

Goodwill Donation Station Parking Lot Relocation

TECHNICAL SPECIFICATIONS:

1. SUMMARY OF WORK

The proposed Goodwill Donation Station Parking Lot Relocation project is located in Section 7, Township 1 North, Range 1 East, Leon County, Florida. The tributary lies within the Ford's Arm Watershed and Lake Jackson Basin.

The scope of work to be performed includes the relocation of the Goodwill Donation Station parking lot from the south side of the existing Goodwill building located on parcel number 11-07-20-212-000-0 to the north side of the store. The existing convenience store building and all impervious areas located on parcel number 11-07-20-213-000-0 will be removed once the new parking area and ramp is operational.

The new improvements will also involve new ADA accessible parking, culvert installation, driveway turnout, gravel material pavement, and the addition of a other site features.

All proposed improvements lie outside of the Canopy Road Protection Zone. No protected trees will be impacted by the proposed development.

Project Construction Phasing:

Phase 1: Construction of new parking area and miscellaneous site features. The new parking area shall be open for use prior to Phase 2 construction activities commencing.

Phase 2: Demolition activities, as indicated on parcel number 11-07-20-213-000-0.

2. GENERAL REQUIREMENTS

The construction sequence and design notes are shown on the construction plans. The contract administration, construction procedure, materials, and equipments, shall be in accordance with the following specifications and contract documents:

- 2.1 All Standards and specifications called out on the Construction Plans.
- 2.2 Leon County Technical Specifications
- 2.4 The City of Tallahassee Standard Specifications for the Design and Construction of Water and Wastewater Facilities, Latest Edition.
- 2.5 Manual on Uniform Traffic Control Devices (MUTCD), U.S. Department of Transportation Federal Highway Administration, Latest Edition.

- 2.6 Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction, 2017 Edition and all supplemental documents thereto.
- 2.7 FDOT Roadway and Traffic Design Standards, 2018 Edition and all supplemental documents thereto .

In the event of any conflict between the Florida Department of Transportation's standard specifications and the specifications of this contract, the specifications of this contract shall govern. The governing order of these specifications is to follow the sequence in the aforementioned specifications and standards.

3. MANDATORY PREBID CONFERENCE

Contractors are required to attend the pre-bid conference to be qualified for bidding. The date of pre-bid conference may be one week before the bid opening date. Contractors shall contact the Leon County Purchasing Office to confirm the meeting time and place details.

4. SPECIAL PROVISIONS

- 4.1 An allowance of 90 calendar days has been set for the completion of this Contract.

The construction approach is laid out in the General Notes section of the Construction Plans.

Contractor shall invite all utilities listed on the construction plans to attend the pre-construction conference and to confirm the work schedules.

The Contractor is required to coordinate with residents to maintain ingress and egress at all times during construction.

The Contractor shall conduct weekly coordination meetings with Utility owners and County representatives.

The Contractor must distribute Flyers to surrounding residents prior to Construction. The Flyers should contain detour map and brief description of project.

- 4.2 Contractor shall notify Property Owners 72 hours in advance of driveway closures.
- 4.3 A National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges from Construction Activities may apply to this Contract. It is the Contractor's responsibility to secure the NPDES permit prior to commencement of construction. A copy of the NPDES permit application form can be obtained through the Florida Department of Environmental Protection's (FDEP) web site at

http://www.dep.state.fl.us/water/stormwater/npdes/permits_forms.htm.

If a NPDES permit is obtained, a copy of the permit shall be provided to Leon County Public Works Department. The costs for the NPDES permit and applicable fees are considered incidental and included in the total bid price.

- 4.4 The liquidated damages will be set based on the bid price and according to Section 8-10 of the FDOT's Standard Specifications for Road and Bridge Construction, 2017 Edition.
- 4.5 It is the Contractor's responsibility to verify the survey control points for construction stakeouts as well as the wetland limits. The costs for construction stakeouts are considered incidental and included in the total bid price.
- 4.6 The exact locations of all utilities in the vicinity of construction activities shall be verified by the Contractor prior to the construction. Contractor shall contact all utility companies through Sunshine State One Call of Florida, Inc. (1-800-432-4770) two business days in advance of beginning construction. It is Contractor's responsibility to verify and locate all the utilities to avoid damages.
- 4.7 It is the Contractor's responsibility to establish a staging area with County representative's review and approval prior to commencement of construction. The Contractor is also responsible to obtain necessary permits if required by any other agencies. If the staging area is outside County's right-of-way or properties, the Contractor is required to obtain separate permits from the Leon County – Development Support & Environmental Management Department. All expenses associated with the additional permits will be paid by the Contractor.
- 4.8 The Clearing and Grubbing pay item includes but not limited to all works within the construction area as described in Section 110 of FDOT's Standard Specifications for Roadway and Bridge Construction, 2017 Edition. The vegetation and debris removal is also included in the clearing and grubbing cost.
- 4.9 The Contractor is also responsible to ensure all construction activities in compliance with the permit requirements.
- 4.10 Contractor provided dewatering design requirements, schedule and maintenance:
 - a. The Contractor shall provide all dewatering necessary to keep the construction and work areas dry. The Contractor shall design, install, operate, and maintain an adequate system. The system shall be of sufficient size and capacity to maintain a dry condition without delays to construction operations.
 - b. The Contractor shall submit a proposed dewatering plan for approval by Leon County Public Works prior to the pre-construction meeting of any construction or excavation operations. The plan shall show all proposed best management practices (I.E. filter bags, sediment sumps, etc.) for complying with all local, state, and national water quality regulations. Discharge points shall be clearly indicated.

- c. The Contractor shall monitor and provide testing at the discharge points during dewatering operations. Contractor shall ensure the discharge turbidity is within the limits set forth in chapter 62-302 F.A.C. (less than 29 NTU + Natural Background). Testing records shall be maintained onsite by the contractor and provided to the County upon request. If dewatering operations exceed the turbidity requirements, the Contractor shall stop work until the best management practices are in place to ensure water quality criteria are reached.
 - d. The Contractor shall maintain a regularly scheduled maintenance program which shall conform to the equipment manufacturer's recommendations and include all other work necessary to maintain all components fully operational.
- 4.11 Erosion controls shown on the plans are to be considered minimum and additional protection shall be accounted for in this project.
 - 4.12 The Contractor shall visit the project site prior to submitting the bids so a complete understanding of the site conditions and construction details can be achieved.
 - 4.13 If the construction works causes any damages to adjacent properties, Contractor will be responsible for compensation unless it is proved otherwise.
 - 4.14 According to the OSHA requirements, a minimum 10-foot clearance (circumference) must be maintained from the overhead electric neutral and primary conductors for any construction work.
 - 4.15 The Contractor shall provide a minimum two-year warranty on the materials and workmanship for the work performed under this contract. The warranty shall commence upon completion of construction and issuance of Final Acceptance by the County.
 - 4.16 Meridian Road is a Canopy Road only work shown shall be conducted within the Canopy Road Protection Zone.
 - 4.17 As-built Survey and Record Drawings will be required for this project. The costs for as-built survey and record drawings are considered incidental and included in the total bid price.
 - 4.18 Contractor shall supply to the Owners Representative the Sub-grade test report, base test report, asphalt test report, trenchline test report, video of storm drain system, certified as-builts and ADA certification.
 - 4.19 Contractor shall submit the Leon County Engineer or Representative, a Maintenance of Traffic Permit prior to commencement of construction.
 - a. Working hours shall be from 9:00 a.m. to 4:00 p.m., Monday through Friday, however upon request of Contractor, County Engineer or his/her designee, may consider an alternative to these working hours based on the time of the year, site,

weather, and traffic conditions.

- b. There shall be no works on national holidays, such as New Year, Memorial, Fourth of July, Labor Day, Veteran's Day, Thanksgiving, Friday after Thanksgiving, and Christmas.
 - c. No night work shall be performed unless approved by County Engineer.
- 4.20
- a. All quality control testing costs are considered to be incidental and included as part of the total bid.
 - b. Leon County shall reserve the right to sample any or all materials to determine whether or not materials meet the required specifications. Failure to meet specifications shall be cause for cancellation of delivery and rejection of materials provided for partial or full payment deduction as determined by the County representative.
- 4.21
- Regular excavation and embankment will be measured by the cubic yard and in accordance with FDOT Section 120. Measurements will be made for materials excavated and removed to obtain proper compaction in cut and in fill sections. Regular excavation and embankment areas will be cross sectioned by a Professional Surveyors and Mappers prior to excavation, at completion of excavation, and at completion of final grade establishment. The final pay quantities for regular excavation and embankment will be determined by utilizing field survey methods.
- 4.22
- The Contractor shall install temporary fencing around the construction laydown area prior to construction activities commencing. The temporary fence shall be 4 feet high (minimum) chain link fence.
- 4.23
- The Contractor shall provide field staking of all temporary construction easement corners located within parcel No. 11-07-20-212-000-0.
- 4.24
- The Contractor shall remove and relocate the existing Goodwill signage. Removal of the existing sign shall not start until the new parking area for the Goodwill Relocation Donation Station site is complete and the site is accessible to the public. The Contractor shall be responsible for obtaining a sign permit, including foundation analysis for the new sign location. Contractor will be responsible for the required electrical power supply and code compliant connections to the sign at the new location.
- 4.25
- At completion of the project, the Contractor shall coordinate and install 100 linear feet of FDOT Fence – Type A across the frontage, outside of the Right-of-Way for Parcel No. 11-07-20-213-000-0.

5.

This Project hereby adopts the Florida Department of Transportation Standard Specifications for Road and Bridge Construction 2017 or latest edition together with all updates in its entirety as part of its guiding standards for construction except as amended by following specifications. If the Standard Specification section is not referenced in this document, it is considered unaltered and remains in force as written with the exception of the general substitution of definitions listed below.

Division 1 General Requirements is modified as follows:

Section 1: Definition and Terms

Department - shall be revised to be Leon County throughout the entire Specifications unless specifically noted otherwise in this document.

Engineer - Engineer shall be revised to mean the Owner's Representative throughout the Specifications unless noted elsewhere in this document.

Section 2: Proposal, Requirements and Conditions

Delete this Section in its entirety with the exception of the retention of Section 2-1 requiring bidders be prequalified with the Florida Department of Transportation and Section 2-4 requiring the contractor to review the plans, site etc.. Replace all remaining sections with Leon County Standard Bid procedures included in the front end of all bid documents.

Section 3: Award and Execution of Contract

Delete in its entirety and replace with Leon County Standard award and bond requirements included with every contract.

Section 5: Control of Work

5-44: Modify to add: The notification of an error or omission in the contract documents shall be made in written form. The County must respond in writing before the contractor proceeds with work associated with the error or omission.

5-5 5 and 5-6: Replace *The Director, Office of Construction* with ***the Leon County Engineer or his designee.***

5-7.1: Revise The ~~Engineer~~ The Engineer of Record will provide centerline control points ...

5-7.3: Revise the sentence: Utilizing the control points furnished by the ~~Department~~ Engineer of Record

5-9.1: Modify to include: If the work was covered without a required inspection and the Engineer requests that it be uncovered for examination, the contractor shall do so at no expense to the County.

5-12.2.1: This section is revised to reduce the time frame for claims for extra work for project under \$1,000,000 from 90 to 30 calendar days after final acceptance and for projects over \$1,000,000 from 180 to 60 calendar days. The same reduced time frames shall apply to claims pertaining to final estimate of quantities.

5-12.2.2: This section is revised to limit the time frame for projects under \$1,000,000 from 90 to 30 calendar days after final acceptance and for projects over \$1,000,000 from 180 to 60 calendar days.

5-12.4: This section is revised to reduce the time for County action on a claim for projects under \$1,000,000 from 90 to 60 calendar days and for projects over \$1,000,000 from 120 to 90 calendar days.

5-12.5: Delete this section in its entirety. The County does not pay interest on claims

5-12.13: The Secretary of Transportation shall mean the Leon County.

Section 6-Control of Materials:

Due to the interchanging of the responsibilities of the Florida Department of Transportation (FDOT) and the County and the need for the FDOT to retain some of its requirements, this section is deleted in its entirety and replaced in its entirety with the following verbiage. The assignments of responsibilities within this section shall be as stated

6-1 Acceptance Criteria

6-1.1 General: Acceptance of materials is based on the following criteria. All requirements may not apply to all materials. Use only materials in the work that meet the requirements of these Specifications. The Leon County Engineer or his designee may inspect and test any material, at points of production, distribution and use.

6-1.2 Sampling and Testing: Use the Florida Department of Transportation's current sampling identification and tracking system to provide related information and attach the information to each sample. Restore immediately any site from which material has been removed for sampling purposes to the pre-sampled condition with materials and construction methods used in the initial construction, at no additional cost to Leon County.

Ensure when a material is delivered to the location as describe in the Contract Documents, there is enough material delivered to take samples, at no expense to Leon County.

6-1.2.1 Pretest by Manufacturers: Submit certified manufacturer's test results to the Owner's Representative for qualification and use on County projects. Leon County may require that manufacturers submit samples of materials for independent verification purposes.

6-1.2.2 Points of Production Test: Test the material during production as specified in the contract documents.

6-1.2.3 Point of Distribution Test: Test the material at Distribution facilities specified in the contract documents.

6-1.2.4 Point of Use Test: Test the material immediately following placement as specified in the Specifications. After delivery to the project, the County may require retesting of material that have been tested and accepted at the source of supply, or may require the testing of materials that are accepted by producer Certification. The County may reject all materials that, when retested, do not meet the requirements of these specifications.

6-1.3 Certification

6-1.3.1 Manufacturer Certification: Provide complete certification for materials as required. Furnish to the Engineer for approval, manufacturer certifications for all products listed on the Approved Product List (APL) and when required by the applicable material specifications. Do not incorporate any manufactured products or materials into the project without approval of the County Engineer. Materials will not be considered for payment when not accompanied by manufacturer's certification. Manufacturers may obtain sample APL certification forms through the Florida Department of Transportation's website. Ensure that the certification is provided on the manufacturer's letterhead and is signed by a legally responsible person from the manufacturer and notarized.

6-1.3.1.1 Approved Products List: The Product Evaluation Section in the State Specifications and Estimates Office maintains the APL. This list provides assurances to the Contractors, consultants, designers and County personnel that specific products and materials are approved for use on County facilities. The County will limit the contractor's use of products and materials that require use of APL items listed on the APL effective at the time of placement. References to the Qualified Products List (QPL) will be synonymous with the APL in all Contract Documents.

6-1.3.2 Contractor Installation Certification: Provide installation certifications as required by the Contract Documents.

6-2 Applicable Documented Authorities other than the Specifications:

6-2.1 General: Details on individual materials are identified in various material specific Sections of the Specifications that may refer to other documented authorities for requirements. When specified, meet the requirements as defined in such references.

6-2.2 Test Methods: Methods of sampling and testing materials are in accordance with the Florida Methods (FM). If a Florida Method does not exist for a particular test, perform the testing in accordance with the method specified in the Specification. When test methods or other standards are referenced in the Specifications without identification of the specific time of issuance, use the most current time of issuance, including interims or addendums thereto, at the time of bid opening.

6-2.3 Construction Aggregates: Aggregates used on County projects must be in accordance with Rule 14-103 FAC.

6-3 Storage of Materials and Samples.

6-3.1 Method of Storage: Store materials in such a manner as to preserve their quality and fitness for the work, to facilitate prompt inspection, and to minimize noise impacts on sensitive receivers. More detailed specifications concerning the storage of specific materials are prescribed under the applicable Specifications. The County may reject improperly stored materials.

6-3.2 Use of Right of Way for Storage: If the Leon County Engineer allows, the contractor may use a portion of the right-of-way for storage purposes and for placing the contractor's plant and equipment. Use only the portion of the right-of-way that is outside the clear zone, which is the portion not required for public vehicular or pedestrian travel. When used, restore the right of way to preconstruction condition at no additional cost to the County or as specified in the contract documents. Provide any additional space required at no expense to the County.

6-3.3 Responsibility for Stored Materials: Accept responsibility for the protection of stored materials. The County is not liable for any loss of materials, by theft or otherwise, or for any damage to stored materials.

6-3.4 Storage Facilities for Samples: Provide facilities for storage of samples as described in the contract documents and warranted by the test methods and Specifications.

6-4 Defective Materials: Materials not meeting the requirements of the FDOT Standard Specifications 2017 edition will be considered defective. The County Engineer will reject all such materials, whether in place or not. All rejected materials shall be immediately removed from the project site and storage areas at no expense to the County.

Do not use material that has been rejected and the defects corrected, until the County Engineer has approved the materials use. Upon failure to comply promptly with any order of the County Engineer made under the provisions of this section, the County may remove and replace defective material and deduct the cost of removal and replacement from any money due or to become due to the Contractor.

As an exception to the above, within 30 calendar days of the termination of the LOT or rejection of the material, the Contractor may submit a proposed scope of work to the County Engineer for an engineering or independent laboratory (as approved by the County Engineer) analysis to determine the disposition of the material. A Specialty Engineer, who is an independent consultant, or the Contractor's Engineer of Record as stated within each individual Section shall perform any such analysis. Upon the County Engineer's approval of the scope of work submitted by the Contractor, the engineering analysis must be completed and the report must be submitted to the County Engineer within 45 calendar days, or other time frame as approved by the County Engineer. The report must be signed and sealed by the Specialty Engineer. The County Engineer will determine the final disposition of the material after review of the information submitted by the Contractor. No additional monetary compensation or time extension will be granted for the impact of any such analysis or review.

6-5 Products and Source of Supply: Sections 6-5.1 and 6-5.2 all wording remains the same with the exception, the word Department shall mean Leon County.

7-1.9 Florida Minority Business Loan Mobilization Program: This section is deleted in its entirety.

7-2.2 Work in Navigable Waters of the U.S.: Modify the statement *will procure all the necessary permits prior to advertisement for bids* to will obtain the necessary permits prior to authorization of that portion of the work. Whenever a permit has not been obtained prior to

advertisement, notification shall be provided in the bid documents pertaining to the anticipated requirements of the required but pending permit.

7-11.3 Contractor Use of Streets and Roads: The Contractor shall repair any road damages as the result of hauling materials or equipments to a job site to as good of condition as before the hauling began. Leon County shall not be responsible for any damages to the roadways.

7-13.2 & 7-13.3 Contractors' Public Liability and Property Damages Liability Insurance & Contractor Protective Public Liability and Property Damage Liability Insurance: Liability limits stated in these sections shall remain unless specifically revised in the project specific front end documents.

7-19 Source of Forest Products: This section is modified to encourage, but not require the use of Florida timber, timber piling or other forest products.

7-24 Disadvantaged Business Enterprise Program: Replace in its entirety with the Leon County Disadvantaged enterprise requirements included in the front end project specific specifications. If the front end does not address DBE requirements, none shall be required.

7-25 5 On the Job Training Requirements: With the exception of Federally Aid Contracts, this section shall be deleted in its entirety.

8-5 Qualifications of Contractor Personnel: This section shall be amended to require that the superintendent or other qualified personnel shall be required to read, speak and understand English in order to communicate effectively with county personnel.

8-9.2 Termination of Contract for Convenience: The Secretary shall mean the Leon County Administrator.

8-10.2 Amount of Liquidated Damages: Liquidated damages shall follow the FDOT amounts unless specifically modified in the contract documents.

9-2.1.1 Fuels: The County will not adjust or tract fuel consumption. This section is deleted in its entirety.

9-2.1.2 Bituminous Material: The County will follow this asphalt adjustment procedure for projects meeting the time or volume criteria. The Department is the FDOT and the County will utilize FDOT's calculations of API posted on the Construction Office website.

9-5.1 Partial Payments General: Delete paragraph 3 regarding the retainage amounts and replace with the county shall withhold 10% of the project cost for all pay requests up to 50% completion, then it shall be reduced to 5% for the remaining balance according to the Florida Local Government Prompt Payment Act. County shall follow Section 9-5.4 for the release of retainage.

9-5.5.2 Partial Payment Amounts: Delete subsection (1) . The County will make partial payments monthly without restriction to the minimum payment amount.

Division II

102-6.2 Construction: The County will not provide any equipment or personnel, the contractor shall be solely responsible for all efforts relating to this item.

102-6.6 Operation of Existing Movable Bridge: Substitute that the contractor shall maintain and operate all movable bridges. The County shall have no responsibility whatsoever for this task.

104-7 Maintenance of Erosion Control Features: Delete the reference to the State of Florida Department of Environmental Protection Generic Permit for Stormwater Discharge from Large and Small Construction Activities. The contractor shall maintain all erosion control features as shown on the construction plans or as required by permits.

104-9 and 104-10 Method of Measurement and Basis of Payment: If the contract documents are silent, this basis of measurement and payment for erosion control devices governs otherwise bid quantities for erosion control devices will be paid as a lump sum.

105-1.2.2 Quality Control Inspection: Delete this section as the County does not maintain a testing and material placement database.

105-4.2 & 105-4.4 Producer Quality Control Program & Compliance with the Materials Manual: In these sections, all references to the Departments Material manual or specifications manual shall remain the Florida Department of Transportation, not Leon County.

105-4.5, 105-4.6 Producers Quality Control (QC) Plan Review and Acceptance: Submittal to and approval of the Quality Control Plan shall be the Leon County Engineer.

105-7 Lab Qualification Program: Any lab meeting the Florida Department of Transportation's qualification is permitted to do testing on Leon County projects.

110-1 (3) Clearing and Grubbing- Description: Modify this section to read: Trim trees and shrubs within the project right-of-way that are identified in the Contract documents or are needed to safely conduct the work. Trees not identified for trimming shall be brought to the attention of the County inspector for approval prior to conducting the work. In no case shall trees be trimmed on any canopy road without express designation in writing on the contract documents or by the County Engineer or his designee.

110-6.5 and 120-1.2 Asbestos Containing Materials (ACM) Not Identified Prior to Work, Unidentified Areas of Contamination: These sections are modified to delete the reference to the District Contamination Assessment Coordinator. The County Engineers shall coordinate with the appropriate party and that party shall act as the CAR Contractor outlined in this specification.

120-6.2 Furnishing of Borrow Areas: Delete this section and replace with: Use of an offsite borrow area shall meet all local, state and federal requirements for use of the site as a borrow area.

120-8.4 Reclaimed Asphalt Pavement (RAP) Method: Use of Reclaimed Asphalt Pavement (RAP) delete this section. Replace with Reclaimed Asphalt Pavement (RAP) shall be used only if specifically designated on the construction drawings. Requirements and limitations shall also be stated on the construction drawings as applicable.

120-10.1.1 and 120-10.1.2 Initial Equipment Comparison and Initial Production Lot: Delete these sections for initial equipment comparison and initial production lot.

120-10.1.6 Reduced Testing Frequency: delete this methodology. Independent testing is at the sole discretion of the County.

120-10.4 Verification Comparison Criteria and Resolution Procedures: The County reserves the right to follow whatever verification testing schedule the Engineer or his representative deem necessary for the project and is not bound by the frequency suggested by FDOT.

121-3 Mix Design: Modify this section to require submittal of a signed and sealed mix design for the County's files.

125-8.1.1 General Requirements for Structures and Pipe: Modify the lot definition Lot is defined as one lift of backfill material placement, not to exceed 500 feet for pipe placed *under pavement* or a single run of pipe connecting two successive structures whichever is less. *For pipe installations outside of pavement a lot is defined as one lift of backfill material placement, not to exceed 1000 feet.* In both cases, backfill around structures compacted separately from pipes will be considered a separate lot

125-8.1.6: Placement and Compaction Modify to indicate performance verification testing may be done by the county.

125-8.3.3.1 Compaction – Lowest Zone: Revise this section to read Compact soil in the lowest zone and bedding to match contiguous in situ density.

125-8.3.4 Backfill under Wet Conditions: Delete the sentence: Leon County will pay for any select material which is not available from the grading as Unforeseeable Work.

125-9.1.1 Reduced Testing Frequency: Delete this section.

125-9.3.1 Frequency: Add that Verification test is at the discretion of the County. Specify that the Quality control frequency is for under pavement. A lesser frequency for work done outside the pavement may be added onto the project specific plans. If no reduction of frequency is included in the project plans, then this testing frequency applies for all project locations.

125-10 Verification Comparison and Resolution: Criteria Delete the verification and resolution test procedures, the County’s independent test lab results govern the acceptance of a work product.

160-3.2-1 Application of Stabilizing Material: Revise the wording to make the verification tests by the County discretionary.

160-3.2.1.1 Verification Comparison Criteria and Resolution Procedures: Delete the comparison and resolution procedures, the County verification tests control the acceptance criteria.

160-4.2.4 Frequency: Modify the testing frequency for non FDOT Roadways for Stabilization provided by the Contractor. Verification tests shall be at the discretion of Leon County. These values represent in most cases a 50% reduction of contractor provided testing frequency required by FDOT

Test Name	Quality Control	Verification
Modified Proctor Maximum Density	One per four consecutive LOTs	At County discretion
Density	One per two LOTs	At County discretion
Stabilizing Mixing Depth	One per 500 feet	At County discretion
LBR	One per four consecutive LOTs	At County discretion
Gradation, LL/PI & Soil Classification	Not required	At County discretion

160-4.3.1.2, 160-4.3.1.3 Mixing Depths, Modified Proctor Maximum Density Requirements: Delete the reference to the use of Random Number Generator for determination of mixing depth

and modified proctor maximum density testing locations. County inspector in most cases will determine the location of the tests .

160-4.3.2 Department Verification Tests: Delete this section its entirety. The County may obtain verification tests at its sole discretion.

160-4.4.2 Mixing Depth Thickness: Replace this section with: The contractor shall notify the County Inspector when stabilization mixing is occurring to provide the opportunity for the County Inspector to witness the mixing operation.

160-4.4.3 and 160-4.4.4 Modified Proctor Maximum Density Determination, Density: Verification tests are done at the discretion of the County and as is the acceptance of the test results.

200-5.2 Number of Courses: The County may elect to utilize different verification testing for the determination of the acceptability of base course installation in thicker than 6” lifts.

200-7.2.2 Frequency: Modify the testing frequency for non FDOT Roadways for Base Course installation provided by the Contractor. Verification tests shall be at the discretion of Leon County. These values represent in most cases a 50% reduction of contractor provided testing frequency required by FDOT

Mainline Pavement Lanes, Turn Lanes, Ramps, Parking Lots, Concrete Culverts and Retaining

Test Name	Wall Systems	
	Quality Control - Contractor	Verification - County
Modified Proctor Maximum Density	One per 16 consecutive LOTs	At County discretion
Density	One per two LOT	At County discretion
Roadway Surface	Five per LOT	At County discretion
Roadway Thickness	2 per LOT	At County discretion

Shoulder - Only, Bike/Shared Use Path and Sidewalk Construction

Test Name	Quality Control- Contractor	Verification – County
Modified Proctor Maximum Density	One per four LOTs	At County discretion
Density	One per two LOTs	At County discretion
Surface	Two per 500 feet	At County discretion
Thickness	1 per 1000 consecutive feet	At County discretion

200-7.3.1: Quality Control Testing Modify this section to require the retention of the samples until the County accepts the test results provided by the contractor.

200-7.3.1.2 Depth and Surface Testing Requirements: Delete the reference to the use of Random Number Generator for determination of depth and surface testing locations. County inspector in most cases will determine the location of the tests. Delete the requirement for entering data into the Department’s database.

200-7.3.1.3 Surface & Thickness Reduced Testing Frequency: Delete this section as the testing frequencies have already been reduced.

200-7.3.2 County Verification Tests: This section shall be modified to delete the requirements for verification testing and replace with: All verification testing shall be done at the sole discretion of the County.

234-9 Method of Measurement: Delete the certification of quantities data information that does not pertain to the County pay request format.

327-1 Milling of Existing Pavement Description: Revise to state: unless the County specifically designates the desire to take ownership of the milled material on the project plans, the contractor shall take ownership of milled material.

327-3.2 Quality Control Requirements: The County Inspector will work with the Contractor to assure compliance with milling cross slope and other construction parameters.

334-2.3.1 Reclaimed Asphalt Pavement Material (RAP) General Requirements: The generic substitution of County for Department does not apply to this section. The use of RAP from a FDOT approved stockpile or RAP that has an FDOT furnished Pavement Composition Data Sheet shall remain the Florida Department of Transportation.

334-2.3.4 Pavement Coring Report: The County does not maintain a Pavement Coring Report. This may apply for federal aid roadways.

334-3.2.1 Mix Design General: Delete section and replace with Contractor shall certify adherence to FDOT standard mix design.

334-5.1.1 Sampling and Testing Requirements: The verification testing shall be at the discretion of the County.

334-5 Acceptance of the Mixture: Delete all references to adjustment pay factors. The pay factor shall be considered a 1.0 for acceptable work. County shall have the discretion on its independent or verification testing.

334-5.1.2 LOT Sizes: Unless stated in the project plans, a LOT will considered 2000 tons.

337-4 Mix Design-FC-5: Revise to require the contractor provide a signed and sealed FC-5 mix design if used.

337-12 Basis of Payment: Pay factors are 1.0

338 Value Added Asphalt Pavement: This section is deleted in its entirety. (Note if the County wants to have this as an option then a dispute resolution system and pavement evaluation criteria needs to be developed or adopted.)

346-2.4 Coarse Aggregate Gradation: Retain the requirement that the aggregate sources must be approved by the Department- meaning FDOT.

346-7.7 Sample Location: Sampling locations must receive approval from the County inspector prior to the taking of the samples. Delete the comparative sampling requirements

346-9.1 Acceptance Sampling and Testing: Samples shall be taken as directed by the County inspector, not in accordance with a random number generator. The County will provide independent testing of the contractors test samples at its discretion. If the County does independent testing, it shall cast one additional cylinder and hold it for possible future evaluation if required.

Delete the requirement for inputting the compressive strength into the sample tracking database within 24 hours. Contractor's lab shall coordinate, if required, with the County's independent lab for results comparisons.

352-2 Equipment: Identification of equipment to be used in grinding concrete is required.

352-8 Basis of Payment: The County does not adjust the contract unit prices.

355 Value Added Portland Cement Concrete Pavement: Delete this section in its entirety.

400 Concrete Structures: precast products must be from a plant that is currently on the Department's Production Facility Listing. The Departments Approved Product List shall remain the Florida Department of Transportation's Approved Product List.

410 Precast Concrete Box Culvert: Box Culverts shall be obtained from a plant that is currently on the Department's Production Facility Listing. Proof of said approval must be provided to the county with the shop drawings.

413 Sealing Cracks and Concrete Structure Surfaces: In the event that the FDOT specification and manufacturers recommendations conflict, it shall be the County's Engineer decision as to which specification governs.

425 Inlets, Manholes and Junction Boxes: For clarity, the design standards referenced means the Florida Department of Transportation latest Design standards.

430 Pipe Culverts: All pipes shall be provided from a producer on the Department's Production Facility Listing. Evidence of the suppliers meeting this standard shall be provided with the shop drawing submittal to the county.

430-12.9 Railroad Requirements: Add: The contractor is expected to schedule its work to minimize its time within the railroad right of way for work requiring a flagman or watchman.

431-4.8 Bursting: The County may designate pipe bursting for pipes with minimal laterals if deemed appropriate.

449 Precast Concrete Drainage Products: All precast drainage products shall be provided from a producer on the Department's Production Facility Listing. Evidence of the suppliers meeting this standard shall be provided with the shop drawing submittal to the county.

530 Revetment Systems: Add the requirement that the engineer of record must verify the size of riprap needed for the particular application

603 General Requirements for Traffic Control Signals and Devices

The Departments Approved Products List means the Florida Department of Transportation Approved Products List.

All products must be on the FDOT list and must meet the current County controller hardware and software for full compatibility and integration with the existing operations

611-2.3 As- Built Drawings: (Signals) The as-built drawings submittal should be signed and sealed paper copies. Drawings in electronic format is also required.

649-4.3 Painting: Factory painting of mast arms and monotubes is required for all County installations. Paint shall be the County Standardized brown. Provide products from a fabricator on the Department's list of Prequalified Fabricators of Painted Galvanized Steel Strain Poles, Mast Arms and Monotube Assemblies.

670-2 Traffic Controller Assembly Materials: Modify this section to add Specific Controller assemblies must be compatible with County installations and actual controller selection is based on project specific criteria provided on the project plans.

710-8 Corrections for Deficiencies to Applied Painted Pavement Markings: Revise this section to: Reapply a .25 mile section centered around any deficiency, at no additional cost to the County.

711-2 & 713-2 Thermoplastic Traffic Stripes and Markings, Permanent Tape and Markings: Use only materials listed on the Department's Approved Product List (APL). The County may take random samples of the material at its discretion.

924-1 Admixtures for Concrete: Add: The County Engineer or his designee must approve the use of admixtures.

949 Brick and Concrete Masonry Unit for Manholes, Inlets and Other Structures: Revise to restrict the use of brick for riser adjustment and repairs, not new structures.

972-1 Recycled Plastic Products: Modify to include: The usage of these products is restricted unless specifically noted on the project plans.

981-1 Turf Materials General: Add: The Contractor must reinstall sod matching the type removed. If a conflict arises between the contractor and the property owner regarding replacement sod, the property owner's claim shall prevail unless the contractor provides evidence of preconstruction sod type.

ATTACHMENTS

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*****Rgto k%/'NGO 3: 2229

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LEON COUNTY
DEPARTMENT OF DEVELOPMENT SUPPORT AND ENVIRONMENTAL MANAGEMENT

ENVIRONMENTAL MANAGEMENT PERMIT

TO SPEAK TO AN ENVIRONMENTAL INSPECTOR, CALL (850) 606-1300.

PERMIT EXPIRES THIRTY-SIX (36) MONTHS FROM ISSUANCE PER ARTICLE 5, SECTION 7-41(4)(A)(1), ENVIRONMENTAL MANAGEMENT ACT

PERMIT EXPIRES: 01/17/2022

PERMIT #: LEM1800072
PROJECT NAME: GOODWILL DONATION STATION
LOCATION: PARKING
PERMITTEE: 3401 N Meridian Rd



DATE ISSUED:
PARCEL TAX ID: 01/17/2019
 1107202120000

FEE INFORMATION

Stormwater SF B Low	9,242.26
Stormwater SF B Low	1,482.26
TOTAL FEES:	1,482.26
TOTAL PAYMENTS	1,482.26
BALANCE:	0.00


 John P. Kraynak, Director Environmental
 Compliance Division

John P. Kraynak, Director
 Environmental Services Division

ACCEPTANCE OF THIS PERMIT ACKNOWLEDGES PREMISIONS FOR LEON COUNTY PERSONNEL TO INSPECT AT REASONABLE TIMES THE PROPERTY AND WORK ASCRIBED IN THIS PERMIT. FAILURE TO POST THE PERMIT PLACARD IN A CONSPICUOUS PLACE ON-SITE OR FAILURE TO HAVE THE APPROVED PERMIT AND PLANS AVAILABLE ON-SITE MAY RESULT IN THE IMMEDIATE ISSUANCE OF A STOP WORK ORDER.

**BOARD OF COUNTY COMMISSIONERS
LEON COUNTY
DEPARTMENT OF DEVELOPMENT SUPPORT AND
ENVIRONMENTAL MANAGEMENT**

**GOODWILL DONATION STATION
PARKING LOT RELOCATION**

**ENVIRONMENTAL MANAGEMENT PERMIT
LEM18-00072**

**-A Pre-Construction Conference with the County Environmental Inspector is Required-
(Contact Brian Lawrence @ 606-1356 or 544-0826)**

This environmental management permit authorizes construction of gravel parking area and driveway connection improvements. Additional associated work includes removal of the existing parking area. The improvements are primarily located within Parcel ID Nos. 11-07-20-212-000-0 and 11-07-20-213-000-0 within Leon County, with limited work and staging on adjacent Leon County right-of-way and temporary construction easements, consistent with the following attachments and exhibits:

Attachment A: Permit Conditions
Exhibit A: Approved Plan (Permit Plan Set)

The permittee should be familiar with the permit conditions and all other attachments and exhibits included in this permit prior to the commencement of development activity. Failure to conform to this permit may cause appropriate enforcement action to be taken that could include a "Stop Work Order" or a "Notice of Violation".

Approved By:



Approved By: Nawfal Ezzagaghi 1/17/2019

John Kraynak, P.E., Director
Environmental Services
AMP

Date

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ATTACHMENT “A”
PERMIT CONDITIONS:
GOODWILL DONATION STATION PARKING LOT RELOCATION

GENERAL CONDITIONS:

1. The permittee shall conduct all development activity consistent with the “Environmental Management Act,” Article VII, Chapter 10 of the Leon County Land Development Code. **Reference Section 10-4.105.**
2. *Posting of placards.* A placard indicating issuance of a valid permit shall be posted in a conspicuous place on site at all times during the development activity. **Reference Section 10-4.203(c)(1).**
3. *Permit and plans on-site.* A copy of the approved permit and plans (Exhibit “A”, Exhibit “B”, and subsequent approved contractor “Shop Drawings”) shall be available on site at all times when any development activity is occurring on the site. **Reference Section 10-4.203(c)(2).**
4. *Notice of intent to proceed and Pre-Construction Conference.* A notice of intent to proceed shall be filed with the Director at least three (3) working days prior to initiation of any physical development activity on the site. The notice shall specify the site location and the permit number(s) applicable to the activity and shall specify the date and approximate time at which such physical development activity is to commence. A pre-construction conference will be scheduled and required prior to the commencement of any development activity. **Reference Section 10-4.203(c)(3).**
5. *Environmental Management Officer.* This individual shall be in responsible charge of all on-going work on the site and ensure that all work is proceeding according to the approved plans and permit. The designated environmental management officer must ensure that during such time as the officer is not personally present on the site a designated alternate remains in responsible charge of the project. For this project, the Environmental Management Officer shall be determined at the pre-construction conference. **Reference Section 10-4.203(c)(6).**
6. *Permit Expiration.* This Environmental Management Permit expires 36 months after issuance. **Reference Section 10-4.214(a)(1).**
7. *Extensions.* Permits may be extended, by request of the applicant and approval of the Director, for successive periods of time not to exceed 36 months each, provided the request for extension is made prior to the expiration of the prior approval and provided continuous good faith efforts have been made to complete the development. **Reference Section 10-4.214(a)(2).**
8. *Early expiration for cause.* If no substantial and readily observable site development activity has taken place within 18 months of the issuance of the permit or, once development is started, if no such development activity occurs for any 12 consecutive months, the Director may, after notifying the permittee and providing an opportunity for hearing, determine the permit to be expired and shall so notify the permittee. Such a permit may not thereafter be extended. **Reference Section 10-4.214(a)(3).**
9. *Effect of permit expiration.* Once a permit has expired, no further development activity may proceed on the permitted development site unless and until a new permit is received for the development site and activity. **Reference Section 10-4.214(c).**

10. *Continued responsibility under expired permit.* An expired permit shall not relieve the permittee from the responsibility of continued compliance with this permit and the Code. Where development has commenced and no final inspection completed before expiration of a permit, the permittee may be required to submit, and obtain the Director's approval of a new environmental management permit application or an application for amendment of the expired permit. As an option, the permittee may be required to complete and maintain the landscaping, trees, or stormwater management systems and facilities which were required by the expired permits, as necessary to prevent significant adverse environmental impacts as a result of development activity which has occurred on the site. **Reference Section 10-4.214(c).**
11. *Notice of transfer of permit.* No later than ten (10) days after the sale or legal transfer of property upon which a stormwater management facility has been, or is approved to be, constructed pursuant to a permit issued by the County, a notice of transfer of permit shall be submitted to the Director. The notice shall be made using a form provided by the Director. **Reference Section 10-4.214(e)(1).**
12. *Transfer liability.* Until a proper notice of permit transfer is provided to the Director, the permittee and any other person constructing, operating, or maintaining the permitted facility shall be liable for compliance with the terms of the permit. The permittee transferring the permit shall remain liable for corrective actions required as a result of any violations occurring prior to transfer. For facilities that have received final inspection approval prior to the time of legal transfer, the original permittee shall remain liable for performance of warranty obligations as set forth in **Section 4.208(d)**, absent an express assumption of liability as to such warranty obligations by the subsequent holder of the property. **Reference Section 10-4.214(e)(2).**
13. *Amendments.* Any minor change or deviation from the approved plans shall require an amendment to this permit. Substantial changes, including significant increases in impervious area, changes in intended land use, modification of stormwater management system, new phases of development, or other additions, shall not be treated as amendments, but shall require a new permit application. **Reference Section 10-4.215.**
14. *During development.* All environmental management controls and facilities shall be maintained in a manner which will ensure proper functioning and protection from unnecessary environmental degradation, throughout the development process. **Reference Section 10-4.210(a).**
15. *Post-development.* Upon completion of development activities and construction, the permittee shall ensure that each site is properly stabilized, and that swales and other stormwater management features shown in the permit are in place in a manner consistent with the permit, approved plans and specifications. **Reference Section 10-4.210(b).**
16. *Post-construction inspection.* Prior to requesting a final inspection by the Director, the permittee shall have a qualified professional to personally inspect the site and facilities and certify as provided for in **Section 10-4.208(b).**

SPECIFIC CONDITIONS:

1. *Permit Scope.* As shown in Exhibit “A” (the permit plan set), this permit authorizes construction of gravel parking area and driveway connection improvements. Additional associated work includes removal of the existing parking area. The improvements are primarily located within Parcel ID Nos. 11-07-20-212-000-0 and 11-07-20-213-000-0 within Leon County, with limited work and staging on adjacent Leon County right-of-way and temporary construction easements
2. *Licensed contractors.* All excavation, grading work, and other site work shall be performed under the supervision of a certified or registered general contractor, building contractor, residential contractor, commercial or residential pool/spa contractor, or underground utility contractor, or by an excavation, grading and site contractor duly licensed by the County Contractors Licensing Board. **Reference Section 10-4.203(c)(5).**
3. *Notification of Easements.* A copy of any required easements, with proof of recording, shall be provided to the Director prior to final inspection. Where transfer of title for any affected parcel is proposed, the owner shall provide clear information to each prospective buyer prior to execution of any contracts, about the existence, impacts, and responsibilities associated with any easements on the property. A copy of the applicable easements shall be provided by the owner to each prospective purchaser prior to closing, and the copy shall be initialed by the parties and attached to such closing documents upon execution. **Reference Section 10-4.203(c)(8).**
4. *Stormwater management facility operating permit.* No stormwater management facility shall be utilized until a stormwater management operating permit is obtained. An operating permit is not required for facilities which have as their primary function the conveyance of stormwater, facilities under construction as part of an approved development plan, and temporary facilities which are part of an erosion and sediment control plan. **Reference Section 10-4.209(a).**
5. *Required disclaimers.* Any contract for the conveyance of title to land for which stormwater management is provided by a system or facility not maintained by the County or the City of Tallahassee shall contain the following statement: “Neither Leon County nor the City of Tallahassee is responsible for the maintenance, upkeep or improvement of any stormwater management facility utilized by the land described herein. Title to this property carries with it the requirement that the current and all subsequent owners or their authorized agent obtain a stormwater management facility operating permit from the County. The owner of this property shall be legally responsible, jointly with other owners using the facility and based on pro rata share, for compliance with all stormwater management facility operating permit maintenance and operation requirements, as well as all other permit conditions, unless such maintenance and operation obligations have been specifically assumed by some other entity pursuant to Director approval and appropriate documentation recorded in the public records of Leon County.” **Reference Section 10-4.210(d).**
6. *Landscape and tree maintenance, if applicable.* All landscaping, landscaped areas, landscape development, buffer areas, and trees required as part of this permit shall be maintained and used pursuant to **Sections 10-4.348(b), 10-4.355, 10-4.209(f)(1)(h), 10-4.209(g)(7) and 10-4.211** of the Land Development Code and shall be checked for compliance during the operating permit renewal process.
7. *Stormwater Facility Performance.* The stormwater management system for the development activity permitted herein shall conform to the “Stormwater Management Plan” (Exhibit A).

8. *System Evaluation & Redesign.* At any time, should the County determine that the stormwater management system, stormwater pollution prevention plan, landscape plan, or any maintenance program is not functioning as designed, the County may request a system evaluation to determine compliance. The Permittee shall have thirty (30) days to evaluate the discrepancy and respond. Should the Permittee verify that a discrepancy exists, then the Permittee shall have sixty (60) days to redesign and implement the appropriate redesign necessary to correct the discrepancy. This process does not apply to any event of noncompliance with the permit and approved plans, in which case the enforcement provisions of the Environmental Management Act shall apply.
9. *Intergovernmental Transfer.* If at any time, the City of Tallahassee (the “City”) annexes the permitted development into its corporate boundary, then this permit shall be transferred to the City with all provisions fully enforceable by the City. The City shall assume the role of the County in each provision of this permit.
10. *Termination of Permit.* The requirements, responsibilities and obligations of the Permittee in the General Conditions, Specific Conditions, and Special Conditions shall never expire with this permit. The Permittee may terminate such requirements, responsibilities and obligations either by an appropriate transfer as prescribed in Paragraph 12 of the General Conditions or by closing the development in a manner guaranteeing the preservation of natural areas, conservation easement areas, and/or other protected areas. Such closure shall require the submittal and approval of a short form environmental management permit which states appropriate plans to close the project in manner that will ensure compliance with the Environmental Management Act upon and after termination of responsibility. **Reference Section 10-4.214(a)(3).**
11. *Other Permits.* This permit is issued with the condition that the applicant procure and comply with all other necessary federal, state, and local agency permits, including but not limited to the Florida Department of Environmental Protection (FDEP) permit, Florida Department of Transportation (FDOT) drainage and/or access connection permits, NPDES permit and Leon County driveway connection permit. These permits must be provided prior to the start of construction. **Reference Section 10-4.201(f).**
12. *Construction Sequence.* All stormwater facilities shall be constructed and functioning prior to any clearing (with the exception of clearing for the stormwater ponds), and prior to the start of the building construction, roadway construction or any other development activity as defined in the Environmental Management Act. Phased stormwater facility construction may be allowed with prior written consent by the Director provided that each phase is fully sustainable, meets the applicable stormwater standards and provides no adverse downstream impacts. This condition supersedes any other permit conditions and plans related to this topic. In the event of a conflict between this condition and any other condition in the permit or plans, this condition will overrule.
13. *Noise Ordinance No. 08-08.* Construction or repair of buildings, excavation of streets and highways: The construction, demolition, alteration or repair of any building or the excavation of streets and highways other than between the hours of 7:00 am and 8:00 pm on weekdays. In cases of emergency, construction or repair noises are exempt from this provision. In non-emergency situations, the County Administrator, or his/her designee may issue a permit upon application, if the County Administrator, or his/her designee, determines that the public health and safety, as affected by loud and raucous noise caused by the construction or repair of buildings or excavation of streets and highways between the hours of 8:00 pm and 7:00 am will not be impaired, and if the County Administrator, or his/her designee further determines that loss or inconvenience would result to a party in interest. The permit shall grant permission in non-emergency cases for a period of not more than three (3) days. The permit may be renewed once for a period of three (3) days or less.

SPECIAL CONDITIONS:

This permit covers environmental review for construction of gravel parking area and driveway connection improvements. Additional associated work includes removal of the existing parking area. The improvements are primarily located within Parcel ID Nos. 11-07-20-212-000-0 and 11-07-20-213-000-0 within Leon County, with limited work and staging on adjacent Leon County right-of-way and temporary construction easements

1. As used herein, the term “permittee” shall refer to the owner of Parcel ID Nos. 11-07-20-212-000-0 and 11-07-20-213-000-0. This permit may be transferred to another party in accordance with the General Conditions. Upon the Director’s approval of a Notice of Transfer of Permit, the term “permittee” shall refer to the new property owner(s) identified in this approval notice. The permittee shall ensure that all contractors and other agents authorized by the permittee to conduct the permitted development activities abide by the terms and conditions of this permit.
2. The permittee or permittee’s authorized agent shall contact the County Environmental Inspector to arrange a pre-construction conference. The County Environmental Inspector for this project will be Mr. Brian Lawrence who may be contacted at (850) 606-1356 or (850) 544-0826.
3. During the pre-construction conference, and prior to commencement of construction, copies of permits from other agencies as required (i.e., NPDES, FDOT, NFWMD, etc.) shall be submitted to the County Environmental Inspector.
4. **A separate Leon County Demolition Permit for the demolition of the existing structure and a separate Leon County Building Permit for the construction of the proposed access ramp may be required.**
5. Project staging activity in areas outside of the areas shown in Exhibit A may require a separate Environmental Management Permit from Leon County Development Support and Environmental Management (LCDSEM). LCDSEM should be contacted regarding any proposed staging activity outside of the project area prior to construction commencement.
6. The permittee shall acquire all necessary property rights, right-of-way, and easement acquisitions prior to construction commencement. The permittee shall supply copies of legal documents to LCDSEM prior to the pre-construction conference demonstrating that sufficient property rights, right-of-way, and easement acquisition have been obtained to conduct the permitted work.
7. Any modification to the permitted plans must be ADA compliant.
8. Additional silt fences or other sediment and erosion control devices and environmental protection measures (i.e., silt curtains at proposed culvert discharges to the waterbodies, floating turbidity barriers, additional tree barricades around protected trees, etc.) may be required during project construction, as specified by the County Environmental Inspector.
9. Sediment control measures shall be sufficient to prevent the tracking or direct flow of mud and sediments onto public or private streets or drainage ditches. Any sediments or mud spilled, dropped, washed, or tracked from any vehicles onto the public or private streets or into the public drainage system shall be recovered and cleaned-up immediately.
10. **Upon completion of the project, no trees remaining within or immediately adjacent to the project area shall be in a hazardous or dangerous condition as to endanger public health, welfare, or safety as determined by the permittee.**

11. Notwithstanding the general and specific conditions contained in this permit, this project will require submittal of as-built plans (record drawings) with specific topographic information, signed/sealed by a Florida licensed Land Surveyor, a Leon County Stormwater Operating Permit, and a compliance certification signed/sealed by a Florida licensed Professional Engineer. As part of the Engineer's Compliance Certification, the Engineer of Record shall verify and certify that all ADA requirements have been met. These should be submitted to the Director at least 20 days prior to the permittee/applicant's request for final inspection. All landscaping shall be completed prior to final inspection.
12. In the event that any condition of this permit is subject to multiple interpretations and becomes the source of conflict that cannot be resolved onsite by the contractor and the County Environmental Inspector, the matter shall be forwarded to the Environmental Services Director for clarification/interpretation.

REPORT OF
GEOTECHNICAL INVESTIGATION
DRAINAGE IMPROVEMENTS
CR 155 (N MERIDIAN RD) AT JOHN HANCOCK DRIVE
LEON COUNTY, FLORIDA

Prepared For:

STANTEC
2316 KILLEARN CENTER BOULEVARD
SUITE 102
TALLAHASSEE, FLORIDA 32309

Prepared By:

ENVIRONMENTAL AND GEOTECHNICAL SPECIALISTS, INC.
104 NORTH MAGNOLIA DRIVE
TALLAHASSEE, FLORIDA 32301

June 2018
53-19-17-01

ENVIRONMENTAL AND GEOTECHNICAL SPECIALISTS, INC.

June 29, 2018

EGS File Number: 53-19-17-01

Stantec, Inc.
2316 Killearn Center Blvd
Suite 102
Tallahassee, Florida 32309

ATTN: Chris E. Brockmeier, P.E.
Principal

SUBJECT: Report of Geotechnical Investigation
Drainage Improvements
CR 155 (North Meridian Rd) at John Hancock Drive
Leon County, Florida

Dear Chris:

Environmental and Geotechnical Specialists (EGS) has completed the Geotechnical Investigation, as authorized by Stantec, for the proposed drainage improvements along North Meridian Road at John Hancock Drive in Tallahassee. This Report contains a brief summary of the subsurface investigation conducted for this Study, evaluation of the field and laboratory test data, measured groundwater levels, geotechnical recommendations, and construction considerations.

SCOPE OF SERVICES

The Scope of Services authorized by Stantec for this investigation consisted of the following:

- Installation of one (1) soil boring to a depth of 40 feet for the proposed box culvert addition;
- Installation of one (1) soil boring to a depth of 15 feet for the proposed pipe culverts;
- Installation of one (1) soil boring to a depth of 15 feet for the proposed sump area;
- Installation of one (1) soil boring to a depth of 10 feet for the proposed control structure;
- Installation of one (1) soil boring to a depth of 5 feet within the proposed parking lot area;
- Developing geotechnical recommendations, and considerations for construction of the proposed drainage improvements; and,
- Preparation of this Report.

SITE LOCATION AND CONDITIONS

The project site is located along Meridian Road approximately one-half (½) mile north of the Interstate 10 overpass, immediately north of the John Hancock Drive intersection. A Project Location Map is provided as **Figure 1**. A copy of the United States Geological Survey (USGS) Topographic Map of the project area has been included as **Figure 2**. As can be seen in **Figure 2**, the ground surface in the area generally slopes downward toward the existing channel north of John Hancock Drive. The channel flows from the southeast toward the site and continues northwest before discharging into Fords Arm of Lake Jackson. Based on EGS knowledge of the area, this site is prone to flooding after periods of heavy rain.

The area surrounding the site is mostly undeveloped and heavily wooded, with the exception of the Goodwill Donation Center and abandon Gas Station northeast of the intersection. A cleared lot exists north of the Goodwill, which appears to be maintained with little vegetation. Photographs taken by EGS of the existing site conditions have been included as **Figures 3A** and **3B**. As can be seen in these photographs, the site is relatively flat with overhead utilities and buried utilities along the east side of the road.

NRCS Soil Survey

As part of this investigation, EGS reviewed the Natural Resources Conservation Service (NRCS) Soil Survey of Leon County, Florida. The soils reported in the NCRS Soil Survey consist of Plummer Fine Sand and Sandy Loam, which is relatively consistent with the soils encountered during the field investigation. It should be noted, however, that the NRCS Soil Survey is used as an approximation of likely soils within the project area. Slight variations in soil properties will occur when comparing data from the NRCS Soil Survey and data obtained in the field.

EGS has provided **TABLE 1**, which includes the NRCS material identifications and descriptions and reported soil classifications. The water table depth is reported vary between a lower limit of six (6) feet to an upper limit at the ground surface. Copies of selected tables from the NRCS Soil Survey and **Figure 4** of the existing material limits have been provided in **APPENDIX A**.

SUBSURFACE INVESTIGATION

The subsurface investigation described in this Report was conducted in June 2018. Josh Jenkins, P.E., served as the Geotechnical Project Engineer with the assistance of Thomas Bishop, E.I., as the Field and Staff Engineer. Myron Hayden, P.E., was the supervising Senior Geotechnical Engineer for this project.

EGS installed a total of five (5) soil borings to depths between five (5) feet and 40 feet below the ground surface as close as possible to the locations requested by Stantec. Due to the proximity of utilities and other site constraints, some soil borings were offset slightly for safe installation. A summary of the soil boring labels, depths and approximate locations are included as **TABLE 2**. The soil boring locations are shown in plan view on the NRCS Soil Survey Map included as **Figure 4**.

Four (4) soil borings were installed using a rotary drill rig with Standard Penetration Test (SPT) sampling conducted continuously to a depth of 12 feet, and then continued on two and one-half (2 ½) feet intervals to the boring termination depth. In order to minimize potential impact to unmarked/mismarked utilities, hand-auger sampling was performed to depths up to seven and one-half (7 ½) feet in conjunction with static hand Cone Penetrometer Index (CPI) tests on two (2) foot intervals. The soil boring installed for the Parking Lot, labeled PL-1, was hand augered to a depth of five and one-half (5 ½) feet with CPI tests on two (2) foot intervals. To facilitate uniformity of the test data, CPI values were converted to equivalent SPT “N” values using the correlation $N=CPI/4$. All SPT sampling was conducted with an automatic hammer and in accordance with ASTM D1586.

Soil samples were collected, classified in the field by EGS personnel, sealed, and then transported to EGS' laboratory for additional testing. The laboratory testing included determination of water content, grain-size distribution, Atterberg Limits, and organic content. The soil samples were classified with respect to the Unified Soil Classification System (USCS) and the American Association of State Highway and Transportation Officials (AASHTO) Soil Classification System. A summary of the testing conducted for this investigation are summarized on the Report of Soil Borings sheet provided in **APPENDIX B**, along with the Soil Boring Logs and the Soil Classification Data sheet provided as **APPENDICES C** and **D**, respectively.

SUBSURFACE CONDITIONS

Soils

The subsurface conditions encountered at each soil boring location were relatively consistent. In general, the surficial soils were very loose silty fine sands (SM/A-2-4) and clayey sands (SC/A-2-6, A-6) underlain by loose clayey sands (SC/A-6) and sandy clay (CL/A-6). A lens of clayey sand with some organic material was encountered within two (2) feet of the surface at Soil Boring CS-1 installed near the proposed control structure. Special design considerations will be needed to mitigate adverse impacts on the proposed improvements due to the presence of very loose and organic soils.

Water

The depth to water measured at each of the soil boring locations at the time of installation has been included in **TABLE 2**. As previously mentioned, the water table in this area fluctuates significantly and this site is prone to flooding after period of heavy rain. Therefore, the seasonal high water table exists above the ground surface at certain times of the year. **EGS cautions that control of ground and surface water during construction will be critical for this project.**

Environmental Classification

In order to aid in the evaluation of corrosion potential for the proposed culvert structure, EGS collected and analyzed a representative soil and water sample from the site. The environmental corrosion tests included determination of pH, sulfate content, chloride content and resistivity performed in accordance with Florida Method procedures (FM 5-550, 5-551, 5-552, 5-553). The results of the corrosivity tests are summarized in **TABLE 3**. Using the Florida Department of Transportation (FDOT) Structure Design Guidelines and corrosion series test results, EGS has assigned the corresponding Environmental Classification, which is included in **TABLE 3**. This information provides the corrosion classification to be considered for design of the improvements.

Scour Considerations

Based on a review of the existing box culvert structure within the project limits, scour has undermined the structure on the downstream (west) end. Scour at other drainage structures nearby and erosion of the roadside ditches was also apparent within the project limits. Therefore, mitigating scour impacts on the new structures will need to be considered during design. To assist with the evaluation scour, EGS has developed grain-size distribution curves using representative samples from Soil Boring BC-1 installed for the proposed box culvert. A summary of the grain-size parameters that can be used for the scour analysis are included as **TABLE 4**, with the grain-size distribution curves provided as **APPENDIX E**.

RECOMMENDATIONS

Box and Pipe Culverts

Based on the results of the soil borings installed for this study, EGS believes the existing soils are too soft and will not be suitable to support the proposed culverts. To improve the bearing capacity of the foundation soils, **EGS recommends** excavating the existing soils to a minimum depth of two (2) feet below the culvert bearing surface. The excavation should extend to at least two (2) feet beyond the limits of the headwalls in each direction. Then, backfill and compact the excavations in accordance with FDOT Standard Specification 125. Provided that the subgrade and bearing surface are prepared as recommended above, the following geotechnical design parameters can be used:

Effective Soil Unit Weight (γ')	50	lb/ft ³
Friction Angle (ϕ)	30	deg
Cohesion (c)	0	lb/ft ²
Nominal Bearing Resistance (q_n)	4,500	lb/ft ²
Modulus of Subgrade Reaction (K_s)	30,000	lb/ft ³
Rankine Active Earth Pressure Coefficient (K_a)	0.33	
Rankine Passive Earth Pressure Coefficient (K_p)	3.00	
Total Settlement	<1.0	inch
Long-term Differential Settlement	<0.5	inch

Sump Area and Control Structure

EGS understands that a “sump” area will be constructed west of the proposed box culvert to improve water quality before being discharged through an outlet control structure. The soft clayey and organic soils encountered in the borings installed for the sump area and control structure are not well suited for the proposed construction. **EGS recommends the following to improve long-term performance of the sump area and associated control structure:**

Sump Area

- Excavate to a minimum depth of two (2) feet below the bottom of the sump.
- Install a Type D-5 Geotextile (separation fabric) in accordance with FDOT Standard Specification 514.
- Backfill with a clean sand having a fines content (% passing -200 sieve) less than 15% free of organics and debris.
- Place backfill in 12-inches of loose soil or less and compact making at least four (4) passes with a 5-ton roller using no vibratory action.

Control Structure

- Excavate to a minimum depth of two (2) feet below and two (2) feet beyond the horizontal limits of the structure.
- Place and compact backfill in accordance with FDOT Standard Specification 125.

Parking Lot

EGS understands a gravel parking lot will be constructed for the Goodwill Donation Center in the vacant area immediately to the north. **In order to provide a stable parking area over the soft soils encountered, EGS recommends the following:**

- Remove all vegetation to at least five (5) feet beyond the extent of the parking lot.
- Excavate area to a depth of six (6) inches below final grade and smooth the excavated surface removing all roots greater than one (1) inch diameter.
- Proof roll the area using a non-vibrating 5-ton roller or fully loaded dump truck until the subgrade is firm and unyielding, as approved by the Engineer.
- Place a geotextile fabric (Mirafi FW404 or approved equivalent) to the extent of the parking lot and remove all wrinkles. Overlap edges by at least one (1) foot.
- Place a geoweb (Presto GW20V 4-inch or approved equivalent) over the geotextile and secure the sections together using Atra Keys in accordance with Manufacturer’s Specifications.
- After the geoweb has been placed and secured, backfill the geoweb using a No. 57 coarse aggregate meeting the requirements of FDOT Standard Specification 901.
- The coarse aggregate shall extend above the top of the geoweb a minimum of two (2) inches.

SUMMARY OF PAVEMENT INVESTIGATION

As requested, EGS installed one (1) pavement core just north of the John Hancock Drive intersection at the location chosen by STANTEC. The pavement core was installed in June of 2018 by Matthew McConnell, a Senior Engineering Technician for EGS. The core was performed using EGS' pavement coring drill in accordance with the FDOT Materials Manual Section 3.2 "Flexible Pavement Coring and Evaluation".

After extracting the core, the base material was augered in order to estimate the composition based on the visual method outlined in the FDOT manual. The location of the requested pavement core has been included on the map included as **Figure 4**, and a photograph of the core and the base material has been provided as **Figures 5A** and **5B**.

Results

The following pavement conditions were encountered at the one (1) pavement core authorized for this study:

- Asphalt Thickness: 9.5-inches
- Base Layer: 6.0-inches Type-B Stabilization mixed with Recycled Asphalt Pavement (RAP)

It should be noted that a detailed pavement core and condition survey, determination of pavement layer types, pavement layer structural coefficients, existing structural number, and development of design recommendations was beyond the scope of this investigation. However, EGS would be pleased to provide further assistance, if requested.

Portland Cement Concrete (PCC)

PCC was not encountered in the one (1) Pavement Core (P-1) installed for this study. However, **EGS observed PCC below the existing the asphalt near the location of the existing culvert. EGS recommends that if PCC is encountered during construction, the Engineer notified immediately, as the presence of buried PCC can disrupt milling operations and/or damage the milling equipment.**

CLOSURE

The data and results presented in this Report are intended for use by Stantec, Inc. for the proposed improvements identified herein. This data may not be used without the expressed written consent of Stantec. This report is not intended for any other use and will likely not be applicable. This Report shall not be reproduced, except in full, without the written approval of Environmental and Geotechnical Specialists, Inc. The data and recommendations presented in this Report are based on the soil borings made at the specific locations and depths noted. Subsurface conditions at other locations may vary significantly from those presented herein. Should data become available which is different from the data presented herein, Environmental and Geotechnical Specialists, Inc., requests the opportunity to review the data and make any modifications to the design recommendations that may be appropriate.

Environmental and Geotechnical Specialists appreciates the opportunity to be of service on this project.

Sincerely,

Joshua M. Jenkins, P.E. No. 77686
Environmental & Geotechnical Specialists, Inc.
104 North Magnolia Drive
Tallahassee, FL 32301
Certificate of Authorization: 6222



TABLES

TABLE 1
NRCS SOIL SURVEY DATA
DRAINAGE IMPROVEMENTS
CR 155 (N MERIDIAN RD) AT JOHN HANCOCK DRIVE
LEON COUNTY, FLORIDA

NRCS SOIL REFERENCE NUMBER	MATERIAL NAME	DEPTH (INCHES)	MATERIAL DESCRIPTION	MATERIAL CLASSIFICATION		REACTION (pH)	CORROSION POTENTIAL		DEPTH TO SEASONAL HIGH GROUNDWATER (FEET)
				UNIFIED	AASHTO		UNCOATED STEEL	CONCRETE	
29	NORFOLK LOAMY FINE SAND, 2 TO 5 PERCENT SLOPES	0 - 6	LOAMY FINE SAND	SC-SM, SC, SM	A-2-4	4.5 - 6.0	HIGH	HIGH	3.3
		6 - 11	SANDY LOAM, SANDY CLAY LOAM	SC-SM	A-2-4	4.5 - 5.5			
		11 - 25	SANDY CLAY LOAM, SANDY LOAM	SC, CL	A-6, A-2-4, A-7-6	4.5 - 5.5			
		25 - 44	SANDY CLAY LOAM, SANDY LOAM	SC, CL	A-2-4, A-7-6, A-6	4.5 - 5.5			
		44 - 80	SANDY CLAY LOAM	CL, SC	A-7-6, A-6	4.5 - 5.5			
34	ORANGEBURG FINE SANDY LOAM, 5 TO 8 PERCENT SLOPES	0 - 2	FINE SANDY LOAM	SC-SM	A-4	4.5 - 5.5	MODERATE	MODERATE	>6.0
		2 - 10	FINE SANDY LOAM	SC	A-4	4.5 - 5.5			
		10 - 16	SANDY CLAY LOAM	CL	A-7-6	4.5 - 5.5			
		16 - 41	SANDY CLAY LOAM	CL	A-7-6	4.5 - 5.5			
		41 - 80	SANDY CLAY LOAM	CL	A-7-6	4.5 - 5.5			
41	PLUMMER, HYDRIC COMPLEX	0 - 17	FINE SAND	SM, SP-SM	A-2-4, A-3	4.5 - 6.0	HIGH	HIGH	0.0
		17 - 61	FINE SAND	SM, SP-SM	A-3, A-2-4	4.5 - 5.5			
		61 - 80	SANDY LOAM, SANDY CLAY LOAM, FINE SANDY LOAM	SC, SC-SM, SM	A-2-6, A-2-4	4.5 - 5.5			
	PLUMMER, NON-HYDRIC COMPLEX	0 - 17	FINE SAND	SM, SP-SM	A-2-4, A-3	4.5 - 6.0	HIGH	HIGH	0.5
		17 - 61	FINE SAND	SM, SP-SM	A-3, A-2-4	4.5 - 5.5			
		61 - 80	SANDY LOAM, SANDY CLAY LOAM, FINE SANDY LOAM	SC, SC-SM, SM	A-2-4, A-2-6	4.5 - 5.5			
50	WAGRAM LOAMY FINE SAND, 0 TO 5 PERCENT SLOPES	0 - 6	LOAMY FINE SAND	SM	A-2	4.5 - 5.5	MODERATE	HIGH	>6.0
		6 - 30	LOAMY FINE SAND	SM	A-2	4.5 - 5.5			
		31 - 62	SANDY CLAY LOAM, FINE SANDY LOAM	SC	A-2, A-4, A-6	4.5 - 5.5			
		62 - 80	SANDY CLAY LOAM, SANDY CLAY	CH, CL, SC	A-6, A-7	4.5 - 5.5			

NOTES: 1. BASED ON THE NRCS SOIL SURVEY REPORT FOR LEON COUNTY, FLORIDA.

2. SEE APPENDIX E FOR DETAILED NRCS SURVEY INFORMATION.

TABLE 2
SOIL BORING LOCATION AND GROUNDWATER DATA
DRAINAGE IMPROVEMENTS
CR 155 (N MERIDIAN RD) AT JOHN HANCOCK DRIVE
LEON COUNTY, FLORIDA

BORING LABEL	BORING DEPTH (FEET)	GLOBAL POSITIONING SYSTEM (GPS) COORDINATES				MEASURED GROUNDWATER DEPTH (FEET)
		LATITUDE		LONGITUDE		
		DEG (°)	MIN (')	DEG (°)	MIN (')	
BOX CULVERT SOIL BORING						
BC-1	40.0	30	30.012	84	16.635	6.0
CONTROL STRUCTURE SOIL BORING						
CS-1	10.5	30	30.022	84	16.703	2.0
PIPE CULVERT SOIL BORING						
PC-1	15.0	30	30.096	84	16.636	5.0
PARKING LOT SOIL BORING						
PL-1	5.5	30	30.041	84	16.619	4.0
SUMP AREA SOIL BORING						
SA-1	15.0	30	30.006	84	16.688	2.5

NOTES: 1. DEPTH MEASURED BELOW EXISTING GROUND SURFACE.

2. BORING LOCATIONS ARE APPROXIMATE AND BASED ON PLANS PROVIDED BY STANTEC.

**TABLE 3
ENVIRONMENTAL CLASSIFICATION DATA
DRAINAGE IMPROVEMENTS
CR 155 (N MERIDIAN RD) AT JOHN HANCOCK DRIVE
LEON COUNTY, FLORIDA**

SAMPLE LOCATION	DEPTH (FEET)	RESISTIVITY (OHM-CM)	pH	SULFATES (PPM)	CHLORIDES (PPM)	ENVIRONMENTAL CLASSIFICATION	
						STEEL	CONCRETE
SOIL							
BC-1	6.0 - 8.0	13,000	5.9	21	43	EXTREMELY AGGRESSIVE	MODERATELY AGGRESSIVE
WATER							
EXISTING CHANNEL	--	17,000	7.1	11	240	SLIGHTLY AGGRESSIVE	SLIGHTLY AGGRESSIVE

NOTE: ENVIRONMENTAL CLASSIFICATION AS IDENTIFIED IN THE FDOT STRUCTURES MANUAL TABLE 1.3.2-1

TABLE 4
GRAIN-SIZE DATA FOR SCOUR CONSIDERATION - SOIL BORING BC-1
DRAINAGE IMPROVEMENTS - BOX CULVERT ADDITION
CR 155 (N MERIDIAN RD) AT JOHN HANCOCK DRIVE
LEON COUNTY, FLORIDA

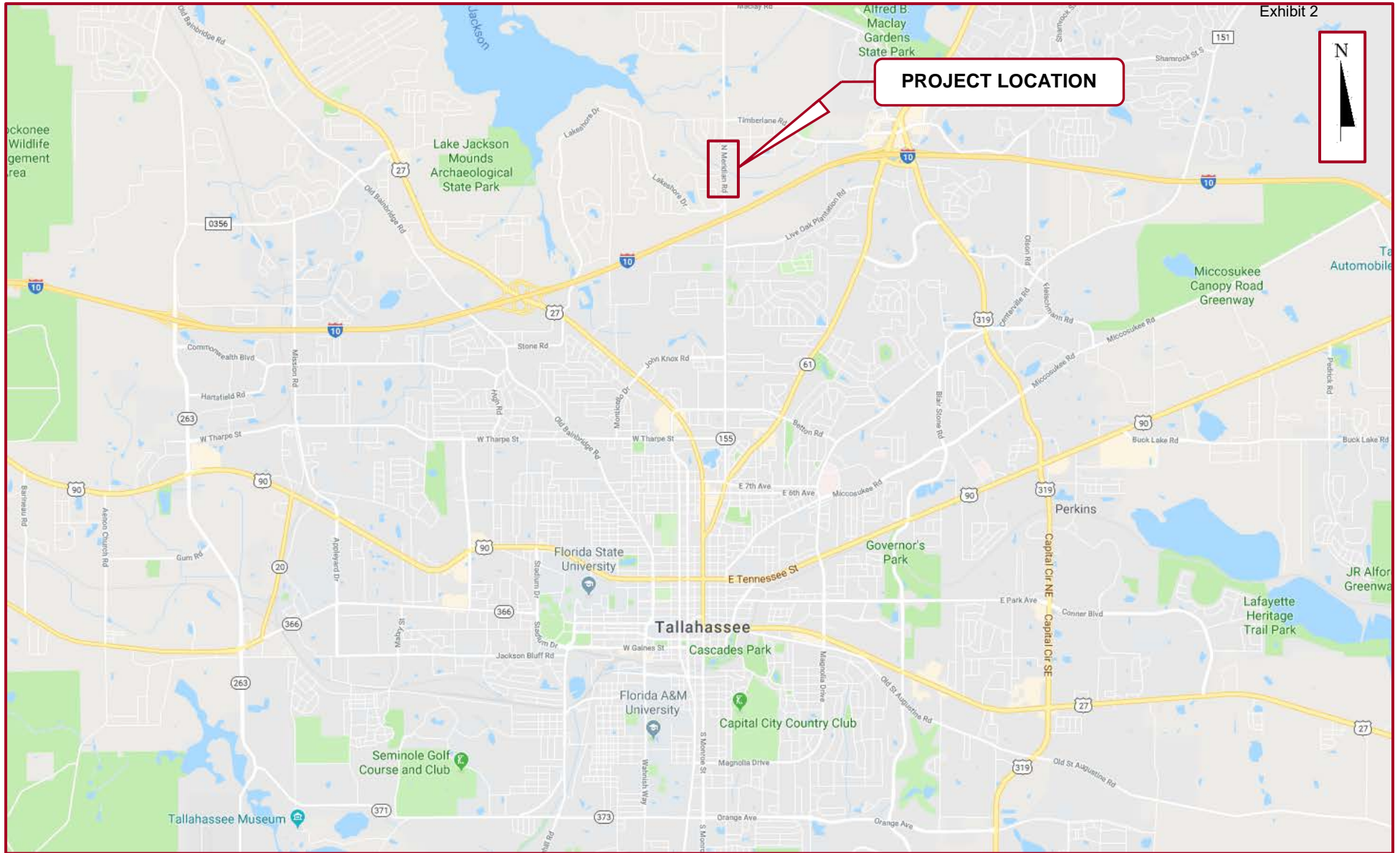
DEPTH BELOW GROUND SURFACE (FEET)	GRAIN-SIZE PARAMETER	RECOMMENDED VALUE	MATERIAL CLASSIFICATION (USCS / AASHTO)
0.0 to 4.0	D ₁₀	0.02*	SC / A-2-6
	D ₅₀	0.17	
	D ₆₀	0.20	
	D ₈₅	0.38	
	C _u	10*	
4.0 to 27.5	D ₁₀	N/A	SC / A-6
	D ₅₀	0.13	
	D ₆₀	0.17	
	D ₈₅	0.25	
	C _u	N/A	

NOTES: 1. PARTICLE SIZE MEASURED IN MILLIMETERS

2. N/A INDICATES VALUE NOT AVAILABLE

* VALUE ESTIMATED FROM EXTRAPOLATION OF GRAIN SIZE CURVE.

FIGURES



DRAWN T. BISHOP		CHECKED: J. JENKINS, P.E.		Environmental and Geotechnical Specialists, Inc. 104 North Magnolia Drive Tallahassee, Florida 32301 Office #: (850) 386-1253		TITLE: PROJECT LOCATION MAP DRAINAGE IMPROVEMENTS CR 155 (N MERIDIAN RD) AT JOHN HANCOCK DRIVE LEON COUNTY, FLORIDA			
ENGINEER: J. JENKINS, P.E.						DATE: MAY 2018		FIGURE NO.: 1	
CLIENT: STANTEC									
PROJ. NO.: 53-19-17-01									



<p>Legend</p> <p>— USGS Elevation Contours (10-Feet)</p>	<p>0 200 1,000 Feet</p>	<p>PREPARED: T. BISHOP</p>	<p>ENVIRONMENTAL AND GEOTECHNICAL SPECIALISTS, INC.</p> <p>104 NORTH MAGNOLIA DRIVE TALLAHASSEE, FLORIDA 32301 OFFICE : (850) 386-1253</p>	<p>USGS TOPOGRAPHIC MAP DRAINAGE IMPROVEMENTS CR 155 (N MERIDIAN RD) AT JOHN HANCOCK DRIVE LEON COUNTY, FLORIDA</p>	
		<p>CHECKED: J. JENKINS, P.E.</p>		<p>SCALE: 1" = 1000'</p>	<p>DATE: JUNE 2018</p>
<p>REVISD: K. SWEENEY, E.I.</p>	<p>ENGINEER: J. JENKINS, P.E.</p>	<p>PROJ. NO.: 53-19-17-01</p>		<p>FIGURE NO.: 2</p>	



FIGURE 3A: PHOTOGRAPH OF EXISTING SITE CONDITIONS NEAR BC-1 (FACING NORTH)



FIGURE 3B: PHOTOGRAPH OF EXISTING SITE CONDITIONS NEAR BC-1 (FACING SOUTH)

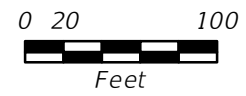


Legend

- Soil Boring Location
- Pavement Core Location

Map Unit Symbol, Map Unit Name, (Depth to SHWT)

- 29 ,Norfolk loamy fine sand, 2 to 5 percent slopes, (3.3 Feet)
- 34 ,Orangeburg fine sandy loam, 5 to 8 percent slopes, (>6.0 Feet)
- 41 ,Plummer fine sand, (0.0 Feet)
- 50 ,Wagram loamy fine sand, 0 to 5 percent slopes, (>6.0 Feet)



PREPARED:	T. BISHOP
CHECKED:	J. JENKINS, P.E.
REVISED:	K. SWEENEY, E.I.
ENGINEER:	J. JENKINS, P.E.

