



The City of Delray Beach
100 NW 1st Avenue
Delray Beach, FL 33444

PURCHASING DEPARTMENT

INVITATION TO BID CONSTRUCTION

ITBC NO.: 2019-005

TITLE: BLOCK 63 AND NW 5TH ALLEYS

MLK- LAKE IDA ROAD

PROJECT NO. 15-001 & 15-040

DUE DATE AND TIME: January 29, 2019 AT 2:00 P.M.

INSTRUCTIONS

Sealed Bids must be received on or before the due date and time (local time). All Bids will be publicly opened at City Hall, unless otherwise specified.

Submission of Bids electronically will be through a secure mailbox at BidSync (www.bidsync.com) until the Due Date and Time as indicated in this ITBC. BidSync does not accept electronic Bids after the Due Date and Time. It is the sole responsibility of the Bidder to ensure its electronic Bid submission is complete prior to the solicitation Due Date and Time. Electronic submission of bids will require the uploading of forms and/or attachments as designated in this ITBC. Electronic submission must include a signed original of the Solicitation Summary form. The submission of forms and attachments containing embedded documents or proprietary file extensions is prohibited. All documents should be attached as separate file.

If the Solicitation Summary form is not included, the City may deem the Bid non-responsive. Bids must contain all information required to be included in the submittal, as described in this Solicitation.

BROADCAST

The City of Delray Beach utilizes electronic online services for notification and distribution of its Solicitation documents. The City's Solicitation information can be obtained from: (a) BidSync – www.bidsync.com; (b) Purchasing webpage on the City of Delray Beach [website](#); Bidders who obtain Solicitations from sources other than those named above are cautioned that the Invitation to Bid Construction package may be incomplete. The City may not evaluate incomplete Bid packages. BidSync is an independent entity and is not an agent or representative of the City. Communications to any independent entities does not constitute communications to the City. The City is not responsible for errors and omissions occurring in the transmission or downloading of any documents, addenda, plans, or specifications from these websites. In the event of any discrepancy between information on these websites and the hard copy Solicitation documents, the terms and conditions of the hard copy documents will prevail.

CONTACT PERSON

Any questions regarding the specifications and Solicitation process must be submitted in writing to the Purchasing Department through the "Question" feature on www.bidsync.com. Requests for clarification and additional information must be received prior to the Deadline for Submission of Questions on January 22, 2019 at 5:00 P.M. local time.



**The City of Delray Beach
100 N.W. 1st Avenue
Delray Beach, FL 33444**

LEGAL ADVERTISEMENT

**INVITATION TO BID CONSTRUCTION NO. 2019-005
BLOCK 63 AND NW 5TH ALLEYS
MLK- LAKE IDA ROAD
PROJECT NOS. 15-001 & 15-040**

The City of Delray Beach is seeking Bids from qualified Bidders to construction services for alleys in accordance with the terms, conditions, and specifications contained in this Invitation to Bid Construction. Contractor is responsible for all permitting requirements.

Invitation to Bid Construction documents are available beginning December 27, 2018, on the Purchasing webpage on the City of Delray Beach [website](#); on the Bid Sync website – www.bidsync.com; Submission of Bids electronically will be through a secure mailbox at BidSync (www.bidsync.com) until the Deadline for Submission as indicated in this ITBC.

The City will hold a Pre-Bid Conference on January 4, 2019, at City Hall, City of Delray Beach, starting promptly at 10:00 A.M. local time. Attendance is recommended, but not mandatory.

It is the responsibility of the Bidder to ensure all pages are included in the submission. All Bidders are advised to closely examine the Solicitation package. Any questions regarding the completeness or substance of the Solicitation package or scope of work must be submitted using the “Question” feature on www.bidsync.com.

The City of Delray Beach is exempt from Federal and State Taxes for tangible personal property tax.

The City of Delray Beach reserves the right to accept or reject any or all Bids, in whole or in part, with or without cause, to waive any irregularities and/or technicalities, and to award the contract on such coverage and terms it deems will best serve the interests of the City.

CITY OF DELRAY BEACH

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SECTION 1 SPECIAL TERMS AND CONDITIONS

1.1 PURPOSE

The purpose of this Solicitation is to establish a contract for the construction of alleys, in accordance with the terms, conditions, and specifications contained in this Invitation to Bid Construction.

1.2 CONTRACT MEASURES AND PREFERENCES

Intentionally Omitted

1.3 PRE-BID CONFERENCE AND SITE VISIT

The City will hold a Non-Mandatory Pre-Bid Conference on January 4, 2019, starting promptly at 10:00am, at City Hall, 100 N.W. 1st Avenue, Delray Beach, FL 33444.

The City will not conduct a site visit for this solicitation.

Potential Bidders should bring a copy of this Solicitation with them to the Pre-Bid Conference. Bidders will be allowed to ask questions and obtain information on important aspects of this Solicitation.

The purpose of the Pre-Bid Conference is to provide and obtain information relative to the scope, purpose, nature, and extent of the work, and any local conditions, which may affect the performance of work. Submission of a Bid shall constitute an acknowledgement by the Bidder that it has thoroughly examined and is familiar with the requirements of this Solicitation package. The failure or neglect of the Bidder to examine the Solicitation package, shall in no way relieve the Bidder of any obligation with respect to its Bid or the requirements of the Contract. No claim for additional compensation will be allowed which is based on a lack of knowledge of the requirements of this Solicitation package or the resultant Contract.

If you need a sign language interpreter or materials in accessible format for this event, please contact the Purchasing Department at purchasing@mydelraybeach.com or by phone at 561.243.7129 at least five (5) days in advance of the conference.

1.4 AGREEMENT PERIOD

The Contract shall commence upon the date of the duly executed Agreement and shall remain in effect until such time as the construction services acquired in conjunction with this solicitation have been completed and accepted by the City's authorized representative and upon completion of the expressed and/or implied warranty periods.

1.5 OPTIONS TO RENEW

Intentionally Omitted

1.6 METHOD OF AWARD: LOWEST PRICE

The City will award this contract to the responsive and responsible Bidder who submits the lowest price to perform the work, based on the option (alternates) selected by the City.

1.7 PRICES SHALL BE FIXED AND FIRM

If the Bidder is awarded a contract under this Solicitation, the prices offered by the Bidder shall remain fixed and firm during the performance of the work, except for any change orders or variations, which must meet the prior approval and authorization of the City.

1.8 PRICE ADJUSTMENTS

Intentionally Omitted

1.9 EXAMINATION OF CITY FACILITIES OR EQUIPMENT

Prior to submitting its offer, it is recommended that the Bidder visit the site of the proposed work and become familiar with any conditions which may in any manner affect the work to be done or affect the equipment, materials and labor required. The Bidder is also advised to examine carefully any drawings, specifications, or equipment, and become thoroughly aware regarding any and all conditions and requirements that may in any manner affect the work to be performed under the Contract. No additional allowances will be made because of lack of knowledge of these conditions.

1.10 EQUAL PRODUCTS

Intentionally Omitted

1.11 LIQUIDATED DAMAGES

Time is of the essence regarding this Invitation to Bid Construction and the work contemplated hereunder and the City may suffer financial loss and inconvenience if the work is not completed to the satisfaction of the City by the time stipulated in the Contract. Therefore, failure to timely complete the work shall result in the awarded Bidder being subject to liquidated damages, but not as penalty, in the amount of amount of 0.01% of the Contract Price for each and every calendar day the work remains incomplete or the items remain undelivered. As compensation due the City for loss of use and for additional costs incurred by the City due to such non-completion of the work, the City shall have the right to deduct the liquidated damages from any amount due, or that may become due to the awarded Bidder under the Contract, or to invoice the awarded Bidder for such damages if the costs incurred exceed the amount due to the awarded Bidder. The awarded Bidder and the City agree that the amount for liquidated damages is not punitive, and is intended to compensate the City for difficult to quantify losses.

1.12 INSURANCE

The awarded Bidder shall not commence any performance pursuant to the terms of this Solicitation until certification or proof of insurance has been received by the Purchasing Department and approved by the City's Risk Management Division.

The required insurance coverage is to be issued by an insurance company authorized and licensed to do business in the State of Florida, with the minimum rating of A- VIII or better, in accordance with the latest edition of A.M. Best's Insurance Guide. This insurance shall be documented in certificates of insurance which provides that the City of Delray Beach shall be notified at least thirty (30) days in advance of cancellation, non-renewal, or adverse change. The receipt of certificates or other documentation of insurance or policies or copies of policies by the City or by any of its representatives, which indicate less coverage than is required, does not constitute a

waiver of the awarded Bidder's obligation to fulfill the insurance requirements herein. Deductibles must be acceptable to the City of Delray Beach.

The awarded Bidder must submit a current Certificate of Insurance, naming the City of Delray Beach as an additional insured and list as such on the insurance certificate. New certificates of insurance are to be provided to the City upon expiration.

The awarded Bidder shall provide insurance coverage as follows, and shall carry:

- a. Workers' Compensation Insurance – as required by law.
- b. Employer's Liability Insurance - \$1,000,000 per occurrence, \$1,000,000 for each disease, and \$1,000,000 for aggregate disease
- c. Comprehensive General Liability Insurance – with limits of not less than \$1,000,000 per occurrence and \$2,000,000 in the aggregate for Bodily Injury and Property Damage which must include:
 - i. Premises and/or Operations on an occurrence basis.
 - ii. Independent contractors.
 - iii. Products and/or Completed Operations Liability on an occurrence basis.
 - iv. Explosion, Collapse, and Underground Coverages.
 - v. Broad Form Property Damage.
 - vi. Broad Form Contractual Coverage applicable to this specific Agreement, including any hold harmless and/or indemnification agreement.
 - vii. Personal Injury Coverage with Employees and Contractual Exclusions removed with minimum limits of coverage equal to those required for Bodily Injury Liability and Property Damage Liability.
- d. Builders Risk / Installation Floater – The awarded Bidder shall take out and maintain, as applicable, during the life of this Contract, "all risk" type builders risk insurance satisfactory to the City for the completed value of the Project, which shall protect the awarded Bidder and the City as their interests may appear, for the following hazards to the work, encompassing structures in the course of construction, including foundations, additions, attachments and all permanent fixtures belonging to and constituting a part of said structures, as well as materials and equipment suitably stored at the site and awarded Bidder's construction equipment, materials, and temporary structures:
 - i. Fire and lightning, vandalism, and malicious mischief
 - ii. Extended coverage including windstorm, hail, flood, explosion, riot, civil commotion, aircraft, vehicle, and smoke damage
- e. Professional Liability – To include coverage for contractor pollution exposure, with minimum limits of \$1,000,000 per claim and in the aggregate.
- f. Business Automobile Liability – With minimum limits of \$1,000,000 per occurrence combined single limit for Bodily Injury Liability and Property Damage Liability. Coverage must be afforded on a form no more restrictive than the latest edition of the Business

Automobile Liability Policy, without restrictive endorsements, as filed by the Insurance Services Office and must include:

City shall be named as an Additional Insured on both the General Liability and Business Automobile Liability policies, on a primary and non-contributory basis, to include additional insured status on the GL policy for both premises operations and products and completed operations.

If no deductible for insurance is referenced above, the City reserves the right to require such deductibles which shall be determined by the Risk Management Division, but not more than \$25,000 per claim.

The Comprehensive General Liability insurance policy must include coverage that is not more restrictive than the latest edition of the Comprehensive General Liability Policy, without restrictive endorsements, as filed by the Insurance Services Offices, and the policy must include coverage's for premises and/or operations, independent contractors, products and/or completed operations for contracts, contractual liability, broad form contractual coverage, broad form property damage, products, completed operations, and personal injury. Personal injury coverage shall include coverage that has the Employee and Contractual Exclusions removed.

1.13 PERFORMANCE BOND AND CONSTRUCTION BOND

The Bidder to whom a contingent award is made shall duly execute and deliver to the City a Performance Bond and a Construction Bond, both in an amount equal to 100% of the total contract price, payable to the City, as surety for faithful performance under the terms and conditions of the contract. The Performance Bond and Construction Bond shall be delivered to the City contemporaneously with contract execution. The bonds shall be substantially in the format of the examples that are a part of this Solicitation.

Both required Bonds must be executed by a surety company of recognized standing, authorized to do business in the State of Florida, and having a resident agent Bonds may not be canceled, terminated, or revised unless the City has been provided with thirty (30) days' advanced written notice of such action by the surety. The surety must insert the registered agent to accept service of process in the State of Florida, directly on each bond document.

Acknowledgement and agreement is given by both parties that the performance and construction bonds do not limit the liability of the awarded Bidder to the City in the event of a material breach of the contract agreement by the awarded Bidder. The bonds may be used to recover liquidated damages on behalf of the City.

If the awarded Bidder fails to deliver the bonds at the same time as contract execution, the City may declare the awarded Bidder in default of the contractual terms and conditions, and the awarded Bidder shall surrender any bid bond, and the City shall not accept any offers or bids from that Bidder for a twelve (12) month period following such default.

1.14 CERTIFICATIONS

Any Bidder that submits an offer in response to this Solicitation shall, at the time of such offer, hold all necessary certifications issued by the State or County Examining Board qualifying the

Bidder to perform the work proposed for this project. If other professions or trades are required in conjunction with this Solicitation and such work/services will be performed or provided by a subcontractor(s), an applicable Certificate of Competency issued to the subcontractor(s) shall be submitted with the Bidder's offer; provided, however, that the City may at its option and in its best interest allow the Bidder to supply the subcontractor(s) certificate to the City during the evaluation period.

All architects or engineers on this project must possess current Florida professional registrations or licenses for the architectural and engineering services which they intend to provide.

1.15 BID BOND/GUARANTY

Intentionally Omitted

1.16 METHOD OF PAYMENT: INVOICE FOR COMPLETED WORK (PROGRESS PAYMENTS)

The awarded Bidder shall submit an invoice to the City for progress payments for work that has been completed, and has been inspected and accepted by the City. The date of the invoices shall not exceed thirty (30) calendar days from the completion of that portion of the work. Under no circumstances shall the invoice be submitted to the City in advance of the completion and acceptance of the work. The invoice shall contain the following basic information: the awarded Bidder's name and address, invoice number, date of invoice, description of the goods or service, the contract number, purchase order number, and any discounts.

The City will allow progress payments for the work to be performed under this contract. Such progress payments shall be only for work that has been completed and verified by the City.

The City prides itself on paying its vendors promptly and efficiently, and as such requires that vendors accept payment via wire transfer, ACH (direct deposit), or an appropriate electronic payment method. The City is averse to issuing paper checks and seeks to discontinue this practice. All payments shall be made in accordance with the Florida Prompt Payment Act, Section 218.74, Florida Statutes, upon presentation of a proper invoice by the awarded Bidder.

1.17 COMPLETION OF WORK FROM DATE OF PURCHASE ORDER

The Bidder shall state in its offer the number of calendar days from the date of the Notice to Proceed in which it will guarantee to complete the Work.

1.18 WARRANTY REQUIREMENTS: ONE (1) YEAR

In addition to all other warranties that may be supplied by the Bidder, the awarded Bidder shall warrant its products and/or service against faulty labor and/or defective material, for a minimum period of one (1) year from the date of acceptance of the labor, materials and/or equipment by the City. This warranty requirement shall remain in force for the full period; regardless of whether the awarded Bidder is under contract with the City at the time of defect. Any payment by the City on behalf of the services received from the awarded Bidder does not constitute a waiver of these warranty provisions.

1.19 ADDITIONAL FACILITIES OR PRODUCTS

Intentionally Omitted

1.20 CATALOGS AND PRICE LISTS
Intentionally Omitted

1.21 CLEAN UP
The awarded Bidder shall remove all unusable materials and debris from the work areas at the end of each workday, and dispose of the same in an appropriate manner. Upon final completion, the awarded Bidder shall thoroughly clean up all areas where work has been involved.

1.22 DEMONSTRATION OF EQUIPMENT
Intentionally Omitted

1.23 HOURLY RATE
Intentionally omitted

1.24 MOTOR VEHICLE LICENSE REQUIREMENT
Intentionally Omitted

1.25 PATENTS AND ROYALTIES
The awarded Bidder, without exception, shall indemnify and hold harmless the City and its employees from liability of any nature or kind, including cost and expenses for, or as a result of, any copyrighted, patented, or unpatented invention, process, or article manufactured by the awarded Bidder. The awarded Bidder has no liability when such claim is solely and exclusively due to the combination, operation, or use of any article supplied hereunder with equipment or data not supplied by awarded Bidder, or is based solely and exclusively upon the City's alteration of the article. The City will provide prompt written notification of a claim of copyright or patent infringement.

Further, if such a claim is made or is pending, the awarded Bidder may, at its option and expense, procure for the City the right to continue use of, replace or modify the article to render it noninfringing. (If none of the alternatives are reasonably available, the City agrees to return the article on request to the awarded Bidder and receive reimbursement, if any, as may be determined by a court of competent jurisdiction.) If the awarded Bidder uses any design, device, or materials covered by letters, patent or copyright, it is mutually agreed and understood without exception that the contract prices shall include all royalties or cost arising from the use of such design, device, or materials in any way involved in the work.

1.26 PRE-CONSTRUCTION CONFERENCE
Prior to the start of construction, the awarded bidder is required to attend a Pre-Construction Conference with City officials who are designated to represent the City for this project.

1.27 RELEASE OF CLAIM REQUIRED
Pursuant Section 255.05, *Florida Statutes* all payments to the subcontractors shall be made by the awarded Bidder within ten (10) days of receipt of the partial payment from the City. With the exception of the first partial payment, the awarded Bidder must pay all of its subcontractors and suppliers who have performed any work or supplied any materials for the project within ten (10) days after receipt of the partial payment by the awarded Bidder for monies due such subcontractors and suppliers as a result of a percentage of the work completed. The awarded

Bidder must provide the City's project manager with duly executed affidavits (subcontractor's statement of satisfaction) or releases of claim from all subcontractors and suppliers who have performed any work or supplied any materials for on the project as of that date. The affidavit or releases shall certify that said subcontractors and suppliers have been paid their proportionate share of all previous partial payments to the awarded Bidder. In the event such affidavits cannot be furnished, the awarded Bidder may submit an executed consent of surety to requisition payment, identifying the subcontractors and suppliers with the amounts for which the statement of satisfaction cannot be furnished. If the awarded Bidder fails to provide consent of surety to requisition payment, the amount in dispute will be withheld until either the statement of satisfaction is furnished, or the consent of surety to requisition payment is furnished.

1.28 SUBCONTRACTORS OF WORK SHALL BE IDENTIFIED

As part of its Bid, the Bidder must identify any and all subcontractors that will be used in the performance of the proposed work, their capabilities and experience, and the portion of the work to be done by the subcontractor. The competency of the subcontractor(s) with respect to experience, skill, responsibility and business standing shall be considered by the City when making the award in the best interest of the City. If the Bidder fails to identify any and all sub-contractors in the Bid, the Bidder may be allowed to submit this documentation during the Bid evaluation period, if such action is in the best interest of the City.

1.29 CHANGES

The City may at any time, as the need arises, order changes within the scope of the work without invalidating the contract. If such changes increase or decrease the amount due under the contract, or the time required for performance of the work, an equitable adjustment shall be authorized by Change Order.

The City may, at any time make changes in the details of the Work. The awarded bidder shall proceed with the performance of any changes in the work so ordered by the City, unless the awarded bidder believes that such changes entitles it to a change in the contract price or time, or both, in which event the awarded bidder shall give the City immediate written notice thereof after the receipt of the ordered change. Thereafter, the awarded bidder shall document the basis for the change in contract price or time within ten (10) calendar days. All changes resulting in a request for added time must be accompanied by a Time Impact Analysis.

Changes in the scope of work may be accomplished by change order, construction change directive, or field order. Any one of these documents shall be interpreted as further instruction from the City.

A change order shall be based upon agreement between the City and the awarded bidder; a construction change directive may or may not be agreed to by the awarded bidder; a field order for a minor change in the work may be issued by the City.

Changes in the work shall be performed under applicable provisions of the contract documents, and the awarded bidder shall proceed promptly, unless otherwise provided in the change order, construction change directive, or field order.

A change order will be prepared and signed by the City and awarded bidder, stating their agreement upon all of the following:

- a. a change in the scope of work;
- b. the amount of the adjustment in the contract price, if any; and
- c. the extent of the adjustment in the contract time, if any.

The issuance of a change order shall be full and final settlement for any issue or item addressed in the change order. No change order will be accepted or processed with any "reservation of rights" notations or clauses.

1.30 FAILURE TO DELIVER OR COMPLETE WORK

Should the awarded Bidder fail to deliver or complete the work within the time stated in the Contract, it is hereby agreed and understood that the City reserves the authority to cancel the Contract with the awarded Bidder and secure the services of another vendor to purchase the items or complete the work. If the City exercises this authority, the City shall be responsible for paying the awarded Bidder for work which was completed and items delivered and accepted by the City in accordance with the Contract specifications. The City may, at its option, demand payment from the awarded Bidder, through an invoice or credit memo, for any additional costs over and beyond the original Contract price, which were incurred by the City, as a result of having to secure the services of another vendor.

1.31 CORRECTING DEFECTS

The awarded Bidder shall be responsible for promptly correcting any deficiency, at no cost to the City, within three (3) calendar days after the City notifies the awarded Bidder of such deficiency in writing. If the awarded Bidder fails to correct the defect, the City may procure the products or services from another source and charge the awarded Bidder for any additional costs that are incurred by the City for this work or items; either through a credit memorandum or through invoicing.

1.32 ACCIDENT PREVENTION AND BARRICADES

Precautions shall be exercised at all times for the protection of persons and property. All contractors performing services or delivering goods under this contract shall conform to all relevant OSHA, State and City regulations during the course of such effort. Any fines levied by the above mentioned authorities for failure to comply with these requirements shall be borne solely by the awarded Bidder. Barricades shall be provided by the awarded Bidder when work is performed in areas traversed by persons, or when deemed necessary by the City.

1.33 OMISSIONS IN SPECIFICATIONS

The Statement of Work or description of items contained within this Solicitation describes the various work requirements deemed necessary for the completion of the project. Any omissions of inherent technical functions or classes of work within the Specifications and/or Statement of Work shall not relieve the awarded Bidder from furnishing, installing or performing such work where required to the satisfactory completion of the project.

1.34 MATERIALS SHALL BE NEW AND WARRANTED AGAINST DEFECTS

The awarded Bidder hereby acknowledges and agrees that all materials, except where recycled content is specifically requested, supplied by the awarded Bidder in conjunction with this Solicitation and resultant Contract shall be new, warranted for their merchantability, and fit for a particular purpose. In the event any of the materials supplied to the City by the awarded Bidder are found to be defective or do not conform to specifications: (1) the materials may be returned to the awarded Bidder at the awarded Bidder's expense and the Contract cancelled or (2) the City may require the awarded Bidder to replace the materials at the awarded Bidder's expense.

1.35 TOXIC SUBSTANCES/FEDERAL "RIGHT TO KNOW" REGULATIONS

The Federal "Right to Know" Regulation implemented by the Occupational Safety and Health Administration (OSHA) requires employers to inform their employees of any toxic substances to which they may be exposed in the workplace, and to provide training in safe handling practices and emergency procedures. It also requires notification to local fire departments of the location and characteristics of all toxic substances regularly present in the workplace.

Accordingly, the awarded Bidder performing under this Contract is required to provide two (2) complete sets of Material Safety Data Sheets to the City for any products that are subject to these regulations. This information shall be provided at the time when the initial delivery is made, on a product by product basis.

END OF SECTION 1

SECTION 2

SCOPE OF WORK AND TECHNICAL SPECIFICATIONS

2.1 SCOPE

The awarded Bidder shall provide all labor, equipment, materials, and other operations to perform alleyway construction. The City estimates the total costs to construct this project will not exceed \$337,000.

2.2 REQUIREMENTS

- a. Working hours for this project shall be:
 - i. 7:30 a.m. ET to 5:00 p.m. ET Monday through Friday
 - ii. 7:30 a.m. ET to 5:00 p.m. ET Saturday, if requested and approved by City
- b. Inspections shall be requested two business days in advance. The City will not charge for inspections during regular business hours. Inspections outside of regular business hours are subject to a fee determined by the City.
- c. The awarded Bidder shall be responsible for performing all required site preparation tests, surveys, and studies to prepare the site for the construction of the building shell.

2.3 ADDITIONAL INFORMATION

- a. The Awarded Bidder shall be responsible for coordinating the removal and relocation of existing privately-owned landscape and fences within the right-of-way (R/W) to private property.
- b. The Awarded Bidder shall obtain the required documentation and approvals to stage equipment outside of the City's R/W.
- c. The Awarded Bidder shall be responsible to apply for and obtain the necessary permits/approvals required to construct the work associated with the Contract Documents.

2.4 GENERAL REQUIREMENTS

Services shall include construction services for alley ways as outlined in the specifications documents.

2.5 TASKS

The Tasks required of Contractor include, but are not limited to the following:

- a. Block 63 Alley:
Develop City Block 63 Alley in accordance with Construction Documents and the City of Delray Beach Standards and Specifications. The project includes clearing and grubbing, milling and resurfacing, paving, grading, sanitary main replacement, drainage improvements, concrete curb, new sidewalk and curb ramps, swale grading, sodding, paving, and grading.

- b. Block 17 Alley:
Develop City Block 17 Alley in accordance with the Construction Documents and City of Delray Beach Standards and Specifications. The project includes clearing and grubbing, drainage improvements, concrete curb, new sidewalk and curb ramps, swale grading, sodding, paving, and grading.
- c. Construction Time: 120 Total days. Substantial completion 90 days and Final completion 30 days.

2.6 SPECIFICATIONS, PLANS AND DRAWINGS

Awarded Bidder shall construct the alley ways per the Specifications, plans, drawings and other documents contained in this ITBC.

2.7 PERMIT FEES

The awarded Bidder shall be responsible for all permit fees associated with the construction of this project.

2.8 PROJECT TIMELINE

The awarded Bidder agrees to complete the work within the timeframe designated by the City. The City, at its discretion may allow for time extensions for unforeseen and unexpected delays. Work shall be substantially completed within 90 calendar days of the date when the Contract Time commences and completed within 30 days of the date of substantial completion.

END OF SECTION 2

SUBMITTAL PAGE

Complete Web Form

SECTION 3 PRICING SCHEDULE

3.1 PRICES AND RATES

The Bidder shall indicate on their bid the firm and fixed prices and rates offered to the City for the work described in this Solicitation, including any Alternates in the line items are on BidSync.

3.2 COMPLETION

Bidder agrees that the work will be finally complete within 120 days from the date of Notice to Proceed.

3.3 Lump sum amount in dollars and cents can be placed here as a reference. Total lump sum costs on the bid form in BidSync is as follows:

\$ _____

Signature

Date

Printed Name and Title

There is no web form available on www.bidsync.com for this form. Please submit pricing via www.bidsync.com or as otherwise indicated in this solicitation.

END OF SECTION 3

SECTION 4

MINIMUM QUALIFICATIONS

Each bidder shall submit the information and documentation requested below that confirms it meets the following qualification requirement(s).

- a. Bidder must have been in business for a minimum of three years prior to the Due Date and Time. **Provide supporting documentation (e.g. state, county, city business license; occupational license) that confirms Bidder has been in business for a minimum of thirty-six months prior to the Due Date and Time.**
- b. Bidder must have experience in constructing a minimum of three similar or same projects since 2013 that had one or more of the following components: roadway work, alley way construction, streets and drainage. **Provide the following information for the three qualifying projects:**
 - i. **Name of project owner**
 - ii. **Contact name**
 - iii. **Contact email**
 - iv. **Location / address of project**
 - v. **Dates of project (start/end)**
 - vi. **Brief description of project**
 - vii. **List of the components of the project as stated above**
 - viii. **The beginning and ending amounts of the contract**
 - ix. **Number and types of change orders and amendments including the amount**
- c. Bidder must hold a Florida State General Contractor's license and a current certificate of competency issued by Palm Beach County Examining Board having jurisdiction over licensing of Contractors in the type of work involved in this contract. **Provide proof that the Bidder is licensed and/or certified.**
- d. Bidder has no reported conflict of interests in relation to this ITBC. **No additional documentation is required. The City will verify from Bidder's Conflict of Interest Disclosure Form.**
- e. Provide proof that bidder is registered with the State of Florida, Division of Corporations to do business in Florida. **No documentation is required. The City will verify.**
- f. Bidder shall NOT be listed on the Florida Department of Management Services, Convicted Vendor List as defined in Florida Statute Section 287.133(3)(d). **No documentation from Respondent is required. The City will verify the status.**

END OF SECTION 4

SECTION 5
ACKNOWLEDGEMENT OF ADDENDA

Complete Web Form

END OF SECTION 5

SECTION 6
BID SUBMITTAL SIGNATURE PAGE

Complete Web Form

END OF SECTION 6

SECTION 7

AFFIDAVITS, PERFORMANCE AND PAYMENT BONDS FORMAT, LETTER OF CREDIT FORMAT

7.1 AFFIDAVITS

The forms listed below must be completed by an official having legal authorization to contractually bind the company or firm. Each signature represents a binding commitment upon the Bidder to provide the goods and/or services offered to the City if the Bidder is determined to be the lowest responsive and responsible Bidder.

- a. Bid Submittal Signature Page
- b. Acknowledgement of Addenda
- c. Conflict of Interest Disclosure Form
- d. Notification of Public Entity Crimes Law
- e. Notification of Public Records Law
- f. Drug-Free Work Place
- g. Non-Collusion Affidavit
- h. Sample Performance Bond Format (will be requested from bidder recommended for award)
- i. Sample Payment Bond Format (will be requested from bidder recommended for award)
- j. Sample Letter of Credit Format (if required, will be requested from bidder recommended for award)
- k. Bid Bond (intentionally omitted)

CONFLICT OF INTEREST DISCLOSURE FORM

Complete Web Form

NOTIFICATION OF PUBLIC ENTITY CRIMES LAW

Complete Web Form

**Notification of Public Records Law Pertaining to Public Contracts and Requests
for Contractor Records Pursuant to Chapter 119, *Florida Statutes***

Complete Web Form

DRUG-FREE WORKPLACE

Complete Web Form

NON-COLLUSION AFFIDAVIT

There is no web form available on www.bidsync.com for this form. Please complete and upload form to www.bidsync.com or as otherwise indicated in this solicitation.

STATE OF _____
COUNTY OF _____

Before me, the undersigned authority, personally appeared _____, who, after being by me first duly sworn, deposes and says of his/her personal knowledge that:

a. He / She is _____ of _____, the Bidder that has submitted a Bid to perform work for the following:

ITBC No.: _____ Title: _____

b. He / She is fully informed respecting the preparation and contents of the attached Request for Bids, and of all pertinent circumstances respecting such Solicitation.

Such Bid is genuine and is not a collusive or sham Bid.

c. Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees, or parties in interest, including this affiant, has in any way colluded, conspired, connived, or agreed, directly or indirectly, with any other Bidder, firm, or person to submit a collusive or sham Bid in connection with the Solicitation and contract for which the attached Bid has been submitted or to refrain from proposing in connection with such Solicitation and contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm, or person to fix the price or prices in the attached Bid or any other Bidder, or to fix any overhead, profit, or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance, or unlawful agreement any advantage against the City or any person interested in the proposed contract.

d. The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

_____ Signature

Subscribed and sworn to (or affirmed) before me this _____ day of _____ 20____, by _____, who is personally known to me or who has produced _____ as identification.

SEAL

Notary Signature _____
Notary Name: _____
Notary Public (State): _____
My Commission No: _____
Expires on: _____

SAMPLE BID BOND

Intentionally Omitted

SAMPLE PERFORMANCE BOND FORMAT

KNOW ALL MEN BY THESE PRESENTS: that - _____

(Insert full name and address or legal title of awarded bidder)

as Principal, hereinafter called Contractor, and _____,
(Name of Insurer)

as Surety, hereinafter called Surety, are held and firmly bound unto the City of Delray Beach, Palm Beach County, Florida.

As Obligee, hereinafter called the City, in the amount of _____,
(\$_____), for the payment whereof, Contractor and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by the presents.

WHEREAS, Contractor has by written agreement dated _____, 20_____, entered into Contract No. _____ with the City in accordance with the Solicitation specifications prepared by the City, which Contract is by reference made a part hereof and is hereinafter referred as the Contract, for the performance of the following Work:

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise, it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the City.

Whenever Contractor shall be and declared by the City to be in default under the Contract, the City having performed City's obligations thereunder, the Surety may promptly remedy the default or shall promptly:

- a. Complete the Contract in accordance with its terms and conditions; or
- b. Obtain a Bid or Bids for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the most responsible Bidder, or if the City elects, upon determination by the City and the Surety jointly of the most responsible Bidder, arrange for a Contract between such Bidder and the City, and make available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance

of the contract price", as used in this paragraph, shall mean the total amount payable by the City to Contractor under the contract and any amendments thereto, less the amount properly paid by the City to the Contractor.

Any suit under this bond must be instituted before the expiration of twenty-five (25) months from the date on which final payment under the Contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the City named herein or the heirs, executors, administrators, or successors of the City.

Signed and sealed this _____ day of _____, 20__.

(Principal)

(Seal)

(Witness)

(Title)

(Seal)

(Name of Insurer)

Surety

(Witness)

By:

(Attorney-in-Fact)

SAMPLE PAYMENT BOND FORMAT

KNOW ALL MEN BY THESE PRESENTS: that - _____

(Insert full name and address or legal title of awarded bidder)

as Principal, hereinafter called Contractor, and _____,
(Name of Insurer)

as Surety, hereinafter called Surety, are held and firmly bound unto the City of Delray Beach, Palm Beach County, Florida.

As Obligee, hereinafter called the City, in the amount of _____,
(\$_____), for the payment whereof, Contractor and Surety bind themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by the presents.

WHEREAS, Contractor has by written agreement dated _____, 20_____, entered into Contract No. _____ with the City in accordance with the Solicitation specifications prepared by the City, which Contract is by reference made a part hereof and is hereinafter referred as the Contract, for the performance of the following Work:

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if said Contractor and all subcontractors to whom any portion of the work provided for in said Contract is sublet and all assignees of said Contract and of such subcontractors shall promptly make payments to all persons supplying him or them with labor, products, services, or supplies for or in the prosecution of the work provided for in such Contract, or in any amendment or extension of or addition to said Contract, and for the payment of reasonable attorney's fees, incurred by the claimants in suits on this bond, then the above obligation shall be void; otherwise, it shall remain in full force and effect.

HOWEVER, this bond is subject to the following conditions and limitations:

a) Any person, firm or corporation that has furnished labor, products, or supplies for or in the prosecution of the work provided for in said Contract shall have a direct right of action against the Contractor and Surety on this bond, which right of action shall be asserted in a proceeding, instituted in the county in which the work provided for in said Contract is to be performed or in any county in which Contractor or Surety does business. Such right of action shall be asserted in proceedings instituted in the name of the claimant or claimants for his or their use and benefit against said Contractor and Surety or either of them (but not later than one year after the final settlement of said Contract) in which action such claim or claims shall be adjudicated and judgment rendered thereon.

b) The Principal and Surety hereby designate and appoint _____

as the agent of each of them to receive and accept service of process or other pleading issued or filed in any proceeding instituted on this bond and hereby consent that such service shall be the same as personal service on the Contractor and/or Surety.

c) In no event shall the Surety be liable for a greater sum than the penalty of this bond, or subject to any suit, action or proceeding thereon that is instituted later than one year after the final settlement of said Contract.

d) This bond is given pursuant to and in accordance with the provisions of Florida Statutes, and all the provisions of the law referring to this character of bond as set forth in any sections or as may be hereinafter enacted, and these are hereby made a part hereof to the same extent as if set out herein in full.

Any suit under this bond must be instituted before the expiration of twenty-five (25) months from the date on which final payment under the Contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the City named herein or the heirs, executors, administrators, or successors of the City.

Signed and sealed this _____ day of _____, 20__.

(Principal)

(Seal)

(Witness)

(Title)

(Seal)

(Name of Insurer)

Surety

(Witness)

By: _____
(Attorney-in-Fact)

SAMPLE LETTER OF CREDIT FORMAT

LETTER OF CREDIT NO.: _____
ISSUANCE DATE: _____

APPLICANT:

{Name of Corporation} _____
{Address} _____
{City, State, Zip} _____

BENEFICIARY:

CITY OF DELRAY BEACH
100 N.W. 1ST AVENUE
DELRAY BEACH, FLORIDA 33444

FOR U.S.D. \$ _____

DATE OF EXPIRATION: _____

WE HEREBY ESTABLISH OUR IRREVOCABLE LETTER OF CREDIT NO. _____ IN FAVOR OF THE BENEFICIARY, THE CITY OF DELRAY BEACH, FLORIDA (HEREINAFTER "CDB") FOR THE ACCOUNT OF THE ABOVE-REFERENCED APPLICANT, AVAILABLE BY YOUR DRAFTS DRAWN ON (Insert name of Bank) PAYABLE AT SIGHT FOR ANY SUM OF MONEY NOT TO EXCEED A TOTAL OF (Insert the amount of money), THE AMOUNT REFERENCED ABOVE.

DEMANDS OF THE LETTER OF CREDIT MUST BE ACCCOMPANIED BY A STATEMENT FROM THE CITY MANAGER OF THE CITY OF DELRAY BEACH CERTIFYING EITHER: (1) THAT SAID LETTER OF CREDIT IS ABOUT TO EXPIRE AND HAS NOT BEEN RENEWED, OR (2) THAT WORK HAS NOT BEEN COMPLETED IN ACCORDANCE WITH THE PLANS, SPECIFICATIONS, AND AGREEMENTS (INCLUDING ANY AMENDMENTS THEREOF) FOR THE FOLLOWING PROJECT: Block 63 and NW 5th Alleys MLK- Lake Ida Road, Project Nos. 15-001 & 15-040 (THE 'PROJECT').

IT IS A CONDITION OF THIS LETTER OF CREDIT THAT IT WILL BE AUTOMATICALLY EXTENDED FOR PERIODS OF ONE YEAR FROM EXPIRY DATE HEREOF, OR ANY FUTURE EXPIRATION DATE, WITHOUT ANY AMENDMENT, UNLESS THIRTY (30) DAYS BUT NO MORE THAN SIXTY (60) DAYS PRIOR TO ANY EXPIRATION DATE WE SHALL NOTIFY CDB IN WRITING BY CERTIFIED MAIL RETURN RECEIPT REQUESTED, OR BY COURIER VIA HAND DELIVERY AT THE ABOVE-LISTED ADDRESS, THAT WE ELECT NOT TO CONSIDER THIS LETTER OF CREDIT RENEWED FOR ANY SUCH ADDITIONAL PERIOD.

WE HEREBY AGREE WITH THE DRAWERS, ENDORSERS, AND BONA FIDE HOLDERS OF ALL DRAFTS DRAWN UNDER AND IN COMPLIANCE WITH THE TERMS OF THE CREDIT THAT SUCH DRAFTS WILL BE DULY HONORED UPON PRESENTATION TO {Name of Bank} _____ (THE 'BANK'), WHICH IS DULY AUTHORIZED TO CONDUCT BUSINESS IN THE STATE OF FLORIDA IN ACCORDANCE WITH THE TERMS HEREOF. IF A DRAFT, AS DESCRIBED IN THIS LETTER OF CREDIT, IS PRESENTED PRIOR TO THE

EXPIRATION DATE AND IN CONFORMITY WITH THE TERMS OF THIS LETTER OF CREDIT AND UPON PRESENTATION IT IS WRONGFULLY DISHONORED BY THE BANK, THE BANK AGREES TO PAY REASONABLE ATTORNEYS FEES AND COSTS, INCLUDING FEES AND COSTS ON APPEAL, INCURRED BY THE CITY OF DELRAY BEACH TO ENFORCE THIS LETTER OF CREDIT SHOULD CDB PREVAIL.

DOCUMENTS MUST BE PRESENTED FOR PAYMENT TO:

{Name of Bank Branch} _____

{Address} _____

{City, State, Zip} _____

ATTN: {Department} _____

ALL DRAWINGS UNDER THIS LETTER OF CREDIT MUST BE ACCCOMPANIED BY THE ORIGINAL LETTER OF CREDIT INSTRUMENT WHICH WILL BE RETURNED TO THE BENEFICIARY AFTER ENDORSING THE BACK OF SAME WITH THE AMOUNT OF EACH DRAWING BY US.

PARTIAL DRAWINGS ARE PERMITTED.

THE AMOUNT OF ANY DRAFT DRAWN UNDER THIS CREDIT MUST BE ENDORSED ON THE REVERSE OF THE ORIGINAL CREDIT. ALL DRAFTS MUST BE MARKED "DRAWN UNDER {Name of Bank} _____ LETTER OF CREDIT NUMBER _____ DATED _____, 20____."

THIS CREDIT IS SUBJECT TO THE "UNIFORM CUSTOMS AND PRACTICE FOR DOCUMENTARY CREDITS, (2007 REVISION), INTERNATIONAL CHAMBER OF COMMERCE PUBLICATION NO. 600", AND TO THE PROVISIONS OF FLORIDA LAW. IF A CONFLICT BETWEEN THE UNIFORM CUSTOMS AND PRACTICE FOR DOCUMENTARY CREDITS AND FLORIDA LAW SHOULD ARISE, FLORIDA LAW SHALL PREVAIL. IF A CONFLICT BETWEEN THE LAW OF ANOTHER STATE OR COUNTRY AND FLORIDA LAW SHOULD ARISE, FLORIDA LAW SHALL PREVAIL. VENUE FOR ANY DISPUTES RELATING TO THE ENFORCEMENT OF THIS LETTER OF CREDIT SHALL BE PALM BEACH COUNTY, FLORIDA.

{Name of Bank} _____

BY: _____

{Name} _____

{Title} _____

SECTION 8

SAMPLE AGREEMENT FORMAT

Below is the standard agreement format for this Invitation to Bid Construction. This is a sample agreement only and is subject to revisions. **DO NOT COMPLETE.**

AGREEMENT

THIS AGREEMENT is hereby made and entered into this _____ day of _____, 20____, (the "effective date") by and between the City of Delray Beach, a Florida municipal corporation ("City"), whose address is 100 N.W. 1st Avenue, Delray Beach, Florida 33444, and _____, a corporation (hereafter referred to as "Contractor"), whose address is _____.

WHEREAS, the City desires to retain the services of the Contractor to provide the goods and services in accordance with the City's Invitation to Bid Construction No. 2019-005 and the Contractor's response thereto, all of which are incorporated herein by reference.

NOW, THEREFORE, in consideration of the mutual covenants and promises hereafter set forth, the Contractor and the City agree as follows:

ARTICLE 1. INCORPORATION OF INVITATION TO BID CONSTRUCTION

The terms and conditions of this Agreement shall include and incorporate the terms, conditions, and specifications set forth in the City's Invitation to Bid Construction No. 2019-005, and the Contractor's response to the Invitation to Bid Construction, including all documentation required thereunder.

ARTICLE 2. DESCRIPTION OF GOODS OR SCOPE OF SERVICES

The Contractor shall provide the goods and/or perform those services identified in the specifications accompanying the City's Invitation to Bid Construction, which are incorporated herein by reference.

ARTICLE 3. COMPENSATION

The City shall pay to the Contractor, in compliance with the Pricing Schedule attached hereto and incorporated herein, according to the terms and specifications of the referenced Invitation to Bid Construction.

ARTICLE 4. MISCELLANEOUS PROVISIONS

a. Notice Format. All notices or other written communications required, contemplated, or permitted under this Agreement shall be in writing and shall be hand delivered, telecommunicated, or mailed by registered or certified mail (postage prepaid), return receipt requested, to the following addresses:

i. As to the City: City of Delray Beach

100 N.W. 1st Avenue
Delray Beach, Florida 33444
Attn: City Manager
Email:

ii. with a copy to: City of Delray Beach
100 N.W. 1st Avenue
Delray Beach, Florida 33444
Attn: City Attorney
Email:

iii. As to the Contractor: _____

Attn.: _____
Email: _____

b. Headings. The headings contained in this Agreement are for convenience of reference only, and shall not limit or otherwise affect in any way the meaning or interpretation of this Agreement.

c. Effective Date. The effective date of this Agreement shall be as of the date it has been executed by both the parties hereto.

ARTICLE 5. CONTRACT TERM

This term of this Agreement shall be from the effective date through the completion of work and full acceptance by the City, unless terminated earlier in accordance with terms set forth in the ITBC.

(Remainder of this page is intentionally left blank.)

IN WITNESS WHEREOF, the parties have executed this Agreement on the dates hereinafter written.

CITY OF DELRAY BEACH, FLORIDA

[SEAL]

By: _____
Mark R. Lauzier, City Manager

ATTEST:

By: _____
Katerri Johnson, City Clerk

APPROVED AS TO FORM AND
LEGAL SUFFICIENCY

By: _____
Lynn Gelin, Interim City Attorney

CONTRACTOR

[SEAL]

By: _____

Printed Name

Title

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of _____, 201_____, by _____, as _____ (name of officer or agent, title of officer or agent), of _____ (name of corporation acknowledging), a _____ (state or place of incorporation) corporation, on behalf of the corporation. He/She is personally known to me or has produced _____ (type of identification) as identification.

Notary Public – State of _____

END OF SECTION 8

SECTION 9

GENERAL TERMS AND CONDITIONS

9.1 DEFINITIONS

- a. Bid: any offer(s) submitted in response to an Invitation to Bid Construction.
- b. Bidder: person or firm submitting a Bid in response to an Invitation to Bid Construction.
- c. Bid Solicitation or Invitation to Bid Construction: this Solicitation documentation, including any and all addenda.
- d. Bid Submittal Form: describes the goods or services to be purchased, and must be completed and submitted with the Bid.
- e. City: shall refer to the City of Delray Beach, Florida.
- f. Contract or Agreement: Invitation to Bid Construction, all addenda issued thereto, all affidavits, the signed agreement, and all related documents which comprise the totality of the contract or agreement between the City and the Bidder.
- g. Contractor: awarded bidder or Bidder who is awarded a contract to provide goods or services to the City.
- h. Invitation to Bid Construction: formal request for Bids from qualified Bidders.
- i. Purchasing Department: Purchasing Department of the City of Delray Beach, Florida.
- j. Responsible Bidder: Bidder which has the capability in all respects to perform in full the contract requirements, as stated in the Invitation to Bid Construction, and the integrity and reliability that will assure good-faith performance.
- k. Responsive Bidder: Bidder whose Bid conforms in all material respects to the terms and conditions included in the Invitation to Bid Construction.

9.2 CONE OF SILENCE

Pursuant to Section 2-355 of Palm Beach County Ordinance No. 2011-039, and the purchasing policies of the City of Delray Beach, all Solicitations, once advertised and until the appropriate authority has approved an award recommendation, are under the "Cone of Silence". This limits and requires documentation of communications between potential Bidders and/or Bidders on City Solicitations, the City's professional staff, and the City Council members.

9.3 ADDENDUM

The Purchasing Department may issue an addendum in response to any inquiry received, prior to the close of the Solicitation period, which changes, adds, or clarifies the terms, provisions, or requirements of the Solicitation. The Bidder should not rely on any representation, statement, or explanation, whether written or verbal, other than those made in the Solicitation document or in the addenda issued. Where there appears to be a conflict between the Solicitation and any addenda, the last addendum issued shall prevail. It is the vendor's responsibility to ensure receipt of all addenda, and any accompanying documentation. The vendor is required to submit with its Bid or Bid a signed "Acknowledgment of Addenda" form, when any addenda have been issued.

9.4 LEGAL REQUIREMENTS

This Solicitation is subject to all legal requirements contained in the applicable City Ordinances and Resolutions, as well as all applicable City, State, and Federal Statutes. Where conflict exists between this Bid Solicitation and these legal requirements, the authority shall prevail in the following order: Federal, State, and local.

9.5 CHANGE OF BID

Prior to the scheduled Bid opening a Bidder may change its Bid by submitting a new Bid (as indicated on the cover page) with a letter on the firm's letterhead, signed by an authorized agent stating that the new submittal replaces the original submittal. The new submittal shall contain the letter and all information as required for submitting the original Bid. No changes to a Bid will be accepted after the Bid has been opened.

9.6 WITHDRAWAL OF BID

A Bid shall be irrevocable unless the Bid is withdrawn as provided herein. Only a written letter received by the Purchasing Department prior to the Bid opening date may withdraw a Bid. A Bid may also be withdrawn ninety (90) days after the Bid has been opened and prior to award, by submitting a letter to the Purchasing and Contracts Director. The withdrawal letter must be on company letterhead and signed by an authorized agent of the Bidder.

9.7 CONFLICTS WITHIN THE BID SOLICITATION

Where there appears to be a conflict between the General Terms and Conditions, Special Conditions, the Technical Specifications, the Bid Submittal Form, or any addendum issued, the order of precedence shall be: the last addendum issued, the Bid Submittal Form, the Technical Specifications, the Special Conditions, and then the General Terms and Conditions.

9.8 PROMPT PAYMENT TERMS

It is the policy of the City of Delray Beach that payment for all purchases by City departments shall be made in a timely manner. The City will pay the awarded Bidder upon receipt and acceptance of the goods or services by a duly authorized representative of the City. In accordance with Section 218.74, Florida Statutes, the time at which payment shall be due from the City shall be forty-five (45) days from receipt of a proper invoice. The time at which payment shall be due to small businesses shall be thirty (30) days from receipt of a proper invoice. Proceedings to resolve disputes for payment of obligations shall be concluded by final written decision of the City Manager or designee, not later than sixty (60) days after the date on which the proper invoice was received by the City.

9.9 DISCOUNTS (PROMPT PAYMENTS)

The Bidder may offer cash discounts for prompt payments; however, such discounts will not be considered in determining the lowest price during Bid evaluation. Bidders are requested to provide prompt payment terms in the space provided on the Bid submittal signature page of the Solicitation.

9.10 PREPARATION OF BIDS

- a. The Bid forms define requirements of items to be purchased, and must be completed and submitted with the Bid. Use of any other forms will result in the rejection of the Bidder's offer. The Bid submittal forms must be legible. Bidders shall use typewriter, computer, or ink. All changes must be crossed out and initialed in ink. Failure to comply with these requirements may cause the Bid to be rejected.
- b. An authorized agent of the Bidder's firm must sign the Bid submittal form. **Failure to sign the Signature Page of the Bid shall render the Bid non-responsive.**
- c. The Bidder may be considered non-responsive if Bids are conditioned upon modifications, changes, or revisions to the terms and conditions of this Solicitation.
- d. The Bidder may submit alternate Bid(s) for the same Solicitation provided that such offer is allowable under the terms and conditions. The alternate Bid must meet or exceed the minimum requirements and be submitted as a separate Bid submittal marked "Alternate Bid".
- e. When there is a discrepancy between the unit prices and any extended prices, the unit prices will prevail.
- f. Late Bids will not be accepted and will be returned to the sender unopened. It is the Bidder's responsibility to ensure timely delivery by the due date and time, and at the place stated in this Solicitation. No exceptions will be made due to weather, carrier, traffic, illness, or other issues.

9.11 CANCELLATION OF BID SOLICITATION

The City of Delray Beach reserves the right to cancel, in whole or in part, any Invitation to Bid Construction when it is in the best interest of the City.

9.12 AWARD OF CONTRACT

- a. The contract may be awarded to the responsive and responsible Bidder meeting all requirements as set forth in the Solicitation. The City reserves the right to reject any and all Bids, to waive irregularities or technicalities, and to re-advertise for all or any part of this Bid Solicitation as deemed in its best interest. The City shall be the sole judge of its best interest.

- b. The City reserves the right to reject any and all Bids if it is determined that prices are excessive, best offers are determined to be unreasonable, or it is otherwise determined to be in the City's best interest to do so.
- c. The City reserves the right to negotiate prices with the **responsive and responsible low Bidder**, provided that the scope of work of this Solicitation remains the same.
- d. The Bidder's performance as a prime contractor or subcontractor on previous City contracts shall be taken into account in evaluating the Bid received for this Bid Solicitation.
- e. The City will provide a copy of the Bid Tabulation to all Bidders responding to this Solicitation.
- f. The Bid Solicitation, any addenda and/or properly executed modifications, the signed Agreement, the purchase order, and any change order(s) shall constitute the contract.
- g. The Purchasing Director will decide all tie Bids.
- h. Award of this Bid may be predicated on compliance with and submittal of all required documents as stipulated in the Bid Solicitation.
- i. The City reserves the right to request and evaluate additional information from any Bidder after the submission deadline as the City deems necessary.

9.13 CONTRACT EXTENSION

The City reserves the right to automatically extend any agreement for a maximum period not to exceed ninety (90) calendar days in order to provide City departments with continual service and supplies while a new agreement is being solicited, evaluated, and/or awarded.

9.14 WARRANTY

All warranties express and implied shall be made available to the City for goods and services covered by this Bid Solicitation. All goods furnished shall be fully guaranteed by the awarded Bidder against factory defects and workmanship. At no expense to the City, the awarded Bidder shall correct any and all apparent and latent defects that may occur within the manufacturer's standard warranty.

9.15 ESTIMATED QUANTITIES

Estimated quantities or dollars are for Bidder's guidance only: (a) estimates are based on the City's anticipated needs and/or usage; and (b) the City may use these estimates to determine the low Bidder. No guarantee is expressed or implied as to quantities or dollars that will be used during the contract period. The City is not obligated to place any order for the given amount subsequent to the award of this Bid Solicitation.

9.16 NON-EXCLUSIVITY

It is the intent of the City to enter into an agreement with the awarded Bidder that will satisfy its needs as described herein. However, the City reserves the right as deemed in its best interest to perform, or cause to be performed, the work and services, or any portion thereof, herein described in any manner it sees fit, including but not limited to, award of other contracts, use of any contractor, or perform the work with its own employees.

9.17 CONTINUATION OF WORK

Any work that commences prior to and will extend beyond the expiration date of the current contract period shall, unless terminated by mutual written agreement between the City and the awarded bidder, continue until completion at the same prices, terms, and conditions.

9.18 BID PROTEST

A recommendation for contract award or rejection of award may be protested by a Bidder. The Bidder may file a written protest with the City Clerk's office. The Bidder shall file its written protest with the City Clerk, Monday through Friday, between the hours of 8:00 AM and 5:00 PM, excluding legal holidays. Protests shall contain the name, address, and phone number of the petitioner, name of the petitioner's representative (if any), and the title and Bid number of the Solicitation. The protest shall specifically describe the subject matter, facts giving rise to the protest, and the action requested from the City.

The written protest must be received no later than seventy-two (72) consecutive hours (excluding Saturdays, Sundays, and legal holidays) after the time of initial posting of the intended award. Failure to file a timely formal written protest within the time period specified shall constitute a waiver by the Bidder of all rights of protest.

In the event of a timely protest, the City will not proceed further with award of the contract and agreement until all administrative remedies are exhausted, or until the City Manager determines the award of the contract is immediately necessary to protect the public health, welfare, or safety.

9.19 LAWS AND REGULATIONS

The awarded Bidder shall comply with all laws and regulations applicable to provide the goods or services specified in this Bid Solicitation. The Bidder shall be familiar with all federal, state, and local laws that may affect the goods and/or services offered.

9.20 LICENSES, PERMITS AND FEES

The awarded Bidder(s) shall hold all licenses and/or certifications, obtain and pay for all permits and/or inspections, and comply with all laws, ordinances, regulations, and building code requirements applicable to the work required herein. Damages, penalties, and/or fines imposed on the City or an awarded Bidder for failure to obtain and maintain required licenses, certifications, permits, and/or inspections shall be borne by the awarded Bidder.

9.21 SUBCONTRACTING

Unless otherwise specified in this Bid Solicitation, the awarded bidder shall not subcontract any portion of the work without the prior written consent of the City. The ability to subcontract may be further limited by the Special Conditions. Subcontracting without the prior consent of the City may result in termination of the contract for default.

9.22 ASSIGNMENT

The awarded Bidder shall not assign, transfer, hypothecate, or otherwise dispose of this contract, including any rights, title, or interest therein, or its power to execute such contract to any person, company, or corporation without the prior written consent of the City. Assignment without the prior consent of the City may result in termination of the contract for default.

9.23 SHIPPING TERMS

Unless otherwise specified in the Bid Solicitation, prices quoted shall be F.O.B. Destination. Freight shall be included in the proposed price.

9.24 RESPONSIBILITIES AS EMPLOYER

The employee(s) of the awarded Bidder shall be considered to be at all times its employee(s), and not an employee(s) or agent(s) of the City or any of its departments. The awarded Bidder shall provide physically competent employee(s) capable of performing the work as required. The City may require the awarded Bidder to remove any employee it deems unacceptable. All employees of the awarded Bidder shall wear proper identification.

It is the awarded Bidder's responsibility to ensure that all its employees and subcontractors comply with the employment regulations required by the US Department of Homeland Security. The City shall have no responsibility to check or verify the legal immigration status of any employee of the awarded Bidder.

9.25 INDEMNIFICATION

The awarded Bidder shall indemnify and hold harmless the City and its officers, employees, agents, and instrumentalities from any and all liability, losses or damages, including attorney's fees and costs of defense, which the City or its officers, employees, agents, or instrumentalities may incur as a result of claims, demands, suits, causes of actions, or proceedings of any kind or nature arising out of, relating to, or resulting from the performance of the agreement by the awarded Bidder or its employees, agents, servants, partners, principals, or subcontractors. The awarded Bidder shall pay all claims and losses in connection therewith, and shall investigate and defend all claims, suits, or actions of any kind or nature in the name of the City, where applicable, including appellate proceedings, and shall pay all costs, judgments, and attorney's fees which may be incurred thereon. The awarded Bidder expressly understands and agrees that any insurance protection required by this contract agreement or otherwise provided by the awarded Bidder shall in no way limit the responsibility to indemnify, keep and save harmless, and defend the City or its officers, employees, agents, and instrumentalities as herein provided.

9.26 **COLLUSION**
A Bidder recommended for award as the result of a competitive Solicitation for any City purchases of supplies, materials, and services (including professional services, other than professional architectural, engineering, and other services subject to Sec. 287.055 Florida Stats.), purchase, lease, permit, concession, or management agreement shall, within five (5) business days of the filing of such recommendation, submit an affidavit under the penalty of perjury, on a form provided by the City, stating either that the contractor is not related to any of the other parties Bidding in the competitive Solicitation or identifying all related parties, as defined in this Section, which Bid in the Solicitation; and attesting that the contractor's Bid is genuine and not a sham or collusive or made in the interest or on behalf of any person not therein named, and that the contractor has not, directly or indirectly, induced or solicited any other Bidder to put in a sham Bid, or any other person, firm, or corporation to refrain from proposing, and that the Bidder has not in any manner sought by collusion to secure to the Bidder an advantage over any other Bidder. In the event a recommended Bidder identifies related parties in the competitive Solicitation its Bid shall be presumed to be collusive and the recommended Bidder shall be ineligible for award unless that presumption is rebutted to the satisfaction of the City. Any person or entity that fails to submit the required affidavit shall be ineligible for contract award.

9.27 **MODIFICATION OF CONTRACT**
The contract may be modified by mutual consent, in writing, through the issuance of a modification to the contract, a supplemental agreement, purchase order, or change order, as appropriate.

9.28 **TERMINATION FOR CONVENIENCE**
The City, at its sole discretion, reserves the right to terminate any contract entered into pursuant to this Invitation to Bid Construction (ITBC) with or without cause immediately upon providing written notice to the awarded Bidder. Upon receipt of such notice, the awarded Bidder shall not incur any additional costs under the contract. The City shall be liable only for reasonable costs incurred by the awarded Bidder prior to the date of the notice of termination. The City shall be the sole judge of "reasonable costs."

9.29 **TERMINATION FOR DEFAULT**
The City reserves the right to terminate this contract, in part or in whole, or place the vendor on probation in the event the awarded Bidder fails to perform in accordance with the terms and conditions stated herein by providing written notice of such failure or default and by specifying a reasonable time period within which the awarded Bidder must cure any such failure to perform or default. If the awarded Bidder fails to cure the default within the time specified, the City may then terminate the subject contract by providing written notice to the awarded Bidder. The City further reserves the right to suspend or debar the awarded Bidder in accordance with the appropriate City ordinances, resolutions, and/or policies. The vendor will be notified by letter of the City's intent to terminate. In the event of termination for default, the City may procure the required goods and/or services from any source and use any method deemed in its best interest. All re-procurement costs shall be borne by the incumbent Bidder.

9.30 **FRAUD AND MISREPRESENTATION**
Any individual, corporation, or other entity that attempts to meet its contractual obligations with the City through fraud, misrepresentation, or material misstatement, may be debarred for up to five (5) years. The City, as a further sanction, may terminate or cancel any other contracts with such individual, corporation, or entity. Such individual or entity shall be responsible for all direct or indirect costs associated with termination or cancellation, including attorney's fees.

9.31 **ACCESS AND AUDIT OF RECORDS**
The City reserves the right to require the awarded Bidder to submit to an audit by an auditor of the City's choosing at the awarded Bidder's expense. The awarded Bidder shall provide access to all of its records, which relate directly or indirectly to this Agreement, at its place of business during regular business hours. The awarded Bidder shall retain all records pertaining to this Agreement, and upon request, make them available to the City for three (3) years following expiration of the Agreement. The awarded Bidder agrees to provide such assistance as may be necessary to facilitate the review or audit by the City to ensure compliance with applicable accounting and financial standards.

9.32 **OFFICE OF THE INSPECTOR GENERAL**
Palm Beach County has established the Office of the Inspector General, which is authorized and empowered to review past, present, and proposed County programs, contracts, transactions, accounts and records. The Inspector General (IG) has the power to subpoena witnesses, administer oaths, require the production of records, and monitor existing projects and programs. The Inspector General may, on a random basis, perform audits on all City contracts.

9.33 PRE-AWARD INSPECTION

The City may conduct a pre-award inspection of the Bidder's site or hold a pre-award qualification hearing to determine if the Bidder is capable of performing the requirements of this Bid Solicitation.

9.34 PROPRIETARY AND/OR CONFIDENTIAL INFORMATION

Bidders are hereby notified that all information submitted as part of, or in support of Bid submittals will be available for public inspection after the opening of Bids in compliance with Chapter 119 of the Florida Statutes, popularly known as the "Public Record Law." The Bidder shall not submit any information in response to this Solicitation which the Bidder considers to be a trade secret, proprietary, or confidential. The submission of any information to the City in connection with this Solicitation shall be deemed conclusively to be a waiver of any trade secret or other protection which would otherwise be available to the Bidder. In the event that the Bidder submits information to the City in violation of this restriction, either inadvertently or intentionally, and clearly identifies that information in the Bid as protected or confidential, the City may, in its sole discretion, either (a) communicate with the Bidder in writing in an effort to obtain the Bidder's withdrawal of the confidentiality restriction, or (b) endeavor to redact and return that information to the Bidder as quickly as possible, and if appropriate, evaluate the balance of the Bid. The redaction or return of information pursuant to this clause may render a Bid non-responsive.

9.35 HEALTH INSURANCE PORTABILITY AND ACCOUNTABILITY ACT (HIPAA)

Any person or entity that performs or assists the City of Delray Beach with a function or activity involving the use or disclosure of "individually identifiable health information (IIHI) and/or Protected Health Information (PHI) shall comply with the Health Insurance Portability and Accountability Act (HIPAA) of 1996. HIPAA mandates for privacy, security, and electronic transfer standards include, but are not limited to:

- a. Use of information only for performing services required by the contract or as required by law;
- b. Use of appropriate safeguards to prevent non-permitted disclosures;
- c. Reporting to the City of Delray Beach any non-permitted use or disclosure;
- d. Assurances that any agents and subcontractors agree to the same restrictions and conditions that apply to the Bidder and reasonable assurances that IIHI/PHI will be held confidential;
- e. Making Protected Health Information (PHI) available to the customer;
- f. Making PHI available to the customer for review and amendment, and incorporating any amendments requested by the customer;
- g. Making PHI available to the City of Delray Beach for an accounting of disclosures; and
- h. Making internal practices, books, and records related to PHI available to the City of Delray Beach for compliance audits.

PHI shall maintain its protected status regardless of the form and method of transmission (paper records and/or electronic transfer of data). The Bidder must give its customers written notice of its privacy information practices, including specifically, a description of the types of uses and disclosures that would be made with protected health information.

9.36 ADDITIONAL FEES AND SURCHARGES

Unless provided for in the contract/agreement, the City will not make any additional payments such as fuel surcharges, demurrage fees, or delay-in-delivery charges.

9.37 COMPLIANCE WITH FEDERAL STANDARDS

All items to be purchased under this contract shall be in accordance with all governmental standards, to include, but not be limited to, those issued by the Occupational Safety and Health Administration (OSHA), the National Institute of Occupational Safety Hazards (NIOSH), and the National Fire Protection Association (NFPA).

9.38 COMPLIANCE WITH FEDERAL REGULATIONS DUE TO USE OF FEDERAL FUNDING

If the goods or services to be acquired under this Solicitation are to be purchased, in part or in whole, with Federal funding, it is hereby agreed and understood that Section 60-250.4, Section 60-250.5, and Section 60-741.4 of Title 41

of the United States Code, which addresses Affirmative Action requirements for disabled workers, is incorporated into this Solicitation and resultant contract by reference.

9.39 BINDING EFFECT

All of the terms and provisions of this contract/agreement, whether so expressed or not, shall be binding upon, inure to the benefit of, and be enforceable by the parties and their respective legal representatives, successors, and permitted assigns.

9.40 SEVERABILITY

In the event any term or provision of any contract or agreement entered into pursuant to this Solicitation is found by a court of competent jurisdiction to be invalid, the remaining terms and provisions shall continue to be effective and shall be interpreted and given meaning to the greatest possible extent in the absence of any severed terms or provisions.

9.41 GOVERNING LAW AND VENUE

This contract and all transactions contemplated by this agreement shall be governed by and construed and enforced in accordance with the laws of the State of Florida without regard to any contrary conflicts of law principle. Venue of all proceedings in connection herewith shall lie exclusively in Palm Beach County, Florida, and each party hereby waives whatever its respective rights may have been in the selection of venue.

9.42 ATTORNEY'S FEES

It is hereby understood and agreed that in the event any lawsuit in the judicial system, federal or state, is brought to enforce compliance with this contract or interpret same, or if any administrative proceeding is brought for the same purposes, each party shall pay their own attorney's fees and costs, including appellate fees and costs.

9.43 EQUAL OPPORTUNITY AND ANTI-DISCRIMINATION

The City of Delray Beach complies with all laws prohibiting discrimination on the basis of age, race, gender, religion, creed, political affiliation, sexual orientation, physical or mental disability, color or national origin, and therefore is committed to assuring equal opportunity in the award of contracts and encourages small, local, minority, and female-owned businesses to participate.

During the performance of this contract, the awarded Bidder agrees it will not discriminate or permit discrimination in its hiring practices or in its performance of the contract. The awarded Bidder shall strictly adhere to the equal employment opportunity requirements and any applicable requirements established by the State of Florida, Palm Beach County and the federal government.

The awarded Bidder further acknowledges and agrees to provide the City with all information and documentation that may be requested by the City from time to time regarding the Solicitation, selection, treatment and payment of subcontractors, suppliers, and vendors in connection with this Contract.

9.44 AVAILABILITY OF CONTRACT TO OTHER CITY DEPARTMENTS

It is agreed and understood that any City department or agency may access this contract and purchase the goods or services awarded herein. Each City department will issue a separate purchase order to the awarded Bidder for the department's specific purchases.

9.45 CRIMINAL HISTORY BACKGROUND CHECKS

Prior to hiring a contract employee or contracting with a Bidder, the City may conduct a comprehensive criminal background check by accessing any Federal, State, or local law enforcement database available. The contract employee or Bidder will be required to sign an authorization for the City to access criminal background information. The costs for the background checks shall be borne by the City.

