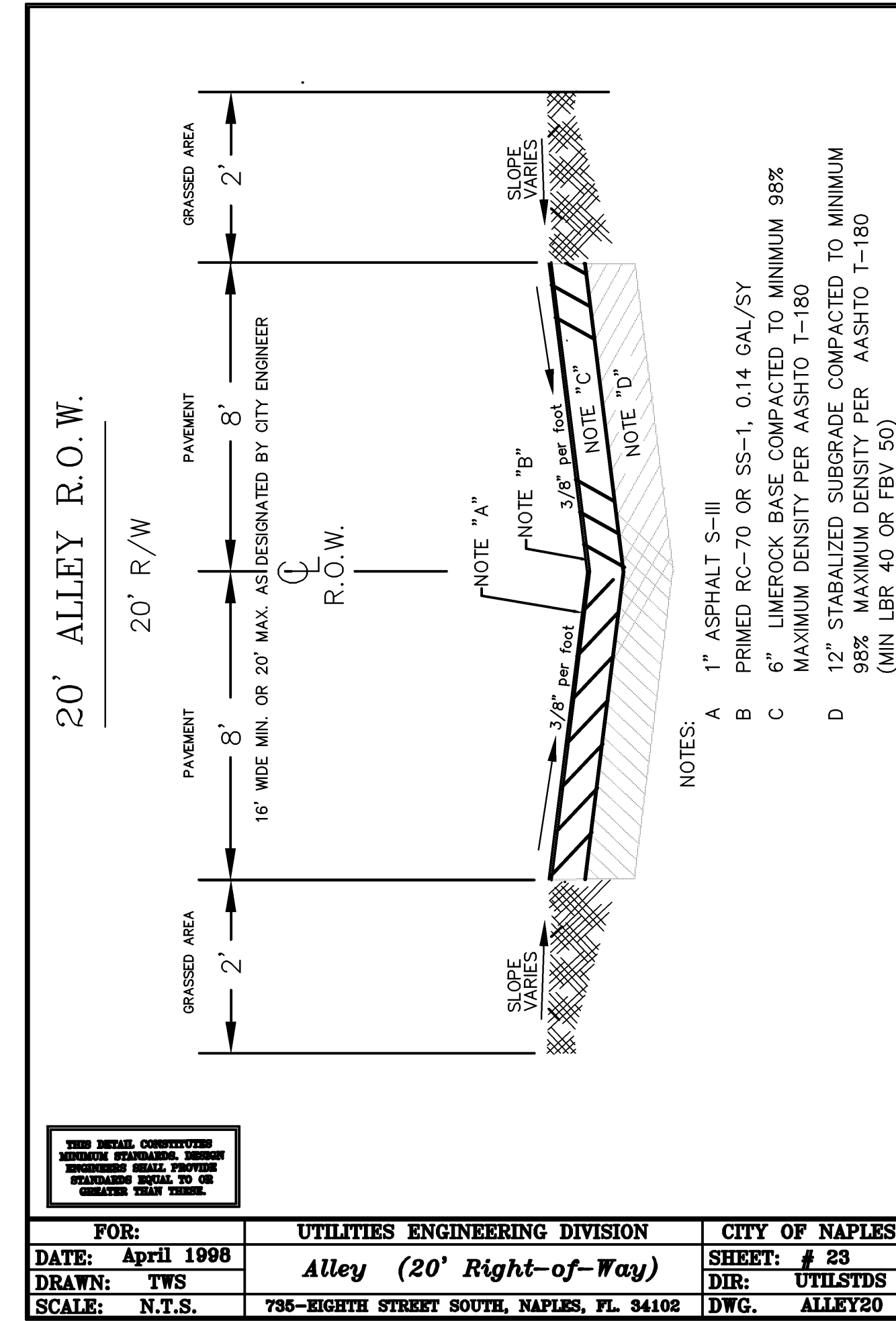
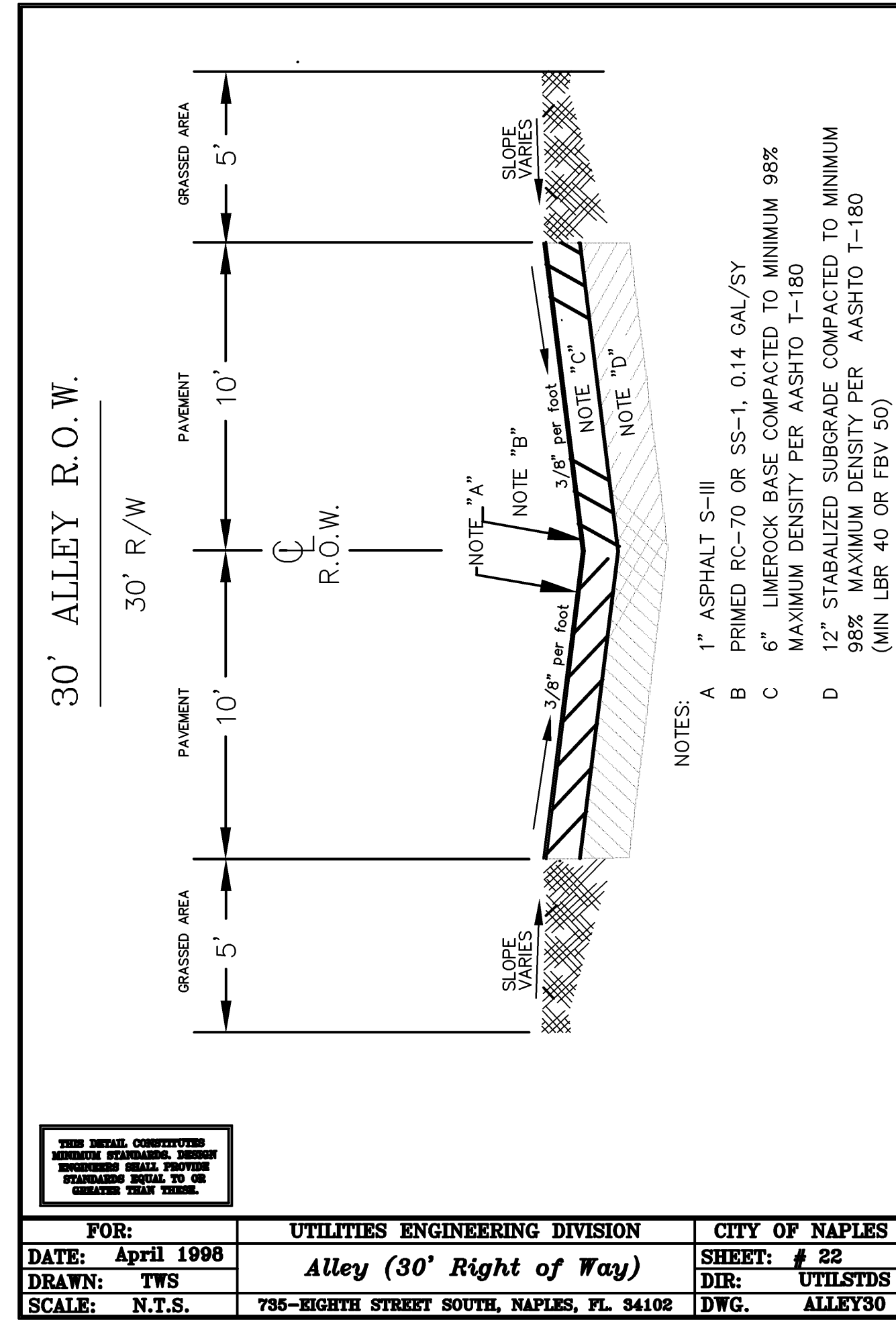
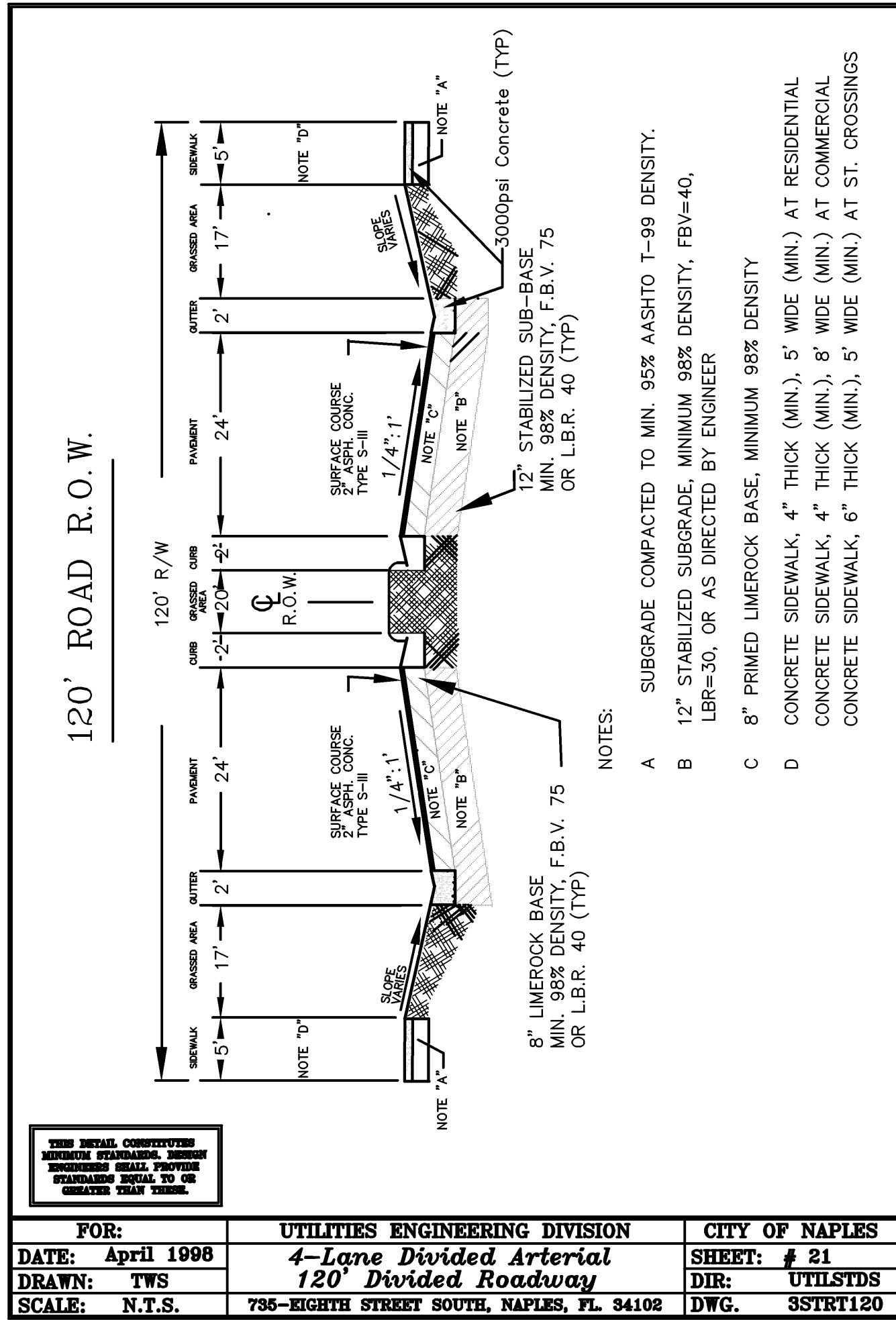
CITY OF NAPLES
2-Lane Minor Collector
80' Roadway
SHEET: # 17
DIR: UTILSTDS
DWG. STREET80

80' ROAD R.O.W.

FOR: UTILITIES ENGINEERING DIVISION
DATE: April 1998
DRAWN: TWS
SCALE: N.T.S.

CITY OF NAPLES
2-Lane Minor Collector
80' Roadway
SHEET: # 17
DIR: UTILSTDS
DWG. STREET80

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JOHNSON ENGINEERING

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CITY OF NAPLES

**BASIN III PHASE 2
 STORMWATER IMPROVEMENTS
 NAPLES, FLORIDA**

NO.	REVISIONS DESCRIPTION	DATE

DATE: FEBRUARY, 2010
 PROJECT NO. 20098079-000
 FILE NO. 3, 4, 9, 10-50-25
 SCALE: As Shown

CITY OF NAPLES
 UTILITY DETAILS

SHEET NUMBER
R04

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PROTECTION AROUND INLETS OR SIMILAR STRUCTURES

SYNTHETIC BALES OR BALE TYPE BARRIERS FOR PAVED DITCHES

SYNTHETIC BALES OR BALE TYPE BARRIERS FOR UNPAVED DITCHES

NOTES FOR SYNTHETIC BALES OR BALE TYPE BARRIERS

- Type I and II Synthetic Barrier should be spaced in accordance with Chart 1, Sheet 1.
- Bales shall be anchored with 2" x 4" wood stakes. Stakes of other materials shall provide equivalent strength may be used if approved by the Engineer. Stakes other than wood shall be removed upon completion of the project.
- Rolls and posts shall be 2" x 4" wood. Other materials providing equivalent strength may be used if approved by the Engineer.
- Adjacent bales shall be butted firmly together.
- Where used in conjunction with silt fences, bales shall be placed on the upstream side of the fence.
- Bales to be paid for under the contract unit price for Synthetic Bales, LF. The unit price shall include the cost of filter fabric for Type I and II barriers. Sandbags shall be paid for under the unit price for Sandbagging, CY. Rock bags to be paid for under the contract unit price for Rock Bags, EA.

TEMPORARY EROSION AND SEDIMENT CONTROL

2010 FDOT Design Standards
 Last Revision: 07/01/09
 Sheet No: 2 of 3
 Index No: 102

TYPE III SILT FENCE

TYPE IV SILT FENCE

SILT FENCE APPLICATIONS

NOTES FOR SILT FENCES

- Type III Silt Fence to be used at most locations. Where used in ditches, the spacing for Type III Silt Fence shall be in accordance with Chart 1, Sheet 1.
- Type IV Silt Fence to be used where large sediment loads are anticipated. Suggested use is where the slope is 1:2 or steeper and length of slope exceeds 25 feet. Avoid use where the obtained water may back into travel lanes or off the right of way.
- Do not construct silt fences across permanent flowing watercourses. Silt fences are to be at upland locations and turbidity barriers used at permanent bodies of water.
- Where used as slope protection, Silt Fence is to be constructed on 0% longitudinal grade to avoid channeling runoff along the length of the fence.
- Silt Fence to be paid for under the contract unit price for Staked Silt Fence, (LF).

TEMPORARY EROSION AND SEDIMENT CONTROL

2010 FDOT Design Standards
 Last Revision: 07/01/09
 Sheet No: 3 of 3
 Index No: 102

TOP SLAB REINFORCING STEEL DIAGRAM (ALTERNATE A)

TOP SLAB REINFORCING STEEL DIAGRAM (ALTERNATE B)

SECTION C-C SPECIAL TDP SLAB*

SECTION A-A (ALTERNATE A)

SECTION B-B (ALTERNATE B)

TYPICAL SLAB TO WALL DETAILS FOR PRECAST STRUCTURES

STRUCTURES BOTTOMS TYPE J AND P

2010 FDOT Design Standards
 Last Revision: 07/01/09
 Sheet No: 1 of 5
 Index No: 200

ROUND STRUCTURE BOTTOMS (ALTERNATE A) & ROUND RISERS-TABLE 1

Structure Type	Cast-In-Place Items Class II Concrete			Precast Items	
	Riser Diameter (feet)	Bottom Diameter (feet)	Bottom Thickness (inches)	ASTM C478 (inches)	ASTM C478 (inches)
P	3'-6"	6	0.20	6	0.105
J	4'-0"	6	0.20	6	0.120
J	5'-0"	6	0.20	6	0.150
J	6'-0"	6	0.20	6	0.180
J	7'-0"	6	0.20	6	0.210
J	8'-0"	6	0.20	6	0.240
J	10'-0"	10	0.40	10	0.350
J	12'-0"	10	0.40	10	0.380

GENERAL NOTES

- Standard structure bottoms 4'-0" diameter and smaller (Alt. A) and 3'-6" square (Alt. B) are designated Type P. Larger standard structure bottoms are designated Type J. Risers are permitted for all structures. Round risers are designated Type A square risers are designated Type B.
- Walls of circular structures (Alt. A) constructed in place may be of brick or reinforced concrete. Precast and rectangular structures (Alt. B) shall be constructed of reinforced concrete only.
- Wall thickness and reinforcement are for either reinforced cast-in-place or precast concrete units except that precast circular units may be furnished with walls in accordance with ASTM C478 (see modified wall thicknesses in Table 1).
- Top and bottom slab thickness and reinforcement are for precast and cast-in-place construction. All concrete shall be of Class II concrete, except use Class I concrete when shown in the Plans, for special applications of structures located in extremely aggressive environments. Concrete as specified in ASTM C478 (14000 psi) may be used in lieu of Class II concrete for precast items manufactured in accordance with Specifications Section 449.
- Reinforcement shown is ASTM A615/A615M Grade 60 steel, deformed bar. Equivalent area Grade 40 steel or equivalent area ASTM A185 (smooth) or ASTM A197 (deformed) welded wire fabric may be substituted according to Index No. 201, unless otherwise noted.
- Alt. A or Alt. B structure bottoms may be used in conjunction with curb inlet tops (Types 1, 2, 3, 4, 5, 6, 9, and 10), and any manhole or junction box unless otherwise shown in the plans or other standard drawings. Silt structure bottoms may be used in conjunction with curb inlet Types 7, 8, 5, or any ditch bottom inlet unless otherwise shown in the plans or other standard drawings.
- Rectangular structures may be rotated as directed by the Engineer in order to facilitate connections between the structure walls and storm sewer pipes.
- Except when ACI hooks are specifically required, reinforcement in top and bottom slab shall be straight embedment.
- Reinforcement shall have 2" minimum cover except for 3'-6" diameter precast circular units manufactured under ASTM C478, keys construction joints, and pipe openings must have 1 1/2" minimum cover, unless otherwise shown. Additional bars used to restrain hole formers for precast structures with grouted pipe connections, may be left flush with the face surface. Cut or bent reinforcement at pipe openings to maintain cover. Exposed ends of reinforcing at precast pipe openings and grouted joints must be removed to 1" below the concrete surface and sealed with a Type F epoxy in accordance with Specification Section 926. Horizontal steel in rectangular structures shall be spaced a minimum of 30 bar diameters or by standard hooks at corners.
- The corner fillets shown are necessary for rectangular structures used with circular risers and inlet throats and when used on skew with rectangular risers, seats and inlet throats. Fillets will be required in the top slab of the Alt. A structure bottoms when used with the Alt. B risers. Each fillet shall be reinforced with two #5 bars.
- Inset walls, throats, risers or manhole tops shall be assured to structures as shown on Index No. 201 (Sheet 3 of 5) Optional Construction Joints.
- Structures with depths over 14' below the mean high water table are to be checked for flotation by the designer at the drainage project.
- Units larger than specified standards may be substituted at the contractor's option when these units will not cause or increase the severity of utility conflicts. Such larger units shall be furnished at no additional cost to the Department. Larger Alt. A units cannot replace Alt. B units without approval of the Engineer. This note applies to this Index only.
- For manhole and junction box tops, for frames and covers, and for supplementary details see Index No. 201.
- Type J structure bottoms must have a minimum 6'-0" wall height when possible, for maintenance access.

SQUARE & RECTANGULAR STRUCTURES (ALTERNATE B) - TABLE 2

Type	Wall Thickness (t _w)		Wall Thickness (t _s)	
	Length (feet)	Depth (feet)	DL (in.)	Precast (in.)
P	3'-6"	4.0	6	6
J	4'-0"	4.0	8	6
J	5'-0"	2.5	—	6
J	6'-0"	1.5	—	6
J	5'-0" to 9'-0"	4.0	8	8
J	10'-0"	2.6	8	8
J	210'-0"	4.0	10	10

TEMPORARY EROSION AND SEDIMENT CONTROL

2010 FDOT Design Standards
 Last Revision: 07/01/09
 Sheet No: 2 of 5
 Index No: 200

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CITY OF NAPLES

BASIN III PHASE 2

STORMWATER IMPROVEMENTS

NAPLES, FLORIDA

DATE: _____

REVISIONS

NO.	DESCRIPTION	DATE

DATE: FEBRUARY, 2010
 PROJECT NO. 20098079-000
 FILE NO. 3, 4, 9, 10-50-25
 SCALE: As Shown

FDOT DETAILS

SHEET NUMBER
R05

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NO.	REVISIONS	DESCRIPTION	DATE

TABLE 3 - MINIMUM STRUCTURE SIZES FOR SINGLE PIPE CONNECTION PER SIDE

PIPE SIZE	RECTANGULAR	ROUND
18"	3'-0" x 3'-0"	3'-0" dia
24"	3'-6" x 3'-6"	3'-6" dia
30"	4'-0" x 4'-0"	4'-0" dia
36"	4'-6" x 4'-6"	4'-6" dia
42"	5'-0" x 5'-0"	5'-0" dia
48"	5'-6" x 5'-6"	5'-6" dia
54"	6'-0" x 6'-0"	6'-0" dia
60"	6'-6" x 6'-6"	6'-6" dia
66"	7'-0" x 7'-0"	7'-0" dia
72"	7'-6" x 7'-6"	7'-6" dia
78"	8'-0" x 8'-0"	8'-0" dia
84"	8'-6" x 8'-6"	8'-6" dia

TABLE 3 NOTES:

- For Round Structures walls with variable angles between pipes and variable pipe sizes, refer to the FDOT Storm Drain Handbook.
- For 3'-6" Precast Square Structure Bottoms, 30" Pipes with similar invert elevations are not permitted in adjacent walls. Use 4'-0" Side Dimensions when 30" pipe openings are required on adjacent walls and the difference in flow lines is less than 3'-0".
- For 4'-0" Precast Square Structure Bottoms, 36" Pipes with similar invert elevations are not permitted in adjacent walls. Use 5'-0" Side Dimensions when 36" pipe openings are required on adjacent walls and the difference in flow lines is less than 3'-0".
- For 7'-0" Precast Square Structure Bottoms, 66" Pipes with similar invert elevations are not permitted in adjacent walls. Use 8'-0" Side Dimensions when 66" pipe openings are required on adjacent walls and the difference in flow lines is less than 4'-0".

TABLE 4 - MINIMUM SIZES FOR MULTIPLE PARALLEL PIPE CONNECTIONS FOR RECTANGULAR STRUCTURE BOTTOMS

PIPE SIZE	PIPE SPACING	MINIMUM WALL LENGTH (L) FOR NUMBER OF PARALLEL PIPES
18"	2'-10"	6'-0"
24"	3'-5"	8'-0"
30"	4'-0"	10'-0"
36"	4'-5"	12'-0"
42"	5'-0"	14'-0"
48"	5'-5"	16'-0"
54"	6'-0"	18'-0"
60"	6'-5"	20'-0"
66"	7'-0"	22'-0"
72"	7'-5"	24'-0"
78"	8'-0"	26'-0"
84"	8'-5"	28'-0"

TABLE 4 NOTES:

- Minimum wall lengths based on precast structures, using concrete pipe with maximum skew angles per Table 5.
- Wall lengths exceeding 20'-0" require special designs.

TABLE 5 - MAXIMUM PIPE SKEW FOR PRECAST ROUND OPENINGS

WALL THICKNESS	18"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"
MAXIMUM SKEW ANGLE	6	8	10	12	14	16	18	20	22	24	26	28

TABLE 5 NOTES: These values are based on 2" clearance for precast structures. Larger skew angles are possible for Cast-In-Place Structures or all-steel pipe openings when approved by the Engineer.

TABLE 6 - SLAB DESIGNS - SQUARE AND RECTANGULAR STRUCTURES (TABLE 6)
(ALL SLABS 8" THICK EXCEPT AS NOTED - REINFORCING PARALLEL TO SHORT WAY AND LONG WAY)

TABLE 7 - SLAB DESIGNS - ROUND STRUCTURES (TABLE 7)

TABLE 8 - WALL DESIGNS - RECTANGULAR STRUCTURES (TABLE 8)

TABLE 9 - REINFORCING SCHEDULE

TABLE 10 - WEIGHT OF CASTINGS

STRUCTURE BOTTOMS TYPE J AND P

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TABLE 6 - SLAB DESIGNS - SQUARE AND RECTANGULAR STRUCTURES (TABLE 6)
(ALL SLABS 8" THICK EXCEPT AS NOTED - REINFORCING PARALLEL TO SHORT WAY AND LONG WAY)

TABLE 7 - SLAB DESIGNS - ROUND STRUCTURES (TABLE 7)

TABLE 8 - WALL DESIGNS - RECTANGULAR STRUCTURES (TABLE 8)

TABLE 9 - REINFORCING SCHEDULE

TABLE 10 - WEIGHT OF CASTINGS

STRUCTURE BOTTOMS TYPE J AND P

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TABLE 8 - WALL DESIGNS - RECTANGULAR STRUCTURES (TABLE 8)

TABLE 9 - REINFORCING SCHEDULE

TABLE 10 - WEIGHT OF CASTINGS

STRUCTURE BOTTOMS TYPE J AND P

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TABLE 6 - SLAB DESIGNS - SQUARE AND RECTANGULAR STRUCTURES (TABLE 6)
(ALL SLABS 8" THICK EXCEPT AS NOTED - REINFORCING PARALLEL TO SHORT WAY AND LONG WAY)

TABLE 7 - SLAB DESIGNS - ROUND STRUCTURES (TABLE 7)

TABLE 8 - WALL DESIGNS - RECTANGULAR STRUCTURES (TABLE 8)

TABLE 9 - REINFORCING SCHEDULE

TABLE 10 - WEIGHT OF CASTINGS

STRUCTURE BOTTOMS TYPE J AND P

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NO.	DESCRIPTION	DATE

DATE: FEBRUARY, 2010
PROJECT NO. 20098079-000
FILE NO. 3, 4, 9, 10-50-25
SCALE: As Shown

2010 FDOT Design Standards
DITCH BOTTOM INLET
TYPES C, D, E & H

Last Revision: 07/01/05
Sheet No. 1 of 7
Index No. 232

2010 FDOT Design Standards
DITCH BOTTOM INLET
TYPES C, D, E & H

Last Revision: 07/01/05
Sheet No. 2 of 7
Index No. 232

2010 FDOT Design Standards
DITCH BOTTOM INLET
TYPES C, D, E & H

Last Revision: 07/01/07
Sheet No. 3 of 7
Index No. 232

2010 FDOT Design Standards
SKIMMER FOR OUTLET CONTROL STRUCTURES

Last Revision: 00
Sheet No. 1 of 2
Index No. 240

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NO.	REVISIONS DESCRIPTION	DATE

DATE: FEBRUARY, 2010
PROJECT NO. 20098079-000
FILE NO. 3, 4, 9, 10-50-25
SCALE: As Shown

DIMENSIONS					
Skimmer Height As Specified In The Plans	H	D	E	L	Bolt Spacing S
12	3	3 3/8	28	3	
14	3	3 3/8	28	4	
16	3	3 3/8	28	5	
18	3	3 3/8	28	6	
20	4	4 1/8	31	6	
22	4	4 1/8	31	7	
24	4	4 1/8	31	8	
26	4	4 1/8	31	9	
28	4	4 1/8	31	10	
30	5	5 1/8	31	10	
32	5	5 1/8	31	11	
34	5	5 1/8	31	12	
36	6	6 1/8	31	12	
38	6	6 1/8	31	13	
40	6	6 1/8	31	14	

FLAT BAR
3/8" Thick x 1 1/2" Wide

FRONT PANEL
Steel Sheet 0.1315" Thick (10 Gauge)

SKIMMER FOR OUTLET CONTROL STRUCTURES

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GENERAL NOTES

- The underdrain pipe shall be either 4" smooth or 5" corrugated tubing unless otherwise shown in the plans. The size to be furnished will be based on the nominal internal diameter of a pipe with a smooth interior wall. Except when prohibited by the plans, the special provisions or this standard pipe with a corrugated interior wall may be provided based on the following size equivalency:
4" smooth interior equivalent to 5" corrugated interior
5" smooth interior equivalent to 6" corrugated interior
6" smooth interior equivalent to 8" corrugated interior
8" smooth interior equivalent to 10" corrugated interior
- Fine aggregate shall be quartz sand meeting the requirements of Sections 902-4 of the Standard Specifications.
- Coarse aggregate shall be gravel or stone meeting the requirements of Sections 901-2 or 901-3. The gradation shall meet Section 901, Grades 4, 4B, 5, 5B or 57 stone unless otherwise shown restricted in the plans.
- Underdrain Type I, II, III and V shall be in accordance with Section 440.
- Filter fabric shall be Type D-3 (See Index No. 199). The internal filter fabric of Type V underdrain shall have a permeability of 0.7 /sec. and an AOS of #40 sieve.
- When Type I is used, a filter fabric sock meeting Section 948 is required.
- See Index No. 500 for the standard location of Type I, II, and III underdrain. The location of Type V underdrain and nonstandard locations of Type I, II, and III underdrain will be as detailed in the plans.
- All filter fabric joints shall overlap a minimum of 1". The internal filter fabric of Type V underdrain shall overlap into the coarse aggregate or the fine aggregate a minimum of 1".
- Underdrain outlet pipes shall be nonperforated and openings shall be made using 1/8" (45 deg.) elbows. 90 deg. bends shall be constructed with two 1/8" elbows separated by at least 1' of straight pipe. Outlet pipes stubbed into inlets or other drainage structures shall be not less than 6" above the structure flow line. Outlet pipes discharging to grassed areas shall have concrete aprons, hardware cloth, and bordering sod as shown in Index No. 287 for Egedrain outlets.
- Ray-Tem shall be based on the size of the smooth interior products. The contract unit price for Underdrain, LF, shall include the cost of pipe, fittings, aggregate, sock, filter fabric, underdrain cleanouts, and concrete aprons.

DESIGN NOTES

- The type of underdrain should be selected to meet design water removal rate and soil conditions. Caution is prescribed in the use of these typical sections since special designs may be required to satisfy project conditions.
- Type I underdrain is intended for minimum water removal conditions.
- Type II underdrain is intended for moderate water removal conditions. Where reactive conditions may create chemical clogging, the use of an inert material and/or elimination of the filter fabric may be necessary.
- Type III underdrain is intended for maximum water removal conditions. Filter fabric is required between the coarse aggregate or fine aggregate including those described in general notes 2 and 3. Design note 3 applies for reactive conditions.
- Type V underdrain is intended for use in detention basins and other locations which require a filtration system. The standard fine aggregate specified for Type V underdrain conforms to filtration gradation requirements of Chapter 92-2b F.A.C.
- The designer should detail in the plans, the location of: (a) Type V underdrain, (b) nonstandard locations of Type I, II, and III underdrain, (c) underdrain inspection boxes, (d) cleanouts for Type V underdrain, and (e) underdrain outlet pipes.
- The designer should specify the flow line elevations at the beginning, bends, junctions and ends of underdrain pipes and outlet pipes.
- The designer should evaluate whether an external filter fabric envelope is required around underdrain Types I and III. When required, fabric shall be specified in the plans.

UNDERDRAIN

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NOTES FOR UTILITY CONFLICT PIPE

- These details are for construction field expediency to resolve utility conflicts that cannot be remedied by relocation. For conflicts determined during design, use the construction shop drawings for structure details.
- Concrete used in conflict structures shall be as specified in ASTM C476. 4000 psi may be used in lieu of Class I concrete.
- Maximum opening for pipe shall be pipe (OD) plus 6". Mortar used to seal the pipe into the opening will be of such mix that shrinkage will not cause leakage into or out of the structure.
- If the conflict structure is round or there are multiple inlet or outlet pipes, then the wall section should be reviewed for strength.
- If during the plans design or construction process it is determined that a domestic water supply line must pass through a storm drain structure, it must be shown on the design or construction plans and submitted to the Florida Department of Environmental Protection (FDEP) Administrator For Drinking Water in Tallahassee for review and comment. This index provides accepted methods for addressing conflicts when and where they cannot be reasonably avoided. To be submitted along with the plans shall be a justification describing the inordinate cost and the impracticality of avoidance. If identified, properly justified, and accomplished in accordance with this index, approval is granted. Upon request, the Utility Agency Director (UAD) must provide support data on the cost of relocation or adjustment to the FDOT for submission to the FDEP.

UTILITY CONFLICT CONDITION I
SECTION LONGITUDINAL TO CARRIER PIPE
(Nonpressure Or Nonfluid Carrier Installations)
No Joints Allowed Within Structure

UTILITY CONFLICT CONDITION II
SECTION LONGITUDINAL TO CARRIER PIPE
(Pressure Or Fluid Carrier Installations)

SECTION AA
DESIGNER'S NOTE:
"Surged" Conflict Manholes Shall Not Be Used Unless The System Is Hydrologically Designed To Account For The Headloss Generated If The Pump Is Completely Blocked

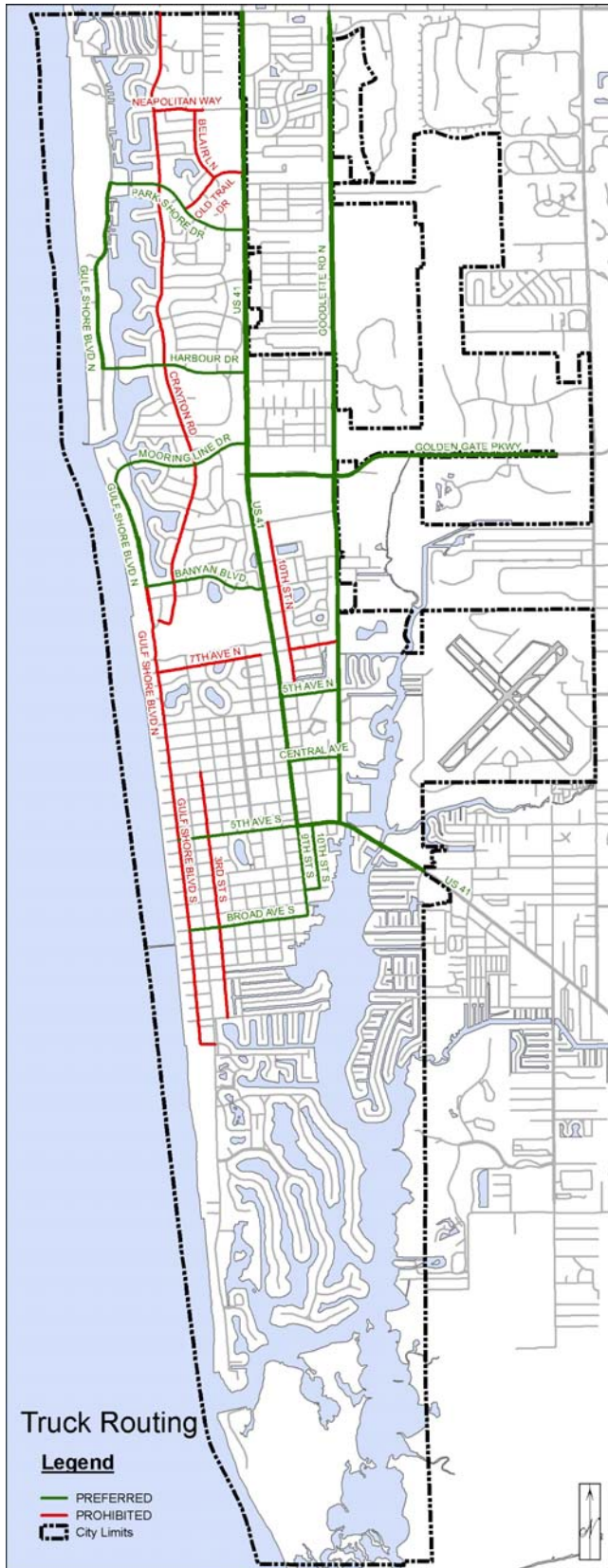
MISCELLANEOUS UTILITY DETAILS

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EXHIBIT A

EXHIBIT D



TRUCK ROUTE MAP

GR-25 Potable / Non Potable Measurement and Payment (in addition to the below, see Section 01026):

1. Price for General Requirements shall include cost for preparatory work and operations for beginning water main work, including all preconstruction expense necessary for start of work including all insurance requirements costs, administrative costs, etc associated with the water main work. The cost of field engineering, permits and fees, construction schedules, construction photographs, shop drawings, temporary facilities, and all other related items shall be included as well as required to complete the proposed work, per the Drawings and City of Naples requirements.
2. Unit price for furnishing and installation of 6-inch C900 Potable Water Piping within the limits of the Stormwater Project, except as otherwise specified, will be based on the laying length of the pipe in linear feet actually placed as measured along the centerline of the completed pipe, Any restoration outside the limits shown on the Drawings or specified elsewhere will be at the Contractor's expense. All cost to clean, and repair new or existing piping and appurtenances will be included under the payment for linear feet of pipe.

Unit price for furnishing and installation of 6-inch C900 Potable Water Piping, except as otherwise specified, will be based on the laying length of the pipe in linear feet actually placed as measured along the centerline of the completed pipe, including the length of fittings, valves (not covered under a separate bid item), laterals of the same size as the main line, utility crossings, and specials measured along their centerlines, between the limits shown on the Drawings. Branch pipes will be measured along their centerlines from the centerline of the main pipe. Payment for water main pipe will be made at the Contract unit price per linear foot for the size and type installed, which price and payment shall be full compensation for all clearing, grubbing, excavation, preconstruction continuous color audio-video recording, maintenance of traffic, dewatering, installation of silt fencing for erosion control along all areas adjacent to ditches or wetlands, sheeting and bracing, pipe bedding, backfill and compaction, limerock base, rock removal and disposal, backfill drying (as necessary), sodding, seeding, restoration, temporary asphalt patching, utility crossing (including stormwater utility and sanitary sewer utility crossings), base restoration, tree removal/restoration; driveway removal/restoration, roadway removal/ restoration, sidewalk removal/restoration, furnishing and installation of all pipe and other materials, pipe restraints, supports, fittings, reducers, bends, stub-outs, caps, pipe coatings and linings, detectable tape and wire; clamps, joining connections to piping and solvent welding (not covered under a separate bid item); abandonment of existing water main piping (as applicable), tie-ins (not covered under a separate bid item), testing, bacteriological sampling, pipe identification, as-built drawings, removal and replacement of fences and

EXHIBIT A-1

other structures, construction staking, trench safety (Contractor to assure that the standards of the Florida Trench Safety Act are followed).

Any restoration outside the limits shown on the Drawings or specified elsewhere will be at the Contractor's expense. All cost to clean, and repair new or existing piping and appurtenances will be included under the payment for linear feet of pipe.

3. The number of fire hydrant assemblies to be paid for will be determined by the actual count of assemblies installed and accepted.

Payment for fire hydrant assemblies will be made at the Contract unit price per hydrant assembly for the respective size and type, which price and payment shall be full compensation for furnishing and installing the hydrant assembly complete and operative. Each fire hydrant assembly includes, at a minimum, hydrant tee, 6-inch gate valve and box, valve identification, concrete work, 6-inch hydrant branch piping, hydrant, restraint joints, thrust restraints, pipe bedding, backfill and compaction, rock removal and disposal, backfill drying (as necessary), sodding, seeding, restoration, temporary asphalt patching, utility crossing (including storm water utility crossings), base restoration, and all other incidentals necessary to complete the installation as specified. Existing hydrants removed shall remain the property of the Owner and shall be given to the Owner.

4. The connections to existing water mains to be paid for will be determined by the actual completion of the connections installed and accepted.

Payment for connections to existing water mains will be made at the Contract unit price, which price and payment shall be full compensation for furnishing and installing the connection complete and operative. Each connection may include, at a minimum, a hot-tap connection to the existing water main, valves, reducers, fittings, restraint joints, pipe bedding, backfill and compaction, rock removal and disposal, backfill drying (as necessary), sodding, seeding, restoration, temporary and permanent asphalt patching, utility crossing (including storm water utility crossings), base restoration, and all other incidentals necessary to complete the installation as specified. Existing water mains shall remain in service during the duration of the project. All clearing, grubbing, stripping, excavation, backfilling, base preparation, compaction, restoration, and testing shall also be included.

5. Measurement of various items, types, and sizes required for the installation of each single water connection, short or long side, will be determined by the actual count of units installed and accepted. Long side services are those service that are on the opposite side of the roadway from the main water line, short side services are on the same side of the road as the main water line.

Payment for each single service water connection (short/long side) shall be full compensation for providing and installing new structures complete and acceptable to the Owner (long side water services shall include the cost for all activities necessary to

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cross the roadways without open-cutting the roadway). New structures to be supplied and installed by the Contractor shall include 2-inch poly tube service lateral piping from the proposed water main to the water service location), taps, valves (up to and including the curb stop with water meter nut inside the water meter box), fittings, appurtenances, utility crossing, coating systems, and all other items shown on the drawings and specified herein, which are necessary for completion of related work and not supplied by the Owner. The Owner shall connect the new service lateral piping to the existing service meter/backflow preventer. All clearing, grubbing, stripping, excavation, rock removal and disposal, backfilling, base preparation, compaction, tie-ins, connections, restoration, and testing shall also be included. Roadways shall not be open-cut to accomplish the installation of long side water services. For long side services, the Contractor shall cross roadways by jack and bore or other non-impacting methods at no additional cost to the Owner.

Note: All work shall conform to City of Naples standards.

The City reserves the right to award all, none, or any portion of the above items.

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- 2.1 Gravity Sewer Systems
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SECTION 1

DESIGN CRITERIA FOR POTABLE WATER, NON-POTABLE IRRIGATION WATER, AND WASTEWATER FACILITIES

PART 1 POTABLE WATER AND NON-POTABLE IRRIGATION WATER SYSTEMS

All potable water, non-potable irrigation (including reclaimed or reuse) water and raw water pipe, material, equipment and appurtenances shall be new, and shall conform to Section 2, Technical Specifications and Section 3, Utilities Detail Drawings. All material and equipment designed or used in connection with a potable (drinking) water system shall conform to the requirements of the National Sanitation Foundation (NSF) Standard 61, "Drinking Water System Components – Health Effects."

1.1 Pipe and Fitting Material

Potable water and non-potable irrigation water pipelines and fittings, except for service piping, shall be a minimum of six inches (6") in diameter, and have a minimum depth of thirty-inches (30") and a maximum depth of forty-eight inches (48") below finished grade. All potable water or non-potable irrigation water pipelines between six and fourteen inches (6"-14") in diameter shall be constructed of PVC or HDPE pipe, and shall utilize pipe meeting the requirements of the Technical Specifications. Water pipelines between sixteen inches and twenty-four inches (16"-24") in diameter may be constructed of ductile iron, HDPE, or PVC pipe. Water pipelines larger than twenty-four inches (24") in diameter shall be constructed of ductile iron pipe.

All pipe and pipe fittings shall contain no more than eight percent (8.0%) lead, and any solder or flux used shall contain no more than two-tenths of a percent (0.2%) lead. All pipe and pipe fittings installed shall be color coded or marked in accordance with F.A.C. 62-555.320(21)(b)3.

All HDPE and PVC buried pipelines shall be color-coded as described in the Technical Specifications. Potable water pipelines shall be Federal Safety Blue in color. Raw water pipelines shall be white in color. Non-potable irrigation, reclaimed and reuse water pipelines shall be pantone purple 522C in color.

All Ductile Iron, metal and concrete buried water main pipelines shall have blue stripes applied to the pipe wall. Pipes striped during manufacturing of the pipe shall have continuous stripes that run parallel to the axis of the pipe, that are located at no greater than 90 degree intervals around the pipe, and that will remain intact during and after installation of the pipe. If tape or paint is used to stripe pipe during installation, the tape or paint shall be applied in a continuous line that runs parallel to the axis of the pipe and that is located along the top of the pipe.

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All buried water pipelines and mains, except those installed by horizontal directional drilling or jack-and-bore methods, shall be marked using plastic locator tape impregnated with metallic filings for HDPE and PVC pipe and non-magnetic for ductile iron pipe. The locator tape shall be placed in the pipe trench two feet (2') below grade or one-half the pipe's bury, whichever is less, and labeled "potable water" or "non-potable water" as applicable. Horizontal directional drilling shall include installation of locating tone wire as described in the Technical Specifications.

All water main aerial crossings shall be Pressure Class 350 flanged ductile iron pipe and shall be coated on the exterior using a suitable grade of appropriately colored, field applied (or factory applied with field touch-up as required) epoxy coating. Potable water mains shall be painted Federal Safety Blue. Raw water mains shall be painted white. Non-potable irrigation, reclaimed and reuse water mains shall be painted Pantone Purple 522C. Specific colors shall be subject to approval of the CITY Manager or designee. All nuts and bolts used in aerial crossings shall be 316 stainless steel. All canal, river or creek crossings shall be aerial, unless otherwise approved by the CITY Manager or designee. Aerial crossings shall be designed to incorporate valves or other flow regulation devices in accordance with F.A.C. 62-555.320(21)(b). Aerial crossings shall be designed to maintain existing or required navigational capabilities within the waterway and to reserve riparian rights of adjacent property Owners. Submit aerial pipe and flange computations, including support and anchor design, for review. The submittal must be signed and sealed by a Florida registered Professional Engineer. See also Section 02650 3.2.Q for more information.

1.2 Design of Pipeline Size and Location

1.2.1 Water Pipeline Sizing Criteria

All water mains to be maintained by the CITY shall be a minimum of six (6) inches in diameter. For dead end mains on short (300' or less) single family residential cul-de-sacs, hydraulic calculations shall show the capability of maintaining 750 gpm fire flow plus potable demand.

Water systems shall be designed to maintain adequate flows and pressures and water quality standards as established by Florida Department of Environmental Protection (FDEP), using the following criteria:

- A. Designs shall assume: 1) a minimum CITY source pressure under peak hourly flow conditions of 40 PSI, or system available pressure if less than 40 PSI, or developer shall make improvements/water main additions to get adequate pressure delivered from the closest CITY transmission main to the project.; and 2) a minimum CITY source pressure with fire flow under maximum day conditions of 40 PSI, or system available pressure if less than 40 PSI, or developer shall make improvements to get adequate fire flow and pressure delivered from the closest CITY transmission main to the project. Minimum residual node pressure within a proposed project system shall be 20 psi under peak hourly flow and maximum day with fire flow conditions.
- B. The design Engineer shall model the proposed system, including all dead ends, for chlorine dissipation assuming a chloramine residual of 2.0 mg/l at the entrance point to the project.

The following criteria shall be used to analyze model chloramine dissipation unless otherwise approved by the Public Utilities Water Director upon the submittal of specific case data:

EXHIBIT A-1

- a) Occupancy of fifty percent (50%) to account for seasonal variations with the load evenly distributed throughout the project.
- b) Average occupancy per dwelling of 1.81 for single family and 1.42 for multi-family as established by the Water Master Plan as amended and adjusted for peak with a factor of 1.2 or 2.2 shall be used when modeling system performance.
- c) Consumption rate of 154 gallons per capita for single family and multi-family shall be used when establishing loading rates for system performance models.
- d) Systems that are proposed to use or will use alternate irrigation sources shall use fifty percent (50%) of the loading rates for modeling chlorine/chloramine dissipation.
- e) The standard decay rate is - 0.012 ppm per hour. The analysis assumes a static chlorine level of 2.0 ppm at the tapping point in front of a project. Using the decay rate and solving for the elapsed time from the initial chlorine level to the minimum chlorine level residual of 0.6 ppm in the following: $0.6 \text{ ppm} = 2.0 \text{ ppm} \times e^{(-1=0.012 \text{ ppm} \times \text{\#hours})} \Rightarrow \text{time} = 100.33 \text{ hours}$.

The Project Engineer shall submit an analysis letter to Community Development and Environmental Services as part of the review package, certifying that all points within the proposed system shall maintain a minimum level of 0.6 mg/l chlorine/chloramine residual under the conditions listed above.

Systems unable to meet minimum design requirements or maintain minimum chlorine residual levels shall not be eligible for ownership and maintenance by the CITY.

Water mains not designed to carry fire flows shall not have fire hydrants connected to them.

1.2.2 Distribution System Layout

Water distribution systems shall be designed so that all systems are located adjacent to, and are accessible from, paved or unpaved roadways so as to allow access for short and long term maintenance, repair and/or replacement of such system. Water mains shall not be placed beneath any existing or proposed building structure.

Generally, new potable water distribution systems shall be designed as “looped” systems to avoid dead ends. If changes in design during construction result in dead ends to any new or relocated water mains (except those serving a cul-de-sac), such dead ends shall be connected to the nearest water main. In cases where no nearby water main is available, dead end mains shall not exceed 300 feet in length and shall terminate temporarily in a blow-off, be full-bore flushed, then permanently ended with a hydrant or other flushing device approved by the Engineer of Record in accordance with F.A.C. Chapter 62-555.

All commercial facilities must be metered separately from residential facilities with the exception of those commercial facilities that are within a master metered residential development and designed for the exclusive use of the residents within such development. Master meters (for domestic or reuse purposes) and the first gate valve after the master meter (the valve between the meter and the backflow assembly or pressure reducing valve) shall be located within a minimum 15'X15' CITY Utility Easement (CUE), which shall be located outside of, but contiguous to, the road right-of-way (ROW). Any single residential unit domestic or reuse meter that is not in the ROW shall be located within a minimum 12'X12' CITY Utility Easement (CUE), which shall be located outside of, but contiguous to, the ROW. For any 3” and larger combination fire and domestic meter assembly and 3” and larger compound meter assembly,

EXHIBIT A-1

the meter and the valve after the meter (the valve between the meter and the backflow assembly) shall be dedicated to and owned by the CITY, and shall be located within a minimum 15'X15' City Utility Easement (CUE), which shall be located outside of, but contiguous to, the ROW. Any fire system detector check assembly on a for-fire-only dedicated line shall have an isolation valve at the City water main, plus an isolation valve in the ground just preceding the aboveground detector assembly, and such valves, if not located in the ROW, shall be located within a minimum 15'X15' City Utility Easement (CUE), which shall be located outside of, but contiguous to, the ROW, and which shall encompass the detector assembly as well; the City shall own up until the valve in the ground preceding the fire system detector check assembly, and the fire detector check assembly shall be owned by the developer.

Water mains shall have a minimum setback of seven feet and six inches (7'6") from the centerline of the pipe to residential roadways, curb and gutters, permanent structures, or planting not specifically allowed by ordinance.

Water mains shall be designed parallel to accessible roadways and within the setbacks established herein above. Deviations from these design parameters shall only be approved in cases where such installations can be shown to be necessary in order to comply with minimum chlorine residuals or other FDEP quality parameters, unless otherwise approved by the CITY Manager or designee. In such cases, the water main shall be located within a separate tract of land or CUE dedicated to the City. Such tracts shall be delineated with fencing, landscaping, signage, pavement, or other methods determined to be acceptable to the City. All such installations shall require approval from the City. In addition, an agreement shall be provided authorizing the CITY to traverse all private property outside of the CUE for the purpose of access, maintenance, repair and/or replacement of such main. The agreement shall also hold the CITY harmless for any damage to the private property resulting from the CITY's maintenance, repair and/or replacement activities within or outside of the CUE.

1.2.3 Pipeline Separation Criteria

Potable water pipelines shall be separated from wastewater lines and /or stormwater lines by a minimum clear vertical distance of eighteen inches (18") and a horizontal distance of ten feet (10') in accordance with F.A.C. 62-555.314(5). The eighteen inches (18") minimum vertical separation distance does not apply to separations of sewer laterals and potable water pipeline installations. 57 stone shall be utilized for separation between wastewater lines and stormwater lines. Non-potable irrigation water pipelines 2" and larger shall be separated from potable water mains, wastewater lines and/or stormwater lines by a minimum clear vertical distance of eighteen inches (18") and a horizontal distance of five feet (5') as shown in the Utilities Detail Drawings. Wastewater lines shall be separated from stormwater lines by a minimum clear vertical distance of eighteen inches (18") and a horizontal distance of five feet (5'). Water mains shall preferably pass above storm lines, with an 18" minimum clearance, in which case water main shall be DR-14 PVC pipe, extended a minimum of 10' either side of storm line center, or 15' each side of storm drainage structure center. Any water main that must go under a storm line shall be ductile iron pipe Class 52 pipe, extended a minimum of 10' to each side of storm line center, or 15' to each side of a storm drainage structure center. All pipeline crossings with vertical clearance less than eighteen inches (18") shall be made using a full 20-foot (20') length of thickness Class 200 AWWA C900 PVC pipe, Class 235 AWWA C905 PVC pipe, or, if necessary, Pressure Class 250 ductile iron pipe centered on the crossing. The sewer pipe in these locations shall be back-filled with bedding stone or sand to a height six inches (6") above the crown of the pipe. When this standard cannot be maintained, the sewer line shall be concrete encased for a distance of ten feet (10') each way from the water line and any other

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conduit, with a minimum vertical clearance of twelve inches (12") being provided at all times. If a water line is under a wastewater line, an eighteen inch (18") minimum separation must be kept (see Cross Over Detail Drawing). All pipelines shall be successfully pressure tested to 150 psi after the concrete has properly cured.

Also see the separation requirements in Section 01045,1.3.F (City Damage Prevention Policy - separation distance from existing CITY Utilities), Section 02650, 3.2.P (Separation from Other Pipe Systems), and Detail Drawings. If these separation criteria cannot be met, use FDEP 62-555.314.

Potable water, non-potable irrigation water, and wastewater pipelines shall be separated from telephone, power, cable and gas sleeves/lines and any other underground utilities by a minimum clear vertical distance of eighteen inches (18") and horizontal distance of five feet (5').

Potable water, non-potable irrigation water, and wastewater lines shall be separated from raw water mains by a clear vertical distance of eighteen inches (18") and a horizontal distance of ten feet (10'). Stormwater lines shall be separated from raw water mains by a clear vertical distance of eighteen inches (18") and a horizontal distance of five feet (5').

Wastewater lines shall be separated from public drinking water supply wells by a horizontal distance of 100 feet. Wastewater lines shall be separated from private drinking water supply wells by a horizontal distance of 75 feet. CITY approval will be required if the separation distance cannot be maintained.

Stormwater retention/detention ponds with a bottom elevation lower than the wet weather season water table shall be located a minimum of 300' away from raw water wells.

The encasement of potable water mains in concrete shall only be made after review and approval by the CITY Manager or designee.

1.2.4 Valve Locations

Valves shall be provided at all intersections and branches in sufficient numbers as to allow for zone isolation of distribution areas in order to limit impacts of line breaks and service disruptions to customers. In-line gate valves shall be provided in accordance with AWWA requirements and at no greater than one thousand foot (1000') intervals when no other valves exist within internal distribution systems. All gate valves 20-inches (20") and smaller shall be of the resilient-seated wedge type, conforming to AWWA C509 or C515, or latest revisions thereof. All valves shall be furnished with valve boxes extending to finished grade as shown in the Utilities Detail Drawings.

1.3 Conflict Crossings

All storm sewer, non-potable irrigation mains and wastewater transmission system conflicts with water systems or portion(s) thereof that must be crossed shall be performed using AWWA C900 Class 200 or C905 Class 235 PVC with ductile iron fittings. All fittings shall be adequately restrained using retainer glands, stainless steel rods, EBAA Iron Sales "Megalug," "Uni-flange," Romac Industries "Grip Ring," or Star restraint. Transitional fittings, when approved by the Engineer of Record, shall be located as close to the point of conflict as possible. Air release assemblies shall be provided as specified in Subsection 1.7 herein, below. Gradual deflection of the water line in lieu of using fittings to clear the conflict shall not be permitted if cover

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exceeds five feet (5'-0"). A minimum vertical clearance of eighteen inches (18") shall be provided between the water main and bottom of conflict. Wherever the eighteen-inch (18") minimum vertical clearance cannot be provided, CITY approval will be required. (City approval will not be required for separation of sewer laterals and potable water pipeline.)

1.3.1 Subaqueous Canal Crossings

Potable and non-potable subaqueous crossings shall be designed to a minimum depth of thirty-six inches (36") below the design or actual bottom, whichever is deeper, of a canal and other dredged waterway or the natural bottom of streams, rivers, estuaries, bays, and other natural water bodies. If not practicable to design the project with a minimum thirty-six inch (36") cover, alternative construction features must be installed to ensure adequate protection of the pipeline. Wherever the thirty-six inch (36") minimum vertical clearance cannot be provided, CITY approval will be required.

All subaqueous crossings must be introduced/discussed at a plan Pre-Submittal Conference. It is important that representatives from the Utilities Department be present for approval at the plan Pre-Submittal Conference.

A permanent easement is needed when there is no room available in the right-of-way.

When crossing watercourses, the following shall be provided:

- a) The pipe shall be of special construction (HDPE), having welded (butt fusion) watertight joints;
- b) Valves shall be provided at both ends of the subaqueous crossing for isolation, testing or repair of the line. The valves shall be easily accessible and not subject to flooding. The valve closest to the supply source shall be in a below grade vault as per FDEP requirements and constructed to meet FDOT standards. All welding shall be done above ground. Water, reclaimed water and wastewater lines shall have two (2) air release valves between the two valves;
- c) Permanent taps shall be made on each side of the valve within the manhole to allow insertion of a small meter to determine leakage and for sampling purposes. The taps will allow for a $\frac{3}{4}$ " meter to be attached;
- d) The HPDE pipe shall be encased in HDPE DR11 casing;
- e) Pressure test according to Section 02676;
- f) Conform to HDPE Specifications, Section 02620.

Warning signs shall be placed along the banks of canals, streams, and rivers clearly identifying the nature and location of subaqueous crossings. The signs shall state the type of pipeline and the depth of pipeline below design or natural bottom of the water body. Warning sign shall be aluminum and have minimum dimensions of 4' wide by 2' high with a minimum of 2" lettering.

1.4 Fire Service Systems

All private fire service systems for sprinkler systems, wet standpipe systems and privately-owned or controlled distribution systems shall be metered and shall be installed with an appropriate back flow prevention device; these systems include any extensions to a development's existing fire system, any modifications to any outside of building part of an existing fire system, as well as any new lines going to new/existing development buildings. Metering requirements shall be classified by the type of development requiring fire service. The type of metering device will be specified in the following subsections, shall be sized by the

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Developer's Engineer and shall be purchased, owned and maintained by the private service owner. The CITY requires all privately-owned backflow devices to be certified at the time of installation and on an annual basis by a Certified Back Flow Tester (University of Florida, TREEO Center, or equivalent certification program). The results shall be submitted to the CITY Manager or designee. The CITY Manager or designee will require all privately owned metering devices to be certified for accuracy at the time of installation. Fire meter devices using a three quarter to two inch ($\frac{3}{4}$ " to 2") metering device shall be re-calibrated or replaced every ten (10) years or replaced immediately upon meter failure. Fire meter devices greater than two inches (2") shall be re-calibrated to manufacturers specifications every ten (10) years or replaced immediately upon meter failure. The CITY Manager or designee will inform the owner by mail prior to the due date. Private owner(s) shall submit certification results to the CITY Manager or designee within sixty (60) days of the due date. All equipment and items downstream of the backflow device shall be tested for ownership and maintenance by the appropriate Fire District, and a letter of approval from the Fire District given by the developer to the City, before the City or County issues a C.O. for the property.

1.4.1 Fire Service Meters for Residential Systems

Residential projects such as, but not limited to, single family, multi-family condominiums, trailer parks, mobile home parks, etc. utilizing a master meter shall pass all fire flow through such meter. The meter shall be sized to pass the domestic coincident draft plus rated fire flow at the AWWA pressure loss specifications. On dual water systems with fire and domestic flows in separate pipelines downstream of the master meter, the fire line shall have a Fire Service rated meter, approved by the CITY Manager or designee, with appropriate backflow protection.

1.4.2 Fire Service Meters for Commercial and Other Non-Residential Systems

Commercial projects such as, but not limited to, shopping centers, malls, retail, airport airplane hangers, and industrial buildings, but not including parks, shall have a separate fire service connection to the water distribution main. A Fire Service rated meter, approved by the CITY Manager or designee, with appropriate backflow protection shall be installed on the fire line. The Fire Service meter and isolation valves shall be extended above final grade as shown in the Utilities Detail Drawings. For meter reading purposes, metering devices shall lie within a CITY Utility Easement (CUE) that shall be dedicated separately to the City in conjunction with the easements for any on-site utility system(s).

The Owner shall purchase and install an approved AMR meter and an approved backflow assembly at no expense to the City.

1.5 Connections to CITY Facilities

Connections to existing CITY water mains shall be constructed as described in Section 2, Technical Specifications and shown in Section 3, Utilities Detail Drawings. These details shall apply to all connections to existing systems including, but not limited to, hot taps and extensions from existing dead end systems. A section of pipe shall be inserted into the gap to connect the new construction to the existing systems for the purpose of accomplishing line flushing. Immediately upon completion of the flush, the connection shall be removed. The jumper shall be replaced and in place until final connection is authorized by the CITY Manager or designee and approved by the FDEP at the completion of construction and after satisfactory completion of all test procedures and bacterial clearance of the new water system or portion(s) thereof.

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Steam condensate, cooling water from engine jackets, or water used in conjunction with heat exchangers shall not be returned to potable water mains.

1.6 Water Services

1.6.1 Service Pipelines

All building lots and parcels of land within a development on the opposite side of the roadway from a water main, or that do not have an accessible water main fronting the location of the proposed meter location, shall be provided with a means for water service by the developer. Accessibility to these lands shall be provided by the installation of water service conduits. Conduits shall be a minimum of four-inch (4") diameter PVC, with a minimum cover of 24 inches. Such pipelines shall extend at least five (5) feet past the edge of pavement, sidewalk, bike path or any other improvement and shall run from lot corners on one (1) side of the street to a lot corner on the opposite side and shall be capped and marked with a magnetic marker. Markers shall be 3M markers or Engineer of Record approved equivalent. Service pipelines shall be polyethylene of a minimum diameter of two inches (2") long-side and one-and-one-half inches (1 ½") short-side.

1.6.2 Water Meters

All water meters larger than two inches (2") shall be installed above ground. These meters shall be equipped with a backflow preventer and installed by the Contractor at his expense. The type of backflow device utilized shall be as shown on the Detail Drawing.

All large potable meters shall be purchased by the owner and installed by the Developer's Contractor. The systems' master meter assemblies shall be built in accordance with the current design details shown in the Utilities Detail Drawings. Alternate designs may be permitted upon submission of design details for review and approval. The location of all meters (potable and non-potable) shall be clearly shown on the construction plans.

All potable water and/or non-potable irrigation water meters shall be equipped to accept the CITY's Automatic Meter Reading (AMR) units shown on the Utilities Detail Drawings. Two-inch (2") and smaller meter units will be installed by the CITY. On meters 3-inches and larger contact the CITY at (239) 213-4717 to determine the necessary AMR equipment for the meters. All meters shall be turned over to the technician performing the full bore flush prior to the acceptance of the meter.

Temporary meters may be applied for by phoning or visiting the City Permit Building between 8:00 a.m. and 4:30 p.m., Monday through Friday, under the conditions provided by the ordinance.