Environmental and Geotechnical Specialists, Inc.
 104 North Magnolia Drive
 Tallahassee, Florida 32301
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 Fax : (850) 385-8050

NRCS SOIL SURVEY MAP DRAINAGE IMPROVEMENTS CR 155 (N MERIDIAN RD) AT JOHN HANCOCK DRIVE LEON COUNTY, FLORIDA	
SCALE:	1" = 100'
DATE:	JUNE 2018
PROJ. NO.:	53-19-17-01
FIGURE NO.:	4



FIGURE 5A: PHOTOGRAPH OF PAVEMENT CORE AT P-1



FIGURE 5B: PHOTOGRAPH OF BASE MATERIAL AT P-1

APPENDIX A
NRCS SOIL SURVEY

Custom Soil Resource Report

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(<http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba>). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties—Leon County, Florida														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
29—Norfolk loamy fine sand, 2 to 5 percent slopes														
Norfolk	85	B	0-6	Loamy fine sand	SC-SM, SC, SM	A-2-4	0- 0- 0	0- 0- 0	98-100- 100	91-100- 100	78-88- 97	15-21- 27	17-22 -27	3-6 -9
			6-11	Sandy loam, sandy clay loam	SC-SM	A-2-4	0- 0- 0	0- 0- 0	97-100- 100	93-100- 100	65-78- 85	21-28- 34	20-21 -24	5-6 -8
			11-25	Sandy clay loam, sandy loam	SC, CL	A-6, A-2-4, A-7-6	0- 0- 0	0- 0- 0	97-100- 100	93-100- 100	70-85- 98	33-45- 58	24-36 -43	9-18-24
			25-44	Sandy clay loam, sandy loam	SC, CL	A-2-4, A-7-6, A-6	0- 0- 0	0- 0- 0	97-100- 100	93-100- 100	68-83- 95	28-38- 52	24-29 -43	9-13-24
			44-80	Sandy clay loam	CL, SC	A-7-6, A-6	0- 0- 0	0- 0- 0	100-100 -100	100-100 -100	80-87- 99	45-52- 60	34-41 -44	17-22-2 4

Custom Soil Resource Report

Engineering Properties—Leon County, Florida														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
34—Orangeburg fine sandy loam, 5 to 8 percent slopes														
Orangeburg	80	C	0-2	Fine sandy loam	SC-SM	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	87-94-97	38-48-52	19-24-29	3-6 -9
			2-10	Fine sandy loam	SC	A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	87-94-97	38-48-52	0-22 -27	NP-8-10
			10-16	Sandy clay loam	CL	A-7-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	79-86-95	43-52-62	29-41-44	13-23-24
			16-41	Sandy clay loam	CL	A-7-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	79-86-95	43-52-62	29-41-44	13-23-24
			41-80	Sandy clay loam	CL	A-7-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	79-86-95	43-52-62	29-41-44	13-23-24
41—Plummer fine sand														
Plummer, hydric	50	A/D	0-17	Fine sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	75-86-96	5-16- 26	0-7 -14	NP
			17-61	Fine sand	SM, SP-SM	A-3, A-2-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	75-86-96	5-16- 26	0-7 -14	NP
			61-80	Sandy loam, sandy clay loam, fine sandy loam	SC, SC-SM, SM	A-2-6, A-2-4	0- 0- 0	0- 0- 0	100-100-100	97-99-100	76-86-96	26-31-35	0-16 -31	NP-8-14
Plummer, non-hydric	40	A/D	0-17	Fine sand	SM, SP-SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	100-100-100	75-86-96	5-16- 26	0-7 -14	NP
			17-61	Fine sand	SM, SP-SM	A-3, A-2-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	75-86-96	5-16- 26	0-7 -14	NP
			61-80	Sandy loam, sandy clay loam, fine sandy loam	SC, SC-SM, SM	A-2-4, A-2-6	0- 0- 0	0- 0- 0	100-100-100	97-99-100	76-86-96	26-31-35	0-16 -31	NP-8-14

Custom Soil Resource Report

Engineering Properties—Leon County, Florida														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			<i>In</i>				<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>	<i>L-R-H</i>
50—Wagram loamy fine sand, 0 to 5 percent slopes														
Wagram	85	B	0-6	Loamy fine sand	SM	A-2	0- 0- 0	0- 0- 0	100-100 -100	98-99-1 00	50-68- 85	15-25- 35	0-7 -14	NP
			6-31	Loamy fine sand	SM	A-2	0- 0- 0	0- 0- 0	100-100 -100	98-99-1 00	50-68- 85	15-25- 35	0-7 -14	NP
			31-62	Sandy clay loam, fine sandy loam	SC	A-2, A-4, A-6	0- 0- 0	0- 0- 0	100-100 -100	98-99-1 00	80-88- 95	31-40- 49	21-31 -40	8-18-25
			62-80	Sandy clay loam, sandy clay	CH, CL, SC	A-6, A-7	0- 0- 0	0- 0- 0	100-100 -100	98-99-1 00	80-90-1 00	40-50- 60	35-53 -70	20-31-4 2

Custom Soil Resource Report

Chemical Soil Properties—Leon County, Florida								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	<i>In</i>	<i>meq/100g</i>	<i>meq/100g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
29—Norfolk loamy fine sand, 2 to 5 percent slopes								
Norfolk	0-6	—	0.1-3.0	4.5-6.0	0	0	0.0-2.0	0
	6-11	—	0.8-2.5	4.5-5.5	0	0	0.0-2.0	0
	11-25	—	0.2-6.1	4.5-5.5	0	0	0.0-2.0	0
	25-44	—	0.2-6.1	4.5-5.5	0	0	0.0-2.0	0
	44-80	—	2.2-5.3	4.5-5.5	0	0	0.0-2.0	0
34—Orangeburg fine sandy loam, 5 to 8 percent slopes								
Orangeburg	0-2	—	0.8-4.1	4.5-5.5	0	0	0.0-2.0	0
	2-10	—	0.9-4.4	4.5-5.5	0	0	0.0-2.0	0
	10-16	—	1.2-5.6	4.5-5.5	0	0	0.0-2.0	0
	16-41	—	1.2-5.6	4.5-5.5	0	0	0.0-2.0	0
	41-80	—	1.2-5.6	4.5-5.5	0	0	0.0-2.0	0
41—Plummer fine sand								
Plummer, hydric	0-17	—	0.1-1.1	4.5-6.0	0	0	0.0-2.0	0-4
	17-61	0.4-1.3	—	4.5-5.5	0	0	0.0-2.0	0-4
	61-80	—	0.5-4.2	4.5-5.5	0	0	0.0-2.0	0-4
Plummer, non-hydric	0-17	—	0.1-1.1	4.5-6.0	0	0	0.0-2.0	0-4
	17-61	0.4-1.3	—	4.5-5.5	0	0	0.0-2.0	0-4
	61-80	—	0.5-4.2	4.5-5.5	0	0	0.0-2.0	0-4

Custom Soil Resource Report

Chemical Soil Properties—Leon County, Florida								
Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	<i>In</i>	<i>meq/100g</i>	<i>meq/100g</i>	<i>pH</i>	<i>Pct</i>	<i>Pct</i>	<i>mmhos/cm</i>	
50—Wagram loamy fine sand, 0 to 5 percent slopes								
Wagram	0-6	—	0.1-3.4	4.5-5.5	0	0	0.0-2.0	0-4
	6-31	—	0.1-8.9	4.5-5.5	0	0	0.0-2.0	0-4
	31-62	—	0.2-5.9	4.5-5.5	0	0	0.0-2.0	0-4
	62-80	—	0.2-6.5	4.5-5.5	0	0	0.0-2.0	0-4

Custom Soil Resource Report

Soil Features—Leon County, Florida									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		<i>Low-RV-High</i>	<i>Range</i>		<i>Low-High</i>	<i>Low-High</i>			
		<i>In</i>	<i>In</i>		<i>In</i>	<i>In</i>			
29—Norfolk loamy fine sand, 2 to 5 percent slopes									
Norfolk		—	—		0	0	None	High	High
34—Orangeburg fine sandy loam, 5 to 8 percent slopes									
Orangeburg		—	—		0	0	None	Moderate	Moderate
41—Plummer fine sand									
Plummer, hydric		—	—		—	—	None	High	High
Plummer, non-hydric		—	—		—	—	None	High	High
50—Wagram loamy fine sand, 0 to 5 percent slopes									
Wagram		—	—		—	—	None	Moderate	High

Custom Soil Resource Report

Map unit symbol and soil name	Hydrologic group	Surface runoff	Most likely months	Water table			Ponding			Flooding	
				Upper limit	Lower limit	Kind	Surface depth	Duration	Frequency	Duration	Frequency
				<i>Ft</i>	<i>Ft</i>		<i>Ft</i>				
29—Norfolk loamy fine sand, 2 to 5 percent slopes											
Norfolk	B	Medium	Jan-Mar	3.3-6.0	6.0	Apparent	—	—	None	—	None
			Apr-Dec	—	—	—	—	—	None	—	None
34—Orangeburg fine sandy loam, 5 to 8 percent slopes											
Orangeburg	C	Medium	Jan-Dec	—	—	—	—	—	None	—	None
41—Plummer fine sand											
Plummer, hydric	A/D	Negligible	Jan-Jul	0.0-0.5	6.0	Apparent	—	—	None	—	None
			Aug-Nov	—	—	—	—	—	None	—	None
			Dec	0.0-0.5	6.0	Apparent	—	—	None	—	None
Plummer, non-hydric	A/D	Negligible	Jan-Jul	0.5-1.5	6.0	Apparent	—	—	None	—	None
			Aug-Nov	—	—	—	—	—	None	—	None
			Dec	0.5-1.5	6.0	Apparent	—	—	None	—	None
50—Wagram loamy fine sand, 0 to 5 percent slopes											
Wagram	B	Very low	Jan-Dec	—	—	—	—	—	None	—	None

Custom Soil Resource Report

Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties--Leon County, Florida														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
29—Norfolk loamy fine sand, 2 to 5 percent slopes														
Norfolk	0-6	80-84- 88	4- 7- 10	8- 9- 10	1.55-1.57-1.59	14.00-28.00-42.00	0.06-0.08-0.10	0.2- 0.4- 0.6	0.0- 0.5- 1.0	.24	.24	5	2	134
	6-11	60-80- 85	4- 7- 20	10-13- 30	1.63-1.64-1.66	14.00-28.00-42.00	0.10-0.13-0.16	0.4- 0.6- 1.3	0.0- 0.3- 0.5	.17	.17			
	11-25	55-62- 80	3-12- 28	14-27- 34	1.58-1.64-1.69	4.00-9.00-14.00	0.10-0.12-0.15	0.4- 1.2- 1.7	0.0- 0.3- 0.5	.20	.20			
	25-44	55-70- 80	3-12- 28	14-19- 34	1.58-1.62-1.65	4.00-9.00-14.00	0.10-0.15-0.16	0.4- 0.9- 1.7	0.0- 0.3- 0.5	.20	.20			
	44-80	50-54- 75	3-14- 22	22-33- 35	1.56-1.60-1.64	4.00-9.00-14.00	0.10-0.13-0.15	1.0- 1.5- 1.7	0.0- 0.3- 0.5	.17	.17			

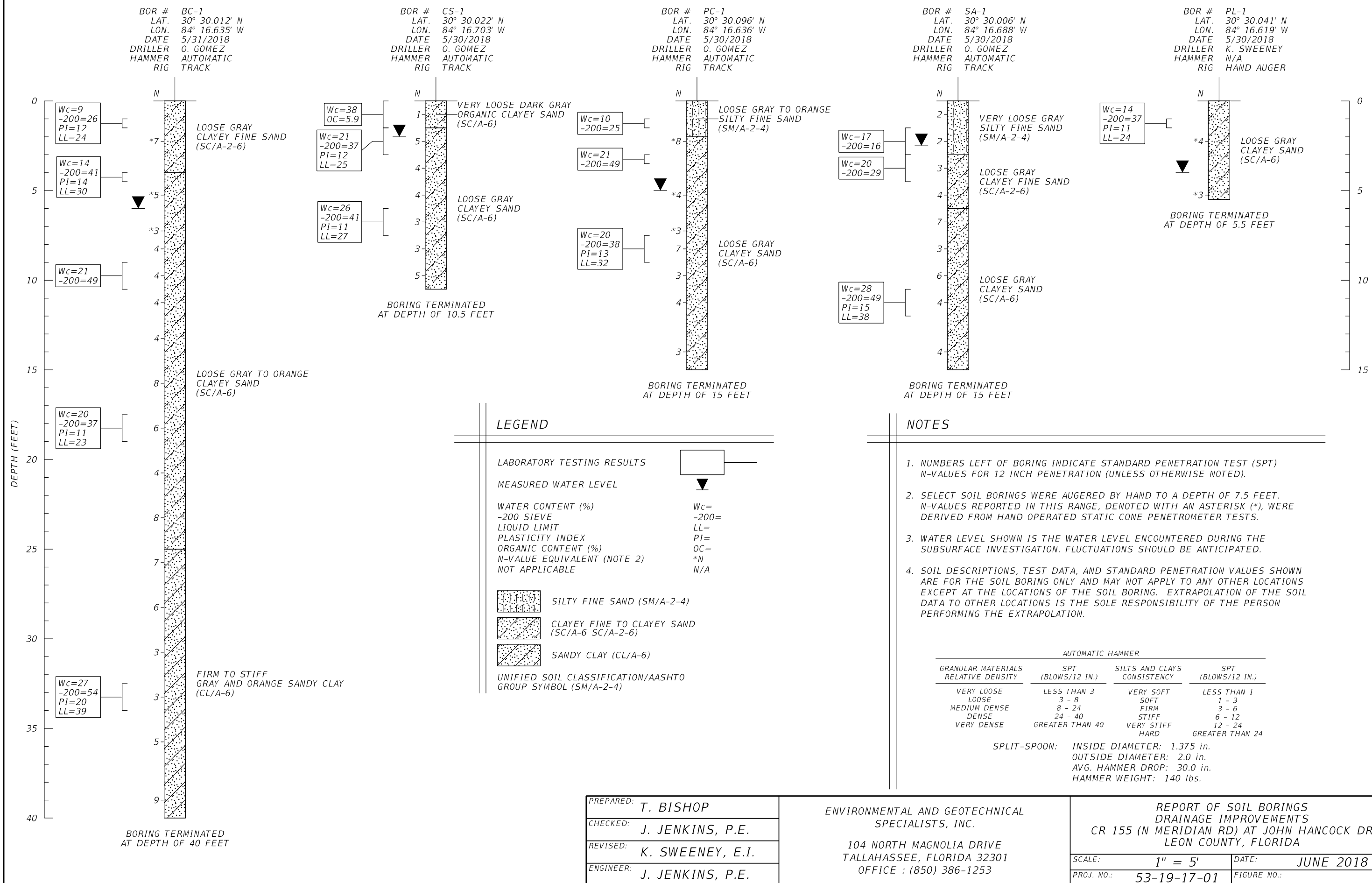
Custom Soil Resource Report

Physical Soil Properties—Leon County, Florida														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
34—Orangeburg fine sandy loam, 5 to 8 percent slopes														
Orangeburg	0-2	55-61- 80	5-25- 32	8-14- 18	1.40-1.43-1.46	14.00-26.33-42.00	0.15-0.16-0.17	0.4- 0.7- 0.9	1.0- 2.0- 3.0	.24	.24	5	3	86
	2-10	55-61- 80	5-25- 32	8-14- 18	1.53-1.56-1.59	3.50-3.84-14.00	0.16-0.17-0.18	0.4- 0.7- 1.0	0.5- 1.0- 1.5	.32	.32			
	10-16	46-54- 77	3-14- 25	20-33- 35	1.59-1.60-1.61	3.00-3.25-14.00	0.11-0.16-0.18	0.8- 1.5- 1.7	0.0- 0.3- 0.5	.20	.20			
	16-41	46-54- 77	3-14- 25	20-33- 35	1.59-1.60-1.61	3.00-3.25-14.00	0.11-0.16-0.18	0.8- 1.5- 1.7	0.0- 0.3- 0.5	.20	.20			
	41-80	46-54- 77	3-14- 25	20-33- 35	1.59-1.60-1.61	3.00-3.25-14.00	0.11-0.16-0.18	0.8- 1.5- 1.7	0.0- 0.3- 0.5	.20	.20			
41—Plummer fine sand														
Plummer, hydric	0-17	-91-	0- 6- 15	2- 3- 7	1.30-1.50-1.80	14.00-28.00-42.00	0.03-0.06-0.08	0.0- 1.5- 2.9	1.0- 1.9- 3.0	.10	.10	5	1	250
	17-61	-93-	0- 5- 15	2- 2- 7	1.30-1.50-1.80	14.00-28.00-42.00	0.03-0.06-0.08	0.0- 1.5- 2.9	0.0- 0.2- 0.5	.05	.05			
	61-80	-80-	0- 5- 50	15-16- 30	1.50-1.70-1.90	4.00-9.00-14.00	0.10-0.12-0.13	0.0- 1.5- 2.9	0.0- 0.1- 0.5	.17	.17			
Plummer, non-hydric	0-17	-91-	0- 6- 15	2- 3- 7	1.30-1.50-1.80	14.00-28.00-42.00	0.03-0.06-0.08	0.0- 1.5- 2.9	1.0- 1.9- 3.0	.10	.10	5	1	250
	17-61	-93-	0- 5- 15	2- 2- 7	1.30-1.50-1.80	14.00-28.00-42.00	0.03-0.06-0.08	0.0- 1.5- 2.9	0.0- 0.2- 0.5	.05	.05			
	61-80	-80-	0- 5- 50	15-16- 30	1.50-1.70-1.90	4.00-9.00-14.00	0.10-0.12-0.13	0.0- 1.5- 2.9	0.0- 0.1- 0.5	.17	.17			

Custom Soil Resource Report

Physical Soil Properties—Leon County, Florida														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	<i>In</i>	<i>Pct</i>	<i>Pct</i>	<i>Pct</i>	<i>g/cc</i>	<i>micro m/sec</i>	<i>In/In</i>	<i>Pct</i>	<i>Pct</i>					
50—Wagram loamy fine sand, 0 to 5 percent slopes														
Wagram	0-6	-85-	0-11- 30	2- 4- 12	1.40-1.52-1.65	42.00-92.00-141.00	0.05-0.07-0.08	0.0- 1.5- 2.9	1.5- 3.7- 4.0	.10	.10	5	2	134
	6-31	-84-	0- 8- 30	2- 8- 12	1.40-1.52-1.65	42.00-92.00-141.00	0.05-0.06-0.08	0.0- 1.5- 2.9	0.5- 0.8- 1.5	.10	.10			
	31-62	-69-	0- 6- 28	15-24- 35	1.50-1.60-1.70	4.00-9.00-14.00	0.12-0.14-0.16	0.0- 1.5- 2.9	0.0- 0.2- 0.5	.17	.17			
	62-80	-57-	0- 4- 20	20-40- 55	1.60-1.65-1.70	0.42-0.90-1.40	0.12-0.14-0.16	6.0- 7.5- 8.9	0.0- 0.1- 0.5	.17	.17			

APPENDIX B
GEOTECHNICAL PLAN SHEET



BOR # BC-1
 LAT. 30° 30.012' N
 LON. 84° 16.635' W
 DATE 5/31/2018
 DRILLER O. GOMEZ
 HAMMER AUTOMATIC
 RIG TRACK

BOR # CS-1
 LAT. 30° 30.022' N
 LON. 84° 16.703' W
 DATE 5/30/2018
 DRILLER O. GOMEZ
 HAMMER AUTOMATIC
 RIG TRACK

BOR # PC-1
 LAT. 30° 30.096' N
 LON. 84° 16.636' W
 DATE 5/30/2018
 DRILLER O. GOMEZ
 HAMMER AUTOMATIC
 RIG TRACK

BOR # SA-1
 LAT. 30° 30.006' N
 LON. 84° 16.688' W
 DATE 5/30/2018
 DRILLER O. GOMEZ
 HAMMER AUTOMATIC
 RIG TRACK

BOR # PL-1
 LAT. 30° 30.041' N
 LON. 84° 16.619' W
 DATE 5/30/2018
 DRILLER K. SWEENEY
 HAMMER N/A
 RIG HAND AUGER

LEGEND

LABORATORY TESTING RESULTS	
MEASURED WATER LEVEL	
WATER CONTENT (%)	Wc=
-200 SIEVE	-200=
LIQUID LIMIT	LL=
PLASTICITY INDEX	PI=
ORGANIC CONTENT (%)	OC=
N-VALUE EQUIVALENT (NOTE 2)	*N
NOT APPLICABLE	N/A
	SILTY FINE SAND (SM/A-2-4)
	CLAYEY FINE TO CLAYEY SAND (SC/A-6 SC/A-2-6)
	SANDY CLAY (CL/A-6)
UNIFIED SOIL CLASSIFICATION/AASHTO GROUP SYMBOL (SM/A-2-4)	

NOTES

- NUMBERS LEFT OF BORING INDICATE STANDARD PENETRATION TEST (SPT) N-VALUES FOR 12 INCH PENETRATION (UNLESS OTHERWISE NOTED).
- SELECT SOIL BORINGS WERE AUGERED BY HAND TO A DEPTH OF 7.5 FEET. N-VALUES REPORTED IN THIS RANGE, DENOTED WITH AN ASTERISK (*), WERE DERIVED FROM HAND OPERATED STATIC CONE PENETROMETER TESTS.
- WATER LEVEL SHOWN IS THE WATER LEVEL ENCOUNTERED DURING THE SUBSURFACE INVESTIGATION. FLUCTUATIONS SHOULD BE ANTICIPATED.
- SOIL DESCRIPTIONS, TEST DATA, AND STANDARD PENETRATION VALUES SHOWN ARE FOR THE SOIL BORING ONLY AND MAY NOT APPLY TO ANY OTHER LOCATIONS EXCEPT AT THE LOCATIONS OF THE SOIL BORING. EXTRAPOLATION OF THE SOIL DATA TO OTHER LOCATIONS IS THE SOLE RESPONSIBILITY OF THE PERSON PERFORMING THE EXTRAPOLATION.

AUTOMATIC HAMMER			
GRANULAR MATERIALS	SPT	SILTS AND CLAYS	SPT
RELATIVE DENSITY	(BLOWS/12 IN.)	CONSISTENCY	(BLOWS/12 IN.)
VERY LOOSE	LESS THAN 3	VERY SOFT	LESS THAN 1
LOOSE	3 - 8	SOFT	1 - 3
MEDIUM DENSE	8 - 24	FIRM	3 - 6
DENSE	24 - 40	STIFF	6 - 12
VERY DENSE	GREATER THAN 40	VERY STIFF	12 - 24
		HARD	GREATER THAN 24

SPLIT-SPOON: INSIDE DIAMETER: 1.375 in.
 OUTSIDE DIAMETER: 2.0 in.
 AVG. HAMMER DROP: 30.0 in.
 HAMMER WEIGHT: 140 lbs.

PREPARED: T. BISHOP
 CHECKED: J. JENKINS, P.E.
 REVISED: K. SWEENEY, E.I.
 ENGINEER: J. JENKINS, P.E.

ENVIRONMENTAL AND GEOTECHNICAL SPECIALISTS, INC.
 104 NORTH MAGNOLIA DRIVE
 TALLAHASSEE, FLORIDA 32301
 OFFICE : (850) 386-1253

REPORT OF SOIL BORINGS DRAINAGE IMPROVEMENTS
 CR 155 (N MERIDIAN RD) AT JOHN HANCOCK DR
 LEON COUNTY, FLORIDA
 SCALE: 1" = 5'
 DATE: JUNE 2018
 PROJ. NO.: 53-19-17-01
 FIGURE NO.:

APPENDIX C
SOIL BORING LOGS

**ENVIRONMENTAL & GEOTECHNICAL
SPECIALISTS, INC.**

104 North Magnolia Drive
Tallahassee, Florida 32301
Office #: (850) 386-1253
Fax #: (850) 385-8050

PROJECT: DRAINAGE IMPROVEMENTS AT CR 155 (N)

CLIENT: STANTEC

PROJECT NO.: 53-19-17-01

PROJECT LOCATION: LEON COUNTY, FL

BORING NO.: BC-1

DRILLER: O. GOMEZ

DEPTH TO WATER: INITIAL: ∇ 6.0' **24 HR:** ∇ N/M

HAMMER TYPE: AUTOMATIC

LATITUDE: 30° 30.012' N

LONGITUDE: 84° 16.635' W

ELEVATION (FEET): N/A

DATE: 5/31/2018

FLUID LOSS: NONE

CAVING: C NONE

This information pertains only to this boring and should not be interpreted as being indicative of the site.

DEPTH (METERS)	DEPTH (FEET)	SAMPLE	SYMBOL	DESCRIPTION	USCS/ AASHTO	TEST RESULTS	Wc (%)	Wc (%)		N	N-Value											
								10	20		30	40	60	10	20	30	40	60	80			
0	0			LOOSE GRAY CLAYEY FINE SAND	SC A-2-6	-200%=26 LL=24 PI=12	7	10	20	7	10											
	5			LOOSE GRAY CLAYEY SAND	SC A-6	-200%=41 LL=30 PI=14	14	10	20	5	10											
	10			LOOSE GRAY CLAYEY SAND	SC A-6	-200%=49	20	10	20	3	10											
	15			LOOSE GRAY CLAYEY SAND	SC A-6	-200%=49	21	10	20	4	10											
	20			LOOSE GRAY CLAYEY SAND	SC A-6	-200%=49	21	10	20	4	10											
	25			LOOSE GRAY CLAYEY SAND	SC A-6	-200%=49	18	10	20	4	10											
	30			LOOSE GRAY CLAYEY SAND	SC A-6	-200%=49	23	10	20	8	10											
	35			LOOSE GRAY CLAYEY SAND	SC A-6	-200%=49	20	10	20	6	10											
	40			LOOSE GRAY CLAYEY SAND	SC A-6	-200%=49	21	10	20	4	10											
	45			LOOSE GRAY CLAYEY SAND	SC A-6	-200%=49	19	10	20	8	10											
	50			LOOSE GRAY CLAYEY SAND	SC A-6	-200%=49	24	10	20	7	10											
	55			LOOSE GRAY CLAYEY SAND	SC A-6	-200%=49	28	10	20	6	10											
	60			LOOSE GRAY CLAYEY SAND	SC A-6	-200%=49	28	10	20	3	10											
	65			LOOSE GRAY CLAYEY SAND	SC A-6	-200%=49	27	10	20	3	10											
	70			LOOSE GRAY CLAYEY SAND	SC A-6	-200%=49	24	10	20	5	10											

NOTES: N/M MEANS NOT MEASURED
N/A MEANS NOT AVAILABLE

**ENVIRONMENTAL & GEOTECHNICAL
SPECIALISTS, INC.**

104 North Magnolia Drive
Tallahassee, Florida 32301
Office #: (850) 386-1253
Fax #: (850) 385-8050

PROJECT: DRAINAGE IMPROVEMENTS AT CR 155 (N)

CLIENT: STANTEC

PROJECT NO.: 53-19-17-01

PROJECT LOCATION: LEON COUNTY, FL

BORING NO.: CS-1

DRILLER: O. GOMEZ

DEPTH TO WATER: INITIAL: ∇ 2.0' 24 HR: ∇ N/M

HAMMER TYPE: AUTOMATIC

LATITUDE: 30° 30.022' N

LONGITUDE: 84° 16.703' W

ELEVATION (FEET): N/A

DATE: 5/30/2018

FLUID LOSS: NONE

CAVING: C NONE

This information pertains only to this boring and should not be interpreted as being indicative of the site.

DEPTH (METERS)	DEPTH (FEET)	SAMPLE	SYMBOL	DESCRIPTION	USCS/ AASHTO	TEST RESULTS	Wc (%)	Wc (%)		N	N-Value	
								10	20		30	40
0	0			VERY LOOSE DARK GRAY ORGANIC CLAYEY SAND	SC A-6	ORG%= 5.9	38			1		
						-200%=37 LL=25 PI=12	21			5		
							23			4		
	5			LOOSE GRAY CLAYEY SAND	SC A-6	-200%=41 LL=27 PI=11	22			4		
							26			3		
	2.5						24			3		
							25			5		
	10											
	15											
	5											
	20											
	7.5											
	25											
	30											
	10											
	35											

NOTES: N/M MEANS NOT MEASURED
N/A MEANS NOT AVAILABLE

ENVIRONMENTAL & GEOTECHNICAL SPECIALISTS, INC. 104 North Magnolia Drive Tallahassee, Florida 32301 Office #: (850) 386-1253 Fax #: (850) 385-8050	PROJECT: DRAINAGE IMPROVEMENTS AT CR 155 (N)	HAMMER TYPE: AUTOMATIC
	CLIENT: STANTEC	LATITUDE: 30° 30.096' N
	PROJECT NO.: 53-19-17-01	LONGITUDE: 84° 16.636' W
	PROJECT LOCATION: LEON COUNTY, FL	ELEVATION (FEET): N/A
	BORING NO.: PC-1	DATE: 5/30/2018
	DRILLER: O. GOMEZ	FLUID LOSS: NONE
DEPTH TO WATER: INITIAL: ∇ 5.0' 24 HR: ∇ N/M		CAVING: <input checked="" type="checkbox"/> NONE

This information pertains only to this boring and should not be interpreted as being indicative of the site.

DEPTH (METERS)	DEPTH (FEET)	SAMPLE	SYMBOL	DESCRIPTION	USCS/AASHTO	TEST RESULTS	Wc (%)	Wc (%)		N	N-Value	
								10	20		10	20
0	0			LOOSE GRAY SILTY FINE SAND WITH ORGANICS	SM A-2-4	-200%=25	14	10				
				LOOSE ORANGE SILTY FINE SAND	SM A-2-4	-200%=49	14	21	8			
							20	20	4			
							22	22	3			
				LOOSE GRAY CLAYEY SAND	SC A-6	-200%=38 LL=32 PI=13	20	20	7			
							20	24	3			
							24	24	4			
							24		3			

NOTES: N/M MEANS NOT MEASURED
N/A MEANS NOT AVAILABLE

ENVIRONMENTAL & GEOTECHNICAL SPECIALISTS, INC. 104 North Magnolia Drive Tallahassee, Florida 32301 Office #: (850) 386-1253 Fax #: (850) 385-8050	PROJECT: DRAINAGE IMPROVEMENTS AT CR 155 (N)	HAMMER TYPE: EXT MANUAL
	CLIENT: STANTEC	LATITUDE: 30° 30.041' N
	PROJECT NO.: 53-19-17-01	LONGITUDE: 84° 16.619' W
	PROJECT LOCATION: LEON COUNTY, FL	ELEVATION (FEET): N/A
	BORING NO.: PL-1	DATE: 5/30/2018
	DRILLER: K. SWEENEY	FLUID LOSS: NONE
DEPTH TO WATER: INITIAL: ∇ 4.0' 24 HR: ∇ N/M		CAVING: <u>C</u> NONE

This information pertains only to this boring and should not be interpreted as being indicative of the site.

DEPTH (METERS)	DEPTH (FEET)	SAMPLE	SYMBOL	DESCRIPTION	USCS/AASHTO	TEST RESULTS	Wc (%)	Wc (%)		N	N-Value	
								10	20		10	20
0	0			LOOSE ORANGE CLAYEY SAND	SC A-6	-200%=37 LL=24 PI=11	18	10	20	4	10	20
				LOOSE GRAY CLAYEY SAND			14	10	20		30	40
5	5						17	10	20			
							20	10	20			
							14	10	20			
							23	10	20	3	10	20
2.5												
10												
15												
5												
20												
7.5												
25												
30												
10												
35												

NOTES: N/M MEANS NOT MEASURED
N/A MEANS NOT AVAILABLE

**ENVIRONMENTAL & GEOTECHNICAL
SPECIALISTS, INC.**

104 North Magnolia Drive
Tallahassee, Florida 32301
Office #: (850) 386-1253
Fax #: (850) 385-8050

PROJECT: DRAINAGE IMPROVEMENTS AT CR 155 (N)

CLIENT: STANTEC

PROJECT NO.: 53-19-17-01

PROJECT LOCATION: LEON COUNTY, FL

BORING NO.: SA-1

DRILLER: O. GOMEZ

DEPTH TO WATER: INITIAL: ∇ 3.0'

24 HR: ∇ 2.5'

HAMMER TYPE: AUTOMATIC

LATITUDE: 30° 30.006' N

LONGITUDE: 84° 16.688' W

ELEVATION (FEET): N/A

DATE: 5/30/2018

FLUID LOSS: NONE

CAVING: C NONE

This information pertains only to this boring and should not be interpreted as being indicative of the site.

DEPTH (METERS)	DEPTH (FEET)	SAMPLE	SYMBOL	DESCRIPTION	USCS/ AASHTO	TEST RESULTS	Wc (%)	Wc (%)		N	N-Value	
								10	20		30	40
0	0			VERY LOOSE GRAY SILTY FINE SAND	SM A-2-4	-200%=16	21			2		
							17			2		
				LOOSE GRAY CLAYEY FINE SAND	SC A-2-6	-200%=29	20			3		
	5						14			4		
							17			7		
	2.5						26			3		
				LOOSE GRAY CLAYEY SAND	SC A-6	-200%=49 LL=38 PI=15	22			6		
	10						28			4		
							24			4		
	15											
	5											
	20											
	7.5											
	25											
	30											
	10											
	35											

NOTES: N/M MEANS NOT MEASURED
N/A MEANS NOT AVAILABLE

APPENDIX D
SOIL CLASSIFICATION DATA

SOIL CLASSIFICATION DATA

Project: DRAINAGE IMPROVEMENTS AT CR 155 (N MERIDIAN RD) AND JOHN HANCOCK DR GEOTECHNICAL INVESTIGATION

Client: STANTEC

Project No.: 53-19-17-01

Boring: BC-1

Location: LEON COUNTY, FL

DEPTH (FEET)	Wc (%)	-4 (%)	-10 (%)	-20 (%)	-40 (%)	-60 (%)	-100 (%)	-200 (%)	LL	PI	Org. (%)	N Value	USCS	AASHTO	Description
0.0-0.5	7												SC	A-2-6	LOOSE GRAY CLAYEY FINE SAND
1.0-1.5	9	100	100	96	87	70	46	26	24	12			SC	A-2-6	LOOSE GRAY CLAYEY FINE SAND
2.0-2.5	13											7	SC	A-2-6	LOOSE GRAY CLAYEY FINE SAND
3.0-3.5	12												SC	A-2-6	LOOSE GRAY CLAYEY FINE SAND
4.0-4.5	14	100	100	99	96	85	58	41	30	14			SC	A-6	LOOSE GRAY CLAYEY SAND
5.0-5.5	17											5	SC	A-6	LOOSE GRAY CLAYEY SAND
6.0-6.5	21												SC	A-6	LOOSE GRAY CLAYEY SAND
7.0-7.5	20											3	SC	A-6	LOOSE GRAY CLAYEY SAND
7.5-9.0	20											4	SC	A-6	LOOSE GRAY CLAYEY SAND
9.0-10.5	21	100	100	100	97	87	64	49				4	SC	A-6	LOOSE GRAY CLAYEY SAND
10.5-12.0	21											4	SC	A-6	LOOSE GRAY CLAYEY SAND
12.5-14.0	18											4	SC	A-6	LOOSE GRAY CLAYEY SAND
15.0-16.5	23											8	SC	A-6	LOOSE GRAY

SOIL CLASSIFICATION DATA

Project: DRAINAGE IMPROVEMENTS AT CR 155 (N MERIDIAN RD) AND JOHN HANCOCK DR GEOTECHNICAL INVESTIGATION

Client: STANTEC

Project No.: 53-19-17-01

Boring: CS-1

Location: LEON COUNTY, FL

DEPTH (FEET)	Wc (%)	-4 (%)	-10 (%)	-20 (%)	-40 (%)	-60 (%)	-100 (%)	-200 (%)	LL	PI	Org. (%)	N Value	USCS	AASHTO	Description
0.0-1.5	38										5.9	1	SC	A-6	VERY LOOSE DARK GRAY ORGANIC CLAYEY SAND
1.5-3.0	21	100	100	100	97	85	57	37	25	12		5	SC	A-6	LOOSE GRAY CLAYEY SAND
3.0-4.5	23											4	SC	A-6	LOOSE GRAY CLAYEY SAND
4.5-6.0	22											4	SC	A-6	LOOSE GRAY CLAYEY SAND
6.0-7.5	26	100	100	100	98	87	57	41	27	11		3	SC	A-6	LOOSE GRAY CLAYEY SAND
7.5-9.0	24											3	SC	A-6	LOOSE GRAY CLAYEY SAND
9.0-10.5	25											5	SC	A-6	LOOSE GRAY CLAYEY SAND

SOIL CLASSIFICATION DATA

Project: DRAINAGE IMPROVEMENTS AT CR 155 (N MERIDIAN RD) AND JOHN HANCOCK DR GEOTECHNICAL INVESTIGATION

Client: STANTEC

Project No.: 53-19-17-01

Boring: PC-1

Location: LEON COUNTY, FL

DEPTH (FEET)	Wc (%)	-4 (%)	-10 (%)	-20 (%)	-40 (%)	-60 (%)	-100 (%)	-200 (%)	LL	PI	Org. (%)	N Value	USCS	AASHTO	Description
0.0-0.5	14												SM	A-2-4	LOOSE GRAY SILTY FINE SAND WITH ORGANICS
1.0-1.5	10	100	100	96	84	66	43	25					SM	A-2-4	LOOSE ORANGE SILTY FINE SAND
2.0-2.5	14											8	SC	A-6	LOOSE GRAY CLAYEY SAND
3.0-3.5	21	100	100	100	97	87	64	49					SC	A-6	LOOSE GRAY CLAYEY SAND
4.0-4.5	20												SC	A-6	LOOSE GRAY CLAYEY SAND
5.0-5.5	20											4	SC	A-6	LOOSE GRAY CLAYEY SAND
6.0-6.5	22												SC	A-6	LOOSE GRAY CLAYEY SAND
7.0-7.5	22											3	SC	A-6	LOOSE GRAY CLAYEY SAND
7.5-9.0	20	100	100	100	97	84	54	38	32	13		7	SC	A-6	LOOSE GRAY CLAYEY SAND
9.0-10.5	20											3	SC	A-6	LOOSE GRAY CLAYEY SAND
10.5-12.0	24											4	SC	A-6	LOOSE GRAY CLAYEY SAND
13.0-15.0	24											3	SC	A-6	LOOSE GRAY CLAYEY SAND

SOIL CLASSIFICATION DATA

Project: DRAINAGE IMPROVEMENTS AT CR 155 (N MERIDIAN RD) AND JOHN HANCOCK DR GEOTECHNICAL INVESTIGATION

Client: STANTEC

Project No.: 53-19-17-01

Boring: PL-1

Location: LEON COUNTY, FL

DEPTH (FEET)	Wc (%)	-4 (%)	-10 (%)	-20 (%)	-40 (%)	-60 (%)	-100 (%)	-200 (%)	LL	PI	Org. (%)	N Value	USCS	AASHTO	Description
0.0-0.5	18												SC	A-6	LOOSE ORANGE CLAYEY SAND
1.0-1.5	14	100	100	100	97	81	52	37	24	11			SC	A-6	LOOSE GRAY CLAYEY SAND
2.0-2.5	17											4	SC	A-6	LOOSE GRAY CLAYEY SAND
3.0-3.5	20												SC	A-6	LOOSE GRAY CLAYEY SAND
4.0-4.5	14												SC	A-6	LOOSE GRAY CLAYEY SAND
5.0-5.5	23											3	SC	A-6	LOOSE GRAY CLAYEY SAND

SOIL CLASSIFICATION DATA

Project: DRAINAGE IMPROVEMENTS AT CR 155 (N MERIDIAN RD) AND JOHN HANCOCK DR GEOTECHNICAL INVESTIGATION

Client: STANTEC

Project No.: 53-19-17-01

Boring: SA-1

Location: LEON COUNTY, FL

DEPTH (FEET)	Wc (%)	-4 (%)	-10 (%)	-20 (%)	-40 (%)	-60 (%)	-100 (%)	-200 (%)	LL	PI	Org. (%)	N Value	USCS	AASHTO	Description
0.0-1.5	21											2	SM	A-2-4	VERY LOOSE GRAY SILTY FINE SAND
1.5-3.0	17	100	100	100	97	79	41	16				2	SM	A-2-4	VERY LOOSE GRAY SILTY FINE SAND
3.0-4.5	20	100	100	100	96	79	49	29				3	SC	A-2-6	LOOSE GRAY CLAYEY FINE SAND
4.5-6.0	14											4	SC	A-2-6	LOOSE GRAY CLAYEY FINE SAND
6.0-7.5	17											7	SC	A-6	LOOSE GRAY CLAYEY SAND
7.5-9.0	26											3	SC	A-6	LOOSE GRAY CLAYEY SAND
9.0-10.5	22											6	SC	A-6	LOOSE GRAY CLAYEY SAND
10.5-12.0	28	100	100	99	97	88	66	49	38	15		4	SC	A-6	LOOSE GRAY CLAYEY SAND
13.0-15.0	24											4	SC	A-6	LOOSE GRAY CLAYEY SAND

APPENDIX E
***GRAIN-SIZE DISTRIBUTION
CURVES***

MECHANICAL GRAIN-SIZE ANALYSIS (ASTM D1140-54)

TEST INFORMATION

PROJECT NO.: 53-19-17-01 DATE: 6/20/2018
 BORING NO.: BC-1 DEPTH: 1.0 - 1.5 (FEET)
 SOIL DESCRIPTION: CLAYEY FINE SAND
SC / A-2-6

TABULAR TEST RESULTS:

PAGE 1 OF 2

Sieve No.	Diameter (Millimeters)	Percent Passing (%)
4	4.750	100
10	2.000	100
20	0.850	96
40	0.425	87
60	0.250	70
100	0.150	46
200	0.075	26

NOTE: THE FOLLOWING VALUES
ARE ESTIMATED FROM THE
GRAIN-SIZE DATA

$$D_{10} = \underline{0.02^*} \text{ mm}$$

$$D_{50} = \underline{0.17} \text{ mm}$$

$$D_{60} = \underline{0.20} \text{ mm}$$

$$D_{85} = \underline{0.38} \text{ mm}$$

$$C_u = \underline{10.0^*}$$

WHERE:

C_u = Coefficient Of Uniformity

* = Estimated Value From Extrapolation
of Grain-Size Curve

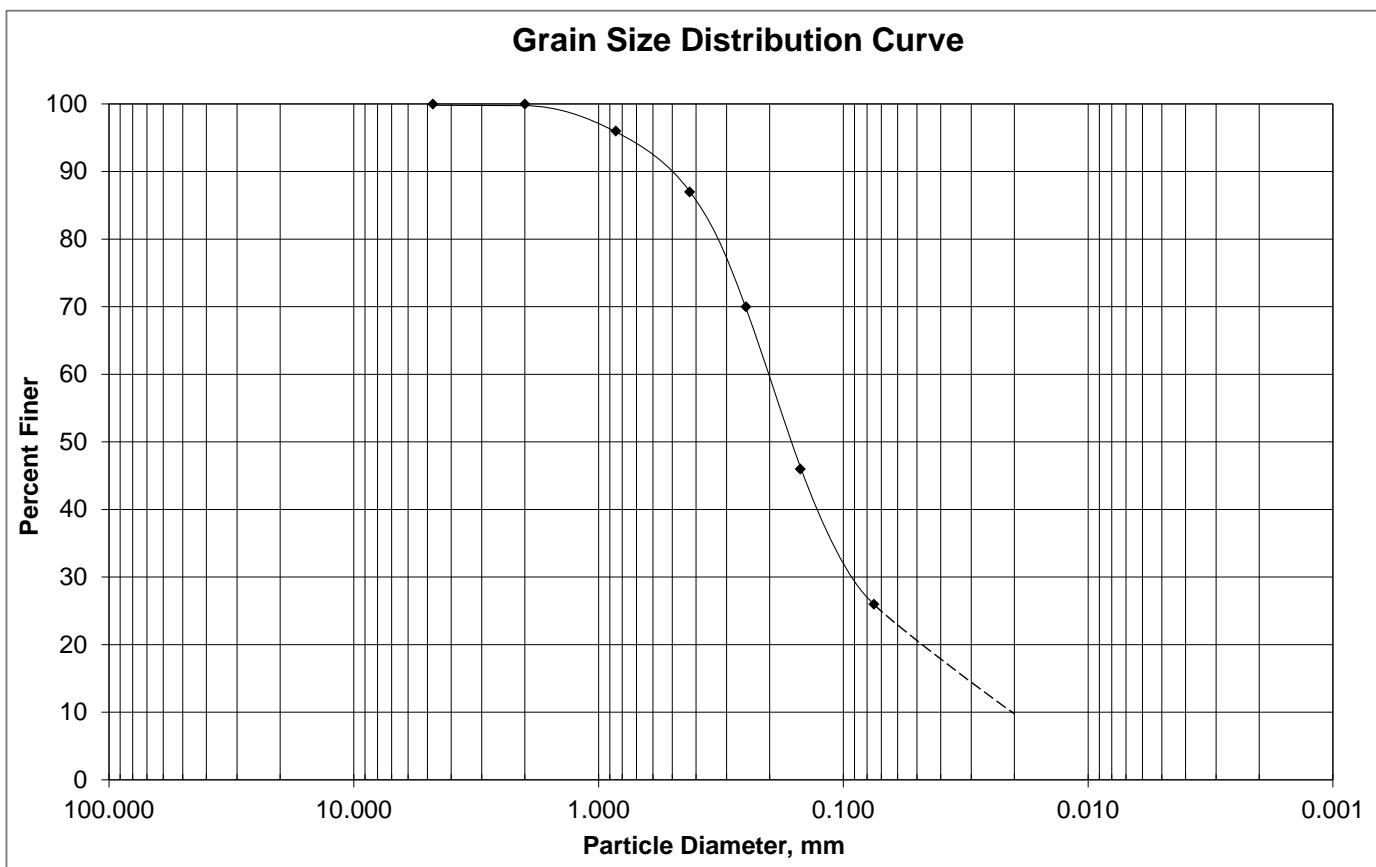
MECHANICAL GRAIN-SIZE ANALYSIS (ASTM D1140-54)

TEST INFORMATION

PROJECT NO.: 53-19-17-01 DATE: 6/20/2018
BORING NO.: BC-1 DEPTH: 1.0 - 1.5 (FEET)
SOIL DESCRIPTION: CLAYEY FINE SAND
SC / A-2-6

GRAPHICAL TEST RESULTS:

PAGE 2 OF 2



MECHANICAL GRAIN-SIZE ANALYSIS (ASTM D1140-54)

TEST INFORMATION

PROJECT NO.: 53-19-17-01 **DATE:** 6/20/2018
BORING NO.: BC-1 **DEPTH:** 4.0-4.5 (FEET)
SOIL DESCRIPTION: CLAYEY SAND
SC / A-6

TABULAR TEST RESULTS:

PAGE 1 OF 2

Sieve No.	Diameter (Millimeters)	Percent Passing (%)
4	4.750	100
10	2.000	100
20	0.850	99
40	0.425	96
60	0.250	85
100	0.150	58
200	0.075	41

NOTE: THE FOLLOWING VALUES
ARE ESTIMATED FROM THE
GRAIN-SIZE DATA

D_{10} = N/A mm

D_{50} = 0.13 mm

D_{60} = 0.17 mm

D_{85} = 0.25 mm

C_u = N/A

WHERE:

C_u = Coefficient Of Uniformity

N/A = Value Not Available

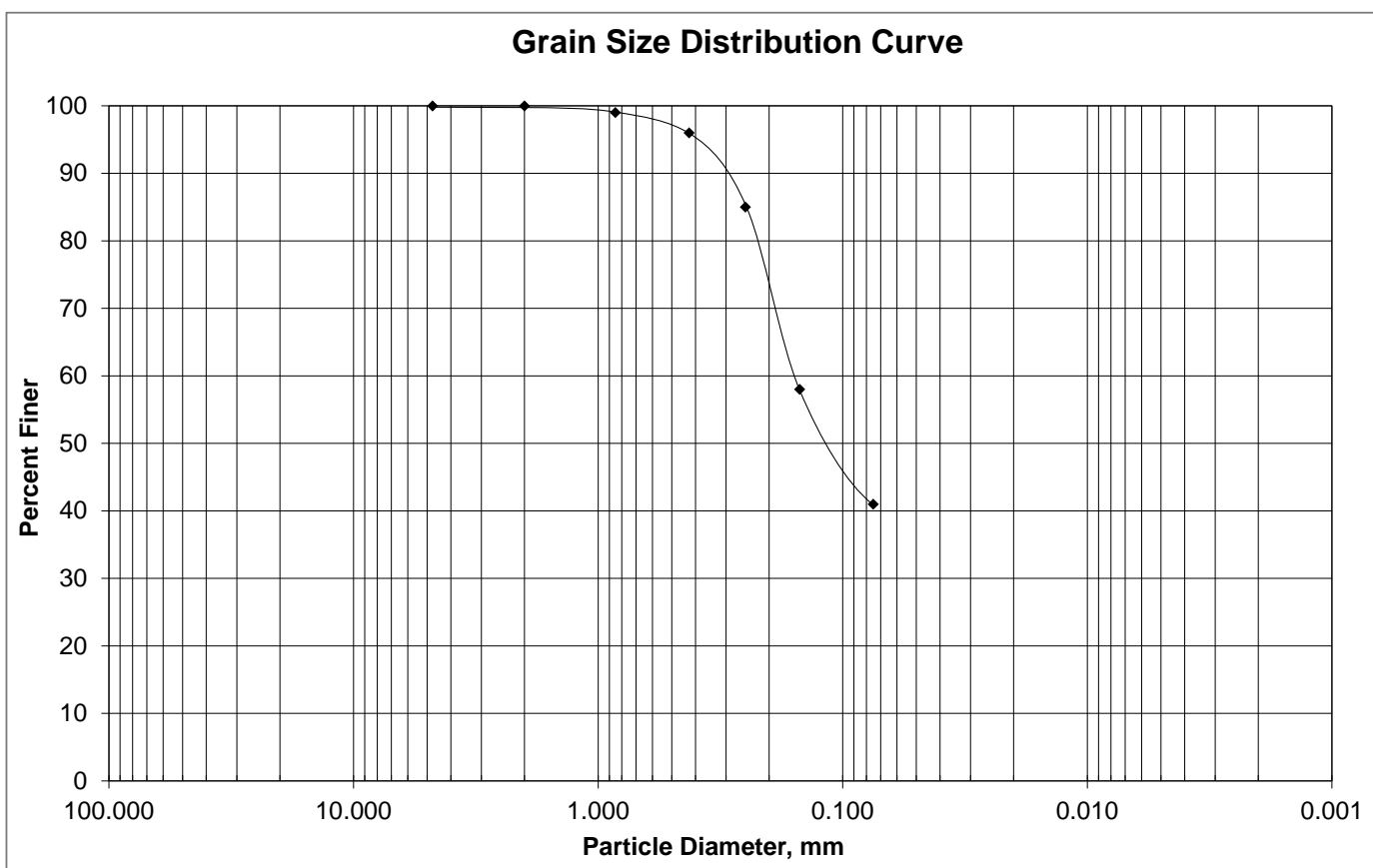
MECHANICAL GRAIN-SIZE ANALYSIS (ASTM D1140-54)

TEST INFORMATION

PROJECT NO.: 53-19-17-01 DATE: 6/20/2018
BORING NO.: BC-1 DEPTH: 4.0-4.5 (FEET)
SOIL DESCRIPTION: CLAYEY SAND
SC / A-6

GRAPHICAL TEST RESULTS:

PAGE 2 OF 2



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Pump Station Control Panel Wiring Diagram E 03.03

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1.1 General

Refer to the General Provisions of the Contract Documents and General Notes of the approved construction plans.

1.2 Measurement and Payment

Measurement and Payment for all work performed under the Contract will be in accordance with the City of Tallahassee Pay Item Manual for Water and Sewer Construction and the Contract Documents. No payment will be made to the Contractor for additional quantities and/or work performed that is not included in the Bid Form of the Contract without written approval by the City.

1.3 Warranty Repairs

When repairs are required within the two-year warranty period, the Contractor must first make all necessary repairs, then patch the damaged asphalt surface in accordance with the jurisdictional agency's requirements, and then mill and resurface the **FULL ROAD WIDTH** with 1-inch thick SP-9.5 asphalt to a minimum distance of 25-feet each direction from the pavement cuts, or as required by the roadway's jurisdictional agency. Once the repairs have been completed, the Contractor shall warranty all repairs and restored work to the same extent as the original warranty period.

1.4 Environmental Management System (EMS)

The Contractor is required to follow all rules and regulations established by EMS (Environmental Management System) documents as well as any other pertinent rules and regulations that relate to the project. The City of Tallahassee Underground Utilities Environmental Policy Statement and a Contractor's informational brochure are available at:

<https://www.talgov.com/Uploads/Public/Documents/you/learn/library/documents/emsbrochure.pdf>.

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END OF SECTION 1

2.1 General

2.1.1 Contractor's Responsibility

It is the Contractor's responsibility to maintain a clean work zone to limit erosion and the release of sediments into stormwater collection systems and the tracking of materials beyond the active work limits.

Environmental controls shown on the plans, and as directed by the City during construction, are minimum requirements. The Contractor is solely responsible for the prevention, control and abatement of erosion, water pollution, and the transport of eroded materials; and any property damage resulting to and from the project as a result of Contractor failing to prevent, control, or abate erosion or water pollution.

All trees are to be protected unless specifically identified on the plans to be removed. Tree barricades will be installed and maintained around all trees to be protected or as directed by the Engineer/COT Environmental Inspector.

The Contractor shall ensure that a foreman or supervisor who has been certified under Florida Stormwater, Erosion and Sedimentation Control Inspector training program is available in person or by phone at all times during the construction activities. The Contractor shall designate that person or persons at the pre-construction meeting and that person or persons must attend the pre-construction meeting.

The Contractor shall employ a certified arborist to mitigate impacts to trees as a result of construction activities and shall coordinate these tree-related issues with the City's Environmental Inspector.

The City may have a separate Certified Arborist on staff for the project. The Contractor is required to notify the City's Certified Arborist prior to and during excavation activities within the CPZ of all trees to ensure proper tree impact mitigation measures are implemented. The City's Arborist will not perform the mitigation, nor does his presence relieve the Contractor from providing their own arborist to monitor any construction activities within the CPZ of any tree.

The Contractor shall make every reasonable effort to schedule and conduct the project construction in a manner that will minimize any adverse effects on the adjacent property, or on public or private use of the adjacent property, and on the environment, including fish, wildlife, water quality, air quality, and natural resources of the area. Any such adverse effects that occur are the responsibility and liability of the Contractor.

Safety of the traveling public, as related to the adequacy of the driving surface as a result of standing stormwater runoff, erosion, or sediment accumulation created by the introduction of inlet protection or other control measures, is the responsibility of the Contractor.

2.1.2 Contractor's Liability

The Contractor shall be liable for any and all penalties, fines, damages, and restitution payments against the project by City, State, local environmental agencies, and the courts which result from failure to control erosion, water pollution, and stormwater runoff across or from the project site and shall indemnify and defend the City from and against all such claims. The Contractor shall be liable for citizen's claims of environmental damage and the City shall be held harmless from such claims.

2.1.3 Prevention-Primary Control

The primary means of erosion control employed by the Contractor shall be prevention. Prevention methods that are to be employed include:

- a. Prepare and follow a construction phasing schedule that limits disturbed surfaces to the minimum necessary for proper execution of the immediate construction activities.
- b. Limit the amount of clearing and grading to only the areas necessary.
- c. Limit the number of construction accesses and locations for non-essential activities which result in ancillary disturbances, i.e., parking, material storage, etc.
- d. Temporarily divert runoff from the area to be worked and return it after completion.

2.2 Erosion and Sedimentation Control Measures

Erosion and sedimentation controls are required to avoid the release of sediments beyond the work limits. Trench spoils and stockpiled backfill materials must be placed to avoid deposition within the roadside ditches or other stormwater conveyance systems. All materials shall be bounded by silt fencing or staked hay bales as needed. The removal of deposited materials within ditches and conveyance systems is the responsibility of the Contractor. The removal of such material shall be coordinated with the City of Tallahassee's/Leon County's Environmental Inspector by the Contractor.

More stringent erosion and sediment control measures may be required, during any phase of development, at the discretion of the City of Tallahassee's/Leon County's Environmental Inspector, or other jurisdictional agency. Erosion and sediment control measures depicted in the plans are typically limited to inlet protection and silt fences. The Contractor is required to provide temporary construction entrances at all staging areas and points of ingress/egress from work limits. If erosion cannot be prevented, then it must be controlled at or near the source using methods that include:

- a. Temporary mulch, hydro-mulch with quick growing grass, sod or other stabilization when unprotected soils will be exposed without working them for several days (particularly during inclement or threatening weather.)
- b. Temporary gravel construction entrances.
- c. Installation of a series of straw bale and/or silt fence barriers from near the top of the grade to the bottom, instead of only at the bottom.
- d. Storm drain inlet protection, limited to inlets within the active construction limits and a minimum of two inlets downstream of the active construction limits.
- e. Installation of permanent grass, sod or other stabilization as soon as possible.
- f. Surface roughening.

The Contractor is referred to FDEP's The Florida Development Manual: A Guide to Sound Land and Water Management, Erosion Control and Water Quality Section; Leon County's Environmental Management Act; and Erosion and Sediment Control Handbook by Goldman, Bursztynksy, and Jackson for guidance in erosion prevention control.

Any disturbed areas that will be left exposed more than 30 days, and not subject to construction traffic, will immediately receive a temporary seeding. If the season prevents the establishment of a temporary cover, the disturbed areas will be mulched with straw or equivalent material, at a rate of two (2) tons per acre, according to State standards.

2.3 Tree Protection

No trenching or excavation shall be allowed within the CPZ of protected trees, except where debits have been noted on plans or mitigation has been approved and performed.

The Contractor is responsible for the protection of all trees and landscaping within the project limits, as well as trees on adjacent properties that may be damaged by construction, and will be solely liable for damage to vegetation on properties adjacent to construction work zones. Any tree-related penalties, imposed by the City or property owner for the trees that are shown to be protected or outside the project limits, shall be paid by the Contractor. **The Contractor is required to have a Certified Arborist on staff for the project during excavation activities within the Critical Protection Zone (CPZ) of all trees to ensure proper tree impact mitigation techniques are implemented.** The cost for the Contractor's Arborist and for all arboricultural measures required shall be included under the lump sum price for Tree Protection. Tree mitigation techniques shall be in compliance with the requirements contained in the COT Land Development Code, Chapter 5 Environmental Management, Article IV, Sec. 5-83, Tree protection and removal standards or Environmental Management Act, Chapter 10, Section 10-4.363, Land Development Code of the Leon County Code of Laws. Specifically, the following minimum tree impact mitigation practices are required:

- a. If root structure is present during trenching and excavation, root pruning shall be required. The Contractor's Certified Arborist shall be required to be on site for proper root pruning. All root removal shall be limited to the least extent possible or as directed on site by the City/County Environmental Inspector/Certified Arborist.
- b. All root pruning shall be done immediately upon exposure of tree roots $\frac{3}{4}$ " in diameter and larger during trenching and excavation, cleanly cut with a handsaw, and covered immediately with soil or kept moistened with wet burlap or peat moss until the trench can be filled. When it is not possible to backfill the same day, the roots shall be recut with a handsaw a reasonable distance from the original cut and backfilled immediately to avoid soil or root dehydration. All encountered roots shall be treated as appropriate (as determined by the Contractor's arborist).
- c. Where excavation machinery is required to operate within the Critical Protection Zone (CPZ) of existing trees or any appendage of the machinery comes in contact with the tree during excavation, a tree barricade shall be incorporated. The type of barricade to be constructed, when construction development occurs in close proximity to a tree, is a girdling structure of vertical boards to be placed around the trunk, so as to protect the tree bark. All tree and girdling protection barricades are to be installed prior to initiation of any construction activity and are to remain in place until all construction activities are completed.
- d. Under no circumstances shall any vehicle, construction material or fill material be stored within the Critical Protection Zone of existing trees.
- e. If overhead tree limbs are intruding into the proposed work area and may be injured by machinery or trucking maneuvers, the Contractor's Certified Arborist shall be required to be on site for proper removal of said tree limbs.
- f. These procedures may be required, all or in part, by the City/County Environmental Inspector/Certified Arborist or variations thereof and are not limited to those listed herein.
- g. The Contractor shall not enter onto private property to accomplish tree protection without specific instruction by the City/County to do so.
- h. These measures will be considered as arboricultural mitigation, allowing construction to proceed without accruing debits.

The tree protection shall be enforced in all areas deemed necessary by the City and shall conform to the following treatments:

2.3.1 Treatment A

A continuous band of 2 x 4 wood, ¾-inch or thicker plywood, or other suitable material approved by the Engineer attached to tree trunks by wire, metal banding, or other means sufficient to secure the band against accidental removal by any construction equipment. The band should extend from the ground level to a height of 4 feet. Scrap or low grade material may be used. This treatment is intended to be used whenever there is danger of construction equipment coming close enough to trees to possibly contact and damage their trunks.

2.3.2 Treatment B

Wood chips or wood debris from branch chippers shall be spread from the base of the tree out to the edge of the drip zone and to a depth of 3 inches. Such cover shall be maintained during the course of construction.

2.3.3 Treatment C

All roots shall be clean cut to the depth of construction impact and at a point immediately outside of the lateral limits of construction. Roots may be cut using a trenching machine or saw (not a backhoe or similar equipment) which will sever the roots without tearing, ripping or pulling. The resultant trench shall be backfilled immediately and a high quality slow release fertilizer broadcast over the fill at a rate of 2 pounds of nitrogen per 1,000 square feet. A fertilizer having at least 50% slow release N and a ratio as close to 4-1-2 as possible shall be used. Locally available products such as Graco Turf and Nursery Special 13-6-6, Lesco 50% SCU 24-5-11, Lesco SC Nursery fertilizer, or Osmocote 18-6-12 are acceptable.

2.3.4 Treatment D

A barricade shall be constructed to protect the entire drip zone of trees. The barricade shall be constructed so as to prevent the movement of equipment or vehicles of any kind (including concrete shoot washing), removal of existing ground cover, or any activity which could result in soil disturbance, soil compaction, or physical scarring of tree roots or trunks.

2.3.5 Treatment E

Wood chips or chipper debris shall be mounded around the bottom of tree trunks so as to cover any exposed roots. Wood chips shall be spread to a depth of 8 inches and cover shall be maintained during the course of construction.

Trimming of branches or roots shall be limited to minimum clearance necessary and done by making clean, unbroken cuts.

Top soils shall be stripped from all areas to be excavated or filled. Top soils shall be stockpiled on the site at locations approved by the Engineer and spread over the excavated or filled areas after completion of earthwork.

The Contractor shall comply with all local and State environmental laws.

2.4 Dust Control

If, in the opinion of the City or the Engineer it is necessary to control dust during construction period, the Contractor shall furnish and apply water until the surface is wet. Temporary vegetative cover shall be established or mulch shall be applied in accordance with State standards for erosion control.

2.5 Noise Control

Noise in excess of the "Permissible Noise Exposures" as defined by OSHA shall not be allowed in any area that may be occupied by the public. The City shall have the right to mitigate situations in which noise creates a nuisance to the public. This could include but not be limited to requiring mufflers on internal combustion engines and setting certain hours for activities such as concrete demolition and pile driving. There shall be no additional compensation for the mitigation of these nuisances.

2.6 Cleanup

The Contractor is required to mechanically sweep the active construction limits a minimum of once weekly. All soil washed, dropped, spilled, or tracked outside the limit of disturbance or onto public rights-of-way will be removed immediately. Soil or construction debris that is deposited on paved areas subject to traffic shall be removed at the beginning and end of each workday, and prior to and following rainfall events. More frequent schedules may be necessary to prevent runoff pollution and provide traffic safety. The Contractor shall determine the schedule for cleaning paved areas closed to all traffic (including local traffic); however, cleaning shall be scheduled or erosion control devices provided to prevent water pollution.

If the Contractor fails to adequately remove soil or debris on paved areas as noted above, the City may cause such removal to be accomplished. The cost incurred to cover direct and indirect costs shall be deducted from the Contractor's next approved payment request.

2.7 Temporary Cover

When disturbed, unprotected soils, outside the roadway limits (areas of subgrade stabilization), will be exposed without working them for 10 days or more, the Contractor shall provide temporary erosion control cover (e.g. mulching & hydro-mulching) within 2 days of the last grading work on the area, and in accordance with the "Excavating, Backfilling, and Compacting for Utilities" specification.

2.8 Manufactured Material

Installations of commercially manufactured erosion control material shall be designed, constructed, and maintained in accordance with the manufacturer's recommendations, the erosion control references cited herein, these Specifications, the Plans, and industry standards.

2.9 Monitoring by Contractor (or Representative)

The Contractor shall ensure that a Representative (i.e. foreman or supervisor) who has been certified under Florida Stormwater, Erosion and Sedimentation Control Inspector training program is available in person or by phone at all times during the construction activities. The Contractor shall designate that person or persons at the pre-construction meeting and that person or persons must attend the pre-construction meeting.

The Contractor shall monitor the effectiveness of inlet protection and provide additional protection if warranted. No sediments are intended to enter the curb inlets. The Contractor shall conduct and maintain the work in such condition to provide adequate drainage at all times and shall monitor the performance of the storm water inlets while impeded by the inlet protection. Street flooding is not to be introduced as a result of the inlet protection.

The Contractor (or Representative) shall inspect all erosion and sedimentation controls at least once a week, regardless of rainfall; during all rainfall events; and immediately following any significant storm event (0.50 inches rainfall, or greater) to ensure that all erosion control measures are in place and functioning properly.

A crew shall be available within 2 hours, when necessary, to repair, replace, or construct erosion control facilities and to repair or cleanup erosion damages. Adequate equipment and materials for this work shall also be readily available. The Contractor shall be capable of being reached by telephone 24 hours each day, 7 days a week. While in route and on the job, he shall be capable of being reached by mobile telephone. The telephone number shall be furnished to the City.

2.10 Work within Jurisdictional Wetlands

No work shall take place within jurisdictional wetlands unless it has been permitted. When work is required within jurisdictional wetlands, the Contractor is required to comply with all permit conditions. Typical activities required for the construction, maintenance, and repair of utility lines and associated facilities in waters of the United States are as follows:

Utility Lines: The construction, maintenance, or repair of utility lines, including outfall and intake structures and the associated excavation, backfill, or bedding for the utility lines, in all waters of the United States, provided there is no change in preconstruction contours. A "utility line" is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquefiable, or slurry substance, for any purpose, an any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, and telegraph messages, and radio and television communication.

Material resulting from trench excavation may be temporarily side cast (up to three months) into waters of the United States, provided the material is not placed in such a manner that it is dispersed by currents or other forces. The District Engineer may extend the period of temporary side casting not to exceed a total of 180 days, where appropriate.

Within the wetland limits identified on the plans, backfill trenches with excavated material only. No select fill shall be used within the wetland limits. All excavated materials that are not used as backfill shall be removed from the project and disposed of in a legal manner by the Contractor. Spoil material shall not be wasted on site.

For a trench with a top width greater than three feet in herbaceous wetlands, the upper layer (6"-12") of the soil horizon shall initially be scraped and segregated into a spoil bank resulting from the excavation of the trench for the utility line. The upper layer of the soil horizon shall be replaced as the last step of restored grades to facilitate natural re-vegetation.

Furthermore, the trench cannot be constructed in such a manner as to drain waters of the United States (e.g., backfilling with extensive gravel layers, creating a french drain effect). For example, utility line trenches can be backfilled with clay blocks to ensure that the trench does not drain the waters of the United States through which the utility line is installed. Any exposed slopes and stream banks must be stabilized immediately upon completion of the utility line crossing of each water body.

Whenever possible, excavated material shall be placed on an upland site. However, when this is not feasible, temporary stockpiling may be authorized provided that:

- a. All excavated material stockpiled in a vegetated wetland is placed on filter cloth, mats, or some other semi-permeable surface. The material will be stabilized with straw bales, filter cloth, etc. to prevent reentry into the waterway.
- b. **All excavated material must be placed back into the trench to the original contour and all excess excavated material must be completely removed from the wetlands within 30 days after the pipeline has been laid through the wetlands area.** Permission must be granted by the District Engineer or his authorized representatives if the material is to be stockpiled longer than 30 days.

Soil Erosion and Sediment Controls: Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within water of the United States during periods of low-flow or no-flow.

Equipment: Heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbance.

2.11 Additional Control Measures

Additional control measures, above and beyond those minimum requirements shown on the plans and included herein, may be required during any phase of development and construction, at the discretion of the City or County Environmental Inspector.

The City may direct the Contractor to provide additional control measures, or repair existing control measures, when deemed necessary. If the Contractor fails to install or repair such measures as directed by the City within 12 hours, the City may cause such work to be performed. The cost incurred to cover direct and indirect costs shall be deducted from the Contractor's next approved payment request.

The Contractor shall be responsible for all fines imposed by regulatory agencies with jurisdiction.

END OF SECTION 2

3.1 Testing Requirements

Perform all testing services of materials, equipment, and workmanship required by the Contract Documents. All materials and equipment used in the performance of work under are subject to inspection and testing at the point of manufacture or fabrication. Standard specifications for quality and workmanship are indicated in the Contract Documents.

The City may require the Contractor to provide statements or certificates from the manufacturers and fabricators that the materials and equipment provided are manufactured or fabricated in full accordance with the standard specifications for quality and workmanship indicated in the Contract Documents. All costs of this testing and providing statements and certificates shall be a subsidiary obligation of the Contractor, and no extra charge to the City shall be allowed on account of such testing and certification.

3.2 Payment for Testing Services

For capital improvement projects, the City will pay for the initial testing services required by the Contract Documents. If the tests, or any subsequent retests, indicate the materials, equipment, and workmanship fail to meet the requirements of the Contract Documents, the total costs of the retests shall be deducted from any payments due the Contractor.

For development projects, the developer (or the developer's contractor) shall pay for all testing services.

3.3 Additional Testing

In addition to the minimum testing requirements established in the Contract Documents, the City may at any time, and at their expense, elect to have construction materials, equipment, and workmanship tested for conformity with the Contract Documents.

The Contractor may, at their own expense, employ and pay for the services of the same, or a separate and equally qualified independent testing laboratory, to perform additional inspections, sampling and testing for the Contractor's convenience.

3.4 Testing Laboratory

All testing services shall be provided by an independent testing laboratory. Perform all testing in accordance with industry standards and provide testing results signed and sealed by a Florida Licensed Professional Engineer.

Employees of the laboratory shall in no way relieve the Contractor of their obligations to perform the work of the Contract. The Laboratory does **NOT** have the authority to:

- a. Release, revoke, alter or enlarge on requirements of Contract Documents.
- b. Approve or accept any portion of the work.
- c. Perform any duties of the Contractor.

3.5 Contractor's Responsibilities

Provide safe access to all work areas and manufacturer's operations that require testing services and cooperate with laboratory personnel to facilitate the execution of the required testing services. Notify laboratory sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests. Upon such notice, if tests or inspections cannot be performed in a timely manner due to the Contractor's negligence, the Contractor shall reimburse City for laboratory personnel and travel expenses incurred.

Secure and deliver to the laboratory adequate quantities of representative samples of materials proposed to be used and which require testing. 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. Provide for the storage and curing of test samples, when required.

END OF SECTION 3

4.1 General

4.1.1 Scope of Work

Work under this section includes clearing and grubbing, excavation, backfill, compaction, pavement removal and replacement, site restoration and cleanup for construction of underground pipelines, pumping stations, wells, and tanks, and their related structures. Pipe materials and pipeline construction are covered in other appropriate sections of these Specifications.

4.1.2 Site Conditions

For the purpose of this section, the following definitions apply:

Improved Areas – Improved areas shall include all areas subject to regular vehicular loading such as all streets, medians, City maintained driveways, and parking lots; as well as all areas within 3-feet of any improved area or above-ground structure; or within a 2(H):1(V) (or greater) slope within 10-feet of any improved area or above-ground structure; or easements within regular vehicular loading.

Unimproved Areas – Unimproved areas shall include easements, sidewalks, trails, vacated right-of-way, privately maintained driveways, and parking lots, green spaces, or other general areas not considered an improved area as defined above.

Above-Ground Structure – Above ground structures shall include all buildings, walls, fences, signs, signal poles, utility poles and cabinets, or other above-ground features requiring a solid and stable foundation.

The Contractor shall examine the site and review the available test borings and/or undertake his own soil borings prior to submitting his bid, taking into consideration all conditions that may affect his work. The City and Engineer will not assume responsibility for variations of subsoil quality or conditions at locations other than places shown at the time the investigation was made.

The Contractor is reminded that he is solely responsible for the locating and protecting all utilities and that the information shown on the Drawings concerning size, type, and location of underground and other utilities is based on information provided by the utility owners, available records, and field survey information. The information may not reflect actual conditions, include all utilities in the area, either in service or abandoned, or show the utilities in the correct horizontal or vertical locations. The Contractor shall make their own determination as to size, type, and location of existing utilities as necessary to avoid damage from proposed work activities.

The Contractor shall notify *Sunshine State One-Call of Florida* at least five days in advance of any construction activities.

All existing underground utilities and facilities (shown on the Plans), or where their locations are made known to the Contractor prior to excavation, shall be protected from damage; and if damaged, shall be repaired to equal prior serviceability or replaced in kind at the Contractor's expense. Repairs or replacement shall be made at the earliest practicable time and in no case shall the Contractor leave the job at the end of the day without making all such repairs or satisfactory arrangements for subsequent repair.

If in the opinion of the City, the repair is not made in a reasonable period of time or satisfactory fashion the City shall make arrangements for such repair at the Contractor's expense.

4.1.3 Submittals

Contractor shall obtain approval of the Engineer for fill materials prior to the date of anticipated use of such material.

4.1.4 Safety Precautions

The Contractor shall provide and maintain adequate barricades, construction signs, flashers and guards as required in pedestrian and vehicular traffic areas. All safety rules and regulations of local, County, State and Federal authorities shall be observed. Proper storage of construction materials and plans, as well as guard-watchmen service, if necessary, shall be provided.

In advance of days during which no trench work is to proceed, the trench shall be backfilled until the next working day. Temporary erosion controls shall be in place for the duration of the dormant period in accordance with the "Environmental Controls" Section of these specifications.

Where trenches will be in paved streets, temporary patching of asphalt will be required and will be provided for the entire time between compaction, pavement removal and final repaving. "Street Closed to Through Traffic" signs and "Detour" routes shall be indicated and maintained by the Contractor when job is located in a public street or way. Signing shall be provided in accordance with OSHA regulations and the State of Florida Manual of Traffic Control. Base material shall be on location prior to roadway cuts. Street closures and detour schedules are to be submitted to the appropriate governing agency for review and approval.

The Contractor shall furnish temporary or permanent support, adequate protection and maintenance of all underground facilities and utilities encountered. Support, protection, maintenance and restoration are the Contractor's responsibility as part of construction process.

OSHA Construction Standards for excavation require that at least one member of the crew on site be in possession of a state competency card. Any pipe installed without compliance shall not be inspected, and hence ineligible for refunding.

4.1.5 Shoring, Sheet piling and Bracing

Where sheet piling, shoring, sheeting, bracing or other supports are called for on the Plans or where they otherwise are necessary to protect adjacent property or the work or are necessary for safety of workmen or the public, they shall be designed, furnished, placed, maintained and removed by the Contractor.

Design, planning, installation and removal of all sheeting, shoring, sheet piling and bracing shall be accomplished in a manner so as to maintain required trench or excavated section with an undisturbed state of soils at and below excavation bottom (must adhere to OSHA and Florida Trench Safety Act requirements).

Use of horizontal struts below barrel of pipe or use of pipe as support for trench bracing is not permitted. Use of soldier pile and horizontal lagging method of support of a traveling shield shall require the review of engineer prior to their use.

Sheet piling and timbers used in trench excavations shall be withdrawn in such a manner so as to prevent subsequent settlement or misalignment of pipe or additional backfill loadings, which might overload pipe. Where, in the opinion of the Engineer, removal of sheeting and shoring will or may cause damage to the work or to adjacent buildings utilities or property, the Engineer may direct Contractor to leave all or a portion of sheeting and shoring in place. Payment for sheeting and shoring left in place will be incidental to the contract unless identified in the bid schedule.

Movable trench boxes may be used and must comply with OSHA and Florida Trench Safety standards for the depth used.

The right of the Engineer to order sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue orders, and his failure to exercise his right to do so shall not relieve the Contractor from liability for damages to persons or property occurring from or upon the work occasioned by negligence or otherwise growing out of a failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.

4.1.6 Control of Water

Furnish, install and operate all necessary machinery, appliances and equipment to keep excavations free from water during construction. Dewater and dispose of water so as not to

cause injury to public or private property or to cause a nuisance or a menace to the public. The Contractor shall at all times have on hand sufficient pumping equipment and machinery in good working condition for all ordinary emergencies and shall have available at all times competent workmen for operation of pumping equipment. Dewatering systems shall not be shut down between shifts, on holidays or weekends, or during work stoppages without written approval from the Engineer. Dewatering systems are required to use socks or other approved devices on discharge pipes to control turbidity in downstream receiving waters or channels.

Control of ground water shall be such that softening of the bottom of excavations or visible water shall be prevented. Dewatering systems shall be designed and operated so as to prevent removal of natural soils.

Static water level shall be drawn below bottom of excavation so as to maintain undisturbed state or natural soils and allow placement of backfill to required density. Dewatering system shall be installed and operated so that ground water level outside excavation is not reduced to extent that would damage or endanger adjacent structures or property.

Release of ground water to its static level shall be performed in a manner so as to maintain undisturbed state of natural foundation soils, prevent disturbance of compacted fill or backfill and prevent flotation or movement of all structures and pipelines.

4.1.7 Environmental Controls

During construction operations, the Contractor shall install and maintain temporary environmental controls to prevent, control, and abate erosion, water pollution, dust, noise, or other nuisances in accordance with the "Environmental Controls" section.

4.2 Products

4.2.1 Select Backfill

Select backfill material shall be required for all trenches within improved areas (as defined herein) where the City will own and maintain the buried utility. See the City's "Pipe Trench and Asphalt Patch within Public R/W and All Improved Areas" detail for the exact backfill requirements over the trench section.

Select backfill material shall be a select granular material free from organic matter and of such size and gradation that desired compaction can be readily attained. The intent is to provide non-plastic soils meeting the requirements for AASHTO A-1-a, A-1-b, A-3 and some A-2-4. When tested in accordance with the latest ASTM D422, it shall conform to the following requirements:

- a. Maximum size not to exceed 3 inches.

- b. At least 95 percent, by dry weight, shall pass a 1½-inch sieve and not more than 25 percent shall pass a No. 200 sieve.

When tested in accordance with the latest ASTM D4318, it shall conform to the following requirements:

- a. Liquid Limit shall be less than 30.
- b. Plasticity Index shall be less than 10.

Material may be clean natural sand or gravel, imported quarry waste, select excavation, or a mixture thereof. Soil reports shall be submitted 10 days in advance of intended use for approval by the City.

4.2.2 Suitable Backfill

Suitable backfill material is permissible for use in trenches in unimproved areas (as defined herein) or in improved areas subject to the requirements of the City's standard "Pipe Trench and Asphalt Patch within Public R/W and All Improved Areas" detail and these specifications.

Suitable material shall be material obtained from the Contractor's excavations and shall be limited to select sand and plastic material in accordance with FDOT Index 505. All backfill materials shall have a maximum liquid limit of 50 and shall be free of debris, deleterious materials, organic material, and expansive soils and shall contain no material larger than 4-inches. Under no conditions are destroyed pavement materials, curbs, broken concrete, etc., to be included in the backfill.

4.2.3 Gravel Base for Structures

Gravel base shall be clean, washed, well-graded rounded gravel or crushed rock of 1½-inch maximum size and ½-inch minimum size. No gravel base material shall be used unless the Engineer has reviewed it. For all coarse aggregate bedding installations, the aggregate shall be completely encapsulated in geotextile filter fabric such as TenCate Marafi N-Series or approved equal prior to setting the proposed structure.

4.2.4 Bedding for Pipe and Manholes

Bedding material shall be ¾-inch nominal size coarse aggregate. When tested in accordance with the latest ASTM D422, it shall conform to the following gradation requirements:

Gradation	% Passing
Passing 1-inch sieve	100%
Passing ¾-inch sieve	90 - 100%
Passing ⅜-inch sieve	20 - 55%
Passing No. 4 Sieve	0 - 10%

Bedding material shall be used if, in the opinion of the City, the condition of the trench bottom is such that proper support of the pipe or manhole being installed cannot be achieved. Material shall be free from soft, laminated, and thin pieces. Limestone from the Brooksville formation may be permitted at the Contractor's option if material furnished substantially meets requirements set forth.

Bedding material for all PVC pipe shall be free from any rock, stone, gravel, or crushed concrete larger than ¾-inch for a distance of 12 inches from the pipe. Materials shall be subject to approval by the City.

4.2.5 Clearing and Grubbing

Except for those areas which are designated to remain undisturbed or protected, remove vegetation such as trees, shrubs, grass, and roots which interferes with construction. If it becomes necessary to remove any vegetation that has been designated to remain undisturbed or protected to accomplish the work, the additional restoration requirements shall be determined by the City. Restore all areas within the limits of construction that are disturbed during construction with sod, unless indicated otherwise.

4.2.6 Pavement and Sidewalk Removal and Replacement

Pavement that is to be removed for open-cut trenching shall be cut vertically with a power-driven friction saw prior to removal. The surface shall be scored to sufficient depth to provide uniform, straight break lines. All removal of pavement shall conform to local, County, State or Federal requirements where applicable. Under no condition shall pavement be cut with a trenching machine, power shovel or backhoe. Width of cut of pavement or sidewalk shall be 2-foot wider than top of trench, one foot on each side of trench. In the event that trench excavation becomes wider than initial cut, pavement or sidewalk shall be re-cut to at least one foot back from all edges of actual excavation by the Contractor at his own expense.

Pavement, driveway or sidewalk material shall be separated from other excavated materials and shall not be placed in backfill, but shall be satisfactorily disposed of by the Contractor. Base materials shall be subject to the review of the Engineer.

Where trenches will be in paved streets, temporary patching of asphalt will be required for the entire time between pavement removal and final repaving. **Temporary asphalt patches shall be installed within 36-hours of pavement removal**, unless otherwise indicated by the City or roadway jurisdictional agency.

“Street Closed to Through Traffic” signs and “Detour” routes shall be indicated and maintained by the Contractor when job is located in a public street or way. Signing shall be provided in accordance with OSHA regulations, State of Florida Manual of Traffic Control, and approved Maintenance of Traffic plan.

Replace all pavement in accordance with the minimum standards established by the City of Tallahassee Public Works Department Flexible Pavement Design, current edition, or as required by the jurisdictional agency. Replace all side walk with base and surface materials conforming as closely as possible in thickness and quality to materials removed.

All street markings and other traffic control devices shall be restored to former conditions. Use safety Coatings Co. Roadrunner Traffic marking paint and Ferro Co. glass spheres or approved equal. Pavement with traffic control devices and sidewalks shall be replaced as soon as practicable after compaction of backfill.

Workmanship and materials shall be in accordance with best standard practice for work of this type, and shall conform to the requirements of the latest issue of the FDOT Road and Bridge Manual.

Pipe crossings and installations along all State highways shall be made in accordance with details shown on the Plans and in full compliance with State Department of Transportation requirements. All materials and workmanship shall conform to Florida DOT specifications.

All necessary barricades, detours, lights and other protective measures shall be provided for protection of both pedestrians and vehicular traffic and shall conform to Florida DOT specifications. Final cleanup along State rights-of-way and inspection of repaired sections of State pavement shall be subject to the approval of the local maintenance engineer for the Florida DOT.

4.2.7 Curb and Gutter Removal and Replacement

Curb or curb and gutter removal, where required in construction of this work, shall be held to a minimum. Curb and gutter material to be removed shall be carefully separated from trench excavation material and shall be satisfactorily disposed of by the Contractor.

The Contractor shall replace all curb or curb and gutter, which has been removed. Curb or curb and gutter shall be replaced as soon as possible after backfill is placed and compacted and shall be a duplicate in all respects to original construction. Workmanship shall be in accordance with the controlling agency (City, County, and State).

4.2.8 Restoration of Roadway Crossings and Driveway Crossings

Clay, marl, shell or similar roadways and driveways that are crossed or traversed by trenches shall be restored to existing conditions prior to the end of the work day. The Contractor may reclaim existing material, if salvable, or they may furnish and install new material. There will be no additional compensation for this type of restoration unless specifically called for in the Special Provisions or on the Bid Proposal.

Pavement on paved roadway crossings is to be cut and removed or milled back according to the Standard Construction Details in the Appendix and as specified in this Technical Specification.

All street markings, signal loops, and signage are to be in place 7 days after final paving is complete.

4.2.9 Excavation

Perform all excavation of every description and of whatever substance encountered to alignment and depth that will result in construction of pipeline to the alignment and grade or depth of cover shown on the Plans.

All excavated material retained for backfill shall be piled in a manner so as not to endanger the work or obstruct sidewalks, driveways or drainage. Fire hydrants, valve vault and manhole covers and valve boxes, curb stop boxes, fire and police call boxes and other utility controls shall be unobstructed and accessible at all times during construction.

4.2.9.1 Common Excavation

Machine excavation shall be carried to a depth above final pipeline grade that will allow final grading as indicated on the Plans. Care shall be taken to not excavate below required depth. If excavation is carried below required depth, over cut depth shall be backfilled with select material furnished at Contractor's expense and compacted to provide pipe support at least equal to that of original material.

Contractor may, at his option, choose to over-cut trench and backfill. If Contractor so chooses, depth of over cut shall be such that a minimum of 6-inches of compacted backfill or bedding material will result under lowest projection of pipe bell. No additional payment will be made for this over-cut or for furnishing and placing of the required backfill material.