9.46 LABOR, MATERIALS, AND EQUIPMENT

Unless specified elsewhere in the Solicitation or resultant contract, all labor, materials, and equipment required for the performance of the requirements of the Contract shall be supplied by the awarded Bidder.

9.47 MINIMUM WAGE REQUIREMENTS

The awarded Bidder shall comply with all minimum wage and living wage requirements, such as Living Wage requirements, minimum wages based on Federal Law, minimum wages based on the Davis-Bacon Act, and the provisions of any other wages laws, as may be applicable to this Contract.

9.48 PACKING SLIP AND DELIVERY TICKET

A packing slip and/or delivery ticket shall accompany all items during delivery to the City. The documents shall include information on the contract number or purchase order, any back order items, and the number or quantity of items being delivered.

9.49 PURCHASE OF OTHER ITEMS

The City reserves the right to purchase other related goods or services, not listed in the Solicitation, during the contract term. When such requirements are identified, the City may request price quote(s) from the awarded Bidder(s) on the contract. The City, at its sole discretion, will determine if the prices offered are reasonable, and may choose to purchase the goods or services from the awarded Bidder, another contract vendor, or a non-contract vendor.

9.50 PUBLIC RECORDS

Florida law provides that municipal records shall at all times be available to the public for inspection. Chapter 119, Florida Statutes, the Public Records Law, requires that all material submitted in connection with a Bid response shall be deemed to be public record subject to public inspection upon award, recommendation for award, or thirty (30) days after Bid opening, whichever occurs first. Certain exemptions to public disclosure are statutorily provided for in Section 119.07, Florida Statutes. If the Bidder believes any of the information contained in his/her/its Bid is considered confidential and/or proprietary, inclusive of trade secrets as defined in Section 812.081, Florida Statutes, and is exempt from the Public Records Law, then the Bidder, must in its response, specifically identify the material which is deemed to be exempt and state the legal authority for the exemption. All materials that qualify for exemption from Chapter 119, Florida Statutes or other applicable law must be submitted in a separate envelope, clearly identified as "EXEMPT FROM PUBLIC DISCLOSURE" with the firm's name and the Bid number clearly marked on the outside. The City will not accept Bids when the entire Bid is labeled as exempt from disclosure. The City's determination of whether an exemption applies shall be final, and the Bidder agrees to defend, indemnify, and hold harmless the City and the City's officers, employees, and agents, against any loss or damages incurred by any person or entity as a result of the City's treatment of records as public records.

The awarded Bidder(s) shall keep and maintain public records and fully comply with the requirements set forth at Section 119.0701, Florida Statutes, as applicable; failure to do so shall constitute a material breach of any and all agreements awarded pursuant to this Solicitation.

9.51 CONFLICTS OF INTEREST

All Bidders must disclose with their Bid the name of any officer, director, or agent who is also an employee of the City of Delray Beach. Further, all Bidders must disclose the name of any City employee who has any interest, financial or otherwise, direct or indirect, of five percent (5%) or more in the Bidders' firm or any of its branches. Failure to disclose any such affiliation will result in disqualification of the Bidder from this Invitation to Bid Construction and may be grounds for further disqualification from participating in any future Bids with the City.

9.52 PUBLIC ENTITY CRIMES

As provided in Section 287.133(2) (a), Florida Statutes, a person or affiliate who has been placed on the convicted vendors list following a conviction for a public entity crime may not submit a Bid on a contract to provide any goods or services to a public entity; may not submit a Bid on a contract with a public entity for the construction or repair of a public building or public work; may not submit Bids on leases of real property to a public entity; may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity.

9.53 OTHER GOVERNMENTAL AGENCIES

If a Bidder is awarded a contract as a result of this ITBC, the Bidder shall allow other governmental agencies to access this contract and purchase the goods and services under the terms and conditions at the prices awarded, as applicable.

9.54 COMPLETION OF WORK AND DELIVERY

All work shall be performed and all deliveries made in accordance with good commercial practice. The work schedule and completion dates shall be adhered to by the awarded Bidder(s), except in such cases where the completion date will be delayed due to acts of nature, force majeure, strikes, or other causes beyond the control of the awarded Bidder.

In these cases, the awarded Bidder shall notify the City of the delays in advance of the original completion so that a revised delivery schedule can be appropriately considered by the City.

9.55 FAILURE TO DELIVER OR COMPLETE WORK

Should the awarded Bidder(s) fail to deliver or complete the work within the time stated in the contract, it is hereby agreed and understood that the City reserves the authority to cancel the contract with the awarded Bidder and secure the services of another vendor to purchase the items or complete the work. If the City exercises this authority, the City shall be responsible for reimbursing the awarded Bidder for work that was completed, and items delivered and accepted by the City in accordance with the contract specifications. The City may, at its option, demand payment from the awarded Bidder, through an invoice or credit memo, for any additional costs over and beyond the original contract price which were incurred by the City as a result of having to secure the services of another vendor.

9.56 CORRECTING DEFECTS

The awarded Bidder shall be responsible for promptly correcting any deficiency, at no cost to the City, within three (3) calendar days after the City notifies the awarded Bidder of such deficiency in writing. If the awarded Bidder fails to correct the defect, the City may (a) place the awarded Bidder in default of its contract; and/or (b) procure the products or services from another source and charge the awarded Bidder for any additional costs that are incurred by the City for this work or items, either through a credit memorandum or through invoicing.

9.57 ACCIDENT PREVENTION AND BARRICADES

Precautions shall be exercised at all times for the protection of persons and property. All awarded Bidders performing services or delivering goods under this contract shall conform to all relevant OSHA, State, and County regulations during the course of such effort. Any fines levied by the above-mentioned authorities for failure to comply with these requirements shall be borne solely by the awarded Bidder. Barricades shall be provided by the awarded Bidder when work is performed in areas traversed by persons, or when deemed necessary by the City.

9.58 OMISSIONS IN SPECIFICATIONS

The specifications and/or statement of work contained within this Solicitation describe the various functions and classes of work required as necessary for the completion of the project. Any omissions of inherent technical functions or classes of work within the specifications and/or statement of work shall not relieve the Bidder from furnishing, installing, or performing such work where required to the satisfactory completion of the project.

9.59 MATERIALS SHALL BE NEW AND WARRANTED AGAINST DEFECTS

The awarded Bidder hereby acknowledges and agrees that all materials, except where recycled content is specifically requested, supplied by the awarded Bidder in conjunction with this Solicitation and resultant contract shall be new, warranted for their merchantability, and fit for a particular purpose. In the event any of the materials supplied to the City by the awarded Bidder are found to be defective or do not conform to specifications, (1) the materials may be returned to the awarded Bidder at the Bidder's expense and the contract cancelled; or (2) the City may require the awarded Bidder to replace the materials at the Bidder's expense.

9.60 TOXIC SUBSTANCES/FEDERAL "RIGHT TO KNOW" REGULATIONS

The Federal "Right to Know" Regulation implemented by the Occupational Safety and Health Administration (OSHA) requires employers to inform their employees of any toxic substances to which they may be exposed in the workplace, and to provide training in safe handling practices and emergency procedures. It also requires notification to local fire departments of the location and characteristics of all toxic substances regularly present in the workplace.

Accordingly, the awarded Bidder(s) performing under this contract are required to provide two (2) complete sets of Material Safety Data Sheets to each City department utilizing the any awarded products that are subject to these regulations. This information should be provided at the time when the initial delivery is made, on a department-by-department basis.

9.61 TAXES

The City of Delray Beach is exempt from Federal and State taxes for tangible personal property.

9.62 BIDDER'S COSTS

The City shall not be liable for any costs incurred by Bidders in responding to this Invitation to Bid Construction.

9.63 SUBSTITUTION OF PERSONNEL

It is the intention of the City that the awarded Bidder's personnel proposed for the contract shall be available for the initial contract term. In the event the awarded Bidder wishes to substitute personnel, the awarded Bidder shall propose personnel of equal or higher qualifications, and all replacement personnel are subject to the City's approval. In the event the substitute personnel are not satisfactory to the City, and the matter cannot be resolved to the satisfaction of the City, the City reserves the right to cancel the contract for cause.

9.64 FORCE MAJEURE

The City and the awarded Bidder are excused from the performance of their respective obligations under the contract when and to the extent that their performance is delayed or prevented by any circumstances beyond their control, including fire, flood, explosion, strikes or other labor disputes, natural disasters, public emergency, war, riot, civil commotion, malicious damage, act or omission of any governmental authority, delay or failure or shortage of any type of transportation, equipment, or service from a public utility needed for their performance provided that:

- a. The non-performing party gives the other party prompt written notice describing the particulars of the force majeure, including, but not limited to, the nature of the occurrence and its expected duration, and continues to furnish timely reports with respect thereto during the period of the force majeure.
- b. The excuse of performance is of no greater scope and of no longer duration than is required by the force majeure.
- c. No obligations of either party that arose before the force majeure causing the excuse of performance are excused as a result of the force majeure.
- d. The non-performing party uses its best efforts to remedy its inability to perform.

Notwithstanding the above, performance shall not be excused under this section for a period in excess of two (2) months, provided that in extenuating circumstances, the City may excuse performance for a longer term. Economic hardship of the awarded Bidder shall not constitute a force majeure. The term of the contract shall be extended by a period equal to that during which either party's performance is suspended under this section.

9.65 NOTICES

Notices shall be effective when received at the addresses specified in the contract/agreement. Changes in respective addresses to which such notices are to be directed may be made from time to time by either party by written notice to the other party. Facsimile and email transmissions are acceptable notice effective when received; however, facsimile and email transmissions received after 5:00 PM or on weekends or holidays will be deemed received on the next business day. The original of the notice must also be mailed to the receiving party.

Nothing contained in this section shall be construed to restrict the transmission of routine communications between representatives of the awarded bidder and the City of Delray Beach.

9.66 POOL CONTRACTS

During the term of contracts and agreements that are executed as vendor pools, awarding vendors in prequalified pools of vendors, either as a general pool or by categories, sub-categories, or groups, the City reserves the right to add new vendors to these contracts for goods or services not awarded for the original Solicitation or as part of the general pool category, sub-category or group. To be eligible to be added to these pool contracts, a vendor must meet the same eligibility requirements established in the original Invitation to Bid Construction.

9.67 FISCAL FUNDING OUT

The City's obligation pursuant to any contract or agreement entered into in accordance with this Solicitation is specifically contingent upon the lawful appropriation of funds. Failure to lawfully appropriate funds for any contract or agreement awarded shall result in automatic termination of the contract or agreement.

END OF SECTION 9

SECTION 10
SOLICITATION SUMMARY

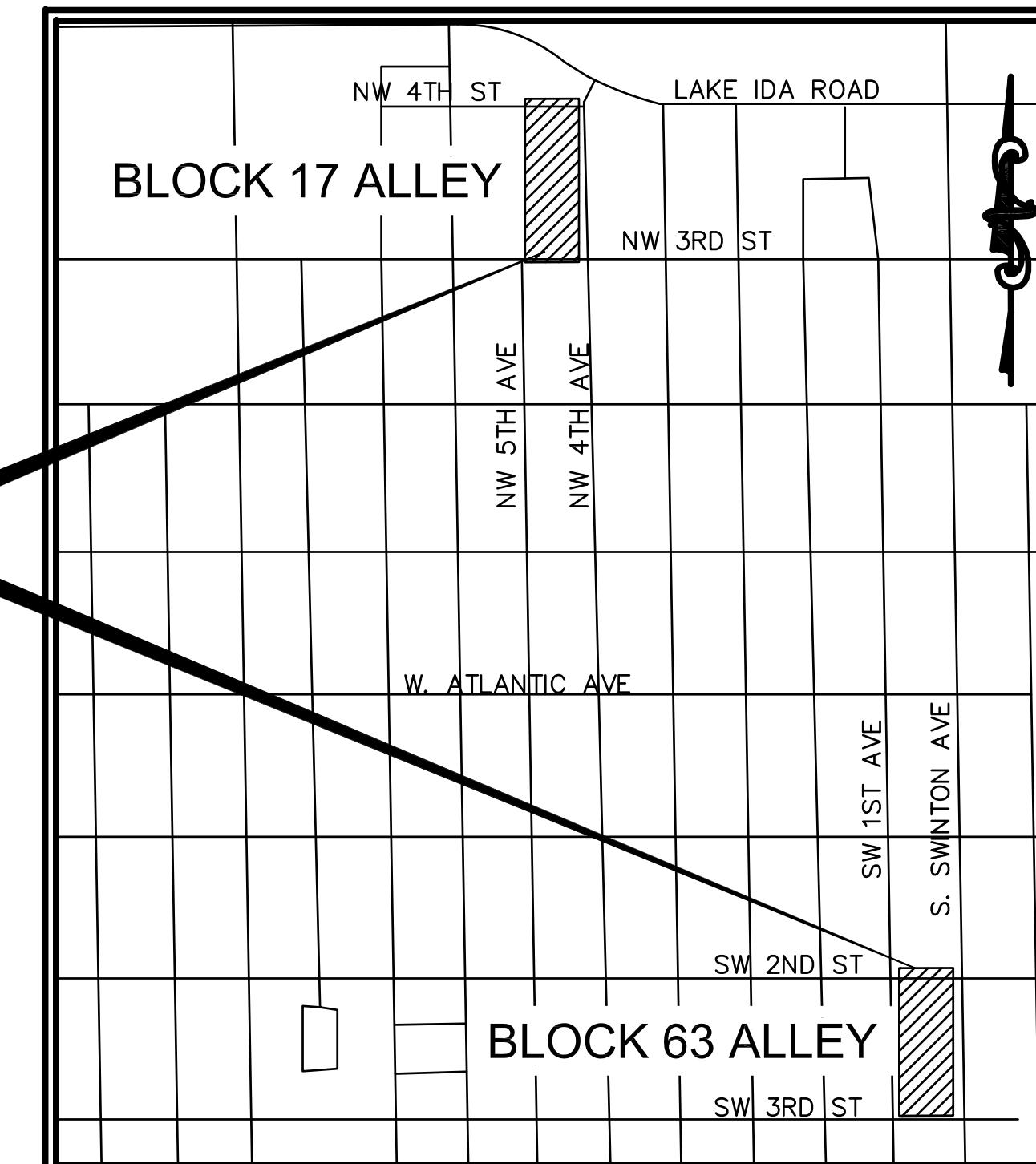
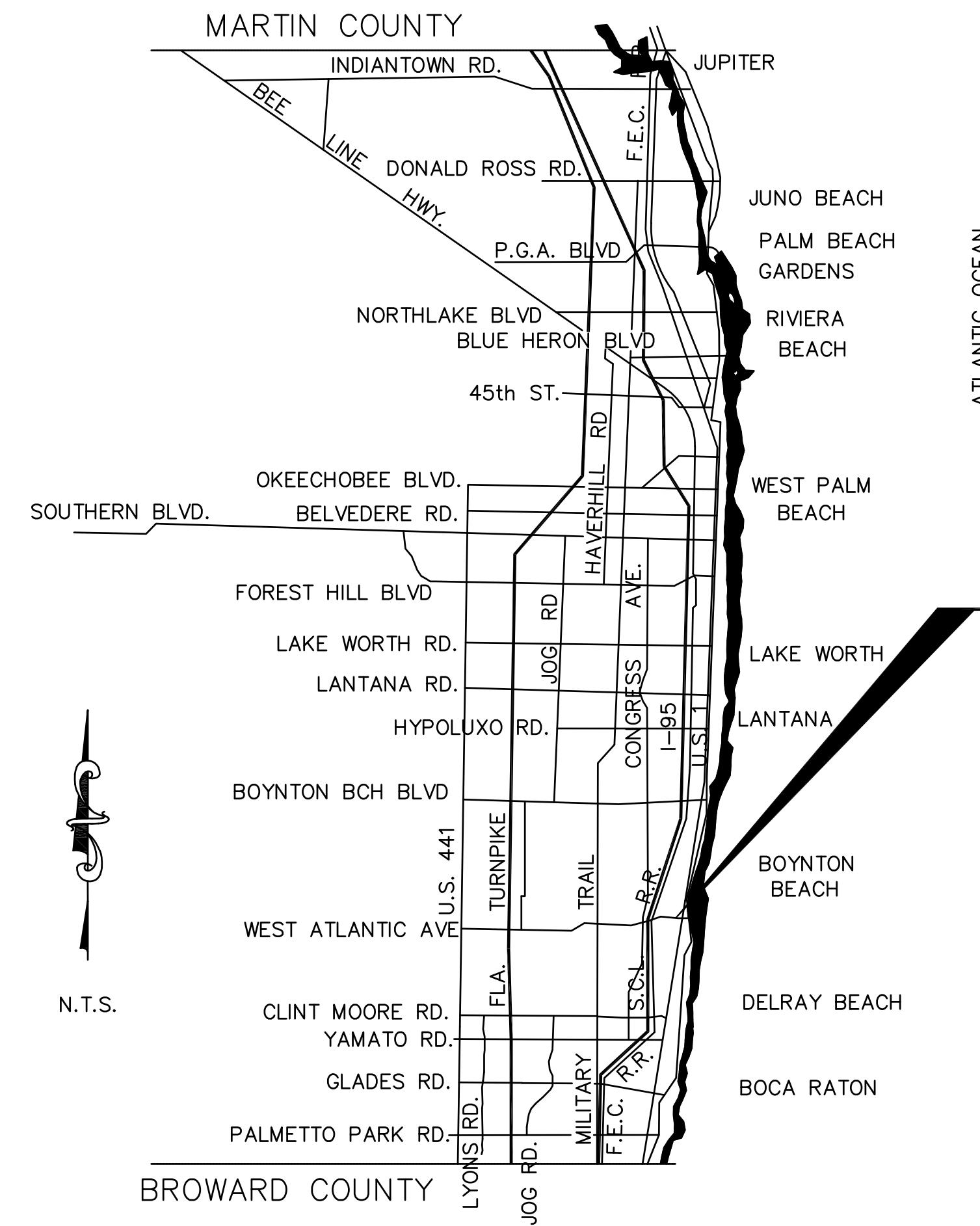
Complete Web Form

END OF SECTION 10

CITY OF DELRAY BEACH

NW 5TH AVENUE NEIGHBORHOOD ALLEY AND BLOCK 63 ALLEY - IMPROVEMENTS

CITY PROJECT NOS. 15-001 & 15-040



LOCATION MAP

SCALE N.T.S.

SECTIONS 16 & 17, TOWNSHIP 46 SOUTH, RANGE 43 EAST

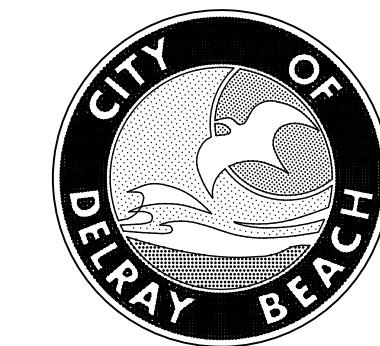


VERTICAL DATUM: NATIONAL GEODETIC
VERTICAL DATUM OF 1929 (NGVD29)
(NAVD88) = (NGVD29) - 1.53

HORIZONTAL DATUM: NORTH AMERICAN
DATUM OF 1983, FLORIDA STATE
PLANES, EAST ZONE, U.S. FEET (NAD83)

CITY OFFICIALS

MAYOR	SHELLY PETROLIA
VICE MAYOR	ADAM FRANKEL
DEPUTY VICE MAYOR	SHIRLEY JOHNSON
COMMISSIONER	RYAN BOYLSTON
COMMISSIONER	BILL BATHURST
CITY MANAGER	MARK R. LAUZIER
CITY ENGINEER	PATRICK FIGURELLA, PE



CRA OFFICIALS

CHAIR	SHELLY PETROLIA
VICE-CHAIR	ADAM FRANKEL
BOARD MEMBER	SHIRLEY JOHNSON
BOARD MEMBER	RYAN BOYLSTON
BOARD MEMBER	BILL BATHURST



SHEET INDEX

C1	COVER SHEET
C2	GENERAL NOTES AND LEGENDS
C3	OVERALL PROJECT MAP
C4 TO C8	BLOCK 17 ALLEY IMPROVEMENTS
C9 TO C11	BLOCK 63 ALLEY IMPROVEMENTS
C12 TO C15	DETAILS



CITY of DELRAY BEACH
PUBLIC WORKS DEPARTMENT
434 SOUTH SWINTON AVENUE, DELRAY BEACH, FLORIDA 33444

Phone: (561) 243-7322 Fax: (561) 243-7314 www.mydelraybeach.com

PREPARED BY:



2035 Vista Parkway
West Palm Beach, FL 33411
Phone No. 561.687.2220
Fax No. 561.687.1110
Cert No. 6091 - LB No. 7055

ENGINEER OF RECORD
BRETT N. OLDFORD, P.E.
PE# 61795

NW 5TH AVENUE NEIGHBORHOOD ALLEY
AND BLOCK 63 ALLEY - IMPROVEMENTS

BID SET

WGI NO.: 1004.15/1004.13

DEFINITIONS

1. CITY – THE CITY OF DELRAY BEACH
2. CONTRACTOR – PRIME CONTRACTOR AND ALL SUBCONTRACTORS
3. ENGINEER – ENGINEER RESPONSIBLE FOR INSPECTION AND CERTIFICATION

PROCEDURE

1. A PRE-CONSTRUCTION MEETING IS TO BE HELD PRIOR TO DELIVERY OF MATERIALS AND INITIATION OF ANY WATER, SEWER OR DRAINAGE CONSTRUCTION. THE MEETING SHALL BE ATTENDED BY THE CITY, CONTRACTOR, SUBCONTRACTORS, ENGINEER AND OTHER INTERESTED PARTIES.
2. ANY REVISIONS TO THE APPROVED PLANS MUST BE APPROVED BY THE CITY PRIOR TO THE PRE-CONSTRUCTION MEETING.
3. A MINIMUM OF THREE (3) COPIES OF THE CURRENT APPROVED PRODUCT LIST AND ALL NECESSARY SHOP DRAWINGS SHALL BE SUBMITTED FOR APPROVAL PRIOR TO SCHEDULING THE PRE-CONSTRUCTION MEETING. ALL PIPE MANUFACTURERS SHALL SUBMIT THREE (3) COPIES OF AN AFFIDAVIT THAT THE PIPE AND COATINGS WERE MANUFACTURED IN ACCORDANCE WITH AWWA C151/A21.51-91.
4. ALL APPLICABLE PERMITS MUST BE OBTAINED WITH COPIES PROVIDED TO THE CITY PRIOR TO COMMENCEMENT OF CONSTRUCTION.
5. THE CONTRACTOR SHALL MAINTAIN A CURRENT APPROVED SET OF CONSTRUCTION DOCUMENTS ON SITE AT ALL TIMES.
6. ALL MATERIALS SUPPLIED SHALL CONFORM TO PRODUCT LIST AND SHOP DRAWINGS AS APPROVED BY THE CITY PRIOR TO CONSTRUCTION. ALL REQUESTS FOR MATERIAL SUBSTITUTION SHALL BE APPROVED PRIOR TO DELIVERY OF THESE MATERIALS TO THE JOB SITE.
7. THE LOCATION OF THE EXISTING UTILITIES AS SHOWN ON THE PLANS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. IN ADDITION, THE CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY IF OTHER UTILITIES (NOT SHOWN ON THE PLAN) EXIST WITHIN THE AREA OF CONSTRUCTION. SHOULD THERE BE UTILITY CONFLICTS, THE CONTRACTOR SHALL INFORM THE CITY AND NOTIFY THE RESPECTIVE UTILITY OWNER TO RESOLVE THE UTILITY CONFLICTS AND PERFORM THE UTILITY ADJUSTMENTS AS REQUIRED.
8. PRIOR TO ANY SANITARY PIPE OR WATER MAIN TESTING, UNDER EXISTING OR FUTURE PAVEMENT, THE ROCK BASE SHALL BE FINISHED AND PRIMED OR FIRST LIFT OF PAVEMENT PLACED.
9. THE CONTRACTOR SHALL BE RESPONSIBLE AT ALL TIMES THROUGHOUT THE DURATION OF CONSTRUCTION FOR THE PROTECTION OF EXISTING AND NEWLY INSTALLED UTILITIES FROM DAMAGE OR DISRUPTION OF SERVICE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING SUCH MEASURES AS NECESSARY TO PROTECT THE HEALTH, SAFETY, AND WELFARE OF THOSE PERSONS HAVING ACCESS TO THE WORK SITE.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING LOCATIONS OF ALL OTHER UTILITY FACILITIES.
11. THE CONTRACTOR SHALL SCHEDULE INSPECTIONS AND TESTS WITH THE CITY A MINIMUM OF 24 HOURS IN ADVANCE.
12. CONTRACTOR SHALL NOT DISTURB EXISTING CITY MAINS OR STRUCTURES WITHOUT THE PRESENCE OF A CITY INSPECTOR. CITY UTILITY SYSTEM VALVES AND APPURTENANCES MAY ONLY BE OPERATED BY CITY PERSONNEL.
13. FACILITIES PROPOSED HEREIN SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE APPROVED PLANS. DEVIATIONS FROM THE APPROVED PLANS MUST BE APPROVED IN ADVANCE BY THE CITY.
14. UPON COMPLETION OF CONSTRUCTION AND PRIOR TO FINAL ACCEPTANCE OF THE WORK, A FINAL INSPECTION SHALL VERIFY PROPER ADHERENCE TO ALL FACETS OF THE PLANS AND SPECIFICATIONS.
15. PAVING, DRAINAGE AND TRAFFIC CONTROL DEVICE CONSTRUCTION SHALL CONFORM TO THE LATEST EDITION OF THE FLORIDA DEPARTMENT OF TRANSPORTATION ROADWAY AND DESIGN STANDARDS, STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND PALM BEACH COUNTY TYPICAL T-9-17 (LATEST REVISION) UNLESS SHOWN OTHERWISE.
16. AS-BUILT DRAWINGS SHALL BE PREPARED BY A REGISTERED LAND SURVEYOR, REGISTERED IN THE STATE OF FLORIDA, AND SUBMITTED BY THE CONTRACTOR TO THE CITY. AS THE WORK PROGRESSES, THE ENGINEER OF RECORD (OR THEIR REPRESENTATIVE) SHALL RECORD ON ONE SET OF DRAWINGS THE LOCATION INCLUDING STATION AND OFFSET WITH SUFFICIENT DIMENSIONS AND DISTANCES TO ADEQUATELY DESCRIBE THE LOCATION OF THE IMPROVEMENT FROM THE BASELINE. ELEVATIONS ARE TO BE PROVIDED AT THE TOP OF PIPE AT INCREMENTS OF EVERY 100 FEET ON ALL WATER AND FORCE MAINS. STATIONING IS REQUIRED ON ALL VALVES, FITTINGS, WATER AND SEWER SERVICES AND FIRE HYDRANTS. THE LENGTHS OF ALL WATER SERVICE LINES AND SEWER LATERALS MUST BE NOTED ON GRAVITY SEWER LINES, ELEVATIONS AND STATIONING ARE TO BE INDICATED ON ALL MANHOLE RIMS AND INVERTS. THE DISTANCE BETWEEN MANHOLES IS TO BE SHOWN ON BOTH THE PLAN AND PROFILE SHEETS. UNLESS PLAN VIEW AND PROFILE VIEW ARE ON THE SAME SHEET, THE ENGINEER OF RECORD IS TO SUBMIT TWO SETS OF BLUE PRINT RECORD OF AS-BUILT DRAWINGS AND ONE MYLAR TO THE ENGINEERING DEPARTMENT ALONG WITH THE HEALTH DEPARTMENT APPLICATION FOR RELEASE OF THE SYSTEM. ALL "AS-BUILT DRAWINGS" SHALL BE SIGNED, SEALED AND DATED BY THE ENGINEER OF RECORD. CERTIFICATE OF OCCUPANCY WILL BE HELD UNTIL ACCEPTANCE BY HRS AND THE ENVIRONMENTAL SERVICES DEPARTMENT. PAVING & DRAINAGE AS-BUILT DRAWINGS SHALL INCLUDE RIM ELEVATIONS, INVERT ELEVATIONS, PIPE SIZES, CONTROL STRUCTURE DIMENSIONS, AS WELL AS, AS-BUILT ELEVATIONS AS EVERY LOCATION A PROPOSED ELEVATION IS INDICATED ON THE CONSTRUCTION PLAN. ADEQUATE AS-BUILT ELEVATIONS SHALL BE PROVIDED ON EMBANKMENTS TO DETERMINE COMPLIANCE WITH MAXIMUM SLOPE REQUIREMENTS.
17. PRIOR TO COMMENCEMENT OF ANY EXCAVATION, THE CONTRACTOR SHALL COMPLY WITH FLORIDA STATUTE 553-851 FOR PROTECTION OF UNDERGROUND GAS PIPE LINES.
18. CONTRACTOR SHALL NOTIFY SUNSHINE STATE ONE CALL OF FLORIDA (1-800-432-4770) 48 HOURS IN ADVANCE OF CONSTRUCTION.
19. GRADES SHOWN ON PLANS ARE FINISHED GRADES. THE CONTRACTOR SHALL BE REQUIRED TO ADJUST EXISTING SANITARY SEWER MANHOLE TOPS AND VALVE BOX COVERS TO FINISHED GRADE.

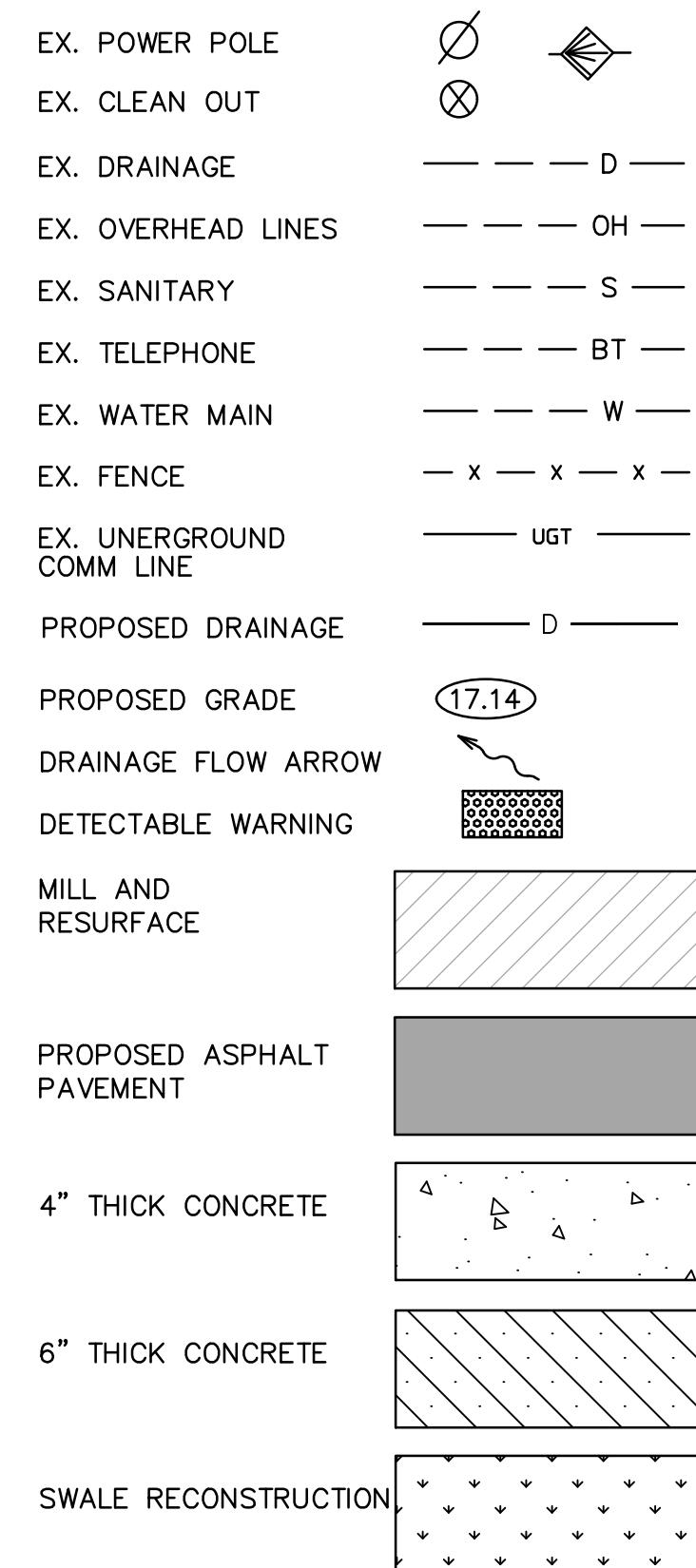
... PROCEDURE CONTINUED

20. CONTRACTOR SHALL MAINTAIN LOCAL TRAFFIC AT ALL TIMES DURING CONSTRUCTION AND SHALL BE REQUIRED TO PROVIDE ALL BARRICADES, LIGHTING, SIGNAGE AND FLAGMAN AS NECESSARY TO PROVIDE FOR THE SAFETY OF THE PUBLIC IN THE WORK AREA. THE CONTRACTOR SHALL SUBMIT A DETAILED TRAFFIC MAINTENANCE PLAN PRIOR TO CONSTRUCTION.
21. EXISTING BASE MATERIAL THAT IS REMOVED DURING CONSTRUCTION SHALL NOT BE USED IN THE CONSTRUCTION OF NEW LIMEROCK BASE.
22. VEGETATION, DEBRIS, CONCRETE OR OTHER UNSUITABLE MATERIAL SHALL BE LEGALLY DISPOSED OF OFF-SITE IN AN AREA AT THE CONTRACTOR'S EXPENSE.
23. CONTRACTOR SHALL UTILIZE CONSTRUCTION METHODS AND DEVICES, SUCH AS TURBIDITY SCREENS, CURTAINS AND FLOATING SILT BARRIERS WHERE NECESSARY IN ORDER TO COMPLY WITH ALL STATE AND LOCAL WATER QUALITY STANDARDS.
24. PRIOR TO AND DURING CONSTRUCTION OF ALL SITES, THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES INCLUDED IN A POLLUTION PREVENTION PLAN PROVIDED TO THE CITY OF DELRAY BEACH'S CHIEF BUILDING OFFICIAL.
25. REINFORCED CONCRETE STORM SEWER PIPE SHALL BE CLASS III, UNLESS OTHERWISE NOTED.
26. ALL PAVED SURFACES SHALL BE PROPERLY MARKED PRIOR TO HOURS OF DARKNESS. PERMANENT PAVEMENT MARKING STALLS SHALL BE LAID OUT USING MARKING CHALK. LAYOUT TO BE REVIEWED BY THE CITY PRIOR TO PLACEMENT OF FINAL MARKING.
27. EMBANKMENT (FILL) AND EXCESS MATERIAL REQUIRED FOR ROADWAY RECONSTRUCTION AND UTILITY INSTALLATIONS SHALL BE SUPPLIED AND/OR DISPOSED OF BY THE CONTRACTOR. ALL COSTS ASSOCIATED WITH EARTHWORK REQUIREMENTS TO COMPLETE THE ROADWAY RECONSTRUCTION AND UTILITY IMPROVEMENTS SHALL BE INCLUDED IN THE COSTS OF OTHER APPROPRIATE PAY ITEMS.
28. CONTINUITY OF WATER AND SEWER SERVICE TO CITY UTILITY CUSTOMERS SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THIS PROJECT. IF A DISRUPTION IN SERVICE IS UNAVOIDABLE TO ACCOMMODATE CONNECTION OF NEW FACILITIES, IT SHALL BE SCHEDULED FOR OFF PEAK HOURS WITH THE CITY. DETERMINATION OF SERVICE DISRUPTION REQUIREMENT WILL BE MADE BY THE CITY.
29. SITE INFORMATION IS BASED ON A SURVEY PREPARED BY: WGI
30. RELOCATION OF UTILITY POLES AND GAS PIPE LINES SHALL BE COORDINATED BY THE CONTRACTOR WITH FLORIDA POWER AND LIGHT, AND FLORIDA PUBLIC UTILITIES, RESPECTIVELY. EACH UTILITY HAS BEEN NOTIFIED THAT THEY WILL BE REQUIRED TO RELOCATE THEIR UTILITIES.

... GENERAL NOTES CONTINUED

11. THE CONTRACTOR SHALL MAINTAIN RIGHT-OF-WAY STAKES FROM THE BEGINNING OF CONSTRUCTION TO THE END OF CONSTRUCTION.
12. ALL EX. TREES, SHRUBS, ABOVE GROUND FEATURES ETC. WITHIN THE RIGHT-OF-WAY SHALL BE COMPLETELY REMOVED AND PROPERLY DISPOSED.
13. ALL STAGING AND CONSTRUCTION ACTIVITIES ARE NOT TO BE PLACED ON PRIVATE PROPERTY WITHOUT PROPER CONSENT.
14. CONTRACTOR SHALL PROVIDE PHOTO DOCUMENTATION OF ALL ADJACENT PROPERTY CONDITIONS PRIOR TO CONSTRUCTION.
15. ALL FENCES WITHIN THE NW 5TH AVENUE ALLEY & BLOCK 63 ALLEY RIGHTS-OF-WAY TO BE REMOVED AND RELOCATED OUTSIDE OF THE RIGHT-OF-WAY.
16. IF A FENCE NEEDS TO BE RELOCATED FROM THE R/W, THE CONTRACTOR SHALL REPLACE IT WITH AN EQUAL CONDITION FENCE (RELOCATED ONLY WHEN IT IS NECESSARY).
17. THE CONTRACTOR SHALL CONSTRUCT SWALES PER CITY STANDARDS TO THE NEXT INTERSECTION.
18. ALL TRAFFIC SIGNS SHALL COMPLY WITH THE LATEST EDITION OF THE MUTCD.
19. SIDEWALK REPLACEMENT SHALL EXTEND A MINIMUM OF 10 LF OR TO THE NEAREST JOINT UNLESS OTHERWISE NOTED.
20. CONTRACTOR SHALL CONNECT TO EXISTING SANITARY SERVICES WITH A NEW CLEANOUT 1' OFF THE PROPERTY LINE INTO PRIVATE PROPERTY.
21. CONTRACTOR SHALL SUBMIT A HEALTH AND SAFETY PLAN TO THE CITY FOR REVIEW AND APPROVAL.

LEGEND



ABBREVIATIONS

CONC.	CONCRETE
DIP	DUCTILE IRON PIPE
EL.	ELEVATION
EOP	EDGE OF PAVEMENT
EX	EXISTING
FH	FIRE HYDRANT
INV	INVERT
LF	LINEAR FOOT
MH	MANHOLE
OH	OVERHEAD ELECTRIC
OS	OFFSET
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
R/W	RIGHT-OF-WAY
SAN	SANITARY
SP	SAMPLE POINT
STA	STATION
S/W	SIDEWALK
TYP	TYPICAL
WM	WATER MAIN

GENERAL NOTES

1. REGULATIONS – ALL CONSTRUCTION SHALL BE DONE IN A WORKMAN LIKE MANNER AND SHALL CONFORM TO ALL CITY, COUNTY, STATE AND FEDERAL REGULATIONS AND OR CODES INCLUDING BUT NOT LIMITED TO THE CURRENT PALM BEACH COUNTY AND FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT) LATEST REGULATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND LICENSES TO BEGIN WORK AND PAY ALL REQUIRED FEES ASSOCIATED WITH SAME.
2. ELEVATIONS SHOWN REGARDING BLOCK 63 ALLEY ARE REFERENCED TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929, AS ESTABLISHED BY PALM BEACH COUNTY BENCHMARK "D 31", HAVING A PUBLISHED ELEVATION OF 17.810 FEET' (NGVD 29). A LEVEL RUN WAS PERFORMED FOR THIS SURVEY LEVELING THROUGH PALM BEACH COUNTY BENCHMARKS "D 31", "D 32" AND TRAVERSE POINTS/SITE BENCHMARKS SET ALONG SW 2ND STREET.
3. ELEVATIONS SHOWN REGARDING NW 5TH AVENUE NEIGHBORHOOD ALLEY ARE REFERENCED TO THE NATIONAL GEODETIC VERTICAL DATUM OF 1929, AS ESTABLISHED BY PALM BEACH COUNTY BENCHMARK "D 31", HAVING A PUBLISHED ELEVATION OF 17.810 FEET (NGVD 29), AND "Z 233" HAVING A PUBLISHED ELEVATION OF 17.569 FEET (NGVD). A LEVEL RUN WAS PERFORMED FOR THIS SURVEY LEVELING THROUGH PALM BEACH COUNTY BENCHMARKS "D 31", "Z 233" AND TRAVERSE POINTS/SITE BENCHMARKS ESTABLISHED AROUND THE PROJECT SITE.
4. HORIZONTAL DATUM – NORTH AMERICAN DATUM 1983, FLORIDA STATE PLANE COORDINATES, EAST ZONE, FOOT.
5. GUARANTEE – THE CONTRACTOR SHALL GUARANTEE ALL WORK AND MATERIAL FOR A PERIOD OF ONE YEAR FROM THE DATE OF PROJECT ACCEPTANCE, DURING WHICH ALL FAULTY CONSTRUCTION AND/OR MATERIAL SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
6. RESTORATION – THE CONTRACTOR SHALL IMMEDIATELY REPAIR AND RESTORE EXISTING SITE FEATURES INCLUDING PAVEMENT, DRIVEWAYS, PIPES, FENCES, TRAFFIC CONTROL DEVICES, MAILBOXES AND PROPERTY CORNERS DAMAGED AS A RESULT OF CONSTRUCTION ACTIVITIES. THE REPAIR AND RESTORATION SHALL CONFIRM TO APPLICABLE STANDARDS AS GOVERNED.
7. CONTRACTOR SHALL SUBMIT A SANITARY BYPASS PUMPING PLAN TO THE CITY AS A SHOP DRAWING FOR REVIEW & APPROVAL.
8. PRIOR TO MILLING AND RESURFACING, THE CONTRACTOR SHALL PROVIDE THE CITY A LISTING, COMPLETE WITH STATIONS, OFFSETS, AND PHOTOS OF ALL EXISTING MANHOLES AND VALVE COVERS LOCATED WITHIN THE EXISTING PAVEMENT. UPON COMPLETION OF MILLING AND RESURFACING THE CONTRACTOR SHALL PROVIDE EVIDENCE TO THE CITY THAT ALL OF THE EXISTING MANHOLE AND/OR VALVE COVERS ARE STILL VISIBLE.
9. IF THE CONTRACTOR ENCOUNTERS AN EXISTING VALVE BOX THAT IS OUT OF PLUMB, THE CONTRACTOR SHALL COORDINATE WITH THE CITY TO ADJUST THE VALVE BOX.
10. THE CONTRACTOR SHALL MATCH EXISTING IMPROVEMENTS TO PROPERTIES UTILIZING REAR ALLEY ACCESS. AN EXISTING FENCE WITHOUT A GATE NEGATES REAR ACCESS.

UTILITY CONTACTS

CITY OF DELRAY BEACH WATER/SEWER
SCOTT SOLOMON
UTILITIES
434 S. SWINTON AVENUE
DELRAY BEACH, FL 33444
(561) 243-7322

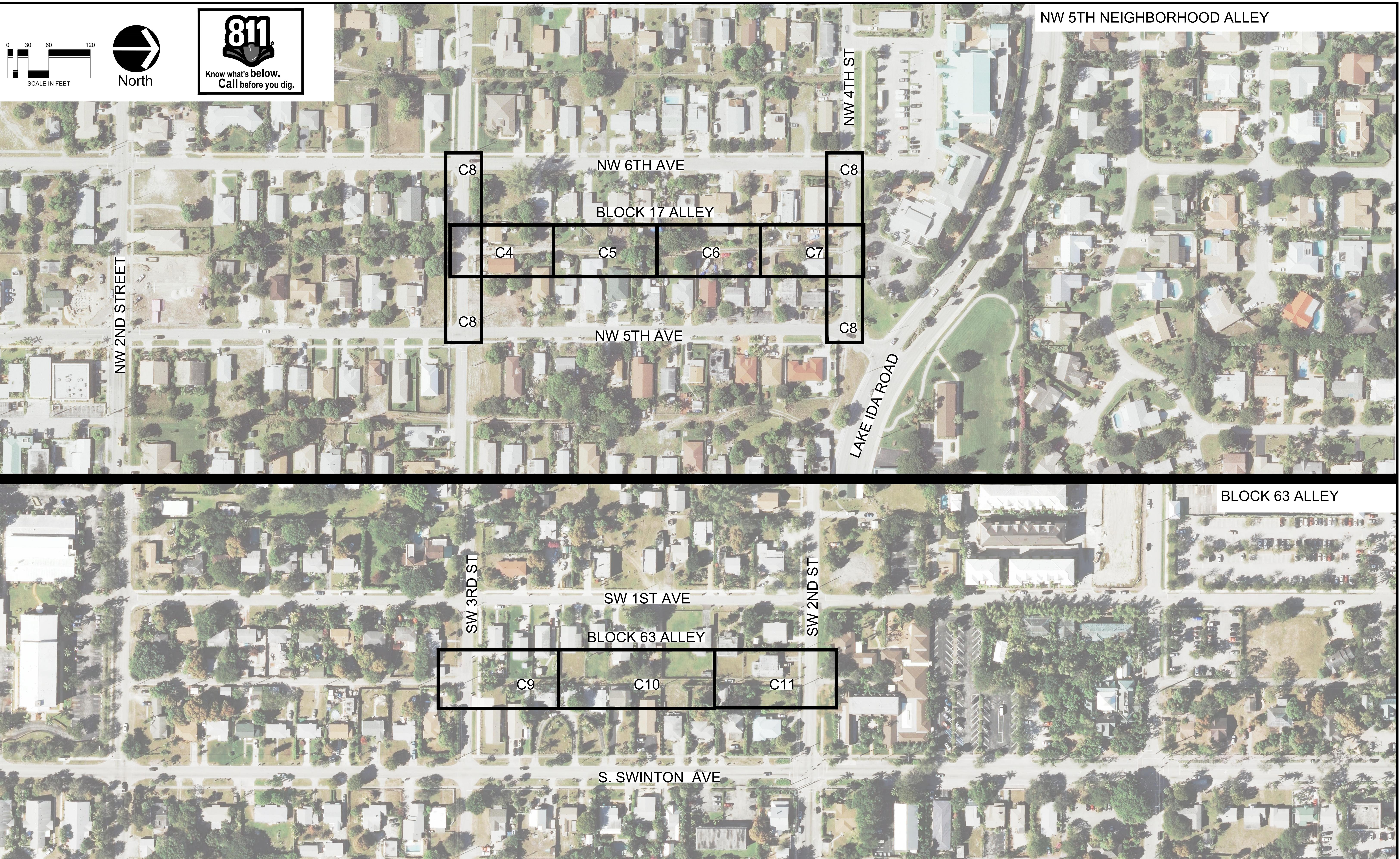
FLORIDA PUBLIC UTILITIES CORP.
IVAN GIBBS
209 N. SAPODILLA AVENUE
WEST PALM BEACH, FL 33401
(561) 723-3459

PALM BEACH COUNTY TRAFFIC OPERATIONS
ROD FRIEDEL
2300 JOG ROAD
WEST PALM BEACH, FL 33411-2747
PHONE 561-681-4371

TECO
MAX CHAMORRO
1363 JUPITER PARK DRIVE
JUPITER, FL 33458
PHONE 954-453-0812

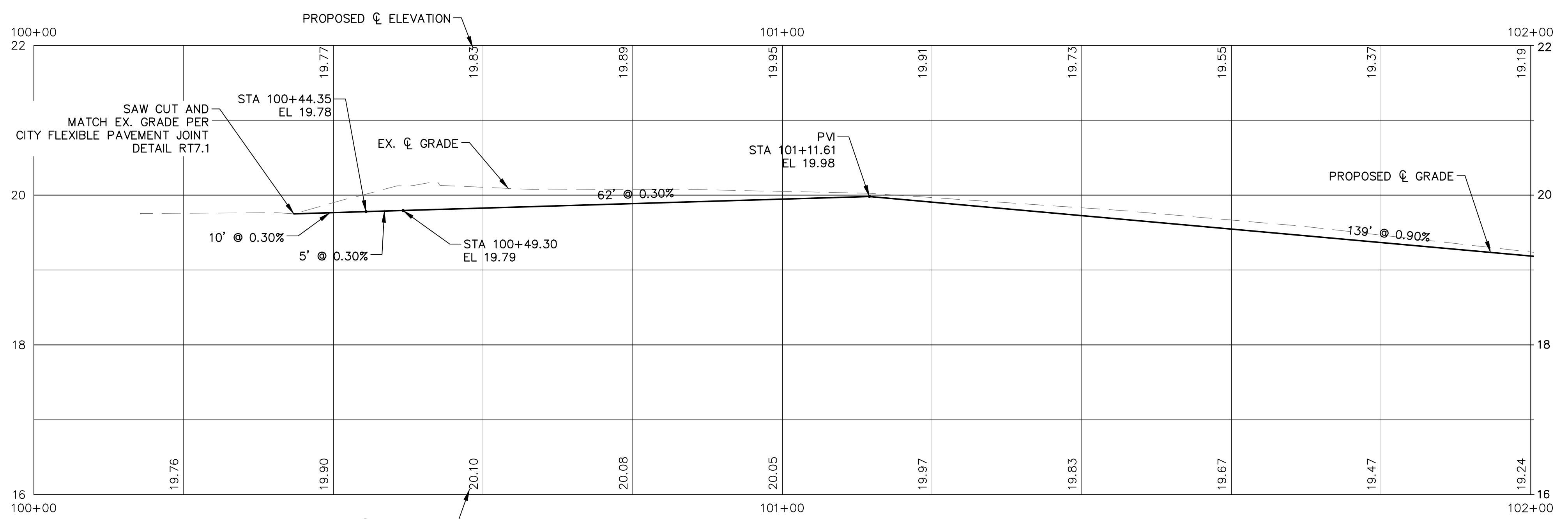
FLORIDA POWER AND LIGHT
LONNIE TAYLOR
9329 S. MILITARY TRAIL
BOYNTON BEACH, FL 33436
(561) 573-1433





SEE SHEET C8

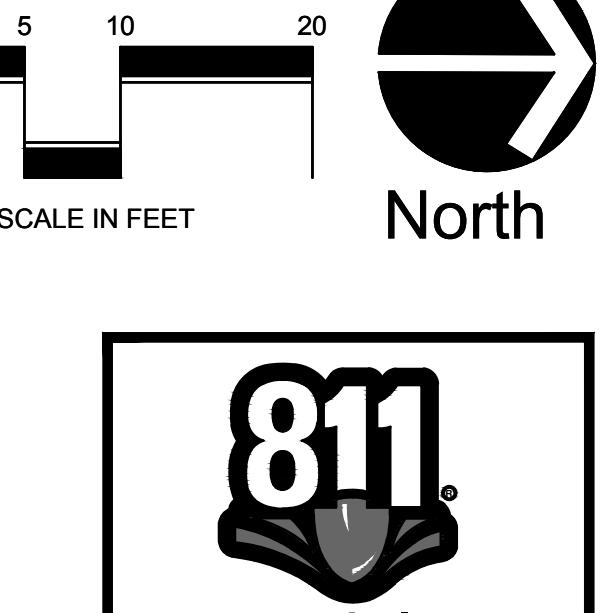
SEE SHEET C8



NW 5TH AVENUE ALLEY
100+00.00 - 102+00.00
SCALE:
HOR. 1" = 10'
VER. 1" = 1'

GENERAL NOTES

1. CONTRACTOR TO VERIFY ALL EX. CONDITIONS PRIOR TO CONSTRUCTION.
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10. REFER TO SHEET C12 AND C13 FOR SWALE SECTIONS & SECTION A-A.
11. ALL PAVEMENT MARKINGS SHALL COMPLY WITH THE CITY OF DELRAY BEACH STANDARD DETAILS RT8.1A & RT8.1B. IF THE CITY DETAIL IS NOT APPLICABLE, REFER TO THE LATEST EDITION OF THE MUTCD.
12. ALL TRAFFIC SIGNS SHALL COMPLY WITH THE LATEST EDITION OF THE MUTCD.
13. SIDEWALK REPLACEMENT SHALL EXTEND A MINIMUM OF 10 LF OR TO THE NEAREST JOINT UNLESS OTHERWISE NOTED.
14. CONTRACTOR SHALL CONSTRUCT UTILITY POLES WITH (2) BOLLARDS. SEE BOLLARD LAYOUT DETAIL ON SHEET C13



LEGEND

EX. POWER POLE	 
EX. CLEAN OUT	
EX. DRAINAGE	— — — D —
EX. OVERHEAD LINES	— — — OH —
EX. SANITARY	— — — S —
EX. TELEPHONE	— — — BT —
EX. WATER MAIN	— — — W —
EX. FENCE	— x — x — x —
PROPOSED DRAINAGE	_____ D _____

ABBREVIATIONS

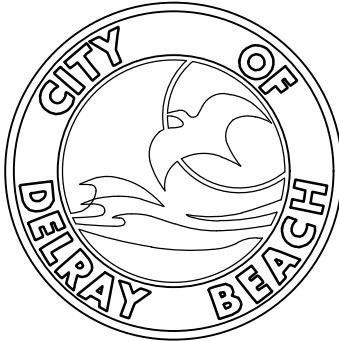
CONC.	CONCRETE
EL., ELEV.	ELEVATION
EOP	EDGE OF PAVEMENT
EX.	EXISTING
HP	HIGH-POINT (GRADING)
INV	INVERT
LT	LEFT
MH	MANHOLE
OH	OVERHEAD ELECTRIC
OS	OFFSET
RCP	REINFORCED CONCRETE PIPE
RT	RIGHT
R/W	RIGHT-OF-WAY
SAN	SANITARY
SP	SAMPLE POINT
STA	STATION
S/W	SIDEWALK
TYP	TYPICAL
WM	WATER MAIN

PAVEMENT MARKING

(A) 24" SOLID WHITE

(B) 6" DOUBLE YELLOW
& RPMS

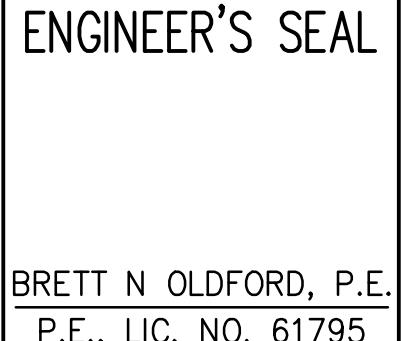
SEE DETAIL RT3.2 FOR PLACEMENT



**CITY of DELRAY BEACH
PUBLIC WORKS DEPARTMENT
434 SOUTH SWINTON AVENUE, DELRAY BEACH, FLORIDA 33444
Phone: (561) 243-7322 Fax: (561) 243-7314 www.mydelraybeach.com**

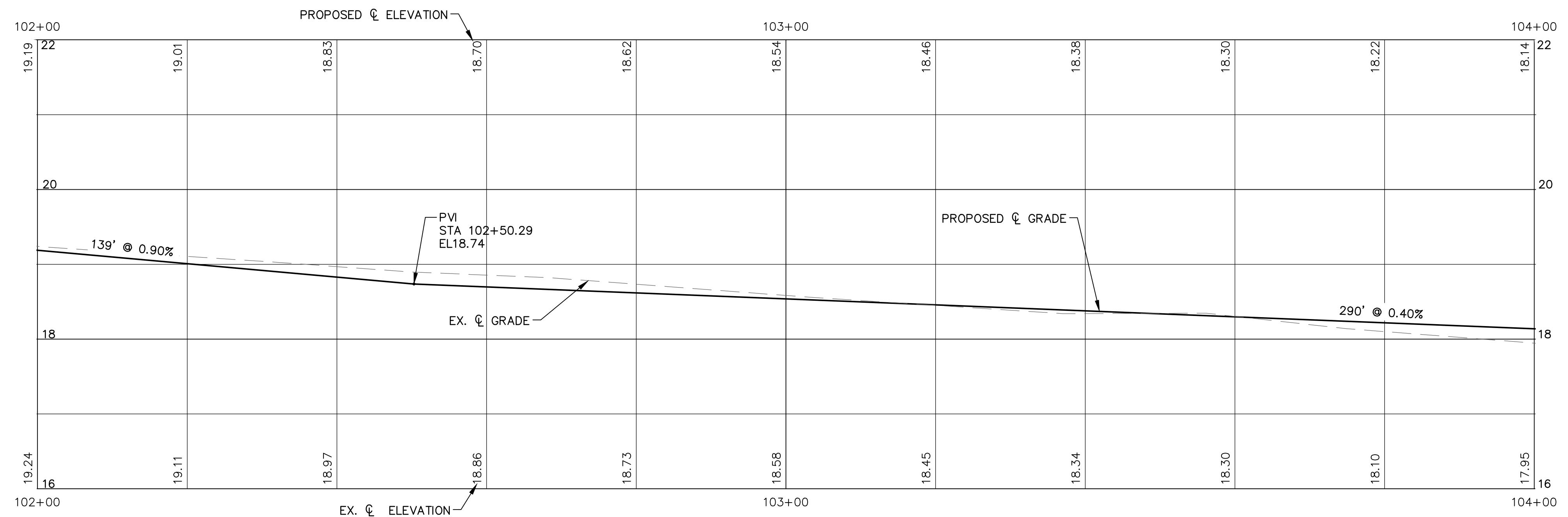
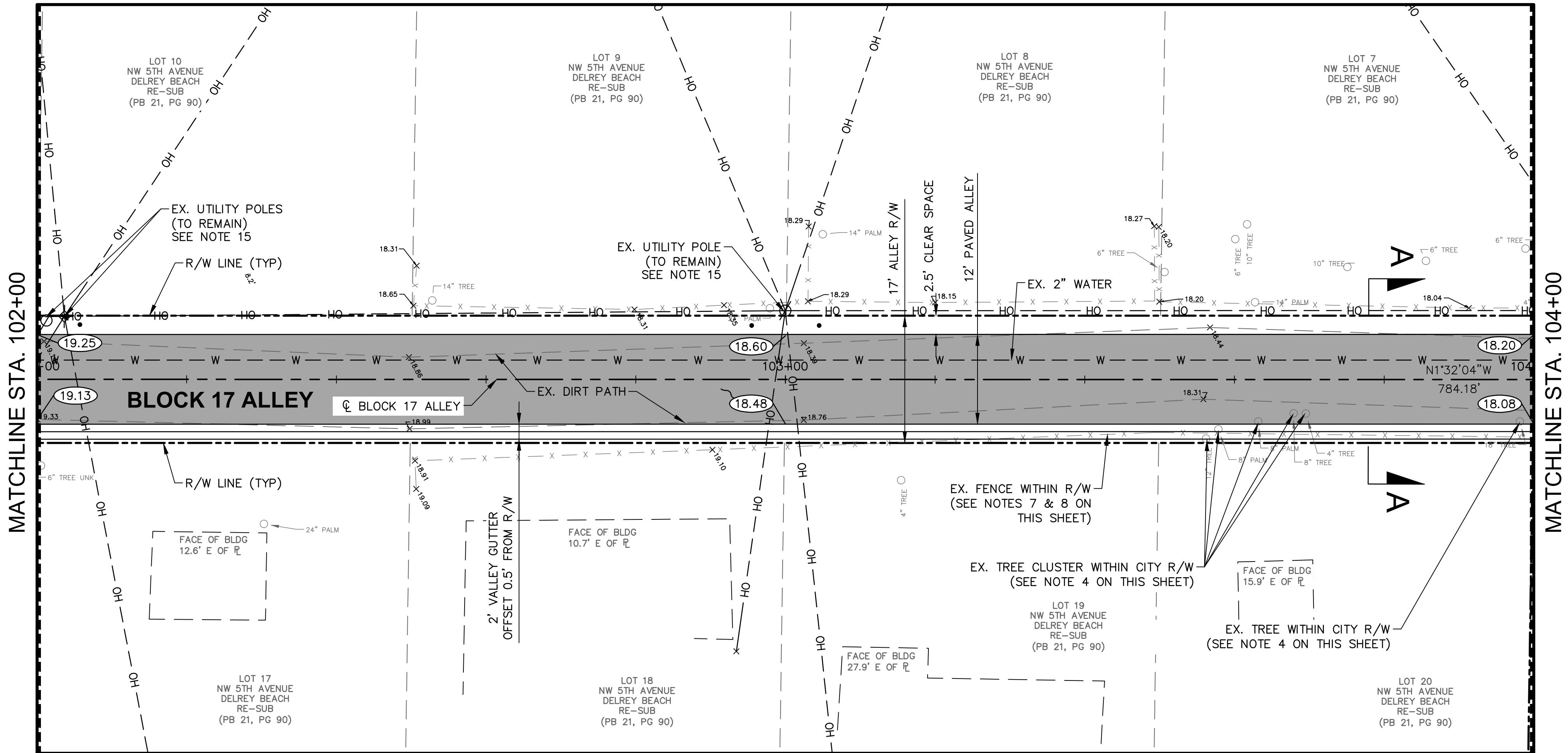
PREPARED BY:

The logo for WGI (Weston Group of Industries) is displayed. It features a large, bold, black 'WGI' monogram. To the left of the monogram is a black square containing a white 'W'. To the right of the monogram is a block of text in a black, sans-serif font. The text includes the company's name, address, phone number, fax number, and certification information.



DESIGNED BY	SCC			
DRAWN BY	SCC			
CHECKED BY	BNO			
QC BY	JWR			
WGI PROJECT #	1004.15/1004.13			
DATE	MARCH 2018	REVISION	DATE	DESCRIPTION

CITY OF DELRAY BEACH



NW 5TH AVENUE ALLEY
102+00.00 - 104+00.00
SCALE:
HOR. 1" = 10'
VER. 1" = 1'

The logo is circular with the words "CITY OF DELRAY BEACH" in a serif font. The "O" in "CITY" and the "O" in "OF" are replaced by a stylized illustration of a pelican in flight, its wings spread wide. Below the pelican are three wavy lines representing water. The "D" in "DELRAY" and the "B" in "BEACH" are partially cut off by the bottom edge of the circle.

**CITY of DELRAY BEACH
PUBLIC WORKS DEPARTMENT
434 SOUTH SWINTON AVENUE, DELRAY BEACH, FLORIDA 33444
Phone: (561) 243-7322 Fax: (561) 243-7314 www.mydelraybeach.com**

PREPARED BY:

The logo for WGI (Weston Group of Industries) features a large, bold, black 'W' on the left, followed by the letters 'GI' in a large, bold, black font. To the right of 'GI' is a smaller, black, registered trademark symbol (TM). To the right of the logo is the company's address and contact information.

ENGINEER'S SEAL

DESIGNED BY	SCC
DRAWN BY	SCC
CHECKED BY	BNO
QC BY	JWR
WGI PROJECT #	1004.15/1004.13
DATE	MARCH 2018

**CITY
NW 5TH AV
AND BLOCK
BLOCK 1
BY**

OF DELRAY BEACH
AVENUE NEIGHBORHOOD ALLEY
63 ALLEY – IMPROVEMENTS
7 ALLEY IMPROVEMENTS

PROJECT NO.
15-001/15-040

SHEET NO.
C5 OF 15

FILE ID.