Temporary meters shall be installed for the purpose of supplying construction water to meet the CITY requirement for new water line construction as listed below and require a minimum of forty eight (48) hours advance notice. All backflow devices shall be reduced pressure type and shall be certified as required by the ordinance, provided by the Contractor, and be of an approved type.

Temporary meters shall be installed as shown in the Utilities Detail Drawings.

1.6.3 Reclaimed Irrigation Water Hose Bibs

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Any hose bibs connected to the City of Naples reclaimed irrigation water system, whether within a development or in the ROW, shall have a counter-sunk square nut (FDEP regulation) to open or close the valve, be a minimum of twelve inches (12") above grade, and be in accordance with all FDEP regulations concerning this subject. There shall be a warning sign nearby, preferably purple, warning hose bib users not to drink the reclaimed irrigation water – the sign shall state "Do not drink – reuse/recycled/non-potable [use any of these preceding words] water – No Beber," with an international symbol of a cup with a diagonal slash through it. Examples of signs can be found at safety-signs.com/compliancesigns.com at telephone number 1(800)578-1245.

1.7 Air Release Assemblies

Air release assemblies shall be installed at all high points on transmission mains where air will not be released through service lines, and on both sides of conflict crossings (unless it can be demonstrated by hydraulic analysis that air pockets will not accumulate at individual high points). In cases where reversal of flow is not expected, the air release assembly shall be provided at high points and on the upstream side of conflict crossings. A high point is defined by the hydraulic gradient and is considered the upper end of any pipe segment that slopes up to the hydraulic gradient or runs parallel to it. The design engineer shall review and apply the pertinent provisions of AWWA-C512 and AWWA Manual of Water Supply Practices M51, "Air-Release, Air Vacuum, and Combination Air Valves." For potable water or non-potable irrigation water mains sixteen inches (16") and greater, the design engineer shall be responsible for air valve selection and sizing. An isolating valve shall be provided below the air valve to allow removal of the valve assembly. All air release assemblies shall be installed as shown in the Utilities Detail Drawings.

1.8 Concrete Collars

All gate valve boxes, air release assembly and permanent sample points outside paved surfaces shall be provided with a concrete collar set to finish grade. Such collar(s) shall have a minimum thickness of six inches (6") and the outside dimension of the pad and the reinforcement shall be as shown in the Utilities Detail Drawings. Concrete shall have minimum compression strength of 3000 psi at twenty eight (28) days.

1.9 Testing and Clearance Procedures

All water systems or portion(s) thereof shall be subjected to pressure testing and disinfection conforming to the AWWA Standards C600, C602, C605 and C606, or latest revision(s) thereof.

Under no circumstances shall any person other than an authorized CITY Water Department employee operate valves, make service taps or otherwise tamper with CITY Distribution system or portion(s) thereof. Failure to comply with these requirements will place such individual in jeopardy of legal action by the CITY pursuant to U.S. Code, CITY Ordinances and/or Resolutions in effect at the time of the violation.

1.9.1 Pigging

All lines larger than twelve inches (12") in diameter shall be pigged with a new pig to clear debris prior to flushing. Refer to specifications section 02675, 3.1.

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1.9.2 Flushing

Flushing shall be coordinated with CITY Water Distribution personnel and shall require forty eight (48) hour notice to Water Distribution prior to performance. During flushing the Contractor will be permitted to install a spool piece to close the gap specified in the jumper as shown in the Utilities Detail Drawings. Flush velocity shall be at least 2.5 feet per second, with a maximum of 4.0 feet per second. Upon completion of such flushing, connection to the CITY's systems or portion(s) thereof shall be returned to the configuration shown in the Utilities Detail Drawings.

1.9.3 Line Filling

Lines under construction shall be filled utilizing water supplied by the temporary meter and such filling shall be performed by the Contractor in accordance with required procedures including those outlined herein below.

1.9.4 Chlorination

Line chlorination shall be performed utilizing water supplied by the temporary meter for the purpose of chlorinating newly constructed potable water lines. Such procedure shall be performed by the Contractor, and shall require forty eight (48) hour notice to Water Distribution prior to performance.

1.9.5 Post-Chlorination Flushes

The Contractor using the temporary construction meter shall perform Post Chlorination Flushes. All chlorine injected into the system for disinfection shall be flushed from the system at least twenty four (24) hours prior to collection of Bacteriological samples.

The initial flush volume equal to the volume of water main being flushed shall be captured and properly disposed of, such that no chlorinated water enters into a storm water system and/or is discharged to the ground; all regulatory requirements for the protection of the environment shall be met.

1.9.6 Bacteriological Samples

Bacteriological sample collection shall be performed utilizing water supplied by the temporary meter in order to supply pressure during sample collection of newly constructed potable water lines. Such procedure shall require forty eight (48) hour notice to Water Distribution prior to performance. These procedures shall be performed on Monday through Thursday, excluding holidays, unless otherwise directed by the CITY Manager or designee.

1.10 Laboratory Testing and Sample Collection

All new potable and raw water systems shall be subject to bacteriological sample collection and testing. Sample collection and laboratory analyses shall be performed by CITY certified laboratory technicians only. The Contractor or his agent shall provide the equipment required in Section 2, Technical Specifications, to supply a continuous sample at the points indicated on the engineer's construction drawings. Sample points having a one (1) day total of two hundred (200) non-coliform bacteria or greater shall be considered as failed samples. Samples containing one (1) coliform bacteria or greater shall be considered as a failed sample. All

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potable water systems shall pass bacteriological tests within thirty (30) days prior to being placed in service.

Sample collection and sample laboratory analyses costs shall be borne by the developer. For Utilities Capital Projects that are run by the CITY for the CITY, one set of tests (including water costs) are provided by the CITY free of charge and the contractor shall pay for any additional tests.

PART 2 WASTEWATER COLLECTION AND TRANSMISSION SYSTEMS

All wastewater pipe, material, equipment and appurtenances shall be new, and shall conform to Section 2, Technical Specifications and Section 3, Utilities Detail Drawings.

Wastewater systems shall be designed to maintain adequate flows and pressures and water quality standards as established by Florida Department of Environmental Protection (FDEP).

All wastewater projects shall be designed to preclude the deliberate introduction of storm water, surface water, groundwater, roof runoff, subsurface drainage, swimming pool drainage, air conditioning system condensate water, non-contact cooling water and sources of uncontaminated wastewater as specified in F.A.C. Chapter 62-610.

2.1 Gravity Sewer Systems

2.1.1 Pipe and Fitting Materials

Gravity sewer pipe and materials shall conform to Technical Specifications for polyvinyl chloride (PVC) pipe and fittings. All pipelines shall be green in color.

2.1.2 Design of Pipeline Size, Depth and Location

All gravity sewer mains constructed shall be a minimum of eight inches (8") in diameter. The minimum depth of cover over all gravity sewers shall be thirty-six inches (36"). All gravity sewer designs shall consider buoyancy of sewers, and appropriate construction techniques to prevent floatation of the pipe where high groundwater conditions are anticipated.

All gravity mains eight inches (8") or larger are allowed to be core bored into existing manholes. The manhole must be restored as per Section 02607. An inspector from the Wastewater Collections Department must be present during manhole restoration. Drop connections will be required if the invert elevation is greater than two feet (2').

Hydraulic Design Requirements - All gravity sewers shall be designed to give mean velocities, when flowing full or half-full of not less than two feet (2.0') per second, based on Manning's formula. When calculating full-flow velocity, use a Manning's Roughness Coefficient of $n=0.013$. Design wastewater system with uniform slope between manholes. The following are the minimum allowable design slopes that may be provided for each pipe size listed:

Minimum Slope in Feet per One Hundred Feet (ft/100'):

Sewer Size	Slope (ft/100 ft)	Sewer Size	Slope (ft/100 ft)
8 inch	0.40	18 inch	0.12

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10 inch	0.28	21 inch	0.10
12 inch	0.22	24 inch	0.08
15 inch	0.15		

Special attention shall be given to gravity lines that receive flows from wastewater transmission or re-pumping facilities. Due care shall be taken in these cases to ensure that no surcharge conditions occur downstream due to excessive flow rates. Under no conditions shall pipe of a diameter larger than that necessary for proper hydraulic design as determined by the CITY Community Development and Environmental Services Division or Public Utilities Engineering Department be permitted for use on any project.

Sewers to be located on 20% slopes or greater shall be designed with anchors secured into concrete with anchors spaced as follows:

Grade Range	Anchor Spacing
20% - 35%	36 feet center to center
35% - 50%	24 feet center to center
50% and higher	16 feet center to center

Pipeline separation criteria and conflict crossings criteria shall conform to the requirements described in Part 1, Sections 1.2.3 and 1.3.

All sewers shall be designed to prevent superimposed loads.

2.1.3 Gravity Sewer Main Extension Stubs

All main-line extension stubs to future developments and/or parcels shall terminate in a stub-out if it is part of a phased project. The stub-out shall end with a bell.

2.1.4 Gravity Sewer Laterals

Laterals shall be extended to the property line or easement limit for all installations. New laterals are required for new houses or duplexes that are replacing an existing house or duplex, and any type of residential, commercial, or industrial development with existing laterals made of cast iron, asbestos cement, or material other than PVC.

Laterals shall be a minimum of six inches (6") in diameter, except for houses, which shall be a minimum of 4" in diameter. Service lines shall be installed at such grades as will adequately serve the properties, with a minimum of 1% slope for 6" laterals, and 2.1% for 4" diameter laterals. Lateral shall have a minimum depth of thirty-inches (30") and a maximum depth of forty-eight inches (48") below finished grade. In locations where a minimum depth of thirty inches (30") cannot be provided, laterals shall be ductile iron pipe unless the length of lateral is thirty feet (30') or less. In such cases the lateral shall be C900, DR 14 PVC pipe. At no time shall the depth of a lateral be less than twenty-four inches (24"). At no time shall a lateral be core bored into manholes. Upon installation, all lateral ends shall be plugged. A 6" minimum cleanout shall be provided at the end of each lateral prior to the end plug. Typical lateral and cleanout standards are shown in the Utilities Detail Drawings. The cleanout riser and cap shall be set twenty-four inches (24") above finished grade. All sewer lateral ends shall be provided with a 3M or Engineer of Record approved equal magnetic marker. Magnetic markers shall be secured to top of lateral about twenty-four inches (24") underground, near cleanout, for CITY

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inspector to see during final plumbing tie-in inspection. At no time shall the connection to the lateral be made to the cleanout riser or any part of the vertical assembly. A single lateral shall be provided to each billable entity or a single lateral with a double wye shall be provided to each billable entity.

2.1.5 Manholes

Manholes shall be installed at the end of each wastewater main, at all changes in grade, size, or horizontal alignment, and at all main pipe intersections, shall be spaced at distances not greater than four hundred feet (400') and shall be placed in roads. For sanitary sewers with a diameter greater than fifteen inches (15"), the recommended maximum distance between manholes is four hundred fifty feet (450'). All gravity collection mains shall terminate in a precast manhole.

Minimum inside diameter of all manholes shall be four feet and zero inches (4'-0"). A drop pipe shall be provided for a sewer entering a manhole at an elevation of twenty-four inches (24") or more above the manhole invert. Drop manholes shall be constructed with an outside drop connection encased in concrete, as shown in the Utilities Detail Drawings. See FDEP Wastewater Checklist Form 62-604.300(8)(a), "Manholes" section, for further design requirements, as well as Specification Section 02607 and the Detail Drawings.

A master manhole shall be required when constructing a wastewater pumping/lift station. This manhole shall have only one effluent pipe to the pumping/lift station.

2.2. Force Mains

2.2.1 Pipe and Fitting Materials

Force main pipelines and fittings shall be a minimum of four inches (4") in diameter. All force mains between four and fourteen inches (4"-14") in diameter shall be constructed of PVC or HDPE pipe and shall utilize pipe meeting the requirements of the Technical Specifications. Force mains between sixteen inches and twenty-four inches (16" - 24") in diameter shall be constructed of ductile iron, HDPE, or PVC pipe. Force mains larger than twenty-four inches (24") in diameter shall be constructed of ductile iron pipe.

Deviations from the minimum 4" diameter pipeline design parameters shall only be approved in cases where such installations are necessary in order to comply with minimum FDEP velocity requirements. Whenever the minimum 4" diameter pipeline cannot be provided, CITY approval will be required. The Owner shall be responsible for maintaining 700 feet of the smaller diameter force main located within the CITY right of way. No check valve will be required.

Due to minimum velocity requirements as set forth by the FDEP, 1-1/2" diameter force mains may be required. If so, force mains shall conform to Section 2, Technical Specifications. All HDPE and PVC buried pipelines shall be color-coded as described in the Technical Specifications. Force main pipelines shall be green in color.

Buried force mains, except those installed by directional drill or jack-and-bore methods, shall be marked using plastic locator tape, impregnated with metallic filings for PVC pipe and non-magnetic for ductile iron pipe. The locator tape shall be placed in the pipe trench at two feet (2') below grade or one-half the depth of the pipe's bury, whichever is less, and labeled "WASTEWATER FORCE MAIN." 3M Brand full range wastewater magnetic markers or

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Engineer of Record approved equivalent shall be secured onto top of force main no greater than every two hundred fifty feet (250') and at all fittings and at any change of direction.

All force main aerial crossings shall be Pressure Class 350 flanged ductile iron pipe and shall be coated on the exterior using a suitable grade of Safety Green colored, field applied (or factory applied with field touch-up as required) epoxy coating. Specific color shall be subject to approval of the CITY Manager or designee. All nuts and bolts used in aerial crossings shall be stainless steel. All canal, river or creek crossings shall be aerial, unless otherwise approved by the CITY Manager or designee. Aerial crossings shall be designed to incorporate valves or other flow regulation devices in accordance with F.A.C. 62-604.400(2)(k)5. Aerial crossings shall be designed to maintain existing or required navigational capabilities within the waterway and to reserve riparian rights of adjacent property Owners. Submit aerial pipe and flange computations, including support and anchor design, for review. The submittal must be signed and sealed by a Florida registered Professional Engineer.

2.2.2 Design of Pipeline Size and Location

Force mains shall be sized to provide a desired flushing velocity of two and one-half feet (2.5') per second with a minimum allowable velocity of two feet (2') per second. The minimum size force main conveyed to the City shall be four inches (4") in diameter. When the Hazen-Williams formula is used to calculate friction losses through the force main, the value for "C" is 100 for unlined iron or steel pipes. For other smooth pipe materials, such as PVC, HDPE and lined ductile iron, the value for "C" shall not exceed 120.

Minimum cover for force mains shall be thirty inches (30"). Maximum cover shall be forty-eight inches (48") after final project grading is complete except when dipping under conflicts in which case the force main shall be returned to normal depth within ten feet (10') on either side of the conflict or as soon as possible using a fitting of forty-five degrees (45°) or less.

Force mains shall be interconnected with a gravity sewer system, for transmission purposes through that system, as shown in the Utility Standard Drawings, unless the connection is made directly in a terminus, upstream manhole at the manhole invert and the Engineer of Record has hydraulically demonstrated that connection to an in-line manhole will not cause a surge condition or disruption to the flow within the gravity sewer system. Connections to any manhole shall be made using a flexible boot with stainless steel strap. Thrust restraint transitioning to the manhole shall be designed by the Engineer and detailed on the construction drawings. No force main laterals shall be core bored into manholes.

Pipeline separation criteria and conflict crossings criteria shall conform to the requirements described in Part 1, Sections 1.2.3 and 1.3. Force mains shall not be placed beneath any existing or proposed building structure.

2.2.3 Valves

All connections of privately-owned and maintained wastewater force mains to the Wastewater Department's force mains shall be connected through a check valve housed in a structure as shown in the Utilities Detail Drawings which shall allow performance of required maintenance, and shall be owned and maintained by the property owner.

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Sufficient plug valves shall be provided to allow for zone isolation of wastewater transmission areas in order to limit the impact of line breaks. In-line gate valves shall be provided at no greater than one thousand foot (1,000') intervals per CITY requirements.

2.2.4 Force Main Extension Stubs

All main-line extension stubs to future developments and/or parcels shall terminate in a stub-out if it is part of a phased project. The stub-out shall end with a valve.

2.2.5 Air Release Assemblies

Air release assemblies shall be provided at all high points and on the upstream side of conflict crossings at which the force main passes under the conflict (unless it can be demonstrated by hydraulic analysis that air pockets will not accumulate at individual high points). A high point is defined by the hydraulic gradient and is considered the upper end of any pipe segment that slopes up to the hydraulic gradient or runs parallel to it. Air valves utilized on raw sewage facilities shall be designed and manufactured specifically for use with domestic sewage. The design engineer shall review and apply the pertinent provisions of AWWA-C512 and AWWA Manual of Water Supply Practices M51, "Air-Release, Air Vacuum, and Combination Air Valves". When installed, the air valve shall be provided with a shut-off valve to allow isolation and removal of the valve assembly. All air release assemblies shall be installed as shown in the Utilities Detail Drawings.

2.3 Pumping Stations

Wastewater pumping stations shall be designed and constructed in accordance with accepted engineering practices, regulatory requirements, Section 2 Technical Specifications, National Electrical Code (NEC) Requirements, and in the Utilities Detail Drawings.

Pumping Station sites located within high water tables shall be designed to withstand floatation forces when empty. The design shall consider the potential for damage or interruption of operation because of flooding. Pump station structures and electrical and mechanical equipment shall be designed to be protected from physical damage by the 100-year flood. Pump stations shall be designed to remain fully operational and accessible during the 25-year flood unless lesser flood levels are appropriate based on local considerations, but not less than the 10-year flood.

Pump stations shall be designed to be readily accessible by maintenance vehicles during all weather conditions. Pump stations shall be designed and located on the site to minimize adverse effects from odors, noise and lighting.

Pump stations shall be designed to avoid operational problems from the accumulation of grit.

The effective volume of wet wells shall be based on design average flows and a filling time not to exceed 30 minutes unless the facility is designed to provide flow equalization. The pump manufacturer's duty cycle recommendations shall be utilized in selecting the minimum cycling time.

2.4 Connections to CITY Facilities

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Connections to existing CITY wastewater mains shall be constructed as described in the Technical Specifications and shown in the Utilities Detail Drawings. These details shall apply to all connections to existing systems.

All projects shall be designed with no physical connections between a public or private potable water supply system and a sewer or force main and with no water mains passing through or coming into contact with any part of a sewer manhole.

2.5 Tests and Inspections

Tests and inspections of all wastewater systems or portion(s) thereof shall be performed in accordance with the Technical Specifications before acceptance of the systems or portions thereof by CITY.

END OF SECTION

SECTION 01010
SUMMARY OF WORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Description of Work
- B. CONTRACTOR's Use of Site
- C. Work Sequence
- D. City Occupancy

1.2 DESCRIPTION OF WORK

- A. General: The Work to be done under this Contract is shown on the drawings and specified in Contract Documents.
- B. The Work includes:
 - 1. Furnishing of all labor, material, superintendence, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies, services and other means of construction necessary or proper for performing and completing the Work.
 - 2. Sole responsibility for adequacy of plant and equipment.
 - 3. Maintaining the Work area and site in a clean and acceptable manner.
 - 4. Maintaining existing facilities in service at all times.
 - 5. Protection of finished and unfinished Work.
 - 6. Repair and restoration of Work or existing facilities damaged during construction.
 - 7. Furnishing as necessary proper equipment and machinery, of a sufficient capacity, to facilitate the Work and to handle all emergencies normally encountered in Work of this character.
 - 8. Furnishing, installing, and protecting all necessary guides, track rails, bearing plates, anchor and attachment bolts, and all other appurtenances needed for the installation of the devices included in the equipment

specified. Make anchor bolts of appropriate size, strength and material for the purpose intended. Furnish substantial templates and shop drawings for installation.

- C. Implied and Normally Required Work: It is the intent of these Specifications to provide the City with complete operable systems, subsystems and other items of Work. Any part or item of Work, which is reasonably implied or normally required to make each installation satisfactorily and completely operable, is deemed to be included in the Work and the Contract Amount. All miscellaneous appurtenances and other items of Work incidental to meeting the intent of these Specifications are included in the Work and the Contract Amount even though these appurtenances may not be specifically called for in these Specifications.
- D. Quality of Work: Regard the apparent silence of the Contract Documents as to any detail, or the apparent omission from them of a detailed description concerning any Work to be done and materials to be furnished as meaning that only the best general practice is to prevail and that only materials and workmanship of the best quality are to be used. Interpretation of these specifications will be made upon this basis.

1.3 CONTRACTOR'S USE OF SITE

- A. In addition to the requirements of the Supplemental Terms and Conditions, limit use of site and premises for work and storage to allow for the following:
 - 1. Coordination of the Work under this CONTRACT with the work of the other contractors where Work under this CONTRACT encroaches on the Work of other contractors.
 - 2. City occupancy and access to operate existing facilities.
 - 3. Coordination of site use with ENGINEER.
 - 4. Responsibility for protection and safekeeping of products under this CONTRACT.
 - 5. Providing additional off site storage at no additional cost to the City as needed.
- B. Use of Premises: Contractor shall confine all construction equipment, the storage of materials and equipment and the operations of workers to the Project Site and land and areas identified in and permitted by the Contract Documents and other lands and areas permitted by law, rights of way, permits and easements, and shall not unreasonably encumber the Project site with construction equipment or other material or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or any land or areas contiguous thereto, resulting from the performance of the Work.

EXHIBIT A-1

1.4 WORK SEQUENCE

- A. Construct Work in stages to accommodate the City's use of premises during construction period and in accordance with the limitations on the sequence of construction specified. Coordinate construction schedules and operations with ENGINEER. The Contractor shall not open up work to conflict with work already in progress. The Engineer may, however require the Contractor to finish a section on which work is in progress prior to starting another section.
- B. Coordinate Work of all subcontractors.

1.5 CITY OCCUPANCY

- A. The City will occupy premises during entire period of construction in order to maintain normal operations. Cooperate with the City's Manager or designee in all construction operations to minimize conflict, and to facilitate City usage.
- B. Conduct operations with the least inconvenience to the general public.

1.6 PROTECTION OF EXISTING UTILITIES

- A. In case of damage to existing utilities caused by construction activities, contact the owner of the utility or appropriate City department (Water or Wastewater) immediately. Repair any damage to existing utilities caused by construction activities in coordination with or as directed by the owner of the utility.

Contractor shall locate all existing roadways, railways, drainage facilities and utility services above, upon, or under the Project site, said roadways, railways, drainage facilities and utilities being referred to in this Section as the "utilities". Contractor shall contact the owners of all Utilities to determine the necessity for relocating or temporarily interrupting any Utilities during the construction of the Project. Contractor shall schedule and coordinate its Work around any such relocation or temporary service interruption. Contractor shall be responsible for properly shoring, supporting and protecting all Utilities at all times during the course of the Work. The Contractor shall conduct his work at all times such that adequate drainage is provided and shall not interfere with or block existing drainage facilities such as gutters, ditches, storm drains, or other drainage appurtenances. Existing fire hydrants adjacent to the project shall be kept accessible for fire apparatus at all times and no material or equipment shall be placed within 25 feet of any hydrant.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

- A. **Starting Work:** Start Work within 10 days following the date stated in the Notice to Proceed and execute with such progress as may be required to prevent delay to other contractors or to the general completion of the project. Execute Work at such items and in or on such parts of the project, and with such forces, material and equipment, as to complete the Work in the time established by the Contract. At all times, schedule and direct the Work so that it provides an orderly progression to completion within the specified time for completion. The Contractor shall obtain all necessary building permits prior to commencement of work. The Contractor shall become totally familiar with the requirements of all permits prior to start of work.

- B. **Intent of Contract Documents:** It is the intent of the Contract Documents to describe a functionally complete project (or portion thereof) to be constructed in accordance with the Contract Documents. Any work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result shall be supplied whether or not specifically called for. When words which have a well known technical or trade meaning are used to describe work, materials or equipment, such works shall be interpreted in accordance with that meaning. Reference to standards specifications, manuals or codes of any technical society, organization or association or to the laws or regulations of any governmental authority having jurisdiction over the Project, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, law or regulation in affect at the time the Work is performed, except as may be otherwise specifically stated herein.

If before or during the performance of the Work Contractor discovers a conflict, error or discrepancy in the Contract Documents, Contractor immediately shall report same to the Engineer in writing and before proceeding with the Work affected thereby shall obtain a written interpretation or clarification from the Engineer. Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to Contractor with the Contract Documents before commencing any portion of the Work.

Drawings are intended to show general arrangements, design and extent of work and are not intended to serve as shop drawings. Specifications are separated into divisions for convenience of reference only and shall not be interpreted as establishing divisions for the Work, trades, subcontracts, or extent of any part of the Work. In the event of a discrepancy between or among the drawings, specifications or other Contract Document provisions, Contractor shall be required to comply with the provision which is the more restrictive or stringent requirement upon the Contractor, as determined by the Engineer. Unless otherwise specifically mentioned, all anchors, bolts, screws, fittings, fillers, hardware, accessories, trim and other parts required in connection with any portion of the Work to make a complete, serviceable, finished and first quality installation shall be furnished and installed as part of the Work, whether or not called for by the Contract Documents.

- B. Investigation and Utilities: Contractor shall have the sole responsibility of satisfying itself concerning the nature and location of the Work and the general and local conditions, and particularly, but without limitation, with respect to the following: those affecting transportation, access, disposal, handling and storage of materials; availability and quality of labor; water and electric power; availability and condition of roads; work area; living facilities; climatic conditions and seasons; physical conditions at the work-site and the project area as a whole; topography and ground surface conditions; nature and quantity of the surface materials to be encountered; subsurface conditions; equipment and facilities needed preliminary to and during performance of the Work; and all other costs associated with such performance. The failure of Contractor to acquaint itself with any applicable conditions shall not relieve Contractor from any of its responsibilities to perform under the Contract Documents, nor shall it be considered the basis for any claim for additional time or compensation.
- C. Schedule: The Contractor, within ten (10) calendar days after receipt of the Notice of Award, shall prepare and submit to the Engineer, for review and approval, a progress schedule for the Project (herein "Progress Schedule"). The Progress Schedule shall relate to all Work required by the Contract Documents and shall provide for expeditious and practicable execution of the Work within the Contract Time. The Progress Schedule shall indicate the dates for starting and completing the various stages of the Work.

The Progress Schedule shall be updated monthly by the Contractor. All monthly updates to the Progress Schedule shall be subject to the Engineer's review and approval. Contractor shall submit the updates to the Progress Schedule with its monthly Applications for Payment noted below. The Engineer's review and approval of the submitted Progress Schedule updates shall be a condition precedent to the City's obligation to pay Contractor.

- D. Submittals and Substitutions: Contractor shall carefully examine the Contract Documents for all requirements for approval of materials to be submitted such as shop drawings, data, test results, schedules and samples. Contractor shall submit all such materials at its own expense and in such form as required by the Contract Documents in sufficient time to prevent any delay in the delivery of such materials and the installation thereof.

Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular supplier, the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other suppliers may be accepted by the City if sufficient information is submitted by Contractor to allow the City to determine that the material or equipment proposed is equivalent or equal to that named. Requests for review of substitute items of material and

equipment will not be accepted by the City from anyone other than Contractor and all such request must be submitted by Contractor to the Engineer within thirty (30) calendar days after Notice of Award is received by Contractor.

If Contractor wishes to furnish or use a substitute item of material or equipment, Contractor shall make application to the Engineer for acceptance thereof, certifying that the proposed substitute shall perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The application shall state that the evaluation and acceptance of the proposed substitute will not prejudice Contractor's achievement of substantial completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with the City for the Project) to adapt the design to the proposed substitute and whether or not the incorporation or use by the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service shall be indicated. The application also shall contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs for redesign and claims of other contractors affected by the resulting change, all of which shall be considered by the Engineer in evaluating the proposed substitute. The Engineer may require Contractor to furnish at Contractor's expense additional data about the proposed substitute.

If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to the Engineer, if Contractor submits sufficient information to allow the Engineer to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedures for submission to and review by the Engineer shall be the same as those provided herein for substitute materials and equipment.

The Engineer shall be allowed a reasonable time within which to evaluate each proposed substitute. The Engineer shall be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without the Engineer's and the City's prior written acceptance which shall be evidenced by either a Change Order or an approved Shop Drawing. The City may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

- I. Daily Reports, As-Builts and Meetings: Unless waived in writing, the Contractor shall complete and submit to the Engineer on a weekly basis a daily log of the Contractor's work for the preceding week in a format approved by the Engineer. The daily log shall document all activities of Contractor at the Project site including, but not limited to, the following:

EXHIBIT A-1

1. Weather conditions showing the high and low temperatures during work hours, the amount of precipitation received on the Project site, and any other weather conditions which adversely affect the Work;
2. Soil conditions which adversely affect the Work;
3. The hours of operation by Contractor's and subcontractor's personnel;
4. The number of Contractor's and subcontractor's personnel present and working at the Project site, by subcontract and trade;
5. All equipment present at the Project site, description of equipment use and designation of time equipment was used (specifically indicating any down time);
6. Description of Work being performed at the Project site;
7. Any unusual or special occurrences at the Project site;
8. Materials received at the Project site;
9. A list of all visitors to the Project site; and
10. Any problems that might impact either the cost or quality of the Work or the time of performance.

The daily log shall not constitute nor take the place of any notice required to be given by Contractor to the City pursuant to the Contract Documents.

Contractor shall maintain in a safe place at the Project site one record copy of the Contract Documents, including, but not limited to, all drawings, specifications, addenda, amendments, Change Orders, Work Directive Changes and Field Orders, as well as all written interpretations and clarifications issued by the Engineer, in good order and annotated to show all changes made during construction. The annotated drawings shall be continuously updated by the Contractor throughout the prosecution of the Work to accurately reflect all field changes that are made to adapt the Work to field conditions, changes resulting from Change Orders, Work Directive Changes and Field Orders, and all concealed and buried installations of piping, conduit and utility services. All buried and concealed items, both inside and outside the Project site, shall be accurately located on the annotated drawings as to depth and in relationship to not less than two (2) permanent features (e.g. interior or exterior wall faces). The annotated drawings shall be clean and all changes, corrections and dimensions shall be given in a neat and legible manner in a contrasting color. The "As-Built" record documents, together with all approved samples and a counterpart of all approved shop drawings shall be available to the Engineer for reference. Upon completion of the Work and as a condition precedent to the Contractor's entitlement to final payment, these "As-Built" record documents, samples and shop drawings shall be delivered to the Engineer by Contractor.

Contractor shall keep all records and supporting documentation which concern or relate to the Work hereunder for a minimum of five (5) years from the date of termination of this Agreement or the date the Project is completed, whichever is later. The City, or any duly authorized agents or representatives of the City, shall have the right to audit, inspect and copy all such records and documentation as often as they deem necessary during the period of this Agreement and during the five (5) year period noted above; provided, however, such activity shall be conducted only during normal business hours.

- L. Contract Time and Time Extensions: Should Contractor be obstructed or delayed in the prosecution of or completion of the Work as a result of unforeseeable causes beyond the control of the Contractor, and not due to its fault or neglect, including but not restricted to acts of God or of the public enemy, acts of government, fires, floods, epidemics, quarantine regulation, strikes or lockouts, Contractor shall notify the City in writing within forty-eight (48) hours after the commencement of such delay, stating the cause or causes thereof, or be deemed to have waived any right which Contractor may have had to request a time extension.

No interruption, interference, inefficiency, suspension or delay in the commencement or progress of the Work from any cause whole or in part, shall relieve Contractor of his duty to perform or give rise to any right to damages or additional compensation from the City. Contractor expressly acknowledges and agrees that it shall receive no damages for delay. Contractor's sole remedy, if any, against the City will be the right to seek an extension to the Contract Time; provided, however, the granting of any such time extension shall not be a condition precedent to the aforementioned "No Damage For Delay" provision. This paragraph shall expressly apply to claims for early completion, as well as to claims based on late completion.

- N. Changes in Work: The City shall have the right at any time during the progress of the Work to increase or decrease the Work. Promptly after being notified of a change, Contractor shall submit an itemized estimate of any cost or time increases or savings it foresees as a result of the change. Except in an emergency endangering life or property, or as expressly set forth herein, no addition or changes to the Work shall be made except upon written order of the City, and the City shall not be liable to the Contractor for any increased compensation without such written order.
- O. Claims and Disputes: A claim is a demand or assertion by one of the parties seeking an adjustment or interpretation of the terms of the Contract Documents, payment of money, extension of time or other relief with respect to the terms of the Contract Documents. The term "Claim" also includes other disputes and matters in question between the City and Contractor arising out of or relating to the Contract Documents.

The responsibility to substantiate a Claim shall rest with the party making the Claim.

Claims by the Contractor shall be made in writing to the City within forty-eight (48) hours after the first day of the event giving rise to such Claim or else the Contractor shall be deemed to have waived the Claim. Written supporting data shall be submitted to the City within fifteen (15) calendar days after the occurrence of the event, unless the City grants additional time in writing, or else the Contractor shall be deemed to have waived the Claim.

The Contractor shall proceed diligently with its performance as directed by the City, regardless of any pending claim, action, suit or administrative proceeding, unless otherwise agreed to by the City in writing. The City shall continue to make payments in accordance with the Contract Documents during the pendency of any Claim.

- P. Other Work: The City may perform other work related to the Project at the site by the City's own forces, have other work performed by utility owners or let other direct contracts. If the fact that such other work is to be performed is not noted in the Contract Documents, written notice thereof will be given to Contractor prior to starting any such other work. If Contractor believes that such performance will involve additional expense to Contractor or require additional time, Contractor shall send written notice of that fact to the City within forty-eight (48) hours of being notified of the other work. If the Contractor fails to send the above required forty-eight (48) hour notice, the Contractor will be deemed to have waived any rights it otherwise may have had to seek an extension to the Contract Time or adjustment to the Contract Amount.

Contractor shall afford each utility owner and other contractor who is a party to such a direct contract (or the City, if the City is performing the additional work with the City's employees) proper and safe access to the site and a reasonable opportunity for execution of such work and shall properly connect and coordinate its Work with theirs. Contractor shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of the Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this paragraph are for the benefit of such utility owners and other Contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between the City and such utility owners and other contractors.

If any part of Contractor's Work depends for proper execution or results upon the work of any other contractor or utility owner (or the City), Contractor shall inspect and promptly report to the Engineer in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results.. Contractor's failure to report will constitute an acceptance of the other work as fit and proper for integration with Contractor's Work.

- Q. Compliance with Laws: Contractor agrees to comply, at its own expense, with all federal, state and local laws, codes, statutes, ordinances, rules, regulations and requirements applicable to the Project, including but not limited to those dealing with taxation, worker's compensation, equal employment and safety (including, but not limited to, the Trench Safety Act, Chapter 553, Florida Statutes). If Contractor observes that the Contract Documents are at variance therewith, it shall promptly notify the Engineer in writing.
- R. Assignment: Contractor shall not assign this Agreement or any part thereof, without the prior consent in writing of the City. If Contractor does, with approval,

assign this Agreement or any part thereof, it shall require that its assignee be bound to it and to assume toward Contractor all of the obligations and responsibilities that Contractor has assumed toward the City.

- S. Permits, Licenses and Taxes: Pursuant to Section 218.80, F.S., the City will pay for all permits and fees, including license fees, permit fees, impact fees or inspection fees applicable to the work through an internal budget transfer(s). Contractor is not responsible for paying for permits issued by The City of Naples, but is responsible for acquiring all permits.

All permits, fees and licenses necessary for the prosecution of the Work which are not issued by the City shall be acquired and paid for by the Contractor unless otherwise noted.

- T. Termination for Default: Contractor shall be considered in material default of the Agreement and such default shall be considered cause for the City to terminate the Agreement, in whole or in part, as further set forth in this Section, if Contractor: (1) fails to begin the Work under the Contract Documents within the time specified herein; or (2) fails to properly and timely perform the Work as directed by the Engineer or as provided for in the approved Progress Schedule; or (3) performs the Work unsuitably or neglects or refuses to remove material or to correct or replace such Work as may be rejected as unacceptable or unsuitable; or (4) discontinues the prosecution of the Work; or (5) fails to resume Work which has been suspended within a reasonable time after being notified to do so; or (6) becomes insolvent or is declared bankrupt, or commits any act of bankruptcy; or (7) allows any final judgment to stand against it unsatisfied for more than ten (10) days; or (8) makes an assignment for the benefit of creditors; or (9) fails to obey any applicable codes, laws, ordinances, rules or regulations with respect to the Work; or (10) materially breaches any other provision of the Contract Documents.

The City shall notify Contractor in writing of Contractor's default(s). If the City determines that Contractor has not remedied and cured the default(s) within seven (7) calendar days following receipt by Contractor of said written notice, then the City, at its option, without releasing or waiving its rights and remedies against the Contractor's sureties and without prejudice to any other right or remedy it may be entitled to hereunder or by law, may terminate Contractor's right to proceed under the Agreement, in whole or in part, and take possession of all or any portion of the Work and any materials, tools, equipment, and appliances of Contractor, take assignments of any of Contractor's subcontracts and purchase orders, and complete all or any portion of Contractor's Work by whatever means, method or agency which the City, in its sole discretion, may choose.

If the City deems any of the foregoing remedies necessary, Contractor agrees that it shall not be entitled to receive any further payments hereunder until after the Project is completed. All monies expended and all of the costs, losses, damages and extra expenses (including Engineer and attorney's fees) or damages incurred by The City incident to such completion, shall be deducted from the Contract Amount, Contractor agrees to pay promptly to the City on demand the full amount (including appeals) and interest thereon at the maximum legal rate of interest until

paid. If the unpaid balance of the Contract Amount exceeds all such costs, expenditures and damages incurred by the City to complete the Work, such excess shall be paid to the Contractor. The amount to be paid to the Contractor, shall be approved by the Engineer, upon application, and this obligation for payment shall survive termination of the Agreement.

The liability of Contractor hereunder shall extend to and include the full amount of any and all sums paid, expenses and losses incurred, damages sustained, and obligations assumed by The City in good faith under the belief that such payments or assumptions were necessary or required, in completing the Work and providing labor, materials, equipment, supplies, and other items therefore or re-letting the Work, and in settlement, discharge or compromise of any claims, demands suits, and judgments pertaining to or arising out of the work hereunder.

If, after notice of termination of contractor's right to proceed pursuant to this Section, it is determined for any reason that Contractor was not in default, or that its default was excusable, or that the City is not entitled to the remedies against Contractor provided herein, then Contractor's remedies against the City shall be the same as and limited to those afforded Contractor under "Completion" section below.

- U. Termination for Convenience and Right of Suspension: The City shall have the right to terminate this Agreement without cause upon seven (7) calendar days written notice to Contractor. In the event of such termination for convenience, Contractor's recovery against the City shall be limited to that portion of the Contract Amount earned through the date of termination, together with any retainage withheld and reasonable termination expenses incurred, but Contractor shall not be entitled to any other or further recovery against the City, including, but not limited to, damages or any anticipated profit on portions of the Work not performed.

The City shall have the right to suspend all or any portions of the Work upon giving Contractor not less than two (2) calendar days' prior written notice of such suspension. If all or any portion of the Work is so suspended, Contractor's sole and exclusive remedy shall be to seek an extension of time to its schedule in accordance with the procedures set forth in the Contract Documents. In no event shall the Contractor be entitled to any additional compensation or damages. Provided, however, if the ordered suspension exceeds six (6) months, the Contractor shall have the right to terminate the Agreement with respect to that portion of the Work which is subject to the ordered suspension.

- V. Completion: When the entire Work (or any portion thereof designated in writing by the City) is ready for its intended use, Contractor shall notify the Engineer in writing that the entire Work (or such designated portion) is substantially complete and request that the Engineer issue a Certificate of Substantial completion (or Certificate of Partial Substantial Completion). Within a reasonable time thereafter, the City, Contractor and Engineer shall make an inspection of the Work (or designated portion thereof) to determine the status of completion. If the City and Engineer do not consider the Work (or designated portion) substantially complete,

the Engineer shall notify Contractor in writing giving the reasons therefore. If the City and Engineer consider the Work (or designated portion) substantially complete, the Engineer shall prepare and deliver to Contractor a Certificate of Substantial Completion (or Certificate of Partial Substantial Completion) which shall fix the date of Substantial Completion for the entire Work (or designated portion thereof) and include a tentative punchlist of items to be completed or corrected by Contractor before final payment. The City shall have the right to exclude Contractor from the Work and Project site (or designated portion thereof) after the date of Substantial Completion, but the City shall allow Contractor reasonable access to complete or correct items on the tentative punchlist.

Upon receipt of written certification by Contractor that the Work is completed in accordance with the Contract Documents and is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Engineer will make such inspection and, if he finds the Work acceptable and fully performed under the Contract Documents, he shall promptly issue a final Certificate for Payment, recommending that, on the basis of his observations and inspection, and the Contractor's certification that the Work has been completed in accordance with the terms and conditions of the Contract Documents, that the entire balance found to be due Contractor is due and payable. Neither the final payment nor the retainage shall become due and payable until Contractor submits: all data establishing payment or satisfaction of all obligations, such as receipts, releases and waivers of liens, arising out of the Contract Documents, to the extent and in such form as may be designated by the City. The City reserves the right to inspect the Work and make an independent determination as to the Work's acceptability, even though the Engineer may have issued his recommendations. Unless and until the City is completely satisfied, neither the final payment nor the retainage shall become due and payable.

- W. Warranty: Contractor shall obtain and assign to the City all express warranties given to Contractor or any subcontractors by any materialmen supplying materials, equipment or fixtures to be incorporated into the project. Contractor warrants to the City that any materials and equipment furnished under the Contract Documents shall be new unless otherwise specified, and that all Work shall be of good quality, free from all defects and in conformance with the Contract Documents. Contractor further warrants to the City that all materials and equipment furnished under the Contract Documents shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturers, fabricators, suppliers or processors except as otherwise provided for in the Contract Documents. If, within one (1) year after final completion, any Work is found to be defective or not in conformance with the Contract Documents, Contractor shall correct it promptly after receipt of written notice from the City. Contractor shall also be responsible for and pay for replacement or repair of adjacent materials or Work which may be damaged as a result of such replacement or repair. These warranties are in addition to those implied warranties to which the City is entitled as a matter of law.

- X. Supervision and Superintendents: Contractor shall plan, organize, supervise, schedule, monitor, direct and control the work competently and efficiently,

devoting such attention thereto and applying such skills and expertise as may be necessary to perform the work in accordance with the contract documents. Contractor shall be responsible to see that the finished work complies accurately with the Contract Documents. Contractor shall keep on the Work at all times during its progress a competent resident superintendent, who shall not be replaced without prior written notice to the Engineer except under extraordinary circumstances. The superintendent shall be Contractor's representative at the Project site and shall have authority to act on behalf of Contractor. All communications given to the superintendent shall be as binding as if given to the Contractor. The City shall have the right to direct Contractor to remove and replace its Project superintendent, with or without cause.

- Y. Protection of Work: Contractor shall fully protect the Work from loss or damage and shall bear the cost of any such loss or damage until final payment has been made. If Contractor or any one for whom Contractor is legally liable for is responsible for any loss or damage to the Work, or other work or materials of the City or the City's separate contractors, Contractor shall be charged with the same, and any monies necessary to replace such loss or damage shall be deducted from any amounts due Contractor.

Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

Contractor shall not disturb any benchmark established by the Engineer with respect to the Project. If Contractor, or its subcontractors, agents or anyone for whom Contractor is legally liable, disturbs the Engineer's benchmark, Contractor shall immediately notify The City and Engineer. The Engineer shall reestablish the benchmark and Contractor shall be liable for all costs incurred by The City associated therewith.

- Z. Emergencies: In the event of an emergency affecting the safety or protection of persons or Work or property at the Project site of adjacent thereto, Contractor, without special instructions or authorization from the City or Engineer is obligated to act to prevent threatened damage, injury or loss. Contractor shall give Engineer written notice within forty-eight (48) hours after the occurrence of the emergency, if Contractor believes that after the occurrence of the emergency, if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If the Engineer determines that a change in the Contract Documents is required because of the action taken in response to an emergency, a Change Order shall be issued to document the consequences of the changes or variations. If Contractor fails to provide the forty-eight (48) hour written notice noted above, the Contractor shall be deemed to have waived any right it otherwise may have had to seek an adjustment to the Contract Amount or an extension to the Contract Time.

- Z1. Project Meetings: Prior to the commencement of Work, the Contractor shall attend a preconstruction conference with the Engineer and others as appropriate to discuss the Progress Schedule, procedures for handling shop drawings and other

submittals, and for processing Applications for Payment, and to establish a working understanding among the parties as to the Work. During the prosecution of the Work, the Contractor shall attend any and all meetings convened by the Engineer or the City with respect to the Project, when directed to do so. Contractor shall have its subcontractors and suppliers attend all such meetings (including the preconstruction conference) as may be directed by the City or Engineer.

- Z2. Traffic Control Plan: A traffic control plan to support the Contractor's operations shall be submitted at least 72 hours prior to commencing work that shall conform to the Florida Department of Transportation's "Manual on Traffic Control and Safe Practices" which shall be obtained by the Contractor at his expense.
- Z3. Hours of Work: Work within the travelled way of the project shall commence no earlier than 7:00 a.m. local time and be completed no later than 7:00 p.m. local time. Hours of work may be altered at any time at the discretion of the City.
- Z4. Tax Exemption: The City of Naples is exempt from the payment of sales or use tax. The tax exemption certificate number is: 85-8012621645C-0.

PART 4 SAFETY

A. Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

- 1. All employees on the Work and other persons and/or organizations who may be affected thereby;
- 2. All the Work and materials and equipment to be incorporated therein, whether in storage on or off the Project site; and
- 3. Other property on Project site or adjacent thereto, including trees, shrubs, walks, pavements, roadways, structures, utilities and any underground structures or improvements not designated for removal, relocation or replacement in the Contract Documents.

B. Contractor shall comply with all applicable codes, laws, ordinances, rules and regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. Contractor shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of underground structures and improvements and utility-owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation or replacement of their property. Contractor's duties and responsibilities for the safety and protection of the Work shall continue until such time as the Work is completed and final acceptance of same by The City has occurred.

- C. Contractor shall designate a responsible representative at the Project site whose duty shall be the prevention of accidents. This person shall be Contractor's superintendent unless otherwise designated in writing by Contractor to The City.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 01026

MEASUREMENT AND PAYMENT

Applies only to City of Naples Utilities Projects and Utilities Portions of City of Naples Stormwater, Streets and Traffic Projects, but not to Private Developments

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Explanation and Definitions
- B. Measurement
- C. Payment
- D. Schedule of Values

1.2 EXPLANATION AND DEFINITIONS

- A. The following explanation of the Measurement and Payment for the Bid Schedule items is made for information and guidance. The omission of reference to any item in this description shall not, however, alter the intent of the Bid Schedule or relieve the CONTRACTOR of the necessity of furnishing such as a part of the Contract. Measurement and payment for all Contract Items shall be made in accordance with this section or as modified by the Supplemental Terms and Conditions.

1.3 MEASUREMENT

- A. The quantities set forth in the Bid Schedule are approximate and are given to establish a uniform basis for the comparison of bids. The CITY reserves the right to increase or decrease the quantity of any class or portion of the work during the progress of construction in accord with the terms of the Contract.

1.4 PAYMENT

- A. Make payment for the items listed on the Bid Schedule on the basis of the work actually performed and completed, such work including but not limited to, the furnishing of all necessary labor, materials, equipment, transportation, clean up, restoration of disturbed areas, and all other appurtenances to complete the construction and installation of the work as shown on the drawings and described in the specifications.
- B. Unit prices are used as a means of computing the final figures for bid and Contract purposes, for periodic payments for work performed, for determining value of additions or deletions and wherever else reasonable.

EXHIBIT A-1

1.5 SCHEDULE OF VALUES

- A. Approval of Schedule: Submit for approval a preliminary schedule of values, in duplicate, for all of the Work. Prepare preliminary schedule in accordance with the Supplemental Terms and Conditions. Submit preliminary schedule of values within 10 calendar days after the Effective Date of the Agreement. Submit final schedule of values in accordance with the Supplemental Terms and Conditions.
- B. Format: Utilize a format similar to the Table of Contents of the Project Specifications. Identify each line item with number and title of the major specification items. Identify site mobilization, bonds and insurance. Include within each line item, a direct proportional amount of CONTRACTOR's overhead profit.
- C. Revisions: With each Application for Payment, revise schedule to list approved Change Orders.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 MEASUREMENT AND PAYMENT

- A. Make payment on the basis of work actually performed completing each item in the Bid, such work including, but not limited to, the furnishing of all necessary labor, materials, equipment, transportation, cleanup, and all other appurtenances to complete the construction and installation of the work to the configuration and extent as shown on the drawings and described in the specifications. Payment for each item includes compensation for cleanup and restorations. Cost of cleanup and surface restorations (including pavement replacement) will be considered as the percentage retained in accordance with the Contract Documents, and complete payment will not be made until cleanup, restorations and as-builts are completed.
 - 1. Mobilization: Payment for mobilization will be made for at the Contract lump sum price.
 - 2. Performance and Payment Bond Premiums and Insurance:
 - 3. Furnish and Install Utility Pipelines: Payment for furnishing and installing utility pipelines (various sizes and types) will be made at the Contract unit price per lineal foot for the pipe in place. This item includes clearing and disposal of trees and bushes, all necessary fittings, pipe coatings and linings, connections to existing mains, labor, equipment and materials for the

furnishing and laying of the pipe, signs, maintenance of traffic, dewatering, compaction, pipe bedding, backfilling, sheeting, restrained joint piping, detectable tape, clamps, harnessing, plugs and caps, adapters, excavation of all material encountered, including rock, backfill, replacement of grass, sod, clearing and grubbing, landscaping, pavement, driveways, sidewalks, mailboxes, culverts, storm sewers, and other surface materials not specifically designated in the Bid, coordination with other contractors, stubs and valves for future connections to existing pipes, clean-up, disinfection and sterilization, temporary facilities for testing and tests. Measure pipe to the nearest foot along the centerline including the lengths of manholes, valves and fittings. Measure lineal footage horizontally. Measure cuts from proposed grade to the invert elevation of the pipe. Pipe installed within casing pipe is included in this item.

4. Furnish and Install Standard Precast Concrete Sanitary Sewer Manholes: Payment for furnishing and installing standard precast concrete sanitary manholes will be made at the unit price per manhole acceptably installed. This item includes all excavation, backfilling, compacted gravel or crushed stone bedding, sheeting, shoring, dewatering, concrete work and reinforcing, protection of adjacent facilities, manhole frames and covers, coatings and linings, manhole joints, bottom channels and sanitary sewer connections. Conform all manholes to the City Standard Details. This item does not include outside drop manholes or standard precast shallow manholes. Measure cuts from proposed grade to the invert elevation of the sewer.
5. Furnish and Install Outside Drop Manholes: Payment for furnishing and installing outside drop manholes will be made at the unit price per drop manhole acceptably installed. This item includes all excavation, backfilling, compacted gravel or crushed stone bedding, sheeting, shoring, dewatering, concrete work and reinforcing, drop pipes and pipe connections, plugs for future connections, protection of adjacent facilities, manhole frames and covers, coatings and linings, manhole joints, bottom channels and sanitary sewer connections. Conform all outside drop manholes to the Drop Manhole detail shown on the Plans. Measure cuts from proposed grade to the invert elevation of the sewer.
6. Furnish and Install Valves and Boxes: Payment for furnishing and installing valves will be made at the appropriate Contract unit price per valve acceptably installed. This item includes the valve, valve box, vault or housing, concrete work, operators, incidentals, and all necessary labor, materials and equipment for installation, including valve stem, valve box extensions and adjustments. This item also includes the installation of base material below the valve in accordance with the detail shown in the Plans.
7. Furnish and Install Air Release Valves: Payment for furnishing and installing air release valves will be made at the appropriate Contract unit price per air release valve acceptably installed. This item includes the valve, valve box, concrete work, operators, stems, incidentals, and all necessary labor, materials and equipment for installation including valve box extensions and

adjustments. This item also includes the installation of base material below the valve in accordance with the detail shown in the Plans.

8. Furnish and Install Fire Hydrant Assemblies: Payment for the furnishing and installing of fire hydrant assemblies will be made at the Contract unit price for each fire hydrant assembly acceptably installed. This item includes the tee installed on the utility main, all necessary fittings, joint restraint from the valve to the tee, necessary piping from the tee to the hydrant location with the installation of barrel section to meet finished grade, control gate valve, valve box and any concrete work. Be responsible to set the hydrant to grade in accordance with the detail shown on the Plans.
9. Furnish and Install Permanent Blow-offs: Payment for furnishing and installing permanent blow-offs will be made at the appropriate Contract unit price per blow-off acceptably installed. This item includes the reinforced concrete thrust collar, piping, making pipe connections, valves, meter box, tie rods and all other work for a complete installation. Conform all permanent blow-offs to the Standard Details.
10. Furnish and Install Temporary Blow-offs: Tapping Sleeve and Valve: Payment for furnishing and installing temporary blow-offs will be made at the appropriate Contract unit price per blow-off acceptably installed. This item includes the reinforced concrete thrust collar, piping, making pipe connections, valves, meter box, tie rods and all other work for a complete installation. Conform all temporary blow-offs to the detail shown on the Plans.
11. Furnish and Install Tapping Sleeves and Valves: Payment for furnishing and installing tapping sleeves and valves will be made at the appropriate Contract unit price per tapping sleeve and valve acceptably installed. This item includes all piping, making pipe connections, tapping sleeve, valve and valve box, restrained joints, and all other work for a complete installation.
12. Furnish and Install Bacteriological Sample Points: Payment for furnishing and installing bacteriological sample points will be made at the appropriate Contract unit price per bacteriological sample point. This item includes valve, tubing, fittings, enclosure, all concrete, removal of temporary sample point, and incidentals necessary for a complete installation as shown on the drawings and as specified herein.
13. Furnish and Install Pump Station: Payment for the furnishing and installing the pump station will be made for at the Contract lump sum price for the pump station acceptably installed. This item includes pumps, wet well structure, valve vault structure, fence, stainless steel hardware, aluminum wet well cover, aluminum valve vault cover, coatings, valves, pipe, fittings, water service, panel, electrical hardware, electrical connection, electrical controls, telemetry, driveway, culvert, and all necessary materials and labor to complete the pump station in accordance with the project plans. Also included is the cost to connect electrical power to the pump station.

Schedule with Florida Power and Light to place the pump station into service.

14. Furnish and Install Sanitary Sewer Services: Payment for furnishing and installing sanitary sewer services will be made at the appropriate Contract unit price per linear foot for P.V.C. and ductile iron pipe sewer service acceptably installed. This item includes all labor, equipment and materials for furnishing and installing all necessary pipe, fittings, connections, solids sleeves and adapters, protection of existing utilities and facilities, excavation, pipe bedding, sheeting, shoring, dewatering, compaction, cleanouts, service markers, plugs, removal and replacement of grass, sod, shrubs, pavement, driveways, culverts and storm sewers, mailboxes, sidewalks and other surface materials not specifically designated in the Bid, cleanup, testing, and all other work for a complete installation.
15. Furnish and Install Water Services: Payment for furnishing and installing water services will be made at the appropriate Contract unit price for each polyethylene short side and long side service acceptably installed. This item includes all labor, equipment and materials for furnishing and installing all necessary pipe, fittings, connections, casing pipes, meter stops, meter box, tapping sleeves, protection of existing utilities and facilities, excavation, pipe bedding, dewatering, compaction, removal and replacement of grass, sod, shrubs, pavement, driveways, culverts and storm sewers, mailboxes, sidewalks and other surface materials not specifically designated in the Bid, cleanup, testing and all other work for a complete installation.
16. Remove and Replace Driveway: Payment for removing and replacing driveway will be made at the appropriate Contract Unit price per square yard of concrete or asphalt driveway shown on the Plans to be removed and replaced for water main construction. Replace driveways to match existing elevations and materials of construction. Include surface restoration required for driveway removal and replacement in this item.
17. Remove and Replace Street Pavement Surface and Base: Payment for removing and replacing street pavement surface and base will be made at the appropriate Contract unit price per square yard for pavement surface and base installed in the work. Replace all pavement surface and base in accordance with the City of Naples Standard Details and details shown on the Plans.
18. Furnish and Install Pipeline Interconnection: Payment for furnishing and installing the pipeline interconnection will be made at the Contract lump sum price for the interconnection acceptably installed. This item includes all labor, equipment and materials to install all necessary pipe, fittings, connections, tapping sleeve and valve with valve box, field measurements, protection of existing facilities, excavation, pipe bedding, dewatering, compaction, surface restoration, testing, cleanup and all other work for a complete installation.

19. Furnish and Install Unreinforced Concrete: Payment for furnishing and installing unreinforced concrete will be made at the Contract unit price per cubic yard for all unreinforced concrete installed as ordered in writing by the ENGINEER. Conform all unreinforced concrete to the technical specifications. All unreinforced concrete installed in the work not shown on the Plans and not ordered by the ENGINEER in writing will not be measured for payment.
20. Furnish and Install Additional Fittings: Payment for furnishing and installing additional fittings will be made at the Contract unit price per ton for additional fittings installed in the work as ordered in writing by the ENGINEER. All fittings installed in the work not shown on the plans and not ordered by the ENGINEER in writing will not be measured for payment.
21. Rock Excavation: Payment for Rock Excavation will be made at the Contract unit price for the actual volume of rock excavated as defined in the Technical Specifications, measured in place within the limits outlined below, or as ordered by the Engineer. The limits for rock excavation for pipes in open cut will be a horizontal plane 6 inches below the lower outside surface of the pipe barrel and the surface of the rock and vertical planes passing 2 feet outside the horizontal diameter of the pipe barrel. Notify the Engineer in writing a sufficient time in advance of the beginning of any rock excavation, so that sufficient elevations and measurements may be obtained. No payment will be made for any rock material excavated or removed before these measurements have been taken.
22. Additional Earth Excavation: Payment for Additional Earth Excavation will be made at the Contract unit price for the total volume of excavation, as ordered in writing by the Engineer, beyond and outside the established lines and grades which would have controlled and been maintained had not the additional excavation been ordered. Additional earth excavation for placement of selected fill material other than that for pipe bedding is included under this item.
23. Additional Fill Material: Payment for Additional Fill Material, obtained from sources other than excavations in this Contract, will be made at the Contract unit price for the actual compacted volume of fill material placed within the payment limits shown on the Plans or established by the Engineer. Order all Additional Fill Material in writing by the Engineer. This item includes disposal of surplus excavated material. Fill material used to fill voids resulting from unauthorized excavation, or where required for dewatering, will not be measured for payment even though the Engineer orders their use. Fill material used for pipe bedding is not included under this item.
24. Jack and Bore Crossing: Payment for furnishing and installing jack and bore crossings will be made at the Contract unit price per linear foot of steel casing installed including all labor, material, equipment and incidentals necessary to install one linear foot of steel casing, regardless of depth of cover in accordance with these specifications. Include price for steel casing

material, including spacers and identification tape, clearing and grubbing, removal of pavement, driveways, sidewalks, trenching, rock excavation, disposal of non-usable excavated material, bedding, laying, backfilling, grassing, sodding, replacement of pavement, driveways, and sidewalks, cleanup and all appurtenances. Measurement for payment will be made horizontally along the centerline of installed casing.

25. Conflict Crossings: Payment for furnishing and installing a complete conflict crossing will be made at the Contract unit price per conflict crossing including pipe, fittings, joint restraints, concrete work, and incidentals necessary for a complete installation as shown on the Drawings and as specified herein.
 26. Utility Locates: Payment for locating utilities will be made at the Contract unit price for locating utilities including labor, material, equipment and incidentals necessary to determine the horizontal and vertical location of an existing utility underground regardless of depth. Price is to also include potholing, soft dig, excavation locating, backfilling, pavement repair, cleanup, sodding, and all appurtenances.
 27. Irrigations Sleeves: Payment for furnishing and installing various sizes of conduit will be made at the contract unit price for irrigation sleeves for all labor, material, and equipment necessary to install complete one linear foot of conduit. Price is to also include locator discs, trenching, directional boring under existing pavement, cleanup and all appurtenances.
 28. Maintenance of Traffic: Payment for maintenance of traffic in accordance with the CITY Maintenance of Traffic Policy will be made for at the Contract lump sum price.
- B. Prior to submitting first monthly Application for Payment, Contractor shall submit to Engineer, for review and approval, a schedule of values based upon the Contract Price, listing the major elements of the Work and the dollar value for each element. After its approval by the Engineer, this schedule of values shall be used as the basis for the Contractor's monthly Applications for Payment.
 - C. Prior to submitting first monthly Application for Payment, Contractor shall submit to The City a complete list of all its proposed subcontractors and materialmen, showing the work and materials involved and the dollar amount of each proposed subcontract and purchase order. The first Application for Payment shall be submitted no earlier than thirty (30) days after the Commencement Date.
 - D. If payment is requested on the basis of materials and equipment not incorporated into the Project, but delivered and suitably stored at the site or at another location agreed to by the City in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that the City has received the materials and equipment free and clear of all liens, charges, security interests and encumbrances, together with evidence that the materials and equipment are covered by appropriate property insurance and other

arrangements to protect the City's interest therein, all of which shall be subject to the City's satisfaction.

- E. Contractor shall submit six (6) copies of its monthly Application for Payment to the Engineer on or before the 25th day of each month for work performed during the previous month. Invoices received after the 25th day of each month shall be considered for payment as part of the next month's application. Within ten (10) calendar days after receipt of each Application for Payment, the Engineer shall either:
1. indicate his approval of the requested payment;
 2. indicate his approval of only a portion of the requested payment, stating in writing his reasons therefore; or
 3. return the Application for Payment to the Contractor indicating, in writing, the reason for refusing to approve payment.

In the event of a total denial and return of the Application for Payment by the Engineer, the Contractor may make the necessary corrections and resubmit the Application for Payment. The City shall, within thirty (30) calendar days after the Engineer's approval of an Application for Payment, pay the Contractor the amounts so approved. Provided, however, in no event shall the City be obligated to pay any amount greater than that portion of the Application for Payment approved by the Engineer.

- F. The City shall retain ten (10%) of the gross amount of each monthly payment request or ten percent (10%) of the portion thereof approved by the Engineer for payment, whichever is less. Such sum shall be accumulated and not released to the Contractor until final payment is due.
- G. Monthly payments to Contractor shall in no way imply approval or acceptance of Contractor's work.
- H. Contractor agrees and understands that funding limitations exist and that the expenditure of funds must be spread over the duration of the Project at regular intervals based on the Contract Amount and Progress Schedule. Accordingly, prior to submitting its first monthly Application for Payment, Contractor shall prepare and submit for the Engineers review and approval, a detailed Project Funding Schedule, which shall be updated as necessary and approved by the City to reflect approved adjustments to the Contract Amount and Contract Time. No voluntary acceleration or early completion of the Work shall modify the time of payments to Contractor as set forth in the approved Project Funding Schedule.