The Contractor shall exercise sound construction practices in excavating and maintaining the trench so no damage will occur to any foundation structure, pole line, pipeline or other facility because of sloughing of slopes or from any other cause. If, as a result of excavation, there is a disturbance of ground that endangers other property, the Contractor shall immediately take remedial action at his own expense. No act of the City or his representatives shall in any way affect liability of the Contractor for damages, expenses or costs that may result from trench excavation.

Trees, stumps and roots within limits of trench excavation shall be removed to a depth of at least 12-inches below bottom of trench. Stump and root holes shall be refilled to existing grade and compacted. No stumps, roots or organic matter of any description shall remain under concrete slabs or footings.

4.2.9.2 Trench Requirements

Trenches for gravity sewers shall be of such depth that the invert of pipe will be at elevations shown on the Plans, or as may be determined by the Engineer. Trench sides from bottom to 24-inches above top of pipe shall be as vertical as soil conditions will permit and shall have a width in accordance with the Standard Construction Details.

The trench shall be dry when the bottom is prepared. A continuous trough shall be excavated by hand to receive the bottom 120-degrees of the pipe barrel. In addition, bell holes shall be excavated so that only the barrel of the pipe receives bearing pressure from, and is uniformly supported by the bottom of trench. Preparation of trench bottom and placement of pipe shall be such that final position of pipe is true to line and grade and uniformly supported throughout barrel of each pipe length. When pipe is placed in select backfill over rock or other over depth, additional backfill of same material shall be tamped on each side of barrel to height of spring line, thus forming a trough of firm, compacted bedding.

The minimum pipe laying condition for all pipe construction shall be as shown on Standard Construction Details. Where the trench bottom will not assure proper line, grade or pipe support, and where materials exposed at the trench bottom may damage the pipe or impair its long-term operation, the Contractor will use a coarse aggregate bedding, as defined above. When coarse aggregate bedding is used, the bedding shall

be completely encapsulated in geotextile filter fabric such as TenCate Marafi N-Series or approved equal prior to installing the pipe.

4.3 Execution

4.3.1 Unsuitable Material

Unsuitable materials are soils exposed at the trench bottom or obtained from the Contractor's excavations that are compressible, subject to liquefaction (liquid limit greater than 50), expansive, contain extraneous rubble, offer uneven foundation support, or have natural moisture content three percent (or greater) in excess of its optimum moisture content. Unsuitable materials/soils will include, but not be limited to mulch, peat, expansive clays, boulders, soils in a quick condition, rubble, any portion of trees or similar vegetation, wood, or unyielding material such as rock.

The Contractor shall notify the Engineer immediately when unsuitable material is encountered. The Engineer will investigate questionable material to determine its suitability. Should the Engineer require soils testing be performed to aid in his determination, then tests revealing suitable materials shall be paid for by the Contractor.

Where the Engineer determines that unsuitable material is present below the pipe envelope which will not provide adequate support the contractor shall remove the unsuitable material as directed by the Engineer and replace the unsuitable material with 6 inches minimum of select backfill up to the bottom of the pipe envelope.

4.3.2 Placing Backfill

Contractor shall not perform any backfilling operation other than that necessary to hold pipe in place until the locations of connections and appurtenances have been recorded on the "as-built" drawings and the line has been inspected and released for backfilling.

4.3.2.1 Haunching

After pipe has been properly installed and inspected, select backfill shall be carefully placed and compacted around the pipe up to spring line of pipe. Backfill material shall be carefully placed in loose horizontal layers not exceeding 6-inches in loose depth, and equally on both sides of pipe, and shall be spaded, "walked in" and compacted to obtain a minimum density of 90% of maximum density as determined by ASTM D698 (Standard Proctor Density), except for depths 10-feet or less, where the minimum density allowed shall be 95% of maximum density. When one layer is completed on both sides of the pipe, a second layer shall be started. Backfill materials shall not be obtained from trench walls.

4.3.2.2 Pipe Envelope

After haunching has been properly compacted and inspected, select backfill shall be carefully placed around pipe and over pipe to the depth, as shown in the Standard Construction Details, in order to comply with the pipe envelope requirements. Backfill material shall be carefully placed in horizontal layers not exceeding 12-inches in loose depth and compacted to obtain a minimum density of 90% of maximum density as determined by ASTM D698 (Standard Proctor Density), except for depths 10-feet or less, where the minimum density allowed shall be 95% of maximum density. Backfill material shall not be obtained from trench walls.

4.3.2.3 Subsequent Backfill

Above the level of initial backfill, the trench shall be filled with material placed in accordance with one of the following three classifications: FDOT, Leon County, and all other situations. In improved areas, or areas proposed to be improved, the utility trench shall be backfilled as shown in the City's "Pipe Trench and Asphalt Patch Within Public R/W and All Improved Areas" detail. Material between the bottom of the base layer and a depth 4 feet beneath the bottom of the base layer shall be **select backfill only**. Suitable backfill (as defined in Section 4.2.2) can be placed beginning at a depth of four feet below the bottom of the base layer extending to a depth of 1 foot over the top of the pipe. The pipe envelope shall be **select fill only**. The surface of the trench shall be prepared to receive sub base and base construction.

The compaction of fill material for utility trenches under improved areas shall be 100% of density, as measured by Standard Proctor.

In unimproved areas, and areas not proposed to be improved, the excavated topsoil shall be used last in the backfill, and the surface of the trench restored to its original elevation and condition.

The compaction of fill material for utility trenches under unimproved areas shall be 95% of density, as measured by Standard Proctor, within the pipe envelope. The compaction of fill material for the remainder of trench shall be compacted to firmness approximately equal to that of the soil adjacent to the pipe trench.

4.3.2.4 Backfill for Structures

Backfill for structures shall be compacted select sand backfill as specified above for a minimum distance of 10 feet from outside wall of structure or to undisturbed excavation wall if nearer.

4.3.2.5 Compaction by Flooding

The Contractor may elect to compact granular backfill materials above level of initial backfill by flooding provided he has secured prior approval from the Engineer for each location. When compaction by flooding is to be done, backfill material shall be coarse grained gravel, gravel-sand or sand, free of clay, having not more than five percent by weight which passes a No. 100 U.S. standard sieve and no material which passes a No. 200 U.S. standard sieve. In addition, the character of soil through which trench passes shall be clay-gravel or gravel-sand-silt mixtures which possess permeability sufficient to result in flooding water being drained away in a reasonable time (not to exceed three days). All tests required to determine if backfill material or soil adjacent to trench is suitable for compaction by flooding shall be the sole responsibility of the Contractor.

4.3.3 Testing

In addition to compaction testing required below, compaction tests may be made at locations as selected by the Engineer. The City will pay for tests revealing satisfactory compaction. The Contractor shall pay for tests revealing unsatisfactory compaction. Where unsatisfactory compaction is revealed by tests, the Contractor shall re-excavate, backfill, and re-compact as required to obtain required degree of compaction over entire depth of trench. The Engineer shall determine the limits of unsatisfactory backfill.

Testing schedule for utility pipeline construction shall be as required in other sections, and as specified in Table 4.2.

Backfill and Compaction Density Test Location	Method of Test	No. of Tests Required
Laboratory	AASHTO T99, ASTM-D698	1 for each type of soil used
Along Linear Utility (<i>in situ</i>)	AASHTO T147, T191, T204, or T205	1 per each 12-inches depth per 150 l.f. of utility
Around Structure (<i>in situ</i>)	AASHTO T147, T191, T204, or T205	1 per each 12-inches depth of structures
At services	AASHTO T147, T191, T204, or T205	1 for each 12-inch depth of 25% of the under pavement (at a minimum)

4.3.4 Disposal of Surplus Material

4.3.4.1 Unsalvable material

Excess excavated material; the Contractor shall dispose of unsalvable material and debris in a legal manner. If the Plans do not indicate a disposal area, then disposal areas shall be selected by the Contractor and submitted for approval to the Engineer.

4.3.4.2 Salvable material

All material to be removed or salvaged shall be inspected by the City or his representative immediately prior to removal. The City's decision as to salvability will be final. Such material that is, in the opinion of the City or his representative, salvable shall be removed and stored by the Contractor within the site area as and where directed by the Engineer. Under no circumstances may existing structures, plant or facilities be removed from site area or demolished without obtaining approval from the City or his representative.

4.3.5 Cleanup and Restoration

4.3.5.1 General

Cleanup is an essential part of the work. As the work progresses and is completed, the Contractor shall clean site of all signs of operation. This cleanup shall be done as promptly as practicable and shall not be left until the end of construction period. No part of the work shall be considered complete and no payment will be made until cleanup is completed. The running end of the pipe will not advance more than 700 feet beyond cleanup within City and public right-of-way (does not apply to developer property). In addition to the 700-foot requirement, all areas disturbed over 30 days shall be cleaned up. Final pavement shall commence no later than 30 days after pavement removal over any portion of the utilities installed. Failure to meet this requirement is reason to stop the job.

Included in cleanup is protection of road shoulders, ditch banks, and other natural or artificial slopes subject to rapid erosion. Except where soil-cement riprap is shown, this protection shall be by grassing and mulching. A satisfactory stand of grass shall be obtained by sprigging, sodding or seeding over entire work site. Seeding under direct supervision of a qualified nurseryman may, subject to approval by the Engineer, be substituted for sprigging or sodding in areas not specifically shown to be completely sodded.

4.3.5.2 Sprigging

Apply 4-8-4 fertilizer at the rate of 600 pounds per acre by means of mechanical spreaders to area to be sprigged. Live sprigs, which match existing grass, with roots uninjured, shall be immediately planted in rows. Distance between rows and between plants in rows shall not exceed one foot. After planting, the entire area shall be compacted lightly by means of culti-packers, tractors or rollers. After sprigging, Contractor shall water sprigs as required until Contract is complete and accepted by the City. Sod shall be watered as specified for sprigging. Water shall be provided by Contractor at his expense and whenever necessary to assure sustained growth and vitality.

4.3.5.3 Sodding

Sod shall be placed solidly in areas shown on Drawings.

Immediately before sod is placed, 4-8-4 fertilizer shall be applied at a rate of 600 pounds per acre by mechanical spreaders or broadcasting and raking.

Sod shall be watered as specified for sprigging. Water shall be provided by Contractor at his expense and whenever necessary to assure sustained growth and vitality.

For contracts that consist of greater than 5,000 S.F., Contractor will be required to install temporary irrigation system.

4.3.5.4 Seeding

All areas to be seeded shall be fertilized with 12-8-8 NPK dry fertilizer at the rate of 800 to 1,000 pounds per acre and thoroughly worked into the soil. Grass seed shall be a mixture of 20 parts of Bermuda and 80 parts of Pensacola Bahia seed, applied with mechanical distributors at the rate of 100 pounds per acre. During the months from October to January, the grass seed mixture shall be 50 parts winter rye and 50 parts Pensacola Bahia seed. All seed and fertilizer used shall meet the requirements of the State Department of Agriculture and all applicable State laws.

The Contractor shall maintain adequate moisture and provide such care as is necessary in seeded areas to ensure an adequate growth of grass. All areas and spots that do not show a prompt growth shall be replanted at intervals of 20 days. Such water and replanting shall continue until a good growth of grass is established over the entire construction area. Sod shall be watered as specified for sprigging. Water shall be provided by Contractor at his expense and whenever necessary to assure sustained growth and vitality.

Prevention and repair of erosion in construction areas and such replanting as necessary to repair damage to seeded or grassed areas shall be the responsibility of the Contractor until final acceptance of the Project by the City.

Seeded areas shall be uniformly mulched in a continuous blanket immediately following seeding and compacting operations, using at least 1½ tons of hay or straw per acre. Hay with noxious seeds or plants will not be acceptable. Rotted, brittle, molded hay will not be accepted. It is intended that mulch shall allow some sunlight to penetrate and air to circulate, at the same time shading the ground, reducing erosion and conserving soil moisture. Thickness of covering shall be adequate to hold soil, but sufficiently loose and open to favor development of grass. Immediately following spreading of mulch, material shall be anchored to soil by means of a seed drill, dish harrow set to cut only slightly, or other suitable equipment which will secure mulch firmly and prevent loss or bunching by wind or rain, or may be anchored with string lines placed at sufficient intervals. On slopes where machinery cannot be used, mulch may be retained in place by hand spading, string lines, or nonmetallic open weave fabric. Unless rain is imminent, mulched areas shall be watered immediately after placing. Upon completion, surface or mulched areas shall be free from clods of earth, bumps, or water holding pockets and to required grades.

4.3.5.5 Hydro-Seeding

Under this method, the seed and fertilizer, and mulch when required, shall be distributed over the area to be seeded as slurry composed of water, seed and fertilizer, and including mulch material. The types of seed and fertilizer and the requirements for seed, fertilizer, and water as specified shall apply to this work.

The equipment for mixing the slurry and for applying the slurry over the areas to be seeded shall be capable of applying uniform slurry over the entire area and shall meet the approval of the Engineer.

The mulch material shall be included in the slurry mixture and shall be applied at the rate of 1,000 pounds of mulch material per acre. Mulch material shall consist of wood cellulose fiber material especially prepared for this purpose. It shall be prepared in such a manner that it will contain no growth-inhibiting or germination-inhibiting factors and shall be dyed an appropriate color for readily determining the rate of spread by visual observation. The slurry shall be uniform and homogeneous forming a blotter like ground cover, impregnated uniformly with grassed seed, allowing the absorption of water and permitting rainfall and watering to percolate to the undersoil. Mulch material, other than wood cellulose fiber material (i.e., jute, cotton, netting and

chemical adhesive soil stabilizers) shall be used when specified or approved by the Engineer.

The Contractor shall, at his expense, maintain the grassed areas in a satisfactory condition until final acceptance of the work.

END OF SECTION 4

5.1 General

5.1.1 Scope of Work

The Contractor shall furnish and install underground pressure mains using the horizontal directional drilling (HDD) method of installation, also commonly referred to as directional boring. This Work shall include all drilling equipment, materials, piping, appurtenances, and labor for the complete and proper installation, testing, and placing into service of pressurized mains; and all required environmental protection and restoration requirements.

The Contractor shall provide all materials for completing the installation and for adequate protection of the work.

5.1.2 Quality Assurance

The directional drilling Contractor or Subcontractor shall have a minimum of 4-years of experience constructing and installing water, wastewater, or reclaimed water pressure mains of similar diameter and similar lengths.

The equipment used in directional boring, also known as horizontal directional drilling, shall be of adequate commercial size and satisfactory working condition for safe operation, and may be subject to approval by the City or State at the discretion of the Engineer. Such approval, however, shall not relieve the Contractor of the responsibility for making a satisfactory installation meeting the criteria set forth herein. Only workmen experienced in directional boring operations shall be used in performing the Work.

Entry and exit points shall be as shown on the drawings, unless otherwise approved in writing by the Engineer. The Contractor shall employ licensed, professional land surveyors to locate the entry and exit points, and to establish horizontal and vertical datum for the bore and the pipe layout and fabrication areas.

Further, the Contractor's Survey Professional shall clearly mark the horizontal limits of construction such as right of way limits, easement limits, etc. It shall be the sole responsibility of the contractor to install the proposed pipe within the limits of construction. Any pipe installed outside the construction limits shall be removed at the contractor's sole expense.

The Directional Boring operation is to be operated in a manner to eliminate the discharge of water, drilling mud, and cuttings to any nearby water bodies, or to the land areas involved during the construction process. If inadvertent spills to nearby water bodies occur, the Contractor shall immediately provide environmental controls and clean up to the satisfaction of, and at no additional expense to the Owner.

Best Management Practices (BMP's) for erosion control within the Contractor's work area shall be implemented and maintained at all times during drilling and back-reaming operations to prevent siltation and turbid discharges in excess of State Water quality Standards pursuant to Rule 62-302, F.A.C. Methods shall include, but are not limited to the immediate placement of turbidity containment devices such as turbidity screen, silt containment fence, hay bales, and earthen berms, etc. to contain the drilling mud.

All pipe and appurtenances of similar type and material shall be furnished by a single manufacturer.

The Contractor's operations shall be in conformance with the Directional Crossing Contractors Association (DCCA) published guidelines (latest edition) and pipe manufacturer's guidelines and recommendations.

5.1.3 Submittals

The Contractor shall provide the following submittals to the City for review and acceptance prior to construction:

- Work plan
- Pipe materials
- Pipe joining
- Fittings and adapters
- Directional drilling equipment and materials specifications

Prior to beginning Work, the Contractor must submit a work plan to the City detailing the procedure and schedule to be used to complete the work. The work plan should include, at a minimum, the following information:

- A description of all equipment to be used
- Down-hole tools
- A list of personnel and their qualifications and experience
- List of Subcontractors
- A schedule of work activity
- A safety plan and traffic control plan (if applicable)
- An environmental protection/materials management plan
- A contingency plan for possible problems

The Contractor will also submit specifications on directional drilling equipment to be used to ensure that the equipment will be adequate to complete the work. Equipment submittals shall include, but not be limited to the following information:

- Drilling rig
- Mud system
- Mud motors (if applicable)
- Down-hole tools
- Guidance system
- Calibration records
- Rig safety systems

If the Contractor is planning on deviating from bid document HDD Profile, then the Contractor is required to submit additional drawings with the new HDD Profile for the Engineer's approval. The Contractor shall also submit calculations to show that the Contractor's proposed method and profile of installing the HDPE pipe is within the allowable tensile force of the pipe. The maximum tensile force shall be calculated with a 1.5 safety factor. If required to maintain the 1.5 safety factor, the Contractor shall submit plans on ballasting the HDPE pipe by filling it with water prior to install to reduce tensile force.

The Contractor shall provide details on measures to be taken to monitor and protect adjacent utilities, structures, and roadways, and provide details on monitoring equipment and provisions, including the layout of settlement points, and other monitoring points.

5.2 Products

5.2.1 General

Provide the following equipment and materials for the horizontal directional drilling installation of pressure mains:

- A directional drilling rig of sufficient capacity to perform the bore and pullback operations
- A drilling fluid mixing, delivery, and recovery system of sufficient capacity to complete the crossing
- A drilling fluid recycling system to remove solids from the drilling fluid so that the fluid can be reused
- A magnetic guidance system to accurately guide boring operations
- A vacuum truck of sufficient capacity to handle the drilling fluid volume
- Trained and competent personnel shall operate the system
- Miscellaneous equipment and materials required to complete the installation in accordance with the plans and permit requirements

All equipment shall be in good, safe operating condition with sufficient supplies, materials, and spare parts on hand to maintain the system in proper working order throughout the drilling and pressure main installation.

5.2.2 Drilling System

The directional drilling machine shall consist of a hydraulically powered system to rotate, push, and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The machine shall be anchored to the ground to withstand the pulling, pushing, and rotating pressure required to complete the crossing. The hydraulic power system shall be self-contained with sufficient pressure and volume to power drilling operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pullback pressure during pullback operations. The rig shall be grounded during drilling and pullback operations. There shall be a system to detect electrical current from the drilling string and an audible alarm that automatically sounds when an electrical current is detected.

5.2.3 Pressure Mains

Pipe shall be fusible HDPE pipe with ductile iron pipe size (DIPS) outside diameters (OD) in accordance with AWWA C906. The dimension ratio (DR) of the pipe shall be based on the pipe material, joint type, drilling rig specifications, and in-situ conditions, and shall be suitable to withstand the pull-back forces required for the directional drilling without any permanent deformation in the pipe section or strength. The pull-back forces and pipe wall thickness shall be verified by the Contractor prior to submitting bid proposal.

In no case shall the pipe wall thickness be less than those required in other specification sections for operating pressure. For 4-inch and greater HDPE pipe (AWWA C906), the maximum dimension ratio (minimum wall thickness) shall be DR11.

Fusible HDPE pipe for horizontal directional drilling applications shall be joined by means of zero leak-rate thermal heat butt-fusion welds. Joints shall provide axial pullout resistance. The bending radius pressure main shall not exceed 80 percent (0.80 X) of the manufacturer's recommended maximum bending radius for the size and type of pipe.

Pipe for potable water applications shall be NSF Approved.

5.2.4 Tracer Wire

The tracer wire shall be a direct burial #10 AWG high-strength copper-clad steel with a 30 mil high-density polyethylene coating on the outside for protection. The tracer wire shall be rated for 30 volts and meet APWA color coding requirements for the utility application. Approved products include Copperhead Industries, LLC - #10 AWG HS-CCS Tracer Wire; Pro-Line Safety Products - #10 AWG Pro-Trace HF-CCS Tracer Wire; or approved equal.

5.2.5 Drilling Fluids

Drilling fluids shall consist of a mixture of potable water and gel-forming colloidal material, such as bentonite or a polymer surfactant mixture producing slurry of custard-like consistency.

5.3 EXECUTION

5.3.1 Personnel Requirements

Responsible representatives of the Contractor and Subcontractor(s) shall be present at all times during directional drilling operations. A responsible representative as specified herein is defined as a person experienced in the type of work being performed and who has the authority to represent the Contractor in a routine decision making capacity concerning the manner and method of carrying out the Work.

The Contractor and Subcontractor(s) shall have sufficient number of competent workers on the Project at all times to ensure the utility placement is made in a timely, satisfactory manner. Adequate personnel for carrying out all phases of the directional drilling operation (where applicable: tunneling system operators, operator for removing spoil material, and laborers as necessary for various related tasks) must be on the job site at the beginning of Work. A competent and experienced supervisor representing the Contractor or Subcontractor that is thoroughly familiar with the equipment and type of work to be performed, must be in direct charge and control of the operation at all times. In all cases, the supervisor must be continually present at the project site during the directional drilling operation.

5.3.2 Work Plan

Work plan should be comprehensive, realistic, and based on actual working conditions for the particular project. Plan should document the requirements to complete the project.

Calibration records for guidance equipment shall be included. Specifications for any drilling fluid additives that the Contractor intends to use or might use shall be submitted.

5.3.3 Coordination of the Work

The Contractor shall notify the City at least 3-days in advance of starting Work. In addition, the actual crossing operation shall not begin until the City is present at the project site and agrees that proper preparations have been made. The City's approval for beginning shall in no way relieve the Contractor from the ultimate responsibility for the completion of the Work.

The Contractor and the City shall select a mutually convenient time for the crossing operation to begin to avoid schedule conflicts.

5.3.4 Procedure

The installation of appropriate safety and warning devices in accordance with the "FDOT Manual on Traffic Control and Safe Practices" shall be completed prior to beginning Work.

5.3.5 Installation

Erosion and sedimentation control measures and on-site containers shall be installed to prevent drilling mud from spilling out of entry and/or exit pits. Drilling mud shall be disposed of off-site in accordance with local, state, and federal requirements and/or permit conditions.

No other chemicals or polymer surfactant shall be used in the drilling fluid without written consent of the City and after a determination is made that the chemicals to be added are not harmful or corrosive to the facility and are environmentally safe.

Pilot Hole: Pilot hole shall be drilled on bore path with no deviations greater than 2% of depth over a length of 100-feet. In the event that pilot does deviate from bore path more than 2% of depth in 100-feet, the Contractor shall notify the City. The City may require the Contractor to pullback and re-drill from the location along bore path before the deviation.

Reaming: Upon successful completion of pilot hole, the Contractor will ream borehole to a minimum of 25% greater than outside diameter of pipe using the appropriate tools. Contractor will not attempt to ream at one time more than the drilling equipment and mud system are designed to safely handle.

Pullback: After successfully reaming borehole to the required diameter, Contractor shall put the pipe through the borehole. In front of the pipe shall be a swivel and barrel reamer to compact bore-hole walls. Once pullback operations have commenced, operations must continue without interruption until pipe is completely pulled into borehole. During pullback operations, the Contractor shall not apply more than the maximum safe pipe pull pressure at any time. A break away head rated at the maximum safe pull pressure shall be utilized.

During pullback, drilling fluid pressures and flow rates shall be continuously monitored and recorded by the Contractor. The pressures shall be monitored at the pump and within the

annular space with a down hole pressure- sensing tool located within thirty (30) feet of the drilling head.

Tracer Wire: A minimum of three continuous tracer wires shall be attached with nylon wire (“zip”) ties at different radial locations around the pipe to ensure continuity in at least one wire subsequent to installation. Contractor shall be required to provide as many wires as necessary to maintain continuity throughout the length of the directional bore. Splices along the length of the bore shall be permitted only in the event of a break in the tracer wire during installation. In such event, the wire shall be joined using a proper sized swage crimp on stripped bare wire ends with a double heat-shrink wrap.

As-built variance from the designed bore path shall not exceed \pm (plus or minus) 1-foot in the vertical plane and \pm 2-feet in the horizontal plane. The Contractor shall submit any proposed deviations from the design bore path with Shop Drawings.

The pipe entry area shall be graded to provide support for the pipe to allow free movement into the borehole. The pipe shall be guided in the borehole to avoid deformation of, or damage to, the pipe.

Surface settlement or heave of utilities and other features above the HDD centerlines and within the zone influenced by the HDD construction shall be limited in values that avoid damage. The Contractor shall repair any damage resulting from settlement or heave caused by HDD activities at no additional cost to the Owner.

If unexpected subsurface conditions are encountered during the bore, the procedure shall be stopped. The installation shall not continue until the City has been consulted.

The pipe shall be pulled back through the borehole using the wet insertion construction technique. The pipe shall be installed full of water.

The pipe shall be installed in a manner that does not cause upheaval, settlement, cracking, movement or distortion of surface features.

A boring log shall be kept with horizontal and vertical location every 10-feet prior to over ream and product pipe pullback. The horizontal location of the bore shall be marked in the field during the bore. The Surveyor shall locate these marks and include this information with the bore depths in the Record Drawings. The Surveyor may make a note on the drawing page containing the directional drill and provide an exception for the directional drill only, as the directional drill route cannot be uncovered and physically located.

The pipe shall be installed at a depth of no more than 15-feet below pavement, as measured from the top of pipe.

The contractor shall be considered as having completed the requirements of any directional boring when he has successfully completed the work and tested the pipe to the satisfaction of the Engineer.

At the completion of construction, the Contractor shall remove all temporary facilities installed by the Contractor. Unused soil, aggregate, and other materials shall be removed and disposed of at approved sites in accordance with all Federal, State, and Local regulations. Any damage to streets, lawns, common areas, and sidewalks shall be restored to original or better conditions. All disturbed areas shall be re-vegetated.

5.3.6 Field Testing

5.3.6.1 HDPE Pipe

Perform hydrostatic testing for leakage following installation of the directional drill.

The total test duration (time), including initial pressurization, initial expansion, and time at test pressure must not exceed 8-hours. If the test is not completed due to leakage, equipment failure, etc., the test section shall be depressurized and allowed to "relax" for a minimum of 8-hours before it is brought back up to test pressure. The test procedure consists of the initial expansion phase and leakage test phase.

The test pressure for all pressure pipe shall be 150-psi.

Initial Expansion Phase: During the initial expansion phase, the test section is pressurized to the test pressure and enough make-up liquid is added each hour for 3-hours to return to test pressure.

Leakage Test Phase: The leakage test phase follows immediately and shall be either 2 or 3-hours in duration. At the end of the time test, the test section shall be returned to test pressure by adding a measured amount of liquid. The amount of make-up liquid added shall not exceed the values provided in Table 5.1.

Table 5.1 - Allowance for Make-up Water Under Pressure*								
Test Duration (hours)	2	4	6	8	12	16	20	24
	Allowance/100-feet of Pipeline (gallons)							
2	0.11	0.25	0.60	1.00	2.30	3.30	5.50	8.90
3	0.19	0.40	0.90	1.50	3.40	5.50	8.00	13.30
*Applies to test period and not to initial expansion phase								

Mandrel Testing: Perform mandrel testing through the entire length of the installed pipe. The mandrel size shall be 90% of the inside diameter of the pipe.

END OF SECTION 5

6.1 General

6.1.1 Scope of Work

Supply all labor, equipment, materials, and incidentals necessary to install casing pipe by the method of jacking and boring at the location(s) shown on the Plans and as specified herein.

This work shall include jack and bore equipment, excavating, sheeting, steel casing pipe, welding, casing spacers, end seals, coatings, location signs (as required), miscellaneous appurtenances, incidentals, and site restoration. Perform jacking and boring operations within the limits of the rights-of-way and/or easements shown on the Plans.

6.1.2 Submittals

Submit shop drawings to the Engineer for review showing a sketch of the jacking pit locations, proposed methods for installation, and material specifications for the casing pipe, casing spacers, end seals, and other miscellaneous appurtenances.

6.1.3 Quality Assurance

Steel casing pipe shall conform to ASTM Standards. All field and shop welds shall conform to American Welding Society Standard Specifications. Carrier pipes shall conform to the requirements of the applicable City of Tallahassee specifications.

Casing pipe to be installed may be inspected for compliance with these specifications by an independent laboratory selected and paid for by the City. The Contractor's and manufacturer's cooperation shall be required in these inspections.

For jack and bore casing installations under CSX, FDOT, or Leon County rights-of-way, comply with the specifications and/or permit requirements of that agency with jurisdiction.

6.2 Products

6.2.1 Steel Casing Pipe

Steel casings shall conform to the requirements of ASTM Designation A139 (straight seam pipe only) Grade "B" with minimum yield strength of 35,000 psi. Field and shop welds of the casing pipes shall conform to the American Welding Society (AWS) standard specifications. Field welds shall be complete penetration, single-bevel or single-vee groove type joints. Welds shall be leak-proof, airtight, and continuous over the entire circumference of the pipe and shall not increase the outside pipe diameter by more than 3/4-inch. The finished steel casing shall be

capable of withstanding the overburden and live loads as required by the jurisdictional agency for the application.

In CSX Railroad rights-of-way, where the carrier pipe is greater than 6-inches in diameter, the casing pipe inside diameter must be at least 4-inches larger than the maximum outside diameter of the carrier pipe, including the pipe bell.

In FDOT, Leon County, or City of Tallahassee rights-of-way, the casing pipe inside diameter must be at least 6-inches larger than the maximum outside diameter of the carrier pipe, including the pipe bell. The casing pipes shall have the minimum inside diameter and wall thickness as shown in Table 6.1.

Carrier Pipe Nominal Diameter (in.)	Roadway Crossing		CSX Railroad Crossing	
	Casing Pipe Minimum Inside Diameter (in.)	Casing Pipe Minimum Wall Thickness (in.)	Casing Pipe Minimum Inside Diameter (in.)	Casing Pipe Minimum Wall Thickness (in.)
6	16	.281	14	.250
8	18	.312	16	.281
10	20	.344	18	.312
12	22	.344	20	.344
14	24	.375	22	.344
16	28	.438	24	.375
18	30	.469	28	.438
20	32	.500	30	.469
24	36	.532	36	.532
30	42	.625	42	.625
36	48	.688	48	.688
42	56	.812	56	.812

*The table above is for "Fastite" or "Tyton" push-on type joint ductile iron pipe. For alternative carrier pipe materials, joint types, and sizes, verify the carrier pipe maximum outside diameter and the steel casing pipe minimum inside diameter and wall thickness.

6.2.2 Carrier Pipe

All pressurized carrier pipes for jack and bore installations shall be restrained joint ductile iron pipe, and shall be lined and coated in accordance with the technical specifications for the pipeline application. Gravity sewers with bore lengths less than 60 feet can be DR26 PVC sewer

pipe. Gravity sewers 60 feet or greater in length must be restrained joint ductile iron pipe, lined for sanitary sewer application.

6.2.3 Casing Spacers

Carrier pipes, inside of steel casing pipe, shall be supported by casing spacers. Casing spacers shall be bolt-on style split-shells manufactured from 14-gauge (minimum) Type 304 stainless steel, with a 0.090-inch thick (minimum) PVC lining. All nuts, bolts and washers shall be 304 stainless steel and compatible with the respective 304 stainless steel shell / band. Each spacer shall have low-friction skids/runners mechanically bolted to the risers. The runners shall be manufactured of an ultra-high molecular weight polyethylene or glass reinforced polymer. The risers and runner supports shall be of adequate spacing and height to position the carrier pipe in the center of casing with a minimum top clearance of 3/4-inch.

Carrier Pipe Nominal Diameter (in.)	Minimum Spacer Length (in.)	Minimum Number of Runner Supports/Risers per Casing Spacer		
		Bottom	Top	Total
6	8	2	2	4
8	8	2	2	4
10	8	2	2	4
12	8	2	2	4
14	12	4	2	6
16	12	4	2	6
18	12	4	2	6
20	12	4	2	6
24	12	4	2	6
30	12	4	2	6
36	12	4	2	6
>36	To be determined by Engineer of Record*			

*All casing spacers for carrier pipes 36-inch diameter and larger shall be factory designed, taking in consideration the weight of the carrier pipe filled with water.

Approved products include Cascade Waterworks Mfg. - Model CCS; Calpico, Inc. – M(SS) Series; APS, Inc. – Model SSI; CCI Pipeline Systems – Model CSS; or approved equal.

6.2.4 Casing End Seals

Seal casing ends in the annular space to completely close both openings on each side of the casing. Acceptable methods include a mechanical link-type casing end seal or a masonry (brick and mortar) plug together with a manufactured molded skirt-type casing end seal.

The mechanical link-type casing end seal shall be interlinked rubber sealing elements that are compressible to create a water-tight seal between the casing pipe and the carrier pipe. The seal shall be manufactured from EPDM rubber elements with composite compression plates and stainless steel nuts and bolts. Approved products include APS, Inc. – Innerlynx S-316, Link-Seal – Model S-316, or approved equal.

The masonry plug shall be suitable for restraining the compacted earth load.

The skirt-type casing end seals shall be molded (seamless) rubber with stainless steel straps for securing the seal to the carrier pipe and the casing pipe. End seals shall be constructed of 1/8-inch thick (minimum) specially compounded synthetic rubber with stainless steel banding straps. Approved products include APS, Inc. – Model AM/AC, Cascade Waterworks Mfg. – Model CCES; Calpico, Inc. – Model C; or approved equal. Wrapped skirt end-seals are not permitted.

6.3 Execution

6.3.1 Inspection

All casing pipe to be installed shall be certified by the manufacturer for compliance with these specifications. Casing pipe shall be subject to careful examination and inspection before installation, and no piece shall be installed which is found to be damaged or defective. Any casing pipe found to be damaged or defective shall be repaired or replaced as determined by the City, and at no additional cost to the City.

6.3.2 Material Handling

Care shall be taken in loading, transporting, unloading, and installing casing pipe and carrier pipes to prevent damage to the pipe or coatings. Pipe shall not be dropped.

6.3.3 Casing Pipe Installation

All work shall be performed in accordance with these specifications and/or the requirements of the agency having jurisdiction of the right-of-way or easement in which the installation is proposed. Any special requirements of the jurisdictional agency shall be adhered to during the performance of the Work. The special requirements shall be performed by the Contractor at no additional cost to the City.

The installation of the casing pipe shall proceed from a pit excavated at a safe distance from the edge of the roadway, railroad, or other structure. Construction shall not interrupt traffic on the roadways or railroads.

Field verify the horizontal and vertical location of all underground utilities and aboveground infrastructure, including utility poles, retaining walls, foundations, or other obstacles along the jack and bore alignment, prior to advancing the auger and/or casing pipe. Identify and resolve any conflicts with the proposed jack and bore alignment and existing underground utilities or aboveground infrastructure before excavating the jacking and receiving pits.

Maintain dry jacking and receiving pits and boreholes, free from groundwater infiltration or stormwater runoff. In the event of inclement weather, provide the necessary protection of the jacking and receiving pits to prevent infiltration and wash out. Provide all necessary equipment to protect and dewater the excavations and bore hole. Dewatering through the casing pipe is not permitted. Dewatering effluent shall be managed in accordance with the regulatory requirements and the Contract.

Install the casing pipe in accordance with approved jacking and boring methods. Install suitable reaction blocks for the jacking operation, as required. Installation of sheeting, bracing, and blocking are considered incidental to the Work. Jacking operations shall be continuous and precautions shall be taken to avoid interruptions that might restrict or prohibit the advancement of the casing pipe.

Earth within the casing shall not be removed too close to the cutting edge in order to prevent the formation of voids outside the casing. If voids are formed, they shall be satisfactorily filled with grout by pumping.

Maintain the necessary line and grade as indicated on the Plans. Installation of the casing pipes shall be at a horizontal and vertical alignment that will allow installation of the carrier pipe, within allowable tolerances, according to the Plans. Failure to meet the lines and grade as indicated on the Plans may result in remediation, at the discretion of, and no additional cost to the City and/or the jurisdictional agency.

Appropriate barricades, signage, and lighting will be provided if pits are open overnight. Excavations shall be completely enclosed with barricades.

The joining of sections of steel casing shall be field welded in accordance with the applicable portions of AWWA C206 and AWS D7.0 for field-welded pipe joints. The Contractor shall wire brush the welded joints and paint with an approved material.

After completion of jacking operation, clean the interior of the casing of all excess material and completely remove the reaction blocks, braces, and all other associated construction materials from the site. Complete as-built documentation, including end of casing locations, elevations, etc., for the jack and bore installation prior to backfilling the jacking and receiving pits. The jacking and receiving pits shall be excavated, backfilled and compacted in accordance with Section 5 - Excavating, Backfilling, and Compacting for Utilities.

The casing pipe is not to be used for linear restraint of the carrier pipe.

6.3.4 Other Equipment

Any equipment used on the job that has not been defined and covered previously in this section must be in proper working order and otherwise conform to the requirements as specified in other sections.

6.3.5 Personnel Requirements

Provide a competent and experienced supervisor that is thoroughly familiar with the equipment and type of work to be performed, and in direct charge and control of the operation at all times. In all cases, the supervisor must be continually present at the job site during the actual crossing operation.

Provide a sufficient number of competent workers on the job at all times to ensure the jack and bore installation is made in a timely and satisfactory manner. Adequate personnel for carrying out all phases of the actual jack and bore installation, where applicable, include: boring machine operator, certified welder(s) for joining additional casing sections; excavator operators, crane or lift operator for handling casing pipe, and laborers, as necessary for various related tasks, must be on the job site during the Work.

The City must be notified 48 hours in advance of starting Work. In addition, the jack and bore operation shall not begin until the City is present at the job site and agrees that proper preparations for the crossing have been made. The City's approval for beginning the Work shall in no way relieve the Contractor of the ultimate responsibility for the satisfactory completion of the Work. The City shall be present on the job site at all times during the actual jack and bore operation and carrier pipe installation.

6.3.6 Carrier Pipe Installation

Gravity sewer pipe (carrier pipe) must be held to slope and azimuth indicated in the Plans and may have up to 0.10-foot \pm tolerance in the vertical plane and up to 0.50-foot \pm tolerance of the center line on the horizontal plane.

Wooden skid casing spacers are not acceptable.

All carrier pipes shall be installed with approved casing spacers. The size and type of casing spacers shall be sufficient to support the pipe so that the carrier pipe is centered within the casing pipe and restrained from cross-sectional horizontal and vertical movement. A minimum of three casing spacers per carrier pipe segment is required. Spacers on the bell end of the pipe shall be a maximum of 2 feet behind the bell. Spacers on the spigot end shall be positioned at the line marking the insertion limit into the bell, such that the casing spacer is in contact with the bell face when the pipe is properly seated. The third casing spacer (or remaining additional casing spacers) shall be evenly distributed between the two end spacers. All casing spacers shall be installed in accordance with the manufacturer's recommendations.

After the carrier pipe has been properly installed and tested, the ends of the casing pipe shall be sealed with masonry (brick and non-shrink mortar) plugs with a molded skirt-type casing end seal, or a mechanical link-type casing end seal, to prevent the infiltration of soil and ground water into the casing annular space. Skirt-type seals with banding straps and mechanical link-type seals shall be installed per the manufacturer's recommendations.

END OF SECTION 6

7.1 General

7.1.1 Scope of Work

Supply all labor, equipment, materials and incidentals necessary to install, test, and place into operation all potable water distribution, sanitary sewer force main, and reclaimed water distribution system piping and fittings as shown on the drawings and as specified herein.

7.1.2 Submittals

Submit shop drawings to the City for review showing the manufacturer's drawings and specifications indicating complete details of all items. The details shall include material specifications, pressure class, certifications, joint types, gasket information, linings, coatings, installation and testing procedures, and other pertinent information necessary to assure that the proposed materials comply with all aspects of these technical specifications. The shop drawings shall be submitted to the Engineer for approval before fabrication and shipment of these items. The City shall not be responsible for items procured by the Contractor that have not been reviewed and approved through this submittal process.

7.1.3 Acceptance of Work

Until the City has formally accepted ownership and maintenance responsibility of the distribution and transmission system piping, the Contractor/Developer will be solely responsible for locating, maintaining, protecting, and repairing (if necessary) the distribution and transmission system piping, regardless of the cause of damage. The Contractor/Developer will be notified of acceptance in accordance with the guidelines outlined in the Contract Documents.

7.1.4 Manufacturer Requirements for Pipe and Fittings

All pipe and fittings shall be in accordance with the Buy American Act unless otherwise approved by the City. Products shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured.

7.2 Products

7.2.1 Ductile Iron Pipe

All ductile iron pipes shall be designed in accordance with the latest version of ANSI/AWWA C150/A21.50 for a rated water working pressure according to Table 7.1, which shall be adequate for the rated working pressure plus a surge allowance of 100 psi, using a 2-to-1 factor of safety on the sum of working pressure plus surge allowance.

Nominal Pipe Size (inches)	Pressure Class* (PSI)	Nominal Pipe Size (inches)	Pressure Class* (PSI)
8	350	20	250
10	350	24	250
12	350	30	250
14	250	36	250
16	250	42	250
18	250	48	250

*The minimum pressure class indicated in the table above is for pressure pipe installations under normal installation and loading conditions. The Engineer of Record shall determine if field conditions warrant a higher pressure class pipe due to special installation conditions or risk factors (i.e. excessive surge pressure, shallow cover, utility clearance, and/or excessive external loading conditions).

Ductile iron pipe shall be in accordance with the latest revision of ANSI/AWWA C151/A21.51. Each pipe shall be subjected to a hydrostatic pressure test of at least 500 psi at the point of manufacture. Coatings and linings shall be as required for the intended application, per this specification. Approved ductile iron pipe manufacturers include American (Cast Iron Pipe Co.), U.S. Pipe, and McWane (Cast Iron Pipe Co.).

Ductile iron pipe for below ground installation shall be supplied in nominal lengths no greater than 20 feet and shall be furnished with push-on type joints, such as “Tyton” or “Fastite,” unless otherwise shown on the drawings. Rubber gasket joints shall be in accordance with the latest revision of ANSI/AWWA C111/A21.11, and be furnished complete with all accessories, including restraints when necessary.

Ductile iron pipe for above ground installation shall be furnished with flange type joints, unless otherwise shown on the drawings. Flanges shall be ductile iron and conform to ANSI/AWWA C115/A21.15. Flange gaskets shall be full-face type gaskets molded from high-quality styrene-butadiene rubber (SBR) and shall be pre-drilled to match flange bolt pattern. The flange and gasket shall be rated for a working pressure of 350 psi, unless otherwise specified.

The class or nominal thickness, net weight without lining, and casting period shall be clearly marked on each length of pipe; additionally, the manufacturer’s mark, country where cast, year produced, and the letters “DI” or “Ductile” shall be cast or stamped on the pipe.

7.2.2 Ductile Iron Fittings

All ductile iron fittings shall be in accordance with the latest version of ANSI/AWWA C110/A21.10 or C153/A21.53.

All distribution and transmission pipe fittings for installation below ground shall be mechanical joint type ductile iron fittings. Rubber gasket joints for mechanical joint type ductile iron fittings shall conform to ANSI/AWWA C111/A21.11.

All distribution and transmission pipe fittings for installation above ground shall be flange joint type ductile iron fittings, and drilled to match ANSI/AWWA C115/A21.15 flanges. Flange gaskets shall be full-face type gaskets molded from high-quality styrene-butadiene rubber (SBR) and shall be pre-drilled to match flange bolt pattern. The flange and gasket shall be rated for a working pressure of 350 psi, unless otherwise specified.

Approved ductile iron fitting manufacturers include Tyler Union, Star Pipe Products, or approved equal.

7.2.3 Linings & Coatings for Ductile Iron Pipe and Fittings

Unless explicitly allowed within this specification, all interior linings and exterior coatings (including primers) shall be applied by a certified applicator at the foundry or certified application facility. All surfaces shall be prepared in accordance with the manufacturers' recommendations for the intended environment and the product(s) to be applied.

For potable water and reclaimed water applications, line the interior surface of all ductile iron pipe and fittings with a cement mortar lining and bituminous seal coat in accordance with ANSI/AWWA C104/A21.4. For buried applications, coat the exterior surface of all fittings with a 1.0 mil thick asphaltic coating in accordance with ANSI A21.51. For exposed or above ground applications, coat the exterior surface with an epoxy primer to a thickness of 5 mils and apply a top coat of epoxy to a minimum thickness of 15 mils. Approved primer and top coat products include Tnemec Series N140 Pota-Pox Plus (primer) and Tnemec Series 435 Perma-Glaze (top coat), or approved equals. The top coat only may be field-applied by an experienced applicator and allowed to cure before installation.

For force main applications, line the interior surface of all ductile iron pipe and fittings to a minimum thickness of 40 mils (DFT) with a high solids (97% minimum) coal-tar free ceramic epoxy. Approved products include Protecto 401 or Permite Permox-CTF. For buried applications, coat the exterior surface of all buried fittings with a 1.0 mil thick asphaltic coating in accordance with ANSI A21.51. For exposed or above-ground applications, coat the exterior surface with an epoxy primer to a thickness of 5 mils and apply a top coat of epoxy to a

minimum thickness of 15 mils. Approved primer and top coat products include Tnemec Series N140 Pota-Pox Plus (primer) and Tnemec Series 435 Perma-Glaze (top coat), or approved equals. The top coat only may be field-applied by an experienced applicator and allowed to cure before installation.

7.2.4 Polyvinyl Chloride (PVC) Pressure Pipe

PVC pressure pipe is an approved material for 4-inch through 12-inch below-ground installation of distribution and transmission mains, when other approved materials are not specifically required. For pipes larger than 12-inch, ductile iron or HDPE pressure pipe shall be used. PVC and HDPE pressure pipe shall not be used in above-ground applications.

All PVC pressure pipe shall conform to the latest version of AWWA C900, "Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4-inches through 12-inches, for Water Transmission and Distribution." Approved PVC pressure pipe manufacturers included JM Eagle Corp., National Pipe & Plastics, North American Pipe Corp., and Diamond Plastics Corp.

PVC pressure pipe for installation below ground shall be supplied in nominal lengths no greater than 20 feet (+/- 1-inch) and shall be furnished with push-on type joints in compliance with ASTM D3139 and Rieber® gaskets conforming to ASTM F477, and be furnished complete with all accessories, including restraints when necessary. No solvent-cement joints will be allowed.

PVC pressure pipe shall have standard ductile iron pipe size (DIPS) outside diameter (OD) dimensions with a wall-thickness dimension ratio (DR) of 18, and a pressure class of 235 PSI per AWWA C900-07 [150 PSI per AWWA C900-97/Factory Mutual (FM) 1612]. Each standard laying length of pipe and integral bell shall be tested up to 600 PSI for a minimum of 5 seconds.

PVC pressure pipe shall be color coded and labeled according to the following applications:

Table 7.2 – Exterior Colors and Markings for Pressure Pipes		
Application	Color	Approvals, Listings, and Special Markings
Potable Water	Blue	NSF 61, UL 1285, FM 1612
Sanitary Sewer	Green	Sewer / Force Main
Reclaimed Water	Purple	Reclaimed Water

Other lettering and markings on the pipe shall include pipe size, OD basis, material code designation, dimension ratio, AWWA pressure class, AWWA C900, manufacturer's name, and production code information.

PVC pipe which is damaged or show signs of sun exposure/ultraviolet degradation will not be considered for use.

7.2.5 High Density Polyethylene (HDPE) Pressure Pipe

HDPE pressure pipe is an approved material for all 4-inch and larger distribution and transmission mains, when other approved materials are not specifically required.

All HDPE pressure pipe shall be manufactured using PE4710 resin and shall conform to the latest version of AWWA C906, "Polyethylene (PE) Pressure Pipe and Fittings, 4-inches through 63-inches, for Water Distribution and Transmission." Approved HDPE pressure pipe manufacturers included JM Eagle Corp., National Pipe and Plastics, and Performance Pipe.

HDPE pressure pipe shall be ductile iron pipe size (DIPS) outside diameter (OD) dimensions with a wall-thickness dimension ratio (DR) of 11 and a minimum pressure rating of 200 PSI, except when thicker materials are specifically required. All HDPE pipe shall be manufactured with a UV inhibitor to protect the pipe from degradation in direct sunlight. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specifications from the same raw material. The pipe shall be free of visible cracks, holes, foreign inclusions, voids or other injurious defects including discoloration. There shall be continuous color stripes along at least two opposite sides of the pipe exterior (preferably at the 3 and 9 o'clock positions) to identify the intended use of the pressure pipe. Stripe colors shall be the same as those used for PVC pressure pipe identification identified in Table 7.1 above.

HDPE pressure pipe that is gouged, scraped, or otherwise damaged resulting in a loss of at least ten percent of the pipe wall thickness shall not be used.

7.2.6 Tracer Wire

All distribution and transmission system piping and appurtenances shall have a continuous reinforced copper tracer wire secured to the pipe to prevent separation during and after installation. The tracer wire shall be a direct burial #10 AWG high-strength copper-clad steel with a 30-mil high-density polyethylene coating on the outside for protection. The tracer wire shall be rated for 30 volts and meet APWA color coding requirements for the utility application. Approved products include Copperhead Industries, LLC - #10 AWG HS-CCS Tracer Wire; Pro-Line Safety Products - #10 AWG Pro-Trace HF-CCS Tracer Wire; or approved equal.

When a splice is required on the tracer wire, a UL 486D Listed direct burial waterproof wire nut shall be used to join the ends of the wire. Wire nuts shall be installed per the manufacturer's specifications. Approved products include King Innovation® DryConn® King 6 Blue One-Step® wire nuts, or approved equal.

7.2.7 Thrust Restraints

7.2.7.1 Restraining Gaskets and Mechanical Thrust Restraints

When restrained joints are required for below ground installations, furnish and install restrained joint pipe and/or mechanical joint restraints in accordance with the Standard Construction Details, or as specified by the Engineer of Record. The type of thrust restraint required shall depend on the material and joint type of the pipe requiring restraint. Approved thrust restraints for various pipe materials and joint types are provided in Table 7.3.

Table 7.3 – Approved Thrust Restraints for Pressure Pipe and Fittings		
Pipe Material	Joint Type	Approved Restraints
DI	Push-On (12-inch and smaller)	American Fast-Grip® Gasket McWane Sure-Stop 350® U.S. Pipe Field-Lok® 350
DI	Push-On (14-inch and larger)	American Flex Ring / Field Flex Ring U.S. Pipe TR Flex®
DI	Mechanical (All sizes)	EBAA Iron Megalug® Series 1100 EBAA Iron Megalug® 15MJ00TD (Tru-Dual®) Sigma One-Lok™ D-Series SLDE (Domestic) Tyler Union TUF Grip™ Series 1000 (TLD/DI) U.S. Pipe MJ Field Lok® (DI)
PVC	Push-On	Diamond Plastics - Diamond Lok-21® Gasket EBAA Iron Megalug® 1900 JM Eagle - Eagle Loc 900™ Gasket Tyler Union TUF Grip™ Series 3000 (PP/PVC)
PVC	Mechanical	EBAA Iron Megalug® 2000PV EBAA Iron Megalug® 15MJ00TD (Tru-Dual®) Sigma One-Lok™ D-Series SLCE (Domestic) Tyler Union TUF Grip™ Series 2000 (TLP/PVC)
HDPE	Fusion Welded	No Restraints Required
HDPE	Mechanical	HDPE MJ Adapter w/ SS Stiffener

1. Concrete thrust blocks shall not be allowed unless approved in writing by the City.
2. Except for PVC Push-On joint restraints, split-design mechanical thrust restraints shall only be considered for adding restraint to existing DI and PVC pipes.
3. Bolts and nuts for mechanically restrained joints shall be hot dipped galvanized, low alloy, high-strength steel. All-thread rods and associated washers and nuts for restrained joints shall be Type 304 Stainless Steel.

7.2.7.2 Thrust Blocks

When concrete thrust blocks are required in lieu of, or in addition to, restraining gaskets and/or mechanical restraints, then the thrust blocks shall be sized and installed in accordance with the Engineer of Record design.

7.3 Execution

7.3.1 General

All streets and easements shall be cleared and graded to within 4 inches of the final grade prior to construction of the utility system.

All pressurized mains and service piping shall have minimum of 3 feet of cover and no more than 6 feet of cover, unless otherwise specified. Trench excavation, backfill and compaction shall meet the requirements of Excavating, Backfilling and Compacting for Utilities specification contained in this document. Type 2 bedding conditions shall be used for all pressure pipe installation, unless specified otherwise.

Pipe shall be handled according to the manufacturer's recommendations. Care shall be taken in loading, transporting, unloading, and storing pipe and fittings to prevent damage to the pipe or fitting, coatings, and linings. Use padded straps, not chains or cables, for lifting pipe, fittings and appurtenances. Pipe shall not be moved using a forklift in the end of the pipe. All pipe and fittings shall be subjected to a careful inspection just prior to being laid or installed, and no piece shall be installed which is found to be damaged or defective. Any damaged pipe, fittings, coatings, and linings shall be repaired or replaced, as directed by the City. If any damaged or defective pipe is discovered after it has been laid, it shall be removed and replaced with a new pipe, in a satisfactory manner, and at no additional expense to the City.

All pipe and fittings shall be thoroughly cleaned before laying, and shall be kept clean until they are used in the work and placed into service. When pipe laying is not actively in progress, the open ends of the pipe shall be closed by watertight plug or other approved means.

All pipe and fittings shall conform to the lines and grades required. Unless specifically indicated otherwise, underground piping shall slope uniformly between shown elevations.

All pressurized distribution and transmission mains shall be laid with a continuous insulated tracer wire to provide for location by metallic pipe locators. Tracer wire shall be wrapped a minimum of two times around each joint of pipe. When a splice is required on the tracer wire, a direct burial waterproof wire nut shall be used to join the wires.

Tracer wires shall be routed to the surface through valve boxes and extend at least 12-inches the beyond valve box. Excess tracer wire shall be coiled under box lid and arranged so as not to interfere with valve operation. Tracer wire runs shall not exceed 1,000 feet without an access point. Extra valve box shall be provided where distances between valves exceeding 1,000 feet so there is no run longer than 1,000 feet. For runs longer than 1,000 feet, evenly split the distance between valves and the extra valve box(s).

The valve box will be supported above the top of the pipe by gravel bedding to eliminate any stress on the pipe at this point. An EMS marker will be buried adjacent to this valve box at a depth of 2 feet to help facilitate location.

7.3.2 Connection to Existing Lines

The City of Tallahassee Inspector shall be notified 48 hours prior to any connection to the existing water, sewer, or reclaimed water systems.

When connecting new pipe to existing pipe, the following work shall be performed:

- a. Expose buried lines to determine pipe material, diameter, and method of proposed connection (plugged end, tap, tie-in, etc.).
- b. Furnish and install piping, fittings, valves, and restraints on both new pipe and existing pipe as necessary to complete the connection as intended in the plans.
- c. Provide all testing (pressure, bacteriological, etc.) for new pipe and fittings, as well as any existing pipe impacted by the connection, before placing into service.

24 hours before any utility service outage, there will be a reflective sign with flasher placed on each street coming into the affected area. The sign will be no smaller than 4 feet x 4 feet and will have an easy to read (4-inch letters) notice that utility service will be off tomorrow.

If the anticipated number of affected customers is less than 25, the Contractor will attempt to notify affected customers in person by 7PM the day before the outage, and leave a door hanger notice at the residence or business. If more than 25 customers are affected, then the Contractor will coordinate an electronic message notification through the City to be sent by 7PM the day before the outage (no personal contact attempted or door hangers placed). Affected critical use facilities may require a longer notification period.

All notifications shall include the date, time, duration, and type (water, sewer, gas, etc.) of anticipated service interruptions; the daytime and nighttime phone numbers of the Contractor; and the City number 891-4YOU (4968) (day & night).

7.3.3 Ductile Iron Pipe

Ductile iron pipe and fittings shall be installed in accordance with requirements of AWWA C600, and as otherwise provided herein.

Proper pipe alignment shall be preserved in laying. The deflection at joints shall not exceed that recommended by manufacturer. Fittings in addition to those shown on the plans shall be provided, if required, in crossing utilities, which may be encountered upon opening the trench.

When cutting pipe is required, the cutting shall be done in accordance with approved methods stated in the Ductile Iron Pipe Research Association's "Installation Guide for Ductile Iron Pipe" leaving a smooth cut at right angles to the axis of the pipe. Cut ends of pipe to be used with a push-on joints or mechanical joint fittings shall be beveled and de-burred to conform to the manufactured spigot end. Coatings and linings shall be undamaged by the cutting process. Coatings and linings requiring touch-up repairs shall be done in accordance with the manufacturers' recommendations.

7.3.3.1 Jointing Ductile-Iron Pipe

Unless otherwise noted, underground piping shall be push-on or mechanical joint types with thrust restraints as required by the City of Tallahassee.

Push-on joints shall be made in strict accordance with the manufacturer's instructions. A rubber gasket supplied by the pipe manufacturer shall be inserted in the groove of the bell end of the pipe, and the joint surfaces cleaned and lubricated. The plain end of the pipe is to be aligned with the bell of the pipe to which it is to be joined, and pushed home with a jack or other means. If a backhoe is used to bell the pipe, a timber header will be used between the pipe and backhoe bucket to avoid damage to the pipe. Contractor shall note the position of the painted gauge lines to properly position the plain end in the bell socket. ***Extreme care shall be taken to avoid over-belling the pipe to avoid damaging the pipe and/or lining.***

Mechanical joints at valves, fittings, and where designated on the drawings and/or as specified shall be in accordance with the "Notes on Method of Installation" under ANSI/AWWA C111/A21.11, AWWA C600 Section 3.4, and the instructions of the manufacturer. To assemble the joints in the field, thoroughly clean the joint surfaces and rubber gasket with soapy water before tightening the bolts. Bolts shall be tightened in a uniformed manner to the specified torque as noted below in Table 7.4.

Table 7.4: Mechanical-Joint Bolt Torque		
Pipe Size (inches)	Bolt Size Inches (mm)	Torque Ft.-Lbs. (N-m)
3	$\frac{5}{8}$ (16)	45 - 60 (61 - 81)
4 - 24	$\frac{3}{4}$ (19)	75 - 90 (102 - 122)
30 - 36	1 (25)	100 - 120 (136 - 163)
42 - 48	1 $\frac{1}{4}$ (32)	120 - 150 (163 - 203)

Ball joints, where designated on the drawings and/or as specified, shall be installed in strict accordance with the manufacturer's instructions. Where ball joint assemblies occur at the face of structures or tanks, the socket end shall be at the structure or tank and the ball end assembled to the socket.

Flanged joints shall be in accordance with ANSI/AWWA C115/A21.15, including its Appendix A and the instructions of the manufacturer. Flanged joints shall be fitted so that the contact faces bear uniformly on the gasket and then are made up with relatively uniform bolt stress.

All valves, hydrants, fittings and other appurtenances needed upon the pipe lines shall be set and jointed as indicated on the Drawings or as required by the manufacturer.

If joint deflection is required to construct the water main as shown on the plans, the maximum deflection shall not exceed the maximum recommended deflections in the latest AWWA or manufacturers written directions (whichever is more stringent).

Fittings shown on the drawings is shown only as an assistance in illustrating a preferred means of installation in specific locations and is not intended to indicate all fittings necessary to affect the installation as shown in plans and profile views.

All taps on DIP pipe will be made by approved methods, using saddles or tapping sleeve and valve, when required.

7.3.4 Polyvinyl Chloride (PVC) Pressure Pipe

PVC piping shall be installed to the requirements of the manufacturer.

If joint deflection is required to construct the main as shown on the plans, the maximum deflection shall not exceed the manufacturer's maximum recommended deflection. Deflected joint pipe shown on the drawings is shown only as assistance to illustrate a preferred means of installation in specific locations and is not intended to indicate all deflected joint pipe necessary to affect the installation as shown in plan and profile views.

If restrained joints are required, use only mechanical thrust restraints approved for PVC pipe. Under no circumstances shall setscrews be used on PVC pipe.

All taps on PVC pipe will be made through approved saddles or tapping sleeve and valve.

7.3.5 High Density Polyethylene (HDPE) Pipe

HDPE piping shall be installed to the requirements of the manufacturer. If restrained joints are shown on the plans, use manufacturer recommended fittings for HDPE pipe.

If joint deflection is required to construct the main as shown on the plans, the maximum deflection shall not exceed the manufacturer's maximum recommended deflection. Deflected joint pipe shown on the drawings is shown only as assistance to illustrate a preferred means of installation in specific locations and is not intended to indicate all deflected joint pipe necessary to affect the installation as shown in plan and profile views.

All taps on HDPE pipe will be made through approved saddles or tapping sleeve and valve.

7.3.6 Thrust Restraints

Restraining gaskets and/or mechanical thrust restraints shall be used to provide resistance to thrust forces generated in pressurized pipelines at all valves, bends, tees, reducers, and caps or plugs. The length of restrained pipe on each side of the valve and/or fitting shall be sufficient to provide adequate resisting force to prevent separation of the pipe joints and fittings.

The minimum number of restrained joints required for resisting thrust forces shall be determined by the pipe size, material, type of valve or fitting, operating conditions, pipe trench, and soil type. Minimum restrained lengths for many typical applications are provided in the Standard Construction Details, which have been calculated for various pipe material and fittings based on the following minimum design parameters:

Soil Designation: Good Sand (Unified Soil Classification: Type SM)
Safety Factor: 1.5
Trench Type: Type 2
Depth of Bury: 3 Feet
Test Pressure: 150 PSI

Any variations from the minimum restrained lengths provided in the Standard Construction Details and the design parameters above shall be requested in writing by an active Florida Licensed Professional Engineer, in good standing with Florida Board of Professional Engineers. Such requests shall include suggested changes to design parameters, supporting

documentation, and new restrained length calculations, signed and sealed by the Professional Engineer.

Where concrete thrust blocks are required in addition to, or in lieu of, restraining gaskets and/or mechanical restraints, then the thrust blocks shall be sized and installed in accordance with these specifications and the Standard Construction Details.

Concrete thrust blocks shall have a load bearing area sufficient to resist the thrust forces at all valves and pipe fitting. Thrust forces shall be calculated using the same design criteria as for restrained lengths above. Concrete shall be placed against undisturbed material, and shall not cover joints, bolts or nuts, or interfere with the removal of any joint. Joints shall be protected by felt roofing paper or plastic sheeting prior to placing concrete thrust block. Wooden side forms shall be provided to achieve the required shape for concrete thrust blocks.

7.3.7 Pressure Tests of Distribution and Transmission System Piping

The City shall be notified 24 hours in advance of any testing. Hydrostatic pressure tests shall conform to Section 4 of the AWWA C600 latest edition, with the exception that the Contractor shall furnish all gauges, meters, pressure pumps and other equipment needed to test the line.

The pressure required for the field hydrostatic pressure test shall be made at 150 psi. Provide temporary plugs and blocking necessary to maintain the required test pressure. Wash stands at least 2-inches in diameter, pipe riser, and angle globe valves shall be provided at each pipe dead-end to bleed air from the line. Duration of pressure test shall be at least 2 hours. All leaks evident shall be repaired. Distribution and transmission system piping, valves, and appurtenances that fail pressure tests shall be repaired and retested as necessary until test requirements are satisfied. Defective pipe and related appurtenances shall be removed and replaced at no additional cost to the City.

The piping systems, valves and appurtenances shall be tested in such sections, as may be directed by the Engineer, by shutting valves or installing temporary plugs, as required. The piping system, valves and appurtenances shall be filled with water, all air removed, and the test pressure shall be maintained in the pipe for the entire test period by means of a force pump to be furnished by the Contractor.

Remove and adequately dispose of all blocking material and equipment after completion and acceptance by the field hydrostatic test, unless otherwise directed by the Engineer. Repair any damage to the pipe coating. Distribution and transmission system piping, valves, and appurtenances shall be totally flushed and cleaned prior to final acceptance.

7.3.8 Disinfecting Potable Water Pipelines

Before being placed in service, all potable water system piping shall be chlorinated in accordance with AWWA 651 latest edition, "Standard Procedure for Disinfecting Water Mains". The procedure shall be approved by the City. The location of the chlorination and sampling points will be determined by the City in the field. Taps for chlorination and sampling shall be uncovered and backfilled by the Contractor as required.

The procedure for chlorination shall be first to flush all dirty or discolored water from the lines, and then introduce chlorine in approved dosages through a tap at one end, while water is being drawn at the other end of the line. The chlorine solution shall remain in the pipeline for 24 hours. Chlorine dosages shall be according to Table 7.5.

Pipe Diameter (in)	Calcium Hypochlorite Granules (oz)
4	0.5
6	1.0
8	2.0
12	4.0
16 and larger	8.0

Following the chlorination period, all treated water shall be flushed from the lines at their extremities and replaced with water from the distribution system. The City shall then make bacteriological sampling and analysis of the replacement water in full accordance with AWWA C651. The Contractor will be required to re-chlorinate, if necessary. The line shall not be placed in service until the disinfection requirements of the Florida Department Environmental Protection (FDEP) are satisfied. Water line flushing will be limited to the amount shown in Table 7.6.

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Table 7.6: Line Flushing Parameters		
Minutes of Flow per 1,000 feet of pipe		
Line Diameter (inches)	Fire Hydrant with 2.5-inch hose connection	Fire Hydrant with 5-inch steamer connection
6	17	6
8	32	11
10	49	17
12	71 (1 hr 11 min)	24
14	96 (1 hr 36 min)	32
16	125 (2 hr 05 min)	42
18	159 (2 hr 39 min)	53
20	196 (3 hr 16 min)	66 (1 hr 06 min)
24	282 (4 hr 43 min)	94 (1 hr 34 min)

Special disinfecting procedures shall be used in connections to existing mains, and where the method outlined above is not practical.

No flushing can begin until the City has verified that a chlorine residual of not less than 10.0 ppm after the line has been filled for at least 24 hours. A City inspector is required to be on site to monitor all flushing activities. The Contractor shall meter and pay for any water used for flushing at standard City rates. City Ordinance 87-0-0108 and State Statute 812.14 will be enforced.

END OF SECTION 7

8.1 General

8.1.1 Scope of Work

Supply all labor, equipment, materials and incidentals necessary to install, test, and place into operation all potable water distribution, sanitary sewer force main, and reclaimed water distribution system valves and appurtenances as shown on the drawings and as specified herein.

8.1.2 Submittals

Submit shop drawings to the City for review showing the manufacturer's drawings and specifications indicating complete details of all items. The details shall include material specifications, pressure class, certifications, joint types, gasket information, linings, coatings, installation and testing procedures, and other pertinent information necessary to assure that the proposed materials comply with all aspects of these technical specifications. The shop drawings shall be submitted to the Engineer for approval before fabrication and shipment of these items. The City shall not be responsible for items procured by the Contractor that have not been reviewed and approved through this submittal process.

8.1.3 Acceptance of Work

Until the City has formally accepted ownership and maintenance responsibility of the distribution and transmission system piping, the Contractor/Developer will be solely responsible for locating, maintaining, protecting, and repairing (if necessary) the distribution and transmission system piping, regardless of the cause of damage. The Contractor/Developer will be notified of acceptance in accordance with the guidelines outlined in the Contract Documents.

8.1.4 Manufacturer Requirements for Pipe and Fittings

All distribution and transmission system valves and appurtenances shall be in accordance with the Buy American Act unless otherwise approved by the City. Products shall be assembled, inspected and tested at the foundry as required by the standard specifications to which the material is manufactured.

8.2 Products

8.2.1 Resilient Wedge Gate Valves

Valves for distribution and transmission system pressure piping 4-inch and larger shall be cast iron or ductile iron body and bonnet, resilient wedge gate type valves with a water service pressure rating of 250 PSI. All valves shall be manufactured to meet the requirements of AWWA

C509 (cast iron) or AWWA C515 (ductile iron), latest revisions. Approved resilient wedge gate valve manufacturers are American Flow Control, Clow/M&H/Kennedy, U.S. Pipe/Mueller, and EJ Foundry.

The valve wedge shall be constructed of ductile iron and shall be fully encapsulated with a resilient EPDM rubber and provided with male type guides and polymer guide covers.

Buried valves shall have non-rising stems and a 2-inch square operating nut. For valves 4-inch through 12-inch, the operating nut shall attach directly to the valve stem. For valves 14-inch and greater, the operating nut shall operate a spur gear or bevel gear actuator to open and close the gate. Valves shall open by turning counter-clockwise (left) with arrow cast in metal to indicate direction of opening.

Valve stems shall be copper/bronze or manganese/bronze alloy and shall be sealed by at least three O-rings with two of the O-rings located above the thrust collar. The thrust collar shall have upper and lower thrust washers to reduce friction and minimize operating torque.

All internal and external ferrous surfaces of the valve body and bonnet shall have fusion-bonded epoxy coating, complying with ANSI/AWWA C550, applied by the manufacturer prior to assembly. Epoxy coatings for potable water system valves shall be certified to NSF/ANSI Standard 61.

Each valve shall have the manufacturer's name, pressure rating and year manufactured cast on the body. Prior to shipment from the factory, each valve shall be tested to a hydrostatic pressure of 350 psi.

8.2.2 Tapping Sleeves and Valves

All tapping valves will be resilient wedge type and designed for use with tapping equipment. All tapping valves will have an alignment ring to prevent misalignment with tapping sleeves. Tapping valves will close clockwise (right), open counter-clockwise (left), and be equipped with a non-rising stem and standard 2-inch square-operating nut. The tapping valve will be mechanical joint (MJ) with the manufacturer's gaskets. Tapping valves will meet or exceed all the requirements for resilient wedge gate valves above.

All tapping sleeves for use on water mains 12-inch or less in diameter shall be constructed of Type 304 stainless steel and have a mechanical joint (MJ) outlet. Tapping sleeves shall conform to AWWA and ANSI standards and shall be ANSI/NSF certified. The branch of the tapping sleeve may be either extruded or welded to the tapping sleeve. All welds on the sleeve shall be fully passivated to restore stainless steel characteristics. The sleeve will be equipped with a ¾-inch

stainless steel plug with a standard square head for hydrostatic testing. The gasket shall be of a 360-degree design and manufactured of gridded virgin SBR or EPDM compounded for water service and complying with ASTM requirements. A 304 or 316 stainless steel armor shall be vulcanized to the gasket to bridge the gap between securing lugs. All bolts and nuts shall be 304 or 316 stainless steel with $\frac{5}{8}$ -inch National Coarse (NC) threads. The lifter bar shall be of adequate design to provide a heavy bearing surface for all nuts. Nlyatron GS washers shall be provided for lubrication. Approved tapping sleeves are Ford Fast (DOT) Model, JCM Model 439, Romac Model SST, or Mueller Model H304.

Sleeves for use on pipe 14-inch in diameter and larger will be ductile iron mechanical joint type. Approved types are Mueller H-615, American Series 2800, or U.S. Pipe T-9.

8.2.3 Cast Iron Valve Box and Lid

An adjustable two-piece screw-type asphalt-dipped cast iron valve box and heavy-duty drop-in lid rated for HS25 loading shall be provided for all valves larger than 1-inch. Cast iron Lids shall be labeled WATER, SEWER, or RECLAIMED, depending on the valve application. Valves boxes in high traffic areas, as determined by the City, shall have a drop-in lid with an extra-deep 4-inch skirt. Approved valve box products include Tylor Union Model 6850, Bingham and Taylor Model 4905, and EJ Foundry Model 8550. Approved valve box lids include Bingham and Taylor Model 4905-L4, EJ Foundry Model 6800(4), and SW Services Non-Pop Lids color coded appropriately to the utility application.

8.2.4 Potable Water and Reclaimed Water Services

All brass or bronze components shall be designed and manufactured in accordance with AWWA C800. Metal surfaces in contact with potable water shall be "lead free" and conform to UNS C89833, according to the latest revision of the Reduction of Lead in Drinking Water Act, 2011.

8.2.4.1 Service Taps and Saddles

8.2.4.1.1 1-Inch Water Service Taps

For water service taps on DI and CI pipe, direct taps shall be allowed. Taps shall be made to receive a male AWWA Tapered (CC) thread pattern corporation stop.

For water service taps on PVC and AC, a service saddle with a single 2-inch wide stainless steel band or strap shall be furnished. The saddle shall be of ductile iron and with an epoxy, nylon, or PE coating (10 mils minimum) and have a

female AWWA Taped (CC) thread pattern. Approved styles are Ford FC101, Romac 101N, Smith-Blair #315, JCM #405, or Cascade Model CNS1. No substitutes will be allowed.

For water service taps on HDPE pipe, an electro-fusion tapping tee (EFTT) shall be used. EFTT's shall have brass cutting teeth and CTS butt outlets and shall be NSF approved for potable water use, tested in accordance with AWWA C906, and approved for use on PE3408/PE4710 HDPE pipe. Approved styles include EFTT's as manufactured by Georg Fischer Central Plastics, or approved equal.

8.2.4.1.2 1-1/2 and 2-Inch Water Service Taps

For all 1½-inch and 2-inch water service taps, a more stable saddle is required. Saddles for these taps shall have multiple stainless steel straps for a minimum combined strap width of 3¼-inches. The saddle body shall be ductile iron and with an epoxy, nylon, or PE coating (10 mils minimum). Approved styles are Ford FC202, Romac 202N, Smith-Blair #317, JCM #406, and Cascade Model CNS2. No substitutes will be allowed.

8.2.4.2 Service Valves

Inlet and outlet connections for service valves shall be as shown in Table 8.1.

Table 8.1 – Water Service Valves Connection Requirements				
Service Size (inches)	Corporation Stop		Curb Stop	
	Inlet	Outlet	Inlet	Outlet
1	AWWA Taper / CC	CTS	CTS	FPT
1.5	FPT	FPT	CTS	FPT
2	FPT	FPT	CTS	FPT

8.2.4.2.1 Corporation Stops

Except for HDPE water mains, all water service taps shall be made using a brass or bronze quarter-turn ball-type valve at the connection to the main.

For 1-inch services, approved products include Ford FB1000-4, A.Y. McDonald #74701B-22, and Mueller 300™ P-25008N. No substitutions are allowed.

For 1½-inch or 2-inch services, with the valve shall be provided with a 2-inch square operating nut and installed with a valve box. Approved valves include

Ford #B11-XXX, A.Y. McDonald #76101, and Mueller B-20200. No substitutes are allowed.

For services on HDPE water mains, the corporation stop shall be an integrated valve contained within the electro-fusion tapping tee.

8.2.4.2.2 Curb Stops

Curb stops for all water service taps shall be made using a brass or bronze quarter-turn ball-type valve at the terminal end of the water service prior to the meter setting. All brass or bronze components shall be designed and manufactured in accordance with AWWA C800. Metal surfaces in contact with potable water shall be “lead free” and conform to UNS C89833, according to the latest revision of the Reduction of Lead in Drinking Water Act, 2011.

Approved products include Ford B41-XXX-W, A.Y. McDonald #76102-22-W, and Mueller 300™ P-25170N. No substitutions are allowed.

Inlet and outlet connections shall be as shown in Table 8.1.

8.2.4.3 Service Tubing

For 1-inch through 2-inch potable water and reclaimed water services, the service piping shall be either Type “K” copper tubing or high density polyethylene tubing. All joints shall be either fusion-welded or compression type. No flared or solder (sweat) joints shall be allowed.

All long side water services (up to 2” in size), across all FDOT and Leon County roadways, and City major collector roadways, shall be sleeved with either PVC or HDPE pipe when the water main is outside the roadway. The PVC and HDPE casing pipe shall be color coded and labeled in accordance to Section 7.2.4, Table 7.2. The inside diameter of the sleeve shall be 2 times the nominal size of the service pipe to allow for the replacement of the service line (i.e. 2” water service shall use a 4” carrier pipe). The casing pipe shall be sealed with a skirt-type casing end seal that shall be molded (seamless) rubber with stainless steel straps for securing the seal to the carrier pipe and the casing pipe. End seals shall be constructed of 1/8-inch thick (minimum) specifically compounded synthetic rubber with stainless steel banding straps. Approved products include Calpico, Inc. – Model C; CCI Pipeline Systems – Model CSK; or approved equal.

Polyethylene services shall be HDPE DR9 (CTS) and shall be manufactured from a PE4710 resin listed with the Plastic Pipe Institute and meet or exceed all applicable

requirements of AWWA C901, latest version. The exterior color shall meet APWA color coding requirements for the application – blue for potable water, purple for reclaimed water. It shall have a clear virgin high density polyethylene center. HDPE services shall be NSF approved for potable water use. The tubing shall have a UV protection and shall not be affected by direct sun light. It shall have a minimum working pressure of 200 PSI, or greater. Other than the connections at the corporation stop and curb stops, there shall be no fittings or joints in the water service piping from the main to the curb stop.

Service piping must comply with County and FDOT requirements when installing under roadways or easements of their jurisdiction.

8.2.4.4 Meter Settings

8.2.4.4.1 5/8-inch and 1-inch

All 5/8-inch and 1-inch water and reclaimed water meter settings shall include a meter yoke assembly with an angle valve inlet, standard expansion connection, and straight ball valve outlet.

Inlet and outlet connections for 5/8-inch and 1-inch meter setting valves shall be as shown in Table 8.2.

Service Size (inches)	Angle Key Valve		Customer Valve	
	Inlet	Outlet	Inlet	Outlet
1	CTS or FPT	Yoke	Yoke	FPT

Approved products for 5/8-inch and 1-inch water and reclaimed water meter settings shall include the following components:

5/8-inch Meters				
Manufacturer	Yoke	Angle Valve	Expander	Cust. Valve
Ford	501	AV19-313W	EC-1	B91-213W
Mueller	H5010	B-24278-N	H14234-1	B-24360-N
A.Y. McDonald	14-1	74644BY	714-1EHG	76101WY
1-inch Meters				
Manufacturer	Yoke	Angle Valve	Expander	Cust. Valve
Ford	504	AV19-444W	EC-4	B91-444W
Mueller	H5040	B24278-N	H14234-4	B-24360-N
A.Y. McDonald	14-4	74644BY	714-4EHG	76101WY

The product information above is intended to provide the Contractor with the approved manufacturers and model numbers of required meter setting components. In some instances, the Contractor must also provide the required component size information when ordering. The Contractor shall verify that all components are provided with the correct size connections for the meter setting application for which it is intended.

For 5/8-inch and 1-inch water and reclaimed water meter settings in non-deliberate and incidental traffic loading areas, a 12-inch x 17-inch x 12-inch deep flared rectangular solid plastic meter box and lid with AMR/AMI recessed hole shall be used. The meter box shall be constructed of solid polypropylene with UV inhibitors for sunlight protection. Approved products include DFW Plastics Series 1200 TT, or approved equal.

8.2.4.4.2 Meter Settings (1.5-inch and 2-inch)

All 1.5-inch and 2-inch water and reclaimed water meter settings shall include flanged meter assembly with bypass. Bypass configuration may be horizontal or vertical, depending on available space, and shall include a lockable ball-valve. Piping, fittings, and valves shall be lead-free brass/bronze, Type 304L stainless steel, or Schedule 40 galvanized iron.

Inlet and outlet connections for 1.5-inch and 2-inch meter setting valves shall be as shown in Table 8.4.

Service Size (inches)	Angle Key Valve		Customer Valve		Bypass Valve	
	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
1.5	FPT	Flange	Flange	FPT	Flange	Flange
2	FPT	Flange	Flange	FPT	Flange	Flange

8.2.5 Tracer Wire

All distribution and transmission system appurtenances shall have a continuous reinforced copper tracer wire secured to the pipe to prevent separation during and after installation. The tracer wire and splices shall be the same as that specified for distribution and transmission system piping.

8.2.6 Dry Barrel Fire Hydrants

All fire hydrants shall fully comply with all provisions of AWWA C502, latest edition. Hydrants shall be the dry barrel type, which prevents the operating threads from coming into contact with the service water. Hydrants shall be of the compression type, opening against the line pressure and closing with the line pressure. Hydrant and piping shall be laid at accurate grade as specified on the Plans/Drawings.

Approved models are Mueller A423, M.H. 129, EJ WaterMaster 5CD250, and Clow Medallion. No substitutes will be allowed.

Hydrant specifications:

- a. The hydrant shall be equipped with weather bonnet/shield to protect the operating nut.
- b. A grease or oil reservoir and lubrication system that automatically circulates lubricant to all operating stem threads and bearing surfaces each time the hydrant is operated shall be provided. The lubrication system shall be completely sealed from the waterway by O-ring seals.
- c. The hydrant barrel shall be the traffic breakaway type with a safety stem coupling and frangible segments that permit full 360-degree rotation of the nozzle.
- d. Main valve opening of the hydrant shall not be less than 5 ¼ inches and shall open clockwise (turn to right looking from top).
- e. Hose threads and steamer threads shall be National Standard threads. Hydrants shall be supplied with a factory installed Storz connection on the steamer with an aluminum or aluminum alloy blind flange that will hold water pressure without leaking. All nozzle caps shall be furnished with a flat gasket to prevent leaking.
- f. The hydrant shall be designed to permit the removal of all working parts from the hydrant up through the barrel without disturbing the earth around the hydrant or disassembling the barrel.
- g. An all-bronze hydrant valve seat ring shall thread directly into an all-bronze drain ring and shall be located between the lower hydrant barrel and base securely retained in the position, or it may be threaded into a heavy bronze bushing in the hydrant base. The valve seat ring and drain ring shall have no less than two bronze drain ports and two bronze drain outlets.
- h. The hydrant shall be designed with an anti-friction bearing, so located that it will reduce the torque required to operate the hydrant.
- i. Operating nut and nozzle cap wrench nut shall be National Standard type.
- j. All hydrants shall be shop tested in accordance with AWWA C502 (latest revision).