GENERAL NOTES

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14. CONTRACTOR SHALL CONSTRUCT UTILITY POLES WITH (2) BOLLARDS. SEE BOLLARD LAYOUT DETAIL ON SHEET C13



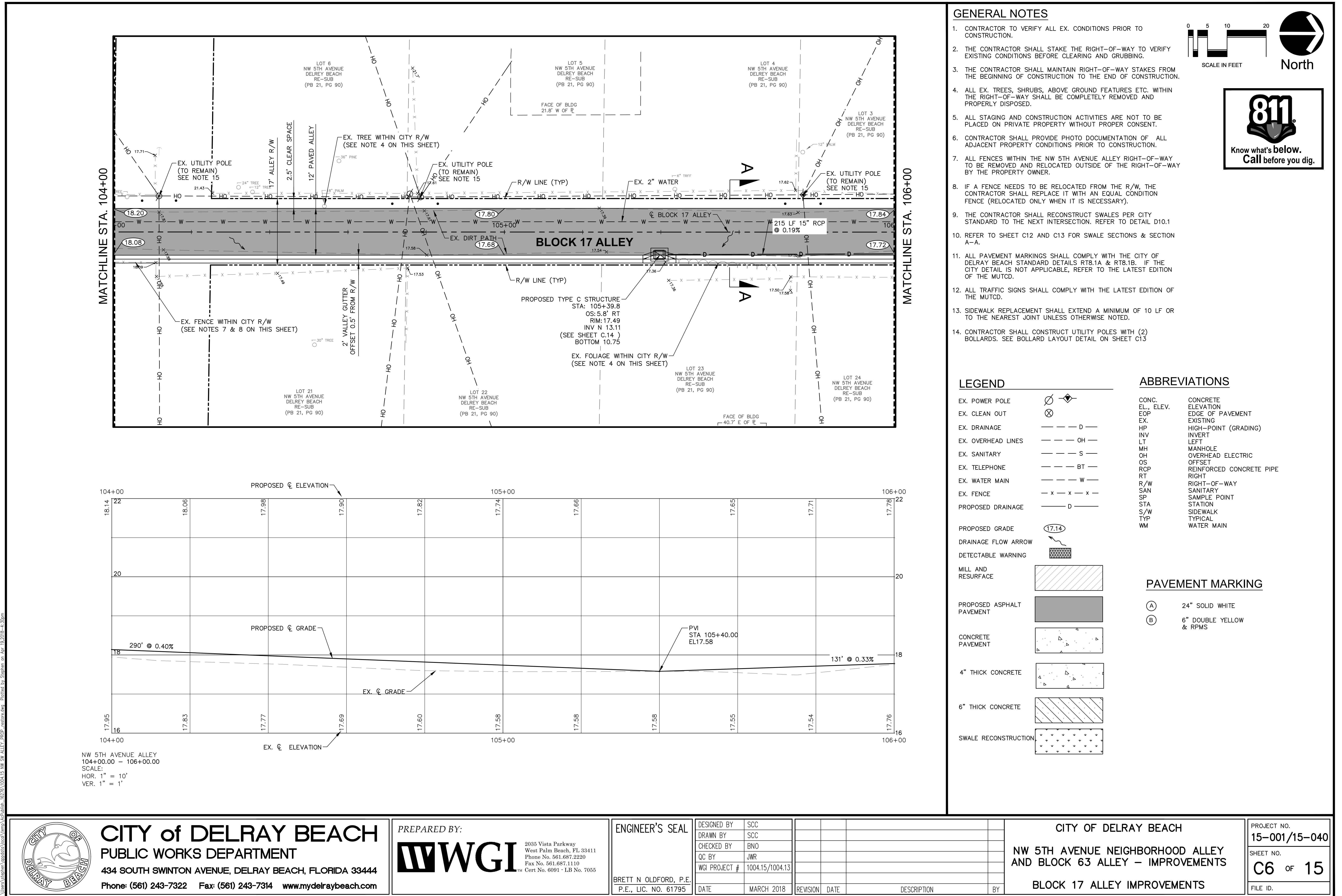
**Know what's below.
Call before you dig.**

ABBREVIATIONS

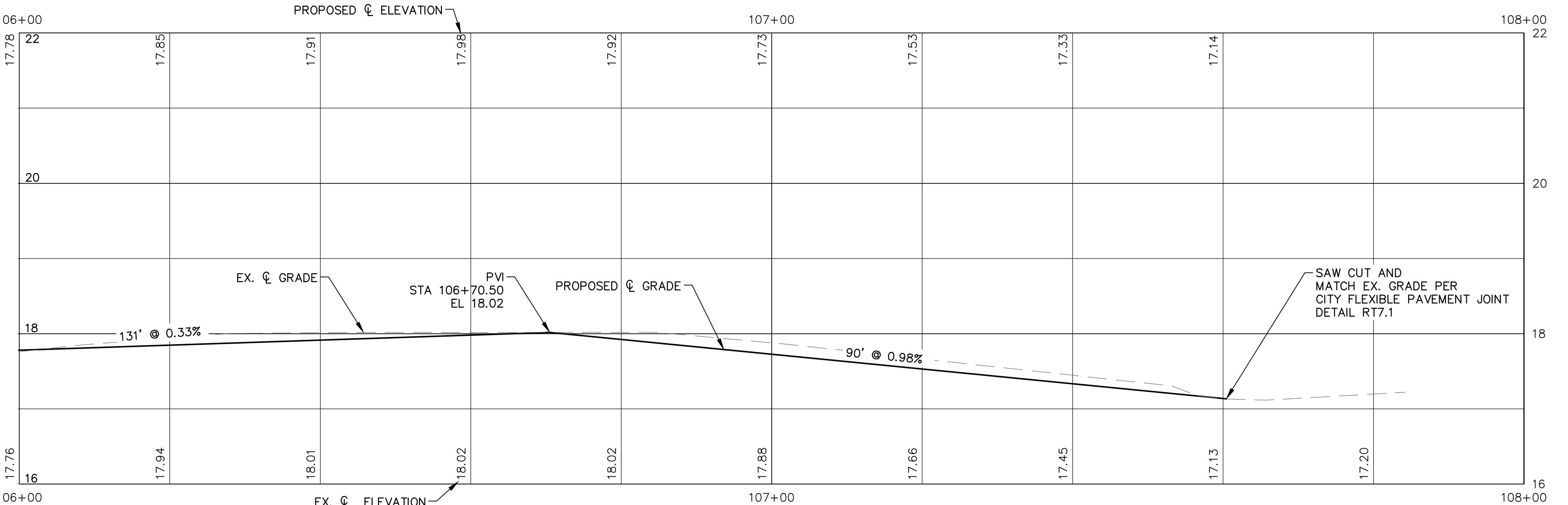
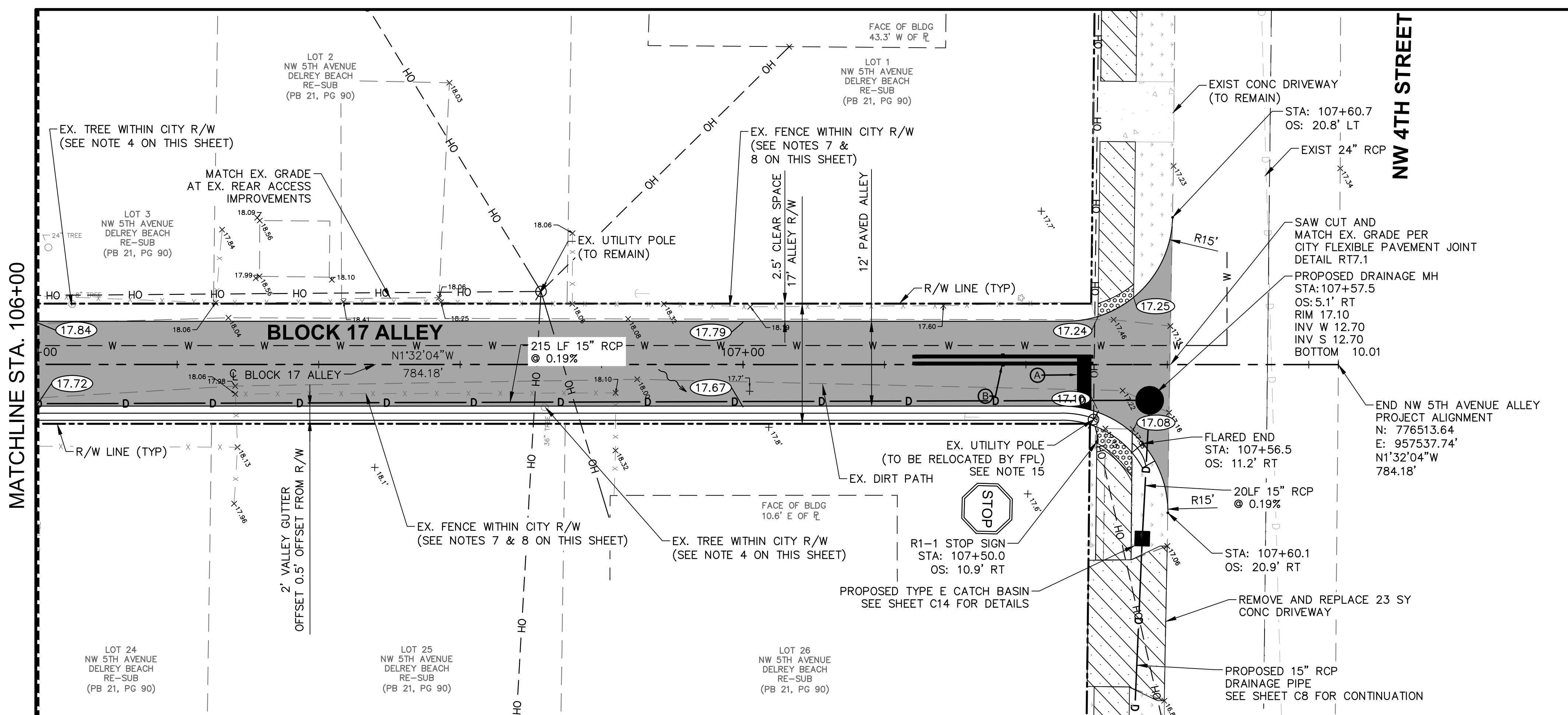
ONC.	CONCRETE
., ELEV.	ELEVATION
DP	EDGE OF PAVEMENT
.	EXISTING
P	HIGH-POINT (GRADING)
V	INVERT
H	LEFT
H	MANHOLE
S	OVERHEAD ELECTRIC
CP	OFFSET
	REINFORCED CONCRETE PIPE
W	RIGHT
AN	RIGHT-OF-WAY
	SANITARY
A	SAMPLE POINT
W	STATION
P	SIDEWALK
	TYPICAL
M	WATER MAIN

PAVEMENT MARKING

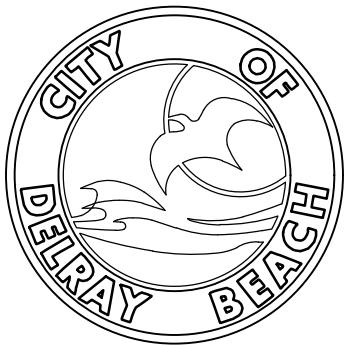
24" SOLID WHITE
6" DOUBLE YELLOW
& RPMS



SEE SHEET C8



NW 5TH AVENUE ALLEY
106+00.00 - 108+00.00
SCALE:
HOR. 1" = 10'
VER. 1" = 1'



CITY of DELRAY BEACH
PUBLIC WORKS DEPARTMENT
434 SOUTH SWINTON AVENUE, DELRAY BEACH, FLORIDA 33444
Phone: (561) 243-7322 Fax: (561) 243-7314 www.mydelraybeach.com

PREPARED BY:



2035 Vista Parkway
West Palm Beach, FL 33411
Phone No. 561.687.2220
Fax No. 561.687.1110
Cert No. 6091 - LB No. 7055

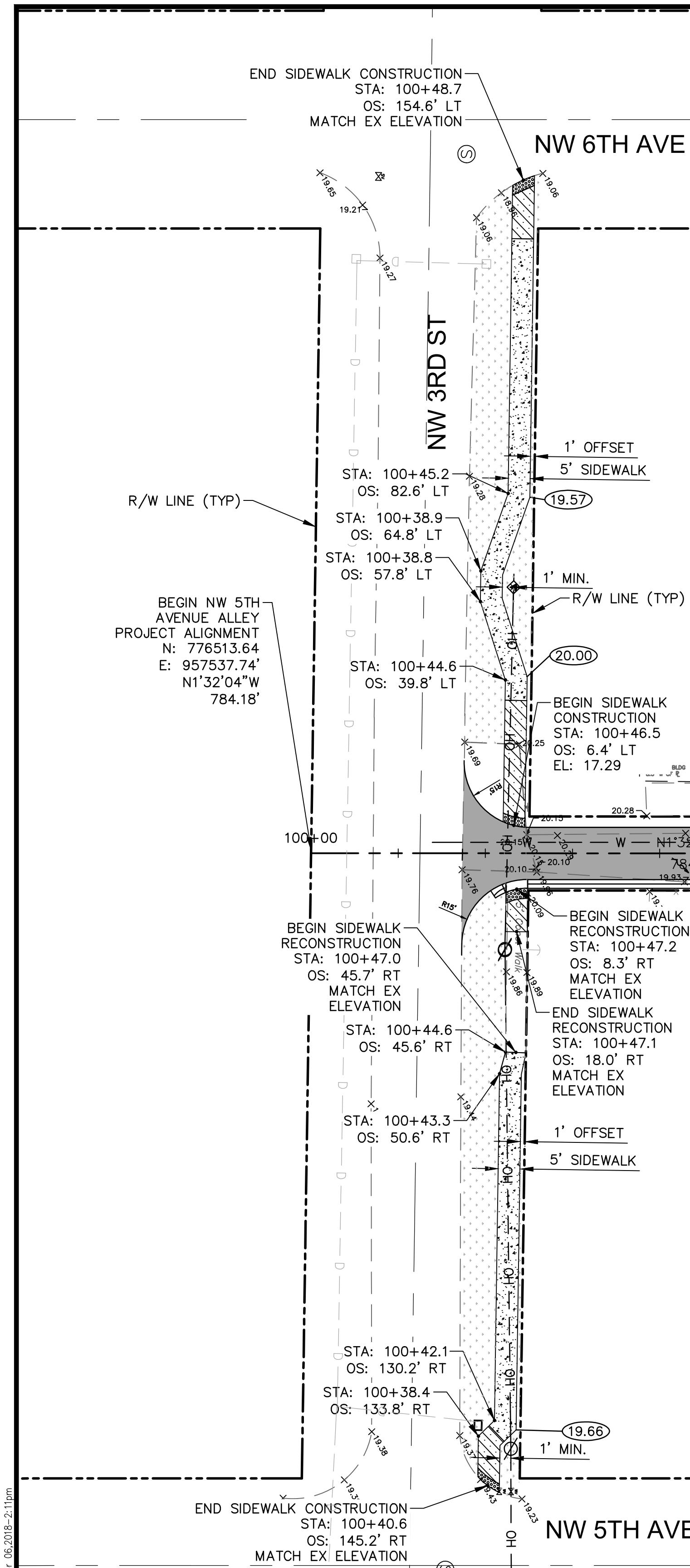
ENGINEER'S SEAL
BRETT N OLDFORD, P.E.
P.E. LIC. NO. 61795

DESIGNED BY	SCC
DRAWN BY	SCC
CHECKED BY	BNO
QC BY	JWR
WGI PROJECT #	1004.15/1004.13
DATE	MARCH 2018

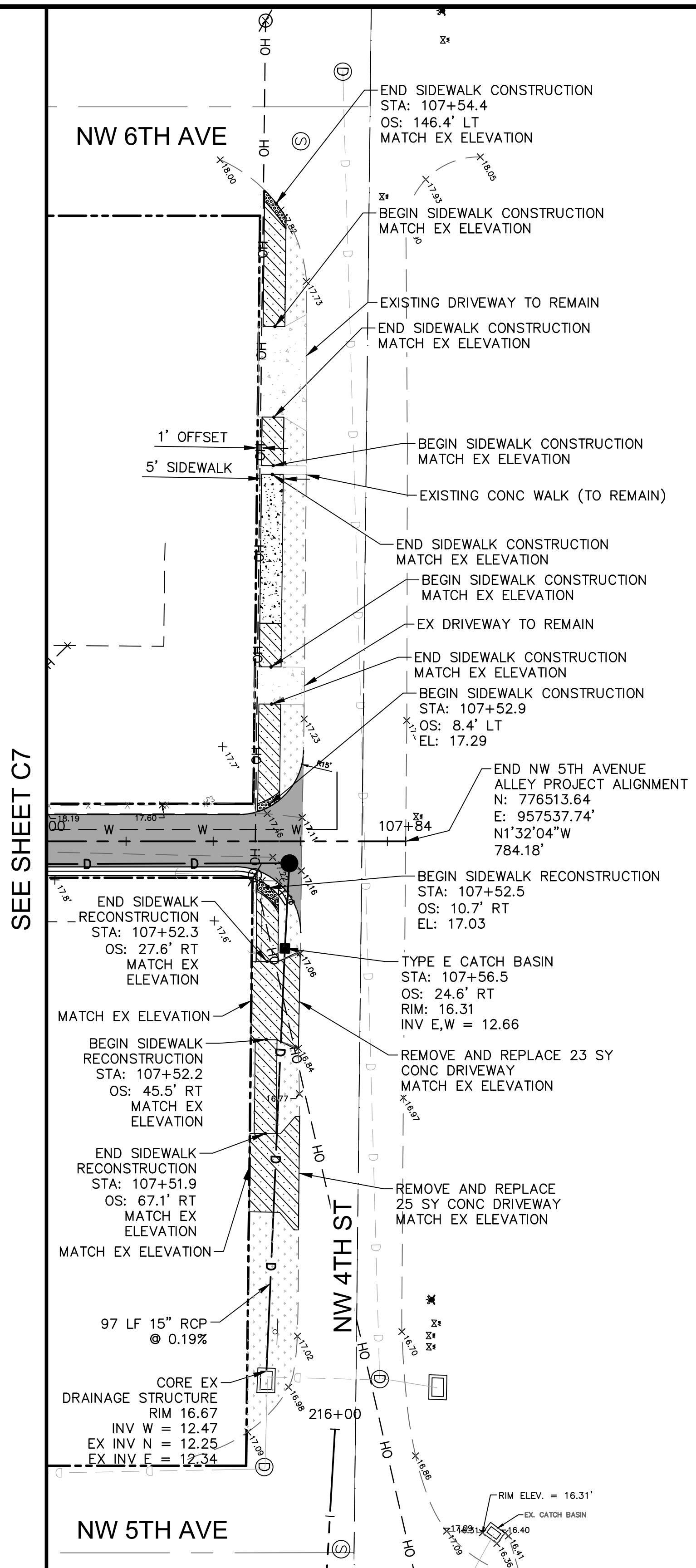
REVISION	DATE	DESCRIPTION	BY

CITY OF DELRAY BEACH
NW 5TH AVENUE NEIGHBORHOOD ALLEY
AND BLOCK 63 ALLEY - IMPROVEMENTS
BLOCK 17 ALLEY IMPROVEMENTS

PROJECT NO.
15-001/15-040
SHEET NO.
C7 OF 15
FILE ID.



SEE SHEET C1



Know what's below.
Call before you dig.



**CITY of DELRAY BEACH
PUBLIC WORKS DEPARTMENT
434 SOUTH SWINTON AVENUE, DELRAY BEACH, FLORIDA 33444
Phone: (561) 243-7322 Fax: (561) 243-7314 www.mydelraybeach.com**

PREPARED BY:

The logo consists of a large, bold, black 'W' and 'G' stacked vertically, with a smaller 'I' to the right. To the right of the logo is a block of text in a black sans-serif font. The text includes the address '2035 Vista Parkway', 'West Palm Beach, FL 33411', the phone number 'Phone No. 561.687.2220', the fax number 'Fax No. 561.687.1110', and the certificate numbers 'Cert No. 6091 - LB No. 7055'. A small 'TM' symbol is located at the bottom right of the 'I' in the logo.

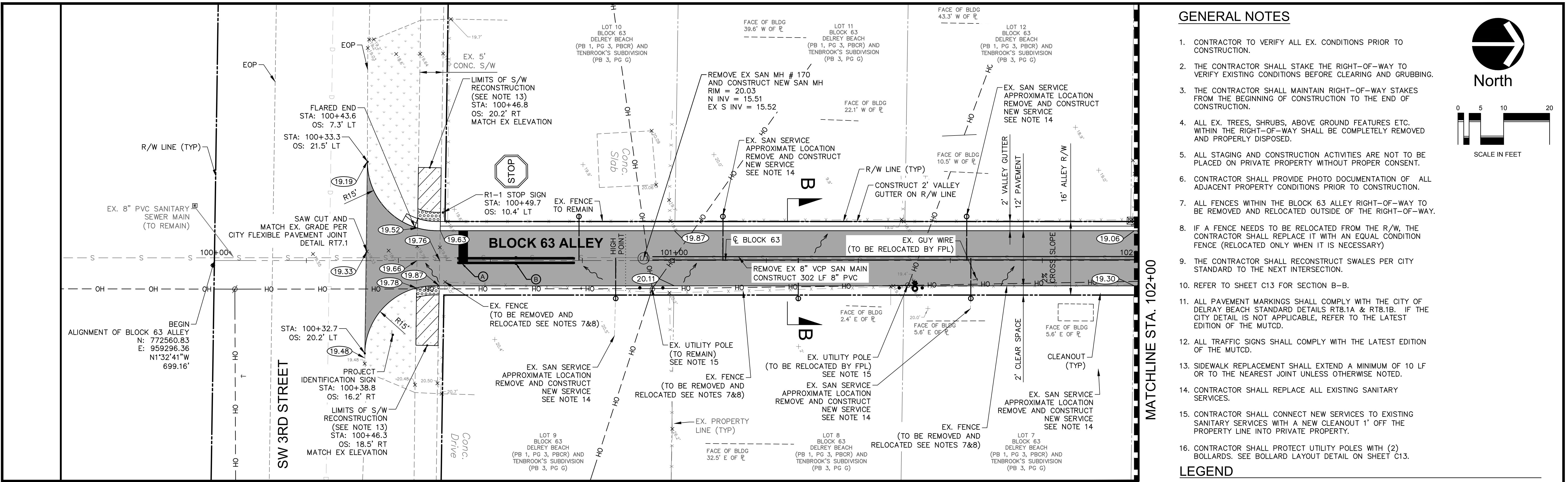
ENGINEER'S SEAL

**CITY OF DELRAY BEACH
NW 5TH AVENUE NEIGHBORHOOD A
AND BLOCK 63 ALLEY – IMPROVEMENT
BLOCK 17 ALLEY IMPROVEMENT**

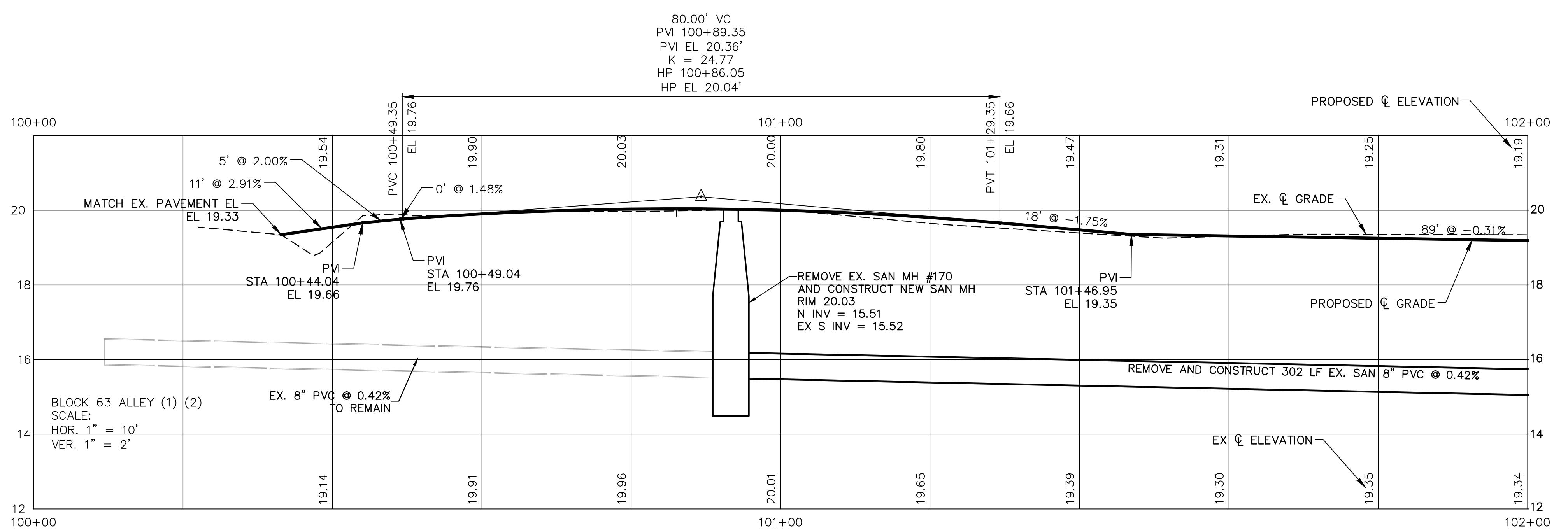
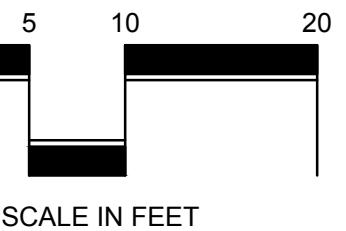
PROJECT NO.
15-001/15-040

SHEET NO.
C8 OF 15

FILE ID.



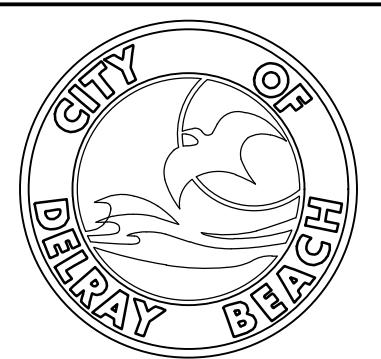
North



EX. POWER POLE	∅	PROPOSED GRADE	(17.14)
EX. CLEAN OUT	⊗	DRAINAGE FLOW ARROW	
EX. DRAINAGE	— D —	DETECTABLE WARNING	
EX. OVERHEAD LINES	— OH —	MILL AND RESURFACE	
EX. SANITARY	— S —		
EX. TELEPHONE	— BT —	PROPOSED ASPHALT PAVEMENT	
EX. WATER MAIN	— W —		
EX. FENCE	— x — x —	CONCRETE PAVEMENT	
EX. UNGROUND COMM LINE	— UGT —		
PROPOSED CLEANOUT	○	4" THICK CONCRETE	
		6" THICK CONCRETE	
		SWALE RECONSTRUCTION	

ABBREVIATIONS

CONC.	CONCRETE
DBI.	DITCH BOTTOM INLET
ELEV.	ELEVATION
EOP	EDGE OF PAVEMENT
EX.	EXISTING
HP	HIGH-POINT (GRADING)
INV	INVERT
LT	LEFT
MH	MANHOLE
OH	OVERHEAD ELECTRIC
OS	OFFSET
RT	RIGHT
R/W	RIGHT-OF-WAY
SAN	SANITARY
SP	SAMPLE POINT
STA	STATION
S/W	SIDEWALK
TYP	TYPICAL
WM	WATER MAIN



CITY of DELRAY BEACH
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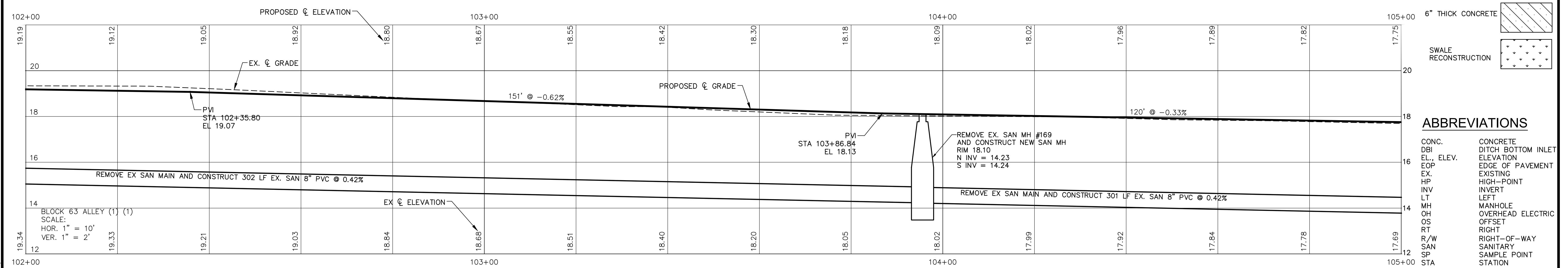
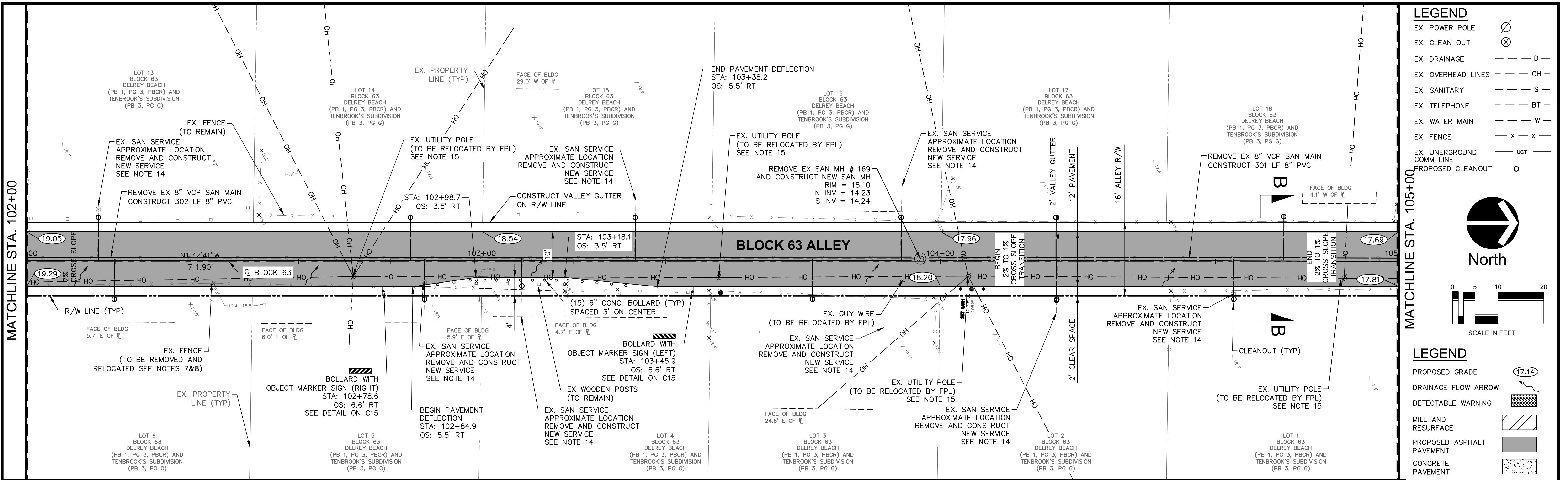
ENGINEER'S SEAL
BRETT N OLDFORD, P.E.
P.E. LIC. NO. 61795

DESIGNED BY SCC
DRAWN BY SCC
CHECKED BY BNO
QC BY JWR
WGI PROJECT # 1004.15/1004.13
DATE MARCH 2018

REVISION	DATE	DESCRIPTION	BY

CITY OF DELRAY BEACH
NW 5TH AVENUE NEIGHBORHOOD ALLEY
AND BLOCK 63 ALLEY - IMPROVEMENTS
BLOCK 63 ALLEY IMPROVEMENTS

PROJECT NO.
15-001/15-040
SHEET NO.
C9 OF 15
FILE ID.



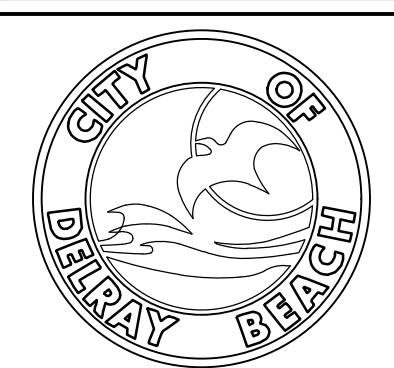
GENERAL NOTES

- CONTRACTOR SHALL VERIFY ALL EX. CONDITIONS PRIOR TO CONSTRUCTION.
- THE CONTRACTOR SHALL STAKE THE RIGHT-OF-WAY TO VERIFY EXISTING CONDITIONS BEFORE CLEARING AND GRUBBING.
- THE CONTRACTOR SHALL MAINTAIN RIGHT-OF-WAY STAKES FROM THE BEGINNING OF CONSTRUCTION TO THE END OF CONSTRUCTION.
- ALL EX. TREES, SHRUBS, ABOVE GROUND FEATURES ETC. WITHIN THE RIGHT-OF-WAY SHALL BE COMPLETELY REMOVED AND PROPERLY DISPOSED.
- ALL STAGING AND CONSTRUCTION ACTIVITIES ARE NOT TO BE PLACED ON PRIVATE PROPERTY WITHOUT PROPER CONSENT.
- CONTRACTOR SHALL PROVIDE PHOTO DOCUMENTATION OF ALL ADJACENT PROPERTY CONDITIONS PRIOR TO CONSTRUCTION.
- ALL FENCES WITHIN THE BLOCK 63 ALLEY RIGHT-OF-WAY TO BE REMOVED AND RELOCATED OUTSIDE OF THE RIGHT-OF-WAY.
- IF A FENCE NEEDS TO BE RELOCATED FROM THE R/W, THE CONTRACTOR SHALL REPLACE IT WITH AN EQUAL CONDITION FENCE (RELOCATED ONLY WHEN IT IS NECESSARY).
- THE CONTRACTOR SHALL RECONSTRUCT SWALES PER CITY STANDARD TO THE NEXT INTERSECTION.
- REFER TO SHEET C13 FOR SECTION B-B.
- ALL PAVEMENT MARKINGS SHALL COMPLY WITH THE CITY OF DELRAY BEACH STANDARD DETAILS RT8.1A & RT8.1B. IF THE CITY DETAIL IS NOT APPLICABLE, REFER TO THE LATEST EDITION OF THE MUTCD.
- CONTRACTOR SHALL CONNECT NEW SERVICES TO EXISTING SANITARY SERVICES WITH A NEW CLEANOUT 1' OFF THE PROPERTY LINE INTO PRIVATE PROPERTY.
- CONTRACTOR SHALL PROTECT UTILITY POLES WITH (2) BOLLARDS. SEE BOLLARD LAYOUT DETAIL ON SHEET C13.

- ALL TRAFFIC SIGNS SHALL COMPLY WITH THE LATEST EDITION OF THE MUTCD.
- SIDEWALK REPLACEMENT SHALL EXTEND A MINIMUM OF 10 LF OR TO THE NEAREST JOINT UNLESS OTHERWISE NOTED.
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PAVEMENT MARKING

- (A) 24" SOLID WHITE
- (B) 6" DOUBLE YELLOW & RPMS



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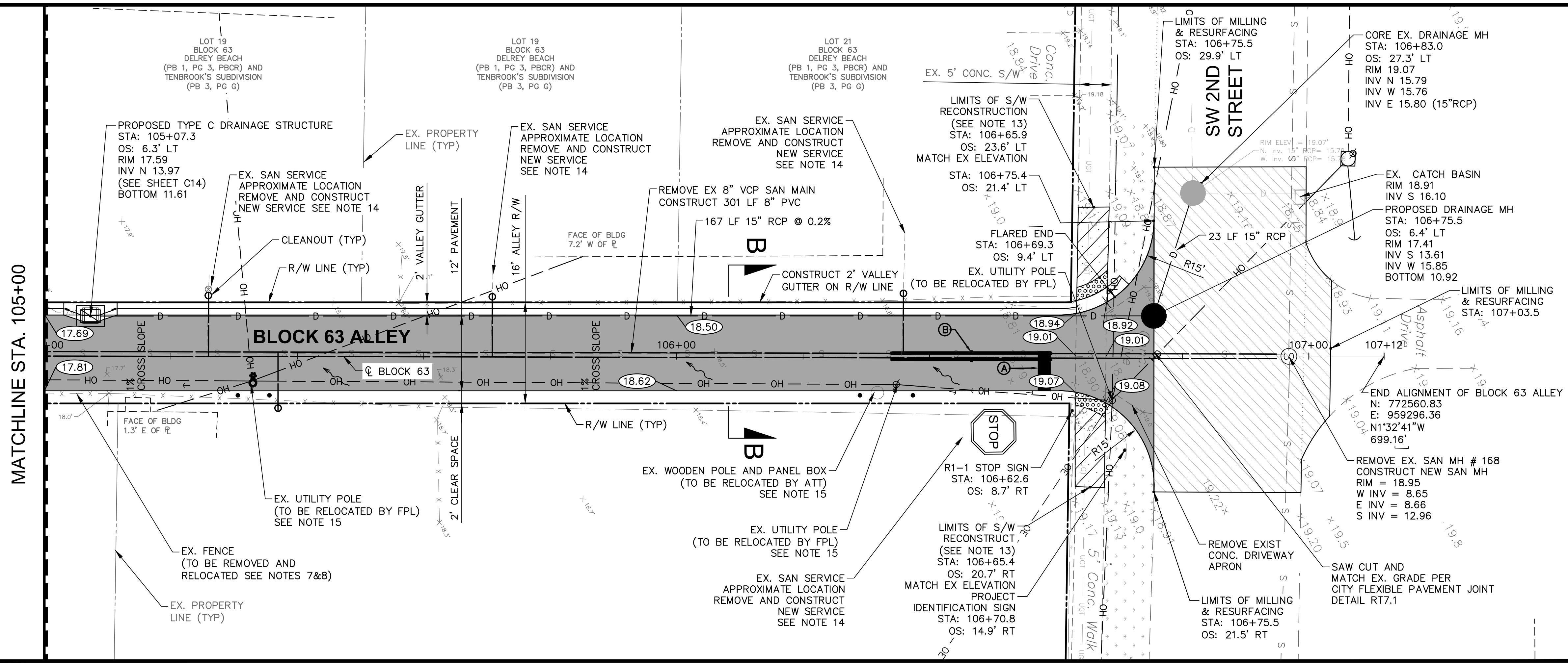
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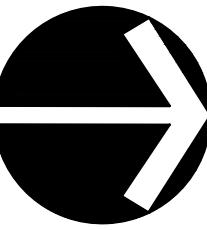
CITY OF DELRAY BEACH
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BLOCK 63 ALLEY IMPROVEMENTS

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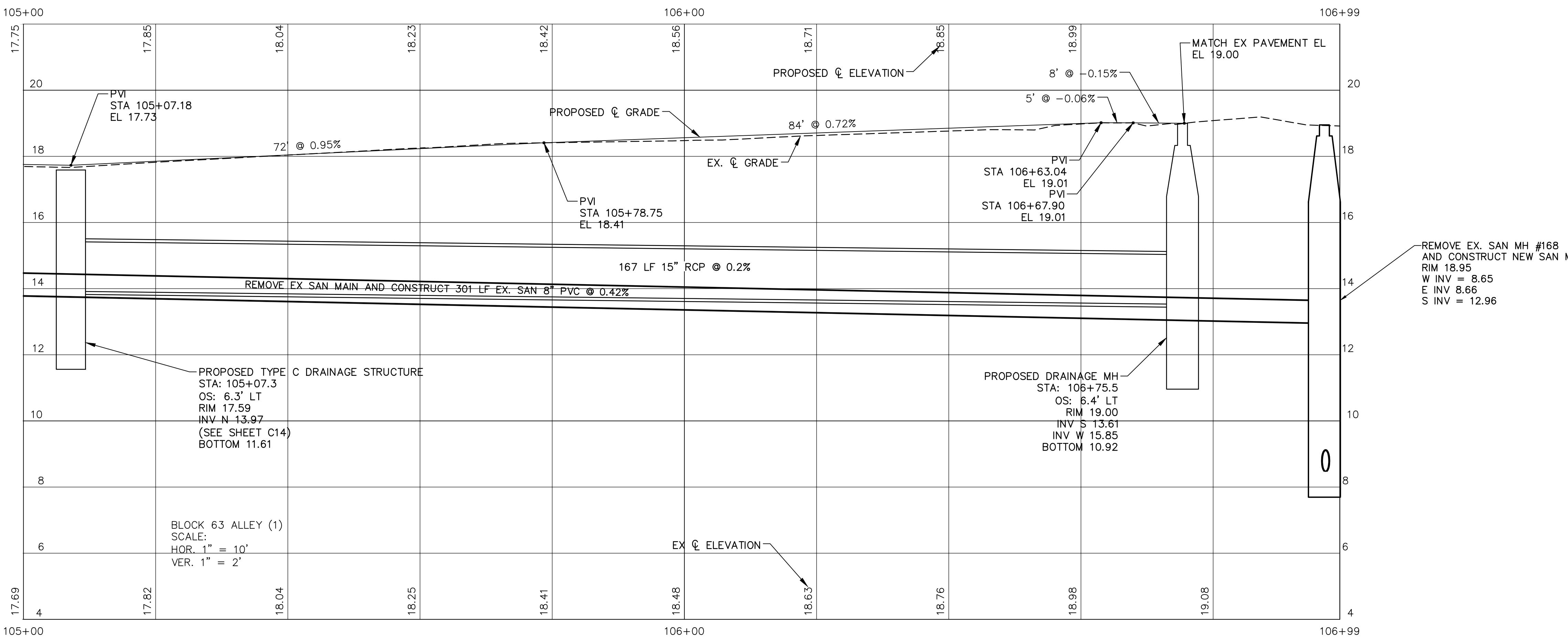


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0 5 10 20
SCALE IN FEET



LEGEND

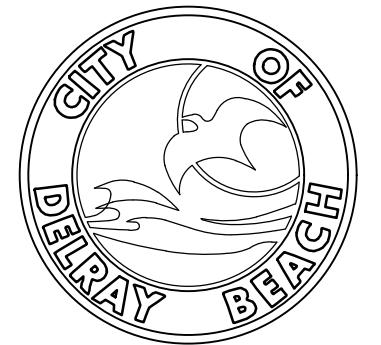
EX. POWER POLE		PROPOSED GRADE
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EX. DRAINAGE		DETECTABLE WARNING
EX. OVERHEAD LINES		MILL AND RESURFACE
EX. SANITARY		PROPOSED ASPHALT PAVEMENT
EX. TELEPHONE		EX. FENCE
EX. WATER MAIN		EX. UNDERGROUND COMM LINE
EX. FENCE		PROPOSED CLEANOUT
EX. UGND COMM LINE		CONCRETE PAVEMENT
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	6" DOUBLE YELLOW & RPMs



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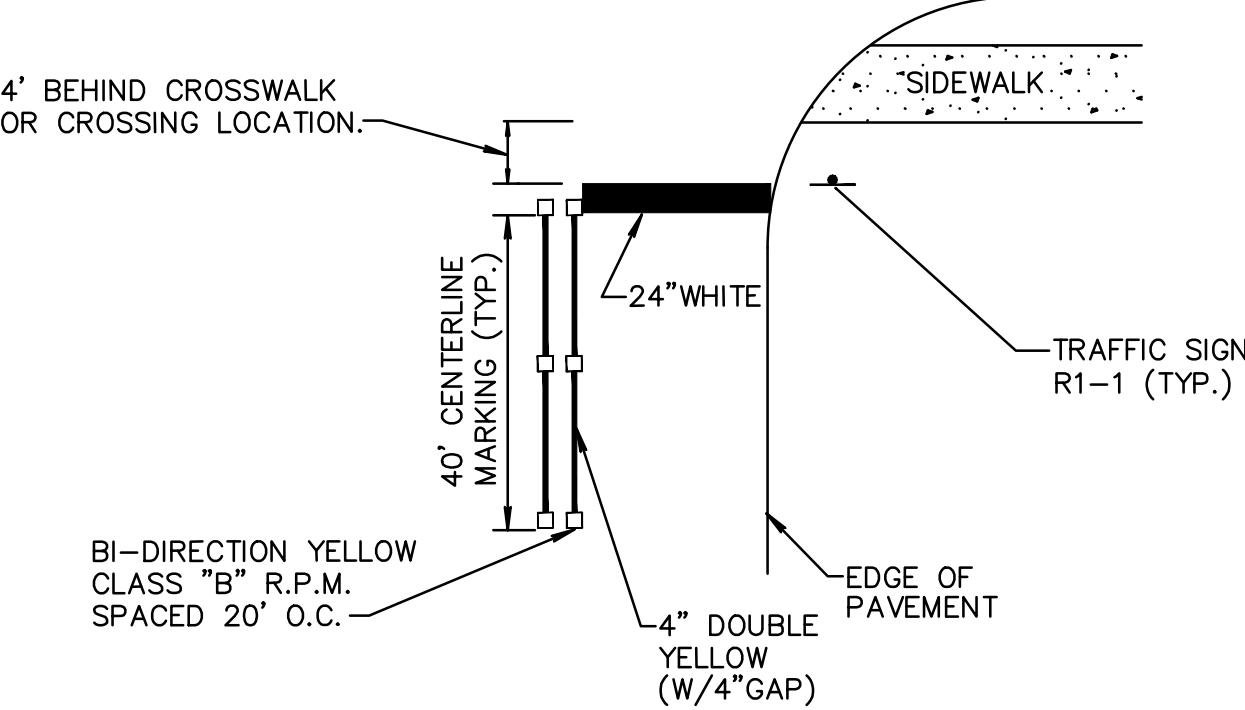
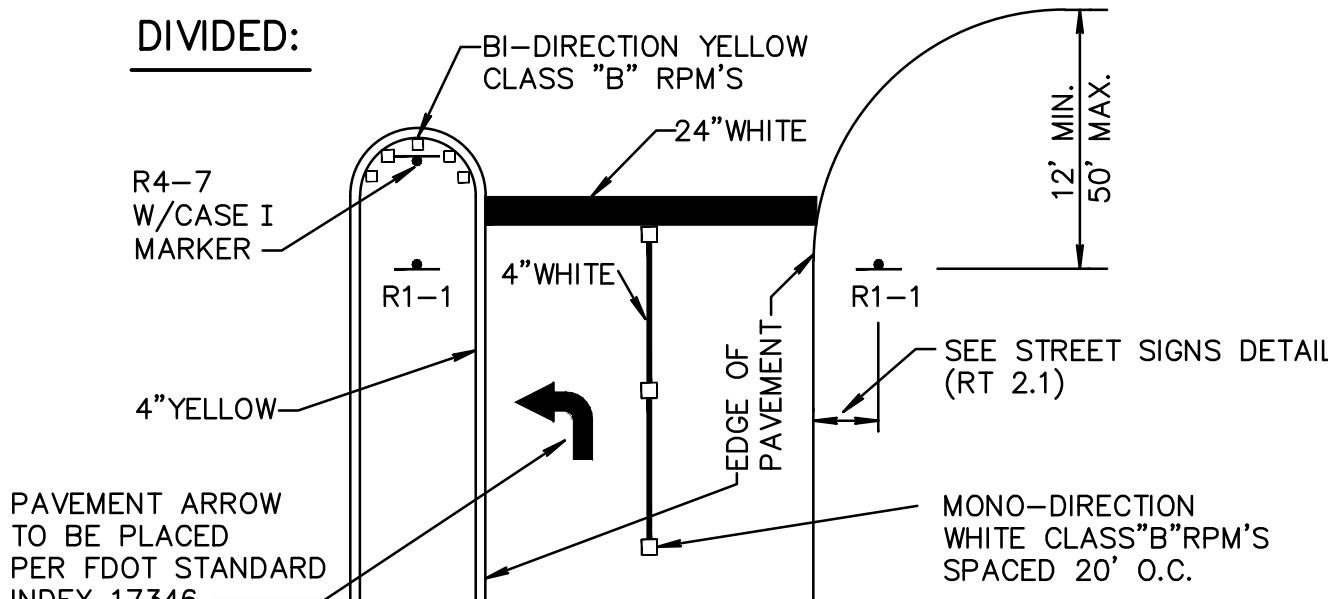
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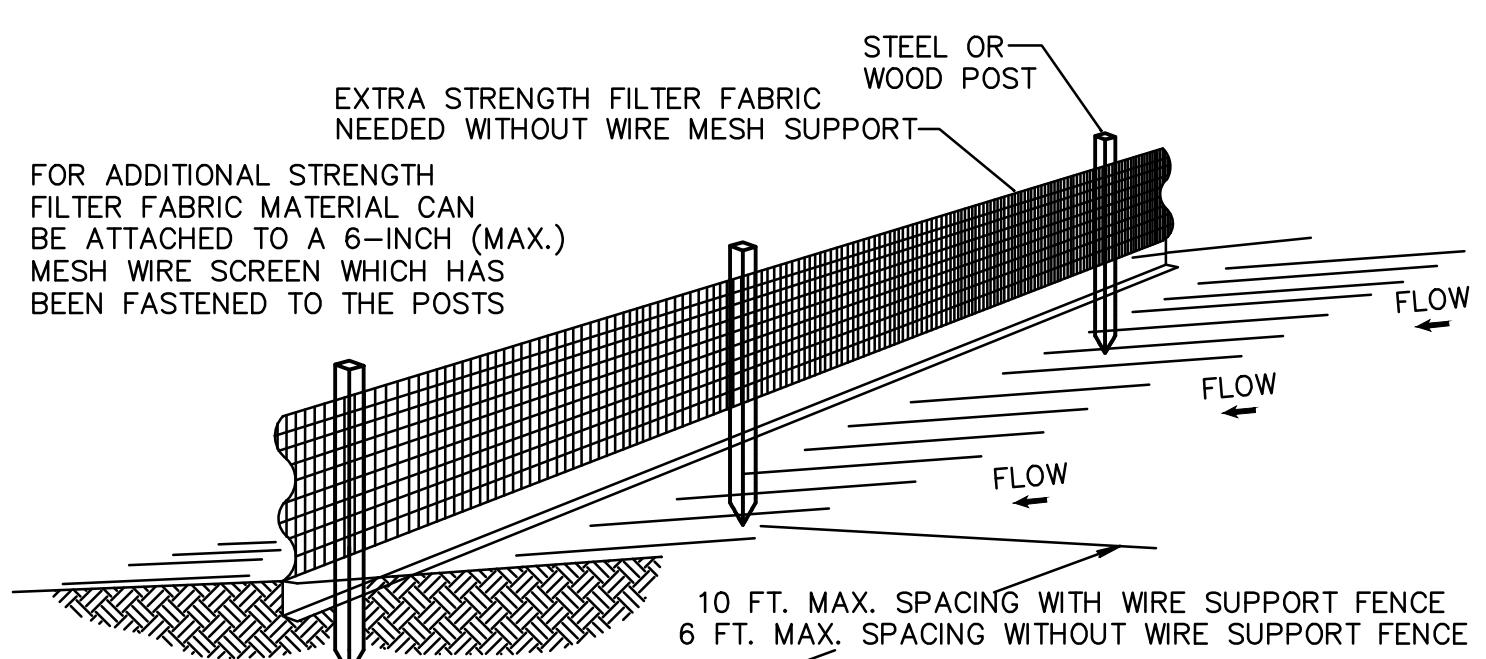
UNDIVIDED:DIVIDED:

NOTE: ALL STRIPING AND DELINEATION TO CONFORM TO THE REQUIREMENTS OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, (MUTCD) LATEST ED.

INTERSECTION TRAFFIC CONTROL STOP CONDITION
DETAIL RT 3.2

NOTE:
A CONSTRUCTION ENTRANCE SHALL BE CONSTRUCTED AND CONTAIN AN AGGREGATE LAYER (FDOT AGGREGATE NO.1), AT LEAST 6-INCHES THICK. IT MUST EXTEND TO THE WIDTH OF THE VEHICULAR INGRESS AND EGRESS AREA.

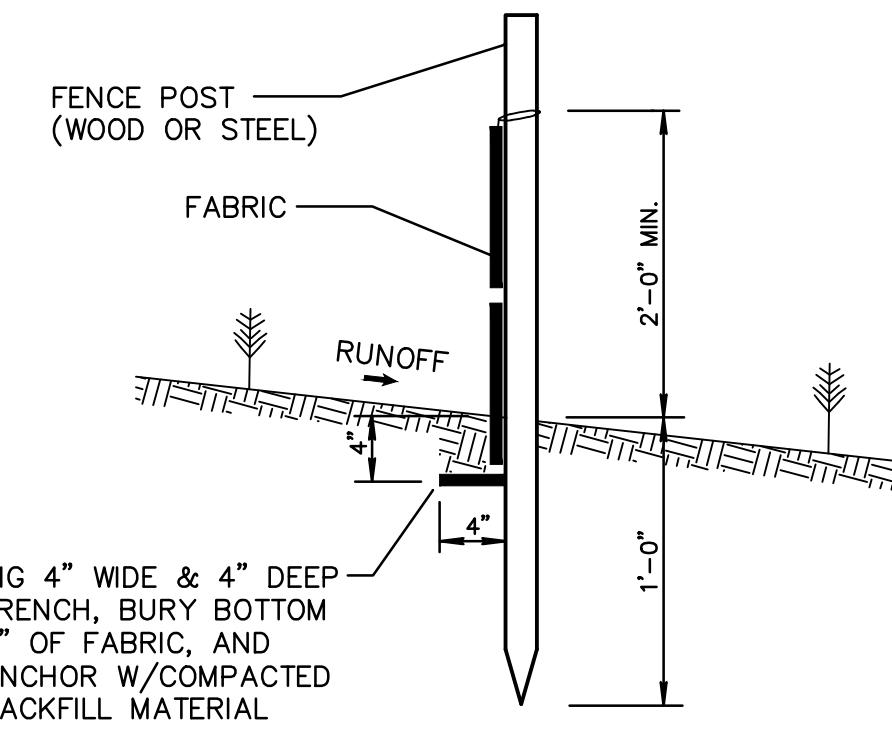
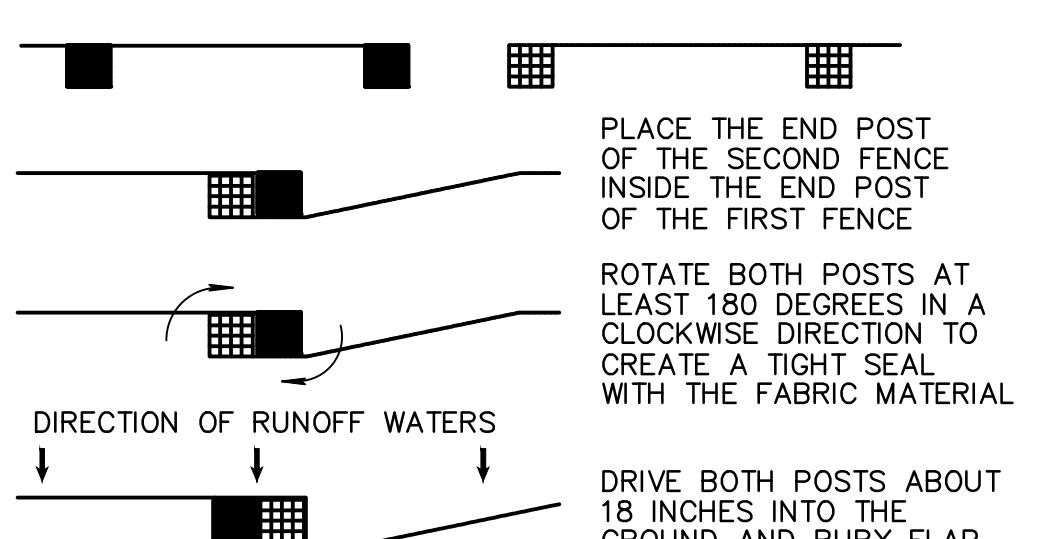
STABILIZED CONSTRUCTION ENTRANCE DETAIL D9.1C



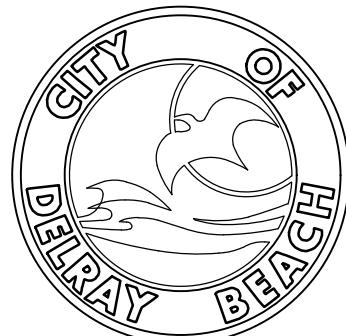
NOTES:

1. THE HEIGHT OF A SILT FENCE SHALL NOT EXCEED 36 INCHES (90 CM).
2. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID THE USE OF JOINTS.
3. POSTS SHALL BE SPACED A MAXIMUM OF 10 FEET (3 M) APART AT THE BARRIER LOCATION AND DRIVEN SECURELY INTO THE GROUND A MINIMUM OF 12 INCHES (30 CM). WHEN EXTRA STRENGTH FABRIC IS USED WITHOUT THE WIRE SUPPORT FENCE, POST SPACING SHALL NOT EXCEED 6 FEET (1.8 M).
4. A TRENCH SHALL BE EXCAVATED APPROXIMATELY 4 INCHES (10 CM) WIDE AND 4 INCHES (10 CM) DEEP ALONG THE LINE OF POSTS AND UPSLOPE FROM THE BARRIER.
5. WHEN STANDARD STRENGTH FILTER FABRIC IS USED, A WIRE MESH SUPPORT FENCE SHALL BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING HEAVY DUTY WIRE STAPLES AT LEAST 1 INCH (25 MM) LONG, TIE WIRES, OR HOG RINGS. THE WIRE SHALL EXTEND INTO THE TRENCH A MINIMUM OF 2 INCHES (5 CM) AND SHALL NOT EXTEND MORE THAN 36 INCHES (90 CM) ABOVE THE ORIGINAL GROUND SURFACE.
6. THE STANDARD STRENGTH FILTER FABRIC SHALL BE STAPLED OR WIRED TO THE FENCE, AND 8 INCHES (20 CM) OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT EXTEND MORE THAN 36 INCHES (90 CM) ABOVE THE ORIGINAL GROUND SURFACE.
7. THE TRENCH SHALL BE BACKFILLED AND THE SOIL COMPAKTED OVER THE FILTER FABRIC.
8. ALL PROJECTS REQUIRE SUBMITTAL OF POLLUTION PREVENTION PLAN (PPP).
9. ALL PROJECTS 1 AC. OR MORE MUST SUBMIT NOTICE OF INTENT (NOI) TO FDEP.

SILT FENCE INSTALLATION DETAIL D 9.1a
Sheet 1 of 2

SILT FENCE SECTION
NOT TO SCALEATTACHING TWO SILT FENCES
NOT TO SCALE

SILT FENCE INSTALLATION DETAIL D 9.1b
Sheet 2 of 2



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ENGINEER'S SEAL

BRETT N. OLDFORD, P.E.
P.E., LIC. NO. 61795

DESIGNED BY

SCC

DRAWN BY

SCC

CHECKED BY

BNO

QC BY

JWR

WGI PROJECT #

1004.15/1004.13

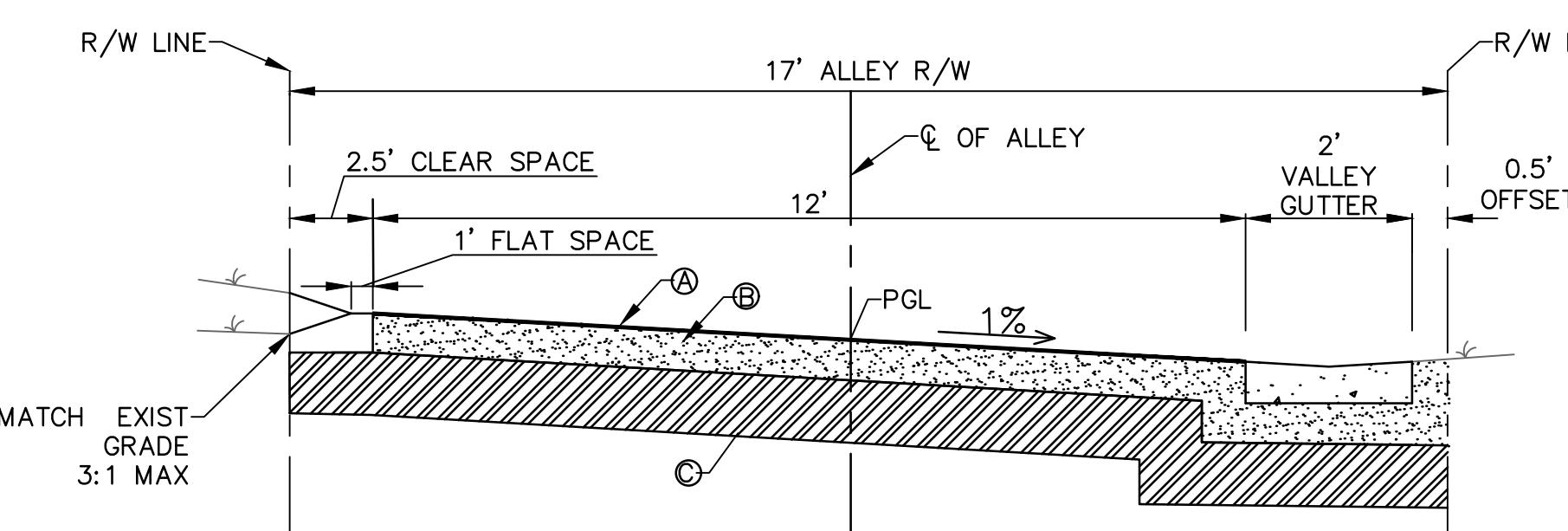
DATE

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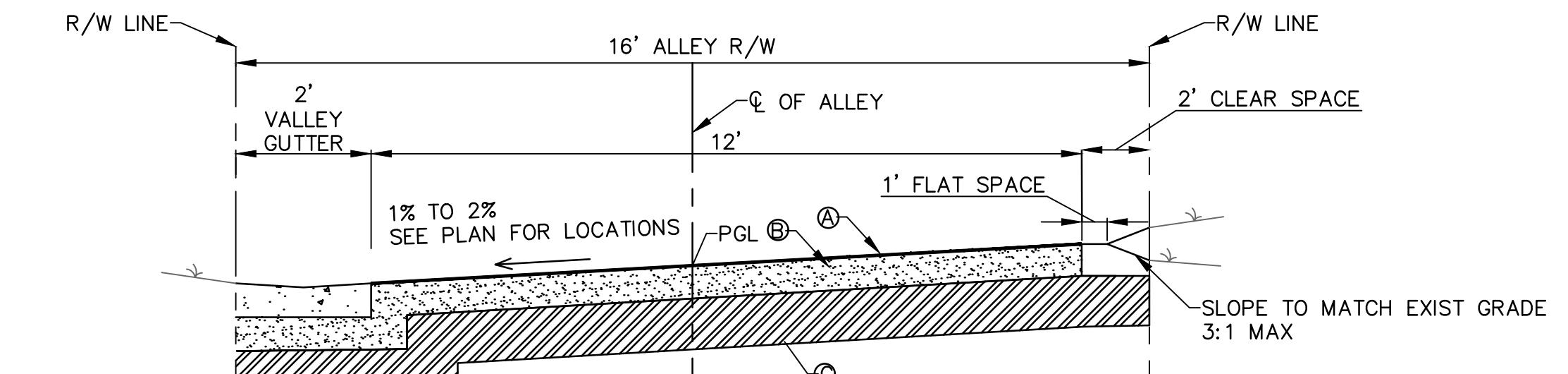
BY



SECTION A-A: BLOCK 17 ALLEY

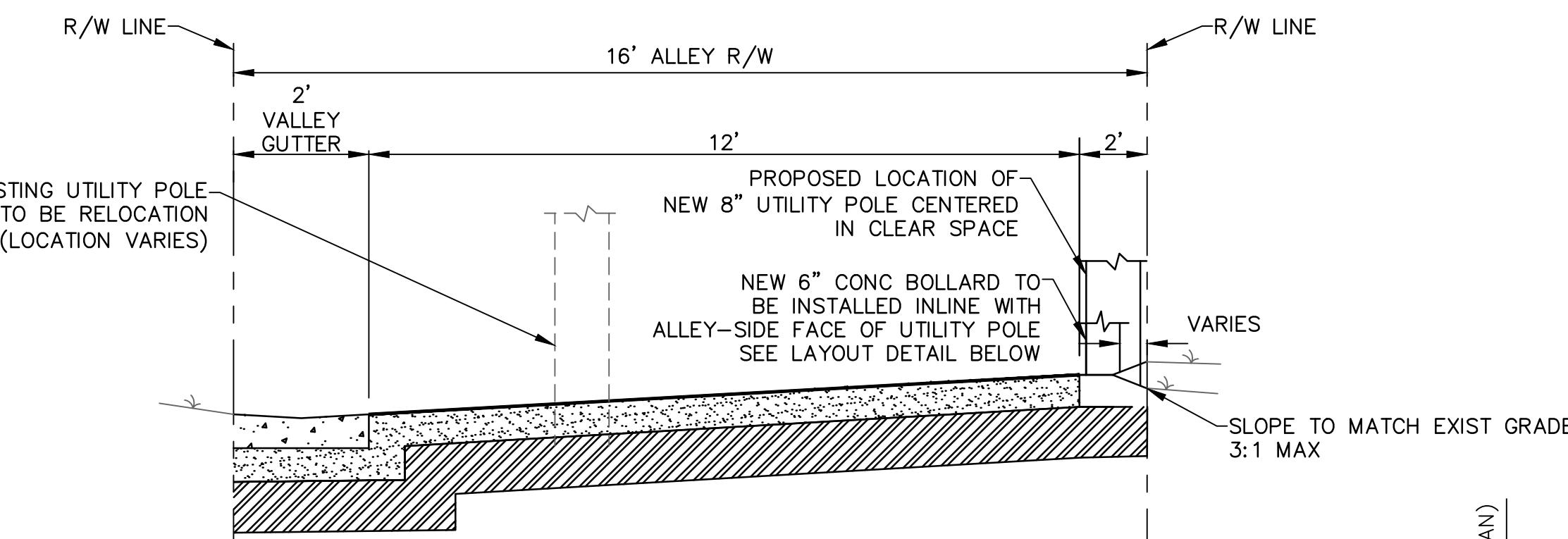
SCALE: NONE

ALLEY PAVEMENT SPECIFICATIONS		
A	WEARING SURFACE	1 1/2" TYPE S-III (2 LIFTS)
B	BASE	8" LIMEROCK COMPAKTED TO 98% MAX. DENSITY PER AASHTO T-180. PRIME AND TACK COAT PER FDOT SECTION 300
C	SUBGRADE	12" STABILIZED SUBGRADE (75 P.S.I. FBV) AND COMPAKTED TO 98% MAX. DENSITY PER AASHTO T-180.



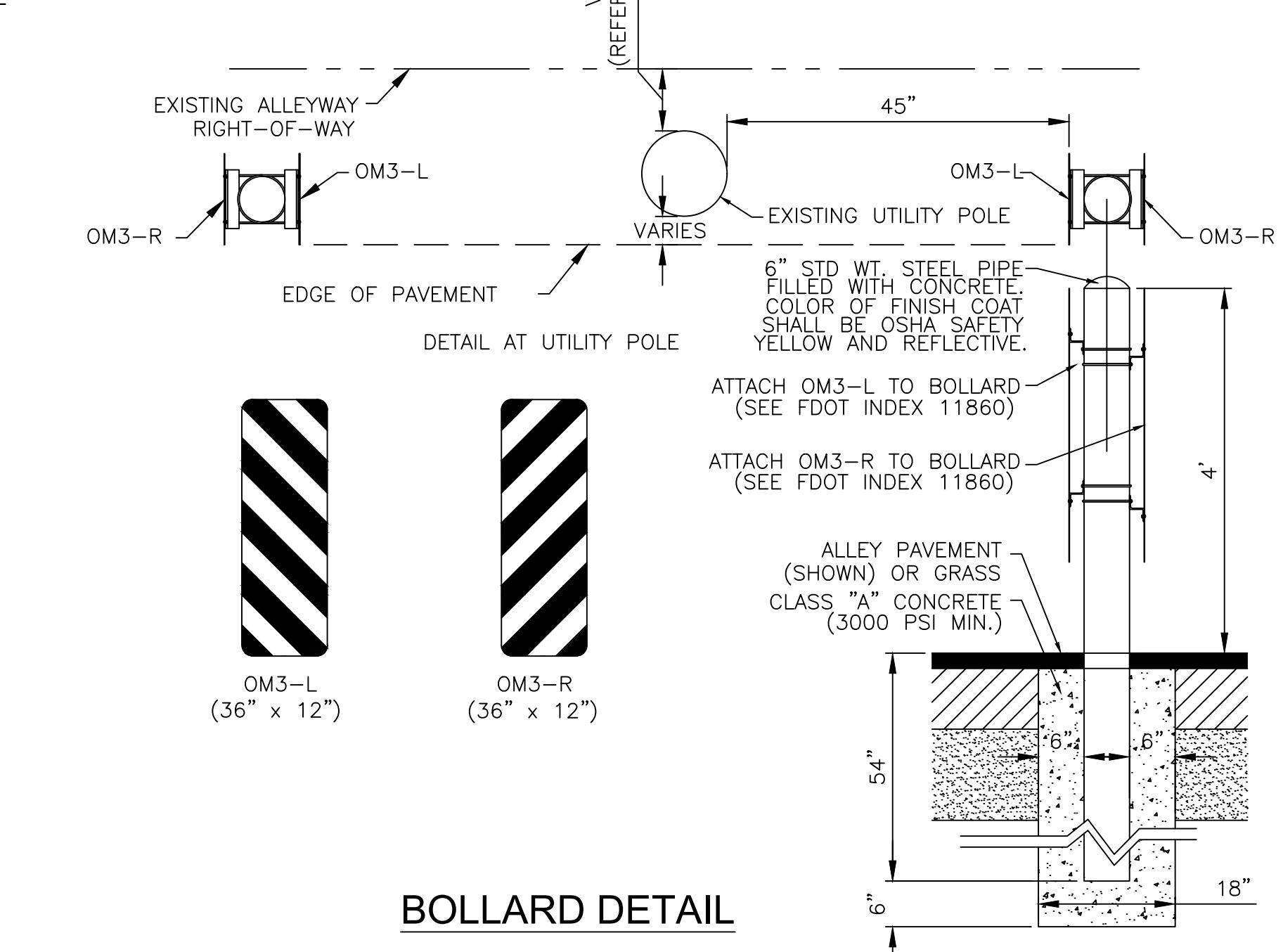
SECTION B-B: BLOCK 63

SCALE: NONE



TYPICAL RELOCATED POLE SECTION

SCALE: NONE



BOLLARD DETAIL

CITY OF DELRAY BEACH

NW 5TH AVENUE NEIGHBORHOOD ALLEY
AND BLOCK 63 ALLEY - IMPROVEMENTS

DETAILS

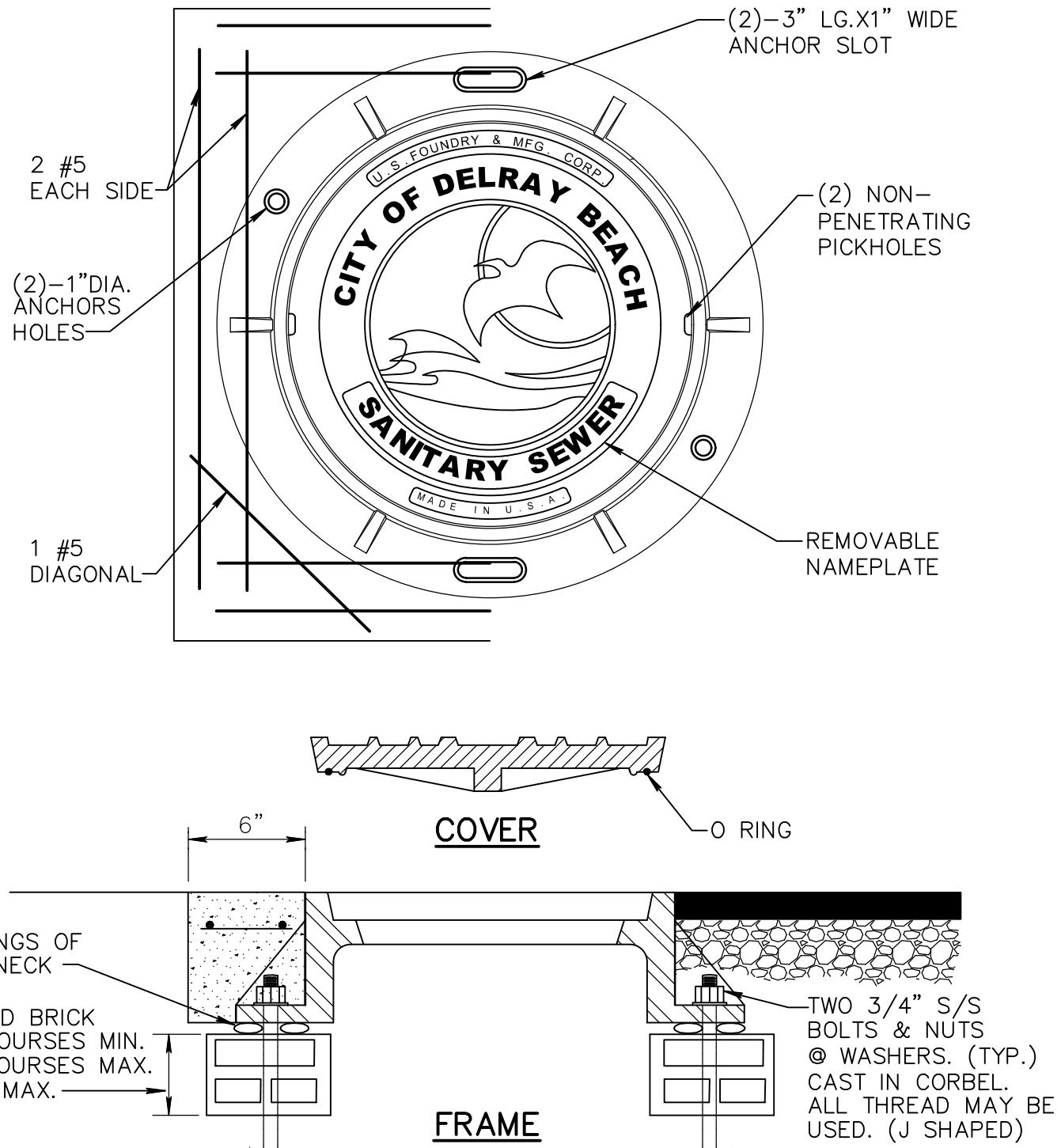
PROJECT NO.
15-001/15-040SHEET NO.
C13 OF 15

FILE ID.