3.2 PAYMENTS WITHHELD

- A. The Engineer may decline to approve any Application for Payment, or portions thereof, because of subsequently discovered evidence or subsequent inspections. The Engineer may nullify the whole or any part of any approval for payment

EXHIBIT A-1

previously issued and the City may withhold any agreement between the City and Contractor, to such an extent as may be necessary in the City's opinion to protect it from loss because of:

1. Defective Work not remedied;
 2. Third party claims filed or reasonable evidence indicating probable filing of such claims
 3. Failure of Contractor to make payment properly to subcontractors or for labor, materials or equipment;
 4. Reasonable doubt that the Work can be completed for the unpaid balance of the Contract Amount;
 5. Reasonable indication that the Work will not be completed within the Contract Time;
 6. Unsatisfactory prosecution of the Work by the Contractor; or
 7. Any other material breach of the Contract Documents.
- B. If these conditions in Subsection 5.1 are not remedied or removed, the City may, after three (3) days written notice, rectify the same at Contractor's expense. The City also may offset against any sums due Contractor the amount of any liquidated or unliquidated obligations of Contractor whether relating to or arising out of this Agreement or any other agreement between Contractor and the Engineer.

3.3 FINAL PAYMENT

- A. The City shall make final payment to Contractor within thirty (30) calendar days after the Work is finally inspected and accepted by both the City and the Engineer in accordance with Section 20.1 herein provided that Contractor first, and as an explicit condition precedent to the accrual of Contractor's right to final payment, shall have furnished the City with any and all documentation that may be required by the Contract Documents and the City.
- B. Contractor's acceptance of final payment shall constitute a full waiver of any and all claims by Contractor against the City arising out of this Agreement or otherwise relating to the Project, except those previously made in writing and identified by Contractor as unsettled at the time of the final Application for Payment. Neither the acceptance of the Work nor payment by the City shall be deemed to be a waiver of the City's right to enforce any obligations of Contractor hereunder or to the recovery of damages for defective Work not discovered by the Engineer at the time of final inspection.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 01045

CONNECTIONS TO EXISTING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General Requirements
- B. Submittals
- C. Scheduling of Shutdown

1.2 RELATED SECTIONS

- A. Section 01010 - Summary of Work
- B. Section 01500 - Construction Facilities and Temporary Controls
- C. Section 01570 – Traffic Regulations and Public Safety
- D. Section 02575 - Pavement Repair and Restoration

1.3 GENERAL REQUIREMENTS

- A. Be responsible for all connection to existing systems, cutting, fitting and patching, including attendant excavation and backfill, required to complete the work or to:
 - 1. Make its several parts fit together properly.
 - 2. Uncover portions of the work to provide for installation of ill-timed work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace work not conforming to requirements of Contract Documents.
- B. Coordination: Before connection is performed, verify and provide for any pipe restraint that may be required for the new connection. Perform all cutting, fitting or patching of the Work that may be required to make the several parts thereof join in accordance with the Contract Documents. Perform restoration with competent workmen skilled in the trade.
- C. If changes to a “looped” water distribution system occurring during construction result in dead ends to any new or relocated water mains, connect such dead ends to the nearest water main. In cases where no nearby water main is

- D. Improperly Timed Work: Perform all cutting and patching required to install improperly timed work, to remove samples of installed materials for testing, and to provide for alteration of existing facilities or for the installation of new Work in the existing construction.
- E. Limitations: Except when the cutting or removal of existing construction is specified or indicated, do not undertake any cutting or demolition, which may affect the structural stability of the Work or existing facilities without the ENGINEER's concurrence.
- F. City of Naples Damage Prevention Policy: This policy has been put in place to avoid damage to CITY underground utilities. A minimum distance of five feet (5') horizontally and eighteen inches (18") vertically must be maintained away from CITY utilities. Any and all variations from this order must be approved by the Water or Wastewater Department. **Before commencement of any excavation, the existing underground utilities in the area affected by the work must be marked by Sunshine State One Call after proper notification to them by either calling 800/432-4770 or emailing www.callsunshine.com. Before commencing excavation for the work, potholing of all potential conflicts must be performed.** All lines in conflict must be physically located by the contractor and verified by CITY Locate Department personnel before performing work. Utilities under concrete or pavement may require soft dig vacuum locates which also is the contractor's responsibility to perform. All utilities will be field marked per Sunshine State One Call's statutes and guidelines. For line verification or any other information concerning locates, please call the Locate Department at 239/213-4717 during normal business hours. For line verification or emergency locates after hours, call emergency number 239/213-4717. **In the event the potholing and/or vacuum soft dig does not locate the marked utility, work must be stopped and the affected utility owner contacted.** Failure to comply with this policy and obtain required signature(s) may result in delay or denial of permit.

The Contractor will be required to take every precaution to guard against any or all damages to existing structures, pipe lines, and equipment of the City water, sewer, or reuse system from any cause whatsoever in the prosecution of the work. All work shall be planned and executed in such a manner by the Contractor as to absolutely insure the regular and continuous operation of the waterworks system insofar as same may be affected by the Contractor's operations; and the sequence of operations of the Contractor in providing for and executing the work shall be at all times subject to the approval of the Engineer of Record and City, insofar as the operation of the above-mentioned system may be affected. Such approval of the EOR shall in no way relieve the Contractor of his responsibility for providing all and adequate means of guaranteeing the continuous, uninterrupted operation of the City utility systems. Any damage done to any City main or facility shall be reported to Public Works immediately by calling (239) 213-4717. Any such damage shall be the direct responsibility of the Contractor and such damage shall be restored, replaced, or repaired per City direction by the Contractor at no expense to the City. See also Section 01500, 1.8.B

EXHIBIT A-1

1.4 SUBMITTALS

- A. Submit a written request to the ENGINEER well in advance of executing any cutting or alteration which affects:
 - 1. Work of the CITY or any separate contractor.
 - 2. Structural value or integrity of any element of the project or work.
 - 3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
 - 4. Efficiency, operational life, maintenance or safety of operational elements.
 - 5. Visual qualities of sight-exposed elements.
- B. Include in request:
 - 1. Identification of the work.
 - 2. Description of affected work.
 - 3. The necessity for cutting, alteration or excavation.
 - 4. Effect on work of the CITY or any separate contract, or on structural or weatherproof integrity of work.
 - 5. Description of proposed work:
 - a. Scope of cutting, patching, alteration, or excavation.
 - b. Trades who will execute the work.
 - c. Products proposed to be used.
 - d. Extent of refinishing to be done.
 - 6. Alternatives to cutting and patching.
 - 7. Cost proposal, when applicable.
 - 8. Written permission of any separate contractor whose work will be affected.
- C. SUBMIT WRITTEN NOTICE TO THE ENGINEER DESIGNATING THE DATE AND THE TIME THE WORK WILL BE UNCOVERED.

1.5 SCHEDULING OF SHUTDOWN

- A. Connections to Existing Facilities: If any connections, replacement, or other work requiring the shutdown of an existing facility is necessary, schedule such work at times when the impact on the CITY's normal operation is minimal. If shutdown involves the water distribution or transmission system, provide notice to the CITY Water Department at least two (2) weeks prior to the proposed shutdown, including date, time and anticipated length of interruption of service. Overtime, night and weekend work without additional compensation from the CITY, may be required to make these connections, especially if the connections are made at times other than those specified. The connection of new or existing pipelines is prohibited from starting until CONTRACTOR assures that the system can receive the new flow.
- B. Interruptions of Service: Perform cut-ins into lines at a time approved in writing by the CITY Manager or designee. Whenever it is required to turn off valves which may interrupt the water supply of residents or businesses, notify all concerned parties or agencies with personal contact, door hangers or written notice at least twenty-four (24) hours in advance of such cut-off, after having obtained the approval of the CITY Manager or designee. Provide a copy of the written notice to the Water Distribution Section by fax. ONLY CITY PERSONNEL MAY OPERATE CITY-OWNED VALVES. Maintain water service to existing connections during construction, under any and all conditions and at no additional cost to the CITY. Thoroughly clean and swab all pipe and fittings for cut-ins with a concentrated solution of calcium hypochlorite.
- C. Request for Water System Shutdowns: When plans call for connection to existing water distribution facilities or the CONTRACTOR plans to shut down existing utilities or where damage to such facilities is likely in order to complete construction of items under this contract, furnish the CITY Manager or designee with a written request for connection. The CITY Water Distribution Section will identify the locations of all water valves needed to isolate the point of connection in the event that the existing facilities are damaged while making the connection. Identify in the request means which the CONTRACTOR proposes to use in order to provide effective shutdown of the system. Include in a connection and shutdown schedule details of shutdown time and duration. No connections to existing utilities – or construction where shutdown of, or damage to, existing utilities may occur – shall commence prior to CITY Manager or designee approval of the connection and shutdown plan and schedule.
- D. Request for Wastewater Diversion: Submit a request for each diversion necessary during construction to the CITY Manager or designee and the ENGINEER sufficiently in advance of any required diversion. Identify in the request the valves, bypass piping, portable pumper trucks or any other means which the CONTRACTOR proposes to use in order to provide effective shutdown of the system. Include in a connection and shutdown schedule details of shutdown time and duration. No connections to existing utilities – or construction where shutdown of, or damage to, existing utilities may occur – shall commence prior to CITY Manager or designee approval of the connection and shutdown plan and schedule.

EXHIBIT A-1

PART 2 PRODUCTS

2.1 MATERIALS

- A. Comply with specifications and standards for each specific product involved.

PART 3 EXECUTION

3.1 INSPECTION

- A. Inspect existing conditions of projects, including elements subject to damage or to movement during cutting and patching.
- B. After uncovering work, inspect conditions affecting installation of products, or performance of the work.
- C. Report unsatisfactory or questionable conditions to the ENGINEER in writing; do not proceed with work until the ENGINEER has provided further instructions.

3.2 PREPARATION

- A. In cases where service to utility customers is interrupted, provide adequate equipment with backup onsite to assure prompt restoration of service.
- B. Provide adequate temporary support as necessary to assure structural value or integrity or affected portion of work.
- C. Provide devices and methods to protect other portions of project from damage.
- D. Provide protection from elements for that portion of the project that may be exposed by cutting and patching work, and maintain excavations free from water.
- E. Material Removal: Cut and remove all materials to the extent shown or as required to complete the Work. Remove materials in a careful manner with no damage to adjacent facilities. Remove materials that are not salvageable from the site.

3.3 PERFORMANCE

- A. Execute cutting and demolition by methods that will prevent damage to other work, and will provide proper surfaces to receive installation of repairs.
- B. Execute excavating and backfilling by methods which will prevent settlement or damage to other work.
- C. Employ original installer or fabricator to perform cutting and patching for:
 - 1. Weather-exposed or moisture-resistant elements.

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2. Sight-exposed finished surfaces.
- D. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.
 - E. Restore work, which has been cut or removed; install new products to provide completed work in accord with requirements of contract documents.
 - F. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
 - G. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
 1. For continuous surfaces, refinish to nearest intersection.
 2. For an assembly, refinish entire unit.

3.4 PAVEMENT RESTORATION

- A. Restore all pavement or roadway surfaces in accordance with Section 02575 – Repair and Restoration of Pavement, Sidewalk, Etc.
- B. Restore, replace or rebuild existing street paving, including underdrains, if any are encountered, where damaged, using the same type of construction as was in the original. Be responsible for restoring all such work, including subgrade, base courses, curb and gutter or other appurtenances where present. The CITY Manager or designee will obtain the permits listed in the Contract Documents. Obtain and pay for at CONTRACTOR's expense any additional local or other governmental permits as may be required for the opening of streets and be satisfied as to any requirements other than those herein set forth which may effect the type, quality and manner of carrying on the restoration of surfaces by reason of jurisdiction of such governmental bodies.
- C. This section does not describe the construction of new road surfaces or the complete resurfacing of existing pavements.
- D. In all cases, the CONTRACTOR will be required to maintain, without additional compensation, all permanent replacement of street paving, done by him under this Contract for a period of 12 months after the acceptance of the Contract, including the removal and replacement of such work wherever surface depressions or underlying cavities result from settlement of trench backfill.
- E. Perform all the final resurfacing or repaving of streets or roads, over the excavations made and be responsible for relaying paving surfaces of roads that have failed or been damaged at any time before the termination of the maintenance period on account of work done by him. Resurface or repave over any tunnel jacking, or boring excavation that settles or breaks the surface, repave

- F. Where pipeline construction crosses paved streets, driveways or sidewalks, the CONTRACTOR may elect, at no additional cost to the CITY, to place the pipe by the jacking and boring, horizontal direction drilling, or tunneling method in lieu of cutting and patching of the paved surfaces. Such work shall be accomplished in accordance with all applicable sections of the Contract Documents.

END OF SECTION

SECTION 01051
ALIGNMENT AND GRADES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General
- B. Surveys
- C. Datum Plane
- D. Protection of Survey Data

1.2 GENERAL

- A. Construct all work in accordance with the lines and grades shown on the Drawings. Assume full responsibility for keeping all alignment and grade.

1.3 SURVEYS

- A. Reference Points: The CITY will provide reference points for the work as described in the General Conditions. Base horizontal and vertical control points will be designated by the ENGINEER and used as datum for the Work. Perform all additional survey, layout, and measurement work.
 - 1. Keep ENGINEER informed, sufficiently in advance, of the times and places at which work is to be performed so that base horizontal and vertical control points may be established and any checking deemed necessary by ENGINEER may be done, with minimum inconvenience to the ENGINEER and at no delay to CONTRACTOR. It is the intention not to impede the Work for the establishment of control points and the checking of lines and grades set by the CONTRACTOR. When necessary, however, suspend working operations for such reasonable time as the ENGINEER may require for this purpose. Costs associated with such suspension are deemed to be included in the Contract Price, and no time extension or additional costs will be allowed.
 - 2. Provide an experienced survey crew, including a Professional Land Surveyor, an instrument operator, competent assistants, and any instruments, tools, stakes, and other materials required to complete the survey, layout, and measurement of work performed by the CONTRACTOR.

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1.4 DATUM PLANE

- A. All datum indicated or specified refer to the North American Datum 1983/1990 (NAD83/90 datum), of the United States Coast and Geodetic Survey and are expressed in feet and decimal parts thereof, or in feet and inches.

1.5 PROTECTION OF SURVEY DATA

- A. General: Safeguard all points, stakes, grade marks, known property corners, monuments, and benchmarks made or established for the Work. Reestablish them if disturbed, and bear the entire expense of checking reestablished marks and rectifying work improperly installed.
- B. Records: Keep neat and legible notes of measurements and calculations made in connection with the layout of the Work. Furnish copies of such data to the ENGINEER for use in checking the CONTRACTOR's layout. Data considered of value to the City Manager or designee will be transmitted to the City Manager or designee by the ENGINEER with other records on completion of the Work.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01090

REFERENCES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Reference Abbreviations
- B. Abbreviations
- C. Reference Standards
- D. Definitions

1.2 RELATED SECTIONS

- A. Information provided in this section is used where applicable in individual Specification Sections, Divisions 2 through 16.

1.3 REFERENCE ABBREVIATIONS

- A. Reference to a technical society, trade association or standards setting organization, may be made in the Specifications by abbreviations in accordance with the following list:

AABC	Associated Air Balance Council
AAMA	Architectural Aluminum Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists
ACI	American Concrete Institute
ADC	Air Diffusion Council
AFBMA	Anti-friction Bearing Manufacturers Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AHA	Association of Home Appliance Manufacturers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMCA	Air Movement and Control Association, Inc.
ANSI	American National Standards Institute
APA	American Plywood Association
ARI	American Refrigeration Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers

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ASSE	American Society of Sanitary Engineers
ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers Association
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders' Hardware Manufacturers Association
BIA	Brick Institute of American
CABO	Council of American Building Officials
CAGI	Compressed Air and Gas Institute
CISPI	Cast Iron Soil Pipe Institute
CMAA	Crane Manufacturers Association of America
CRD	U.S. Corps of Engineers Specifications
CRSI	Concrete Reinforcing Steel Institute
CTI	Cooling Tower Institute
DHI	Door and Hardware Institute
DOH	Department of Health
DOT	Department of Transportation
Fed. Spec.	Federal Specifications
FGMA	Flat Glass Marketing Association
FM	Factory Mutual
HMI	Hoist Manufacturing Institute
HPMA	See HPVA
HPVA	Hardwood Plywood Veneer Association
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical and Electronics Engineers
IFI	Industrial Fasteners Institute
MIL	Military Specifications
MSS	Manufacturer's Standardization Society
NAAMM	National Association of Architectural Metal Manufacturers
NACM	National Association of Chain Manufacturers
NBS	National Bureau of Standards, See NIST
NEBB	National Environmental Balancing Bureau
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NETA	National Electrical Testing Association
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NFPA	National Fluid Power Association
NIST	National Institute of Standards and Technology
NLMA	National Lumber Manufacturers Association
NSF	National Sanitation Foundation
OSHA	Occupational Safety and Health Act
PCI	Prestressed Concrete Institute
PDI	Plumbing and Drainage Institute
SAE	Society of Automotive Engineers
SCPRF	Structural Clay Products Research Foundation
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SPI	Society of the Plastics Industry

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SSPC	Steel Structures Painting Council
STI	Steel Tank Institute
TCA	Tile Council of American
TIMA	Thermal Insulation Manufacturers' Association
UL	Underwriters' Laboratories, Inc.
USBR	U. S. Bureau of Reclamation
USBS	U. S. Bureau of Standards, See NIST

1.4 ABBREVIATIONS

- A. Abbreviations which may be used in individual Specification Sections Divisions 1 through 16 are as follows:

alternating current..... ac	cubic yard(s) cu yd
American wire gauge AWG	
ampere(s) amp	decibels..... dB
ampere-hour(s) AH	decibels (A scale) dBa
annual ann	degree(s) deg
Ampere Interrupting	dewpoint temperature dpt
Capacity AIC	diameter dia
atmosphere(s)..... atm	direct current..... dc
average avg	dissolved oxygen DO
	dissolved solids DS
biochemical oxygen demand BOD	dry-bulb temperature dbt
Board Foot FBM	
brake horsepower bhp	efficiency eff
Brinell Hardness BH	elevation el
British thermal unit(s)..... Btu	engineer of record.....EOR
	entering water temperature ewt
calorie (s) cal	entering air temperature eat
carbonaceous biochemical	equivalent direct radiation.....edr
oxygen demand CBOD	
Celsius (centigrade)..... C	face area.....fa
Center to Center C to C	face to face f to f
centimeter(s)..... cm	Fahrenheit..... F
chemical oxygen demand.....COD	feet per day..... fpd
coefficient, valve flow..... C _v	feet per hour fph
condensate return..... CR	feet per minute..... fpm
cubic cu	feet per second fps
cubic centimeter(s) cc	foot (feet) ft
cubic feet per day cfd	foot-candle fc
cubic feet per hour cfh	foot-pound.....ft-lb
cubic feet per minute cfm	foot-pounds per minute..... ft-lb/min
cubic feet per minute,	foot-pounds per second..... ft-lb/sec
standard conditions scfm	formazin turbidity unit(s) FTU
cubic feet per second cfs	frequency freq
cubic foot (feet) cu ft	fuel oil FO
cubic inch(es)..... cu in	fuel oil supply FOS

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fuel oil return	FOR	miles per hour	mph
gallon(s)	gal	milliamper(e)s	mA
gallons per day	gpd	milligram(s)	mg
gallons per day per		milligrams per liter	mg/L
cubic foot	gpd/cu ft	milliliter(s).....	mL
gallons per day per		millimeter(s)	mm
square foot.....	gpd/sq ft	million gallons	MG
gallons per hour	gph	million gallons per day	mgd
gallons per minute	gpm	millisecond(s).....	ms
gallons per second.....	gps	millivolt(s).....	mV
gas chromatography and		minute(s).....	min
mass spectrometry	GC-MS	mixed liquor suspended	
gauge.....	ga	solids.....	MLSS
grain(s).....	gr	nephelometric turbidity	
gram(s)	g	unit	NTU
grams per cubic centimeter	gm/cc	net positive suction head	NPSH
Heat Transfer Coefficient.....	U	noise criteria	nc
height	hgt	noise reduction coefficient	NRC
Hertz	Hz	number.....	no
horsepower	hp		
horsepower-hour.....	hp-hr	ounce(s).....	oz
hour(s)	hr	outside air	oa
humidity, relative.....	rh	outside diameter	OD
hydrogen ion concentration	pH		
		parts per billion	ppb
inch(es).....	in	parts per million	ppm
inches per second.....	ips	percent.....	pct
inside diameter	ID	phase (electrical)	ph
		pound(s).....	lb
Jackson turbidity unit(s).....	JTU	pounds per cubic foot	pcf
		pounds per cubic foot	
kelvin.....	K	per hour	pcf/hr
kiloamperes	kA	pounds per day	lbs/day
kilogram(s)	kg	pounds per day per	
kilometer(s)	km	cubic foot	lbs/day/cu ft
kilovar (kilovolt-ampere		pounds per day per	
reactive)	kvar	square foot.....	lbs/day/sq ft
kilovolt(s).....	kV	pounds per square foot.....	psf
kilovolt-ampere(s)	kVA	pounds per square foot	
kilowatt(s).....	kW	per hour	psf/hr
kilowatt-hour(s)	kWh	pounds per square inch	psi
linear foot (feet).....	lin ft	pounds per square inch	
liter(s).....	L	absolute	psia
		pounds per square inch	
megavolt-ampere(s).....	MVA	gauge.....	psig
meter(s)	m	power factor	PF
micrograms per liter.....	ug/L	pressure drop or	
		difference	dp

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pressure, dynamic (velocity)	vp	temperature difference	TD
pressure, vapor.....	vap pr	temperature entering	TE
quart(s)	qt	temperature leaving.....	TL
Rankine.....	R	thousand Btu per hour	Mbh
relative humidity	rh	thousand circular mils.....	kcmil
resistance	res	thousand cubic feet	Mcf
return air	ra	threshold limit value.....	TLV
revolution(s)	rev	tons of refrigeration.....	tons
revolutions per minute	rpm	torque.....	TRQ
revolutions per second	rps	total dissolved solids.....	TDS
Right of Way.....	ROW	total dynamic head	TDH
root mean squared.....	rms	total kjeldahl nitrogen.....	TKN
safety factor	sf	total oxygen demand	TOD
second(s)	sec	total pressure	TP
shading coefficient.....	SC	total solids.....	TS
sludge density index	SDI	total suspended solids	TSS
Sound Transmission		total volatile solids	TVS
Coefficient.....	STC	vacuum	vac
specific gravity	sp gr	viscosity	visc
specific volume	Sp Vol	volatile organic chemical	VOC
sp ht at constant pressure	Cp	volatile solids	VS
square.....	sq	volatile suspended solids.....	VSS
square centimeter(s).....	sq cm	volt(s)	V
square foot (feet)	sq ft	volts-ampere(s).....	VA
square inch (es).....	sq in	volume	vol
square meter(s)	sq m	watt(s)	W
square yard(s).....	sq yd	watthour(s).....	Wh
standard.....	std	watt-hour demand.....	WHD
static pressure	st pr	watt-hour demand meter	WHDM
supply air	sa	week(s)	wk
suspended solids.....	SS	weight	wt
temperature	temp	wet-bulb	WB
		wet bulb temperature.....	WBT
		yard(s).....	yd
		year(s).....	yr

1.5 REFERENCE PUBLICATIONS

The following publications are incorporated into this Manual and are made a part of this Manual as is set out verbatim in this Manual. Violations of any provision of every such publication, latest revision, shall be a violation of City Ordinance.

- A. Water Environment Federation, Manual of Practice No. 8, Wastewater Treatment Plant Design, W.E.F., 601 Wythe Street, Alexandria, VA, 22314-1994.

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- B. Water Environment Federation, Manual of Practice No. 9, Design and Construction of Sanitary and Storm Sewers, W.E.F., 601 Wythe Street, Alexandria, VA, 22314-1994.
- C. Great Lakes/Upper Mississippi River Board of State Sanitary Engineers. Recommended Standards for Sewage Works, Health Education Service, Inc., P.O. Box 7283, Albany, New York, 12224.
- D. Great Lakes/Upper Mississippi River Board of State Sanitary Engineers. Recommended Standards for Water Works, Health Education Service, Inc., P.O. Box 7283, Albany, New York, 12224.
- E. Florida Department of Environmental Protection for Water, Wastewater, and Reclaimed Water Systems, latest revisions of F.A.C. Chapters 62-550, 62-555, 62-600, 62-604, 62-610, 64E-6, and 64E-8, 3900 Commonwealth Boulevard M.S. 49, Tallahassee, Florida, 32399.
- F. American Water Works Association, Inc., Water Treatment Plant Design, 6666 West Quincy Avenue, Denver, Colorado, 80235.
- G. American Water Works Association, Inc., Water Treatment Plant Design, AWWA Standards and Applicable Manuals, 6666 West Quincy Avenue, Denver, Colorado, 80235.
- H. Ductile Iron Pipe Research Association, Handbook, Ductile Iron Pipe/Cast Iron Pipe, Ductile Iron Pipe Research Association, 245 Riverchase Parkway East, Birmingham, Alabama, 35244.
- I. Uni-Bell Plastic Pipe Association, Handbook of PVC Pipe, Uni-Bell Plastic Pipe Association, 2655 Villa Creek Drive, Suite 164, Dallas, Texas, 75234.
- J. American National Standards Institute, latest revisions of applicable standards, 1819 L Street NW, Suite 600, Washington, D.C., 20036.
- K. American Society for Testing and Materials, latest revisions of applicable standards, ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, Pennsylvania, 19428-2959.
- L. National Water Research Institute, Treatment Technologies for Removal of MTBE. NWRI, 10500 Ellis Ave., P.O. Box 20865, Fountain Valley, CA, 92728.
- M. National Water Research Institute, Valuing Ground Water: Economic Concepts/Approaches. NWRI, 10500 Ellis Ave., P.O. Box 20865, Fountain Valley, CA, 92728.7.3.14.
- N. U.S. Environmental Protection Agency, Design Criteria for Mechanical, Electric, and Fluid System and Component Reliability, Supplement to the Federal Guidelines for Design, Operation, and Maintenance of Wastewater Treatment Facilities, Technical Bulletin EPA-430-99-74-001, U.S. EPA, Office of Water Program Operations.

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- O. Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, Maps & Publications Sales, Mail Station 12, 605 Suwannee Street, Tallahassee, Florida 32399-0450.
- P. Plastics Pipe Institute, Handbook of Polyethylene Pipe, 1825 Connecticut Ave., NW, Suite 680, Washington, DC 20009.
- Q. National Fire Protection Association, 1995 Edition of NFPA 24 – Standard for the Installation of Private Fire Service Mains and Their Appurtenances, 1 Batterymarch Park, Quincy, MA 02169.
- R. City of Naples Utilities Standards and Specifications Manual.
- S. National Electrical Code, latest revisions of applicable requirements.
- T. Metcalf and Eddy, Wastewater Engineering Treatment and Reuse, 4th Edition, McGraw-Hill, 2002.
- U. Water Environment Federation, Manual of Practice No. 11, Operation of Municipal Wastewater Treatment Plants, 601 Wythe Street, Alexandria, VA 22314-1994.
- V. American Petroleum Institute, 1801 K Street NW, Washington, DC 20006.
- W. American Welding Society, 2501 NW 7th St, Miami, FL 33125
- X. Factory Mutual Research, 1151 Boston-Providence Turnpike, Norwood, MA 02062
- Y. National Association of Corrosion Engineers, P.O. Box 218340, Houston, TX 77218.
- Z. National Electrical Manufacturer's Association, 155 East 44th St., NY, NY 10017.
- AA. Occupational Safety and Health Act, U.S. Dept. of Labor, Occupational Safety and Health Administration, 299E. Broward Blvd. – Rm 302, Ft. Lauderdale, FL 33301.
- BB. Society of Automotive Engineers, 2 Pennsylvania Plaza, NY, NY 10001.
- CC. Steel Structures Painting Council, 4400 Fifth Ave., Pittsburgh, PA 15213.
- DD. Standard Specification for Public Works, Construction Building News, Inc., 3055 Overland Ave., Los Angeles, CA 90034.
- EE. Uniform Building Code, published by ICBO.
- FF. Underwriters Laboratories, Inc., 207 East Ohio Street, Chicago, IL 60611.

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1.6 REFERENCE STANDARDS

- A. Latest Edition: Construe references to furnishing materials or testing, which conform to the standards of a particular technical society, organization, or body, to mean the latest standard, code, or specification of that body, adopted and published as of the date of bidding this Contract. Standards referred to herein are made a part of these Specifications to the extent that is indicated or intended.
- B. Precedence: The duties and responsibilities of the CITY, CONTRACTOR or ENGINEER, or any of their consultants, agents or employees are set forth in the Contract Documents, and are not changed or altered by any provision of any referenced standard specifications, manuals or code, whether such standard manual or code is or is not specifically incorporated by reference in the Contract Documents. Any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority, to undertake responsibility contrary to the powers of the ENGINEER as set forth in the Contract Documents cannot be assigned to the ENGINEER or any of the ENGINEER's consultants, agents or employees.

1.7 DEFINITIONS

- A. In these Contract Documents the words furnish, install, and provide are defined as follows:
 - 1. Furnish (Materials): to supply and deliver to the project ready for installation and in operable condition.
 - 2. Install (services or labor): to place in final position, complete, anchored, connected in operable condition.
 - 3. Provide: to furnish and install complete. Includes the supply of specified services. When neither furnish, install, or provide is stated, provided is implied.
 - 4. CITY or City: City Council, Naples, Florida , or authorized staff or representatives.
 - 5. ENGINEER: The terms Design Professional, Design Engineer, Engineer, and Engineer of Record are interchangeably used throughout the Contract Documents.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01400
QUALITY CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittals
- B. Inspection Services
- C. Inspection of Materials
- D. Quality Control
- E. Costs of Inspection
- F. Acceptance Tests
- G. Failure to Comply with Contract

1.2 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1 and the individual material sections. Submit manufacturer's Certificates of Inspection, descriptive literature, catalog data, illustrations, principle dimensions, materials of construction, specifications, installation instructions, and related information. See Section 01730 for operation manual submittal information.
- B. Certificate Submittals: Furnish the ENGINEER authoritative evidence in the form of Certificates of Manufacture that the materials and equipment to be used in the Work have been manufactured and tested in conformity with the Contract Documents and this Manual and Specifications. Include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

1.3 TESTS AND INSPECTIONS

- A. City's Access: At all times during the progress of the Work, and until the date of final completion, afford the City Manager or designee and ENGINEER every reasonable, safe, and proper facility for inspecting the Work at the site. The observation and inspection of any work will not relieve the CONTRACTOR of any obligations to perform proper and satisfactory work as specified. Replace work rejected due to faulty design, inferior, or defective materials, poor workmanship, improper installation, excessive wear, or nonconformity with the requirements of the Contract Documents, with satisfactory work at no additional cost to the City. Replace as directed, finished or unfinished work found not to be in strict

accordance with the Contract, even though such work may have been previously approved and payment made therefor.

The City of Naples, its respective representatives, agents and employees, and governmental agencies with jurisdiction over the Project shall have access at all time to Work, whether the Work is being performed on or off the Project site, for their observation, inspection and testing. Contractor shall provide proper, safe conditions for such access. Contractor shall provide Engineer with timely notice of readiness of the Work for all required inspections, tests or approvals.

If the Contract Documents or any codes, laws, ordinances, rules or regulations of any public authority having jurisdiction over the Project requires any portion of the Work to be specifically inspected, tested or approved, Contractor shall assume full responsibility therefore, pay all costs in connection therewith and furnish Engineer the required certificates of inspection, testing or approval. All inspections, tests or approvals shall be performed in a manner and by organizations acceptable to the Engineer and The City of Naples.

If any Work that is to be inspected, tested or approved is covered without written concurrence from the Engineer, such work must, if requested by Engineer, be uncovered for observation. Such uncovering shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness to respond to such notice. If any Work is covered contrary to written directions from Engineer, such Work must, if requested by Engineer, be uncovered for Engineer's observation and be replaced at Contractor's sole expense.

The City shall charge to Contractor and may deduct from any payments due Contractor all engineering and inspection expenses incurred by the City in connection with any overtime work. Such overtime work consisting of any work during the construction period beyond the regular eight (8) hour day and for any work performed on Saturday, Sunday or holidays.

Neither observations nor other actions by the Engineer nor inspections, tests or approvals by others shall relieve Contractor from Contractor's obligations to perform the Work in accordance with the Contract Documents.

- B. Rejection: The City's Manager or designee has the right to reject materials and workmanship which are defective or require correction. Promptly remove rejected work and materials from the site.
- C. Inferior Work Discoveries: Failure or neglect on the part of the City Manager or designee to condemn or reject bad or inferior work or materials does not imply an acceptance of such work or materials. Neither is it to be construed as barring the City Manager or designee at any subsequent time from recovering damages or a sum of money needed to build anew all portions of the Work in which inferior work or improper materials were used.

Work not conforming to the requirements of the Contract Documents shall be deemed defective Work. If required by Engineer, Contractor shall as directed, either correct all defective Work, whether or not fabricated, installed or completed, or if the defective Work has been rejected by Engineer, remove it from the site and replace it with undefective Work. Contractor shall bear all direct, indirect and consequential costs of such correction or removal (including, but not limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby, and shall hold the City harmless for same.

If any portion of the Work is defective, or Contractor fails to supply sufficient skilled workers with suitable materials or equipment, or fails to finish or perform the Work in such a way that the completed Work will conform to the Contract Documents, Engineer may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Engineer to stop the Work shall not give rise to any duty on the part of the City or Engineer to exercise this right for the benefit of Contractor or any other party.

Should the City determine, at its sole opinion, it is in the City's best interest to accept defective Work, the City may do so. Contractor shall bear all direct, indirect and consequential costs attributable to the City's evaluation of and determination to accept defective Work. If such determination is rendered prior to final payment, a Change Order shall be executed evidencing such acceptance of such defective Work, incorporating the necessary revisions in the Contract Documents and reflecting an appropriate decrease in the Contract Amount. If the City accepts such defective Work after final payment, Contractor shall promptly pay the City an appropriate amount to adequately compensate the City for its acceptance of the defective Work.

If Contractor fails, within a reasonable time after the written notice from the City or Engineer, to correct defective Work or to remove and replace rejected defective Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any of the provisions of the Contract Documents, the City may, after seven (7) days written notice to Contractor, correct and remedy any such deficiency. To the extent necessary to complete corrective and remedial action, the City may exclude Contractor from any or all of the Project site, take possession of all or any part of the Work, and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Project site and incorporate in the Work all materials and equipment stored at the Project site or for which the City has paid Contractor but which are stored elsewhere. Contractor shall allow the City and its respective representatives, agents, and employees such access to the Project site as may be necessary to enable the City to exercise the rights and remedies under the paragraph. All direct, indirect and consequential costs of the City in exercising such rights and remedies shall be charged against Contractor, and a Change Order shall be issued, incorporating the necessary revisions to the Contract Documents, including an appropriate decrease to the Contract Amount. Such direct, indirect and consequential costs shall include, but not be limited to, fees and charges of engineers, architects, attorneys, and other professionals, all court costs and all

costs of repair and replacement or work of others destroyed or damaged by Contractor shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by the City of The City's rights and remedies hereunder.

- D. **Removal for Examination:** Should it be considered necessary or advisable by the City Manager or designee, at any time before final acceptance of the Work, to make examinations of portions of the Work already completed, by removing or tearing out such portions, promptly furnish all necessary facilities, labor, and material, to make such an examination. If such Work is found to be defective in any respect, defray all expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the cost of examination and restoration of the Work will be considered a change in the Work to be paid for in accordance with applicable provisions of the Contract.

If the City or Engineer consider it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at the City's or Engineer's request, shall uncover, expose or otherwise make available for observation, inspection or tests as the Engineer may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is defective, Contractor shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction (including, but not limited to, fees and charges of engineers, architects, attorneys and other professionals), and the City shall be entitled to an appropriate decrease in the Contract Amount. If, however, such Work is not found to be defective, Contractor shall be allowed an increase in the Contract Amount and/or an extension to the Contract Time, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction.

- E. **Operation Responsibility:** Assume full responsibility for the proper operation of equipment during tests and instruction periods. Make no claim, other than provided in the Contract Documents, for damage that may occur to equipment prior to the time when the City Manager or designee accepts the Work.
- F. **Rejection Prior to Warranty Expiration:** If at anytime prior to the expiration of any applicable warranties or guarantees, defective equipment is rejected by the City Manager or designee, repay to the CITY all sums of money received for the rejected equipment on progress certificates or otherwise on account of the Contract lump sum prices, and upon the receipt of the sum of money, City Manager or designee will execute and deliver a bill of sale of all its rights, title, and interest in and to the rejected equipment. Do not remove the equipment from the premises of the CITY until the City Manager or designee obtains from other sources, equipment to take the place of that rejected. The City Manager or designee hereby agrees to obtain other equipment within a reasonable time and the CONTRACTOR agrees that the CITY may use the equipment furnished by the CONTRACTOR without rental or other charge until the other new equipment is obtained.

1.4 INSPECTION OF MATERIALS

- A. Premanufacture Notification: Give notice in writing to the ENGINEER sufficiently in advance of the commencement of manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. When required, notice to include a request for inspection, the date of commencement, and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, ENGINEER will arrange to have a representative present at such times during the manufacture or testing as may be necessary to inspect the materials, or will notify CONTRACTOR that the inspection will be made at a point other than the point of manufacture or testing, or that the inspection will be waived. Comply with these provisions before shipping any materials. Such inspection will not constitute a release from the responsibility for furnishing materials meeting the requirements of the Contract Documents.
- B. Testing Standards: Conduct tests of electrical and mechanical equipment and appliances in accordance with recognized, applicable test codes.

1.5 QUALITY CONTROL

A. Testing

1. Field and Laboratory

- a. Provide personnel to assist the ENGINEER in performing the following periodic observation and associated services.
 - (1) Soils: Observe and test excavations, placement and compaction of soils. Determine suitability of excavated material. Observe subgrade soils and foundations.
 - (2) Concrete: Observe forms and reinforcement; observe concrete placement; witness air entrainment tests, facilitate concrete cylinder preparation and assist with other tests performed by ENGINEER.
 - (3) Masonry: Sample and test mortar, bricks, blocks and grout; inspect brick and block samples and sample panels; inspect placement of reinforcement and grouting.
 - (4) Structural Steel: Verify that all welders are certified; visually inspect all structural steel welds; mechanically test high-tensile bolted connections.
- b. When specified in Divisions 2 through 16 of the Contract Documents, provide an independent laboratory testing facility to perform required testing. Qualify the laboratory as having performed previous satisfactory work. Prior to use, submit to the ENGINEER for approval.

- c. Cooperate with the ENGINEER and laboratory testing representatives. Provide at least 24 hours notice prior to when specified testing is required. Provide labor and materials, and necessary facilities at the site as required by the ENGINEER and the testing laboratory.
 - d. When an independent electrical testing agency is specified in the Contract Documents, provide a member of the National Electrical Testing Association to perform inspections and tests.
 2. Equipment: Coordinate and demonstrate test procedures as specified in the Contract Documents and as required during the formal tests.
 3. Pipeline and Other Testing: Conform to test procedures and requirements specified in the appropriate Specification Section.
 4. Testing of Gravity Sanitary Sewer Lines
 - a. Watertight Construction: It is imperative that all sewers and force mains, manholes, and service connections be built watertight and that the CONTRACTOR adhere rigidly to the specifications for material and workmanship. Since all of the water and sewage in the lines will be treated at the treatment plant, special care and attention must be given to securing watertight construction. After completion, the sewers or sections thereof will be tested and gauged. If infiltration or exfiltration is above the limits specified, the sewer construction work will be rejected.
 - b. Cleaning: Exercise care during construction of the manhole to see that materials do not enter the sewer line. Keep the invert and shelf of the manhole clean of all mortar, broken brick, sand, or any other materials falling into the manhole. Immediately remove such material. Maintain this condition until final acceptance of the work. Prior to testing of gravity sanitary sewer lines, clean the lines using appropriate tools.
 - c. Gravity Sewers - Visual Inspections: On completion of each block or section of sewer, or at such other times as the City Manger or designee may direct, the block or section of sewer is to be cleaned, tested and inspected. Each section of the sewer is to show, on examination from either end, a full circle of light between manholes. Each manhole, or other appurtenance to the system, shall be of the specified size and form, be watertight, neatly and substantially constructed, with the rim set permanently to design position and grade. All repairs shown necessary by the inspection are to be made; broken or cracked pipe replaced, all deposits removed and the sewers left true to line and grade, entirely clean and ready for use.

- d. Infiltration Limits: Provide the equipment necessary to check the lines for infiltration or exfiltration as directed by the City Manager or designee, before they are put in service. Infiltration in excess of fifty (50) gallons per day inch-mile of sewer will result in having the CONTRACTOR go over the lines, ascertain where the leakage exists, and repair the lines to the extent necessary to bring the infiltration down within acceptable limits. Observable inflow is not permitted.
- e. Exfiltration Limits: The length of sewer subject to an exfiltration test shall be the distance between two (2) adjacent manholes. Close the inlets of the upstream and downstream manholes with watertight plugs and the test section filled with water until the elevation of the water in the upstream manhole is two (2) feet above the crown of the pipe in the line being tested, or two (2) feet above the existing groundwater in the trench, whichever is higher. A standpipe may be used instead of the upstream manhole for providing the pressure head when approved by the City Manager or designee. Measure exfiltration by determining the amount of water required to maintain the initial water elevation for one (1) hour period from the start of the test. The maximum allowable leakage, including manholes, shall be 50 gallon per inch for diameter per mile of pipe per day.
- f. Air Testing: Air testing shall be required if, in the opinion of the City Manager or designee, conditions are such that infiltration measurements may be inconclusive. Conduct the test in the presence of the City Manager or designee and conform to the following requirements:
 - (a) Test pressure shall be 3.5 psi increased by the groundwater pressure above the top of the sewer.
 - (b) Pressure loss from shall not exceed 0.5 psi during the required testing time.
 - (c) Testing time in minutes shall be calculated as $0.625 \times$ nominal pipe size (inches).

B. Reports

- 1. Certified Test Reports: Where transcripts or certified test reports are required by the Contract Documents, meet the following requirements:
 - a. Before delivery of materials or equipment submit and obtain approval of the ENGINEER for all required transcripts, certified test reports, certified copies of the reports of all tests required in referenced specifications or specified in the Contract Documents. Perform all testing in an approved independent laboratory or the manufacturer's laboratory. Submit for approval reports of shop equipment tests within thirty days of testing. Transcripts or test reports are to be

accompanied by a notarized certificate in the form of a letter from the manufacturer or supplier certifying that tested material or equipment meets the specified requirements and the same type, quality, manufacture and make as specified. The certificate shall be signed by an officer of the manufacturer or the manufacturer's plant manager.

2. Certificate of Compliance: At the option of the ENGINEER, submit for approval a notarized Certificate of Compliance. The Certificates may be in the form of a letter stating the following:
 - a. Manufacturer has performed all required tests
 - b. Materials to be supplied meet all test requirements
 - c. Tests were performed not more than one year prior to submittal of the certificate
 - d. Materials and equipment subjected to the tests are of the same quality, manufacture and make as those specified
 - e. Identification of the materials

1.6 COSTS OF INSPECTION

- A. CITY's Obligation: Initial inspection and testing of materials furnished under this Contract will be performed by the City Manager or designee, or inspection bureaus without cost to the CONTRACTOR, unless otherwise expressly specified. If subsequent testing is necessary due to failure of the initial tests or because of rejection for noncompliance, reimburse the CITY for expenditures incurred in making such tests.
- B. CONTRACTOR's Obligation: Include in the Contract Price, the cost of all shop and field tests of equipment and other tests specifically called for in the Contract Documents, except those tests described above under "CITY's Obligation". The City Manager or designee may perform tests on any material or equipment furnished under this Contract at any time during the Contract. If tests performed by the City Manager or designee result in failure or rejection for noncompliance, reimburse the CITY for expenditures incurred in making such tests. Tests performed by the City Manager or designee shall prevail in determining compliance with Contract requirements.
- C. Reimbursements to the CITY:
 1. Materials and equipment submitted by the CONTRACTOR as the equivalent to those specifically named in the Contract may be tested by the City Manager or designee for compliance. Reimburse the CITY for expenditures incurred in making such tests on materials and equipment that are rejected for noncompliance.

2. Reimburse the CITY for all costs associated with Witness Tests that exceed 5 Calendar Days per kind of equipment.

1.7 ACCEPTANCE TESTS

- A. Preliminary Field Tests: As soon as conditions permit, furnish all labor and materials and services to perform preliminary field tests of all equipment provided under this Contract. If the preliminary field tests disclose that any equipment furnished and installed under this Contract does not meet the requirements of the Contract Documents, make all changes, adjustments and replacements required prior to the acceptance tests.
- B. Final Field Tests: Upon completion of the Work and prior to final payment, subject all equipment, piping and appliances installed under this Contract to specified acceptance tests to demonstrate compliance with the Contract Documents.
 1. Furnish all labor, fuel, energy, water and other materials, equipment, instruments and services necessary for all acceptance tests.
 2. Conduct field tests in the presence of the ENGINEER. Perform the field tests to demonstrate that under all conditions of operation each equipment item:
 - a. Has not been damaged by transportation or installation
 - b. Has been properly installed
 - c. Has been properly lubricated
 - d. Has no electrical or mechanical defects
 - e. Is in proper alignment
 - f. Has been properly connected
 - g. Is free of overheating of any parts
 - h. Is free of all objectionable vibration
 - i. Is free of overloading of any parts
 - j. Operates as intended
 3. Operate work or portions of work for a minimum of 100 hours or 14 days continuous service, whichever comes first. For those items of equipment that would normally operate on wastewater or sludge, plant effluent may be used if available when authorized by ENGINEER. If water cannot properly exercise equipment, conduct 100-hour test after plant startup. Conduct test on those systems that require load produced by weather (heating or cooling) exercise only when weather will produce proper load.

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- C. Failure of Tests: If the acceptance tests reveal defects in material or equipment, or if the material or equipment in any way fails to comply with the requirements of the Contract Documents, then promptly correct such deficiencies. Failure or refusal to correct the deficiencies, or if the improved materials or equipment, when tested again, fail to meet the guarantees or specified requirements, the City Manager or designee, notwithstanding its partial payment for work and materials or equipment, may reject said materials or equipment and may order the CONTRACTOR to remove the defective work from the site at no addition to the Contract Price, and replace it with material or equipment which meets the Contract Documents.

1.8 FAILURE TO COMPLY WITH CONTRACT

- A. Unacceptable Materials: If it is ascertained by testing or inspection that the material or equipment does not comply with the Contract, do not deliver said material or equipment, or if delivered remove it promptly from the site or from the Work and replace it with acceptable material without additional cost to the CITY. Fulfill all obligations under the terms and conditions of the Contract even though the City Manager or designee fail to ascertain noncompliance or notify the CONTRACTOR of noncompliance.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General Requirements
- B. Related Sections
- C. Temporary Utilities
- D. Temporary Construction
- E. Barricades and Enclosures
- F. Fences
- G. Security
- H. Temporary Controls
- I. Traffic Regulation
- J. Field Offices and Sheds

1.2 RELATED SECTIONS

- A. Section 01010 - Summary of Work
- B. Section 01045 – Connection to Existing Systems
- C. Section 01570 – Traffic Regulations and Public Safety
- D. Section 02530 – Groundwater Control for Open Cut Excavation
- E. Section 02575 - Pavement Repair and Restoration
- F. Section 02650 –Laying and Jointing Buried Pipelines

1.3 GENERAL REQUIREMENTS

- A. Plant and Facilities: Furnish, install, maintain and remove all false work, scaffolding, ladders, hoistways, braces, pumping plants, shields, trestles, roadways, sheeting, centering forms, barricades, drains, flumes, and the like, any of which may be needed in the construction of any part of the Work and which are

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not herein described or specified in detail. Accept responsibility for the safety and efficiency of such works and for any damage that may result from their failure or from their improper construction, maintenance or operation.

- B. First Aid: Maintain a readily accessible, completely equipped first aid kit at each location where work is in progress.
- C. Safety Responsibility: Accept sole responsibility for safety and security at the site. Indemnify and hold harmless the CITY and the City's Manager or designee, including the ENGINEER, for any safety violation, or noncompliance with governing bodies and their regulations, and for accidents, deaths, injuries, or damage at the site during occupancy or partial occupancy of the site by CONTRACTOR's forces while performing any part of the Work.
- D. Hazard Communication: Furnish two copies of the CONTRACTOR's Hazard Communication Program required under OSHA regulations before beginning on site activities. Furnish two copies of amendments to Hazard Communications Program as they are prepared.

1.4 TEMPORARY UTILITIES

- A. Water: Provide all necessary and required water without additional cost, unless otherwise specified. If necessary, provide and lay water lines to the place of use; secure all necessary permits; pay for all taps to water mains and hydrants and for all water used at the established rates.
- B. Light and Power: Provide without additional cost to the CITY temporary lighting and power facilities required for the proper construction and inspection of the Work. If, in the ENGINEER's opinion, these facilities are inadequate, do NOT proceed with any portion of the Work affected thereby. Maintain temporary lighting and power until the Work is accepted.
- C. Heat: Provide temporary heat, whenever required, for work being performed during cold weather to prevent freezing of concrete, water pipes, and other damage to the Work or existing facilities.
- D. Sanitary Facilities: Provide sufficient sanitary facilities for construction personnel. Prohibit and prevent nuisances on the site of the Work or on adjoining property. Discharge any employee who violates this rule. Abide by all environmental regulations or laws applicable to the Work.

1.5 TEMPORARY CONSTRUCTION

- A. Bridges: Design and place suitable temporary bridges where necessary for the maintenance of vehicular and pedestrian traffic. Assume responsibility for the sufficiency and safety of all such temporary work or bridges and for any damage that may result from their failure or their improper construction, maintenance, or operation. Indemnify and save harmless the CITY and the CITY's representatives from all claims, suits or actions, and damages or costs of every description arising by reason of failure to comply with the above provisions.

1.6 BARRICADES, LIGHTS AND ENCLOSURES

- A. Protection of Workmen and Public: Effect and maintain at all times during the prosecution of the Work, barriers, lights and enclosures necessary for the protection of workmen and the public. Perform all work within the City right-of-way in strict accordance with the CITY Maintenance of Traffic Policy and other applicable statutory requirements.
- B. Provide suitable barricades, lights, signs and watchmen at excavation sites and all other places where the Work causes obstructions to normal traffic or constitutes in any way a hazard to the public.

1.7 FENCES

- A. Existing Fences: Obtain written permission from property owner(s) prior to relocating or dismantling fences that interfere with construction operations. Reach agreements with the fence owner as to the period the fence may be left relocated or dismantled. Install adequate gates where fencing must be maintained. Keep gates closed and locked at all times when not in use.
- B. Restoration: Restore all fences to their original or better condition and to their original location on completion of the Work.

1.8 SECURITY

- A. Preservation of Property:
 - 1. Preserve from damage, all property along the line of the Work, in the vicinity of or in any way affected by the Work, the removal or destruction of which is not called for by the Drawings. Preserve from damage, public utilities, trees, lawn areas, building monuments, fences, pipe and underground structures, and public streets. Note: Normal wear and tear of streets resulting from legitimate use by the CONTRACTOR are not considered as damage. Whenever damages occur to such property, immediately restore to its original condition. Costs for such repairs are incidental to the Contract.
 - 2. In case of failure on the part of the CONTRACTOR to restore property or make good on damage or injury, the City Manager or designee may, upon 24 hours written notice, proceed to repair, rebuild, or otherwise restore such property as may be deemed necessary, and the cost thereof will be deducted from any moneys due or which may become due the CONTRACTOR under this Contract. If removal, repair or replacement of public or private property is made necessary by alteration of grade or alignment authorized by the City Manager or designee and not contemplated by the Contract Documents, the CONTRACTOR will be compensated, in accordance with the General Conditions, provided that such property has not been damaged through fault of the CONTRACTOR or the CONTRACTOR's employees.

B. Public Utility Installations and Structures:

1. Public utility installations and structures include all poles, tracks, pipes, wires, conduits, vaults, valves, hydrants, manholes, and other appurtenances and facilities, whether owned or controlled by public bodies or privately owned individuals, firms or corporations, used to serve the public with transportation, gas, electricity, telephone, storm and sanitary sewers, water, or other public or private utility services. Facilities appurtenant to public or private property that may be affected by the Work are deemed included hereunder.
2. The Contract Documents contain data relative to existing public utility installations and structures above and below the ground surface. Existing public utility installations and structures are indicated on the Drawings only to the extent such information was made available to, or found by, the ENGINEER in preparing the Drawings. These data are not guaranteed for completeness or accuracy, and the CONTRACTOR is responsible for making necessary investigations to become fully informed as to the character, condition, and extent of all public utility installations and structures that may be encountered and that may affect the construction operations.
3. Before starting construction, identify and mark all existing valves and maintain access to the valves at all times during construction.
4. Contact utility locating service sufficiently in advance of the start of construction to avoid damage to the utilities and delays to the completion date. See Section 01045, 1.3.F for additional information.
5. If existing utilities are damaged during the Work, immediately notify the owner of the affected utility. In coordination with or as directed by the owner, remove, replace, relocate, repair, rebuild, and secure any public utility installations and structures damaged as a direct or indirect result of the Work under this Contract. Costs for such work are incidental to the Contract. Be responsible and liable for any consequential damages done to or suffered by any public utility installations or structures. Assume and accept responsibility for any injury, damage, or loss that may result from or be consequent to interference with, or interruption or discontinuance of, any public utility service. See Section 01045, 1.3.F for additional information.
6. At all times in the performance of Work, employ proven methods and exercise reasonable care and skill to avoid unnecessary delay, injury, damage, or destruction to public utility installations and structures. Avoid unnecessary interference with, or interruption of, public utility services. Cooperate fully with the owners thereof to that end.
7. Provide notice to the City Manager or designee of any proposed connections to existing utilities, interruptions of service or shutdowns in accordance with Section 01045. Give written notice to the owners of all public utility installations and structures affected by proposed construction operations

sufficiently in advance of breaking ground in any area or on any unit of the Work, to obtain their permission before disrupting the lines and to allow them to take measures necessary to protect their interests. Advise the Stormwater, Streets and Traffic Department and Police and Emergency Services Department of any excavation in public streets or the temporary shut-off of any water main. Provide at least 24 hours notice to all affected property owners whenever service connections are taken out of service.

- C. **Work on Private Property:** Work on this project will require operations on private property, rights of way or easements. The City Manager or designee has secured the appropriate easements or rights of entry from the affected property owners. Comply with all easement or rights of entry provisions. Conduct operations along rights-of-way and easements through private property to avoid damage to the property and to minimize interference with its ordinary use. Upon completion of the Work through such property, restore the surface and all fences or other structures disturbed by the construction as nearly as possible to the preconstruction conditions. Do not remove any material from private property without the consent of the property owner or responsible party in charge of such property. Hold the CITY harmless from any claim or damage arising out of or in connection with the performance of work across and through private property.
- D. **Miscellaneous Structures:** Assume and accept responsibility for all injuries or damage to culverts, building foundations and walls, retaining walls, or other structures of any kind met with during the prosecution of the Work. Assume and accept liability for damages to public or private property resulting therefrom. Adequately protect against freezing all pipes carrying liquid.
- E. **Protection of Trees and Lawn Areas:**
 - 1. Protect with boxes, trees and shrubs, except those ordered to be removed. Do not place excavated material so as to cause injury to such trees or shrubs. Replace trees or shrubs destroyed by accident or negligence of the CONTRACTOR or CONTRACTOR's employees with new stock of similar size and age, at the proper season, at no additional cost to the CITY. If required by Contract Documents, provide preconstruction audio-video recording of project in accordance with the Technical Specifications.
 - 2. Leave lawn areas in as good condition as before the start of the Work. Restore areas where sod has been removed by seeding or sodding.

1.9 TEMPORARY CONTROLS

- A. **During Construction:**
 - 1. Keep the site of the Work and adjacent premises free from construction materials, debris, and rubbish. Remove this material from any portion of the site if such material, debris, or rubbish constitutes a nuisance or is objectionable.

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2. Remove from the site all surplus materials and temporary structures when they are no longer needed.
 3. Neatly stack construction materials such as concrete forms and scaffolding when not in use. Store pipe to be incorporated into the Work in accordance with AWWA standards. Promptly remove splattered concrete, asphalt, oil, paint, corrosive liquids, and cleaning solutions from surfaces to prevent marring or other damage.
 4. Properly store volatile wastes in covered metal containers and remove from the site daily.
 5. Do not bury or burn on the site or dispose of into storm drains, sanitary sewers, streams, or waterways, any waste material. Remove all wastes from the site and dispose of in a manner complying with applicable ordinances and laws.
- B. Smoke Prevention:
1. Strictly observe all air pollution control regulations.
 2. Open fires will be allowed only if permitted under current ordinances.
- C. Noises:
1. In accordance with the CITY's or COUNTY's Noise Ordinance, maintain acceptable noise levels in the vicinity of the Work. Limit noise production to acceptable levels by using special mufflers, barriers, enclosures, equipment positioning, and other approved methods.
 2. Supply written notification to the City Manager or designee sufficiently in advance of the start of any work that violates this provision. Proceed only when all applicable authorizations and variances have been obtained in writing.
- D. Hours of Operation:
1. Operation of construction equipment is only permitted Monday through Saturday, 7:00 AM to 7:00 PM. Obtain written consent from the City Manager or designee for operation of construction equipment during any other period.
 2. Do not carry out non-emergency work, including equipment moves, on Sundays without prior written authorization by the City Manager or designee.

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E. Dust Control:

1. Take measures to prevent unnecessary dust. Keep earth surfaces exposed to dusting moist with water or a chemical dust suppressant. Cover materials in piles or while in transit to prevent blowing or spreading dust.
2. Adequately protect buildings or operating facilities that may be affected adversely by dust. Protect machinery, motors, instrument panels, or similar equipment by suitable dust screens. Include proper ventilation with dust screens.

F. Temporary Drainage Provisions:

1. Provide for the drainage of stormwater and any water applied or discharged on the site in performance of the Work. Provide adequate drainage facilities to prevent damage to the Work, the site, and adjacent property.
2. Supplement existing drainage channels and conduits as necessary to carry all increased runoff from construction operations. Construct dikes as necessary to divert increased runoff from entering adjacent property (except in natural channels), to protect the CITY's facilities and the Work, and to direct water to drainage channels or conduits. Provide ponding as necessary to prevent downstream flooding.
3. Maintain excavations free of water. Provide, operate, and maintain pumping equipment. Dewater trenches in accordance with Sections 02350 and 02650.

- G. Pollution: Prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities. Do not permit sanitary wastes to enter any drain or watercourse other than sanitary sewers. Do not permit sediment, debris, or other substances to enter sanitary sewers. Take reasonable measures to prevent such materials from entering any drain or watercourse.

1.10 TRAFFIC REGULATION

- A. Parking: Provide and maintain suitable parking areas for the use of all construction workers and others performing work or furnishing services in connection with the Contract, to avoid any need for parking personal vehicles where they may interfere with public traffic or construction activities.
- B. Access: Conduct Work to interfere as little as possible with public travel, whether vehicular or pedestrian. Provide and maintain suitable and safe bridges, detours, or other temporary expedients for the accommodation of public and private travel. Whenever it is necessary to cross, obstruct, or close roads, driveways, and walks, whether public or private, give reasonable notice to owners of private drives before interfering with them. Such maintenance of traffic will not be required when the CONTRACTOR has obtained permission from the owner or tenant of private property, or from the authority having jurisdiction over the public property involved,

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to obstruct traffic at the designated point. The Contractor may be allowed to restrict traffic for short periods of time provided that he first contacts the City Stormwater, Streets and Traffic Department, County, and/or Florida DOT for their restrictions and also provided that adequate traffic control devices are placed in accordance with applicable City, County, and/or State Ordinances.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01510

PRE-CONSTRUCTION AUDIO-VIDEO RECORDING

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. The work specified in this section includes the requirements for pre-construction audio-video recordings necessary to document existing conditions on public and private property.

PART 2 PRODUCTS

2.1 CONTRACTOR REQUIREMENTS

- A. The Contractor shall provide color videos showing pre-construction site conditions of all public and private property within the scope of construction. The videos shall be DVD format indicating on the beginning and front of each disk, the date, job title and location where the video was taken. The videos shall be clear and shall thoroughly document all existing structures and landscaping. The construction recording shall be taken by a responsible commercial firm known to be skilled and regularly engaged in the business of pre-construction color audio-video documentation. The audio portion of the recording shall begin with a complete description of the beginning point of the construction scene, i.e. job name, street, direction of travel, direction of view. The video portion shall continuously show the time (hour, minute, and second) and date. All recording shall be done during daylight hours with sufficient sunlight to properly illuminate the surrounding area. Recording shall not be done during inclement weather conditions. Recording on heavily traveled streets or roads may require the use of police escort at the option of the Engineer. If police escort is required, all costs shall be borne by the Contractor.
- B. Two copies of the disks (including the original) shall be delivered to the City Manager or designee for review. The construction recording shall be made no more than 30 calendar days prior to construction start date.

PART 3 EXECUTION

3.1 INSPECTION

- A. Construction on private property shall not commence until the City Manager or designee has reviewed and approved the audio-video recording.

3.2 PERFORMANCE

- A. The Contractor may be required to restore private properties to conditions better than existing, at no additional cost to the City, if the Contractor fails to sufficiently document existing conditions.

3.3 AREA OF COVERAGE

- A. Tape coverage shall include all surface features located within the zone of influence of construction supported by appropriate audio coverage. Such coverage shall include, but not be limited to, existing driveways, sidewalks, curbs, pavements, ditches, mailboxes, landscaping, culverts, fences, signs and headwalls within the area covered.

END OF SECTION

SECTION 01570

TRAFFIC REGULATION AND PUBLIC SAFETY

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. General Requirements
- B. Traffic Control
- C. Public Safety

1.2 RELATED SECTIONS

- A. Section 01500 – Construction Facilities and Temporary Controls
- B. Section 02230 – Roadway Crossings by Open Cut
- C. Section 02575 – Pavement Repair and Restoration

1.3 GENERAL REQUIREMENTS

- A. Perform all work within CITY rights-of-way in strict accordance with the City's Maintenance of Traffic Policy and other applicable statutory requirements to protect the public safety. The Maintenance of Traffic Plan shall include but not be limited to: placement of signs, timing of phases, transition lengths, hours of traffic interference, and contact person (24 hour availability).
- B. Be responsible for providing safe and expeditious movement of traffic through construction zones. A construction zone is defined as the immediate areas of actual construction and all abutting areas which are used by the CONTRACTOR and which interfere with the driving or walking public.
- C. Remove temporary equipment and facilities when no longer required. Restore grounds to original or specified conditions.
- D. The requirements specified herein are in addition to the plan for Maintenance of Traffic as specified in Section 02230.