- k. The interior of the hydrant shoes shall be located with a fusion-bonded epoxy coating of at least 6 mils.
- l. Hydrant exterior shall be painted with two coats of high visibility yellow enamel paint.

8.2.7 Air Valves

Combination air valves shall be provided, as needed, to protect the distribution and transmission system piping. The “air release” component shall be designed to automatically release small pockets of air to the atmosphere as they accumulate along a pipeline or piping system when it is full and operating under pressure. The “air and vacuum” component shall be designed to automatically discharge or admit large volumes of air during the filling or draining of a pipeline or piping system. This valve will open to relieve negative pressures whenever water column separation occurs.

The Contractor shall notify the City of any deviations from the proposed pipeline profile during construction so that the air valve design can be reviewed and adjusted, if needed, to accommodate the actual installation conditions.

Each air valve assembly shall include all pipe, valves, fittings, structures, enclosures, and vent pipes. Each assembly shall be equipped with a manual blow-off, either integral to the air valve or connected to tee between the pipeline and the air valve. The blow-off size shall be determined by the Engineer; however, the minimum blow-off size shall be 2-inches.

Combination air valves for sewage and effluent (non-public access reclaimed water) applications shall be specifically designed to operate with liquids carrying solid particles. The combination air valve shall be made with a composite body and select corrosion-resistant polymer and stainless steel internal operating parts. The combination air valve shall be rated for a working pressure range of 3 PSI to 150 PSI, with a test pressure rating of 250 PSI. Approved products include A.R.I. Model D-Series, or approved equal.

Combination air valves for potable water and reclaimed water (public access) applications shall be specifically designed to operate with clear liquids (no solid particles). The combination air valve shall be made with an epoxy-coated ductile iron body and select corrosion-resistant polymer and stainless steel internal operating parts. The combination air valve shall be rated for a working pressure range of -3 PSI to 285 PSI. All valves shall be NSF Approved for potable water applications. Approved products include A.R.I. Model D-Series, or approved equal.

8.2.8 Check Valves

Check valves shall be the rubber flapper swing check type, designed to minimize slamming during the rapid reversal of flow in the piping system. All check valves shall fully comply with all provisions of AWWA C508, latest edition, and shall be rated for a cold working pressure of 250 psi. All internal check valve components shall be capable of being replaced without removing the valve body from the piping system.

The check valve body shall be ductile iron meeting ASTM A536, Gr. 65-45-12. The check valve seating component shall be mounted at a 45-degree angle to the centerline of the pipe with a full flow opening equivalent to the pipe flow area. The valve disc shall be Buna-N rubber encapsulated steel disc flapper with a maximum swing opening angle (disk stroke) of 35-degrees. The check valve body exterior and interior shall be coated with fusion-bonded epoxy. For potable water applications, the interior epoxy surface in contact with water shall be NSF-61 approved. For sewage applications, all exposed bolts for mounting and maintenance shall be stainless steel.

The check valve shall be equipped with a visual disk position indicator, backflow actuator, and proximity/limit switch sensor with SCADA compatible output signal. Approved products include Val-Matic® - Surgebuster® Check Valve; Flomatic – Model 745 or approved equal.

8.2.9 Plug Valves

Plug valves shall be of the non-lubricated, eccentric plug type with resilient faced plugs as manufactured by DeZurik Corp. (Sartell, MN); Henry Pratt, Val-Matic (Elmhurst, IL); or approved equal. Plug valve actuation shall be rotated 90 degrees for full open to full closed. Plug valve shall be equipped with a reducing worm gear operator providing for manual actuation. All plug valves shall fully comply with all provisions of AWWA C517, latest edition, and shall be rated for a maximum rated working pressure of 175 psi through 12-inch and 150 psi for 14-inch and above. Valve shall have flanges with drilling to ANSI B16.1, Class 125 and shall provide drop tight shut off with 100 psi pressure against the plug in either direction. All plug valves shall be minimum 100% of full port.

The plug valve bodies and covers shall be of ASTM A126 Class B cast iron or ductile iron. The words "SEAT END" shall be cast on the exterior of the body seat end. Bodies in 4-inch and larger valves shall be furnished with a 1/8-inch thick welded overlay seat of not less than 90% pure nickel, applied directly to the body on a pre-machined, cast seating surface and machined to a smooth finish. Valves utilizing resilient seats attached to the body are not acceptable. Plugs shall be of ASTM A126 Class B cast iron or ductile iron with a resilient facing per ASTM D2000-

DG and AWWA C504. The plug shall be of one-piece construction and shall be capable of withstanding the full pressure rating of the valve without use of additional structural reinforcing ribs that extend beyond the profile of the plug itself. Plugs shall be resilient faced with neoprene or hycar, suitable for use with sewage. Valves shall be furnished with replaceable, sleeve type metal bearings. Radial shaft bearings shall be constructed of self-lubricating Type 316 stainless steel. The top and bottom thrust bearing shall be Teflon. All valve shaft seals shall be of the multiple V-ring type, or U- cup type. Shaft seals shall conform to AWWA C504 and AWWA C517. Valves utilizing O-ring seals are not acceptable. All exposed nuts, bolts, springs, washers, etc., shall be grade 316 stainless steel for buried or submerged service. Plug valves shall be provided with stops.

All plug valves shall be equipped with enclosed gear actuators conforming to AWWA C504 Section 3.8. All gearing shall be enclosed in a semi-steel, ASTM A126, Class B housing. Gears shall be suitable for running in a lubricant, with seals provided on all valve shafts and actuators to prevent entry of dirt and water. Each actuator shaft and quadrant shall be supported on permanently lubricated bronze bearings. An adjustable stop shall be provided to set the closing torque. Valve actuation shall be accomplished with a standard 2-inch square actuation nut. An extension shall be added to the valve bringing the actuation nut to within 3 feet of the grade surface. The actuation extension shall be made of Grade 300 stainless steel and fit within a standard 2-piece valve box.

All plug valves shown in a location subject to submergence or buried valves and operators shall be suitable for submerged service in wastewater applications. All exposed nuts, washers, bolts and springs shall be Grade 316 stainless steel. Valves shall generally be installed in a position which will allow the plug to rotate into the top of the valve housing when the valve is open with the seat on the upstream end.

8.3 Execution

8.3.1 General

Distribution and transmission system valves and appurtenances shall be installed in conjunction with the distribution and transmission system piping, and in accordance with the specifications that govern its installation.

Care shall be taken in storing, loading, transporting, and unloading valves and appurtenances to prevent damage. All items shall be handled according to the manufacturer's recommendations. All items shall be examined before installing, and no piece shall be installed which is found to be damaged or defective. Any damaged or defective items shall be repaired or replaced as directed

by the Engineer. All items shall be subjected to a careful inspection just prior to being laid or installed. If any defective items are discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner at no additional expense to the City.

All items shall be thoroughly cleaned before laying, shall be kept clean until they are used in the work, and when installed, shall conform to the lines and grades required.

8.3.2 System Valves

All distribution and transmission system valves shall be restrained to pipe and fittings. All valves shall be set and jointed to the pipe in the proper locations as specified on the Plan.

8.3.3 Tapping Sleeves and Valves

All tapping valves and sleeves shall be hydrostatically tested prior to making the tap. Tap shall be installed horizontal to the water main. Proper equipment to install the tap shall be on-site prior to beginning the Work. Coordinate with the City Inspector regarding connection to the existing City water system with a minimum of 48 hours notification prior to tie-in. The City reserves the right to delay the tap if, in the City's opinion, the proper equipment is not on-site. No hand powered tapping is allowed for taps larger than 2-inch.

8.3.4 Cast Iron Valve Box and Lid

All distribution and transmission system valves larger than 1-inch shall be installed with a two-piece adjustable cast iron valve box and lid in accordance with the Standard Construction Details. The valve boxes and lids shall be installed so as not to transmit shock or stress to the valve or pipe. Valve boxes will be centered on the operating nut and plumb with the finished surface, unless otherwise indicated on the Plan.

For valves located in paved roadways, the valves shall be left temporarily below the finished grade until final pavement is installed.

Take additional precautions when installing clusters of valves at tees and crosses so as to achieve proper compaction of backfill material between the valve boxes.

8.3.5 Potable Water and Reclaimed Water Services

8.3.5.1 Service Saddle & Taps

All service taps and service saddles shall be installed in accordance with the Standard Construction Details and the manufacturer specifications.

All 1-inch taps on ductile iron pipe shall be direct taps, and shall be made to receive an AWWA Tapered (CC) thread pattern corporation stop. All other sizes and materials will be tapped with a saddle. All service taps on DI, PVC, AC, and CI, will be located at 9:00 or 3:00 on the circumference of the pipe. Service taps on HDPE using electrofusion tapping tee will be located at 12:00 on the circumference of the pipe.

All taps shall be made under pressure. Pipe thread compound or Teflon® tape shall be used on all threaded connections.

8.3.5.2 Service Valves

Valves shall be installed per manufacturer's recommendations and according to the plans and specifications. A roadway valve box shall be provided for every valve larger than 1-inch corporation stops. The valve box shall be installed so as not to transmit shock or stress to the valve, main, or service piping. Valve boxes will be centered on the operating nut and plumb with the paved surface, unless otherwise indicated on the drawings.

Ensure that all corporation stops and electrofusion tapping saddles are in the open position upon completion of the work.

8.3.5.3 Service Tubing

Allowance for any possible movement in the main will be made by making a half loop in the service tubing at the tap.

No repair couplings will be allowed on new services. If a new service is damaged during construction, it shall be removed and a new service shall be installed.

8.3.5.4 Meter Settings

Meter settings shall be made in accordance with the Standard Construction Details. Provide adequate spacing around meter setting to make repairs without damage to sidewalks, driveways, walls, irrigation plumbing, or other features.

If a meter is not going to be set at the time of construction of the service line, then a 3M™ EMS Full-Range Marker – Water 1252 buried water marker and an above-ground service marker will be placed at the end of the service line. The above-ground marker will be constructed out of ½-inch schedule 40 PVC or Fiberglass strips and will meet APWA color coding requirements for the utility application. The marker shall be

installed to a minimum height of 36-inches above grade, with a tee or anchor to hold it in place.

8.3.5.5 Meter Manifold

Any manifold greater than two meters shall be installed by the contractor. There shall be a maximum of five (5) 5/8-inch meters per manifold on 1½-inch service lines, and a maximum of ten (10) 5/8-inch meters per manifold on 2-inch service lines. All water meters must be located in green space (i.e., not under pavement, sidewalk, etc.) and must be located at least 5 feet from all building foundations.

8.3.6 Dry Barrel Fire Hydrants

Hydrants shall be installed with uppermost breakaway joint at or above ground level, but no more than 2-inches above ground level. The Storz connection shall face the nearest access roadway and shall be a minimum of 18-inches above grade. There shall not be any scallop or mound around the hydrant at finished grade.

Hydrant shall be provided with extension kit where necessary to adjust level of breakaway joint.

Connection between hydrant and main shall be straight ductile iron pipe. All joints shall be restrained from the main to the hydrant. A tracer wire shall be installed from the main to the breakaway flange on the hydrant and be visible. The tracer wire is to be a continuous loop or spliced per specifications to the tracer wire on the main.

Backfill around hydrant shall be compacted to 100% of maximum density as determined by ASTM D698 (Standard Proctor Density). Density testing shall meet the same requirements as backfill under roadway pavement.

8.3.7 Air Valves

Combination air valves for use in distribution and transmission system piping shall be constructed and installed in accordance to the Standard Construction Details, and as shown on the plans. All structures (manholes, vaults, and boxes) shall be constructed so that the top is flush with finished paved surfaces, and slightly (1 to 3-inches) above grade where structures are located in green spaces.

8.3.8 Thrust Restraints

Restraining gaskets and/or mechanical thrust restraints shall be used to provide resistance to thrust forces generated in pressurized pipelines at all valves, bends, tees, reducers, and caps or

plugs. The length of restrained pipe on each side of the valve and/or fitting shall be sufficient to provide adequate resisting force to prevent separation of the pipe joints and fittings.

The minimum number of restrained joints required for resisting thrust forces shall be determined by the pipe size, material, type of valve or fitting, operating conditions, pipe trench, and soil type. Minimum restrained lengths for many typical applications are provided in the Standard Construction Details, which have been calculated for various pipe material and fittings based on the following minimum design parameters:

Soil Designation: Good Sand (Unified Soil Classification: Type SM)
Safety Factor: 1.5
Trench Type: Type 2
Depth of Bury: 3 Feet
Test Pressure: 150 PSI

Any variations from the minimum restrained lengths provided in the Standard Construction Details and the design parameters above shall be requested in writing by an active Florida Licensed Professional Engineer, in good standing with Florida Board of Professional Engineers. Such requests shall include suggested changes to design parameters, supporting documentation, and new restrained length calculations, signed and sealed by the Professional Engineer.

Where concrete thrust blocks are required in addition to, or in lieu of, restraining gaskets and/or mechanical restraints, then the thrust blocks shall be sized and installed in accordance with these specifications and the Standard Construction Details.

Concrete thrust blocks shall have a load bearing area sufficient to resist the thrust forces at all valves and pipe fitting. Thrust forces shall be calculated using the same design criteria as for restrained lengths above. Concrete shall be placed against undisturbed material, and shall not cover joints, bolts or nuts, or interfere with the removal of any joint. Joints shall be protected by felt roofing paper or plastic sheeting prior to placing concrete thrust block. Wooden side forms shall be provided to achieve the required shape for concrete thrust blocks.

8.3.9 Pressure Tests of Distribution and Transmission Valves and Appurtenances

Hydrostatic pressure tests shall conform to Section 4 of the AWWA C600 latest edition, with the exception that the Contractor shall furnish all gauges, meters, pressure pumps and other equipment needed to test the line.

The pressure required for the field hydrostatic pressure test shall be made at 150 psi. Provide temporary plugs and blocking necessary to maintain in the required test pressure. Wash stands

at least 2-inches in diameter, pipe riser, and angle globe valves shall be provided at each pipe dead-end in order to bleed air from the line. Duration of pressure test shall be at least 2 hours. All leaks evident shall be repaired. Distribution and transmission system piping, valves, and appurtenances that fail pressure tests shall be repaired and retested as necessary until test requirements are satisfied. Defective valves and appurtenances shall be removed and replaced at no additional cost to the City.

The piping systems, valves and appurtenances shall be tested in such sections, as may be directed by the Engineer, by shutting valves or installing temporary plugs, as required. The piping system, valves and appurtenances shall be filled with water, all air removed, and the test pressure shall be maintained in the pipe for the entire test period by means of a force pump to be furnished by the Contractor.

Remove and adequately dispose of all blocking material and equipment after completion and acceptance by the field hydrostatic test, unless otherwise directed by the Engineer. Repair any damage to the pipe coating. Distribution and transmission system piping, valves, and appurtenances shall be totally flushed and cleaned prior to final acceptance.

The City shall be notified 24 hours in advance of any testing.

8.3.10 Disinfecting Potable Water Valves and Appurtenances

Before being placed in service, all potable water system valves and appurtenances shall be chlorinated in accordance with AWWA 651 latest edition, "Standard Procedure for Disinfecting Water Mains". The procedure shall be approved by the City. The location of the chlorination and sampling points will be determined by the City in the field. Taps for chlorination and sampling shall be uncovered and backfilled by the Contractor as required.

The disinfection procedures shall be as specified for distribution and transmission system piping.

END OF SECTION 8

9.1 General

9.1.1 Scope of Work

Supply all labor, equipment, materials and incidentals necessary to install, test, and place into operation all new sanitary sewer system manholes, piping, fittings, laterals, and related appurtenances as shown on the drawings and as specified herein. This specification **does not** cover the rehabilitation of existing sanitary sewer system manholes, piping, fittings, laterals, and related appurtenances.

9.1.2 Submittals

Submit shop drawings to the City for review showing the manufacturer's drawings and specifications indicating complete details of all items. The details shall include material specifications, pressure class, certifications, joint types, gasket information, linings, coatings, installation and testing procedures, and other pertinent information necessary to assure that the proposed materials comply with all aspects of these technical specifications. The shop drawings shall be submitted to the Engineer for approval before fabrication and shipment of these items. The City shall not be responsible for items procured by the Contractor that have not been reviewed and approved through this submittal process.

9.1.3 Acceptance of Work

Until the City has formally accepted ownership and maintenance responsibility of the sanitary sewer collection system infrastructure, the Contractor/Developer will be solely responsible for locating, maintaining, protecting, and repairing damage (if necessary), regardless of the cause of damage, the sanitary sewer system. The Contractor/Developer will be notified of acceptance in accordance with the guidelines outlined in the contract documents.

9.1.4 Manufacturer Requirements for Manholes, Pipe, and Fittings

All manholes, pipe, fittings, and appurtenances shall be in accordance with the Buy American Act unless otherwise approved by the City. Products shall be inspected and tested at the foundry, as required by the standard specifications to which the material is manufactured.

Inspection of the quality and condition of all materials shall be made at the site after delivery. Damaged or defective items shall be subject to rejection, even though sample sections may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to the job shall be marked for identification and shall be removed from the job at once and replaced at the Contractor's expense.

9.2 Products

9.2.1 General

All sewer mains shall be a minimum of 8-inches in diameter.

For gravity sewers to a maximum depth of 16 feet, as measured from finish grade to the flow line (invert) elevation, polyvinyl chloride (PVC) pipe or ductile iron (DI) pipe may be used, unless otherwise indicated on the drawings. For depths greater than 16-feet (as measured above), thick-wall PVC or ductile iron pipe may be used. For shallow depths with less than 30 inches cover, as measured from finish grade to the top of pipe, only ductile iron pipe shall be used.

9.2.2 Ductile Iron Pipe

All ductile iron pipes shall be designed in accordance with the latest version of ANSI/AWWA C150/A21.50 for a rated water working pressure according to Table 9.1, which shall be adequate for the rated working pressure plus a surge allowance of 100 psi, using a 2-to-1 factor of safety on the sum of working pressure plus surge allowance.

Nominal Pipe Size (inches)	Pressure Class* (PSI)	Nominal Pipe Size (inches)	Pressure Class* (PSI)
8	350	20	250
10	350	24	250
12	350	30	250
14	250	36	250
16	250	42	250
18	250	48	250

*The minimum pressure class indicated in the table above is for gravity sewer installations under normal installation and loading conditions. The Engineer of Record shall determine if field conditions warrant a higher pressure class pipe due to special installation conditions or risk factors (i.e. shallow cover, utility clearance, and/or excessive external loading conditions).

Ductile iron pipe shall be in accordance with the latest revision of ANSI/AWWA C151/A21.51. Each pipe shall be subjected to a hydrostatic pressure test at the point of manufacture. Coatings and linings shall be as required for the intended application, per this specification. Approved products include American (Cast Iron Pipe Co.), U.S. Pipe, and McWane (Cast Iron Pipe Co.).

Ductile iron pipe for installation below ground shall be supplied in nominal lengths no greater than 20 feet and shall be furnished with push-on type joints, such as "Tyton" or "Fastite," unless otherwise shown on the drawings. Rubber gasket joints for ductile iron pipe push-on type joints

shall conform to ANSI/AWWA C111/A21.11, latest revision. Joints shall be in accordance with the latest revision of ANSI/AWWA C111/A21.11, or latest revision, and be furnished complete with all accessories, including restraints when necessary.

The class or nominal thickness, net weight without lining, and casting period shall be clearly marked on each length of pipe; additionally, the manufacturer's mark, country where cast, year produced, and the letters "DI" or "Ductile" shall be cast or stamped on the pipe.

9.2.3 Ductile Iron Fittings

All ductile iron fittings shall be in accordance with the latest version of ANSI/AWWA C110/A21.10 or C153/A21.53.

All ductile iron sanitary sewer collection system fittings for installation below ground shall be mechanical or push-on type joint ductile iron fittings. Rubber gasket joints for mechanical joint type ductile iron fittings shall conform to ANSI/AWWA C111/A21.11, latest revision.

Approved ductile iron fitting manufacturers include Tyler Union, Star Pipe Products (U.S.A.-Domestic), or approved equal.

No service saddles will be allowed for new sewer collection system pipe installations. Transition fitting and adapters shall be suitable for the materials supplied.

9.2.4 Linings & Coatings for Ductile Iron Gravity Sewer Pipe and Fittings

Unless explicitly allowed within this specification, all interior linings and exterior coatings (including primers) shall be applied by a certified applicator at the foundry or certified application facility. All surfaces shall be prepared in accordance with the manufacturers' recommendations for the intended environment and the product(s) to be applied.

For sanitary sewer applications, line the interior surface of all ductile iron pipe and fittings to a minimum thickness of 40 mils (DFT) with a high solids (97% minimum) coal-tar free ceramic epoxy. Approved products include Protecto 401 or Permite Permox-CTF. For buried applications, coat the exterior surface of all buried fittings with a 1.0 mil thick asphaltic coating in accordance with ANSI A21.51. For exposed or above-ground applications, coat the exterior surface with an epoxy primer to a thickness of 5 mils and apply a top coat of epoxy to a minimum thickness of 15 mils. Approved primer and top coat products include Tnemec Series N140 Pota-Pox Plus (primer) and Tnemec Series 435 Perma-Glaze (top coat), or approved equals. The top coat only may be field-applied by an experienced applicator and allowed to cure before installation.

9.2.5 Polyvinyl Chloride (PVC) Pipe

PVC sewer pipe and fittings are approved materials for 4-inch to 15-inch installation of sanitary sewer collection system components, when other materials are not specifically required. For pipes larger than 15-inch, ductile iron sewer pipe shall be used, unless otherwise approved by the Engineering Manager. PVC shall not be used in above ground applications.

All PVC sewer pipe and fittings shall be manufactured in the U.S.A. from extra strength polyvinyl chloride pipe conforming to ASTM D3034, and shall meet or exceed the requirements of ASTM D1784, Type 1, Grade 1 (12454-B). Standard PVC pipe for gravity sewer applications shall be DR26. Thick-wall PVC for installation depths greater than 16-feet shall be C-900, DR18. All PVC pipe for sanitary sewers and laterals shall be colored green. Approved PVC sewer pipe manufacturers include JM Eagle Corp., National Pipe & Plastics, North American Pipe Corp., and Diamond Plastics Corp. Approved PVC sewer fittings manufacturers include GPK Products, Inc., Multi Fittings Corp., as well as those manufactured by approved sewer pipe manufacturers.

PVC sewer pipe shall be supplied in nominal standard laying lengths no greater than 20 feet (+/- 1-inch) and shall be furnished with push-on type joints in compliance with ASTM D3212 and Rieber® gaskets conforming to ASTM F477, and be furnished complete with all accessories, including restraints when necessary. No solvent-cement joints will be allowed.

No service saddles will be allowed for new sewer collection system pipe installations. Transition fitting and adapters shall be suitable for the materials supplied.

All PVC materials shall be stored and handled in accordance with the manufacturer's specifications and shall not be stored in direct sunlight. PVC pipe and fittings, which show signs of ultraviolet degradation/sun exposure/discoloration, will not be considered for use.

9.2.6 High Density Polyethylene (HDPE) Pipe

HDPE pipe is an approved material for all 4-inch to 12-inch installation of sanitary sewer collection system components, when other materials are not specifically required. For pipes larger than 12-inch, PVC or ductile iron sewer pipe shall be used, as specified. HDPE shall not be used in above ground applications.

All HDPE pipe shall be manufactured using PE4710 resin and shall conform to the latest version of AWWA C906, "Polyethylene (PE) Pressure Pipe and Fittings, 4-inches through 63-inches, for Water Distribution and Transmission." Approved HDPE sewer pipe manufacturers included JM Eagle Corp., National Pipe and Plastics, and Performance Pipe.

HDPE pipe for gravity sewer applications shall be iron pipe size (DIPS) with a wall-thickness dimension ratio (DR) of 17, and a minimum pressure rating of 125 PSI. All HDPE pipe shall be

manufactured with a UV inhibitor to protect the pipe from degradation in direct sunlight. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specifications from the same raw material. The pipe shall be free of visible cracks, holes, foreign inclusions, voids or other injurious defects including discoloration. There shall be continuous color stripes along at least two opposite sides of the pipe exterior (preferably at the 3 and 9 o'clock positions) to identify the intended use of the pressure pipe. Stripe colors shall be GREEN for sewer applications.

Fusion-weld all HDPE pipe joints and shave the interior weld bead flat so that gravity flow is unobstructed.

HDPE pressure pipe that is gouged, scraped, or otherwise damaged resulting in a loss of at least ten percent of the pipe wall thickness shall not be used.

9.2.7 Pre-cast Concrete Manholes

9.2.7.1 General

Sanitary sewer manholes shall conform to ASTM C478 – "Standard Specification for Precast Reinforced Concrete Manhole Sections," latest revision. Concrete for precast manhole structures shall conform to ASTM C94, Type II cement, with a comprehensive strength of 4,000 psi. Manhole sections shall be allowed to properly cure within approved methods prior to removing forms, painting, and shipping structures. The date of manufacture and the name of the manufacturer or trademark shall be clearly marked on the outside of each pre-cast section when the form is removed and on the inside after painting.

Each pre-cast section shall have lifting holes capable of supporting the weight of the section. These holes shall be a maximum of 3½ inches deep and not penetrate the interior wall of the structure. The diameter of the lifting hole shall accommodate a min of 1½ inch lifting pin.

Sanitary sewer manholes shall be constructed as watertight structures from the bottom-most section and base to the top section and manhole access frame.

9.2.7.2 Manhole Joints

Precast manhole sections shall come standard with bell and spigot joints installed in the spigot-down orientation. Joints shall be sealed with an asphalt-based preformed flexible joint sealant in accordance with ASTM C990. Approved preformed flexible joint sealants include Henry Co. – RAM-NEK (RN103), Concrete Sealants, Inc. – ConSeal 102; or approved equal.

All outside manhole joints shall be sealed with self-adhesive rubber-asphalt based external concrete joint wrap. The wrap shall be a minimum of 6-inches wide. Approved products are Henry Co. – RUB’R-NEK (RU116); Concrete Sealants, Inc. – ConWrap; or approved equal.

9.2.7.3 Manhole Base and Riser Sections

The manhole base and first riser section shall be monolithic and supplied with a spigot-down or “female” joint orientation to mate with the precast barrel sections in a spigot-down orientation. The diameter of the manhole base and first riser section shall be determined by the sewer pipe diameter according to Table 9.2.

Largest Gravity Sewer Pipe Diameter (inches)	Manhole Base and First Riser Section		
	Inside Diameter (inches)	Min. Wall Thickness (inches)	Min. Base Thickness (inches)
8 - 15	48	5	6
18 - 24	60	6	8
27 - 42	72	7	8

9.2.7.4 Straddle or “Doghouse” Manhole Section

The straddle or “doghouse” manhole section will be fabricated in the same manner of the regular precast concrete manhole sections, except that formed openings will be provided in the base and walls to fit over the existing sewer piping.

9.2.7.5 Manhole Top Sections

Standard manhole top sections shall be eccentric cones vertically aligned with the centerline of manhole outfall pipe connection to the manhole. Where cover over the top of the gravity sewer pipe is less than 4 feet, the manholes shall have vertical walls with a flat precast concrete slab top with an offset manhole access opening vertically aligned with the centerline of manhole outfall pipe connection to the manhole. Precast concrete slabs over top section, when required, shall be capable of supporting the overburden plus a live load equivalent to AASHTO HS25 loading.

The top elevation of eccentric cones or top slabs shall be set between 3 inches and 18 inches below bottom of manhole cover frame. It is the intent of this specification to provide a minimum of 3-inches to accommodate future grade changes without disturbing manhole structure. Manhole grade adjustment rings shall be used to bring the manhole ring and cover flush with final grade.

Certain applications may require the ring and cover to be pre-cast into the top slab to allow for a flush surface. In these applications, the orientation of the ring and cover on the flat top component may be centered or offset as required by the manufacturer.

9.2.7.6 Manhole Grade Adjustment Rings

Manhole grade adjustment rings shall not be used for more than 18-inches of vertical adjustment. **No bricks will be allowed for manhole adjustments.** Grade adjustment rings may be tapered to achieve a finished manhole level with the road slope and shall be sized to accommodate the manhole frame and cover without restricting access opening. All grade adjustment rings shall be +/- 1/16-inch from required nominal dimensions and shall be designed for use with AASHTO HS-25 heavy-duty street traffic loading.

Manhole grade adjustment rings shall be precast concrete, injection molded HDPE, or ultra-high density rubber/rubber composite and shall be of uniform quality and free from cracks, holes, and any other surface defects. Seals between grade rings, manhole top, and frame shall be made with an ASTM C990/AASHTO M198 approved preformed 3/8-inch round butyl rubber adhesive sealant, unless otherwise directed by the manufacturer.

Precast concrete grade adjustment rings shall be a minimum of 3-inches thick and have one 6 Ga. or thicker continuous reinforcing wire. Approved HDPE grade adjustment ring products include Ladtech, Inc. – Ladtech System Manhole Adjustment Rings. Approved rubber/rubber composite grade adjustment ring products include EJ Foundry – Infra-Riser or Hamilton Kent, LLC. – Lifespan® Adjustment Riser.

Manhole grade adjustment rings shall be installed in accordance with the specifications and the manufacturer's recommendations.

9.2.7.7 Manhole Access Frame and Covers

All frame and cover castings shall be manufactured in the U.S.A and shall be tough, close grained, smooth, and free from blow holes, blisters, shrinkage, strains, cracks, cold shots and other imperfections.

All manhole covers shall have heavy-duty design load classifications. Covers shall be provided with pick holes that do not penetrate through to the inside of the manhole, and provided with the lettering according to the Standard Construction Details.

For standard manhole installations, where the manhole access cover finished elevation is flush to or within 6-inches of finished grade, manhole access frames and covers shall

be two separate pieces. Manhole frame and covers shall be gray cast iron conforming to ASTM A48 – Class 35B and produced in accordance with AASHTO M306. Manhole frames shall have a minimum clear opening of 22½ -inches. Approved standard manhole frame and cover products include EJ Foundry – Model 1338; or U.S. Foundry – Model USF 170 w/ Type DY cover.

For raised manholes installations, where the manhole access cover finished elevation is above finished grade by more than 6-inches, the manhole frame and cover shall be a 120-degree hinged opening assembly with 90-degree blocking system to prevent accidental closure. Manhole frames shall be gray cast iron conforming to ASTM A48/AASHTO M105 – Class 35B and produced in accordance with AASHTO M306. Manhole covers shall be ductile iron produced in accordance with ASTM A536. The hinged manhole cover shall have a clear opening of 24-inches and shall be one-person operable. Approved raised manhole frame and cover products include EJ Foundry – ERGO Model 1040, or approved equal.

When approved by the City, structures in roadways requiring large access openings (such as air release valve manholes) may be provided with a large diameter composite manhole frame and cover. The frame and cover shall be manufactured of fiber-reinforced thermoset polymer resin with a molded non-skid texture. The composite frame and cover must meet HS25 load capacity and ASSHTO M306 proof-load testing requirements. The composite materials shall not be affected by common corrosive elements including H₂S sewer gas, petroleum products (oil, gasoline, diesel, and ethanol), de-icing solutions, and salt water. Approved products include GMI Composites, Inc. – Model 3800 Composite Frame and Cover, or approved equal.

Structures outside of the roadway requiring large access openings shall be provided with the same composite cover specified above, or with a rectangular polymer concrete box and cover. The polymer concrete boxes shall be open-bottom style, straight-wall boxes with bolted lids. The boxes may be stackable to achieve the desired depth. The complete assembly shall be rated for at least 20,000 pounds. Approved products include Highline Products – Model PHA3048xxH; Hubble, Inc. – Quazite® Tier 22 BOX, Model PG3048BAxx; or approved equal.

9.2.7.8 Manhole Finishes

The interior and mating surfaces of standard manhole shall be coated with 16 mils (DFT) heavy-duty coal tar epoxy coating containing not less than 74% (±2%) by volume nonvolatile solids. Approved products include Carboline Bitumastic 300M, Sewpercoat, or approved equal. This coating shall be self-priming, or applied with a primer as recommended by the manufacturer.

9.2.7.9 Manhole Linings

The interior of manholes with force main discharge connections, air release valves, or other high-corrosion applications, shall be lined with a protective coating to prevent sewer gas corrosion. Approved lining products include AGru America, Inc. – HDPE Sure Grip®; CCI Spectrum, Inc. – Spectrashield; GML Coatings, LLC. – Green Monster Liner; Quadex, Inc. – StructureGuard epoxy; Raven 405 ultra-high build epoxy; or approved equal. These linings shall be applied in strict accordance with the manufacturer's recommendations by a certified installer.

9.2.7.10 Manhole Pipe Connections

Where pipes enter or exit manholes, flexible or resilient boot seals are required. Boot seals shall conform to ASTM C-923 – “Standard Specification for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes, and Laterals.” Approved products include Trelleborg Pipe Seals Milford, Inc. – NPC Kor-N-Seal; A-Lok Products, Inc. – Z-Lok or Quik-Lok; or GU Florida, Inc. – GU Boot Hub.

9.2.7.11 Invert Flow Channels and Benches

Provide sewer manholes with an invert flow channel and bench. Shape the invert flow channel(s) to match the lower one-half of the connecting sewer pipe(s). Provide a smooth concrete finish without exposing aggregate when forming the invert flow channel and bench.

The width of the invert flow channel shall match the connecting sewer pipe diameter. Where the manhole outlet pipe is larger than the inflow pipe(s), the width shall be smooth tapered from a width matching the inlet pipe diameter, through the manhole, to width matching the outlet pipe diameter.

When the inlet pipe(s) crown elevation(s) match the outlet pipe crown elevation, the flow line elevation of the invert flow channels shall slope uniformly from each inlet connection to the outlet connection of the manhole. When the inlet pipe(s) crown elevation(s) do not match the crown elevation of the outlet pipe, but does not meet the criteria for requiring a drop connection, then the invert flow channel shall be uniformly sloped across the manhole from the outlet pipe invert elevation to an elevation equal to $0.25 \times D_i$ (where D_i is the incoming pipe diameter).

Form the elevation of the bench at the edge of the invert flow channel to match the spring line elevation of the connecting pipe(s). Slope the manhole bench from the edge of the flow channel upward and out to the manhole walls at a rate of 1-inch vertical to 12-inches horizontal (approximately 5 degrees).

Use pre-cast concrete invert channels and bench units conforming to ASTM C478, 4000-psi concrete for all manholes, unless specifically approved by the City. When approved, use FDOT Class I or Class II concrete for poured-in-place invert channels and benches.

Use FDOT Class I or Class II concrete for poured-in-place invert channels and benches on all straddle or “doghouse” manholes.

All terminal or “dead-end” manholes shall be provided with a full-length straight invert channel across the manhole.

Any deviations from this specification will require written approved equal by the City.

9.2.7.12 Drop Manhole Sections

An outside drop pipe will be provided for sewers entering a manhole at an elevation of 24-inches, or greater, above the manhole outlet pipe invert elevation. No drop connection shall be installed in the interior of the manhole. The manhole base, connection, and outside drop elbow shall be cast as a single unit, unless approved by the City. The entire drop connection (pipe, tees, and bends) shall be formed and encased in FDOT Class I Concrete.

9.2.7.13 Manhole Steps

NO MANHOLE STEPS SHALL BE ALLOWED.

9.3 Execution

9.3.1 General

It shall be the Contractor’s responsibility to locate all underground utilities in advance of construction, and to identify and resolve any conflicts occur with the proposed line and grade. If approved in writing by the City, minor changes in the alignment, may be permitted to avoid conflicts with underground facilities. However, if a conflict is found between an existing utility and proposed grade, the Contractor is to furnish the City all pertinent information, so that remedial design can be performed.

Care shall be taken in loading, transporting, unloading, and storing pipe, fittings, manholes, and castings to prevent damage. Materials shall be handled according to the manufacturer’s recommendations. Sewer pipe shall not be moved using a forklift in the end of the pipe. All materials shall be subjected to a careful inspection just prior to being laid or installed, and no piece shall be installed which is found to be damaged or defective. Any damaged items shall be repaired or replaced, as directed by the City. If any damaged or defective items are discovered

after it has been installed, it shall be removed and replaced with a new item, in a satisfactory manner, and at no additional expense to the City.

Set all survey grade stakes, lines, and levels for the construction of the sewer collection system in accordance with the design and survey information provided on the Plans. A land surveyor registered to practice in the State of Florida shall set all grades and alignment stakes for construction under this project and all costs thereof shall be borne by the Contractor. The requirements for this work to be accomplished by a registered land surveyor may be waived by the City in the event the Contractor desires to utilize his own personnel and furnish, in writing to the City, satisfactory evidence that his personnel are qualified to set the grade and alignment stakes. The Contractor shall assume all responsibility for the correctness of the grade and alignment stakes. Grade shall be verified at each manhole prior to the installation of additional pipe from that manhole. If a break in grade is detected the City shall be notified immediately.

Clear and grade all streets and easements to within 4-inches of the final grade prior to construction of the utility system.

Install sewer mains at a constant slope between manhole structures to the elevations shown on the Plans. No tangent pipe slope shall be less than the minimum slope outlined in the Design Specifications for the City of Tallahassee.

The method of pipe laying shall be subject to the approval of the City. Any main greater than 100-feet in length must be installed using a laser system designed for pipeline installation. The laser shall be capable of an accuracy of +/- 0.05%.

Manhole invert elevations shall not deviate more than 0.20-feet from design elevations. Manhole top elevations shall not deviate more than ¼-inches from finished roadway elevation or finished grade elevations, if outside of roadway. Centerline of manhole ring and cover shall not deviate more than 18-inches from designed horizontal location. Take extreme care to keep the pipe in exact alignment and elevation.

All sanitary sewer collection system piping shall be constructed to maintain the preferred separation requirements defined in Rule 62-555.314, F.A.C. Deviations from the preferred separation requirements shall be approved by the City in writing prior to installation. In all cases where sewer mains cross over or under water mains or storm drains, where a minimum clear distance between pipes is less than 18-inches, the sewer shall be ductile iron pipe or concrete encased PVC pipe, for a distance of 10-feet to either side of point of crossing. There will be no sewer joint within 10-feet of the centerline of the water line or storm drain.

Dimensions of concrete encasement or pipe cradles shall conform to those shown on the Plans. Each pipe shall be supported on brick at two points to allow minimum thickness of concrete to be placed under pipe. Concrete shall be placed carefully around and over pipe to avoid

displacement or floating of pipe. Trench shall be dewatered properly before placing of concrete. Backfill shall not be placed over poured-in-place concrete until 24 hours after pouring, unless authorized in writing by the City.

All trenches and excavations are to be kept dry and free from water at all times when work is in progress, and at no time is water to run through the sewer or its bedding material. All pipe and fittings shall be thoroughly cleaned before laying, and shall be kept clean until they are used in the work and placed into service. When laying is not in progress, including breaks, the open ends of the pipe shall be closed by watertight plug or other approved means.

Existing manholes are to be kept accessible at all times. (No stockpiling of materials, debris or equipment on top of the manholes).

9.3.2 Manhole Installation

9.3.2.1 General

Manholes located within an unimproved easement shall be installed with the final manhole frame and cover elevation a minimum of 18-inches above finish ground elevation. Manholes located within a landscaped easement shall be installed with the final manhole frame and cover elevation at finished grade unless, otherwise noted on plans. Manholes located within an unpaved roadway shall be installed with the final manhole frame and cover elevation at 12-inches below finished grade.

Within the limits of proposed street paving, manholes shall to be constructed such that the final manhole top section elevation is a minimum of 12-inches below the proposed finished grade shown on the Plans. During the roadway construction, after the base and structural asphalt courses are completed, manhole frame and cover shall be raised to match the finished road surface slope and elevation.

9.3.2.2 Inspection

All manhole sections shall be inspected for general appearance, dimension, "scratch-strength", blisters, cracks, roughness, soundness, etc. Imperfections may be repaired, subject to the approval of the City, after demonstration by the manufacturer that strong and permanent repairs will result. Repairs shall be carefully inspected before final approval. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi at the end of 7 days and 5,000 psi at the end of 28 days, when tested in 3-inch by 6-inch cylinders stored in the standard manner. Epoxy mortar may also be utilized for repairs, subject to the approval of the City.

9.3.2.3 Manhole Base Installation

Excavate manhole trenches such that the precast manhole bottom is set on a level, stable, and unyielding subgrade. If in the opinion of the City, the natural soil is not capable of supporting the manhole structure, then over-excavate the manhole trench and use a compacted select fill or coarse aggregate bedding material to stabilize the subgrade such that it is stable and unyielding, and set the structure to the elevation shown on the Plans.

For large diameter manholes, and manholes where the bench and invert flow channel are not precast, form and pour the invert flow channel and bench using FDOT Class I or Class II concrete, and trowel the surfaces for a smooth concrete finish.

For straddle or “doghouse” manhole bases, the excavation for the structure shall be to a depth of 8 inches (minimum) below the invert of the existing pipe. After the structure has been installed, the formed base and wall openings shall be filled with FDOT Class II concrete. Once the base concrete is set and cured, the bench and invert flow channel shall be formed and poured around the spring line of the existing sewer pipe with FDOT Class I or Class II concrete, and trowel the surfaces for a smooth concrete finish.

The existing sewer pipe will remain intact until the sewer system has passed final inspection. Upon passing final inspection, the top half of the sewer pipe shall be cut from between the manhole walls (less 6-inches each side) flush to where the pipe spring line meets the bench. All rough pipe and concrete edges shall be ground smooth.

9.3.2.4 Joint Assembly

Clean all joining surfaces with a brush and remove any dirt, debris, flashing, or concrete high points, which could keep the joint from coming together or prevent the sealant from adhering to the concrete. If necessary, a joint primer can be applied to improve adhesion. When using a primer, allow the primer to properly dry before placing sealant.

Apply the joint sealant to the spigot end of the manhole section according to the manufacturer’s directions. Where possible, the joint sealant shall be a single coil piece. Where the two ends meet together, join the sealant into one continuous strand by kneading the ends together where they meet. **DO NOT STRETCH OR OVERLAP THE SEALANT.** Once the sealant is installed, do not compress the sealant or allow dirt to fall on the sealant.

When joining the manhole sections, properly align the upper and lower sections. Carefully lower the upper section until it makes even contact with the lower section. Continue lowering the upper section until the full weight is received by the lower

section. The sealant must be compressed to a minimum of 50 percent to properly seal the joint. Once proper compression is achieved, do not lift up on the manhole section(s).

To apply the exterior joint wrap, begin by cleaning all joining surfaces with a brush and remove any dirt, debris, flashing, or concrete high points, which could prevent the sealant from adhering to the concrete. If necessary, a joint primer can be applied to improve adhesion. When using a primer, allow the primer to properly dry before placing sealant.

Apply joint wrap to the exterior horizontal joint by removing the release paper from the adhesive side and apply the wrap to the concrete. Continue around the joint by removing the release paper as the roll of wrap is unrolled. Press the wrap firmly by hand against the entire surface as it is applied to assure full contact.

Where joining two sections, or where two ends meet together, provide an overlap of approximately 2" and firmly press the overlapping strip onto the end of the underlying strip to seal the joint.

9.3.2.5 Manhole Grade Adjustment Ring Installation

NO BRICKS WILL BE USED FOR MANHOLE GRADE ADJUSTMENT.

Cut the asphalt and base concentrically around the manhole out to a minimum distance of 14-inches from the frame, and removed the material to a minimum depth of 16-inches. Adjust the manhole ring and cover using approved grade adjustment rings to match the finished grade and slope.

For grade adjustment greater than 3-inches up to a maximum of 18-inches, use Ladtech System grade adjustment rings or precast concrete rings in combination with rubber/rubber composite grade adjustment rings for final grade adjustment within the 3-inches of finish grade.

For Ladtech System grade adjustment rings and all precast concrete grade adjustment rings, seal all joints between the manhole structure, grade adjustment rings, and manhole frame with a 3/8-inch preformed butyl adhesive rope.

For rubber/rubber composite grade adjustment rings, seal all joints in contact with the rubber/rubber composite material with two concentric and continuous 3/8-inch beads of butyl rubber adhesive caulk.

Apply a joint wrap tape to seal around exterior joint of the manhole structure to grade ring connection, and around all precast concrete grade adjustment rings.

Backfill the excavated area around the manhole riser and frame with compacted fill, sub-base, and road base materials to match the typical road section. DO NOT USE CONCRETE COLLAR. Install matching asphalt mix patch to bring the final surface flush with finished road surface.

9.3.3 Connections to Existing Manholes

When beginning sewer construction, where the new system connects to an existing sewer system, install a sewer plug in the downstream pipe connection of the first new manhole prior to installing the first section of pipe working outward from the manhole. This plug shall be mechanically expanded to seal the pipe and shall be secured with at least a $\frac{3}{8}$ -inch diameter rope to prevent it from being pushed down the pipe. The plug is to remain in place to protect the existing downstream sewer system and will only be removed when the new sewer system has been cleaned, tested, and passed final inspection.

In cases where gravity sewers, services, and force mains connect to an existing pre-cast concrete manhole, and existing stub-outs for connection do not exist, the manhole structure shall be core-drilled. Core-drilled penetrations shall be as such as to accept a flexible boot seal appropriately sized for the pipe diameter used in the connection. The invert elevation of the connecting pipe shall not be higher than the crown of the existing effluent pipe, unless otherwise directed by the City.

When connecting a sewer force main to an existing manhole, the invert elevation shall not be higher than the existing effluent sewer invert elevation, and the force main shall be aligned such that the flow is straight through the manhole from influent to effluent, unless otherwise approved in writing by the City. Force main connections shall be restrained, as necessary.

9.3.4 Laying Gravity Sewer Lines

Gravity sewer lines shall be laid according to the details shown on the drawings or specified herein, and according to applicable portions of ASTM D2321, Underground Installation of Flexible Thermoplastic Sewer Pipe. Ductile iron pipe shall be installed in accordance with the requirements of Section VII of the Handbook of Ductile Iron Pipes, latest Edition. The type of bedding to be used shall be as shown on the drawings, specified herein, or as directed in writing by the Engineer.

The laying of the sewer pipe shall be commenced at the lowest point, with all bell ends upstream. The interior of the pipe and the jointing seal shall be free from sand, dirt and trash before installing in the line. Extreme care must be taken to keep the bells of the pipe free from dirt and rocks so that joint may be properly assembled without over stressing the bells. The

jointing of the pipe shall be done in strict accordance with the pipe manufacturer's instructions and shall be done entirely in the trench.

Each time the work on the sewer is halted for more than one hour, the ends of the pipe shall be sealed to prevent foreign material from gaining entrance to the pipe. Each time a new manhole is installed, place a sewer plug in the downstream pipe connection of the new manhole prior to installing the first section of pipe working outward from the manhole.

Trench excavation, backfill and compaction shall meet the requirements of Excavating, Backfilling and Compacting for Utilities specification contained in this document. The trench bottom shall be graded to the proposed elevation of the pipeline and the bottom shaped to fit the lower quadrant of the pipe. Holes shall be excavated at each bell so that pipe is uniformly supported along the entire length of the barrel only and not the bell. Pipe laying shall not precede backfilling by more than 100 feet without approval from the City.

9.3.5 Joining Sewer Lines

Laying instructions of the manufacturer of the pipe and fittings shall be followed explicitly. Any pipe having defective joint surfaces (bell or spigot), including gaskets, shall be rejected and replaced.

Lateral connections 6-inch or larger in diameter shall be connected to a manhole on existing VCP mains. 6-inch wyes will be allowed in new construction.

Only one repair will be allowed per tangent and will use the same material as the sewer main, except for VCP repair, where PVC fittings are to be used.

No flexible couplings will be allowed other than connections to existing VCP mains, in which case a Fernco® Strong Back 1000-Series repair coupling; MAXADAPTOR One & Done; or equal, may be used.

9.3.6 Lateral Installation

A lateral connection shall be provided for each platted lot or parcel, or as approved by the City

Service connections shall be extended to the property line as shown on the drawings and adequately sealed with plugs or caps prior to beginning exfiltration tests.

The Contractor shall maintain a record of service connection locations in conjunction with the "as-built plans" and, upon completion of work, shall furnish a copy of record to Engineer. The record shall include (1) location of wye branch and end of sewer connection referenced to next downstream manhole of each run, (2) offset of end of service as referenced from center line of main sewer pipe, (3) depth at end of service, and (4) distance from service end to nearest lot

corner (reference lot corner shall be clearly indicated on the record). End of service pipe shall be marked with an EMS marker buried directly over end of service. Use EMS markers as manufactured by 3M, #1253 Green, Austin, Texas.

Unless otherwise indicated, service connections shall be constructed perpendicular to the sewer, and on a straight line and a constant grade of not less than 2 percent and not greater than 100 percent (i.e., 45 degrees from horizontal or vertical). Service connections less than 2 percent must be signed and sealed by an engineer and meet the applicable flow rates. Riser piping is not acceptable. Inverts of service connections at property lines shall be established so as to provide a minimum grade of 2 percent to the center of the lot or parcel plus 2-foot vertical with a minimum invert depth of 5-feet, unless otherwise indicated by the drawings. The maximum invert depth shall be 8-feet.

Do not connect services directly to manholes unless approved by the City. Where service lines are connected to manholes, match the invert elevation of the service lines with the crown elevation of the manholes discharge main. Provide a shaped invert from the wall of the manhole to the invert of main sewer.

When installing service connections on existing sewer mains not having wyes and tees, the Contractor may install a tee on PVC mains or install a PVC wye connection and fittings. No tapping saddles or tapping tees shall be used.

9.3.7 Infiltration

THERE WILL BE NO ALLOWABLE INFILTRATION.

Air Testing

Low pressure testing shall be conducted in accordance with the following procedures: Sanitary sewers tested will not be accepted by the City until the sewers meet the criteria stated. The Contractor will provide testing equipment and test supervision. The Contractor in the presence of the Engineer will conduct all tests. Generally, the sewers will be tested from manhole to manhole or from manhole to the end of the sewer if there is no manhole at the end. Service connections along the sewer main will be included in the testing.

The test procedure shall be conducted in the following manner:

- a. Clean pipe to be tested by propelling a snug fitting inflated ball through the pipe by water pressure or other adequate method. This step is important because it not only flushes out construction debris, but the water used to flush the ball through the pipe dampens the pipe wall. The rate of air loss through pipe wall permeation can be significant on dry pipes.

- b. Plug all pipe outlets with pneumatic plugs having a sealing length equal to or greater than the diameter of the pipe to be tested. The pneumatic plug shall be able to resist internal testing pressures without requiring external bracing.
- c. The groundwater level surrounding the section of sewer under testing shall be determined. If the groundwater table is above the pipe, then test pressures shall be increased by the corresponding increment (e.g., if the groundwater table is above the lowest crown of the pipe, the air pressure should be increased 0.43 times each foot of water.)
- d. Once the pipe outlet plugs are securely in place, pressurized air is introduced to the system. The air shall be fed through a single control panel with three individual hose connections as follows:
 1. From control panel to pneumatic plugs for inflation in sewer pipe;
 2. From control panel to sealed line for introducing the pressurized air;
 3. From sealed line to control panel. This line will enable continuous monitoring of the air pressure rise in the sealed line.
- e. The air shall be introduced slowly to the section of pipe under evaluation until the internal air pressure is raised to 4.0 psig greater than the hydrostatic pressure head created by the existence of groundwater that is over the pipe section.
- f. A minimum of two (2) minutes shall be provided for the air pressure to stabilize to conditions within the pipe. (This stabilization period is necessary for variations in temperature to adjust to the interior pipe conditions.) Air may be added slowly to maintain a pressure to 3.5 to 4.0 psig for at least two (2) minutes.
- g. After the stabilization period, when the pressure reaches exactly 3.5 psig, the stopwatch shall be started; and when the pressure reaches 2.5 psig, it is stopped. The portion of the line being tested shall be acceptable if the time in minutes for the air pressure to decrease from 3.5 psig to 2.5 psig is greater than the time shown in Table 9.3.

Pipe Diameter (inches)	Time (minutes)
4	2.0
6	3.0
8	4.0
10	5.0
12	5.5
15	7.5
18	8.5

21	10.0
24	11.5

- h. In areas where the groundwater is above the top of the pipe, the test pressures shall be increased by 0.433 per foot of groundwater (e.g., if the groundwater is 11½ feet, the 3.5 to 2.5 pressure drop will be increased by 5 psi; the time then will be measured for a pressure drop from 8.5 to 7.5 psi.).

Alternate Pressure Test

$$T = (0.0850 \times D \times K) / 0.003$$

where:

T = minimum time in seconds the air pressure must hold while dropping from 3.5 psig to 2.5 psig

D = pipe diameter in inches

K = 0.000419DL, but not less than 1.0

L = length of line being tested

See example calculation on next page.

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Example: 10-inch sewer that is 350 feet long

$$K = 0.000419 \times D \times L$$

$$K = 0.000419 \times 10 \times 350$$

$$K = 1.4665 \text{ (use 1.47)}$$

$$T = \frac{0.0850 \times D \times K}{0.003}$$

$$T = \frac{0.0850 \times 10 \times 1.47}{0.003}$$

$$T = \frac{1.2495}{0.003}$$

$$T = 416.5 \text{ seconds}$$

$$T = 6 \text{ minutes and } 56.5 \text{ seconds}$$

The Contractor shall clean and remove all debris, silt, earth or other material from the sewer prior to testing. The Contractor shall flush the sewer with water. None of this water or debris shall be allowed to enter the existing sewer.

Test plugs will be installed within the pipe at each manhole.

If the pipe to be tested is below the groundwater table, the Contractor shall determine, in a manner suitable to the Engineer, the depth of the groundwater above the pipe invert immediately prior to testing the sewer. All gauge pressures in the test shall be increased by the amount of this backpressure due to groundwater submergence.

Air shall be added slowly to the test portion of the pipe until the internal air pressure is raised to 4.0 psig. A stabilization time of 5 minutes will be used to allow entering air to equalize with the temperature of the pipe wall.

If, at any time, prior to acceptance, a portion of the main line or any service laterals are damaged and repaired, additional air tests will be required.

9.3.8 Cleaning

At the conclusion of the work, the Contractor shall thoroughly clean the entire pipe by flushing with water or other means to remove all dirt, stones, pieces of wood, or other material that may have entered during the construction period. Debris cleaned from the lines shall be removed from the lowest outlet. Debris or water from the lowest outlet shall not be introduced into the City's sewage collection system. If, after this outlet cleaning obstructions remain, they shall be removed. After the pipe is cleaned and if the groundwater level is above the pipe, or following a heavy rain, the Engineer will examine the pipe for leaks. If defective pipes or joints are discovered at this time, the Contractor shall repair them.

All water used in testing and flushing shall be furnished at the Contractor's expense.

9.3.9 Final Test and Inspection

Upon completion of the work, the sewer system or selected sections therein shall be subjected to a final test and inspection. All work in the system or sections therein being tested shall be complete, cleaned and ready for use. Tests shall be as specified herein and shall meet all requirements including but not limited to line, grade, cleanliness, infiltration, and workmanship. Deflection testing will be done on all flexible pipe at the direction of the Engineer. No pipe deflection will exceed 5%.

The Contractor will provide testing equipment and test supervision. This testing will be done using a mandrel having a diameter equal to 95% of the inside diameter of the pipe. The test shall be performed without mechanical pulling devices. Re-rounders are not allowed.

Inspection of mains shall be by use of a self-contained closed-circuit television (CCTV) system. These facilities shall be provided and operated by the City and scheduled through the Water Resources Engineering Division. All requests for TV inspection shall be in writing 24 hours in advance from the Contractor.

For pipes 15-inch in diameter and less, no deflections (dips/sags) will exceed $\frac{3}{4}$ -inch; and for pipes greater than 15-inch in diameter, no deflections (dips/sags) will exceed $1\frac{1}{4}$ -inch.

9.3.9.1 Sewer within street rights-of-way, paved areas, or areas subjected to frequent vehicular traffic

The City will inspect the lines with the television system on two occasions. First inspection shall be completed prior to road base construction. Second inspection shall be performed prior to final acceptance. A third or subsequent inspection if required will be charged to the Contractor at the current rates.

9.3.9.2 Non-paved areas and not subject to vehicular traffic

The City will inspect the lines with the television system on only one occasion. A second or subsequent inspection if required will be charged to the Contractor at the current rates.

END OF SECTION 9

10.1 General

10.1.1 Scope of Work

Contractor shall furnish, deliver and install an automatic submersible sewage pump station. The station shall be complete with all needed equipment. The principle items of equipment shall include two submersible pumps; valves; internal piping; central control panel with circuit breakers; motor starters; automatic pumping level controller; lighting and all on-site improvements including slab, wet well, discharge piping including emergency by-pass, valve-vault, gravity piping, including gate valve (mechanically assisted if over 12-inch), emergency generator (for designated installations where required by the City), electrical wiring, driveway, parking area, stormwater structures, stormwater piping, fence and related items which make the station complete and operable.

These specifications are intended to give a general description of what is required, but do not cover all details which will vary in accordance with the requirements of the equipment as offered. It is, however, intended to cover the installation and field testing, of all materials, equipment and appurtenances for the complete pumping units as herein specified, whether specifically mentioned in these specifications or not.

To assure unity of responsibility, the pumps, accessories, and pump control system, including the RTU, coaxial cable, and antenna, shall be furnished and coordinated by the pump manufacturer. The contractor shall assume responsibility for the satisfactory installation and operation of the entire pumping system including pumps, accessories and controls as specified.

The centrifugal submersible pumps shall be manufactured by WILO/EMU or ITT Flygt Corporation. The pumps furnished shall be designed, constructed and installed in accordance with the best practice and methods, and shall operate satisfactorily when installed. All equipment furnished under this specification shall be new and unused. Pumps shall be manufactured in accordance with the Hydraulic Institute Standards.

10.1.2 Submittals

Copies of all materials required to establish compliance with the specification shall be submitted in accordance with the provisions of the general conditions. Submittals shall include at least the following:

- a. Shop erection drawings showing all important details of construction, dimensions and anchor bolt locations.
- b. Descriptive literature, bulletins, and/or catalogs of the equipment.
- c. Data on the characteristics and performance of each pump. Data shall include guaranteed performance curves, based on actual certified tests of similar units, which

show that they meet the specified requirements for head, capacity, efficiency, NPSHR, submergence and horsepower, except where certified witness testing is requested by the City. Curves shall be submitted on 8½ by 11-inch sheets; at as large a scale as is practical. Curves shall be plotted from no flow at shut off head to pump capacity at minimum specified TDH for one pump running and for two pumps operating in parallel. Catalog sheets showing a family of curves will not be acceptable.

- d. Complete wiring diagrams showing in full detail all line voltage wiring and components, and control voltage wiring and components.
- e. A drawing showing layouts of the pump control panel for each pumping station shall be furnished.
- f. The total weight of the equipment including the weight of the single largest item.
- g. A complete bill of materials of all equipment.
- h. A list of the manufacturer's recommended spare parts, with the manufacturer's current price for each item. Include o-rings, seals, etc. on the list. List bearings by the bearing manufacturer's name and part number.
- i. All submittal data required by the general conditions.
- j. Complete motor data.

In the event that it is impossible to conform to certain details of the specifications due to different manufacturing techniques, describe completely all non-conforming aspects.

10.1.3 Materials and Equipment

The pumping units required under this section shall be complete including pumps and motors with proper alignment and balancing of the individual units. All parts shall be so designed and proportioned as to have liberal strength, stability, and stiffness and to be especially adapted for the work to be done.

- a. New discharge connections shall be furnished for each pump and be rigidly and accurately anchored into position. All bolts used to mount pump base, guide rails and guide rails supports shall be drilled and epoxied per FDOT Standard Specifications. Necessary anchor bolts, nuts, and washers shall be 316 series stainless steel and be furnished by the pump manufacturer for installation by the contractor.
- b. Stainless steel nameplates giving the name of the manufacturer, the rated capacity, head, speed, and all other pertinent data shall be attached to each pump.

10.1.4 Product Handling

All parts shall be properly protected so that no damage or deterioration will occur during a prolonged delay from the time of shipment until installation is completed and the units and equipment are ready for operation.

Factory assembled parts and components shall not be dismantled for shipment or installation unless permission is received in writing from the engineer.

Finished surfaces of all exposed pump openings shall be protected by wooden blanks strongly built and securely bolted thereto.

Finished iron or steel surfaces not painted shall be properly protected to prevent rust and corrosion.

Use padded straps when handling pipe and fittings so not to damage finished metal and/or coated surfaces. Any surfaces damaged shall be repaired or replaced by the Contractor at the City's discretion.

After hydrostatic or other tests, all entrapped water shall be drained prior to shipment, and proper care shall be taken to protect parts from the entrance of water during shipment, storage and handling.

Each box or package shall be properly marked to show its net weight in addition to its contents.

10.2 Products

10.2.1 Pumps

The pumps shall be totally submersible non-clog centrifugal pumps with submersible close-coupled motors designed to pump sewage. The design shall be such that the pumping units shall be automatically connected to the discharge piping when lowered into place on the discharge connection. The pumps shall be easily removable for inspection or service, requiring no bolts, nuts or other fastenings to be removed for this purpose, and no need for personnel to enter the wet well. Each pump shall be fitted with a 304-series stainless steel lifting chain of adequate strength and length to permit raising the pump for inspection and removal.

Standard impellers shall be constructed of cast iron, ASTM A48, Class 35B and coated with Belzona. Cutting impellers shall be constructed of hardened high chrome. The design shall permit low liquid velocities and gradual acceleration and change of flow direction of the pumped media. The impeller/casing design shall result in a passage-free surface to which solid or fibrous materials cannot adhere. The overall pump design shall combine high efficiency, low required NPSH, large sphere passage and the ability to handle high solids concentrations efficiently. All other parts shall be of close grain gray iron construction, with all parts coming into contact with sewage protected by approved sewage resistant coating. All external bolts and nuts shall be of 304 series stainless steel. The impeller shall be of a centrifugal non-clog type capable of passing solids and fibrous material of minimum 3-inch sphere size.

Each pump shall be provided with a balanced tandem mechanical seal system or cartridge. All seal faces and springs shall be immersed in oil. Both sets of faces (both upper and lower sets) are tungsten carbide or silicon carbide construction. Seal faces shall be self-aligning, positively driven, and each held by separate spring systems. The construction shall be such that no spring is exposed to the pumped media. Also acceptable is a tandem double mechanical seal running in an oil reservoir, composed of two (2) separate lapped face seals, each ring with each pair held in contact by a separate spring. The upper seal unit, between the oil sump and motor housing, shall contain one (1) stationary and one (1) rotating tungsten-carbide ring. One (1) face seal and the oil reservoir from the motor chamber shall seal the pumped liquid from the oil reservoir by the other. The seals shall require neither maintenance nor adjustment, and shall be easily replaced. Conventional double mechanical seals with a single spring between the rotating faces, requiring constant differential pressure to effect sealing and subject to opening and penetration by pumping forces shall not be considered equal to the tandem seals specified and required.

A wear ring shall be installed to provide efficient sealing between the volute and impeller. The wear ring shall consist of a stationary ring made of nitrile rubber molded with a steel ring insert or stainless steel ANSI 304 ring that is drive-fitted to the impeller eye.

A sliding guide bracket shall be an integral part of the pumping unit and the pump casing shall have a machined connection flange to connect with a cast iron discharge connection, which shall be bolted to the floor of the sump with stainless steel anchor bolts and so designed as to receive the pump connection without the need for any bolts or nuts. Anchor bolts shall be drilled and epoxied, no redhead bolts shall be allowed. Sealing of the pumping units to the discharge connection shall be with the entire weight of the pumping unit guided by stainless steel guide rails. No portion of the pump shall bear directly on the floor of the sump and no rotary motion of the pump shall be required for sealing. The pump with its appurtenances and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet.

Pump motor shall be 3-Phase (unless otherwise approved by the City), NEMA-B design, squirrel-cage, induction, shell type design, housed in an air-filled (with a positive circulation system) watertight chamber. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31. The combined service factor (combined effect of voltage, frequency and specific gravity) shall be a minimum of 1.15. Motor service factor less than 1.15 may be considered on a case-by-case basis, whereby the pump manufacturer shows this service factor to be their standard offering per published catalog information or other issued publication data; however, in no case shall it be less than 1.10. The motor horsepower shall be adequate so that the pump is non-overloading throughout the entire pump performance curve, from shut-off through run-out.

The stator winding and stator leads shall be insulated with moisture resistant Class F insulation which will resist a temperature of 311°F (155°C). The stator shall be dipped and baked three (3) times in Class F varnish and shall be fitted into the stator housing. The use of bolts, pins or other fastening devices requiring penetration of the stator housing will not be acceptable. The motor shall be capable of sustaining a minimum of ten (10) starts per hour with the liquid surface located at the top of the pump's volute, but below the motor casing, with a temperature rise not exceeding 104°F (40°C) above ambient. The motor shaft shall be series AISI 420 stainless steel of solid construction without shaft sleeves or overhang longer than 2.5 times its diameter. Overhang shall be defined as the distance from the lower bearing to the hub of the impeller. Pump motors shall have cooling characteristics suitable to permit continuous operation, in a totally, partially or non-submerged condition. Each motor shall incorporate an ambient temperature compensated overheat sensing controls. The device shall be self-resetting. The power cable shall be fixed to the pump using a watertight grommet assembly. Pump motor cables shall be suitable for submersible pump applications and shall be properly sealed and PIZZMSHA approved.

10.2.2 Stainless Steel Pump Discharge Piping and Fittings

Stainless steel pipe is an approved material for discharge piping within the wet well and above ground pipe and fittings at pump stations. Stainless steel pipe shall be Schedule 40S T304L austenitic stainless steel in accordance with the latest revision of ASME B36.19/ASTM A312. Stainless steel pipe and fittings shall have flanged connections. Flanges shall be slip-on welded type, 150#, raised-faced, T304L stainless steel in accordance with ASTM A182. All welds shall be made by an American Welding Society (AWS) Certified Welder according to the AWS D10 (and other applicable standards) for welding stainless steel pipe and fittings.

All stainless steel pipe and fittings shall be in accordance with the Buy American Act unless otherwise approved by the City. Pipe shall be fabricated from only high-quality stainless steel materials, free from defects, and from sources with that are ISO9001:2008 compliant.

10.2.3 Ductile Iron Pump Discharge Piping and Fittings

Ductile iron pipe is an approved material for above ground pipe and fittings at pump stations. With approval from the Engineering Manager or designee, ductile iron pipe can be used for pump station discharge piping and fittings within the wet well. All ductile iron pipe and fittings shall be as specified in the Technical Specification for Distribution and Transmission System Piping (Section 7), with the following modifications:

For pump station wet well installations, line the interior surface of ductile iron pipe and fittings to a minimum thickness of 40 mils (DFT) with a high-solids (97% minimum) coal-tar free ceramic epoxy. Coat the exterior surface with epoxy primer to a thickness of 5 mils, and apply a top

coat of epoxy to a minimum thickness of **30 mils**. Approved products include Permite Permox-CTF (interior); Tnemec Series N140 Pota-Pox Plus (primer), and Tnemec Series 435 Perma-Glaze (top coat), or approved equals. The top coat only may be field applied by an experienced applicator and allowed to cure before installation.

10.2.4 Electromagnetic Flow Meter

For designated installations where required by the City (generally those stations in excess of 1 MGD average daily consumption, or where otherwise directed by the City), an electromagnetic flow meter shall be furnished and installed. The flow meter shall be McCrometer/Water Specialties Model Ultra-Mag[®] UM-06, with 150-lb AWWA Class-D flanges. The flow meter shall operate within a range of 0.2 – 32.0 FPS and be accurate within 0.5% of the actual flow.

The flow meter shall be installed per manufacturer's recommendations in separate vault or manhole at a determined point in the piping beyond the station discharge. The flow meter signal shall be wired back to the Pump Control Panel and integrated into the telemetry system.

10.2.5 Wet Well Liners

Inside the wet well all exposed surfaces (including bottom of top slab) shall be lined with a protective coating. Approved lining products include AGru America, Inc. – HDPE Sure Grip[®]; CCI Spectrum, Inc. – Spectrashield; GML Coatings, LLC. – Green Monster Liner; Quadex, Inc. – StructureGuard epoxy; Raven 405 ultra-high build epoxy; or approved equal. Liners shall be shown, labeled, and dimensioned on the shop drawings submitted for approval to the Engineer.

All concrete shall be sufficiently cured to prevent gaseous formation behind the liner per the liner manufacturer's specifications. All wet well surfaces shall be thoroughly prepared, cleaned, dry and free from all mill-scale, rust, grease, dirt and other foreign matter to assure proper adhesion/installation of the liner. These linings shall be applied in strict accordance with the manufacturer's recommendations by a certified installer.

Wet-well shall be covered with a temporary cover during construction to prevent unplanned or unauthorized entry of persons or objects.

10.2.6 Access Frames and Guides

The pumping station wet-well and valve-vault shall be furnished with the necessary aluminum access frames, complete with hinged and hasp-equipped covers, fall protection grating, stainless steel upper guide holder and level sensor cable holder. The frames shall be securely mounted above the pumps. Doors shall have safety-locking handle in open position. Doors shall have a 300 psf load rated (H20, if traffic bearing) aluminum checkered plate and shall be similar to

Model "JD-AL" with stainless steel hardware manufactured by the Bilco Company, model "S2R" by Halliday Products, Electric Specialty, or model "APD 300" manufactured by US Foundry.

The wet-well shall be a minimum 8-foot diameter, the entrance opening a minimum of 36 inches x 48 inches. The wet well hatch shall be sized by the design engineer to ensure that the pumps may be passed on the guide rail through the hatch without conflict. The valve-vault shall be a minimum 7 feet wide x 8 feet 6 inches long x 5 feet 6 inches deep with a minimum 72 inches x 48 inches access opening. Shop drawings for the pumps, pump controllers, wet-well, and valve-vault and related piping, must be submitted to the City Engineer for review and approval prior to manufacture of the wet-well valve-vault or ordering of the pumps and controllers.

Guide rails (2 per pump) shall be Schedule 40, T304 tubular stainless steel pipe sized according to Table 10.1. **DO NOT** use T-shape or other beam-type rail systems.

Pump Horsepower	Pump Rail Diameter
<10 HP	1.5" or 2"
10 HP to < 50 HP	2"
50 HP or greater	3"

Lower guide holders shall be integral with the pump discharge connection. Intermediate guide brackets shall be required on stations whose depth is equal to or greater than 20 feet. Intermediate guide brackets shall be TP 304 stainless steel.

10.2.7 Pump Control System

The pumps shall be controlled by a submersible pressure transmitter manufactured by KPSI with the following specifications:

Part No.: 700S14ABB015.000000.000B10040A

Pressure Range: 0.00 to 15.00 PSIG

Excitation: 9-28 VDC

Output: 4-20mA

Cable Length: 30 ft.

The submersible pressure transmitter shall be mounted on a 4-inch PVC stilling well, schedule 40, and attached to the side of the wet well using pipe supports. It shall also be terminated on TB-4 in the control panel as per the electrical drawings and the face of the sensor end of the transmitter shall be located 12 inches AFF of the bottom of the wet well.

10.2.8 Wiring

The control panel shall be completely wired at the factory, except for the power feeder lines, in accordance with National Electric Code. All wiring outside the panel shall be in conduit.

10.3 Execution

10.3.1 Inspection and Testing

10.3.1.1 General

The engineer shall have the right to inspect, test, or witness tests of all materials or equipment to be furnished under these specifications, prior to their shipment to the job site. The engineer shall be notified in writing prior to initial shipment, in ample time so that the Engineer can make arrangements for inspection.

The services of a factory representative shall be furnished for 1 day and he shall have complete knowledge of proper operation and maintenance to inspect the final installations and supervise the test run of the equipment. This must be done on a Monday, Tuesday, Wednesday or Thursday; not on a Friday, Saturday or Sunday nor on a holiday or the day before a holiday. This must be closely coordinated with the City, providing a minimum of two weeks advance notice.

10.3.1.2 Pumps

After all pumps have been completely installed, and working under the direction of the manufacturer, conduct in the presence of the Engineer, such tests as are necessary to indicate that pumps conform to the specifications. Field tests shall include all pumps included under this section. The Contractor shall supply all electric power, water or wastewater, labor, equipment and incidentals required to complete the field tests.

If the pump performance does not meet the specification, corrective measure shall be taken or pumps shall be removed and replaced with pumps, which satisfy the conditions, specified. A 24-hour operating period of the pumps will be required before acceptance. During this 24-hour operating period, the contractor shall supply all power necessary.

10.3.1.3 Field Testing

Upon completion of all the mechanical work, the contractor shall conduct testing as specified herein to demonstrate that the equipment performs in accordance with all specifications.

The contractor shall perform initial testing of the equipment to ensure that the tests listed below can be satisfactorily completed.

The initial start-up shall demonstrate that all items of these specifications have been met by the equipment as installed and shall include, but not limited to, the following tests:

- a. That the quick release lift out feature functions properly and allows the pump to be raised and lowered without draining the pit.
- b. That all units have been properly installed and are in correct alignment.
- c. That the units operate without overheating or overloading any parts submerged and un-submerged and without objectionable vibration.
- d. That there are not mechanical defects in any of the parts.
- e. That the pumps can deliver the specified pressure and flow rate.
- f. That the pumps shall be capable of pumping raw unscreened sewage.
- g. That the pump sensors and controls perform satisfactorily as to sequence, the pumps correct start and stop levels, and correct high level alarm.

10.3.2 Guarantee

The contractor shall guarantee the station for 24 months from the date of acceptance that the structure and all equipment will be free from defects in design, materials and workmanship. The lift station manufacturer shall furnish replacement parts FOB factory, for any component proven defective, whether of his or of other manufacturer during the guarantee period, except for those items which are normally consumed in service such as light bulbs, oil, grease, pump seals, etc.

10.3.3 Warranty

The equipment manufacturer shall warrant the pumping units being furnished against defects in workmanship and material for a period of five (5) years or 10,000 hours, whichever occurs first, under the use indicated by these specifications and as shown in the drawing. The warranty shall be in printed form and shall apply to all units furnished, and shall be duplicated into each of the four operation and maintenance manuals submitted.

The warranty shall cover all parts and labor required to repair or replace a defective unit as follows: 100% (0 – 24 months), 50% (24 – 39 months), and 25% (40 – 60 months).

The manufacturer's warranty period shall run concurrently with the Contractor's warranty period. No exception to this provision shall be allowed.

10.3.4 Operating Instructions

Four (4) operating and maintenance manuals complete with spare parts lists for all equipment shall be furnished. The manuals shall be prepared specifically for this installation and shall include all required cuts, drawings, equipment lists, descriptions, etc. that are required to instruct operation and maintenance personnel unfamiliar with such equipment.

A factory representative of all major component manufacturers, who has complete knowledge of their proper operation and maintenance, shall be provided one day to instruct representatives of the City on proper operation and maintenance. With the permission of the City, this work may be conducted in conjunction with the inspection of the installation and test run as provided under Section 9.3.1.3. If there are difficulties in operation of the equipment due to the manufacturer's design or fabrication, additional service shall be provided at no cost to the City.

10.3.5 Tools and Spare Parts

One (1) set of all special tools required for normal operation and maintenance shall be provided. All such tools shall be furnished in a suitable steel tool chest complete with lock and duplicate keys.

Check out - The manufacturer shall have his representative place the station in initial operation after all construction has been completed. This shall be done on a Monday, Tuesday, Wednesday or Thursday (not on a Friday, Saturday, Sunday or holiday or day before a holiday). The manufacturer shall furnish the City with four (4) copies of the "crank up" report. A formal inspection of the pumping station shall be scheduled on a day following the station start up but not concurrently (again not a Friday, Saturday, Sunday, Holiday or day before a Holiday). This must be closely coordinated with the City, providing a minimum of two weeks advance notice.

10.3.6 Miscellaneous

Any materials not listed in the Contract Documents (specification, construction drawings, special provisions, bid solicitation) will be per latest FDOT specifications.

All 90° and 45° flanged bends on the entire project will be long radius bends. There is to be no 90° or 45° bend on the job site that is not long radius bends except for 90° and 45° MJ bends.

Pump motors will be no older than 4 months old and pump supplier will certify the date of manufacture.

All stainless steel will be 316 series unless noted otherwise.

The pump station includes everything to make the station fully operational which includes, but is not limited to, pumps, piping, valves, control panel (which must be furnished by the pump supplier), pad, 304 SS lifting chain, 304 SS guide rails, 316 SS brackets, 2 glycerin filled gauges.

10.3.6.1 Fencing

The fence and gate bolts shall be pinned to make disassembly difficult. Fencing shall be vinyl coated (green or black) with top rail. All slabs, equipment, and utilities shall be located within the fenced area at least 4 feet from the fence. A 6-foot high perimeter chain link fence shall be installed with a walk in and drive through sixteen (16) foot cantilever slide gate. This metal fencing shall conform to the current FDOT standard specification for Type "B" fencing or as detailed on the construction documents. Barbed wire attachments are not to be included, unless specifically noted otherwise in the construction documents.

10.3.6.2 Driveway and Parking Areas

Concrete driveway and parking areas shall meet the current FDOT specification. Where approved by the engineer, asphalt driveway & parking area are permitted given the following requirements. Drive and parking area shall include subgrade base and wearing surface in accordance with current City Standards. Pavement grade shall be determined in relation to the drainage installations. The station's paved access road shall be 16-feet wide and have a slope between 2% and 12%. The road width may be reduced to a minimum of 12-feet wide with the permission of the Engineering Manager or designee. A paved vehicle turnaround area with a 20-foot inside turning radius to allow a two-ton truck to turn around is required. Four (4) inches of FDOT No. 57 gravel over 20 mil geotextile will be placed in the unpaved areas surrounding the station. Should the plans show a concrete drive and parking area, the drive and parking area will be per the plans.

10.3.6.3 Exceptions

No exceptions from these specifications will be allowed unless specifically approved in writing by the Water Resources Engineering Manager or designee.

The City will review submittal data of the pump station manufacturer to facilitate inadvertent exceptions, however, inclusion of exceptions in the submittal shall not satisfy the requirement that it be specifically approved.

END OF SECTION 10

11.1 General Provisions

11.1.1 Scope of Work

In general, the scope of work shall be to provide and install the electrical service, electrical power distribution and controls interface for a sewage pumping station. All permits needed for the electrical construction work shall be the responsibility of the Contractor.

It is the intent of these specifications and drawings that the electrical system shall be complete, fully operational, and suitable in every way for the service required. Drawings are diagrammatic in nature and do not show in every detail all devices and incidental materials necessary to accomplish their intent. Therefore, it shall be understood that such devices and incidental materials required shall be furnished by the Contractor. The following generally describes the tasks to be included in the installation of the electrical and control systems for the pumping station:

- a. The electrical service equipment and lightning air terminal grounding shall be mounted on a pole that will be installed adjacent to the pump station. The Contractor shall provide and install the meter base, conduit (with weather-head) and wire to construct the service from the pole to the pump station control panel. The Contractor shall provide and install the lightning air terminal and #6 grounding conductor on the pole. The Contractor shall coordinate, schedule, and make payment to City Electric for City Electric's provision and mounting of the service pole. Coordination with the City and the pole installer shall be part of the work.
- b. The pole will also be the antenna mast. The Contractor shall install the antenna cable/conduit between the pump station control panel and the antenna location at the top of the pole (conduit should stop 10 feet up the pole). The cable shall be installed on the pole after the pole has been installed to avoid damage to the cable. The Contractor shall coordinate with the City concerning installation of the antenna by the City.
- c. The pump station control panel contains the main service disconnect, telecommunication RTU, and pump control equipment. The Contractor shall receive the control panel from the City or City's Vendor, and store the control panel until ready for installation. The supply and installation of the concrete pad (6 feet x 6 feet x 6 inches- or larger if generator required) with imbedded conduits (service and antenna cable) shall be part of the Electrical Contractor's work. The Contractor shall install the control panel on the concrete slab.
- d. The Contractor shall provide and install the conduit and wire (including "seal-offs") between the control panel at the wet well and valve vault. The conduit and wiring shall be sized to comply with the NEC. The Contractor shall provide and install the field instrumentation (level transmitter and float switch in the wet well; and proximity

switches on the check valves). Termination of field wiring at the devices/motors and at the control panel shall be part of the work.

- e. The Contractor shall provide and install the grounding for the pump station and shall test the grounding system per the specifications.
- f. The Contractor shall provide a complete check out of the pump station (i.e. motor phase rotation, emergency power phase rotation matches normal power, field instruments provide correct input to SCADA system, etc.). The Contractor shall fill out the "startup check list" per the specification.
- g. The Contractor shall provide personnel for the start-up of the pump station (i.e. station pumping fluid). For the purpose of bidding, start-up will be 4 hours at the pump station site. Coordination of the start-up date and time with the City shall be the responsibility of the Contractor.

11.1.2 Permits and Inspections

The Contractor shall obtain all necessary permits and inspections required for the work to be performed and shall pay all charges incidental thereto. Upon completion of the work, the Contractor shall deliver to the Engineer a Certificate of Inspection and approval, from the City of Tallahassee Electrical Inspection Department or the Leon County Electrical Inspection Department, as to compliance with the National Electrical Code and the City of Tallahassee Electrical Code. A Master or Journeyman Electrician must be present during the final inspection.