GRAVITY SEWER NOTES

- MANHOLES SHALL BE INSPECTED BY THE ENGINEER BEFORE PLACEMENT AND SURFACE TREATMENT.
- ALL OPENINGS IN PRECAST MANHOLES SHALL BE CAST AT TIME OF MANUFACTURE. CONNECTIONS TO EXISTING MANHOLES SHALL BE CORE ENTRY ONLY.
- ALL MANHOLES SHALL BE SET PLUMB TO LINE AND GRADE.
- (PVC) GRAVITY SEWER PIPE SHALL CONFORM TO ASTM D 3034, SDR 35, LATEST REVISIONS, WITH PUSH ON RUBBER GASKET JOINTS.
- (DIP) GRAVITY SEWER PIPE SHALL BE CLASS 350, EPOXY LINED OR AS OTHERWISE APPROVED BY ENVIRONMENTAL SERVICES DEPARTMENT.
- NO SERVICE CONNECTIONS, WYES, SERVICES OR VALVES WILL BE PERMITTED IN RESIDENTIAL DRIVEWAYS.
- MANHOLE FRAMES SHALL BE ATTACHED TO THE PRECAST STRUCTURE WITH A MINIMUM OF TWO 3/4" 316 STAINLESS STEEL BOLTS, NUTS AND WASHERS. FRAMES SHALL BE SEALED WITH A MINIMUM OF TWO 1/2" BEADS OF RAM-NEK CAULKING.
- TRENCHES SHALL BE DE-WATERED TO ENABLE PIPE AND APPURTENANCES TO BE INSTALLED FREE OF WATER ON UNDISTURBED SOIL. IF UNSUITABLE SUBSURFACE MATERIAL IS ENCOUNTERED, EXCAVATE EXTRA 6" AND BACKFILL WITH 3/4" GRAVEL.
- PVC SHALL BE LAID IN STRICT CONFORMANCE TO MANUFACTURER'S SPEC (JOHNS MANVILLE RING TITE PVC PIPE INSTALLATION GUIDE OR EQUAL). BACKFILLING OF UTILITY TRENCHES WILL NOT BE ALLOWED UNTIL INSPECTED BY THE ENGINEER.
- BACKFILL MATERIAL FOR SEWER MAIN AND LINES SHALL BE NON-COHESIVE, NON PLASTIC MATERIAL FREE OF ALL DEBRIS, LUMPS AND ORGANIC MATTER. BACKFILL MATERIAL PLACED WITHIN ONE (1) FOOT OF PIPING AND APPURTENANCES SHALL NOT CONTAIN ANY STONES LARGER THAN TWO (2) INCHES IN DIAMETER (1" FOR PVC PIPE) AND NO STONES LARGER THAN SIX (6) INCHES IN DIAMETER WILL BE PERMITTED IN ANY BACKFILL.
- ALL EXCAVATION IN EXISTING RIGHT OF WAY SHALL BE BACKFILLED AND STABILIZED AT THE END OF EACH DAY TO PERMIT PEDESTRIAN AND VEHICULAR TRAFFIC PRIOR TO THE CONTRACTOR LEAVING THE SITE.
- WHERE SEWER IS NOT WITHIN PUBLIC R/W, IT IS TO BE LOCATED IN A 12' UTILITY EASEMENT. CITY MAINTENANCE RESPONSIBILITY IS MANHOLE TO MANHOLE ONLY.
- UPON COMPLETION OF THE WORK AND PRIOR TO PLACEMENT OF ASPHALT A VISUAL INSPECTION BY THE ENGINEER SHALL BE MADE OF THE COMPLETED SYSTEM ALONG WITH A LOW PRESSURE AIR TEST AFTER ROCK BASE FINISHED & PRIMED, OR 1ST LIFT OF ASPHALT PLACED. AFTER ALL OTHER TESTING HAS BEEN COMPLETED, A CD VIDEO RECORDING SHALL BE MADE BY THE CONTRACTOR AND APPROVED BY THE ENGINEER, BEFORE THE LENGTHS ARE ACCEPTED FOR MAINTENANCE.
- EACH LINE SEGMENT SHALL BE LAMPED TO DETERMINE PROPER ROUNDNESS.
- COMPLETE "AS BUILT" INFORMATION RELATIVE TO MANHOLES, VALVES, SERVICES FITTINGS, PIPE LENGTHS, INVERTS AND SLOPES SHALL BE ACCURATELY RECORDED & SUBMITTED TO THE ENGINEER CITY SIGNED AND SEALED BY A REGISTERED LAND SURVEYOR.
- AT THE END OF THE ONE (1) YEAR WARRANTY PERIOD THE DEVELOPER/CONTRACTOR WILL T.V. INSPECT, AIR TEST EVERY JOINT, AND CHECK MANHOLE JOINTS AND CONNECTIONS TO DETERMINE IF REPAIRS ARE NECESSARY BEFORE THE WARRANTY BOND IS RELEASED.
- NO PROPOSED STRUCTURES SHALL BE INSTALLED WITHIN A HORIZONTAL DISTANCE OF 10-FEET FROM ANY EXISTING OR PROPOSED SANITARY SEWER FACILITY.
- ANY PIPE INTRODUCED INTO AN EXISTING MANHOLE MUST HAVE CARBOLINE BITUMASTIC 300M OR APPROVED EQUAL APPLIED EXTERNALLY WITHIN A MINIMUM 2-FOOT RADIUS OF OPENING AND THE ENTIRE MANHOLE MUST HAVE SEWER COAT OR APPROVED EQUAL APPLIED INTERNALLY.
- ANY REHABILITATION TO AN EXISTING MANHOLE MUST BE INTERNALLY STRIPPED AND LINED WITH SEWER COAT OR APPROVED EQUAL.

GRAVITY SEWER NOTES WW 1.1



SANITARY SEWER MANHOLE FRAME AND COVER WW 2.5



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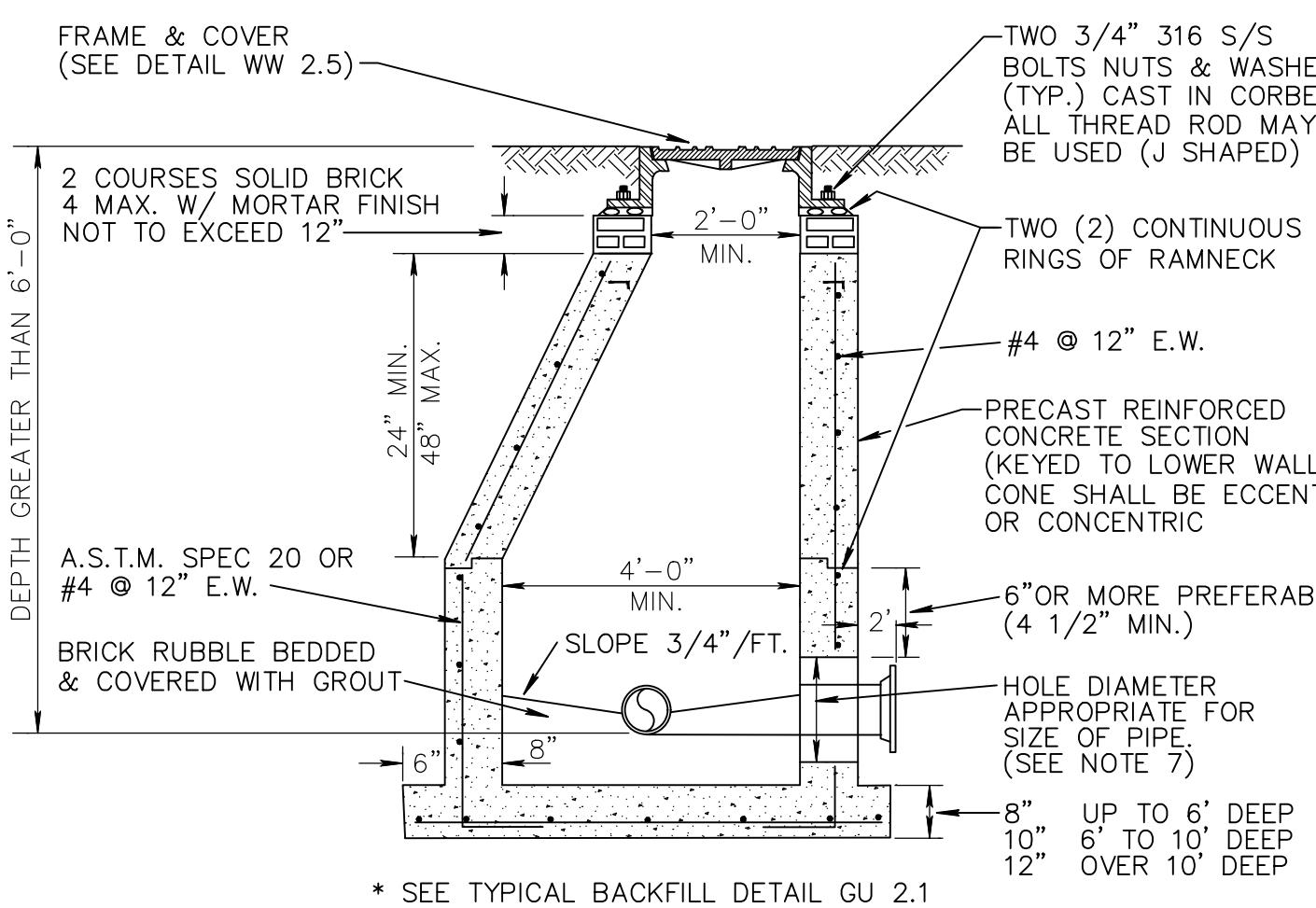
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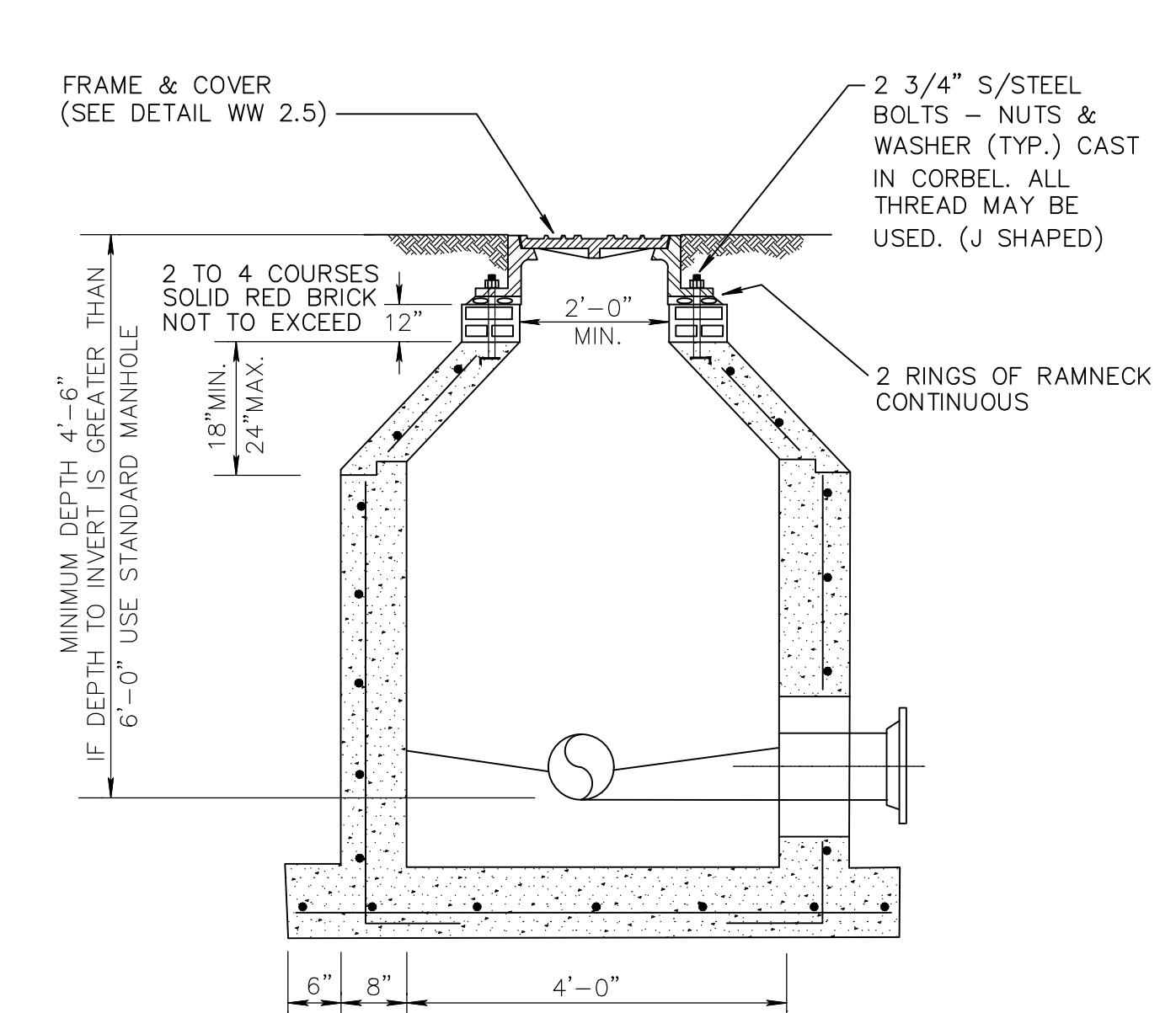
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NOTES:

1. PRECAST CONCRETE TYPE II 4000 P.S.I.
2. RAMNECK AT ALL RISER JOINTS WITH GROUT ON INSIDE AND OUTSIDE AT ALL RISER JOINTS.
3. ALL OPENINGS SHALL BE SEALED WITH A WATERPROOF NON-SHRINKING GROUT.
4. FLOW CHANNELS SHALL BE CONSTRUCTED TO DIRECT INFLUENT INTO FLOW STREAM.
5. LIFT HOLES SHALL BE FILLED WITH EXPANDABLE GROUT
6. ALL PIPE HOLES SHALL BE PRECAST.
7. CAST IN PLACE FLEXIBLE PIPE-TO-MANHOLE CONNECTOR (LOCK JOINT FLEXIBLE SLEEVE ELASTOMER EPDM OR RUBBER GASKET WITH GLASS FIBER REINFORCED NYLON 6/6 INTERNAL EXPANSION RING) INSTALLED PER MANUFACTURER.
8. PAINT MANHOLE INSIDE AND OUTSIDE WITH ONE (1) COAT RED CARBOLINE BITUMASTIC 300M THEN ONE (1) COAT BLACK OR APPROVED EQUAL, to 8-10 MILS D.F.T./COAT, FIRST COAT RED THEN BLACK.
9. MANHOLE FABRICATION SHALL BE IN ACCORDANCE W/ ASTM C-478, LATEST STANDARD.
10. IF THE STRUCTURE IS INSTALLED IN WATER TABLE MUST HAVE BEDDING. (SEE DETAIL BEDDING WW.6.1)

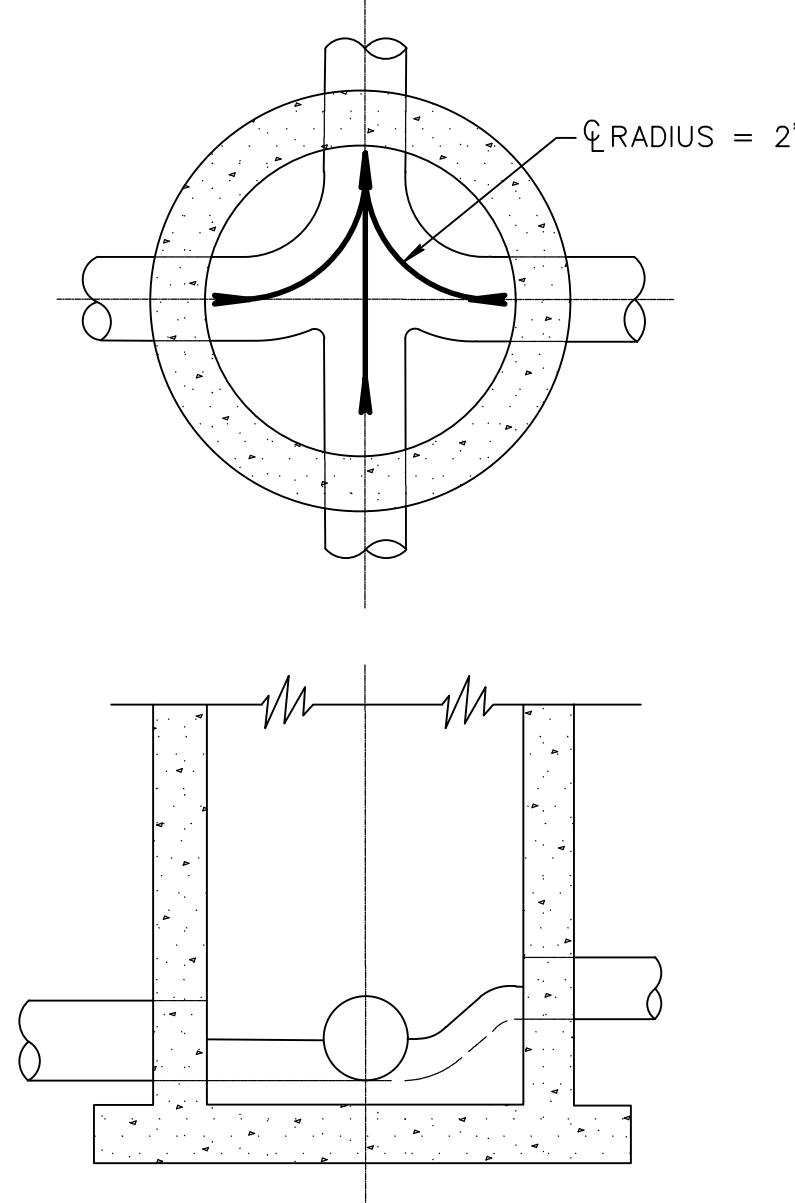
STANDARD MANHOLE DETAIL WW 2.1



NOTES:

1. ALL STANDARD MANHOLE NOTES AND DETAILS ARE APPLICABLE (DETAIL WW 2.1).

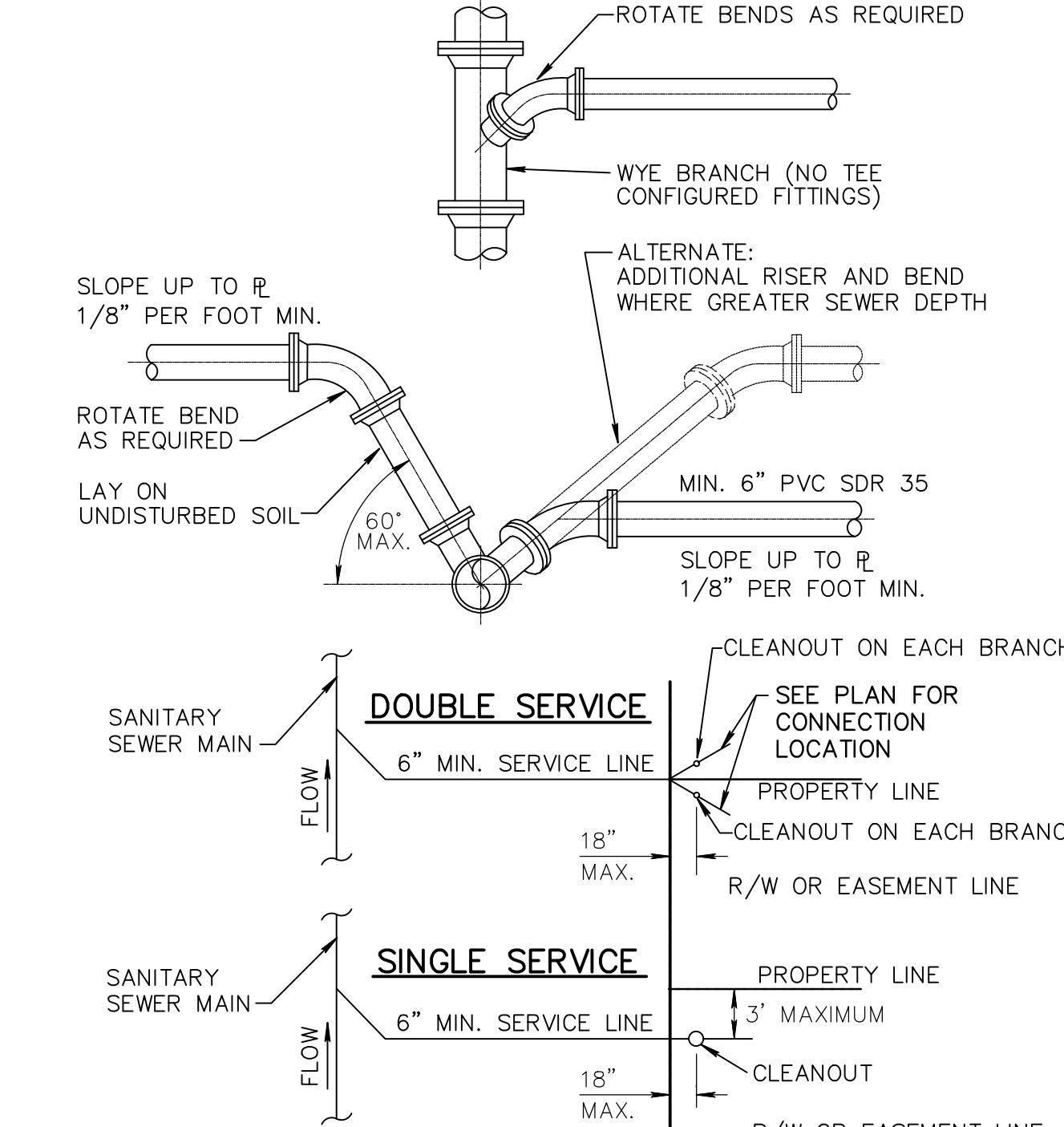
SHALLOW MANHOLE DETAIL WW 2.2



NOTES:

1. ALL INVERT CHANNELS ARE TO BE CONSTRUCTED FOR SMOOTH FLOW WITHOUT OBSTRUCTION OR TURBULENCE.
2. PROPERLY SHAPED SPILLWAYS SHALL BE CONSTRUCTED BETWEEN PIPES WITH DIFFERENT INVERT ELEVATIONS TO PROVIDE FOR SMOOTH FLOWS.
3. SERVICE LATERALS SHALL NOT ENTER MANHOLES.
4. 2500 PSI CONCRETE ONLY PERMITTED AS FLOW CHANNEL BUILDUP.

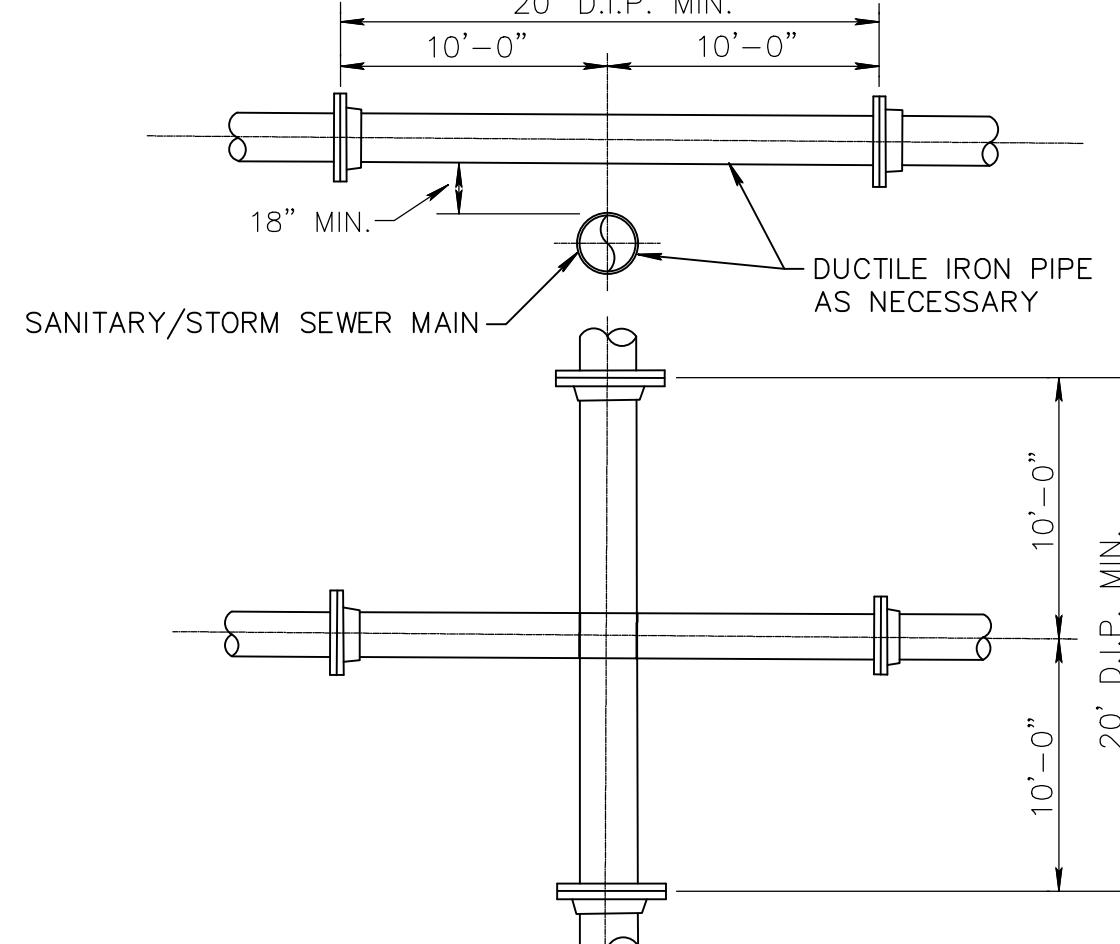
INVERT FLOW CHANNELS WW 2.4



NOTE:

1. CONNECTION TO EXISTING SERVICE LATERALS WITH CLEANOUT SHALL BE WITHIN 18" OF THE R/W
2. CLEANOUT INSTALLATION SHALL BE COORDINATED WITH THE OWNER AND CITY AND INSTALLED BY CITY PERSONNEL
3. SEE DETAIL PW 2.1 FOR SEPARATION REQUIREMENTS.

SEWER SERVICE CONNECTIONS WW 4.1



NOTES:

1. STORM AND SANITARY SEWER CROSSING UNDER WATER MAINS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18 INCHES BETWEEN THE INVERT OF THE UPPER PIPE AND THE CROWN OF THE LOWER PIPE. WHERE THIS MINIMUM SEPARATION CANNOT BE MAINTAINED, THE CROSSING SHALL BE ARRANGED SO THAT THE SEWER PIPE JOINTS AND WATER MAIN JOINTS ARE EQUIDISTANT FROM POINT OF CROSSING WITH NO LESS THAN (10) FEET BETWEEN ANY TWO JOINTS AND BOTH PIPES SHALL BE D.I.P., AND THE MINIMUM VERTICAL SEPARATION SHALL BE 6 INCHES. WHERE THERE IS NO ALTERNATIVE TO SEWER PIPES CROSSING OVER A WATER MAIN, THE CRITERIA FOR MINIMUM 18" VERTICAL SEPARATION BETWEEN LINES AND JOINT ARRANGEMENT, AS STATED ABOVE, SHALL BE REQUIRED AND BOTH PIPES SHALL BE CLASS 52 D.I.P. IRRESPECTIVE OF SEPARATION. D.I.P. IS NOT REQUIRED FOR STORM SEWERS.
2. MAINTAIN (10) FEET HORIZONTAL DISTANCE BETWEEN WATER MAIN AND STORM OR SANITARY SEWER MAIN, AS A MINIMUM.
3. FORCE MAIN CROSSING WATER MAIN SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 18 INCHES BETWEEN THE OUTSIDE OF THE FORCE MAIN AND THE OUTSIDE OF THE WATER MAIN WITH WATER MAIN CROSSING OVER FORCE MAIN.
4. SEWER SERVICE LATERALS SHALL CROSS UNDER WATERMANS WITH A MINIMUM VERTICAL SEPARATION OF EIGHTEEN (18) INCHES. IF EIGHTEEN (18) INCHES VERTICAL SEPARATION CANNOT BE MAINTAINED, THEN THE WATERMAN SHALL BE D.I.P. AND THE SANITARY LATERAL C-900 SDR18 OR BETTER AND THE MINIMUM SEPARATION SHALL BE SIX (6) INCHES.
5. WHEN IT IS NOT POSSIBLE FOR THE WATER MAIN TO CROSS OVER THE SEWER SERVICE LATERAL A MINIMUM VERTICAL SEPARATION OF AT LEAST TWELVE (12) INCHES MUST BE MAINTAINED. THE WATERMAN SHALL BE D.I.P. AND THE SEWER LATERAL SHALL BE C-900 SDR-18 OR BETTER.

WATER MAIN & SEWER CONFLICT DETAIL PW 2.1

TECHNICAL SPECIFICATIONS

DIVISION 1 - GENERAL REQUIREMENTS

01010	SUMMARY OF WORK
01020	UNDEFINED GENERAL ALLOWANCE
01025	MEASUREMENT AND PAYMENT
01041	PROJECT COORDINATION
01045	CUTTING AND PATCHING
01050	FIELD ENGINEERING
01090	REFERENCE STANDARDS
01152	APPLICATION FOR PAYMENT
01153	CHANGE ORDER PROCEDURES
01200	PROJECT MEETINGS
01310	CONSTRUCTION SCHEDULES
01340	SHOP DRAWINGS
01370	SCHEDULE OF VALUES
01380	CONSTRUCTION PHOTOS
01410	TESTING LAB SERVICES
01500	CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS
01530	BARRIERS
01570	TRAFFIC CONTROL
01580	PROJECT IDENTIFICATION SIGNS
01590	FIELD OFFICES AND SHEDS
01600	MATERIAL & EQUIPMENT
01630	SUBSTITUTIONS AND PRODUCT OPTIONS
01650	STARTING OF MECHANICAL SYSTEMS
01672	TESTING PIPING SYSTEMS
01700	CONTRACT CLOSE-OUT
01720	PROJECT RECORD DOCUMENTS

DIVISION 2 - SITE WORK

02010	SUBSURFACE INVESTIGATION
02110	CLEARING AND GRUBBING
02210	EXCAVATION AND SWALE GRADING
02211	SITE GRADING
02220	TRENCHING, BACKFILLING, AND COMPACTING
02235	LIMEROCK BASE, PRIMED
02260	FINISH GRADING
02317	INSERTION PITS FOR SLIP-LINING OF SANITARY SEWERS
02484	SOIL PREPARATION AND SOIL MIXES
02511	CONCRETE SIDEWALKS
02512	CONCRETE SIDEWALK RESTORATION
02513	ASPHALTIC CONCRETE PAVING
02515	CONCRETE PAVING STONES
02520	CONCRETE CURBS AND HEADERS
02546	FINAL ASPHALTIC CONCRETE SURFACE COURSE
02550	ASPHALTIC CONCRETE OVERLAY
02570	MILLNG OF EXISTING ASPHALT PAVEMENT
02574	PAVEMENT REMOVAL AND REPLACEMENT
02580	PAVEMENT MARKINGS
02605	SEWERAGE AND DRAINAGE MANHOLES
02610	POLYETHYLENE ENCASEMENT
02720	STORM DRAINAGE SYSTEM

02730	SANITARY SEWER PIPE
02735	SLIP-LINING GROUT
02738	CLOSED PROFILE PVC PIPE FOR SLIP-LINING OF SANITARY SEWERS
02767	MANHOLE REHABILITATION
02775	MANHOLES AND VAULTS
02850	UNDERGROUND SPRINKLER SYSTEM
02934	SODDING

DIVISION 3 – CONCRETE

03300	CONCRETE
03600	GROUT

APPENDIX

1 HEALTH AND SAFETY PLAN (PROVIDED BY CONTRACTOR)

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. The work covered by these specifications comprises, in general, the furnishing of all labor, equipment, materials, and performing all operations to construct alley improvements, as well as, water, sewer, and drainage improvements for the City of Delray Beach as described and specified further in the Technical Specifications and as shown on the Contract Drawings.
- B. Except as specifically noted, the Contractor shall provide and pay for:
 - 1. Labor, materials, tools, construction equipment, and machinery.
 - 2. Water and utilities required for construction.
 - 3. Other facilities and services necessary for proper execution and completion of the work.
- C. The Contractor shall comply with all codes, ordinances, rules, regulations, orders and other legal requirements of the City of Delray Beach.
- D. **ALLEY restoration/reconstruction for any individual street shall be completed within 30 calendar days subsequent to substantial completion of underground utility construction on a alley by alley basis. The submitted construction schedule shall indicate this construction sequence.**

1.02 SILTATION AND BANK EROSION

The Contractor shall take adequate precautions to minimize siltation and bank erosion in the vicinity of canals or ditches, in discharging well point systems or during other construction activities.

1.03 STORAGE OF MATERIALS

Suitable storage facilities shall be furnished by the Contractor. All materials, supplies and equipment intended for use in the work shall be suitably stored by the Contractor to prevent damage from exposure, admixture with foreign substances, or vandalism or other cause. The Engineer will refuse to accept, or sample for testing, materials, supplies or equipment that have been improperly stored, as determined by the Engineer.

Materials found unfit for use shall not be incorporated in the work and shall immediately be removed from the construction or storage site. Delivered materials

shall be stored in manner acceptable to the Engineer before any payment for same will be made. Materials strung out along the line of construction will not be allowed unless the materials will be installed within one week from the time of unloading and stringing out.

1.04 PRESERVATION OF PROPERTY

The Contractor shall preserve from damage all property along the line of the work, or which is in the vicinity of or is in any way affected by the work, the removal or destruction of which is not called for by the plans. Wherever such property is damaged due to the activities of the Contractor, it shall be immediately restored to its original condition by the Contractor at no cost to the Owner.

In case of failure on the part of the Contractor to restore such property, or make good such damage for injury, the Owner may, after 48 hours notice to the Contractor, proceed to repair, rebuild or otherwise restore such property as may be deemed necessary and the cost thereof will be deducted from any monies due or which may become due the Contractor under this contract.

1.05 CLEAN UP

The Contractor shall keep the construction site free of rubbish and other materials and restore to their original conditions those portions of the site not designated for the alteration by the Contract Documents. Clean up and restoration shall be accomplished on a continuing basis throughout the contract period and in such a manner as to maintain a minimum of nuisance and interference to the general public and residents in the vicinity of the work.

The Contractor shall also remove, when no longer needed, all temporary structures and equipment used in his operation. It is the intent of this specification that the construction areas and those other areas not designated for alteration by the Contract Documents shall be immediately restored to original condition as upon completion of the project.

1.06 PUBLIC SAFETY AND CONVENIENCE

The Contractor shall at all times so conduct his work as to ensure the least possible obstruction to traffic, or inconvenience to the general public and residents in the vicinity of the work. No road or street shall be closed to the public, except with the permission of the Engineer and other jurisdictional governmental authority, if any. Fire hydrants on or adjacent to the work shall be kept accessible. Provisions shall be made by the Contractor to ensure public access to sidewalks, public telephones, and the proper functioning of all gutters, sewer inlets, drainage ditches, and irrigation ditches. No open excavation shall be left overnight except during road closing. All

open excavation within the roadway shall be backfilled and a temporary asphalt patch applied prior to darkness each day. A cold asphalt patch is acceptable.

1.07 **SAFETY AND OSHA COMPLIANCE**

- A. The Contractor shall comply in all respects with all Federal, State and Local safety and health regulations. Copies of the Federal regulations may be obtained from the U.S. Department of Labor, Occupation Safety and Health Administration (OSHA), Washington, DC 20210 or their regional offices.
- B. The Contractor shall comply in all respects with the applicable Workman's Compensation Law.

1.08 **CONTRACTOR'S USE OF PREMISES**

- A. Coordinate use of premises under direction of Engineer.
- B. Assume full responsibility for the protection and safekeeping of equipment and materials stored on the site.
- C. Move any stored Products, under Contractor's control, which interfere with operations of the Owner or separate Contractor.

END OF SECTION

SECTION 01020 ALLOWANCE

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

Include in the Contract Sum the allowance stated in the Contract Documents.

1.02 RELATED REQUIREMENTS

Conditions of the Contract.

1.04 CONTINGENCY ALLOWANCE

Include in the Contract, lump sum contingency allowances as follows:

1. Video recordings: Allow the lump sum of \$2,000.00.
2. Unforeseen Conditions Allowance:

Allow the lump sum of	BID "1"	\$20,000.00
	BID "2"	\$40,000.00

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.01 GENERAL

- A. The Video Allowance is to be used as directed by the Engineer.
- B. The Utility Allowance shall be used as necessary to pay for unforeseen utility conflict resolutions, utility repair work, or other work not within the original scope of work as bid, such work to be performed only at the direction and with the authorization of the City.
- C. At the closeout of contract, monies remaining in the Contingency Allowance will be credited to the Owner by Change Order.

END OF SECTION

SECTION 01025
MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 EXPLANATION AND DEFINITIONS

- A. The following explanation of the Measurement and Payment for the bid form 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 form or relieve the Contractor of the necessity of furnishing such as part of the Contract.

1.02 PAYMENT

- A. Payment shall be made for the items listed on the Bid Form 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, 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. **The City does not pay for items ordered and/or stored on site. Payment for pay items are paid once the item is installed, measured in place, completed and accepted.**
- B. It is intended that all mobilization, insurance, bond, license and other miscellaneous administrative costs, and all other costs to the Contractor not specifically identified in the following item description be distributed among and included in the unit prices stated. No additional payment shall be made for transportation, communications, office maintenance, project signs, and other incidental work or services, and no further payment shall be made for remobilization unless all of the work is suspended by the Engineer for a period in excess of three months and through no fault to the Contractor.
- C. The CONTRACTOR's attention is called to the fact that the quotations for the various items of work are intended to establish a total price for completing the work in its entirety. No separate payment will be made for any item that is not specifically set forth in the Bid Schedule, and all costs therefore shall be included in the prices named in Bid Schedule for various appurtenant items of work.
- D. All required manufacturer testing and certification shall be included in the unit prices shown in the Proposal and Contract. **Density testing required for compacted backfilling, and concrete strength and materials testing required at the time of construction shall be arranged for and paid for by the contractor.**

1.03 MEASUREMENT

- A. The quantities for payment under this Contract shall be determined by actual

measurement of the completed items, in place, ready for service and accepted by the City.

PART 2 - MATERIALS

Not used.

PART 3 - EXECUTION

3.01 SITE MOBILIZATION / DEMOBILIZATION – Bid Item Nos. 1 & 28

- A. Payment for mobilization/demobilization, permits, bonds, insurance, scheduling and temporary facilities and utilities will be made at the contract Lump Sum (LS) price bid for the item, which price shall be full compensation for all materials, labor, equipment, tools, excavation, masonry and all other incidentals necessary to complete this item.
- B. Payment item for mobilization shall not exceed five percent (5%) of the base bid contract price and shall be paid in increments in proportion to the total work completed. Should the price for Site Mobilization exceed 5% of the Contract amount, any amount over the 5% will be paid with the Contractor's final payment application.

3.02 MAINTENANCE OF TRAFFIC – Bid Item Nos. 2 & 29

- A. The quantity of traffic control to be considered for payment shall be equivalent to the percentage of the project determined by the Engineer to be complete as of the date of the pay request submitted. The percent completion of the project shall be based on the percent of the total project actually constructed and not on the percent of the Contract price completed.
- B. Payment for traffic control shall be made on the basis of a percentage (as determined in 'A' above) of the Lump Sum (LS) Price. The contract unit price shall include compensation for required labor, materials, and equipment necessary to keep roadways and property accesses in service during construction activities in accordance with the Contract Documents.
- C. This item includes maintenance of traffic plan, traffic control, flagman, portable changeable (variable) message signs, detour signs, barricades, advance warning arrow panels, construction and removal of temporary access driveways to businesses and/or residential properties, etc. in order to provide safety and traffic access in accordance with local and state requirements.
- D. Contractor will need to have their detailed MOT Plan for City Roads approved by the City of Delray Beach. The MOT Plan(s) shall be approved prior to mobilizing on-site.
- E. Refer to Specification Section 01570.

3.03 CLEARING AND GRUBBING – Bid Item Nos. 3 & 30

- A. Payment for this item shall be made on a Lump Sum (LS) basis. The Contractor's unit price shall include full compensation for all excavation necessary within the road right of way including full-depth pavement removal and legal disposal, debris removal, existing drainage pipe and structure removal noted in plans, removal of sidewalk, grading, and any other required clearing and grubbing in accordance with the plans and specifications, except for any areas designated to be paid for separately or to be specifically included in the costs of other work under the Contract.
- B. The Contractor shall remove and dispose of all existing pavement materials, bushes, trees, stumps, roots, fill material, debris, and other such protruding objects, appurtenances, fences, or any other facilities to prepare the area within the Right-of Way for construction of the proposed improvements. This item shall include the relocation of all mailboxes, removal and reinstallation of all irrigation piping, irrigation heads, walls, fencing, trees, and other such appurtenances that conflict with the proposed improvements or is shown to be relocated.

3.04 SIGNAGE AND PAVEMENT MARKINGS – Bid Item No. 4 & 31

- A. The Lump Sum (LS) bid price shall include all labor, material, and equipment required for all thermoplastic pavement markings and symbols and reflective markers that are to be replaced in areas of roadway resurfacing. This includes all stop conditions. All pavement marking shall be thermoplastic. The lump sum prices shall include all materials, equipment, preparation, testing, and other miscellaneous work required to complete the work in accordance with Florida Department of Transportation Section 711, the MUTCD, Palm Beach County requirements and City of Delray Beach specification.
- B. The unit price includes all temporary (traffic paint) pavement markings required until the permanent thermoplastic pavement markings are installed.

3.05 MILL 1" ASPHALT & OVERLAY 1" TYPE S-III ASPHALT - Bid Item No. 5

- A. Payment for 1-inch milling and installing new 1" Type S-III asphalt overlay, where indicated on the plans shall be made at the Contractor's unit price per Square Yard (SY) for 1-inch milling and Type S-III asphalt overlay and shall include all labor, material, and equipment required to mill 1-inch of existing asphalt and construct 1" Type S-III asphaltic concrete overlay as shown on the plan view and detail drawings. The unit price shall include compensation for multiple mobilizations, labor, materials, and equipment required to mill existing pavement and to construct the new Type S-III asphaltic surface overlay with tack coat.
- B. This unit price shall also include all necessary labor, materials, and equipment to adjust the valve boxes, manholes, rims, inlets, or other fixtures to final grade, transitions to existing pavement, tack coating, compaction, rolling, brooming, testing,

and any other work required to complete the work.

3.06 ASPHALT PAVEMENT – 1-1/2” TYPE S-III ASPHALT (TWO LIFTS) – Bid Item Nos. 6 & 32

- A. Payment for installing new 1-1/2” Type S-3 asphalt pavement (two $\frac{3}{4}$ ” lifts), including tack coat, where indicated on the plans shall be made at the Contractor’s unit price per Square Yard (SY) for Type S-3 asphalt pavement and shall include all labor, material, and equipment required to construct 1-1/2” asphaltic concrete as required due to construction activities. The unit price shall include compensation for labor, materials, and equipment required to construct the new asphaltic surface.
- B. This unit price shall also include all necessary labor, materials, and equipment to adjust the valve boxes, manholes, rims, inlets, or other fixtures to final grade, transitions to existing pavement, tack coating, compaction, rolling, brooming, testing, and any other work required to complete the work.
- C. This item also includes installing an asphalt taper around all structures in roadway, if both $\frac{3}{4}$ ” lifts are not installed within 24 hours.

3.07 8” COMPACTED LIMEROCK BASE – Bid Item Nos. 7 & 33

- A. Payment for installing new 8-inch compacted limerock base including primer and tack coats where indicated on the plans shall be made at the Contractor’s unit price per Square Yard (SY) for limerock base installed and accepted.
- B. The Contract Unit Price shall include compensation for labor, materials, and equipment required to construct and test the new limerock base, including primer coats in accordance with the plans and specifications.

3.08 12” STABALIZED SUBGRADE – 75 PSI – Bid Item Nos. 8 & 34

- A. The unit price bid per Square Yard (SY) for the stabilized subgrade (12" thick, 75 PSI FBV) shall include all labor, material, and equipment required to construct the subgrade as shown on the detail drawings. The unit price shall include all excavation, line cutting of existing pavement, preparation of subgrade, fine grading, placement of subgrade material, compaction, rolling, brooming, testing, and other miscellaneous work required to complete the work in accordance with Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition and City of Delray Beach specifications.

3.09 VALLEY GUTTER – Bid Item Nos. 9 & 35

- A. The quantity of curbs and/or gutter shall be determined by measurement of the units Linear Feet (LF) installed and accepted.
- B. Payment for furnishing and installing concrete curbs and gutters shall be made at the contract unit price per Linear Foot (LF) of each type concrete curb and/or gutter, including flared ends and transitions, rebar (as applicable) installed and accepted. The contract unit price shall include all labor, materials, testing, and equipment necessary to prepare the sub-base and install the concrete curbs and/or gutter in accordance with the plans and specifications.
- C. Refer to “CURB AND GUTTER SECTIONS” detail.

3.10 5' WIDE CONCRETE SIDEWALK (4" & 6"THICK) – Bid Item Nos. 36 & 37

- A. Payment for sidewalks where indicated on the plans and specifications per City Detail – RT 5.1, shall be made at the Contractor's unit price per Linear Foot (LF) of sidewalk installed and accepted. The Contract Unit Price shall include full compensation for labor, material, testing, joints, and equipment required to install the sidewalk, including saw cutting existing sidewalk, in accordance with the plans and specifications.
- B. Payment shall be made for sidewalks constructed or replaced by authorization of the Engineer. Any sidewalk that is broken incidental to construction shall be replaced at the Contractor's expense.

3.11 CONCRETE DRIVEWAY APRON (6" THICK) – Bid Item No. 10 & 38

- A. Payment of concrete drive aprons shall be determined by measurement of the units per Square Yard (SY) installed and accepted.
- B. Payment for furnishing and installing 6-inch thick concrete drive aprons shall be made at the contract unit price per square foot of apron installed and accepted. The contract unit price shall include full compensation for all labor, materials, brooming, testing, and equipment necessary to install the drive aprons in accordance with the plans and specifications.
- C. Concrete driveway apron replacement beyond the limits established by the project construction drawings will not be considered for payment.

3.12 CURB RAMP WITH DETECTABLE WARNING – Bid Item Nos. 11 & 39

- A. Payment of this item shall be made at the Contractor's unit price for Each (EA) curb ramp installed and accepted. The Contractor's unit price shall include full compensation for furnishing and installing the curb ramps including the provision of white truncated dome paver brick located at tactile surface locations. Ramp slopes and dimensions shall be constructed per FDOT Index 304 at the locations shown on the Drawings. The curb ramps shall be in accordance with the plans, details, and specifications.
- B. The paver brick color selection shall be as indicated on the plans and as approved by the City during the shop drawing process.
- C. The Contract Unit Price shall also include adjustment of existing paver bricks to proposed grades including provision of additional sand or adjustments to the subgrade in order to match proposed back of curb elevations or in order to relocate curb ramps.
- D. Refer to "Detectable Warning Ramp in Paver Sidewalk Detail".

3.13 CONCRETE BOLLARD – Bid Item Nos. 12 & 40

- A. Payment for this item shall be made on a Unit Price Basis for Each (EA) unit installed and approved. The Contractor's unit price shall include full compensation for furnishing and installing the decorative bollards, AND warning signs where indicated, at the location shown on the drawings for utility pole protection and alley intrusions. The work shall include provision and installation of the bollard, concrete deadman, reinforcement, grout, testing, and all necessary equipment and appurtenances for a complete installation in accordance with the details.
- B. Refer to "Bollard Detail"

3.14 MODIFY EXISTING SANITARY MANHOLE (INCL. LINING) – Bid Item No. 13

- A. Payment for this item shall be made per Each (EA) manhole modified. The Contractor's unit price shall include full compensation for all removal and adjusting of manhole collars to proposed grade, and lining the existing manholes in accordance with the City specifications, as noted in the plans.
- B. The Contractor's unit price shall constitute full compensation for all labor, materials, and equipment required for excavation, grading, hauling, placing, grouting, maintaining active service, compacting, backfilling, and testing of earthwork required to modify the manhole.

3.15 SANITARY MANHOLE 4' DIAMTER – Bid Item No. 14

- A. The number of sanitary manholes shall be determined by the count of Each (EA) unit installed and accepted.
- B. The Unit Price for this pay item shall also include bypass methods in order to maintain continuous service throughout the duration of the project
- C. Payment for furnishing and installing 4' and 5' inside diameter and conflict drainage manhole structures shall be made at the Contractor's unit price per each structure installed and accepted. The Contact unit price shall include compensation for labor, materials, and equipment required to install the manholes, castings, lids, inverts, invert flow channels, bedding, maintaining active service, testing, and appurtenances in accordance with the plans and specifications. All sanitary manholes and installation to meet latest edition of the FDOT Standard Specifications for Road and Bridge Construction.

3.16 SANITARY SEWER GRAVITY MAIN (SDR-35 PVC PIPE) – Bid Item No. 15

- A. The quantity of polyvinyl chloride pipe (PVC) shall be determined by Linear Foot (LF) of the units installed and accepted. Measurement shall be along the centerline of the pipe from fitting to fitting.
- B. The Unity Price for this pay item shall also include bypass methods in order to maintain continuous service throughout the duration of the project.
- C. Payment for furnishing and installing PVC pipe of various sizes shall be made at the Contractor's unit price per linear foot of the pipe and shall include all necessary labor and materials for furnishing and laying of the pipe, lamping, dewatering if required, excavation of any type including rock, excavation and removal of muck, backfilling, maintaining active service, clean-up, testing, and appurtenances in accordance with the plans and specifications. All pipe material and installation to meet latest edition of the FDOT standard specifications for road and bridge construction.

3.17 SEWER SERVICE LATERAL W/ CLEANOUT (ONE PER LOT) – Bid Item No. 16

- A. The quantity of sanitary service laterals shall be determined by Each (EA) of the units installed and accepted. Measurement shall be along the centerline of the pipe from cleanout to main.
- B. Payment for furnishing and installing sanitary service laterals of various lengths shall be made at the Contractor's unit price per linear foot of the pipe and shall include single and double cleanouts, all necessary labor and materials for furnishing and laying of the pipe, concrete collars, cleanouts, tees, wyes, connection to gravity main, dewatering if required, excavation of any type including rock, excavation and removal of muck, backfilling, testing, clean-up, and appurtenances in accordance with the plans and specifications. All pipe material and installation to meet latest edition of the FDOT

standard specifications for road and bridge construction.

C. Refer to "Sewer Service Connections" and "Typical Residential Cleanout".

3.18 REINFORCED CONCRETE PIPE (15" RCP) – Bid Item Nos. 17 & 41

- A. The quantity of reinforced concrete pipe (RCP) – Class III shall be determined by measurement of the units installed and accepted in Linear Feet (LF) of each size pipe installed in place, completed and approved. Measurement shall be along the centerline of the pipe from center of structure to center of structure.
- B. The unit price bid per foot under this item shall be full compensation for the following: unloading, stringing, clearing and preparing pipe corridor, all excavation of any type including rock and limestone, excavation and removal of any organic "muck" material and disposal, hand trimming, furnishing and installing imported backfill material if required, complying with the State of Florida Trench Safety Act, sheeting, shoring, coring, de-watering, backfilling, mechanical restraining devices, all fittings, sleeves, supporting power poles, maintaining irrigation system in operation and restoring irrigation and control wiring to original condition, existing utility protection, re-installing mail boxes, temporary plugs, flushing, testing and all restoration and other appurtenances required to complete construction of the pipeline and not included in other bid items.
- C. The unit price per foot shall also include the cost for soft-digs to verify location (horizontal & vertical) of all utility crossings, including paralleling of utilities, prior to construction of the proposed drainage.
- D. This pay item shall also include the cost of replacing any Sanitary Sewer laterals that are found to be in conflict with the proposed drainage pipe. Contractor shall identify potential conflicts and notify the City prior to replacement of the sanitary sewer lateral. All new laterals are to be a full stick of PVC SDR-35 and be installed per the City of Delray Beach standards.**

3.19 DRAINAGE STRUCTURES (TYPE C, TYPE E, MANHOLE) – Bid Item Nos. 18, 19, 42, 43, & 44

- A. The number of drainage inlets shall be determined by the count of Each (EA) unit installed and accepted.
- B. Payment For furnishing and installing drainage catch basin structures shall include compensation for labor, material and equipment required to install the manholes, type "E" and "C" structures, frames, grates, covers, testing, and appurtenances in accordance with the plans and specifications including all excavation, dewatering and backfilling. This item includes all restoration (sod, irrigation repair, etc.) to complete the work.
- C. Refer to "Type C & E Inlet and Grate Details".

3.20 SWALE GRADING AND SODDING – Bid Item Nos. 20 & 45

- A. Payment for this item shall be made on a Square Yard (SY) basis. The Contractor's unit price shall include full compensation for all swale grading and sodding within the road right of way as indicated on the plans.
- B. The Contractor's unit price shall constitute full compensation for all labor, materials, and equipment required for excavation, grading, hauling, placing, compacting, testing, and dressing of the surface of the swales in preparation for sodding, placement, and maintenance of the Bahia sod or St. Augustine sod.

3.21 MODIFY EXISTING DRAINAGE STRUCTURES – Bid Item Nos. 21 & 46

- A. Payment for this item shall be made per Each (EA) manhole modified. The Contractor's unit price shall include full compensation for all removal and adjusting of manhole collars to proposed grade, and lining the existing manholes in accordance with the City specifications, as noted in the plans.
- B. The Contractor's unit price shall constitute full compensation for all labor, materials, and equipment required for excavation, grading, hauling, placing, grouting, compacting, testing, cleaning and videoing the existing system, backfilling of earthwork required to modify the structure.

3.22 AS-BUILT RECORD DRAWINGS – Bid Item Nos. 22 & 47

- A. Payment for this item shall be on a Lump Sum (LS) Basis. One set of full size design drawings on reproducible material and an electronic file of the design drawings on compact disk will be furnished to the Contractor by the City. The Contractor shall maintain full size (22" x 34") field drawings to reflect the "as-built" items of work as the work progresses. Upon completion of the work, the contractor shall prepare a record set of "as-built" drawings on full size, reproducible material and an electronic file in AutoCAD 2012 or latest version. **The As-built data shall be in State Plane Coordinates and NGVD 29. No final payment will be made for "as-built" drawings until both the reproducible and electronic files are received and accepted by the City.**
- B. This item does not include surveying work required for layout and alignment of utility improvements.
- C. The signed and sealed As-Built drawings prepared by professional surveyor are required to be submitted with each pay request. Measurement for payment for providing and furnishing As-Built drawings shall be based upon percent of project complete.
- D. All survey work shall be performed by an independent third party surveyor, licensed

to practice in the State of Florida. The surveyor shall be retained by the Contractor and approved by the City.

3.23 VIDEO ALLOWANCE – Bid Item Nos. 23 & 48

- A. Payment under this pay item shall be made as stipulated in Specifications Section 0120 - Allowances

3.24 UNFORESEEN CONDITIONS ALLOWANCE – Bid Item Nos. 24 & 49

- A. Payment under this item shall be made as stipulated in Specifications Section 01020 - Allowances.

3.25 INDEMNIFICATION – Bid Item Nos. 25 & 50

- A. Payment under this item is included in accordance with Article 6.30 of the General Conditions.

3.26 PROJECT IDENTIFICATION SIGN – Bid Item Nos. 26 & 51

- A. Payment for project identification sign shall be made at the contract unit price for each (EA) sign installed and accepted. The contractor's price shall include furnishing and maintaining the sign throughout the project duration.

3.27 NPDES PERMIT/EROSION CONTROL – Bid Item Nos. 27 & 52

- A. Payment for Contractor required NPDES Permit application (Notice of Intent and Notice of Termination), reporting and associated erosion protection measures including turbidity abatement for dewatering procedures will be made at the Contract Lump Sum (LS) Price Bid for this item. The percent completion of the project shall be based on the percent of the total project actually constructed and not on the percent of the Contract price completed.
- B. Payment for NPDES Permit/Erosion Protection Measures shall be made on the basis of a percentage (as determined in 'A' above) of the Lump Sum Price. The contract unit price shall include compensation for required labor, materials, and equipment necessary for complying with the NPDES Permit and providing Erosion Protection Measures during construction activities in accordance with the Contract Documents.
- C. Pay item includes NPDES Inspections per the permit conditions and all inlet protection and all silt fencing required.

END OF SECTION

SECTION 01041

PROJECT COORDINATION

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Engineer will coordinate the work between Prime Contractors as required.
- B. [The] [Each Prime] Contractor shall:
 - 1. Coordinate work of his [own] employees and subcontractors.
 - 2. Expedite his work to assure compliance with schedules.
 - 3. [Coordinate his work with that of other Prime Contractors and work by Owner.]
 - 4. Comply with orders and instructions of Engineer.

1.02 RELATED REQUIREMENTS

- A. Section 01152: Applications for Payment.
- B. Section 01200: Project Meetings.
- C. Section 01340: Shop Drawings, Product Data and Samples.
- D. Section 01700: Contract Closeout.

1.03 CONSTRUCTION ORGANIZATION AND START-UP

- A. Engineer shall establish on-site lines of authority and communications:
 - 1. Schedule and conduct pre-construction meeting and progress meetings as specified in Section.
 - 2. Establish procedures for [intra-project communications]:
 - a. Submittals
 - b. Reports and records
 - c. Recommendations
 - d. Coordination of drawings
 - e. Schedules
 - f. Resolution of conflicts
 - 3. Interpret Contract Documents:
 - a. Transmit written interpretations to [Prime] Contractors, and to other concerned parties.
 - 4. Assist in obtaining permits and approvals:

- a. Verify that contractor[s] and subcontractors have obtained inspections for Work and for temporary facilities.
5. Control the use of Site:
 - a. Allocate space for [each Prime] Contractor's use for field offices, sheds, and work and storage areas.
6. Inspection and Testing:
 - a. Inspect work to assure performance in accord with requirements of Contract Documents.
 - b. Administer special testing and inspections of suspect Work.
 - c. Reject Work which does not comply with requirements of Contract Documents.

1.04 CONTRACTOR'S DUTIES

A. Construction Schedules:

1. Prepare a detailed schedule of basic operations.
2. Monitor schedules as work progresses:
 - a. Identify potential variances between scheduled and probable completion dates or each phase.
 - b. Recommend to Owner adjustments in schedule to meet required completion dates.
 - c. Document changes in schedule; submit to Owner, Engineer and to involved subcontractors.
3. Observe work of each subcontractor to monitor compliance with schedule.
 - a. Verify that labor and equipment are adequate for the work and the schedule.
 - b. Verify that product procurement schedules are adequate.
 - c. Verify that product deliveries are adequate to maintain schedule.
 - d. Report noncompliance to Engineer, with recommendation for changes.

B. Process Shop Drawings, Product Data and Samples:

1. Prior to submittal to Engineer, review for compliance with Contract Documents:
 - a. Field dimensions and clearance dimensions.
 - b. Relation to available space.
 - c. Effect of any changes on the work of any subcontractor.

C. Prepare Coordination Drawings as required to resolve conflicts and to assure coordination of the work of, or affected by, mechanical and electrical trades, or by special equipment requirements.

1. Submit to Engineer.

2. Reproduce and distribute copies to concerned parties after Engineer review.

D. Maintain Reports and Records at Job Site, available to Engineer and Owner.

1. Daily log of progress of work.
2. Records
 - a. Contracts
 - b. Purchase orders
 - c. Materials and equipment records
 - d. Applicable handbooks, codes and standards
3. Maintain file of record documents

1.05 CONTRACTOR'S CLOSE-OUT DUTIES

- A. At completion of Work, conduct an inspection to assure that:
 1. Specified cleaning has been accomplished.
 2. Temporary facilities have been removed from site.
- B. Substantial Completion:
 1. Conduct an inspection to develop a list of Work to be completed or corrected.
 2. Assist Engineer in inspection.
 3. Supervise correction and completion of work of subcontractors.

1.06 ENGINEER'S CLOSE-OUT DUTIES

- A. Final Completion:
 1. When [each] Contractor determines that Work is finally complete, conduct an inspection to verify completion of Work.
- B. Administration of Contract closeout:
 1. Receive and review contractor's final submittals.
 2. Transmit to Owner with recommendations for action.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01045

CUTTING AND PATCHING

PART 1- GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Contractor shall be responsible for all cutting, fitting and patching, including related 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 requirement of Contract Documents.
 - 5. Remove samples of installed work as specified for testing.
 - 6. Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.

1.02 RELATED REQUIREMENTS

- A. Section 01010: Summary of Work.
- B. Section 01630: Substitutions and Product Options.

1.03 SUBMITTALS

- A. Submit a written request to Engineer well in advance of executing and cutting or alteration which affects:
 - 1. Work of the Owner or any separate contractor.
 - 2. Structural value or integrity of any element of the project.
 - 3. Integrity or effectiveness of weather-exposed or moisture-resistant element or systems.
 - 4. Efficiency, operational life, maintenance or safety of operational elements.
 - 5. Visual qualities of sight-exposed elements.
- B. Request shall include:
 - 1. Identification of the Project.
 - 2. Description of affected work.
 - 3. The necessity for cutting, alteration or excavation.

4. Effect on work of Owner or any separate contractor, or on structural or weatherproof integrity of Project.
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. Alternative to cutting and patching.
7. Cost proposal, when applicable.
8. Written permission of any separate contractor whose work will be affected.

C. Should conditions of Work or the schedule indicate a change of products from original installation, contractor shall submit request for substitution as specified in Section 01630 - Substitutions and Product Options.

D. Submit written notice to Engineer designating the date and the time the Work will be uncovered.

PART 2 - PRODUCTS

2.01 MATERIALS

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

PART 3 - EXECUTION

3.01 INSPECTION

- A. Inspect existing conditions of Project, 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 work.
- C. Report unsatisfactory or questionable conditions to Engineer in writing; do not proceed with work until Engineer has provided further instructions.

3.02 PREPARATION

- A. Provide adequate temporary support as necessary to assure structural value or integrity of affected portion of work.
- B. Provide devices and methods to protect other portions of Project from damage.

- C. Provide protection from elements for that portion of the Project which may be exposed by cutting and patching work, and maintain excavations free from water.

3.03 **PERFORMANCE**

- A. Execute cutting and demolition by methods which 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 fittings 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 or 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.

END OF SECTION

SECTION 01050

FIELD ENGINEERING

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Provide and pay for field engineering services required for Project.
 - 1. Survey work required in execution of Project.
 - 2. Civil, structural or other professional engineering services specified, or required to execute Contractor's construction methods.
- B. Owner's Representative will identify existing control points indicated on the Drawings, as required.

1.02 RELATED REQUIREMENTS

- A. Conditions of the Contract.
- B. Section 01010: Summary of Work.
- C. Section 01700: Contract Closeout.

1.03 QUALIFICATIONS OF SURVEYOR OR ENGINEER

- A. Qualified engineer or land surveyor, registered in the State of Florida.

1.04 SURVEY REFERENCE POINTS

- A. Existing basic horizontal and vertical control points for the Project are those designated on Drawings.
- B. Locate and protect control points prior to starting site work, and preserve all permanent reference points during construction.
 - 1. Make no changes or relocations without prior written notice to Engineer.
 - 2. Report to Engineer when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
 - 3. Require surveyor to replace project control points which may be lost or destroyed.
 - a. Establish replacements based on original survey control.

1.05 PROJECT SURVEY REQUIREMENTS

- A. Establish lines and levels, locate and lay out, by instrumentation and similar appropriate means:
 - 1. Site improvements
 - a. Stakes for grading, fill and topsoil placement.
 - b. Utility slopes and invert elevations.
 - 2. Batter boards for structures.
 - 3. Building foundation, column locations and floor levels.
 - 4. Controlling lines and levels required for mechanical and electrical trades.
- B. From time to time, verify layouts by same methods.
- C. Locate and mark all known underground utilities prior to entrance of any equipment on the site. All such utilities shall be protected from heavy traffic. Establish and maintain barricades around all manholes, drains, and similar underground items. Immediately notify the owner of any conflict between operations and any in ground item to remain.

1.06 RECORDS

- A. Maintain a complete, accurate log of all control and survey work as it progresses.

1.07 SUBMITTALS

- A. Submit name and address of registered surveyor and Professional Engineer to Engineer.
- B. On request of Engineer, submit documentation to verify accuracy of field engineering work.
- C. Submit certificate signed by registered engineer or surveyor certifying that elevations and locations of improvements are in conformance, or non-conformance, with Contract Documents.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

01050-3

FIELD ENGINEERS

SECTION 01090

REFERENCE STANDARDS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

Abbreviation and acronyms used in Contract Documents to identify reference standards.

1.02 QUALITY ASSURANCE

- A. Application: When a standard is specified by reference, comply with requirements and recommendations stated in that standard, except when requirements are modified by the Contract Documents, or applicable codes establish stricter standards.
- B. Publication Date: The publication in effect on the date of issue of Contract Documents, except when a specific publication date is specified.

1.03 ABBREVIATIONS, NAMES, AND ADDRESSES OR ORGANIZATIONS

- A. Obtain copies of referenced standards direct from publication source, when needed for proper performance of Work, or when required for submittal by Contract Documents.