1.4 TRAFFIC CONTROL

- A. Include as necessary precautions, not to be limited to, such items as proper construction warning signs, signals, lighting devices, marking, barricades, channelization, flares, and hand signaling devices. Be responsible for installation and maintenance of all devices and requirements for the duration of the Construction period. All design, application, installation, maintenance and

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removal of all traffic control devices and all warning devices and barriers which are necessary to protect the public and workmen from hazards within the project limits shall be as specified in the State of Florida, Manual of Traffic and Highway Construction, Maintenance and Utility Operations. The standards established in the aforementioned Manual constitute the minimum requirements for normal conditions. Additional traffic control devices, warning devices, barriers, or other safety devices shall be required where unusual, complex, or particularly hazardous conditions exist.

- B. Provide notice, at least five (5) working days prior to construction, to the State or City Stormwater, Streets and Traffic Department of the necessity to close any portion of a roadway carrying vehicles or pedestrians so that the final approval of such closings can be obtained at least 48 hours in advance. At no time will more than one (1) lane of roadway be closed to vehicles and pedestrians. With any such closings make adequate provision for the safe expeditious movement of each.
 - C. Be responsible for notifying the Stormwater, Streets and Traffic Department, and Police, Fire, and other Emergency Departments at least 48 hours prior to construction whenever construction is within roadways and of the alternate routes.
 - D. Be responsible for removal, relocation, or replacement of any traffic control device in the construction area that exists as part of the normal pre-construction traffic control scheme.
 - E. Immediately notify the City Manager or designee of any vehicular or pedestrian safety or efficiency problems incurred as a result of the construction of the project.
 - F. Be responsible for notifying all residents of any road construction and limited access at least 72 hours in advance.
- 1.5 PUBLIC SAFETY (DURING CONSTRUCTION, ALTERATION OR REPAIR)
- A. In areas of high vehicular traffic, provide a safe walkway around the work area.
 - B. Use barricades or other barriers to prevent any possibility of injury to the public caused by the CONTRACTOR's work.
 - C. Keep walk areas around the work areas clean of sand, stones, and any other material that could cause a pedestrian accident.
 - D. Barricade work areas left overnight. Install flashing warning lights in areas required by the CITY.
 - E. Unless an approved detour is provided at any open cut crossings, a minimum of one-way traffic will be maintained during the daylight hours and two-way traffic at night. All traffic detours will be restricted to limits of the Right-of-Way with necessary flagmen and/or marking devices. These detours shall be approved by the CITY. Detour of traffic outside of the Right-of-Way will be

considered with the approval of local governmental agencies and private concerns involved.

- F. Crossing and Intersections: Do not isolate residences and places of business. Provide access to all residences and places of business whenever construction interferes with existing means of access. Maintain access at all times. If pavement is disturbed, a cold mix must be applied at the end of the day.
- G. Detours
 - 1. Construct and maintain detour facilities wherever it becomes necessary to divert traffic from any existing roadway or bridge, or wherever construction operations block the flow of traffic. The location of all detours will require prior approval of the CITY.
 - 2. Furnishing of Devices and Barriers: Furnish all traffic control devices (including signs), warning devices and barriers. Costs of such devices shall be incidental to construction and included in unit prices bid.
 - 3. Maintenance of Devices and Barriers: Keep traffic control devices, warning devices and barriers in the correct position, properly directed, clearly visible and clean, at all times. Immediately repair replace or clean damaged, defaced or dirty devices or barriers as necessary.
- H. Flagmen: Provide certified flagmen (flaggers) to direct traffic where one-way operation in a single lane is in effect, and in other situations as may be required. Radios may be required if flagmen cannot maintain contact with each other.
- I. Utilize all necessary signs, flagmen, and other safety devices during construction.
- J. Perform all work with the requirements set forth by the Occupational Safety Health Administration.

PART 2 PRODUCTS
NOT USED.

PART 3 EXECUTION
NOT USED.

END OF SECTION

SECTION 01600
MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Description
- B. Substitutions
- C. Manufacturer's Written Instructions
- D. Transportation and Handling
- E. Storage, Protection and Maintenance
- F. Manufacturer's Field Quality Control Services
- G. Post Startup Services
- H. Special Tools and Lubricating Equipment
- I. Lubrication

1.2 DESCRIPTION

- A. Proposed Manufacturers List: Within 15 calendar days of the date of the Notice to Proceed, submit to the ENGINEER a list of the names of proposed manufacturers, material men, suppliers and subcontractors, obtain approval of this list by the City Manager or designee prior to submission of any working drawings. Upon request submit evidence to ENGINEER that each proposed manufacturer has manufactured a similar product to the one specified and that it has previously been used for a like purpose for a sufficient length of time to demonstrate its satisfactory performance.
- B. All material and equipment designed or used in connection with a potable (drinking) water system shall conform to the requirements of the National Sanitation Foundation (NSF) Standard 61, "Drinking Water System Components – Health Effects."
- C. Furnish and install Material and Equipment which meets the following:
 - 1. Conforms to applicable specifications and standards.
 - 2. Complies with size, make, type, and quality specified or as specifically approved, in writing, by ENGINEER.

3. Will fit into the space provided with sufficient room for operation and maintenance access and for properly connecting piping, ducts and services, as applicable. Make the clear spaces that will be available for operation and maintenance access and connections equal to or greater than those shown and meeting all the manufacturers' requirements. If adequate space is not available, the CONTRACTOR shall advise the ENGINEER for resolution.
4. Manufactured and fabricated in accordance with the following:
 - a. Design, fabricate, and assemble in accordance with best engineering and shop practices.
 - b. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.
 - c. Provide two or more items of same kind identical, by same manufacturer.
 - d. Provide materials and equipment suitable for service conditions.
 - e. Adhere to equipment capabilities, sizes, and dimensions shown or specified unless variations are specifically approved, in writing, in accordance with the Contract Documents.
 - f. Adapt equipment to best economy in power consumption and maintenance. Proportion parts and components for stresses that may occur during continuous or intermittent operation, and for any additional stresses that may occur during fabrication or installation.
 - g. Working parts are readily accessible for inspection and repair, easily duplicated and replaced.
5. Use material or equipment only for the purpose for which it is designed or specified.

1.3 SUBSTITUTIONS

A. Substitutions:

1. Make any CONTRACTOR's requests for changes in equipment and materials from those required by the Contract Documents in writing, for approval by the Engineer of Record. Such requests are considered requests for substitutions and are subject to CONTRACTOR's representations and review provisions of the Contract Documents when one of following conditions are satisfied:
 - a. Where request is directly related to a "Engineer of Record approved equal" or "City approved equal" clause or other language of same effect in Specifications.

- b. Where required equipment or material cannot be provided within Contract Time, but not as result of CONTRACTOR's failure to pursue Work promptly or to coordinate various activities properly.
 - c. Where required equipment or material cannot be provided in manner compatible with other materials of Work, or cannot be properly coordinated therewith.
2. CONTRACTOR'S Options:
- a. Where more than one choice is available as options for CONTRACTOR's selection of equipment or material, select option compatible with other equipment and materials already selected (which may have been from among options for other equipment and materials).
 - b. Where compliance with specified standard, code or regulation is required, select from among products that comply with requirements of those standards, codes, and regulations.
 - c. Or City approved Equal: For equipment or materials specified by naming one or more equipment manufacturer(s) as "or City approved equal", submit request for substitution for any equipment or manufacturer not specifically named to the Engineer of Record.
- B. Conditions Which are Not Substitution:
- 1. Requirements for substitutions do not apply to CONTRACTOR options on materials and equipment provided for in the Specifications.
 - 2. Revisions to Contract Documents, where requested by the City Manager or designee or ENGINEER, are "changes" not "substitutions".
 - 3. CONTRACTOR's determination of and compliance with governing regulations and orders issued by governing authorities do not constitute substitutions and do not constitute basis for a Change Order, except as provided for in Contract Documents.

1.4 MANUFACTURER'S WRITTEN INSTRUCTIONS

- A. Instruction Distribution: When the Contract Documents require that installation, storage, maintenance and handling of equipment and materials comply with manufacturer's written instructions, obtain and distribute printed copies of such instructions to parties involved in installation, including six copies to ENGINEER.
- 1. Maintain one set of complete instructions at jobsite during storage and installation, and until completion of work.

EXHIBIT A-1

- B. Manufacturer's Requirements: Store, maintain, handle, install, connect, clean, condition, and adjust products in accordance with manufacturer's written instructions and in conformity with Specifications.
 - 1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult ENGINEER for further instructions.
 - 2. Do not proceed with work without written instructions.
- C. Performance Procedures: Perform work in accordance with manufacturer's written instructions. Do not omit preparatory steps or installation procedures, unless specifically modified or exempted by Contract Documents.

1.5 TRANSPORTATION AND HANDLING

- A. Coordination with Schedule: Arrange deliveries of materials and equipment in accordance with Construction Progress Schedules. Coordinate to avoid conflict with work and conditions at site.
 - 1. Deliver materials and equipment in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible. Keep product free of dirt and debris.
 - 2. Protect bright machined surfaces, such as shafts and valve faces, with a heavy coat of grease prior to shipment.
 - 3. Immediately upon delivery, inspect shipments to determine compliance with requirements of Contract Documents and approved submittals and that material and equipment are protected and undamaged.
- B. Handling: Provide equipment and personnel to handle material and equipment by methods recommended by manufacturer to prevent soiling or damage to materials and equipment or packaging.

1.6 STORAGE, PROTECTION, AND MAINTENANCE

- A. On-site storage areas and buildings:
 - 1. Conform storage buildings to requirements of Section 01500.
 - 2. Coordinate location of storage areas with ENGINEER and the CITY.
 - 3. Arrange on site storage areas for proper protection and segregation of stored materials and equipment with proper drainage. Provide for safe travel around storage areas and safe access to stored materials and equipment.
 - 4. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.

EXHIBIT A-1

5. Store materials such as pipe, reinforcing and structural steel, and equipment on pallets, blocks or racks, off ground.
 6. PVC Pipe may be damaged by prolonged exposure to direct sunlight, take necessary precautions during storage and installation to avoid this damage. Store pipe under cover, and install with sufficient backfill to shield it from the sun.
 7. Store fabricated materials and equipment above ground, on blocking or skids, to prevent soiling or staining. Cover materials and equipment that are subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.
- B. Interior Storage:
1. Store materials and equipment in accordance with manufacturer's instructions, with seals and labels intact and legible.
 2. Store materials and equipment, subject to damage by elements, in weathertight enclosures.
 3. Maintain temperature and humidity within ranges required by manufacturer's instructions.
- C. Accessible Storage: Arrange storage in a manner to provide easy access for inspection and inventory. Make periodic inspections of stored materials or equipment to assure that materials or equipment are maintained under specified conditions and free from damage or deterioration.
1. Perform maintenance on stored materials of equipment in accordance with manufacturer's instructions, in presence of the City Manager or designee or ENGINEER.
 2. Submit a report of completed maintenance to ENGINEER with each Application for Payment.
 3. Failure to perform maintenance, to notify ENGINEER of intent to perform maintenance or to submit maintenance report may result in rejection of material or equipment.
- D. CITY's Responsibility: The CITY assumes no responsibility for materials or equipment stored in buildings or on-site. CONTRACTOR assumes full responsibility for damage due to storage of materials or equipment.
- E. CONTRACTOR's Responsibility: For CITY Capital Improvement Projects, the CONTRACTOR assumes full responsibility for protection of completed construction until facilities (or portions of facilities) are accepted for operation and placed in service. Repair and restore damage to completed Work equal to its original condition.

- F. Special Equipment: Use only rubber tired wheelbarrows, buggies, trucks, or dollies to wheel loads over finished floors, regardless if the floor has been protected or not. This applies to finished floors and to exposed concrete floors as well as those covered with composition tile or other applied surfacing.
- G. Surface Damage: Where structural concrete is also the finished surface, take care to avoid marking or damaging surface.

1.7 MANUFACTURER'S FIELD QUALITY CONTROL SERVICES

A. General:

- 1. Provide manufacturer's field services in accordance with this subsection for those tasks specified in other sections.
- 2. Include and pay all costs for suppliers' and manufacturers' services, including, but not limited to, those specified.

B. Installation Instruction: Provide instruction by competent and experienced technical representatives of equipment manufacturers or system suppliers as necessary to resolve assembly or installation procedures that are attributable to, or associated with, the equipment furnished.

C. Installation Inspection, Adjustments and Startup Participation:

- 1. Provide competent and experienced technical representatives of equipment manufacturers or system suppliers to inspect the completed installation as follows.
 - a. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or for other conditions that may cause damage.
 - b. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
 - c. Verify that wiring and support components for equipment are complete.
 - d. Verify that equipment or system is installed in accordance with the manufacturer's recommendations, approved shop drawings and the Contract Documents.
 - e. Verify that nothing in the installation voids any warranty.
- 2. Provide manufacturer's representatives to perform initial equipment and system adjustment and calibration conforming to the manufacturer's

recommendations and instructions, approved shop drawings and the Contract Documents.

3. Start-up of Equipment: Provide prior written notice of proposed start-up to the City Manager or designee and ENGINEER. Obtain ENGINEER's approval before start-up of equipment. CITY's departmental representative must be on-site during start-up. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.
4. Furnish ENGINEER with three copies of the following. When training is specified, furnish the copies at least 48 hours prior to training.
 - a. "Certificate of Installation, Inspection and Start-up Services" by manufacturers' representatives for each piece of equipment and each system specified, certifying:
 - (1) That equipment is installed in accordance with the manufacturers' recommendations, approved shop drawings and the Contract Documents.
 - (2) That nothing in the installation voids any warranty.
 - (3) That equipment has been operated in the presence of the manufacturer's representative.
 - (4) That equipment, as installed, is ready to be operated by others.
 - b. Detailed report by manufacturers' representatives, for review by ENGINEER of the installation, inspection and start-up services performed, including:
 - (1) Description of calibration and adjustments if made; if not in Operation and Maintenance Manuals, attach copy.
 - (2) Description of any parts replaced and why replaced.
 - (3) Type, brand name, and quantity of lubrication used, if any.
 - (4) General condition of equipment.
 - (5) Description of problems encountered, and corrective action taken.
 - (6) Any special instructions left with CONTRACTOR or ENGINEER.
- D. Field Test Participation: Provide competent and experienced technical representatives of all equipment manufacturers and system suppliers as

EXHIBIT A-1

necessary to participate in field testing of the equipment specified in Section 01400.

- E. Trouble-Free Operation: Provide competent and experienced technical representatives of all equipment manufacturers and system suppliers as necessary to place the equipment in trouble-free operation after completion of start-up and field tests.

1.8 SPECIAL TOOLS AND LUBRICATING EQUIPMENT

- A. General: Furnish, per manufacturer's recommendations, special tools required for checking, testing, parts replacement, and maintenance. (Special tools are those which have been specially designed or adapted for use on parts of the equipment, and which are not customarily and routinely carried by maintenance mechanics.)
- B. Time of Delivery: Deliver special tools and lubricating equipment to the CITY when unit is placed into operation and after operating personnel have been properly instructed in operation, repair, and maintenance of equipment.
- C. Quality: Provide tools and lubricating equipment of a quality meeting equipment manufacturer's requirements.

1.9 LUBRICATION

- A. General: Where lubrication is required for proper operation of equipment, incorporate in the equipment the necessary and proper provisions in accordance with manufacturer's requirements. Where possible, make lubrication automated and positive.
- B. Oil Reservoirs: Where oil is used, supply reservoir of sufficient capacity to lubricate unit for a 24-hour period.

1.10 WARRANTY

- A. Provide copies of any warranties of materials or equipment to the City Manager or designee with documentation showing compliance with warranty requirements.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

CERTIFICATE OF INSTALLATION, INSPECTION AND START-UP SERVICES

Project _____

Equipment _____

Specification Section _____

Contract _____

I hereby certify that the named equipment has been inspected, adjusted and operated by the Manufacturers' Representative and further certify:

1. That the equipment is installed in accordance with the manufacturer's recommendations, approved shop drawings and the Contract Documents.
2. That nothing in the installation voids any warranty.
3. That equipment has been operated in the presence of the manufacturer's representative.
4. That equipment, as installed, is ready to be operated by others.

MANUFACTURERS' REPRESENTATIVE

Signature _____ Date _____

Name (print) _____

Title _____

Representing _____

CONTRACTOR

Signature _____ Date _____

Name (print) _____

Title _____

Attach the detailed report called for by Specification Section 01600.

Complete and submit three copies of this form with the detailed report to ENGINEER as specified.

CERTIFICATE OF POST START-UP SERVICES

Project _____

Equipment _____

Specification Section _____

Contract _____

I hereby certify the Manufacturers' Representative has inspected this equipment, made adjustments and calibrations, and that it is operating in conformance with the design, specifications, and manufacturer's requirements. Detailed notation of improper operation with corresponding recommendations, if any, are made and attached to this form.

MANUFACTURERS' REPRESENTATIVE

Signature _____ Date _____

Name (print) _____

Title _____

Representing _____

CONTRACTOR

Signature _____ Date _____

Name (print) _____

Title _____

ENGINEER

Signature _____ Date _____

Name (print) _____

Title _____

Complete and submit three copies of this form to the City Manager or designee upon completion of 6 to 11 months reinspection as required by Specification Section 01600.

END OF SECTION

SECTION 01710

CLEANING

PART 1 GENERAL

1.1 SECTION INCLUDES:

- A. General Requirements
- B. Disposal Requirements

1.2 GENERAL REQUIREMENTS

- A. Execute cleaning during progress of the work and at completion of the work.

1.3 DISPOSAL REQUIREMENTS

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 DURING CONSTRUCTION

- A. Execute daily cleaning to keep the work, the site, and adjacent properties free from accumulations of waste materials, rubbish, and windblown debris, resulting from construction operations.
- B. Provide onsite containers for the collection of waste materials, debris and rubbish. All waste materials including containers, food debris and other miscellaneous materials must be disposed of daily in onsite containers.
- C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

3.2 FINAL CLEANING

- A. Requirements: At the completion of work and immediately prior to final inspection, clean the entire project as follows:
 - 1. Thoroughly clean, sweep, wash, and polish all work and equipment provided under the Contract, including finishes. Leave the structures and site in a complete and finished condition to the satisfaction of the ENGINEER.
 - 2. Direct all subcontractors to similarly perform, at the same time, an equivalent thorough cleaning of all work and equipment provided under their contracts.
 - 3. Remove all temporary structures and all debris, including dirt, sand, gravel, rubbish and waste material.
 - 4. Should the CONTRACTOR not remove rubbish or debris or not clean the buildings and site as specified above, the OWNER reserves the right to have the cleaning done at the expense of the CONTRACTOR.
- B. Employ experienced workers, or professional cleaners, for final cleaning.
- C. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- D. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.
- E. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed interior and exterior finished surfaces. Polish surfaces so designated to shine finish.
- F. Repair, patch, and touch up marred surfaces to specified finish, to match adjacent surfaces.
- G. Replace air-handling filters if units were operated during construction.
- H. Clean ducts, blowers, and coils, if air-handling units were operated without filters during construction.
- I. Vacuum clean all interior spaces, including inside cabinets.
- J. Handle materials in a controlled manner with as few handlings as possible. Do not drop or throw materials from heights.
- K. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly-painted surfaces.

EXHIBIT A-1

- L. Clean interior of all panel cabinets, pull boxes, and other equipment enclosures.
- M. Wash and wipe clean all lighting fixtures, lamps, and other electrical equipment that may have become soiled during installation.
- N. Perform touch-up painting.
- O. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.
- P. Remove erection plant, tools, temporary structures and other materials.
- Q. Remove and dispose of all water, dirt, rubbish or any other foreign substances.

3.3 FINAL INSPECTION

- A. After cleaning is complete the final inspection may be scheduled. The inspection will be done with the OWNER and ENGINEER.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 01730

OPERATION AND MAINTENANCE MANUALS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Description
- B. Quality Assurance
- C. Format and Contents

1.2 DESCRIPTION

- A. Scope: Furnish to the ENGINEER three (3) printed copies and one (1) electronic copy of an Operation and Maintenance Manual for all equipment and associated control systems furnished and installed.

1.3 QUALITY ASSURANCE

- A. Reference Codes and Specifications: No current government or commercial specifications or documents apply.

1.4 FORMAT AND CONTENTS

- A. Prepare and arrange each copy of the manual as follows:
 - 1. One copy of an equipment data summary (see sample form) for each item of equipment.
 - 2. One copy of an equipment preventive maintenance data summary (see sample form) for each item of equipment.
 - 3. One copy of the manufacturer's operating and maintenance instructions specific to the model number furnished. Operating instructions include detailed assembly drawings including a list of all parts and materials with catalog number, and instructions for equipment start-up, normal operation, adjusting, overhauling, shutdown, emergency operation, troubleshooting. Maintenance instructions include equipment installation, calibration and adjustment, preventive and repair maintenance, lubrication schedule, lubricant types and grades, troubleshooting, parts list and recommended spare parts. Include Manufacturer's telephone numbers for Technical Support.
 - 4. List of electrical relay settings and control and alarm contact settings.

EXHIBIT A-1

5. Electrical interconnection wiring diagram for equipment furnished including all control and lighting systems.
 6. One valve schedule giving valve number, location, fluid, and fluid destination for each valve installed. Group all valves in same piping systems together in the schedule. Obtain a sample of the valve numbering system from the ENGINEER.
 7. Furnish all O&M Manual material in bound 8-1/2 by 11 commercially printed or typed forms or an acceptable alternative format.
- B. Organize each manual into sections paralleling the equipment specifications. Identify each section using heavy section dividers with reinforced holes and numbered plastic index tabs. Use 3-ring, hard-back binders. Punch all loose data for binding. Arrange composition and printing so that punching does not obliterate any data. Print on the cover and binding edge of each manual the project title, and manual title, as furnished and approved by the ENGINEER.
- C. Leave all operating and maintenance material that comes bound by the equipment manufacturer in its original bound state. Cross-reference the appropriate sections of the CONTRACTOR's O&M manual to the manufacturers' bound manuals.
- D. Label binders Volume 1, 2, and so on, where more than one binder is required. Include the table of contents for the entire set, identified by volume number, in each binder.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

City Utilities

Equipment Data Summary

Equipment Name:		Specification Reference:	
Manufacturer:			
	Name:		
	Address:		
	Telephone:		
Number Supplied:		Location/Service:	
Model No:		Serial No:	
Type:			
Size/Speed/Capacity/Range (as applicable):			
Power Requirement (Phase/Volts/Hertz):			
Local Representative:			
	Name:		
	Address:		
	Telephone:		
NOTES:			

City Utilities

Preventive Maintenance Summary

Equipment Name:		Location:	
Manufacturer:			
Name:			
Address:			
Telephone:			
Model No:		Serial No:	
Maintenance Task	Lubricant/Part	D W M Q SA A	O&M Manual Reference
NOTES:			

*D-Daily W-Weekly M-Monthly Q-Quarterly SA-Semi-Annual A-Annual

SECTION 01750

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

Requirements for preparation, maintenance and submittal of project record documents. The Contractor's attention is specifically directed to Part 3.2.B. of this Section, which requires use of a Florida licensed surveyor to sign and seal all record drawings.

1.2 RELATED SECTIONS

- A. Section 01051 – Lines and Grades
- B. Section 01400 - Quality Control

1.3 SUBMITTALS

- A. General: Provide all submittals as specified. Final disbursement of project monies shall not occur until or unless said “record drawings” are submitted to the satisfaction of the City.
- B. At Contract close out, two (2) sets of signed and sealed Record Drawings for the potable water system, non-potable irrigation water system, and/or wastewater system to be conveyed shall be submitted to the City.
- C. Provide electronic submittal as specified in Part 3.2.B of this Section.

1.4 REQUIREMENTS

- A. Contractor shall maintain at the site for the City one record copy of:
 - 1. Drawings
 - 2. Specifications
 - 3. Addenda
 - 4. Change orders and other modifications to the Contract
 - 5. Design Engineer’s field orders or written instructions
 - 6. Approved shop drawings, working drawings and samples
 - 7. Field test records
- B. Additional Requirements for City Capital Projects Only
 - 1. GIS Turn-Over Documents (see City of Naples GIS and CAD Record Standards and Requirements)

PART 2 PRODUCTS (not used)

EXHIBIT A-1

PART 3 EXECUTION

3.1 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Project record documents shall be stored in Contractor's field office or other location approved by the City apart from documents used for construction.
- B. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
- C. Make documents and samples available at all times for inspection by the City.

3.2 RECORDING

A. General

- 1. Record Drawings shall accurately depict the constructed configuration of all potable water, non-potable irrigation water and/or wastewater systems or portion(s) thereof. All revisions to City staff approved construction drawings shall be precisely identified and illustrated on the Record Drawings. All Record Drawings of utility systems or portion(s) thereof that are not being conveyed to the Board shall bear, on the cover sheet, a prominently displayed DISCLAIMER, in bold lettering at least one-quarter (1/4) inch high, stating: "All on-site potable water, non-potable irrigation and/or wastewater systems shall be owned, operated and maintained by the private owner(s) and/or the master condominium/homeowners' association, successors or assigns" (or other comparable private ownership).
- 2. Label each document "PROJECT RECORD" or similar text in neat, large printed letters.
- 3. Survey information can be obtained as needed by the use of 2-inch PVC labeled pipes installed over underground improvements by the contractor during construction. This method is an adequate process for obtaining record information.
- 4. Record information in red ink.

B. Record Drawings

- 1. The Record Drawings require signed and sealed as-built information, including above and below ground improvements including underground piping, valves and ductbanks, by a Florida Licensed Land Surveyor.
- 2. The Record Drawings shall identify the entity that provided the record data.
- 3. Drawings shall be referenced to and tie-in with the state plane coordinate system, with a Florida East Projection, and a North American Datum 1983/1990 (NAD 83/90 datum), and with United States Survey Feet (USFEET) units, as established by a registered Florida surveyor and mapper.
- 4. Files shall be also submitted in Drawing File (DWG) format in AutoCAD Release 2004 or later version and a red-lined "field" hardcopy.

EXHIBIT A-1

5. Record drawings shall be submitted to the City staff within 60 days of the final construction completion date.
6. The following items shall be accurately depicted in vertical and horizontal directions on the Record Drawings:
 - a) All associated rights-of-way and utility easements whether shown on the Contract Drawings, found during construction or added during the Work.
 - b) Sewer system inverts, pipe slopes, manhole rims and run lengths.
 - c) Sewer lateral locations stationed from the nearest downstream manhole.
 - d) Sewer main stub extension inverts at both ends, pipe slope, run length and location.
 - e) Tie-ins to all valves, air release assemblies, fire hydrants, manholes, blowoffs, etc.
 - f) Top elevations of treatment plant structures and tanks.
 - g) Manhole center for sanitary sewers and storm sewers as related to utility improvements.
 - h) Pipe changes in direction or slope.
 - i) Buried valves, tees and fittings.
 - j) Pipe invert, or centerline, elevations at crossing with other pipe.
 - k) Invert, or centerline, elevations and coordinates of existing exposed pipe at crossing with underground pipe installed under this project.
 - l) Other horizontal and vertical record data pertinent to completed Work.
7. Each pipe elevation shall be clearly identified as to whether it is top of pipe, centerline of pipe or invert of pipe.
8. Record Drawings shall indicate all deviations from Contract Drawings including:
 - a) Field changes.
 - b) Changes made by Change Order.
 - c) Details, utilities, piping or structures not on original Contract Drawings.
 - d) Equipment and piping relocations.

C. Specifications and Addenda

Legibly mark each Section to record:

2. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.
3. Changes made by Field Order or Change Order.

D. Shop Drawings

1. Keep one copy of the final, approved shop drawing with the Record Documents.

EXHIBIT A-1

2. Record documents should include all shop drawing information submitted. Additional information submitted during the review process should be filed with the appropriate submittal.

END OF SECTION

SECTION 02050

DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: All work necessary for the removal and disposal of structures, foundations, piping, equipment and roadways, or any part thereof including masonry, steel, reinforced concrete, plain concrete, electrical facilities, and any other material or equipment shown or specified to be removed.
- B. Basic Procedures and Schedule: Carry out demolition so that adjacent structures, which are to remain, are not endangered. Schedule the work so as not to interfere with the day-to-day operation of the existing facilities. Do not block doorways or passageways in existing facilities.
- C. Additional Requirements: Provide dust control and make provisions for safety.
- D. Related Work Specified in Other Sections Includes:
 - 1. Section 01045 – Connection to Existing Systems
 - 2. Section 02110 – Site Clearing

1.2 SUBMITTALS

- A. Provide all submittals, including the following, as specified in Division 1.
- B. Site Inspection: Visit the site and inspect all existing structures. Observe and record any defects that may exist in buildings or structures adjacent to but not directly affected by the demolition work. Provide the City Manager or designee with a copy of this inspection record and obtain the ENGINEER's and the City's Manager or designee approval prior to commencing the demolition.

1.3 QUALITY ASSURANCE

- A. Limits: Exercise care to break concrete well for removal in reasonably small masses. Where only parts of a structure are to be removed, cut the concrete along limiting lines with a suitable saw so that damage to the remaining structure is held to a minimum.

PART 2 PRODUCTS

Not Used

EXHIBIT A-1

PART 3 EXECUTION

3.1 EXAMINATION OF EXISTING DRAWINGS

- A. Available drawings of existing structures and equipment will be available for inspection at the office of the ENGINEER.

3.2 PROTECTION

- A. General Safety: Provide warning signs, protective barriers, and warning lights as necessary adjacent to the work as approved or required. Maintain these items during the demolition period.
- B. Existing Services: Undertake no demolition work until all mechanical and electrical services affected by the work have been properly disconnected. Cap, reroute or reconnect interconnecting piping or electrical services that are to remain in service either permanently or temporarily in a manner that will not interfere with the operation of the remaining facilities.
- C. Hazards: Perform testing and air purging where the presence of hazardous chemicals, gases, flammable materials or other dangerous substances is apparent or suspected, and eliminate the hazard before demolition is started.

3.3 DEMOLITION REQUIREMENTS

- A. Explosives: The use of explosives will not be permitted.
- B. Protection: Carefully protect all mechanical and electrical equipment against dust and debris.
- C. Removal: Remove all debris from the structures during demolition and do not allow debris to accumulate in piles.
- D. Abandoned Pipelines: Fill all abandoned pipelines using grout in accordance with Section 03310.
- E. Access: Provide safe access to and egress from all working areas at all times with adequate protection from falling material.
- F. Protection: Provide adequate scaffolding, shoring, bracing railings, toe boards and protective covering during demolition to protect personnel and equipment against injury or damage. Cover floor openings not used for material drops with material substantial enough to support any loads placed on it. Properly secure the covers to prevent accidental movement.
- G. Lighting: Provide adequate lighting at all times during demolition.
- H. Closed Areas: Close areas below demolition work to anyone while removal is in progress.

- I. Material Drops: Do not drop any material to any point lying outside the exterior walls of the structure unless the area is effectively protected.
- J. Chemicals: All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant or of other classification must show approval of either EPA or USDA. Use of all such chemicals and disposal of residues shall be in strict conformance with manufacturer's instructions or government regulations as applicable.

3.4 ASBESTOS-CONCRETE (AC) PIPE

- A. If existing asbestos-cement pipe is encountered during the course of construction, remove the AC pipe and replace it with C900 PVC pipe having a pressure rating as required elsewhere in these specifications. Replace the AC pipe with PVC pipe for a distance of 10 feet each way from the centerline of the pipe under construction or 5 feet beyond the length of AC pipe exposed by trench excavation, whichever is greater. A change order will be issued for required replacement of AC pipe not shown on the drawings.
- B. Coordinate the shutdown of the AC pipeline with the City Manager or designee in accordance with Section 01045, including proper notice to the City Manager or designee and any customers that may be affected by the shutdown as required by these specifications and/or current Water Department policy. In the event of an unanticipated encounter with AC pipe, immediately recover and protect the pipe and notify the CITY Water Department.
- C. Perform cutting of AC pipe by means of cutting wheels mounted in a chain wrapped around the pipe barrel. Do not use power driven saws with abrasive discs or any other means that produce concentrations of airborne asbestos dust.

3.5 DISPOSAL OF MATERIALS

- A. Final Removal: Dispose of AC pipe in accordance with CITY special handling requirements and coordination with City Solid Waste Management Department. Remove all other debris, rubbish, scrap pieces, equipment, and materials resulting from the demolition. Take title to all demolished materials and remove such items from the site.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 02110

SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for clearing of all areas within the Contract limits and other areas shown, including work designated in permits and other agreements, in accordance with the requirements of Division 1.
- B. Related Work Specified in Other Sections Includes:
 - 1. Section 02050 – Demolition
 - 2. Section 02222 - Excavation - Earth and Rock
 - 3. Section 02223 – Backfilling
 - 4. Section 02400 – Restoration by Sodding or Seeding

1.2 DEFINITIONS

- A. Clearing: Clearing is the removal from the ground surface and disposal, within the designated areas, of trees, brush, shrubs, down timber, decayed wood, other vegetation, rubbish and debris as well as the removal of fences.
- B. Grubbing: Grubbing is the removal and disposal of all stumps, buried logs, roots larger than 1-1/2 inches, matted roots and organic materials.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PROTECTION OF EXISTING UTILITIES

- A. Prior to site clearing, locate and mark all existing utilities in coordination with the CITY and other affected owners. Protect all existing utilities and markings from damage. In case of damage to existing utilities caused by construction activities, contact the owner of the utility or appropriate CITY department (Water or Wastewater) immediately. Repair any damage to existing utilities or markings caused by construction activities in coordination with or as directed by the owner of the utility.

3.2 TREE REMOVAL

- A. Tree Removal Within Right-of-Way Limits: Remove trees and shrubs within the right-of-way unless otherwise indicated.
 - 1. Remove trees and shrubs to avoid damage to trees and shrubs designated to remain.
 - 2. Grub and remove tree stumps and shrubs felled within the right-of-way to an authorized disposal site. Fill depressions created by such removal with material suitable for backfill as specified in Section 02223.
- B. Tree Removal Outside Right-of-Way Limits: Do not cut or damage trees outside the right-of-way unless plans show trees to be removed or unless written permission has been obtained from the property owner. Furnish three copies of the written permission before removal operations commence.
- C. If the landowner desires the timber or small trees, cut and neatly pile it in 4 ft. lengths for removal by the owner; otherwise, dispose of it by hauling it away from the project site. If hauled timber is of merchantable quality, credit shall accrue to the CONTRACTOR.

3.3 TREES AND SHRUBS TO BE SAVED

- A. Protection: Protect trees and shrubs within the work limits that are so delineated or are marked in the field to be saved from defacement, injury and destruction.
 - 1. Work within the limits of the tree drip line with extreme care using either hand tools or equipment that will not cause damage to trees.
 - a. Do not disturb or cut roots unnecessarily. Do not cut roots 1-1/2 inches and larger unless approved.
 - b. Immediately backfill around tree roots after completion of construction in the vicinity of trees.
 - c. Do not operate any wheeled or tracked equipment within drip line.
 - 2. Protect vegetation from damage caused by emissions from engine-powered equipment.
 - 3. During working operations, protect the trunk, foliage and root system of all trees to be saved with boards or other guards placed as shown and as required to prevent damage, injury and defacement.
 - a. Do not pile excavated materials within the drip line or adjacent to the trunk of trees.
 - b. Do not allow runoff to accumulate around trunk of trees.

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- c. Do not fasten or attach ropes, cables, or guy wires to trees without permission. When such permission is granted, protect the tree before making fastening or attachments by providing burlap wrapping and softwood cleats.
 - d. The use of axes or climbing spurs for trimming will not be permitted.
 - e. Provide climbing ropes during trimming.
4. Remove shrubs to be saved, taking a sufficient earth ball with the roots to maintain the shrub.
 - a. Temporarily replant if required, and replace at the completion of construction in a condition equaling that which existed prior to removal.
 - b. Replace in kind if the transplant fails.
 5. Have any tree and shrub repair performed by a tree surgeon properly licensed by the State of Florida and within 24 hours after damage occurred.

3.4 CLEARING AND GRUBBING

- A. Clearing: Clear all items specified to the limits shown and remove cleared and grubbed materials from the site.
 1. Do not start earthwork operations in areas where clearing and grubbing is not complete, except that stumps and large roots may be removed concurrent with excavation.
 2. Comply with erosion, sediment control and storm management measures as specified in Division 1.
- B. Grubbing: Clear and grub areas to be excavated, areas receiving less than 3 feet of fill and areas upon which structures are to be constructed.
 1. Remove stumps and root mats in these areas to a depth of not less than 18 inches below the subgrade of sloped surfaces.
 2. Fill all depressions made by the removal of stumps or roots with material suitable for backfill as specified in Section 02223.
- C. Limited Clearing: Clear areas receiving more than 3 feet of fill by cutting trees and shrubs as close as practical to the existing ground. Grubbing will not be required.
- D. Dispose of all material and debris from the clearing and grubbing operation by hauling such material and debris away to an approved dump. The cost of disposal (including hauling) of cleared and grubbed material and debris shall be considered

EXHIBIT A-1

a subsidiary obligation of the CONTRACTOR; include the cost in the bid for the various classes of work.

3.5 TOPSOIL

- A. Stripping: Strip existing topsoil from areas that will be excavated or graded prior to commencement of excavating or grading and place in well-drained stockpiles in approved locations.

END OF SECTION

SECTION 02151

SHORING, SHEETING AND BRACING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Work required for protection of an excavation or structure through shoring, sheeting, and bracing.
- B. Related Work Specified In Other Sections Includes:
 - 1. Section 02222 - Excavation - Earth and Rock
 - 2. Section 02223 - Backfilling

1.2 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. CONTRACTOR's Submittals: All sheeting and bracing shall be the responsibility of the CONTRACTOR to retain qualified design services for these systems, and to be completed with strict adherence to OSHA Regulations. Submit complete design calculations and working drawings of proposed shoring, sheeting and bracing which have been prepared, signed and sealed by a Licensed Professional Engineer experienced in Structural Engineering and registered in the State of Florida, before starting excavation for jacking pits and structures. Use the soil pressure diagram shown for shoring, sheeting and bracing design. ENGINEER's review of calculations and working drawings will be limited to confirming that the design was prepared by a licensed professional engineer and that the soil pressure diagram shown was used.

1.3 REFERENCES

- A. Design: Comply with all Federal and State laws and regulations applying to the design and construction of shoring, sheeting and bracing.
- B. N.B.S. Building Science Series 127 "Recommended Technical Provisions for Construction Practice in Shoring and Sloping Trenches and Excavations.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Do work in accordance with the U.S. Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54), and the Florida

EXHIBIT A-1

Trench Safety Act. Observe 29 CFR 1910.46 OSHA regulations for Confined Space Entry.

PART 2 PRODUCTS

2.1 MANUFACTURERS AND MATERIALS

A. Material Recommendations: Use manufacturers and materials for shoring, sheeting and bracing as recommended by the Licensed Professional Engineer who designed the shoring, sheeting, and bracing.

1. Wood Materials: Oak, or treated fir or pine for wood lagging.

PART 3 EXECUTION

3.1 SHORING, SHEETING AND BRACING INSTALLATION

A. General: Provide safe working conditions, to prevent shifting of material, to prevent damage to structures or other work, to avoid delay to the work, all in accordance with applicable safety and health regulations. Properly shore, sheet, and brace all excavations which are not cut back to the proper slope and where shown. Meet the general trenching requirements of the applicable safety and health regulations for the minimum shoring, sheeting and bracing for trench excavations.

1. CONTRACTOR's Responsibility: Sole responsibility for the design, methods of installation, and adequacy of the shoring, sheeting and bracing.

B. Arrange shoring, sheeting and bracing so as not to place any strain on portions of completed work until the general construction has proceeded far enough to provide ample strength.

C. If ENGINEER is of the opinion that at any point the shoring, sheeting or bracing are inadequate or unsuited for the purpose, resubmission of design calculations and working drawings for that point may be ordered, taking into consideration the observed field conditions. If the new calculations show the need for additional shoring, sheeting and bracing, it should be installed immediately.

D. Monitoring: Periodically monitor horizontal and vertical deflections of sheeting. Submit these measurements for review.

E. Accurately locate all underground utilities and take the required measures necessary to protect them from damage. Keep all underground utilities in service at all times as specified in Division 1.

F. Driven Sheet piling: Drive tight sheet piling in that portion of any excavation in paved or surface streets City collector and arterial streets and in State, County, and City

EXHIBIT A-1

highways below the intersection of a one-on-one slope line from the nearest face of the excavation to the edge of the existing pavement or surface.

- G. Sheeting Depth: In general drive or place sheeting for pipelines to a depth at elevation equal to the top of the pipe as approved.
1. If it is necessary to drive sheeting below that elevation in order to obtain a dry trench or satisfactory working conditions, cut the sheeting off at the top of the pipe and leave in place sheeting below the top of the pipe.
 2. Do not cut the sheeting until backfill has been placed and compacted to the top of the pipe.
- H. Sheeting Removal: In general, remove sheeting and bracing above the top of the pipe as the excavation is refilled in a manner to avoid the caving in of the bank or disturbance to adjacent areas or structures. Remove sheeting as backfilling progresses so that the sides are always supported or when removal would not endanger the construction of adjacent structures. When required to eliminate excessive trench width or other damages, shoring or bracing shall be left in place and the top cut off at an elevation 2.5 feet below finished grade, unless otherwise directed.
1. Carefully fill voids left by the withdrawal of the sheeting by jetting, ramming or otherwise.
 2. No separate payment will be made for filling of such voids.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 02210

PIPE REMOVAL AND ABANDONMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Removal and abandonment of piping and appurtenances, wholly or in part, as required to complete Work as shown on the Drawings and specified in this Section.
- B. Work on and/or removal of asbestos cementitious pipe shall be performed per OSHA, EPA, NESHAPS, and State regulations and must be supervised by a person that has satisfactorily completed an Asbestos Abatement Project Supervisor course.
- C. Related Work Specified in other Sections Includes:
 - 1. Section 01045 – Connection to Existing Systems
 - 2. Section 02222 – Excavation – Earth and Rock
 - 3. Section 02223 – Backfilling
 - 4. Section 03310 – Concrete, Masonry Mortar and Grout

1.2 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Submit the following:
 - 1. Proposed methods for pipe removal and abandonment;
 - 2. Equipment proposed to be used to do pipe removal and abandonment work;
 - 3. Resume of pipe grouting subcontractor;
 - 4. Pipe removal and abandonment schedule/sequence.
- C. If a detour is required, submit a traffic control plan for approval to City Manager or designee and/or the Florida Department of Transportation as described in Section 01570.

1.3 SITE CONDITIONS

- A. General
 - 1. Prior to any work, a proper and approved maintenance of traffic plan (MOT) shall be submitted to the engineer and the City.
 - 2. Execute pipe removal and abandonment so that there is no injury to persons or damage to adjacent buildings, structures, equipment, materials, piping, wiring, pavement, fences, trees, guardrails, and other adjacent improvements. Execute demolition and abandonment so that access to facilities that are in operation and to residences and businesses is free and safe.

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3. Execute pipe removal and abandonment so that interference to vehicular traffic and personnel traffic does not exceed scheduled interference. Do not place rubble, excavation, piping, or other materials removed on roadways, drives, or sidewalks that are to remain in service.

PART 2 - PRODUCTS

2.1 TEMPORARY MATERIALS

- A. Provide temporary fencing, barricades, barriers, piping, valves, pumps, power and controls, and water necessary to meet the requirements of this Section.
- B. Temporary fencing, barricades, barriers, and enclosures shall be suitable to the purpose intended.

2.2 REPAIR AND REPLACEMENT MATERIALS

For repair or replacement of existing facilities or improvements to remain, use materials identical to, or equal to, materials used in existing work when new.

PART 3 – EXECUTION

3.1 GENERAL

- A. Conduct pipe removal and abandonment as shown and specified in the Contract Documents.
- B. Conduct pipe removal and abandonment so that existing equipment, piping, wiring, structures, and other improvements to remain are not damaged. Repair or replace equipment, piping, wiring, structures, and other improvements damaged at no additional cost to the City.
- C. Do not remove equipment, piping, wiring, structures, or other improvements not shown or specified to be removed. If equipment, piping, wiring, structures, or other improvements not shown or specified to be removed is removed, replace equipment, piping, wiring, structures, or other improvements at no additional cost to the City.

3.2 DISCONNECTIONS

- A. Prior to starting pipe removal or abandonment, check underground and exposed existing utilities, piping, and equipment within the limits of pipe removal or abandonment. Prior to starting, check underground and exposed existing utilities, piping connected to and associated with existing pipe to be removed or abandoned. Verify the following:
 1. Piping is inactive (abandoned);
 2. Other utilities which may be in conflict have been permanently or temporarily disconnected, if required:
- B. Do not proceed with salvage or demolition if piping is active or utilities have not been disconnected.

3.3 ABANDONMENT

- A. The Contractor shall, as described on the Drawings and as may be directed by the City, abandon in place the following existing utility improvements:
 - 1. All water mains, reuse water mains and raw water mains that are designated to be abandoned shall be filled with grout. Refer to Section 03310 – Concrete, Masonry Mortar and Grout.
 - 2. All sewer lines, force mains, laterals and services that are designated to be abandoned shall be flushed clean and filled with grout. Prior to grout fill, sewer lines, force mains, laterals and services to be abandoned shall be flushed clean to remove wastewater and solids. Contractor is responsible for securing and providing flushing water, collection of flush water/wastewater, and disposal. The cleaning of these piping systems shall comply with all local and DEP requirements.
 - 3. Sewer manholes designated to be abandoned shall have the top two feet removed. The remainder of each manhole shall be abandoned and filled with grout or flowable fill. The excavation or pit shall be backfilled with select fill and compacted in accordance with Section 02223 – Backfilling and the trenching details on the Drawings.
- B. Appurtenances: All water hydrants, ARV valves and other appurtenances on abandoned lines shall be removed to the main and the fitting at the main shall be capped or plugged. All valves shall have the valve box, pad and operator removed, with the valve left in the open position unless specifically noted otherwise.
- C. Preparation:
 - 1. The City shall be notified at least 72 hours in advance of grouting operations.
 - 2. Bulkheads shall be spaced at intervals of not more than 1,000 feet. If the line to be abandoned is longer, bulkheads shall be inserted in the pipe to maintain the required maximum spacing between bulkheads.
 - 3. Temporary vents shall be installed in the line to be filled at a maximum spacing of 150 ft. The vents shall be capable of being capped to allow further grouting operations.
- D. Equipment:
 - 1. The materials shall be mixed or delivered in equipment of sufficient size and capacity to provide the desired amount of grout material for each stage in a single operation. The equipment shall be capable of mixing the grout at densities required for the approved procedure and shall also be capable of changing density as dictated by field conditions any time during the grouting operation.
 - 2. Mixers and Pumps - The grout shall be delivered to the injection point at a steady pressure with a non-pulsating centrifugal or triplex pump. Means shall be provided to increase or decrease the water-cement ratio. The system shall mix the grout to a homogeneous consistency. Means of accurately measuring grout component quantities, pumping pressures, and volumes pumped shall be provided.

EXHIBIT A-1

3. Pressure Gauges - CONTRACTOR shall provide one pressure gauge at the point of injection and one pressure gauge at the grout pump. Grouting shall not proceed without appropriate calibrated gauges in place and in working order. Pressure gauges shall be equipped with diaphragm seals, have a working range between 1.5 to 2.0 times the design grout pressure, and have an accuracy within 0.5 percent of full range. Pressure gauges shall be instrument oil filled and attached to a saddle-type diaphragm seal to prevent clogging with grout.

E. Grouting:

Once grouting operations begin, grouting shall proceed uninterrupted from bulkhead to bulkhead. Grout placement shall not be terminated until both of the following conditions have been met, unless otherwise approved by the City: a) The estimated volume of grout to fill the line has been injected; and, b) grout has been expelled from the furthest vent or bulkhead. Bulkheads and temporary vents shall not be removed until the grout has set.

F. Testing and Sampling:

1. Take four test specimens for each 50 cubic yards of grout or for each four hours of placing.
2. Test in accordance with ASTM C109 except:
 - a. The specimens shall be 3 inch by 6 inch cylinders covered after casting to prevent damage and loss of moisture. Moist cure specimens for a period up to 7 days prior to a 28-day compressive strength test.
 - b. Do not oven dry specimens that are load tested. Specimens may be tested at any age to monitor compressive strength. The material may require special handling and testing techniques.

- G. The CONTRACTOR may remove the pipe in accordance with the Paragraph 3.04 in lieu of abandonment if acceptable to the City. Such removal, however, will be paid at the same price for pipe abandonment.

- H. All work under this Section shall comply with City, State and Federal regulations.

3.4 REMOVAL AND DISPOSAL

- A. The Contractor shall, as described on the Drawings and as may be directed by the City, remove the following existing utility improvements:

1. All water mains, reuse water mains and raw water mains that are designated to be removed.
2. All sewer lines, sewer manholes, force mains, laterals and services that are designated to be removed shall be flushed clean with water prior to removal. Contractor is responsible for securing and providing flushing water, collection of flush water/wastewater, and disposal. The cleaning of these piping systems shall comply with all local and DEP requirements.

- B. The pipe removal and disposal shall include all valves, fittings and appurtenances.

EXHIBIT A-1

3.5 SALVAGE OF EQUIPMENT, PIPING, AND MATERIALS

- A. Remove items identified on the drawings or specified to remain the property of the City. Do not damage equipment, piping, and materials to be salvaged.
- B. Following removal of equipment, piping, and materials to be salvaged, place equipment, piping, and materials in a location within the City limits as designated by the City.

3.6 REPAIRS

Repair structural elements, equipment, piping, conduit, and other improvements to remain that are damaged during demolition. Use workers specifically qualified in trade, or trades, involved to repair damaged work.

3.7 DISPOSAL

- A. Remove and dispose of all equipment, piping, and materials from the jobsite not specifically designated to be retained by the City.
- B. Contractor shall not accumulate or store debris from demolition on the project site.
- C. The disposal of the piping, manholes and appurtenances shall be in accordance with City, State and Federal laws.

3.8 BACKFILLING

- A. Backfill excavations, trenches, and pits resulting from abandonment and removal according to Section 02223 – Backfilling.
- B. Backfill of the pipe trenches shall be according to the City details for pipe trench backfill. Pipe trenches for removed pipes that were within 3 horizontal feet of the edge of pavement shall be backfilled according to the detail for the type of roadway.

3.9 CLEANUP AND CLOSURE

- A. Following pipe abandonment or removal, clean-up areas where other work is to be done as specified in this Section, or Sections applicable to work to be done.
- B. Following pipe abandonment or removal, clean-up areas where no other work is to be done under this Contract. Remove debris and rubbish, temporary facilities, and equipment. Level surface irregularities to eliminate depressions. Leave work in a neat and presentable condition.
- C. In locations where a pipe to be abandoned or removed connects to a pipe that remains in service, the Contractor shall install a suitable cap or plug on the end of the active pipe.

END OF SECTION

SECTION 02222

EXCAVATION - EARTH AND ROCK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for performing opencut excavations to the widths and depths necessary for constructing structures and pipelines, including excavation of any material necessary for any purpose pertinent to the construction of the Work.
- B. Related Work Specified In Other Sections Includes:
 - 1. Section 02110 - Site Clearing
 - 2. Section 02151 - Shoring, Sheeting and Bracing
 - 3. Section 02223 – Backfilling
 - 4. Section 02530 – Groundwater Control for Open Cut Excavation
 - 5. Section 03310 – Concrete, Masonry, Mortar and Grout

1.2 DEFINITIONS

- A. Earth: "Earth" includes all materials which, in the opinion of the ENGINEER, do not require blasting, barring, wedging or special impact tools for their removal from their original beds, and removal of which can be completed using standard excavating equipment. Specifically excluded are all ledge and bedrock and boulders or pieces of masonry larger than one cubic yard in volume.
- B. Rock: "Rock" includes all materials which, in the opinion of the ENGINEER, require blasting, barring, wedging and/or special impact tools such as jack hammers, sledges, chisels, or similar devices specifically designed for use in cutting or breaking rock for removal from their original beds and which have compressive strengths in their natural undisturbed state in excess of 300 psi. Boulders or masonry larger than one cubic yard in volume are classed as rock excavation.

1.3 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Engage the services of a Professional Engineer who is registered in the State of Florida to design all cofferdam and sheeting and bracing systems which the CONTRACTOR feels necessary for the execution of his work. Submit to the

EXHIBIT A-1

ENGINEER a signed statement that he has been employed by the CONTRACTOR to design all sheeting and bracing systems. After the systems have been installed, furnish to the ENGINEER an additional signed statement that the cofferdams and sheeting and bracing systems have been installed in accordance with his design.

- C. If a detour is required, submit a traffic control plan for approval to City Manager or designee and/or the Florida Department of Transportation as described in Section 01570.

1.4 SITE CONDITIONS

- A. Geotechnical Investigation: A geotechnical investigation may have been prepared by the CITY and ENGINEER in preparing the Contract Documents.
 - 1. The geotechnical investigation report may be examined for what ever value it may be considered to be worth. However, this information is not guaranteed as to its accuracy or completeness.
 - 2. The geotechnical investigation report is not part of the Contract Documents.
- B. Actual Conditions: Make any geotechnical investigations deemed necessary to determine actual site conditions.
- C. Underground Utilities: Locate and identify all existing underground utilities prior to the commencement of Work.
- D. Quality and Quantity: Make any other investigations and determinations necessary to determine the quality and quantities of earth and rock and the methods to be used to excavate these materials.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 GENERAL

- A. Clearing: Clear opencut excavation sites of obstructions preparatory to excavation. Clearing in accordance with Section 02110, includes removal and disposal of vegetation, trees, stumps, roots and bushes, except those specified to be protected during trench excavation.
- B. Banks: Shore or slope banks to the angle of repose to prevent slides or cave-ins in accordance with Section 02151.

EXHIBIT A-1

- C. **Safety:** Whenever an excavation site or trench is left unattended by the CONTRACTOR or when an area is not within 100 feet of observation by the CONTRACTOR, the excavation site or trench shall be filled and/or, at the City Manager's or designee discretion, protected by other means to prevent accidental or unauthorized entry. Include barricades and other protection devices requested by the ENGINEER or City Manager or designee, including temporary fencing, snow fencing, or temporary "structure" tape. Such safety items shall not relieve the CONTRACTOR of any site safety requirements or liabilities established by Federal, State and local laws and agencies, including OSHA, but is intended as additional safety measures to protect the general public.
- D. **Hazardous Materials:** If encountered, take care of hazardous materials not specifically shown or noted in accordance with Section 01500.
- E. During excavation and any site work, take storm water pollution prevention measures to ensure that water quality criteria are not violated in the receiving water body and all state and local regulatory requirements are met.

3.2 STRUCTURE EXCAVATION

- A. **Excavation Size:** Provide excavations of sufficient size and only of sufficient size to permit the Work to be economically and properly constructed in the manner and of the size specified.
- B. **Excavation Shape:** Shape and dimension the bottom of the excavation in earth or rock to the shape and dimensions of the underside of the structure or drainage blanket wherever the nature of the excavated material permits.
- C. **Compaction:** Before placing foundation slabs, footings or backfill, proof roll the bottom of the excavations to detect soft spots.
 - 1. For accessible areas, proof roll with a ten wheel tandem axle dump truck loaded to at least 15 tons or similarly loaded construction equipment.
 - 2. For small areas, proof roll with a smooth-faced steel roller filled with water or sand, or compact with a mechanical tamper.
 - 3. Make one complete coverage, with overlap, of the area.
 - 4. Overexcavate soft zones and replace with compacted select fill.

3.3 TRENCH EXCAVATION

- A. **Preparation:** Properly brace and protect trees, shrubs, poles and other structures which are to be preserved. Unless shown or specified otherwise, preserve all trees and large shrubs. Hold damage to the root structure to a minimum. Small shrubs may be preserved or replaced with equivalent specimens.

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- B. Adequate Space: Keep the width of trenches to a minimum, however provide adequate space for workers to place, joint and backfill the pipe properly and safely.
1. The minimum width of the trench shall be equal to at least 3.5 feet or the outside diameter of the pipe at the joint plus 8-inches for unsheeted trench or 12 inches for sheeted trench, whichever is greater. Conform the trench walls to OSHA Regulations.
 2. In sheeted trenches, measure the clear width of the trench at the level of the top of the pipe to the inside of the sheeting.
- C. Depth:
1. Excavate trenches to a minimum depth of 8 inches, but not more than 12 inches, below the bottom of the pipe so that bedding material can be placed in the bottom of the trench and shaped to provide a continuous, firm bearing for pipe barrels and bells.
 2. Standard trench grade shall be defined as the bottom surface of the utility to be constructed or placed within the trench. Trench grade for utilities in rock or other non-cushioning material shall be defined as additional undercuts backfilled with crushed stone compacted in 6-inch lifts, below the standard 8-inches minimum trench undercut. Backfill excavation below trench grade not ordered in writing by the ENGINEER with acceptable USCS Class I, II or III (see Section 02223, 2.1.C) embedment material to trench grade and compact to density equal to native soil.
 3. In stable trenches, where the soil is neither wet, yielding, nor mucky, trench bottom may be either native undisturbed soils of USCS Class II, III, or IV, or thoroughly compacted USCS Class I, II, or III material from three inches (3") to six inches (6") depth to provide a stable, continuous support for the pipe bedding system. In USCS Class V soil areas, foundation bedding is required. All foundation bedding shall be USCS Class I material. In no case shall pipe be bedded on solid rock. See Section 02223, subsections 3.2 and 2.4 for more information on bedding.
- D. Unstable or Unsuitable Materials: If unstable or unsuitable material is exposed at the level of the bottom of the trench excavation, excavate the material in accordance with the subsection headed "Authorized Additional Excavation".
1. Remove material for the full width of the trench and to the depth required to reach suitable foundation material.
 2. When in the judgment of the ENGINEER the unstable or unsuitable material extends to an excessive depth, the ENGINEER may advise, in writing, the need for stabilization of the trench bottom with additional select fill material, crushed stone, washed shell, gravel mat or the need to provide firm support for the pipe or electrical duct by other suitable methods.

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3. Crushed stone, washed shell and gravel shall be as specified in Section 02223.
 4. Payment for such trench stabilization will be made under the appropriate Contract Items or where no such items exist, as a change in the Work.
- E. Length of Excavation: Keep the open excavated trench preceding the pipe laying operation and the unfilled trench, with pipe in place, to a minimum length which causes the least disturbance. Provide ladders for a means of exit from the trench as required by applicable safety and health regulations.
- F. Excavated Material: Neatly deposit excavated material to be used for backfill at the sides of the trenches where space is available. Where stockpiling of excavated material is required, obtain the sites to be used and maintain operations to provide for natural drainage and not present an unsightly appearance.
- G. Water: Allow no water to rise in the trench excavation until sufficient backfill has been placed to prevent pipe flotation. Provide trench dewatering in accordance with Section 02530.

3.4 EXCAVATION FOR JACKING AND AUGERING

- A. Jacking and Augering Requirements: Allow adequate length in jacking pits to provide room for the jacking frame, the jacking head, the reaction blocks, the jacks, auger rig, and the jacking pipe. Provide sufficient pit width to allow ample working space on each side of the jacking frame. Allow sufficient pit depth such that the invert of the pipe, when placed on the guide frame, will be at the elevation desired for the completed line. Tightly sheet the pit and keep it dry at all times.

3.5 ROCK EXCAVATION

- A. Rock Excavation: Excavate rock within the boundary lines and grades as shown, specified or required. Use of explosives will not be permitted unless written approval is obtained from the Engineer of Record.
1. Rock removed from the excavation becomes the property of the CONTRACTOR. Transport and dispose of excavated rock at an off site disposal location. Obtain the off site disposal location.
 2. Remove all shattered rock and loose pieces.
- B. Structure Depths: For cast-in-place structures, excavate the rock only to the bottom of the structure, foundation slab, or drainage blanket.
- C. Trench Width: Maintain a minimum clear width of the trench at the level of the top of the pipe of the outside diameter of the pipe barrel plus 2 feet, unless otherwise approved.

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- D. Trench Depth: For trench excavation in which pipelines are to be placed, excavate the rock to a minimum depth of 8 inches below the bottom of the pipe or duct encasement. Provide a cushion of sand or suitable crushed rock. Refill the excavated space with pipe bedding material in accordance with Section 02223. Include placing, compacting and shaping pipe bedding material in the appropriate Contract Items.
- E. Manhole Depths: For manhole excavation, excavate the rock to a minimum depth of 8 inches below the bottom of the manhole base for pipelines 24 inches in diameter and larger and 6 inches below the bottom manhole base for pipelines less than 24 inches in diameter. Refill the excavated space with pipe bedding material in accordance with Section 02223. Include placing, compacting and shaping pipe bedding material for manhole bases in the appropriate Contract Items.
- F. Over-excavated Space: Refill the excavated space in rock below structures, pipelines, conduits and manholes, which exceeds the specified depths with 2,500 psi concrete, crushed stone, washed shell, or other material as directed. Include refilling of over-excavated space in rock as part of the rock excavation.
- G. Other Requirements: Follow, where applicable, the requirements of the subsections on "Trench Excavation" and "Structure Excavation".
- H. Payment: Rock excavation, including placing, compacting and shaping of the select fill material, will be paid for under the appropriate Contract Items or where no such items exist, as a change in the Work.

3.6 FINISHED EXCAVATION

- A. Finish: Provide a reasonably smooth finished surface for all excavations, which is uniformly compacted and free from irregular surface changes.
- B. Finish Methods: Provide a degree of finish that is ordinarily obtainable from blade-grade operations and in accordance with Section 02223.

3.7 PROTECTION

- A. Traffic and Erosion: Protect newly graded areas from traffic and from erosion.
- B. Repair: Repair any settlement or washing away that may occur from any cause, prior to acceptance. Re-establish grades to the required elevations and slopes.
- C. It shall be the CONTRACTOR's responsibility to acquaint himself with all existing conditions and to locate all structures and utilities along the proposed utility alignment in order to avoid conflicts. Where actual conflicts are unavoidable, coordinate work with the facility owner and perform work so as to cause as little interference as possible with the service rendered by the facility disturbed in accordance with Section 1045. Repair and/or replace facilities or structures damaged in the prosecution of the work immediately, in conformance with current

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standard practices of the industry, or according to the direction of the owner of such facility, at the CONTRACTOR's expense.

- D. Other Requirements: Conduct all Work in accordance with the environmental protection requirements specified in Division 1.

3.8 AUTHORIZED ADDITIONAL EXCAVATION

- A. Additional Excavation: Carry the excavation to such additional depth and width as authorized in writing, for the following reasons:

1. In case the materials encountered at the elevations shown are not suitable.
2. In case it is found desirable or necessary to go to an additional depth, or to an additional depth and width.

- B. Refill Materials: Refill such excavated space with either authorized 2500 psi concrete or compacted select fill material, in compliance with the applicable provisions of Section 02223.

- C. Compaction: Compact fill materials to avoid future settlement. As a minimum, backfill layers shall not exceed 6-inches in thickness for the full trench width and compaction shall equal 95% of maximum density, or 98% if under paved area of roadway, as determined by using ASTM D 1557. Perform compaction density tests at all such backfill areas with spacing not to exceed 100 feet apart and on each 6-inch compacted layer.