In addition to the above required inspection the City of Tallahassee may retain a local Consulting Engineer, hereinafter referred to as "the Consulting Engineer" to provide construction administration, ensure adherence to these specifications and drawings, observe and perform specified measurements, perform a final inspection and submit a written report.

The Water Resources Engineering Division's decision on any questions concerning acceptability of equipment, materials or construction methods shall be construed as the decision of the City. As it is the intent of these specifications and drawings to provide for typical electrical service standards for all sewage lift stations in the City of Tallahassee or Leon County, no deviations from the plans or specifications will be allowed without advance, written approval from the Engineer.

The Contractor shall notify the City Inspector when the following items are ready for approval, inspection, performance or observation; and when practical, these services shall be accomplished with a minimum of visits to the site by the Engineer:

- a. Approval of service entrance equipment location.
- b. Inspection of the underground service and feeder conduits prior to backfilling of the trenches.

- c. Observation of final ground rod resistance measurement.
- d. Performance of phase rotation check.
- e. Final inspection.

11.1.3 Codes and Standards

The latest editions of the established standards of the following organizations shall be followed as if they were fully written herein and constitute a part of the specification requirements, except where otherwise specified:

- a. National Fire Protection Associations - National Electrical Code.
- b. Occupational Safety and Health Administration (OSHA).
- c. Federal Communications Commission (FCC).
- d. Municipal, local or other codes having jurisdiction.
- e. Utility Company Rules and Regulations.

The foregoing rules, standards, regulations, specifications, recommendations, and requirements shall be followed by the Contractor as minimum requirements. They shall not relieve the Contractor from furnishing and installing higher grades of materials and workmanship, which are specified herein or indicated on the drawings.

11.1.4 Minor Deviations

The Contractor shall note that the electrical drawings and these specifications are intended to define a typical installation as to the extent, general character and location of the work included. The Contractor shall be responsible for a complete and operable system to perform the functions desired.

Arrangements of conduit and wiring and equipment that differ materially from the obvious intent of the drawings and specifications will not be permitted except where specifically approved by the Engineer. Shop Drawings shall be furnished showing all changes. Any change resulting in a saving of labor or material shall be made in accordance with a Contract Change Order.

Any alternate proposals affecting the design or the intent of the plans and specifications shall be submitted with the bid. They shall be complete with plans, specifications and sufficient details for proper evaluation. Incomplete or partial proposals will not be given consideration.

11.1.5 Guarantee

In addition to the guarantee of equipment by the manufacturer of each piece specified herein, this Contractor shall guarantee such equipment and shall be responsible for a period of two (2) years after final acceptance to make good any defects of materials or workmanship occurring during this period, without expense to the City. Light bulb replacement guarantee shall be limited to 30 days.

11.1.6 Qualifications

This work shall be performed by, or under the direct supervision of a Master Electrician, duly licensed to conduct business, or to practice his trade within the limits of the City of Tallahassee

11.1.7 Plans and Specifications

The plans and specifications are complementary one to the other and any item called for by one and not the other shall be supplied the same as if it were called for by both.

11.2 Basic Materials and Methods

11.2.1 Conduits

Type of Conduit to be used:

- a. All raceways shall be continuous and shall be secured to all enclosures so that an electrically continuous system ground will be maintained, when IMC or flexible conduit is used.
- b. All exposed raceways shall be racked and installed with runs parallel to or perpendicular with structural members.
- c. All raceways entering an enclosure shall have a substantial insulated bushing or insulated connector providing a smoothly rounded surface to protect the conductors, equal to Thomas and Betts Insulated Bushings.
- d. All job cut threads shall be made rust resistant by application of zinc chromate paint prior to assembly.
- e. Intermediate metal conduit (IMC) that runs in concrete or underground shall be made watertight by applying compound to the joints and shall be given two protective quick drying asphalt base paint coatings throughout the imbedded length and to a point 6 inches above final grade.
- f. Sealing fittings shall be installed in conduits where required by the NEC for Class I Division II installations and/or the drawings. The fittings shall be suitable for vertical or horizontal installation equal to O-Z Gedney type EYA, appropriately sized to fit conduits. Each fitting shall be installed as close as practicable to enclosures, and in no case, more

than 18 inches from enclosures. Sealing compound shall be a type approved for the purpose, unaffected by the surrounding atmosphere or liquids, and shall have a minimum melting point of 200 °F.

- g. Conduit riser shall be clamped to service pole with standoff pipe straps to provide proper alignment into meter socket.
- h. Where not otherwise restricted by the above Paragraphs, underground conduit shall be Schedule 40 PVC.
- i. Where not otherwise restricted by the above Paragraphs, above-ground or exposed conduit shall be IMC or rigid galvanized.

11.2.2 Wiring

11.2.2.1 Type

- a. Power Wiring: The secondary wire and cable shall be 600-volt THW or THWN insulated copper conductors.
- b. Control Wiring: 120VAC control wiring shall be No. 14 AWG, THHN 600-volt insulation, 7 strand copper conductors.

11.2.2.2 Installation

- a. When pulling lubricants are used, they shall be of a type approved for the particular cable insulation.
- b. All wiring in switches, control panels, etc., shall be neatly formed, grouped and taped to present a neat orderly appearance.

11.2.2.3 Identification

- a. Conductor identification shall be by color-coded insulation and wire labels.

Power Wiring Color Codes

120/240 Volts AC System --
Phase A - Black
Phase B - Red
Phase C - Blue
Neutral - White
Ground – Green

[THE REMAINDER OF THIS PAGE LEFT INTENTIONALLY BLANK]

480 Volts AC System --

Phase A - Brown
Phase B - Orange
Phase C - Yellow
Neutral - Grey
Ground - Green

- b. Control wiring shall be identified by color-coded insulation and an adhesive wire label corresponding to the wiring diagrams.

Control Wiring Color Codes --

120VAC Discrete Control Red
24VAC Discrete Control Gray
DC Discrete Control Blue
Analog Control Shielded - Pairs/Cable

The adhesive wire markers shall be pre-printed cloth wrap on style or the type written adhesive or shrink-on style.

- c. All neutral conductors shall have white or gray insulation (white preferred). All grounding conductors shall have green or green with/yellow stripe insulation.

11.2.3 Lighting

Area Lighting - Furnish and install a pole mounted, 100-watt, 120-VAC, high-pressure sodium (HPS) luminaire. The luminaire shall be per Figure 10-1 a G.E. PBS10S1A5V5AC or approved equal.

11.3 Service and Distribution

11.3.1 General

The Contractor shall install a three-phase service of the size, number of conductors, and voltage characteristics shown on the drawings. Refer to the figures at the end of this Section.

11.3.2 Location

Location of service entrance equipment shall be in accordance with the site plan, but must be approved at the job site by the Engineer prior to installation of electrical distribution and monitoring equipment.

11.3.3 Control Panel

Service entrance, metering, electrical distribution, and antenna, shall be rigidly mounted to suitable support structures as shown on the drawings.

Overhead service entrance riser poles shall be 65-foot, Class 5, CCA yellow pine service poles, or approved equal, and may be used for partial support of electrical distribution, lighting and antenna.

A 65-foot, Class 5, CCA yellow pine service pole shall be furnished and installed at underground service locations to facilitate mounting of area lighting and antenna. The light fixture and antenna shall be as specified in other sections of this specification and shall be furnished with all necessary mounting hardware. Aluminum pole cap is required. The service pole shall be paid for by the contractor.

When overhead service is required by the drawings, a suitable guy shall be installed to balance service drop conductor tension. The guy shall be composed of a seven-strand 5/16-inch galvanized steel guy with a screw type anchor, 6 inches in diameter. Anchor setting depth shall be determined in the field, as required to provide a minimum holding strength of 1,000 pounds. Minimum setting depth shall be 5 feet. Guy strand shall be attached to service pole with a galvanized steel thimble-eye angle bolt (with flat washer). Two (2) bolt-galvanized guy clamps shall be used for guy attachments to both the thimble-eye bolt and the thimble-eye anchor rod. All guying hardware shall be galvanized. Anchor and anchor rod shall be coated with asphalt paint before installation.

In all cases, service distribution support structures will be subject to approval under the provisions of the final inspection.

11.3.4 Metering

The Contractor shall install the metering equipment furnished or specified by the Electric Utility Company supplying power to the site.

The meter socket shall be installed as shown on the drawings, and in accordance with utility company regulations. When installed on a service riser pole, the meter socket shall be rigidly mounted.

11.3.5 Grounding

The Contractor shall install a complete grounding system in conformance with the National Electrical Code.

The Contractor shall install a driven ground rod, consisting of coupled 8-foot sections of 5/8-inch copper-clad steel ground rods. After notifying the City Inspector as to the time and date, ground rod installation shall be as follows:

- a. Ground rods shall be driven to a minimum depth of 32 feet, unless earth conditions prohibit reaching this depth. Under such circumstances, the Engineer may use alternate schemes of paralleled rods after prior approval.
- b. After driving 32 feet of ground rod, the Contractor shall test the ground rod for ground resistance by the fall of potential method. This shall be accomplished by utilizing a megger earth tester and two auxiliary reference probes driven into the earth in a straight line from the test rod at distances of 62 and 100 feet.
- c. If the ground resistance is measured at 10 ohms or less, the ground rod is satisfactory and shall have the grounding electrode conductor(s) connected to it by means of an exothermic weld connection. The service entrance grounding conductor and the service pole/antenna-grounding conductor shall be connected to the same ground rod.
- d. If the ground resistance is greater than 10 ohms, additional ground rods must be driven until a satisfactory reading is obtained. The Contractor shall include in his bid the unit cost for installing additional 8-foot sections of ground rod. He shall be compensated on this basis, by change order, for each additional 8-foot ground rod section required, above the minimum of four (4) sections, in order to obtain the necessary 10 ohms or less ground resistance.
- e. Should additional rod sections be required to obtain the maximum 10-ohm ground resistance, the City Inspector shall be informed and shall observe the resistance measurement after 32 feet of rod has been driven. The City Inspector will then initiate a change order request to allow the Contractor to drive the necessary additional rods at the quoted per unit price to obtain the desired ground resistance. The additional rods will be driven under the observation of the City Inspector.
- f. The City Inspector shall observe the final ground resistance measurement. Ground resistance measurements shall be made in normally dry weather, not less than 48 hours after rainfall, and with the rod under test isolated from other grounds. A written report, in duplicate shall be made to the City Inspector giving the date, the final ground rod length, any special array of rods authorized for use, and the final ground resistance measurement.
- g. A grounding electrode conductor shall be attached to the service pole air terminal and shall be fastened to the service pole with wire staples 4 feet o.c. minimum, and shall be

protected to a height of 10 feet above ground with suitable plastic molding and clamps. This grounding conductor shall be connected to the ground rod by means of an exothermic weld.

11.4 Special Systems

11.4.1 SCADA

11.4.1.1 Antenna

The Antenna shall be a Yagi antenna, Decibel Products Model DB-499 or equivalent with the following minimum specifications:

- Antenna Gain - 12db
- Radiation Pattern - Directional
- Frequency Range - 920-960 MHz
- Power Handling - 25 Watts
- Polarization - Vertical
- Horizontal Beam Width - 60 deg. Max.
- Lighting Protection - Direct ground to mount
- Wind Rating - 150 MPH
- VSWR - 1.5:1 max (REF. 50 ohms)
- Termination - N Type

Antenna Mounting Clamps - Provide two (2) mounting clamps model DB365W or equivalent. These clamps are used in mounting a 2" mast to wood poles or masonry walls up to 14 inch thickness.

Antenna Mast - Provide a 2" non-corrosive metal piping, 10' in length, such that the antenna is mounted a minimum of 5 feet above tip of the pole and 6 inches from the tip of the mast. The 2" mast shall be grounded to station grounding system.

11.4.1.2 Coaxial Cable

a. Coaxial Cable

The transmission line shall have a solid corrugated outer conductor and polyethylene protective jacket. Type N male connectors for both ends.

- ½-inch foam-filled cable, Andrew Corporation, Model LD4-50A or equivalent
- ½-inch Super flex cable, Andrew Corporation, Model FSJ4-50 or equivalent

The length of this cable shall be determined at the site after the installation of the antenna mast or pole.

b. Coaxial Surge Protection

Provide bulkhead type protectors as means to penetrate the enclosure and “feed-through” the coaxial connection to the radio transceiver.

- Type-PolyPhaser Corporation Single channel coaxial surge protector Model IS-B50LN, or equal
- Surge - 50,000 amps minimum, IEEE 8/20 waveform (Ref. ANSI C62.1)
- Turn On Potential – 60 VDC, maximum
- Turn On Time - 7nSec. After voltage wave front reaches DC threshold (1KV/nSec waveform reference)
- Impedance – 50 ohms

11.4.1.3 Level Sensor System

To control the operation of the pumps with variations of sewage level in the wet well, a pressure transducer to measure head pressure, which correlates to level, shall be provided. The pressure transducer shall be manufactured by KPSI (Hampton, Virginia 800-328-3665) model number 700S14ABB015. The transducer shall have a pressure range of 0 to 15 PSIG, operate with excitation of 9-30VDC and shall have an output of 4-20mA.

11.4.1.4 Phase Relays

Provide and install a phase loss, under voltage and phase sequence monitory/relay, SLA-230-ALE or SLA-440-ALE depending on the operating voltage of the pumping station. Phase relays shall be installed at the RTU Control Panel as shown on the Drawings.

11.4.1.5 Auxiliary High Level Switches

In addition to the liquid level sensing control system components herein specified, an additional liquid level sensor shall be provided for a high wet well alarm. The sensor shall be a float type switch (magnetic switch or encapsulated mercury switch using less than 0.9 grams of mercury). The sensor shall be watertight, encased in polypropylene or polyurethane resin for direct application in the wet well. The sensor shall be provided with sufficient conductor to reach the bottom of the wet well and terminate in the RTU Control Panel.

11.4.1.6 Emergency Pump Control Backup Switch

An additional liquid level sensor shall be provided for controlling pump #1 whenever the RTU is malfunctioning. The sensor shall be a float type switch (magnetic switch or encapsulated mercury switch using less than 0.9 grams of mercury). The sensor shall be watertight, encased in polypropylene or polyurethane resin for direct application in the wet well. The sensor shall be provided with sufficient conductor to reach the bottom of the wet well and terminate in the RTU Control Panel. The sensor shall be positioned at about one (1) foot above the "High Level Float Switch" and connected to an Allen-Bradley timer off-delay model 700-FEB1TU22 as shown in the Drawings.

11.4.1.7 Pump Failure Check Valve Proximity Switch

The pump failure circuit for each pump shall consist of a proximity switch mounted on the pump discharge check-valve such that when the check-valve is open the contacts on the switch open providing an input to the RTU. The RTU shall be configured such that if the pump is running (auxiliary contact from SMC) and the proximity switch is not opened within a specific amount of time, then the pump is stopped and a fault alarm is generated in the RTU.

- a. Proximity Switch – Provide and install an Automation Direct, AT1-A0-2A, 30 mm diameter, 10-30 VDC, 2-wire, sink/source, unshielded, 15 mm nominal sensing distance, normally open output, cable style, nickel-plated brass stainless steel threaded barrel type inductive proximity switch sensor mounted on the check valve's body as specified on the drawings.

11.4.1.8 Intrusion Alarm

The intrusion alarm system shall consist of normally open push type spring return limit switch activated by the RTU Control Panel door. For two-door cabinets, the switches controlled by each panel door shall be wired together in series. Intrusion switch(es) mounted inside the control cabinet shall be physically mounted such that intrusion is recognized with opening of outer door.

11.4.1.9 Emergency Power Auxiliary Contact

Provide the emergency power circuit breaker with Form C auxiliary contact (A and B contacts). The normally open contact shall be wired to the RTU.

11.4.1.10 Indicating Lights

Provide and install in the door of the control enclosures 120VAC LED type pilot lights. The lights shall have green lenses and shall be Allen-Bradley 800T-QH10(R) (G) or equal.

11.4.1.11 Testing

As part of the final inspection herein specified, the SCADA system components shall be completely tested by the system manufacturer or his representative, with the City in attendance during the test. All functions of the system shall be demonstrated to be operating properly as required by these specifications.

11.4.1.12 Licensing

The City shall accomplish proper licensing of this system with the FCC with the assistance from the manufacturer.

11.5 Start-Up**11.5.1 Procedure**

The Contractor shall be responsible for placing the sewage pumping station into initial operation. A representative of the pumping station manufacturer shall be present at the start-up. The start-up shall be coordinated with the City's representative and City Inspector.

The Contractor shall complete the start-up checklist which is included as part of this specification, and furnish the City's representative with five (5) copies.

END OF TECHNICAL SPECIFICATION

(See Start-Up Checklist on following pages)

START-UP CHECK LIST (PAGE 1 OF 2)			
ITEM	OK	DEFECTIVE	COMMENT
PIPING			
Check Flanges for Leakage			
Check Valve Operation			
Check Pipe Stands			
Check Valve Alignment (Can a Valve Key Operate the Valve)			
Check Tracer Wire			
Check force main valves and boxes			
Check ARV/VRV materials (all piping should be stainless)			
Check ARV/VRV access			
Check Pressure Release Valve on Bypass Connection			
PUMPS			
Motor Rotation			
Motor Amps (Coupled to Pump)			
Excessive Leakage			
Electrical Cables			
Lifting Chains			
Pump Guides			
CONTROLS			
Motor Controls			
Motor Control Auxiliary Contacts Inputs			
Pump Fail Proximity Switches Inputs			
H-O-A "Auto" Input			
H-O-A "Hand" Input			
Pumps Run in "Hand"			
Pumps Run in "Auto"			
Motor Status Indicating Lights			
Level Control			
Level Transducer consistent with actual liquid level			
Level Transducer Signal OK (4-20ma)			
Pumps Respond to Level Control			
Wet Well Level Switch Input			
Intrusion Alarm			
Door Switch Input			

START-UP CHECK LIST (PAGE 2 OF 2)			
ITEM	OK	DEFECTIVE	COMMENT
CONTROLS (CONTINUED)			
Power/Phase Relays			
AC Power Service Input			
AC Loss of Phase Input			
Emergency Power Auxiliary Contact Input			
Emergency Power Phases Correct			
AUXILIARY EQUIPMENT			
Lighting (Interior & Exterior)			
Lighting Protection			
WET WELL			
Liner			
Wet Well Bottom Clean			
Cable Brackets			
Access Lids on Wet Well and Valve Vault			
LANDSCAPE			
Fence			
Concrete			
Plants			
WATER SERVICE			
Black Flow			
Meter			
Hose Bib			
Back Flow Cover			
VENTILATION SYSTEM			
12 VDC			
Fans run when temp switch adjusted			

PROJECT ENGINEER'S SIGNATURE _____ DATE _____

INSPECTOR'S SIGNATURE _____ DATE _____

SERVICE OPERATION SIGNATURE _____ DATE _____

ELECTRICAL MAINTENANCE SIGNATURE _____ DATE _____

12.1 General

Prepare As-Built Drawings depicting as-constructed water and sewer facilities in accordance with these specifications, as required under the Contract. THE AS-BUILT DRAWINGS MUST REFLECT THE HORIZONTAL AND VERTICAL CONFIGURATION OF THE INSTALLED FACILITIES, WITHOUT EXCEPTION. ALL EXISTING FACILITIES THAT ARE PLACED OUT OF SERVICE SHALL BE INDICATED AS SUCH ON THE AS-BUILT SURVEY. Ensure that adequate information is collected during construction to satisfy this requirement.

Exiting facilities included in the Water Resources Engineering GIS is for general information only and is not to be relied upon for as-built drawings or survey purposes.

12.2 Products

12.2.1 Digital Specifications

Unless otherwise specified, all as-built drawings will be submitted using the AutoCAD .dwg format. All as-built drawings will be drawn to scale and using the horizontal and vertical controls defined herein.

All as-built drawings will conform to the layering scheme defined herein and shall use the following predefined attribute blocks with their designated insertion points:

- T_HYD (Hydrant)
- T_SSMH (Sanitary Sewer Manhole)
- T_VALVE_WATER (Water Valve)
- T_VALVE SEWER (Sewer Valve).

Some attributes will require a value to be selected from a distinct list of translate values. The translate values are used in order to standardize these attributes. For acceptable values please refer to the "AsBuiltCode.pdf" document.

The "DIMASO" system variable value shall be set to "ON" and all dimensions used in the as-built shall be drawn using this setting for the "DIMASO" system variable.

12.2.2 Information Provided by the City

An AutoCAD file labeled "master.dwg" will be provided on request on CD from the engineering staff or the GIS-Mapping staff. This file will provide information, usage and properties regarding layering, line types and attributed blocks to be used when preparing the required water/sewer as-built drawings. Contact Water Resources Engineering and/or GIS Mapping if another CAD format is required.

A pdf document file labeled "AsBuiltCode.pdf" will be provided on request on CD from the engineering staff. This file will provide a list of coded values to be used with the attributed blocks provide in the "master.dwg" file.

An Excel file labeled "PumpStationData.xls" will be provided on request on CD from the engineering staff. This file contains a tabular listing of the required engineering data of the pump station installation. This table shall be completed in full and submitted in addition to the as-built drawings.

12.3 Execution

12.3.1 As-Built Survey

During construction, the Contractor shall employ a Registered Land Surveyor, licensed in Florida, shall keep an accurate record of the actual locations, dimensions, and elevations of the finished work; especially those items which will subsequently be concealed or inaccessible.

Prior to the approval of the final payment, the Contractor's Registered Land Surveyor shall submit to the Engineer a complete set of as-built drawings, as specified herein. The Land Surveyor shall certify on each sheet of the as-built drawings that all improvements have been constructed to the grades, elevations and locations shown on the as-built drawings and are located within the easements, rights-of-way and property boundaries shown on the record prints. Such as-built drawings shall also include a similar certification by the Contractor.

The Land Surveyor as well as the Contractor shall sign and seal all copies of the as-built drawings. All As-built drawing preparation shall be incidental to performance of the total contract and no additional compensation will be allowed.

12.3.2 Survey Controls

12.3.2.1 Horizontal Control

The horizontal datum is North American Datum 1983 (NAD83), with 1990 Florida adjustment (NAD83/90); or for Global Positioning System (GPS) survey control, the horizontal datum is NAD83, with the National Spatial Reference System (NSRS) 2007 National Readjustment (NAD83/NSRS2007), as defined by the National Geodetic Survey (NGS). The applicable State Plane Coordinate zone is Florida North - Zone 3576, FIPS 903.

12.3.2.2 Vertical Control

Vertical control datum is North American Vertical Datum 1988 (NAVD88), as defined by the NGS.

12.3.3 Survey Ties

Survey ties are the measured distances from permanent objects to the utility infrastructure (see sample tie sheets at the end of this section). Preferred permanent objects, listed in their order of preference, include the following: manholes, drainage inlets, building corners, property corners, power poles, hydrants, trees (18-inch diameter or greater), and perpendicular distances from curb and gutter (or edge of pavement, when no curb and gutter are present).

Three (3) ties are required for precise location of all proposed utility infrastructure, including valves 1½-inch diameter or larger. Ties from adjacent property corners are required for locating all service stub outs. Provide perpendicular measurements from curb to utility mains at intervals described herein.

12.3.4 Survey Data

Clearly label all roads and road names, including appropriate county or state numbers where applicable, as well as parcels, rights of way, easements, and landmarks.

All gravity sewer lines and sewage force mains are to be drawn in direction of flow.

Illustrate pressurized piping systems by depicting the application designation (water main [WM], reclaimed main [RM], sewer force main [FM], or other application designation), pipe size, and material; including 3 permanent ties, as well as vertical and horizontal locations, specifically showing the proposed and as-built elevation to +/- 0.01 feet of all fittings, appurtenances, and the top of pipe at a maximum of 50-foot intervals along the mains. Provide survey ties showing the distance from the frontage lot corners to each service.

Illustrate all valves by properly depicting the application designation (WM, RM, FM, etc.), type of valve (gate valve, ball valve, etc.), location of valve with permanent ties, the vertical and horizontal alignment of the valve, elevation of the valve operating nut; as well as the manufacturer, type of gear box, and the number of turns to open/close.

Illustrate gravity sewers systems by depicting the as-built manhole information, including top elevation; invert elevations at center of manhole and all connecting pipes; exterior drop connections; sewer pipe size, material, length, and calculated slope; sewer lateral locations, including distance from downstream manhole to service wye; the

distance from the downstream manhole to nearest lot corner, the distance from the frontage lot corners to each service lateral, and the depth below natural grade +/-0.25-feet to the invert of each service lateral.

Pumping stations shall include the completed as-built design data table, as well as all pertinent horizontal and vertical locations of the wetwell and valve vault structures (or valve arrays) and components, including all gravity sewers invert elevations, pumps, piping, fittings, valves, controls, electrical and water services, and other appurtenances and accessories.

Note any deviations from the approved Construction Plans.

12.3.5 Submission of As-Builts

12.3.5.1 As-built submission for preliminary review procedure:

Submit one (1) set of paper copies and one (1) computer disk/cd of as-built drawing for review to the construction inspection Program Engineer of the Water Resources Engineering Division.

Upon receiving above stated as-built material required, the assigned inspector and the Water Resources Engineering GIS mapping staff will review for data and formatting compliance then return to contractor/developer for revisions if found necessary within 10 business days.

12.3.5.2 As-built submission for final payment:

After the preliminary submittal has been approved to be in compliance, the following must be submitted:

- Five (5) bond copies formatted 24-inch x 36-inch/D size
- One (1) Mylar formatted 24-inchx36-inch (D size)
- One (1) computer disk/CD containing completed digital file of the as-built drawing conforming to the specifications.

12.3.6 Water Utility As-Built Layer Definitions

0: nothing is to be placed on this layer

ABANDON (WATER & SEWER): All Abandoned Gravity lines, Force Main lines, water lines, pump stations, valves and manholes located or referenced need to be placed on this layer

BUILDING: All buildings in the drawing need to be placed on this layer

BUILDINGTXT: All text associated with buildings on the drawing need to be placed on this layer

CASING: All casing and other conflict structures need to be placed on this layer

DEFPOINTS nothing is to be placed on this layer

DWG_FIELD_NOTES: All Drawing notes, reference or other notation related to the water or sewer system need to be placed on this layer

FIREHYDRANT: All fire hydrants need to be placed on this layer. i.e., the fire hydrants only and not the isolation valves for the fire hydrants these valves need to be placed on the VALVE layer

LAKE_BOUNDARY: All water bodies, watercourses and lakes to be shown on this layer

LAKE_NAMES (TEXT): All text associated with water bodies, watercourses and lakes need to be placed on this layer

LANDMARKS_(WATER & SEWER): This layer is for all structures that are used in the process of tying down water entities (Power Poles, Tel Poles, Manhole Covers, Catch Basins, Pedestals of any kind etc.). If you wish to create other layers for these structures to reside on that is permissible however the structures used for the purpose of tying down water entities need to also reside on the LANDMARKS_WATER layer

MH (MANHOLE): All manholes need to be placed on this layer using the attributed manhole block provided

MV: All layout view ports to be on this layer

PARCEL_TXT: All text associated with Parcels, needs to be placed on this layer. This includes but not limited to lot size and dimensions, parcel I.D.'s and Tax I.D.'s

PARCELS: All Parcels shown on the drawing needs to be placed on this layer

PLUG: All Plugs placed at the end of stub outs need to be placed on this layer using the attributed plug block provided

PUMP_STATION: All pump stations need to be placed on this layer using the attributed pump station block provided

ROAD_EDGE: All Road edge shown on the drawing needs to be placed on this layer

ROAD_NAME_TXT: All text associated with Roads, Street names, City/County and State route I.D.'s, etc. need to be placed on this layer

ROW (RIGHT-OF-WAY): All Right-of-Way's shown on the drawing need to be placed on this layer

ROWTXT: All text associated with the Right-of-Way's need to be placed on this layer

SUB_DIVISION_NAMES: All Subdivision names/as-built names and notes related to the Subdivision need to be placed on this layer

VALVE (WATER): All water valves shown in the drawing including fire hydrant isolation valves need to be placed on this layer

VENT: All vents need to be placed on this layer using the attributed vent block provided

WATER_INFO_TEXT: All text associated with the water portion of the drawing need to be placed on this layer

WATERTIES: All dimensions used in the process of tying down water entities need to reside on this layer

WATFITTINGS (WATER FITTINGS): All blocks or symbols for water fittings shall reside on this layer

WB (WIRE BOX): All wire boxes used for location need to be placed on this layer using the attributed plug block provided

WET_WELL: All wet wells need to be placed on this layer using the attributed wet well block provided

12.3.7 Examples for Layer and Block Use

All layers in the template drawing pertaining to pipe size and material shall be used for the corresponding pipe segments (water & sewer).

EXAMPLE (WATER): 6-inch Ductile Iron Pipe shall be placed on the "6_INCH_DUCTILE-IRON" layer.

EXAMPLE (SEWER): 6-inch Gravity shall be placed on the "GL_FLOW_6_Inch" layer.

EXAMPLE (SEWER): 6-inch Force Main shall be placed on the "FM_FLOW_6_Inch" layer.

All layers in the template drawing pertaining to valve & valve type & size shall be used for the corresponding valves (sewer) using the attributed valve block provided.

Valve Types as follows:

Valve Type	Layer	Valve Type	Layer
Air Release Valve	Valve_ARV	Ball Valve	Valve_Ball
Butterfly valve	Valve_BFV	Check Valve	Valve_Check
Gate Valve	Valve_Gate	Surge Valve	Valve_Surge
Plug Valve	Valve_Plug	Emergency Pump Bypass	Valve_EPB

EXAMPLE: 6-inch Air Release Valve shall be placed on the "Valve_ARV" layer.

12.3.8 As-Built Attribute Codes

The Contractor shall request the most current as-built attribute codes from the City.

12.3.9 Pump Station Data Table

Pump Data	Value	Wet Well Data	Value
ID		ID	
CAPACITY		TYPE	
SHUT_HEAD		BTM_ELEV	
DSGN_HEAD		LEAD_OFF_EL	
DSGN_FLOW		LEAD_ON_EL	
HIGH_HEAD		LAG_ON_EL	
YR_INST		LAG_OFF_EL	
RATED_PWR		INIT_LEVEL	
ON_OFF		TOP_OF_SLAB_EL	
TDH		DIAMETER	
STATIC_HEAD		YR_INST	
DISCHARGE_PIPING		VOLUME_REQD*	
DISCHARGE_PIPING_MATERIAL			
PUMP_MANUFACTURER		*Submit Volume & Cycle calculations	
PUMP_MODEL_NO			
PUMP_IMPELLER_MODEL_NO			
PUMP_IMPELLER_SIZE			
PUMP_RPM			
SUPPLY_VOLTAGE			
MOTOR_HP			

Figure 12.1 – Sample Tie Sheet for Water and Resue Construction

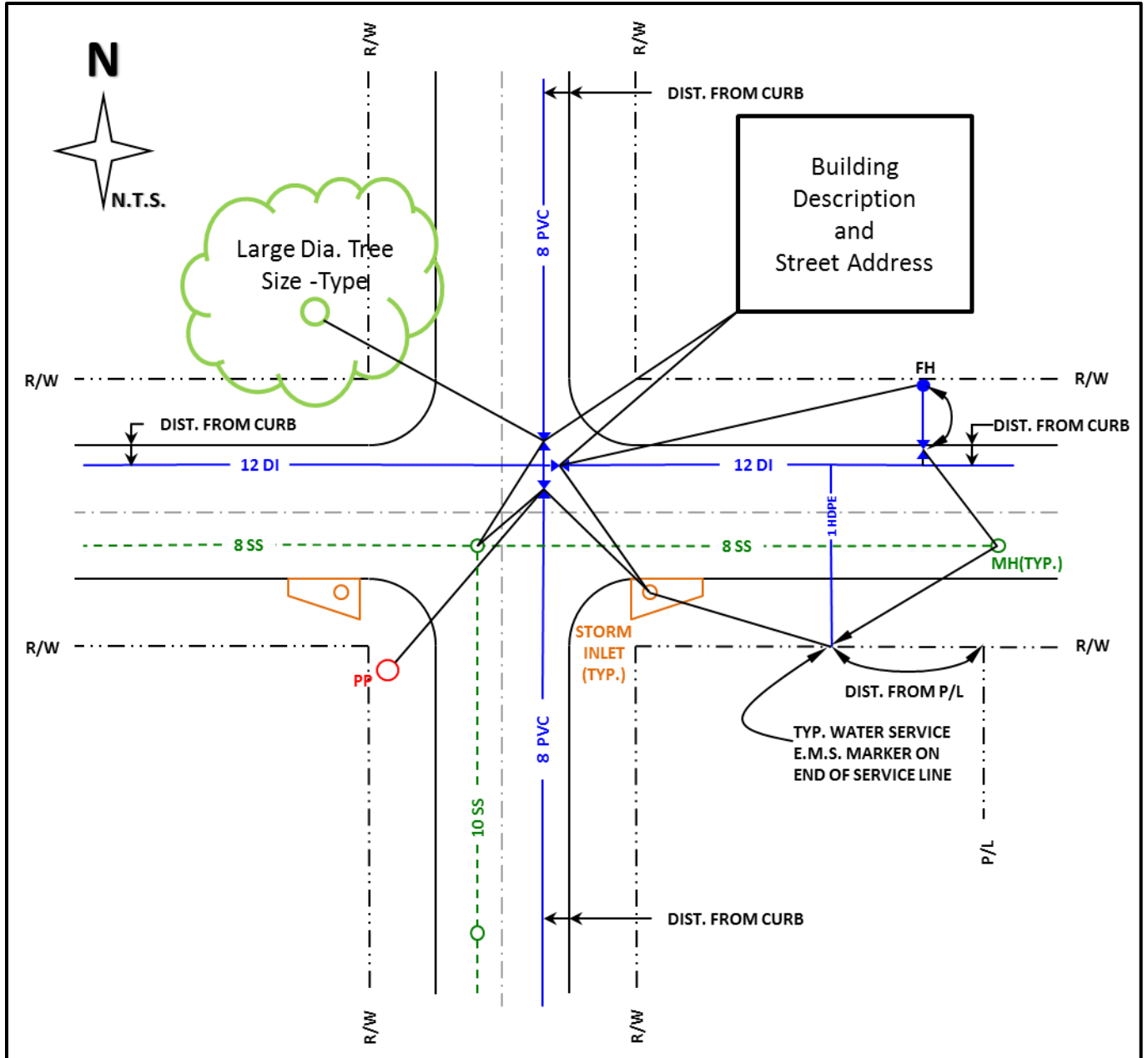


Figure 12.2 – Sample Tie Sheet for Gravity Sewer Construction

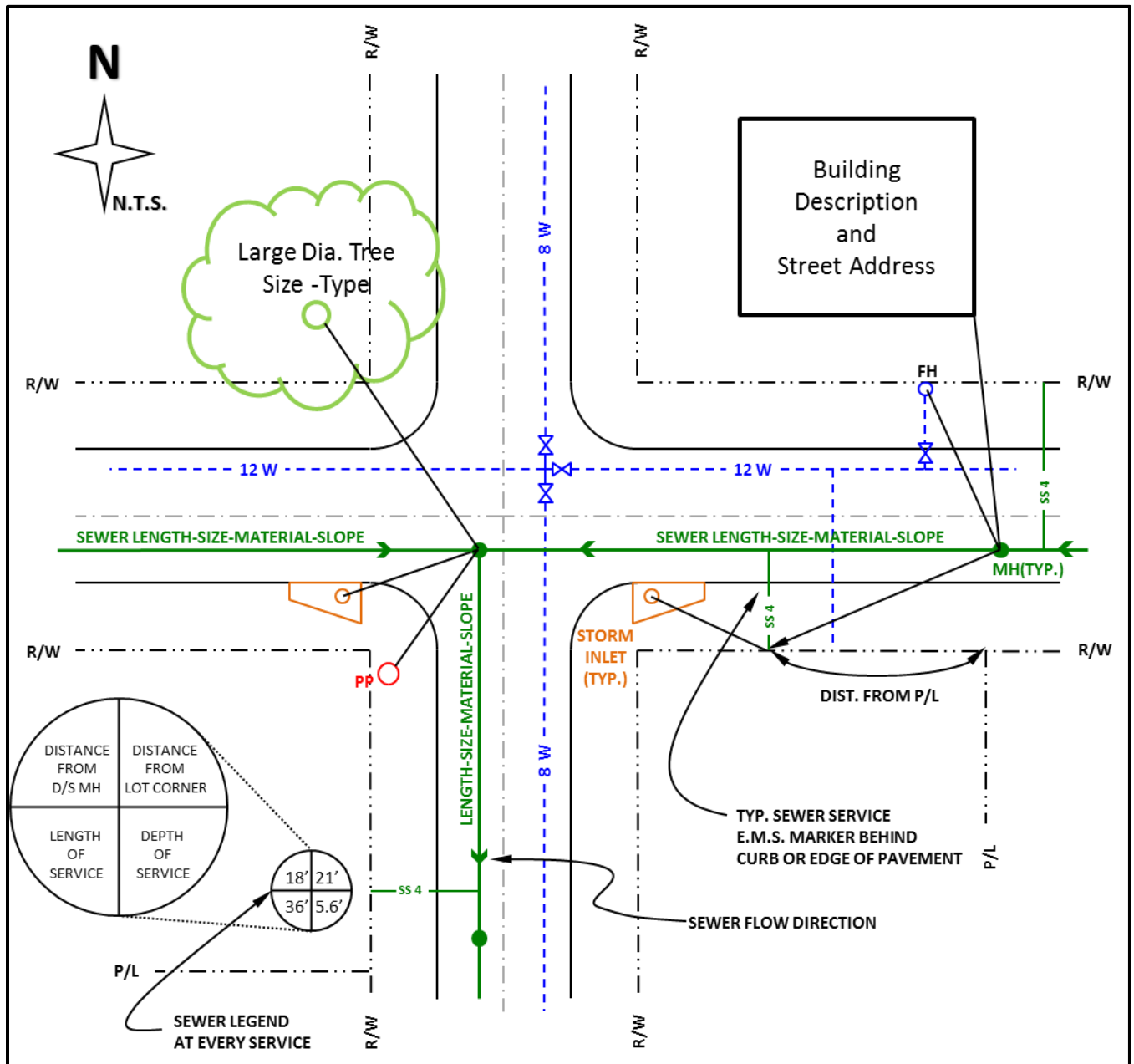
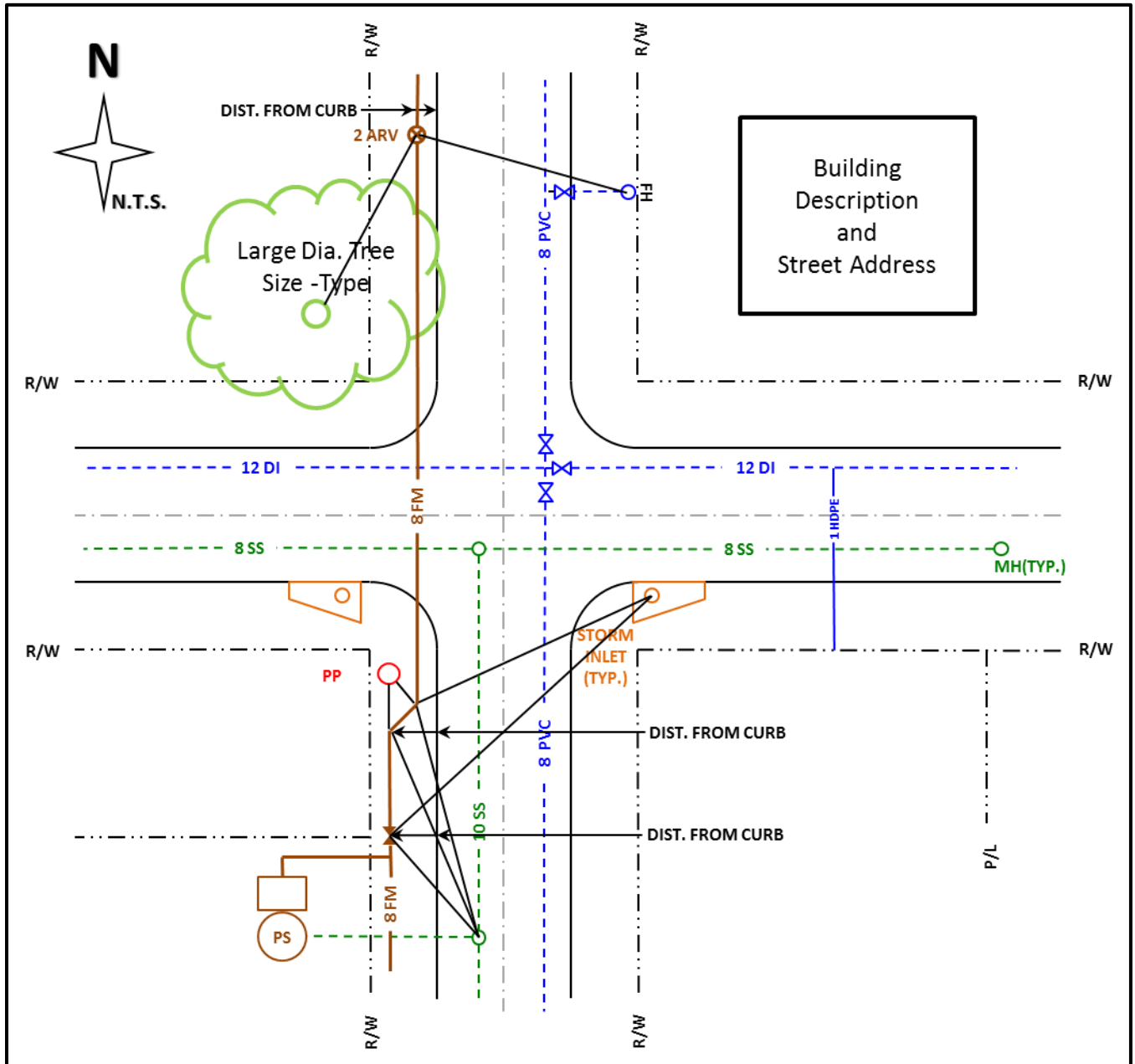


Figure 12.3 – Sample Tie Sheet for Sewer Force Main Construction



END OF SECTION

Appendix

Standard Construction Details for Water and Sewer Construction

Prepared by:



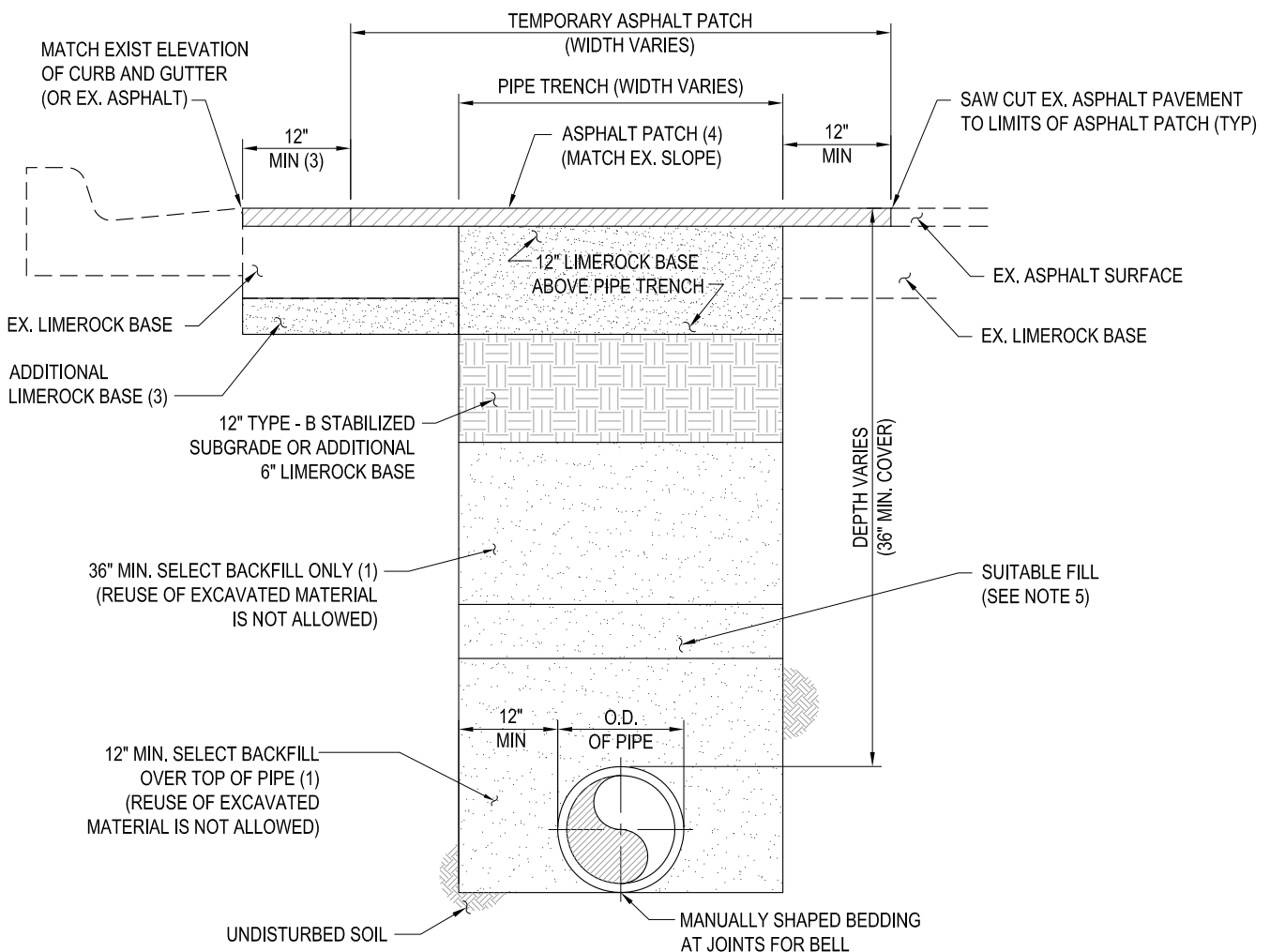
Water Resources Engineering Division
408 North Adams Street
Tallahassee, Florida 32301

October 2018

NOTES:

1. TRENCH BACKFILL SHALL BE "SELECT BACKFILL" MATERIAL IN ACCORDANCE WITH THE CITY OF TALLAHASSEE TECHNICAL SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION.
2. THE TECHNICAL SPECIFICATIONS SHALL APPLY FOR ALL OTHER REQUIREMENTS NOT SUPERCEDED BY THIS DETAIL FOR ALL EXCAVATING, BACKFILLING, AND COMPACTING FOR UTILITIES.
3. TRENCHES WITH ASPHALT PATCHES THAT ARE CLOSER THAN 12" TO THE CURB AND GUTTER OR EDGE OF PAVEMENT SHALL HAVE CONTINUOUS 12" LIMEROCK BASE AND 2" MIN. ASPHALT PATCH TO THE CURB AND GUTTER OR EDGE OF PAVEMENT.
4. THESE SECTIONS SHALL BE IN ACCORDANCE WITH THE CITY OF TALLAHASSEE PUBLIC INFRASTRUCTURE DEPARTMENT FLEXIBLE PAVEMENT DESIGN, CURRENT EDITION.
5. SUITABLE FILLS LIMITED TO SELECT SAND AND PLASTIC MATERIAL IN ACCORDANCE WITH F.D.O.T. INDEX 505.
6. NO ORGANIC MATERIALS AND PARTICLES EXCEEDING 4" IN DIAMETER WILL BE PERMITTED.

MINIMUM ASPHALT THICKNESS	
LOCAL STREETS	2.0"
MINOR COLLECTORS	2.5"
MAJOR COLLECTORS	3.0"
MINOR ARTERIALS	3.5"
MAJOR ARTERIALS	4.0"



**PIPE TRENCH AND ASPHALT PATCH
WITHIN PUBLIC ROW AND ALL IMPROVED AREAS**

N.T.S.

SHEET TITLE

PIPE TRENCH AND ASPHALT PATCH
WITHIN PUBLIC ROW AND ALL IMPROVED AREAS

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G01

Approved by:

Date Issued: **OCTOBER 2018**

SCALE

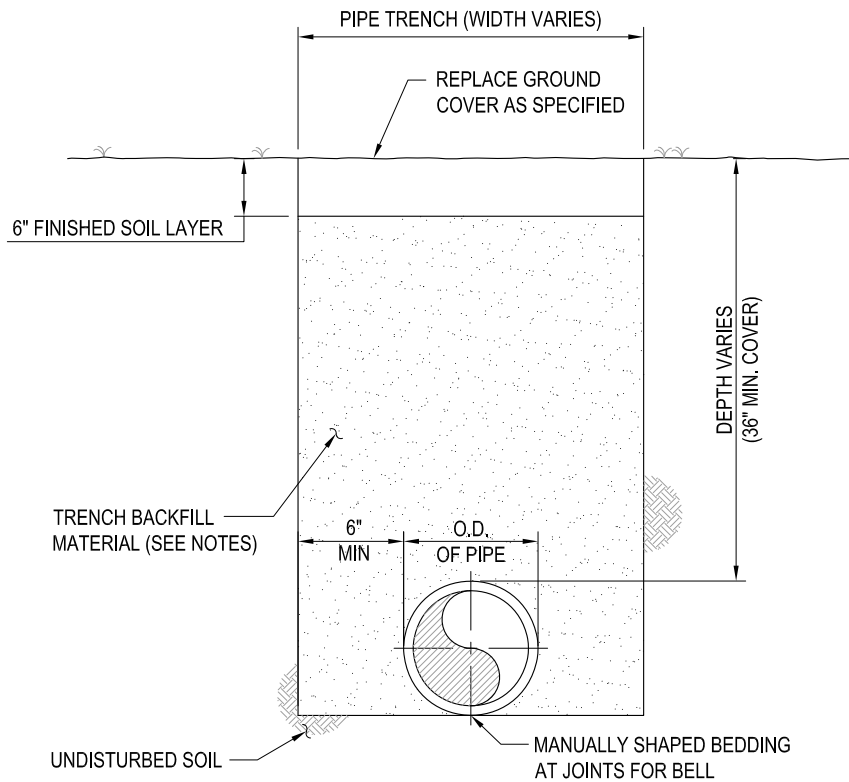
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N.T.S.

NOTES:

1. TRENCH BACKFILL SHALL BE "SUITABLE FILL" MATERIAL IN ACCORDANCE WITH THE CITY OF TALLAHASSEE TECHNICAL SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION.
2. THE TECHNICAL SPECIFICATIONS SHALL APPLY FOR ALL OTHER REQUIREMENTS NOT SUPERCEDED BY THIS DETAIL FOR ALL EXCAVATING, BACKFILLING, AND COMPACTING FOR UTILITIES.



PIPE TRENCH WITHIN UNIMPROVED AREAS

N.T.S.

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PIPE TRENCH WITHIN UNIMPROVED AREAS

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Date Issued:

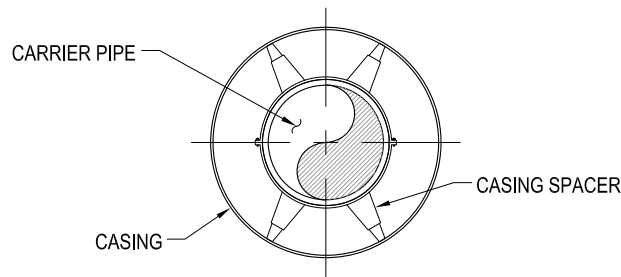
OCTOBER 2018

SCALE

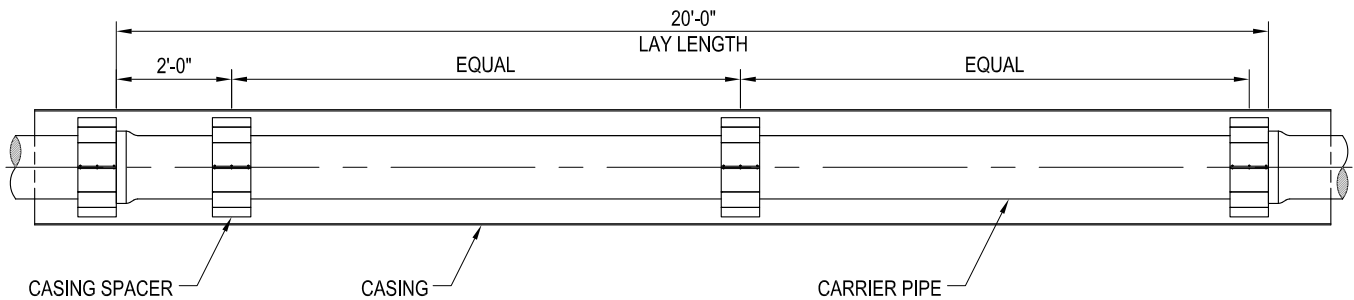
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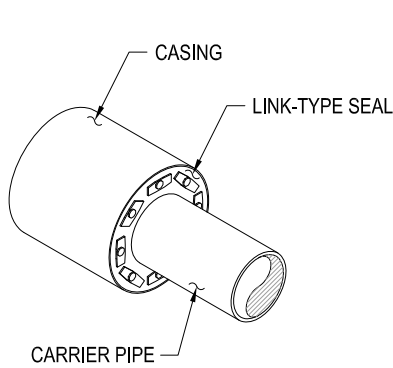
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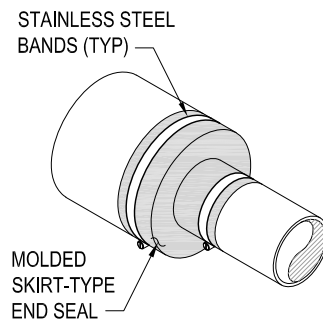
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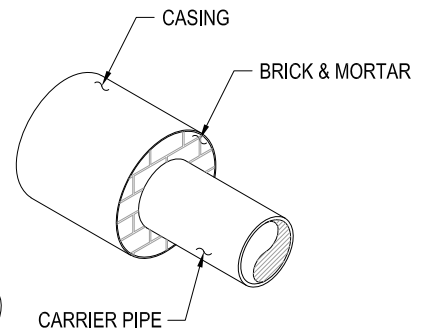
PROFILE



LINK-TYPE CASING END SEAL



SKIRT-TYPE END SEAL OVER MASONRY PLUG



JACK & BORE

N.T.S.

SHEET TITLE

JACK AND BORE

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Date Issued:

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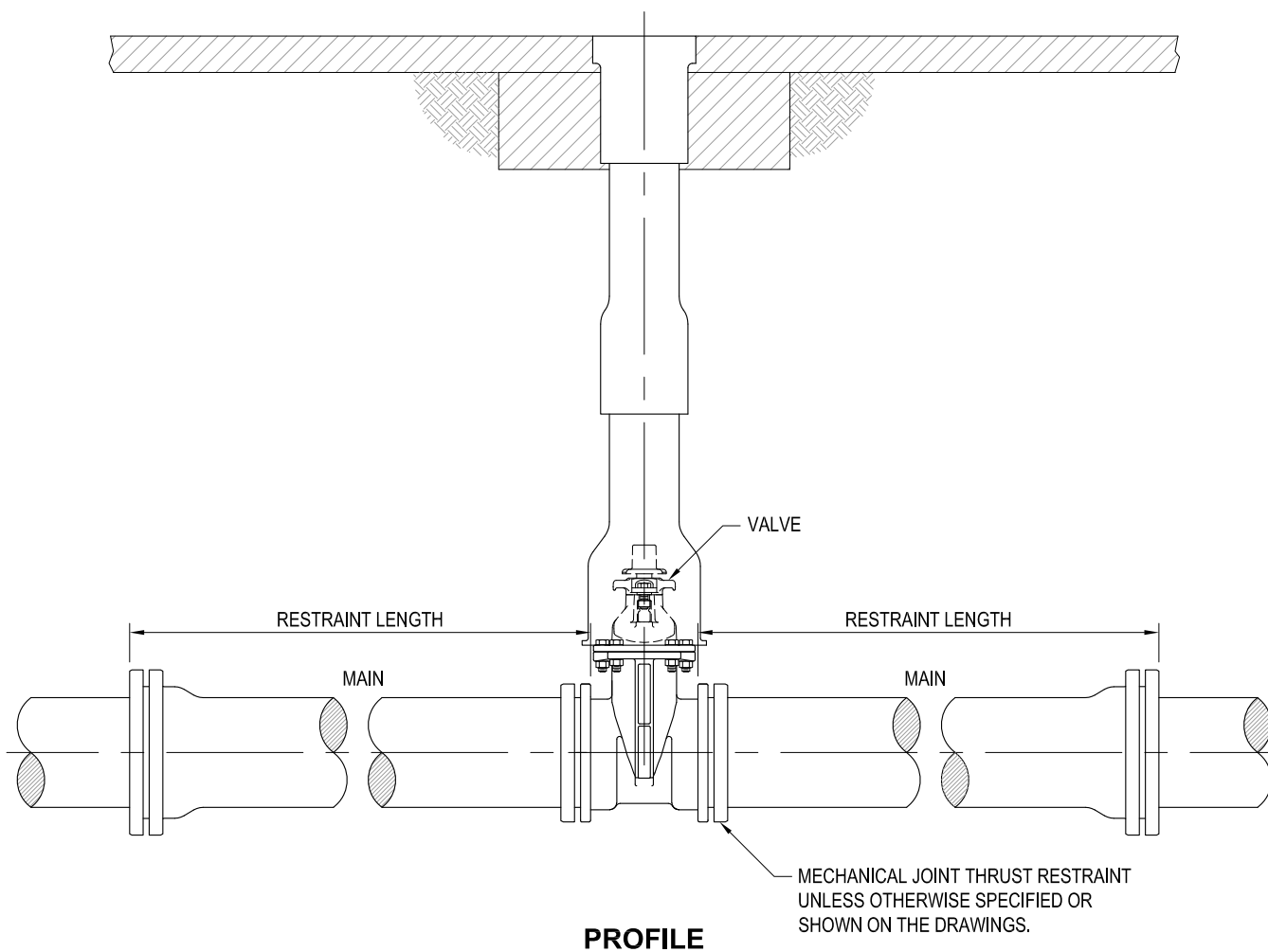
N.T.S.

RESTRAINT LENGTH FOR DEAD ENDS AND VALVES (IN FEET)

PIPE DIAMETER (INCHES)	DUCTILE IRON (FEET)	PVC (FEET)
4	31	45
6	44	63
8	58	82
10	69	98
12	81	115
14	92	131
16	103	147

THRUST RESTRAINT NOTE FOR VALVES:

1. SEE THE CITY OF TALLAHASSEE TECHNICAL SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION FOR DESIGN PARAMETERS.
2. VALVES REQUIRE RESTRAINT OF ALL JOINTS WITHIN THE CALCULATED RESTRAINT LENGTH ON BOTH SIDES OF THE VALVE.



RESTRAINT LENGTHS FOR VALVES

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THRUST RESTRAINTS
FOR VALVES

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Approved by:

Date Issued:

OCTOBER 2018

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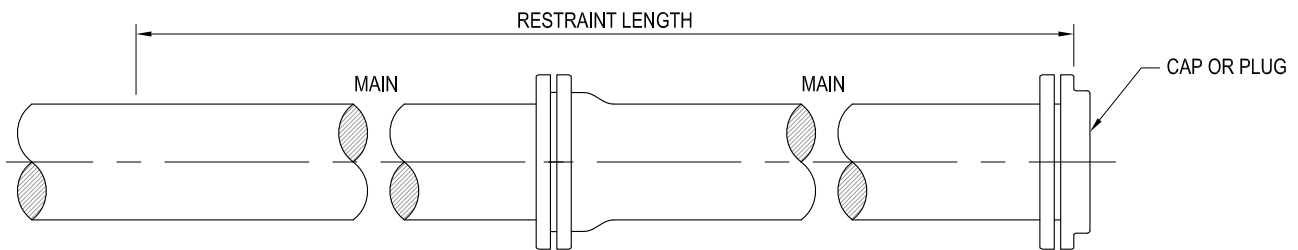
N.T.S.

RESTRAINT LENGTH FOR DEAD ENDS AND VALVES (IN FEET)

PIPE DIAMETER (INCHES)	DUCTILE IRON (FEET)	PVC (FEET)
4	31	45
6	44	63
8	58	82
10	69	98
12	81	115
14	92	131
16	103	147

THRUST RESTRAINT NOTE FOR DEAD ENDS:

1. SEE THE CITY OF TALLAHASSEE TECHNICAL SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION FOR DESIGN PARAMETERS.
2. CAPS AND PLUGS REQUIRE RESTRAINT OF ALL JOINTS WITHIN THE CALCULATED RESTRAINT LENGTH EXTENDING FROM THE DEAD END.



PLAN

RESTRAINT LENGTHS FOR DEAD ENDS

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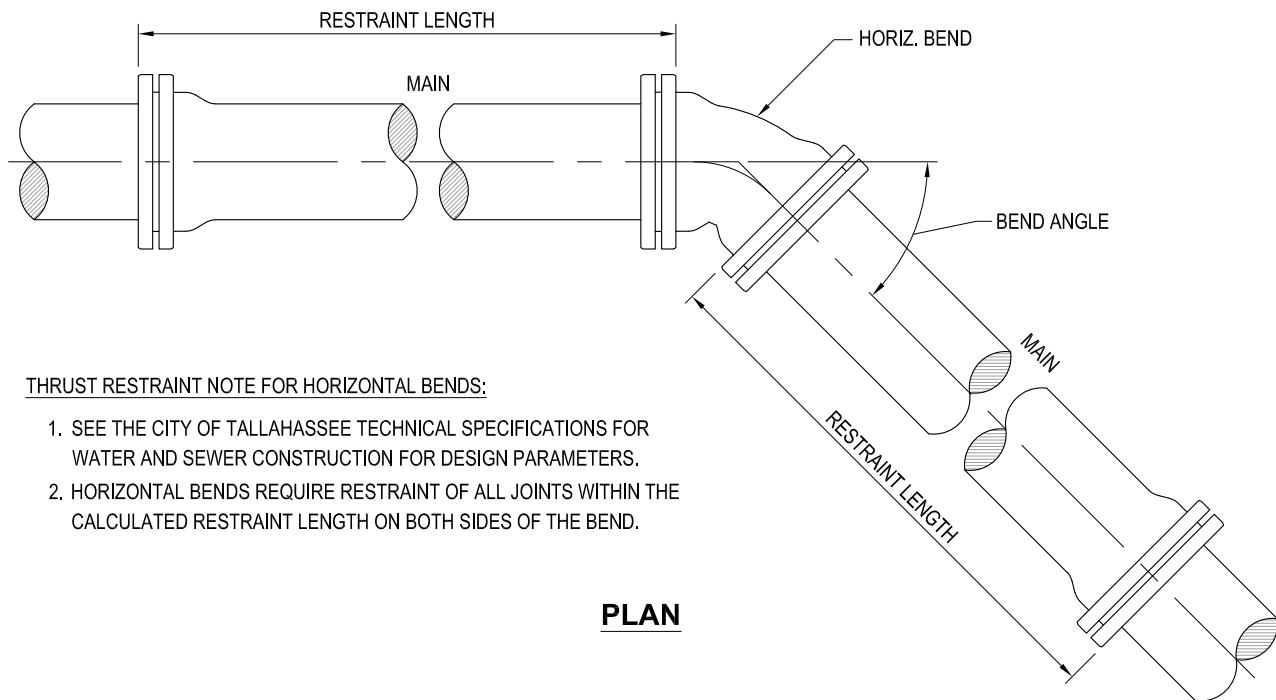
SCALE

COMPUTER FILE

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N.T.S.

RESTRAINT LENGTH FOR HORIZONTAL BENDS (IN FEET)								
PIPE DIAMETER (INCHES)	DUCTILE IRON				PVC			
	BEND				BEND			
	11.25°	22.5°	45°	90°	11.25°	22.5°	45°	90°
4	2	4	8	18	3	5	9	22
6	3	5	11	25	3	6	13	30
8	4	7	14	33	4	8	17	39
10	4	8	16	39	5	10	20	47
12	5	9	19	46	6	11	23	55
14	6	11	22	52	7	13	26	62
16	6	12	24	58	7	14	29	69



THRUST RESTRAINT NOTE FOR HORIZONTAL BENDS:

1. SEE THE CITY OF TALLAHASSEE TECHNICAL SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION FOR DESIGN PARAMETERS.
2. HORIZONTAL BENDS REQUIRE RESTRAINT OF ALL JOINTS WITHIN THE CALCULATED RESTRAINT LENGTH ON BOTH SIDES OF THE BEND.

PLAN

RESTRAINT LENGTHS FOR HORIZONTAL BENDS

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THRUST RESTRAINTS
FOR HORIZONTAL BENDS

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Date Issued:

OCTOBER 2018

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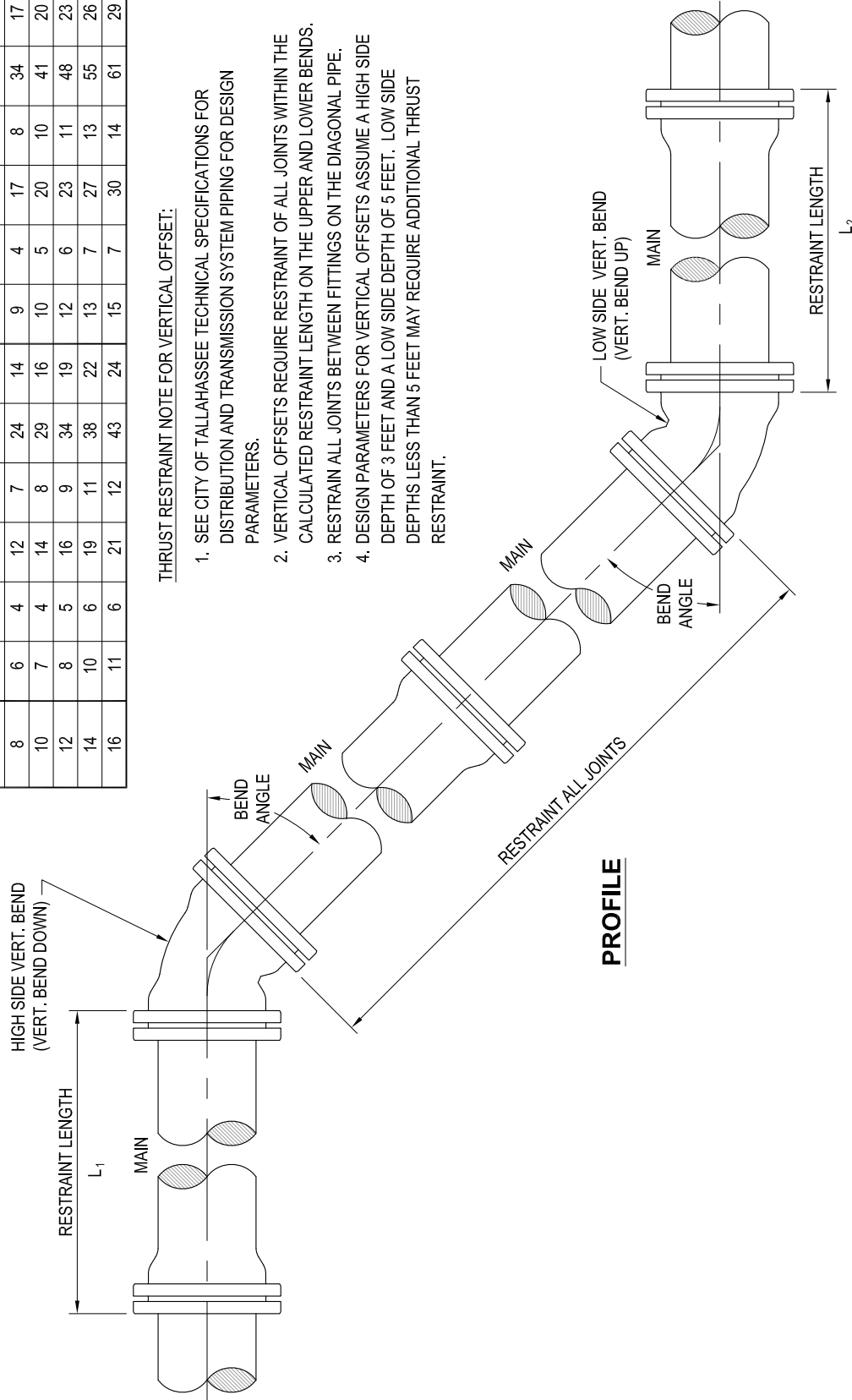
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N.T.S.

RESTRAINT LENGTH FOR VERTICAL OFFSETS (IN FEET)												
PIPE DIAMETER (INCHES)	DUCTILE IRON						PVC					
	11.25°		22.5°		45°		11.25°		22.5°		45°	
	L ₁	L ₂	L ₁	L ₂	L ₁	L ₂	L ₁	L ₂	L ₁	L ₂	L ₁	L ₂
4	4	2	7	4	13	8	5	3	9	5	19	9
6	5	3	9	5	19	11	7	3	13	6	26	13
8	6	4	12	7	24	14	9	4	17	8	34	17
10	7	4	14	8	29	16	10	5	20	10	41	20
12	8	5	16	9	34	19	12	6	23	11	48	23
14	10	6	19	11	38	22	13	7	27	13	55	26
16	11	6	21	12	43	24	15	7	30	14	61	29

THRUST RESTRAINT NOTE FOR VERTICAL OFFSET:

1. SEE CITY OF TALLAHASSEE TECHNICAL SPECIFICATIONS FOR DISTRIBUTION AND TRANSMISSION SYSTEM PIPING FOR DESIGN PARAMETERS.
2. VERTICAL OFFSETS REQUIRE RESTRAINT OF ALL JOINTS WITHIN THE CALCULATED RESTRAINT LENGTH ON THE UPPER AND LOWER BENDS.
3. RESTRAIN ALL JOINTS BETWEEN FITTINGS ON THE DIAGONAL PIPE.
4. DESIGN PARAMETERS FOR VERTICAL OFFSETS ASSUME A HIGH SIDE DEPTH OF 3 FEET AND A LOW SIDE DEPTH OF 5 FEET. LOW SIDE DEPTHS LESS THAN 5 FEET MAY REQUIRE ADDITIONAL THRUST RESTRAINT.



RESTRAINT LENGTHS FOR VERTICAL BENDS

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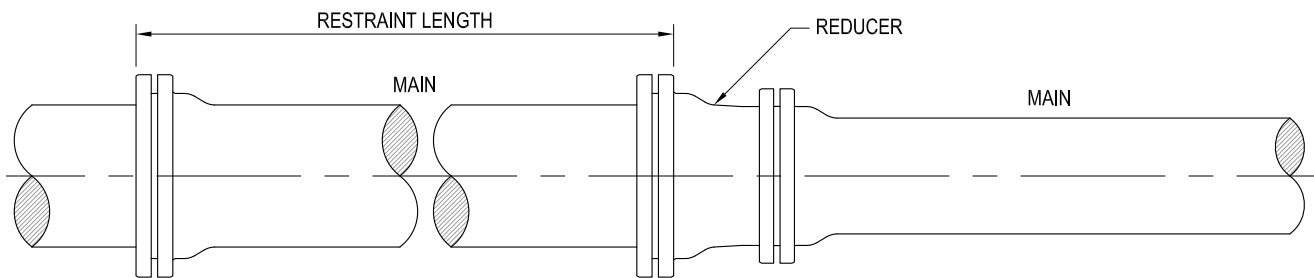
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N.T.S.

RESTRAINT LENGTH FOR REDUCERS			
LARGE PIPE DIAMETER (INCHES)	SMALL PIPE DIAMETER (INCHES)	DUCTILE IRON RESTRAINT (FEET)	PVC RESTRAINT (FEET)
6	4	23	32
8	4	41	59
	6	24	35
10	4	56	80
	6	42	60
	8	23	33
12	4	70	100
	6	59	84
	8	43	61
	10	24	34
14	4	83	118
	6	73	105
	8	60	85
	10	44	62
16	12	24	34
	4	95	136
	6	87	124
	8	75	108
	10	61	88
	12	44	63
	14	24	34

THRUST RESTRAINT NOTE FOR REDUCERS:

1. SEE THE CITY OF TALLAHASSEE TECHNICAL SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION FOR DESIGN PARAMETERS.
2. REDUCERS REQUIRE RESTRAINT OF ALL JOINTS WITHIN THE CALCULATED RESTRAINT LENGTH, EXTENDING FROM THE REDUCER ON THE SIDE OF THE LARGER PIPE.



PLAN

RESTRAINT LENGTHS FOR REDUCERS

N.T.S.

SHEET TITLE

THRUST RESTRAINTS
FOR REDUCERS

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Approved by:

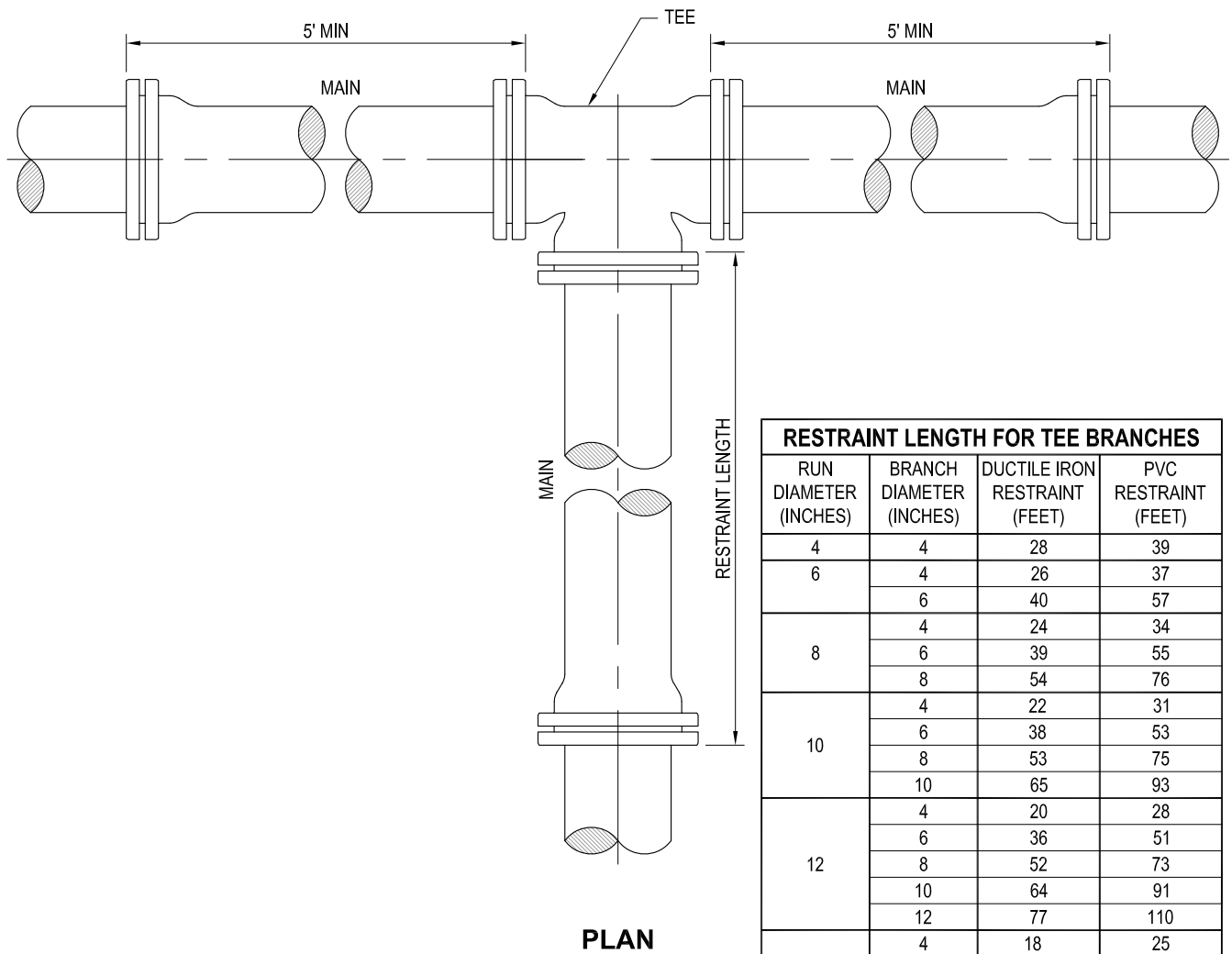
Date Issued: **OCTOBER 2018**

SCALE

COMPUTER FILE

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N.T.S.



RESTRAINT LENGTH FOR TEE BRANCHES			
RUN DIAMETER (INCHES)	BRANCH DIAMETER (INCHES)	DUCTILE IRON RESTRAINT (FEET)	PVC RESTRAINT (FEET)
4	4	28	39
	6	26	37
6	4	40	57
	6	24	34
	8	39	55
8	4	54	76
	6	22	31
	8	38	53
10	6	53	75
	8	65	93
	10	20	28
12	6	36	51
	8	52	73
	10	64	91
	12	77	110
14	4	18	25
	6	35	49
	8	50	72
	10	63	90
	12	76	109
16	14	88	126
	4	16	22
	6	33	47
	8	49	70
	10	62	89
	12	75	108
16	14	87	125
	16	99	142

THRUST RESTRAINT NOTES FOR TEES:

1. SEE THE CITY OF TALLAHASSEE TECHNICAL SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION FOR DESIGN PARAMETERS.
2. TEES REQUIRE RESTRAINT OF ALL JOINTS WITHIN THE CALCULATED RESTRAINT LENGTH ALONG THE BRANCH PIPE.
3. BRANCH RESTRAINT LENGTH FOR TEES ASSUMES A 5 FOOT RUN LENGTH ON EACH SIDE OF THE TEE. SHORTER RUN LENGTHS MAY REQUIRE ADDITIONAL THRUST RESTRAINT.

RESTRAINT LENGTHS FOR TEES

N.T.S.

SHEET TITLE

THRUST RESTRAINTS
FOR TEES

City of Tallahassee
Your Own Utilities™

SHEET

G09

Approved by:

Date Issued:

OCTOBER 2018

SCALE

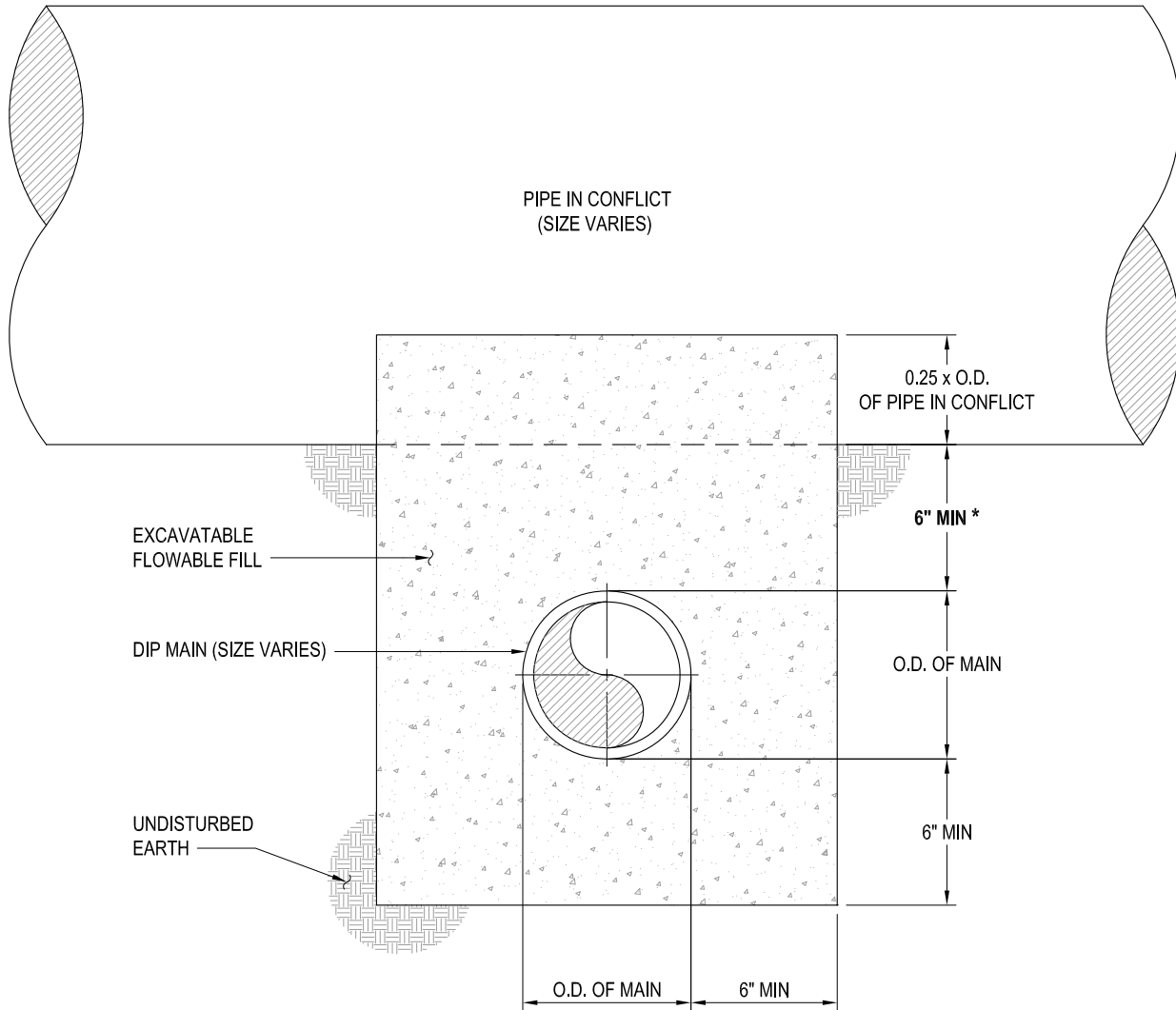
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N.T.S.