AA Aluminum Association
 818 Connecticut Avenue, N.W.
 Washington, DC 20006

AABC Associated Air Balance Council
 1000 Vermont Avenue, N.W.
 Washington, DC 20005

AASHTO American Association of State
 Highway & Transportation Officials
 444 North Capitol Street, N.W.
 Washington, DC 20001

ACI American Concrete Institute
 Box 19150
 Redford Station
 Detroit, MI 48219

ADC	Air Diffusion Council 435 North Michigan Avenue Chicago, IL 60611
AI	Asphalt Institute Asphalt Institute Building College Park, MD 20740
AISC	American Institute of Steel Construction 1221 Avenue of the Americas New York, NY 10020
AISI	American Iron and Steel Institute 1000 16th Street, N.W. Washington, DC 20036
AMCA	Air Movement and Control Association 30 West University Drive Arlington Heights, IL 60004
ANSI	American National Standards Institute 1430 Broadway New York, NY 10018
ARI	Air-Conditioning and Refrigeration Institute 1815 North Fort Myer Drive Arlington, VA 22209
ASHRAE	American Society of Heating, Refrigerating & Conditioning Engineers 345 East 47th Street New York, NY 10017
ASME	American Society of Mechanical Engineers 345 East 47th Street New York, NY 10017
ASPA	American Sod Producers Association Association Building Ninth and Minnesota Hastings, NE 68901

ASTM	American Society of Testing & Materials 1916 Race Street Philadelphia, PA 19103
AWWA	American Water Works Association 6666 W. Quincy Avenue Denver, CO 80235
AWI	Architectural Woodwork Institute 2310 South Walter Reed Drive Arlington, VA 22206
AWPA	American Wood-Preserver's Association 7735 Old Georgetown Road Bethesda, MD 20014
AWS	American Welding Society 2501 NW 7th Street Miami, FL 33125
CDA	Cooper Development Association 57th Floor, Chrysler Building 405 Lexington Avenue New York, NY 10017
CLFM	Chain Link Fence Manufacturers Institute 1101 Connecticut Avenue Washington, DC 20036
CRSI	Concrete Reinforcing Steel Institute 180 North LaSalle Street, Suite 2110 Chicago, IL 60601
MF	Factory Mutual System 1151 Boston Providence Turnpike Norwood, MA 02062
FS	Federal Specification General Services Administration Specifications and Consumer Information Distribution Section (WFSIS) Washington Navy Yard, Bldg. 197 Washington, DC 20407
GA	Gypsum Association 01090-3

1603 Orrington Avenue
Evanston, IL 60201

MIL	Military Specification Naval Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120
MLSFA	Metal Lath/Steel Framing Association 221 North LaSalle Street Chicago, IL 60601
NAAMM	National Association of Architectural Metal Manufacturers 221 North LaSalle Street Chicago, IL 60601
NEBB	National Environmental Balancing Bureau 8224 Old Courthouse Road Vienna, VA 22180
NEMA	National Electrical Manufacturer's Association 2101 L Street, N.W. Washington, DC 20037
NFPA	National Fire Protection Association 470 Atlantic Avenue Boston, MA 02210
NFPA	National Forest Products Association 1619 Massachusetts Avenue, N.W. Washington, DC 20036
NTMA	National Terrazzo and Mosaic Association 3166 Des Plains Avenue Des Plains, IL 60018
PCA	Portland Cement Association 5420 Old Orchard Road Skokie, IL 20076
PCI	Prestressed Concrete Institute 20 North Wacker Drive Chicago, IL 60606
PS	Product Standard U.S. Department of Commerce 01090-4

Washington, DC 20203

RCSHSB	Red Cedar Shingle & Handsplit Shake Bureau 515 116th Avenue Bellevue, WA 98004
SDI	Steel Deck Institute Box 3812 St. Louis, MO 63122
SDI	Steel Door Institute 712 Lakewood Center North Cleveland, OH 44107
SIGMA	Sealed Insulating Glass Manufacturers Association 111 East Wacker Drive Chicago, IL 60601
SJI	Steel Joist Institute 1703 Parham Road, Suite 204 Richmond, VA 23229
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association 8224 Old Court House Road Vienna, VA 22180
TAS	Technical Aid Series Construction Specifications Institute 1150 Seventeenth Street, N.W. Washington, DC 20036
TCA	Tile Council of America, Inc. Box 326 Princeton, NJ 08540
UL	Underwriter's Laboratories, Inc. 333 Pfingston Road Northbrook, IL 60062

PART 2 - PRODUCTS

Not used.

01090-5

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01152

APPLICATION FOR PAYMENT

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Submit Applications for Payment to Engineer in accordance with the schedule established by Conditions of the Contract and herein.

1.02 RELATED REQUIREMENTS

- A. Agreement Between Owner and Contractor: Lump Sum and Unit Price.
- B. Conditions of the Contract: Progress Payments, Retainage and Final Payment.
- C. Section 01020: Allowances.
- D. Section 01153: Change Order Procedures.
- E. Section 01370: Schedule of Values.
- F. Section 01700: Contract Closeout.

1.03 FORMAT AND DATA REQUIRED

- A. Submit applications in the form required by Owner, in accordance with the example which will be provided by the Engineer, with itemized data typed on 8-1/2 inch x 11 inch white paper continuation sheets.
- B. Provide itemized data on continuation sheet:
 1. Format, schedules, line items and values: Those of the Schedule of Values accepted by Engineer.

1.04 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

- A. Application Form:

1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.
2. Fill in summary of dollar values to agree with respective totals indicated on continuation sheets.
3. Execute certification with signature of a responsible officer of Contract firm.

B. Continuation Sheets:

1. Fill in total list of all scheduled component items of Work, with item number and scheduled dollar value for each item.
2. Fill in dollar value in each column for each scheduled line item when work has been performed or products stored.
 - a. Round off values to nearest dollar, or as specified for Schedule of Values.
3. List each Change Order executed prior to date of submission at the end of the continuation sheets.
 - a. List by Change Order Number, and description, as for an original component item of work.

1.05 **SUBSTANTIATING DATA FOR PROGRESS PAYMENTS**

A. When the Owner or the Engineer requires substantiating data, Contractor shall submit suitable information, with a cover letter identifying:

1. Project
2. Application number and date.
3. Detailed list of enclosures.
4. For stored products:
 - a. Item number and identification as shown on application.
 - b. Description of specific material.

B. Submit one copy of data and cover letter for each copy of application.

1.06 **PREPARATION OF APPLICATION FOR FINAL PAYMENT**

A. Fill in Application form as specified for progress payments.

B. Use continuation sheet for presenting the final statement of accounting as specified in Section 01700 - Contract Closeout.

1.07 **SUBMITTAL PROCEDURE**

A. Submit Applications for Payment to Engineer at the times stipulated.

B. Number: 4 copies of Application.

C. When Engineer finds Application properly completed and correct, he will transmit certificate for payment to Owner, with copy to Contractor.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01153

CHANGE ORDER PROCEDURES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Promptly implement change order procedures.
 - 1. Provide full written data required to evaluate changes.
 - 2. Maintain detailed records of work done on time and material/force account basis.
 - 3. Provide full documentation to Engineer on request.
- B. Designate in writing the member of Contractor's organization:
 - 1. Who is authorized to accept changes in the Work.
 - 2. Who is responsible for informing others in the Contractor's employ of the authorization of changes in the Work.
- C. Owner will designate in writing the person who is authorized to execute Change Orders.

1.02 RELATED REQUIREMENTS

- A. Agreement: The amounts of established unit prices.
- B. General conditions and Supplementary Conditions.
- C. Conditions of the Contract:
 - 1. Methods of determining cost or credit to Owner resulting from changes in Work made on a time and material basis.
 - 2. Contractor's claims for the additional cost.
- D. Section 01020: Allowances.
- E. Section 01152: Application for Payment.
- F. Section 01310: Construction Schedules.
- G. Section 01370: Schedule of Values.
- H. Section 01630: Substitutions and Product Options.

I. Section 01700: Contract Closeout.

1.03 **DEFINITIONS**

- A. Change Order: See General Conditions and Supplementary Conditions.
- B. Construction Change Authorization: A written order to the Contractor, signed by Owner and Engineer, which amends the Contract Documents as described, and authorizes Contractor to proceed with a change which affects the Contract Sum or the Contract Time, for inclusion in a subsequent Change Order.
- C. Field Order: A written order, instructions, or interpretations, signed by Engineer making minor changes in the Work not involving a change in Contract Sum or Contract Time.

1.04 **PRELIMINARY PROCEDURES**

- A. Owner or Architect may initiate changes by submitting a Proposal Request to Contractor. Request will include:
 1. Detailed description of the Change, products, and location of the change in the Project.
 2. Supplementary or revised Drawings and Specifications.
 3. The projected time span for making the change, and a specific statement as to whether overtime work is, or is not, authorized.
 4. A specific period of time during which the requested price will be considered valid.
 5. Such request is for information only, and is not an instruction to execute the changes, nor to stop Work in progress.
- B. Contractor may initiate changes by submitting a written notice to Architect, containing:
 1. Description of the proposed changes.
 2. Statement of the reason for making the changes.
 3. Statement of the effect on the Contract Sum and the Contract Time.
 4. Statement of the effect on the work of separate contractors.
 5. Documentation supporting any change in Contract Sum or Contract Time, as appropriate.

1.05 **CONSTRUCTION-CHANGE AUTHORIZATION**

- A. In lieu of Proposal Request, Engineer may issue a construction change authorization for Contractor to proceed with a change for subsequent inclusion in a Change Order.

- B. Authorization will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change, and will designate the method of determining any change in the Contract Sum and any change in Contract Time.
- C. Owner and Engineer will sign and date the Construction Change Authorization as authorization for the Contractor to proceed with the changes.
- D. Contractor shall sign and date the Construction Change Authorization to indicate agreement with the terms therein.

1.06 DOCUMENTATION OF PROPOSALS AND CLAIMS

- A. Support each quotation for a lump-sum proposal, and for each unit price which has not previously been established, with sufficient substantiating data to allow Engineer to evaluate the quotation.
- B. On request provide additional data to support time and cost computations:
 - 1. Labor required.
 - 2. Equipment required.
 - 3. Products required.
 - a. Recommended sources of purchase and unit cost.
 - b. Quantities required.
 - 4. Taxes, insurance and bonds.
 - 5. Credit for work deleted from Contract, similarly documented.
 - 6. Overhead and profit.
 - 7. Justification for any change in Contract Time.
- C. Support each claim for additional costs, and for work done on a time-and-material/force account basis, with documentation as required for a lump-sum proposal, plus additional information:
 - 1. Name of Owner's authorized agent who ordered the work, and date of the order.
 - 2. Dates and times work was performed, and by whom.
 - 3. Time record, summary of hours worked, and hourly rates paid.
 - 4. Receipts and invoices for:
 - a. Equipment used, listing dates and times of use.
 - b. Products used, listing of quantities.
 - c. Subcontractors.
- D. Document requests for substitutions for Products as specified in Section 01630.

1.07 PREPARATION OF CHANGE ORDERS

- A. Engineer will prepare each Change Order.
- B. Owner's Form, per example provided by the Engineer.
- C. Change Order will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change.
- D. Change Order will provide an accounting of the adjustment in the Contract Sum and in the Contract Time.

1.08 LUMP-SUM/FIXED PRICE CHANGE ORDER

- A. Content of Change Orders will be based on, either:
 - 1. Engineer's Proposal Request and Contractor's responsive Proposal as mutually agreed between Owner and Contractor.
 - 2. Contractor's Proposal for a change, as recommended by Engineer.
- B. Owner and Engineer will sign and date the Change Order as authorization for the Contractor to proceed with the changes.
- C. Contractor shall sign and date the Change Order to indicate agreement with the terms therein.

1.09 UNIT PRICE CHANGE ORDER

- A. Content of Change Orders will be based on, either:
 - 1. Engineer's definition of the scope of the required changes.
 - 2. Contractor's Proposal for a change, as recommended by Engineer.
 - 3. Survey of completed work.
- B. The amounts of the unit prices to be:
 - 1. Those stated in the Agreement.
 - 2. Those mutually agreed upon between Owner and Contractor.
- C. When quantities of each of the items affected by the Change Order can be determined prior to start of the work:
 - 1. Owner and Engineer will sign and date the Change Order as authorization for Contractor to proceed with the changes.
 - 2. Contractor shall sign and date the Change Order to indicate agreement with the terms herein.

D. When quantities of the items cannot be determined prior to start of the work:

1. Engineer or Owner will issue a construction change authorization directing Contractor to proceed with the change on the basis of unit prices, and will cite the applicable unit prices.
2. At completion of the change, Engineer will determine the cost of such work based on the unit process and quantities used.
 - a. Contractor shall submit documentation to establish the number of units of each item and any claims for a change in Contract Time.
3. Engineer will sign and date the Change Order to establish the change in Contract Sum and in Contract Time.
4. Owner and Contractor will sign and date the Change Order to indicate their agreement with the terms therein.

1.10 TIME AND MATERIAL/FORCE ACCOUNT CHANGE ORDER/ CONSTRUCTION CHANGE AUTHORIZATION

- A. Engineer and Owner will issue a Construction Change Authorization directing Contractor to proceed with the changes.
- B. At completion of the change, Contractor shall submit itemized accounting and supporting data as provided in the Article "Documentation of Proposals and Claims" of this Section.
- C. Engineer will determine the allowable cost for such work, as provided in General Conditions and Supplementary Conditions.
- D. Engineer will sign and date the Change Order to establish the change in Contract Sum and in Contract Time.
- E. Owner and Contractor will sign and date the Change Order to indicate their agreement therewith.

1.11 CORRELATION WITH CONTRACTOR'S SUBMITTALS

- A. Periodically revise Schedule of Values and Request for Payment forms to record each change as a separate item of Work, and to record the adjusted Contract sum.
- B. Periodically revise the Construction Schedule to reflect each change in Contract Time.

1. Revise subschedules to show changes for other items of work affected by the changes.

C. Upon completion of work under a Change Order, enter pertinent changes in Record Documents.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Owner shall schedule and administer preconstruction meeting, periodic progress meetings, and specially called meetings throughout progress of the Work.
 - 1. Prepare agenda for meetings.
 - 2. Distribute written notice of each meeting four days in advance of meeting date.
 - 3. Make physical arrangements for meetings.
 - 4. Preside at meetings.
 - 5. Record the minutes; include significant proceedings and decisions.
 - 6. Reproduce and distribute copies of minutes within three days after each meeting.
 - a. To participants in the meeting.
 - b. To parties affected by decisions made at the meeting.
- B. Representatives of contractors, subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

1.02 RELATED REQUIREMENTS

- A. Instructions to Bidders: Pre-Bid Conferences.
- B. Section 01340: Shop Drawings, Product Data and Samples.
- C. Section 01700: Contract Closeout.
- D. Section 01730: Operating and Maintenance Data.

1.03 PRE-CONSTRUCTION MEETING

- A. Schedule within 20 days after effective date of the agreement.
- B. Location: A central site, convenient for all parties, designated by the Owner.
- C. Attendance:
 - 1. Owner's Representative.

2. Engineer and his professional consultants.
3. Resident Project Representative.
4. Contractor's Superintendent.
5. Major Subcontractors.
6. Others as Appropriate and approved by the Owner.

D. Suggested Agendum:

1. Distribution and discussion of:
 - a. List of major subcontractors and suppliers.
 - b. Projected Construction Schedules.
2. Critical work sequencing.
3. Major equipment deliveries and priorities.
4. Project Coordination.
 - a. Designation of responsible personnel.
5. Procedures and processing of:
 - a. Field decisions.
 - b. Proposal requests.
 - c. Submittals.
 - d. Change Orders.
 - e. Applications for Payment.
6. Adequacy for distribution of Contract Documents.
7. Procedures for maintaining Record Documents.
8. Use of premises.
 - a. Office, work and storage areas.
 - b. Owner's requirements.
9. Construction facilities, controls and construction aids.
10. Temporary utilities.
11. Safety and first-aid procedures.
12. Security procedures.
13. Housekeeping procedures.
14. Miscellaneous.

1.04 PROGRESS MEETINGS

- A. Schedule regular periodic meetings, as required.
- B. Hold called meetings as required by progress of the Work.
- C. Location of the meetings: Project field office of the Contractor or other site directed by the Engineer.
- D. Attendance:
 1. Engineer, and his professional consultants as needed.
 2. Subcontractors as appropriate to the agenda.

3. Suppliers as appropriate to the agenda.
4. Others.

E. Suggested Agenda:

1. Review, approval of minutes of previous meeting.
2. Review of Work progress since previous meeting.
3. Field observations, problems, conflicts.
4. Problems which impede Construction Schedule.
5. Review of off-site fabrication, delivery schedules.
6. Corrective measures and procedures to regain projected schedule.
7. Revisions to Construction Schedule.
8. Progress, schedule, during succeeding work period.
9. Coordination of schedules.
10. Review of submittal schedules; expedite as required.
11. Maintenance of quality standards.
12. Pending changes and substitutions.
13. Review proposed changes for:
 - a. Effect on Construction Schedule and on completion date.
 - b. Effect on other contracts relating to the project.
14. Review of record drawings.
15. Other business.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Promptly after award of the Contract, prepare and submit to Engineer estimated construction progress schedules for the Work, with subschedules of related activities which are essential to its progress.
- B. Submit revised progress schedules to maintain proposed schedule within 30 days of work in place.

1.02 RELATED REQUIREMENTS

- A. Conditions of the Contract.
- B. Section 01010: Summary of Work.
- C. Section 01020: Allowances.
- D. Section 01041: Project Coordination.
- E. Section 01200: Project Meetings.
- F. Section 01340: Shop Drawings.

1.03 FORM OF SCHEDULES

- A. Prepare schedules in the form of:
 - 1. Horizontal Bar Chart.
 - 2. Network Analysis System.
 - 3. Other Method Accepted by Owner.
- B. Format of Listings: The chronological order of the start of each item of work.

1.04 CONTENT OF SCHEDULES

- A. Construction Progress Schedule:
 - 1. Show the complete sequence of construction by activity.

2. Show the dates for the beginning, and completion of each major element of construction. Specifically list:
 - a. Site clearing.
 - b. Site utilities.
 - c. Foundation work.
 - d. Structural framing.
 - e. Subcontractor work.
 - f. Equipment installations.
 - g. Delivery of O & M Manuals.
 - h. Finishings.
 - i. Start-up
- B. Submittals, Schedule for Shop Drawings, Product Data and Samples. Show:
 1. The dates for Contractor's Submittals.
 2. The dates revised submittals will be required from the Engineer.
- C. Provide subschedules to define critical portions of prime schedules.

1.05 PROGRESS REVISIONS

- A. Indicate progress of each activity to date of submission.
- B. Show changes occurring since previous submission of schedule:
 1. Major changes in scope.
 2. Activities modified since previous submission.
 3. Revised projections of progress and completion.
 4. Other identifiable changes.
- C. Provide a narrative report as needed to define:
 1. Problem areas, anticipated delays, and the impact on the schedule.
 2. Corrective action recommended, and its effect.
 3. The effect of changes on schedules of other prime contractors.

1.06 SUBMISSIONS

- A. Submit initial schedules within 10 days after the effective date of the Agreement.
 1. Engineer will review schedules and return review copy within 10 days after receipt.
 2. If required, resubmit within seven days after return of review copy.

- B. With each application for payment, submit progress schedule if revised since last payment request.
- C. Submit one reproducible transparency which will be returned to the Contractor, plus two copies which will be retained by the Engineer.

1.07 **DISTRIBUTION**

- A. Distribute copies of the reviewed schedules to:
 - 1. Job site file.
 - 2. Subcontractors.
 - 3. Other concerned parties.
- B. Instruct recipients to report promptly to the Contractor, in writing, any problems anticipated by the projections shown in the schedules.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01340

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

Submit Shop Drawings, Product Data and Samples required by Contract Documents.

1.02 RELATED REQUIREMENTS

- A. Definitions and Additional Responsibilities of Parties: Conditions of the Contract.
- B. Section 01700: Contract Closeout.

1.03 SHOP DRAWINGS

- A. Drawings shall be presented in a clear and Thorough manner.
 - 1. Details shall be identified by reference of sheet and detail or schedule.
- B. Minimum sheet size: 8½ X 11 inches.

1.04 PRODUCT DATA

- A. Preparation
 - 1. Clearly mark each copy to identify pertinent products or models.
 - 2. Show performance characteristics and capacities.
 - 3. Show dimensions and clearances required.
 - 4. Show wiring or piping diagrams and controls.
- B. Manufacture's standard schematic drawings and diagrams:
 - 1. Modify drawings and diagrams by deleting information which is not applicable to the work.
 - 2. Supplement standard information to provide information specifically applicable to the work.

1.05 CONTRACTOR RESPONSIBILITIES

- A. Review Shop Drawings, Product Data and Samples prior to submission.

- B. Determine and verify:
 - 1. Field measurements.
 - 2. Field construction criteria.
 - 3. Catalog numbers and similar data.
 - 4. Conformance with specifications.
- C. Coordinate each submittal with requirements of the Work and of the Contract Documents.
- D. Notify the Engineer in writing, at time of submission, of any deviations in the submittals from requirements of the contract Documents.
- E. Begin no fabrication or work which requires approved submittals until return of submittals by Engineer

1.06 SUBMISSION REQUIREMENTS

- A. Make submittals in such sequence as to cause no delay in the work.
- B. Number of submittals required:
 - 1. Shop Drawings and Product Data: Submit six (6) copies.
 - 2. Samples: Submit the quantity stated in each specification section.
- C. Submittals shall contain:
 - 1. The date of submission and the dates of any previous submissions.
 - 2. The Project title and number.
 - 3. Contract identification.
 - 4. The names of:
 - a. Contractor
 - b. Supplier
 - c. Manufacturer
 - 5. Identification of the product, with the specification section number.
 - 6. Field dimensions, clearly identified as such.
 - 7. Relation to adjacent or critical features of the work or materials.
 - 8. Applicable standards, such as ASTM or Federal specification numbers.
 - 9. Identifications of deviations from Contract Documents.
 - 10. Identification of revisions on resubmittals.
 - 11. An 8-inch X 3.5-inch blank space for Contractor and Engineer stamps.
 - 12. CONTRACTOR'S stamp initialed or signed, certifying to review of submittal, verification of products, field measurements and field construction criteria and coordination of the information within the submittal with requirements of the Work and of Contract Documents.

1.07 RESUBMISSION REQUIREMENTS

- A. Make any corrections or changes in the submittals noted by the Engineer and resubmit unless otherwise noted.
- B. Shop Drawings and Product Data:
 - 1. Revise initial drawings or data, and resubmit as specified for the initial submittal.
 - 2. Indicate any changes which have been made other than those suggested by the Engineer.
- C. Samples: Submit new samples as required for initial submittal.

1.08 **ENGINEER'S DUTIES**

- A. Review submittals within 30 days or in accord with schedule.
- B. Affix stamp and initials or signature, and indicate status of submittal.
- C. Return submittals to Contractor for distribution, or resubmission.
- D. Review initial submittals and one resubmittal. Resubmittals that cannot be approved will be returned. Additional resubmittals will be reviewed by the Engineer, and costs for time and materials for reviewing resubmittals will be back charged by the Engineer to the Contractor.

END OF SECTION

SECTION 01370

SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Submit to the Engineer a Schedule of Values allocated to the various portions of the Work, within ten days after award of contract.
- B. Upon the request of the Engineer, support the values with data which will substantiate their correctness.
- C. The Schedule of Values, unless objected to by the Engineer, shall be used only as the basis for the Contractor's Applications for Payment.
- D. Related Requirements in Other Parts of the Contract Documents.
 1. Agreement
 2. General Conditions
 3. Supplementary Conditions

1.02 RELATED REQUIREMENTS

- A. Section 01020: Allowances
- B. Section 01152: Application for Payment
- C. Section 01600: Material and Equipment.

1.03 FORM AND CONTENT OF SCHEDULE OF VALUES

- A. Type schedule on 8-1/2-inch X 11-inch white paper; Contractor's standard forms and automated printout will be considered for approval by Engineer upon Contractors request. Identify schedule with:
 1. Title of Project, location and (City, County, Owner) Project Number.
 2. Engineer and Engineer's Project number.
 3. Name and Address of Contractor.
 4. Date of Submission.
- B. Schedule shall list the installed value of the component parts of the Work, in sufficient detail to serve as a basis for computing values for progress payments during construction.

- C. Follow the table of contents of these Specifications as the format for listing component items.
 - 1. Identify each line item with the number and title of the respective major section of the specifications.
- D. For each major line item list sub-values of:
 - 1. Major products or operations under the item.
 - 2. Contract conditions, such as: bonds, insurance premiums, job mobilization, construction facilities and temporary controls.
- E. For the various portions of the Work:
 - 1. Each item shall include a directly proportional amount of the Contractor's overhead and profit.
 - 2. For items on which progress payments will be requested for stored materials, break down the value into:
 - a. The cost of the materials, delivered and unloaded, with taxes paid.
 - b. The total installed value.
- F. The sum of all values listed in the schedule shall equal the total Contract Sum.

1.04 SUBSCHEDULE OF UNIT MATERIAL VALUES

- A. Submit a subschedule of unit costs and quantities for:
 - 1. Products specified under a unit cost allowance in Section 01020.
 - 2. Products on which progress payments will be requested for stored products.
- B. The form of submittal shall parallel that of the Schedule of Values, with each item identified the same as the line item in the Schedule of Values.
- C. The unit quantity for bulk materials shall include an allowance for normal waste.
- D. The unit values for the materials shall be broken down into:
 - 1. Cost of the material, delivered and unloaded at the site, with taxes paid.
 - 2. Installation costs, including Contractor's overhead and profit.
- E. The installed unit value multiplied by the quantity listed shall equal the cost of that item in the Schedule of Values.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01380

CONSTRUCTION PHOTOGRAPHS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Employ competent photographer to take construction record photographs periodically during course of the Work.

1.02 RELATED REQUIREMENTS

- A. Section 01010: Summary of Work
- B. Section 01020: Allowances.
- C. Section 01152: Application for Payment.
- D. Section 01700: Contract Closeout.

1.03 PHOTOGRAPHY REQUIRED

- A. Provide photographs taken on cutoff date for each scheduled Application for Payment.
- B. Views and Quantities Required:
 - 1. At each specified time, photograph Project from twelve to twenty different views, as approved by Engineer.
 - 2. Provide 8 x 10 inch prints of each view.
- C. Negatives:
 - 1. Submit to Engineer with prints.

1.04 COSTS OF PHOTOGRAPHY

- A. Pay costs for specified photography and prints.
- B. Parties requiring additional photography or prints will pay photographer directly.

PART 2 - PRODUCTS

2.01 PRINTS

A. Color:

1. Paper; Single weight, neutral black image tone, white base.
2. Finish: Smooth surface, glossy.

B. Identify each print on back, listing:

1. Name of Project.
2. Orientation of view.
3. Date and time or exposure.
4. Name and address of photographer.
5. Photographer's numbered identification of exposure.

PART 3 - EXECUTION

3.01 TECHNIQUE

A. Factual presentation

B. Correct exposure and focus.

1. High resolution and sharpness.
2. Maximum depth-of-field.
3. Minimum distortion.

3.02 VIEWS REQUIRED

A. Photograph from locations to adequately illustrate condition of construction and state of progress.

1. At successive periods of photography, take at least one photograph from the same overall view as previously.
2. Consult with engineer at each period of photography for instructions concerning views required.

3.03 DELIVERY OF PRINTS

A. Deliver prints to Engineer to accompany each Application for Payment.

END OF SECTION

SECTION 01410

TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The Contractor will employ services of an Independent Testing Laboratory to perform specified testing.
 - 1. Contractor shall cooperate with laboratory to facilitate the execution of its required services.

1.02 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

- A. Laboratory is not authorized to:
 - 1. Release, revoke, alter or enlarge on requirements of Contract Documents.
 - 2. Approve or accept any portion of the Work.
 - 3. Perform any duties of the Contractor.

1.03 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel and/or Engineer, provide access to Work or manufacturer's operations.
- B. Secure and deliver to the laboratory adequate quantities of representational samples of materials proposed to be used and which require testing.
- C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other material mixes which require control by the testing laboratory.
- D. Furnish copies of Products test reports as required.
- E. Furnish incidental labor and facilities:
 - 1. To provide access to Work to be tested.
 - 2. To obtain and handle samples at the Project site or at the source of the product to be tested.
 - 3. To facilitate inspections and tests.
 - 4. For storage and curing of test samples.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.01 PAYMENT

- A. Testing of materials and products will be performed by an independent testing laboratory appointed and paid for by the Contractor. Testing will be performed so as to least encumber the performance of Work.
- B. When work of this contract or portions of work are completed, notify the Engineer so that arrangements can be made with the laboratory to perform or witness the tests. Do not proceed with additional portions of Work until results have been verified.

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnish, install and maintain temporary utilities required for construction, remove on completion of Work.

1.02 RELATED REQUIREMENTS

- A. Section 01010: Summary of Work.
- B. Section 01590: Field Offices an Sheds.

1.03 REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with National Electric Code.
- B. Comply with Federal, State and local codes and regulations and with utility company requirements.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

- A. Materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

2.02 TEMPORARY ELECTRICITY AND LIGHTING

- A. Arrange with utility company, provide service required for power and lighting, and pay all costs for service and for power used.
- B. Install circuit and branch wiring, with area distribution boxes located so that power and lighting is available throughout the construction by the use of construction-type power cords.
- C. Provide adequate artificial lighting for all areas of work when natural light is not adequate for work, and for areas accessible to the public.

2.03 TEMPORARY HEAT AND VENTILATION

- A. Provide temporary heat and ventilation as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for the installation of materials, and to protect materials and finishes from damage due to temperature or humidity.
- B. Provide adequate forced ventilation of enclosed areas for curing of installed materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors or gases.
- C. Portable heaters shall be standard approved units complete with controls.
- D. Pay all costs of installation, maintenance, operation and removal, and for fuel consumed.

2.04 TEMPORARY TELEPHONE SERVICE

- A. Arrange with local telephone service company to provide direct line telephone service at the construction site. Service required:
 - 1. One direct line instrument in Field Office of Contractor.
 - 2. One direct line instrument in Field Office of Project Representative.
 - 3. Other instruments at the option of the contractor, or as required by regulations.
- B. Pay all costs for installation, maintenance and removal, and service charges for local calls. Toll charges shall be paid by the party who places the call.

2.05 TEMPORARY WATER

- A. Provide water for construction and potable purposes; pay all costs for installation, maintenance and removal.
- B. {Owner will provide all water for construction purposes for use by the Contractor at no expense.}
- C. Make conservative use of water. Any negligence or wastefulness will be reason for waiving the provisions for free water.
- D. All connections to hydrants to be made by Owner's personnel.
- E. [Water for construction and non-potable purposes may be obtained from wells developed on site by Contractor.]

- F. [Non-potable water for general construction purposes shall be clean, non-turbid, and non-saline; and acceptable to the Engineer.]
- G. Water utilization for concrete plaster and mortar shall meet the respective requirements and standards set forth for water utilized in these construction materials.
- H. The Owner will make water available at designated hydrants on the Owner's water system for use by the Contractor.

2.06 **TEMPORARY SANITARY FACILITIES**

- A. Provide sanitary facilities in compliance with laws and regulations.
- B. Service, clean and maintain facilities and enclosures.
- C. Existing plumbing facilities shall not be used by construction personnel.

2.07 **TEMPORARY ACCESS ROAD AND PARKING**

- A. Site Access Roads:
 - 1. Construct new temporary access roads over designated easements from public thorough- fare to site entrance.
- B. On-Site Roads and Parking Areas:
 - 1. Locate roads, drives, walks and parking facilities to provide uninterrupted access to construction offices, mobilization, work, storage areas, and other areas required for execution of the contract.
 - 2. Submit proposed location for Engineer's approval.
 - 3. Provide access for emergency vehicles.
 - a. Maintain driveways a minimum of 15 feet wide, between and around combustible materials in storage and mobilization areas.
 - 4. Maintain traffic areas free as possible of excavated materials, construction equipment, products and debris.
 - 5. Keep fire hydrants and water control valves free from obstruction and accessible for use.
 - 6. Provide traffic control devices as required by governing authorities along established public thoroughfares which will be used as haul routes to site access.

2.08 **TEMPORARY CONTROLS**

A. Noise Control:

Not used.

B. Dust Control:

1. Provide positive methods and apply dust control materials to minimize raising dust from construction operations, and provide positive means to prevent air-borne dust from dispersing into the atmosphere.

C. Water Control:

1. Provide methods to control surface water to prevent damage to the Project, the site, or adjoining properties.
 - a. Control fill, grading and ditching to direct surface drainage away from excavations, pits, tunnels and other construction areas; and to direct drainage to proper runoff.
2. Provide, operate and maintain hydraulic equipment of adequate capacity to control surface water.
3. Dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of the site or to adjoining areas.

D. Pest Control:

Not used.

E. Rodent Control:

1. Provide rodent control as necessary to prevent infestation of construction or storage area.
 - a. Employ methods and use materials which will not adversely affect conditions at the site or on adjoining properties.
 - b. Should the use of rodenticides be considered necessary, submit an informational copy of the proposed program to Owner with a copy to Engineer. Clearly indicate:
 - (1) The area or areas to be treated.
 - (2) The rodenticides to be used, with a copy of the manufacturer's printed instructions.
 - (3) The pollution preventative measures to be employed.
2. The use of any rodenticide shall be in full accordance with the manufacturer's printed instructions and recommendations.

F. Debris Control:

1. Maintain all areas under Contractor's control free of extraneous debris.
2. Initiate and maintain a specific program to prevent accumulation of debris at construction site, storage and parking areas, or along access roads and haul routes.
 - a. Provide acceptable containers for deposit of debris.
 - b. Prohibit overloading of trucks to prevent spillages on access and haul routes.
 - (1) Provide periodic inspection of traffic areas to enforce requirements.
3. Schedule periodic collection and disposal of debris.
 - a. Provide additional collections and disposals of debris whenever the periodic schedule is inadequate to prevent accumulation.

G. Pollution Control:

1. Provide methods, means and facilities required to prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations.
2. Provide equipment and personnel, perform emergency measures required to contain any spillages, and to remove contaminated soils or liquids.
 - a. Excavate and dispose of any contaminated earth off-site, and replace with suitable compacted fill and topsoil.
3. Take special measure to prevent harmful substances from entering public waters.
 - a. Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams, or in sanitary or storm sewers.
4. Provide systems for control of atmospheric pollutants.
 - a. Prevent toxic concentrations of chemicals.
 - b. Prevent harmful dispersal of pollutants; into the atmosphere.

H. Erosion Control:

1. Plan and execute construction and earth work by methods to control surface drainage from cuts and fills, and from borrow and waste disposal areas, to prevent erosion and sedimentation.
 - a. Hold the areas of bare soil exposed at one time to a minimum.
 - b. Provide temporary control measures such as berms, dikes and drains.
2. Construct fills land waste areas by selective placement to eliminate surface silts or clays which will erode.
3. Periodically inspect earthwork to detect any evidence of the start of erosion, apply corrective measures as required to control erosion.

PART 3 - EXECUTION

3.01 GENERAL

- A. Comply with applicable requirements specified in Division 15 - Mechanical, and in Division 16 - Electrical.
- B. Maintain and operate systems to assure continuous service.
- C. Modify and extend systems as work progress requires.

3.02 REMOVAL

- A. Completely remove temporary materials and equipment when their use is no longer required.
- B. Clean and repair damage caused by temporary installations or use of temporary facilities.
- C. Restore permanent facilities used for temporary services to specified condition.
 - 1. Prior to final inspection, remove temporary lamps and install new lamps.

END OF SECTION

SECTION 01530

BARRIERS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnish, install and maintain suitable barriers as required to prevent public entry, and to protect the Work, existing facilities, trees and plants from construction operations; remove when no longer needed, or at completion of Work.

1.02 RELATED REQUIREMENTS

- A. Section 01010: Summary of Work.
- B. Section 01500: Construction Facilities and Temporary controls.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

- A. Materials may be new or used, suitable for the intended purpose, but must not violate requirements of applicable codes and standards.

2.02 FENCING

- A. Minimum fence height six feet.
- B. Open-Mesh Fence:
 - 1. No 11 gauge, two inch mesh, 72 inches high galvanized chain link fabric, with extension arms and three strands of galvanized barbed wire.
 - 2. Galvanized steel posts; 1-1/2 inch line posts and two inch corner posts.

2.03 BARRIERS

- A. Materials are Contractor's option, as appropriate to serve required purpose.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install facilities of a neat and reasonably uniform appearance, structurally adequate for the required purposes.
- B. Maintain barriers during entire construction period.
- C. Relocate barriers as required by the progress of construction.

3.02 FENCES

- A. Provide and maintain fences necessary to assure security of the site during construction to keep unauthorized people and animals from the site when construction is not in progress.
- B. Gates shall have locks; and keys shall be furnished to the Owner.
- C. Provide additional security measures as deemed necessary and approved by the Engineer.

3.03 TREE AND PLANT PROTECTION

- A. Preserve and protect existing trees and plants at site which are designated to remain, and those adjacent to site.
- B. Consult with the Engineer, and remove agreed-on roots and branches which interfere with construction.
 - 1. Employ qualified tree surgeon to remove branches and treat cuts.
- C. Provide temporary barriers to a height of six feet, around each, or around each group, of trees and plants.
- D. Protect root zones of trees and plants:
 - 1. Do not allow vehicular traffic or parking.
 - 2. Do not store materials or products.
 - 3. Prevent dumping of refuse or chemically injurious materials or liquids.
 - 4. Prevent puddling or continuous running water.
- E. Carefully supervise excavating, grading and filling, and other construction operations, to prevent damage.

- F. Replace, or suitably repair, trees and plants designated to remain which are damaged or destroyed due to construction operations.

3.04 **REMOVAL**

- A. Completely remove barricades, omit, when construction has progressed to the point that they are no longer needed and when approved by Engineer.
- B. Repair damage caused by construction. Fill and grade areas of the site to the required evaluations, and clean up the area.

END OF SECTION

SECTION 01570

TRAFFIC CONTROL

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Provide, operate and maintain equipment, services and personnel, with traffic control and protective devices, as required to expedite vehicular traffic flow around the construction area.
- B. Remove temporary equipment and facilities when no longer required, restore grounds to original, or to specified conditions.

1.02 REFERENCES

Traffic regulation shall be in accordance with F.D.O.T. Roadway and Traffic Design Standards Series 600, 1991 Edition, Manual on Uniform Traffic Control Devices, latest Ed., and FDOT Standard Specifications, latest Ed.

1.03 TRAFFIC CONTROL PLAN

- A. The Contractor is to prepare a traffic control plan and/or policy statement for each phase of construction. This plan is to be presented to the City Engineer at or before the pre-construction meeting.
- B. All proposed traffic control plans and policy statements shall be complete and in compliance with Section 1.02.

1.04 TRAFFIC SIGNALS AND SIGNS

- A. Provide and operate traffic control and directional signals required to direct and maintain an orderly flow of traffic in all areas under Contractor's control, or affected by Contractor's operations.
- B. Provide traffic control and direction signs, post mounted, at all areas required by Section 1.02.
- C. Traffic Signals - Construction requiring traffic signal modification shall be reported to the City Engineer at least 72 hours prior to the commencement of such activities. All excavation work within 30 feet of any traffic signal shall be reported to the City Engineer at least 72 hours prior to its commencement.

D. All existing traffic signs shall remain visible throughout construction activities unless superseded by required construction signing.

1.05 **FLAGMEN**

Provide qualified and suitably equipped flagmen when construction operations encroach on traffic lanes, as required for regulation of traffic (See Section 1.02).

1.06 **FLARES AND LIGHTS**

A. Provide lights as required by Section 1.02.

1. To clearly delineate traffic lanes and to guide traffic as required in Section 1.02
2. For use by flagmen in directing traffic.

B. Provide illumination of critical traffic and parking areas as required in Section 1.02.

1.07 **CONSTRUCTION PARKING CONTROL**

A. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, Owner's operations, or construction operations.

B. Monitor parking of construction personnel's private vehicles.

1. Maintain free vehicular access to and through parking areas and driveways.
2. Prohibit parking on or adjacent to access roads, or in non-designated areas.

1.08 **CONSTRUCTION VEHICLES**

A. All slow moving construction vehicles shall have a slow moving sign visible from the rear of the vehicle.

B. All vehicles used for construction activities shall have audible back-up warning devices.

1.09 **ROAD CLOSURES**

A. No road shall be closed prior to receiving approval from the City Engineer.

B. At least seven days prior to a proposed road closure, the contractor shall submit to the City Engineer a complete traffic control plan. This plan shall include the following minimum information:

1. Sketch of work site and all area roads, streets and mark driveways.

2. Proposed detour route.
3. All necessary traffic control devices to be used.
4. Emergency contractor contact person name and phone to be available 24 hours a day.
5. Estimated times/dates of road closure.

C. The City Engineer shall have the authority to approve an emergency road closure.

PART 2 - PRODUCTS

- A. All traffic control devices shall meet or exceed FDOT certification standards.
- B. All traffic signs shall have high intensity face material.

PART 3 - EXECUTION

- A. Upon notification by the owner either verbally or in writing, the contractor shall correct any noted deficiencies within one hour.
- B. Inspection of all traffic control items shall be accomplished at least twice per day. One of these inspections shall be at the end of the work day or at night.

END OF SECTION

SECTION 01580

PROJECT IDENTIFICATION AND SIGNS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnish, install and maintain one project identification sign.
- B. Remove sign upon completion of construction.
- C. Allow no other signs to be displayed without approval of Engineer.

1.02 PROJECT IDENTIFICATION SIGN

One painted sign of size, design, lettering, and construction as shown on page three of this section.

- 1. Locate as directed by Engineer.
- 2. Color as indicated.

1.03 QUALITY ASSURANCE

- A. Sign Painter: Professional Experience in type of work required.
- B. Finishes, Painting: Adequate to resist weathering and fading for scheduled construction period.

PART 2 - PRODUCTS

2.01 SIGN MATERIALS

- A. Structure and Framing: May be new or used, wood or metal, in sound condition structurally adequate to work and suitable for specified finish.
- B. Sign Surfaces: Exterior softwood plywood with medium density overlay, standard large sizes to minimize joints.
- C. Rough Hardware: Galvanized
- D. Paint: Exterior quality.
 - 1. Use Bulletin colors for graphics.

2. Colors for structure, framing, sign surfaces and graphics: As indicated.

PART 3 - EXECUTION

3.01 PROJECT IDENTIFICATION SIGN

- A. Paint exposed surfaces of supports, framing and surface material; one coat of primer and one coat of exterior paint.
- B. Paint graphics in styles, sizes and colors selected.
 1. Lettering shall be as noted.
 2. City Logo shall be yellow and blue.
 3. Background shall be white.

3.02 SIGN LOCATION

Sign shall be located within the City right of way in an area approved by the Engineer.

3.03 MAINTENANCE

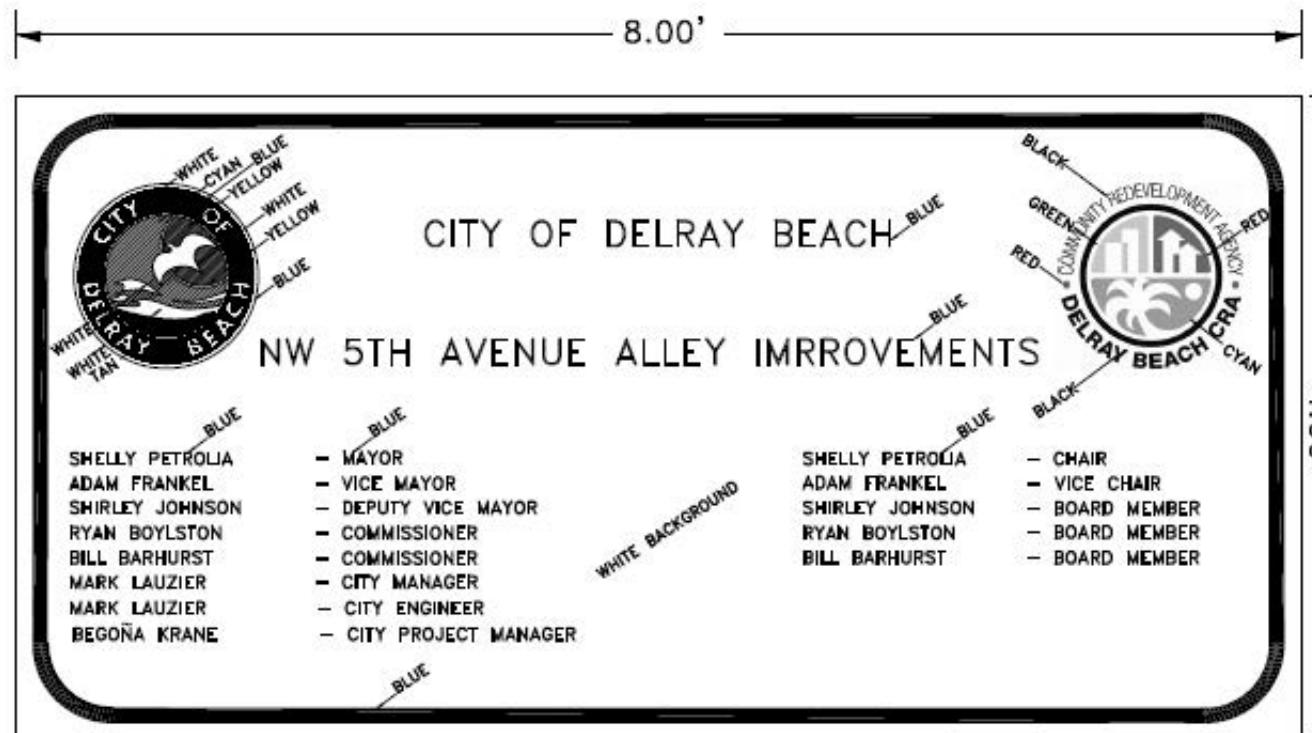
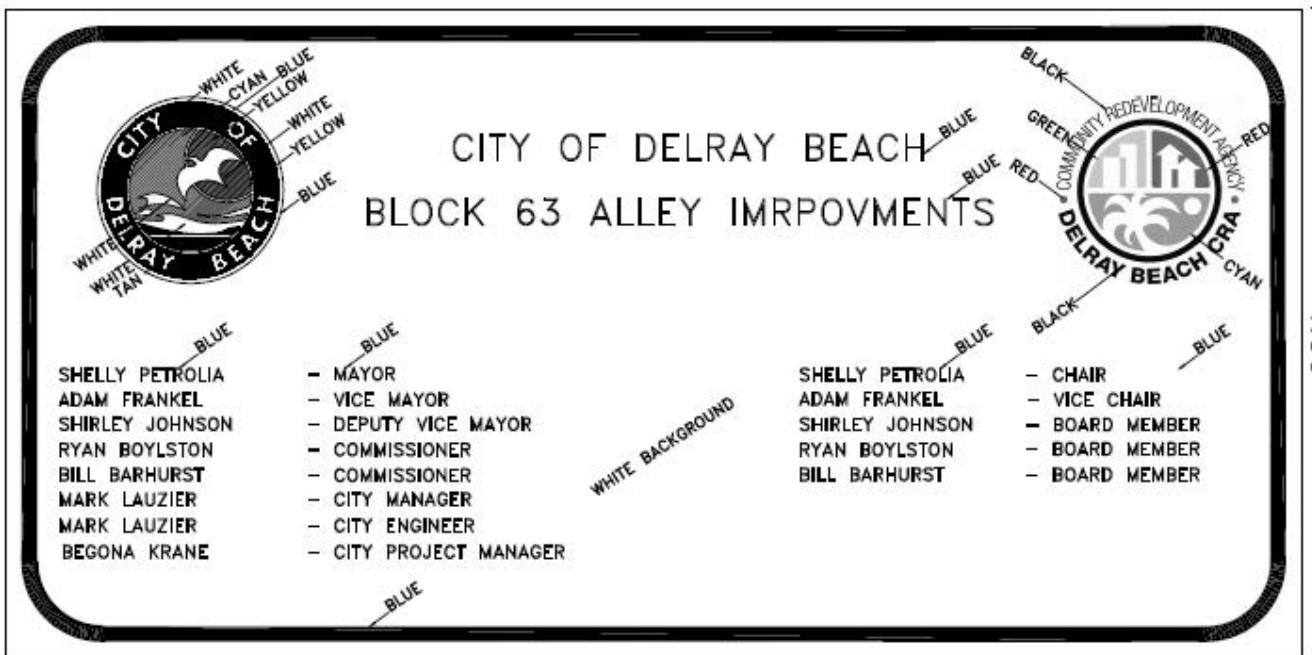
- A. Maintain sign and supports in a neat, clean condition; repair damages to structure, framing or sign.
- B. Relocate informational sign as required by progress of the work.

3.04 REMOVAL

- A. Remove sign, framing, supports and foundations at completion of project or at direction of Engineer.

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8.00'



END OF SECTION

01580-3

SECTION 01590

FIELD OFFICES AND SHEDS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Furnish, install and maintain temporary field offices during entire construction period.
- B. Furnish, install and maintain storage and work sheds needed for construction.
- C. At completion of work, remove field offices, sheds and contents.

1.02 RELATED REQUIREMENTS

- A. Section 01010: Summary of Work.
- B. Section 01500: Construction Facilities and Temporary Controls.

1.03 OTHER REQUIREMENTS

- A. Prior to installation of offices and sheds, consult with Engineer on location, access and related facilities.

1.04 REQUIREMENTS FOR FACILITIES

A. Construction:

- 1. Structurally sound, weathertight, with floors raised above ground.
- 2. Temperature transmission resistance: Compatible with occupancy and storage requirements.
- 3. At Contractor's option, portable or mobile buildings may be used.
 - a. Mobile homes, when used, shall be modified for office use.
 - b. Do not use mobile homes for living quarters.

B. Office for Engineer and Owner's Representative:

- 1. A separate space for sole use of designated occupants, with secure entrance doors and one key per occupant.
- 2. Area: 150 sq. ft. minimum, with minimum dimension eight feet.
- 3. Windows:
 - a. Minimum: Three, with a minimum total area of 10 percent of floor area.

- b. Operable sash and insect screens.
 - c. Locate to provide view of construction areas.
4. Furnishings:
 - a. One standard size desk with three drawers, one per occupant.
 - b. One drafting table: 39 in. X 72 in. and 36 in. high.
 - c. One metal, double-door storage cabinet.
 - d. One plan rack to hold a minimum of six racks of project drawings.
 - e. Standard four-drawer legal-size metal filing cabinet with locks and keys.
 - f. Six LF of bookshelves.
 - g. One swivel arm chair.
 - h. Two straight chairs.
 - i. One drafting table stool.
 - j. One waste basket per desk and table.
 - k. One tackboard, 36 in. X 30 in.
5. Services
 - a. Lighting: 50 foot-candles at desk top height.
 - b. Automatic heating and mechanical cooling equipment to maintain comfort conditions.
 - c. Minimum of four 110 volt duplex electric convenience outlets, at least one on each wall.
 - d. Electric distribution panel: Two circuits minimum, 110 volt, 60 hertz service.
 - e. Convenient access to drinking water and toilet facilities.
 - f. Telephone: One direct line instrument.

C. Storage Sheds:

1. To requirements of various trades.
2. Dimensions: Adequate for storage and handling of products.
3. Ventilation: Comply with specified and code requirements for products stored.
4. Heating: Adequate to maintain temperatures specified in respective sections for the products stored.

1.05 USE OF EXISTING FACILITIES

A. Existing facilities at the site shall not be used for field offices or for storage.

1.06 USE OF PERMANENT FACILITIES

A. Permanent facilities shall not be used for field offices or for storage.

PART 2 - PRODUCTS

2.01 **MATERIALS, EQUIPMENT, FURNISHINGS**

- A. May be new or used, but must be serviceable, adequate for required purpose, and must not violate applicable codes or regulations.

PART 3 - EXECUTION

3.01 **PREPARATION**

- A. Fill and grade sites for temporary structures to provide surface drainage.
 - 1. Dimensions: Adequate for storage and handling of products.

3.02 **INSTALLATION**

- A. Construct temporary field office and storage sheds on proper foundations, provide connections for utility services.
 - 1. Secure portable or mobile buildings when used.
 - 2. Provide steps and landings at entrance doors.
- B. Mount thermometer at convenient outside location, not in direct sunlight.

3.03 **MAINTENANCE AND CLEANING**

- A. Provide periodic maintenance and cleaning for temporary structures, furnishings, equipment and services.

3.04 **REMOVAL**

- A. Remove temporary field offices, contents and services at a time no longer needed.
- B. Remove storage sheds when no longer needed.
- C. Remove foundations and debris; grade site to required elevations and clean the areas.

END OF SECTION

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Products.
- B. Workmanship.
- C. Manufacturer's Instructions.
- D. Transportation and Handling.
- E. Storage and Protection
- F. Substitutions and Product Options.

1.02 RELATED REQUIREMENTS

- A. Section 01010: Summary of Work.
- B. Section 01020: Allowances.
- C. Section 01090: Reference Standards.
- D. Section 01340: Shop Drawings, Product Data and Samples.
- E. Section 01630: Substitutions and Product Options.
- F. Section 01700: Contract Closeout.

1.03 PRODUCTS

- A. Products include material, equipment, and systems.
- B. Comply with Specifications and referenced standards as minimum requirements.
- C. Components required to be supplied in quantity within a Specification section shall be the same, and shall be interchangeable.

1.04 **WORKMANSHIP**

- A. Comply with industry standards except when more restrictive tolerances of specified requirements indicate more rigid standards or more precise workmanship.
- B. Perform work by persons qualified to produce workmanship for specified quality.
- C. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1.05 **MANUFACTURER'S INSTRUCTIONS**

- A. When work is specified to comply with manufacturer's instructions, submit copies as specified in Section 01340, and distribute copies to persons involved, and maintain one set in field office.
- B. Perform work in accordance with details of instructions and specified requirements. Should a conflict exist between Specifications and instructions, consult with the Engineer.

1.06 **TRANSPORTATION AND HANDLING**

- A. Provide equipment and personnel necessary to handle products, including those provided by Owner, by methods to prevent soiling or damage to products or packaging.
- B. Provide additional protection during handling as necessary to prevent scraping, marring or otherwise damaging products or surrounding surfaces.
- C. Handle products by methods to prevent bending or overstressing.
- D. Lift heavy components only at designated lifting points.

1.07 **STORAGE AND PROTECTION**

- A. Store Products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive Products in weather-tight enclosures and maintain within temperature and humidity ranges required by manufacturer's instructions.
- B. For exterior storage of fabricated Products, place on supports above ground. Cover Products subject to deterioration with impervious sheet covering; and provide ventilation to avoid condensation.
- C. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter.

- D. Arrange storage to provide access for inspection. Periodically inspect to assure Products are undamaged, and are maintained under required conditions.
- E. After installation, provide coverings to protect Products from damage from traffic and construction operations. Remove when no longer needed.
- F. During such periods of time that are designated by the United States Weather Bureau as being a hurricane warning or alert, construction materials or equipment shall be secured against displacement by wind forces.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01630

SUBSTITUTIONS AND PRODUCT OPTIONS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

Furnish and install Products specified, under options and conditions for substitutions stated in this Section.

1.02 RELATED REQUIREMENTS

- A. Information for Bidders and General Conditions.
- B. Section 01020: Allowances.
- C. Section 01340: Shop Drawings.
- D. Section 01700: Contract Closeout.

1.03 PRODUCTS LIST

- A. Within 30 days after award of Contract, submit to Engineer five copies of complete list of major Products which are proposed for installation.
- B. Tabulate Products by specification section number and title.
- C. For products specified only by reference standards, list for each such Product:
 - 1. Name and address of manufacturer.
 - 2. Trade Name.
 - 3. Model or catalog designation.
 - 4. Manufacturer's data:
 - a. Reference standards.
 - b. Performance test data.

1.04 CONTRACTOR'S OPTIONS

- A. For Products specified only by reference standard, select product meeting that standard, by any manufacturer.
- B. For products specified by naming several products or manufacturers, select any one or those products and manufacturers names which complies with Specifications.

C. For products specified by naming only one or more products or manufacturers and stating "or equal", submit a request as for substitutions, for any product or manufacturer which is not specifically named.

1.05 **SUBSTITUTIONS**

A. Within a period of 30 days after award of Contract, Engineer will consider formal requests from the Contractor for substitution of products in place of those specified:

After the end of that period, the request will be considered only in case of product unavailability or other conditions beyond the control of the Contractor.

B. Submit a separate request for each substitution. Support each request with:

1. Complete data substantiating compliance of the proposed substitution with requirements stated in the Contract Documents:
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature; identify:
 - 1) Product description.
 - 2) Reference standards.
 - 3) Performance and test data.
 - c. Samples, as applicable.
 - d. Name and address of similar projects on which product has been used, and the date of each installation
2. Itemized comparison of the proposed substitution with product specified; List significant variations.
3. Data relating to changes in the construction schedule.
4. Any effect of the substitution on separate contracts.
5. List of changes required in other work or products.
6. Accurate cost data comparing proposed substitution with product specified.
7. Designation of required license fees or royalties.
8. Designation of availability of maintenance services, and sources of replacement materials.

C. Substitutions will not be considered for acceptance when:

1. They are indicated or implied on Shop Drawings or product data submittals without a formal request from Contractor.
2. They are requested directly by a subcontractor or supplier.
3. No Data relating to changes in construction schedule.
4. Any effect of substitution on separate contracts.
5. List of changes required in other work or products.
6. Accurate cost data comparing proposed substitution with product specified.
7. Designation of required license fees or royalties.
8. Designation of availability of maintenance services, sources of replacement materials.

9. Acceptance will require substantial revision of Contract Documents.
- D. Substitute products shall not be ordered or installed without written acceptance of Engineer.
- E. Engineer will determine the acceptability of proposed substitutions.

1.06 **CONTRACTOR'S REPRESENTATION**

- A. In making formal request for substitution Contractor represents that:
 1. He has investigated proposed product and has determined that it is equal to or superior in all respects to that specified.
 2. He will provide the same warranties or bonds for substitution as for product specified.
 3. He will coordinate installation of accepted substitution into the Work, and will make such changes as may be required for the Work to be complete in all respects.
 4. He waives claims for additional costs caused by substitution which may subsequently become apparent.
 5. Cost data is complete and includes related costs under his Contract, but not:
 - a. Costs under separate contracts.
 - b. Engineer's costs of redesign or revision of Contract Documents.

1.07 **ENGINEER DUTIES**

- A. Review Contractor's requests for substitutions with reasonable promptness.
- B. Notify Contractor, in writing, of decision to accept or reject requested substitution.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01650

STARTING OF MECHANICAL SYSTEMS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Provide material and labor required to perform start-up of each respective item of equipment and system. Start-up shall include: adjustment and balance procedures.
 - 1. Provide information and assistance required, cooperate with test, adjust and balance services.
- B. Comply strictly with specified procedures in starting up mechanical systems.
- C. Provide Factory Service Representative to check equipment and certify to its proper installation prior to start-up and during start-up and testing.

1.02 RELATED REQUIREMENTS

- A. Section 01041: Project Coordination.
- B. Each Specification Section as Applicable.

1.03 START-UP PROCEDURES

- A. Bearings:
 - 1. Inspect for cleanliness, clean and remove foreign materials.
 - 2. Verify alignment.
 - 3. Replace defective bearings, and those which run rough or noisy.
 - 4. Grease as necessary, and in accord with manufacturer's recommendations.
- B. Drives:
 - 1. Adjust tension in V-belt drives, and adjust varipitch sheaves and drives for proper equipment speed.
 - 2. Adjust drives for alignment of sheaves and V-belts.
 - 3. Clean, remove foreign materials before starting operation.
- C. Motors:
 - 1. Check each motor for amperage comparison to nameplate value.

2. Correct conditions which produce excessive current flow, and which exist due to equipment malfunction.

D. Pumps:

1. Check mechanical seals for cleanliness and adjustment before running pump.
2. Inspect shaft sleeves for scoring.
3. Inspect mechanical faces, chambers, and seal rings, replace if defective.
4. Verify that piping system is free of dirt and scale before circulating liquid through the pump.

E. Control Valves:

1. Inspect both hand and automatic control valves, clean bonnets and stems.
2. Tighten packing glands to assure no leakage, but permit valve stems to operate without galling.
3. Replace packing in valves to retain maximum adjustment after system is judged complete.
4. Replace packing on any valve which continues to leak.
5. Remove and repair bonnets which leak.
6. Coat packing gland threads and valve stems with a surface preparation of "Moly-Cote", "Fel-Pro", or equal after cleaning.
7. Verify that control valve seats are free from foreign material, and are properly positioned for intended service.

F. Tighten flanges after system has been placed in operation.

1. Replace flange gaskets which show any sign of leakage after tightening.

G. Inspect screwed joints for leadage.

1. Promptly remake each joint which appears to be faulty, do not wait for rust to form.
2. Clean threads on both parts, apply compound and remake joints.

H. After systems has been placed in operation, clean strainers, dirt pockets, orifices, valve seats and headers in fluid systems, to assure being free of foreign materials.

I. Open air vents, remove operation elements.

1. Clean thoroughly, replace internal parts and put back into operation.

K. Set and calibrate draft guages of air filters and other equipment.

L. Inspect fan wheels for clearance and balance.

1. Provide factory-authorized personnel for adjustment when needed.
- M. Check each electrical control circuit to assure that operation complies with specifications and requirements to provide desired performance.
- N. Inspect each pressure gauge and thermometer for calibration.
 1. Replace items which are defaced, broken, or which read incorrectly.
- O. Repair damaged insulation.
- P. Vent gases trapped in any part of systems.
 1. Verify that liquids are drained from all parts of gas or air systems.
- Q. Check piping for leaks at every joint, and at every screwed, flanged, or welded connection, using "Leak-Tek" or other approved compound.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01672

TESTING PIPING SYSTEMS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Perform specified services with Contractor's qualified personnel, or employ and pay for a qualified organization to perform specified services.
- B. Domestic and Small Diameter Systems Test.
- C. Interior Drainage Systems.
- D. Underground Sewer Systems.
- E. Exterior and Interior Process Piping Systems.
- F. Gas and Air Piping Systems.

1.02 RELATED REQUIREMENTS

- A. Section 01200: Project Meetings
- B. Section 02675: Disinfection of Potable Water Lines.
- C. Section 01700: Contract Closeout.

1.03 DESCRIPTION

- A. Perform testing of piping systems as specified below.
- B. Provide instruments required for testing of piping systems.
 - 1. Make instruments available to Engineer to facilitate spot checks during testing.
 - 2. Retain possession of instruments, remove from site at completion of services.
- C. Provide all water required for flushing and testing.
- D. Provide all necessary pumping equipment and other equipment, materials and facilities required for proper completion of the flushing and testing specified.

- E. Source and quality of water, procedure and test equipment shall be acceptable to the Engineer.
- F. All tests shall be made in the presence of the Engineer. Notify Engineer at least 48 hours before any Work is to be inspected or tested.
- G. If inspection or test shows defects, the piping system(s) shall be repaired or replaced and inspection repeated, until such piping is acceptable to the Engineer.
- H. All pipe, fittings, valves and joints shall be carefully examined during test. Leaky joints shall be tightened by remaking the joint. Repair of lead joints with a caulking tool using wicking, or tinfoil will not be accepted.
- I. Sections of the system may be tested separately, but when so tested it shall be distinctly understood that any defect which may subsequently develop in a section already tested and accepted shall promptly be corrected and that section retested.
- J. Disposal of the water used for testing shall be subject to the approval of the Engineer.

1.04 QUALITY ASSURANCE

- A. The organization which performs the testing shall, prior to testing, provide their qualifications and demonstrate their ability to perform the services to the satisfaction of the Engineer.

1.05 SUBMITTALS

- A. Preliminary:
 1. Submit three copies of documentation to confirm compliance with Quality Assurance provisions:
 - a. Organization supervisor and personnel training and qualifications.
 - b. Specimen copy of each of the report forms proposed for use.
- B. At least fifteen days prior to Contractor's request for final inspection, submit three copies of final reports on applicable reporting forms, for review.
 1. Each individual final reporting form must bear the signature of the person who recorded data and that of the supervisor of the reporting organization.
 2. Identify instruments of all types which were used, and last date of calibration of each.

1.06 JOB CONDITIONS

A. Prior to start of testing of piping systems, verify that required "Job Conditions" are met:

1. System or system element installation is complete.
2. All required materials, water, instruments, etc. are on hand.
3. All other preparations are completed.

1.07 TESTING PROCEDURES

A. Domestic and Small Diameter Process Systems Test:

1. Domestic Water and process system four inches and under in size, including hot and cold water systems, water supply lines, chemical handling and process systems, shall all be tested and approval obtained prior to painting, placing of any backfill, installation of insulating covering, or concealment within the building construction.
2. All such piping systems shall be tested at a pressure of 100 psi unless written approval for a lesser test pressure is obtained from the Engineer.

B. Interior Drainage System:

1. The entire drainage system inside teh buildings, including underground sanitary and storm sewer and soil waste, vent and downspout piping shall be tested with air or water.
2. Teh tests shall be applied to the drainage system in sections as directed by the Engineer.
3. No section shall be tested with less than a 10 foot head of water or five pounds per square inch of air pressure and all underground storm sewer and downspout piping shall be tested with a pressure equal to at least 10 feet above the highest roof drain.
4. In general, one of the following tests will be required, as the plumbing on each floor is completed.
 - a. Water Test:
 - (1) Each section shall be tightly plugged except the highest opening of the section under test. The Contractor shall set up a temporary standpipe on the highest opening not less than 10 feet high above the opening and fill the test section with water.
 - (2) In testing successive sections, at least the upper 10 feet of the next preceding section shall be retested, so that no joint or pipe in the building shall have been subjected to a test of less than a head of 10 feet of water.
 - (3) The water pressure shall remain constant for not less than two hours without the addition of water.

(4) When vertical stacks above the ground floor, together with their branch waste and vent pipes, are tested separately, a plug shall be inserted in the cleanout at the base of the vertical stack being tested in lieu of filling entire system in the building with water.

b. Air Test:

(1) The air test shall be made by attaching an air compressor or test apparatus to any suitable opening, and closing all other inlets and outlets to the system, then forcing air into the system until there is a uniform pressure sufficient to balance a column of mercury 10 inches in height, or five pounds per square inch, whichever is greater, on the entire system. This pressure shall be maintained constant for 30 minutes.

(2) Water tests are preferred, and shall be made, unless prohibited by freezing weather. In all cases, prior approval of the Engineer shall be obtained before substituting air tests for water tests.

C. Underground Sewer System:

1. After backfill has been placed, the Engineer shall visually inspect, by lamping, all gravity flow lines to check alignment and grade. All obstructions shall be removed. Any sewer showing less than a full circle of light when a lamp is viewed between adjacent manholes shall be considered unsatisfactory and shall be repaired by the Contractor without additional compensation.
2. All force mains shall be tested before the joints are covered by applying a hydrostatic pressure of 100 psi for a duration of two hours or as directed by the Engineer.
3. All underground sewer system piping for gravity flow shall be tested according to one of the following leakage test methods as approved by the Engineer. When leakage occurs in excess of the specified limits, defective pipe or joints shall be located and repaired at the expense of the Contractor. If defective portions cannot be located, the Contractor, at his own expense, shall remove and reconstruct as much of the original work as necessary to obtain a sewer testing within the allowable leakage limits.

a. Infiltration Tests:

(1) When the ground water level is above the level of the top of the sewer, a test shall be made for infiltration. The infiltration test will be made by sealing off a length of sewer and measuring the amount of infiltration by the depth of flow over a measuring weir, or by pumping the infiltrated water into barrels, or other suitable containers.