- D. Payment: Additional earth excavations so authorized and concrete or select fill materials authorized for filling such additional excavation and compaction of select fill materials will be paid for under the appropriate Contract Items or where no such items exist, as a change in the Work.

3.9 UNAUTHORIZED EXCAVATION

- A. Stability: Refill any excavation carried beyond or below the lines and grades shown, except as specified in the subsection headed "Authorized Additional Excavation", with such material and in such manner as may be approved in order to provide for the stability of the various structures.

- B. Refill Materials: Refill spaces beneath all manholes, structures, pipelines, or conduits excavated without authority with 2500 psi concrete or compacted select fill material, as approved.

- C. Payment: Refill for unauthorized excavation will not be measured and no payment will be made therefor.

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3.10 SEGREGATION STORAGE AND DISPOSAL OF MATERIAL

- A. Stockpiling Suitable Materials: Stockpile topsoil suitable for final grading and landscaping and excavated material suitable for backfilling or embankments separately on the site in approved locations.
- B. Stockpile Locations: Store excavated and other material a sufficient distance away from the edge of any excavation to prevent its falling or sliding back into the excavation and to prevent collapse of the wall of the excavation. Provide not less than 2 feet clear space between the top of any stockpile and other material and the edge of any excavation.
- C. Excess Materials: Be responsible for transport and disposal of surplus excavated material and excavated material unsuitable for backfilling or embankments at an off site disposal location secured by the CONTRACTOR. Contractor shall be responsible for the proper disposal of all AC pipe/couplings and shall comply with all Federal, State, and local regulatory agencies accordingly.

3.11 REMOVAL OF WATER

- A. Water Removal: At all times during the excavation period and until completion and acceptance of the WORK at final inspection, provide ample means and equipment with which to remove promptly and dispose of properly all water entering any excavation or other parts of the WORK.
- B. Dry Excavations: Keep the excavation dry, in accordance with Section 02530.
- C. Water Contact: Allow no water to rise over or come in contact with masonry and concrete until the concrete and mortar have attained a set and, in any event, not sooner than 12 hours after placing the masonry or concrete.
- D. Discharge of Water: Dispose of water pumped or drained from the Work in a safe and suitable manner without damage to adjacent property or streets or to other work under construction.
- E. Protection: Provide adequate protection for water discharged onto streets. Protect the street surface at the point of discharge.
- F. Sanitary Sewers: Discharge no water into sanitary sewers.
- G. Storm Sewers: Discharge no water containing settleable solids into storm sewers.
- H. Repair: Promptly repair any and all damage caused by dewatering the Work.

END OF SECTION

SECTION 02223
BEDDING AND BACKFILLING

PART 1 GENERAL

1.1 SUMMARY

- A. General Requirements: Backfill all excavation to the original surface of the ground or to such other grades as may be shown or required. For areas to be covered by topsoil, leave or stop backfill (12) inches below the finished grade. Obtain approval for the time elapsing before backfilling against masonry structures. Remove from all backfill, any compressible, putrescible or destructible rubbish and refuse and all lumber and braces from the excavated space before backfilling is started. Leave sheeting and bracing in place or remove as the work progresses.
- B. Equipment Limitations: Do not permit construction equipment used to backfill to travel against and over cast-in-place concrete structures until the specified concrete strength has been obtained, as verified by concrete test cylinders. In special cases where conditions warrant, the above restriction may be modified providing the concrete has gained sufficient strength, as determined from test cylinders, to satisfy design requirements for the removal of forms and the application of load.
- C. Related Work Specified In Other Sections Includes:
 - 1. Section 02110 - Site Clearing
 - 2. Section 02222 – Excavation – Earth and Rock

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. ASTM D 1557 - Standard Test Methods for Moisture-Density Relations of Soil and Soil-Aggregate Mixtures Using 10 lb Rammer and 18 in Drop

PART 2 PRODUCTS

2.1 BACKFILL MATERIAL - GENERAL

- A. General: Whenever trenches are in or across driveways, paved areas or streets, the Contractor shall be responsible for any settlement which occurs within one (1) year of preliminary acceptance. Backfill with sound materials, free from waste, organic matter, rubbish, boggy or other unsuitable materials. Acceptable backfill shall not contain rocks or stones larger than 2 inches in size.

- B. General Materials Requirements: Conform materials used for backfilling to the requirements specified. Follow common fill requirements whenever drainage or select fill is not specified. Determine and obtain the approval of the appropriate test method where more than one compaction test method is specified.
- C. Classification of Approved Embedment Materials: Embedment materials listed here include a number of processed materials plus the soil types defined according to the Unified Soil Classification System (USCS) in ASTM D2487. These materials are grouped into 5 broad categories according to their suitability for this application.
1. Class I: Angular, 0.25 inch to 1.5 inch (6 to 40 mm) graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed shells and crushed stone. (Note: The size range and resulting high void ratio of Class I material makes it suitable for use to dewater trenches during pipe installation. This permeable characteristic dictates that its use be limited to locations where pipe support will not be lost by migration of fine grained natural material from the trench walls and bottom or migration of other embedment materials into the Class I material. When such migration is possible, the material's minimum size range should be reduced to finer than 0.25 inch (6 mm) and the gradation properly designed to limit the size of the voids. An alternative to modifying the gradation is to use a geotextile fabric as a barrier to migration to fines.)
 2. Class II: Coarse sands and gravels with maximum particle size of 1.5 inches (40 mm), including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil Types GW, GP, SW and SP are included in this class. (Note: Sands and gravels, which are clean or borderline between clean and with fines, should be included. Coarse-grained soils with less than 12 percent, but more than 5 percent fines are neglected in ASTM D2487 and the USCS, but should be included. The gradation of Class II material influences its density and pipe support strength when loosely placed. The gradation of Class II material may be critical to the pipe support and stability of the foundation and embedment, if the material is imported and is not native to the trench excavation. A gradation other than well graded, such as uniformly graded or gap graded, may permit loss of support by migration into void spaces of a finer grained natural material from the trench wall and bottom. An alternative to modifying the gradation is to use a geotextile fabric as a barrier to migration of fines.)
 3. Class III: Fine sand and clayey (clay filled) gravels, including fine sands, sand-clay mixtures and gravel-clay mixtures. Soil Types GM, GC, SM and SC are included in this class.
 4. Class IV: Silt, silty clays and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil Types MH, ML, CH and CL are included in this class. (Note: Use caution in the design and selection of the degree and method of compaction for Class IV soils because of the

difficulty in properly controlling the moisture content under field conditions. Some Class IV soils with medium to high plasticity and with liquid limits greater than 50 percent (CH, MH, CH-MH) exhibit reduced strength when wet and should only be used for bedding, haunching and initial backfill in arid locations where the pipe embedment will not be saturated by groundwater, rainfall or exfiltration from the pipe. Class IV soils with low to medium plasticity and with liquid limits lower than 50 percent (CL, ML, CL-ML) also require careful consideration in design and installation to control moisture content, but need not be restricted in use to arid locations.)

- 5. Class V: This class includes the organic soils OL, OH and PT as well as soils containing frozen earth, debris, rocks larger than 1.5 inches (40 mm) in diameter and other foreign materials. Do not use these materials for bedding, haunching or backfill.

2.2 SELECT BACKFILL

- A. Materials for Select Backfill: Use clean gravel, crushed stone, washed shell, or other granular or similar material as approved which can be readily and thoroughly compacted to 95 percent of the maximum dry density obtainable by ASTM D 1557.

- 1. Allowed Materials: Grade select backfill between the following limits:

U.S. Standard Sieve	Percent Passing By Weight
2 inch	100
1-1/2 inch	90-100
1 inch	75-95
1/2 inch	45-70
#4	25-50
#10	15-40
#200	5-15

- 2. Unallowed Materials: Very fine sand, uniformly graded sands and gravels, sand and silt, soft earth, or other materials that have a tendency to flow under pressure when wet are unacceptable as select backfill.

2.3 COMMON ON-SITE BACKFILL

- A. Materials for Common Backfill: Material from on-site excavation may be used as common backfill (fill) provided that it can be readily compacted to 90 percent of the maximum dry density obtainable by ASTM D 1557, and does not contain unsuitable material. Select fill may be used as common fill at no change in the Contract Price.

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- B. Granular Materials On-Site: Granular on-site material, which is fairly well graded between the following limits may be used as granular common fill:

U.S. Standard Sieve	Percent Passing by Weight
2 inch	100
#10	50-100
#60	20-90
#200	0-20

- C. Cohesive Materials On-Site: Cohesive site material may be used as common fill.
1. The gradation requirements do not apply to cohesive common fill.
 2. Use material having a liquid limit less than or equal to 40 and a plasticity index less than or equal to 20.
- D. Material Approval: All material used as common fill is subject to approval. If there is insufficient on-site material, import whatever additional off-site material is required which conforms to the specifications and at no additional cost.

2.4 UTILITY PIPE BEDDING

- A. Gradation for all Piping: Bedding material shall be FDOT No. 57 stone if below the seasonal low groundwater table; or FDOT No. 89 stone, FDOT No. 131 screenings, or No. 132 screenings if above the seasonal low groundwater table. Provide a minimum of 6 inches of bedding material under all piping.
- B. Gradation for ductile iron (DIP) piping: For DIP piping provide bedding material up to the bottom of the pipe.
- C. Gradation for polyvinyl chloride (PVC) piping: For PVC piping provide bedding material up to the centerline (haunch/springline) of the pipe.

PART 3 EXECUTION

3.1 PRECAST MANHOLE BEDDING

- A. Bedding Compaction: Bed all precast manholes in well graded, compacted 12-inch layer of crushed stone. Compact bedding thickness no less than 6 inches for precast concrete manhole bases.
- B. Concrete Work Mats: Cast cast-in-place manhole bases and other foundations for structures against a 2500 psi concrete work mat in clean and dry excavations.

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- C. Bedding Placement: Place select fill used for bedding beneath precast manhole bases, in uniform layers not greater than 9 inches in loose thickness. Thoroughly compact in place with suitable mechanical or pneumatic tools to not less than 95 percent of the maximum dry density as determined by ASTM D 1557.
- D. Use of Select Fill: Bed existing underground structures, tunnels, conduits and pipes crossing the excavation with compacted select fill material. Place bedding material under and around each existing underground structure, tunnel, conduit or pipe and extend underneath and on each side to a distance equal to the depth of the trench below the structure, tunnel, conduit or pipe.

3.2 PIPE BEDDING AND INITIAL BACKFILL

- A. Placement: Place backfill for initial pipe backfill from top of bedding to 1 foot over top of pipes in uniform layers not greater than 8 inches in loose thickness. Tamp under pipe haunches and thoroughly compact in place the backfill with suitable mechanical or pneumatic tools to not less than 98 percent of the maximum dry density as determined by ASTM D 1557.
- B. Foundation Bedding: Place bedding, to a depth specified by the City Manager or designee, as a foundation in wet, yielding or mucky locations. Construct foundation bedding by removal of the wet, yielding or mucky material and replacement with sufficient Class I material to correct soil instability.
- C. Stone Placement: Do not place large stone fragments in the pipe bedding or backfill within 2 feet over or around pipelines, or nearer than 2 feet at any point from any casing pipe, conduit or concrete wall.
- D. Machine Compaction: Machine Compaction of initial backfill is prohibited unless adequate cover as deemed by the City Manager or designee is provided. In no case shall adequate cover be less than 12 inches.
- E. Unallowed Materials: Pipe bedding containing very fine sand, uniformly graded sands and gravels, sand and silt, soft earth, or other materials that have a tendency to flow under pressure when wet is unacceptable.

3.3 TRENCH BACKFILL

- A. General: Backfill trenches from 1 foot over the top of the pipe, from the top of electrical duct bedding or as shown to the bottom of pavement base course, subgrade for lawns or lawn replacement, to the top of the existing ground surface or to such other grades as may be shown or required.
- B. Materials: All backfill material shall be acceptable dry materials, and shall be free from cinders, ashes, refuse, vegetable or organic material, boulders, rocks, or stones, or other deleterious material which in the opinion of the City Manager or designee is unsuitable.
- C. Depth of Placement - Place trench backfill in uniform layers not greater than 12 inches in loose thickness and that can be thoroughly compacted in place using

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suitable mechanical or pneumatic equipment to not less than 98 percent of the maximum dry density as determined by ASTM D 1557.

- D. **Depth of Placement - Undeveloped Areas:** In nondeveloped areas and where select fill material or hand-placed backfill are not specified or required, place suitable job-excavated material or other approved backfill in lifts not exceeding 12 inches in loose thickness. Lifts of greater thickness may be permitted by the City Manager or designee if the CONTRACTOR demonstrates compliance with required densities. When the trench is full, consolidate the backfill by jetting, spading, or tamping to ensure complete filling of the excavation. Mound the top of the trench approximately 12 inches to allow for consolidation of backfill.
- E. **Compaction:** Compact backfill as a percentage of the maximum density at optimum moisture content as determined by the standard proctor test, ASTM D698 as demonstrated in the following table:

Area	(Mod.) ASTM D1557
Around and 1' (Min) above top of pipe	98
Remaining Trench	98
Pavement Sub-Grade and Shoulders (Last 3' of Fill)	98
Base Material and Pavement	98
Adjacent to Structures (Areas not Paved)	98
Under Structures	98
Sub-Base	98

- F. **Density Tests:** Density tests will be made at the request of the City Manager or designee. Deficiencies will be corrected at the expense of the CONTRACTOR.
- G. **Dropping of Material on Work:** Do trench backfilling work in such a way as to prevent dropping material directly on top of any conduit or pipe through any great vertical distance.
- H. **Distribution of Large Materials:** Break lumps up and distribute any stones, pieces of crushed rock or lumps which cannot be readily broken up, throughout the mass so that all interstices are solidly filled with fine material.

3.4 STRUCTURE BACKFILL

- A. Use crushed stone underneath all structures, and adjacent to structures where pipes, connections and structural foundations are to be located within this fill. Use crushed stone beneath all pavements, walkways, and railroad tracks, and extend to the bottom of pavement base course or ballast.
1. Place backfill in uniform layers not greater than 8 inches in loose thickness and thoroughly compact in place with suitable approved mechanical or pneumatic equipment.

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2. Compact backfill to not less than 95 percent of the maximum dry density as determined by ASTM D 1557.
- B. Use of Common Fill: Use common granular fill adjacent to structures in all areas not specified above. Select fill may be used in place of common granular fill at no additional cost.
1. Extend such backfill from the bottom of the excavation or top of bedding to the bottom of subgrade for lawns or lawn replacement, the top of previously existing ground surface or to such other grades as may be shown or required.
 2. Place backfill in uniform layers not greater than 8 inches in loose thickness and thoroughly compact in place with suitable equipment, as specified above.
 3. Compact backfill to not less than 90 percent of the maximum dry density as determined by ASTM D 1557.

3.5 COMPACTION EQUIPMENT

- A. Equipment and Methods: Carry out all compaction with suitable approved equipment and methods.
1. Compact clay and other cohesive material with sheep's-foot rollers or similar equipment where practicable. Use hand held pneumatic tampers elsewhere for compaction of cohesive fill material.
 2. Compact low cohesive soils with pneumatic-tire rollers or large vibratory equipment where practicable. Use small vibratory equipment elsewhere for compaction of cohesionless fill material.
 3. Do not use heavy compaction equipment over pipelines or other structures, unless the depth of fill is sufficient to adequately distribute the load.

3.6 FINISH GRADING

- A. Final Contours: Perform finish grading in accordance with the completed contour elevations and grades shown and blend into conformation with remaining natural ground surfaces.
1. Leave all finished grading surfaces smooth and firm to drain.
 2. Bring finish grades to elevations within plus or minus 0.10 foot of elevations or contours shown.
- B. Surface Drainage: Perform grading outside of building or structure lines in a manner to prevent accumulation of water within the area. Where necessary or

where shown, extend finish grading to ensure that water will be carried to drainage ditches, and the site area left smooth and free from depressions holding water.

3.7 RESPONSIBILITY FOR AFTERSETTLEMENT

- A. **Aftersettlement Responsibility:** Take responsibility for correcting any depression which may develop in backfilled areas from settlement within one year after the work is fully completed. Provide, as needed, backfill material, pavement base replacement, permanent pavement, sidewalk, curb and driveway repair or replacement, and lawn replacement, and perform the necessary reconditioning and restoration work to bring such depressed areas to proper grade as approved.

3.8 INSPECTION AND TESTING OF BACKFILLING

- A. **Sampling and Testing:** Provide sampling, testing, and laboratory methods in accordance with the appropriate ASTM Standard Specification. Subject all backfill to these tests.
- B. **Correction of Work:** Correct any areas of unsatisfactory compaction by removal and replacement, or by scarifying, aerating or sprinkling as needed and recompaction in place prior to placement of a new lift.
- C. **Testing Schedule:**
 - 1. **Compaction Schedule**
 - 2. **Optimum Moisture Content (Proctor Test)**

END OF SECTION

SECTION 02226

JACKING, AUGERING AND MINING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Pipeline installation in casing pipe beneath highways, railroads and other structures may be installed by jacking and augering or by jacking and mining.
- B. Related Work Specified in Other Sections Includes:
 - 1. Section 02151 – Shoring, Sheeting and Bracing
 - 2. Section 02222 - Excavation - Earth and Rock
 - 3. Section 03310 – Concrete, Masonry, Mortar and Grout

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. ASTM C 76 - Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
 - 2. ASTM A 139 - Specification for Electric-Fusion (Arc) -Welded Steel Pipe (NPS in 4 in. and Over)
 - 3. OSHA PL-91-596 - Occupational Safety Health Act of 1970 Public Law 91-596

1.3 SUBMITTALS

- A. Provide all submittals, including the following, as specified in Division 1.
 - 1. Working drawings of the jacking pipe, jacking frame, jacking head, reaction blocks, sheeting, including design calculations and the complete jacking installation.
 - 2. Necessary permit applications and approvals by the appropriate authority.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle all products and materials as specified in Division 1.

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PART 2 PRODUCTS

2.1 MATERIALS

A. General: Use one of the following for casing piping.

1. Spiral weld or smooth wall steel pipe, meeting the requirements of ASTM A 139, Grade B. The minimum casing pipe size and wall thickness shall be as shown in the following table, for the carrier pipe size indicated. For sizes not included therein, or for special design considerations, obtain approval from City Utilities.

For PVC and HDPE Pressure Carrier Pipes

<u>Carrier Pipe Nominal Size</u>	<u>Casing Pipe Nominal Diameter</u>	<u>Casing Pipe Wall Thickness</u>
<u>Inches</u>	<u>Inches</u>	<u>Inches</u>
2	4	0.1875
4	14	0.250
6	16	0.250
8	18	0.250
10	20	0.250
12	24	0.250
14	30	0.312
16	30	0.312
18	36	0.375
20	36	0.375
24	42	0.500
30	42	0.500
36	48	0.500

For Gravity Sewer Carrier Pipes

<u>Carrier Pipe Nominal Size</u>	<u>Casing Pipe Nominal Diameter</u>	<u>Casing Pipe Wall Thickness</u>
<u>Inches</u>	<u>Inches</u>	<u>Inches</u>
8	14	0.250
10	16	0.250
12	20	0.250
15	24	0.312
18	26	0.312
21	30	0.312
24	32	0.375
27	36	0.375

- B. Fill Material: Use fill material consisting of 1-1/4 pounds of Bentonite per gallon of water during jacking to fill any voids between pipe and the earth.

PART 3 EXECUTION

3.1 INSTALLATION

A. Casing Pipe:

1. Install all casing pipe in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1.
2. The provisions of this section shall represent the minimum standards for the installation of casing pipe for sewer force main or water main pipeline. Install steel casing pipe so that carrier pipe can be installed true to line and grade.
3. If jack and bore is specified by the Engineer of Record, install all sewer force mains and water mains in a casing to be placed under all present and future City roadways. Conform steel casing procedures to the requirements of the FDOT. All work and materials shall be subject to inspection by DOT. Restore the Department's property and surface conditions to the original condition in keeping with the Department's specifications and standards.
4. In general, for jack and bore operations, install all underground sewer force mains and water mains crossing all existing City and County roadways, Florida State Highways and railroads within steel casing pipe extending at least five (5) feet beyond pavement edge. Obtain specific crossing requirements in advance from the authority having jurisdiction.
5. Submit the necessary permit documents and data to the appropriate authority and receive approval thereof. Maintain traffic on the roadway and keep all workmen and equipment clear of the travelway during the work. Comply with all Federal, State, County, and City safety regulations and any permit(s).
6. Locate casing pipes crossing under City and County roadways at suitable approved alignments in order to eliminate possible conflict with existing or future utilities and structures with a minimum 30 inches depth of cover between the top of the casing pipe and the surface of the roadway. Conduct boring operations in such a manner as not to create hazardous conditions or impede traffic flow.
7. For casing pipe crossing under roadways, railroads, or other installations not within the jurisdiction of the City of Naples, comply with the regulations of said authority in regard to design, specifications and construction. State Highway casing installations shall be as specified in the FDOT, "Utility Accommodation Guide", and for railroads, the American Railway Engineering Association, Part 5, Section 5.2, "Specifications for Pipelines Conveying Nonflammable Substances", shall be applicable. However, in no case shall the minimum casing pipe diameter and wall thickness, for a specific carrier pipe size, be less than that specified above.

8. Use a simultaneous and continuous installation of any dry boring and jacking operation until the casing pipe is in final position. Maintain correct line and grade. Use full-ring welded add-on sections of casing pipe, developing water-tight total pipe strength joints. Use pipe lengths of at least 18 feet. Casing welders shall be certified welders. A copy of the certification shall be obtained by the Engineer of Record and given to the City Manager or designee prior to the welding procedure. Produce no upheaval, settlement, voids, cracking, movement or distortion of the existing roadbed or other facilities during the casing installation. Fill any voids with 1:3 portland cement grout at sufficient pressure for roadway protection. Following placement of the carrier pipe within the steel casing, install masonry plugs at each open end. Plugs shall be suitable for restraining the external earth load, while allowing internal drainage.
9. Mechanically bore casing pipe holes through the soil by a cutting head on a continuous auger mounted inside the pipe. Extend the auger a maximum of two inches (2") beyond the end of the casing pipe to preclude formation of voids outside the pipe shell. Auger should not be of a greater diameter than the outside diameter of the encasement.
10. Adequately protect the casing pipe to prevent crushing or other damage under jacking pressures. Provide backstops for adequately distributing the jack thrust without causing deformation of the soil or other damage. Replace damaged casing pipe if not installed; however, if installed, abandon encasement pipe in place, suitably plug, and install an alternate installation, as directed by the County Manager or designee.
11. In the event of obstruction, withdraw auger, cut and cap excess pipe and fill void with 1:3 portland cement grout under sufficient pressure
12. Excavate and maintain required boring or jacking pits or shafts to the minimum dimension. Adequately barricade, sheet, brace and dewater excavation as required.
13. Deviation from approved jack and bore methods and above specifications is grounds for work stoppage and line replacement at the expense of the CONTRACTOR.

B. Casing Spacers:

1. Use Cascade Stainless Steel Casing Spacer being on center and restrained as the preferred method for installing the carrier pipe. Use skids installed with 6 ft to 10 ft spacing as recommended by the manufacturer. After the carrier pipe has been tested for leakage, block the casing ends with either an 8" wall of brick masonry with a weep hole installed near the bottom of each wall or Cascade Model CCES End Seals with stainless steel bands. Upsizing casings may be required for PVC push on pipe with EBAA restrained bells. No extra payment will be made for this upsizing.

2. The minimum casing pipe inside diameters needed for restrained carrier pipe are as follows:

MINIMUM CASING PIPE INSIDE DIAMETER NEEDED FOR RESTRAINED CARRIER PIPE			
DUCTILE IRON MECHANICAL JOINT WITH MEGALUG RESTRAINT			
EBAA Product	Nominal Carrier Pipe Size (in.)	Diameter (in.)	Min. Steel Casing ID (in.)
1104	4	9.90	13
1106	6	12.00	15
1108	8	14.15	17
1110	10	16.20	19
1112	12	18.30	21.5
1114	14	20.94	23.5
1116	16	22.90	25.5
1118	18	25.00	28
1120	20	27.10	30
1124	24	32.64	35
1130	30	38.87	41
1136	36	45.17	48
1142	42	55.57	58
1148	48	61.87	64
PVC PUSH ON PIPE WITH EBAA RESTRAINED BELLS			
EBAA Product	Nominal Carrier Pipe Size (in.)	Diameter (in.)	Min. Steel Casing ID (in.)
1504	4	10.13	12.5
1506	6	12.63	15
1508	8	15.50	18
1510	10	17.73	20
1512	12	21.25	24
1114HV	14	24.25	26.5
1116HV	16	26.50	28.5
1120HV	20	31.00	34
1124HV	24	35.50	38
1130HV	30	42.38	45

- C. Augering: Conduct augering with the proper equipment and procedure such that the carrier pipe and the casing pipe can be installed to the grades specified without disturbing the adjacent earth. Submit all equipment and procedures for prior approval.
- D. Hand Mining: Conduct hand mining only in casings that are sufficiently large enough to permit such operation. Provide adequate fresh air supply within the casing pipe and conduct all operations in accordance with the requirements of the U.S. Department of Labor Safety and Health Regulations for Construction promulgated under the Occupational Safety and Health Act 7 1970 (PL-91-596).

EXHIBIT A-1

- E. Jacking Pit: Make the jacking pit of adequate length to provide room for the jacking frame, the jacking head, the reaction blocks, the jacks, auger rig, and the jacking pipe. Make the pit sufficiently wide to allow ample working space on each side of the jacking frame. Make the depth of the pit such that the invert of the pipe, when placed on the guide frame, is at the elevation desired for the completed line. Provide excavation in conformance with Section 02222.
- F. Sheeting: Sheet the jacking pit tightly and keep it dry at all times. Conform sheeting to Section 02151. Have complete design calculation for sheeting the jacking pit sealed and submitted by a Professional Engineer registered in the State of Florida.
- G. Jacking Frame: Use a jacking frame that applies a uniform pressure over the entire pipe wall area of the pipe to be jacked.
- H. Reaction Blocks: Use reaction blocks designed to carry the thrust of the jacks to the soil without excessive soil deflection and in such a manner as to avoid any disturbance of adjacent structures or utilities.
- I. Operation: Use hydraulic jacks in the jacking operation. Use extreme care to hold the pipe to exact line and grade. Advance the excavation at the heading manually or with an auger. Do not allow the advance to exceed one foot ahead of the casing pipe. Make every effort to avoid loss of earth outside the casing.
- J. Safety Railing: Provide a safety railing all around the top of the pit at all times.
- K. Restore property and surface conditions to the original condition in accordance with City specifications and standards.
- L. Carrier Pipe:

Utilize joint restrained pipe for the entire water main or force main pipe length inside the casing. Use special supporting of the carrier pipe within the casing with a design approved by the County Manager or designee.

END OF SECTION

SECTION 02230

ROADWAY CROSSINGS BY OPEN CUT

PART 1 GENERAL

1.1 SCOPE OF WORK

Provide all labor, materials, equipment, supervision and incidentals required to install the pipeline as shown on the drawings in City streets by method of open cut.

Note: Open cutting of existing pavement will generally not be allowed, but may be considered under one or more of the following conditions:

1. Subsurface obstructions including rock;
2. Extreme high water table;
3. Limited space for jack and bore pits;
4. Condition of roadway surface - including imminent resurfacing and rebuilding, provided inspection and approval beforehand is made by the affected Transportation Department; or
5. Extreme economic hardship is proven with adequate supportive data.

1.2 SUBMITTAL

- A. Submit shop drawings to the ENGINEER for review.
- B. Before starting work, submit to the City Stormwater, Streets and Traffic Department, with copy to the ENGINEER, a detailed schedule of his operations a minimum of fourteen (14) days prior to beginning work for approval. This shall include, but not be limited to, type and extent of temporary paving, and drawings and lists describing materials and traffic control methods to be used. Approval shall not relieve the CONTRACTOR of his obligation to provide a safe and proper crossing.
- C. If a detour is required, submit a traffic control plan for approval to the City Stormwater, Streets and Traffic Department, County, and/or the Florida Department of Transportation.
- D. Submit a plan for maintenance of traffic in accordance with Index 600 through 650 of the Florida Department of Transportation Specifications.

EXHIBIT A-1

PART 2 PRODUCTS

2.1 MATERIALS

- A. Use materials specified in other applicable portions of this Specification.

PART 3 EXECUTION

3.1 GENERAL

- A. Trench dimensions for open cutting of road crossings are shown on the Standard Details.
- B. Where possible, limit the completion of the open-cut road crossing to a 24-hour period. Perform all work in accordance with the approved traffic control plan.
- C. Notify City Stormwater, Streets and Traffic Department forty-eight (48) hours in advance of starting construction.

3.2 INSTALLATION

A. Temporary Roadways

1. For temporary roadways required for traffic relocation use materials meeting the requirements of the FDOT. Use temporary roadways when crossing a state highway right-of-way or at the direction of the ENGINEER.
2. Maintain temporary roadways in good condition throughout their use.
3. Maintain drainage through all existing ditches by the use of culvert pipe as necessary.
4. Submit drawings indicating the type and location of temporary roadways for approval prior to beginning work.
5. Provide all necessary barricades and signs where detours are permitted as required to divert the flow of traffic. Notify Collier County DOT and ENGINEER in advance of planned detours. While traffic is detoured, expedite construction operations to minimize the period of detour.
6. Perform and complete all work at the roadway crossing in a manner fully satisfactory to the City Stormwater, Streets and Traffic Department.

B. Maintenance of Traffic

1. The requirements specified herein are in addition to the plan for Maintenance of Traffic as specified in Section 01570.
2. Furnish during construction and any subsequent maintenance within State secondary road right-of-ways and City streets, proper signs, signal lights,

flagmen, and other warning devices for the protection of traffic all in conformance with the latest Manual on Uniform Traffic Control and Safe Streets and Highways, and the Florida Manual of Traffic Control and Safe Practices for Street and Highway Construction, Maintenance and Utility Operations. Information as to the above may be obtained from FDOT Division engineers. The ENGINEER, City Engineer, or FDOT Manager of the right-of-way or their representatives reserves the right to stop any work for non-compliance.

3. Take precautions to prevent injury to the public due to open trenches. Night watchmen may be required where special hazards exist, or police protection provided for traffic while work is in progress. Be fully responsible for damage or injuries whether or not police protection has been provided.
4. Unless permission to close a City street is received in writing from the proper authority, place all excavated material so that vehicular and pedestrian traffic may be maintained at all times. Repair the road surface, provide temporary ways, erect wheel guards or fences, or take other measures for safety satisfactory to the ENGINEER if the CONTRACTOR's operations cause traffic hazards.
5. Be fully responsible for the installation of adequate safety precautions, for maintenance of the channelization devices, and for the protection of the traveling public.
6. Maintain at all open cut crossings, a minimum of one-way traffic during the daylight hours, and two-way traffic at night.

C. Installation of Pipeline

1. Meet the requirements of the applicable portions of this specification for pavement removal, sheeting, shoring and bracing, excavation and backfill, and dewatering.
2. Install the pipe in accordance with Division 2 of these Specifications.
3. Backfill the trench in accordance with the requirements of Section 02223.
4. Replace pavement in accordance with Section 02575 of this Specification.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 02275

NPDES REQUIREMENTS

FOR CONSTRUCTION ACTIVITIES IMPACTING MORE THAN ONE ACRE

PART 1 GENERAL

1.1 DESCRIPTION

- A. This Section describes the required documentation to be prepared and signed by the CONTRACTOR before conducting construction operations, in accordance with the terms and conditions of the National Pollutant Discharge Elimination System (NPDES) Stormwater Permit, as required by Florida Administrative Code (F.A.C.) Chapter 62-621.
- B. The CONTRACTOR shall be responsible for implementation, maintenance and inspection of stormwater pollution prevention control measures in accordance with F.A.C. Chapter 62-621 including, but not limited to, erosion and sediment control, stormwater management plans, waste collection and disposal, off-site vehicle tracking, and other practices shown on the Drawings and/or specified elsewhere in this or other specifications. The stormwater pollution prevention control measures shall include protection of offsite public and private stormsewer facilities potentially impacted during construction. Stormwater facilities include streets, inlets, pipes, ditches, swales, canals, culverts, control structures, and detention/retention areas.
- C. The CONTRACTOR shall prepare and review implementation of the Stormwater Pollution Prevention Plan (SWPPP) in a meeting with the City Manager or designee prior to start of construction.

1.2 UNIT PRICES

- A. Unless indicated in the Unit Price Schedule as a pay item, no separate payment will be made for work performed under this Section. Include cost of work to be performed under this Section in pay items of which this work is a component.

1.3 REFERENCE DOCUMENTS

- A. ASTM D3786 – Standard Test Method for Hydraulic Bursting Strength for Knitted Goods and Nonwoven Fabrics
- B. ASTM D4632 – Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

EXHIBIT A-1

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

3.1 NOTICE OF INTENT (NOI)

- A. Fill out, sign and date a Notice of Intent to Use Generic Permit for Stormwater Discharge from Large and Small Construction Activities, (FDEP Form 62-621.300(4)(b)). Submit the signed copy of the NOI to the City Manager or designee. The City Manager or designee will submit the completed form to the FDEP along with the required permit fee.

3.2 CERTIFICATION REQUIREMENTS

- A. On the attached OPERATOR'S INFORMATION form, fill out the name, address and telephone number for the CONTRACTOR, persons or firms responsible for maintenance and inspection of erosion and sediment control measures, and all Subcontractors.
- B. The CONTRACTOR and Subcontractors named in the Operator's Information form shall read, sign and date the attached CONTRACTOR'S/ SUBCONTRACTOR'S CERTIFICATION form.
- C. The persons or firms responsible for maintenance and inspection of erosion and sediment control measures shall read, sign and date the attached EROSION CONTROL CONTRACTOR'S INSPECTION AND MAINTENANCE CERTIFICATION form.
- D. Submit all forms to the City Manager or designee before beginning construction.

3.3 RETENTION OF RECORDS

- A. Retain a copy of the SWPPP at the construction site and at the Contractor's office from the date that it became effective to the date of project completion.
- B. At project closeout, submit to the City Manager or designee all NPDES forms and certifications, as well as a copy of the SWPPP. Stormwater pollution prevention records will be retained by the City Manager or designee for a period of three (3) years from the date of project completion.

3.4 REQUIRED NOTICES

- A. The following notices shall be posted from the date that the SWPPP goes into effect until the date of final site stabilization:

EXHIBIT A-1

1. A copy of the submitted NOI and a brief project description, as given in the SWPPP, shall be posted at the construction site and at the CONTRACTOR's office in a prominent place for public viewing.
2. Notice to drivers of equipment and vehicles, instructing them to stop, check and clean tires of debris and mud before driving onto traffic lanes. Post such notices at every stabilized construction exit area.
3. Post a notice of waste disposal procedures in an easily visible location on site.
4. Notice of hazardous material handling and emergency procedures shall be posted with the NOI on site. Keep copies of Material Safety Data Sheets at a location on site that is known to all personnel.
5. Keep a copy of each signed certification at the construction site and at the CONTRACTOR's office.

REQUIRED FORMS FOLLOW

OPERATOR'S INFORMATION

Owner's Name and Address: City Utilities Department

380 Riverside Circle
Naples, Florida 34102
(239) 213-4717

Contractors' Names and Addresses:

General Contractor: _____

Telephone: _____

Site Superintendent: _____

Telephone: _____

Erosion Control and
Maintenance Inspection: _____

Telephone: _____

Subcontractors' Names and Addresses:

Phone: _____

Phone: _____

CONTRACTOR'S / SUBCONTRACTOR'S CERTIFICATION

I certify under penalty of law that I understand the terms and conditions of Florida's National Pollutant Discharge Elimination System (NPDES) Construction General Permit that authorizes storm water discharges associated with activity from the construction site identified as part of this certification, and that I have received a copy of the SWPPP.

Signature: _____
Name: (printed or typed) _____
Title: _____
Company: _____
Address: _____

Signature: _____
Name: (printed or typed) _____
Title: _____
Company: _____
Address: _____

Signature: _____
Name: (printed or typed) _____
Title: _____
Company: _____
Address: _____

**EROSION CONTROL CONTRACTOR'S
INSPECTION AND MAINTENANCE CERTIFICATION**

I certify under penalty of law that I understand the terms and conditions of Florida's National Pollutant Discharge Elimination System (NPDES) Construction General Permit that authorizes storm water discharges associated with activity from the construction site identified as part of this certification, and that I have received a copy of the SWPPP.

Signature: _____
Name: (printed or typed) _____
Title: _____
Company: _____
Address: _____
Date: _____

**STORM WATER POLLUTION PREVENTION PLAN
INSPECTION AND MAINTENANCE REPORT**

Project: _____

Contractor: _____

Inspector: _____

Date: _____

CONTROLS	LOCATION	SEDIMENT HEIGHT	PROBLEM DESCRIPTION	MAINTENANCE REQUIRED	REPAIRED BY / DATE

END OF SECTION

SECTION 02276

EROSION AND SEDIMENTATION CONTROL

PART 1 GENERAL

1.1 DESCRIPTION

- A. The work specified in this Section consists of designing, providing, maintaining and removing temporary erosion and sedimentation controls as necessary. The Contractor shall exercise extreme care to minimize contamination of rainfall run-off from the site. All necessary provisions and care shall be taken to insure compliance with the Water Quality Standards of the State of Florida, more particularly the South Florida Water Management District (SFWMD). The Contractor shall make himself familiar with Chapter 17-3, "Water Quality Standards," of the Florida Administrative Code (F.A.C.). Compliance for protection of State Waters and/or jurisdictional areas require the use of hay bales, temporary swales, settling ponds, silt screens, and other appropriate methods as necessary to prevent soils and sediment from entering such areas. Prior to commencement of work , the Contractor shall submit a plan of action and a list of materials he plans to use for sedimentation/erosion control to the City for approval.
- B. Temporary erosion controls include, but are not limited to rip rap channels, road stabilization, grassing, mulching, setting, watering, and reseeding onsite surfaces and spoil and borrow area surfaces and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the CITY.
- C. Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, public and private on- and off-site storm sewer inlets protectors, and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the CITY.
- D. If required by regulation or CITY, CONTRACTOR is responsible for providing an approved Erosion Control Plan for effective temporary erosion and sediment control measures during construction or until final controls become effective.

1.2 REFERENCE DOCUMENTS

- A. South Florida Building Code and Standard Building Code.

EXHIBIT A-1

PART 2 PRODUCTS

2.1 EROSION CONTROL

- A. Sodding and Seeding is specified in Section 02400.
- B. Rip Rap Channel.
- C. Road Stabilization.
- D. Netting - fabricated of material acceptable to the City Manager or designee.

2.2 SEDIMENTATION CONTROL

- A. Temporary Sediment Trap.
- B. Sediment Fence.
- C. Bales - clean, seed free pine needle or cereal hay type.
- D. Netting - fabricated of material acceptable to the City Manager or designee.
- E. Filter Stone - crushed stone conforming to Florida Department of Transportation specifications.
- F. Concrete Block - hollow, non-load-bearing type.
- G. Concrete - exterior grade not less than one inch thick.

PART 3 EXECUTION

3.1 EROSION CONTROL

- A. Minimum procedures for grassing are:
 - 1. Scarify slopes to a depth of not less than six inches and remove large clods, rock, stumps, roots larger than 1/2 inch in diameter and debris.
 - 2. Sow seed within twenty-four (24) hours after the ground is scarified with either mechanical seed drills or rotary hand seeders.
 - 3. Apply mulch loosely and to a thickness of between 3/4 inch and 1-1/2 inches.
 - 4. Apply netting over mulched areas on sloped surfaces.
 - 5. Roll and water seeded areas in a manner which will encourage sprouting of seeds and growing of grass. Reseed areas that exhibit unsatisfactory growth (less than 70 percent coverage). Backfill and seed eroded areas, removing eroded material from effected drainage facilities.

EXHIBIT A-1

B. Minimum procedures for rip rap channel are:

1. Clear the foundation of all trees, stumps, and roots.
2. Excavate the bottom and sides of the channel 30 inches below grade at all points to allow for the placement of riprap as shown in the typical cross-section in the Standard Details.
3. Install extra strength filter fabric on the bottom and sides of the channel foundation, placing the upstream fabric over the downstream fabric with at least a 1 foot overlap on all joints. The fabric is to be securely held in place with metal pins.
4. Place riprap evenly to the lines and grades shown on the drawings and staked in the field. Place riprap immediately following the installation of the filter fabric.
5. Riprap shall meet the specification for F.D.O.T. Class 2 Riprap.
6. Restore all disturbed areas in accordance with a vegetation plan submitted in advance and approved by the City Manager or designee.

C. Minimum Procedures for road stabilization are:

1. Clear roadbed and parking areas of all vegetation, roots and other objectionable material.
2. Provide surface drainage.
3. Spread 6 inch course of lime rock evenly over the full width of road and parking area and smooth to avoid depressions.
4. After grading, seed or resod all disturbed areas adjoining roads and parking areas conforming to existing conditions prior to construction.

3.2 SEDIMENTATION CONTROL

A. Install and maintain silt dams, traps, barriers, and appurtenances as required. Replace deteriorated hay bales and dislodged filter stone.

B. Minimum requirements for sediment trap:

1. Clear, grub and strip the area under the embankment of all vegetation and root mat.
2. Clear retention area to elevation as approved by the City Manager or designee.

EXHIBIT A-1

3. Use fill material free of roots, woody vegetation and organic matter. Place fill in lifts not to exceed 9 inches and machine compact.
4. Construct dam and stone spillway to dimensions, slopes and elevations shown.
5. Ensure that the spillway crest is level and at least 18 inches below the top of the dam at all points.
6. Stone used for spillway section - Class "B" erosion control stone.
7. Stone used on inside spillway face to control drainage - #67 washed stone.
8. Extend stone outlet section to vegetated road ditch on zero grade with top elevation of stone level with bottom of drain.
9. Ensure that the top of the dam at all points is 6 inches above natural surrounding ground.
10. Stabilize the embankment and all disturbed area above the sediment pools as shown in the vegetation plan.

C. Minimum requirements for sediment fence:

1. Construct sediment fence on low side of topsoil stockpile to prevent sediment from being washed into the drainage system. Fence to extend around approximately 70 percent of the perimeter of the stockpile. Fence must be unobstructed so as to maintain a minimum of 75 percent of its design flow rate.
2. Locate posts down slope of fabric to help support fencing.
3. Bury toe of fence approximately 8 inches deep to prevent undercutting.
4. When joints are necessary, securely fasten the fabric at a support post with overlap to the next post.
5. Filter fabric shall be of nylon, polyester, propylene or ethylene yarn with extra strength – 50 pounds per linear inch (minimum) - and with a flow rate of at least 0.30 gallons per foot per minute. Fabric should contain ultraviolet ray inhibitors and stabilizers.
6. Post to be 4-inch diameter pine with a minimum length of 4 feet.

D. Minimum Requirement for stormwater facilities protection

1. Public and private stormsewer facilities, both on and offsite, shall be protected at all inlets affected by construction. Stormsewer facilities include streets, inlets, pipes, ditches, swales, canals, culverts, control structures, and detention/retention areas.
2. Grated drop inlets shall be rapped with filter fabric in a manner that allows removal of accumulated sediment from the fabric before removing the grate.
3. Curb inlets shall be protected from sediment, turbid water from stormwater or dewatering activities; also construction debris, concrete mix and rinsate, and any other pollution.
4. Stormwater runoff entering such stormsewer inlets and stormwater detention/retention facilities with a turbidity greater than 50 NTU shall be considered to be in non-compliance with these regulations.

3.3 PERFORMANCE

- A. Should any of the temporary erosion and sediment control measures employed fail to produce results which comply with the requirements of the State of Florida, immediately take steps necessary to correct the deficiency at no expense to the CITY. Sedimentation or turbid water violations to stormwater facilities on or offsite shall require the contractor to remove all sediment from the affected facilities.

END OF SECTION

SECTION 02400

RESTORATION BY SODDING OR SEEDING

PART 1 GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

- A. The work in this section consists of furnishing all labor, material and equipment to restore all areas disturbed during construction to match preconstruction conditions. Establish a stand of grass within the areas disturbed by furnishing and placing grass sod where required, or by seeding and mulching areas not requiring sod.

1.2 REFERENCE DOCUMENTS

- A. Use materials conforming to the requirements of Florida Department of Transportation Standard Specifications for Road and Bridge Construction as follows:
 - 1. Section 570 – Grassing (by Seeding)
 - 2. Section 575 – Sodding
 - 3. Section 981 – Grassing and Sodding Materials
 - 4. Section 982 – Commercial Fertilizer
 - 5. Section 983 – Water for Grassing

1.3 SUBMITTALS

- A. Submit certifications and identification labels for all sodding supplied in accordance with General Conditions.

PART 2 PRODUCTS

2.1 SODDING

- A. Types: Sod may be of either St. Augustine or Argentine Bahia grass or as that disturbed, as established prior to construction. Use well matted sod with roots. When replacing sod in areas that are already sodded, use sod of the same type as the existing sod.
- B. Provide sod as required in accordance with Florida Department of Transportation Specifications 575 and 981. Furnish sod equal to and similar in type as that disturbed. Place and water in accordance with FDOT Specifications Section 575.

EXHIBIT A-1

- C. Use sod in commercial-size rectangles, preferably 12-inch by 24-inch or larger, except where 6-inch strip sodding is called for.
- D. Use sod that is sufficiently thick to secure a dense stand of live grass. Use sod that is live, fresh and uninjured at the time of planting, having a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. It shall be reasonably free of weeds and other grasses. Plant sod as soon as possible after being dug, and shade and keep moist from the time it is dug until it is planted.
- E. Handle sod in a manner to prevent breaking or other damage. Do not handle by dumping from trucks or other vehicles. Use care at all times to retain the native soil on the roots of each sod roll during stripping and handling. Sod that has been damaged by handling during delivery, storage or installation will be rejected.
- F. Swales: Place sod to the proper grade and cross section in all flow areas to ensure the design flow of water in the ditch. In excavating for the placement of sod, provide a minimum of 3 inches of undercut.

2.2 FERTILIZER

- A. Supply chemical fertilizer in suitable bags with the net weight certification of the shipment. Fertilizer shall be 12-8-8 and comply with Section 982 of the FDOT Standard Specification for Road and Bridge Construction.
- B. The numerical designations for fertilizer indicate the minimum percentages (respectively) of (1) total nitrogen, (2) available phosphoric acid and (3) water soluble potash, contained in the fertilizer.
- C. The chemical designation of the fertilizer shall be 12-8-8, with at least 50 percent of the nitrogen from a nonwater-soluble organic source. The nitrogen source may be a unreaformaldehyde source provided it is not derived from a waste product of the plastic industry.

2.3 EQUIPMENT

- A. Spread fertilizer uniformly at the specified rate.

2.4 NETTING

- A. Netting is fabricated of material similar to Geoscope Landscape Fabric or Engineer of Record approved equal.

2.5 SEEDING

- A. Seed all unpaved areas disturbed during construction that do not require sod. Complete all seeding in conformance with FDOT Specifications Sections 570 and 981. Mulch and fertilize the grassed areas shall be mulched and fertilized in accordance with FDOT Specifications.

EXHIBIT A-1

- B. Provide mulch material free of weeds. Mulch shall be oat straw or rye, Pangola, peanut, Coastal Bermuda, or Bahia grass hay.
- C. All seeds must have been tested within 6 months of planting. Submit a seed bag tag with final payment requests from each type or mixture of seed used. Seed mixtures shall be chosen to insure the development of the planting during the season or planting, and to insure future growth and permanence.

2.6 TOPSOIL

- A. Topsoil stockpiled during excavation may be used. If additional topsoil is required to replace topsoil removed during construction, it shall be obtained off site at no additional cost to the CITY. Topsoil shall be fertile, natural surface soil, capable of producing all trees, plants, and grassing specified herein.

2.7 MULCH

- A. Furnish small grain straw mulch. Apply mulch at a rate of 1.5 tons per acre, corresponding to a depth not less than 1-inch or more than 3-inches according to texture and moisture content of mulch material. Apply asphalt emulsion at a rate of 150 gallons per ton of straw to anchor the straw applied.

2.8 WATER

- A. It is the CONTRACTOR'S responsibility to supply all water to the site, as required during seeding and sodding operations and through the maintenance period and until the work is accepted. Make whatever arrangements may be necessary to ensure an adequate supply of water to meet the needs for the work. Furnish all necessary hose, equipment, attachments, and accessories for the adequate irrigation of lawns and planted areas as may be required. Water shall be suitable for irrigation and free from ingredients harmful to plant life.

2.9 SOIL IMPROVEMENTS

- A. Apply lime at the rate of 1 to 1.5 tons per acre. Apply 10-10-10 commercial fertilizer at the rate of 800 pounds per acre and work well into the top inch of topsoil.

PART 3 EXECUTION

3.1 SOD BED PREPARATION

- A. Clear areas to be sodded and/or seeded of all rough grass, weeds, and debris, and bring soil to an even grade.
- B. Thoroughly till soil to a minimum 4-inch depth.
- C. Bring area to proper grade, free of sticks, stones, or other foreign matter over 1-inch in diameter or dimension. The surface shall conform to finish grade, less the

EXHIBIT A-1

thickness of sod, free of water-retaining depressions, the soil friable and of uniformly firm texture.

3.2 INSPECTION

- A. Verify that soil preparation and related preceding work has been completed.
- B. Do not start work until conditions are satisfactory.

3.3 SOD HANDLING AND INSTALLATION

- A. During delivery, prior to planting, and during the planting of sod areas, protect the sod panels at all times from excessive drying and unnecessary exposure of the roots to the sun. Stack sod during construction and planting so as not to be damaged by sweating or excessive heat and moisture.
- B. After completion of soil conditioning as specified above, lay sod panels tightly together so as to make a solid sodded lawn area. On mounds and other slopes, the long dimension of the sod shall be laid perpendicular to the slope. Immediately following sod laying, roll the lawn areas with a lawn roller customarily used for such purposes, and then thoroughly water.
- C. Place sod at all areas where sod existed prior to construction, on slopes of 3 horizontal to 1 vertical (3:1) or greater, in areas where erosion of soils will occur, and as directed by the ENGINEER. On areas where the sod may slide, due to height and slope, the ENGINEER may direct that the sod be pegged, with pegs driven through the sod blocks into firm earth, at suitable intervals.

3.4 USE OF SOD ON ROADWAY PROJECTS

- A. In accordance with the FDOT District One Standard Practice, establish permanent green grass at the completion of roadway construction and maintenance work. The following shall apply to all restoration involving State or City roadways:
 - 1. Use sod in lieu of seed and mulch on all roadways with urban (raised curb) typical sections.
 - 2. One inch water per week shall be required for a minimum of four (4) consecutive weeks for the purpose of establishing sod. This can be waived during construction, if and only if there is a minimum of one inch of rain per week on all sod on the project.
 - 3. Placed sod on slopes 1:3 or greater. Stake sod on slopes 1:2 or greater.
 - 4. On all curves with superelevation, place sod from the edge of pavement to the toe of slope on the downhill side(s) for the entire length of the superelevated roadway. On multi-lane divided rural facilities, place sod in the median and on the inside of the curve in the superelevated areas. This does not apply to reverse crowns.

5. Use sod for all projects with less than 10,000 square yards grass area.
6. On tangent sections and on outside of curves, use sod between the edge of pavement and a point 4 feet beyond the shoulder break point.
7. The entire width of sod should not exceed 15 feet from the edge of pavement.
8. Sod is to be used to eliminate narrow seed and mulch areas. Sod areas less than 6 feet in width.
9. Place sod around drainage structures as per the standard Indexes and extend to the edge of pavement.

3.5 SOD MAINTENANCE

- A. The sod shall produce a dense, well-established growth. Repair and re-sod all eroded or bare spots until project acceptance. Repair to sodding shall be accomplished as in the original work.
- B. Perform sufficient watering to maintain adequate moisture for optimum development of the seeded and sodded areas, and no less than 1.5 inches of water per week for at least 2 weeks. Thereafter, apply water for a minimum of 60 days as needed until the sod takes root and starts to grow or until final acceptance, whichever is latest.

3.6 GUARANTEE

- A. Guarantee a live and vigorous stand of permanent grass at the time of acceptance of the work consisting of 80 percent minimum coverage for seeded grass areas with no bare spots greater than 5 square feet.

3.7 CLEANING

- A. Remove debris and excess materials from the project site.

END OF SECTION

SECTION 02523

SIDEWALKS, DRIVEWAYS AND CURBS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Sidewalks, sidewalk ramps, driveways, curbs and drive approaches complete with concrete materials, concrete curing compounds, joint materials, field quality control and appurtenances.

1.2 REFERENCES

- A. Reference Standards: Conform the work for this Section to the applicable portions of the following standard Specifications.
 - 1. ASTM - American Society of Testing and Materials
 - 2. AASHTO - American Association of State Highway and Transportation Officials
 - 3. FDOT - Florida Department of Transportation - Standard Specifications for Road and Bridge Construction.
 - 4. FAC - Florida Accessibility Code.
 - 5. ADAAG - American with Disabilities Act Accessibility Guidelines
 - 6. UFAS - Uniform Federal Accessibility Standards

1.3 SUBMITTALS

- A. Reports: Written permission for the use of all local disposal sites. Furnish copies to the ENGINEER.
- B. Test Reports:
 - 1. Thickness and Compressive Strength: Provide the ENGINEER with two (2) certified copies of the test results. Perform the tests by a laboratory approved by the ENGINEER.

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1.4 JOB CONDITIONS

A. Environmental Requirements:

1. Temperature: Comply with the requirements for concrete installation due to outside ambient air temperatures as specified under Article 3.3.I of this Section.

B. Protection:

1. Protection Against Rain: Comply with the requirements for protecting new work against damage from Rain, as specified under Article 3.3.I of this Section.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Concrete: Use 2,500-psi concrete except as modified herein.
- B. Ready-Mixed Concrete: Use ready-mixed concrete that conforms to ASTM C94, Alternate 2.
- C. Water: Use water for mixing and curing concrete reasonably clean and free from oil, salt, acid, alkali, chlorides, sugar, vegetable, or other substances injurious to the finished product. Waters from sources approved by the local Health Department as potable may be used without test. Test water requiring testing in accordance with the current Method of Test for Quality of Water to be Used in Concrete, AASHTO T-26.
- D. Concrete Curing Compounds: Use white membrane curing compound for curing concrete that conforms to AASHTO M148, Type 1 clear, or Type 2 white per FDOT Section 925.
- E. Premolded Joint Filler: Use fiber joint filler that conforms to ASTM D1751. Use filler of the thickness, as specified herein, or as directed by the ENGINEER.
- F. Steel Hook Bolts: Use hook bolts that conform to ASTM A706, or for Grade 60 of ASTM A615, A616, or A617. Use 5/8-inch diameter hook bolts self-tapping.
- G. Joint Sealant: Use hot-poured type joint sealant that conforms to ASTM D1190.

PART 3 EXECUTION

3.1 CONTRACTOR'S VERIFICATION

- A. Excavation and Forming: Prior to the installation of any concrete, examine the excavation and forms for the proper grades, lines, and levels required to receive

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the new work. Ascertain that all excavation and compacted subgrades are adequate to receive the concrete to be installed.

1. Correct all defects and deficiencies before proceeding with the work.

B. Existing Improvements: Investigate and verify location of existing improvements to which the new work is to be connected.

1. Making necessary adjustment in line and grade to align the new work with the existing improvements must be approved by the ENGINEER prior to any change.

3.2 PREPARATION

A. Forms: Use wood or metal forms, straight and free from warp, clean, and sufficient strength to resist springing during the process of depositing concrete against them.

1. Use full depth of the concrete forms.

3.3 INSTALLATION

A. Sidewalks, Sidewalk Ramps, Driveways and Driveway Approaches: Construct all sidewalks and sidewalk ramps four (4) inches thick except at driveways and alleys. Construct thickness of the sidewalks six (6) inches at driveways and alleys. Construct sidewalks five (5) feet wide unless otherwise noted on the Plans, and slope 1/4-inch per foot towards the center of the road. Normally, sidewalks will be located within the right-of-way, parallel the property lines, at a distance of 1-foot from the property line.

1. Construct alleys, driveways and approaches six (6) inches thick. Construct the width of the driveways and driveway approaches as shown on the Plans or as directed by the ENGINEER.

2. Asphalt sidewalks/bikeways/access paths/paths where authorized shall be constructed to specifications established by the City, but shall be no less than six inches (6") of compacted limerock base over a stabilized subgrade, primed and surfaced with a minimum of one inch (1") of Type II asphaltic concrete.

B. Removal of Existing Curb for Sidewalk Ramps and Driveway Approaches: Conform construction of sidewalk ramps within street intersections where curbed pavement existing to the current FDOT Roadway and Traffic Design Standards.

1. Saw cut, to full depth of pavement, and remove a minimum of an 18-inch wide curb and gutter section where there is no proper curb drop for the sidewalk ramp or driveway approach. When mountable curbs are present, remove a 24-inch wide curb and gutter section for the construction of sidewalk ramps, as specified above.

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2. Remove curb and gutter as determined by the ENGINEER in the field but remove curb and gutter at least as wide as the proposed sidewalk ramp plus 1-foot on each side.
 3. Replace the removed curb and gutter section with materials, equal to what was removed and seal joint with hot poured rubber asphalt.
- C. Install 5/8-inch diameter self-tapping hook bolts, in the existing concrete pavement as indicated on the Plans prior to placing concrete for the removed curb and gutter section.
- D. Placement of Forms: Use wood forms, straight and free from warp, of nominal depth for sidewalk sections less than 25 feet in length.
1. Stake forms to line and grade in a manner that will prevent deflection and settlement.
 2. When unit slab areas are to be poured, place slab division forms such that the slab division joints will be straight and continuous.
 3. Set forms for sidewalk ramps to provide a grade toward the centerline of the right-of-way in accordance with current standards. Use a uniform grade, except as may be necessary to eliminate short grade changes.
 4. Oil forms before placing concrete. Leave forms in place at least 12 hours after the concrete is placed. Place forms ahead of the pouring operations to maintain uninterrupted placement of concrete.
 5. The use of slip form pavers can be allowed when approved by the ENGINEER in lieu of the construction system described above.
- E. Joints: Construct transverse and longitudinal expansion and plane-of-weakness joints at the locations specified herein, or as indicated on the Plans or as directed by the ENGINEER.
1. Place the transverse expansion joints for the full width and depth of the new work. Use transverse expansion joints placed against an existing pavement a minimum of six (6) inches deep but no less than the thickness of the concrete being placed.
 2. Conform longitudinal expansion joints to the requirements as transverse expansion joints.
 3. Construct joints true to line with their faces perpendicular to the surface of the sidewalk. Install the top slightly below the finished surface of the sidewalk. Construct transverse joints at right angles to the centerline of the sidewalk and construct longitudinal joints parallel to the centerline or as directed by the ENGINEER.

4. Place transverse expansion joints, 1/2-inch thick, through the sidewalk at uniform intervals of not more than 50 feet and elsewhere as shown on the Plans, or as directed by the ENGINEER.
 5. Place expansion joints, 1/2-inch thick, between the sidewalk and back of abutting parallel curb, buildings or other rigid structures, concrete driveways and driveway approaches. When directed by the ENGINEER, place the expansion joint between sidewalks and buildings 1-foot from the property line and parallel to it.
 6. Form plane-of-weakness joints every five (5) feet. Form joints by use of slab divisions forms extending to the full depth of the concrete or by cutting joints in the concrete, after floating, to a depth equal to 1/4 the thickness on the sidewalk. Construct cut joints not less than 1/8-inch or more than 1/4-inch in width and finish smooth and at right angles to the centerline on the sidewalk.
- F. Placing and Finishing Concrete: Place all concrete on a prepared unfrozen, smooth, leveled, rolled and properly compacted base. Place concrete on a moist surface with no visible water present.
1. Deposit the concrete, in a single layer to the depth specified. Spade or vibrate and compact the concrete to fill in all voids along the forms and joints. Strike off the concrete with a strike board until all voids are removed and the surface has the required grade and cross section as indicated on the Plans, or as directed by the ENGINEER.
 2. Float the surface of the concrete just enough to produce a smooth surface free from irregularities. Round all edges and joints with an edger having a 1/4-inch radius.
 3. Broom the surface of sidewalks, driveways and approaches to slightly roughen the surface.
 4. Texture the surface of the sidewalk ramps with a coarse broom transversely to the ramp slope, and coarser roughen than the remainder of the sidewalk. Contract the ramp slope in color (using a brick-red dye or approved equal) from the remainder of the sidewalk. Comply with minimum color contract and slope requirements from FAC, UFAS, ADAAG, Local Government Standards, or as directed by the ENGINEER.
- G. Curing: After finishing operations have been completed and immediately after the free water has left the surface, completely coat and seal the surface of the concrete (and sides if slip-forming is used) with a uniform layer of white membrane curing compound. Do not thin the curing compound. Apply the curing compound at the rate of one gallon per 200 square feet of surface.
- H. Barricades: Place suitable barricades and lights around all newly poured sidewalks, sidewalk ramps, driveways, driveway approaches and curb and gutter

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sections in order to protect the new work from damage from pedestrians, vehicles and others until the concrete has hardened.

1. Leave barricades in place for a minimum of two (2) days, except for driveway approaches and curb and gutter sections. Leave barricades in place for a minimum of three (3) days.
2. Remove and replace any concrete that suffers surface or structural damage at no additional cost.

I. Protection:

1. **Against Rain:** Protect new concrete from the effects of rain before the concrete has sufficiently hardened. Have available on the job site at all times enough burlap or 6-mil thick polyurethane film to cover and protect one day's work. Stop work and cover completed work when rain appears eminent. As soon as the rain ceases, uncover the concrete and burlap drag the surface where necessary. Apply curing compound to any areas where the compound has been disturbed or washed away.
2. **Against Cold Weather:** If concrete is placed between December 15 and February 15, have available on the site sufficient amount of clean, dry straw or hay to cover one (1) day's production. If the temperature reaches 40 degrees F and is falling, place the hay or straw 12 inches thick, immediately after the curing compound is applied.
3. **Concrete Temperature Limitations:** Do not place concrete when the temperature of the concrete at the point of placement is above 90 degrees F.

J. **Cleanup:** After the concrete has gained sufficient strength, but no sooner than within 12 hours, remove the fixed forms and backfill the spaces on both sides with sound earth of topsoil quality. Compact, level and leave backfill in a neat condition.

K. **Gutters and Curbs:** Construct gutters and curbs in accordance with Section 520 FDOT Standard Specifications for Road and Bridge Construction, latest edition, including supplements.

3.4 FIELD QUALITY CONTROL

A. **Concrete Delivery Ticket:** Use a ticket system for recording the transportation of concrete from the batching plant to point of delivery. Issue this ticket to the truck operator at the point of loading and give to the ENGINEER upon delivery.