NOTES:

1. PIPE ENCASEMENT TO EXTEND A MINIMUM OF 24" BEYOND PIPE IN CONFLICT (BOTH DIRECTIONS)



* CONTRACTOR SHALL NOTIFY CITY IF SEPARATION IS LESS THAN 6"

**PIPE ENCASEMENT FOR UTILITY CROSSINGS
w/ LESS THAN 12" VERTICAL SEPARATION**

N.T.S.

SHEET TITLE

PIPE ENCASEMENT FOR UTILITY CROSSINGS
w/ LESS THAN 12" VERTICAL SEPARATION

City of Tallahassee
Your Own Utilities™

SHEET

G10

Approved by:

Date Issued:

OCTOBER 2018

SCALE

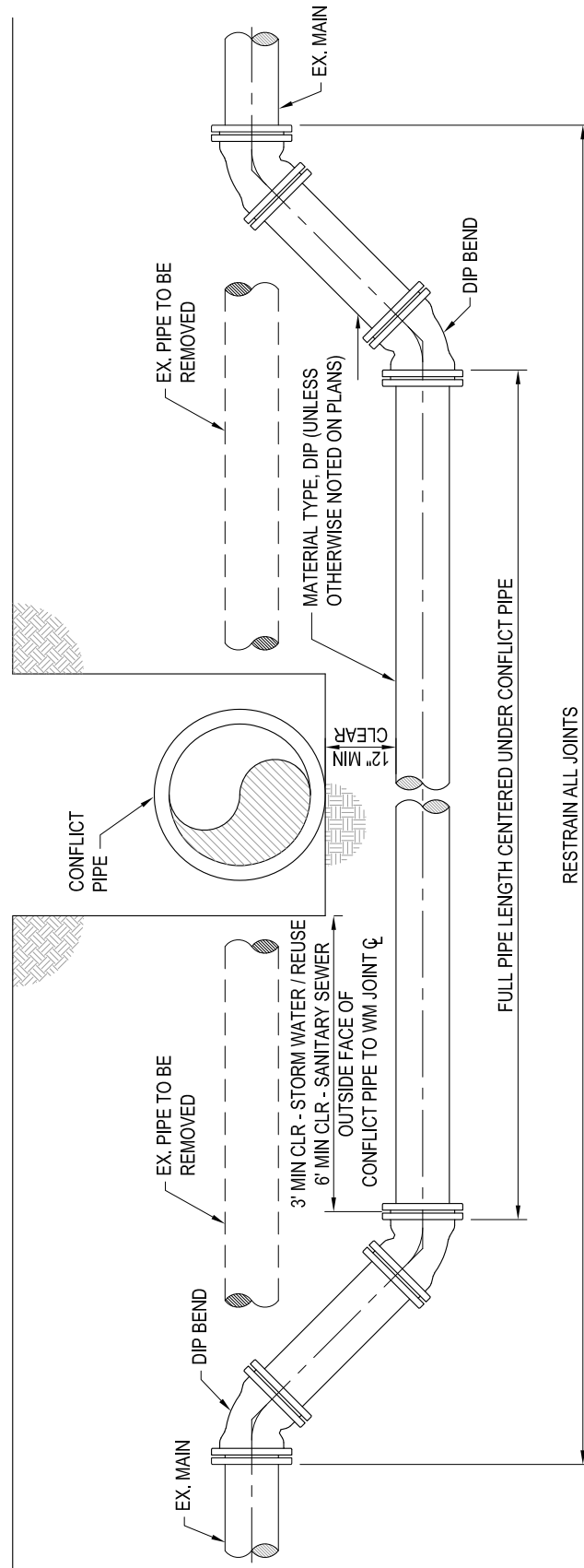
COMPUTER FILE

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N.T.S.

NOTES:

1. RESTRAINT LENGTHS FOR VERTICAL OFFSETS SHALL BE IN ACCORDANCE WITH THE CITY OF TALLAHASSEE TECHNICAL SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION.



STANDARD MAIN LOWERING

N.T.S.

SHEET TITLE

STANDARD MAIN LOWERING

City of Tallahassee
Your Own Utilities™

SHEET

G11

Approved by:

Date Issued:

OCTOBER 2018

SCALE

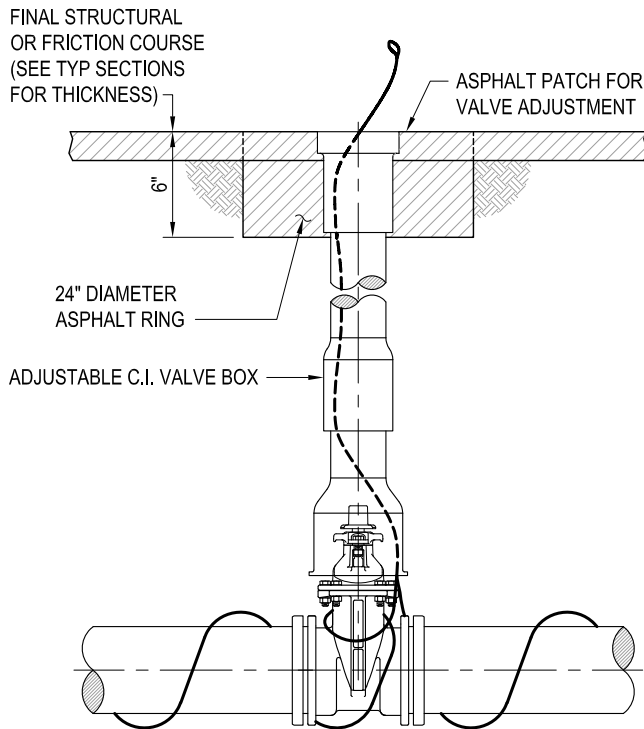
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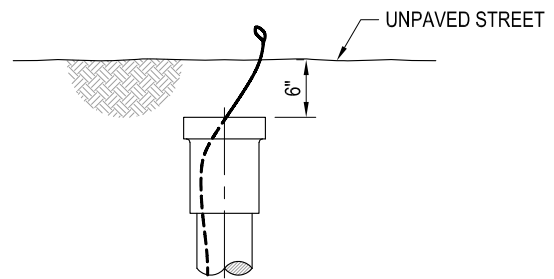
N.T.S.

NOTES:

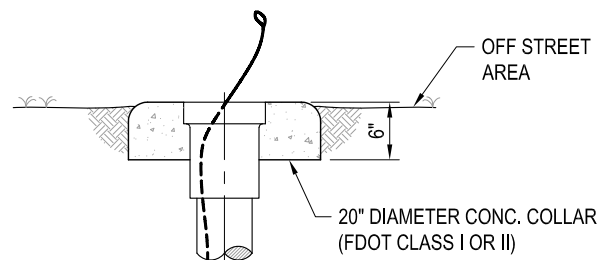
1. FOR CONSTRUCTION WITHIN ROADWAY, CONSTRUCT VALVE BOX WITH TOP 12" BELOW PROPOSED STREET GRADE. AFTER FINAL PAVING, CUT SMOOTH, CIRCULAR HOLE AROUND VALVE BOX AND ADJUST TO BE FLUSH WITH FINISH PAVEMENT. PLACE ASPHALT RING AND FINISHED ASPHALT PATCH AS SHOWN TO MATCH EXISTING GRADE.
2. AT NO TIME IS VALVE BOX OR EXTENSION PIPE TO TOUCH BONNET, BODY OF VALVE, OR MAIN.
3. EXTENSION PIPE TO BE 6" C-900 PVC , DR 18 OR D.I.P.
4. WIRE SHALL NOT BE WRAPPED AROUND OPERATING NUT OR STEM FOR ANY REASON.
5. GPS LOCATION OR SWING TIES TO BE PROVIDED TO CITY BY CONTRACTOR OF ALL VALVE BOXES LOCATED BELOW FINISHED GRADE. ALL INFORMATION MUST BE KEPT CURRENT UNTIL MILLING AND RESURFACING OPERATIONS ARE COMPLETE AND VALVE BOXES ARE ADJUSTED TO FINISHED GRADE.



PAVED STREET



GRADED STREET



OFF STREET

TYPICAL VALVE BOX PLACEMENT

N.T.S.

SHEET TITLE

TYPICAL VALVE BOX PLACEMENT

City of Tallahassee
Your Own Utilities™

SHEET

W01

Approved by:

Date Issued:

OCTOBER 2018

SCALE

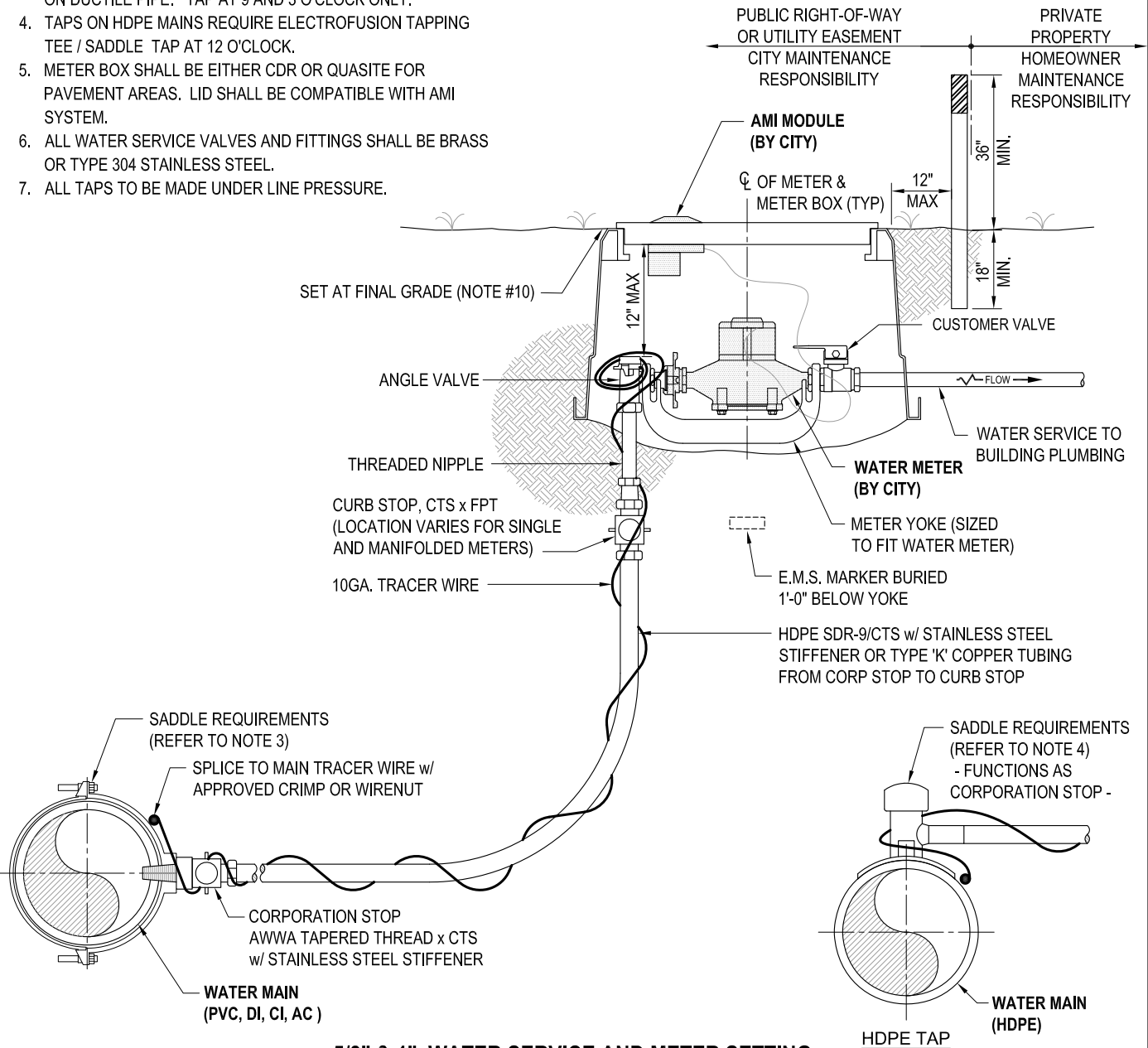
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N.T.S.

NOTES:

1. ALL CONSTRUCTION SHALL CONFORM TO THE LATEST EDITION OF THE CITY OF TALLAHASSEE TECHNICAL SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION.
2. A MINIMUM OF 10 GAUGE TRACER WIRE WILL RUN FROM MAIN TO METER; CONNECT TO EXISTING TRACER WIRE AT MAIN, WRAP AROUND CORPORATION STOP, WRAP AROUND AND SECURE TO SERVICE TUBING, THEN EXTEND UP INTO METER BOX AT ANGLE VALVE. A 24" MIN OF TRACING WIRE TO BE COILED IN METER BOX.
3. TAPS ON PVC, CAST IRON AND AC MAINS REQUIRE SADDLES (REFER TO TECHNICAL SPECIFICATIONS). DIRECT TAP ONLY ON DUCTILE PIPE. TAP AT 9 AND 3 O'CLOCK ONLY.
4. TAPS ON HDPE MAINS REQUIRE ELECTROFUSION TAPPING TEE / SADDLE TAP AT 12 O'CLOCK.
5. METER BOX SHALL BE EITHER CDR OR QUASITE FOR PAVEMENT AREAS. LID SHALL BE COMPATIBLE WITH AMI SYSTEM.
6. ALL WATER SERVICE VALVES AND FITTINGS SHALL BE BRASS OR TYPE 304 STAINLESS STEEL.
7. ALL TAPS TO BE MADE UNDER LINE PRESSURE.
8. CONTRACTOR SHALL INSTALL A PLUG IN ALL CUSTOMER VALVES IF WATER SERVICE IS "NOT IN USE" (I.E. IF NO METER IS INSTALLED). FOR NEW DEVELOPMENT AREAS WHERE THE WATER SERVICE IS "NOT IN USE", A LANDSCAPE TIMBER OR 3X3 MIN. P.T. POST (TOP PAINTED BLUE FOR POTABLE WATER OR PURPLE FOR RECLAIMED WATER) SHALL BE INSTALLED.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF THE METER ASSEMBLY AND APPURTENANCES IF DAMAGED BY THE CONTRACTOR DURING CONSTRUCTION.
10. METER BOX AND TOP SHALL BE CLEAR OF ALL DEBRIS TO ALLOW FULL ACCESS TO BOX (I.E. NO DIRT, TRASH, OR OTHER DEBRIS PLACED ON TOP OF BOX).



5/8" & 1" WATER SERVICE AND METER SETTING

N.T.S.

SHEET TITLE

5/8" & 1" WATER SERVICE AND METER SETTING

City of Tallahassee
Your Own Utilities™

SHEET

W02

Approved by:

Date Issued:

OCTOBER 2018

SCALE

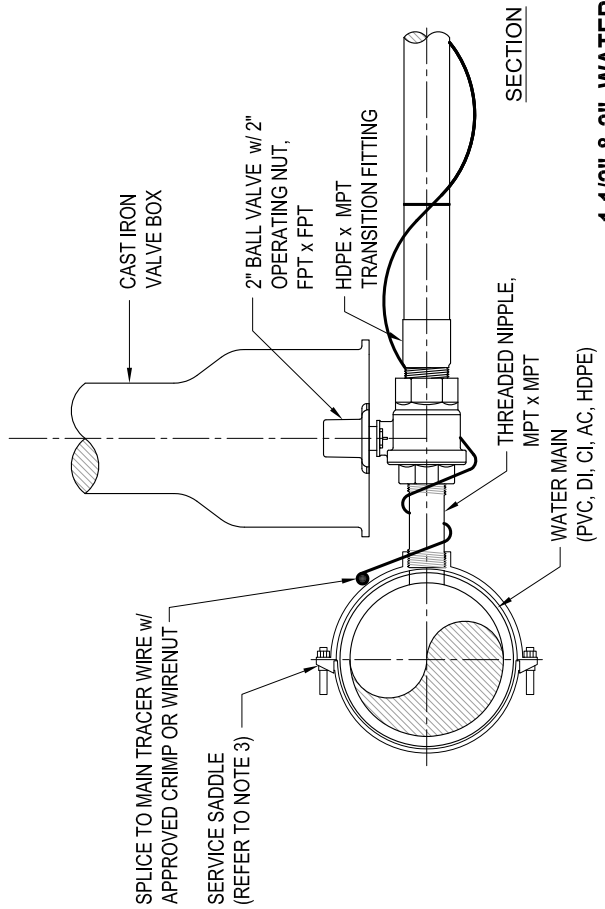
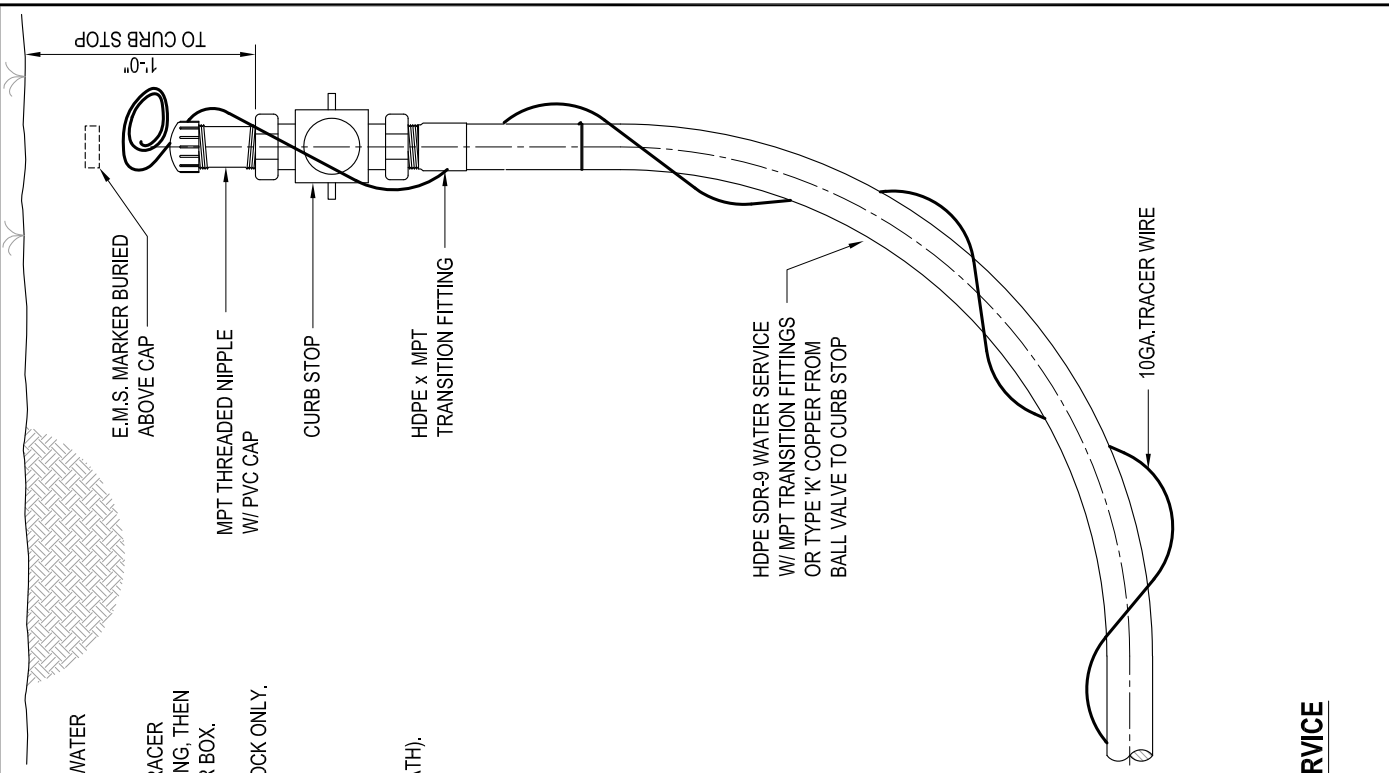
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N.T.S.

NOTES:

1. ALL CONSTRUCTION SHALL CONFORM TO CITY OF TALLAHASSEE TECHNICAL SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION.
2. A MINIMUM OF 10 GAUGE TRACER WIRE WILL RUN FROM MAIN TO METER; CONNECT TO EXISTING TRACER WIRE AT MAIN, WRAP AROUND CORPORATION STOP, WRAP AROUND AND SECURE TO SERVICE TUBING, THEN EXTEND UP INTO METER BOX AT ANGLE VALVE. A 24" MIN OF TRACING WIRE TO BE COILED IN METER BOX.
3. TAPS ALL MAINS REQUIRE SADDLES (REFER TO TECHNICAL SPECIFICATIONS). TAP AT 9 AND 3 O'CLOCK ONLY.
4. ALL WATER SERVICE VALVES AND FITTINGS SHALL BE BRASS OR TYPE 304 STAINLESS STEEL.
5. ALL TAPS TO BE MADE UNDER LINE PRESSURE.
6. BY-PASS MUST BE LOCATED INSIDE OF BOX RUNNING PARALLEL TO WATER METER (NOT UNDERNEATH).
7. BY-PASS IS NOT REQUIRED IF METER IS FOR IRRIGATION.



1 1/2" & 2" WATER SERVICE
N.T.S.

SHEET TITLE

1 1/2" & 2" WATER SERVICE

City of Tallahassee
Your Own Utilities™

SHEET

W03

Approved by:

Date Issued:

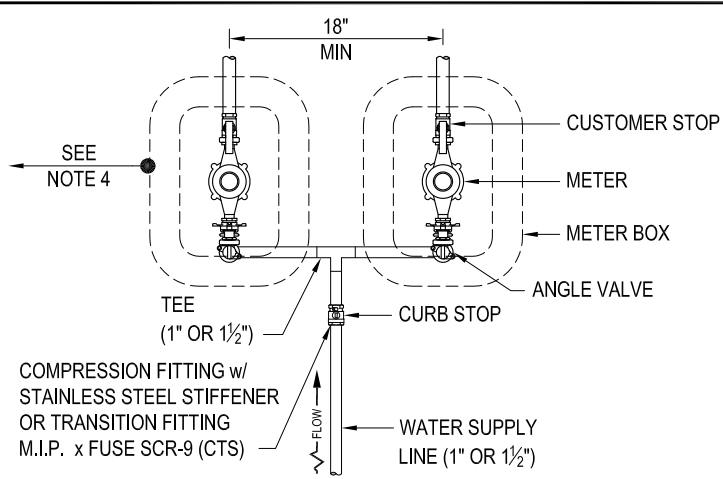
OCTOBER 2018

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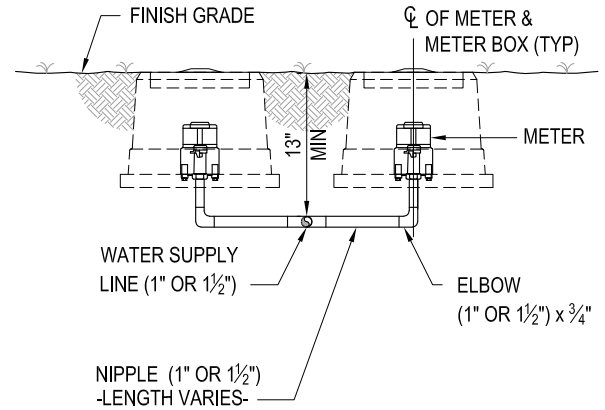
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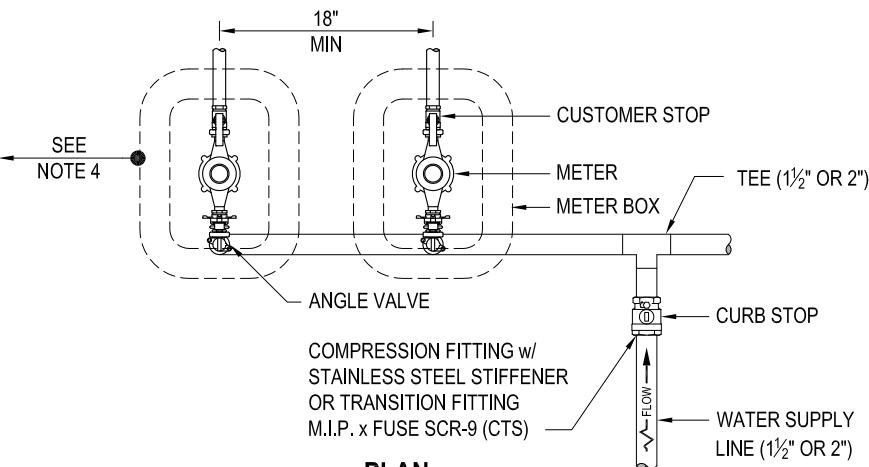
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PLAN
1" OR 1 1/2" SERVICE



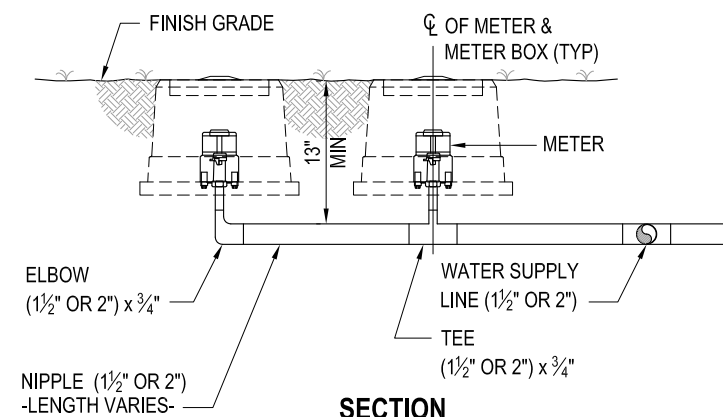
SECTION
1" OR 1 1/2" SERVICE



PLAN
1 1/2" OR 2" SERVICE

METERS ALLOWED PER MANIFOLD		
No. OF 5/8" METERS	SIZE OF SERVICE	CONFIGURATION
2	1" or 1 1/2"	
3	1" or 1 1/2"	
4	1 1/2"	
5	1 1/2" or 2"	
6	2"	
7	2"	
8	2"	
9	2"	
10	2"	

ALL METER SERVICES MUST BE BALANCED w/ NO MORE THAN (1) ONE ADDITIONAL METER EITHER SIDE OF SUPPLY LINE.



SECTION
1 1/2" OR 2" SERVICE

NOTES:

1. ALL MANIFOLD PIPING, VALVES AND FITTINGS SHALL BE BRASS OR TYPE 304 STAINLESS STEEL. ON 1 1/2" AND 2" METERS FOR ABOVE GROUND APPLICATIONS, GALVANIZED PIPE MAY BE USED.
2. ALL MATERIAL FOR METER AND MANIFOLDS SHALL BE IN ACCORDANCE WITH THE BUY AMERICAN ACT.
3. 1 1/2" HDPE BLUE TUBING SDR-9 (CTS) w/ 1 1/2" MANIFOLD FOR : UP TO (5) FIVE 5/8" METERS PER MANIFOLD, MAX.
4. 2" HDPE BLUE TUBING SDR-9 (CTS) w/ 2" MANIFOLD FOR : (6) SIX TO (10) TEN 5/8" METERS, (10) MAX.
5. METER SHALL BE CENTERED IN METER BOX.
6. METER BOXES SHALL BE CLEAR OF ALL STRUCTURES ON ALL SIDES, 30" MIN.

MANIFOLDS FOR 5/8" METER

N.T.S.

SHEET TITLE

MANIFOLDS FOR 5/8" METER

City of Tallahassee
Your Own Utilities™

SHEET

W04

Approved by:

Date Issued: OCTOBER 2018

SCALE

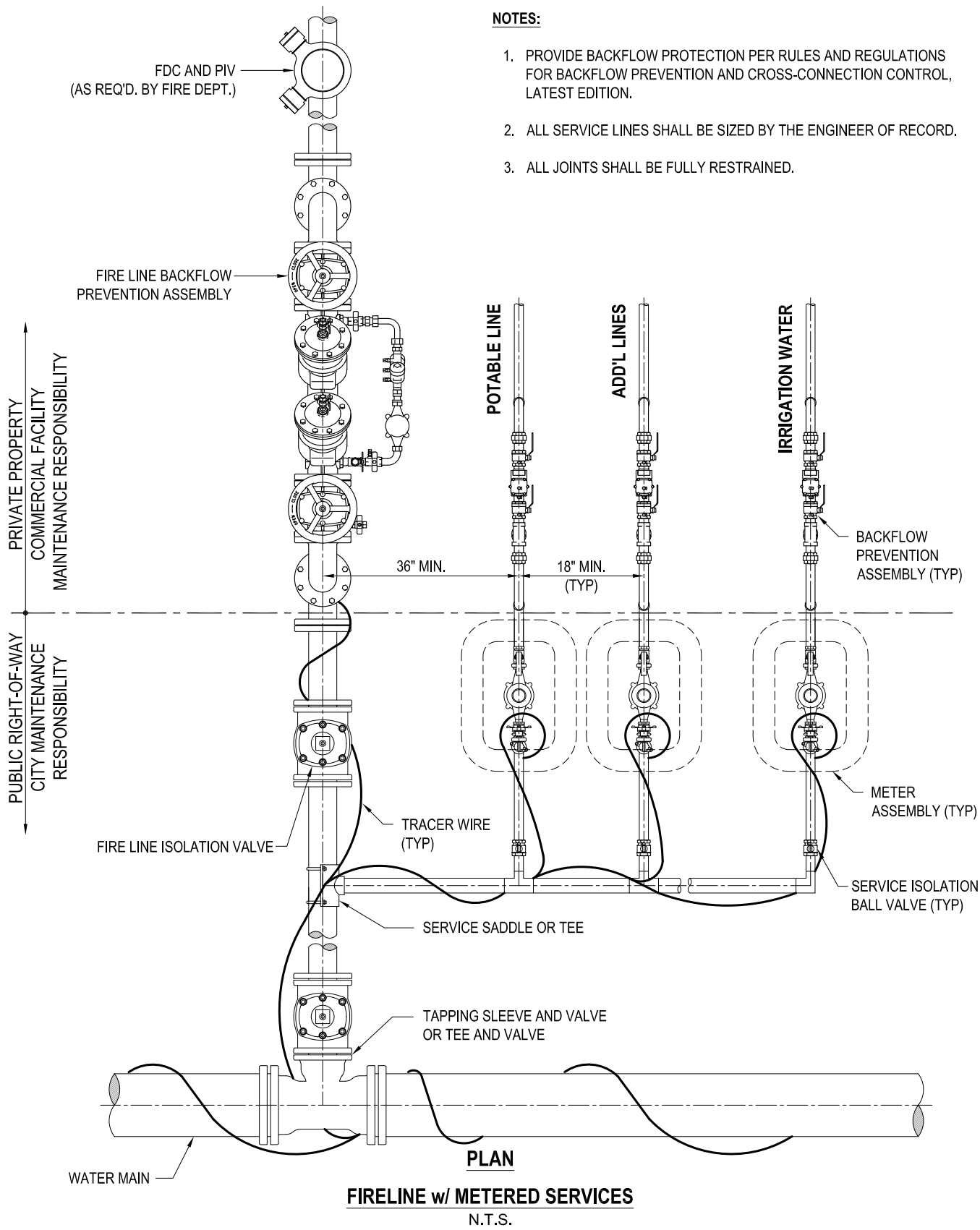
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N.T.S.

NOTES:

1. PROVIDE BACKFLOW PROTECTION PER RULES AND REGULATIONS FOR BACKFLOW PREVENTION AND CROSS-CONNECTION CONTROL, LATEST EDITION.
2. ALL SERVICE LINES SHALL BE SIZED BY THE ENGINEER OF RECORD.
3. ALL JOINTS SHALL BE FULLY RESTRAINED.



SHEET TITLE

FIRELINE w/ METERED SERVICES

City of Tallahassee
Your Own Utilities™

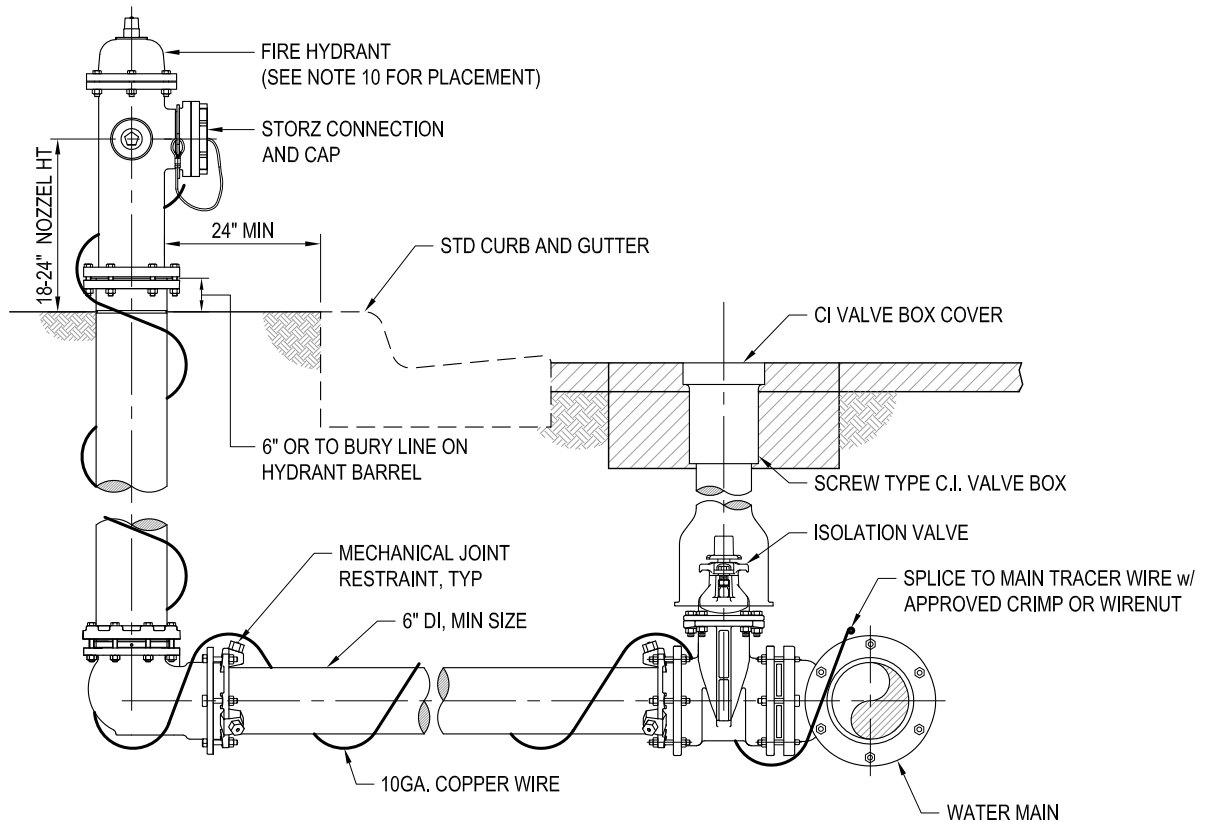
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W05

Approved by: _____ Date Issued: **OCTOBER 2018**

SCALE

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N.T.S.

**NOTES:**

- HYDRANT TO BE PLACED WITH PUMPER NOZZLE FACING STREET.
- VALVE OPENING 5 1/4" MINIMUM.
- SIX INCH MJ CONNECTION TO MAIN.
- HOSE NOZZLES: NATIONAL STANDARD THREADS WITH TWO 2 1/2" HOSE NOZZLES AND ONE STEAMER NOZZLE WITH 5" OPENING AND STORZ CONNECTION WITH CAP ON NOZZLE.
- ALL PIPE FROM MAIN TO HYDRANT SHALL BE RESTRAINED DUCTILE IRON w/o FITTINGS.
- COMPACTION WILL BE 100% STANDARD PROCTOR.
- DEPTH OF PIPE TO HAVE 36" MINIMUM COVER.
- HYDRANTS PAINT SHALL BE COMEX (U-10: HIGH SOLIDS, GLOSS POLYURETHANE) OVER (M-10: UNIVERSAL PRIMER) OR APPROVED EQUAL.
- HYDRANTS COLOR:
SAFETY YELLOW - HYDRANTS PLACED ON CITY WATER MAINS.
RED - HYDRANTS PLACED ON PRIVATE WATER MAINS.
OFF WHITE - HYDRANT PRIMER.
- HYDRANT PLACEMENT:
CURB AND GUTTER STREET - AS NOTED PER PLANS
OPEN DITCH STREET - TOP OF BACKSLOPE OF DITCH, ON THE R/W LINE AND OR PROPERTY CORNER.
(MAX. 10' FROM DRIVING SURFACE)
- CLEARANCES OF SEVEN AND ONE HALF FEET IN FRONT OF AND TO EACH SIDE OF HYDRANT WITH FOUR FOOT TO THE REAR SHALL BE MAINTAINED.

FIRE HYDRANT CONNECTION

N.T.S.

SHEET TITLE

FIRE HYDRANT CONNECTION

City of Tallahassee
Your Own Utilities™

SHEET

W06

Approved by:

Date Issued:

OCTOBER 2018

SCALE

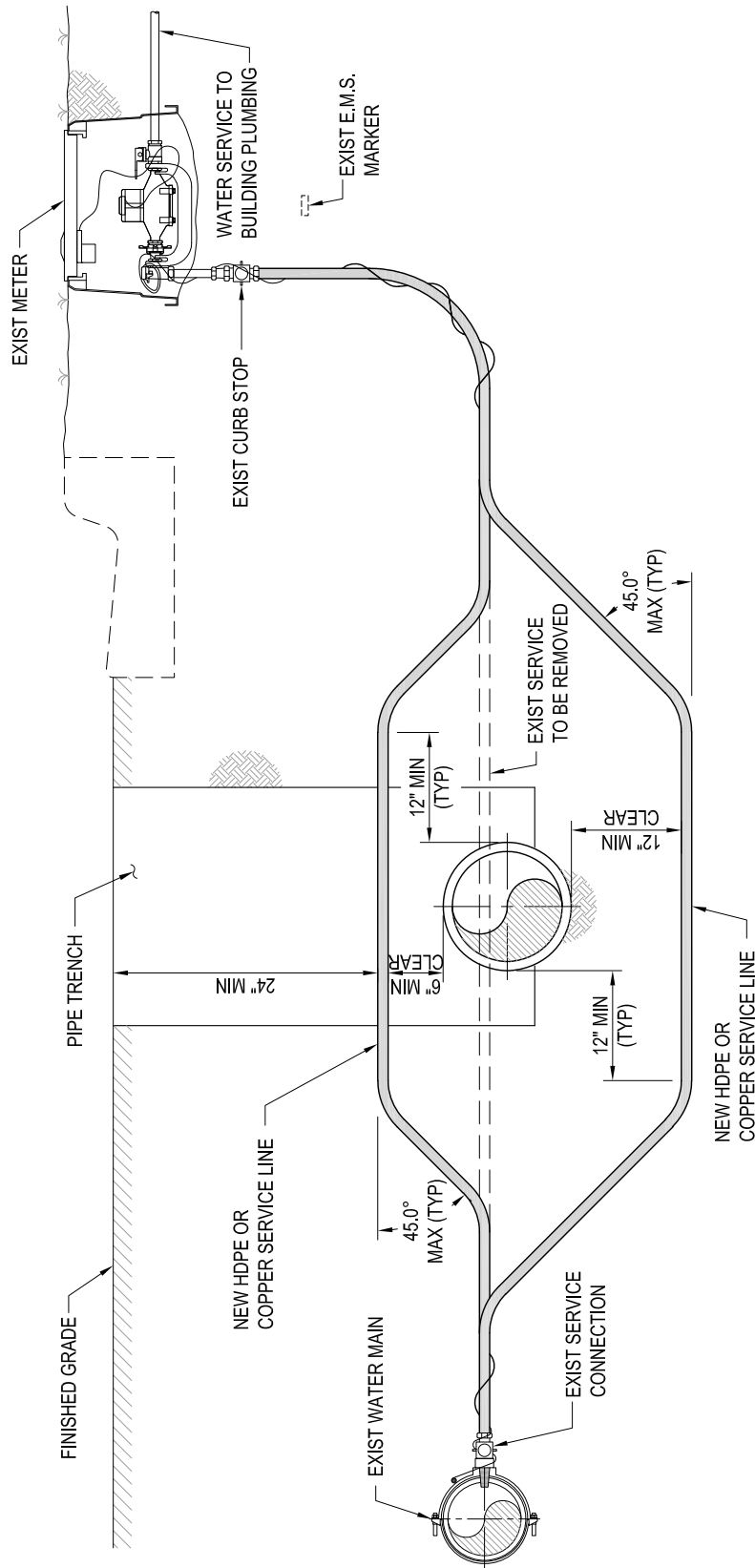
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N.T.S.

NOTES:

1. IF NEW PIPE TRENCH OCCURS WITHIN IMPROVED AREAS, EXIST WATER SERVICE IS TO BE REPLACED FROM EXIST WATER MAIN SERVICE CONNECTION TO EXIST CURB STOP AT METER.
2. A MINIMUM OF 10 GAUGE SOLID COPPER WIRE (BLUE) WILL RUN FROM MAIN TO METER; CONNECT TO EXISTING TRACER WIRE AT MAIN. WRAP AROUND CORPORATION STOP, WRAP AROUND AND SECURE TO SERVICE TUBING; THEN EXTEND UP INTO METER BOX AT ANGLE VALVE. A 24" MIN OF TRACING WIRE TO BE COILED IN METER BOX.



PROFILE

**WATER SERVICE ADJUSTMENT
(IMPROVED AREAS)**
N.T.S.

SHEET TITLE

**WATER SERVICE ADJUSTMENT
(IMPROVED AREAS)**

City of Tallahassee
Your Own Utilities™

SHEET

W07

Approved by:

Date Issued:

OCTOBER 2018

SCALE

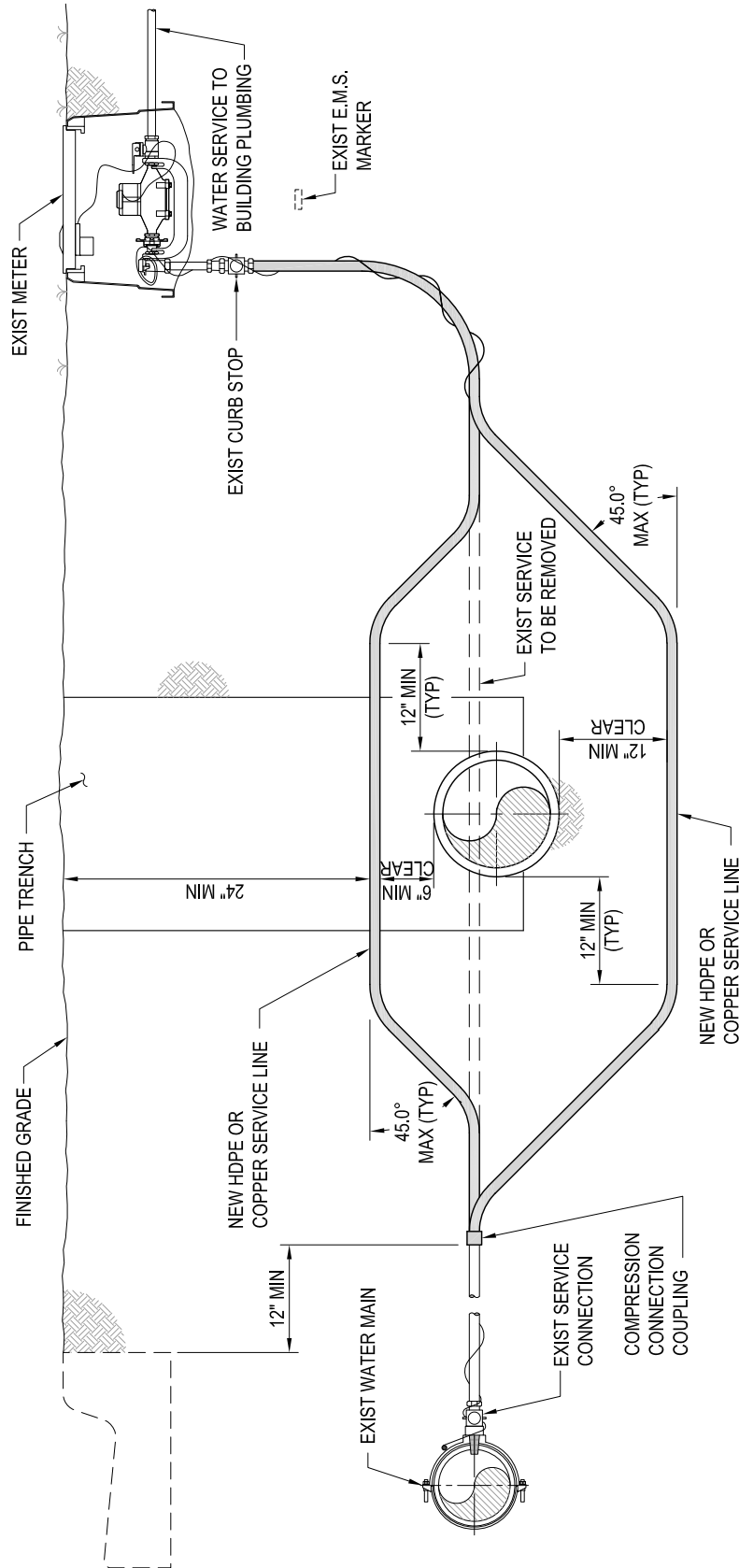
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N.T.S.

NOTES:

1. IF NEW PIPE TRENCH OCCURS WITHIN UNIMPROVED AREAS, EXIST WATER SERVICE IS TO BE REPLACED FROM 12" BEHIND THE BACK SIDE OF CURB OR 12" OFF THE EDGE OF PAVEMENT TO EXIST CURB STOP AT METER.
2. A MINIMUM OF 10 GAUGE SOLID COPPER WIRE (BLUE) WILL RUN FROM MAIN TO METER; CONNECT TO EXISTING TRACER WIRE AT MAIN, WRAP AROUND CORPORATION STOP, WRAP AROUND AND SECURE TO SERVICE TUBING, THEN EXTEND UP INTO METER BOX AT ANGLE VALVE. A 24" MIN OF TRACING WIRE TO BE COILED IN METER BOX.



PROFILE

WATER SERVICE ADJUSTMENT
(UNIMPROVED AREAS)
N.T.S.

SHEET TITLE

WATER SERVICE ADJUSTMENT
(UNIMPROVED AREAS)

City of Tallahassee
Your Own Utilities™

SHEET

W08

Approved by:

Date Issued:

OCTOBER 2018

SCALE

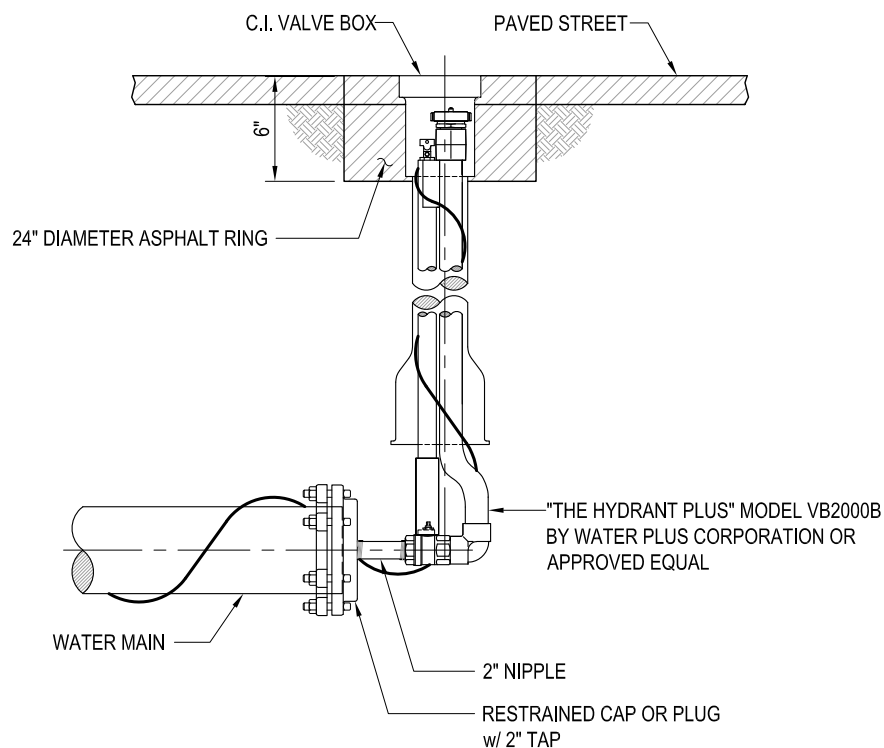
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N.T.S.

NOTES:

1. FOR CONSTRUCTION WITHIN ROADWAY, CONSTRUCT VALVE BOX WITH TOP 12" BELOW PROPOSED STREET GRADE. AFTER FINAL PAVING, CUT SMOOTH, CIRCULAR HOLE AROUND VALVE BOX AND ADJUST TO BE FLUSH WITH FINISH PAVEMENT. PLACE ASPHALT RING AND FINISHED ASPHALT PATCH AS SHOWN TO MATCH EXISTING GRADE.
2. AT NO TIME IS VALVE BOX OR EXTENSION PIPE TO TOUCH BONNET, BODY OF VALVE, OR MAIN.
3. EXTENSION PIPE TO BE 6" C-900 PVC , DR 18 OR D.I.P.
4. GPS LOCATION OR SWING TIES TO BE PROVIDED TO CITY BY CONTRACTOR OF ALL VALVE BOXES LOCATED BELOW FINISHED GRADE. ALL INFORMATION MUST BE KEPT CURRENT UNTIL MILLING AND RESURFACING OPERATIONS ARE COMPLETE AND VALVE BOXES ARE ADJUSTED TO FINISHED GRADE.
5. ALL CONSTRUCTION SHALL CONFORM TO CITY OF TALLAHASSEE TECHNICAL SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION.
6. A MINIMUM OF 10 GAUGE TRACER WIRE WILL RUN FROM MAIN TO METER BOX; CONNECT TO EXISTING TRACER WIRE AT MAIN, WRAP AROUND BALL VALVE, WRAP AROUND AND SECURE TO SERVICE TUBING, THEN EXTEND UP INTO METER BOX AT BALL VALVE. A 24" MIN OF TRACING WIRE TO BE COILED IN METER BOX. WIRE SHALL NOT BE WRAPPED AROUND OPERATING NUT OR STEM FOR ANY REASON.
7. ALL WATER SERVICE VALVES AND FITTINGS SHALL BE BRASS OR TYPE 304 STAINLESS STEEL.

**MANUAL 2" WATER MAIN FLUSH STAND**

N.T.S.

SHEET TITLE

MANUAL 2" WATER FLUSH STAND

City of Tallahassee
Your Own Utilities™

SHEET

W09

Approved by:

Date Issued:

OCTOBER 2018

SCALE

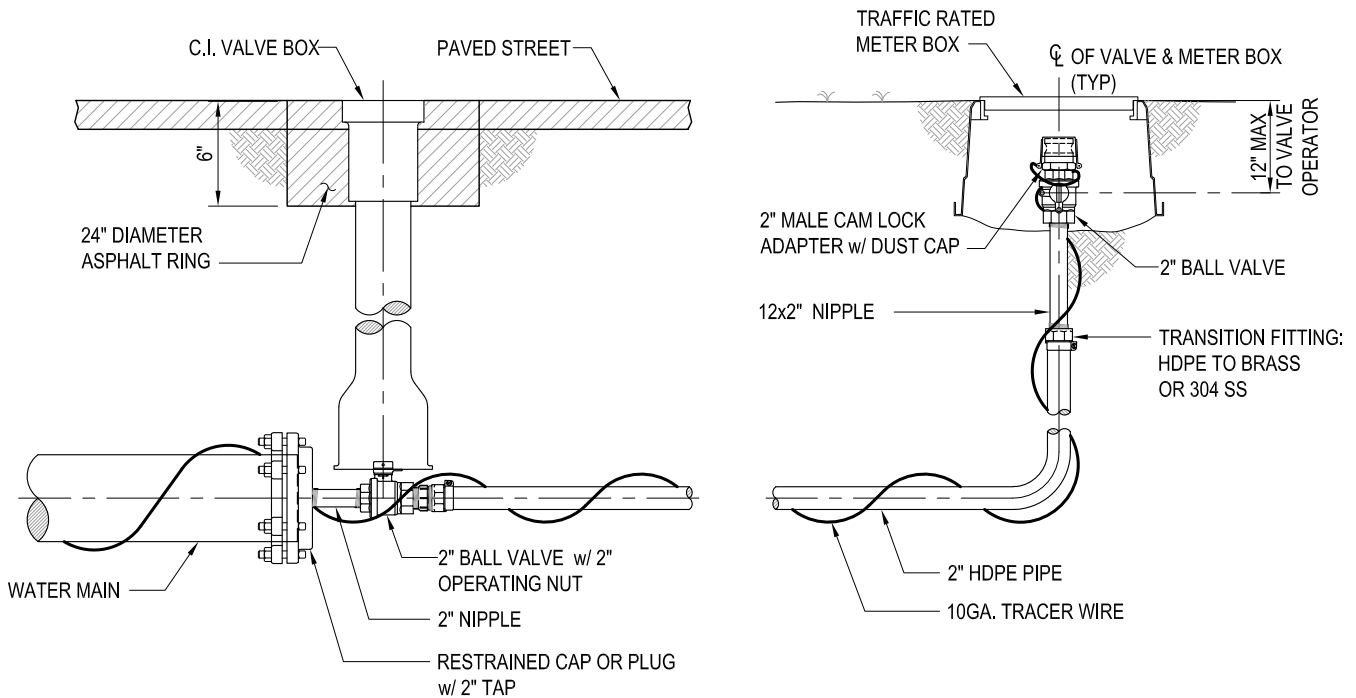
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N.T.S.

NOTES:

1. FOR CONSTRUCTION WITHIN ROADWAY, CONSTRUCT VALVE BOX WITH TOP 12" BELOW PROPOSED STREET GRADE. AFTER FINAL PAVING, CUT SMOOTH, CIRCULAR HOLE AROUND VALVE BOX AND ADJUST TO BE FLUSH WITH FINISH PAVEMENT. PLACE ASPHALT RING AND FINISHED ASPHALT PATCH AS SHOWN TO MATCH EXISTING GRADE.
2. AT NO TIME IS VALVE BOX OR EXTENSION PIPE TO TOUCH BONNET, BODY OF VALVE, OR MAIN.
3. EXTENSION PIPE TO BE 6" C-900 PVC , DR 18 OR D.I.P.
4. GPS LOCATION OR SWING TIES TO BE PROVIDED TO CITY BY CONTRACTOR OF ALL VALVE BOXES LOCATED BELOW FINISHED GRADE. ALL INFORMATION MUST BE KEPT CURRENT UNTIL MILLING AND RESURFACING OPERATIONS ARE COMPLETE AND VALVE BOXES ARE ADJUSTED TO FINISHED GRADE.
5. ALL CONSTRUCTION SHALL CONFORM TO CITY OF TALLAHASSEE TECHNICAL SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION.
6. A MINIMUM OF 10 GAUGE TRACER WIRE WILL RUN FROM MAIN TO METER BOX; CONNECT TO EXISTING TRACER WIRE AT MAIN, WRAP AROUND BALL VALVE, WRAP AROUND AND SECURE TO SERVICE TUBING, THEN EXTEND UP INTO METER BOX AT BALL VALVE. A 24" MIN OF TRACING WIRE TO BE COILED IN METER BOX. WIRE SHALL NOT BE WRAPPED AROUND OPERATING NUT OR STEM FOR ANY REASON.
7. ALL WATER SERVICE VALVES AND FITTINGS SHALL BE BRASS OR TYPE 304 STAINLESS STEEL.



OPTIONAL MANUAL 2" WATER MAIN FLUSH STAND

N.T.S.

SHEET TITLE

OPTIONAL MANUAL 2" WATER FLUSH STAND

City of Tallahassee
Your Own Utilities™

SHEET

W10

Approved by:

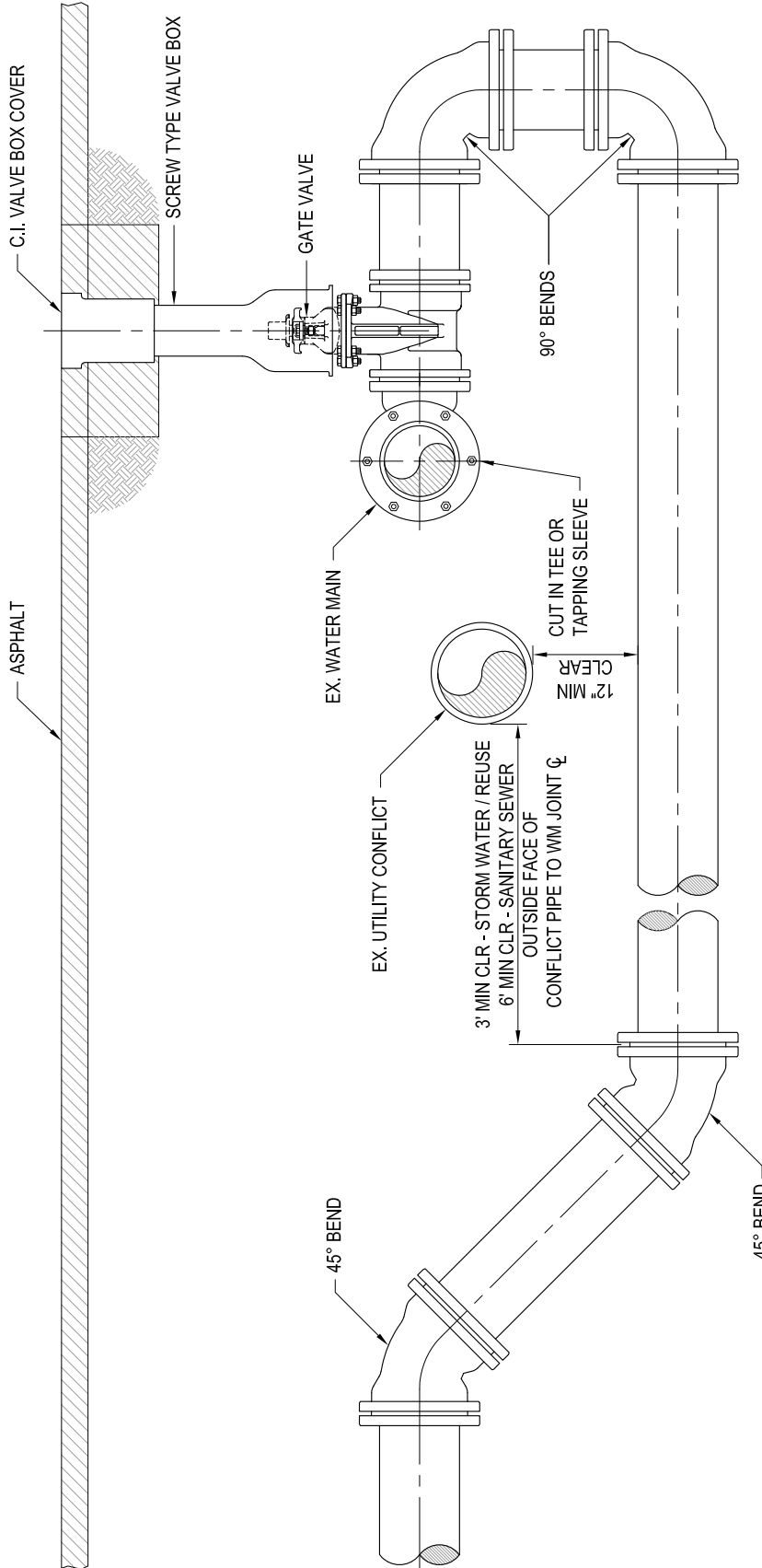
Date Issued: OCTOBER 2018

SCALE

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N.T.S.



REVERSE CONNECTION AT WATER MAIN

N.T.S.

SHEET TITLE

REVERSE CONNECTION AT WATER MAIN

City of Tallahassee
Your Own Utilities™

SHEET

W11

Approved by:

Date Issued: OCTOBER 2018

SCALE

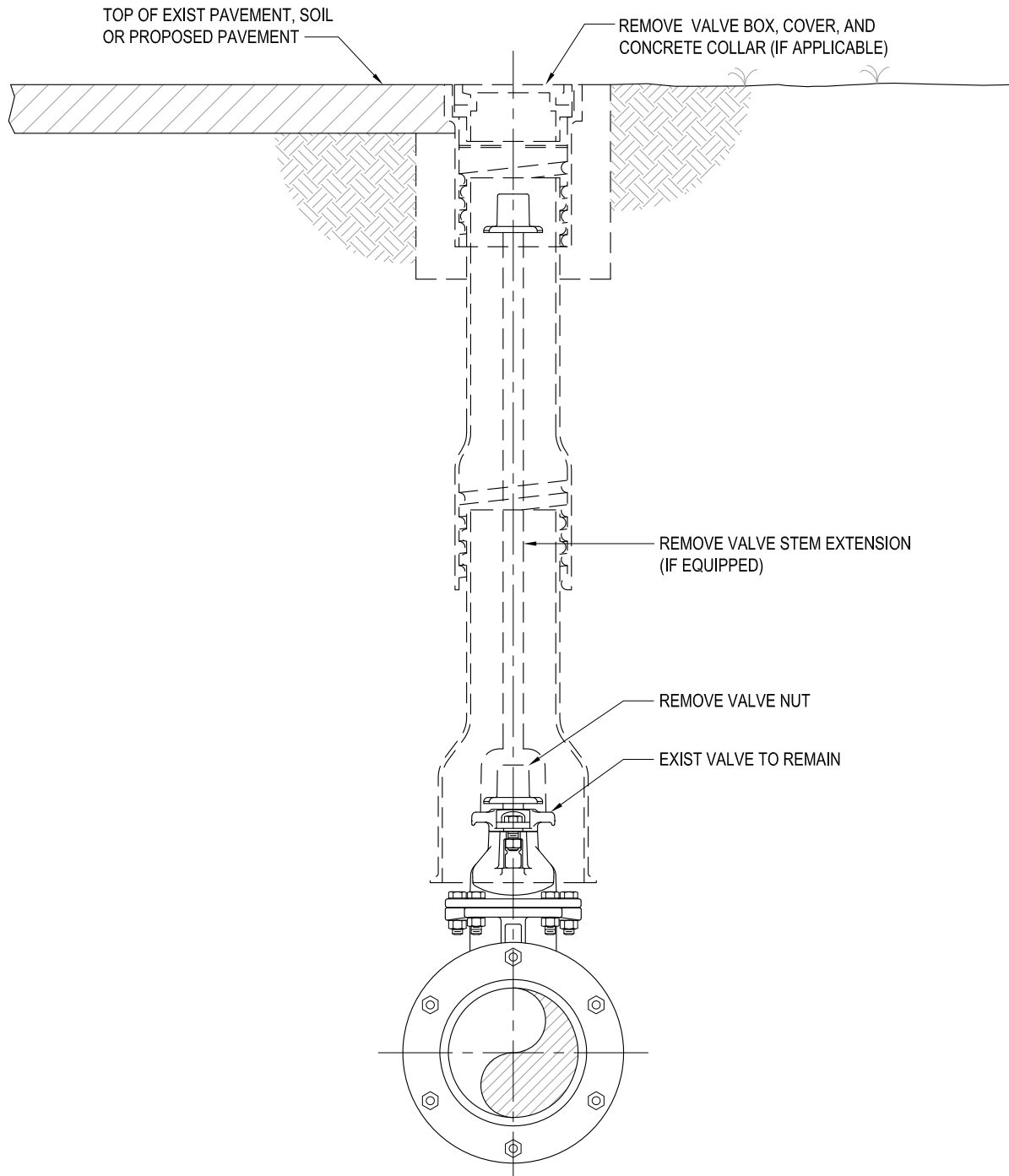
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N.T.S.

NOTES:

1. IN PAVEMENT: ALL CUTS AND REPAIRS TO EXIST SURFACE MUST CONFORM TO THE TECHNICAL SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION.
2. COMPACT AS REQUIRED AND MATCH EXIST GRADE AND SURFACE CONDITIONS.



VALVE PLACED OUT OF SERVICE
N.T.S.

SHEET TITLE

VALVE PLACED OUT OF SERVICE

City of Tallahassee
Your Own Utilities™

SHEET

W12

Approved by:

Date Issued:

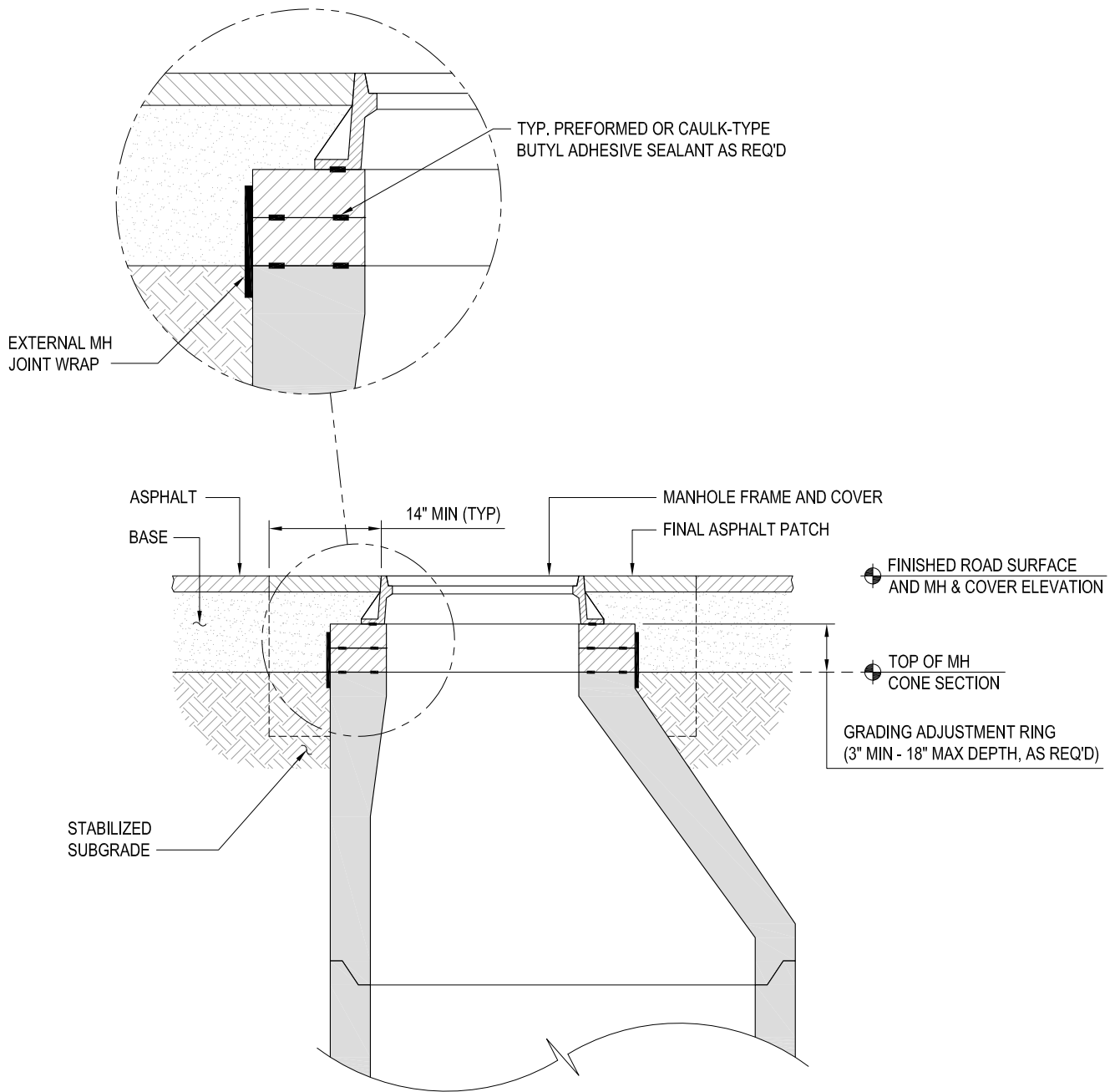
OCTOBER 2018

SCALE

COMPUTER FILE

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N.T.S.



MANHOLE FRAME & COVER PLACEMENT

N.T.S.

SHEET TITLE

MANHOLE FRAME & COVER PLACEMENT

City of Tallahassee
Your Own Utilities™

SHEET

S01

Approved by:

Date Issued:

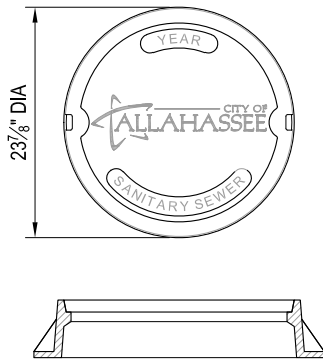
OCTOBER 2018

SCALE

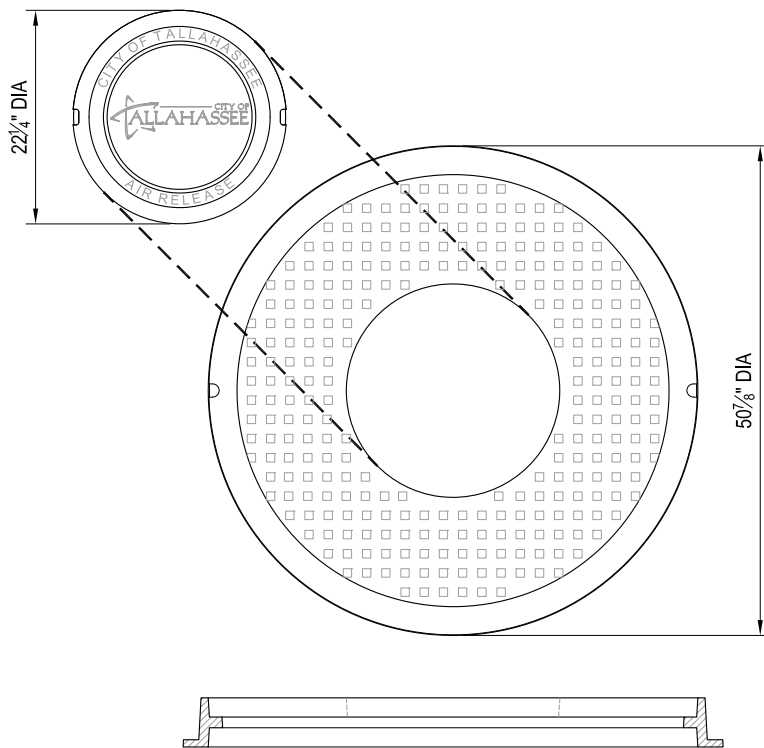
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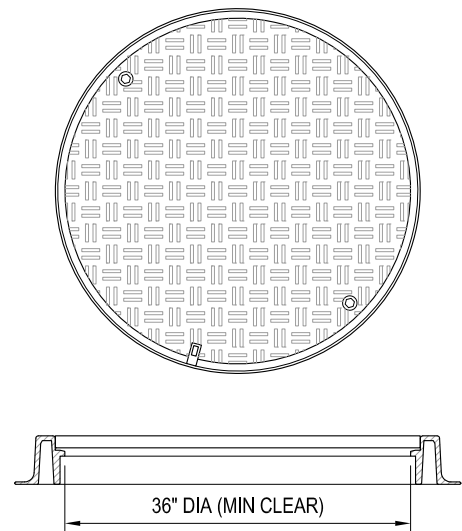
N.T.S.



**STANDARD SANITARY SEWER
MANHOLE COVER & FRAME**



**AIR RELEASE VALVE (ARV)
MANHOLE COVER & FRAME**



**AIR RELEASE VALVE (ARV)
COMPOSITE MANHOLE COVER & FRAME**

MANHOLE FRAMES & COVERS

N.T.S.

SHEET TITLE

MANHOLE FRAMES & COVERS

City of Tallahassee
Your Own Utilities™

SHEET

S02

Approved by:

Date Issued:

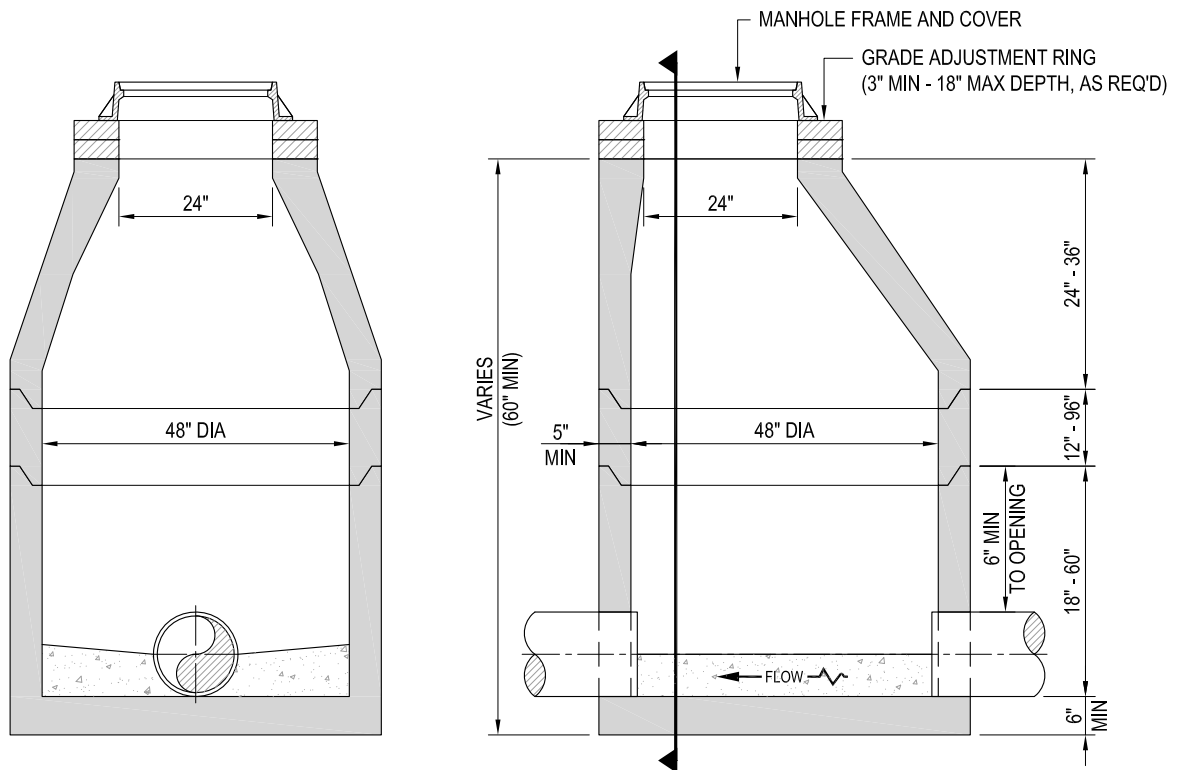
OCTOBER 2018

SCALE

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N.T.S.



FOR PIPE DIA 15" AND LESS
AND DEPTHS MORE THAN 5'

48-INCH MANHOLE
N.T.S.

SHEET TITLE

48-INCH MANHOLE
FOR PIPE DIA 15" AND LESS
AND DEPTHS MORE THAN 5'

City of Tallahassee
Your Own Utilities™

SHEET

S03

Approved by:

Date Issued:

OCTOBER 2018

SCALE

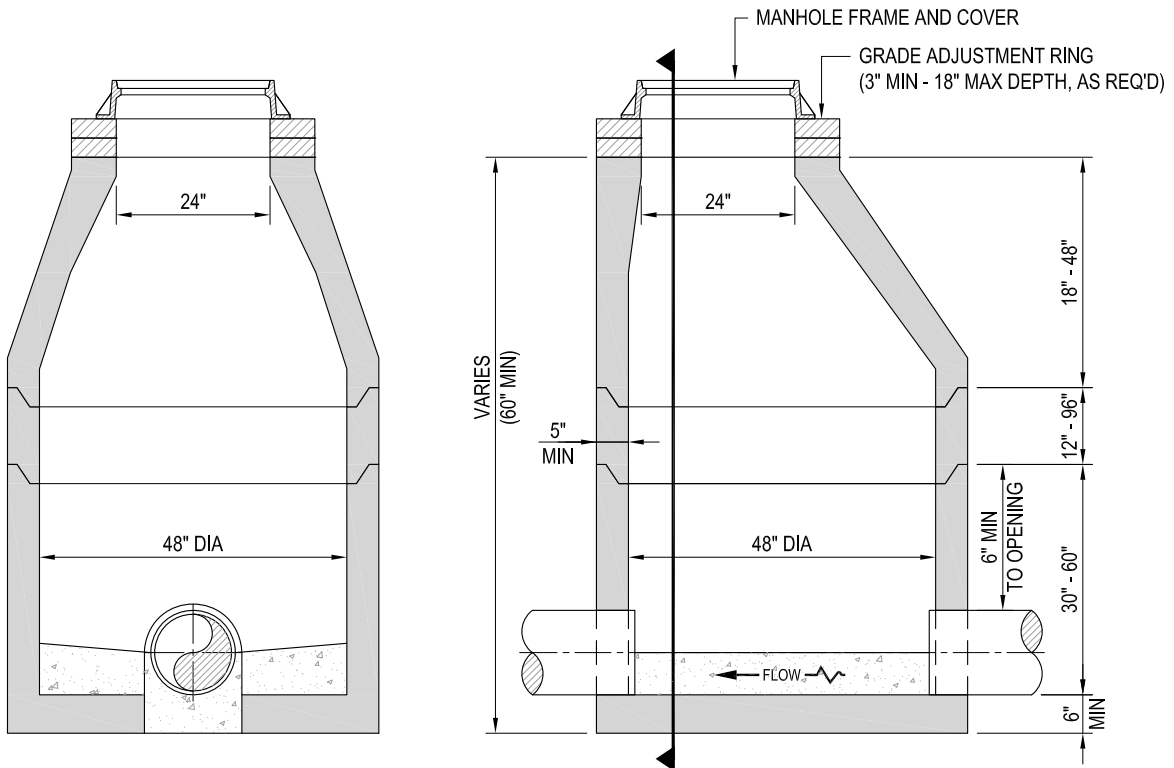
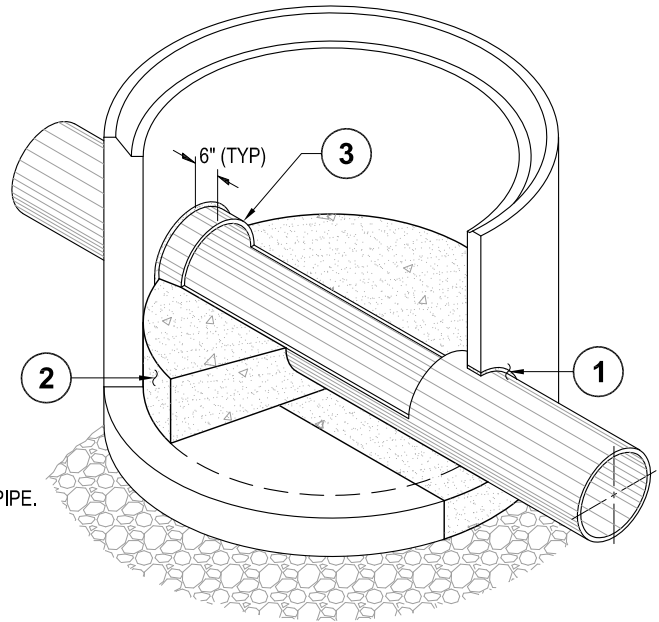
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N.T.S.

INSTALLATION NOTES:

1. **INSTALL MANHOLE**
FILL DOGHOUSE OPENINGS w/ CONC. (FDOT CLASS I OR II)
2. **FORM MANHOLE BENCH**
FORM BENCH w/ CONC. (FDOT CLASS I OR II) TO SPRINGLINE (.5D) OF PIPE.
SEE MANHOLE BENCH DETAIL FOR SLOPE REQUIREMENTS.
3. **CUT EXIST PIPE**
CUT EXIST PIPE TO MATCH SPRINGLINE (.5D) OF PIPE.



FOR PIPE DIA 15" AND LESS
AND DEPTHS MORE THAN 5'

48-INCH SADDLE MANHOLE

N.T.S.

SHEET TITLE

48-INCH SADDLE MANHOLE
FOR PIPE DIA 15" AND LESS
AND DEPTHS MORE THAN 5'

SHEET

City of Tallahassee
Your Own Utilities™

S04

Approved by:

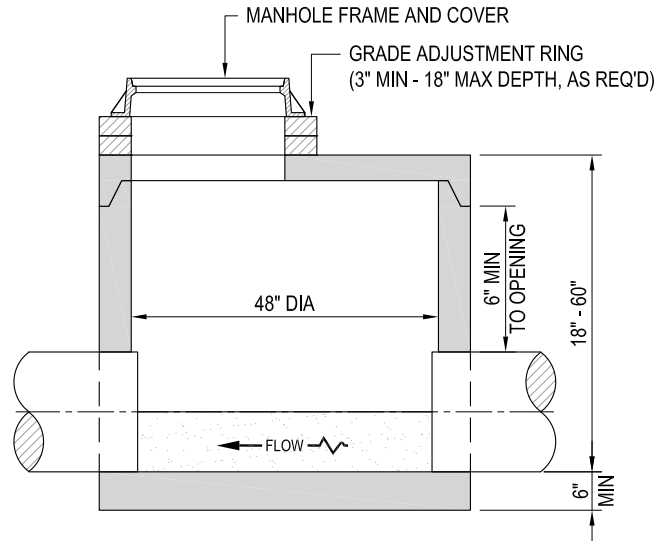
Date Issued: OCTOBER 2018

SCALE

COMPUTER FILE

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N.T.S.