(2) Tests shall be conducted for a minimum of four hours. Infiltration leakage shall not exceed 50 gallons per 24

hours, per inch diameter, per mile of sewer (0.038 gallons/day/inch/foot).

b. Exfiltration Tests:

- (1) When the ground water table is below the top of the pipe, the sewer shall be tested for leakage by exfiltration. Exfiltration leakage test shall consist of plugging off the particular section of the sewer pipe between two manholes, filling the section with water to the rim in the upper manhole and allowing it to stand not less than four hours.
- (2) The section shall then be refilled with water up to the original point and after two additional hours the drop in the water surface shall be measured. With this measurement over the two hour period and based on the diameter of the manhole, the Engineer will compute the leakage, which in no case shall exceed 50 gallons per inch diameter, per 24 hours, per mile of pipe for exfiltration (0.076 gal./day/inch/foot).

c. Air Testing:

- (1) After backfilling the Contractor shall conduct a pressure test using low pressure air. The contractor shall furnish all labor, tools and equipment for air testing. The section of sewer to be tested shall be isolate with pneumatic plugs that have a sealing length greater than the diameter of the pipe and are capable of resisting test pressures without external bracing or blocking.
- (2) The sewer shall be pressurized to four psi gauge greater than the average back pressure of any ground water over the pipe. This pressure shall be maintained until the temperature of the pipe and the air have equalized, but not less than two minutes. After the temperature has stabilized, the air supply shall be disconnected and the pressure allowed to drop. The time in minutes required for the pressure to drip from 3.5 psig to 2.5 psig shall not be less than t as computed as follows: $t = 0.47d$, where d is the pipe diameter in inches.

D. Exterior and Interior Process Piping Systems:

1. Exterior and interior process piping shall pass a hydrostatic pressure test and a leakage test as defined below before acceptance. The pressure and leakage test shall be made after all jointing operations are completed and after backfilling is completed. All concrete reaction blocks, or other bracing and restraining facilities, shall be in place at least 14 days before the initial filling of the line.
2. The pressure and leakage tests may be applied to an individual section of line isolated between the existing line valves, or may be applied to shorter

sections of line at the Contractor's option. If shorter sections are tested, test plugs or bulkheads as required at the ends of the test section shall be furnished and installed by the Contractor at his expense, together with all anchors, braces, and other devices required to withstand the hydrostatic pressure on such plug or plugs, without imposing any hydraulic thrust on the pipe line or any part thereof. The Contractor shall be solely responsible for any and all damage to the pipe line, and/or to any other facility, which may result from the failure of test plugs furnished by him or supports therefor, in any case.

3. Tests:

a. Hydrostatic Tests.

(1) The section of line to be tested shall be slowly filled with water and all air expelled from the pipe. Care shall be taken that all air valves are installed and open in the section being filled, and that the rate of filling does not exceed the venting capacity of the air valves.

(2) Hydrostatic test pressure shall be as follows:

Pressure Test System	Rating
Effluent Piping	20 psi
Potable Water	100 psi
Miscellaneous Pressure Pipe	100 psi
Other Process Piping	20 psi

(3) After the section of the line to be tested has been filled with water, the specified test pressure shall be applied and maintained for a period of not less than two hours for whatever longer period as may be necessary for the Engineer to complete the inspection of the line under test and to locate any and all defective joints and pipe line materials. If the repairs are needed, such repairs shall be made, the line refilled, and the test pressure applied as before; this operation shall be repeated until the line and all parts of it withstand the test pressure in a satisfactory manner.

b. Leakage Test for Slip Type Joint.

(1) After the specified pressure test has been completed, the line being tested shall be subjected to a leakage test under a hydrostatic pressure selected by the Contractor in the range of 50 percent to 100 percent of the pressure specified for the pressure test. Regardless of the leakage test pressure used, such pressure shall be maintained constant (within a maximum variation of plus or minus five percent) during the entire time that line leakage measurements are being made, so that the allowable leakage rate may be determined accurately from the leakage rate formula.

(2) Leakage measurements shall not be started until a constant test pressure has been established. Compression of air trapped in unvented pipes or fittings will give false leakage readings under changing pressure conditions. After the test pressure has been established and stabilized, the line leakage shall be measured by means of a water meter installed on the line side of the force pump.

(3) Line leakage is defined as the total amount of water introduced into the line as measured by the meter during the leakage test. The pipe line, or tested section thereof, will not be accepted if and while it has a leakage rate in excess of that rate determined by the following formula:

$$L = 0.00025 NDp, \text{ in which:}$$

L = Maximum permissible leakage rate, in gallons per hour, throughout the entire length of line being tested.

N = Number of gasketed joints (two for each flexible coupling joint) in the line under test.

D = Nominal internal diameter (in inches) of the pipe in the line.

p = The square root of the actual pressure in psig on all joints in the tested portion of the line (not necessarily the authorized test pressure). This actual pressure shall be determined by finding the difference between the average elevation of all tested pipe joints and the elevation of the pressure plane represented by the specified or authorized leakage test pressure, and then converting this difference, in feet of head, to pounds per square inch hydrostatic pressure.

The average actual pressure may be assumed to be equal to the leakage test pressure where the maximum difference in elevations of the pipe joints under test does not exceed 20 feet.

(4) There shall be no leakage allowed in threaded, flanged, mechanical joint or welded pipeline construction whether buried or exposed. The field welded pipe joints shall be inspected for pinholes and tested by means of soap suds and vacuum look box or other methods acceptable to the Engineer. Pinholes and leaks shall not be repaired by peening. The defective portion of weld shall be cut out and rewelded. All testing and repairs shall meet the approval of the Engineer at all times.

(5) Where the leakage test shows a leakage rate in excess of the permissible maximum, the Contractor shall make all necessary surveys in connection with the location and repair of leaking joints to the extent required to reduce the total leakage to the prescribed amount.

(6) All joints in piping shall be watertight and free from visible leaks during the prescribed tests. Each and every leak which may be discovered at any time prior to the expiration of one year from and after the date of final acceptance of the work by the Owner shall be located and repaired by and at the expense of the Contractor, regardless of any amount that the total line leakage rate during the specified leakage test may be below the specified maximum rate.

E. Gas and Air Piping Systems: Gas and air piping systems shall be tested with air at a pressure of 20 psig. The test pressure shall be maintained for a period of not less than two hours and for whatever longer period as may be necessary for the Engineer to complete the inspection of the line under test and to locate; any and all defective joints and pipe line materials.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.01 GENERAL

A. Prior to testing, flush all piping systems with water to remove all debris in the system.

B. For testing refer to the Testing Procedures above.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Substantial Completion
- B. Final inspection after completion
- C. Final cleaning
- D. Contractor's closeout submittals
- E. Final adjustment of accounts

1.02 SUBSTANTIAL COMPLETION

- A. When CONTRACTOR considers work has reached substantial completion, he shall submit to the ENGINEER the following:
 - 1. Written notice that the work is substantially complete in accordance with Contract Documents.
 - 2. A list of items yet to be completed or corrected and explanations thereof.
- B. Within a reasonable time upon receipt of such notice, the ENGINEER will make an inspection, if necessary, to determine the status of completion.
- C. Should the ENGINEER determine that the work is not substantially complete:
 - 1. The ENGINEER will promptly notify the CONTRACTOR in writing, giving the reasons thereof.
 - 2. CONTRACTOR shall remedy the deficiencies in the work and send a second written notice of Substantial Completion to the ENGINEER.
 - 3. Upon receipt of the second notice, the ENGINEER will reinspect the Work.
- D. When the ENGINEER finds that the Work is substantially complete he will issue a Certificate of Substantial Completion with a tentative list of items to be completed or corrected before final inspection.

1.03 FINAL INSPECTION AFTER COMPLETION

- A. When CONTRACTOR considers the Work is complete with all minor deficiencies completed or corrected, he shall submit written certification that:
 - 1. Contract Document requirements have been met.
 - 2. Work has been inspected for compliance with Contract Documents.
 - 3. Work has been completed in accordance with Contract Documents.
 - 4. All minor deficiencies have been corrected or completed and the Work is ready for final inspection.
 - 5. Project record documents are complete and submitted.
- B. Within a reasonable time upon receipt of such certification, the ENGINEER will make an inspection to verify the status of completion.
- C. Should the ENGINEER determine that the work is incomplete or defective:
 - 1. The ENGINEER will promptly notify the CONTRACTOR in writing, listing the incomplete or defective work.
 - 2. CONTRACTOR shall remedy the deficiencies in the work and send a second written certification to the ENGINEER that the Work is complete.
 - 3. Upon receipt of the second certification, the ENGINEER will reinspect the Work.
- D. When the ENGINEER determines that the work is acceptable, under the Contract Documents, he shall request the CONTRACTOR to make closeout submittals.

1.04 FINAL CLEANING

- A. Execute prior to final inspection.
- B. Clean site; sweep paved areas, rake clean other surfaces.
- C. Remove waste and surplus materials, rubbish, and construction facilities from the Project and from the site.

1.05 CONTRACTOR'S CLOSEOUT SUBMITTALS

- A. Project Record Documents
 - 1. At Contract closeout, submit documents with transmittal letter containing date, Project title, CONTRACTOR'S name and address, list of documents, and signature of CONTRACTOR.
 - 2. Drawings; Legibly marked to record actual construction:

- a. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - b. Drawings shall be signed and sealed by a surveyor registered in the State of Florida.
3. Specifications and Addenda; Legibly mark each Section to record.
4. Changes made by Field Order or by Change Order.

B. Evidence of payment and Release of Liens.

1.06 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit a final statement of accounting to the Engineer.
- B. Statement shall reflect all adjustments to the Contract Sum.
 1. The original Contract sum.
 2. Additions and deductions resulting from:
 - a. Previous change orders or written amendment.
 - b. Allowances
 - c. Unit prices
 - d. Deductions for uncorrected work.
 - e. Penalties and bonuses
 - f. Deductions for liquidated damages
 - g. Other adjustments
 3. Total Contract Sum as adjusted
 4. Previous payments
 5. Sum remaining due

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Maintain at the site of the OWNER a record copy of:
 - 1. Drawings
 - 2. Specifications
 - 3. Addenda
 - 4. Change Orders and other modifications to the Contract.
 - 5. Approved Shop Drawings, Product Data and Samples.
 - 6. Field Test Records.

1.02 RELATED REQUIREMENTS

- A. All applicable sections of the Specifications.
- B. Conditions of the Contract.

1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Store documents and samples in CONTRACTOR's field office apart from documents used for construction.
 - 1. Provide files and racks for storage of documents.
 - 2. Provide locked cabinet or secure storage space for storage of samples.
- B. File documents and samples in accordance with CSI format.
- C. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
- D. Make documents and samples available at all times for inspection by OWNER's Representative.

1.04 **MARKING DEVICES**

Provide felt tip marking pens for recording information in the color code designated by OWNER's Representative.

1.05 **RECORDING**

- A. Label each document, "PROJECT RECORD" in neat large printed letters, or by rubber stamp.
- B. Record information concurrently with construction progress. Do not conceal any work until required information is recorded.
- C. Drawings: Legibly mark to record actual construction (hard copy):
 1. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 2. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structures.
 3. Field changes of dimension and detail.
 4. Changes made by Field Order or by Change Order.
 5. Details not on original Contract Drawings.
- D. Specifications and Addenda; legibly mark each Section to record:
 1. Manufacturer, trade name, catalog number, and supplier of each produce and item of equipment actually installed.
 2. Changes made by Field Order or by Change Order.

1.06 AS-BUILT PLANS (RECORD DRAWINGS)

- A. The CONTRACTOR shall maintain full size (24"x36") field drawings to reflect the "as-built" items of work as the work progresses. Upon completion of the work, the CONTRACTOR shall prepare a record set of "as-built" drawings on full-size, reproducible material and an electronic file in ACAD 2000 Format or Latest Version. One set of full size design drawings on reproducible material will be furnished to the CONTRACTOR by the design ENGINEER at the current square foot price. An electronic file of the design drawings on a compact disk will be furnished to the CONTRACTOR by the design ENGINEER at no additional cost. No additional payment will be made for those "as-built" drawings.
- B. The cost of maintaining record changes, and preparation of the Record Drawings shall be included in the unit prices bid for the affected items. Upon completion of the work the CONTRACTOR shall furnish the ENGINEER the reproducible "as-built" Drawings and the electronic files. The completed Record drawings shall be delivered to the Engineer at least 48 hours prior to final inspection of the work. **The Final inspection will not be conducted unless the Record Drawings are in the possession of the ENGINEER.**
- C. The completed (or final) record drawings shall be certified by a Professional Land surveyor registered in the State of Florida. This certification shall consist of the surveyor's embossed seal bearing his registration number, the surveyor's signature and date on each sheet of the drawing set. In addition, the key sheet, cover sheet or first sheet of the plans set shall list the business address and telephone number of the surveyor.
- D. Representative items of work that should be shown on the record drawings as verified, changed or added are shown below:
 1. Plans:
 - a. Structure types, location with grade of rim and flow-line elevations.
 - b. Sewer type, length, size and elevations.
 - c. Utility type, length, size and elevation in conflict structures.
 - d. All maintenance access structures, valves and hydrants within right-of way.
 - e. Spot (critical) elevations at plateaued intersections, P.C., P.T., midpoint of all intersections.
 - f. Sewer laterals shall be stationed between maintenance access structures.

2. Pavement Marking and Signing Plans: Sign location where installed if different from plans.
3. Water and Sewer Plans: Location (horizontal and vertical) of all pipe lines, structures, fittings, valves and appurtenances and water /sanitary sewer pipe crossings.

E. The CONTRACTOR shall submit three sets of progress record drawings with each application for payment. These drawings shall accurately depict the work completed and for which payment is being requested.

F. As-built drawings shall include the following criteria at a minimum.

1. As-builts of water lines shall include the following information:
 - a. Top of pipe elevations and horizontal location every 100 lf.
 - b. Locations and elevations of all fittings including bends, tees, gate valves, double detector check valves, fire hydrant, etc.
 - c. All tie-ins to existing lines shall be as-built.
 - d. The ends of all water services at the buildings or homes shall be as-built or where the water service terminates.
2. As-builts of all gravity sanitary sewer lines include the following information:
 - a. Rims, invert and length of piping between structures as well as slopes.
 - b. The stub ends of all sewer laterals shall be located and if there are any cleanouts installed on the sewer laterals then the invert elevation of these cleanouts need to be obtained.
 - c. Lift station as-builts shall consist of top of wet well elevation, invert elevation of the incoming line, bottom of the wet well and as-builts of the compound area.
3. Force main as-builts shall be prepared the same as the water line as-builts.
4. As-builts of all drainage lines shall include the following information:
 - a. Rims, invert and length of piping between structures and weir elevations if applicable.

- b. The size of the piping shall be verified by the survey crew at the time of as-built.
5. All rock as-builts for parking lot, roadways and swales areas shall consist of the following:
 - a. Rock elevations at all high and low points, and at enough intermediate point's to confirm slope consistency and every 50' for roadways.
 - b. Rock as-builts shall be taken at all locations where there is a finish grade elevation shown on the design plans.
 - c. All catch basin and manhole rim elevations shall be shown.
 - d. Elevations around island areas will also be required.
 - e. As-builts shall be taken on all paved and unpaved swales prior to placement of asphalt and/or topsoil/sod, at enough intermediate points to confirm slope consistency and conformance to the plan details.
6. Lake and canal bank as-builts shall include a key sheet of the lake for the location of cross sections. Lake and canal bank cross sections shall be plotted at a minimum of every 100 lf, unless otherwise specified. As builts shall consist of the location and elevation of the top of bank, edge of water and the deep cut line, with the distance between each shown on the drawing.
7. Retention area as-built elevations shall be taken at the bottom of the retention area and at the top of bank. If there are contours indicated on the design plans, then they shall be as-built as well
8. If a change is made via field order or deviation to any structure, pipeline, etc., a new location shall be noted on the as-builts. The ENGINEER may request additional as-built information to verify horizontal or vertical locations.

1.07 **SUBMITTAL**

- A. At Contract closeout, deliver Record Documents to OWNER's Representative, or presentation to the OWNER.
- B. A complete set of "As-Built" Drawings shall be prepared and delivered to the OWNER's Representative for the OWNER. Work shall be performed by a Registered Professional Land Surveyor and shall include, but not be limited to the following:
 - 1. Valve boxes, splice boxes, pull boxes, all underground utilities-waterlines, electrical runs, irrigation system, storm drainage pipe and structures, finished necessary grades, benches, curbs, fences walls signs, light fixtures and other items as necessary.
- C. Accompany submittal with transmittal letter in duplicate, containing:
 - 1. Date.
 - 2. Project title and number.
 - 3. CONTRACTOR's name and address.
 - 4. Title and number of each Record Document.
 - 5. Signature of CONTRACTOR or his authorized representative.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION

SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Maintain at the site of the OWNER a record copy of:
 - 1. Drawings
 - 2. Specifications
 - 3. Addenda
 - 4. Change Orders and other modifications to the Contract.
 - 5. Approved Shop Drawings, Product Data and Samples.
 - 6. Field Test Records.

1.02 RELATED REQUIREMENTS

- A. All applicable sections of the Specifications.
- B. Conditions of the Contract.

1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Store documents and samples in CONTRACTOR's field office apart from documents used for construction.
 - 1. Provide files and racks for storage of documents.
 - 2. Provide locked cabinet or secure storage space for storage of samples.
- B. File documents and samples in accordance with DSI format
- C. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
- D. Make documents and samples available at all times for inspection by OWNER's Representative.

1.04 MARKING DEVICES

Provide felt tip marking pens for recording information in the color code designated by OWNER's Representative.

10.5 RECORDING

- A. Label each document, "PROJECT RECORD" in neat large printed letters, or by rubber stamp.
- B. Record information concurrently with construction progress. Do not conceal any work until required information is recorded.
- C. Drawings: Legibly mark to record actual construction (hard copy and ACAD 2000 Format):
 1. Horizontal and vertical locations of underground utilities and appurtenances

Record information concurrently with construction progress. Do not conceal any work until required information is recorded.

- C.
 1. Size: 8-1/2 inches X 11 inches.
 2. Paper: Manufacturer's printed data, or neatly typewritten.
 3. Drawings:
 - a. Provide reinforced punched binder tab, bind in with text.
 - b. Fold larger drawings to size of text pages.
 4. Provide fly-leaf for each separate product, or each piece of operating equipment.
 - a. Provide typed description of product, and major component parts of equipment.
 - b. Provide indexed tabs.
 5. Cover - Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS." List:
 - a. Title and Project.
 - b. Identity of separate structure as applicable.
 - c. Identity of general subject matter covered in the manual.

D. Binders:

1. Commercial quality three-ring binders with durable and cleanable plastic covers.
2. Maximum ring size: Three inch.
3. When multiple binders are used, correlate the data into related consistent groupings.

1.05 CONTENT OF MANUAL

- A. Neatly typewritten table of contents for each volume, arranged in systematic order.
 - 1. A list of each product required to be included, indexed to content of the volume.
 - 2. List, with each product, name, address and telephone number of:
 - a. Maintenance contractor, as appropriate.
 - b. Local source of supply for parts and replacement.
 - 3. Identify each product by product name and other identifying symbols as set forth in Contract Documents.
- B. Product Data:
 - 1. Include only those sheets which are pertinent to the specific product.
 - 2. Annotate each sheet to:
 - a. Clearly identify specific product or part installed.
 - b. Clearly identify data applicable to installation.
 - c. Delete references to inapplicable information.
- C. Drawings
 - 1. Supplement product data with drawings as necessary to clearly illustrate:
 - a. Relations of component parts of equipment and systems.
 - b. Control of flow diagrams.
- D. Written text, as required to supplement product data for the particular installation:
 - 1. Organize in consistent format under separate headings for different procedures.
 - 2. Provide logical sequence of instruction for each procedure.
- E. Copy of each warranty, bond and service contract issued.
 - 1. Provide information sheet for Owner's personnel:
 - a. Proper procedures in event of failure.
 - c. Instances which might affect validity of warranties or bonds.

1.06 MANUAL FOR MATERIALS AND FINISHES

Not used.

1.07 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit ten copies of complete manual in final form.

B. Content, for each unit of equipment and system, as appropriate:

1. Description of unit and component parts.
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
2. Operating procedures.
 - a. Start-up, break-in, routine and normal operating instructions.
 - b. Regulation, control, stopping, shut-down and emergency instructions.
 - c. Summer and winter operating instructions.
 - d. Special operating instructions.
3. Maintenance Procedures:
 - a. Routine operations.
 - b. Guide to "Trouble-shooting.
 - c. Disassembly, repair and reassembly.
 - d. Alignment, adjusting and checking.
4. Servicing and lubricants required.
 - a. List of lubricants required.
5. Manufacturer's printed operating and maintenance instructions.
6. Description of sequence of operation by control manufacturer.
7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
 - a. Predicted life of parts subject to wear.
 - b. Items recommended to be stocked as parts.
8. As-installed control diagrams by controls manufacturer.

C. Content, for each electric and electronic system, as appropriate:

1. Description of system and component parts.
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
2. Circuit directories of panelboards.
 - a. Electrical service.
 - b. Controls.
 - c. Communications.
3. As-installed color coded wiring diagrams.
4. Operating procedures:
 - a. Routine and normal operating instructions.
 - b. Sequences required.

- c. Special operating instructions.
 - 5. Maintenance procedures:
 - a. Routing operations.
 - b. Guide to trouble shooting.
 - c. Disassembly, repair and reassembly.
 - d. Adjustment and checking.
 - 6. Manufacturer's printed operating and maintenance instructions.
 - 7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
 - 8. Other data as required under pertinent Sections of Specifications.
- D. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.
- E. Additional requirements for operating and maintenance data: Respective Sections of Specifications.
- F. Provide complete information for products specified in:
 - 1. Section 02441: Underground Sprinkler System.
 - 2. Section 02598: Pond and Reservoir Liners.
 - 3. Section 05500: Metal Fabrications.
 - 4. Section 08120: Aluminum Doors and Frames.
 - 5. Section 08331: Overhead Coiling Doors.
 - 6. Section 08521: Aluminum Projected Windows.
 - 7. Section 10525: Fire and Safety Equipment.
 - 8. Section 11010: Maintenance Equipment.
 - 9. Section 11201: Stop Gates.
 - 10. Section 11214: Vertical Turbine Pumps.
 - 11. Section 11225: Hydropneumatic System.
 - 12. Section 11234: Chlorination Equipment.
 - 13. Section 11302: Sewage Ejectors.
 - 14. Section 11303: Package Pump Stations.
 - 15. Section 11314: Vortex Type Pumps.
 - 16. Section 11316: Plunger Pumps.
 - 17. Section 11315: Progressive Cavity Pumps.
 - 18. Section 11320: Grit Removal Equipment.
 - 19. Section 11331: Bar Screen.
 - 20. Section 11361: Clarifier Equipment.
 - 21. Section 11365: Lateral Flow Thickener.
 - 22. Section 11373: Aeration Blowers.
 - 23. Section 11374: Aeration Equipment.
 - 24. Section 11400: Kitchen Equipment.
 - 25. Section 11600: Laboratory Equipment and Supplies.

26. Section 12347: Laboratory Casework and Accessories.
27. Section 13620: Monitoring Systems.
28. Section 13980: Solar Heating Systems.
29. Section 14300: Electric Hoists and Trolleys.
30. Section 14310: Hand Operated Hoists.
31. Section 15100: Valves, Cocks and Appurtenances.
32. Section 15139: Seal Water Units.
33. Section 15150: Compressors.
34. Section 15661: Air Cooled Condensing Units.
35. Section 15699: Refrigeration Specialties.
36. Section 15750: Coils.
37. Section 15763: Air Handling Units with Coils.
38. Section 15764: Terminal Units.
39. Section 15820: Air Distribution Equipment.
40. Section 15880: Air Treatment Equipment.
41. Section 15900: Controls and Instrumentation.
42. Section 16142: Incandescent Dimmers.
43. Section 16150: Motors and Motor Controls.
44. Section 16160: Panel Boards.
45. Section 16172: Dry Type Transformers.
46. Section 16205: Package Engine Generator Set.
47. Section 16741: Telephone System.
48. Section 16900: Instrumentation System.
49. Section 16913: Mechanical Equipment Controls.
50. Section 16920: Motor Control Centers.
51. Section 16921: Miscellaneous Mechanical Equipment.
52. Other items as may be individually specified within the sections.

1.08 SUBMITTAL SCHEDULE

- A. Submit specified number of copies of approved data in final form prior to 50 percent completion of project.
- B. Changes and Corrections to approved data due to construction adjustments shall be submitted prior to substantial completion of the project.

1.09 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to final inspection or acceptance, provide Factory Representative to fully instruct Owner's designated operating and maintenance personnel in operation, adjustment and maintenance of products, equipment and systems.
- B. Operating and Maintenance Manual shall constitute the basis of instruction.
 1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 02010

SUBSURFACE INVESTIGATION

PART 1 - GENERAL

1.01 RESPONSIBILITY

A. Subsurface explorations have been made and copies of the results are included herein for reference. This information was obtained primarily for use in preparing the pavement base and subgrade design, the Contractor may draw his own conclusions therefrom. No responsibility is assumed by the Owner for subsoil quality or condition other than at the locations, and at the time the exploration was made. No claim for extra compensation or for extension of time will be allowed on account of subsurface conditions inconsistent with the data shown, except as may be provided elsewhere herein.

PART 2 - PRODUCTS

2.01 SOIL BORINGS

A. Copies of the following are included herein:

1. Soil boring data.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 02110

CLEARING AND GRUBBING

PART 1 - GENERAL

1.01 SCOPE

The work to be performed under this item shall consist of either the clearing of or the clearing and grubbing of the area along the alignment of construction as designated on the drawings.

- A. Clearing - Where clearing only is required it shall consist of the cutting and removal of all trees, stumps, bush, logs, hedges, and the removal of all fences and other loose or projecting material from the designated area. The grubbing of stumps and roots will be required.
- B. Clearing and Grubbing - Clearing and grubbing shall consist of clearing the surface of the ground of the designated areas of all trees, stumps, down timber, logs, snags, brush, undergrowth, hedges, heavy growth of grass or weeds, fences, structures, debris, and rubbish of any nature, natural obstructions or such material which, in the opinion of ENGINEER, is unsuitable, including grubbing of stumps, roots, matter roots, foundations ad disposal from the project of all spoil materials resulting from clearing and grubbing by burning or otherwise.

1.02 REFERENCES

Florida Department of Transportation Standard Specifications for Road and Bridge construction (F.D.O.T.). latest edition.

PART 2 - MATERIALS

2.01 MATERIALS FOR REPLACEMENT

All materials required to be brought on to the site for filling of holes caused by grubbing or otherwise shall be consistent with materials of the surrounding area.

PART 3 - EXECUTION

3.01 SCHEDULE

CONTRACTOR shall schedule the clearing or clearing and grubbing work at a satisfactory distance in advance of the pipe laying operations.

3.02 SPOIL MATERIALS REMOVAL

All materials to be disposed of by removal from the site shall be disposed of by CONTRACTOR at the Contractor's expense. In no case shall any discarded materials be left in piles adjacent to or within the project limits. The manner and location of disposal of materials shall be subject to review by ENGINEER and shall not create an unsightly or objectionable view.

3.03 CLEARING

Clear the area of all objectionable materials. Trees unavoidably falling outside the specified limits must be cut up, removed, and disposed of in a satisfactory manner. Preserve and protect from injury all trees not to be removed. The trees, stumps, and brush shall be cut to a height of not more than 12-inches above the ground. The grubbing of stumps and roots will be required.

Fences shall be removed and disposed of when directed by ENGINEER. Fence wire shall be neatly rolled and the wire and posts stored on the project if they are to be used again, or stored at a designated location if the fence is to remain the property of OWNER.

3.04 CLEARING AND GRUBBING

In areas designated to be cleared and grubbed, all stumps, roots, buried logs, brush, grass and other unsatisfactory materials shall be removed.

All holes remaining after the grubbing operation in embankment areas shall have the sides broken down to flatten out the slopes, and shall be filled with acceptable material, moistened and properly compacted in layers to the density required. The same construction procedure shall be applied to all holes remaining after grubbing in excavation areas where the depth of holes exceeds the depth of the proposed excavation.

END OF SECTION

SECTION 02210

EXCAVATION AND SWALE GRADING

PART 1 - GENERAL

1.01 SCOPE

This item shall consist of the excavating, removing and satisfactory disposition of all materials required to construct the Project and the placement and shaping of required swales to be done in accordance with these Specifications and in conformity with the dimensions and typical sections, lines, and grades, shown on the Plans.

All suitable material taken from excavation shall be used in the formation of embankment, subgrade and for backfilling as indicated on the Plans or hauled off-site, or as directed by the ENGINEER. When the volume of excavation is not sufficient for construction of the fill to the grades indicated, the deficiency shall be supplied by the Contractor.

1.02 REFERENCES

Standards applicable to these specifications shall be:

- A. Americans Association of State Highway and Transportation Officials (AASHTO).
- B. Florida Department of Transportation (F.D.O.T.) Section 120 "Excavation and Embankment". from the Standards Specification for Road & Bridge Construction book

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION OF WORK

3.01 EXCAVATION

The rough excavation shall be carried to the necessary depth to obtain the specified depth of subgrade compaction shown on the Plans. Likewise, on embankments, the depth of subgrade compaction shall be as shown on the Plans.

Should the CONTRACTOR, through negligence or other fault, excavate below the designated lines, he shall replace the excavation with approved materials, in an approved manner and condition, at his own expense. The ENGINEER shall have complete control over the interpretation of the Plans and Specifications concerning the excavation, moving, placing and disposal of all material and shall determine the suitability of material to be placed in embankments. All material determined unsuitable shall be disposed of in waste areas or as directed. Topsoil shall not be used in fill or in subgrades but shall be handled and placed as directed.

The CONTRACTOR shall inform and satisfy himself as to the character, quantity, and distribution of all material to be excavated. No payment will be made for any excavated material which is used for purposes other than those designated. All spoil areas shall be leveled to a uniform line and section and shall present a neat appearance before project acceptance.

Those areas outside of the pavement areas in which the top layer of soil material becomes compacted, due to hauling or to any other activity of the CONTRACTOR, shall be scarified to a depth of 4-inches, as directed, to loosen and pulverize the soil.

If it is necessary to interrupt existing irrigation systems, sewers or under drainage conduits, utilities or similar underground structures, or parts thereof, the CONTRACTOR shall be responsible for and shall take all necessary precautions to protect and preserve or provide temporary services. When such facilities are encountered, the CONTRACTOR shall, at his own expense, satisfactorily repair all damage to such facilities or structures which may result from any of his operations during the period of the contract.

3.02 SWALE EXCAVATION

Swale excavation shall consist of excavating for drainage swales such as intercepting, inlet or outlet or any other type as designed or shown on the Plans.

The work shall be performed in the proper sequence with the other construction. The location of all ditches shall be established on the ground. All satisfactory material shall be placed in fills; unsatisfactory material shall be placed in spoil areas or as directed. Waste or surplus material shall be disposed of as directed by the ENGINEER. All necessary handwork shall be performed to secure a finish true to line, elevation, and cross section, as designated.

Swales constructed on the project shall be maintained to the required cross section and shall be kept free from debris or obstructions until the project is accepted.

3.03 **STRIPPING**

All vegetation such as brush, heavy sods, heavy growth of grass, decayed vegetable matter, rubbish and any other unsuitable material within the area upon which embankment is to be placed shall be stripped or otherwise removed before the embankment is started, and in no case shall such objectionable material be allowed in or under the embankment.

END OF SECTION

SECTION 02211 SITE GRADING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Remove topsoil and stockpile on site for later use.
- B. Excavate sub-soil and reform to grades, contours and levels.
- C. Excavate or fill for roadways, walks, curbs, gutters, parking areas, landscaped areas and as shown on the Drawings.

1.02 RELATED WORK

- A. Section 02110: Clearing and Grubbing.
- B. Section 02210: Excavation and Swale Grading.
- C. Section 02220: Trenching, Backfilling and Compacting.
- D. Section 02260: Finish Grading.
- E. Section 02513: Asphaltic Concrete Paving.

1.03 EXISTING CONDITIONS

- A. Known underground, surface and aerial utility lines, and buried objects are based on best available data and indicated on the Drawings. Contractor shall verify all locations.

1.04 PROTECTION

- A. Protect trees, shrubs and lawns and other features remaining as part of final landscaping.
- B. Protect bench marks, and existing structures, fences, roads, sidewalks, paving and curbs against damage from equipment and vehicular traffic.
- C. Protect aerial, surface, or underground utility lines or appurtenance which are to remain.
- D. Repair any damage, at no cost to Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Excavated fill material: Soil free from roots, rocks larger than 3-inches, and building debris.
- B. Additional fill material: Shall be approved by the Engineer.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Establish and identify required lines, levels, contours and datum.
- B. Maintain bench marks, monuments, and other reference points. Re-establish if disturbed or destroyed, at no cost to Owner.
- C. Before start of grading, establish the location and extent of utilities in the work areas. Notify utilities to remove and relocate lines which are in the way of construction.
- D. Maintain, protect, reroute or extend as required existing utilities to remain which pass through the work area.

3.02 REMOVAL OF TOPSOIL

- A. Topsoil of horticultural value shall be stripped from areas of construction under this contract and stockpiled in area designated by Engineer. Said material shall be stockpiled separately from fill material.
- B. Do not permit topsoil to be mixed with subsoil
- C. Do not strip topsoil when wet.
- D. Do not drive heavy equipment over stockpiled topsoil.

3.03 ROUGH GRADING

- A. Rough grade site to required levels, profiles, contours and elevations ready for finish grading and surface treatment. Maintain the following:

1. Sodded areas - 4 1/2-inches below finished grade elevation.
2. Seeded areas - 6-inches below finished grade.
3. Paved areas - 18-inches below finished grade elevations.
4. Shrub beds - 24-inches below finished grade elevations.
5. Flower beds - 18-inches below finished grade elevations.
6. Concrete sidewalks - 8-inches below finished grade elevations.

B. Prior to placing fill material over undisturbed subsoil, scarify surface to depth of 6-inches.

3.04 **SURPLUS MATERIAL**

- A. Remove surplus materials from site.
- B. Dispose of surplus material at no cost to Owner.

END OF SECTION

SECTION 02220

TRENCHING, BACKFILLING AND COMPACTING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Excavate for all underground piping.
- B. Place and compact granular beds and fills over pipelines to rough grade elevations.
- C. Dewater excavations as required.

1.02 RELATED WORK

- A. Section 02661: Water Mains.
- B. Section 02720: Storm Drainage System.
- C. Section 02730: Sanitary Sewer Pipe.

1.03 SITE COMPACTION TESTING

- A. Testing of compacted fill materials will be performed in accordance with F.D.O.T. and A.A.S.H.T.O. specifications.
- B. If, during progress of Work, tests indicate that compacted materials do not meet specified requirements, remove defective work, replace and retest as directed by ENGINEER.
- C. Ensure compacted fills are tested before proceeding with placement of surface materials.

1.04 PROTECTION

- A. Protect trees, shrubs, lawn, areas to receive planting, rock outcropping and other features remaining as part of final landscaping.
- B. Protect bench marks and existing structures, roads, sidewalks, paving and curbs against damage from vehicular or foot traffic. Install and maintain proper bridging, planking and cants to provide access to buildings.

- C. Protect excavations by shoring, bracing, sheet piling underpinning, or by other methods, as required to prevent cave-ins or loose dirt from falling into excavations in accordance with Trench Safety Act.
- D. Underpin or otherwise support adjacent structure(s) which may be damaged by excavation work. This includes other utility lines and pipe runs.
- E. Notify ENGINEER of any unexpected sub-surface conditions. Discontinue work in the area until ENGINEER provides notification to resume work.

PART 2 - PRODUCTS

2.01 PRODUCTS

- A. Bedding Materials: Pipe shall be placed on dry, undisturbed earth.
- B. Selected Backfill: After pipe joints have been inspected and given preliminary approval, and sufficient time has elapsed for setting of joints if necessary, backfilling shall be performed, together with tamping until fill has progressed to an elevation at least one foot above the top of the pipe bell. During this initial stage of backfilling, approved granular materials or loose soil free from lumps, clods, or stones shall be deposited in layers approximately 6-inches thick and compacted by manually operated machine tampers actuated by compressed air, or other suitable means. Tampers and machines shall be suitable for the work, and subject to approval by ENGINEER.
- C. Backfill Material: Excavated material, free from roots, rocks larger than 3½ inches in size and building debris.
- D. Fill under landscaped areas: Free from alkali, salt, and petroleum products. Use sub-soil excavated from site only if conforming to specified requirements.

PART 3 - EXECUTION

3.01 PREPARATION AND LAYOUT

- A. Establish extent of excavation by area and elevation. Designate and identify datum elevation.
- B. Set required lines and levels.
- C. Maintain bench marks, monuments and other reference points.

3.02 UTILITIES

- A. Before starting excavation, establish the location and extent of underground utilities occurring in the work area.
- B. Notify ENGINEER if utility lines which are in the way of excavation are uncovered.
- C. Protect active utility services uncovered by excavation.
- D. Remove abandoned utility service lines from areas of excavation. Cap, plug or seal such lines and identify at grade.
- E. Accurately locate and record abandoned and active utility lines re-routed or extended on Project Record Documents.

3.03 TRENCHING

- A. Ensure trenching does not interfere with normal 45 degree bearing splay of any foundation.
- B. Excavate in accordance with lines and grades.
- C. Cut trenches sufficiently wide to enable proper installation of pipe and to allow for inspection. Trim and shape trench bottom and leave free of irregularities, lumps and projections.
- D. Do not disturb soil within branch spread of existing trees or shrubs that are to remain. If it is necessary to excavate through roots, perform work by hand and cut roots with a sharp axe.
- E. When complete, request ENGINEER to inspect excavations. Correct unauthorized excavation as directed, at no cost to OWNER.
- F. Remove excess or unsuitable excavated sub-soil from site.

3.04 DEWATERING

- A. Keep trenches dry. Provide necessary equipment including pumps, piping and temporary drains.
- B. Do not discharge drainage water into municipal sewers without municipal approval. Ensure water discharge does not contain silt held in suspension.
- C. Direct surface drainage away from excavated areas.
- D. Control the grading in and adjacent to excavations to prevent water running into excavated areas or onto adjacent properties or public thoroughfares.

- E. Furnish and operate suitable pumps on a 24 hour basis to keep excavations free of water until piping has been placed and backfilling has been completed.
- F. No water shall be allowed to rise over masonry or mortar until the concrete or mortar has set at least 24 hours.

3.05 BACKFILLING

- A. Do not start backfilling until piping has been inspected.
- B. Ensure trenches are free of building debris, wood, rocks over 3½ inches in diameter and water.
- C. Backfill systematically and as early as possible to allow maximum time for natural settlement and compaction.
- D. After backfill has reached a point one foot above the top of the pipe, a variation in the procedure as to manner of placing and amount of compaction to fill will be allowed, depending upon the location of the work and danger from subsequent settlement, as follows:
 1. For backfilling in unimproved areas (along utility easements and in parkway strip beyond the edge of driveways and graveled parking areas), from an elevation of one foot above top of pipe to the surface of the ground, backfill may be deposited by equipment. Depositing in layers, or tamping will not be required. Sufficient surplus excavated material shall be neatly rounded over the trench, to compensate for settlement. All surplus excavated materials beyond that indicated above shall be disposed of by Contractor.
 2. For backfilling beneath driveways and parking areas, alleys, and streets where non-rigid type surfacing is to be replaced. This shall also include dirt, gravel or asphalt driveways and alleys.
 - a. The backfill material shall be carefully deposited in uniform layers not to exceed 12-inches in thickness and each layer shall be compacted to 98% of maximum density in accordance with AASHTO T-180 with manually operated machine tampers.
 - b. In lieu of the foregoing compaction method, the backfill material and procedure used may be that as specified under Method 3, below.
 - c. Berms: Every 200 feet per lift.
 - d. Swales: For areas that have been built-up and a swale cut-in to every 200 feet; otherwise; density testing of swales cut-in to existing ground does not require density testing.
 - e. The Contractor is to "map" all density test results on the Record Drawings on each day when field tests are performed. Contractor's testing laboratory shall leave a copy of the day's density testing results on site.

3. For backfilling across and beneath driveways, sidewalks, parking areas or streets where a rigid type paving is to be replaced (concrete and asphaltic concrete and brick surfaces).
 - a. All backfill material shall be approved granular material of high weight and density. The material shall be carefully deposited in uniform layers not to exceed 12-inches thick (loose measure), and each layer shall be compacted by ramming or tamping with tools approved by ENGINEER in a manner that does not disturb the pipe. Where necessary, granular base material of the type and thickness specified shall be used for the last layer prior to surfacing.

END OF SECTION

SECTION 02235

LIMEROCK BASE, PRIMED

PART 1 - GENERAL

1.01 SCOPE

- A. This item shall consist of the construction of a base course composed of limerock including the application of a bituminous prime coat. It shall be constructed on the prepared subgrade in accordance with these specification and shall conform to the dimensions, lines, grades and cross sections shown on the plans.

1.02 REFERENCES

Standards applicable to this Specification shall be:

- A. American Association of State Highway and Transportation Officials Standard Specifications (AASHTO).
 - 1. AASHTO T49-80 - Standard Method of Test for Penetration of Bituminous Materials.
 - 2. AASHTO M81-75 (Latest Edition) - Standard Specification for Cut-Back Asphalt (Rapid-Curing Type).
 - 3. AASHTO T180-74 (Latest Edition) - Standard Method of Tests for Moisture-Density Relations.
- B. Florida Department of Transportation Standard Specifications (F.D.O.T.).
 - 1. FDOT Section 200, Limerock Base Latest edition
 - 2. FDOT Section 300, Prime and tack Latest edition
 - 3. FDOT Section 911, Limerock Material for Base and Stabilized Base Latest edition

1.03 SUBMITTALS

- A. The contractor will, at least ten days prior to start of work, submit in writing the source of all materials to be used.
- B. The Contractor will, without additional compensation, submit such tests as may be required by the Engineer.

1.04 MEASUREMENT AND PAYMENT

- A. Method of Measurement: The quantity to be paid for under this Section shall be the area, in square yards, of limerock base, primed, completed and accepted.
- B. Basis of Payment: The quantity of limerock base primed, determined as provided above, shall be paid for at the contract unit price per square yard for Limerock Base primed, completed and accepted. Such price and payment shall be full compensation for all the work specified in this Section, including correcting all defective surface and deficient thickness.

PART 2 - MATERIALS

2.01 LIMEROCK

Except as might be specifically shown otherwise, all limerock material and the sources thereof shall be furnished by the Contractor. Any limerock material occurring in State furnished borrow areas shall not be used by the Contractor in constructing the base, unless permitted by the plans or other contract documents.

- A. Composition - The minimum percentage of carbonates of calcium and magnesium in the limerock material shall be 70. The maximum percentage of water-sensitive clay mineral shall be 3%. Determination shall be at the option of the Engineer.
- B. Liquid Limit and Plasticity Requirements
 - 1. Material for Limerock Base: The liquid limit shall not exceed 35 and the material shall be non-plastic.
 - 2. Material Used in Limerock Stabilized Base: The liquid limit shall not exceed 35 and the plastic index shall not exceed 10.
- C. Mechanical Requirements
 - 1. Deleterious Material - Limerock material shall not contain cherty or other extremely hard pieces, or lumps, balls or pockets of sand or clay size material in sufficient quantity as to be detrimental to the proper bonding, finishing, or strength of the limerock base.
 - 2. Gradation and Size Requirements
 - a) For Limerock Base - At least 97 percent (by weight of the material) shall pass a 3-1/2 inch sieve and the material shall be graded uniformly down to dust. The fine material shall consist entirely of dust of fracture. All crushing or breaking-up which might be necessary in order to meet such size requirements shall be done before the material is placed on the road.

- b) For Limerock Stabilized Base - For this use the limerock material shall meet the requirements of 911-5.21 except that 97 percent shall pass the 1-1/2 inch sieve.
- D. Limerock Bearing Ratio Requirements - Limerock material used in construction of limerock base shall have an average LBR value of not less than 100. The average LBR value of material produced at a particular source shall be determined in accordance with an approved quality control procedure.

2.02 PRIME COAT MATERIAL (300-2 Latest Edition)

- A. The material used for prime coat shall be cut-back Asphalt Grade RC-70 or RC-250 meeting the requirements of (FDOT 916-2) Emulsified Asphalt Grades SS-1 or CSS-1, SS-1H or CSS-1H diluted in equal proportion with water; Asphalt Emulsified Asphalt Grade AE-60, AE-90, AE-150 or AE-200 diluted at the ratio of 6 parts emulsified asphalt to 4 parts water; special MS-Emulsion diluted at the ratio of 6 parts emulsified asphalt to 4 parts water; Asphalt Emulsion Prime (AEP) meeting the requirements, Emulsion Prime (RS type) meeting the requirements of (FDOT 916-4), or other types and grades of bituminous material which may be called for in the plans or Special Provisions.

The Contractor may select any of the specified bituminous materials unless the plans or Special Provisions indicate the use of a specific material. Types and Grades of bituminous material other than those specified above may be allowed if it can be shown that the alternate material will properly perform the function of prime coat material.

- B. Cover Material for Prime Coat - If an emulsified asphalt is used for prime coat, the Engineer may require that cover material be hot-asphalt coated (mix to contain from two to four percent asphalt-cement) if necessary to achieve a prime coat which will remain reasonably intact until the surface course is placed.

If material other than emulsified asphalt is used for the prime coat, the cover material shall be either sand (bare or hot-asphalt coated) or screenings, at the Contractor's option. The sand shall be nonplastic and free from any appreciable amount of silt, clay balls and root particles, and from any noticeable sticks, trash, vegetation or other organic matter. Screening shall be as specified in FDOT 902.5.

PART 3 - EXECUTION

3.01 TRANSPORTING LIMEROCK

The limerock shall be transported to the point where it is to be used, over rock previously placed if practicable, and dumped on the end of the preceding spread.

Hauling over the subgrade and dumping on the subgrade will be permitted when these operations will not be detrimental to the base as determined by the Engineer.

3.02 EQUIPMENT

- A. Limerock Base - The rock shall be spread by mechanical rock spreaders, equipped with a device which strikes off the rock uniformly to laying thickness, and capable of producing an even distribution of the rock. For crossovers, intersections and ramp areas; for roadway widths of 20 feet or less; for the main roadway area when forms are used and for any other areas where the use of a mechanical spreader is not practicable; spreading may be done by bulldozers or blade graders.
- B. Pressure Distributor - The pressure distributor shall be equipped with pneumatic tires having a sufficient width of rubber in contact with the road surface to avoid breaking the bond or forming a rut in the surface. The distance between the centers of openings of the outside nozzles of the spray bar shall be equal to the width of the application required, within an allowable variation two (2) inches.

The outside nozzle at each end of the spray bar shall have an area of opening not less than 25 percent nor more than 75 percent, in excess of the other nozzles. All other nozzles shall have uniform openings. When the application covers less than the full width, the normal opening of the end nozzle at the junction line may remain the same as those of the interior nozzles. less than the full width, the normal opening of the end nozzle at the junction line may remain the same as those of the interior nozzles.

3.03 SPREADING LIMEROCK

- A. Method of Spreading - The limerock shall be spread uniformly with equipment as specified in 3.02 A. above. All segregated areas of fine or coarse rock shall be removed and replaced with properly graded rock.
- B. Number of Courses - When the specified compacted thickness of the base is greater than six inches, the base; shall be constructed in two courses. The thickness of the first course shall be approximately one-half the total thickness of the finished base, or enough additional to bear the weight of the construction equipment without disturbing the subgrade.

3.04 COMPACTING AND FINISHING BASE

- A. Single-Course Base - For single-course base, after the spreading is completed the entire surface shall be scarified and then shaped so as to produce the required grade and cross section after compaction.

- B. Double-Course Base - For double-course base, the first course shall be cleaned of foreign material and bladed and brought to a surface cross section approximately parallel to that of the finished base. Prior to the spreading of any material for the upper course, the density tests for the lower course shall be made and the Engineer shall have determined that the required compaction has been obtained. After the spreading of the material for the final course is completed, its surface shall be finished and shaped so as to produce the required grade and cross section after compaction, and free of scabs and laminations.
- C. Moisture Content - When the material does not have the proper moisture content to insure the required density, wetting or drying will be required. When water is added it shall be uniformly mixed-in by disking to the full depth of the course which is being compacted. Wetting or drying operations shall involve manipulation, as a unit, of the entire width and depth of the course which is being compacted.
- D. Density Requirements - As soon as proper conditions of moisture are attained the material shall be compacted to a density of not less than 98 percent of maximum density as determined by AASHTO T 180. The minimum density which will be acceptable at any location outside the traveled roadway (such as intersections, crossovers, turnouts, etc) shall be 95 percent of such maximum. Limerock base for shoulder pavement shall be compacted to a density not less than 95 percent of the maximum density as determined under AASHTO T 180.
- E. Density Test - At least three density determinations shall be made on each day's final compaction operations on each course, and the density determinations shall be made at more frequent intervals if deemed necessary by the Engineer.

During final compacting operations, if blading of any areas is necessary to obtain the true grade and cross section, the compacting operations for such areas shall be completed prior to making the density tests on the finished base.

F. Correction of Defects

- 1. Contamination of Base Material - If, at any time, the subgrade material should become mixed with the base course material, the Contractor shall, without additional compensation, dig out and remove the mixture, reshape and compact the subgrade and replace the materials removed with clean base material, which shall be shaped and compacted as specified above.
- 2. Cracks and Checks - If cracks or checks appear in the base, either before or after priming, which, in the opinion of the Engineer, would impair the structural efficiency of the base, the Contractor shall remove the cracks or checks by rescarifying, reshaping, adding base material where necessary, and recompacting.

A. Preparation - The prime coat shall be applied only when the base meets the specified density requirements and the moisture content in the top half of the base does not exceed 90 percent of the optimum moisture of the base material. At the time of priming, the base shall be firm, unyielding and in such condition that no undue distortion will occur.

Before any bituminous material is applied, all loose material, dust, dirt, caked clay and other foreign material which might prevent proper bond with the existing surface shall be removed for the full width of the application. Particular care shall be taken in cleaning the outer edges of the strip to be treated, to insure that the prime or tack coat will adhere.

When the prime or tack coat is applied adjacent to curb and gutter, valley gutter or any other concrete surfaces, such concrete surfaces (except where they are to be covered with a bituminous wearing course) shall be covered with heavy paper, or otherwise protected while the prime or tack coat is being applied. Any bituminous material deposited on such concrete surfaces shall be removed.

The temperature of the prime material shall be between 100 degrees Fahrenheit and 150 degrees Fahrenheit. The actual temperature shall be that which will insure uniform distribution. The material shall be applied by means of a pressure distributor. The amount to be applied will be dependent on the character of the surface and shall be sufficient to coat the surface thoroughly and uniformly, with no excess.

B. Rate of Application - The rate of application shall be not less than 0.10 gallon per square yard, unless a lower rate is approved by the Engineer.

C. Sprinkling - If so required by the Engineer the base shall be lightly sprinkled with water and rolled with a traffic roller, in advance of the application of the prime.

D. Sanding - The primed base shall be covered by a light uniform application of cover material. If considered necessary for proper distribution of spread, the cover material shall be lightly dragged with a drag broom, after which it shall be rolled with a traffic roller, for at least ten passes over the entire area.

E. Sampling Device on Transport Tanks - All transport tanks delivering bituminous materials for use on the project shall be equipped with an approved spigot-type sampling device.

F. Temperature Sensing Device on Transport Tanks - All transport tanks delivering bituminous materials for use on the Department's projects shall be equipped with an approved dial type thermometer.

The thermometer shall have a temperature range from 50 degrees Fahrenheit to 500 degrees Fahrenheit in 25 degrees Fahrenheit increments with a minimum dial diameter of two inches.

The thermometer shall be located near the midpoint in length and within the middle third of the height of the tank and be enclosed in a well with a protective window or by other means as necessary to keep the instrument clean and in the proper working condition.

3.06 QUALITY CONTROL

- A. Testing Surface - The finished surface of the base course shall be checked with a templet cut to the required crown and with a 15-foot straightedge laid parallel to the centerline of the road. All irregularities greater than 1/4 inch shall be corrected by scarifying and removing or adding rock as required, after which the entire area shall be recompacted as specified hereinbefore. In the testing of the surface, the measurements will not be taken in small holes caused by individual pieces of rock having been pulled out by the grader.
- B. Thickness Requirements
 1. Measurements - Thickness of base shall be measured at intervals of not more than 200 feet. Measurements shall be taken at various points on the cross section, through holes not less than three inches in diameter.
 2. Areas Requiring Correction - Where the compacted base is deficient by more than 1/2 inch from the thickness called for in the plans, the Contractor shall correct such areas by scarifying and adding rock. The base shall be scarified and rock added for a distance of 100 feet in each direction from the edge of the deficient area. The affected areas shall then be brought to the required state of compaction and to the required thickness and cross section.
 3. Deficient Areas Left in Place - As an exception to the requirement for correcting areas of base which show a thickness deficiency exceeding the allowable 1/2 inch, if so approved in writing by the Engineer. Any of such areas in which the extent of the deficiency might be considered as not sufficient to seriously impair the required strength of the base may be left in place. No payment, however, will be made for such deficient areas left in place and not corrected.

3.07 MAINTENANCE

The Contractor will be responsible for assuring that the true crown and templet are maintained, with no rutting or other distortion, and that the base meets all the requirements, at the time the surface course is applied.

END OF SECTION

02235-8

LIMEROCK BASE, PRIMING

SECTION 02260

FINISH GRADING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The Contractor shall, under this Section, supply, place, compact and roll finish grade materials prior to landscaping work.
- B. Finish grade sub-soil.
- C. Cut out areas to receive stabilizing base course materials for paving and sidewalks.
- D. Place, finish grade and compact topsoil.

1.02 RELATED WORK

- A. Section 02210: Excavation and Swale Grading.
- B. Section 02211: Site Grading.
- C. Section 02220: Trenching, Backfilling and Compacting.
- D. Section 02934: Sodding.

1.03 PROTECTION

The Contractor shall prevent damage to existing fencing, trees, landscaping, natural features, bench marks, pavement, utility lines, and sprinkler system. Correct damage at no cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

Topsoil shall be friable loam free from subsoil, roots, grass, excessive amount of weeds, stones and foreign matter; acidity range (ph) of 5.5 to 7.5; containing a minimum of 4 percent and a maximum of 25 percent organic matter. (Use topsoil stockpiled on site if conforming to these requirements, or as directed by the Engineer.)

PART 3 - EXECUTION

3.01 SUB-SOIL PREPARATION

- A. Rough grade sub-soil systematically to allow for a maximum amount of natural settlement and compaction. Eliminate uneven areas and low spots. Remove debris, roots, branches, stones, etc., in excess of 2 inches in size. Remove sub-soil which has been contaminated with petroleum products.
- B. Cut out areas, to sub-grade elevation, which are to receive stabilizing base for paving and sidewalks.
- C. Bring sub-soil to required levels, profiles and contours. Make changes in grade gradual. Blend slopes in to level areas.
- D. Slope grade away from building minimum 4 inches in 10 feet (unless indicated otherwise on Drawings).

3.02 PLACING TOPSOIL

- A. Place topsoil in area where seeding, sodding and planting is to be performed. Place to the following minimum depths, up to finished grade elevations:
 - 1. 6-inches for seeded areas.
 - 2. 4 1/2-inches for sodded areas.
 - 3. 24-inches for shrub beds.
 - 4. 18-inches for flower beds.
- B. Use topsoil in relatively dry state. Place during dry weather.
- C. Fine grade topsoil eliminating rough and low areas to ensure positive drainage. Maintain levels, profiles and contours of sub-grades.
- D. Remove stones, roots, grass, weeds, debris and other foreign material while spreading.
- E. Manually spread topsoil around trees, plants, buildings and other structures to prevent damage which may be caused by grading equipment.
- F. Lightly compact placed topsoil.

3.03 SURPLUS MATERIAL

- A. Remove surplus sub-soil and topsoil from site.

- B. Leave stockpile areas and entire job site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 02317

INSERTION PITS FOR SLIP-LINING OF SANITARY SEWERS

PART 1 GENERAL

1.01 SECTION INCLUDES

Excavation, grading, and backfilling for insertion pits for slip-lining of sanitary sewers as specified in this Section.

1.02 RELATED SECTIONS

A. Division 01 - General Requirements

1. Project Procedures

1.03 REFERENCES

A. General: As specified in Section 01090 Reference Standards.

B. AASHTO Standards

AASHTO M-145 Classification of Soils and Soil Aggregate Materials for Highway Construction Purposes

C. ANSI/ASTM Standards

ANSI/ASTM Concrete Aggregates
C33

ANSI/ASTM Moisture-Density Relations of Soils and Soil Aggregate
D698 Mixture Using 5.5 lb. (2.49 kg) Rammer and 12 inch
(305mm) Drop
(AASHTO-T-99)

ANSI/ASTM Moisture-Density Relations of Soils and Soil Aggregate
D1557 Mixture Using 10lb. (4.54 kg) Rammer and 18 inch (457
mm) Drop
(AASHTO T-180)

D. ASTM Standards

ASTM D2922 Test Methods for Density of Soil and Soil-Aggregate in
(AASHTO T-238) Place by Nuclear Method (Shallow Depth)

E. Florida Department of Transportation (FDOT) Standards

1. Standard Specifications for Road and Bridge Construction
- F. State of Florida
 1. Florida Trench Safety Act (90-96, Laws of Florida)
- G. Occupational Safety and Health Administration
 1. Excavation Safety Standards, 29 C.F.R.s. 1926.650 Subpart P.

1.04 PROTECTION

- A. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave-in or loose soil from falling into excavation.
- B. Provide barricades, warning signs, and lights as required by law, regulations, or law and regulation.
- C. Underpin adjacent structures which may be damaged by excavation work, including service utilities. Repair damaged structures at no additional cost to the Owner.
- D. Notify Engineer of unexpected subsurface conditions and discontinue work in affected area until notification to resume work.
- E. Grade excavation top perimeter to prevent surface water run off into excavation.

PART 2 PRODUCTS

2.01 SELECT FILL MATERIALS

- A. Select Fill
 1. On site or imported non-cohesive, non-plastic material free of debris and gravel larger than one-half inch in diameter.
 2. Satisfactory backfill materials are defined as those soils complying with American Association of State Highway and Transportation Officials (AASHTO) Standard M-145 Soil Classification Groups A-1 and A-3.
- B. Common Fill

1. Reused or imported non-cohesive, non-plastic material, free of debris and rocks larger than six inches in diameter.
2. Satisfactory backfill materials are defined as those soils complying with AASHTO Standard M-145 Soil Classification Groups A-1, A-2-4, A-2-5, and A-3.

PART 3 EXECUTION

3.01 INSPECTION

- A. Verify approval of full or limited use of stockpiled fill.
- B. Verify areas to be backfilled are free of debris and water.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. When necessary, compact subgrade surfaces to density requirements for backfill material.

3.03 EXCAVATION

- A. Excavate subsoil, including earth, rubbish, trash, debris, and other material, for insertion pits for slip-lining of sanitary sewers.
- B. Remove subsoil, subgrade, rubbish, trash, debris, boulders, and rock as required to complete excavation.
- C. Remove unsuitable subsoil, unsuitable subgrade, rubbish, trash, debris, boulders, and rock from project site. Dispose of unsuitable material off site.
- D. If sheeting is used, sheeting may be removed provided removal can be accomplished without disturbing existing sewer pipe, bedding, or alignment. Should Engineer determine that removal of sheeting will damage pipe, sheeting shall be left in place at no additional cost to the Owner. If left in place, cut sheeting off two feet above top of pipe and leave sheeting in place below cut.
- E. Keep insertion pits free from water. Provide pumps, piping, and other means for removing water from insertion pits and other parts of the Work. Continue dewatering until backfill is above natural water table. Obtain required permits for permits for dewatering prior to starting dewatering.

3.04 BACKFILLING

- A. Backfill insertion pits to contours and elevations shown on drawings, or to match existing grade if finish grade is not changed. Backfill systematically, as early as possible, to allow maximum time for natural settlement.
- B. Place and compact select fill material in continuous layers not exceeding 6 inches to a depth of 12 inches above top of existing pipe. Compaction shall be 95% of maximum density as determined by AASHTO T-180, Method C. Where pipe lies within a roadway, compaction shall be in continuous layers not exceeding 6 inches to bottom of stabilized subgrade. Compaction shall be 98% of maximum density as determined by AASHTO T-180 Method C. Compaction shall be by small portable plate compactor or other approved method.
- C. Place and compact common fill material in continuous layers not exceeding 12 inches to 95% of maximum density as determined by AASHTO T-180, Method C. Compaction shall be by mechanical means or other approved methods.

3.05 COMPACTION

- A. Compact materials at moisture content within \pm 2% of the optimum to permit specified compaction.
- B. Add water or permit material to dry until optimum moisture content is obtained.
- C. Field test density of each compacted backfill lift in accordance with ASTM D2922 prior to placement of succeeding lifts. Make at least one test per lift.
- D. Make one Proctor Test in accordance with AAHTO T-99 for each source of fill. If material from excavation is used as backfill material, take a test proctor from the best available location as determined by the testing lab. Upon completion of backfill, take an additional proctor from actual material used and compared to the test proctor. If the actual proctor varies from the test proctor, retest the backfill.
- E. Retain a laboratory approved by Engineer to make field density tests and Proctor Tests as specified below.
 1. Contractor shall pay the cost of initial density test(s).

2. Contractor shall pay cost for any additional testing required as a result of failure of any initial test.

END OF SECTION

02317-5

SECTION 02511

CONCRETE SIDEWALKS

PART 1 - GENERAL

1.01 SCOPE

- A. The work specified in this section consists of the construction of concrete sidewalks, in accordance with these specifications, and in conformity with the lines, grades, dimensions and notes shown on the plans.

1.02 REFERENCES

- A. City of Delray Beach Standards RT 5.1.
- B. FDOT Standard Specifications for Road and Bridge Construction, latest edition

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The concrete mix shall produce standard weight concrete with the following properties to be verified by the use of the appropriate listed test methods.
 - 1. Compressive strength: 3,000 psi at 28 days - tested according to ASTM designation C31 (AASHTO T23)
 - 2. Slump Range: 2-4 inches - tested according to ASTM designation C143 (AASHTO T119)
- B. Joint materials shall be in accordance with FDOT Specification Section 932.

2.02 FORMS

- A. Forms for this work shall be made of either wood or metal and shall have a depth equal to the plan dimensions for the depth of concrete being deposited against them. They shall be straight, free from warp or bends, and of sufficient strength, when staked, to resist the pressure of the concrete without deviation from line and grade. Forms shall be cleaned each time they are used and shall be oiled or saturated with water prior to placing the concrete.

PART 3 - EXECUTION

3.01 SUB-GRADE

- A. Excavation shall be made to the required depth, and the sub-grade or base upon which the sidewalk is to be set shall be compacted to a firm, even surface, true to grade and cross-section, by means of watering, rolling or tamping. The sub-grade For sidewalk to be used as driveway pavement shall be compacted as directed by the City Engineer. The sub-grade shall be moist at the time the concrete is placed.

3.02 JOINTS

- A. Expansion Joints between the sidewalk and the curb or driveway or at fixed objects and sidewalk intersections shall be 1/2 inch joints, formed with a preformed joint filler.
- B. Preformed Filler shall meet the requirements of AASHTO M-153 or M-213, or cellulose fiber types meeting all the requirements of AASHTO M-213 except the asphalt content are acceptable provided they contain minimums of 0.2 percent copper pentachlorophenate as a preservative and 1.0 percent waterproofing wax. For AASHTO M-153, unless a particular type is specified, either type I, type II, or type III may be used
- C. Contraction Joints may be of the open type, or may be sawed.
 - 1. Open type contraction joints shall be formed by staking a metal bulkhead in place and depositing the concrete on both sides. After the concrete has set sufficiently to preserve the width and shape of the joint, the bulkhead shall be removed. After the sidewalk has been finished over the joint, the slot shall be edged with a tool having a 1/2" radius.
 - 2. If the Contractor elects to saw the contraction joints, a slot approximately 3/16" wide and not less than 1-1/2" deep shall be cut with a concrete saw after the concrete has set and within the following periods of time: Joints at not more than 30' intervals - 12 hrs after finishing, and remaining joints - within 96 hrs after finishing.

3.03 PLACING

- A. The concrete shall be placed in the forms to the required depth, and shall be tamped and spaded until mortar entirely covers its surface.

3.04 FINISHING

- A. SCREEDING: All surplus water, laitance and inert material shall be worked off the surface of the concrete with a ten (10) foot straight edge, or by some other method equally as satisfactory and so approved by the City Engineer.

B. FLOATING; SURFACE REQUIREMENTS: The concrete shall be given a wooden float finish. The surface variations shall not be more than three-sixteenths (3/16) inch under a ten (10) foot straight edge, nor more than one-eighth (1/8) inch on a five (5) foot transverse section. The edge of the sidewalk shall be carefully finished with an edging tool having a radius of one-half (1/2) inch.

3.06 **THICKNESS**

Concrete sidewalks shall be four (4) inches thick except at driveways where sidewalks shall be six (6) inches thick.

END OF SECTION

SECTION 02512

CONCRETE SIDEWALK RESTORATION

PART 1 - GENERAL

1.01 SCOPE

The work to be performed under this item shall include the selling and delivering and the installing of concrete sidewalk which have been removed and/or damaged during the course of construction of the work performed under this Contract. The sidewalk shall be replaced to the same width as the original sidewalk.

1.02 REFERENCES

Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction 1986 Section 345 "Portland Cement Concrete".

PART 2 - MATERIALS

2.01 ACCEPTABLE MATERIALS

- A. The concrete mix shall produce standard weight concrete with the following properties to be verified by the use of the appropriate listed test methods.
 1. Compressive strength: 3,000 psi at 28 days - tested according to ASTM designation C31 (AASHTO T23)
 2. Slump Range: 2-4 inches - tested according to ASTM designation C143 (AASHTO T119)
- B. Joint materials shall be in accordance with FDOT Specification Section 932.

PART 3 - EXECUTION

All material, labor, forms, tools and equipment for restoration of the sidewalk shall be supplied by the Contractor. All disturbed sidewalk shall be replaced with 4-inch thick 3,000 psi concrete (6-inches thick at driveways) to the widths required. The sidewalk finish shall match as near as possible the original finish. Broken or cracked sidewalk shall be removed and disposed of as directed by the Engineer.

END OF SECTION

SECTION 02513

ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Prepare sub-grade to receive base course.
- B. Place stabilizing base courses, work and compact.
- C. Prime base course, place asphalt pavement.

1.02 RELATED WORK

- A. Section 01410: Testing Laboratory Services.
- B. Section 02211: Site Grading.
- C. Section 02580: Pavement Marking.

1.03 REFERENCE STANDARDS

- A. ASTM D1557 - Tests for Moisture - Density Relationship of Soils using 10 lb. Rammer in 18 inch Drop.
- B. AASHTO M-81 - Penetration Graded Asphalt Cement.
- C. AASHTO M-140 - Emulsified Asphalt.
- D. FDOT Standard Specification for Road & Bridge Construction - Section 200 - Limerock Base
- E. FDOT Standard Specification for Road and Bridge Construction - Section 913 - Shell Base.
- F. FDOT Standard Specification for Road and Bridge Construction - Section 913 - Shell Stabilized Base.
- G. FDOT Standard Specification for Road and Bridge Construction - Section 330 - Hot Bituminous Mixtures General Construction Requirements.
- H. FDOT Standard Specification for Road and Bridge Construction - Section 916-1 - Asphalt Cement.