B. **Concrete Delivery Rejection:** Remove concrete not permitted for inclusion in the work by the ENGINEER from the site. Rejection of concrete will be determined through Field Quality Control and elapsed time from mixer charging to delivery.

- C. Concrete Testing at Placement: Perform tests of each batch of concrete delivered, each 50 cubic yards, or whenever consistency appears to vary. The sampling and testing of slump, air content and strength will be performed at no cost to the CITY.
1. Sampling: Secure composite samples in accordance with the Method of Sampling Fresh Concrete, ASTM C172.
 2. Slump Test: Test in accordance with ASTM C143. Use the least slump possible consistent with workability for proper placing of the various classifications of concrete.
 - a. Place structural concrete for walls and slabs, by means of vibratory equipment, with a slump of four (4) inches.
 - b. A tolerance of up to 1-inch above the indicated maximum will be allowed for individual batches provided the average for all batches or the most recent ten (10) batches tested, whichever is fewer, does not exceed the maximum limit.
 3. Air Content: Determine air content of normal weight concrete in accordance with Method of Test for Air Content of Freshly Mixed Concrete by the Pressure Method, ASTM C23 1, or by the volumetric method, ASTM C 173, for each strength test.
 4. Compressive Strength: Make two (2) strength tests of three (3) samples each for each 50 cubic yards, or fraction thereof, of each mix design of concrete placed in any one (1) day.
 - a. Handling Samples: Mold and cure three (3) specimens from each sample in accordance with Method of Making and Curing Concrete Test Specimens in the Field, ASTM C31. Record any deviations from the requirements of this Standard in the test report.
 - b. Testing: Test specimens in accordance with Method of Test for Compressive Strength of Cylindrical Concrete Specimens, ASTM C39. Test one (1) specimen at seven (7) days for information and test two (2) at 28 days for acceptance. Use the average of the strengths of the two (2) specimens tested at 28 days. Discard results if one (1) specimen in a test manifests evidence of improper sampling, molding or testing, and use the strength of the remaining cylinder. Should both specimens in test show any of the above defects, discard the entire test.
 - c. Acceptance of Concrete: The strength level of the concrete will be considered satisfactory so long as the averages of all sets of three consecutive strength test results equal or exceed the specified 28-day strength and no individual strength test results falls below the specified

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28-day strength by more than 500 psi. If the strength test is not acceptable, perform further testing to qualify the concrete.

- d. Concrete Temperature: Determine the temperature of concrete sample for each strength test.
- D. Reductions due to deficiencies in thickness or compressive strength are additive, that is, if an area is deficient by 3/8 inch and under strength by 200 psi, the total reduction is 20% plus .02% or .40% reduction.

END OF SECTION

SECTION 02530

GROUNDWATER CONTROL FOR OPEN CUT EXCAVATION

PART 1 GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

- A. This section provides for furnishing all permits, labor, materials, equipment, power and incidentals for performing all operations necessary to dewater, depressurize, drain and maintain excavations as described herein and as necessary for installation of pipeline and appurtenances. Included are installing, maintaining, operating and removing dewatering systems and other approved devices for the control of surface and groundwater during the construction of pipelines and appurtenances, open cut excavations, directional drilling. Included also are protecting work against rising waters and repair of any resulting damage.

1.2 CONTRACTOR'S RESPONSIBILITY

- A. It is the sole responsibility of the CONTRACTOR to identify groundwater conditions and to provide any and all labor, material, equipment, techniques and methods to lower, control and handle the groundwater as necessary for his construction methods and to monitor the effectiveness of this installed system and its effect on adjacent facilities.
- B. Operate, maintain and modify the system(s) as required to conform to these Specifications. Upon completion of the Construction, remove the system(s). The development, drilling and abandonment of all wells used in the dewatering system shall comply with regulations of the Florida Department of Environmental Protection and the governing Water Management District.
- C. Assume sole responsibility for dewatering systems and for all loss or damage resulting from partial or complete failure of protective measures and any settlement or resultant damage caused by the dewatering operation.

1.3 PLANS AND OTHER DATA TO BE SUBMITTED

- A. Prior to commencement of work, submit complete drawings, details and layouts showing the proposed dewatering plans in sufficient detail (i.e., general arrangements, procedures to be used, etc.) so as to allow the ENGINEER to evaluate the proposed dewatering systems. Include the following, as required by the CONTRACTOR's proposed operation:
 - 1. Names of equipment suppliers.
 - 2. Names of installation subcontractors.
 - 3. Plan for dewatering at access shafts and control of surface drainage.

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4. Plan for dewatering for cut-and-cover excavations, or otherwise controlling groundwater.
5. Eductor system layout and details.
6. Deep well locations and details.
7. Well point system layout and details.
8. Installation reports for eductors, deep wells and well points.
9. Water level readings from piezometers or observation wells, and method of maintenance.
10. As part of his request for approval of a dewatering system, demonstrate the adequacy of the proposed system and well point filler sand by means of a test installation.

PART 2 PRODUCTS

- A. Select equipment including but not limited to pumps, eductors, well points and piping and other material desired.

PART 3 EXECUTION

3.1 DEWATERING EXCAVATIONS

- A. Obtain all permits necessary for dewatering operations and file a copy of all such permits with the City Manager or designee and ENGINEER.
- B. Furnish, install, operate and maintain all necessary equipment for dewatering the various parts of the Work and for maintaining free of water the excavations and such other parts of the Work as required for Construction operations. Dewatering system should provide for continuous operation including nights, weekends, holidays, etc. Provide appropriate backup if electrical power is primary energy source for dewatering system.
- C. Continue dewatering in all required areas, until the involved work is completed, including the placing and compaction of backfill materials.
- D. Provide a uniform diameter for each pipe drain run constructed for dewatering. Remove the pipe drain when it has served its purpose. If removal of the pipe is impractical, provide grout connections at 50-foot intervals, and fill the pipe with clay grout or cement and sand grout when the pipe has served its purpose.

3.2 DEWATERING TRENCH

- A. Dewatering Excavation Plan: Develop an excavation dewatering plan that considers site ground and groundwater conditions, the type and arrangement of the equipment to be used and the proper method of groundwater disposal. Prepare the dewatering plan before beginning excavations below groundwater. Maintain one copy of the dewatering plan at the project site to be available for inspection while all dewatering operations are underway.
- B. Do not lay any pipeline in a trench in the presence of water. Remove all water from the trench sufficiently ahead of the pipeline placing operation. The ENGINEER shall have full and final authority to require dewatering of the trench to ensure a dry, firm bed on which to place the pipeline. As a minimum, maintain water levels at least 6 inches below the bottom of the trench. Continue to dewater trench until trench backfilling operations have been completed.
 - 1. If a dry trench bottom has not been obtained with usual methods of trench dewatering, then the order to excavate below grade and place sufficient select fill material, crushed stone, or 2500 psi concrete over the trench bottom may be given.
 - 2. If all efforts fail to obtain a stable dry trench bottom, and it is determined that the trench bottom is unsuitable for pipe foundation, present an alternate system for stabilization to the Engineer of Record for approval by the City Manager or designee on a case-by-case basis.
- C. Removal of water may be accomplished by pumping in connection with well point installation as the particular situation may warrant.
- D. If the soils encountered at the trench grade are suitable for the passage of water, without destroying the sides or utility foundation of the trench, sumps may be provided at intervals at the side of the main trench excavation. Use pumps to lower the water level by taking their suction from said sumps.

3.3 REQUIREMENTS FOR EDUCTOR, WELL POINTS OR DEEP WELLS

- A. Eductor, well points or deep wells, where used, must be furnished, installed and operated by a reputable CONTRACTOR regularly engaged in this business, and approved.

3.4 DURATION OF DRAINAGE

- A. In areas where concrete is to be placed, carry out the foundation drainage so that the required lowering of the water table will be effected prior to placing reinforcing steel. Keep foundation beds free from water to the same levels for 3 days after placing concrete.

3.5 PROTECTION OF STRUCTURES

- A. Provide adequate protection for all structures to avoid damage to concrete.

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- B. Operate construction equipment over completed concrete slabs or structures only with approval. Rubber tire equipment heavier than 5 tons and crawlers heavier than 7 tons will require adequate load spreading by sand fill or other means.

3.6 DISCHARGE OF WATER

- A. Do not discharge pumped drainage water into the sanitary sewer system or inhibit pedestrian or vehicular traffic with the groundwater control system.
- B. Discharge pumped drainage water into the storm sewer system or drainage ditch by direct means (i.e., discharge hose to inlet, burying header, etc.). Monitor the discharged water to determine that soil particles are not being removed.
- C. Conform all discharge to current South Florida Water Management District and City Department of Stormwater, Streets and Traffic rules, regulations, procedures and regulatory permits and if discharged into receiving waters, shall not exceed 29 N.T.U.'s above background.

3.7 REPAIR OF DAMAGE

- A. Assume full responsibility for all loss and damage due to flooding, rising water or seepage resulting from dewatering operations in any part of the work. Repair any damage to partially completed work from these or other causes, including the removal of slides, repair of foundation beds and performance of any other work necessitated by lack of adequate dewatering or drainage facilities.

END OF SECTION

SECTION 02575

REPAIR AND RESTORATION OF PAVEMENT, SIDEWALK, ETC.

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required and remove and replace pavements over trenches excavated for installation of pipelines as shown on the drawings and/or specified herein.

1.2 GENERAL

- A. Repair all damage, as a result of work under this project, done to existing pavement, driveways, paved areas, curbs and gutters, sidewalks, shrubbery, grass, trees, fences, utility poles, utility pipe lines, conduits, drains, catch basins, or stabilized areas or driveways and including all obstructions not specifically named herein, in a manner satisfactory to the ENGINEER. Include in the bid price, the furnishing of all labor, materials, equipment, and incidentals necessary for the cutting, repair, and restoration of the damaged areas unless pay items for specific types of repair are included in the Bid Form.
- B. Keep the surface of the backfilled area of excavation in a safe condition and level with the remaining pavement until the pavement is restored in the manner specified herein. All surface irregularities that are dangerous or obstructive to traffic are to be removed. Conform the repair to applicable CITY or State requirements for pavement repair and as described herein.
- C. The CITY reserves the right to require soil bearing or loading tests or materials tests, should the adequacy of the foundation or the quality of materials used be questionable. Costs of these tests shall be the responsibility of the CITY, if found acceptable; the costs of all failed tests shall be the responsibility of the CONTRACTOR.
- D. Make all street and road repair in accordance with the details indicated on the drawings and in accordance with the applicable requirements of these Specifications and meeting the permit requirements and approval of the governing Department of Transportation agencies.
- E. Replace pavement or roadway surfaces cut or damaged in equal or better condition than the original, including stabilization, base course, surface course, curb and gutter or other appurtenances. Obtain the necessary permits prior to any roadway work. Provide advance notice to the appropriate authority, as required, prior to construction operations.
 - 1. Roadway Restoration (within City Department of Transportation & Engineering jurisdiction): Perform restoration in accordance with the

requirements set forth in the “Right-of-Way Utility Construction Activities Policy” and these Standards. Obtain prior approval from the City Stormwater, Streets and Traffic Department for the materials of construction and method of installation, along with the proposed restoration design for items not referred or specified herein.

- a. Where existing pavement is to be removed, mechanical saw cut the surface prior to trench excavation, leaving a uniform and straight edge parallel or perpendicular to the roadway centerline with minimum disturbance to the remaining adjacent surfacing. Provide minimal width of cut for this phase of existing pavement removal. Limerock from a FDOT approved pit shall be on the job site during open cutting. When the specified compacted limerock base is greater than six inches (6”), the base shall be constructed in two (2) or more lifts.
 - b. Immediately following the specified backfilling and compaction, apply a temporary sand seal coat surface to the cut areas. For this temporary surfacing, provide a smooth traffic surface with the existing roadway and maintain until final restoration. Ensure that surfacing remains for a minimum of ten (10) days in order to assure the stability of the backfill under normal traffic conditions. Thirty (30) days following this period and prior to sixty (60) days after application: remove the temporary surfacing and perform final roadway surface restoration.
 - c. In advance of final restoration, remove the temporary surfacing and mechanically saw the existing pavement straight and clean to the stipulated dimensions, if needed. Following the above operation, proceed immediately with final pavement restoration in accordance with the requirements set forth by the City.
 - d. No layer shall be greater than two inches (2”) when compacted. Where a surface course is constructed to a thickness greater than two inches (2”), construct it in approximately equal layers, each not exceeding two inches (2”).
 - e. Where necessitated by traffic conditions, lay mixture in strips in such manner as to provide for the passage of traffic. Where the road is closed to traffic, mixture may be laid to the full width, by machines traveling in parallel.
2. Roadway Restoration (outside City jurisdiction) – Conform work within the rights-of-way of public thoroughfares which are not under jurisdiction of City to the requirements of the Governmental agency having jurisdiction or the Florida Department of Transportation, if no governmental agencies have jurisdiction. Work within State Highway right-of-way shall be in full compliance with all requirements of the permit drawings, and to the satisfaction of the Florida Department of Transportation.

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1.3 QUALITY ASSURANCE

- A. Applicable provisions of the latest version of the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction", and Supplemental Specifications hereunder govern the work under this Section. The Florida Department of Transportation will hereafter be referred to as FDOT.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Use materials for flexible base pavement and base course as specified in the latest version of the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction".

PART 3 EXECUTION

3.1 CUTTING PAVEMENT

- A. Cut and remove pavement to straight edges, 6 inches outside each edge of proposed trench to avoid pavement damage during installation of the new pipelines and appurtenances and for making connections to existing pipelines.
- B. Before removing pavement, mark the pavement for cuts nearly paralleling pipelines and existing street lines. Cut asphalt pavement along the markings with a jackhammer, rotary saw, or other suitable tool.
- C. No pavement shall be machine pulled until completely broken and separated along the marked cuts.
- D. The pavement adjacent to pipeline trenches shall neither be disturbed nor damaged. If the adjacent pavement is disturbed or damaged, irrespective of cause, remove the damaged pavement replace it at CONTRACTOR's expense.

3.2 GENERAL RESTORATION

- A. Restore, replace or rebuild existing street paving, driveways, sidewalks, etc., using the same type of construction as was in the original. Be responsible for restoring all such work, including sub-grade and base courses where present. Obtain and pay for such local or other governmental permits as may be necessary for the opening of streets. Meet any requirements other than those herein set forth which may affect the type, quality and manner of carrying on the restoration of surfaces by reason of jurisdiction of such governmental bodies.
- B. In all cases, maintain, without additional compensation, all permanent replacement of street paving, done by him under this Contract until accepted by the City Manager or designee, including the removal and replacement of such

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work wherever surface depressions or underlying cavities result from settlement of trench backfill.

- C. Complete all the final resurfacing or re-paving of streets or roads, over the excavations and relay paving surfaces of roadbed that have failed or been damaged prior to acceptance by the City Manager or designee. Conform backfilling of trenches and the preparation of sub-grades to the requirements of Section 02223.
- D. Do all re-paving or resurfacing in accordance with Florida Department of Transportation Specifications, to which the following requirement of trench backfill will be added: Where pipeline construction crosses paved areas such as streets, backfill the top 24 inches of trench below the road bases or concrete slabs with compacted A-4 or better material that will provide a bearing value of not less than 75 when tested by the Florida Department of Transportation Soil Bearing Test Methods. All open cuts through paved areas shall be repaved within 48 hours at least with cold patch.

3.3 PRIME AND TACK COATS

- A. Apply bituminous prime and tack coats on the previously prepared base course in accordance with Section 300 of the FDOT Specifications.

3.4 WEARING COURSE

- A. Use plant-mixed hot bituminous pavement to the thickness indicated in the drawings conforming to Type III asphaltic concrete in accordance with Section 333 of the FDOT Specifications. The requirements for plant and equipment are specified in Section 320 and the general construction requirements for asphaltic concrete pavement are contained in Section 330 of the FDOT specifications.

3.5 TESTING

- A. Perform all field-testing at an independent laboratory employed by the CITY. Test and certify all materials by the producer. Repeat tests of sub-grade or base not meeting specified compaction at the CONTRACTOR's expense.

3.6 MISCELLANEOUS RESTORATION

- A. Restore sidewalks, cut or damaged by construction, in full sections or blocks to a minimum thickness of four inches. Restore concrete curb or curb gutter to the existing height and cross section in full sections or lengths between joints. Concrete shall be as specified on the drawings. Restore grassed yards, shoulders and parkways to match the existing sections with grass seed or sod of a type matching the existing grass.

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3.7 CLEANUP

- A. After all repair and restoration or paving has been completed, remove all excess asphalt, dirt, and other debris from the roadways. Check and clean all existing storm sewers and inlets of any construction debris.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 02622

POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing buried PVC pipe, fittings and appurtenances.
 - 1. Provide PVC pipe and fittings complete with all necessary jointing facilities and materials, specials, adapters and other appurtenances required for installation in and completion of the pipelines to be constructed.
 - 2. Provide plain end or rubber gaskets (push-on or mechanical joint) of the types, sizes and classes shown or specified.
- B. Related Work Specified In Other Sections Includes:
 - 1. Section 02630 - Buried Ductile-Iron Pipe and Fittings
 - 2. Section 02650 - Laying and Jointing Buried Pipelines
 - 3. Section 02675 – Disinfection
 - 4. Section 02676 - Leakage Tests

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. ASTM D3034 - Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
 - 2. ASTM F679 - Polyvinyl Chloride (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings
 - 3. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. through 12 In., for Water Distribution
 - 4. AWWA C905 - Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14 In. through 36 In.
 - 5. AWWA C907 - Polyvinyl Chloride (PVC) Pressure Fittings for Water - 4 In. through 8 In.

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6. ASTM D2321 - Underground Installation of Flexible Thermoplastic Sewer Pipe
7. ASTM F477 - Elastomeric Seals (Gaskets) For Joining Plastic Pipe
8. ANSI A21.10 - Ductile-Iron and Gray-Iron Fittings 3 inches through 48 inches, for Water and Other Liquids
9. ANSI A21.11 - Rubber-Gasket Joints for Ductile-Iron and Gray Iron Pressure Pipe and Fittings
10. Uni-Bell B-11

1.3 SYSTEM DESCRIPTION

- A. Gravity Sewer Pipe - PVC pipe shall be of the integral wall bell and spigot joint type, which meets or exceeds all requirements set forth in ASTM D3034, latest revision. Minimum wall thickness shall conform to ASTM SDR 26. PVC pipes used for gravity sewers shall be green in color. Fittings shall be made of PVC plastic as defined by ASTM SDR 26 1784, latest revision. Flexible gasketed joints shall be compression type conforming to ASTM D3201, latest revision. Joints shall have elastomeric joint gaskets and shall conform to ASTM F477, latest revision. Lubricant and gaskets are to be supplied with the pipe by the manufacturer of the pipe. Other types of lubricants are prohibited. At all conflict crossings using 4"-12" substitute C900 PVC, Class 200, DR 14 and for PVC pipe 14" and larger use C905 PVC, Class 235, DR 18.
- B. Force Main Pipe – PVC pipe meeting the latest revision of AWWA C900 or AWWA C905 shall be provided. For installation of 4" – 12" pipe, the pressure class shall be 150 with a DR of 18. For installation of 14" – 24" pipe, use pressure class 165, DR 25, meeting or exceeding the requirements of Uni-Bell B-11. PVC pipes used for force mains shall be green in color. Outside diameters shall be equivalent to ductile iron pipe of the same nominal size. Pipes shall be marked with the manufacturer's name, nominal size, type of plastic, and pressure rating. Joints between successive lengths of straight PVC pipe shall be compression type using a single elastomeric gasket, per ASTM C-3139 and F477. Lubricant and gaskets are to be supplied with the pipe by the manufacturer of the pipe. Other types of lubricants are prohibited. Fittings shall be ductile iron (see Section 02630, 2.4.B). Restraint shall be provided for horizontal or vertical alignment changes using uni-flange type collars, epoxy coated, with high strength, low alloy hardware, and shall be EBAA "Megalug," "Uni-flange," Romac "Grip Ring," Sigma, Tyler, or Star restraint. (see also Section 2.1.L.) Fittings above 8 inch shall conform to the standards in Section 02505, until such time that C900 rated fittings in sizes larger than 8 inch are available. PVC pipe direct buried beneath roadways, parking lots or parking lot entrances shall meet AWWA Specification C900 or C905, latest revision. All 4" to 12" pipe in such locations shall be a minimum of Class 200, DR 14, and all 14" to 24" pipe shall be a minimum of Class 235, DR 18. Pressure Class 250 ductile iron pipe may be used instead of PVC in these locations if approved by the City Manager or designee.

- C. Potable, Raw and Non-Potable Irrigation Water Main Pipe - PVC shall conform to AWWA Specification C900 or C905, latest revision. All 4" to 12" pipe shall be a minimum of Class 150, DR 18 and all 14" to 24" pipe shall be a minimum of Class 165, DR 25 and shall meet or exceed Uni-Bell B-11. All potable water pipe shall bear the seal of the National Sanitation Foundation (NSF) for potable water pipe. All pipe shall be marked with the manufacturer's name, nominal size, type of plastic and pressure rating. All PVC pipe used for potable water lines shall be predominately blue in color. Underground PVC pipes used for potable water lines shall be solid-wall blue pipe, will have a co-extruded blue external skin, or will be white or black pipe with blue stripes incorporated into, or applied to, the pipe wall. PVC pipes used for raw water shall be olive green in color. PVC pipes used for non-potable irrigation, reclaimed or reuse water shall be purple in color. Pipe O.D. shall be equivalent to cast iron pipe of the same nominal size. See Section 2.1.L for joint restraint information. PVC pipe direct buried beneath roadways, parking lots or parking lot entrances shall meet AWWA Specification C900 or C905, latest revision. All 4" to 12" pipe in such locations shall be a minimum of Class 200, DR 14, and all 14" to 24" pipe shall be a minimum of Class 235, DR 18. Pressure Class 250 ductile iron pipe may be used instead of PVC in these locations if approved by the City Manager or designee. Fittings shall be ductile iron (see Section 02630, 2.4.A). For PVC service mains within a development that is 4" or greater, use above specifications. For PVC water service lines less than 4", use Class 200 ASTM D2241 3" PVC, or schedule 40 2" or smaller PVC. When going under roads, service lines 2" and smaller shall be encased in schedule 80 PVC a minimum of twice the nominal outside diameter of the carrier pipe; for 3" and larger under roads, use Class 200 6" PVC casing. All fittings for use with PVC pipe 2 1/2" and smaller shall be manufactured of PVC in accordance with the same specifications as the PVC pipe of the same size; fittings shall have bell ends with elastomeric gaskets which conform to the same dimensions, tolerances, and specifications as the PVC pipe.
- D. Provide pipe of the various sizes and classes as specified in the schedule or shown. Restrain all pressure pipe joints.
- E. Construct concrete encasements only with written permission from the Water Director.

1.4 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Submit the following shop drawings:
 - 1. Pipe joints, fittings, sleeves and cleanouts. Where special designs or fittings are required, show the work in large detail and completely describe and dimension all items.
 - 2. Fully dimensioned drawings of piping layouts, including fittings, couplings, sleeves, cleanouts, valves, supports and anchors. Label pipe size, materials, type, and class on drawings and include the limits of each reach

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of restrained joints. Provide cross sections showing elevations of cleanouts, pipes, fittings, sleeves, and valves.

3. Catalog data for pipe, joints, fittings, sleeves, harnessing and cleanouts.
- C. Quality Control: Submit certificate of compliance for pipe, fittings, gaskets, coatings, specials, sleeves and cleanouts in accordance with this Section.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle all pipe, fittings and appurtenances as specified in Division 1 and Section 02650.

PART 2 PRODUCTS

2.1 MATERIALS

- A. PVC Pipes and Fabricated Fittings: PVC pipe and fabricated fittings shall be made from virgin PVC resin that has been compounded to provide physical and chemical properties that equal or exceed cell class 12454-B as defined in ASTM D1784, and shall qualify for a hydrostatic design basis of 4,000 psi (27.58 MPa) at 73.4°F (23°C) per the requirements of PPI TR-3.
- B. Fittings for Pressure Pipe: Provide all fittings meeting the requirements of Section 02630, except for PVC pipe 2 ½" or smaller, in which case use specifications above.
- C. Joints and Fittings for Gravity Sewer Pipe: Provide all fittings meeting the requirements of ASTM D 3034 and ASTM F 679. Provide joints that are a molded integral part of the pipe section. Do not use joints or couplings furnished loose. Provide joints with elastomeric gasket joints.
- D. Joints for Pressure Pipe: Provide pipe with bell ends in accordance with AWWA C900 and AWWA C905. Provide joints with elastomeric gasket joints.
- E. Elastomeric Gasket Joints: Provide elastomeric gasket joints in accordance with ASTM F 477.
- F. Rubber Gasket Joints: Provide mechanical joints meeting the requirements of ANSI A21.11.
- G. Color: Provide pipe made of 100 percent of the color specified. Provide green sewer or force main pipe. Provide blue potable water pipe. Provide olive green raw water pipe. Provide purple non-potable irrigation, reclaimed or reuse water pipe.
- H. Pipe Marking: Provide mark on each pipe at internals of 5 feet or less to designate compliance with applicable ASTM or AWWA specification.

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- I. Temporary Bulkheads: Provide temporary bulkheads at the ends of sections where adjoining pipelines have not been completed and are not ready to connect.
 - 1. Remove all temporary bulkheads when they are no longer needed.
- J. Date of Manufacturer: Provide pipe and fitting manufactured no earlier than 12 month period proceeding the date of the Agreement.
- K. Wall Thickness for Pressure Pipe:
 - 1. 4 through 12 inches diameter – provide AWWA-C900 DR 14, Class 200 for pressure pipe installed under pavement.
 - 2. 14 through 24 inches diameter – provide AWWA-C905 DR 25, PR 165 for pressure pipe installed under pavement.
- L. Restraining Devices: Restraining joints shall be placed at all bends, tees, plugs, reducers, and other fittings to provide lateral support, and shall conform to the City Standard Details. Concrete thrust blocks shall only be utilized if approved by City Utilities. Restrained joint shall be capable of deflection during assembly. Deflection shall not exceed the manufacturer recommendations. Tee head bolts and nuts for restrained joints shall be manufactured of Corten-A, high strength, low alloy, corrosion resistant steel.
 - 1. Joint restraint devices for ductile iron mechanical joint fittings to PVC pipe shall be EBAA Iron Sales, Series 2000PV, Uniflange, Sigma, Star, Tyler, Lok-Type or Tr-Flex manufactured by U.S. Pipe Co., Lok-Fast or Lok-Ring manufactured by American Cast Iron Pipe Co., or Romac Industries.
 - 2. Bell joint restraint devices for PVC push joint pipe shall be EBAA Iron Sales, Series 1600 for C900 pipe and Series 2800 for C905 pipe or approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install all buried PVC pipe and fittings in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1 and Section 02650.

3.2 LEAKAGE TESTING

- A. Cleaning: Flush clean and test all pipes after installation.
- B. Testing: Test pipes for leaks and repair or tighten as required.
- C. Procedures: Conduct tests in accordance with Section 02676.

EXHIBIT A-1

3.3 DISINFECTION

- A. General: Disinfect all pipelines that are to carry potable water before they are placed in service as specified in Section 02675.

3.4 SCHEDULES

- A. Refer to the Schedules contained in Section 02650 Laying and Jointing Buried Pipelines for information on the piping that is to be constructed using the pipe materials and methods specified herein.

END OF SECTION

SECTION 02630

DUCTILE IRON PIPE (DIP) AND FITTINGS

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required, and install ductile iron pipe, fittings and appurtenances as shown on the Drawings and as specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02650 - Laying and Jointing Buried Pipe

1.3 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Commercial Standards: (Latest Revision)

1. ANSI/AWWA C104/A21.4 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
2. ANSI/AWWA C105/A21.5 Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids.
3. ANSI/AWWA C110/A21.10 Ductile-Iron Fittings, 3 in. Through 48 Inches, for Water and Other Liquids. (C110 2-48 inches).
4. ANSI/AWWA C111/A21.11 Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
5. ANSI/AWWA C115/A21.15 Flanged Ductile-Iron Pipe with Threaded Flanges.
6. ANSI/AWWA C150/A21.50 Thickness Design of Ductile-Iron Pipe.
7. ANSI/AWWA C151/A21.51 Ductile-Iron Pipe, Centrifugally Cast for Water or Other Liquids.
8. ANSI/AWWA C153/A21.53 Ductile-Iron Compact Fittings, 3 inches through 16 inches, for Water and Other Liquids.
9. AWWA C600 Installation of Ductile Iron Water Mains and Their Appurtenances.

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1.4 CONTRACTOR SUBMITTALS

- A. Shop Drawings: Submit shop drawings of pipe and fittings in accordance with the requirements in the General Conditions, the requirements of the referenced standards and the following supplemental requirements as applicable:
 - 1. Certified dimensional drawings of all valves, fittings, and appurtenances.
 - 2. In all cases, a line layout to indicate the limits of each reach of restrained joints or of concrete encasement shall be supplied. (NOTE: Obtain CITY Utilities Department approval of all proposed concrete encasement of ductile iron pipe.)
- B. Certifications: Furnish a certified affidavit of compliance for all pipe and other products or materials furnished under this Section of the Specifications, which indicates that all tests have been made and that all results comply with the requirements of AWWA C151, including but not necessarily limited to the following:
 - 1. Acceptance Tests.
 - 2. Hydrostatic Tests.
 - 3. Low Temperature Impact Tests.
- C. Additional Documentation: Upon request, furnish foundry records in the form of written transcripts.
- D. All expenses incurred for certification, testing, and data submittal shall be borne by the CONTRACTOR or the Supplier.

1.5 QUALITY ASSURANCE

- A. Inspection: All pipe shall be available for inspection at the place of manufacture prior to shipping in accordance with the provisions of the referenced standards. Notify the ENGINEER in writing not less than 10 calendar days prior to the shipping of the pipe.
- B. The ENGINEER shall be given access to all areas where manufacturing and testing is performed and shall be permitted to make all inspections necessary to confirm manufacturer compliance with these Specifications.
- C. Tests: Except as modified herein, all materials used in the manufacture of the pipe shall be tested in accordance with the requirements of the referenced standards as applicable.
- D. Provide data on material tests at no additional cost to the CITY.

EXHIBIT A-1

- E. In addition to those tests specifically required, the ENGINEER may request additional samples of any material including lining and coating samples for testing by the CITY. Furnish the additional samples at no additional cost to the CITY.

1.6 CORROSION PROTECTION

- A. If specifically approved by City Utilities for use, provide exterior protection for underground ductile iron pipe and fittings, steel pipe, and pre-stressed concrete cylinder pipe within areas of severe corrosive conditions (dump areas, swamps, marshes, alkaline soils, cinder bed, etc.). This shall be accomplished by the installation of polyethylene encasement (minimum eight (8) millimeters thick) through the area of concern in accordance with AWWA C105. The soil test evaluation to determine the necessity for extra protection in suspect areas shall be those set forth in ANSI Standard A21.5. Additionally, where other existing utilities are known to be cathodically protected, ductile iron pipe crossing said utility shall be protected for a distance of 20 feet to each side. If ductile iron pipe is to be installed parallel to and within 10 feet of cathodically protected pipe, then protection shall be provided for the entire length. Do not install steel pipe in severe corrosion areas.

PART 2 PRODUCTS

2.1 GENERAL

- A. Protective Lining for Water Mains: Cement mortar lined ductile iron pipe shall conform to ANSI/AWWA C151 and C104, subject to the following supplemental requirements. The pipe shall be of the diameter and class shown, shall be furnished complete with rubber gaskets as indicated in the Contract Documents, and all specials and fittings shall be provided as required under the Contract Documents.
- B. Protective Lining for Force Mains and Sewers: Where lining is shown, specified or required, for the protection of pipelines carrying sewage from corrosive gases, line the pipe using protective ceramic epoxy coating or polyethylene lining in accordance with the manufacturer's written instructions. For ceramic epoxy lining, abrasive blast clean pipe and fittings to a near white surface to SSPC SP-10 and provide 40 mils minimum of dry film thickness of ceramic epoxy lining using Protecto 401 coating as manufactured by Vulcan Painters and certified by U.S. Pipe and Foundry. For polyethylene lining, provide Polybond Plus (60 mils minimum thickness) as manufactured by American Cast Iron Pipe, or Engineer of Record approved equal.
- C. Handling and Storage: Handle the pipe by using wide slings, padded cradles, or other devices designed and constructed to prevent damage to the pipe and its lining. The use of equipment or handling, which might injure the pipe and its lining, will not be permitted. Stockpiled pipe shall be suitably supported and shall be secured to prevent accidental rolling. Assure that all other pipe handling equipment and methods is acceptable to the ENGINEER.

EXHIBIT A-1

- D. Laying lengths: Maximum pipe laying lengths shall be 20 feet.
- E. Finish: The pipe shall have smooth dense interior surfaces and shall be free from fractures, excessive interior surface crazing and roughness, in accordance with ANSI/AWWA C104.
- F. Closures and Correction Pieces: Provide closures and correction pieces as required so that closures may be made due to different headings in the pipe laying operation and so that correction may be made to adjust the pipe laying to conform to pipe stationing shown on the Drawings or line layouts where applicable.

2.2 PIPE DESIGN CRITERIA

- A. General: Ductile Iron pipe shall be designed in accordance with the requirements of ANSI/AWWA C150 as applicable and as modified in this Section.
- B. Pipe Wall Thickness for Internal Pressure: The pipe shall be designed with a net thickness to withstand the design internal pressure in accordance with the hoop stress formula. In addition to the requirements of the Section, the minimum wall thickness shall be in accordance with the minimum thickness wall depicted in table 50.5 of ANSI/AWWA C150.
- C. Potable, Raw and Non-Potable Irrigation Water Mains:
 - 1. Ductile Iron Pipe shall be a minimum pressure Class 250 and will be accepted in any diameter for use within the water distribution system.
 - 2. All aboveground potable water main pipe shall be painted Federal Safety Blue. All aboveground raw water main pipe shall be painted white. All aboveground non-potable irrigation, reclaimed or reuse water main pipe shall be painted Pantone Purple 522C. The pipe wall thickness shall not be less than that required by a working pressure of 250 psi in laying condition Type 4 "B" with 5-foot cover in conformance with ANSI Standard A21.50.
- D. Force Mains and Gravity Sewers:
 - 1. Ductile Iron Pipe shall be a minimum pressure Class150 and will be accepted in any diameter for use within the wastewater collection system.
 - 2. Ductile iron pipe for Gravity Sewer applications is not permitted unless the ENGINEER can demonstrate that C900 PVC pipe, Class 150 or 200, cannot be utilized from a structural standpoint.
 - 3. All aboveground force main pipe shall be painted Safety Green. The pipe wall thickness shall not be less than that required by a working pressure of 150 psi.

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2.3 MATERIALS

- A. Ductile Iron Pipe: Pipe materials shall conform to the requirements of ANSI/AWWA C151.
- B. Adapters to connect ductile iron pipe or fittings to pipe or fittings of dissimilar materials shall be supplied by the CONTRACTOR in accordance with ASTM specifications and the pipe manufacturer recommendations, and as approved by the ENGINEER.
- C. Water Mains:
 - 1. All water mains shall contain cement for mortar lining conforming to the requirements of ANSI/AWWA C104. Cement for mortar lining shall be Type II or V. A fly ash or pozzolan shall not be used.
 - 2. All Ductile Iron buried water main pipelines shall have blue stripes applied to the pipe wall. Stripe width shall comply with AWWA standards. The stripes shall be applied by one of the methods described below:
 - a. Pipes striped during manufacturing of the pipe shall have continuous stripes that run parallel to the axis of the pipe located at no greater than 90 degree intervals around the pipe and that will remain intact during and after installation of the pipe.
 - b. Pipes striped during installation shall incorporate blue tape or blue paint. The tape or paint shall be applied in a continuous line that runs parallel to the axis of the pipe and that is located along the top of the pipe.
 - 3. All pipe with an internal diameter of 24" or greater, tape or paint shall be applied in continuous lines along each side of the pipe as well as along the top of the pipe.
- D. Force Mains and Gravity Sewer:
 - 1. All Ductile iron pipe used within the wastewater system shall be lined with polyethylene in accordance with ASTM D1248. Pipe and fittings shall be lined as specified herein. Each piece of pipe shall bear a marking denoting the class to which it belongs. Pipes shall have green stripes applied to the pipe wall and shall conform to standards above.

2.4 SPECIALS AND FITTINGS

- A. Fittings for Potable, Raw, Non-Potable Irrigation, Reclaimed and Reuse Water Systems:
 - 1. Fittings shall conform to the requirements of ANSI/AWWA C153/A21.53 or ANSI/AWWA C110/A21.10 for diameters 3 inches through 48 inches, and shall have a minimum pressure rating of 350 psi for pipe sizes 6 inches

through 24 inches and 250 psi for sizes larger than 24 inches. Ductile iron fittings shall be double cement lined, seal coated inside and outside with an asphaltic material in accordance with AWWA C104 as specified.

B. Fittings for Wastewater System:

1. Fittings in direct contact with wastewater 8 inches in diameter and smaller, shall be interior coated with a 12 mil thickness of coal tar epoxy coating. Pipe and fittings, for force mains 10 inches in diameter and larger, shall be interior coated with either a 20 mil to 40 mil thickness polyethylene as specified above or a 12 mil thickness of coal tar epoxy coating in conformance with ASTM 1248. Pipe and fittings shall have an outside asphaltic coating as specified in AWWA Standard C151. Each piece of pipe shall bear a marking denoting the class to which it belongs.

2.5 DESIGN OF PIPE

- A. General: The pipe furnished shall be ductile iron pipe, lined as specified, with rubber gasketed joints.
- B. The pipe shall be designed, manufactured, tested, inspected, and marked according to applicable requirements previously stated and except as hereinafter modified, shall conform to ANSI/AWWA C150 and ANSI/AWWA C151.
- C. Pipe Dimensions: The pipe shall be of the diameter and class shown. The minimum wall thickness for each pipe size shall be as specified herein or shown on the Drawings.
- D. Fitting Dimensions: The fittings shall be of the diameter shown and class specified.
- E. Joint Design: Ductile Iron pipe and fittings shall be furnished with mechanical joints, push-on joints and flanged joints as follows:
 1. For buried pipe applications, unless otherwise indicated, mechanical and push-on joints shall conform to ANSI/AWWA C111/A21.11, with the minimum pressure rating of 350 psi, and shall be as manufactured by U.S. Pipe Co. (Tyton Joint), Clow Corp. (Super Bell-Tite Joint), or American Cast Iron Pipe Co. (Fastite Joint), Alltite, Star, or Engineer of Record approved equal. Restrained joint shall be capable of deflection during assembly. Deflection shall not exceed the manufacturer recommendations. Tee head bolts and nuts for restrained joints shall be manufactured of Corten-A, high strength, low alloy, corrosion resistant steel.
 2. For above-ground or buried vault applications, unless otherwise indicated, flanged joints shall conform to ANSI/AWWA C115/A21.15, with the minimum pressure rating of 250 psi. All above-ground fittings shall be painted blue.
 3. Use manufactured, labeled gasket lubricant for push on joints with trade name and pipe manufacturer name, other lubricants are prohibited.
 4. Nuts and bolts for flanged joints shall be 304 stainless, as specified by the CITY, and conform to ANSI/AWWA C111.

- F. Restraining Devices: Restraining joints shall be placed at all bends, tees, plugs, caps, reducers, and other fittings to provide lateral support and to prevent pipe joints and fittings from pulling apart under pressure, and shall conform to the City Standard Details (see Typical Conflict Crossings Detail Drawing). Concrete thrust blocks shall only be utilized if approved by City Utilities or as shown on the Detail Drawings, and shall have a minimum compressive strength of 3,000 psi at 28 days. Do not disturb soil in the thrust block area prior to pouring concrete. Both concrete thrust blocks and restrained joints or tie rods must be used when, in the judgment of the Engineer of Record, the nature and criticality of the installation is such as to require positive assurance of stability. Fittings and pipes shall be wrapped with 8 mil thick polyethylene prior to pouring concrete, so that no concrete comes in direct contact with the surface of the fitting or pipe. Concrete shall cure a minimum of 7 days prior to placing the line under pressure. Contractor shall not backfill around thrust blocks until approval is obtained from the City Field Inspector. See Section 02650 page 10 for more information on thrust blocks.
1. Joint restraint devices for ductile iron mechanical joint pipe and ductile iron mechanical joint fittings to ductile iron pipe shall be EBAA Iron Sales, Series 1100 Megalug (R), Uniflange, Romac Industries, Sigma, Lok-Type or Tr-Flex manufactured by U.S. Pipe Co., Lok-Fast or Lok-Ring manufactured by American Cast Iron Pipe Co., or Star Restraint.
 2. Bell joint restraint devices for ductile iron push joint pipe shall be EBAA Iron Inc., Series 1700 Megalug (R) for bell restraint.
 3. Restrained push-on joints for push joint pipe shall be U.S. Pipe and Foundry, TR Flex, McWane Inc., Super-Lock, American Cast Iron Pipe Company, Lok-Ring or Flex-Ring.
- G. For bell-and-spigot ends with rubber gaskets, the clearance between the bells and spigots shall be such that when combined with the gasket groove configuration and the gasket itself will provide watertight joints under all operating conditions when properly installed. Require the pipe manufacturer to submit details complete with significant dimensions and tolerances and also to submit performance data indicating that the proposed joint has performed satisfactorily under similar conditions. In the absence of a history of field performance, the results of a test program shall be submitted.
- H. Gaskets shall be a Buna N, Neoprene, or a Nitril-based rubber product approved by the City Manager or designee. Gaskets shall have clean tips unless otherwise specified. Elastomeric gaskets conforming to ASTM F-477 shall also be acceptable.
- I. Shop-applied interior linings and exterior coatings shall be applied evenly to the nominal thickness specified. Holiday free cement is not possible to manufacture. Exterior coatings: asphalt coating for buried pipe or primed pipe cannot be furnished holiday free.

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2.6 CEMENT-MORTAR LINING

- A. Cement-Mortar Lining For Shop Application: Except as otherwise provided herein, interior surfaces of all ductile iron pipe shall be cleaned and lined in the shop with cement-mortar lining applied centrifugally in conformity with ANSI/AWWA C104. Ductile-Iron pipe fittings need not have the cement-mortar lining applied centrifugally. The lining machines shall be of a type that has been used successfully for similar work. Every precaution shall be taken to prevent damage to the lining. If lining is damaged or found faulty at delivery site, the damaged or unsatisfactory portions shall be repaired in the field in accordance with ANSI/AWWA C104.
- B. The nominal wet lining thickness shall be as follows:

Nominal Factory Nominal Replacement		
Nominal Pipe Diameter (in.)	Applied Lining Thickness (in.)	Lining Thickness (in.)
3-12	1/8	1/8
14-24	3/16	3/16
30-64	1/4	1/4

- C. Protection of Pipe Lining/Interior: All shop-applied cement mortar lining shall be given a seal coat of asphaltic material in conformance with ANSI/AWWA C104.

2.7 EXTERIOR COATING OF PIPE

- A. Exterior Coating of Buried Piping: The exterior coating shall be an asphaltic coating approximately 1 mil thick, conforming to ANSI/AWWA C151.

2.8 CORROSION PROTECTION

- A. If specifically approved by City Utilities for use, exterior protection shall be provided for underground ductile iron pipe and fittings within areas of severe corrosive conditions. This shall be accomplished by the installation of polyethylene encasement through the area of concern. The soil test evaluation to determine the necessity for extra protection in suspect areas shall be those set forth in ANSI Standard A21.5. Additionally, where other existing utilities are known to be cathodically protected, ductile iron pipe crossing said utility shall be protected for a distance of 20 feet to each side. If ductile iron pipe is to be installed parallel to and within 10 feet of cathodically protected pipe, then protection shall be provided for the entire length. Steel pipe shall not be installed in severe corrosion areas.

PART 3 EXECUTION

3.1 INSTALLATION OF PIPE

- A. Handling and Storage: Carefully handle and protect all pipe, fittings, etc., against damage, impact shocks, and free fall and in accordance with ANSI/AWWA C600. Do not place pipe directly on rough rocky ground, but in such instances support the pipe in a manner that will protect the pipe against injury whenever stored at such trench site or elsewhere. Do not install any pipe where the lining or coating show defects that may be harmful as determined by the ENGINEER. Repair such damaged lining or coating, or furnish and install a new undamaged pipe.
- B. Repair or replace all pipe damaged prior to Substantial Completion or during warrantee period.
- C. Inspect each pipe and fitting prior to installation to insure that no damaged portions of pipe are installed.
- D. Before placement of pipe in the trench, thoroughly clean each pipe or fitting of any foreign substance that may have collected therein, and keep the pipe clean at all times thereafter. For this purpose, close the openings of all pipes and fittings in the trench during any interruption to the work.
- E. Pipe Laying: Install the pipe in accordance with ANSI/AWWA C600.
- F. Lay pipe directly on the bedding material. Refer to the Collier County Utilities Standards and Procedures Ordinance Section 9.1.2 for laying and backfilling requirements. No blocking will be permitted, and the bedding shall be such that it forms a continuous, solid bearing for the full length of the pipe. Make excavations as needed to facilitate removal of handling devices after the pipe is laid. Form bell holes at the ends of the pipe to prevent point loading at the bells or couplings. Make excavations as needed outside the normal trench section at field joints to permit adequate access to the joints for field connection operations and for application of coating on field joints.
- G. Where necessary to raise or lower the pipe due to unforeseen obstructions or other causes, the ENGINEER may change the alignment and/or the grades. Such change may be made by the deflection of joints, by the use of bevel adapters, or by the use of additional fittings. However, in no case shall the deflection in the joint exceed 70 percent of the maximum deflection recommended by the pipe manufacturer. No joint shall be misaligned any amount which will be detrimental to the strength and water tightness of the finished joint.
- H. Pipe and Specials Protection: Protect the openings of all pipe and specials with suitable bulkheads to prevent unauthorized access by persons, animals, water, or any undesirable substance. At all times, provide means to prevent the pipe from floating.
- I. Pipe Cleanup: As pipe laying progresses, keep the pipe interior free of all debris. Completely clean the interior of the pipe of all sand, dirt, mortar splatter and any

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other debris following completion of pipe laying, pointing of joints, and any necessary interior repairs per ANSI/AWWA C600 and C602 prior to testing and disinfecting the completed pipeline. For pipe larger than 12" diameter, utilize a polyurethane foam plug "Poly Pig" to remove all debris from main.

3.2 RUBBER GASKETED JOINTS

- A. Rubber Gasketed Joints: Immediately before jointing pipe, thoroughly clean the bell end of the pipe, and place a clean rubber gasket in the bell groove. Carefully clean the bell and spigot end of push-on joint pipe, and lubricate with a vegetable-based lubricant or per manufacturer's recommendation. Insert the spigot end of the pipe section into the bell of the previously laid joint and telescope into the proper position. Do not tilt the pipe to insert the spigot into the bell.

3.3 INSTALLATION OF PIPE APPURTENANCES

- A. Installation of Valves: Handle all valves in a manner to prevent any injury or damage to any part of the valve. Thoroughly clean and prepare all joints prior to installation. Adjust all stem packing and operate each valve prior to installation to insure proper operation.
- B. Install all valves so that the valve stems are plumb and in the location shown on the Drawings.
- C. Mechanical joints consisting of bell, socket, gland, gasket, bolts, and nuts shall conform to ANSI Standard A21.11. Bolts and nuts shall be high strength, low alloy, Cor-Ten, T-Head Type having hexagonal nuts. Bolts and nuts shall be machined through and nuts shall be tapped at right angles to a smooth bearing surface. Single sealed gasket push-on type joints shall conform to the requirements of ANSI A21.11 and shall be Tyton, Fastite, Superbelltite, Alltite, or Engineer of Record approved equal.
- D. Mechanical joint retainer glands may be used to restrain mechanical joint pipe and fittings to the plain end of ductile iron pipe and fittings when used in conjunction with thrust blocks of reduced size. The Utilities ENGINEER must approve thrust block size. Maintain joint flexibility.

3.4 TESTING AND DISINFECTION

- A. Test completed water or force main pipeline in accordance with Section 02676. Disinfect completed water pipeline in accordance with Section 02675.

END OF SECTION

SECTION 02645
FIRE HYDRANTS

PART 1 GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

- A. Furnish and install fire hydrants where shown on the Drawings or directed by the ENGINEER.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A. Section 15100 – Water Valves and Appurtenances
- B. Section 03310 – Concrete for Non-Plant Work

1.3 QUALITY ASSURANCE

- A. Install hydrants to meet current requirements of City Utilities and in accordance with the manufacturer's installation instructions.
- B. Provide manufacturer's certificate that products meet or exceed minimum requirements as specified.

1.4 SUBMITTALS

- A. Submit manufacturer's certificates on conformance.
- B. Shop Drawings: Submit manufacturer's drawings and data sheets for material to be supplied under this Section. Indicate sizes and types to be installed.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. During loading, transportation and unloading, exercise care to prevent damage to materials.
- B. Handling: Fire hydrants should be unloaded carefully. The hydrant should be carefully lowered from the truck to the ground, not dropped. Only hoists and slings with adequate load capacity to handle the weight of the hydrant shall be used.
- C. Storage: Hydrants should be stored in the fully closed position to prevent entry of foreign material that could cause damage to the seating surfaces. Whenever practical, hydrants should be stored indoors. If outside storage is required, means should be provided to protect the operating mechanism. In outside storage, parts and flanges should be protected from the weather and foreign materials.

PART 2 PRODUCTS

2.1 FIRE HYDRANTS

- A. Fire hydrants shall be of the dry barrel, compression type conforming to and/or tested in accordance with AWWA C502 "Standard for Dry-Barrel Fire Hydrants," AWWA Manual M-17 "Dry Barrel Fire Hydrants," and additional requirements as set forth herein. Each fire hydrant shall be tested mechanically and hydrostatically in accordance with AWWA C502, latest revision, Section 5. Submit affidavits from the hydrant manufacturer indicating compliance with the testing requirements. Submit manufacturer's product data, including sample test curves of head loss/flow volume data plotted from zero to full flow for the test conditions required in AWWA C502, Section 5, for each model of hydrant purchased.
- B. Hydrant shall have break away upper sections capable of ready replacement without loss in the event of traffic damage. Each hydrant shall have a 6" bottom inlet connection and valve opening at least 5-1/4 inches in diameter. Hydrants shall have a national standard pentagon 1.5 inch, point to flat operating nut and turn to the left (counter clockwise) to open. Each hydrant shall be fitted with one 4-1/2-inch pumper connection and two 2-1/2 inch hose connections, both having threads that conform to the Fire Division Standard for the area. Hose caps shall be chained to the hydrant barrel and fitted with nuts similar to the hydrant operating nuts. Each hydrant shall have a barrel of sufficient length to bring the bottom of the 6" pipe connection 3 feet below the surface of the finished ground. Each hydrant shall have breakaway flanges and be made in at least two sections bolted together. All interior working parts of the hydrant shall be removable from the top of the hydrant to allow repairs without removing the hydrant barrel after it has been installed. Hydrants shall have renewable O-ring stem seals. Hydrant barrels shall be painted Federal Safety Red and White for those connected to potable water, pantone purple 522C for those connected to the reuse system, or as specified by appropriate fire control district. They shall be designed for a working pressure of 150 psi.
- C. Hydrant shall have no drain ports. If ports exist, they shall be plugged with a threaded plug.
- D. Operating stem shall be equipped with anti-friction thrust bearing to reduce operating torque and assure easy opening. Stops shall be provided to limit stem travel. Stem threads shall be enclosed in a permanently sealed lubricant reservoir with O-ring seals.
- E. Hydrants shall be designated for 150 psi working pressure and shop tested to 300 psi pressure with main valve both opened and closed. Under test the valve shall not leak, the automatic drain shall function and there shall be no leakage into the bonnet.
- F. Hydrants shall be of the year's manufacture when construction commenced. All hydrants shall be new and not relocated from another location.
- G. Acceptable models include:

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1. For hydrants connected to the potable water system Mueller Super Centurion 250/HS "High Security" Fire, Kennedy, American Darling, Clow, or approved equal. Contractor shall provide one traffic repair kit for every two hydrants installed.
2. For hydrants connected to the reuse system American Flow Control American Darling 5-1/4" B-84-B-5, or approved equal. Contractor shall provide one traffic repair kit for every two hydrants installed.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Set hydrants plumb and in true alignment with mains. Utilize restrained joints as shown in the City of Naples Standard Details. Carefully backfill around hydrants so as not to disturb the hydrant and thoroughly compact backfill so as to support the hydrant securely. The hydrants shall have 18-inch minimum and 24 inch maximum clearance measured from finish grade to the center of pumper connection. The weight of valves and hydrants shall not be carried by the pipe. The valve or hydrant shall be supported by a concrete cradle as shown on the detail drawings. Concrete for the cradle shall be poured against undisturbed soil. Concrete thrust blocking shall have a minimum compressive strength of 3,000 psi at 28 days.
- B. Hydrants shall be located a minimum of 4 feet from the curb in urban areas, and a minimum of 14 feet from the edge of pavement in rural areas, and in accordance with local Fire Department requirements. A gate valve shall be provided within five (5) feet of the hydrant as shown in the Standard Details.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 02650

LAYING AND JOINTING BURIED PIPELINES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Installation of all underground pipelines. Provide pipeline materials, coatings and linings as specified and pipe of the types, sizes and classes shown or specified. Furnish and install the potable water piping system, complete, tested, and ready for operation. Submit Certificate of Inspection from manufacturer stating materials furnished have been inspected at the place of manufacturer, conform to the requirements of these specifications, and have been tested as specified.
1. Use proper and suitable tools and appliances for the safe and convenient cutting, handling, and laying of pipe and fittings.
 2. Use suitable fittings where shown and at connections or where grade or alignment changes require offsets greater than those recommended and approved.
 3. Lay all underground pipelines not supported on piles or concrete cradle in select fill bedding material.
 4. Close off all lines with bulkheads when pipe laying is not in progress.
- B. Related Work Specified in Other Sections Includes:
1. Section 02222 - Excavation - Earth and Rock
 2. Section 02223 – Backfilling
 3. Section 02530 – Groundwater Control for Open Excavation
 4. Section 02620 – High Density Polyethylene (HDPE) Pipe and Fittings
 5. Section 02622 – Polyvinyl Chloride (PVC) Pipe and Fittings
 6. Section 02630 – Ductile Iron Pipe (DIP) and Fittings
 7. Section 02676 - Leakage Tests
 8. Section 02675 - Disinfection

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1.2 REFERENCES

A. Codes and standards referred to in this Section are:

1. ASTM D 2774 - Practice for Underground Installation of Thermoplastic Pressure Piping
2. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances
3. ASTM A 307 - Specification for Carbon Steel Bolts and Studs, 60000 psi Tensile
4. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, C25, 125, 250, 800
5. ASME B16.21 - Nonmetallic Flat Gaskets for Pipe Flanges
6. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
7. AWWA C115/A21.15 - Flanged Ductile-Iron Pipe With Threaded Flanges
8. Uni-Bell - Handbook of PVC Pipe

1.3 DELIVERY, STORAGE AND HANDLING

- A. General: Deliver, store and handle all products and materials as specified in Division 1 and as follows:
- B. Transportation and Delivery: Take every precaution to prevent injury to the pipe during transportation and delivery to the site.
- C. Loading and Unloading: Take extreme care in loading and unloading the pipe and fittings.
 1. Work slowly with skids or suitable power equipment, and keep pipe under perfect control at all times.
 2. Under no condition is the pipe to be dropped, bumped, dragged, pushed, or moved in any way that will cause damage to the pipe or coating. Pipe shall not be skidded or rolled against pipe already on the ground.
- D. Sling: When handling the pipe with a crane, use a suitable sling around the pipe.
 1. Under no condition pass the sling through the pipe. Interior of pipe is to be kept free of dirt and foreign matter at all times.

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2. Use a nylon canvas type sling or other material designed to prevent damage to the pipe and coating.
 3. When handling reinforced concrete pipe or uncoated steel or ductile iron pipe, steel cables, chain or like slings are acceptable.
- E. Damaged Piping: If in the process of transportation, handling, or laying, any pipe or fitting is damaged, replace or repair such pipe or pipes. All cracked, damaged, or defective pipe, and indentation of more than 10 percent of the wall thickness in depth, shall be rejected and removed at once from the work and replaced with new acceptable pipe at no cost to the City.
- F. Blocking and Stakes: Provide suitable blocking and stakes installed to prevent pipe from rolling.
1. Obtain approval for the type of blocking and stakes, and the method of installation.
- G. Storage for Pipes and Gaskets: When long-term (more than one week) storage with exposure to direct sunlight is unavoidable, pipe should be covered with an opaque material while permitting adequate air circulation above and around the pipe as required to prevent excessive heat accumulation (Uni-Bell PVC Handbook). Pipe shall not be stored close to heat sources or hot objects such as heaters, fires, boilers, or engine exhaust. Store gaskets for pipe joints in a cool place and protect gaskets from light, sunlight, heat, oil, grease, or ozone until installed. Store gaskets in a sealed container (such as a vented drum).
1. Do not use any gaskets showing signs of cracking, weathering or other deterioration.
 2. Do not use gasket material stored in excess of six months without approval.

1.4 FIELD CONDITIONS

- A. Repair of Sanitary Sewers and Services: Rebed, in compacted select fill material, sanitary sewers which cross over the new pipe or which cross under the new pipe with less than 12 inches clear vertical separation. Compact the bedding to densities required for new pipeline construction and extend bedding below the sewer to undisturbed earth. Reconstruct sewers damaged by pipeline construction.
1. Furnish and install all materials and do all work necessary for the reconstruction or repairs of sanitary sewers and services.
 2. Provide pipe for reconstruction of sanitary sewers and services meeting the appropriate specification requirements.
 3. Provide pipe of the same size as the existing sewer or when the same size is not available, use the next larger size of pipe. Obtain approval of joints made between new pipe and existing pipe.

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PART 2 PRODUCTS

- A. The materials allowed for buried sewer pipes are PVC, HDPE or Ductile Iron Pipe.

PART 3 EXECUTION

3.1 PREPARATION

- A. Dry Trench Bottoms: Lay pipe only in dry trenches having a stable bottom.
 - 1. Where groundwater is encountered, make every effort to obtain a dry trench bottom in accordance with Section 02530.
 - 2. Perform trench excavation and backfill in accordance with Sections 02222 and 02223.

3.2 INSTALLATION

- A. General: Install all piping in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1. Where pipe deflections are used, use any of the following guidelines: for deflections, do not exceed 80 percent of the maximum deflection limits shown in AWWA C600, or use the deflections shown in the tables below, or deflect not more than 80% of the pipe manufacturer's recommendations. Gravity systems will contain no deflection. For restrained lengths, see Typical Conflict Crossings Detail Drawing – for fittings not included in detail drawing, refer to Collier County Detail Drawing G-10. For thrust blocks, each fitting and pipe shall be wrapped with 8 millimeter thick polyethylene prior to pouring concrete, so that no concrete comes in direct contact with the surface of the fitting or pipe; concrete shall cure a minimum of 7 days prior to placing the line under pressure.
 - 1. Arrange miscellaneous pipelines, which are shown in diagram form on the Plans, clear of other pipelines and equipment.
- B. Code Requirements: Provide pipeline installations complying with AWWA C600 for iron pipe, AWWA Manual M11 for steel pipe, ASTM D 2774 for thermoplastic pressure piping, and as modified or supplemented by the Specifications.
- C. Pipe Laying - General:
 - 1. Thoroughly inspect all pipe for damage (including the gasket, pipe spigot bevel, gasket groove, and sealing surfaces) and cleanliness. If found to be defective, tag, remove and replace pipe with satisfactory pipe or fittings at no additional charge to CITY. Clean the interior of the bell, gasket, and spigot of the pipe to be jointed with a rag to remove any dirt or foreign material before assembling.
 - 2. In preparation for pipe installation, placement (stringing) of pipe should be as close to the trench as practical on the opposite side of the trench from

the excavated material. The bell ends of the pipe should point in the direction of the work in progress.

3. Generally, lay all pipe with bells pointing ahead.
4. Carefully place all pipe, pipe fittings, valves and hydrants into trench by means of a derrick, ropes or other suitable tools or equipment in such a manner as to prevent damage and check for alignment and grade.
5. Make adjustments to bring pipe to line and grade by scraping away or filling in select fill material under the body of the pipe.
6. Wedging or blocking up the pipe barrel is not permitted.
7. Bring the faces of the spigot ends and the bells of pipes into fair contact and firmly and completely shove the pipe home.
8. As the work progresses, clean the interior of pipelines of all dirt and superfluous materials of every description. If necessary, a heavy, tightly woven canvas bag of suitable size shall be placed over each end of the pipe before lowering into the trench and left there until the connection is made to the adjacent pipe.
9. Keep all lines absolutely clean during construction. Prevent contaminating materials from entering the water main during storage, construction, or repair.
10. Lay pipelines accurately to line and grade.
11. During suspension of work for any reason at any time, even for a lunch break, a suitable watertight stopper or plug shall be placed in the end of the pipe last laid to prevent mud or other material from entering the pipe. Also, the pipe shall be secured to prevent it from being dislodged.
12. All valves and fittings on the customer side of any fire line past the backflow preventer, and all valves and fittings within 50' (fifty feet) of a saltwater or estuary body of water, shall be field coated with Koppers Bitumastic No. 300-M or Amercoat No. 78, or Engineer of Record approved equal product, prior to backfilling; coat all exterior surfaces and all uncoated nuts, bolts, glands, rods, and other parts of joints.

D. Pipe Laying - Trenches:

1. Carefully lay all pipelines in trench excavations piece by piece using suitable tools or equipment on select fill bedding (refer to City of Naples Utilities Standard Specifications and Details), concrete cradle, or other foundations as shown, specified, or ordered in writing. Give the pipe a firm bearing along its entire length. Any pipe which has its grade or joint disturbed after laying shall be taken up and relaid. Prevent damage to materials, protective

coatings and linings. The backhoe method of assembly may be used to assemble pipe of intermediate and larger sizes. The plain end of the pipe should be carefully guided by hand into the bell of the previously assembled pipe. The bucket of the backhoe may then be used to push the pipe until fully seated via a pipe sling only. Direct contact between the backhoe bucket and pipe shall not be permitted. The pipe can also be pushed into the bell using a bar and block. If undue resistance to insertion of the spigot end is encountered or if the reference mark does not reach the flush position, disassemble the joint and check the position of the gasket. If the gasket is twisted or pushed out of its seat, inspect the components, repair, or replace damaged items, clean the components, and repeat the assembly steps. Be sure the pipe is in proper alignment during assembly. If the gasket was not out of position, check the distance between the spigot end and the reference mark and relocate the mark if it is out of position.