FOR PIPE DIA 15" AND LESS

48-INCH MANHOLE w/ TOPSLAB

N.T.S.

SHEET TITLE

48-INCH MANHOLE w/ TOP SLAB
FOR PIPE DIA 15" AND LESS

City of Tallahassee
Your Own Utilities™

SHEET

S05

Approved by:

Date Issued:

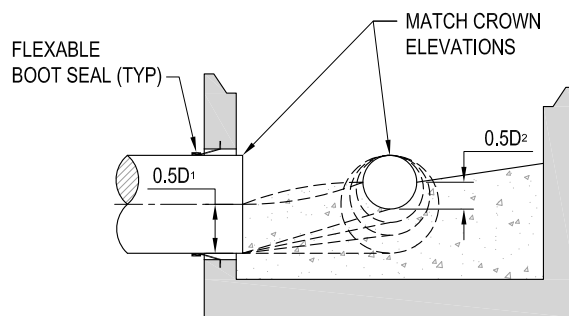
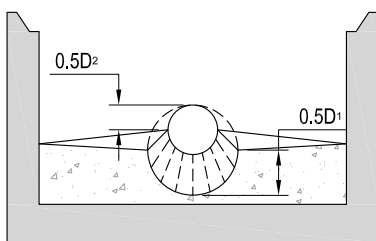
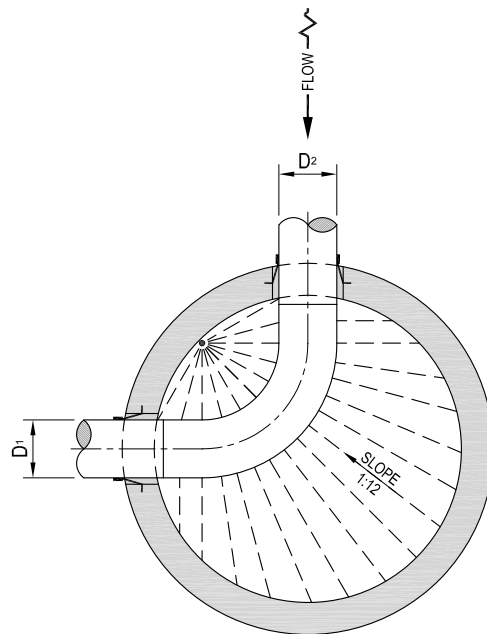
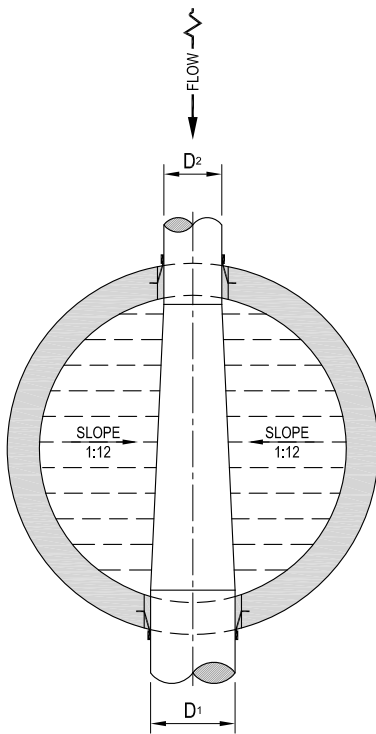
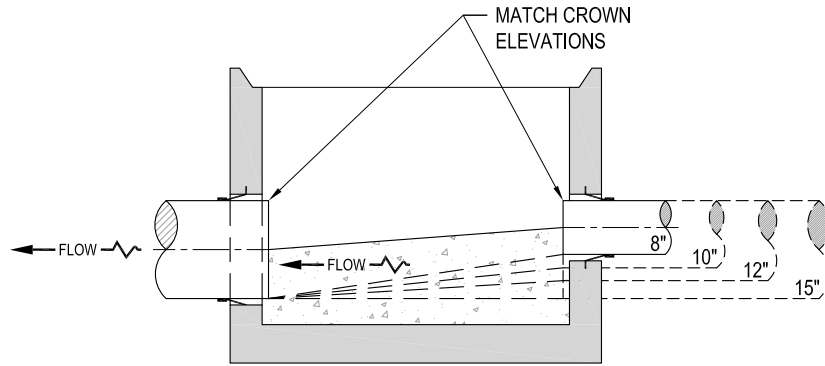
OCTOBER 2018

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COMPUTER FILE

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N.T.S.



MANHOLE BENCH w/ MATCHING CROWNS

N.T.S.

SHEET TITLE

MANHOLE BENCH
w/ MATCHING CROWNS

City of Tallahassee
Your Own Utilities™

SHEET

S06

Approved by:

Date Issued:

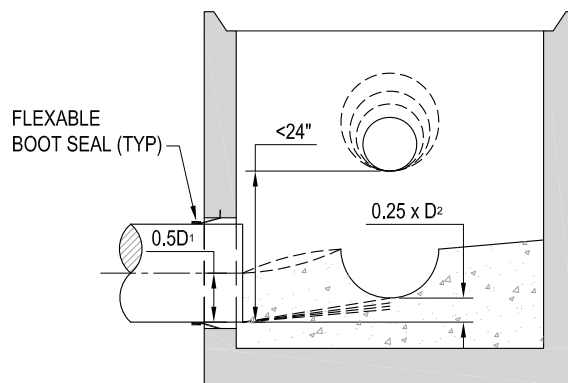
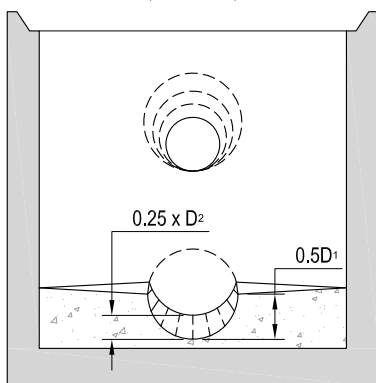
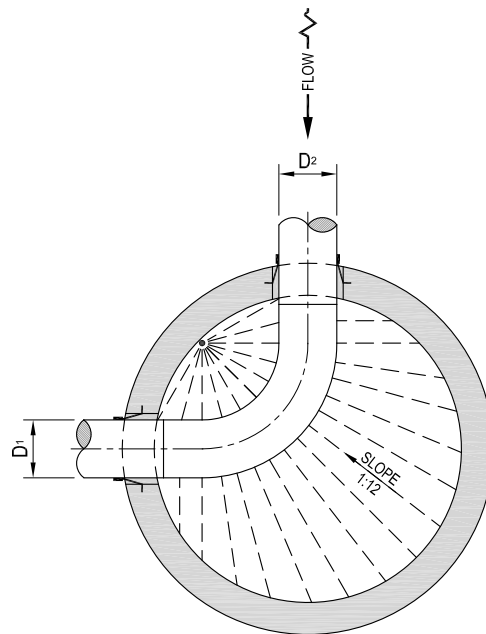
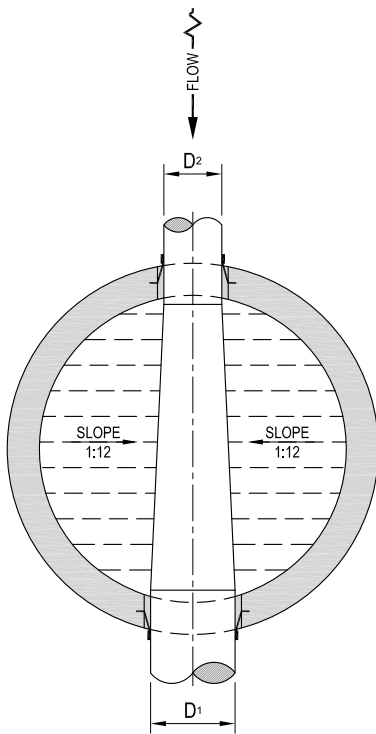
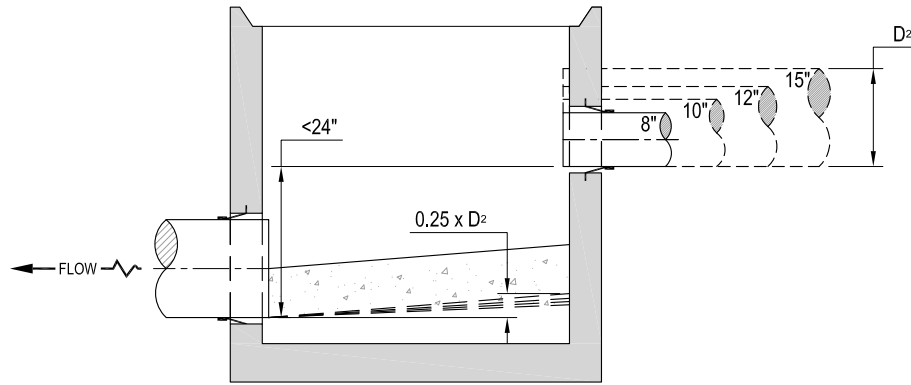
OCTOBER 2018

SCALE

COMPUTER FILE

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N.T.S.



MANHOLE BENCH w/ OFFSET CROWNS

N.T.S.

SHEET TITLE

MANHOLE BENCH
w/ OFFSET CROWNS

City of Tallahassee
Your Own Utilities™

SHEET

S07

Approved by:

Date Issued:

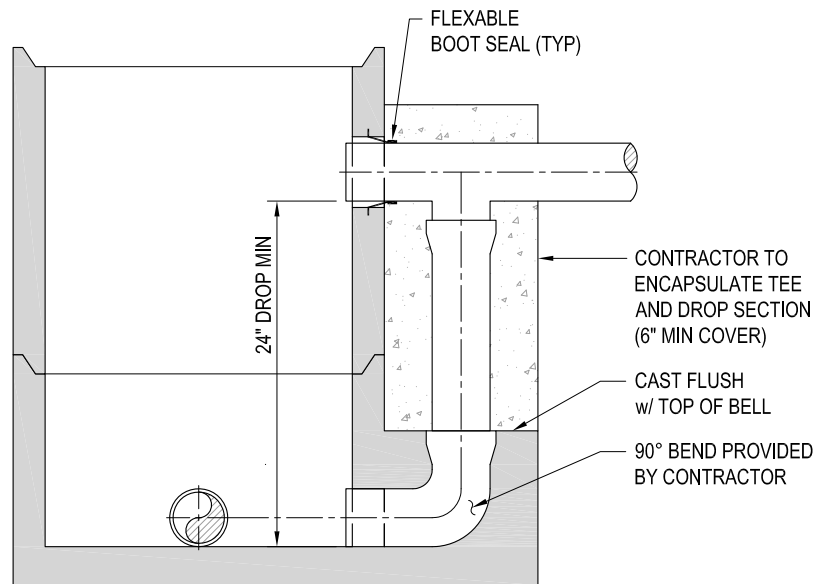
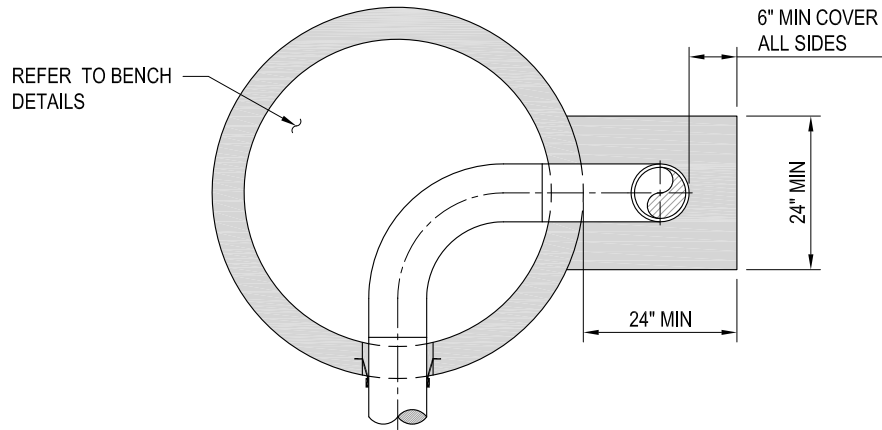
OCTOBER 2018

SCALE

COMPUTER FILE

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N.T.S.



DROP MANHOLE
N.T.S.

SHEET TITLE

DROP MANHOLE
w/ PARTIAL PRECAST ENCASEMENT

City of Tallahassee
Your Own Utilities™

SHEET

S08

Approved by:

Date Issued:

OCTOBER 2018

SCALE

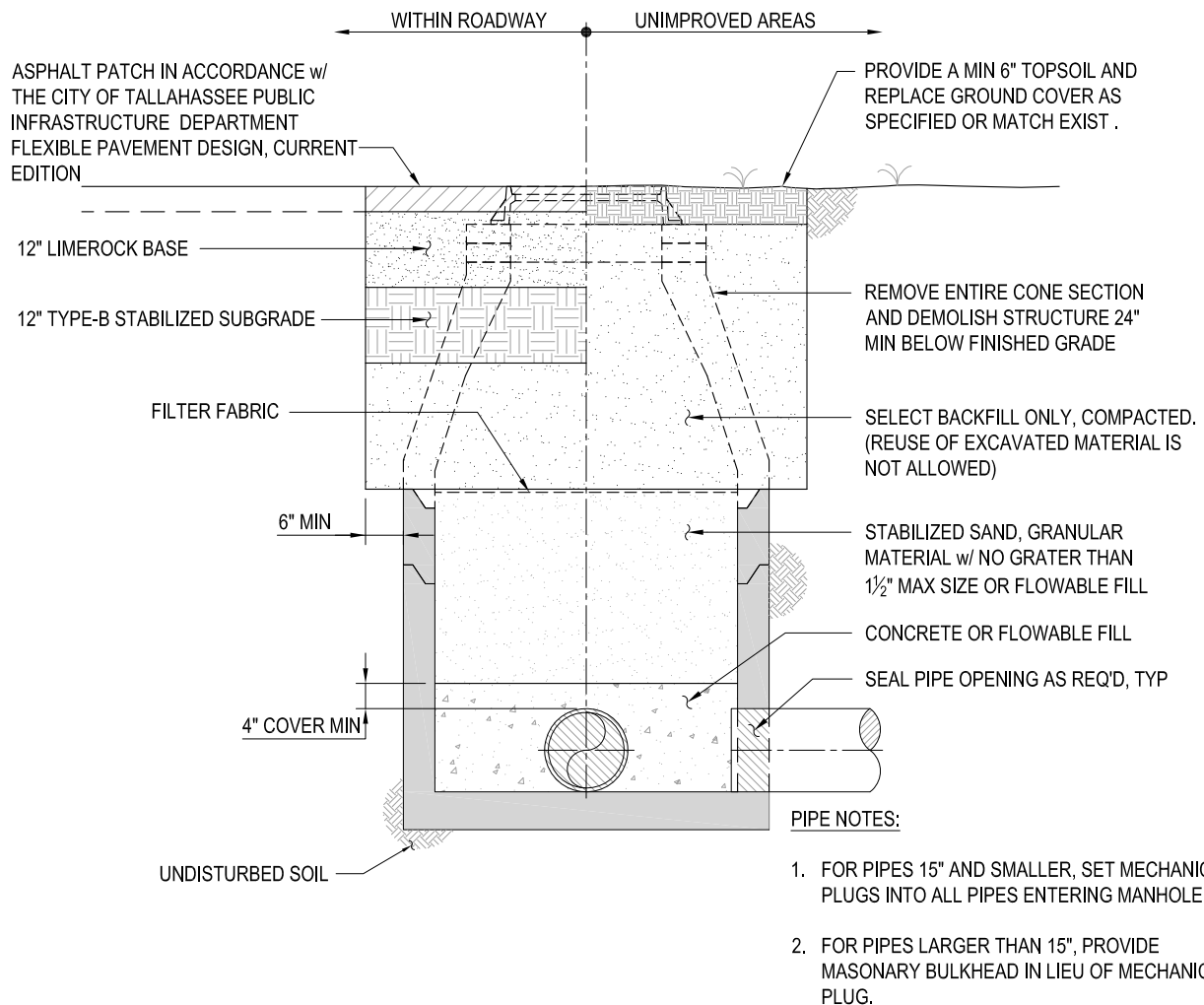
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N.T.S.

NOTES:

1. THE TECHNICAL SPECIFICATIONS SHALL APPLY FOR ALL OTHER REQUIREMENTS NOT SUPERCEDED BY THIS DETAIL FOR ALL EXCAVATING, BACKFILLING, AND COMPACTING FOR UTILITIES.
2. IF SEWER LINE WHICH IS TO BE PLACED OUT OF SERVICE EXTENDS UNDER EXISTING OR PROPOSED STRUCTURE, THE ENTIRE SEWER LINE TO THE NEXT MANHOLE SHALL BE GROUTED OR SLURRY (FLOWABLE FILL) FILLED.
3. IF SEWER LINE IS NOT LOCATED UNDER STRUCTURE, PLACE EXISTING SEWER LINE OUT OF SERVICE BY PLUGGING BOTH ENDS OF LINE AND GROUTING AROUND PLUGS.
4. CONTRACTOR SHALL RECORD AND CERTIFY QUANTITIES OF GROUT OR SLURRY (FLOWABLE FILL) PUMPED.
5. ALL SALVAGED MATERIAL BECOMES PROPERTY OF COT UNDERGROUND UTILITIES DEPARTMENT.



PLACING SANITARY SEWER MANHOLE OUT OF SERVICE

N.T.S.

SHEET TITLE

PLACING SANITARY SEWER MANHOLE
OUT OF SERVICE

City of Tallahassee
Your Own Utilities™

SHEET

S09

Approved by:

Date Issued:

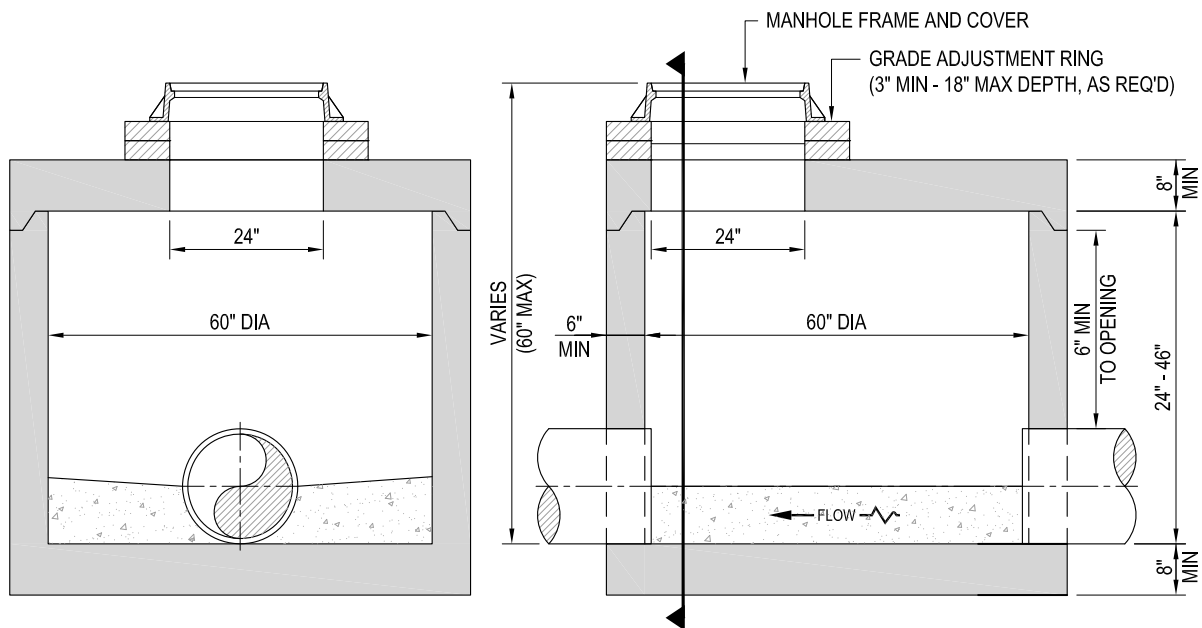
OCTOBER 2018

SCALE

COMPUTER FILE

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N.T.S.



FOR PIPE DIA 18" TO 24"
AND DEPTHS UP TO 5'

60-INCH MANHOLE w/ TOP SLAB

N.T.S.

SHEET TITLE

60-INCH MANHOLE w/ TOP SLAB
FOR PIPE DIA. 18" TO 24"
AND DEPTHS UP TO 5'

City of Tallahassee
Your Own Utilities™

SHEET

S10

Approved by:

Date Issued:

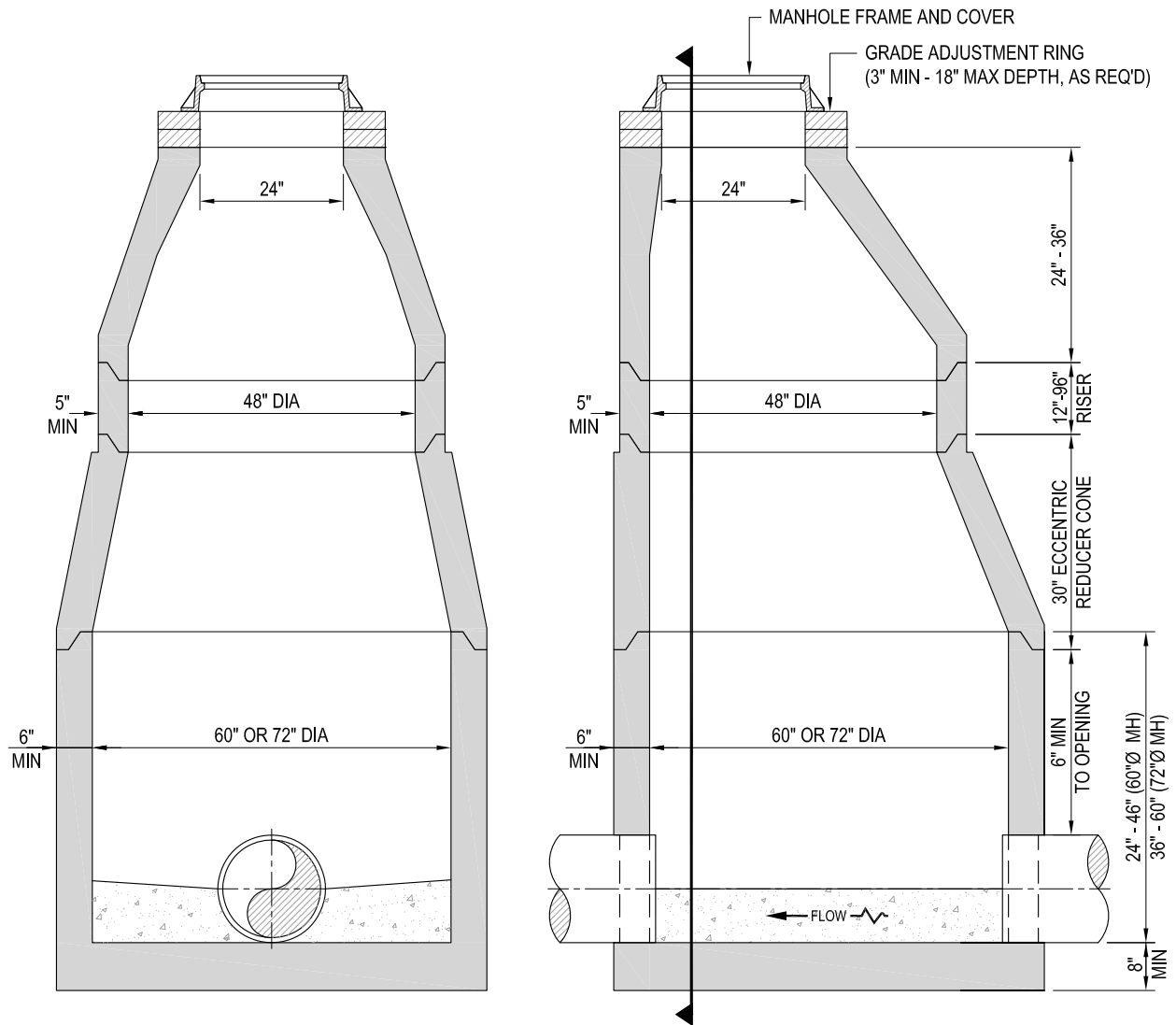
OCTOBER 2018

SCALE

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N.T.S.



60-INCH - FOR PIPE DIA 18" TO 24"
 72-INCH - FOR PIPE DIA GREATER THAN 24"
 AND DEPTHS GREATER THAN 5'

60-INCH & 72-INCH MANHOLE

N.T.S.

SHEET TITLE

60-INCH MANHOLE - FOR PIPE DIA 18" TO 24"
 72-INCH MANHOLE - FOR PIPE DIA GREATER THAN 24"
 AND DEPTHS MORE THAN 5'

City of Tallahassee
 Your Own Utilities™

SHEET

S11

Approved by:

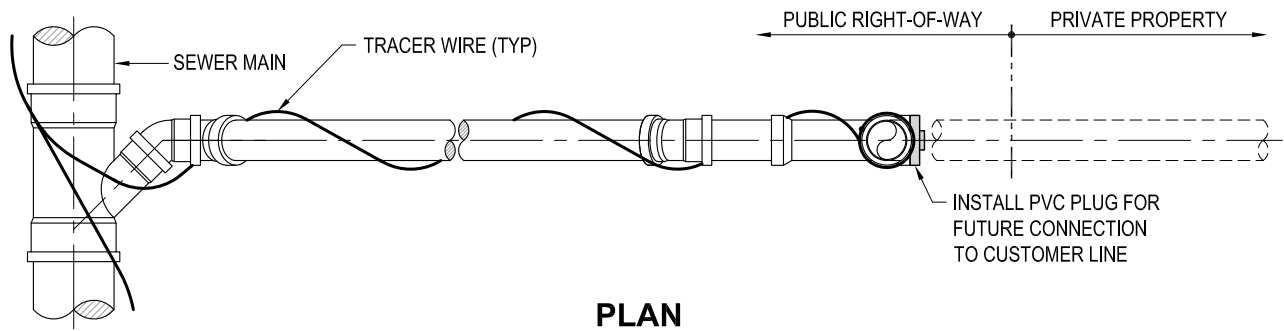
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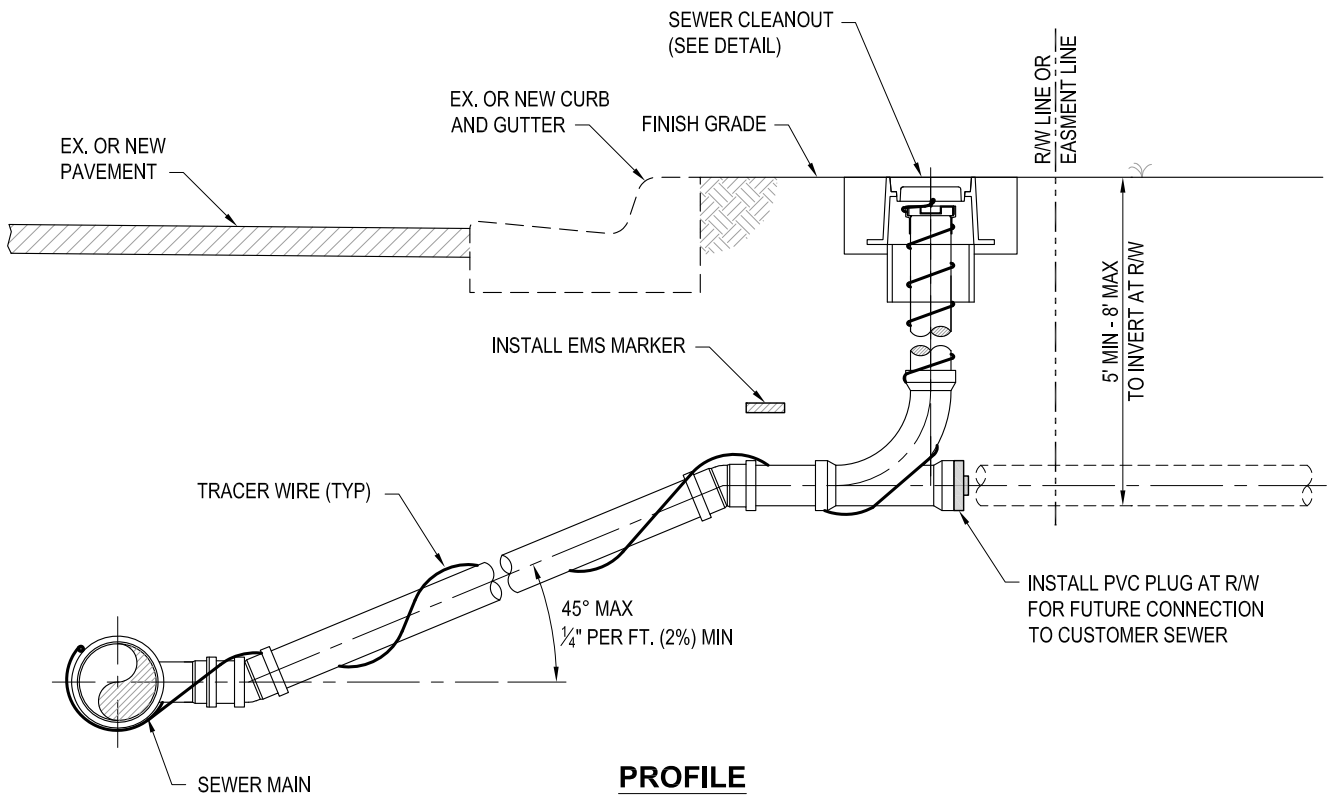
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N.T.S.



PLAN



PROFILE

SANITARY SEWER LATERAL

N.T.S.

SHEET TITLE

SANITARY SEWER LATERAL

City of Tallahassee
Your Own Utilities™

SHEET

S12

Approved by:

Date Issued:

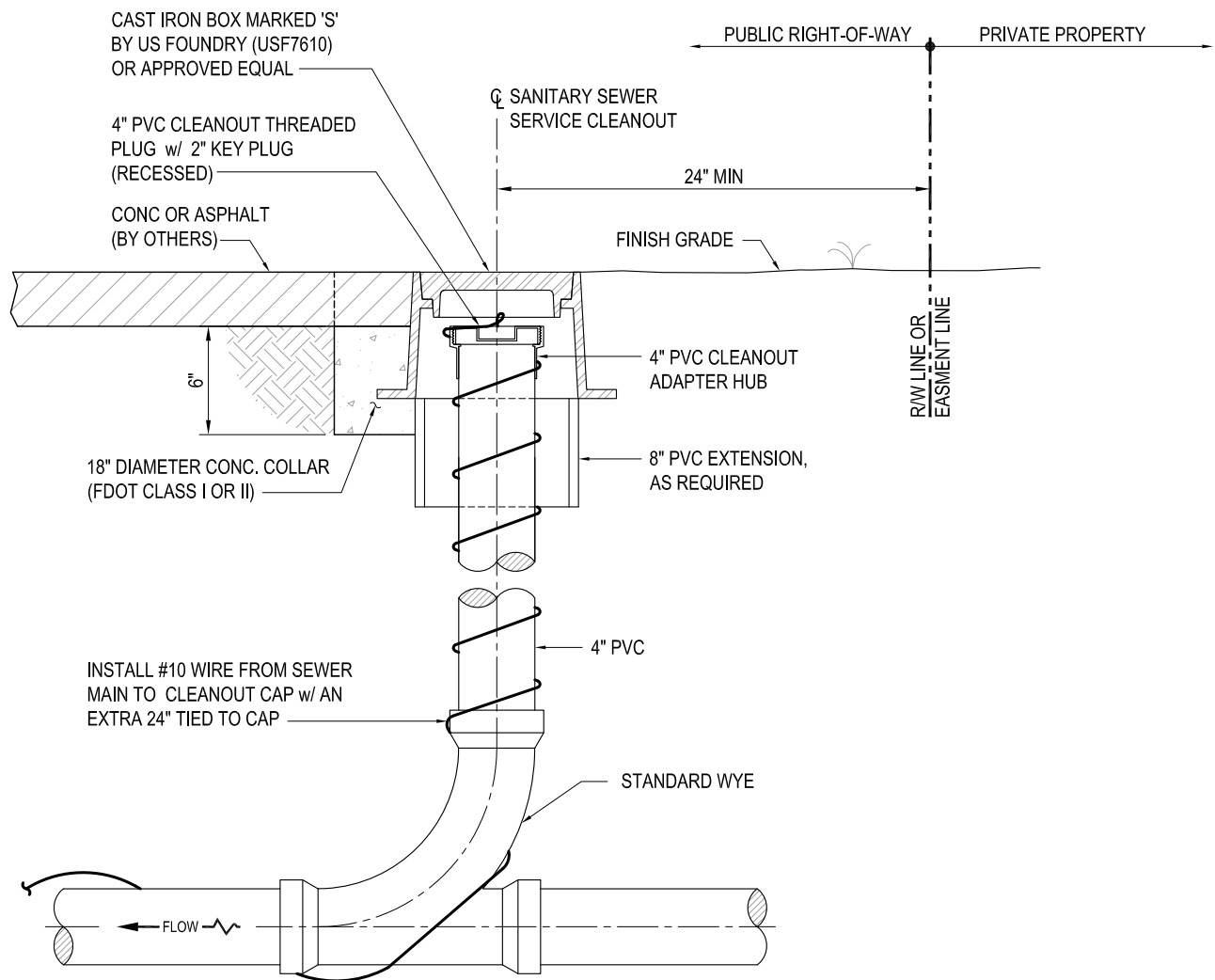
OCTOBER 2018

SCALE

COMPUTER FILE

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N.T.S.



SANITARY SEWER CLEANOUT

N.T.S.

SHEET TITLE

SANITARY SEWER CLEANOUT

City of Tallahassee
Your Own Utilities™

SHEET

S13

Approved by:

Date Issued:

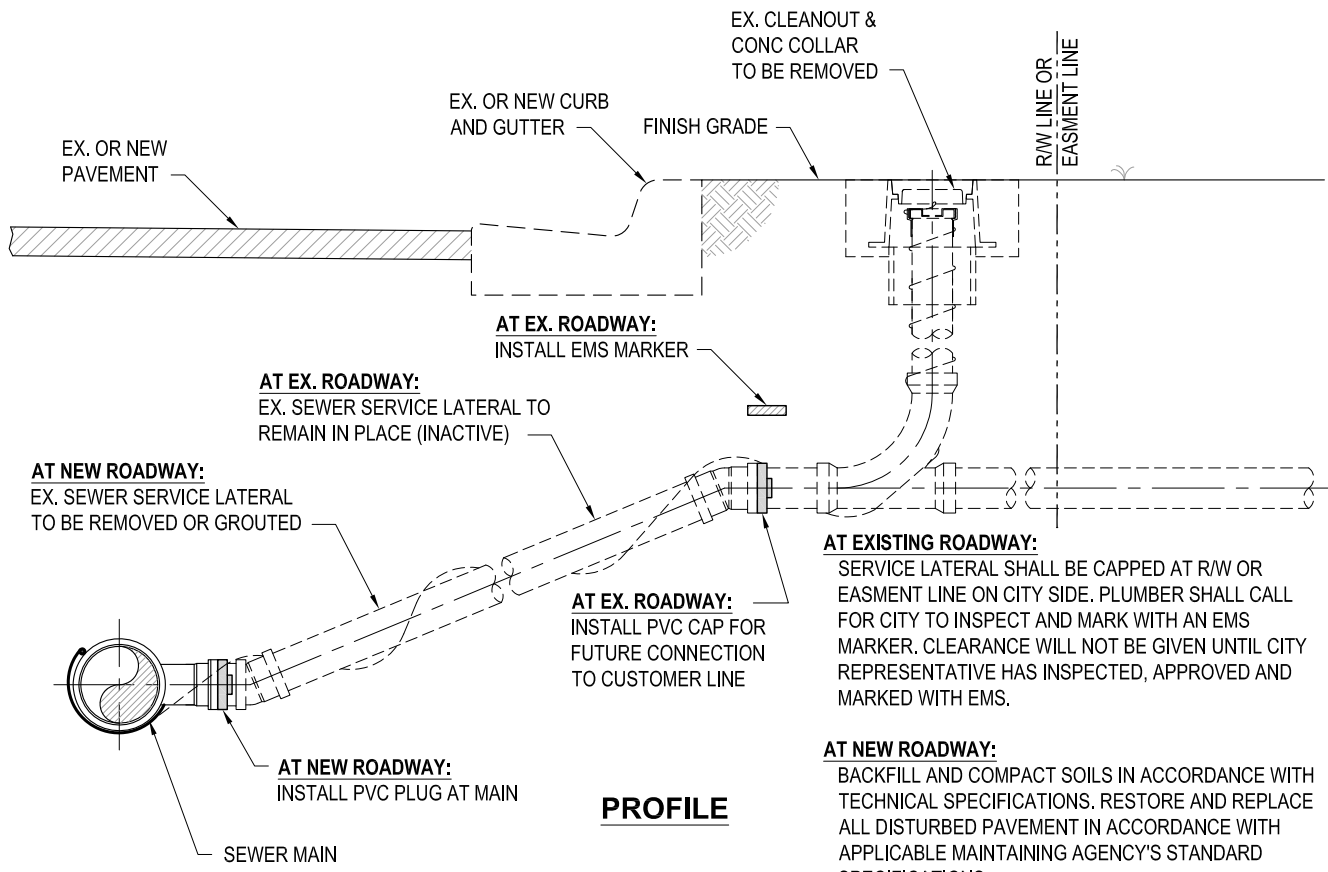
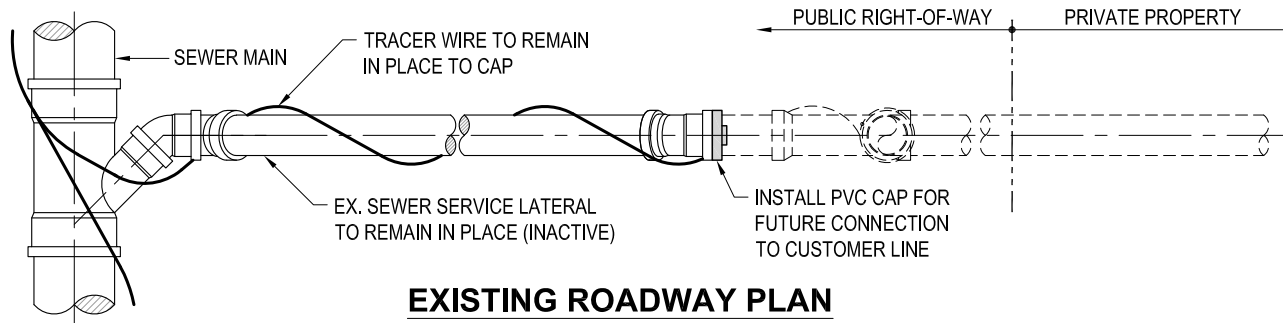
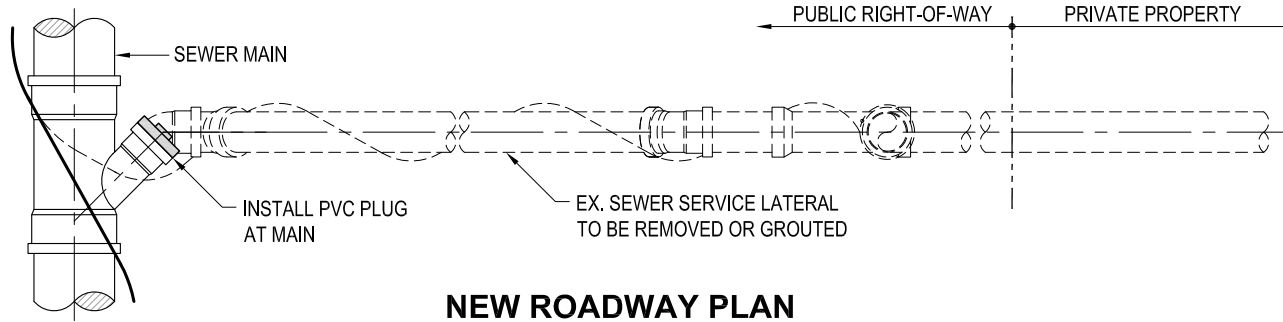
OCTOBER 2018

SCALE

COMPUTER FILE

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N.T.S.



AT EXISTING ROADWAY:
SERVICE LATERAL SHALL BE CAPPED AT R/W OR EASEMENT LINE ON CITY SIDE. PLUMBER SHALL CALL FOR CITY TO INSPECT AND MARK WITH AN EMS MARKER. CLEARANCE WILL NOT BE GIVEN UNTIL CITY REPRESENTATIVE HAS INSPECTED, APPROVED AND MARKED WITH EMS.

AT NEW ROADWAY:
BACKFILL AND COMPACT SOILS IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS. RESTORE AND REPLACE ALL DISTURBED PAVEMENT IN ACCORDANCE WITH APPLICABLE MAINTAINING AGENCY'S STANDARD SPECIFICATIONS.

**SANITARY SEWER LATERAL DISCONNECTION
(WITHIN IMPROVED AREAS)**

N.T.S.

SHEET TITLE

SANITARY SEWER LATERAL DISCONNECTION
WITHIN IMPROVED AREAS

City of Tallahassee
Your Own Utilities™

SHEET

S14

Approved by:

Date Issued: OCTOBER 2018

SCALE

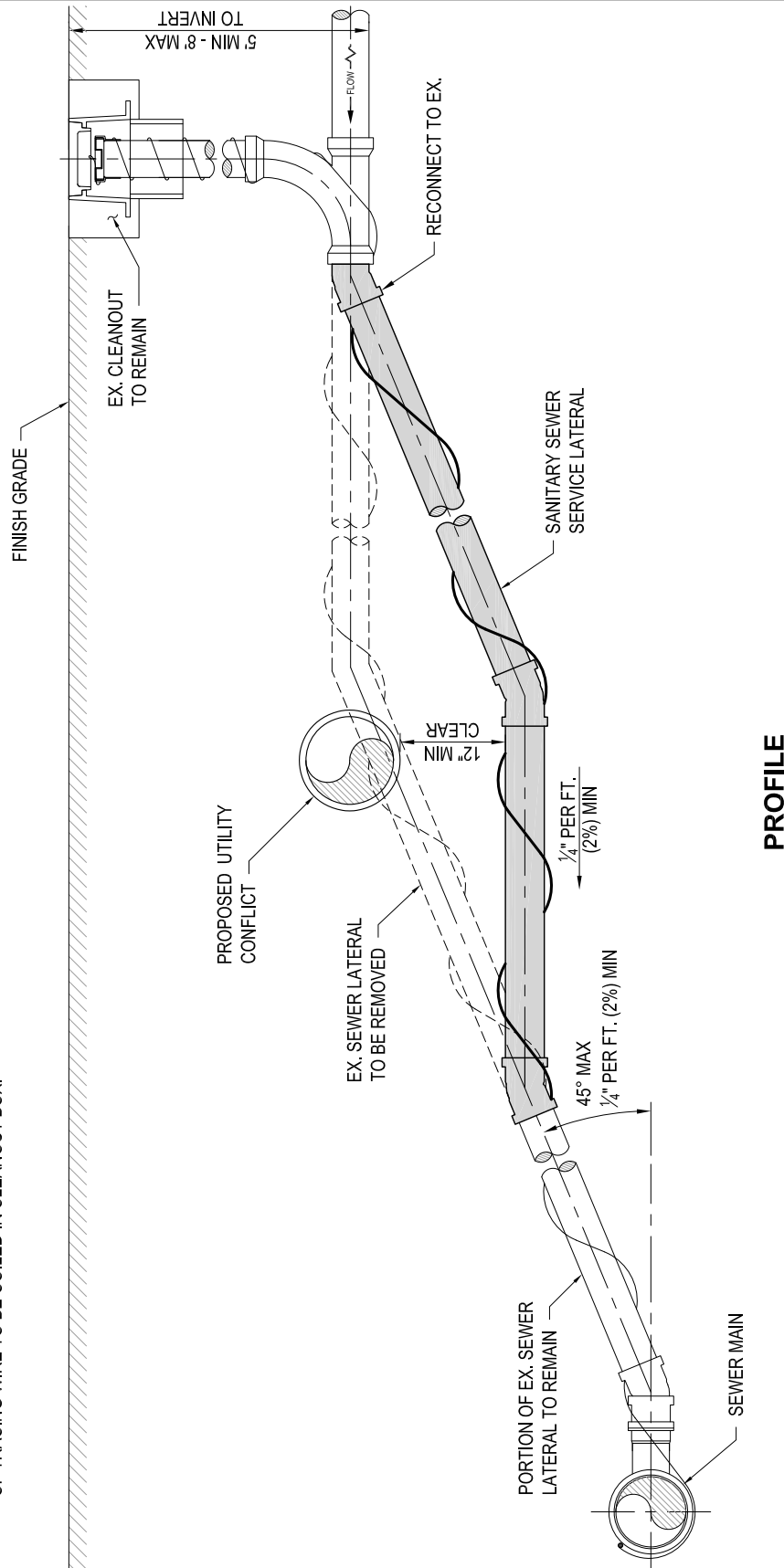
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N.T.S.

NOTES:

1. THE SEWER LATERAL ADJUSTMENT MUST BE CONSTRUCTED UNDER THE PROPOSED UTILITY CONFLICT. IF THIS CAN NOT BE ACCOMPLISHED, THE PROPOSED CONFLICT MUST BE ADJUSTED LOWER.
2. BENDS GREATER THAN 22½° ARE NOT PERMITTED.
3. A MINIMUM OF 10 GAUGE TRACER WIRE (GREEN) WILL RUN FROM MAIN TO CLEANOUT WITH TWO WRAPS PER JOINT; CONNECT TO EXISTING TRACER WIRE AT MAIN AND EXTEND UP TO CLEANOUT CAP. A 24" MIN OF TRACING WIRE TO BE COILED IN CLEANOUT BOX.



PROFILE

ADJUSTMENT OF EXIST SANITARY SEWER LATERAL

N.T.S.

SHEET TITLE

ADJUSTMENT OF EXISTING SANITARY SEWER LATERAL

City of Tallahassee
Your Own Utilities™

SHEET

S15

Approved by:

Date Issued: **OCTOBER 2018**

SCALE

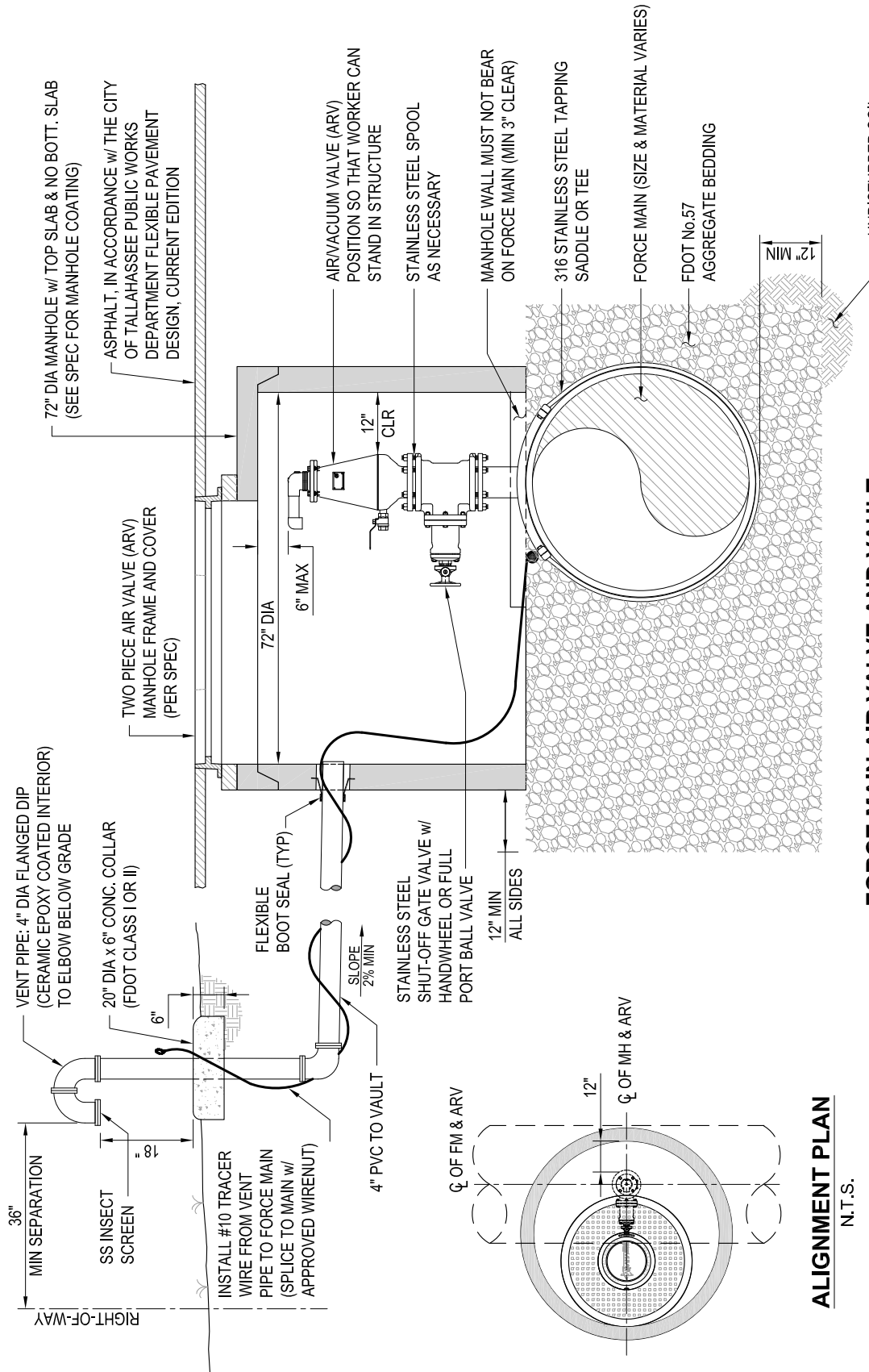
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N.T.S.

NOTES:

1. ALL CONSTRUCTION SHALL CONFORM TO CITY OF TALLAHASSEE TECHNICAL SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION.
2. ALL MATERIALS WITHIN VAULT SHALL BE TYPE 316 STAINLESS STEEL (SS).
3. DESIGNER SHALL ENSURE THAT SUFFICIENT HEAD ROOM IS AVAILABLE TO ACCOMMODATE INSTALLATION. FOR INSTANCES W/ INSUFFICIENT HEAD ROOM, CONSULT CITY ENGINEER.



ALIGNMENT PLAN
N.T.S.

**FORCE MAIN AIR VALVE AND VAULT
WITHIN VEHICLE TRAVEL LANE**
N.T.S.

SHEET TITLE

**FORCE MAIN
AIR VALVE AND VAULT
WITHIN VEHICLE TRAVEL LANE**

City of Tallahassee
Your Own Utilities™

SHEET
S16

Approved by: _____ Date Issued: **OCTOBER 2018**

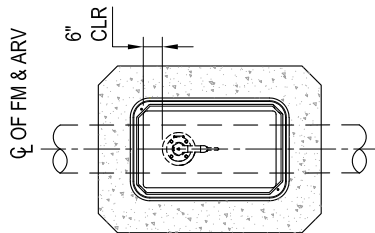
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N.T.S.

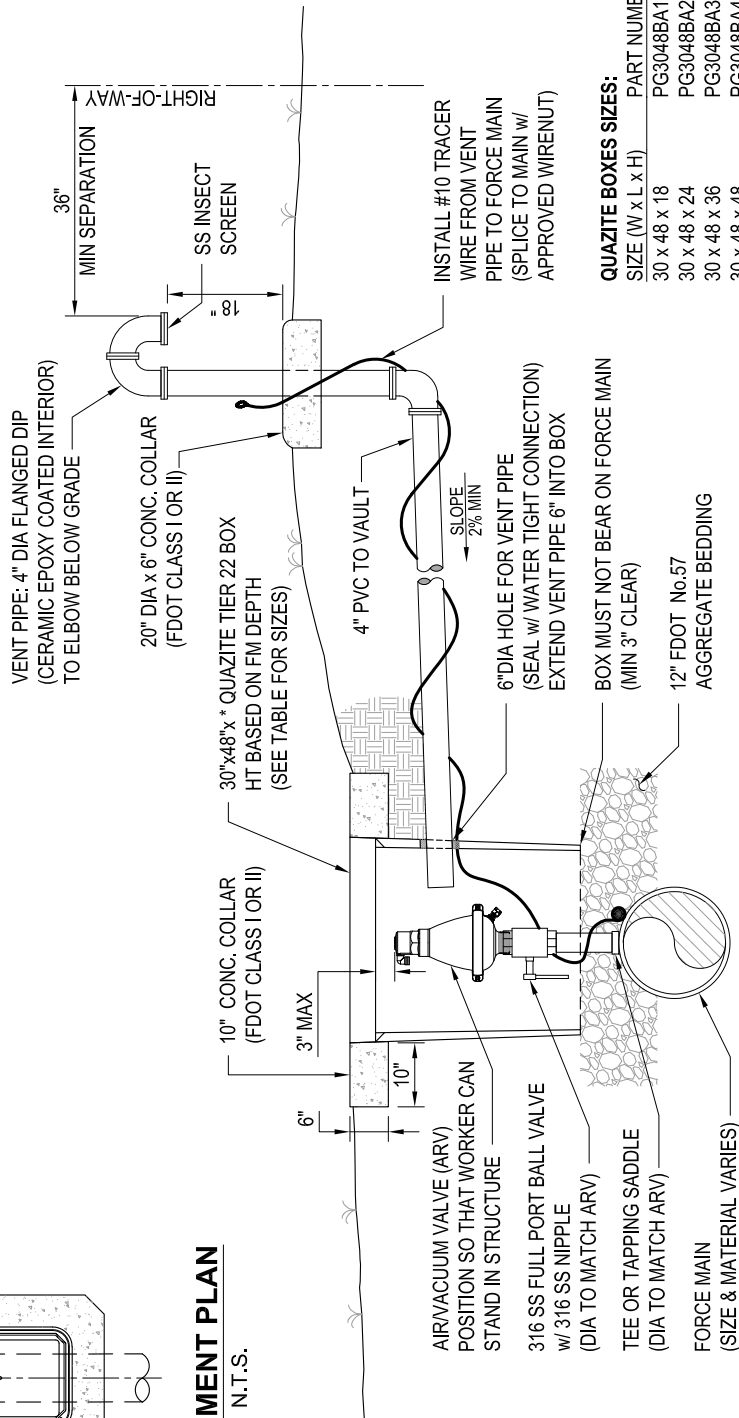
NOTES:

1. ALL CONSTRUCTION SHALL CONFORM TO CITY OF TALLAHASSEE TECHNICAL SPECIFICATIONS FOR WATER AND SEWER CONSTRUCTION.
2. ALL MATERIALS WITHIN VAULT SHALL BE TYPE 316 STAINLESS STEEL (SS).
3. ALL QUAZITE BOXES AND COVERS SHALL BE TEIR 22 (STATIC DESIGN LOAD OF 22,500 LBS. [100,085 N] OVER A 10 [254] X 10 [254] AREA AND MUST PASS A MINIMUM STATIC TEST LOAD OF 33,750 LBS. [150,128 N]).
4. DESIGNER SHALL ENSURE THAT SUFFICIENT HEAD ROOM IS AVAILABLE TO ACCOMMODATE INSTALLATION. FOR INSTANCES W/ INSUFFICIENT HEAD ROOM, CONSULT CITY ENGINEER.
5. FOR INSTALLATIONS w/o VENT TUBE, CONSULT CITY ENGINEER.



ALIGNMENT PLAN

N.T.S.



QUAZITE BOXES SIZES:

SIZE (W x L x H)	PART NUMBER
30 x 48 x 18	PG3048BA18
30 x 48 x 24	PG3048BA24
30 x 48 x 36	PG3048BA36
30 x 48 x 48	PG3048BA48

* IF REQUIRED, QUAZITE BOXES MAY BE STACKED. A MIN BOX SIZE OF 48" x 48" SHALL BE USED. BOXES SHALL BE WRAPPED WITH MANHOLE WRAP.

**FORCE MAIN AIR VALVE AND VAULT
OUTSIDE VEHICLE TRAVEL LANE**

N.T.S.

SHEET TITLE

**FORCE MAIN
AIR VALVE AND VAULT
OUTSIDE VEHICLE TRAVEL LANE**

City of Tallahassee
Your Own Utilities™

SHEET

S17

Approved by:

Date Issued:

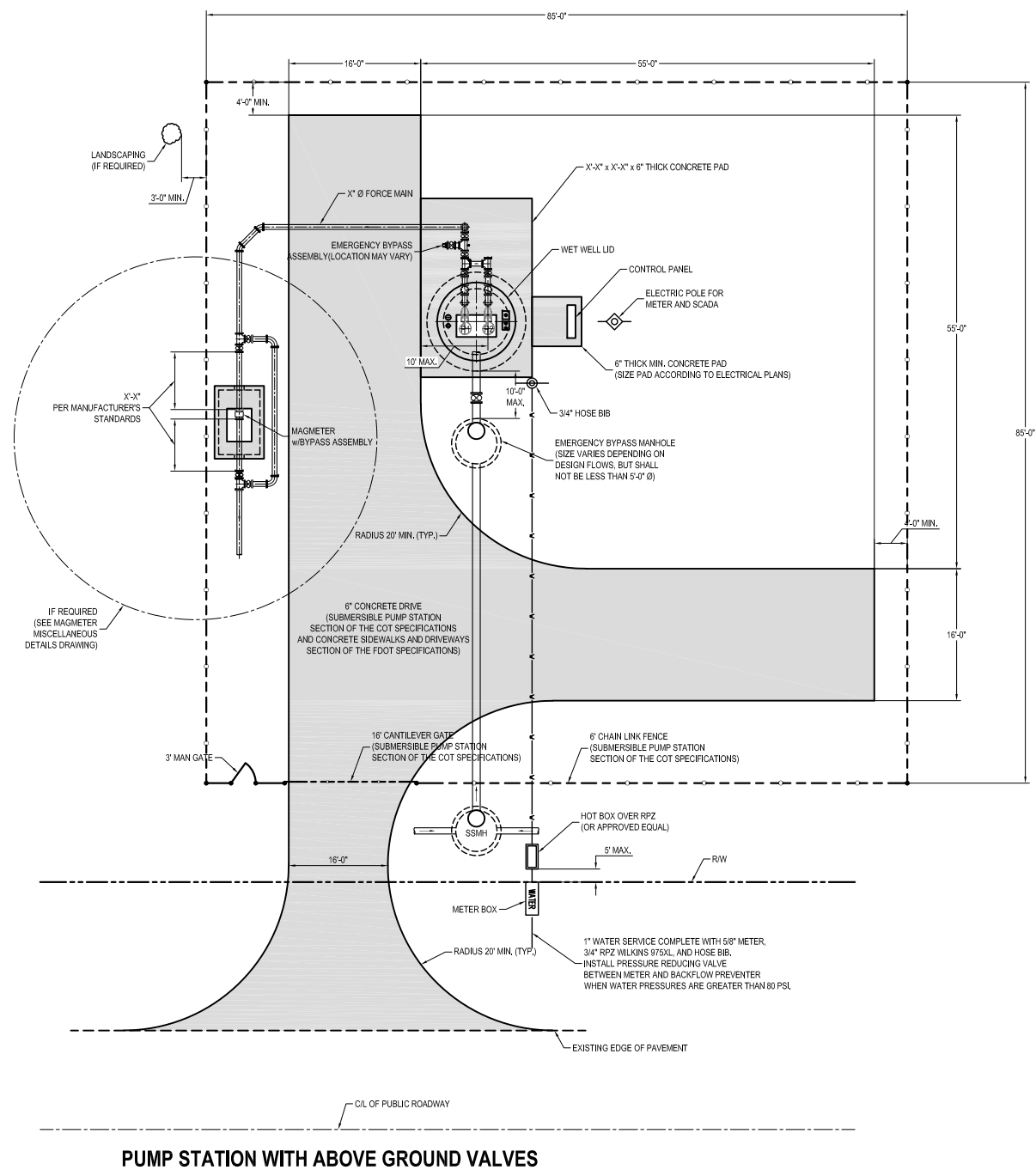
OCTOBER 2018

SCALE

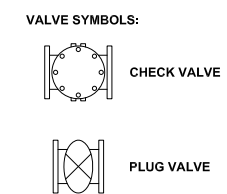
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N.T.S.



PUMP STATION No. XX DESIGN DETAILS		
PUMP MANUFACTURER	FLYGT	WILO-EMU
PUMP DUTY POINT (GPM)		
TDH AT DUTY POINT (FT)		
DESIGN DUTY POINT (FT) (ALL PUMPS)		
STATIC HEAD (FT)		
PUMP MODEL NO.		
PUMP CURVE NO. (IF AVAILABLE)		
EXPLOSION PROOF (YES/NO)		
PUMP IMPELLER SIZE - CAST IRON		
INLET / DISCHARGE SIZE (IN)		
SUPPLY VOLTAGE		
PUMP RPM		
HORSEPOWER		
FORCEMAIN SIZE (IN)		
TOTAL FORCEMAIN LENGTH (FT)		
EQUIVALENT FORCEMAIN LENGTH (FT)		
FORCEMAIN ELEVATION AT POINT OF DISCHARGE / HIGH POINT (FT)		
WET WELL SIZE (FT)		
WET WELL DEPTH (FT)		
WET WELL TYPE (DUPLEX / TRIPLEX)		



DRAWING NOT TO SCALE - FOR REFERENCE ONLY

PUMP STATION SITE PLAN LAYOUT

SHEET TITLE

City of Tallahassee
Your Own Utilities

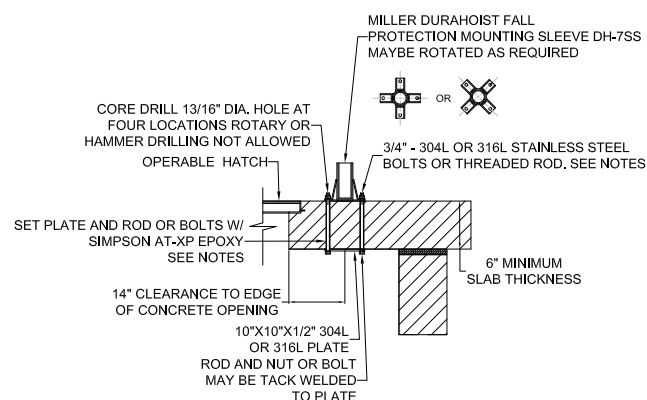
SHEET

PS01

Approved by: _____ Date Issued: **OCTOBER 2018** SCALE

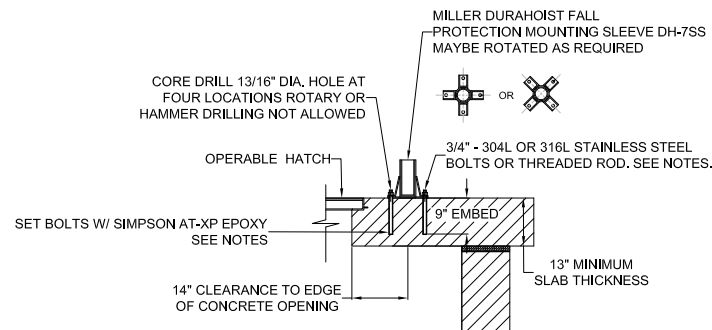
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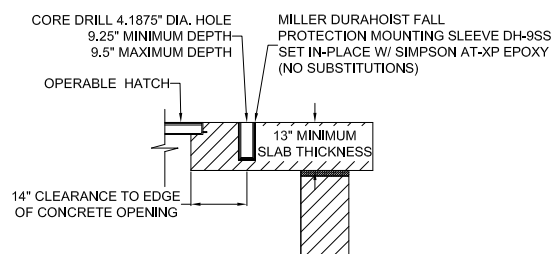
**FALL PROTECTION MOUNTING SLEEVE
SURFACE MOUNT - THIN SLAB OPTION**

SCALE 1"=2'



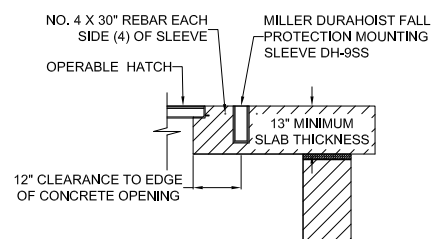
**FALL PROTECTION MOUNTING SLEEVE
SURFACE MOUNT - THICK SLAB OPTION**

SCALE 1"=2'



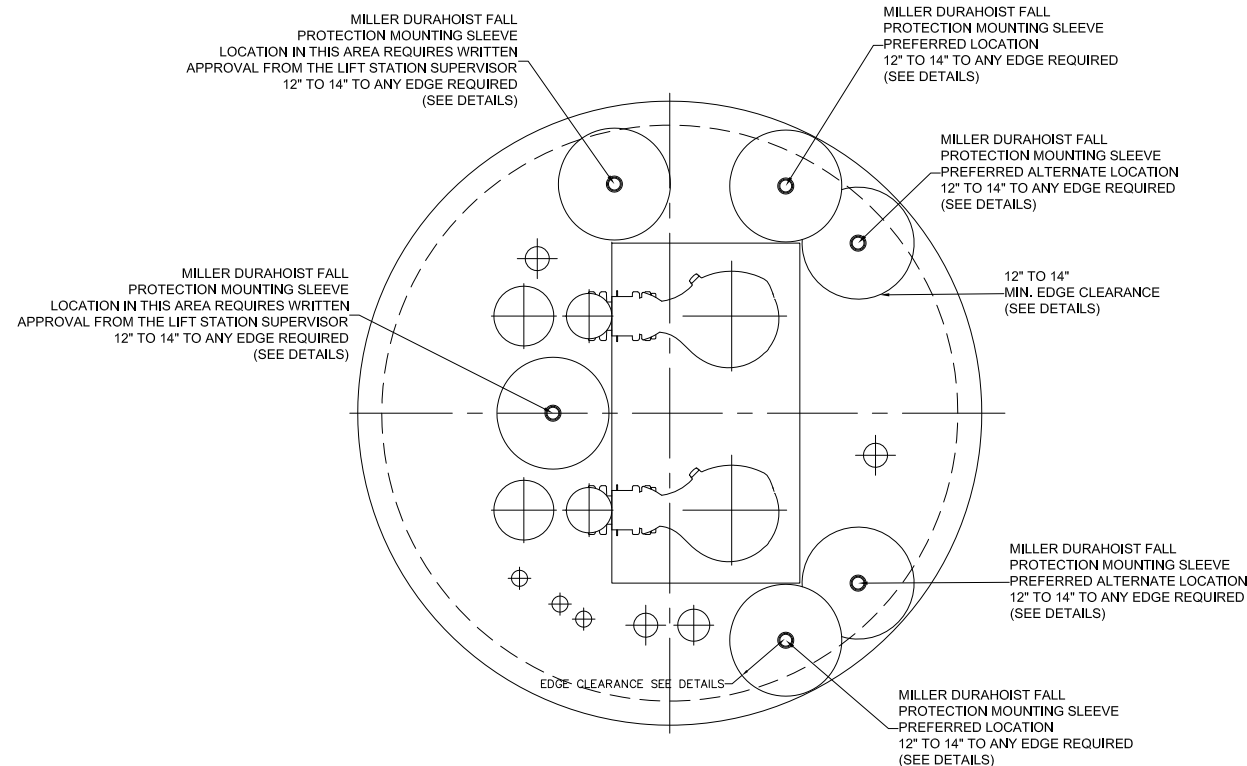
**FALL PROTECTION MOUNTING SLEEVE
RETRO FIT INSTALLATION
EPOXY OPTION**

SCALE 1"=2'



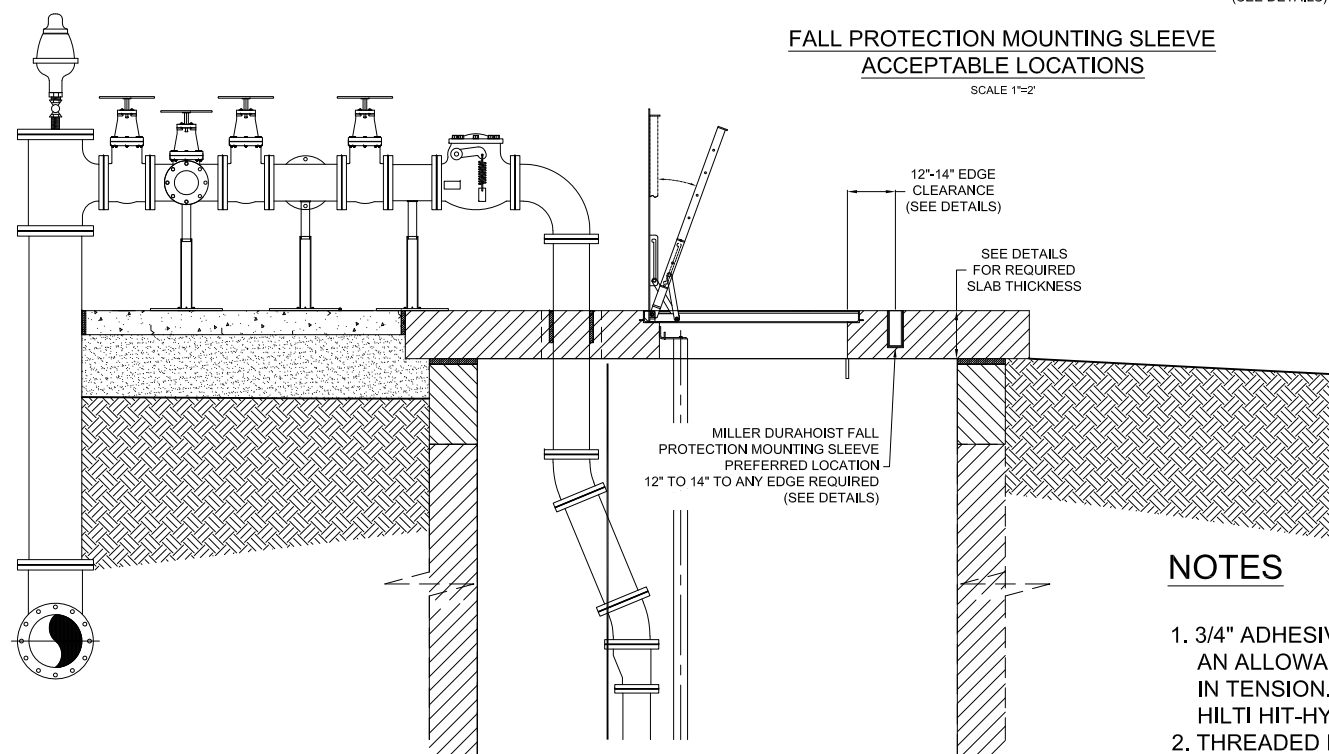
**FALL PROTECTION MOUNTING SLEEVE
NEW CONSTRUCTION CAST IN-PLACE SLEEVE**

SCALE 1"=2'



**FALL PROTECTION MOUNTING SLEEVE
ACCEPTABLE LOCATIONS**

SCALE 1"=2'



**FALL PROTECTION MOUNTING SLEEVE
EDGE LOCATION**

SCALE 1"=2'

NOTES

1. 3/4" ADHESIVE ANCHORS MUST HAVE AN ALLOWABLE LOAD OF 10,600 POUNDS IN TENSION. SIMPSON AT-XP OR HILTI HIT-HY-200.
2. THREADED ROD FOR ANCHORS SHALL BE STAINLESS STEEL, ASTM A193-GRADE B8 OR B8 (304 OR 316). ASTM A193-GRADE B6 IS ALSO ACCEPTABLE (410)

SHEET TITLE

PUMP STATION FALL PROTECTION

City of Tallahassee
Your Own Utilities™

SHEET

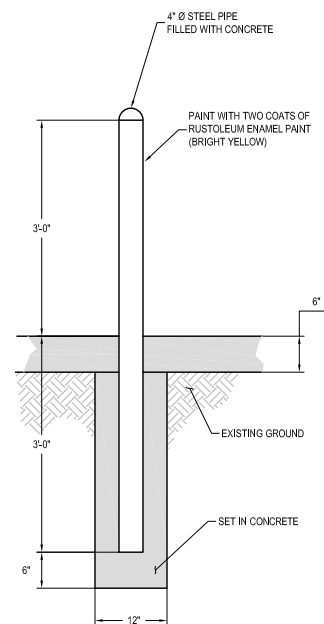
PS03

Approved by: _____ Date Issued: OCTOBER 2018

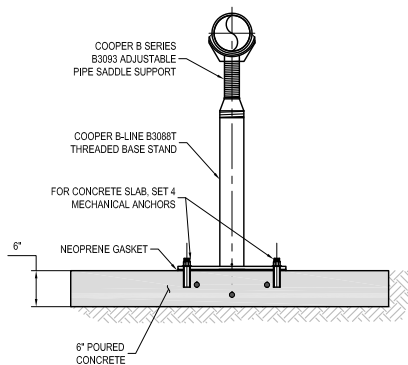
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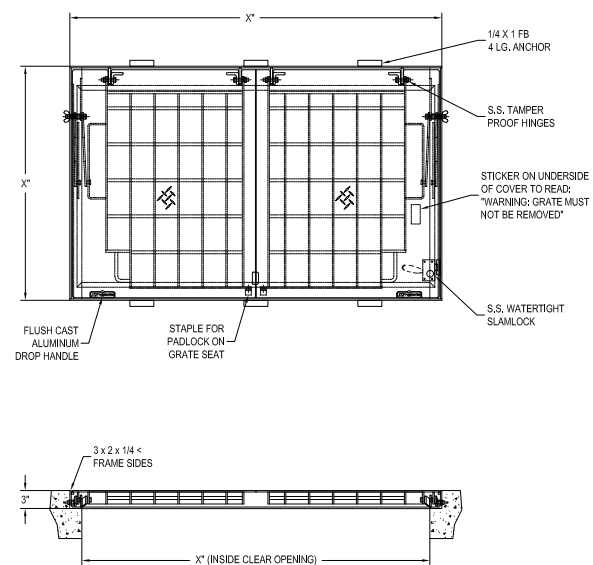


TRAFFIC BOLLARD DETAIL
(NOT TO SCALE)

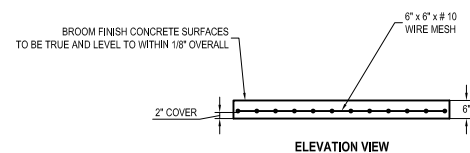
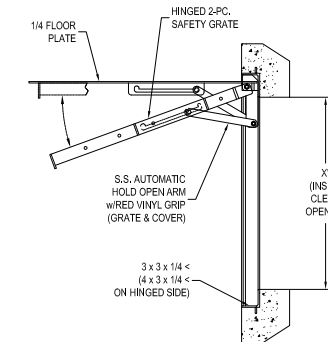


- NOTES:**
- FOR PIPE SUPPORT USE COOPER B-LINE PRODUCT. USE B3088T THREADED BASE STAND WITH B3093 PIPE ADJUSTER. CONTRACTOR IS RESPONSIBLE FOR SPECIFYING AND ORDERING APPROPRIATE HEIGHT PIPE STANDS.
 - PIPE SUPPORT BASE IS 18"x18"x12" WITH A 4" THREADED STANDPIPE TO A 2 1/2" THREADED SUPPORT.
 - COMPACT SUBGRADE TO ACHIEVE AT LEAST 95% OF THE SOLID MAX. DRY DENSITY AS DETERMINED BY ASTM D698. BACKFILL, IF REQUIRED, SHALL BE PLACED IN 6" MAX LIFTS.

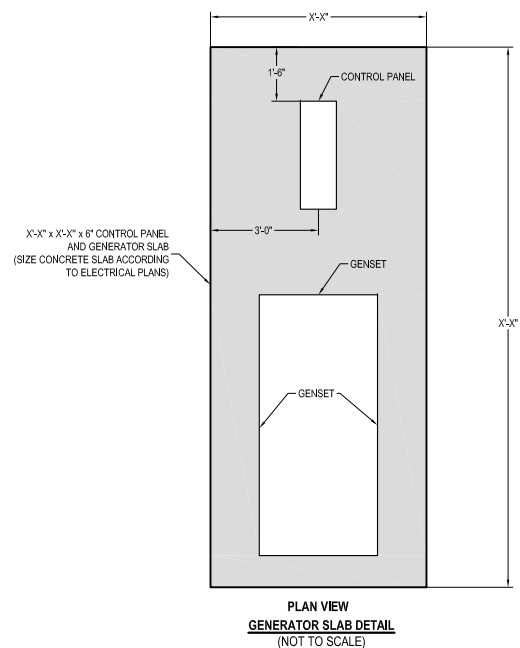
PIPE SUPPORT DETAIL
(NOT TO SCALE)



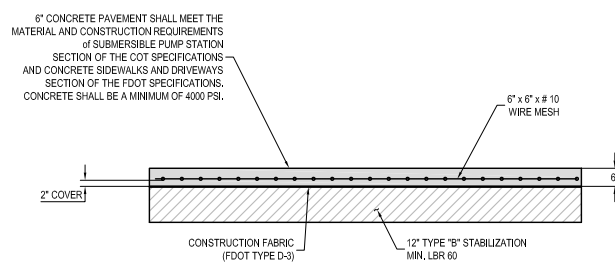
US FOUNDRY ASGD ACCESS HATCH WITH SAFETY GRATE
(NOT TO SCALE)



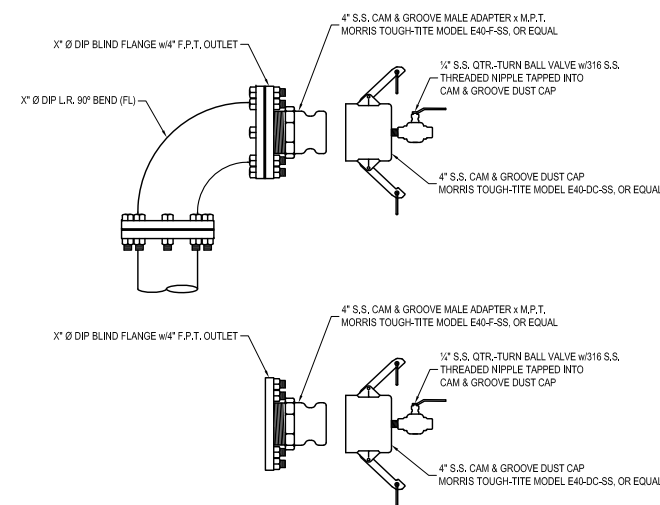
ELEVATION VIEW



**PLAN VIEW
GENERATOR SLAB DETAIL**
(NOT TO SCALE)



CONCRETE PAVEMENT AND CONTROL PANEL SLAB DETAIL
(NOT TO SCALE)



EMERGENCY BYPASS CONNECTION DETAIL
(NOT TO SCALE)

SHEET TITLE

PUMP STATION MISCELLANEOUS DETAILS

City of Tallahassee
Your Own Utilities

SHEET

PS04

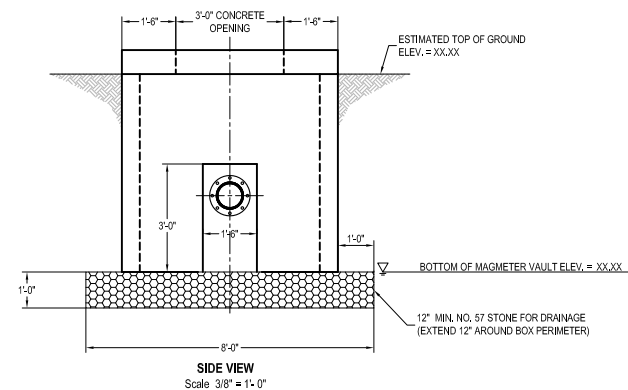
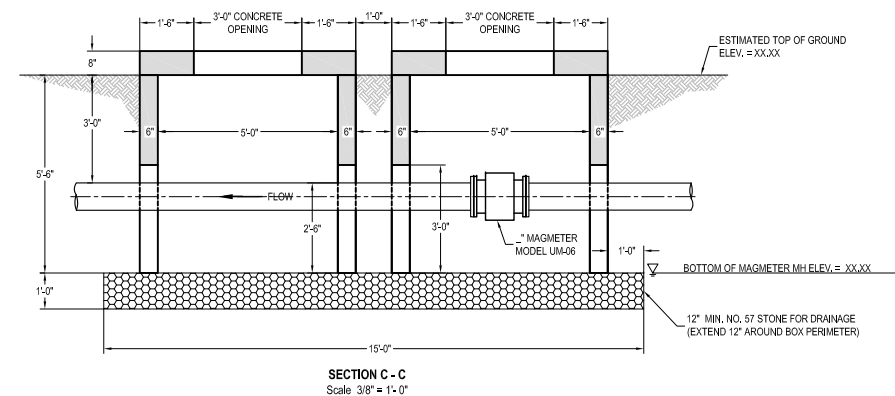
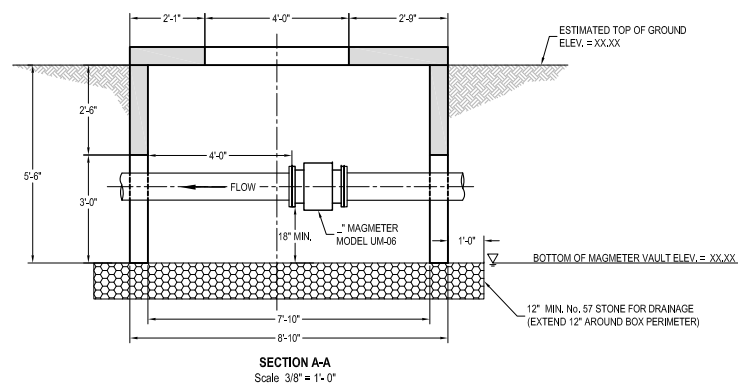
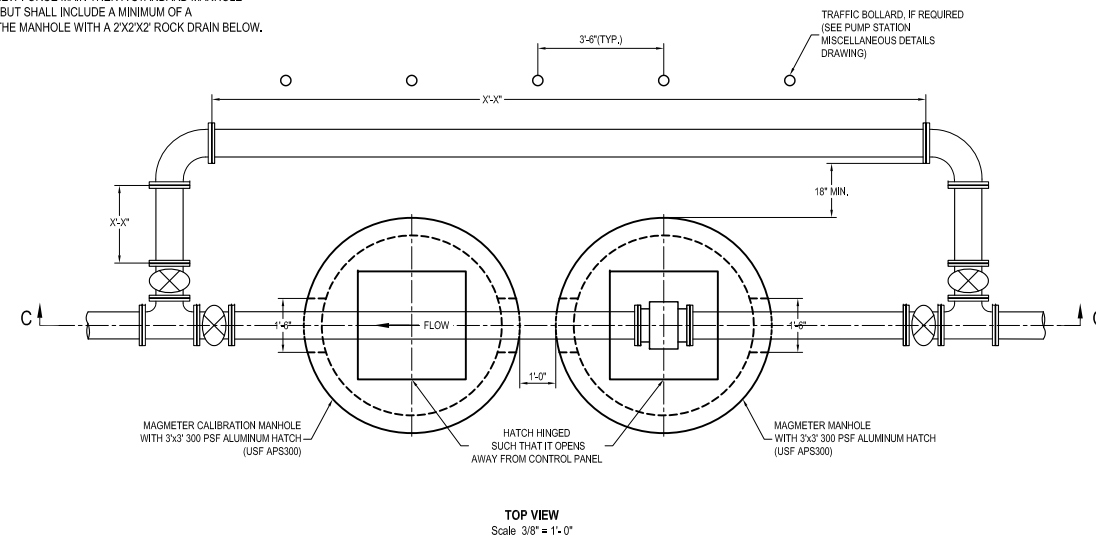
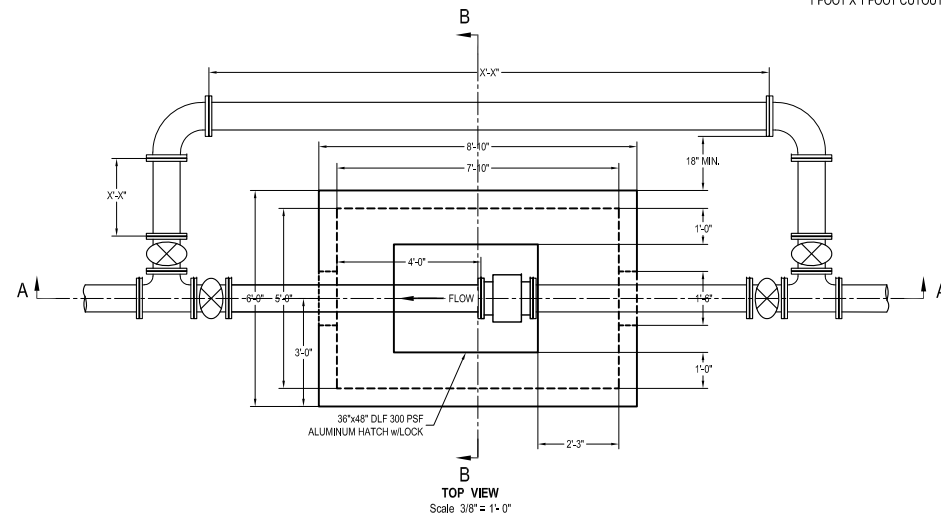
Approved by: _____ Date Issued: **OCTOBER 2018**

SCALE

COMPUTER FILE: ...WS\PROG\1600-WBS Specs\01-2018 Specification Update\007-Detail

N.T.S.