1.04 TESTING AND INSPECTION

- A. Testing and inspection of asphalt pavement mixes and testing of placed stabilizing base course and asphalt pavement will be performed by an independent testing laboratory, in accordance with Section 01410-Testing Lab Services, and Section 01020-Allowances. Testing and inspection will be performed so as to minimize disruption to work.
- B. Allow testing laboratory access to the mixing plant for verification of weights or proportions, character of materials used and determination of temperatures used in the preparation of asphalt concrete mix.
- C. When and if required, the testing laboratory will perform laboratory tests on proposed asphalt pavement mixes to determine conformity with requirements.
- D. The testing laboratory will perform one series of compaction tests for stabilizing base course and for asphalt pavement. The contractor shall pay for costs of additional testing as required due to improper performance of work.
- E. When stabilizing base course or portion thereof has been placed and compacted in accordance with requirements, notify the testing laboratory to perform density and bearing value tests. Do not place asphalt pavement until results have been verified and base course installation approved.
- F. If compaction tests indicate that stabilizing base course or asphalt paving do not meet specified requirements, remove defective work, replace and retest at Contractor's expense.

PART 2 - MATERIALS

2.01 LIMEROCK

- A. Composition - The minimum percentage of carbonates of calcium and magnesium in the limerock material shall be 70. The maximum percentage of water-sensitive clay mineral shall be 3 percent. Limerock material shall not contain cherty or other extremely hard pieces, or lumps, balls or pockets of sand or clay size material in sufficient quantity as to be detrimental to the proper bonding, finishing, or strength of the limerock base.
- B. Gradation and Size Requirements - At least 97 percent (by weight of the material) shall pass a 3½ inch sieve and the material shall be graded uniformly down to dust.

The fine material shall consist entirely of dust of fracture. All crushing or breaking-up which might be necessary in order to meet such size requirements shall be done before the material is placed on the road.

C. Limerock Bearing Requirements - Limerock material used in construction of limerock base shall have an average LBR value of not less than 100. The average LBR value of material produced at a particular source shall be determined in accordance with an approved quality control procedure.

2.02 CRUSHED CONCRETE

- A. Composition - The minimum percentage of carbonates of calcium and magnesium in the material shall be 70. All foreign material such as metal fragments, organic matter, etc. shall be removed from the material before delivery to the job site.
- B. Gradation - 100 percent (by weight) of the material shall pass a 3 inch sieve, with 40 percent to 70 percent passing the number 10 sieve. Not more than 20 percent, by dry weight, of the material shall pass the 200 sieve by washing. all crushing or breaking up which might be necessary in order to meet such size requirements shall be done before the material is placed on the road.
- C. Bearing Requirements - The Crushed Concrete Base shall have an average Limerock Bearing Ration (LBR) of not less than 100. The average LBR value of material produced at a particular source shall be determined in accordance with an approved quality control procedure.
- D. Crushed Concrete may be substituted for Limerock as base material by adding 2 inches to the specified thickness.

2.03 PRIME COAT

- A. Prime coat shall be one of the following:
 - 1. Cutback Asphalt, Grade RC-70 or RC-250 shall meet the requirements of AASHTO Specification M-81.
 - 2. Emulsified Asphalt Grade SS-1 or SS1H shall meet the requirements of ASSHTO Specifications M-140 and/or M-280.

2.04 TACK COAT

- A. Tack coat shall be one of the following:
 - 1. Asphalt Cement, Penetration Grade 85-100 shall meet the requirements of AASHTO Specification M-20.
 - 2. Emulsified Asphalt, Grade RS-2 shall meet the requirements of AASHTO Specification M-140.

2.05 ASPHALTIC CONCRETE

- A. Asphaltic concrete surface course - Type S-III asphaltic concrete wearing surface, 1½ inches in compacted thickness or as indicated on the Drawings, in accordance with Sections 330-10 Compacting Mixture and 331 Type S-III Asphaltic Concrete of aforesaid DOT Standard Specification.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Subgrade shall be stabilized per Section 160 - Stabilizing, of the FDOT Standard Specifications for Road and Bridge Construction.
- B. Bearing Value Requirements for subgrade stabilization
 - 1. Limerock Bearing Ratio - Minimum LBR 40 under paved and curbed areas, and minimum LBR 30 in shoulder and swale areas.
 - 2. Florida Bearing Value - Minimum FBV 75 pounds per square inch (psi) under paved and curbed areas, and minimum FBV 50 psi in shoulder and swale areas.

3.02 TRANSPORTING BASE COURSES

The limerock shall be transported to the point where it is to be used, over rock previously placed if practicable, and dumped on the end of the preceding spread. Hauling over the subgrade and dumping on the subgrade will be permitted when these operations will not be detrimental to the base as determined by the Engineer.

3.03 EQUIPMENT

- A. Base Course - The rock shall be spread by mechanical rock spreaders, equipped with a device which strikes off the rock uniformly to laying thickness, and capable of producing an even distribution of the rock.
- B. Pressure Distributor - The pressure distributor shall be equipped with pneumatic tires having a sufficient width of rubber in contact with the road surface to avoid breaking the bond or forming a rut in the surface. The distance between the centers of openings of the outside nozzles of the spray bar shall be equal to the width of the application required, within an allowable variation two (2) inches.

3.04 SPREADING BASE COURSE

- A. Method of Spreading - The limerock shall be spread uniformly with equipment as specified in 3.02 above. All segregated areas of fine or coarse rock shall be removed and replaced with properly graded rock.
- B. Number of Courses - When the specified compacted thickness of the base is greater than six inches, the base shall be constructed in two courses. The thickness of the first course shall be approximately one-half the total thickness of the finished base, or enough additional to bear the weight of the construction equipment without disturbing the subgrade.

3.05 COMPACTING AND FINISHING BASE

- A. **Dynamic Compactor with vibratory rollers shall not be used on this project and shall not be permitted at the job site. The contractor is responsible for all damages caused by compaction operations.**
- B. Single-Course Base - For single-course base, after the spreading is completed the entire surface shall be scarified and then shaped so as to produce the required grade and cross section after compaction.
- C. Double-Course Base - For double-course base, the first course shall be cleaned of foreign material and bladed and brought to a surface cross section approximately parallel to that of the finished base. Prior to the spreading of any material for the upper course, the density tests for the lower course shall be made and the Engineer shall have determined that the required compaction has been obtained. After the spreading of the material for the final course is completed, its surface shall be finished and shaped so as to produce the required grade and cross section after compaction, and free of scabs and laminations.
- D. Moisture Content - When the material does not have the proper moisture content to insure the required density, wetting or drying will be required. When water is added it shall be uniformly mixed-in by disking to the full depth of the course which is being compacted. Wetting or drying operations shall involve manipulation, as a unit, of the entire width and depth of the course which is being compacted.
- E. Density Requirements - As soon as proper conditions of moisture are attained the material shall be compacted to a density of not less than 98 percent of maximum density as determined by AASHTO T-180. The minimum density which will be acceptable at any location outside the traveled roadway.

F. Density Test - At least three density determinations shall be made on each day's final compaction operations on each course, and the density determinations shall be made at more frequent intervals if deemed necessary by the Engineer.

During final compacting operations, if blading of any areas is necessary to obtain the true grade and cross section, the compacting operations for such areas shall be completed prior to making the density tests on the finished base.

G. Correction of Defects:

1. Contamination of Base Material - If, at any time, the subgrade material should become mixed with the base course material, the Contractor shall, without additional compensation, dig out and remove the mixture, reshape and compact the subgrade and replace the materials removed with clean base material, which shall be shaped and compacted as specified above.

2. Cracks and Checks - If cracks or checks appear in the base, either before or after priming, which, in the opinion of the Engineer, would impair the structural efficiency of the base, the Contractor shall remove the cracks or checks by rescarifying, reshaping, adding base material where necessary, and recompacting.

H. Surface Testing - The finished surface of the base course shall be checked with a templet cut to the required crown and with a 15 foot straightedge laid parallel to the center line of the road. All irregularities greater than $\frac{1}{4}$ inch shall be corrected by scarifying and removing or adding base course material as required, after which the entire area shall be recompacted.

3.06 PRIMING

A. Preparation - The prime coat shall be applied only when the base meets the specified density requirements and the moisture content in the top half of the base does not exceed 90 percent of the optimum moisture of the base material. At the time of priming, the base shall be firm, unyielding and in such condition that no undue distortion will occur.

Before any bituminous material is applied, all loose material, dust, dirt, caked clay and other foreign material which might prevent proper bond with the existing surface shall be removed for the full width of the application. Particular care shall be taken in cleaning the outer edges of the strip to be treated, to insure that the prime or tack coat will adhere.

When the prime or tack coat is applied adjacent to curb and gutter, valley gutter or any other concrete surfaces, such concrete surfaces (except where they are to be covered with a bituminous wearing course) shall be covered with heavy paper, or otherwise protected while the prime or tack coat is being applied. Any bituminous material deposited on such concrete surfaces shall be removed.

The temperature of the prime material shall be between 100 degrees Fahrenheit and 150 degrees Fahrenheit. The actual temperature shall be that which will insure uniform distribution. The material shall be applied by means of a pressure distributor. The amount to be applied will be dependent on the character of the surface and shall be sufficient to coat the surface thoroughly and uniformly, with no excess.

- B. Rate of Application - The rate of application shall be not less than 0.10 gallon per square yard, unless a lower rate is approved by the Engineer.
- C. Sprinkling - If so required by the Engineer the base shall be lightly sprinkled with water and rolled with a traffic roller, in advance of the application of the prime.
- D. Sanding - The primed base shall be covered by a light uniform application of cover material. If considered necessary for proper distribution of spread, the cover material shall be lightly dragged with a drag broom, after which it shall be rolled with a traffic roller.
- E. Sampling Device on Transport Tanks - All transport tanks delivering bituminous materials for use on the project shall be equipped with an approved spigot-type sampling device.
- F. Temperature Sensing Device on Transport Tanks - All transport tanks delivering bituminous materials shall be equipped with an approved dial type thermometer. The thermometer shall have a temperature range from 50 degrees Fahrenheit to 500 degrees Fahrenheit in 25 degrees Fahrenheit increments with a minimum dial diameter of two inches.

3.07 QUALITY CONTROL

- A. Testing Surface - The finished surface of the base course shall be checked with a templet cut to the required crown and with a 15-foot straightedge laid parallel to the centerline of the road. All irregularities greater than $\frac{1}{4}$ inch shall be corrected by scarifying and removing or adding rock as required, after which the entire area shall be recompacted as specified hereinbefore. In the testing of the surface, the measurements will not be taken in small holes caused by individual pieces of rock having been pulled out by the grader.
- B. Thickness Requirements:
 - 1. Measurements - Thickness of base shall be measured at intervals of not more than 200 feet. Measurements shall be taken at various points on the cross section, through holes not less than three inches in diameter.
 - 2. Areas Requiring Correction - Where the compacted base is deficient by more than $\frac{1}{2}$ inch from the thickness called for in the plans, the Contractor shall correct such areas by scarifying and adding rock. The base shall be scarified

and rock added for a distance of 100 feet in each direction from the edge of the deficient area. The affected areas shall then be brought to the required state of compaction and to the required thickness and cross section.

3. Deficient Areas Left in Place - As an exception to the requirement for correcting areas of base which show a thickness deficiency exceeding the allowable $\frac{1}{2}$ inch, the deficiency might be considered as not sufficient to seriously impair the required strength of the base and may be left in place. No payment, however, will be made for such deficient areas left in place and not corrected.

3.08 MAINTENANCE

The Contractor will be responsible for assuring that the true crown and templet are maintained, with no rutting or other distortion, and that the base meets all the requirements, at the time the surface course is applied.

3.09 PROTECTING ADJACENT WORK

Provide adequate protection for all adjacent construction, whatever it may be, against bituminous spraying. Spraying of bituminous material on work, other than base course, will not be accepted.

3.10 TRANSPORTATION OF THE ASPHALT

The surface course shall be transported in tight vehicles previously cleaned of all foreign material. The inside surface of the truck bodies shall be only thinly coated with soapy water or an approved emulsion containing not over 5 percent oil. Kerosine, gasoline or similar products shall not be used. After coating and before loading, the truck bodies shall be raised and drained of all excess liquids.

3.11 INSTALLATION OF FINAL ASPHALTIC CONCRETE SURFACE COURSE

The Contractor shall install Type S-III asphaltic concrete surface course over the entire surface in two (2) $\frac{3}{4}$ inch lifts.

Mechanical spreading and screeding equipment shall be of an approved type that is self-propelled and can be steered. It shall be equipped with a receiving and disbursing hopper and a mechanical screed or strike-off member capable of adjustment to regulate the depth of material being spread. Tandem Type 5 to 12 ton steel- wheeled rollers shall be used for sealing. Self- Propelled, pneumatic-tired traffic rollers equipped with at least 7b smooth tread, low pressure tires, having a total weight of 6 to 10 tons shall be used for final rolling.

3.12 FIELD QUALITY CONTROL

The final surface course of all pavements will be required to be checked by a rolling straightedge. The finished surface shall not vary more than 3/16 inch from the straightedge applied parallel to the centerline of the pavement. The straightedge shall have an effective length of 15 feet.

END OF SECTION

SECTION 02515

CONCRETE PAVING STONES

PART 1 - GENERAL

1.01 RELATED WORK

- A. Section 02513: Asphaltic Concrete Paving

1.02 WORK INCLUDED

- A. Prepare subgrade and base course
- B. Supply and place sand laying course.
- C. Supply and install interlocking concrete paving stones in quality, shape, thickness and color as specified.
- D. Supply and place all accessory items as required by the Contract.

1.03 PRODUCT HANDLING

- A. Paving stones shall be delivered and unloaded at jobsite with or without pallets and bound in such manner that no damage occurs to the product during handling, hauling and unloading.

PART 2 - MATERIALS

2.01 SOLID CONCRETE INTERLOCKING PAVING STONES:

ASTM DESIGNATION C936-82

Paving stones shall be : UNI-Stone, UNI-Decor, Super-Decor, Appian-Stone, City Square, Holland-Stone, UNI-Coloc, UNI-Stone II, Finetta Stone, or Delta Stone, as shown on the plans, and manufactured by Paver Systems, or equal.

Paving stones thickness shall be: 2-3/8" (6cm) or 3-1/8" (8cm). Paving stones color shall be: Grey, Charcoal, Tan, Colorado, Brown, Red, Colormix II (Red & Charcoal), Colormix III (Red, Charcoal, & Tan), Colormix I (Tan - Red), Slate (Grey - Charcoal).

2.02 CEMENTITIOUS MATERIALS

- A. Portland Cements shall conform to ASTM Specification C-150.

B. Aggregates shall conform to ASTM Specification C-33 for Normal Weight Concrete Aggregate (no expanded shale or lightweight aggregates) except that grading requirements shall not necessarily apply.

C. Other Constituents:

Coloring pigments, air-intraining agents, integral water repellents, finely ground silica, etc., shall conform to ASTM standards where applicable, or shall be previously established as suitable for use in concrete.

D. Physical Requirements:

1. Compressive Strength - At the time of delivery to the work site, the average compressive strength shall not be less than 8,000 psi with no individually unit strength less than 7,200 psi with testing procedures in accordance with ASTM Standard C-140.
2. Absorption - The average absorption shall not be greater than five percent (5%) with no individual unit absorption greater than seven percent (7%).
3. Proven Field Performance - Satisfying field performance is indicated with units similar in composition, and made with the same manufacturing equipment as those to be supplied to the City, do not exhibit objectionable deterioration after at least one (1) year.

E. Visual Inspection:

1. All units shall be sound and free of defects. Pavers damaged in any manner will be rejected and replaced with new materials at no expense to the City.

F. Sampling and Testing:

1. The Contractor shall submit manufacturer's product data for each type of concrete paver specified.
2. A minimum of three (3) concrete pavers of each type and size specified shall be submitted to the City for approval. Samples shall exhibit the full color range of pavers to be provided.
3. Reports of testing of pressed concrete paver shall be submitted to the City.
4. Testing shall be performed by an independent testing laboratory, and shall conform to ASTM C 140 methods where applicable.
5. Test reports shall indicate the following as a minimum:
 - a. Compressive strength, psi.
 - b. Absorption, 5 hour submersion in cold water.
 - c. Absorption, 24 hour submersion in cold water.
 - d. Maximum saturation coefficient.
 - e. Initial rate of absorption (suction).
 - f. Abrasion index.

g. Freeze - thaw.

G. Rejection:

1. In case the shipment fails to conform to the specified requirements, the manufacturer may sort it, and new test units shall be selected at random by the purchaser from the retained lot and tested at the expense of the manufacturer. In case the second set of test units fails to conform to the specified requirements, the entire lot shall be rejected.

H. Expense of Tests:

The expense of inspection and testing shall be borne by the Contractor.

2.03 SAND LAYING COURSE

- A. The sand laying course shall be a well graded clean washed sharp sand with 100% passing a 3/8" sieve size and a maximum of 3% passing a No. 200 sieve size. Manufactured concrete sand, limestone screening, or similar material may be used. DO NOT USE MASON SAND.

2.04 EDGE RESTRAINT

- A. All edges of the installed paving stone shall be restrained. The type of edge restraint shall be approved at locations as noted on plans.
- B. The edge restraint can be:
 1. Paver Systems-Curb (Precast)
 2. Buildings
 3. Concrete curb or sidewalk (Cast in Place)
 4. Pressure treated timber
 5. Compacted earth
 6. Other suitable method of preventing movement of edge stones
 7. As indicated on the plans

PART 3 - EXECUTION

3.01 CONTRACTOR

The paving stone installer/contractor must have related experience in the installation of interlocking concrete paving stones.

3.02 PREPARATION OF THE BASE COURSE

- A. A suitable base must be prepared as detailed in section 02513 - Asphaltic Concrete Pavers of the project specifications.
- B. The base course shall be shaped to grade and cross section with an allowable tolerance of 1/4" (5mm).
- C. The compacted base shall be 3-1/8" (80 mm) below final grade for 2-3/8" (6cm) pavers and 3-7/8" (100 mm) below final grade for 3-1/8" (8cm) pavers.

3.03 CONSTRUCTION OF THE SAND LAYING COURSE

- A. The finished base course shall be approved before the placement of the sand laying course.
- B. The uncompacted sand laying course shall be spread evenly over the area to be paved and then screeded to a level that will produce 1" (25 mm) thickness when the paving stones have been placed.
- C. Screeded and leveled to the desired elevation, this sand laying course shall not be disturbed in any way.

3.04 LAYING OF CONCRETE PAVING STONES

- A. The paving stones shall be laid in the approved pattern as noted or shown on drawings.
- B. The paving stones shall be laid in such a manner that the desired pattern is maintained and the joints between the stones do not exceed 1/8" (3 mm).
- C. String lines should be used to hold all pattern lines true.
- D. The gaps at the edge of the paver surface shall be filled with standard edge stone or with stones cut to fit. Cutting shall be accomplished to leave a clean edge to the traffic surface using a masonry saw. Scoring and breaking will not be acceptable. No cuts shall result with a paver less than 1/3 of original dimension.
- E. Paving stones shall be vibrated into the sand laying course using a vibrator capable of 3,000 to 5,000 pounds compaction force with the surface clean and joints open.
- F. After vibration, clean masonry type sand containing at least 30% of 1/8" (3mm) particles shall be spread over the paving stone surface, allowed to dry, and vibrated into joints with additional vibrator passes and brushing so as to completely fill joints.
- G. Surplus material shall then be swept from the surface or left on surface during construction time to insure complete filling of joints during initial use. This sand also may provide surface protection from construction debris.

- H. Upon completion of work covered in the Section, the Contractor shall clean up all work areas by removing all debris, surplus material and equipment from the site.

END OF SECTION

SECTION 02520

CONCRETE CURBS AND HEADERS

PART 1 - GENERAL

1.01 SCOPE

The work covered by this section of the specifications consists of furnishing all plant, labor, equipment, appliances and materials and performing all operations in connection the construction of concrete curbs and headers, complete and in place, in strict accordance with these specifications and the applicable drawings and subject to the terms and conditions of this contract.

1.02 REFERENCES

Florida Department of Transportation Standard Specifications for Road and Bridge Construction, (latest edition)

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The concrete mix shall produce standard weight concrete with the following properties to be verified by the use of the appropriate listed test methods.
 - *Compressive strength:* 3,000 psi at 28 days - tested according to ASTM designation C31 (AASHTO T23)
 - *Slump Range:* 2-4 inches - tested according to ASTM designation C143 (AASHTO T119)
- B. Joint materials shall be in accordance with FDOT Specification Section 932

PART 3 - EXECUTION

3.01 CONSTRUCTION METHODS

Concrete curbs and headers shall be constructed of the type and in the locations as shown on the plans.

- A. FORMS: Forms for this work shall be made of either wood or metal. They shall be straight, free from warp or bends, and of sufficient strength, when staked, to resist the pressure of the concrete without springing. If made of wood, they shall be of two (2)

inch surfaced plank; if made of metal, they shall be of approved section and shall have a flat surface on top.

B. CONSTRUCTION: Excavation shall be made to the required depth; and the sub-grade or base upon which the curb or header is placed shall be compacted to 98% AASHTO T-180.

The concrete shall be placed in the forms to the depth specified, and tamped and spaded to prevent honeycomb and until the top of the structure can be floated smooth and the edges rounded to the radius shown on the plans.

Contraction joints shall be placed at intervals of ten feet except where a lesser interval is required for closure, but no section shall be less than four feet in length.

Contraction joints shall be created while the concrete is still plastic by using a grooving tool or by inserting a premolded filler strip, or a groove may be saw cut into the concrete soon after it has hardened. Curb with irregular cracks due to late contraction joint construction will not be accepted.

Expansion joints shall be constructed at all radius points and at other locations indicated on the plans. They shall be located at intervals of 500 feet between other expansion joints, or ends of a run. The joint shall be 1/2 inch in width.

The forms shall be removed within twenty-four (24) hours after the concrete has been placed, and minor defects then filled with mortar composed of one (1) part of Portland Cement and two (2) parts of fine aggregate. Plastering shall not be permitted on the face of the curb; and all rejected curb, or header shall be removed and replaced without additional compensation. The curb top, face and/or header top shall be given a surface finish while the concrete is still green. A brush finish will be required unless noted otherwise; however, additional finishing may be required in areas considered too rough or with minor defects.

After the concrete has been rubbed smooth, it shall be rubbed again until a uniform color is produced, using a thin grout composed of one (1) part of Portland Cement and one (1) part of fine aggregate.

After concrete has set sufficiently, the spaces in front and back of the curb shall be refilled to the required elevation with suitable material, which shall be placed and thoroughly compacted in layers of not more than six (6) inches in thickness.

END OF SECTION

SECTION 02546

FINAL ASPHALTIC CONCRETE SURFACE COURSE

PART 1 - GENERAL

1.01 SCOPE

The work to be performed under this item shall include the selling, delivering and installing of final asphaltic concrete surface courses as herein specified.

1.02 REFERENCES

Standards applicable in this Specification shall be:

- A. Florida Department of Transportation - Standard Specifications for Road and Bridge Construction (Latest Edition).
 1. Section 300 - Prime and Tack Coats for Base Courses. Subsections (1, 2.3, 3, 4, 5, 7).
 2. Section 320 - Hot Bituminous Mixtures - Plant, Methods and Equipment. Subsections (1, 2.1, 2.5 to 2.13, 3, 4, 5).
 3. Section 330 - Hot Bituminous Mixtures - General Construction Requirements. Subsections (1, 3 to 13).
 4. Section 334 - Type S-1 or SP-12.5, Asphaltic Concrete.

1.03 SUBMITTALS

- A. Manufacturer's Data - Prior to fabrication or installation of the final asphaltic concrete surface course, the Contractor shall furnish to the Engineer, for review and approval the following:
 1. Certification from the manufacturer that their plant meets the requirements of Section 320 above.
 2. Formula for job mix.

PART 2 - MATERIALS

2.01 TACK COAT

Unless otherwise specified by the Engineer, the material used for the tack coat shall be Emulsified Asphalt, Grade RS-2, Section 300-2.3 F.D.O.T. Standard Specification for Road and Bridge Construction.

2.02 FINAL ASPHALTIC SURFACE COURSES

The material used shall be Type S-III or SP-9.5 asphaltic concrete conforming to Section 334 of the F.D.O.T. Standard Specifications for Road and Bridge Construction.

PART 3 - EXECUTION

3.01 CLEANING SURFACES

Prior to the laying of the surface courses, the surface of the pavement or base to be covered shall be cleaned of all loose and deleterious material by the use of power brooming or hand brooming where necessary. All such material shall be collected and disposed of by the Contractor.

3.02 PATCHING AND LEVELING COURSES

Where a surface course is to be constructed on an existing paved surface which is irregular, said surface shall be brought to proper grade and cross section by the application of patching or leveling courses.

3.03 APPLICATION OF TACK COAT

The material shall be heated to a suitable temperature and applied in a thin, uniform layer at a rate of between 0.02 and 0.08 gallons per square yard. The tack coat shall be applied sufficiently in advance of the surface course laying to permit drying but not so far in advance as to lose its adhesiveness as a result of being covered with dust. The tack coat shall be kept free from traffic until the surface course has been laid.

3.04 TRANSPORTATION OF THE ASPHALT

The surface course shall be transported in tight vehicles previously cleaned of all foreign material. The inside surface of the truck bodies shall be only thinly coated with soapy water or an approved emulsion containing not over 5% oil. Kerosine, gasoline or similar products shall not be used. After coating and before loading, the truck bodies shall be raised and drained of all excess liquids.

3.05 INSTALLATION OF FINAL ASPHALTIC CONCRETE SURFACE COURSE

Prior to final acceptance, or as directed by the Engineer, the Contractor shall install a 1-inch layer of Type S-1 Final Asphaltic Concrete Surface course over the entire street width as directed by the Engineer. A leveling course as indicated

on the storm drainage plan sheets shall be placed prior to the final asphaltic concrete surface course under this item. All other placement of pavement shall be as shown on the "Restoration Detail" for non state-owned public pavement.

Mechanical spreading and screeding equipment shall be of an approved type that is self-propelled and can be steered. It shall be equipped with a receiving and disbursing hopper and a mechanical screed or strike-off member capable of adjustment to regulate the depth of material being spread. Tandem Type 5 to 12 ton steel- wheeled rollers shall be used for sealing. Self- Propelled, pneumatic-tired traffic rollers equipped with at least 7b smooth tread, low pressure tires, having a total weight of 6 to 10 tons shall be used for final rolling.

3.06 FIELD QUALITY CONTROL

The final surface course of all pavements will be required to be checked by a rolling straightedge. The finished surface shall not vary more than 3/16 inch from the straightedge applied parallel to the centerline of the pavement. The straightedge shall have an effective length of 15 feet.

END OF SECTION

SECTION 02550

ASPHALTIC CONCRETE OVERLAY

PART 1 - GENERAL

1.10 SCOPE

The work to be performed under this item shall include the selling, delivering and installing of final asphaltic concrete surface courses as herein specified.

1.02 REFERENCES

Standards applicable in this Specification shall be:

- A. Florida Department of Transportation - Standard Specifications for Road and Bridge Construction (1986).
 1. Section 300 - Prime and Tack Coats for Base Courses. Subsections (1, 2.3, 3, 4, 5, 7).
 2. Section 320 - Hot Bituminous Mixtures - Plant, Methods and Equipment. Subsections (1, 2.1, 2.5, to 2.13, 3, 4, 5).
 3. Section 330 - Hot Bituminous Mixtures - General Construction Requirements. Subsections (1, 3 to 13).
 4. Section 331 - Type S-III, Asphaltic Concrete. Subsections (1 to 5).

1.03 SUBMITTALS

- A. Manufacturer's Data - Prior to fabrication or installation of the final asphaltic concrete surface course, the Contractor shall furnish to the Engineer, for review and approval the following:
 1. Certification from the manufacturer that their plant meets the requirements of Section 320 above.
 2. Formula for job mix.

PART 2 - MATERIALS

2.01 TACK COAT

Unless otherwise specified by the Engineer, the material used for the tack coat shall be Emulsified Asphalt, Grade RS-2, Section 300-2.3 F.D.O.T. Specification.

2.02 ASPHALTIC CONCRETE

Asphaltic concrete surface course - Type S-III asphaltic concrete wearing surface, 1 inch in compacted thickness or as indicated on the Drawings, in accordance with Sections 330-10 Compacting Mixture and 331 Type S-III Asphaltic Concrete of aforesaid DOT Standard Specification.

PART 3 - EXECUTION

3.01 CLEANING SURFACES

Prior to the laying of the surface courses, the surface of the pavement or base to be covered shall be cleaned of all loose and deleterious material by the use of power brooming or hand brooming where necessary. All such material shall be collected and disposed of by the Contractor.

3.02 PATCHING AND LEVELING COURSES

Where a surface course is to be constructed on an existing paved surface which is irregular, said surface shall be brought to proper grade and cross section by the application of patching or leveling courses.

3.03 APPLICATION OF TACK COAT

The material shall be heated to a suitable temperature and applied in a thin, uniform layer at a rate of between 0.02 and 0.08 gallons per square yard. The tack coat shall be applied sufficiently in advance of the surface course laying to permit drying but not so far in advance as to lose its adhesiveness as a result of being covered with dust. The tack coat shall be kept free from traffic until the surface course has been laid.

3.04 TRANSPORTATION OF THE ASPHALT

The surface course shall be transported in tight vehicles previously cleaned of all foreign material. The inside surface of the truck bodies shall be only thinly coated with soapy water or an approved emulsion containing not over 5 percent oil. Kerosine, gasoline or similar products shall not be used. After coating and before loading, the truck bodies shall be raised and drained of all excess liquids.

3.05 INSTALLATION OF ASPHALTIC CONCRETE

Prior to final acceptance, or as directed by the Engineer, the Contractor shall install a 1-inch layer of Type S-III (as indicated on the drawings) Asphaltic Concrete over the entire street width as directed by the Engineer. A leveling course as indicated on the

plan sheets shall be placed prior to the final asphaltic concrete surface course under this item.

Mechanical spreading and screeding equipment shall be of an approved type that is self-propelled and can be steered. It shall be equipped with a receiving and disbursing hopper and a mechanical screed or strike-off member capable of adjustment to regulate the depth of material being spread. Tandem Type 5 to 12 ton steel- wheeled rollers shall be used for sealing. Self- Propelled, pneumatic-tired traffic rollers equipped with at least 7b smooth tread, low pressure tires, having a total weight of 6 to 10 tons shall be used for final rolling.

3.06 FIELD QUALITY CONTROL

The final surface course of all pavements will be required to be checked by a rolling straightedge. The finished surface shall not vary more than 3/16 inch from the straightedge applied parallel to the centerline of the pavement. The straightedge shall have an effective length of 15 feet.

END OF SECTION

SECTION 02570

MILLING OF EXISTING ASPHALT PAVEMENT

PART 1 - GENERAL

1.10 SCOPE

The work specified in this Section consists of removing existing asphaltic concrete pavement by milling to improve the rideability of the finished pavement, to lower the finished grade adjacent to existing curb prior to resurfacing, or to completely remove existing pavement.

When milling to improve rideability, an average depth of cut will be specified in the plans.

Unless otherwise specified, the milled material becomes the property of the Contractor.

1.02 REFERENCES

Florida Department of Transportation - Standard Specification for Road and Bridge Construction (Latest Edition)

PART 2 - EQUIPMENT

2.01 MILLING MACHINE

The milling machine shall be capable of maintaining a depth of cut and cross slope that will achieve the results specified in the plans and specifications. The overall length of the machine (out to out measurement excluding the conveyor) shall be a minimum of 18 feet. The minimum cutting width shall be six feet.

The milling machine shall be equipped with a built-in automatic grade control system that can control the transverse slope and the longitudinal profile to produce the specified results.

Any commercially manufactured milling machine meeting the above requirements will be approved to start the project. If it becomes evident after milling has started that the milling machine cannot consistently produce the specified results, the milling machine will be rejected for further use.

When milling to lower the grade adjacent to existing curb or other areas where it is impractical to use the above described equipment, the use of a smaller milling machine will be permitted.

The milling machine shall be equipped with means to effectively limit the amount of dust escaping the removal operation. For complete pavement removal, the use of alternate

removal and crushing equipment, in lieu of the equipment specified above, may be approved by the Engineer.

PART 3 - EXECUTION

3.01 CONSTRUCTION

When milling to improve rideability, the existing pavement shall be removed to the average depth specified in the plans, in a manner that will restore the pavement surface to a uniform cross section and longitudinal profile. The Project Engineer may require the use of a stringline to ensure maintaining the proper alignment.

The contractor may elect to make multiple cuts to achieve the required pavement configuration or depth of cut.

The milling machine shall be operated to effectively minimize the amount of dust being emitted from the machine. Prewetting of the pavement may be required.

If traffic is to be maintained on the milled surface prior to the placement of the new asphaltic concrete, the pattern of striations shall be such as to produce an acceptable riding surface.

Prior to opening an area which has been milled to traffic, the pavement shall be thoroughly swept with a power broom or other approved equipment to remove to the greatest extent practicable, fine material which will dust under traffic. This operation shall be conducted in a manner so as to minimize the potential for creation of a traffic hazard and to minimize air pollution.

Sweeping of the milled surface with a power broom will be required prior to placing asphaltic concrete.

In urban and other sensitive areas where dust would cause a serious problem, the Contractor shall use a street sweeper (using water) or other equipment capable of removing and controlling dust. Approval of the use of such equipment is contingent upon its demonstrated ability to do the work.

To prevent, to the greatest extent practicable, the infiltration of milled material into the storm sewer system when the milling operation is within the limits of and adjacent to a municipal curb and gutter or a closed drainage system, the sweeping operation shall be performed immediately after the milling operations or as directly by the Engineer.

END OF SECTION

SECTION 02574

PAVEMENT REMOVAL AND REPLACEMENT

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Work included under this Section consists of cutting, removing, protecting and replacing existing pavements of the various types encountered, roadways, driveways, sidewalks, curb and combination curb and gutter.
- B. Protection of Existing Improvements: The Contractor shall be responsible for the protection of all pavements, sidewalks and other improvements within the work area. All damage to such improvements, as a result of the Contractor's operations, beyond the limits of the work of pavement replacement as described herein, shall be repaired by the Contractor at his expense.

PART 2 - PRODUCTS

2.01 MATERIALS

Materials, including limerock, bituminous prime and tack coat, and asphaltic concrete for the above work shall meet the requirements established therefore by the FDOT Specifications.

1. Limerock shall be Miami or Ocala Limerock.
2. Bituminous prime coat material shall be cutback asphalt Grade RC-70.
3. Bituminous tack coat material shall be emulsified asphalt Grade RS-2.
4. Asphaltic concrete shall be Type S-III

PART 3 - EXECUTION

3.01 PREPARATION

Pedestrian or school crossings: Where the work crosses or interferes with school or pedestrian crossings, extreme care shall be taken by the contractor to insure the safety of school children or other pedestrians.

3.02 PERFORMANCE

A. Removals:

1. *Pavement Removal:* Where existing pavement is to be removed, the surfacing shall be mechanical saw cut prior to trench excavation, leaving a uniform and straight edge, with minimum disturbance to the remaining adjacent surfacing. The width of cut for this phase of existing pavement removal shall be minimal.
2. *Sidewalk, Drive, and Curb Removal:* Concrete sidewalks, curbs, combination curb and gutter, walks, drive ribbons, or driveways shall be removed by initially sawing the structure, with a suitable power saw, as specified above for pavement. When a formed joint in the concrete exists within 3 feet of the proposed saw cut and parallels the proposed saw cut, the removal line shall be extended to the formed joint. After sawing, the material shall be removed.

B. Restorations:

1. *General:* Street or roadway pavement cut and removed in connection with trench excavation shall be replaced or restored in equal or better condition than the original and as shown on the Drawings. The Drawings indicate minimum requirements.
2. *Pavement Restoration - Asphalt:*
 - a. Limerock base course shall be compacted for its full thickness to not less than 98 percent of maximum density as determined by AASHTO T-180.
 - b. Construction methods and equipment shall generally meet the requirements therefore as established in the FDOT Specifications, but shall be modified to meet the relatively narrow strip construction conditions. Any such modifications shall be approved by the Engineer prior to their use.
 - c. Joints with existing surface and base shall be straight and neat. If necessary to obtain a straight net joint, the Contractor shall cut out sufficient existing material and replace it with new material.
 - d. The upper surface of the completed base course shall be compacted to an elevation to permit the full depth of the surface course to be of the pavement surface. The completed surface shall match the line and grade of the existing surface. When pavement is removed to the edge of the roadway, the replaced base course shall extend not less than 6-inches beyond the edge of the surfacing constructed without deviating from the grade
3. *Driveway Restoration - Asphalt:* Driveway pavement with limerock base cut and removed in connection with trench excavation shall be replaced or restored as specified above for street or roadway pavement, except the new limerock base course shall equal the existing base course in thickness, except that in no case shall new driveway base course be less than 6-inches in

thickness. Muck or unsuitable material found under existing driveway construction will not be removed and replaced.

4. *Concrete, Sidewalk, Walkway, Driveway Ribbon and Curb Restoration.*
 - a. Concrete sidewalks, walkways, driveways, driveway ribbons and curbs required to be removed for the installation of facilities under this Contract shall be restored. Class B concrete shall be used in all cases.
 - b. Replaced portions of these items shall conform to the lines, grades and cross sections of the removed portions. Concrete sidewalks and walkways shall be of 4-inch thickness; concrete driveways and driveway ribbons shall be 6-inch thickness. Replaced concrete curb and/or gutter shall joint neatly to the remaining section.
5. *Pavement Restoration - Concrete:* Rigid pavement shall be replaced in kind with Class B concrete, using high early strength cement.

END OF SECTION

SECTION 02580

PAVEMENT MARKINGS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The work included in this Section consists of applying pavement markings as required to restore disturbed pavement areas. Work shall adhere to all City and FDOT standards.

1.02 RELATED REFERENCES

- A. All markings shall conform to the requirements of the Manual of Uniform Traffic Control Devices, and FDOT Roadway and Traffic Design Standards.
- B. Thermoplastic shall conform to the requirements of the Florida D.O.T. Standard Specifications for Road and Bridge Construction (Section 711) latest edition.

PART 2 - PRODUCTS

2.01 THERMOPLASTIC

- A. All markings to be Alkyd thermoplastic only.

2.02 TEMPORARY MARKINGS

- A. Temporary markings on final asphalt shall be only for backed construction tape. Lower asphalt lifts may be marked with paint or any other approved marking material.

2.03 REFLECTIVE PAVEMENT MARKERS (RPM'S)

- A. RPM'S shall meet FDOT Class B Specifications, and shall be installed per Palm Beach County Typical T-3-89-004-PS.

PART 3 - EXECUTION

3.01 APPLICATION

- A. Thermoplastic shall not be installed on roadway until five (5) calendar days after final lift of asphalt has been completed, with the exception of friction course which shall be thirty (30) days.
- B. If existing marking material is not compatible with Alkyd thermoplastic, it shall be removed prior to installation of new markings.

END OF SECTION

SECTION 02605

SEWERAGE AND DRAINAGE MANHOLES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish and install manholes as shown on the drawings, including:
 - 1. Precast concrete sections
 - 2. Brick
 - 3. Mortar
 - 4. Cast iron frame and lids

1.02 RELATED WORK

- A. Section 02720: Storm Drainage System
- B. Section 02221: Trenching, Backfilling and Compacting
- C. Section 02513: Asphaltic Concrete Paving

1.03 REFERENCE STANDARDS

- A. ASTM C478: Precast Reinforced Concrete Manhole Sections.
- B. ASTM C443: Joints For Circular Concrete Sewer and Culvert Pipe Using Rubber Gaskets.

1.04 SUBMITTALS

- A. Submit Shop Drawings in accordance with Section 01340.

PART 2 - PRODUCTS

2.01 MANHOLES

- A. Manholes shall be 48 inch diameter, unless otherwise indicated, constructed of precast ring block and/or precast concrete ring, eight inch minimum thickness construction, unless otherwise indicated on the Drawings.

- B. Concrete floor slab shall be minimum eight inches thick with #6 bar at six inch spacing each way or precast bases.
- C. Top section shall be offset cone 2 feet 8 inches high with 24 inch opening at top.
- D. Joints shall be a compression type, neoprene gasket joint conforming to ASTM C443, of a design approved by the Engineer.
- E. Lifting holes through the structures are not permitted.
- F. All grout used for sealing around pipe openings shall be of a non-shrinking type, acceptable to the Engineer, designed for use in water. All openings and joints shall be sealed water-tight.
- G. Precast manhole tops shall terminate at such elevations as will permit laying up a minimum of five inches of brick under the manhole frame to make allowance for future street grade adjustments.
- H. Drop connections, where required on precast manholes, shall be cast monolithically with the manhole elements.
- I. Inverts shall be formed of sewer pipe or of mortar and brick, as described below, to provide a smooth flowing channel of the exact shape of the sewer to which it connects. All inverts of manholes shall be shaped while the manholes are under construction. All inverts shall follow the grades of the pipe entering the manholes. Changes in direction of the sewer and entering branch or branches shall have a true curve of as large a radius as the size of the manhole will permit.
- J. Where shown on the Drawings or ordered by the Engineer, the Contractor shall provide manholes with stub lines for connection to future sewer lines. Provide the end of each stub line with a bell and close by means of an approved plug. This plug shall be removed, at some later time, without injury to the pipe. Reference each stub accurately to the center of the manhole, and record the actual invert elevation of each end.

PART 3 - EXECUTION

3.01 LEAK PROOFING

- A. Walls shall be sealed against leakage by the application on the complete exterior surface of a plaster coat of cement mortar of approximately the same composition as mortar for masonry joints, applied not less than 1/2 inch in thickness at any point by steel trowel as the wall is built. Precast manholes shall be sealed at ring joints.

B. Walls alternatively may be sealed against leakage by a heavy brush-coat application of an approved waterproofing compound, mixed and applied in accordance with manufacturer's recommendations. Not less than 50 pounds of compound shall be used on each 125 square feet of exterior surface area, and the coverage of block and joints shall be continuous and uniform. Joints must be struck and troweled flush, and dried for at least twenty four (24) hours under good curing conditions, before seal coat is applied.

3.02 INSTALLATION

No backfilling of excavation, above elevation of top of interior concrete fill, shall be performed until waterproof coating has been cured for at least twenty four (24) hours and inspected and approved by the Engineer. Any defective coverage shall be repaired to the satisfaction of the Engineer before backfilling is performed.

END OF SECTION

SECTION 02610

POLYETHYLENE ENCASEMENT

PART 1 - GENERAL

1.10 SCOPE

This standard covers materials and installation procedures for polyethylene encasement to be applied to underground installations of ductile-iron pipe. This standard also may be used for polyethylene encasement of fittings, valves, and other appurtenances to ductile-iron pipe systems.

1.02 REFERENCES

AWWA C105 (ANSI A21.5) polyethylene encasement for ductile-iron piping for water and other liquids.

1.03 RELATED WORK

1. Section 02661 - Water Mains
2. Section 02645 - Valves, Cocks, Hydrants and Appurtenances.

PART 2 - MATERIALS

2.01 POLYETHYLENE FILM

A. Polyethylene -

Polyethylene film shall be manufactured of virgin polyethylene material conforming to the following requirements of ASTM* D1248-84, Standard Specification for Polyethylene Plastics Molding and Extrusion Materials.

Type: I

Class: A (natural color) or C (black)

Grade: E-1

Flow rate (formerly melt index): 0.4 maximum Dielectric strength: Volume resistivity, minimum ohm.cm=1015

B. Polyethylene film -

Tensile strength: 1200 psi (8.3 MPa) minimum Elongation: 300 percent minimum

C. Thickness -

Polyethylene film shall have a nominal thickness of 0.008 in. (8 mil or 200 um). The minus tolerance on thickness is 10 percent of the nominal thickness.

D. Tube size or sheet width -

Tube size for each pipe diameter shall be 20 inches for 6" DIP and 24 inches for 8" DIP.

PART B - INSTALLATION

3.01 GENERAL

The polyethylene encasement shall prevent contact between the pipe and the surrounding backfill and bedding material, but is not intended to be a completely airtight or watertight enclosure. All lumps of clay, mud, cinders, etc. on the pipe surface shall be removed prior to installation of the polyethylene encasement. During installation, care shall be exercised to prevent soil or embedment material from becoming trapped between the pipe and the polyethylene.

The polyethylene film shall be fitted to the contour of the pipe to effect a snug, but not tight, encasement with minimum space between the polyethylene and the pipe. Sufficient slack shall be provided in contouring to prevent stretching the polyethylene where it bridges irregular surfaces, such as bell-spigot interfaces, bolted joints, or fittings, and to prevent damage to the polyethylene due to backfilling operations. Overlaps and ends shall be secured with adhesive tape, string, or any other material capable of holding the polyethylene encasement in place until backfilling operations are complete.

For installations below the water table and/or in areas subject to tidal actions, it is recommended that both ends of the polyethylene tube be sealed as thoroughly as possible with adhesive tape at the joint overlap.

3.02 PIPE

This standard includes three methods of installation of polyethylene encasement on pipe. Methods A and B are for use with polyethylene tubes.

3.03 METHOD A

Cut polyethylene tube to a length approximately 2 feet (0.6 m) longer than the pipe section. Slip the tube around the pipe, centering it to provide a 1-ft (0.3-m) overlap on each adjacent pipe section, and bunching it accordion-fashion lengthwise until it clears the pipe ends. Lower the pipe into the trench and make up the pipe joint with the preceding section of pipe. A shallow bell hole must be made at joints to facilitate installation of the polyethylene tube.

After assembling the pipe joint, make the overlap of the polyethylene tube. Pull the bunched polyethylene from the preceding length of pipe, slip it over the end of the new length of pipe, and secure it in place. Then slip the end of the polyethylene from the new pipe section over the end of the first wrap until it overlaps the joint at the end of the preceding length of pipe. Secure the overlap in place. Take up the slack width at the top

of the pipe to make a snug, but not tight, fit along the barrel of the pipe, securing the fold at quarter points.

Any cuts, tears, punctures, or other damage to the polyethylene shall be repaired as described in paragraph 3.07. Proceed with installation of the next section of pipe in the same manner.

3.04 METHOD B

(Refer to Figure 5.3) Cut polyethylene tube to a length approximately 1 ft (0.3 m) shorter than that of the pipe section. Slip the tube around the pipe, centering it to provide 6 in.

(15 cm) of bare pipe at each end. Take up the slack width at the top of the pipe to make a snug, but not tight, fit along the barrel of the pipe, securing the fold at quarter points; secure the ends as described in paragraph 3.01.

Before making up a joint, slip a 3-ft (0.9 -m) length of polyethylene tube over the end of the preceding pipe section, bunching it accordion-fashion lengthwise. After overlapping the polyethylene previously installed on each adjacent section of pipe

Any cuts, tears, punctures, or other damage to the polyethylene shall be repaired as described in paragraph 3.07. Proceed with installation of the next section of pipe in the same manner.

3.05 PIPE-SHAPED APPURTENANCES

Cover bends, reducers, offsets, and other pipe-shaped appurtenances with polyethylene in the same manner as the pipe.

3.06 ODD-SHAPED APPURTENANCES

When it is not practical to wrap valves, tees, crosses, and other odd-shaped pieces in a tube, wrap with a flat sheet or split length of polyethylene tube by passing the sheet under the appurtenance and bringing it up around the body. Make seams by bringing the edges together, folding over twice, and taping down. Handle width and overlaps at joints as described in paragraph 3.30.

3.07 REPAIRS

Repair any cuts, tears, punctures, or damage to polyethylene with adhesive tape or with a short length of polyethylene sheet or a tube cut open, wrapped around the pipe to cover the damaged area, and secured in place.

3.08 OPENINGS IN ENCASEMENT

Provide openings for branches, service taps, blowoffs, air valves, and similar appurtenances by making an X-shaped cut in the polyethylene and temporarily folding back the film. After the appurtenance is installed, tape the slack securely to the appurtenance and repair the cut, as well as any other damaged areas in the polyethylene, with tape. Service taps may also be made directly through the polyethylene, with any resulting damaged areas being repaired as described above.

3.09 JUNCTIONS BETWEEN WRAPPED AND UNWRAPPED PIPE

Where polyethylene-wrapped pipe joins an adjacent pipe that is not wrapped, extend the polyethylene wrap to cover the adjacent pipe for a distance of at least 3 ft (0.9 m). Secure the end with circumferential turns of tape.

Service lines of dissimilar metals shall be wrapped with polyethylene or a suitable dielectric tape for a minimum clear distance of 3 ft (0.9 m) away from the ductile-iron pipe.

3.10 BACKFILL FOR POLYETHYLENE-WRAPPED PIPE

Use the same backfill material as that specified for pipe without polyethylene wrap, exercising care to prevent damage to the polyethylene wrapping when placing backfill. Backfill material shall be free from cinders, refuse, boulders, rocks, stones, or other material that could damage polyethylene. In general, backfilling practice should be in accordance with the latest revision of AWWA C600, Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances.

END OF SECTION

SECTION 02720

STORM DRAINAGE SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

The extent of the storm drainage system is shown on the drawings and/or specified.

1.02 RELATED WORK

- A. Section 02110: Clearing and Grubbing
- B. Section 02210: Excavation and Swale Grading
- C. Section 02220: Trenching, Backfilling and Compacting

1.03 SUBMITTALS

- A. Submit shop drawings for pipe, inlets, manholes, frames and covers.

PART 2 - PRODUCTS

2.01 REINFORCED CONCRETE PIPE

- A. Reinforced concrete pipe for the construction of the storm drainage system shall be manufactured in accordance with Section 430 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction and ASTM C76. The reinforced concrete pipe shall meet the design requirements for Class III, Wall B pipe as specified on Table 3, ASTM C76. Location and size of pipe is as shown on the drawings.
- B. The reinforced concrete pipe shall be sealed by the use of round rubber gaskets. The rubber gaskets used shall meet the requirements as specified in Section 941 of the Standard Specifications for Road and Bridge Construction and ASTM C76.

2.02 CORRUGATED ALUMINUM PIPE

- A. Corrugated Aluminum pipe for the construction of the storm drainage system shall be manufactured in accordance with Section 945 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

2.03 MANHOLES AND INLETS

- A. Precast manholes and inlets shall be manufactured in accordance with Section 425 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction and the Department of Transportation Road Design Standards.
- B. Manhole frames and covers, and inlet frames and grated shall be the type and duty as shown on the drawings. All castings shall be true to pattern in form, have the correct dimensions and be free from faults and cracks. Bearing surfaces between frames and covers shall be machine fitted to prevent rocking.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Piping and appurtenances for sewers shall be of the type and material specified in the applicable sections of the Detailed Specifications. All pipe, fittings, jointing, materials, grates, manhole frames and covers, and other appurtenances shall be new material to be included in the work; and if not specifically described in these specifications, shall be of the best quality and entirely suitable for the service intended. All such material shall be approved by the engineer prior to installation.
- B. Pipe shall be protected during storage and handling against impact shocks, or free fall. Pipe shall be kept clean at all times and no pipe shall be used that does not conform fully with standards or specifications hereinafter described.
- C. Each pipe section shall be laid in strict conformance with the line and grade as shown on the construction plans. Three (3) batter boards and a top line shall be used when pipe is laid, unless another method of checking the inner grade is approved by the engineer. The laying of pipe in finished trenches shall commence at the lowest point with the bell end laid upgrade.
- D. The contractor shall provide and maintain on the job site at all times, a guage rod of sufficient length to reach from the invert of the pipe being laid to the top line secured on the batter boards. The gauge rod shall be graduated and numbered each foot of its entire length and shall be equipped with either a plumb line or two (2) spirit levels.
- E. Construction using any of the several type laser beam devices is generally acceptable provided same is in good repair and calibration and a level and level rod is used to check for grade at catch basins, manholes and outfalls. Use of levels and/or transits alone is discouraged and generally will not be permitted.
- F. Prior to installing the pipe, the rubber gasket shall be placed on the tongue of the pipe, in accordance with the manufacturer's recommendations, but not more than

twenty-four (24) hours prior to installation of the pipe. The tongue end shall be protected at all times from the sun, blowing dust, or other deleterious agents. Gaskets shall be inspected before installation of the pipe and any loose or improperly affixed gaskets shall be removed and replaced to the satisfaction of the engineer.

- G. Pipe shall be set firmly according to the lines and grade; and preparatory to making joints for concrete pipe, all surfaces of the portion of the pipe to be jointed shall be thoroughly cleaned. The pipe shall be laid with the groove upstream. A shallow excavation shall be made underneath the pipe at the joint.
- H. Immediately prior to installation, the entire interior of the groove of the pipe already installed, and the rubber gasket of the pipe to be installed shall be coated with an approved vegetable soap lubricant. The groove and spigot ends shall be cleaned prior to application of the lubricant. The pipe shall then be aligned with the previously installed pipe and the joint pulled together. The joint shall be pulled by the use of interior or exterior pull jacks or winches, anchored by suitable means. The choice of method and type of equipment will depend on trench conditions, type and size of pipe, and its ability to properly seat the gasket. If, while making the joint, the gasket becomes loose and can be seen through the exterior joint recess, when the joint is pulled up to within one (1) inch of closure, the pipe shall be removed and the joint remade to the satisfaction of the engineer.

3.02 EARTHWORK

Excavation of trenches, preparation of trench bottoms, backfilling and other earthwork in connection with installation of storm sewers shall be in accordance with the section: 02220 Trenching, Backfilling and Compacting for piping systems.

3.03 RESPONSIBILITY

The contractor shall be held strictly responsible for all parts of the work that bear the load of the backfill. If structural failures in the sewers or appurtenances develop within one (1) year from the date of final acceptance of the work, the contractor shall be required to replace all faulty material at his full expense. To this end, the contractor is advised to purchase material under a guarantee from the manufacturer, guaranteeing proper service under conditions which are established by the drawings, specifications and local conditions.

END OF SECTION

SECTION 02730

SANITARY SEWER PIPE

PART 1 - GENERAL

1.01 DESCRIPTION

The work of this section includes, but is not limited to:

1. Sanitary sewer gravity pipelines.
2. Sanitary sewer pressure pipelines.
3. Laterals/service connections.

1.03 RELATED WORK:

Section 02220: Trenching, Backfilling and Compaction

1.02 QUALITY ASSURANCE

A. Reference Standards:

1. American National Standards Institute (ANSI):
A21.4 - 1974 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
A21.11 - 1972 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
A21.51 - 1984 Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for water or other Liquids.
2. American Society for Testing and Materials (ASTM):
D1248 Polyethylene plastics moulding and extrusion materials for ductile-iron pipe & fittings.
D1785-76 Specification for Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120.
D2241-78 Specification for Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR).
D2466-76 Specification for Socket-Type PVC Plastic Pipe Fittings, Schedule 40.
D3033-79 Specification for Type PSP Polyvinyl Chloride (PVC) Sewer Pipe and Fittings.
D3034-78 Specification for Type PMS Polyvinyl Chloride (PVC) Sewer Pipe and Fittings.
D3212-76 Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
F477-76 Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

B. Reject materials contaminated with gasoline, lubricating oil, liquid or gaseous fuel, aromatic compounds, paint solvent, paint thinner, or acid.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery and Handling:

1. Do not place materials on private property without written permission of the property owner.
2. During loading, transporting and unloading, exercise care to prevent damage to materials.
3. Do not drop pipe or fittings. Avoid shock or damage at all times.
4. Take measures to prevent damage to the exterior surface or internal lining of the pipe.

B. Storage:

1. Pipe may be strung along alignment where approved by the Engineer.
2. Do not stack pipe higher than recommended by the pipe manufacturer.
3. Store gaskets for mechanical and push-on joints in a cool, dry location out of direct sunlight and not in contact with petroleum products.

PART 2 - PRODUCTS

2.01 POLYVINYLCHLORIDE (PVC) PIPE

A. Gravity Pipe and Fittings:

1. Pipe 15-inch diameter and smaller: ASTM D3033 or ASTM D3034, SDR-35 (Johns-Manville, Ring-Tite, or approved equal).
2. Pipe 18-inch to 27-inch diameter: ASTM F679 (Johns-Mansville Permaloc or approved equal).
3. Flexible Elastomeric Seals: ASTM D3212 Seal Material: ASTM F477.

2.02 DUCTILE-IRON PIPE

A. Pipe:

1. AWWA C151-81 ANSI A21.51, Thickness Class as shown (Class 52 Min.)
2. ASTM Standard D1248 "Polyethylene Plastics Moulding and Extrusion Materials". (Virgin Polyethylene, compounded with carbon black).

B. Fittings:

1. Ductile-Iron, ANSI A21.10
2. Provide with standard lining as for ductile-iron pipe for force mains.

C. Joints: ANSI A21.11

1. Where not specifically shown on the contract drawings, joints may be either mechanical joint or push-on joint as specified by AWWA C151 (ANSI A 21.51), (Tyton) (Usiflex).

D. Rubber gaskets, Lubricants, Glands, Bolts and Nuts: ANSI A21.11.

2.03 **STEEL CASING PIPE**

A. Pipe: ASTM A53; 35,000 psi minimum yield strength, asphalt coated.

1. Wall thickness as indicated on the drawings.

B. Joints: Electric resistance welded.

PART 3 - EXECUTION

3.01 PREPARATION

A. Perform trench excavation to the line and grade indicated on the Contract Drawings and as specified in Section 02220. Remove all muck and organic material.

B. Provide pipe protection as specified in Section 02220 for each type of pipe used. Place aggregate in a manner to avoid segregation, and compact to the maximum practical density so that the pipe can be laid to the required tolerances.

3.02 LAYING PIPE IN TRENCHES

A. Use laser alignment instruments during pipe laying operations. Instruments should be checked and calibrated periodically.

B. Lower pipe into trench using handling equipment designed for the purpose to assure safety of personnel and to avoid damage to pipe. Do not drop pipe.

C. Lay pipe proceeding upgrade with the bell or groove pointing upstream.

D. Lay pipe to a true uniform line with the barrel of the pipe resting solidly in pipe protection material throughout its length. For pipe lines under paved areas trench bottom to be lined with geo-textile fabric material to enclose all rock material added to trench. Excavate recesses in pipe protection material to accommodate joints,

fittings and appurtenances. Do not subject pipe to a blow or shock to achieve solid bearing or grade.

E. Lay each section of pipe in such a manner as to form a close concentric joint with the adjoining section and to avoid offsets in the flow line.

F. Clean and inspect each section of pipe before joining. Assemble to provide tight, flexible joints that permit movement caused by expansion, contraction, and ground movement. Use lubricant recommended by the pipe or fittings manufacturer for making joints. If unusual joining resistance is encountered or if the pipe can not be fully inserted into the bell, disassemble joints, inspect for damage, reclean joint components and reassemble joints.

G. Assemble joints in accordance with recommendations of the manufacturer.

1. *Push-on-Joints:*

- a. Clean the inside of the bell and the outside of the spigot. Insert rubber gasket into the bell recess.
- b. Apply a thin film of gasket lubricant to either the inside of the gasket or the spigot and of the pipe, or both.
- c. Insert the spigot end of the pipe into the socket using care to keep the joint from contacting the ground. Complete the joint by forcing the plain end of the bottom of the socket. Mark pipe that is not furnished with a depth mark before assembly to assure that the spigot is fully inserted.

2. *Mechanical Joints:*

- a. Wash the socket and plain end. Apply a thin film of soapy water. Slip the gland and gasket over the plain end of the pipe. Apply soapy water to gasket.
- b. Insert the plain end of the pipe into the socket and seat the gasket evenly in the socket.
- c. Slide the gland into position, insert bolts, and finger-tighten nuts.
- d. Bring bolts to uniform tightness. Tighten bolts 180 degrees apart, alternately.

H. Disassemble and remake improperly assembled joints using a new gasket.

I. Check each pipe installed as to line and grade in place. Correct deviation from grade immediately. A deviation from the designed grade as shown on the Contract Drawings, or deflection of pipe joints will be cause for rejection.

J. Place sufficient backfill on each section of pipe as it is laid, to hold firmly in place.

K. Clean interior of the pipe as work progresses. Where cleaning after laying is difficult because of small pipe size, use a suitable swab or drag in the pipe and pull forward past each joint immediately after the jointing has been completed.

- L. Keep trenches and excavations free of water during construction.
- M. When the work is not in progress, and at the end of each workday, securely plug open ends of pipe and fittings to prevent trench water, earth, or other substances from entering the pipes or fittings.

3.03 **WYE BRANCHES AND TEES**

- A. Install wye branches or pipe tees at locations designated by the Engineer concurrent with pipe laying operations. Use standard fittings of the same material and joint type as the pipeline into which they are installed.
- B. For taps into the existing pipeline, use a saddle wye or tee with stainless steel clamps. Mount saddles with solvent cement or gasket and secure with metal bands. Lay out holes with a template and cut holes with a mechanical hole cutter.

3.04 **LATERALS**

- A. Construct laterals from the wye branch to a terminal point as designated on the drawings or as required to maintain existing service.
- B. Where the depth of the main pipeline warrants, construct riser-type laterals from the wye branch in accordance with Standard Details. The determination as to the type of riser, slope and depth of lateral pipe at the termination point will be made by the Engineer in the field.
- C. Install an approved watertight plug, braced to withstand pipeline test pressure thrust, at the termination of the lateral. Install a temporary marker stake extending from the end of the lateral to 1 foot above finished grade.

3.05 **THRUST RESTRAINT**

- A. Provide thrust blocking or restrained joints for pressure pipeline at all bends, tees, and changes in direction.

3.06 **BACKFILLING TRENCHES**

- A. Backfill pipeline trenches only after examination of pipe laying by the Engineer.

3.07 **TESTING**

Pneumatic Leak Tests:

A. Equipment: Furnish the following equipment for the pneumatic tests:

Amount	Description
1	Pneumatic compressor separator-dryer system capable of providing oil-free dry air & equipped with one or more full capacity safety relief valves set at a pressure of not more than 105 percent of the required primary test pressure.
1	Calibrated test gauge

B. Gravity Sewers: Gravity sewers shall be air tested as follows:

1. *Time of Testing:* Test pipe after backfilling has been completed. The Contractor, at his option and expense, may make other earlier tests to ensure compliance with the tests specified herein.
2. *Procedure:*
 - a. After all plugs are in place and securely blocked, introduce air slowly into the pipe section to be tested until the internal air pressure reaches 5.0 pounds per square inch or 4.0 pounds per square inch greater than the average back pressure of any ground water that may submerge the pipe. Allow a minimum of 2 minutes for the air temperature to stabilize. Determine the height of the groundwater table, at the time of the test.
 - b. Pipe and joints being air tested shall be considered satisfactory when tested at an average pressure of 3.0 pounds per square inch greater than the average back pressure of any ground water that may submerge the pipe, when (1) the total rate of air loss from the section being tested does not exceed 2.0 cubic feet per minute, or (2) the section of line does lose air at a rate greater than 0.0030 cubic foot per minute per square foot of internal pipe surface.

3.08 VIDEO RECORDING, AS BUILT, & WARRANTY

- A. After completion of the work and after completing the air test, a video recording shall be made by the contractor and approved by the city, before the system is accepted for maintenance.
- B. Complete "AS BUILT" information relative to manholes, valves, services, fittings, pipe lengths, inverts, and slopes shall be accurately recorded and submitted to the city signed and sealed by a registered land surveyor.

- C. At the end of the one year warranty period, the contractor shall T.V. inspect, air test every joint, and check manhole joints and connections to determine if repairs are necessary before the warranty bond is released.

END OF SECTION

02730-7

SECTION 02735

SLIP-LINING GROUT

PART 1 GENERAL

1.01 GENERAL

- A. This Section specifies the furnishing and placing of grout in the annular space between the slip-liner pipe and the host sewer pipe.
- B. The contractor shall have a choice of grouting systems and methods which may be proposed. Selection of a grouting system shall take into account: liner pipe stiffness, liner pipe materials, the condition of the host pipe, liner creep rate, temperature, actual size of the annular space, the need to keep the liner pipe down on the invert of the host pipe, sewage flow depth, grout set time, spacing between grout injection and bleed off points, grout run out rate, and sewer conditions. These concerns shall be fully addressed in the grouting submittal. It is anticipated that the grouting process will either utilize single stage, low density grout, or multiple stage grouting with a higher density grout.
- C. This information on the proposed grout system shall be submitted well in advance of the start of grouting operations so that sufficient time is available for review and change, if required. No mix design shall be used without the approval of the Engineer.

1.02 REFERENCES

- A. ASTM C109 - Standard Test method for Compressive Strength of Hydraulic Cement Mortars (Using 2-inch or 50-mm Cub Specimens)
- B. ASTM C138 - Test Method for Unit Weight, Yield, and Air content (Gravimetric) of Concrete
- C. ASTM C144 - Standard Specification for Masonry Mortar
- D. ASTM C150 - Standard Specification for Portland Cement
- E. ASTM C403 - Test Method for Time of Setting of Concrete Mixtures by Penetration Resistance
- F. ASTM C495 - Test Method for Compressive Strength of Lightweight Insulating Concrete
- G. ASTM C618 - Standard Specification for Fly Ash and Raw or Calcined Natural Pozzolan for use as a Mineral Admixture in Portland Cement Concrete

H. CRD C621 - Specification for Non-shrink Grout

1.03 SUBMITTALS

A. At least 45 days prior to grouting, submit details of equipment, grout mixes, and procedures to the Engineer for review. The shop drawings and product data shall include but not limited to the following:

1. Grout mix design and trial mix tests with set time, compressive strength, density test results, and viscosity test results.
2. Initial set time of the grout.
3. The 24-hour and 28-day minimum grout comprehensive strength.
4. The maximum injection pressure.
5. Proposed grout stage volumes for one stage or multiple states.
6. Bulkhead designs and locations.
7. Buoyant force calculations during grouting. A detailed plan of how the liner pipe will be prevented from floating due to the grouting process.
8. Flow control.
9. A detailed description of equipment and operational procedures to accomplish the annular grouting operation, including mixing and pumping schedule, grouting pressures, rates of pumping, and methods to monitor the effectiveness of the grouting.
10. A detailed description and drawing indicating locations of surface mixing equipment, subsurface injection points, flowlines, waste grout recovery, and grout pressure limiting equipment, bulkhead design, and venting system.
11. Qualifications and experience of each member of the grout team performing the grouting.
12. Written confirmation that the Contractor has coordinated grouting procedures with the grout installer and the line pipe manufacturer.
13. References to identify where this grout mix and grouting system have been successfully utilized.
14. Pressure gauge, recorder, and field equipment certifications, e.g. calibrations by an approved laboratory.

1.04 PERFORMANCE REQUIREMENTS

- A. The grout mix shall be designed to be pumpable through a 2-inch-diameter hose with a maximum allowable pressure at point of placement of 10 psi. The cast density shall be 55pcf or as approved by the Engineer for the grouting system selected and submitted by the Contractor. The minimum penetration resistance after 24 hours shall be 100 psi in accordance with ASTM C403. The minimum compressive strength at 28 days shall be 300 psi in accordance with ASTM C495. The grout mix shall have less than 1 percent shrinkage by volume.
- B. The apparent viscosity shall not exceed 20 seconds in accordance with ASTM C939.
- C. The application system shall have sufficient gages, monitoring devices, and tests to determine the efficiency and effectiveness of the grouting work and provide means of accurately determining the amount of grout injected. The Contractor shall be prepared to modify or change his operation should the grouting not perform as proposed. Such modifications and changes shall be done in a timely manner to avoid unnecessary delay to the completion of the Project.
- D. No deleterious amounts of toxic or other poisonous substances shall be included in the mix or otherwise injected underground.
- E. Upon completion of slip-lining, but prior to grouting, bulkheading of the ends and appropriate venting shall be required to seal the annular space from sewer flow, to permit the grout to set, and withstand the loads imposed by the grout and groundwater. The Contractor shall submit a detailed plan to the Engineer that will hold the liner pipe on the invert of host pipe. The Contractor has sole responsibility for preventing floatation of the liner pipe and for ensuring a uniform encasement of the annular space between the liner pipe and the 36" sewer pipe.