2. Do not dump or drop pipe or pipe materials into trench.
3. Properly secure the pipe against movement and make the pipe joints in the excavation as required.
4. Carefully grade and compact pipe bedding.
5. Bell Holes:
 - a. Cut out bell holes for each joint as required to permit the joint to be properly made and allow the barrel of the pipe to have full bearing throughout its length.
 - b. Thoroughly tamp bell holes full of select fill material following the making of each joint to provide adequate support to the pipe throughout its entire length.
6. Curved Alignment: In special cases where curved alignment is required on pressure lines, the deflection of alignment at a joint shall not exceed the appropriate permissible deflection as specified in the following table. These values indicate the maximum permissible deflection for eighteen foot (18') lengths as noted. Gravity systems shall contain no deflections. Any deflection greater than the allowable deflection shall be made with appropriate fittings.

TABLE 1

Pipe Deflection Allowance – Polyvinyl Chloride (PVC) Pipe
Maximum Permissible Deflection, Inches

<u>Size of Pipe, Inches</u>	<u>Push-On-Joints, Inches</u>
4	23
6	16
8	12
10	9
12	8

TABLE 2

Pipe Deflection Allowances – Ductile Iron (DI) Pipe
Maximum

<u>Size of Pipe</u>	<u>Joint Deflection In Degrees</u>	<u>Deflection in Inches – 18ft. Length</u>
4	5	19
6	5	19
8	5	19
10	5	19
12	5	19
14	4	15
16	4	15
18	3	11
20	3	11
24	3	11
30	3	11
36	3	11
42	3	12*
48	3	12*
54	3	12*

*20 ft. length for 42", 48", and 54" DI pipe

- E. Other Foundations: Install pipelines laid on other types of foundations as specified for such other foundations or as ordered in writing.
- F. Field Cuts of Pipelines: For shorter than standard pipe lengths, make field cuts in a manner producing a cut square and perpendicular to the pipe axis. Remove any sharp, rough edges which otherwise might injure the gasket. Ductile iron pipe may be cut using an abrasive pipe saw, rotary wheel cutter, guillotine pipe saw,

milling wheel saw, or oxyacetylene torch; for push-on joint connections the cut end shall be beveled to prevent gasket damage during joint assembly. PVC pipe shall be cut square with a fine-toothed hand or power saw or other cutter or knife designed for use with plastic pipe; prior to cutting, the pipe shall be marked around its entire circumference or a square-in vise shall be used to ensure the pipe end is cut square; remove burrs by smoothing edges with a knife, file, or sandpaper.; bevel the cut end of the pipe using a pipe beveling tool, wood rasp, or portable sander to prevent damage to the gasket during joint assembly; a factory finished beveled end should be used as a guide to ensure proper beveling angle and correct depth of bevel; round off any sharp edges on the leading edge of the bevel with a knife or file.

G. Procedure for sealing cut ends and repairing field damaged areas of polyethylene lined pipe and fittings is as follows:

1. Remove burrs caused by field cutting of ends or handling damage and smooth out edge of polyethylene lining if made rough by field cutting or handling damage.
2. Remove oil or lubricant used during field cutting operations.
3. Areas of loose lining associated with field cutting operation must be removed and exposed metal cleaned by sanding or scraping. For larger areas, remove loose lining and dirt, then roughen bare pipe surface by scratching or gouging with a small chisel to provide an anchor pattern for the epoxy. It is recommended that the polyethylene lining be stripped back by chiseling, cutting, or scraping about 1 inch (1") to 2 inches (2") into well adhered lined area before patching. This ensures that all areas of undercutting have been removed. Be sure to roughen an overlap of 1 inch (1") to 2 inches (2") of polyethylene lining in area to be epoxy coated. This roughening should be done with a rough grade emery paper (40 grit), rasp, or small chisel. Avoid honing, buffing, or wire brushing since these tend to make surface to be repaired too smooth for good adhesion.
4. With area to be sealed or repaired clean and suitably roughened, apply a thick coat of a two-part coal tar epoxy such as Madewell 1104 or City approved equal. The heavy coat of epoxy must be worked into the scratched surface by brushing. Mixing and application procedure for the epoxy must follow the epoxy manufacturer's instructions.
5. It is important that the entire freshly cut, exposed metal surface of the cut pipe be coated. To ensure proper sealing, overlap at least 1 inch (1") of the roughened polyethylene lining with this two-part epoxy system.

H. Ductile Iron Pipe Mechanical Joints:

1. **Assembly:** In making up mechanical joints, center the spigot in the bell.

- a. With a wire brush just prior to assembly of the joint thoroughly brush 8 inches outside of spigot and inside of bell with which the rubber gasket comes in contact. Remove all oil, grit, tar (other than standard coating) and other foreign matter from joint.
- b. Brush lubricant over the gasket just prior to installation. (Note: There is only one rubber gasket size for each diameter of pipe.)
- c. Press the gasket into place within the bell and move the gland into position, bolts inserted, and the nuts tightened finger tight.
- d. Tighten the nuts with a torque wrench so that the gland is brought up toward the pipe evenly. Torque wrenches shall be set as specified in AWWA C111. Spanner type wrenches not longer than specified in AWWA C111 may be used with the permission of City Manager or designee.
- e. Prime all bolts by dipping with a bituminous coating, except the threads. Coat threads immediately prior to installation of nuts.
- f. Tighten all nuts 180 degrees apart alternately in order to produce equal pressure on all parts of the gland.

2

TABLE F.3

<u>Bolt Size (Inches)</u>	<u>Torque (ft. lbs)</u>
5/8	45 - 60
3/4	75 - 90
1	-100-120
1-1/4	-120-150

3. Remaking of Joints: If effective sealing is not obtained at the maximum torque listed above, disassemble and reassemble the joint after thorough cleaning.

I. Ductile Iron Pipe Rubber Gasket Joints:

1. Assembly: In making up the rubber gasket joint, brush the gasket seat in the socket thoroughly with a wire brush and wipe the gasket with a cloth.
 - a. Place the gasket in the socket with the large round end entering first so that the groove fits over the bead in the seat.
 - b. Apply a thin film of lubricant (AWWA C600) to the inside surface of the gasket that will come in contact with the entering pipe.

- c. Brush the plain end of the pipe to be entered thoroughly with a wire brush and place it in alignment with the bell of the pipe to which it is to be joined.
 - d. Exert sufficient force on the entering pipe so that its plain end is moved past the gasket until it makes contact with the base of the socket to make the joint.
 2. Positioning: Before proceeding with backfilling, feel completely around the joint using a feeler gauge to confirm that the gasket is in its proper position.
 - a. If the gasket can be felt out of position, withdraw the pipe and examine the gasket for cuts or breaks.
 - b. If the gasket has been damaged, replace it with a new one before re-installing the pipe.
 3. Optional Mechanical Joints: Use mechanical joint fittings that meet the requirements of Section 02630 with the rubber gasket joint pipe when specified or when rubber gasket fittings are not available.
- J. Temporary Bulkheads: Provide temporary bulkheads at the ends of sections where adjoining pipelines have not been completed, and in connections built into pipelines where adjoining pipelines or structures have not been completed and are not ready to be connected.
 1. Remove bulkheads encountered in connecting sewers or structures included in this Contract, or in pipelines or structures previously built, when they are no longer needed or when ordered.
- K. Dead-End Lines, Temporary Blow-Off Assemblies, and Thrust Blocks: Dead-end water lines shall be temporarily ended with a blow-off as shown in City Standard Details. After full bore flush, replace with a fire hydrant meeting the requirements of Section 02645. If an automatic flushing valve unit is necessary, it must be approved by the City Manager or designee, and must be in accordance with the automatic flushing valve Detail Drawing; a meter must be installed just before the automatic flushing valve unit between the line size gate valve and the 2" curb stop. Wastewater line dead-ends shall be installed with a terminus thrust block as shown in the Detail Drawings. See Section 02630 page 7 for more information on restraining joints and concrete thrust blocks.
- L. Sleeve Type Couplings: For sleeve type couplings, equally tighten diametrically opposite bolts on the connection so that the gaskets will be brought up evenly all around the pipe.
 1. Torque Wrenches: Do the final tightening with torque wrenches set for the torque recommended by the coupling manufacturer.

M. Concrete Encasement: Concrete encasement shall be constructed in accordance with City Standard Details when:

1. A potable water main crosses at a depth that provides less than 18 inches clear distance from sewer lines. Encase the sewer main unless specifically approved by City Utilities. Encasement shall extend a minimum 10 feet on each side of the point of crossing. Pressure test both pipelines to 150 psi after the concrete has properly cured.
2. A water main running parallel to a sewer line provides less than 10 feet separation from sewer line, in which case City approval will be required. Encase the sewer main unless specifically approved by City Utilities.
3. The ENGINEER has ordered the line encased. **NO POTABLE WATER MAIN SHALL BE ENCASED IN CONCRETE UNLESS SPECIFICALLY AUTHORIZED BY THE CITY MANAGER OR DESIGNEE.**

The points of beginning and ending of pipe encasement shall be not more than 6 inches from a pipe joint to protect the pipe from cracking due to uneven settlement of its foundation or the effects of superimposed live loads.

N. Valve Box Setting: Install valve boxes vertical and concentric with the valve stem. Place a Gate Box Aligner (USA Bluebook Stock #MC-75181) over the valve stem in order to help keep valve box aligned during backfilling.

1. Adjust valve-box to final grade at the time designated by the City Manager or designee.
2. Build a reinforced collar, as shown in the standard details, 18 inches by 18 inches by 6 inches with 2, #4 reinforcing bars around the valve box head in pavement, flush to grade of top of box. Similar collar shall be poured flush with grade and top of unpaved areas.
3. Satisfactorily reset any valve box that is moved from its original position, preventing the operation of the valve.
4. Replace any valve box that has been damaged.

O. Identification:

1. Metallized and Non-Metallized Warning Tape: For PVC and DIP pipe (other than gravity sewer pipe and laterals) to be installed, 3-inch detectable marking tape, of appropriate color and appropriate warning statement, shall be placed along the entire pipe length, with metallized warning tape used for PVC pipe and non-metallized warning tape used for ductile iron pipe. In all cases, marking tape shall be installed two feet (2') below grade or one-half the pipe's bury, whichever is less, during backfill operations (refer to Manual Section 1 – 1.1 and 2.2.1). For wastewater force mains and reclaimed water mains, identification tape shall be installed at two depths: directly on

top of the pipe as well as at the location mentioned above. All PVC pipe, PVC fittings, and identification tape shall be color-coded per the following: blue for potable water, white for raw water, pantone purple for reclaimed water, and green for wastewater. Metallized tape shall be Terra Tape D as manufactured by Reef Industries, Inc., Houston Texas (800)231-6074 and Allen Systems, Inc., Wheaton, IL (800)323-1749 or Engineer of Record approved equal. HDPE pipe installed by horizontal directional drilling will not be required to be marked with metallized warning tape, but shall be marked with two 12 gage copper tracer wires (see Section 02300, 3.5), or Engineer of Record approved wire.

2. Tracer Wire for Locating: Mark with 10 gage copper tracer wire all non-ductile-iron laterals, force mains, gravity mains, water mains, and water service lines. Loop 10 gage tracer wire into all valve boxes and meter boxes.
3. Electronic Markers: Place 3M Magnetic Ball Markers at lateral ends, cleanouts, connections to the gravity system, before and after lift stations, connections to force main, next to valve boxes, in meter boxes, at all fittings and change of direction along water and wastewater pipes, and along water and wastewater pressure pipe intervals no greater than every 100 feet. For service lines, place 3M Magnetic Ball Markers at water service line connection to water main and at intervals no greater than every 100 feet. Place 3M Magnetic Ball Markers 6 inches above pipe, and hand backfilled one foot (1') above ball to prevent damage or movement during subsequent backfilling. Burial depth shall not be less than two feet (2') nor more than six feet (6'). Markers shall be the appropriate Omni Marker Model 161 or 162 as manufactured by 3M Telecom Systems Group or City approved equal. Contractor shall install all tape and marker balls as specified.

P. Separation From Other Pipe Systems:

1. Parallel Water and Sewer or Non-Potable Lines: Sanitary sewer lines, storm sewers or force mains shall be separated from water mains by a minimum clear vertical distance of 18 inches and a horizontal distance of 10 feet. Non-potable, reclaimed or reuse water mains shall be separated from water mains, gravity sewers or force mains by a minimum clear vertical distance of 18 inches and a horizontal distance of 5 feet center to center or 3 feet outside to outside. When this standard cannot be maintained, the sewer or non-potable line shall be concrete encased for a distance of 10 feet each way from the water line and any other conduit, with a minimum vertical clearance of 12 inches being provided at all times. See also Section 1 - Design Criteria, Subsection 1.2.3.
2. Crossing Water and Gravity Sewer or Non-Potable Lines: Water mains crossing over a sewer or non-potable water line shall be (bottom of water main to top of sewer) separated by at least 18 inches unless local conditions or barriers prevent an 18 inch vertical separation. All crossings with vertical clearance less than 18 inches shall be made using sewer or non-potable

pipe thickness Class 200 AWWA C900 PVC pipe for a distance of 10 feet on each side of the crossing. The gravity sewer pipe in these locations shall be backfilled with USCS Class I bedding stone to a height of 6 inches above the crown of the pipe. When water mains cross under a sewer, both mains shall be constructed of C900 Class 200 PVC pipe with joints equivalent to water main standards for a distance of 10 feet on each side of the point of crossing with no intermediate joints. Additionally, a section of water main pipe shall be centered at the point of crossing. See also Section 1 – Design Criteria, Subsection 1.3.

Q. Aerial Crossings:

1. Obtain necessary construction permits for ditch or canal crossings from appropriate authorities. Contractor shall not begin work on any ditch or canal crossing until a copy of the approved permit is received from the Engineer of Record. The work shall be subject to an additional requirement of the governing authority. Pipes spanning elevated pier crossings shall be flanged ductile iron Pressure Class 350 pipe conforming to AWWA C115, C150 & C151. Pipe spanning on piers spaced further apart than normal pipe length of 18 or 20 ft. shall be multiple length pipe with interior flanged joints with a rubber gasket pipe such as Clow "Long-span Pipe", Flanged US Pipe, Flanged American Pipe or City approved equal. Concrete piers shall conform accurately to the bottom 1/3 to 1/2 of the pipe. Piping along walls shall be supported by approved wall brackets with attached pipe rolls or saddles or by wall brackets with adjustable hanger rods. For piping supported from the ceiling, approved rod hangers of a type capable of screw adjustment after erection of the pipeline and with suitable adjustable concrete inserts or beam clamps shall be used. The pipe wall thickness and flanged joints shall be designed to safely span the elevated piers under working pressure without exceeding the allowable stresses and conform to AWWA C150. Limit pipe deflection at center of span with pipe full of water to 1/720 of span length. Provide expansion joints for between above ground and below ground wastewater lines. See also Section Design Criteria, Section 1.1.
2. Flanges shall conform to AWWA C150 and C115. All bolts and nuts used in aerial crossings shall be stainless steel. Gaskets shall be full faced or recessed "O-Ring" type to prevent leaks in pipe under stress in the aerial crossing.
3. Outside surface of all pipe, flanges or spool pieces shall be shop coated with zinc primer, High Build Epoxy protective coat and a finish coat of polyurethane high gloss. Color shall be Federal Safety Blue for potable water mains and Pantone Purple 522 C for non-potable irrigation water mains. Raw water mains shall be painted white and sewer force mains shall be painted green.

4. Install operating valves or other flow regulating devices on each shoreline or at a safe distance from each shoreline to prevent discharge in the event the line is damaged.
5. Install supports for all joints in pipes utilized for aerial crossings and to prevent overturning and settlement. Expansion jointing is specified between above ground and below ground sewers and force mains.
6. Ditch banks and bottoms shall be restored to the original condition or as required by the Permitting agency, whichever is more stringent.

3.3 FIELD QUALITY CONTROL

- A. Whenever water, sewer, or reuse lines are in or across streets, driveways, or paved areas, the Contractor shall be responsible for any trench settlement which occurs within one year from the time of preliminary acceptance. Testing: Test pipelines in accordance with Section 02676.
 1. Test valves in place, as far as practicable, and correct any defects in valves or connections.
 2. Gravity Sewer Lines: Test in accordance with Section 02676
- B. Inspection: Clean, inspect, and examine each piece of pipe and each fitting and special for defects before it is installed.
 1. Cut away any lumps or projections on the face of the spigot end or the shoulder.
 2. Do not use any cracked, broken, or defective pieces in the work.
 3. If any defective piece should be discovered after having been installed, remove and replace this piece with a sound piece in a satisfactory manner at no increase in Contract Amount.

3.4 CLEANING

- A. General: Thoroughly clean all pipe before it is laid and keep it clean until it is accepted in the completed work. If necessary, a heavy, tightly woven canvas bag of suitable size shall be placed over each end of the pipe before lowering into the trench and left there until the connection is made to the adjacent pipe.
- B. Removal of Materials: Exercise special care to avoid leaving bits of wood, dirt, and other foreign particles in the pipe. If any particles are discovered before the final acceptance of the work, remove and clean the pipe.

3.5 DISINFECTION

- A. General: Disinfect all pipelines that are to carry potable water in accordance with Section 02675.

END OF SECTION

SECTION 02675

DISINFECTION

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Disinfection of all pipelines, tanks, structures, conduits and equipment that are to store, handle or carry potable water. Furnish all labor, water, chemicals and equipment, including taps, corporation stops, temporary pumps and other items necessary to perform the Work, except as otherwise specified.

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. AWWA C651 - Disinfecting Water Mains
 - 2. AWWA C652 - Disinfection of Water-Storage Facilities

1.3 QUALITY ASSURANCE

- A. Disinfection Standards: Disinfect in accordance with AWWA C651 for water mains and AWWA C652 for water storage facilities and equipment.
- B. Chlorinated Water Disposal: Dispose of old highly chlorinated water in accordance with applicable regulations.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 FLUSHING

- A. After coordination with the CITY Water Distribution Section, perform all flushes, pigging or swabbing, disinfection and post flushes in the presence of Water department personnel. Fill all water lines with potable water, pig or swab (optional at the discretion of the City or Engineer of Record), and perform a line flushing (full bore flush). All lines larger than 12 inches in diameter shall be pigged to clear debris prior to flushing. Use a swab-type pig for HDPE pipe. Use a 5- to 7-lb. density poly-jacketed bullet style pig for all other pipe material. Under no circumstances is a pig or swab considered reusable. A section of pipe shall be inserted in the gap specified in the jumper shown in the Standard Details to

EXHIBIT A-1

connect the new construction to the existing facilities for the purpose of accomplishing the full-bore flush. Immediately after completion of the flush, remove the connection. The facilities shall be capped and returned to the jumper connection shown in the Standard Details until final connection is permitted by City Manager or designee at the completion of construction and after finalization of all test procedures and bacterial clearance for new water facilities.

3.2 WATER MAIN DISINFECTION

- A. Following acceptable pressure testing, disinfect all sections of the water distribution system and receive approval thereof from the appropriate agencies, prior to placing in service. Provide advance notice of 48 hours to the City Manager or designee before disinfecting procedures start. The disinfection shall be accomplished in accordance with the applicable provisions of AWWA Standard C651, "Disinfecting Water Mains" and all appropriate approval agencies.
- B. The disinfecting agent shall be free chlorine in aqueous solution with sustained concentration for 48 hours of not less than 50 parts per million. After 48 hours, if chlorine solution contains at least 25 parts per million of chlorine, the line may then be flushed and samples taken at various points. Chlorine may be derived from Chlorine gas, or 70% (high test) calcium hypochlorite (HTH or Perchloron, or equal). Administration may be by any of the several methods described in AWWA Standard C651 as proposed by the CONTRACTOR and approved by the ENGINEER. Proposals as to method must be made prior to commencement of the disinfection process.
- C. Following contact with chlorine solution, the system shall be thoroughly flushed out. Schedule water sampling in coordination with the CITY Utilities Department. The CITY Utilities Department will obtain all water samples for analysis.
- D. If samples do not demonstrate satisfactory results, the line shall be flushed and a resample taken. If the samples fail on the second attempt, redisinfection per AWWA standards must be repeated until two satisfactory samples are obtained. The period between samples must be a minimum of 24 hours.
- E. After approval of the samples, and before placing the system in service, perform another flushing of the water lines to remove any stagnant water.

3.3 DISINFECTION PROCEDURES FOR TANKS

- A. Disinfect potable water storage tanks and equipment in accordance with AWWA C652, Method 2 or 3, using sodium hypochlorite.
 1. In Method 2, spray method, spray the entire interior surface of the tank with chlorinated water containing 200 mg/l of available chlorine. After spraying, allow the tank to stand at least two hours before filling with fresh water.
- B. After disinfection, allow the tanks and equipment to overflow until the chlorine residual is approximately 2 mg/l.

3.4 BACTERIAL SAMPLE POINTS

- A. For the purpose of new water main construction, bacterial sampling points shall be positioned at the beginning of each new system, at 1000-foot intervals and all dead ends unless otherwise directed. These sampling points will be utilized by Utilities personnel for water main bacterial clearance procedures. See Section 1 Design Criteria, Section 1.10 for more information. At the completion of the project, when authorization is given by the City Manager or designee, permanent sampling points shall remain every 3000 feet or one at 2/3 of the length from the point of connection to the CITY system if the line is less than 3000 feet long. All others shall be removed down to the main and properly capped by the CONTRACTOR. The permanent sampling points shall be constructed as shown in the Utility Detail Drawings. City staff will review the permanent sampling point locations during final plans review.

- B. Appropriately located fire hydrants will be utilized for sampling points. Under this circumstance, the Contractor will be solely responsible for maintaining the hydrants in a satisfactory environment for conducting the bacterial testing.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 02676

PRESSURE AND LEAKAGE TESTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Testing for any signs of leakage in all pipelines and structures required to be watertight.
 - 1. Test gravity sewers and drain lines by infiltration/exfiltration testing.
 - 2. Test all other pipelines with water under the specified pressures.
- B. Operation of Existing Facilities: Conduct all tests in a manner to minimize as much as possible any interference with the day-to-day operations of existing facilities or other contractors working on the site.

1.2 PERFORMANCE REQUIREMENTS

- A. Written Notification of Testing: Provide written notice when the work is ready for testing, and make the tests as soon thereafter as possible.
 - 1. Personnel for reading meters, gauges, or other measuring devices, will be furnished.
 - 2. Furnish all other labor, equipment, air, water and materials, including meters, gauges, smoke producers, blower, pumps, compressors, fuel, water, bulkheads and accessory equipment.

1.3 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances
 - 2. AWWA C605 - Underground Installation of PVC Pressure Pipe and Fittings for Water

1.4 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Testing Report: Prior to placing the sewer system in service submit for review and approval a detailed report summarizing the leakage test data, describing the test procedure and showing the calculations on which the leakage test data is based.

EXHIBIT A-1

1. Reference Sewer Line Data
 - a. For Low Pressure Testing
 - (1) The length and diameter of the section of line tested (MH to MH), including any laterals.
 - (2) A complete description of the test procedure, including:
 - (a) Trench backfilling and sewer cleaning status
 - (b) Type of plugs used and where
 - (c) Depth of sewer, and ground water pressure over sewer pipe
 - (d) Stabilization time period and air pressure
 - (e) Actual air test pressures used if ground water is present
 - (f) The time allowed by specifications
 - (g) The actual test time
 - (h) The air pressure at beginning and end of test
 - (3) The name of the inspector/tester and the date(s) and time(s) of all testing performed, including any retesting.
 - (4) A description of any repairs made.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 LEAKAGE TESTING

- A. All new sewer and water pipelines installed shall be tested for leakage. The test used will be Hydrostatic Testing for pressure lines and Infiltration/Exfiltration Testing for gravity lines. Tests to be performed will be indicated by the ENGINEER and witnessed by the ENGINEER and the City Manager or designee.

1. Flushing

- a. Flush all mains to remove all sand and other foreign matter. The velocity of the flushing water shall be at least 4 fps. Flushing shall be terminated at the direction of the ENGINEER. Dispose of the flushing water without causing nuisance or property damage.
- b. Install temporary flush out connections on all dead end water mains at the locations shown on plans and in accordance with the Collier City Standard Details.

2. Hydrostatic Testing for DIP and PVC Pipelines:

Perform hydrostatic testing of the system as set forth in the following, and conduct said tests in the presence of the City Manager or designee and other authorized agencies, with 48 hours advance notice provided.

Piping and appurtenances to be tested shall be within sections between valves unless alternate methods have received prior approval from the City Manager or designee. Testing shall not proceed until concrete thrust blocks are in place and cured, or other restraining devices installed. Thoroughly clean and flush all piping prior to testing to clear the lines of all foreign matter. While the piping is being filled with water care shall be exercised to permit the escape of air from extremities of the test section, with additional release cocks provided if required.

Perform hydrostatic testing with a sustained minimum pressure of 150 psi for a period of not less than two (2) hours. If sustained pressure goes 5 psi above or below 150 psi during the first two (2) hours, the test fails (AWWA regulation). After two (2) hours, use the AWWA formula if less than 5 psi to determine whether test fails. Testing shall be in accordance with the applicable provisions as set forth in the most recent edition of AWWA Standards C600 for Ductile Iron Pipe and C605 for PVC Pipe. The allowable rate of leakage shall be less than the number of gallons per hour determined by the following formula:

$$L = \frac{SD (P)^{1/2}}{133,200}$$

Where,

- L = Allowable leakage in gallons per hour;
- S = Length of pipe tested in feet;
- D = Nominal diameter of pipe in inches;
- P = Average test pressure maintained during the leakage test in pounds per square inch

$$\text{For 150 psi, } L = (9.195 \times 10^{-5}) SD$$

The testing procedure shall include the continued application of the specified pressure to the test system, for the one-hour period, by way of a

pump taking supply from a container suitable for measuring water loss. The amount of loss shall be determined by measuring the volume displaced for the said container.

Should the test fail, repair the fault and repeat the test until results are within the established limits. Furnish the necessary labor, water, pumps, and gauges at specified location(s) and all other items required to conduct the required testing and perform necessary repairs. All visible leaks and cracked pipe, fittings, valves, pipe couplings, and the like shall be repaired or replaced regardless of the amount of leakage.

General - All sanitary sewers and associated service lines shall be constructed watertight to prevent infiltration and/or exfiltration. Since all the water and sewage in the lines will be treated at the treatment plant, special care and attention must be given to securing watertight construction. Gravity sewer visual inspections – on completion of each block or section of sewer, or at such other times as the Engineer of Record may direct, the block or section of sewer is to be cleaned, tested, and inspected. Each section of the sewer is to show, on examination from either end, a full circle of light between manholes. Each manhole, or other appurtenance to the system, shall be of the specified size and form, be watertight, neatly and substantially constructed, with the rim set permanently to design position and grade. All repairs shown necessary by the inspection are to be made, with broken or cracked pipe replaced, all deposits removed, and the sewers left true to line and grade, entirely clean and ready for use. See Section 01400 1.5.A.4. for further information on gravity sewer line and manhole testing.

3. Hydrostatic Testing for HDPE Pipelines:

Perform hydrostatic testing of all HDPE pipelines as set forth in the following, and conduct said tests in the presence of the City Manager or designee and other authorized agencies, with 48 hours advance notice provided.

Provide all labor, equipment and material required for testing the pipeline upon completion of installation, pipe laying and backfilling operations, and placement of any required temporary roadway surfacing.

Disinfect all HDPE potable water mains prior to testing in accordance with the requirements of Section 02675 – Disinfection.

Test pipelines at 150 psi.

Field test all HDPE pipelines for leakage in accordance with manufacturer's recommendations for the size and class of pipeline installed. Unless other procedures recommended by the manufacturer are approved by the City Manager or designee, pressure test the pipeline as follows:

EXHIBIT A-1

- a. Fill pipeline slowly with water. Maintain flow velocity less than two (2) feet per second.
- b. Expel air completely from the line during filling and again before applying test pressure. Expel air by means of taps at points of highest elevation. Following completion of the testing, the taps shall be tightly plugged unless otherwise specified.
- c. Apply initial test pressure and allow to stand without makeup pressure for two (2) to three (3) hours, to allow for diametric expansion or pipe stretching to stabilize.
- d. After this equilibrium period, apply the specified test pressure and turn the pump off. The final test pressure shall be held for not less than two (2) hours.
- e. Upon completion of the test, the pressure shall be bled off from the location other than the point where the pressure is monitored. The pressure drop shall be witnessed by the City Manager or designee at the point where the pressure is being monitored.

Allowable amount of makeup water for expansion of the pipeline during the pressure test shall conform to Table III, Test Phase Make-up Amount, contained in the manual "Inspections, Test and Safety Considerations" published by the Plastics Pipe Institute, Inc.

If any test of pipeline installed exceeds the amount of makeup water as allowed above, locate and repair the cause of leakage and retest the pipeline, without additional cost to the CITY. Repair all visible leaks regardless of the amount of leakage.

- 4. Force Main Pressure Testing: All force mains shall be subject to pressure testing at the following standards:

<u>System Operating Pressure</u>	<u>Test pressure</u>	<u>Duration</u>
50 PSI or less	100 PSI	2 hours
Greater than 50 PSI	150 PSI or 2 times the operating pressure, whichever is greater.	2 hours

Allowable leakage on force mains shall be computed utilizing the standards for water loss in conformance with AWWA C600, the latest revision thereof. Following the hydrostatic and leakage tests, all wastewater force mains constructed under this contract shall be flushed to remove sand, loose dirt, and other debris. Flushing velocity shall be a minimum of 2.5 fps. Flushing shall continue until clean water flows from the force main; however, the

Contractor shall endeavor to use the minimum amount of flushing water required to complete the work. Absolutely no direct connections shall be permitted to a potable water system for the purpose of obtaining flushing water for wastewater force mains; the potable water supply shall be protected with an air gap or reduced pressure principle backflow prevention assembly approved by the Department. Temporary blowoffs may be required for the purpose of flushing the force main. The Department shall be notified at least 72 hours prior to flushing wastewater force mains. Blowoffs and drainage piping used for flushing shall not be discharged to any wastewater gravity sewer or pumping station wet well.

5. Infiltration/Exfiltration Testing for Gravity Lines

The allowable limits of infiltration or exfiltration for the entire system, or any portion thereof, shall not exceed a rate of 50 gallons per inch of inside pipe diameter per mile of pipe per 24 hours. No additional allowance shall be made for house service lines. Any part of or all of the system shall be tested for infiltration or exfiltration, as directed by the ENGINEER or as required by the City Manager or designee. The procedures and limitations for conducting infiltration/exfiltration tests shall be established at the pre-construction conference on a project-by-project basis. Air testing of gravity sewer mains may be required. All testing shall be run continuously for 24 hours, unless the City Inspector can visually verify that this test duration is not required due to the observed infiltration/exfiltration rate. The amounts of infiltration or exfiltration shall be determined by pumping water into or out of calibrated drums, or by other methods approved by the Public Works Division, such as in-line V-notch weirs. Where infiltration or exfiltration exceeds the allowable limits specified herein, locate and repair the defective pipe, joints or other faulty construction at no additional cost to the CITY. If the defective portions cannot be located, remove and reconstruct as much of the work as is necessary in order to conform to the specified allowable limits. All visible leaks shall be repaired regardless of the amount of leakage. Provide all labor, equipment and materials required and conduct all testing required under the direction of the ENGINEER.

- a. Infiltration: Prior to testing for infiltration, the system shall be pumped out so that normal infiltration conditions exist at the time of testing. The cumulative results of the entire collection system results shall not be a satisfactory method for gauging infiltration compliance. Each sewer section between manholes must permit infiltration no greater than the maximum allowable, as specified above.
- b. Exfiltration: The exfiltration test, when required due to groundwater levels, will be conducted by filling the portion of the system being tested with water to a level 2 feet above the top of the pipe being tested or 2 feet above the existing groundwater in the trench, whichever is higher.. Plugs shall be used to close the upstream and downstream manhole inlets. The cumulative results of the entire collection system results shall not be a satisfactory method for gauging

exfiltration compliance. Each sewer section between manholes must permit exfiltration no greater than the maximum allowable, as specified above. Exfiltration shall be measured by determining the amount of water required to maintain the initial water elevation for the one (1) hour period from the start of the test. The maximum allowable leakage, including manholes, shall be 50 gallons per inch of inside pipe diameter per mile of pipe per day.

6. Low Pressure Air Testing

Contractor shall conduct air testing in accordance with ASTM specifications:

- a. ASTM C-828 – for clay pipes.
- b. ASTM C-924 – for concrete pipes.
- c. ASTM F-1417 – for plastic pipes.

When low pressure air testing of gravity sewer mains is specifically required, or if in the opinion of the Engineer of Record, conditions are such that infiltration measurements may be inconclusive. all testing shall be run continuously for 24 hours, unless the City Inspector can visually verify that this test duration is not required due to the observed infiltration/exfiltration rate.

When air testing is specifically required, after completing backfill of a section of gravity sewer line, conduct a Line Acceptance Test using low pressure air. The test shall be performed using the below stated equipment, according to state procedures and under the supervision of the ENGINEER and in the presence of the City Manager or designee, with 48 hours advance notice.

d. Equipment:

- (1) Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.
- (2) Pneumatic plugs shall resist internal bracing or blocking.
- (3) All air used shall pass through a single control panel.
- (4) Three individual hoses shall be used for the following connections:
 - (a) From control panel to pneumatic plugs for inflation.
 - (b) From control panel to sealed line for introducing the low-pressure air.

- (c) From sealed line to control panel for continually monitoring the air pressure rise in the sealed line.

e. Procedure:

All pneumatic plugs shall be seal tested before being used in the actual test installation. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. Air shall be introduced into the plugs to 25 psi. The sealed pipe shall be pressurized to 5 psi. The plugs shall hold against this pressure without bracing and without movement of the plugs out of the pipe.

After a manhole-to-manhole reach of pipe has been backfilled and cleaned and the pneumatic plugs are checked by the above procedure, the plugs shall be placed in the line at each manhole and inflated to 25 psi. Low-pressure air shall be introduced into this sealed line until the internal air pressure reaches 4 psi greater than the average back pressure of any ground water that may be over the pipe. At least two (2) minutes shall be allowed for the air pressure to stabilize. After the stabilization period (3.5 psi minimum pressure in the pipe), the air hose from the control panel to the air supply shall be disconnected. The portion of the line being tested shall be termed "Acceptable", if the time required in minutes for the pressure to decrease from 3.5 to 2.5 psi (greater than the average back pressure of any ground water that may be over the pipe) is greater than the time shown for the given diameters in the following table:

EXHIBIT A-1

<u>Pipe Diameter In Inches</u>	<u>Minutes</u>
8	4.0
10	5.0
12	5.5
16	7.5
18	8.5
24	11.5

Time in Minutes = 0.472 D

D = Diameter of pipe in inches

In areas where ground water is known to exist, install capped pipe adjacent to the top of the sewer lines. This shall be done at the time of the sewer line is installed. Immediately prior to the performance of the Line Acceptance Test, the ground water shall be determined by removing the pipe cap, and a measurement of the height in feet of water over the invert of the pipe shall be taken. The height in feet shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings. (For example, if the height of water is 11-1/2 feet, then the added pressure will be 5 psi. This increases the 3.5 psi to 8.5 psi, and the 2.5 psi to 7.5 psi. The allowable drop of one pound and the timing remain the same).

If the installation fails to meet this requirement, determine the source of the leakage and repair or replace all defective materials and/or workmanship, all at no additional cost to the CITY.

3.2 LEAKAGE TESTS FOR STRUCTURES

- A. Structure Leakage Testing: Perform leakage tests of manholes, wet wells, tanks, vaults and similar purpose structures before backfilling, by filling the structure with water to the overflow water level and observing the water surface level for the following 24 hours.
1. Make an inspection for leakage of the exterior surface of the structure, especially in areas around construction joints.
 2. If visible leaks appear, repair the structure by removing and replacing the leaking portions of the structure, waterproofing the inside, or by other methods approved.
 3. Water for testing will be provided by the CITY at the CONTRACTOR's expense.

END OF SECTION

SECTION 02999

RESTORATION AND MISCELLANEOUS WORK AND CLEANUP

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. This Section includes operations that cannot be specified in detail as separate items but can be sufficiently described as to the kind and extent of work involved. Furnish all labor, materials, equipment and incidentals to complete the work under this Section.
- B. The work of this Section includes, but is not limited to, the following:
 - 1. Restoring of sidewalks, driveways, curbing and gutters.
 - 2. Crossing utilities.
 - 3. Relocation of existing water lines, low pressure, gas lines, telephone lines, electric lines, cable TV lines and storm drains as necessary, all as shown on the drawings.
 - 4. Restoring easements and rights-of-ways.
 - 5. Cleaning up.
 - 6. Incidental work.

1.2 WORK SPECIFIED UNDER OTHER SECTIONS

- A. Complete all work in a workmanlike manner by competent workmen in full compliance with all applicable sections of these Specifications.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Materials required for this Section shall be of at least the same type and quality as materials that are to be restored. Where possible, reuse existing materials that are removed and then replaced, with the exception of paving.

PART 3 EXECUTION

3.1 RESTORING OF CURBING, FENCES, AND GUARD RAILS

- A. Protect existing curbing. If necessary, remove curbing from joint to joint and replace after backfilling. Replace curbing that is damaged during construction with curbing of equal quality and dimension.

3.2 CROSSING UTILITIES

- A. This item shall include any extra work required in crossing culverts, water courses, drains, water mains, and other utilities, including all sheeting and bracing, extra excavation and backfill, or any other work required for the crossing, whether or not shown on the drawings.

3.3 RELOCATIONS OR REPLACEMENT OF EXISTING GAS LINES, TELEPHONE LINES, ELECTRIC LINES, CABLE TV LINES AND DRAINAGE CULVERT

- A. Notify the proper authority of the utility involved when relocation or replacement of these lines is required. Coordinate all work by the utility so that the progress of construction will not be hampered.
- B. Reference all side drains, side ditches, swales, and storm sewers as to grade and location prior to construction, maintain them during construction, and repair them as necessary after construction. Where drainage structures are disturbed and must be replaced, the minimum size replacement shall be twelve inches (12"). All drainage culverts installed shall have mitered ends in conformance with the City Standard Details. Place the culvert to the specified elevations and regrade or reshape the swale and road shoulders that have been disturbed or damaged during construction.

3.4 PROTECTION AND RESTORATION OF PROPERTY

- A. Protection and Restoration of Property: During the course of construction, take special care and provide adequate protection in order to minimize damage to vegetation, surfaced areas, fences, and structures within the construction right-of-way, easement or site, and take full responsibility for the replacement or repair thereof. Immediately repair any damage to private property created by encroachment thereon. Should the removal or trimming of valuable trees, shrubs, or grass be required to facilitate the installation within the designated construction area, this work shall be done in cooperation with the City and/or local communities which the work takes place. Said valuable vegetation, removed or damaged, shall be replanted, if possible, or replaced by items of equal quality, and maintained until growth is re-established. Tree limbs which interfere with equipment operation and are approved for pruning shall be neatly trimmed and the tree cut coated with a tree paint. Topsoil damaged in the course of work shall be replaced in kind with suitable material, graded to match existing grade. Following construction completion, the work area along the route of the installation shall be finish grade to elevations compatible with the adjacent surface, with grassing or hand raking required within developed areas.

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- B. Existing lawn surfaces damaged by construction shall be re-graded and re-sodded or re-seeded. These areas shall be maintained until all work under this Contract has been completed and accepted.

3.5 CLEANING UP

- A. Remove all construction material, excess excavation, buildings, equipment and other debris remaining on the job as a result of construction operations and shall render the site of the work in a neat and orderly condition.
- B. Work site clean-up shall follow construction operations without delay and in accordance with Section 01710.

3.6 INCIDENTAL WORK

- A. Do all incidental work not otherwise specified, but obviously necessary for the proper completion of the Contract as specified and as shown on the drawings.

END OF SECTION

SECTION 15100

WATER VALVES AND APPURTENANCES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required and install complete and ready for operation all valves and appurtenances as shown on the Drawings and as specified herein.

1.2 REFERENCES

- A. Codes, specifications, and standards referred to by number or title form a part of this Section to the extent required by the references to codes, specifications, and standards. Latest revisions, as of the date of bid opening, apply, unless otherwise noted on the Drawings or specified in this Section.

B. Standards

<u>Designation</u>	<u>Title</u>
ANSI/AWWA C110	Standard for Ductile Iron and Gray Iron Fittings
ANSI/AWWA C111/A21.11	Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
ANSI/AWWA C500	Metal-Seated Gate Valves for Water Supply Service 3"-48", 200 psi working pressure 3"-12" size
ANSI/AWWA C509	Resilient-Seated Gate Valves 3" through 30" NPS, for Water and Sewage Systems, 200 psi working pressure 3"-12"
ANSI/AWWA C512	Air Release, Air/Vacuum, and Combination Air Valves for Waterworks Service
ANSI/AWWA C515	Reduced-Wall Resilient-Seated Gate Valves for Water Supply Service 3"-48", 200 psi working pressure for all sizes
ANSI/AWWA C800	Underground Service Line Valves and Fittings, ½"-2"
ANSI/B16.1	Cast/ductile Iron Pipe Flanges and Flanged Fittings, Class 125
ANSI/B16.3	Malleable Iron Threaded Fittings, Class 150 and 300

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ANSI/B16.5	Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and Other Special Alloys
ASTM A276	Specification for Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A231	Specification for Steel Casting, Austenitic, for High-Temperature Service
ASTM A743	Specification for Castings, Iron-Chromium, Iron-Chromium-Nickel, and Nickel-Base Corrosion-Resistant for General Application
MSS SP-60	Connecting Flange Joint Between Tapping Sleeves and Tapping Valves

1.3 DEFINITIONS

- A. References to valve sizes on the Drawings and in the Specifications are intended to be nominal size, and shall be interpreted as nominal size.

1.4 SUBMITTALS

- A. General: as specified in:
 - 1. General Conditions;
 - 2. Supplementary General Conditions;

1.5 QUALITY ASSURANCE

- A. Testing: Test valves as specified in this Section.

PART 2 PRODUCTS

2.1 GENERAL:

- A. All valves and appurtenances shall be of the size shown on the Drawings and as far as possible all equipment of the same type shall be from one manufacturer.
- B. All valves and appurtenances shall have the name of the maker and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body.

2.2 MANUFACTURERS

- A. Manufacturers for gate valves shall be U.S. Pipe, AVK, Clow, American Darling, Kennedy, Mueller, Tyler, or Ford .

2.3 DESIGN

A. Resilient-Seated Wedge or Gate Valves

1. Valves for pipe 2 inches (2") in diameter and smaller shall conform to the requirements of AWWA C800, C509 or C515 (latest revisions), and gate valves shall be cast/ductile iron, single wedge, non-rising stem, screwed bonnet, 125 pounds S.P., 200 pounds W.O.G with stuffing box repackable under pressure and all parts renewable. Ends shall be as shown or indicated on the drawings. Air release line valves, bacterial sampling station line valves and curb stops shall be Mueller or Ford. Corporation stops shall be Mueller, or Ford Brass Ball Valves. Valves shall open by turning to the left (counter-clockwise), when viewed from the stem.
2. Resilient-seated wedge, or gate valves larger than 2 inches (2") in diameter shall have a cast/ductile iron body, non-rising stem, and be bronze mounted gate valves, mechanical joint conforming to requirements of the AWWA Standard C509 or C515 and shall be provided with a 2 inch square operating nut with the word "open" and an arrow cast in the metal to indicate direction. Valves shall open by turning to the left (counter-clockwise), when viewed from the stem. Valves shall be resilient-seated wedge gate type and shall turn to the left (counter clockwise) to open. The wedge or gate shall be cast/ductile iron per ASTM A536, minimum 65,000-psi strength and, completely encapsulated with urethane rubber, permanently bonded to the wedge or gate to meet ASTM test for rubber metal bond, ASTM D429. The valve stems for non-rising stem assemblies shall be cast bronze with integral collars in full compliance with AWWA. OS & Y stems shall be on bronze bar stock. The NRS stem stuffing box shall be the O-ring seal type with two rings located above thrust collar; the two rings shall be replaceable with valve fully open and subjected to full rated working pressure. The minimum safe working pressure shall be 200 psi.
3. There shall be two low torque thrust bearings located above and below the stem collar. The stem nut shall be independent of wedge and shall be made of solid bronze. There shall be a smooth unobstructed waterway free of all pockets, cavities and depressions in the seat area. The body and bonnet shall be coated with fusion-bonded epoxy both interior and exterior. For aboveground service, the exterior ferrous parts of all valves shall be coated as follows: 1) prior to shipment from the factory, valves shall be shop painted with one coat, 1.5 mils dry film thickness, of a combination lead and chromate primer with rust-inhibitive pigments and synthetic resins; 2) following installation in the field, valves shall be painted with one coat, 1.5 mils dry film thickness, of a combination lead and chromate primer with rust-inhibitive pigments and synthetic resins; valves shall be finish painted with two coats, 1.4 mils dry film thickness each coat, of a medium to long oil alkyd resin coating; the color of the finish coats shall be in accordance with the piping color code in the painting schedule. Each valve, aboveground or below ground, shall have the manufacturers name, pressure rating and year manufactured cast on body. The valve shall be designed and tested to be

opened and closed under a hydrostatic pressure of at least twice the specified working pressure.

B. Valves for Buried Service and Valve Boxes

1. Valves for buried service shall meet all the requirements as specified herein for interior except that buried valves shall have mechanical joint ends. Place a Gate Box Aligner (valve box aligner) (order through USA Bluebook Stock #MC-75181) over the valve stem in order to help keep valve box aligned during backfilling. Extension stems shall be provided on all buried valves when operating nut is deeper than 4 feet below final grade.
2. All buried valves shall have cast/ductile-iron three-piece valve boxes, valve boxes shall be provided with suitable heavy bonnets to extend to such elevation at the finished grade surface as directed by the ENGINEER. The top section shall be set to allow equal movement above and below finished grade. The barrel shall be two-piece, screw type. The upper section shall have a flange at the bottom having sufficient bearing area to prevent settling, shall be designed so as to prevent the transmission of surface loads directly to the valve or piping, and shall be complete with cast/ductile iron covers. Covers shall have "WATER" cast into the top. The covers shall be so constructed as to prevent tipping, rocking, or rattling. The valve boxes shall be coated inside and outside with an asphaltic coating prior to machining, so that the machined seating surfaces will be free of any coating. All valve boxes located in major paved roadways shall have locking covers. Valve boxes shall be Dewey Brothers VBX-TE 100 (6-5/16 inch cover), Tyler/Union Model 461, Clow Corp. F-2450, or Engineer of Record approved equal.
3. Where valves are located out of pavement, the boxes shall be adjusted to finished grade with a concrete collar as shown in the Details.
4. Valve boxes shall be of the heavy duty, traffic bearing cast/ductile iron, adjustable screw type with a drop cover. The valve box assembly shall consist of a bottom section, top section and cover which is cast from gray iron, formulated to ASTM specification A-48 latest revision, minimum tensile of 21,000 psi and shall be free from blowholes, shrinkage or other imperfections not true to pattern. The shaft size shall be 5 1/4" and the adjustable length shall be from 18" to 36". The wall thickness shall be 1/4". The weight of the assembly shall be 61 pounds \pm 2 pounds, with the cover weight being a minimum of 13 pounds.
5. The name of the manufacturer and foundry of origin shall be cast into each of the components of the assembly in legible form. The assembly shall be suitable for highway traffic wheel loads of 16,000 pounds and shall withstand a proof load test of 25,000 pounds without failure or permanent deflection.

6. Valve box cover shall be painted Federal Safety blue for “water,” white for “raw water,” and purple for “reclaimed water.” See Detail Drawing for word to cast into cover (eg. “Water” for potable water mains).

C. Check Valves (Sewer/Water/Reuse)

1. All swing check valve bodies shall be Val-Matic Series 500 with back flow activator or APCO Series 100 rubber flapper swing checks.
2. Valve exterior to be painted with Red Oxide Phenolic Primer. Materials shall be certified to the following ASTM specifications:

Body, cover, disc	Ductile Iron or approved shop drawing	ASTM A126, Class B
Disc	Buna-N (NBR)	ASTM D2000 – BG
Disc Seat	Buna-N or metal	
Cushion cylinder	Corrosion-resistant material	Commercial

3. Swing check valves shall have a shaft of single and continuous stainless steel, extending both sides of the body with a lever and weight. The air cushion cylinder, when specifically required, shall be constructed of corrosion resistant material and the piston shall be totally enclosed within the cylinder and not open at one end. The air cushion cylinder assembly shall be externally attached to either or both sides of the valve body and shall permit adjustability to cushion the closure of the valve. Cushioning shall be by air trapped in the cushion cylinder, which shall be fitted with a one-way adjustable control check valve to cushion disc contact to the seat at the shut-off point. The bottom cylinder head shall be swivel mounted and not rigid to follow the change of force angles as the lever raises or lowers to open or close the check valve. Valve shall prevent backflow on normal pump shut off or power failure, at zero velocity and be watertight. The disc shall be cast/ductile iron utilizing a double clevice hinge connected to a ductile iron disc arm. The disc arm assembly shall be suspended from a stainless steel shaft, which passes through a seal retainer on both sides of the valve body.
4. Rubber flapper swing valves shall have a heavily constructed cast/ductile iron body and cover. The body shall be long pattern design (not wafer) with integrally cast-on end flanges. The flapper shall be Buna-N having an O-ring seating edge and be internally reinforced with steel. Flapper shall be captured between the body and the body cover in a manner to permit the flapper to flex from closed to full open position. Flapper shall be easily removed without the need to remove the valve from line. The check valves shall have full pipe size flow area. Seating surface to be on a 45° angle requiring the flapper to travel only 35° from closed to full open position for minimum head loss. Valve has non-slam closure characteristics. Flapper shall create an elastic spring effect to assist the flapper to close against a slight head to prevent or minimize slamming. Valve shall be designed for

175 psi working pressure for water. The valve shall be suitable for buried service, in which case, stainless cover bolts shall be furnished.

5. Valve exterior to be painted with Red Oxide Phenolic Primer Paint as accepted by the FDA for use in contact with Potable Water.

D. Backflow Prevention Devices

1. Backflow prevention devices shall be reduced pressure principle assemblies or double check assemblies and shall be USC approved, and shall meet all requirements of County Ordinance 97-33. Refer to Detail Drawings.

E. Air Release Valves

1. Air Release Valves shall be Val-Matic Model 100-200 or Engineer of Record approved equal.
2. Air Release Valves shall be float operated and both the air/vacuum and air release functions shall be performed by a combination valve housed in a single body.
3. The valve shall automatically exhaust large quantities of air during the filling of the pipeline. The valve shall be capable of venting air up to sonic velocity without blowing shut, closing only after all the air has been vented. The air release port shall automatically release small pockets of air from the pipeline while the pipeline is in operation and under pressure, to keep the system free of accumulated air. The valve shall automatically open to allow air to re-enter during draining or whenever a negative pressure occurs.
4. Combination air valves shall be of the size shown on the plans and conform to the requirements of AWWA C512 and be of the "kinetic" design capable of exhausting air at up to sonic velocity without blowing shut.
5. The air release valve shall have a maximum working pressure of 300 psi, unless otherwise indicated on the drawings, and shall have been tested at a pressure not less than 300 psi.
6. Body, cover, and baffle shall be ASTM A126 Class B cast/ductile iron with stainless steel floats and replaceable seats of Buna-N or other suitable material. Plastic or bronze components are not acceptable. Screens shall be installed on the opening of all air release valves.
7. Valves 3-inch size and smaller shall have a threaded inlet connection, and valves over 3 inches shall have a flanged inlet faced and drilled per ANSIB16.1 Class 250. Valves shall have a threaded outlet on valves to 4 inch size and a protective cowl on larger sizes. Connections from corporation stops to air release valves shall be brass for rigidity.
8. Air release valves shall be Val-Matic Series 100-200 or Engineer of Record approved equal.

9. One-inch (1") NPT inlet and outlet shall be provided, unless otherwise specified on the drawings.

F. Tapping Valves and Sleeves

1. All tapping sleeve assemblies (for 3" or larger service lines) shall meet the requirements of AWWA Standards C110, latest revision. Cast/ductile iron tapping sleeves or stainless steel wrap-around sleeves, and cast/ductile iron valves shall be used to make live taps into the existing water mains where shown on the drawings. Sleeve bodies must be of stainless steel. The flanges must conform to AWWA C207 Class D ANSI 150# drilling. All bolts and nuts shall be as specified. Tapping sleeves shall be as manufactured by Mueller, American Valve and Hydrant, Kennedy Valve, or Engineer of Record approved equal.
2. CONTRACTOR shall verify type of existing main prior to ordering. The tapping valve shall have an inlet flange to match the sleeve and a mechanical joint outlet for connection to water main pipe. Tapping valve shall meet the requirements for valves specified in this manual. The sleeve shall have provisions for a tap and shall be pressure tested at 150 psi for a minimum of 30 minutes prior to tapping. After installation, wrap sleeve and valve with vinyl before pouring support and thrust block.

G. Service Connection Materials

1. Service Saddles

- a. Service saddles or fittings shall be used with taps to all types of pipe. Gasket shall be cemented in place and confined in a retaining groove. Saddles shall be cast/ductile iron or stainless steel saddles with double brass straps.
- b. Tapping sleeves and valves shall be used for all taps, with tap being performed at least 3' from AC pipe couplings and PVC joints.
- c. Service saddles shall be Smith-Blair, Ford, Rockwell, or Engineer of Record approved equal, with AWWA threaded corporation stop connections.

2. Water Meters

- a. Potable Water Meters: Potable water meters provided for service connections to the CITY water distribution system shall be designed to accept an encoder compatible with the CITY Automatic Meter Reading (AMR) system. The CITY will install the meter and the AMR encoder unit on 2" and smaller meters; the meter box cover shall be set ½" to 1" above finished grade in unpaved areas, and flush to grade in paved

areas; meter box shall be concrete box with cast or ductile iron lid in paved areas that are traffic bearing or in unpaved areas that are next to alleys; meter box shall be concrete with concrete lid in sidewalks. All meters 3" and larger shall be purchased by the owner and installed by the contractor, with the CITY or contractor installing the AMR. All potable water meters larger than 2" shall be installed above ground and shall be equipped with a backflow preventer installed by the CONTRACTOR at his expense. The type of backflow device utilized for potable lines shall be as shown in the Detail Drawings. The master meter assemblies shall be built in accordance with the Detail Drawings. The location of all meters shall be clearly shown on the construction plans.

- b. Non-Potable Irrigation Water Meters: Non-potable water meters provided for service connections to the CITY non-potable reclaimed distribution system shall have a purple cover and be stamped "Reclaimed", and be designed to accept an encoder compatible with the CITY Automatic Meter Reading (AMR) system. The CITY will install the meter and the AMR encoder unit on 2" and smaller meters. All meters 3" and larger shall be purchased by the owner and installed by the contractor, with the CITY or contractor installing the AMR. Master meter assemblies shall be built in accordance with the design details in the Detail Drawings. The locations of all meters shall be clearly shown on the construction plans.

3. Corporation Stops for Service Connections

- a. Corporation stops shall meet the requirements of AWWA C800, and shall be Mueller, Ford, or City approved equal; with the 1" being CC and the 2" being IPS, and ends AWWA thread x compression, and both being CTS.

4. Water Service Tubing

- a. Water service connection tubing shall be blue polyethylene municipal service tubing as shown on the Detail Drawings. Color of tubing for reclaimed water shall be purple.
- b. Polyethylene tubing shall meet the requirements of AWWA Standard C901. Polyethylene tubing shall be PE 3408 polyethylene, SDR 9 Class 200.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install all valves and appurtenances in accordance with manufacturer's instructions and in the locations shown, true to alignment and rigidly and properly supported. Repair any damage to the above items to the satisfaction of the

EXHIBIT A-1

ENGINEER before they are installed. Following installation of aboveground valves, touch-up nicks and scratches of exterior painted surfaces with the same finish coating as specified herein.

- B. After installation, test all valves and appurtenances for at least one hour at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. If any joint proves to be defective, repair it to the satisfaction of the ENGINEER.
- C. Install all floor boxes, brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings that are in masonry floors or walls, and install concrete inserts for hangers and supports as soon as forms are erected and before concrete is poured. Before setting these items, check all plans and figures, which have a direct bearing on their location and assure the proper location of these valves and appurtenances during the construction of the structures.
- D. Flanged joints shall be made with Series 300, stainless steel bolts. All exposed bolts shall be made with Series 300 stainless steel bolts.
- E. Prior to assembly of split couplings, thoroughly clean the grooves as well as other parts. The ends of the pipes and outside of the gaskets shall be moderately coated with petroleum jelly, cup grease, soft soap or graphite paste, and the gasket shall be slipped over one pipe end. After the other pipe has been brought to the correct position, center the gasket properly over the pipe ends with the lips against the pipes. The housing sections then shall be placed. After the bolts have been inserted, tighten the nuts until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.
- F. Prior to the installation of sleeve-type couplings, thoroughly clean the pipe ends for a distance of 8". Soapy water may be used as a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6" from the end, and the middle ring shall be placed on the already laid pipe end until it is properly centered over the joint. Insert the other pipe end into the middle ring and bring to proper position in relation to the pipe already laid. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flaires. After the bolts have been inserted and all nuts have been made up finger-tight, uniformly tighten diametrically opposite nuts progressively all around the joint, preferably by use of a torque wrench of the appropriate size and torque for the bolts.
- G. Carefully inspect each valve, open it wide and then tightly close it and test the various nuts and bolts for tightness. Special care shall be taken to prevent any foreign matter from becoming lodged in the valve seat. Gate valves, unless shown otherwise, shall be set with their stems vertically above the centerline of the pipe. Remove and replace any valve that does not operate correctly.
- H. Place a Gate Box Aligner (valve box aligner) (order through USA Bluebook Stock #MC-75181) over the valve stem in order to help keep valve box aligned during backfilling. Carefully center valve boxes over the operating nuts of the

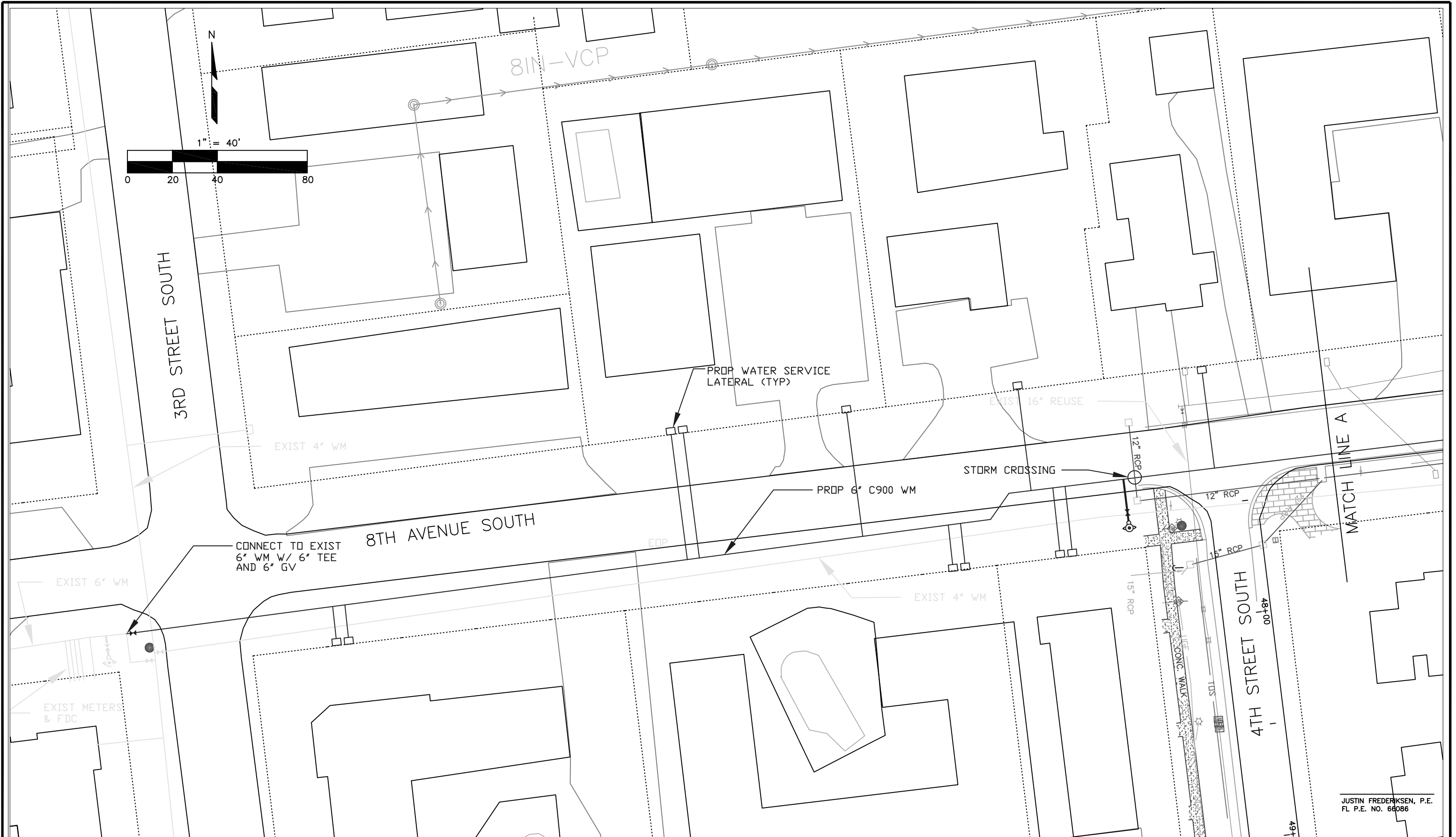
valves so as to permit a valve wrench or key to be fitted easily to the operating nut. Valve boxes shall be set to conform to the level of the finished surface and held in position by a ring of concrete placed under the support flange as shown in Section 3, Utility Detail Drawings. The valve box shall not transmit surface loads to the pipe or valve. Exercise care to prevent earth and other material from entering the valve box. Any valve box which is out of alignment or whose top does not conform to the finished ground surface shall be dug and reset. Before final acceptance of the work, adjust all valve boxes to finish grade. Valve extension stems or risers shall not be used.

3.2 SHOP PAINTING

- A. Ferrous surfaces of valves and appurtenances shall receive a coating of epoxy in accordance with AWWA Standard C550 and meets or exceeds all test requirements including the Food and Drug Administration Document Title 21 of the Federal Regulations on Food Additives, Section 175.000 entitled "Resinous and Polymeric Coating"; Impact Test Requirement in accordance with the ASTM D2794.