PART 2 PRODUCTS

2.01 MANUFACTURERS/APPLICATORS

- A. The Contractor shall provide the services of a slip-line grouting company familiar with and having demonstrated experience with annular space grouting of slip-lined pipe. Prior to beginning the slip lining work, the Contractor shall demonstrate to the Engineer that either he, or his intended grouting subcontractor, is capable of meeting

the specifications regarding this work. Only a company specializing in the design and placement of annular fill with a minimum of 5 years of successful experience shall be employed. The company must have experience in design, placement, and testing on at least two (2) relevant projects where annular fill was successfully placed to strict quality control requirements in an annulus similar to or equal to around similar pipe with similar distances between access points at injection pressures proposed. The contractor shall submit a detailed plan to the Engineer that will show how he intends to anchor the liner in the invert of the host sewer pipe for a period of time long enough to allow the grout to set, where buoyant uplift is a factor.

- B. The applicator of the grout mix shall be certified by the grout mix manufacturer and approved by the Engineer. The certified applicator shall be regularly engaged in the placement of grout, including completion of pipeline grouting installations having at least 1,000 cubic yards in the past 3 years in the State of Florida.

2.02 MATERIALS

- A. General - Lightweight grouts form the basis of this specification. The admixtures, density and viscosity of the grout shall be suitable for providing a solid uniform encasement around the slip liner pipe under conditions of groundwater flowing into the annular space during the grouting. The lightweight grouts shall be as supplied by Pacific International Grout Co., Bellingham, Washington or approved equal. Alternate grout design mixes will be considered for use by the Engineer based on receipt of acceptable submittal information and an extensive, successful experience record.
- B. Cement - The cement shall comply with ASTM C150. Pozzolans and other cementitious materials are permitted.
- C. Fly Ash - The fly ash shall comply with ASTM C618. Either Type C or Type E shall be used.
- D. Sand, if provided, shall conform to ASTM C144 except as modified below, or as required by the grout system:
 1. Sieve Size No. 16: 100% passing
 2. Sieve Size No. 30: 60 - 85% passing
 3. Sieve Size No. 50: 10 - 35% passing
 4. Sieve Size No. 100: 5 - 25% passing
 5. Sieve Size No. 200: 0 - 10% passing

- E. Water - Use potable water free from deleterious amounts of alkali, acid, and organic materials which would adversely affect the setting time or strength of the slip-lining grout.
- F. Admixtures - Admixtures shall be selected by the manufacturer of the slip-lining grout to meet the performance requirements, to improve pumpability, to control set time, and to reduce segregation.

PART 3 EXECUTION

3.01 PREPARATION

- A. Engineer shall be notified at least 72 hours in advance of grouting operations.
- B. Grouting equipment and procedures shall be selected and operated with sufficient safety and care to avoid damage to existing underground utilities and structures.

3.02 EQUIPMENT

- A. The materials shall be mixed 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.
- B. Mixers and Pumps - The grout shall be delivered to the injection point at a steady pressure with a non-pulsating centrifugal or triplex pump at the mix tank. 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.
- C. 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.

3.03 Grouting

- A. Scope - Grout shall be placed in the annular space between the slip-lining pipe and the host sewer. The annual space shall be completely filled without deflecting the pipe greater than 1.5 percent.
- B. General - The gauged pumping pressure shall not exceed the liner pipe manufacturer's approved recommendations. Pumping equipment shall be of a size

sufficient to inject grout at a volume, velocity and pressure compatible with the size of the annular space and degree of host pipe corrosion. Once grouting operations begin, grouting shall proceed uninterrupted from bulkhead to bulkhead. Grout placement shall not be terminated until the following conditions have been met, unless otherwise approved by the Engineer: a) The estimated annular volume of grout has been injected; b) The exhausted grout at each vent is not less than ninety-five percent of the density of freshly injected grout, and c) The exhausted grout viscosity is not less than eighty-five percent of the original viscosity of the freshly injected grout. Grout pressure gauge and recorder shall be installed immediately adjacent to each injection port. During grouting operations, the recorder shall continuously record, on paper with ink, the actual grouting pressure versus time. The gauge shall conform to an accuracy of 0.5 psi. Pressure gauges shall be instrument oil filled and attached to a saddle-type diaphragm seal (gauge saver) to prevent clogging with grout. All gauges shall be certified and calibrated in accordance with ANSI B40, Grade 2A. As a minimum, the grout pressure recordings shall be identified with a date, batch, and time of day grouting was performed and shall be submitted to the Engineer at the end of the work day that grouting was performed.

C. Procedure:

1. The grout shall be placed for a given pipeline segment between bulkheads. Bulkheads shall be placed at the ends of each pipeline segment to seal the annular space from sewer flow. Bulkheads shall not be removed until after the grout has set.
2. The slip-line pipe shall not be penetrated to facilitate grouting of the annular space.
3. The slip-liner pipe shall be equipped with a weir to fill the slip-liner pipe to prevent floating during the grouting operation.
4. Standing or running water in the annular space shall be displaced, removed or controlled to maintain the correct water ratio of the grout mixture. The annular space shall be grouted by injecting grout from one end of the pipeline segment, allowing it to flow toward the other end. The annular space shall be vented to assure uniform filling of the void space.
5. Pressure on the annular space shall be limited to prevent damage to the liner and shall not exceed 10 psi unless recommended otherwise by the slip liner pipe manufacturer. Regardless of the pressure, the Contractor shall be solely responsible for any damage or distortion to the slip-liner pipe due to grouting. An open ended, high point tap or equivalent vent must be provided and monitored at the bulkhead.
6. The drilling of access holes from the surface to facilitate grouting shall not be allowed.

3.04 FINAL CLEANUP

- A. No hardened grout shall be permitted in the slip-liner pipe or manhole invert after completion of grouting operations.

3.05 TESTING

- A. Density - During placement of the grout, the density shall be measured in accordance with ASTM C138 a minimum of twice per hour. Adjust the mix as required to obtain the specified cast density.
- B. Viscosity - Viscosity shall be checked with a flowcone provided by the Contractor and tested per ASTM C939.
- C. Sampling:
 1. Take four test specimens for each 100 cubic yards of grout or for each four hours of placing.
 2. Test in accordance with ASTM C495 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.

END OF SECTION

02735-8

SLIP - LINING GROUT

SECTION 02738
CLOSED PROFILE PVC PIPE FOR SLIP-LINING OF SANITARY
SEWERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. This section describes the materials and methods for the rehabilitation of sanitary sewer lines by the insertion of a closed profile PVC pipe into an existing sewer line.

1.02 REFERENCES

A. The following specifications described the design and properties of closed profile PVC pipe for slip-lining the existing sewer line:

1. ASTM D1784 - Specification from Rigid Poly (Vinyl Chloride) (PVC) Compounds.
2. ASTM F 1803 Poly (Vinyl Chloride) (PVC) Closed Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter.
3. ASTM D 2412 - Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
4. ASTM D 3212 - Specification for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
5. ASTM F 794 - Specification for PVC Sewer Pipe.
6. ASTM F 477 - Specification for PVC Elastomeric seals (gaskets) for joining plastic pipe.
7. AWWA C905 - PVC Water Pipe.

B. All materials incorporated for liner pipe shall comply with these specifications, or as otherwise indicated, and the Contractor may be required to furnish the City with certificates that these requirements are being met.

1.03 DESIGN CRITERIA

A. Pipe, fittings, and special pieces shall be designed to withstand all loadings as described below. No structural consideration is to be given to any existing carrier pipe. Pipe shall be of sufficient structural strength to carry all external crushing loads on the pipeline if the existing pipe were to fail completely. The following design criteria shall be utilized to develop a suitable structural and corrosion resistant design for the liner pipe for slip-lining:

1. Interior Surface - The interior surface of the pipe and joint shall be designed and manufactured to obtain a Manning's coefficient of friction of 0.009 or less. The pipe and joint shall have a smooth interior surface. Interior couplings or laps are not acceptable.
2. Exterior Surface - The exterior surface of the pipe and joint shall be smooth with no exterior ribs. Joints shall be flush type with the OD of the joint no greater than the OD of the pipe.
3. Hydrostatic Pressure - Water table shall be construed at the finished grade on the entire length of the Project.
4. Dead Loads - Invert of pipes and rim elevations are shown on the Plan. Assume soil weight of 120 pounds per cubic foot and soil modulus of elasticity of (E') 2,000 psi.
5. Live Loads - Highway loads are AASHTO HS20-44.
6. Total Load - The slip-lining pipe to be used shall be designed to withstand continuous hydrostatic pressures in feet of water head plus dead loads and live loads as specified.
7. Corrosion - Pipe carries domestic wastewater and shall be resistant to sulfuric acid attack resulting from hydrogen sulfide oxidation.
8. Buckling - Pipe design shall incorporate a safety factor of 2.0 for buckling strength calculations. Calculations shall use the external pressure of at least 10 psi with Love's Equation regarding Plastics Pipe Institute Standard.
9. Grout - Grout shall be considered to provide no structural reinforcement for the liner other than to improve the bedding and side support.
10. Sizing - The pipe shall be nominal 30" diameter and fabricated to fit neatly into the inside circumference of the existing 36" diameter concrete sewer line. The length of the liner shall be that deemed necessary by the

Contractor and as approved by the manufacturer and the Engineer to effectively carry out the insertion and seal the liner at the inlet and outlet points. The Contractor shall verify the lengths in the field before cutting the liner to length.

11. The pipe shall be in nominal 15 foot lengths. The pipe system shall be designed to minimize the number of installed joints.
12. The structural design basis shall be the provisions set forth in the PVC Pipe Design Manual of AWWA M23.

B. Hydrostatic testing may be required by the Engineer on all or a portion of the pipe sections. Payment will be made as extra work. Manufacturer must have the capability of hydrostatically testing all pipe in accordance with AWWA C950 if required to do so.

1.04 SUBMITTALS

- A. The Contractor's shop drawing submittals shall include:
 1. Names of installation crew including project experience in slip-lining with PVC pipe. Each individual's experience record to indicate project location, pipe lining size and lengths, and position on installation crew.
 2. Manufacturer's certificates of compliance and test reports on pipe.
 3. Manufacturer's certificate of safe compressive load for slip liner based on safety factor of 4.
 4. Schedule and sequence of operations for all slip-lining and grouting work including insertion pits and video inspections.
 5. Shop drawings for all materials and products including specials and design criteria.
 6. Indication of push lengths of pipe slip-liners, closure locations and procedures, and locations of insertion pits (including sheeting, dewatering techniques, and erosion control details.)
 7. Detailed information on pushing equipment and measurement of compressive loads during pushing.
 8. A general description of equipment, type of grout, and operational procedures to accomplish annular grouting operation. Procedure and details for closing of pipe coupon at insertion pit. Documentation indicating the anticipated heat of hydration and its effect on the pipe.

9. A detailed description and drawing indicating locations of surface mixing equipment, subsurface injection points, waste grout recovery, flowline, grout pressure limiting equipment, and grouting schedule will be required, see Section 02735.
10. Manufacturer's published literature for pipe, specials, and grout.

PART 2 MATERIALS

2.01 SLIP-LINING - CLOSED PROFILE PVC PIPE

A. General

1. Pipe shall have a minimum pipe stiffness of 46 psi at 5 percent deflection when testing in accordance with ASTM D 2412 at 73.4 degree \pm 3.6 degree F or greater stiffness if required by the design criteria.
2. Pipe shall meet chemical test requirements of ASTM 3262, and shall have corrosion resistance for conveying sewage.
3. Pipe shall be manufactured in accordance with ASTM F794, F1803, and tested in accordance with AWWA-C950.
4. Acceptable manufacturer for PVC closed profile wall pipe is Lamson Vylon Pipe or equal.

B. PVC Liner Pipe

1. PVC closed profile wall pipe with a smooth interior and exterior shall conform to the requirements of ASTM F 1803 for 21" through 60". Pipe and fitting shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions or other injurious defects. The pipe shall be made of PVC compound having a minimum cell classification of 12364A as defined in ASTM D1784.
2. The pipe shall be connected with a PVC coupling utilizing elastomeric sealing gaskets. When joined, the coupling should not reduce the interior diameter while maintaining a constant outside diameter. The assembled joint shall meet the performance requirements of ASTM D 3212. Elastomeric seals (gaskets) shall meet the requirements of ASTM F477.

C. The pipe manufacturer shall have a factory representative on site to review and approve the videos described in Paragraphs 3.02 H and 3.06 A. The manufacturer shall submit written acceptance of the installed liner based on the information contained in the video.

PART 3 EXECUTION

3.01 PREPARATION FOR INSTALLATION

A. The existing sewer being slip-lined is a 36" concrete pipe. Based on a video tape recording performed by the City several years ago, this pipe has multiple locations where water is entering the pipe through the pipe barrel and at the joints. It is the intent of the preparation work prior to slip-lining to remove all debris along the entire length of the 36" sewer. The bidders are urged to arrange with the City to view this historical video in order to gauge the condition of the existing piping prior to submission of their bid. The City assumes no responsibility associated with the condition or cleaning of this piping, and the Contractor agrees to undertake as part of this Work whatever steps are needed to provide a clean pipe interior prior to commencing the slip-lining.

B. Prior to the installation of the slip-liner and subsequent to installation of the insertion pit and sewer opening, the following preparation shall be performed for each section of slip-lining.

1. The existing 36" pipe shall be thoroughly cleaned by bucket cleaning or any other method required to remove all debris and undesirable material as approved by the Engineer. The cleaned pipe shall be inspected by closed circuit television and visual inspection. Two copies of the TV tape in VCR format shall be submitted to the Engineer for review. The video shall identify the continuous location of the camera in relation to adjacent manholes and the date. This video shall be used to assist in determining where underground cavities may exist.
2. A proof plug (pig) shall be passed through the line. The proof plug shall be 1-inch larger in diameter than the slip-liner OD (including coupling or joint), shall maintain a continuous influent "flow-through" characteristic, and a sufficient lubricating device and reservoir to prevent damage to the line in place, and shall be equipped with a trailing line. The proof plug shall be a minimum of 15 feet long.
3. Any damages from removal and replacement of proof plug shall be remedied by the Contractor at no additional cost to the City.
4. If the proof plug becomes jammed, the Contractor shall remove the jammed plug and make all restoration and repairs at his expense; however, excavation will not be permitted to remove a "jammed" proof plug without the Engineer's approval.

3.02 INSTALLATION

- A. Each portion of the existing 36" sewer line to be slip-lined shall be re-inspected by video with VCR recording if more than two weeks have elapsed between the initial video specified in Paragraph 3.01.B above and the slip-lining installation for that sewer section.
- B. The liner pipe shall be installed to the limits shown in the Plans by pushing the liner pipe into the existing pipe with an approved pipe insertion system. The leading pipe end shall be adequately protected by a nose piece or nose cone. The Contractor shall be responsible for clearing the line of obstructions, solids, or dropped joints that prevent the insertion of the liner prior to beginning insertion process.
- C. The compressive load on the liner pipe during installation shall be measured and monitored. It shall not exceed the load identified in Paragraph 1.04.A.2.
- D. The liner pipe shall be guided into the existing pipe through a previously constructed insertion pit. Once the insertion is initiated, it is desirable to continue the push to completion without interruption. Precautions should be taken to protect the liner pipe and prevent the rough or ragged edges or broken sewer pipe from scouring the outside of the liner as it is being pushed into the sewer. Any damage shall be repaired at the Contractor's expense.
- E. After insertion, the liner pipe shall be vertically cut inside the manhole or concrete structure. If coating of the cut surface is required, an approved corrosion protection resin shall be applied in conformance to the manufacturer's recommendation.
- F. The entire length of the annular space shall be grouted as specified in Section 02735 including shorts, specials and closures.
- G. The Contractor shall install the liner in such a manner that it provides a smooth invert, free of vertical deflection. All joints shall exhibit openings without excessive gap or deflection. Any pipe joint with questionable seal in the Engineer's opinion shall be removed and replaced at the Contractor's expense.
- H. After completion of each slip-lined section and prior to grouting, a video VCR recording shall be made of the interior. The recording shall be submitted to the Engineer for review and checking of joints, closures, couplings and the uniform slope of the liner pipe.

3.03 INSERTION PITS

- A. Insertion and grouting pits shall be fully sheeted, with steel sheeting or other approved method as directed by the Engineer, to the minimum limits as required.

The design of the sheeting and shoring of the pit and the dewatering system shall be solely the Contractor's responsibility. The Contractor shall submit for the Engineer's review his dewatering plan. A submittal of the proposed sheeting is required showing engineering calculations and construction plans and details sealed by a Florida licensed professional engineer. Insertion pits shall be dewatered through the use of a wellpoint or any other required system, operated continuously until backfill is completed upon completion of construction.

3.04 GROUTING

A. General

1. The annular space between the slip-liner pipe and the existing pipe shall be grouted completely. The grout shall be placed by the Contractor in a manner approved by the Engineer which will not damage the pipe and shall be worked into the annular space to provide an even, solid bedding and encasement for the pipe liner.
2. Grout application shall not exceed the maximum pressure stipulated by the slip-liner manufacturer, maintaining a 2.0 to 1 safety factor for the slip-liner pipe used. Grouting pressure is limited to 10 psi maximum unless higher pressure is approved by the pipe manufacturer and the Engineer.
3. See Section 02735 for annular space grouting requirements.

B. Bulkheads

1. See details shown on the plans and Section 02735.

3.05 CONNECTION AT MANHOLES

- A. Cut liner so that it extends 2 inches into a manhole. Seal the annular space between liner and sanitary main at each manhole with non-shrink epoxy grout. Bulkheads where required shall completely fill the annular space and constructed to withstand the loads imposed by the grout during placement and curing and the pressure of groundwater without leakage. Appropriate venting to dewater the annular space and seal it from sewer flow, permit grout to set and allow air to escape as grout is introduced should be utilized.
- B. Finish seal of liner pipe to host pipe with a non-shrink grout placed around annular space from inside manhole. Apply grout in a band not less than 6 inches wide. Sealing method including materials require approval by Engineer.
- C. The ends of the PVC slip-liner pipe shall be fiberglassed into the existing manhole fiberglass lining system. This work shall conform to the drawings and Section 02739. The Contractor shall provide no flow conditions during the fiberglass work

and curing process. The Contractor shall submit his plan to the Engineer for accomplishing this work without impact to the County or the public. Portions of this plan might require by pass pumping, work during low flow conditions, temporary plugging of the pipelines, etc.

3.06 FINAL VIDEO INSPECTION

- A. After completion of all slip lining and grouting, a final video inspection and VCR recording shall be made to verify the integrity of the pipe and joints and to confirm the uniform slope of the liner pipe. Two copies of the VCR recording shall be submitted to the Engineer for his approval.

END OF SECTION

SECTION 02767

MANHOLE REHABILITATION

PART 1 - GENERAL

1.01 SCOPE

This specification shall govern all work, materials, and equipment required for manhole rehabilitation for the purpose of eliminating infiltration, providing corrosion protection, repair of voids, and restoration of the structural integrity of the manhole as a result of applying a monolithic fiber-reinforced structural/structurally enhanced cementitious liner to the wall and bench surfaces of brick, concrete, or any other masonry construction material.

Described are procedures for manhole preparation, cleaning, application and testing. The applicator, approved and trained by the manufacturer, shall furnish all labor, equipment and materials for applying a cementitious mix to form a monolithic liner of a minimum 1/2 inch thickness, with machinery specially designed for the application. All aspects of the installation shall be in accordance with the manufacturer's recommendation and with the following specifications which includes....

- A. The removal of any loose and unsound material.
- B. Cleaning of the area to be sprayed with high pressure water.
- C. The repair and filling voids.
- D. The repair and sealing of the invert and benches.
- E. The elimination of active infiltration prior to making the application.
- F. The spray application of a cementitious mix to form a structural/structurally enhanced monolithic liner.

PART 2 - MATERIALS

2.01 PATCHING MIX

A quick-setting, fiber-reinforced, calcium aluminate-based cementitious material for patching and filling voids and cracks

A.	Compressive Strength (ASTM C-109)	6 Hrs. 1400 psi
B.	Shrinkage (ASTM C-596)	0% at 90% R. H.
C.	Bond (ASTM C321)	28 days, 150 psi
D.	Cement	Sulfate resistant
E.	Density, when applied	105 \pm 5 pcf

2.02 INFILTRATION CONTROL MIX

A rapid setting cementitious product specifically formulated for leak control, shall be used to stop minor water infiltration and shall be mixed and applied according to manufacturer's recommendations and shall have the following minimum requirements:

Compressive Strength	ASTM C-109	1 hr	600 psi
Compressive Strength	ASTM C-109	24 hr	1,000 psi
Bond	ASTM C-321	1 hr	30 psi
Bond	ASTM C-321	24 hr	80 psi

2.03 GROUTING MIX

- A. A rapid setting cementitious grout, shall be used for stopping very active infiltration and filling voids and shall be mixed and applied according to manufacturer's recommendations.
- B. Chemical grouts may be used for stopping very active infiltration and shall be mixed and applied per manufacturer's recommendations.

2.04 LINER MIX

- A. A fiber-reinforced pure-fused calcium aluminate aggregate to be wet mixed and low pressure spray applied to form the structure/structurally enhanced monolithic cementitious liner covering all internal manhole surfaces. Liner material to be LaFarge SewperCoat PG or a pre approved equal.
- B. Material shall be pre-mixed and specially formulated to withstand H₂S (hydrogen sulfide) bacterial corrosion and abrasion in sewer networks.
- C. Material shall have the following minimum requirements:

Compressive Strength	ASTM C-495	1 day > 8,000 psi
Compressive Strength	ASTM C-495	7 day > 9,000 psi
Compressive Strength	ASTM C-495	28 day > 9,000 psi
Flexural Strength	ASTM C-293	12 hr > 1,000 psi
Flexural Strength	ASTM C-293	28 day > 1,400 psi
Shrinkage	ASTM C-596	0 percent at 95% R.H.

2.05 BONDING COMPOUND

Material shall be a modified cementitious bonding compound that protects exposed reinforcement steel and enhances bond of overlay to substrate.

2.06 WATER

Shall be clean and potable. Questionable water shall be tested by a testing laboratory in accordance with ASTM C-94. Potable water need not be tested.

2.07 OTHER MATERIALS

No other material shall be used with the mixes described in 2.01, 2.02, 2.03, 2.04 and 2.05 without prior approval from the Engineer.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Place covers over sewer invert to prevent extraneous material form entering the sewer lines.
- B. Remove foreign loose and unsound concrete and masonry material not able to be removed by high pressure water spray may require the use of mason's or mechanical tools for removal.
- D. Loose, unsound, and protruding concrete and masonry material not able to be removed by high pressure water spray may require the use of mason's or mechanical tools for removal.
- E. Active hydrostatic leaks (infiltration) shall be stopped using one of the rapid-setting grouting mixes specially formulated for control of very active infiltration.
- F. Very active hydrostatic leaks (infiltration) shall be stopped using one of the rapid-setting grouting mixes specially formulated for control of very active infiltration.

- G. Clean and prepare exposed reinforcement steel, and apply and cure bonding compound, in accordance with the product manufacturer's instructions and recommendations.
- H. Prepare cracks and voids to be patched and filled, and apply cure patching mix, in accordance with the product manufacturer's instructions and recommendations.
- I. Areas of manholes that are found to be structurally damaged and in need of repair beyond the scope of this specification shall be brought to the attention of the Engineer. A suitable repair method shall be developed for each area and submitted to the Engineer for review prior to commencing the repair.
- J. Prepare, clean and repair manhole benches and inverts in the same manner as prescribed above.

3.02 INVERT REPAIR

- A. After all preparation has been completed, remove all loose material and wash wall again.
- B. Any bench, invert, or service line repairs shall be made at this time using the quick setting patching mix (paragraph 2.01) and shall be used per manufacturer's recommendations.
- C. Invert repair shall be performed on all inverts with visible damage or infiltration. After blocking flow through the manhole, and thoroughly cleaning invert, the quick setting patch mix (paragraph 2.01) shall be applied to the invert in an expeditious manner. The mix shall be troweled uniformly onto the damaged invert extending out onto the base of the manhole sufficiently to tie into the structural/structurally enhanced monolithic liner to be applied. The finished invert surfaces shall be smooth and free of ridges. The flow may be re-established in the manhole within 30 minutes after placement of the mix.

3.03 LINER APPLICATION, CURING AND TESTING

- A. Prepare manhole surfaces, wet batch-mix liner material, low pressure spray apply liner mix to manhole ceiling, wall and bench surfaces and allow liner to cure in accordance with the product manufacturer's instructions and recommendations.
- B. Equipment is complete with water storage and metering system. Mixer and pump are hydraulically powered. Equipment is mounted to heavy duty construction tandem axle, road worthy trailer, complete with electric brakes and running lights. Internal combustion engine powers hydraulic system and air compressor.

3.04 MIXING

- A. For each bag of product, use the amount of water specified by the manufacturer and mix using the approved equipment described in Part 3 for 30 seconds to 1 minute after all materials have been placed in the mixing hopper.
- B. Liner application shall be 0.5 inch minimum thickness. The application shall be completed with a minimum of two coats. The first coat shall be applied at a thickness adequate to cover the substrate and be trowled to compact the material into voids and set the bond. The second coat shall be applied to ensure complete coverage at the specified 0.5 inch minimum thickness.
- C. Inverts shall be lined with patching mix, trowl applied in one coat to a 0.5 inch minimum thickness.
- D. Prepare, label and submit recommended daily or per lot test specimens for testing.

3.05 WEATHER

No application shall be made to frozen surfaces or if freezing is expected to occur inside the manhole within 24 hours after application. If ambient temperatures are in excess of 95 degrees F, precautions shall be taken to keep the mix temperature at time of application below 90 degrees F. Mix water temperature shall not exceed 85 degrees F. Chill with ice if necessary.

3.06 FINAL ACCEPTANCE TESTING

At the direction of the owner or his assignee, the rehabilitated manholes shall be tested as follows:

- A. Visually verify the absence of leaks.
- B. Perform an exfiltration test.
 - 1. (For manholes 0 to 6 feet deep) if water loss is one (1) inch or less in five minutes manhole is acceptable.
 - 2. (For manholes over 6 feet deep) if water loss is one (1) inch or less plus 1/8 inch per additional foot of depth in five minutes, manhole is acceptable.

END OF SECTION

SECTION 02775

MANHOLES AND VAULTS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish and install, as shown on the Drawings, manholes and vaults including:
 - 1. Precast concrete sections
 - 2. Brick
 - 3. Mortar
 - 4. Cast iron frame and lids

1.02 RELATED WORK

- A. Section 02720: Storm Drainage System
- B. Section 02221: Trenching, Backfilling and Compacting
- C. Section 02513: Asphaltic Concrete Paving

1.03 REFERENCE STANDARDS

- A. ASTM C478: Precast Reinforced Concrete Manhole Sections.
- B. ASTM C443: Joints For Circular Concrete Sewer and Culvert Pipe Using Rubber Gaskets.

1.04 SUBMITTALS

- A. Submit Shop Drawings in accordance with Section 01340.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Neenah No. R-1712 with Type A Lid.
- B. Russco No. M-510 with Type C lid.
- C. Clark No. R502 with Type A lid.

D. Substitutions: Items of same function and performance are acceptable in conformance with Section 1630.

2.02 **MANHOLES**

- A. Manholes shall be 48 inch diameter, unless otherwise indicated, constructed of precast ring block and/or precast concrete ring, eight inch minimum thickness construction, unless otherwise indicated on the Drawings.
- B. Concrete floor slab shall be minimum eight inches thick with #6 bar at six inch spacing each way or precast bases.
- C. Top section shall be offset cone 2 feet 8 inches high with 24 inch opening at top.
- D. Joints shall be a compression type, neoprene gasket joint conforming to ASTM C443, of a design approved by the Engineer.
- E. Lifting holes through the structures are not permitted.
- F. All grout used for sealing around pipe openings shall be of a non-shrinking type, acceptable to the Engineer, designed for use in water. All openings and joints shall be sealed water-tight.
- G. Precast manhole tops shall terminate at such elevations as will permit laying up a minimum of five inches of brick under the manhole frame to make allowance for future street grade adjustments.
- H. Drop connections, where required on precast manholes, shall be cast monolithically with the manhole elements.
- I. Manhole steps shall be provided in the manholes, consisting of approved aluminum or fiberglass steps spaced at 16 inches on centers, set into the manhole wall.
- J. Inverts shall be formed of sewer pipe or of mortar and brick, as described below, to provide a smooth flowing channel of the exact shape of the sewer to which it connects. All inverts of manholes shall be shaped while the manholes are under construction. All inverts shall follow the grades of the pipe entering the manholes. Changes in direction of the sewer and entering branch or branches shall have a true curve of as large a radius as the size of the manhole will permit.
- K. Where shown on the Drawings or ordered by the Engineer, the Contractor shall provide manholes with stub lines for connection to future sewer lines. Provide the end of each stub line with a bell and close by means of an approved plug. This plug shall be removed, at some later time, without injury to the pipe. Reference each stub accurately to the center of the manhole, and record the actual invert elevation of each end.

2.03 VAULTS

- A. Vaults and similar structures shall be constructed as shown on the Drawings of size and shape indicated. The installation shall be in accordance with all other sections of this specification.
- B. Pipes entering the vault or structure shall enter through wall sleeves, except for concrete or VCP pipe entering a wet vault, wherein the pipe may be installed as follows:
 - 1. The pipe may be cast into the wall of the structure provided the first three pipe lengths outside the structure shall have minimum laying length, dependent on pipe type and size, with the first point occurring within 12 inches of the structure.
 - 2. Grout the pipe into the structure with a non-shrinking grout, acceptable to the Engineer, designed for use in water. All joints shall be sealed watertight.
 - 3. Utilize a sealing material between the pipe and structure such as Link Seal manufactured by the Thunderline Corporation, or equal when approved by the Engineer.

PART 3 - EXECUTION

3.01 LEAK PROOFING

- A. Walls shall be sealed against leakage by the application on the complete exterior surface of a plaster coat of cement mortar of approximately the same composition as mortar for masonry joints, applied not less than 1/2 inch in thickness at any point by steel trowel as the wall is built. Precast manholes shall be sealed at ring joints.
- B. Walls alternatively may be sealed against leakage by a heavy brush-coat application of an approved waterproofing compound, mixed and applied in accordance with manufacturer's recommendations. Not less than 50 pounds of compound shall be used on each 125 square feet of exterior surface area, and the coverage of block and joints shall be continuous and uniform. Joints must be struck and troweled flush, and dried for at least twenty four (24) hours under good curing conditions, before seal coat is applied.

3.02 INSTALLATION

- A. No backfilling of excavation, above elevation of top of interior concrete fill, shall be performed until waterproof coating has been cured for at least twenty four (24) hours

and inspected and approved by the Engineer. Any defective coverage shall be repaired to the satisfaction of the Engineer before backfilling is performed.

END OF SECTION

02775-4

MANHOLES AND VAULTS

SECTION 02850

UNDERGROUND SPRINKLER SYSTEM

PART 1 - GENERAL

1.01 SCOPE

- A. The Contractor shall provide all labor, materials and equipment necessary to construct an irrigation system complete with ditching, piping, manual valves, sprinklers, cleaning and testing. All materials shall be new. If a conflict arises between Drawings and Specifications, the Specifications shall govern.

1.02 WORK INCLUDED

- A. Sprinkler heads.
- B. Valves and associated accessories.
- C. Excavation, installation of system to water source, testing, and backfilling.

1.03 RELATED WORK

- A. Section 02220: Trenching, Backfilling and Compacting.
- B. Section 02260: Finish Grading.
- C. Section 02661: Water Mains
- D. Section 02640: Valves, Cocks and Appurtenances.

1.04 WARRANTY AND GUARANTEE CERTIFICATE

- A. The Contractor shall furnish a Certificate of Warranty registration and a guarantee of workmanship and materials for a one (1) year period from the date of final acceptance of the system. Final payment for the system shall be contingent upon receipt of this certification by the Owner.

1.05 OPERATING AND MAINTENANCE DATA

- A. The Contractor shall submit data in accordance with Section 01340.
- B. Provide instructions covering full operation, care and maintenance of system and controls, and manufacturer's parts catalog.

- C. Include schedule showing length of time each valve is to be open to provide determined amount of water.
- D. Instruct Owner's designated maintenance personnel in proper operation of system, including adjusting of sprinkler heads.

1.08 **PROTECTION**

- A. Protect trees, shrubs, lawns, structures, and features installed or remaining as part of landscaping, from damage.

PART 2 - PRODUCTS

2.01 **ACCEPTABLE MANUFACTURERS**

- A. Buckner
- B. Safe-T-Lawn
- C. Rainbird

2.02 **MATERIALS**

- A. Pipe:
 1. Polyvinyl Chloride Pipe: polyvinyl chloride pipe and fittings shall be rigid high impact Type 1, Schedule 80, meeting commercial standards CS-207-60; and physical characteristics shall conform to the latest ASTM Specifications D-256, D-696, D-785, D792 and D-1599. Fittings shall be compatible with the pipe.
 - a. The jointing and installation of polyvinyl chloride pipe and fittings shall conform to the manufacturer's recommendations. All PVC joints shall have clean solvent welds except; those threaded connections shown.
 - b. PVC pipe under pavement shall be in sleeves constructed of Schedule 40 galvanized sleeve prior to placement of the sleeve. The encased PVC irrigation line shall be capped on both ends to prevent foreign materials from entering the pipe.
 - c. Pipe sleeves shall extend not less than 12 inches beyond the curb line into the planting areas. The PVC irrigation lines lines shall extend not less than two (2) feet into the planting areas. All sleeves shall have minimum cover of twenty-four (24) inches. The ends of all sleeves shall be marked and flagged to prevent them from being lost during construction.
 - d. Valves and Boxes: see Section 02640

PART 3 - EXECUTION

3.01 PREPARATION

- A. Piping layout indicated on Drawings is diagrammatic. Reroute around plants and structures.
- B. Ensure sleeves are installed under paving.

3.02 TRENCHING

- A. Trench for sprinkler system to ensure proper grades and slopes to drain points.
- B. Keep trenches free of debris, material, or obstructions that may damage pipe.

3.03 INSTALLATION

- A. Install piping, valves, controls, and sprinklers in accordance with manufacturer's written instructions.
- B. Provide for thermal movement.
- C. Set sprinkler heads and box covers to finished grade.
- D. Use threaded Schedule 80 nipples for risers to each outlet to facilitate easy replacement.
- E. After piping is installed and before sprinkler heads are installed and backfilling commences, open valves and use full head of water to flush out system.
- F. Backfill sprinkler system as specified in Section 02220.
- G. Replace plantings or structures damaged by installation of sprinkler system.
- H. Mark locations of all buried valves with a five (5) foot section of three (3) inch concrete filled PVC Pipe set vertically so that three (3) feet extends above finish grade.

3.04 CLEANING AND TESTING OF SYSTEM

- A. Prior to installing irrigation heads, the lines shall be thoroughly flushed with water to remove all stone and sand particles from the system. Threaded caps shall be installed on all risers, beginning with one closest to the water source and working out to the end of all lateral lines. Backfilling of the trench may begin at this time; however, all pipe joints and riser connections shall be left exposed for leakage testing. At the direction of the Engineer, all heads within a representative portion of the system shall be capped and the following hydrostatic leakage tests shall be performed.
- B. The pressure required for hydrostatic pressure tests shall be 100 pounds per square inch. The Contractor shall provide temporary plugs and blocking necessary to maintain the required test pressure. Corporation cocks at least 3/4 inches in diameter shall be provided at each pipe dead end in order to bleed air from the line. The cost of these items shall be included as part of testing.
- C. Pipe lines shall be filled with water, all air shall be removed, and a pressure of 100 pounds per square inch shall be maintained in the pipe for a period of not less than two (2) hours by means of a pressure pump. Accurate means shall be provided for measuring the water required to maintain this pressure. The line water loss when tested under a pressure of 100 pounds per square inch, shall not exceed 60 gallons per 24 hours per inch diameter per mile of pipe. All leaks at exposed joints, and all leaks evident at the surface where pipe is covered shall be repaired, regardless of total leakage, as shown by test. Lines which fail to meet tests shall be repaired and re-tested as necessary until test requirements are met. Defective materials, pipes, valves and accessories shall be removed and replaced at no cost to the Owner.

3.05 WATERING PERIODS AND APPLICATION RATES

- A. All sections of the irrigation system are to provide the landscaped areas with 1.5 inches of water per week. Each system should be run every other day; however, during the first month after planting, the sprinkler system should be operated every day to ensure establishment of the plants.

3.06 SPARE PARTS

- A. The following items shall be provided:
 1. Two extra sprinkler heads of each size and type for each twenty (20) heads installed.
 2. Two valve keys for every ten (10) manual valves.
 3. Two keys for valve markers.
 4. Two wrenches for each type of head core, and for removing and installing each type of head.

END OF SECTION

02850-5

SPRINKLER SYSTEM - UNDERGROUND

SECTION 02934

SODDING

PART 1 - GENERAL

1.01 SCOPE

Provide all labor, materials and equipment necessary for complete sodding of areas affected by construction and not within the area covered by the Landscaping Plans. This shall include, but not be limited to: liming, fertilizing, sodding, necessary barriers, tests and all incidentals to make the work complete.

1.02 WORK INCLUDED

- A. Testing of topsoil.
- B. Raking and leveling topsoil as required for sodding.
- C. Liming and fertilizing of topsoil.
- D. Laying and rolling of sod.
- E. Maintaining sod.

Part 2 - PRODUCTS

2.01 MATERIALS

- A. Fertilizer:
 - 1. Fertilizer shall be commercial fertilizer, as manufactured by International Chemical Company or approved equal.
 - 2. Said fertilizer shall have a 10-20-6 N.P.K. content and contain a minimum of 60 percent of organic material.
 - 3. It shall be delivered at the site in the original sealed containers.
- B. Sod:
 - 1. The sod shall be as grown by a certified turf nursery and CONTRACTOR shall inform ENGINEER as to the source of the sod to be utilized prior to ordering and delivery of sod.

2. Sod shall be furnished and installed in rectangular sod strips measuring 12 to 16-inches in width of standard lengths of not less than 2 feet and delivered on pallets.
3. After the preparation of the areas to be sodded has been approved by ENGINEER sod all previously sodded areas where no permanent construction exists. Supply and install sod which is equal to or approved equal to sod which exists at the project site. As a minimum, Type No. 1 sod composed of grasses grown from a Bahia Seed mixture shall be used for stabilization of final grade.
4. St. Augustine Floratam Sod shall be placed in areas that will be or are irrigated. Bahia sod shall be placed in areas not irrigated.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. These areas shall be fine graded to achieve the finished subgrade after compaction which shall be obtained by rolling, dragging or by an approved method which obtains an equivalent compaction to that produced by a hand roller weighing from 75 to 100 pounds per foot of width. All depressions caused by settlement or rolling shall be filled with additional existing or furnished topsoil and regraded and prepared as specified above until it presents a reasonably smooth and even finish at the required sod sub-grade.
- B. All sod furnished shall be living sod containing at least 70 percent of thickly matter grasses as specified and free from noxious weeds.
- C. No broken pads or torn or uneven ends will be accepted. Standard size sections of sod shall be strong enough to support own weight and retain their size and shape when suspended vertically with a firm grasp on the upper 10 percent of the section. Sod shall not be harvested when its moisture content (excessively wet or dry) may adversely affect its survival.
- D. Sod shall be harvested, delivered, and installed within a period of 36 hours. Sod not installed within this time period shall be subject to inspection and rejection by ENGINEER, and shall be removed from the site and a fresh sod supply shall be furnished at no extra cost to OWNER.
- E. The topsoil shall not be moist at time of installation; however, it shall contain sufficient moisture so as not be powdery or dusty, both as determined by the supplier's representative.
- F. The overlapping of existing lawn with new sod along limit of work lines will not be permitted. Sod shall be laid in strips, edge to edge, with the lateral joints staggered. All minor or unavoidable openings in the sod shall be closed with sod plugs or with

topsoil, as directed by ENGINEER. However, sod laid with joints determined to be too large shall be lifted and 43-laid as specified herein at no extra cost to OWNER.

- G. Immediately after the sod is laid, the sod shall be watered thoroughly by hand or mechanical sprinkling until the sod and at least 2-inch of the top soil bed have been thoroughly moistened.
- H. CONTRACTOR shall be responsible to furnish his own supply of water to the site at no extra cost. If possible, OWNER shall furnish CONTRACTOR, upon request, with a source and supply of water. Contractor shall apply for temporary meter and pay Owner for water used at current utility billing rates. However, if OWNER's water supply is not available or not functioning, CONTRACTOR shall be responsible to furnish adequate supplies at his own cost. All work injured or damaged due to the lack of, or the use of too much water, shall be CONTRACTOR's responsibility to correct.

3.02 MAINTENANCE

- A. Maintain the entire sodded areas until final acceptance at the completion of the Contract. Maintenance shall include watering as specified, weeding and removal of stones which may appear. All bare or dead spots which become apparent shall be properly prepared, limed and fertilized, and resodded at CONTRACTOR's expense as many times as necessary to secure a good growth. In the event that the sod installation is not accepted by ENGINEER, the entire area shall be maintained and cut by CONTRACTOR until final acceptance of the sod installation.
- B. Take whatever measures are necessary to protect the sod while it is developing. These measures shall include furnishing or warning signs, barriers, or any other necessary measures of protection.

END OF SECTION

SECTION 03300

CONCRETE

PART 1 GENERAL

1.01 WORK INCLUDED

- A. This section covers all work necessary for providing, testing and placing ready mix concrete.
- B. See CONDITIONS OF THE CONTRACT and Division 1, GENERAL REQUIREMENTS, which contain information and requirements which apply to the Work specified herein and are mandatory for this project.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Not Used.

1.03 REFERENCE STANDARDS, CODES AND SPECIFICATIONS

- A. ACI 214 "Recommended Practice for Evaluation of Compressive Test Results of Field Concrete".
- B. ACI 318 "Building Code Requirement for Reinforced Concrete".
- C. ASTM C31 "Standard Method for Making and Curing Concrete Compressive and Flexure Test Specimens in the Field".
- D. ASTM C33 "Standard Specification for Concrete Aggregates".
- E. ASTM C94 "Standard Specification for Ready-Mix Concrete".

1.04 SUBMITTALS

- A. Submittals shall be in accordance with Section 01300 - Submittals and shall include the following:
 - 1. Concrete mix designs and trial mix laboratory reports.
 - 2. Manufacturer's certification of admixtures.
 - 3. Contractor's schedule and sequence of placement.
 - 4. All Test Results.
 - 5. Drawings showing locations of construction joints.

1.05 QUALITY ASSURANCE

- A. Submit certificates of mill reports on all foreign cements for review by ENGINEER before batching concrete.
- B. Secure the services of a reputable manufacturer for counseling regarding the use of any specified admixture.
- C. The ENGINEER shall have access to and have the right to inspect all batch plants, cement mills, and supply facilities of suppliers, manufacturers, subcontractors, and contractors providing products included in these Specifications. Batch plants shall have current certification that all weighing scales have been tested and are within the tolerances as set forth in the National Bureau of Standards Handbook No. 44.

1.06 CERTIFICATION

- A. Submit batch delivery tickets to the ENGINEER in compliance with and in accordance to ASTM C94.

1.07 TESTING

- A. Performed by an acceptable Engineering Laboratory at OWNER's expense. CONTRACTOR shall assist in the collection of samples. Any retests shall be at CONTRACTOR's expense within the Scope of the Contract.
- B. Criteria:
 - 1. Each test: not less than 5 cylinders; retain one after 28 days.
 - 2. One test for every 50 consecutive cubic yards of concrete cast.
 - 3. Furnish ENGINEER with 4 certified copies of tests made of 2 prior to form removal, 2 at 28 days and 1 hold.
- C. Questionable strength of in-place concrete:
 - 1. Additional tests may be ordered by the ENGINEER.
 - 2. Execute the core tests in accordance with ASTM C42 procedure.
 - 3. Costs of additional tests showing strength of in-place concrete conforming to design criteria are the responsibility of the OWNER.
 - 4. Costs of additional tests showing noncompliance with the design criteria are the responsibility of the CONTRACTOR.
 - 5. Additional items at CONTRACTOR's expense:
 - a. Provide load tests as directed by the ENGINEER.
 - b. Reinforce structure as directed or remove and replace all under strength concrete structure in place.

PART 2 PRODUCTS

2.01 MATERIALS

A. Cement

1. Portland cement Type I or Type II conforming to ASTM C 150. In addition, the tricalcium aluminate content of Type I cement shall not exceed 12 percent.
2. Type I or Type II cement, at the Contractor's option, may be used for nonhydraulic structures.

3. Type II cement or Type I cement, in combination with pozzolan (fly ash) as hereinafter specified, shall be used for all hydraulic structures and sanitary sewers.

B. Water: potable, salt free.

C. Fine Aggregate: salt free and clean, conforming to ASTM C33.

D. Coarse Aggregate: salt free and clean, conforming to ASTM C33, maximum size 3/4-inch.

E. All aggregates: quarried/mined in fresh water only.

2.02 MIXES

A. Fillets, thrust blocks, sidewalks, curbs and miscellaneous slabs on grade.

1. 28 day compressive strength: 3000 p.s.i.
2. Admixture: As required below, use only specified product.
3. Slump: 5 inches, \pm 1 inch.
4. Air content (ASTM C 231): 4 to 6 percent.

B. Structural and precast concrete:

1. 28 day compressive strength: 4000 p.s.i., minimum, or as illustrated on the Drawings.
 - a. Strengths noted on the Drawings take precedence over herein specified amounts.
2. Water-cement ratio: w/c \leq 0.4.
3. Slump: 5 inches, \pm 1 inch.
4. Air Content (ASTM C231): 4 to 6 percent.
5. Admixture: As required below, use only specified products.

C. Pavement:

1. 28 day compressive strength: 3000 p.s.i.
2. Water-cement ratio: w/c \leq 0.4.
3. Slump: 5 inches, \pm 1 inch.
4. Air Content (ASTM C231): 4 to 6 percent

5. Admixture: As required below, use only specified products.
 - D. Flowable Fill
 1. Cement: 50 to 100 lbs/Cy.
 2. Pozzolan (Flyash): 0 to 600 lbs/Cy.
 3. Fine Aggregate: 2750 lb/Cy.
 4. Water: 500 lbs/Cy. (Maximum)

2.03 ADMIXTURES

- A. Air-Entraining
 1. Provide air-entraining admixture in all concrete. Admixture shall conform to ASTM C 260, except it shall be nontoxic after 30 days and shall contain no chlorides. Furnish manufacturer's compliance statement for these requirements.
- B. Water-Reducing
 1. All concrete shall contain a water-reducing admixture. The admixture shall conform to ASTM C 494, Type A or Type D, except it shall contain no chlorides, shall be nontoxic after 30 days, and shall be compatible with the air-entraining admixtures. The amount of admixture added to the concrete shall be in accordance with the manufacturer's recommendations. Furnish a compliance statement that the admixture used satisfies all requirements of this Specification.

C. Pozzolan (Fly-Ash)

1. The pozzolan to be used in combination with Type I cement, as previously F fly ash conforming to ASTM C 618 and furnish test data confirming that the fly ash in combination with the cement to be used meets all strength requirements, is compatible with air-entraining agents and other additives, and provides increased sulfate resistance equivalent to or better than Type II cement.

2.04 BONDING AGENT

- A. Product shall be recommended by manufacturer as suitable to meet job requirements with regard to surface, pot life, set time, vertical or horizontal application, forming restrictions, etc. Furnish manufacturer's specific instructions for this job application, and obtain ENGINEER's review prior to purchase.
- B. Bonding agent shall be Sikastix 370 as manufactured by Sika Corporation, or equal.

2.05 EVAPORATION RETARDANT

- A. Evaporation retardant shall be used where specified to retard rapid evaporation of bleeding water from exposed concrete. The evaporation retardant may be used with or without fluorescent color tint which shall disappear completely upon drying. It shall be sprayed onto the surface of fresh concrete immediately after screeding to react with surface moisture and shall be reapplied after smoothing the surface with a bull float to ensure a continuous, compacted monomolecular layer. The evaporation retardant shall be CONFILM, as manufactured by Master Builders, Inc., or equal.

2.06 CURING COMPOUNDS

- A. Normal placement without special finish; approved products:
 1. Master Builders Company: "Masterseal".
 2. Sonneborn-Contech: "Kure-N'Seal".

PART 3 EXECUTION

3.01 EXAMINATION

- A. Place no concrete until all reinforcing steel, pipes, inserts, sleeves, conduits, etc., have been set in place and reviewed by the ENGINEER. Notify the ENGINEER of scheduled pours 24 hours prior to placement.

3.02 PLACING

- A. Placement shall conform to the requirements and recommendations of ACI 304 and ACI 318, except as modified herein.

- B. Place concrete as soon as possible after leaving mixer, without segregation or loss of ingredients, without splashing forms or steel above, and in layers not over 1.5 feet deep. The vertical free fall drop to final placement shall not exceed that hereinafter specified.
- C. Place concrete expeditiously in clean forms that are not hot to the touch; spray forms with water just prior to placing concrete. Before placing concrete directly against earth, install vapor barrier to prevent water absorption, secure reinforcement in position, inspect, and approve before placing concrete. Do not rest runways for transporting concrete on the reinforcing steel. Deposit concrete as nearly as practical in final position; and, do not allow concrete to drop freely more than 5 feet. Place all concrete during daylight, unless otherwise authorized. Where reinforcing steel above the top of the cast is coated with concrete while placing below, remove all concrete from such reinforcing steel after the placing is complete and prior to the next cast.
- D. Place slabs-on-grade carefully to avoid damages to the vapor barrier.
- E. When placing concrete, use of aluminum pipe or other aluminum conveying devices will not be permitted.
- F. Before depositing concrete, remove debris from the space to be occupied by the concrete. Prior to placement of concrete, dampen gravel fill under slabs on ground, dampen sand where vapor barrier is specified, and dampen all wood forms. Reinforcement shall be secured in position and acceptable to the ENGINEER before concrete is placed. Conform to ACI 304 and ACI 318 and to other requirements needed to obtain the finishes specified.

3.03 PUMPING CONCRETE

- A. Pumping of concrete will be permitted with the ENGINEER's approval. If, in the ENGINEER's opinion, the pumped concrete does not produce satisfactory end results, the CONTRACTOR shall discontinue the pumping operation and proceed with the placing of concrete using conventional methods.
- B. Minimum Pumping Equipment Requirements
 - 1. The CONTRACTOR shall have a standby pump, conveyor system, crane and concrete bucket, or other system acceptable to the ENGINEER, on the site during pumping, in order to provide adequate redundancy to assure completion of the concrete placement without cold joints in the event of breakdown of the primary placing equipment.
 - 2. The minimum diameter of the hose (conduit) shall be 4 inches.
 - 3. Pumping equipment and hoses (conduits) that, in the opinion of the ENGINEER, are not functioning properly, shall be replaced.

4. Aluminum conduits for conveying the concrete shall not be used.
- C. Pumped concrete field quality control samples for slump, test cylinders and shrinkage specimens will be taken at the placement (discharge) end of the line.

3.04 REMOVAL OF WATER

- A. Unless the tremie method for placing concrete is specified, remove all water from the space to be occupied by the concrete.

3.05 CONSOLIDATION

- A. Consolidate concrete in layers by internal vibrating equipment, supplemented by hand rodding and tamping as required. Do not use vibrators to move the concrete laterally inside the forms.
- B. Maintain internal vibrators at speed of at least 5000 impulses per minute when submerged in concrete. Maintain at least 1 spare vibrator in working condition at site at all times.
- C. Limit duration of vibration to time necessary to produce satisfactory consolidation without causing segregation. In no case more than 15 seconds per square foot of exposed surface. Move the vibrator constantly and place in each specific spot only once.

3.06 PLACING CONCRETE IN HOT WEATHER

- A. Prepare concrete aggregates, mixing water, and other ingredients; place concrete; cure; and protect in accordance with the requirements of ACI 305. Provide special admixtures and special curing methods required by other paragraphs in this section even though not required by ACI 305 and ACI 318. Water-reducing and/or set-retarding admixtures shall be used in such quantities as recommended by the manufacturer to assure that the concrete is workable, and placement lift lines will not be visible in the architectural concrete finishes.
- B. Every effort shall be made to maintain a concrete temperature below 90 degrees F at time of placement. Ingredients may be cooled before mixing to prevent excessive concrete temperature.
- C. Provisions may be made for windbreaks, shading, fog spraying, sprinkling or wet cover, when necessary.
- D. Apply evaporation retardant as herein specified and in strict conformance with manufacturer's written instructions.

3.07 PLACING CONCRETE IN COLD WEATHER

A. Do not place concrete when the ambient temperature is below 40 degrees F, or approaching 40 degrees F and falling, without special protection as approved by the ENGINEER. No concrete shall be placed against frozen earth or ice, or against forms and reinforcement with frost or ice present.

3.08 JOINTS

A. Construction joints:

1. Locate as illustrated on the Drawings and as reviewed by the ENGINEER for slabs.
2. Key joints.

B. Construction joints shall be as specified in Section 03251 - Expansion and Construction Joints.

3.09 BONDING TO OLD CONCRETE

A. Coat the contact surfaces with bond agent specified hereinbefore. The method of preparation and application of the bonding agent shall conform to the manufacturer's printed instructions and recommendations for specific application for this project. Obtain this recommendation in writing from the manufacturer's representative.

3.10 CURING

A. Begin curing of concrete as soon as practicable after placing, but not more than 3 hours thereafter.

B. Continue curing of the structural elements immediately after removal of forms.

C. Apply curing compounds as specified.

D. Water curing methods are preferred for all water retaining structures in lieu of application of curing compounds.

Cure concrete by keeping the surface continuously wet for 7 days where normal Portland cement is used, or 3 days where high-early strength Type III cement is used. Subject to approval by the ENGINEER, one of the following methods shall be followed:

WALLS

1. Concrete forms shall be left in place and kept sufficiently damp at all times to prevent opening of the joints and drying of the concrete.
2. Exposed surfaces shall be continuously sprinkled.

SLABS AND CURBS

1. Protect surface by ponding; or
2. Cover with burlap or cotton mats kept continuously wet; or
3. Cover with 1-inch layer of wet sand, earth, or sawdust, and keep continuously wet; or
4. Continuously sprinkle the exposed surface; or
5. Spray surface with curing compound and when hard enough to sustain foot traffic on same day as pour, lay sprinkler hoses and cover with Visqueen sheets. Keep enough water from sprinkler hoses to keep surface of slab under Visqueen wet for full cure period; or
6. Other agreed upon method that will insure that moisture is present and uniform at all times on the entire surface of the slab.

3.11 PATCHING

- A. Immediately after stripping forms, patch all defective areas with non-shrink non-metallic grout. Grout after curing shall match color of adjacent concrete. Patch defects as specified below or as designated by the ENGINEER. Clean, dampen, and fill all the holes with patching mortar.
 1. Major defective areas, as judged by the ENGINEER, including those resulting from the leakage of forms, excessive honeycombs, large bulges, and large offsets at form joints: chip away to a depth of at least 1/4 inch; and, the surfaces that are to be patched coat with an epoxy-polysulfide adhesive. Press non-shrink, non-metallic grout in for a complete bond and finish to match adjacent areas.
 2. Minor defective areas, as judged by the ENGINEER, including honeycombs, air bubbles, holes resulting from removal of ties and those resulting from leakage of forms: patch with non-shrink grout without resorting to chipping. Minor bulges and offsets at form joints: finish as specified herein below.

3.12 CONCRETE WALL FINISHES

- A. Type W-1
 1. All snap-tie holes shall be filled with non-shrink, non-metallic grout. All projections shall be KNOCKED OFF. Also all honeycomb areas and rock pockets shall be patched. Small air holes do not require patching.
- B. Type W-2
 1. All snap-tie holes shall be plugged with non-shrink, non-metallic color matched grout that has been approved by ENGINEER. GRIND OFF projections, fins, and

rough spots. Repair all other defects such as honeycomb areas, rock pockets, and rough spots which are a result of form release agent failure or other reasons with color matched non-shrink grout.

C. Type W-3

1. All snap-tie holes shall be plugged with non-shrink, non-metallic grout that has been approved by ENGINEER. GRIND OFF all projections, fins, and rough spots. Repair all defects as per type W-3. Apply a cementitious coating per Section 09900 - Protective Coatings or stucco per Section 09200 - Lath and Plaster as scheduled on the Drawings, or as specified in other sections.

3.13 CONCRETE SLAB FINISHES

A. General

1. The excessive use of "jitterbugs" or other special tools designed for the purpose of forcing the coarse aggregate away from the surface and allowing a layer of mortar to accumulate will not be permitted on any slab finish. The dusting of surfaces with dry materials will not be permitted. Slabs and floors shall be thoroughly completed by vibration. All edges of slabs and tops of walls shall be rounded off with a steel edging tool, except where a chamfered edge is indicated on the Drawings. Steel edging tool radius shall be 1/4-inch for all slabs subject to wheeled traffic.

B. Type S-1 (Steel Troweled Finish)

1. Finish by screeding and floating with straightedges to bring the surfaces to the required finish elevation shown on the Drawings. While the concrete is still green, but sufficiently hardened to bear a person's weight without deep imprint, it shall be wood floated to a true, even plane with no coarse aggregate visible. Sufficient pressure shall be used on the wood floats to bring moisture to the surface. After surface moisture has disappeared, the concrete shall be hand troweled to produce a smooth, impervious surface, free from trowel marks. An additional troweling shall be given the surface for the purpose of burnishing. The final troweling shall produce a ringing sound from the trowel. Dry cement or additional water shall not be used in troweling, nor will excessive troweling be permitted.
2. The slab finish tolerances and slope tolerances and/or repairs shall be as hereinbefore specified. Floor flatness measurements will be made the day after a concrete floor is finished and before the shoring is removed, in order to eliminate any effects of shrinkage, curling, and deflection. The 10-foot long straightedge shall be supported at each end with steel gauge blocks whose thickness are equal to specified tolerance. Floor surface shall not have crowns so high as to prevent 10-foot straightedge from resting on these two end blocks, nor low spots so low that a third block of twice the tolerance in thickness can easily pass under the supported 10-foot straightedge.

3. Compliance with the designated limits in four of five consecutive measurements should generally be satisfactory unless obvious faults are observed. A check for adequate slope and drainage will also be made to confirm compliance with these specifications.

C. Type S-2 (Wood float Finish)

1. Slabs to receive fill and mortar setting beds shall be finished by screeding with straightedges to bring the surface to the required finish plane. Slab shall be wood floated to compact and seal surface. All laitance shall be removed and the surface left clean. Subject to approval of the ENGINEER, an acceptable aggregate revealing material may be used and laitance washed off when concrete has set.

D. Type S-3 (Underside of Elevated Slab)

1. When forming is removed, the underside of slab shall have all projection ground off, all rock pockets and honeycomb area defects repaired.

E. Type S-4 (Exterior Broomed Finish)

1. Finish concrete as specified for Type S-1 floor finish above, except the final troweling shall be omitted and the surface shall be finished by drawing a fine-hair broom lightly across the surface. All brooming shall be in the same direction and parallel to expansion joints, or, in the case of inclined slabs, perpendicular to the slope, except for a round roof slab, broom surface in radial direction.

F. Type S-6 (Power Machine Finish)

1. In lieu of hand finishing, the CONTRACTOR may use an approved power machine for finishing concrete floors and slabs in accordance with the directions of the machine manufacturer and as approved by the ENGINEER. The use of a power machine will not be allowed when the concrete has not attained the necessary set to allow finishing without introducing high and low spots in the slab. The first steel troweling for slab Type S-1 finish should be done by hand.

3.14 BEAM AND COLUMN FINISHES

A. Type B-1

1. Knock off all fins and projections. Repair all rock pockets and honeycomb areas.

B. Type B-2

1. Beams shall be ground to remove all form marks. Repair all rock pockets.

C. Type B-3

1. Beams shall be ground to remove all form marks. Repair all rock pockets. Fill all air voids. Apply finishes as scheduled on the drawings.

D. Type C-1

1. Knock off all fins and projections. Repair all rock pockets and honeycomb areas.

E. Type C-2

1. Column shall be ground to remove all form marks. Repair all rock pockets.

F. Type C-3

1. Column shall be ground to remove all form marks. Repair all rock pockets. Fill all air pockets. Apply finishes as scheduled on the drawings.

3.15 FIELD QUALITY CONTROL

- A. Only ready mixed concrete in accordance with ASTM C94 will be accepted.
- B. Place all concrete within 1-1/2 hours after introduction of water to mix.
- C. Under no circumstances may additional water be added to mix.
- D. Discard unused concrete older than 1-1/2 hours. Retempering is prohibited.

END OF SECTION

SECTION 03600

GROUT

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Furnish all materials for grout in accordance with the provisions of this Section and form, mix, place, cure, repair, finish, and do all other work as required to produce finished grout, all in accordance with the requirements of the Contract Documents.
- B. The following types of grout shall be covered in this Section:
 - 1. Non-Shrink Grout: This type of grout shall be used to seal abandoned pipe and other penetrations of existing and new sanitary structures.
 - 2. Cement Grout: This type of grout to be used for pump station inverts.
 - 3. Epoxy Grout: This type of grout to be used for setting anchor bolts and other mechanical features as required.
- C. Like items of materials provided hereunder shall be the end products of one manufacturer in order to achieve standardization for appearance, maintenance, replacement and service.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 03300 - Concrete.

1.03REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Specifications, codes, and standards shall be as specified in Section 03300 - Concrete and as referred to herein.

B. Additional Commercial Standards:

Corps of Engineers Specifications for Non-shrink grout.

ASTM C 109-80 Standard test methods for compressive strength of hydraulic cement mortars (using 2-in or 50-mm cube specimens).

ASTM C 531-81 Test method for linear shrinkage and coefficient of thermal expansion of chemical-resistant mortars, grouts and monolithic surfacings.

ASTM C 579-82	Test methods for compressive strength of chemical-resistant mortars and monolithic surfacings.
ASTM C 827-82	Standard test method for early volume change of cementitious mixtures.
ASTM C 696-79	Test method for coefficient of linear thermal expansion of plastics.

1.04 SUBMITTALS

- A. Submit certified test results verifying the compressive strength, shrinkage, and expansion requirements specified herein; and manufacturer's handling, placement and appropriate uses for each type of non-shrink and epoxy grout used in the Work.

PART 2 PRODUCTS

2.01 CEMENT GROUT

- A. Cement Grout: Cement grout shall be composed of one part cement, three parts sand, and the minimum amount of water necessary to obtain the desired consistency. Where needed to match the color of adjacent concrete, white portland cement shall be blended with regular cement as needed. The minimum compressive strength at 28 days shall be 4000 psi.
- B. Cement grout materials shall be as specified in Section 03300 - Concrete.

2.02 PREPACKAGED GROUTS

- A. Non-Shrink Grout
 1. Non-shrink grout shall be a prepackaged, inorganic, non-gasliberating, non-metallic, cement-based grout requiring only the addition of water. Manufacturer's instructions shall be printed on each bag or other container in which the materials are packaged. The specific formulation for each class of non-shrink grout specified herein shall be that recommended by the manufacturer for the particular application.
 2. Class A non-shrink grouts shall have a minimum 28 day compressive strength of 5000 psi; shall have no shrinkage (0.0 percent) and a maximum 4.0 percent expansion in the plastic state when tested in accordance with ASTM C-827; and shall have no shrinkage (0.0 percent) and a maximum of 0.2 percent expansion in the hardened state when tested in accordance with CRD C 621.
 3. Class B non-shrink grouts shall have a minimum 28 day compressive strength of 5000 psi and shall meet the requirements of CRD C 621.
 4. Application
 - a. Class A non-shrink grout shall be used for the repair of all holes and defects in concrete members which are water bearing or in contact with soil or other fill material, grouting under all equipment base plates, and at all locations where grout is specified in the Contract Documents; except for those applications for Class B non-shrink grout and epoxy grout specified herein. Class A non-shrink grout may be used in place of Class B

non-shrink grout for all applications.

- b. Class B non-shrink grout shall be used for the repair of all holes and defects in concrete members which are not water-bearing and not in contact with soil or other fill material, grouting under all base plates for structural steel members, and grouting railing posts in place.

B. Epoxy Grout

- 1. Epoxy grout shall be a pourable, non-shrink, 100 percent solids system. The epoxy grout system shall have three components: resin, hardener, and specially blended aggregate, all premeasured and prepackaged. The resin component shall not contain any nonreactive diluents. Resins containing butyl glycidyl ether (BGE) or other highly volatile and hazardous reactive diluents are not acceptable. Variation of component ratios is not permitted unless specifically recommended by the manufacturer. Manufacturer's instructions shall be printed on each container in which the materials are packaged.
- 2. The chemical formulation of the epoxy grout shall be that recommended by the manufacturer for the particular application.
- 3. The mixed epoxy grout system shall have a minimum working life of 45 minutes at 75 degrees F.
- 4. The epoxy grout shall develop a compressive strength of 5000 psi in 24 hours and 10,000 psi in seven days when tested in accordance with ASTM C 579, Method B. There shall be no shrinkage (0.0 percent) and a maximum 4.0 percent expansion when tested in accordance with ASTM C 827.
- 5. The epoxy grout shall exhibit a minimum effective bearing area of 95 percent. This shall be determined by a test consisting of filling a 2-inch diameter by 4-inch high metal cylinder mold covered with a glass plate coated with a release agent. A weight shall be placed on the glass plate. At 24 hours after casting, the weight and plate shall be removed and the area in plan of all voids measured. The surface of the grout shall be probed with a sharp instrument to locate all voids.
- 6. The peak exotherm of a 2-inch diameter by 4-inch high cylinder shall not exceed 95 degrees F when tested with 75 degree F material at laboratory temperature. The epoxy grout shall exhibit a maximum thermal coefficient of 30×10^{-6} inches/inch/degree F when tested according to ASTM C 531 or ASTM D 696.
- 7. Application: Epoxy grout shall be used to embed all anchor bolts and reinforcing steel required to be set in grout and for all other applications required in the Contract Documents.

1.03 CURING MATERIALS

- A. Curing materials shall be as specified in the Section entitled, 03300 - Concrete, for cement grout and as recommended by the manufacturer of prepackaged grouts.

1.04 CONSISTENCY

- A. The consistency of grouts shall be that necessary to completely fill the space to be grouted for the particular application. Dry pack consistency is such that the grout is plastic and moldable but will not flow. Where "dry pack" is called for in the Contract Documents, it shall mean a grout of that consistency; the type of grout to be used shall be as specified herein for the particular application.

1.05MEASUREMENT OF INGREDIENTS

- A. Measurements for cement grout shall be made accurately by volume using containers. Shovel measurement will not be allowed.
- B. Prepackaged grouts shall have ingredients measured by means recommended by the manufacturer.

PART 3 EXECUTION

3.01GENERAL

- A. All surface preparation, curing, and protection of cement grout shall be as specified in Section 03300 - Concrete. The finish of the grout surface shall match that of the adjacent concrete.
- B. The manufacturer of Class A non-shrink grout and epoxy grout shall provide on-site technical assistance upon request.
- C. All mixing, surface preparation, handling, placing, consolidation and other means of execution for prepackaged grouts shall be done according to the instructions and recommendations of the manufacturer.

1.02CONSOLIDATION

- A. Grout shall be placed in such a manner for the consistency necessary for each application so as to assure that the space to be grouted is completely filled.

END OF SECTION