END OF SECTION

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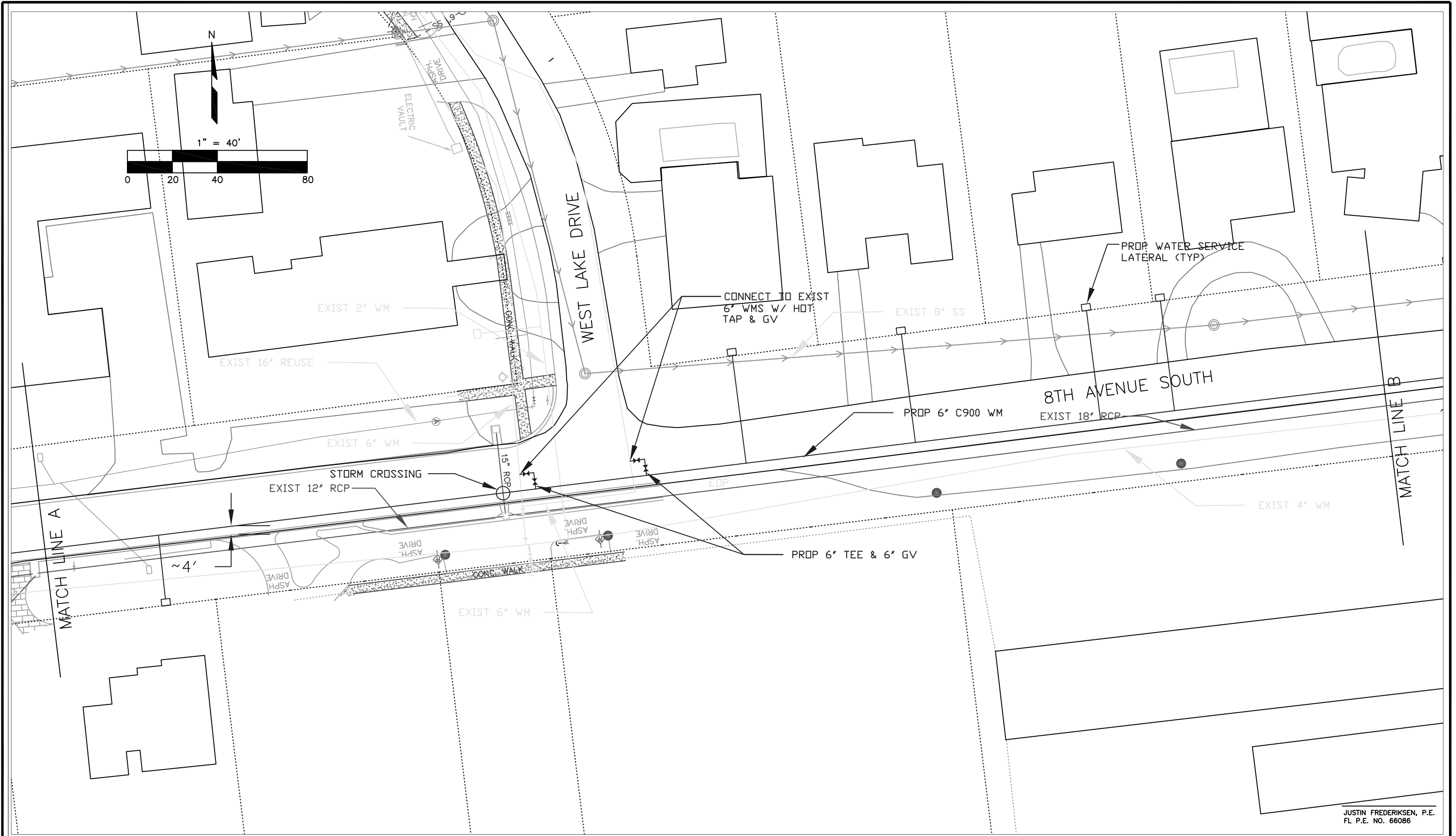
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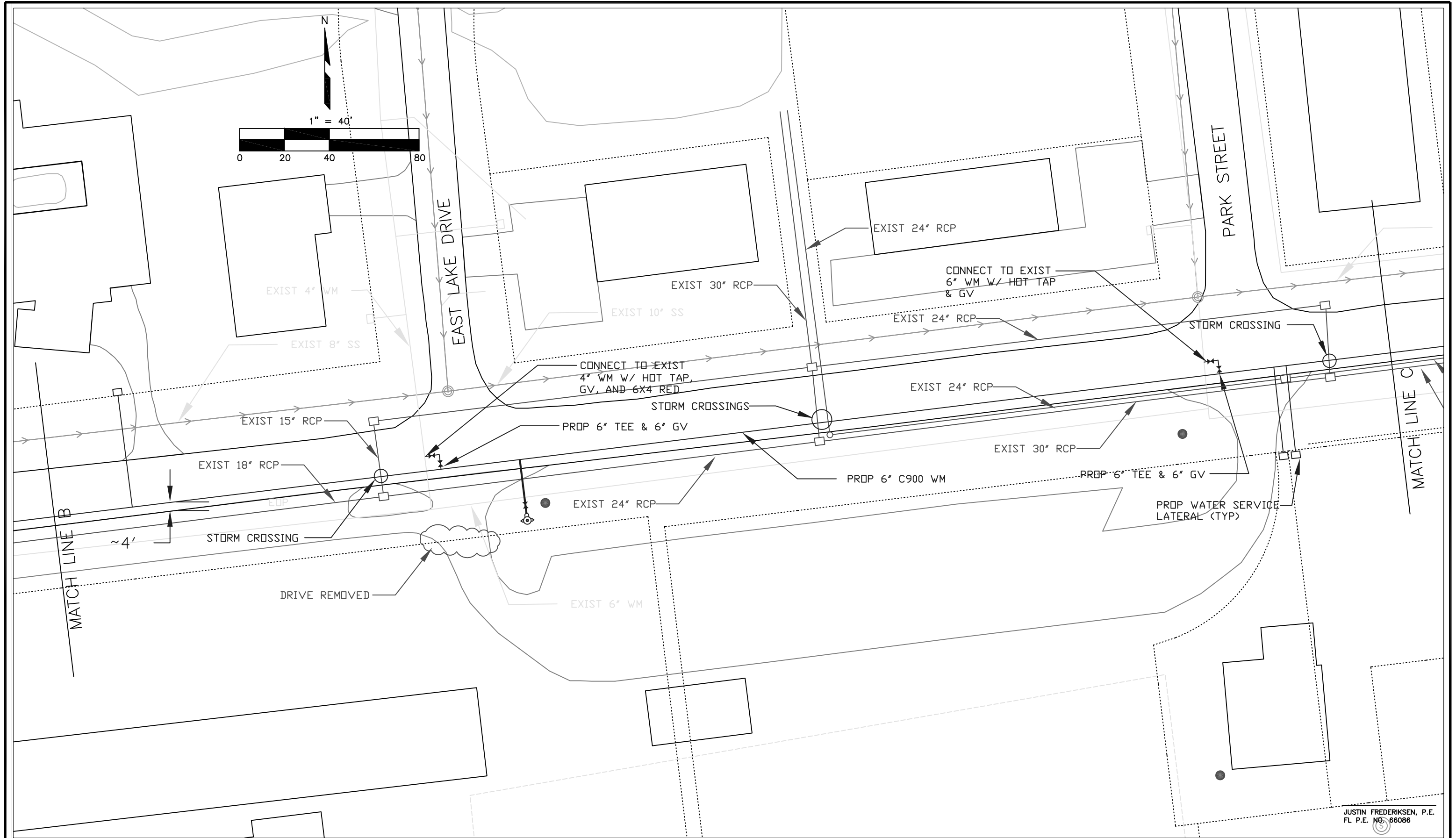
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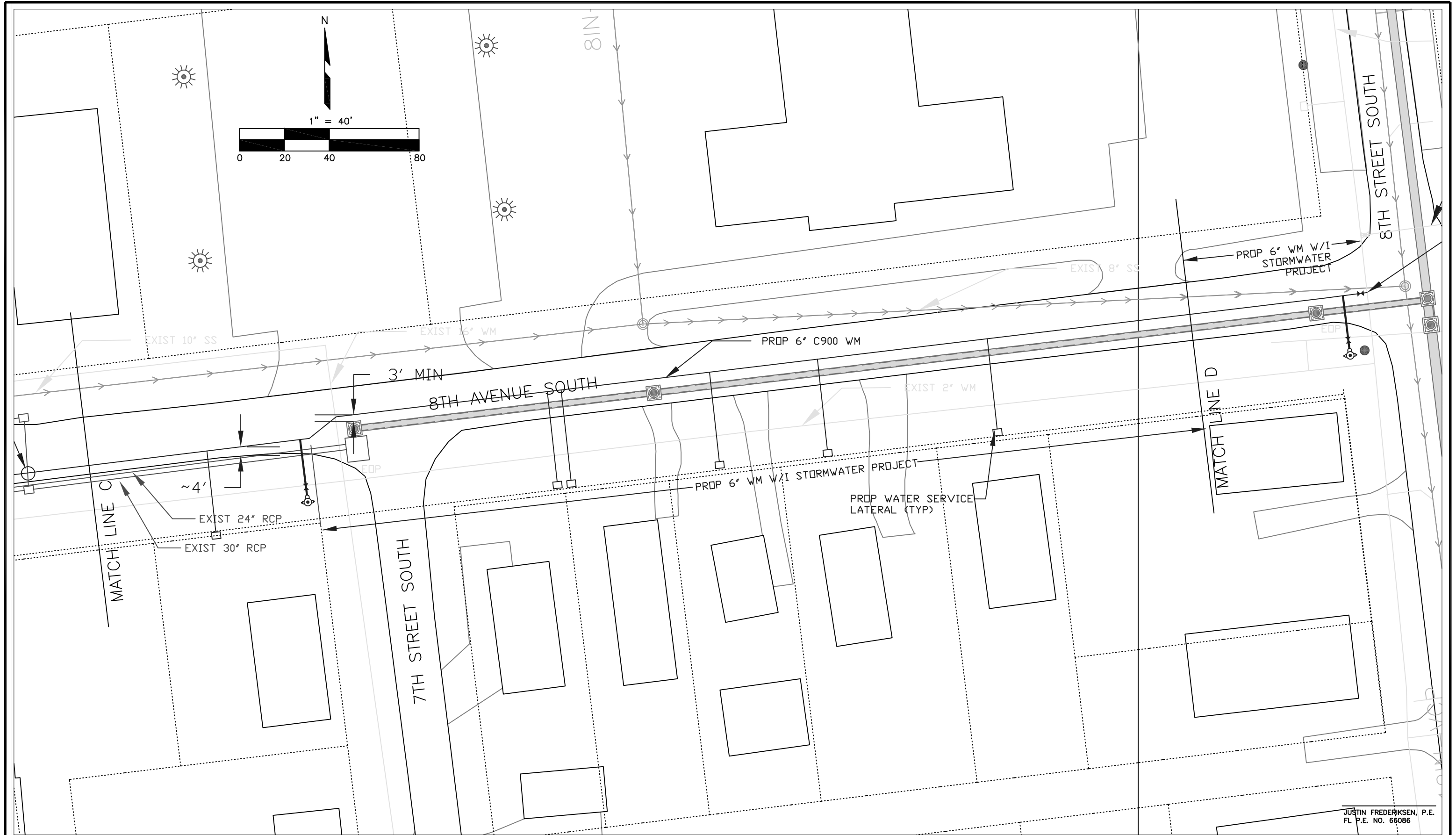
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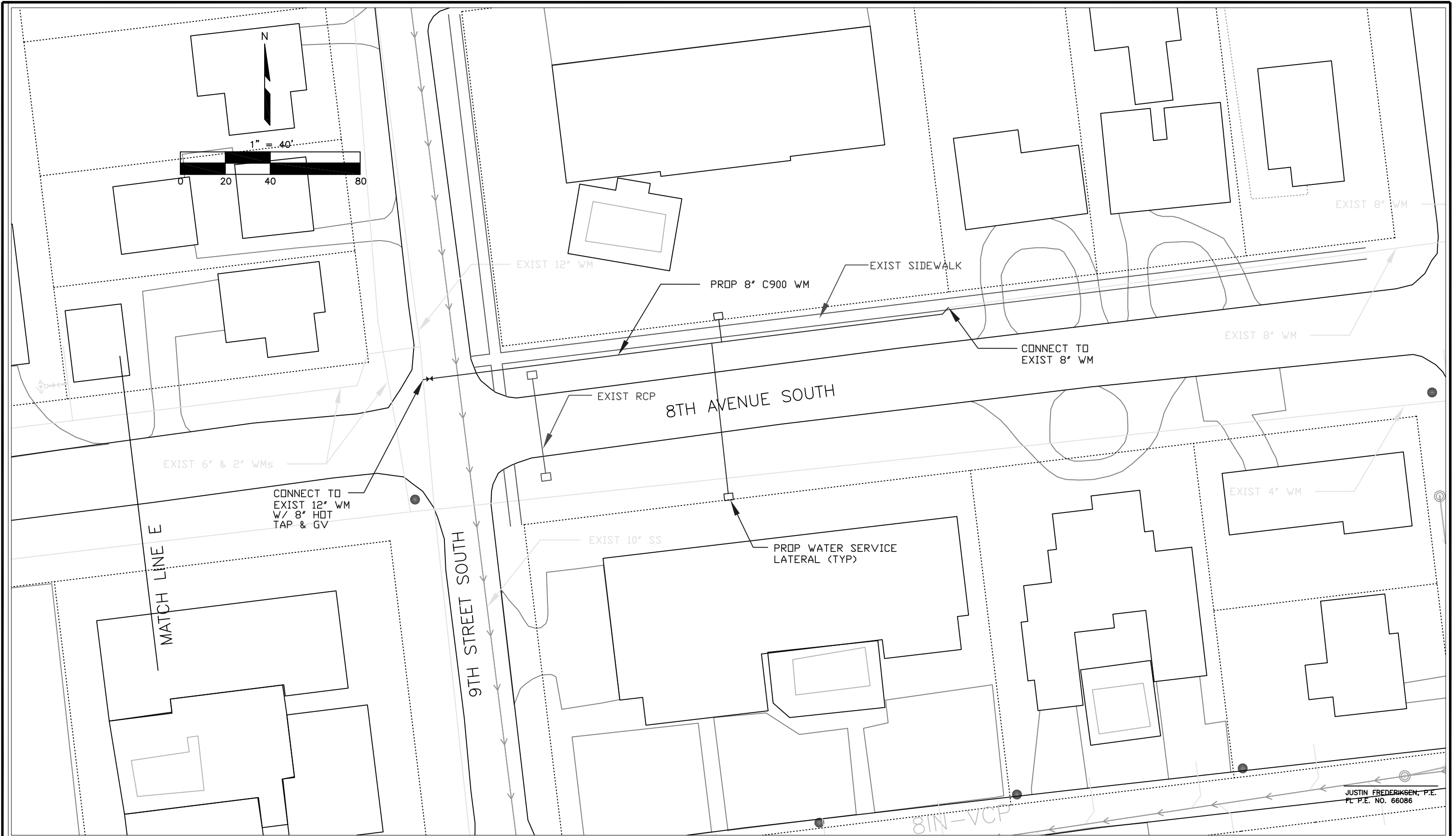
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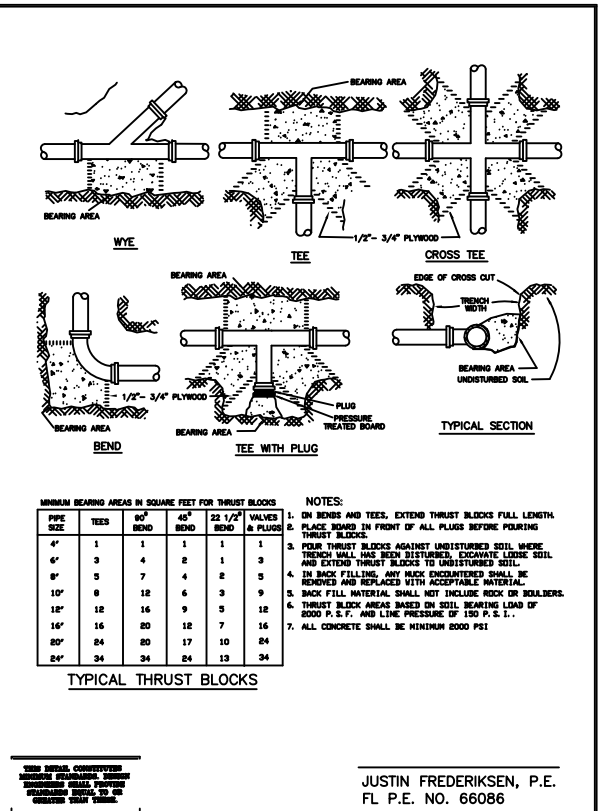
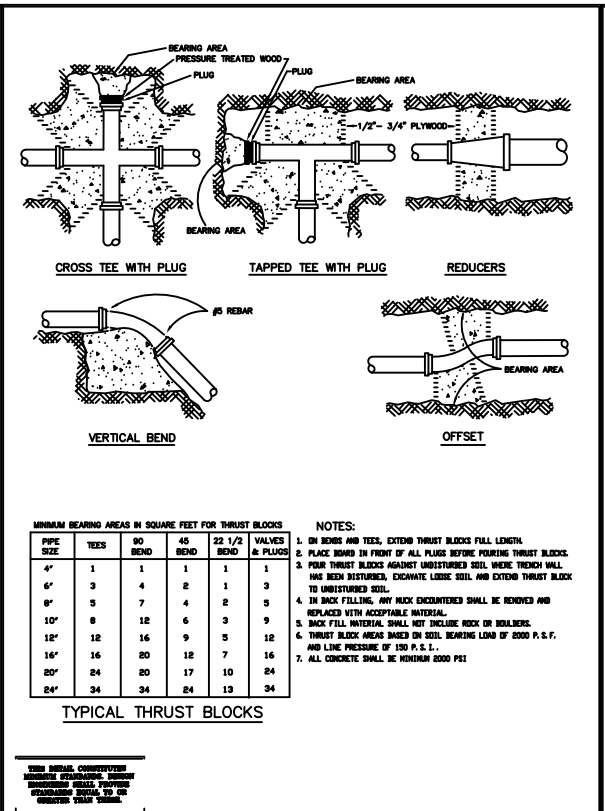
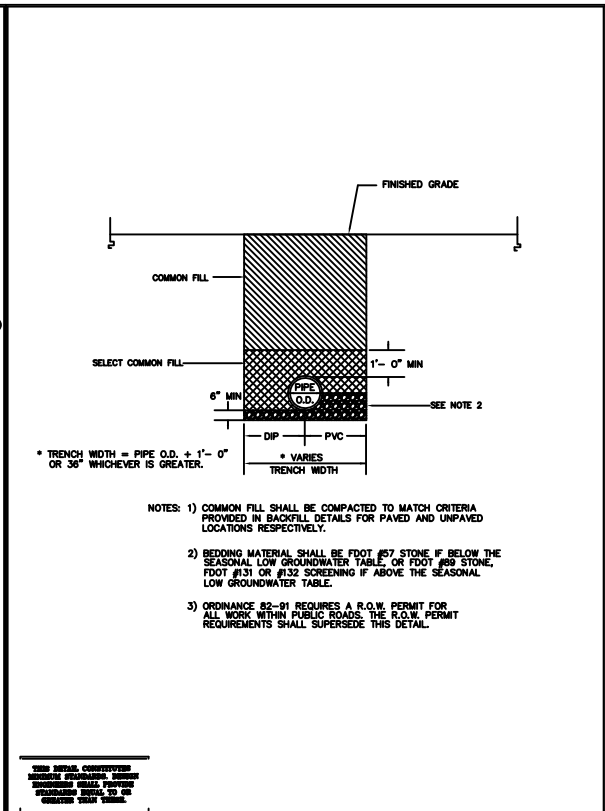
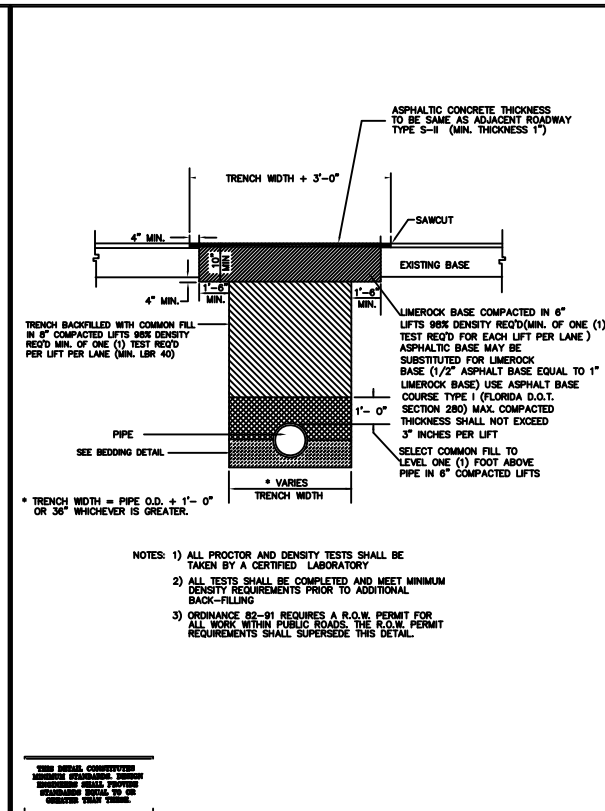
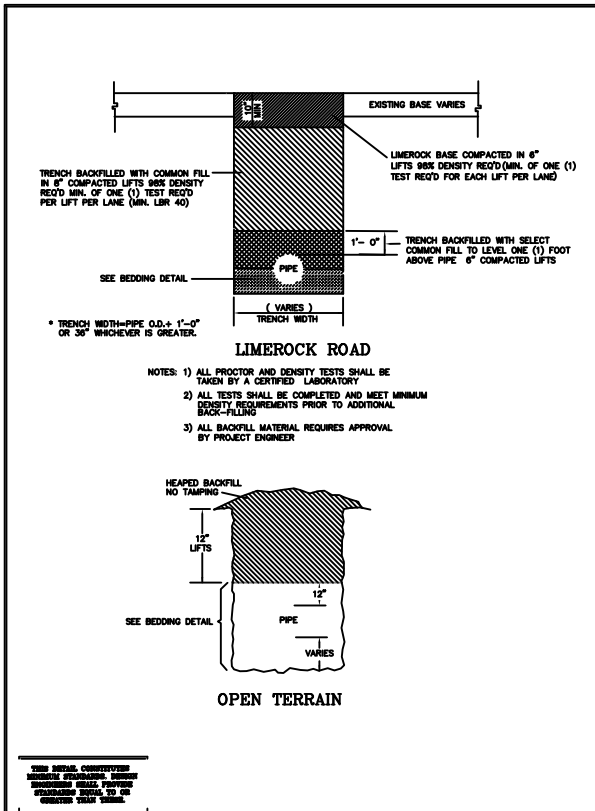
CHECKED BY: DAG	CHECKED BY: []	DATE: []
REVISION	APPROVED BY	



CITY OF NAPLES - UTILITIES DEPARTMENT
8TH AVENUE SOUTH

FILE NO.
 SHEET C-6
 DATE: MAR 2012

JUSTIN FREDRIKSEN, P.E.
 PL P.E. NO. 66086



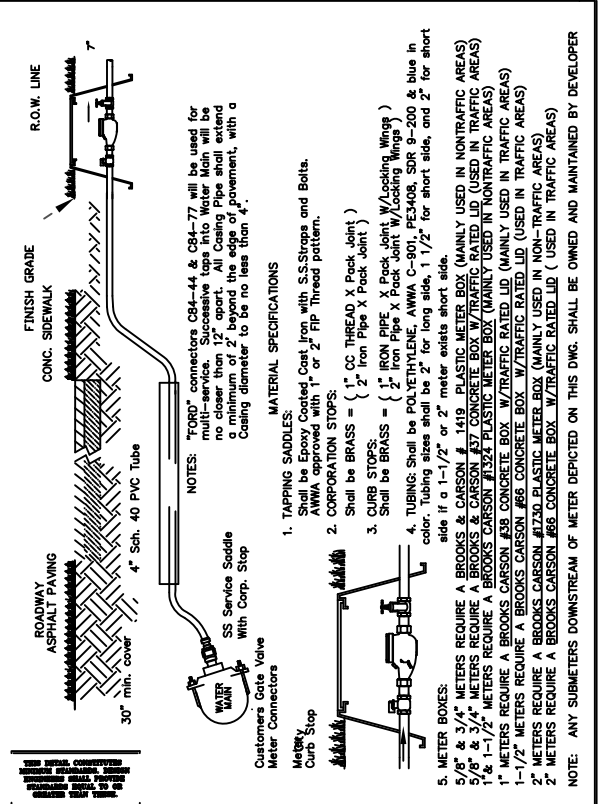
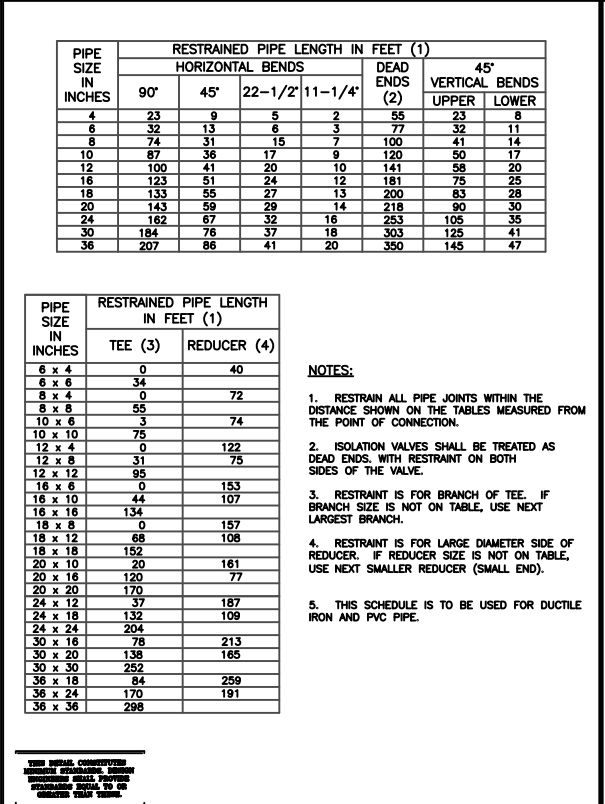
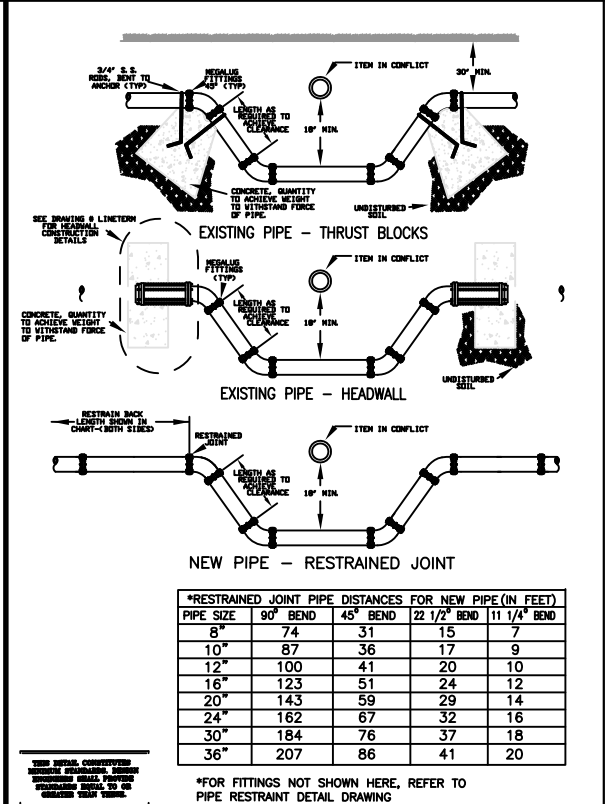
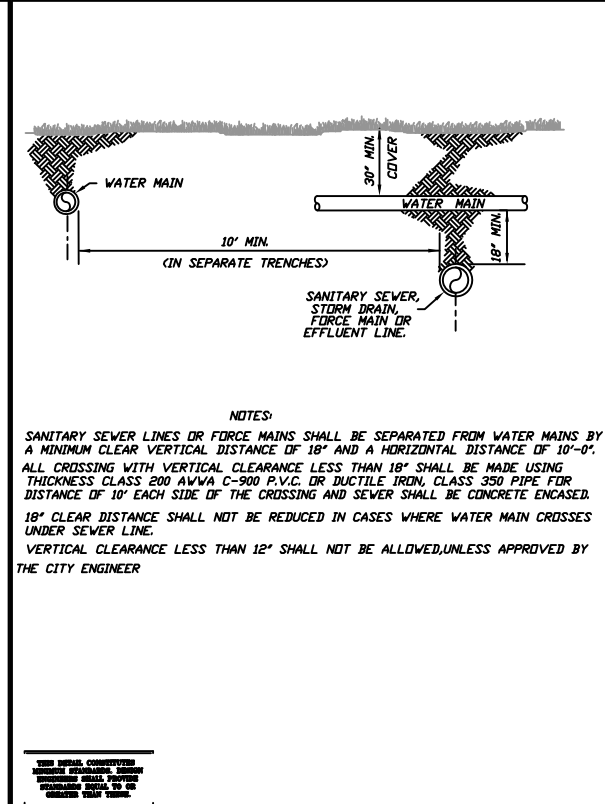
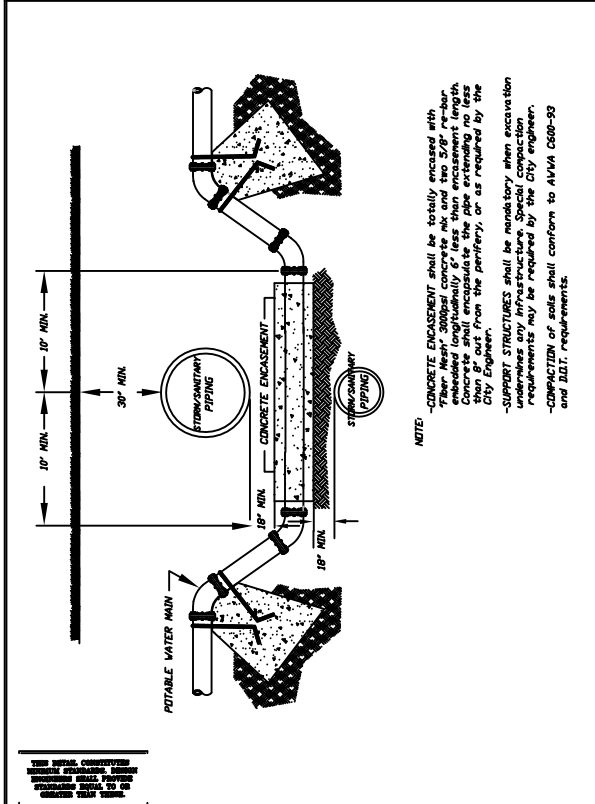
FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 BACKFILL - LIMEROCK ROAD & OPEN TERRAIN SHEET: U-01
DRAWN: JAF DIR: UTILITIES
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FLORIDA, 34102 DWG. U-01.DWG

FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 BACKFILL - PAVED ROADWAYS SHEET: U-02
DRAWN: JAF DIR: UTILITIES
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL. 34102 DWG. U-02.DWG

FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 PIPE BEDDING & BACKFILL SHEET: U-03
DRAWN: JAF DIR: UTILITIES
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL. 34102 DWG. U-03.DWG

FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 THRUST BLOCKS NO. 1 SHEET: U-04
DRAWN: TWS DIR: UTILSTDS
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL. 34102 DWG. U-04.DWG

FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 THRUST BLOCKS NO. 2 SHEET: U-05
DRAWN: TWS DIR: UTILSTDS
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL. 34102 DWG. U-05.DWG



FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 TYPICAL ENCASEMENT SHEET: U-06
DRAWN: TWS DIR: UTILSTDS
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL. 34102 DWG. U-06.DWG

FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 CROSS OVER SHEET: U-07
DRAWN: TWS DIR: UTILSTDS
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL. 34102 DWG. U-07.DWG

FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 TYPICAL CONFLICT CROSSING SHEET: U-08
DRAWN: TWS DIR: UTILSTDS
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL. 34102 DWG. U-08.DWG

FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 PIPE RESTRAINT SCHEDULE SHEET: U-09
DRAWN: TWS DIR: UTILSTDS
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL. 34102 DWG. U-09.DWG

FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 TYPICAL METER SETTING DETAIL SHEET: W-13
DRAWN: JAF DIR: WATER
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL. 34102 DWG. W-13.DWG

THESE DRAWINGS ARE A COMBINATION OF SEVERAL REFERENCE DRAWINGS PROVIDED TO THE CITY. THESE DRAWINGS ARE TO BE USED AS REFERENCE ONLY. THE USER SHALL BE RESPONSIBLE FOR OBTAINING ALL CURRENT UTILITY LOCATIONS. THE CONTRACTOR SHALL LOCATE BY POT-HOLING ALL CRITICAL UTILITIES PRIOR TO ANY EXCAVATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY UNDERGROUND UTILITY. THE CONTRACTOR SHALL RETORE ALL SOD, PAVEMENT, IRRIGATION, LANDSCAPING, DRIVEWAYS, CURBING, ETC. TO EXISTING CONDITION OR BETTER.

CHECKED BY: JAF

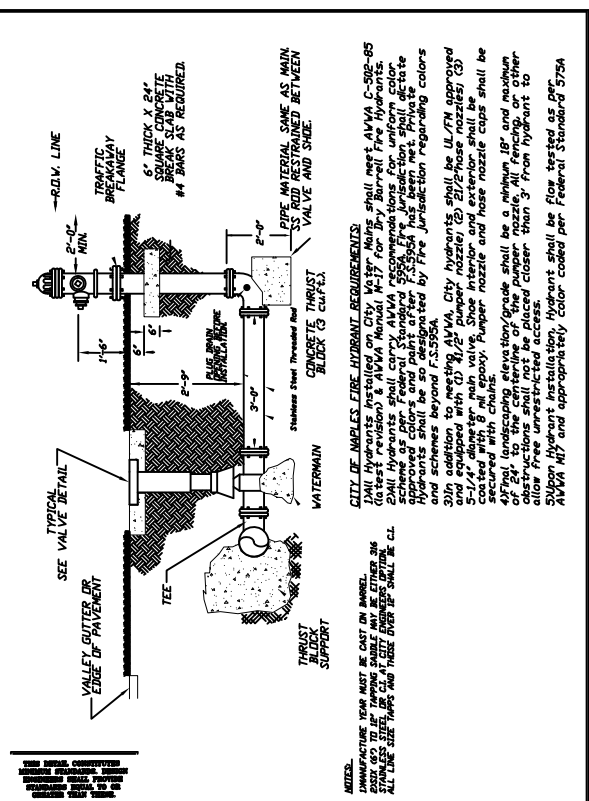
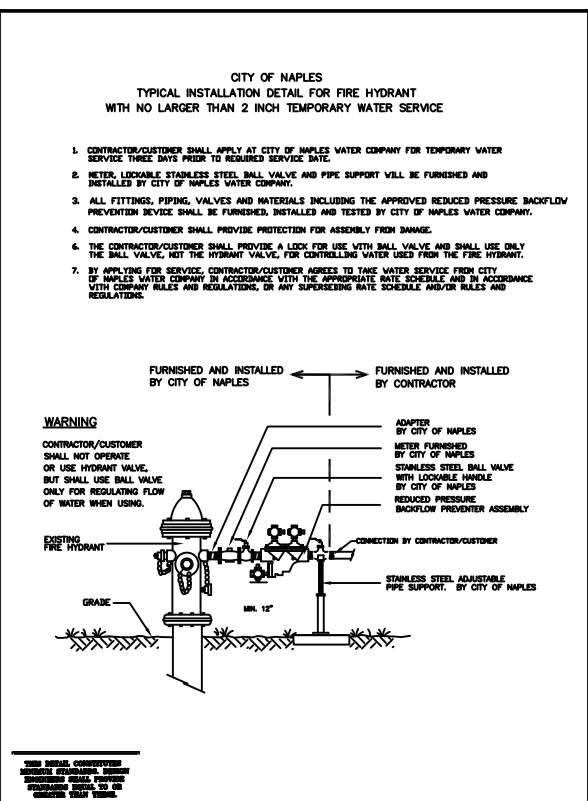
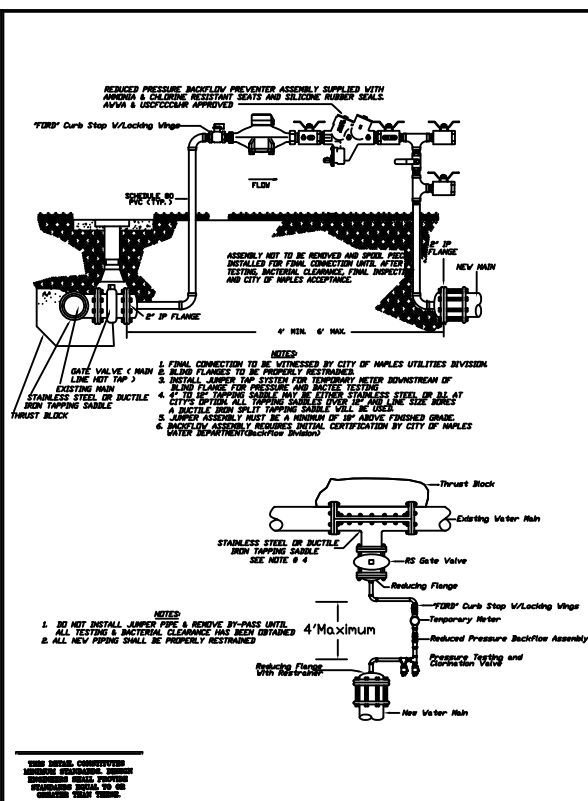
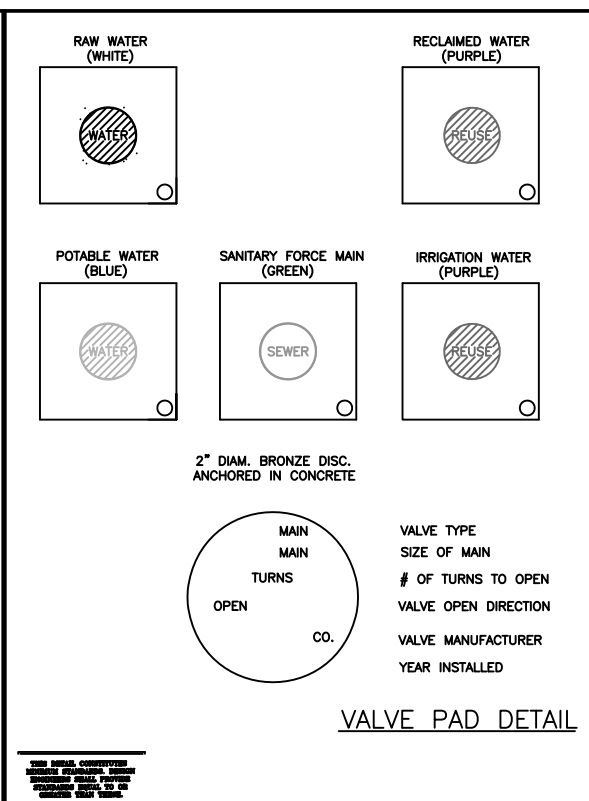
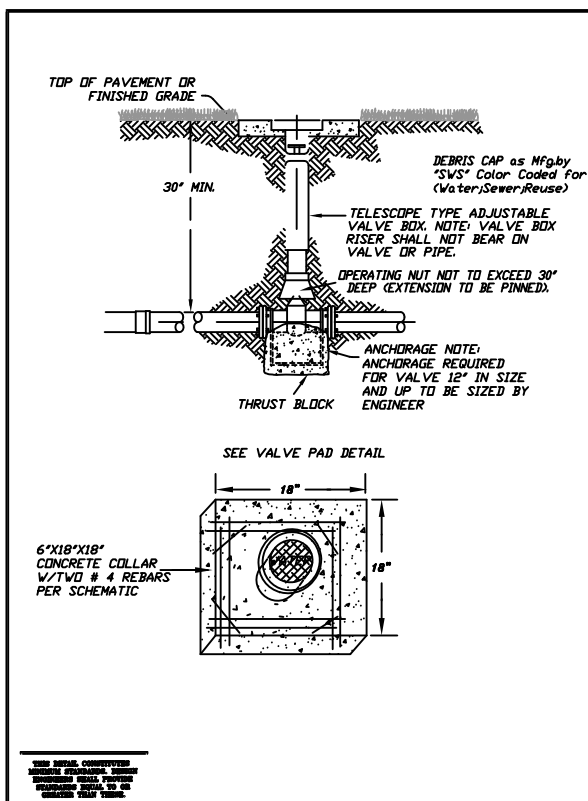
REVISION	DATE



519 UTILITIES DEPARTMENT

CITY OF NAPLES - UTILITIES DEPARTMENT
DETAILS - Water Line Upgrade

FILE NO.
SHEET D-1
DATE: Jan 2011



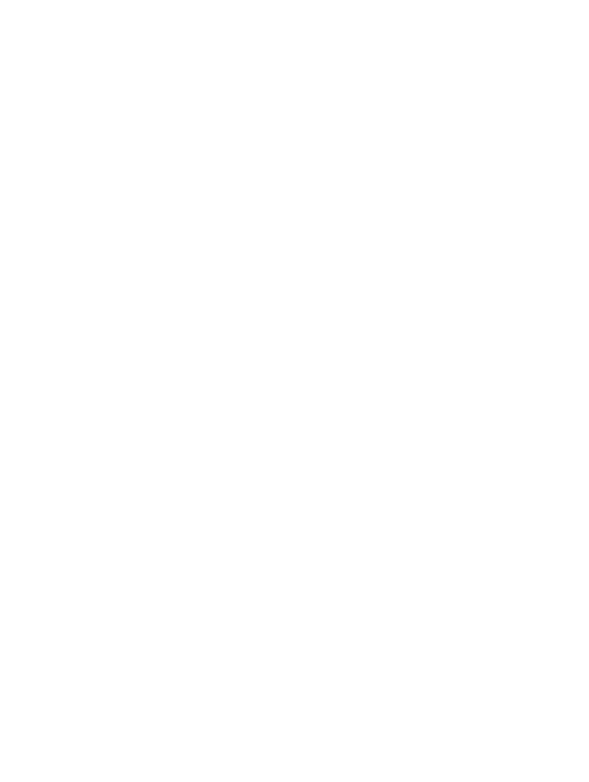
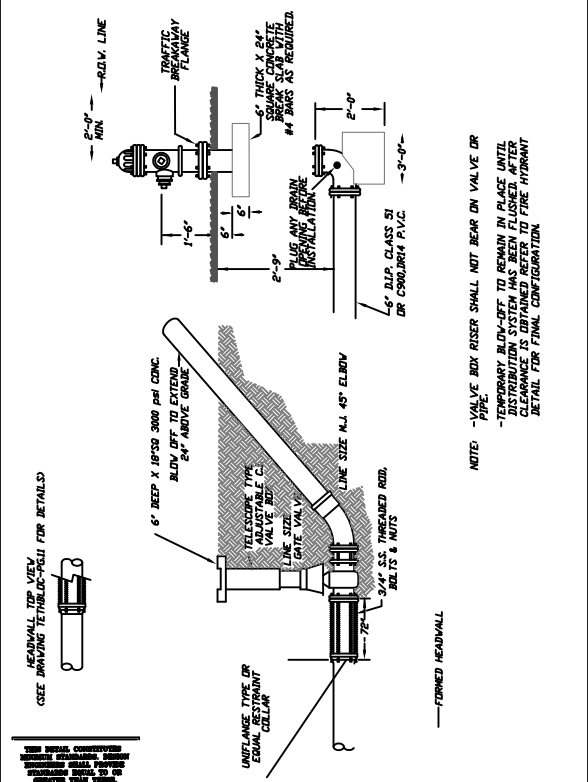
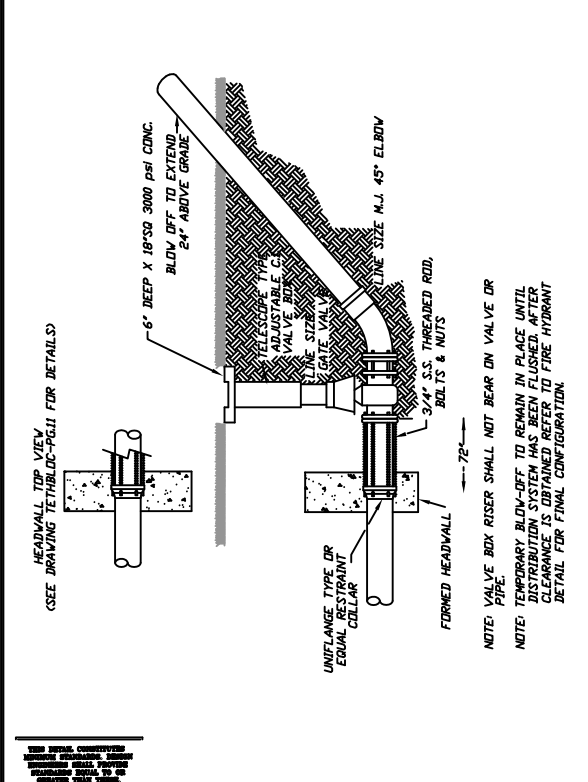
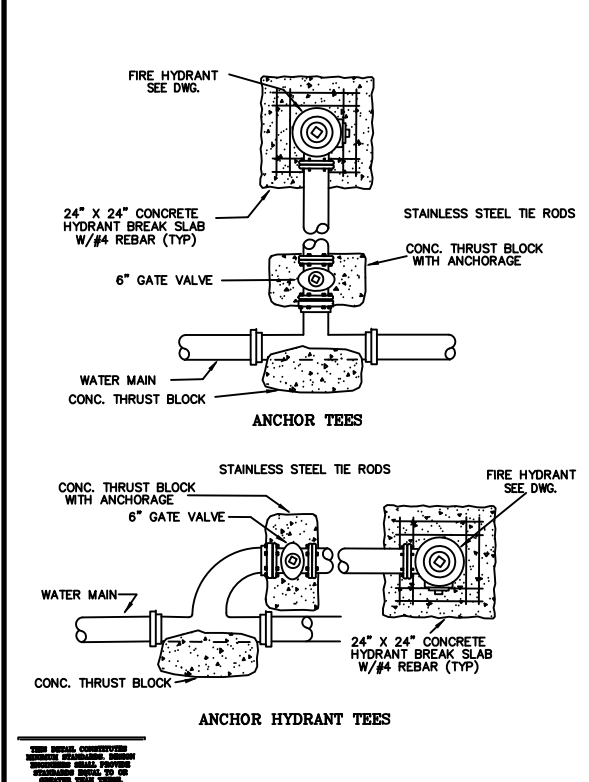
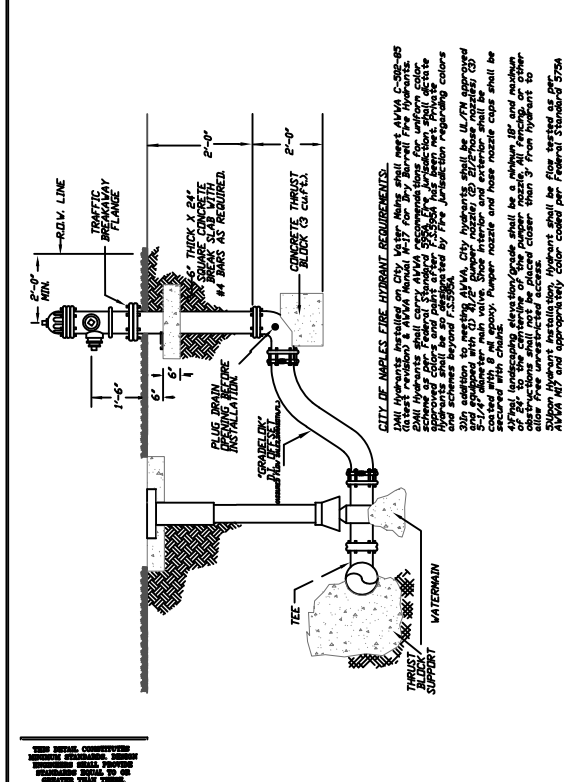
FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 SHEET: U-14
DRAWN: TWS DIR: UTILSTDS
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL 34102 DWG. U-14.DWG

FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 SHEET: U-15
DRAWN: JAF DIR: UTILSTDS
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL 34102 DWG. U-15.DWG

FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 SHEET: W-06
DRAWN: JAF DIR: WATER
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL 34102 DWG. W-06.DWG

FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 SHEET: W-07
DRAWN: JAF DIR: WATER
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL 34102 DWG. W-07.DWG

FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 SHEET: W-10
DRAWN: JAF DIR: WATER
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL 34102 DWG. W-10.DWG



FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 SHEET: W-12
DRAWN: JAF DIR: WATER
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL 34102 DWG. W-12.DWG

FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 SHEET: W-11
DRAWN: JAF DIR: WATER
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL 34102 DWG. W-11.DWG

FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 SHEET: W-15
DRAWN: JAF DIR: WATER
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL 34102 DWG. W-15.DWG

FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 SHEET: W-16
DRAWN: JAF DIR: WATER
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL 34102 DWG. W-16.DWG

FOR: UTILITIES ENGINEERING DIVISION CITY OF NAPLES
DATE: SEPT 2010 SHEET: W-10
DRAWN: JAF DIR: WATER
SCALE: N.T.S. 380 RIVERSIDE CIRCLE, NAPLES, FL 34102 DWG. W-10.DWG

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CHECKED BY: JAF	CHECKED BY:
REVISION	DATE



CITY OF NAPLES - UTILITIES DEPARTMENT
DETAILS - Water Line Upgrade

JUSTIN FREDERIKSEN, P.E.
FL P.E. NO. 66086

FILE NO.
SHEET D-2
DATE: Jan 2011

EXHIBIT B

EXHIBIT E (Addendum 1 Supplement)

**NAPLES BASIN III Stormwater Improvements
 BID TABULATION 8th St S (& 8th Ave S)**

5/4/2012

SUMMARY OF PAY ITEMS						
ITEM NO.	FOOT REF.	DESCRIPTION	Units	Unit Price	Est. Quant.	Cost
1	101-1	Mobilization	LS		1	\$ 40,000.00
2	102-1	Maintenance of Traffic	LS		1	\$ 18,250.00
3		Pre-construction Audio/Video Recording	LS		1	\$ 1,650.00
4	104	Stormwater Pollution Prevention Plan Implementation	LS		1	\$ 500.00
5		Permitting (Dewatering, NPDES)	LS		1	\$ 8,500.00
6		Utility Locates via Potholing	LS		1	\$ 4,000.00
7		Abandonment, Removal/Disposal of Existing Pipes				
7a.	430-830	Grout-fill and Leave In-place	CY	\$ 150	15	\$ 2,250.00
7b.		Remove & Dispose Reinforced Concrete Pipe	LF	\$ 8	70	\$ 560.00
7c.		Remove & Dispose Asbestos-Containing Cementitious Pipe	LF	\$ 20	595	\$ 11,900.00
8		Sod Restoration (Including Private Irrigation Repairs)				
8a.		Sod (Floritam)	SY	\$ 3	878	\$ 2,633.33
8b.		Sod (Bahia)	SY	\$ 3	44	\$ 133.33
8c.		Sod (Zoysia)	SY	\$ 4	44	\$ 177.78
9		Road Restoration				
9a.		Milling (0.75" Ave depth)	SY	\$ 6.3	4,184	\$ 26,356.40
9b.	331-1 (2000 Ed)	Type S-III (1.5")	SY	\$ 7.7	4,184	\$ 32,213.38
9c.	331-1 (2000 Ed)	Type S-III (0.75")	SY	\$ 5.1	4,125	\$ 20,871.38
9d.	285-706	Optional Base Group 6 (8")	SY	\$ 9	4,125	\$ 37,123.00
9e.	160-4	Type B Stabilization (12")	SY	\$ 3.0	4,542	\$ 13,626.00
9f.		Brick Paver/Concrete Crosswalks Restoration	SY	\$ 30.0	130	\$ 3,900.00
9g.	711-1	Replace Pavement Markings and Signage	LS		1	\$ 3,500.00
10		Concrete Valley Gutter Restoration	LF	\$ 13	2,462	\$ 32,006.00
11		Driveway and Swales Restoration				
11a.		Concrete Driveway Restoration	SY	\$ 40	60	\$ 2,400.00
11b.		Asphalt Driveway Restoration	SY	\$ 40	319	\$ 12,764.44
11c.		Brick Driveway Restoration	SY	\$ 20	96	\$ 1,911.11
12	522-1	Sidewalk Removal and Replacement (5' wide x 4" thick)	LF	\$ 18	420	\$ 7,560.00
13	430-17	Furnish & Install Reinforced Concrete Drain Pipe				
13a.		24" RCP	LF	\$ 61	927	\$ 56,547.00
13b.		36" RCP	LF	\$ 85	451	\$ 38,335.00
13c.		42" RCP	LF	\$ 94	1,628	\$ 153,032.00
14	425-1-52	Furnish & Install Ditch Bottom Inlets (Type C)	EA	\$ 3,030	1	\$ 3,030.00
15	425-2-71	Furnish & Install Storm Manholes (J-7) (Depth <10')	EA	\$ 3,640	12	\$ 43,680.00
16		Furnish & Install Special Structure S-035			1	\$ 7,970.00
17	425-11	Modify Existing Drainage Structures (Inlets/Manholes)	EA	\$ 800	5	\$ 4,000.00
18	425-2-71	Furnish & Install Conflict Boxes				
18a.		Conflict Boxes (J-7) (Depth <5')*	EA	\$ 5,090	3	\$ 15,270.00
18b.		Conflict Boxes (J-7) (Depth >5')	EA	\$ 5,850	5	\$ 29,250.00
19		Utility Conflict Avoidance				
19a.		Deflection of Water Mains	EA	\$ 3,250	11	\$ 35,750.00
19b.		Deflection/Restoration of Sanitary Sewer Lateral	EA	\$ 630	24	\$ 15,120.00
19c.		Deflection/Restoration of Potable Water Service Lateral	EA	\$ 590	12	\$ 7,080.00
19d.		Private Utilities: Coordination and Remedy of Conflicts			1	\$ 100.00
20		Furnish and Install Gate Valves				
20a.	1080-11-304	6" Gate Valves	EA	\$ 970	1	\$ 970.00
20b.	1080-11-404	8" Gate Valves	EA	\$ 1,240	2	\$ 2,480.00
20c.	1080-11-404	12" Gate Valves	EA	\$ 1,970	1	\$ 1,970.00
20d.		8"x4" Tapping Valve & Sleeve and 4"x2" Reducer	EA	\$ 3,960	2	\$ 7,920.00
20e.		8"x6" Tapping Valve & Sleeve and 6" Plug	EA	\$ 4,180	1	\$ 4,180.00
21		Connect 6" C900 to existing 8" Water Main			1	\$ 3,220.00
22		Layout Survey & Final As-Built Survey	LS		1	\$ 15,000.00
				SubTotal		\$ 729,690.15
23		Allowance for Unforeseen Conditions (Calculated 10% of Subtotal)				\$ 72,969.02
24		Allowance for Landscaping (Calculated 1% of Subtotal)				\$ 7,296.90
25-31		Bid Alternate for Water Main Improvements				\$ 218,681.10
TOTAL BID PRICE						\$ 809,956.07

Notes:

* Only if determined to be needed

Official Company Representative



Signature

Date

BRIAN PENNER

4-May-12

Printed Name

EXHIBIT B

EXHIBIT E (Addendum 1 supplement)

**NAPLES BASIN III Alternate - Water Main Improvements
 BID ALTERNATE TABULATION 8th St S (&8th Ave S)**

5/4/2012

SUMMARY OF PAY ITEMS						
ITEM NO.	FDOT REF.	DESCRIPTION	Units	Unit Price	Est. Quant.	Cost
25		General Requirements		LS	1	\$ 5,000.00
26		Furnish & Install Water Main				
26a.		6" C900 PVC WM Piping - Within Stormwater Project	LF	\$ 20	475	\$ 9,500.00
26b.		6" C900 PVC WM Piping	LF	\$ 36	2,200	\$ 79,200.00
27		Fire Hydrant Assembly	EA	\$ 3,810	4	\$ 15,240.00
28		Water Main Connection				
28a.		Water Main Connection - 3rd Street South	EA	\$ 4,720	1	\$ 4,720.00
28b.		Water Main Connection - West Lake Dr.	EA	\$ 5,280	2	\$ 10,560.00
28c.		Water Main Connection - East Lake Dr.	EA	\$ 6,780	1	\$ 6,780.00
28d.		Water Main Connection - Park Street	EA	\$ 5,660	1	\$ 5,660.00
28e.		Water Main Connection - 8th Street South	EA	\$ 2,460	1	\$ 2,460.00
28f.		Water Main Connection - 9th Street South	EA	\$ 8,750	1	\$ 8,750.00
29		Furnish and Install Water Service				
29a.		Single Water Service (Long Side)	EA	\$ 1,820	11	\$ 20,020.00
29b.		Single Water Service (Long Side)	EA	\$ 1,820	16	\$ 29,120.00
				SubTotal		\$ 197,010.00
30		Allowance for Unforeseen Conditions (Calculated 10% of Subtotal)				\$ 19,701.00
31		Allowance for Landscaping (Calculated 1% of Subtotal)				\$ 1,970.10
TOTAL BID PRICE						\$ 218,681.10

Notes:

See Measurement and Payment Items included in Addendum

Official Company Representative



Signature

5/4/12

Date

Brian Penner

Printed Name

EXHIBIT C

GENERAL INSURANCE REQUIREMENTS

The Contractor shall not commence work until he has obtained all the insurance required under this heading, and until such insurance has been approved by the Owner, nor shall the Contractor allow any subcontractor to commence work until all similar insurance required of the subcontractor has also been obtained and approved by the Owner.

Certificates of insurance must be issued by an authorized representative of the insurance company at the request and direction of the policyholder and must include sufficient information so as to identify the coverage and the contract for Owner's improvements for which they are issued. Certificates of insurance must be issued by a nationally recognized insurance company with a Best's Rating of no less than B+VII, satisfactory to the Owner, and duly licensed to do business in the state of said Contract.

The Contractor shall procure and maintain, during the life of this Contract, Workmen's Compensation Insurance for all of his employees to be engaged in work under this Contract, and he shall require any subcontractor similarly to provide Workmen's Compensation Insurance for all of the latter's employees to be engaged in such work, unless such employees are covered by the protection afforded by the Contractor's insurance. In case any employees are to be engaged in hazardous work under this Contract, and are not protected under this Workmen's Compensation statute, the Contractor shall provide, and shall cause each subcontractor to provide, adequate coverage for the protection of such employees. It is acceptable to use a State-approved Workmen's Compensation Self-Insurance fund.

The Contractor shall take out and maintain during the life of this Contract, Public Liability and Property Damage and shall include Contractual Liability, Personal Injury, Libel, Slander, False Arrest, Malicious Prosecution, Wrongful Entry or Eviction, Broad Form Property Damage, Products, Completed Operations and XCU Coverage to be included on an occurrence basis, and to the full extent of the Contract to protect him, the Owner, and any subcontractor performing work covered by this Contract from damages for personal injury, including accidental death, as well as from claims for property damage, which may arise from operations under this contract, whether such operations be by himself or by a subcontractor, or by anyone directly or indirectly employed by either of them. The Contractor shall also maintain automobile liability insurance including "non-owned and hired" coverage. The entire cost of this insurance shall be borne by the Contractor.

The amount of such insurance shall be no less than \$1,000,000 annual aggregate for bodily injury and property damage combined per occurrence.

The City of Naples must be named as Additional Insured on the insurance certificate and the following must also be stated on the certificate. "These coverage's are primary to all other coverage's the City possesses for this contract only." The City of Naples shall be named as the Certificate Holder. The Certificate Holder shall read as follows:

The City of Naples
735 Eighth Street South
Naples, Florida 34102

No City Division, Department, or individual name should appear on the Certificate.
No other format will be acceptable.

The Certificate must state the bid number and title.

When using the "Accord"- 25 Certificate of Insurance only the most current version will be accepted.

The City of Naples requires a copy of a cancellation notice in the event the policy is cancelled. The City of Naples shall be expressly endorsed onto the policy as a cancellation notice recipient must be deleted: "endeavor to" and "but failure to mail such notice shall impose no obligation or liability of any kind upon the company"

[If other insurance or insurance requirements or any waivers, attach as Exhibit C-1 through C-__]

END OF EXHIBIT C

EXHIBIT D

CERTIFICATION OF COMPLIANCE WITH IMMIGRATION LAWS

The undersigned, is the _____ of the **Mitchell & Stark Construction Co, Inc** (“the CONTRACTOR”), and hereby certifies to the following:

1. The CONTRACTOR is in full compliance with all provisions of the Immigration Reform and Control Act of 1986 (“IRCA”), as well as all related immigration laws, rules, regulations pertaining to proper employee work authorization in the United States.

2. The undersigned has verified that the CONTRACTOR has obtained and maintains on file, and will continue to obtain and maintain on file, all documentation required by law, including but not limited to, Form I-9, Employment Eligibility Verification, for all persons employed by or working for the CONTRACTOR in any capacity on any project for the City of Naples (CITY). All such persons have provided evidence of identity and eligibility to work to the CONTRACTOR in accordance with the IRCA and related law. The undersigned hereby affirms that no person has been or will be employed by the CONTRACTOR to work on projects for the CITY who is not authorized to work under law. The undersigned further affirms that the CONTRACTOR’s files will be updated by written notice any time that additional employees work on projects for the CITY.

3. The CONTRACTOR will have its contractors, subcontractors, suppliers and vendors who are involved in projects for the CITY to sign a written acknowledgment that they too are in compliance with immigration law. It is understood that failure to do so could result in the CONTRACTOR being liable for any violation of the law by such third parties.

4. The CONTRACTOR will fully cooperate with and have its contractors, subcontractors, suppliers and vendors to fully cooperate with, all inquiries and investigations conducted by any governmental agency in connection with proper compliance with the laws pertaining to appropriate work authorization in the United States.

5. The undersigned, on behalf of the CONTRACTOR, acknowledges that this Certification may be relied upon by the CITY, its officers, directors, employees, and affiliates or related persons and entities.

6. If it is found that the CONTRACTOR has not complied with the laws pertaining to proper employment authorization, and any legal and administrative action ensues against the CITY, the CONTRACTOR will indemnify, defend and hold the CITY harmless along with their officers, directors, employees, and affiliated or related persons and entities.

7. The CONTRACTOR acknowledges that the CITY by their authorized representatives shall have the right, at any time, upon 24 hours notice, to examine the CONTRACTOR’s books and records to confirm that the CONTRACTOR is in compliance with the terms of this certification.

Executed this _____ day of _____, 2012.

By: _____

ACKNOWLEDGMENT

STATE OF _____

COUNTY OF _____

SWORN TO AND SUBSCRIBED before me this _____ day of _____, 2012.

The Affiant, _____, is [] personally known to me or [] has produced _____ as identification, which is current or has been issued within the past five years and bears a serial number or other identifying number.

Print Name:

NOTARY PUBLIC - STATE

OF _____

Commission Number: _____

My Commission Expires: _____

(Notary Seal)

543759 v_01 \ 016763.0001 REV. 12-27-07 RDP