NOTE: THE MAG METER MANHOLE DETAILS SHOWN ARE FOR EXISTING FORCE MAINS. IF THE MAG METER IS TO BE INSTALLED ON A NEW FORCE MAIN THEN A STANDARD MANHOLE MAY BE SUBSTITUTED IN LIEU OF A STRADDLE BUT SHALL INCLUDE A MINIMUM OF A 1 FOOT X 1 FOOT CUTOUT IN THE BOTTOM OF THE MANHOLE WITH A 2X2X2' ROCK DRAIN BELOW.



**OPTION 1
MAGMETER STRADDLE VAULT DETAIL
WITH OPTIONAL BYPASS, IF REQUIRED**

**OPTION 2
MAGMETER STRADDLE MANHOLE DETAIL
(UP TO 6" MAGMETER)**

SHEET TITLE

PUMP STATION MAGMETER DETAILS

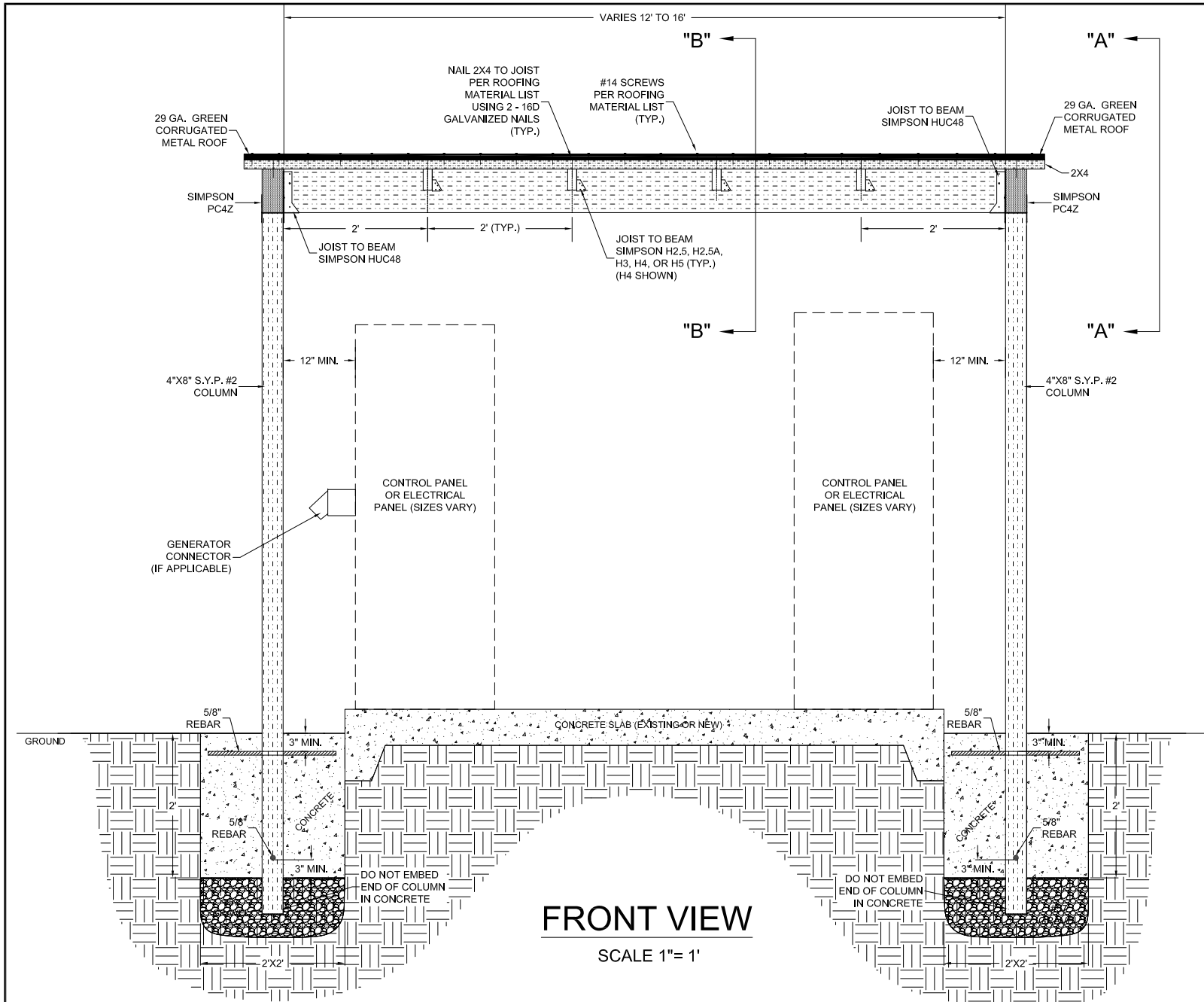
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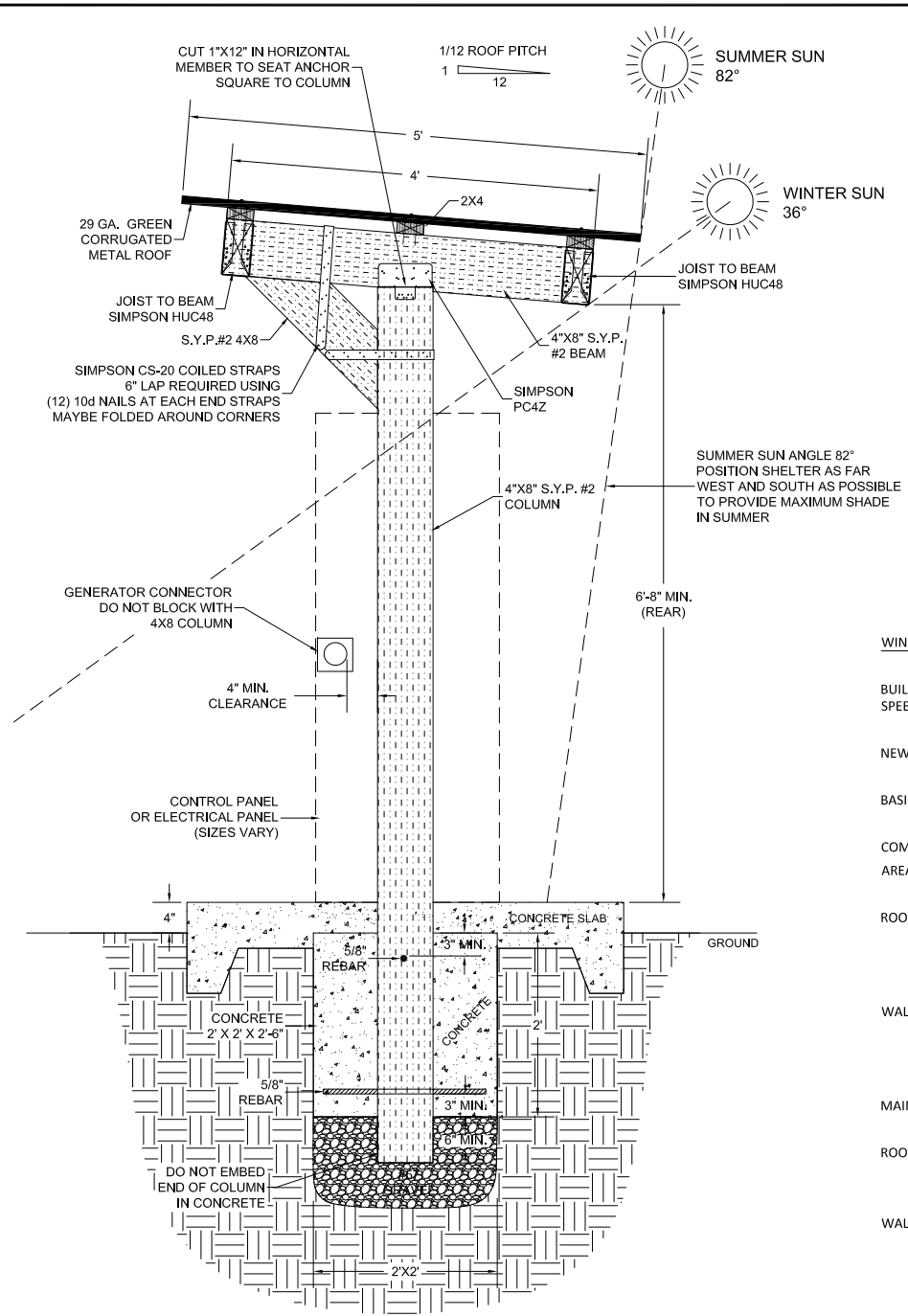
PS05

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FRONT VIEW
SCALE 1" = 1'



CROSS SECTION "A"- "A"
SCALE 1" = 1'

WIND LOAD INFORMATION

BUILDING CATEGORY II, ENCLOSED, EXPOSURE C, WIND SPEED 120 MPH, ROOF SLOPE 1:12

NEW SHELTER DESIGNED AS UNENCLOSED, EXPOSURE C

BASIC WIND PRESSURE $Q_s = 26.6$ PSF

COMPONENTS AND CLADDING - AREAS OF DISCONTINUITY PRESSURES

ROOF	ZONE 1	+29.0 PSF	-20.6 PSF
	ZONE 2	+43.6 PSF	-43.6 PSF
	ZONE 3	+43.6 PSF	-43.6 PSF

WALLS	ZONE 4	0 PSF	0 PSF
	ZONE 5	0 PSF	0 PSF

MAIN WIND FRAME RESISTING STRUCTURE

ROOF	ZONE A	+29.0 PSF	-25.2 PSF
	ZONE B	+29.0 PSF	-29.8 PSF

WALLS	WALL 1	29.0 PSF
	WALL 2	29.0 PSF
	WALL 3	29.0 PSF
	WALL 4	29.0 PSF

CODE NOTES:

APPLICABLE CODES	
FLORIDA BUILDING CODE, BUILDING (FBC-B)	5TH EDITION (2014)
FLORIDA ACCESSIBILITY CODE (FACBC)	5TH EDITION (2014)
FLORIDA BUILDING CODE, MECHANICAL (FBC-M)	5TH EDITION (2014)
FLORIDA BUILDING CODE, FUEL GAS (FBC-FG)	5TH EDITION (2014)
FLORIDA BUILDING CODE, PLUMBING (FBC-P)	5TH EDITION (2014)
FLORIDA BUILDING CODE, EXISTING BUILDING (FBC-EB)	5TH EDITION (2014)
FLORIDA FIRE PREVENTION CODE (FFPC)	5TH EDITION
NATIONAL ELECTRICAL CODE (NEC)	2011 EDITION

OCCUPANCY CLASS:	N/A
OCCUPANCY LOAD:	N/A
DESIGN LOADS:	WIND LOADS ONLY
TOTAL BUILDING AREA PER FLOOR (NEW):	N/A
SQUARE FOOTAGE OF ALTERED AREA (ALT):	N/A
BUILDING HEIGHT / NUMBER OF STORIES:	N/A
REQUIRED SPRINKLER OR ALARM SYSTEMS:	N/A
BLDG KEY PLAN IF ALT. TO A TENANT AREA:	N/A
OCCUPANCY SEPARATIONS:	N/A
NUMBER OF BEDROOMS PER BUILDING:	N/A
TOTAL NUMBER EXITS PROVIDED:	N/A
TENANT SEPARATIONS (MALLS ONLY):	N/A

NOTES:

- 1) CONCRETE SHALL BE 3,000 PSI AT 28 DAYS MINIMUM.
- 2) REBAR SHALL BE GRADE 60.
- 3) CLIPS AND STRAPS SHALL BE BY SIMPSON STRONG TIE AS INDICATED.
- 4) WOOD SHALL BE SOUTHERN PINE #2 OR BETTER PRESSURE TREATED FOR GROUND CONTACT.
- 5) ALL FASTENERS SHALL BE GALVANIZED OR PLATE COATED, CERTIFIED FOR USE WITH PRESSURE TREATED WOOD
- 6) ROOFING SHALL BE 29 GAUGE METAL FLORIDA APPROVAL NUMBER FL-1832.2-MASTER LOCK 90

DESIGN DATA:

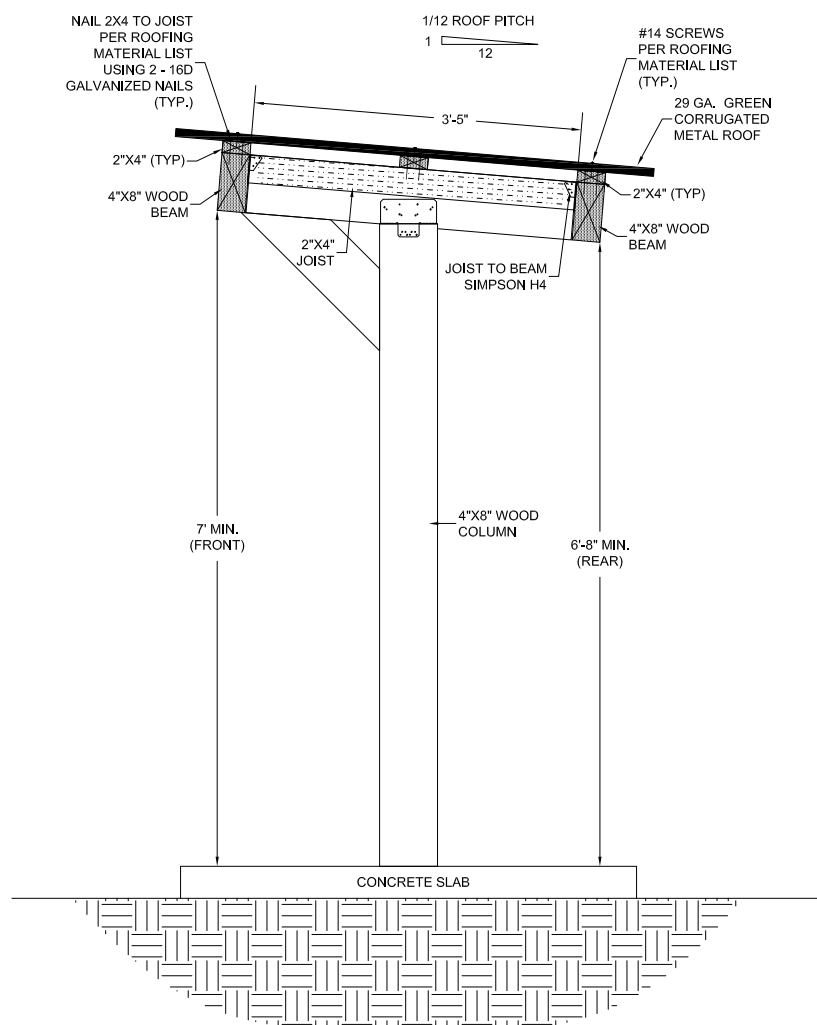
SHEET TITLE

CONTROL PANEL SHELTER ELEVATIONS

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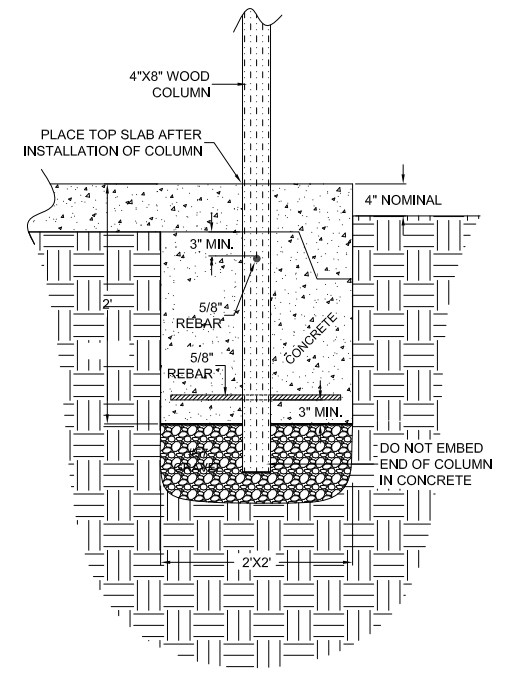
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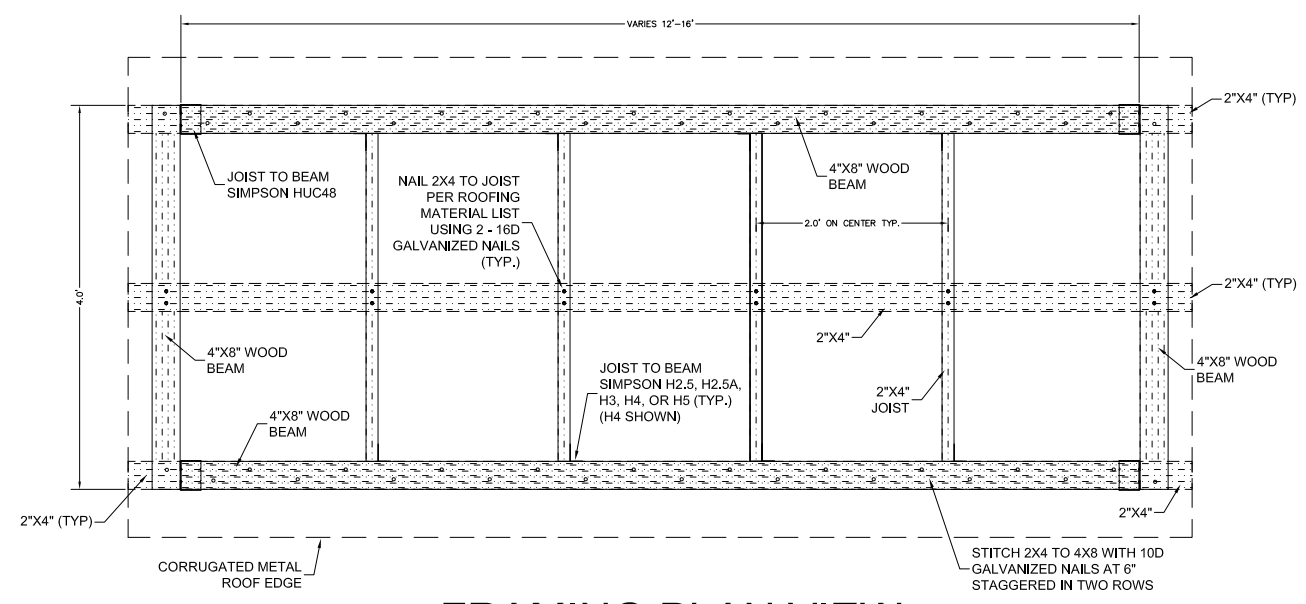
CROSS SECTION "B" - "B"

SCALE 1" = 1'



**ALTERNATE FOUNDATION
DETAIL**

SCALE: 1" = 1'



FRAMING PLAN VIEW

SCALE 1" = 1'

SHEET TITLE

CONTROL PANEL SHELTER DETAILS

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PS07

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SCALE

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N.T.S.

NOTES:

1. DRAWINGS DEPICTED ARE TYPICAL AND SHALL BE DRAWN TO SCALE IN THE PLANS AND SUBMITTED TO THE CITY BY THE ENGINEER OF RECORD. ALL DIMENSIONS SHALL BE INCLUDED THAT ARE SHOWN IN THESE STANDARDS.
2. PUMP DRAWINGS MUST BE OBTAINED FROM THE PUMP MANUFACTURER TO AID IN THE DRAFTING OF THESE PLANS.
3. HOLES CORED FOR FORCE MAIN PIPES SHALL BE 6" LARGER THAN THE PIPE OUTSIDE DIAMETER IN THE EVENT FIELD ADJUSTMENTS ARE REQUIRED. HOLES THAT ARE CORED IN THE FIELD THROUGH CONCRETE SHALL RECEIVE A HEAVY DUTY COAL TAR EPOXY COATING TO PREVENT CORROSION TO THE CONCRETE AND/OR EXPOSED REBAR AS SPECIFIED IN THE SANITARY SEWER PRE-CAST CONCRETE MANHOLES SECTION OF COT SPECIFICATIONS.
4. THE FLANGE FOR THE LONG RADIUS 90° FITTING IN THE WET WELL SHALL BE A MINIMUM OF 6" FROM THE BACK WALL. THIS MAY REQUIRE SHIFTING THE PUMP MOUNTING BRACKETS FARTHER OUT FROM PUMP MANUFACTURER'S RECOMMENDED PUMP BASE LOCATION.
5. BE AWARE THAT THE DIMENSIONS GIVEN FOR THE WET WELL AND VALVE VAULT HATCHES ARE THE "CLEAR" OPENING AND THE HATCH USED MUST PROVIDE NO LESS THAN THE CLEAR OPENING GIVEN TO INSURE THE COMPONENTS CAN BE INSTALLED AND REMOVED. THE HATCH WILL BE LARGER THAN THE "CLEAR" OPENING DIMENSIONS. US FOUNDRY HATCH WAS USED FOR THIS DRAWING, OTHER MANUFACTURER DIMENSIONS MAY VARY SLIGHTLY. FALL PROTECTION IS REQUIRED.
6. THERE SHALL BE AT LEAST 3" CLEARANCE FROM ALL SIDES OF THE PUMP VOLUTE TO THE CLEAR OPENING IN THE LID.
7. DEPICTED VALVE VAULT IS SIZED TO ACCOMMODATE UP TO A 34" PUMP SPACING AND 8" PIPING IN MOST CASES. LARGER PUMPS (I.E. HIGH HEAD) MAY REQUIRE VALVE VAULT TO BE RESIZED. INDICATE EXACT PUMP SPACING AND INSURE MINIMUM CLEARANCES ARE MET.
8. IN ADDITION TO THE DETAILS SHOWN, THE FOLLOWING DETAILS MUST BE PROVIDED AS PART OF THE SUBMITTED PLANS: OVERALL SITE LAYOUT, GRADING PLAN, EROSION CONTROL PLAN, FENCING LAYOUT/DETAILS, LANDSCAPING PLAN, DETAILED PIPING LAYOUT (FORCE MAIN, VALVES, GRAVITY MAIN) WITHIN THE LIMITS OF THE PUMP STATION FENCING & DRAWN TO SCALE, DETAILED DRAWINGS OF ALL CONCRETE STRUCTURES (PLAN, PROFILE, SIDE PROFILE, ETC.) & DRAWN TO SCALE. THESE DETAILS SHALL BE SPECIFIED BY THE ENGINEER OF RECORD.
9. ALL BOLTS USED TO MOUNT PUMP BASE, GUIDE RAILS, GUIDE RAIL SUPPORTS & PIPE SUPPORTS SHALL BE DRILLED AND EPOXIED. NO REDHEADS WILL BE ALLOWED.
10. REBAR LAYOUT FOR WET WELL AND VALVE VAULT SHALL BE PROVIDED BY THE PRE-CAST CONCRETE MANUFACTURER UNLESS A SPECIAL DESIGN IS REQUIRED.
11. MAG METERS SHALL BE INSTALLED AT STATIONS DESIGNATED BY THE CITY AND AT ALL STATIONS PUMPING MORE THAN 1 MGD. MAG METER INSTALLATION MAY CONSIST OF TWO MANHOLES OR ONE RECTANGULAR BOX. FOR PROPER CALIBRATION, CONTACT THE FLOW METER MANUFACTURER FOR MINIMUM UPSTREAM AND DOWNSTREAM DISTANCES FROM THE NEAREST FITTING AND ENSURE THAT THESE ARE AVAILABLE WITHIN THE FLOW METER VAULT/MANHOLE. NO FITTING SHALL BE CLOSER THAN THE MANUFACTURER'S RECOMMENDATIONS TO THE MAG METER UPSTREAM AND DOWNSTREAM.
12. TOP OF WET WELL AND VALVE VAULT LIDS SHALL BE A MINIMUM OF ONE FOOT ABOVE THE 100 YEAR FLOOD PLAIN ELEVATION. PROVIDE CALCULATIONS AND/OR DOCUMENTATION.
13. ALL PIPES & VALVE BOXES THAT WILL HAVE CONCRETE POURED AROUND THEM SHALL BE WRAPPED WITH 30LB FELT A MINIMUM OF TWO TIMES AND SECURED IN PLACE SUCH THAT THE CONCRETE DOES NOT ADHERE TO THE PIPE OR VALVE BOX. THE 30LB FELT SHALL BE CUT FLUSH WITH THE FINISHED CONCRETE GRADE.
14. ENGINEER SHALL PROVIDE ALL CALCULATIONS, INCLUDING SYSTEM HEAD CURVES FOR ONE PUMP RUNNING, 2 PUMPS RUNNING, ETC. BUOYANCY CALCULATIONS ARE REQUIRED. IF THE PUMP STATION FORCE MAIN IS A MANIFOLDED SYSTEM, CALCULATIONS AND/OR MODELING RESULTS SHALL BE SUBMITTED SHOWING HEAD CONDITIONS AT ALL EXISTING AND PROPOSED AFFECTED PUMPING STATIONS.
15. CONTRACTOR SHALL PROVIDE A RECORD DRAWING SURVEY AND PROFILE OF THE PUMP STATION FORCE MAIN TO THE LIMITS OF NEW CONSTRUCTION IN ADDITION TO THE RECORD DRAWING REQUIREMENTS FOUND IN AS-BUILT SPECIFICATIONS SECTION OF THE COT SPECIFICATIONS.
16. CONTRACTOR IS RESPONSIBLE FOR REMOVING AND PROPERLY DISPOSING OF ALL EXISTING MECHANICAL AND ELECTRICAL EQUIPMENT THAT THE CITY DOES NOT WANT TO SALVAGE. CONTRACTOR SHALL NOTIFY CITY INSPECTOR 72 HOURS IN ADVANCE BEFORE EXISTING STATION PUMPS AND CONTROLS ARE REMOVED.
17. GRAVEL ALL AREAS INSIDE PUMP STATION FENCE WITH 4" OF FDOT No. 57 GRAVEL OVER 20 MIL PDC OR EQUIVALENT.
18. PROVIDE SOIL BORINGS TO DEPTH OF WET WELL PLUS 5 FEET (MINIMUM).
19. MAINTAIN A 2% SLOPE ACROSS THE ENTIRE PUMP STATION SITE TO PROMOTE PROPER DRAINAGE.
20. PUMP STATION SITE SHOULD BE SIZED AT A MINIMUM OF 85' X 85'. DEVIATIONS FROM THIS STANDARD SITE LAYOUT WILL NOT BE ALLOWED UNLESS APPROVED BY THE WATER RESOURCES ENGINEERING MANAGER OR DESIGNEE.
21. THE FENCE SHALL TYPICALLY BE LOCATED 6" WITHIN THE PROPERTY/EASEMENT LIMITS UNLESS LANDSCAPING IS REQUIRED.
22. LANDSCAPING SHALL BE IN ACCORDANCE WITH APPROVED PLANS AND PERMITTING DOCUMENTS. LANDSCAPING MUST BE A MINIMUM OF 3 FEET AWAY FROM THE OUTSIDE OF THE FENCE. IF LANDSCAPING IS REQUIRED, A LANDSCAPING PLAN SHALL BE PROVIDED AS PART OF THE PUMP STATION DESIGN PLANS.
23. THE ENGINEER OF RECORD SHALL PREPARE, OR HAVE PREPARED, ELECTRICAL PLANS THAT ARE SPECIFIC TO THE STATION. THE USE OF "STANDARD" DRAWINGS OR REFERENCE TO THE COT SPECIFICATIONS IS NOT PERMITTED.

SHEET TITLE

PUMP STATION STANDARD NOTES

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PS08

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Date Issued:

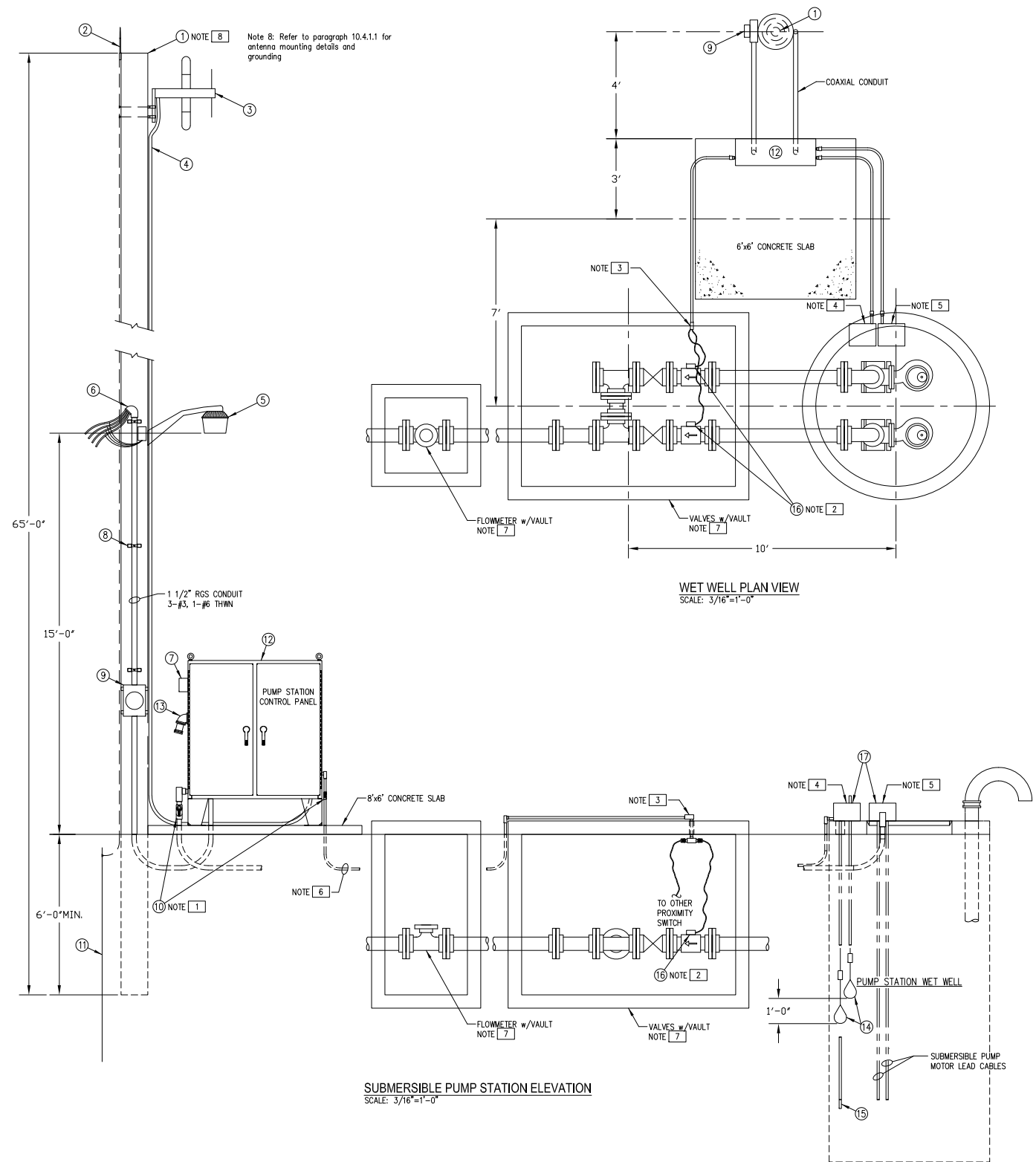
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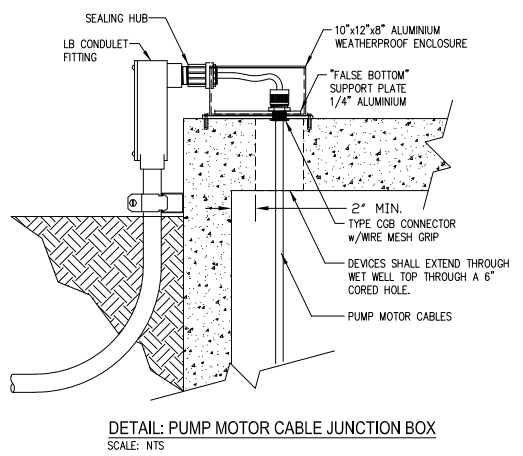
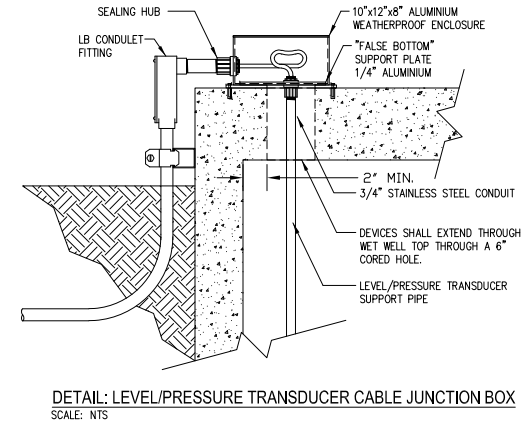
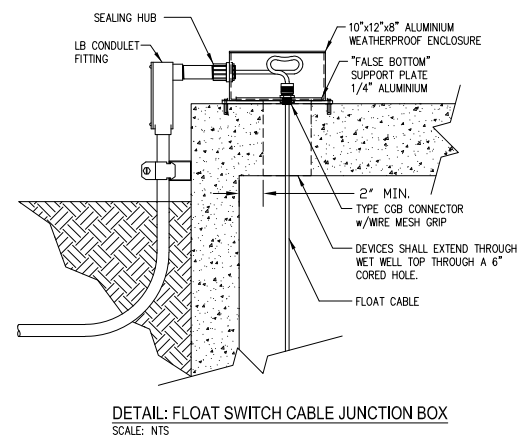
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N.T.S.



BILL OF MATERIAL				
ITEM	DESCRIPTION	MANUFACTURER	CATALOG NO.	QTY.
1	WOOD POLE-60" ABOVE GRADE MINIMUM	(PAID FOR BY CONTRACTOR)		1
2	AIR TERMINAL - CLASS 1 SOLID COPPER AIR TERMINAL BASE	HARGER LIGHTING PROTECTION, INC.	NO. 60 NO. 160	1
3	ANTENNA-YAGI w/MOUNTING AND GROUNDING HARDWARE	DECIBEL PRODUCTS	MODEL DB-499	1
4	ANTENNA COAXIAL CABLE	ANDREW CORP.	LD4-50A, FS34-50 or EQUIVALENT	1
5	SECURITY LIGHT - 100W, HIGH PRESSURE SODIUM, 120VAC	GENERAL ELECTRIC	PBS10S1A5V5AC	1
6	ELECTRICAL SERVICE MAST AND WEATHER HEAD			
7	SERVICE LIGHTNING ARRESTERS	ADVANCED PROTECTION TECHNOLOGIES, INC.	TE/3XF/4X	1
8	SERVICE MAST SUPPORT AND STRAP			
9	METER BASE			
10	CONDUIT SEAL-OFF FITTINGS			
11	GROUND ROD 5/8" COPPER CLAD 8' LONG			
12	PUMP STATION RTU CONTROL PANEL	SEE CNTL PANEL DWG.		
13	EMERGENCY CONNECTION	SEE CNTL PANEL DWG.		
14	FLOAT SWITCH	ANCHOR SCIENTIFIC	S40N0NC	2
15	PRESSURE TRANSDUCER LEVEL TRANSMITTER SUSPENDED ON 3/4" STAINLESS STEEL PIPE	KPSI	700-340-4015	1
16	PROXIMITY SWITCH	AUTOMATION DIRECT	ATI-A0-2A	2
17	10"x12"x8" ALUMINIUM ENCLOSURE			2
18	MAGMETER	McCROMETER	ULTRA-MAG UM-XX	1



- NOTES:**
- 1 CONDUIT SEALS SHALL BE PLACED WITHIN (18)EIGHTEEN INCHES OF THE PUMP STATION CONTROL PANEL ENCLOSURE.
 - 2 PROXIMITY SWITCH TO BE MOUNTED ON EACH SUBMERSIBLE PUMP'S DISCHARGE PIPING CHECK VALVE TO INDICATE PUMP FAILURE IF NO FLOW OCCURS TO ACTIVATE THE SWITCH.
 - 3 3/4" LB CONDULET FITTING WITH GASKETED COVER MOUNTED ON TOP OF VALVE VAULT, EXTEND CONDUIT DOWN THROUGH VAULT TOP. CONTRACTOR TO USE TYPE CGB CORD GRIP CONNECTORS FOR PROXIMITY SWITCH CABLES.
 - 4 10"x12"x8" ALUMINIUM JUNCTION BOX WITH GASKETED COVER MOUNTED ON TOP OF THE WET WELL FOR THE WET WELL LEVEL/PRESSURE TRANSDUCER AND EMERGENCY BACKUP FLOAT SWITCH. THIS ASSEMBLY WILL REQUIRE CORED HOLES TO FACILITATE INSTALLATION AND REMOVAL OF THE 3/4" STAINLESS STEEL PIPE ON WHICH PRESSURE TRANSDUCER IS SUSPENDED AND THE FLOAT SWITCH ASSEMBLY FROM THE OUTSIDE OF THE WET WELL. CONTRACTOR TO USE TYPE CGB CONNECTORS WITH WIRE MESH GRIP TO SUPPORT THE FLOAT SWITCH AND CABLE SUSPENDED IN THE WET WELL.
 - 5 10"x12"x8" ALUMINIUM JUNCTION BOX WITH GASKETED COVER MOUNTED ON TOP OF THE WET WELL FOR THE PUMP MOTORS POWER CABLES. ASSEMBLY WILL REQUIRE 2 CORED HOLES IN TOP OF THE WET WELL LID FOR PUMP MOTOR CABLES TO CHASE THROUGH INTO WET WELL. CONTRACTOR TO USE TYPE CGB CORD CONNECTORS WITH WIRE MESH GRIP TO SUPPORT THE PUMP MOTOR CABLES.
 - 6 CONDUIT FOR VALVE POSITION PROXIMITY SWITCHES CAN ENTER VALVE BOX THROUGH THE TOP AS SHOWN OR MAY ENTER THROUGH THE SIDE OF THE VALVE BOX DEPENDING UPON WHICH IS BEST SUITED TO SITE CONDITIONS.
 - 7 DEVICE POSITION AND LAYOUT ARE APPROXIMATE, REFER TO CHAPTER NINE OF THE CITY OF TALLAHASSEE SPECS FOR DETAILED STRUCTURAL DRAWINGS AND PIPE LAYOUTS.
 - 8 THE ELECTRICAL/SCADA POLE WILL BE PROVIDED AND INSTALLED BY THE CITY OF TALLAHASSEE. THE COST OF THE POLE AND INSTALLATION WILL BE THE RESPONSIBILITY OF THE CONTRACTOR.

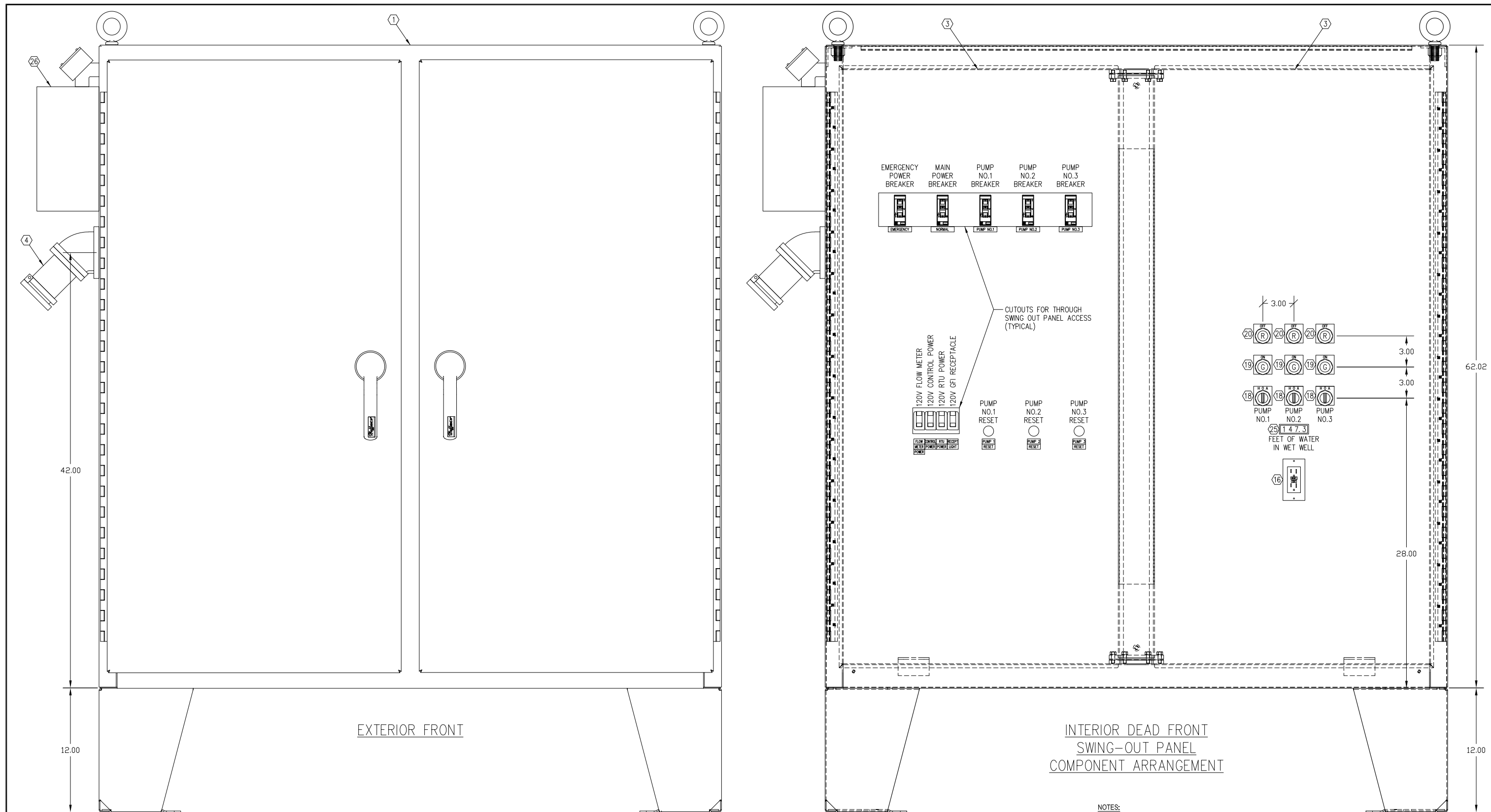
SHEET TITLE

ELECTRICAL SITE PLAN & DETAILS FOR PUMP STATIONS

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SHEET
E01

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SHEET TITLE

PUMP STATION CONTROL PANEL LAYOUT
(230V, 15HP OR LESS)

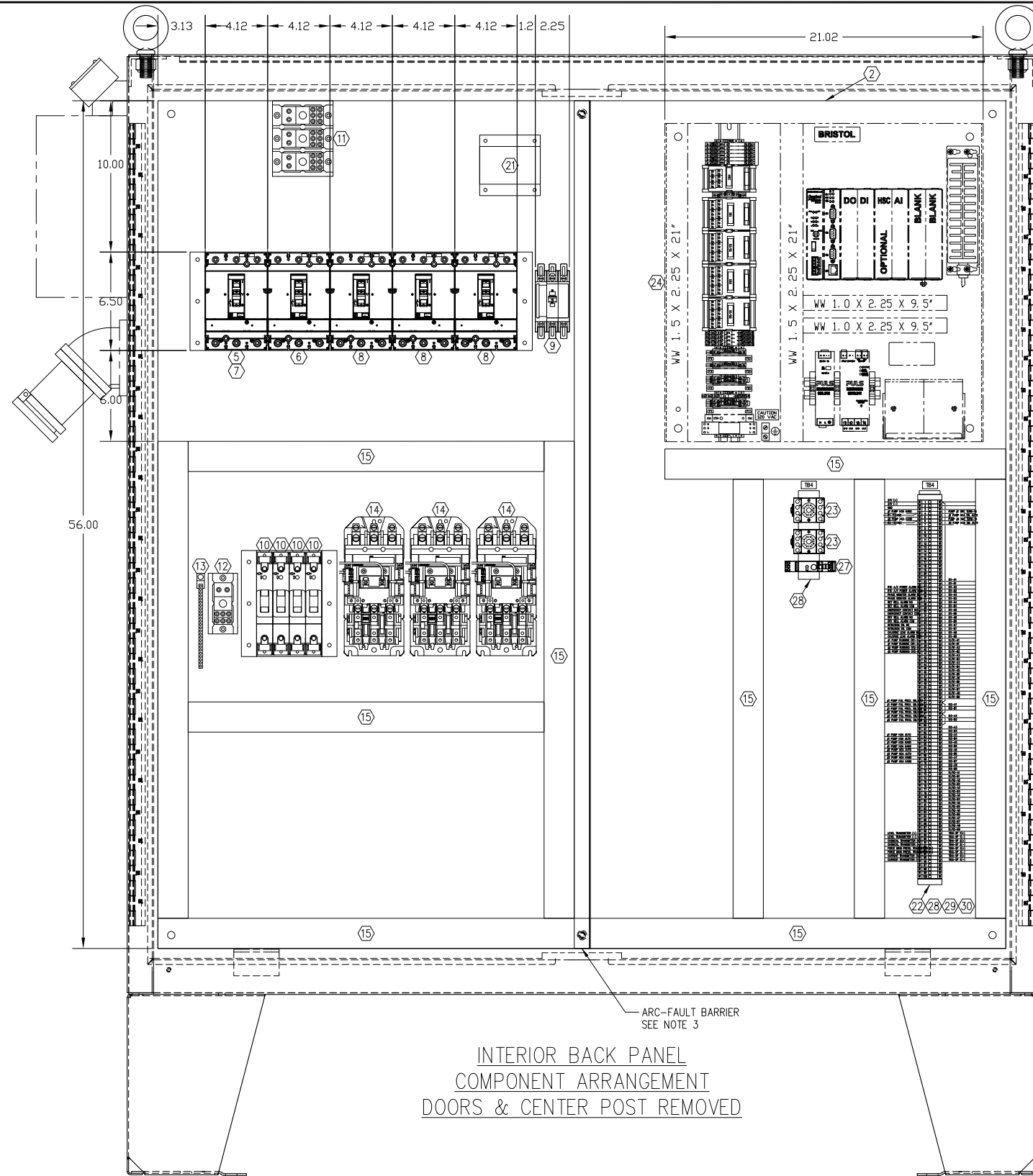
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SCALE
N.T.S.



INTERIOR BACK PANEL
COMPONENT ARRANGEMENT
DOORS & CENTER POST REMOVED

ARC-FAULT BARRIER
SEE NOTE 3

BILL OF MATERIAL			
ITEM	DESCRIPTION	MANUFACTURER	CATALOG NO. QTY.
1	STAINLESS STEEL TYPE 4X ENCLOSURE w/FLOOR STAND KIT	HOFFMAN	A-62H6012SS6LP A-FK1212SS 1
2	ENCLOSURE BACK PANEL XXX	HOFFMAN	A-60P60 1
3	DEAD FRONT SWING-OUT PANEL KIT XXX	-	- 2
4	EMERGENCY POWER RECEPTACLE - 100A, 3P, 4 WIRE, w/45' ADAPTER & SCREW CAP	RUSSELL-STOLL	7334-72-45 1
5	H-FRAME MECHANICAL INTERLOCK FOR TOGGLE HANDLE	SQUARE-D	S29354 1
6	BREAKER-150A, THREE POLE	SQUARE-D	HGL36150 1
7	BREAKER-100A, THREE POLE AUXILIARY CONTACT 1A/1B ON EMERG. BKR	SQUARE-D	HGL36100 S29450 1
8	BREAKER 80A, THREE POLE	SQUARE-D	HGL36080 2
9	BREAKER 10A, THREE POLE	SQUARE-D	QOU310 1
10	BREAKER 15A, SINGLE POLE	SQUARE-D	BDL16015 4
11	POWER BLOCK	SQUARE-D	9080LBA363206 1
12	POWER BLOCK FOR NEUTRALS	SQUARE-D	9080LBA163206 1
13	EQUIPMENT GROUND BAR w/ #1-4/0 COPPER LUG	SQUARE-D	PK15GT-A-L 1
14	FULL VOLTAGE STARTER, SIZE 2, w/OL'S AND N.O.-N.C. AUXILIARY CONTACT	ALLEN-BRADLEY	509-COC 595-AB 2
15	WIREWAY DUCT 2"x4" w/COVER	HOFFMAN	A-200400WH A-200CWH -
16	SERVICE RECEPTACLE 15A, 125VAC, G.F.I. w/COVER	LEVITON	6599-W 1
17	MICRO SWITCH - SPDT, 15A	HONEYWELL	BZ-2RQ1-A2 1
18	3 POSITION SELECTOR SWITCH w/"H-O-A" LEGEND PLATE	ALLEN-BRADLEY	800T-J2B 800T-X511 2
19	PILOT LIGHT - w/GREEN LENSE w/"ON" LEGEND PLATE	ALLEN-BRADLEY	800T-QHT0G 800T-X530 2
20	PILOT LIGHT - w/RED LENSE w/"OFF" LEGEND PLATE	ALLEN-BRADLEY	800T-QHT0R 800T-X527 2
21	PHASE MONITOR	DIVERSIFIED ELEC.	SLA-230-ALE 1
22	TERMINAL	PHOENIX CONTACT	UK 5 A/R
23	GENERAL PURPOSE DPDT 120VAC RELAY w/RELAY SOCKET	SQUARE-D	KP12P14V20 NR51 3
24	RTU	BRISTOL-BABCOCK	- 1
25	PANEL METER (see NOTE 1) LEGEND: FEET OF WATER IN WETWELL	NEWPORT	205-PA1-R-CO 1
26	TRANSIENT VOLTAGE SURGE SUPPRESSOR	APT	TE/03/XAL/15/4S 1
27	GENERAL PURPOSE TIMING RELAY	ALLEN-BRADLEY	700-FEB1TU22 1
28	35mm SYMMETRICAL DIN RAIL	PHOENIX CONTACT	NS 35/7,5 0801733 A/R
29	TERMINAL END COVER	PHOENIX CONTACT	D-UK 4/10 3003020 A/R
30	TERMINAL END CLAMP	PHOENIX CONTACT	CLIPFIX 35 3022218 A/R

MOTOR HP	MAIN BREAKER	EMERG. BREAKER	STARTER BREAKER	STARTER SIZE
15	100	100	80	2
10	80	80	60	2
7.5	60	60	45	1
5	60	60	30	1

DUPLEX PUMP STATION

MOTOR HP	MAIN BREAKER	EMERG. BREAKER	STARTER BREAKER	STARTER SIZE
15	150*	100*	80	2
10	100	100	60	2
7.5	80	80	45	1
5	60	60	30	1

TRIPLEX PUMP STATION

* MAIN AND EMERGENCY BREAKERS SHALL BE SAME FRAME IN ORDER TO ACCOMMODATE STOCK MECHANICAL INTERLOCK COMPONENT. (150A IS A H-FRAME BREAKER THEREFORE THE 100A EMERGENCY BREAKER MOUNTED WITH IT SHALL ALSO BE A H-FRAME BREAKER)

NOTES:

- PANEL CONSTRUCTOR AND PUMP STATION INSTALLATION CONTRACTOR SHALL COORDINATE THE CALIBRATION OF THE PANEL METER AND THE WETWELL LEVEL INSTRUMENT (PRESSURE TRANSDUCER) SUCH THAT THE PANEL METER READ OUT IS IN ENGINEERING UNITS. UNITS SHALL BE FEET TO TENTHS OF FEET (i.e. 14.6 FEET).
- BREAKERS AND GENERATOR RECEPTACLE TO BE SIZED BASED ON THE HORSEPOWER OF THE PUMP STATION'S PUMP MOTORS.
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SHEET TITLE

PUMP STATION CONTROL PANEL LAYOUT
(230V, 15HP OR LESS)

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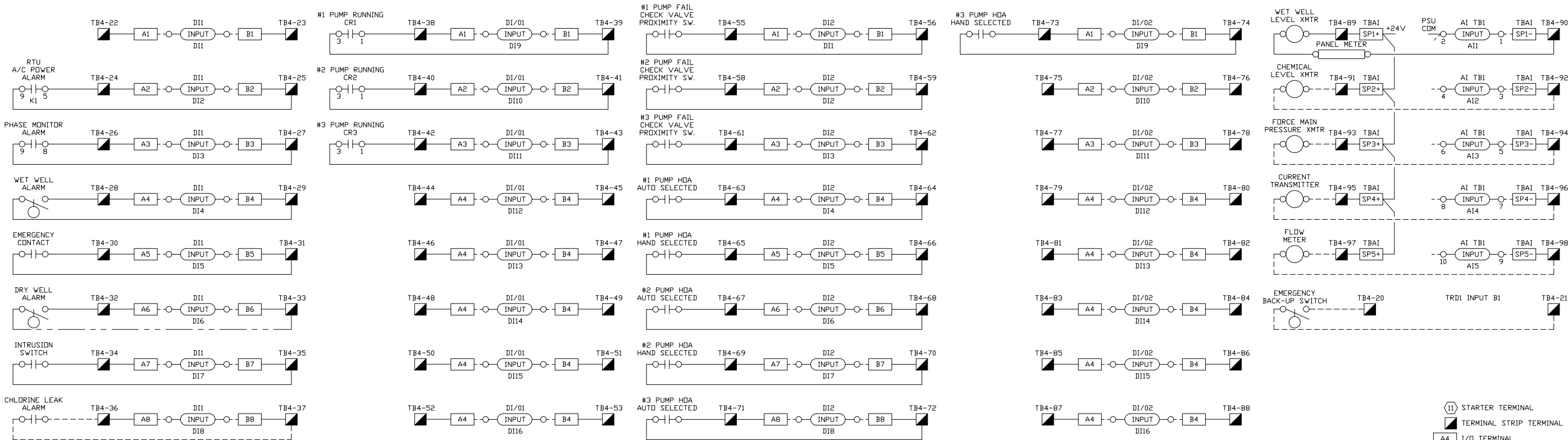
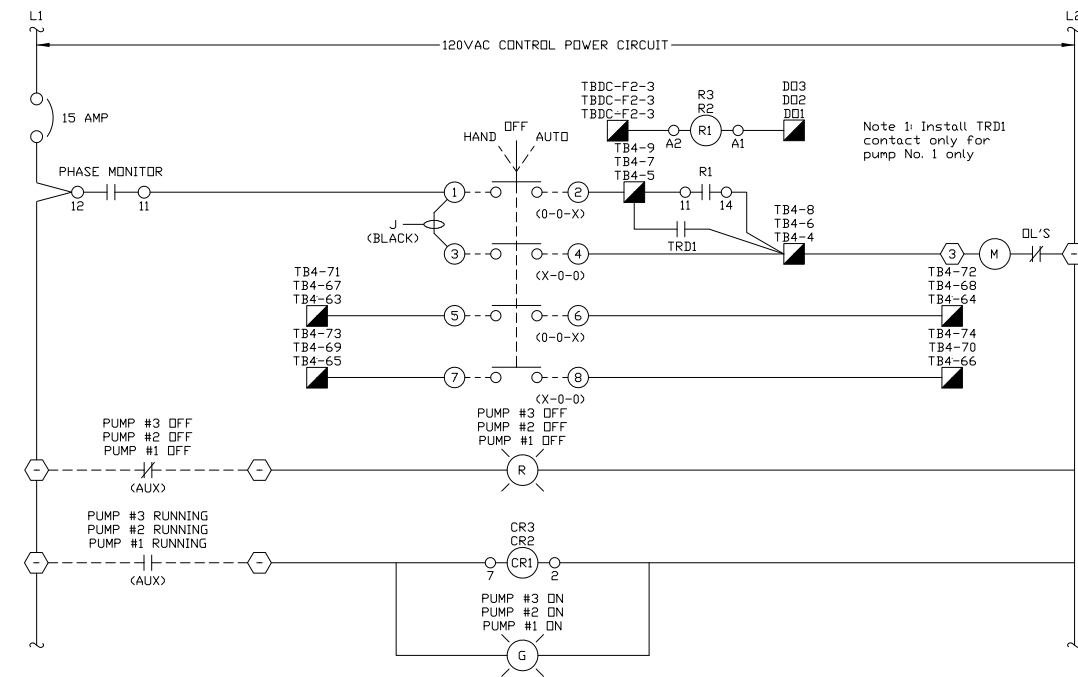
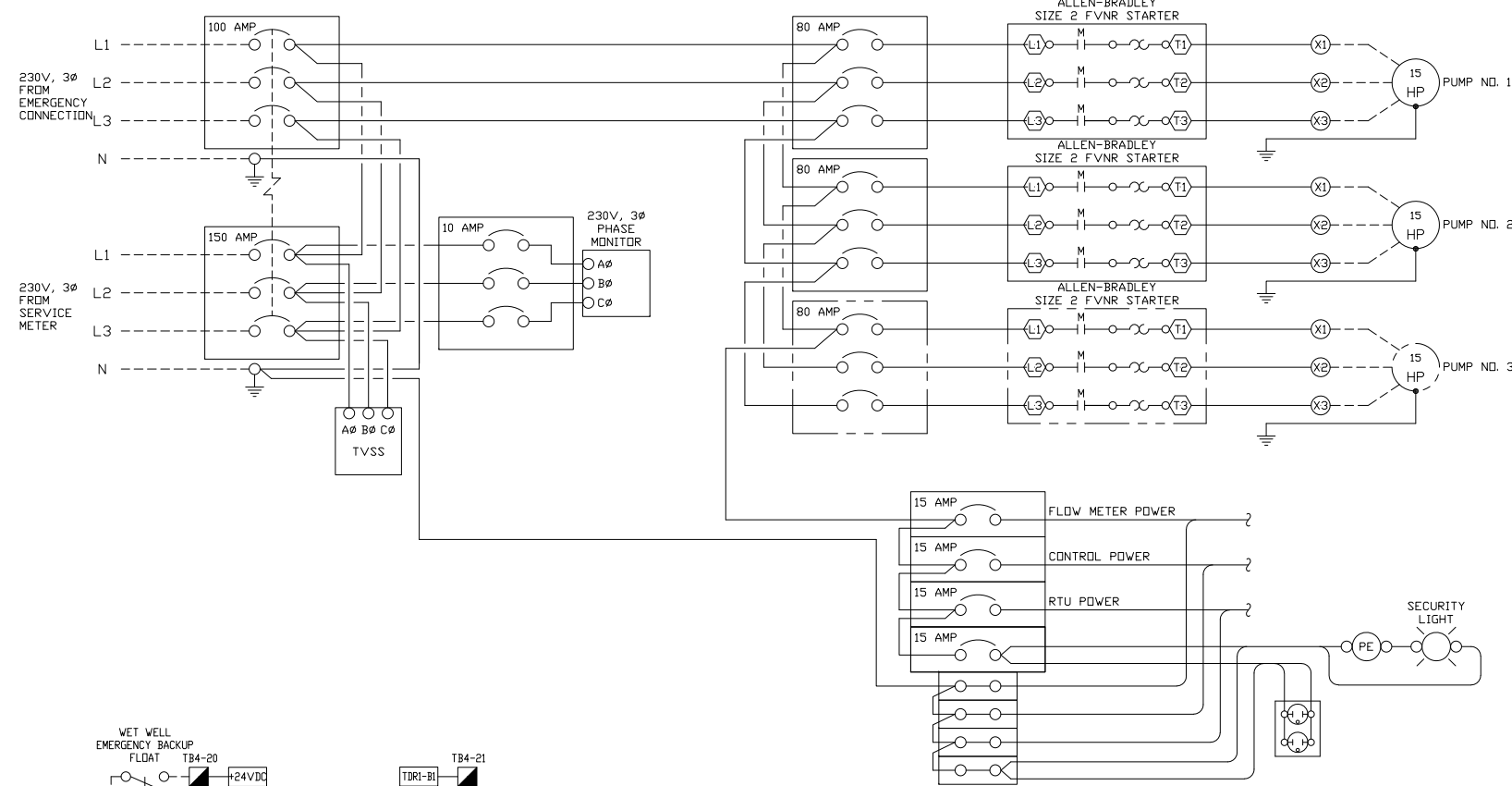
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Approved by: _____ Date Issued: JUNE 2018

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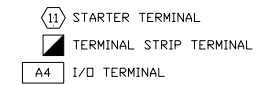
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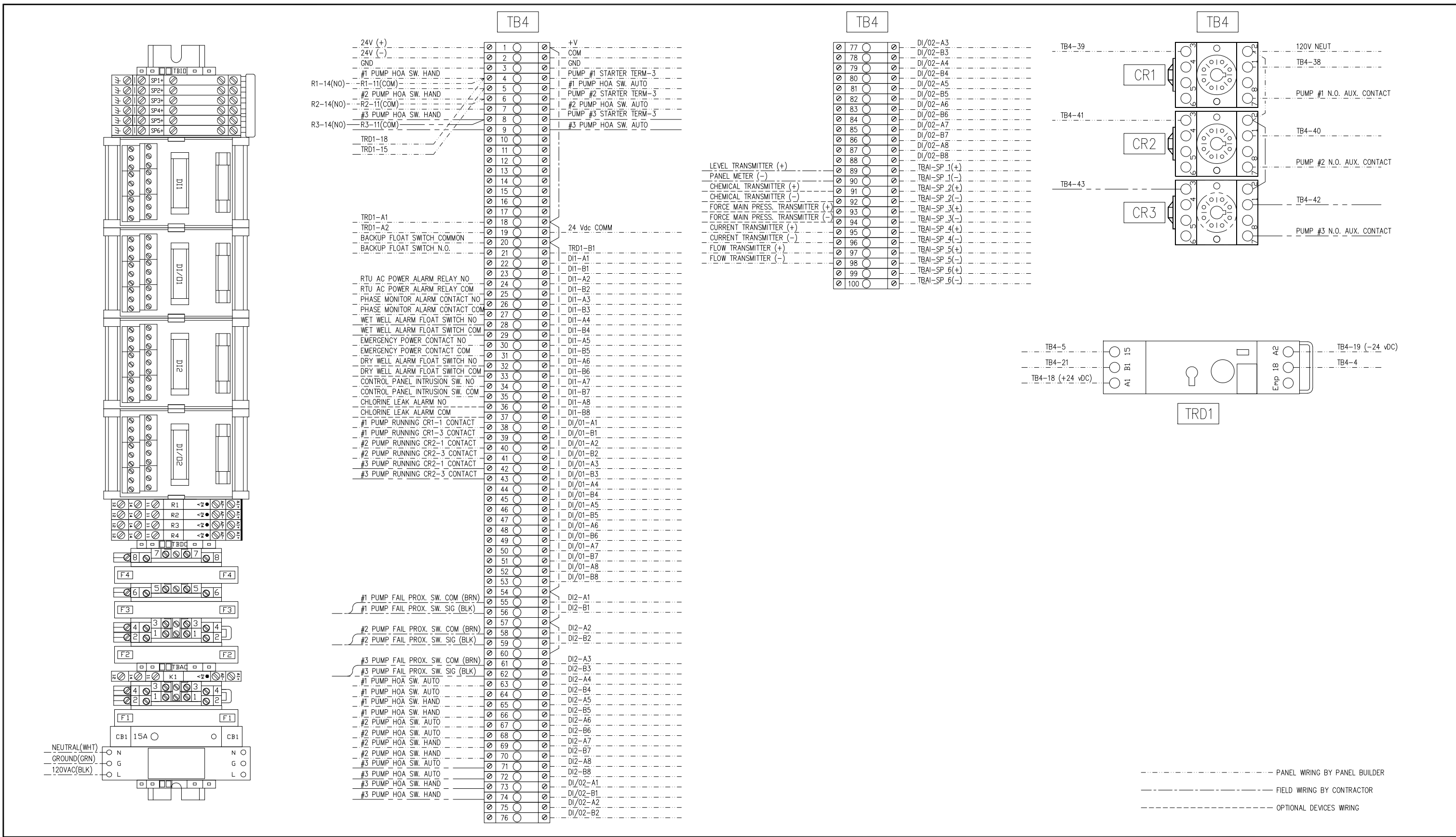
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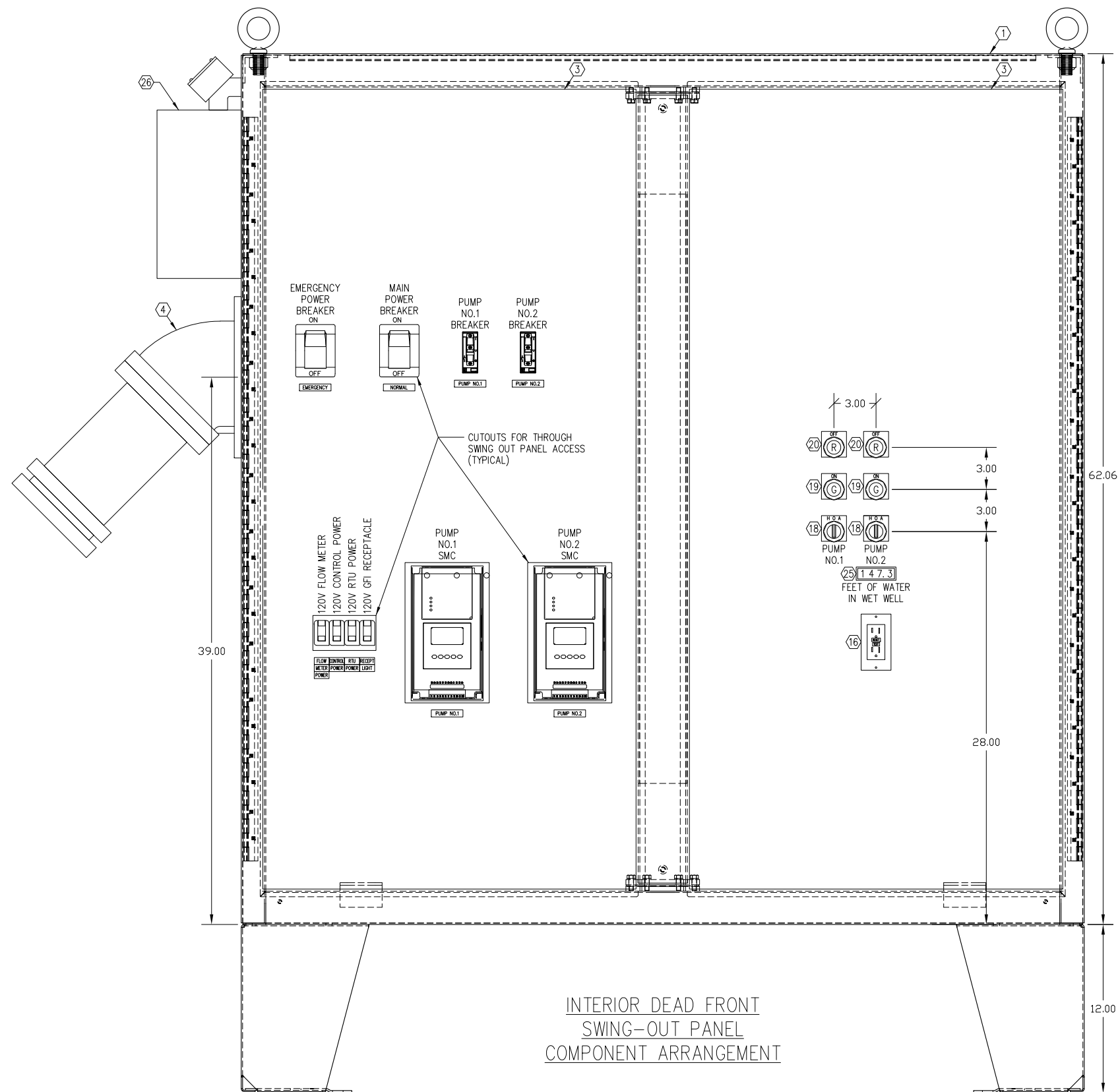


Note 2: Normally opened contact. Install additional relay to interface with power supply

Note 3: Normally opened contact. Wired in series for two-door cabinets.







NOTES:
 1 REFERENCE DRAWING E-06 FOR BILL OF MATERIALS AND INTERNAL ARRANGEMENT OF THE ELECTRICAL COMPONENTS.

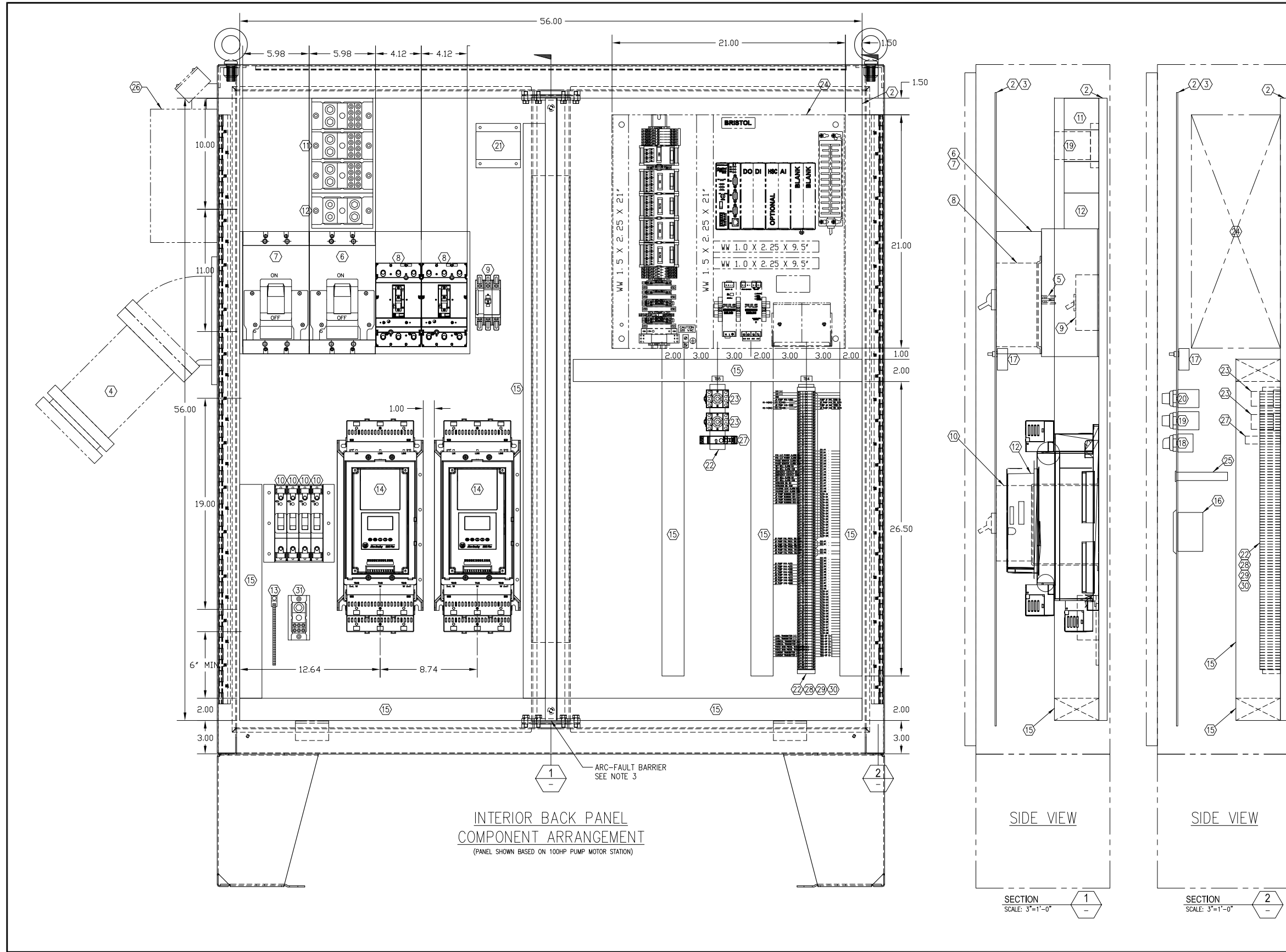
SHEET TITLE

PUMP STATION CONTROL PANEL LAYOUT
 (230V, 20-50HP)

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Approved by:	Date Issued: JUNE 2018	SCALE
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BILL OF MATERIAL				
ITEM	DESCRIPTION	MANUFACTURER	CATALOG NO.	QTY.
1	STAINLESS STEEL TYPE 4X ENCLOSURE w/FLOOR STAND KIT	HOFFMAN	A-62H6012SSLP A-FK1212SS	1
2	ENCLOSURE BACK	HOFFMAN	A-60P60	1
3	DEAD FRONT SWING-OUT PANEL KIT	-	-	2
4	EMERGENCY POWER RECEPTACLE - 400A, 3Ø, 4 WIRE, w/45° ADAPTER & SCREW CAP	CROUSE-HINDS	AR40422	1
5	WALKING BEAM MECHANICAL INTERLOCK ASSEMBLY	SQUARE-D	LA6WB	1
6	BREAKER-300A, THREE POLE	SQUARE-D	LAL36300WB	1
7	BREAKER-200A, THREE POLE	SQUARE-D	LAL36200WB	1
8	BREAKER 200A, THREE POLE	SQUARE-D	KA36200	2
9	BREAKER 10A, THREE POLE	SQUARE-D	QOU310	1
10	BREAKER 15A, SINGLE POLE	SQUARE-D	BDL16015	4
11	POWER TERMINAL BLOCK	SQUARE-D	9080LBA365208	1
12	POWER TERMINAL BLOCK	SQUARE-D	9080LBA165202	1
13	EQUIPMENT GROUND BAR w/ #1-4/0 COPPER LUG	SQUARE-D	PK15GT-A-L	1
14	FLEX SMART MOTOR CONTROLLER (SMC), 135A, w/PUMP CONTROL LINE/LOAD LUGS	ALLEN-BRADLEY	150-F135NBDB	2
15	TERMINAL COVERS	ALLEN-BRADLEY	199-LF1 150-TC1	4
16	WIREWAY DUCT 2"x4" w/COVER	HOFFMAN	A-200400WH A-200CWH	-
17	SERVICE RECEPTACLE 15A, 125VAC w/COVER	LEVITON	6599-W	1
18	MICRO SWITCH - SPDT, 15A	HONEYWELL	BZ-2RQ1-A2	2
19	3 POSITION SELECTOR SWITCH w/"H-O-A" LEGEND PLATE	ALLEN-BRADLEY	800T-J2B 800T-X511	2
20	PILOT LIGHT - w/GREEN LENSE w/"ON" LEGEND PLATE	ALLEN-BRADLEY	800T-QH10G 800T-X530	2
21	PILOT LIGHT - w/RED LENSE w/"OFF" LEGEND PLATE	ALLEN-BRADLEY	800T-QH10R 800T-X527	2
22	PHASE MONITOR	DIVERSIFIED ELEC.	SLA-230-ALE	1
23	TERMINAL	PHOENIX CONTACT	UK 5	60
24	GENERAL PURPOSE DPDT 120VAC RELAY w/RELAY SOCKET	SQUARE-D	KP12P14V20 NR51	2
25	RTU	BRISTOL-BABCOCK	-	1
26	PANEL METER (see NOTE 1) LEGEND: FEET OF WATER IN WETWELL	NEWPORT	205-PA1-R-CO	1
27	TRANSIENT VOLTAGE SURGE SUPPRESSOR	APT	TE/03/XAL/15/4S	1
28	GENERAL PURPOSE TIMING RELAY	ALLEN-BRADLEY	700-FEB1TU22	1
29	35mm SYMMETRICAL DIN RAIL	PHOENIX CONTACT	NS 35/7.5 0801733	A/R
30	TERMINAL END COVER	PHOENIX CONTACT	D-UK 4/10 3003020	A/R
31	TERMINAL END CLAMP	PHOENIX CONTACT	CLIPFIX 35 3022218	A/R
32	POWER TERMINAL BLOCK	SQUARE-D	9080LBA163106	1

MOTOR HP	MAIN BREAKER	EMERG. BREAKER	SMC BREAKER	SMC RATING	EMERG. RECEPT.
50	300	200	200	135A	400
40	250	200	150	108A	400
30	225	125	110	85A	100
25	200	100	100	85A	100
20	175	100	80	60A	100

BREAKERS & GENERATOR RECEPTACLE SIZE CHART

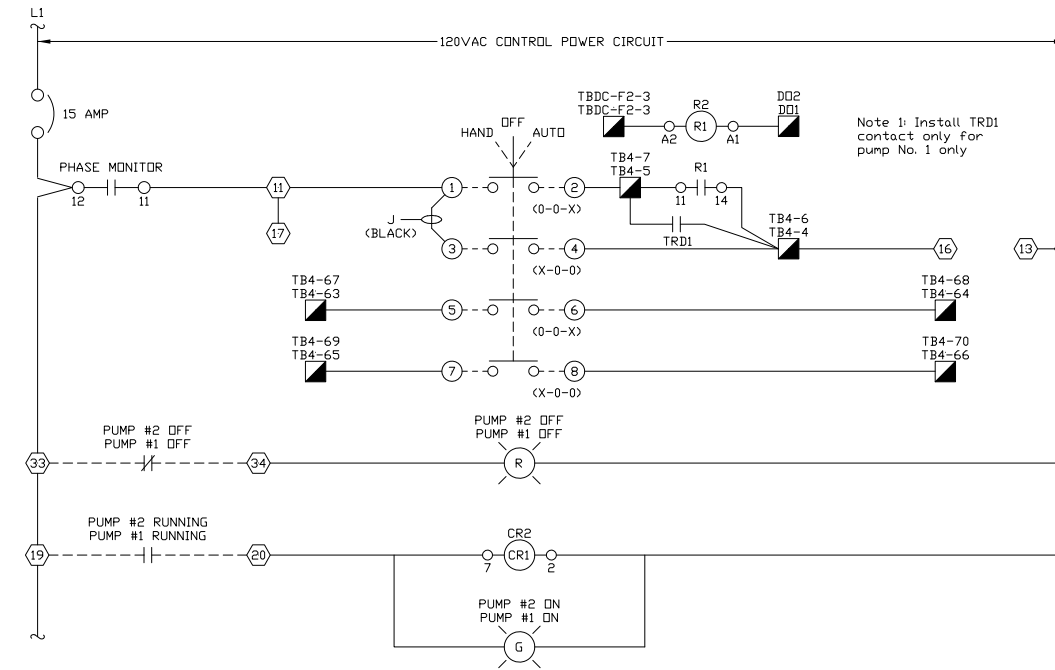
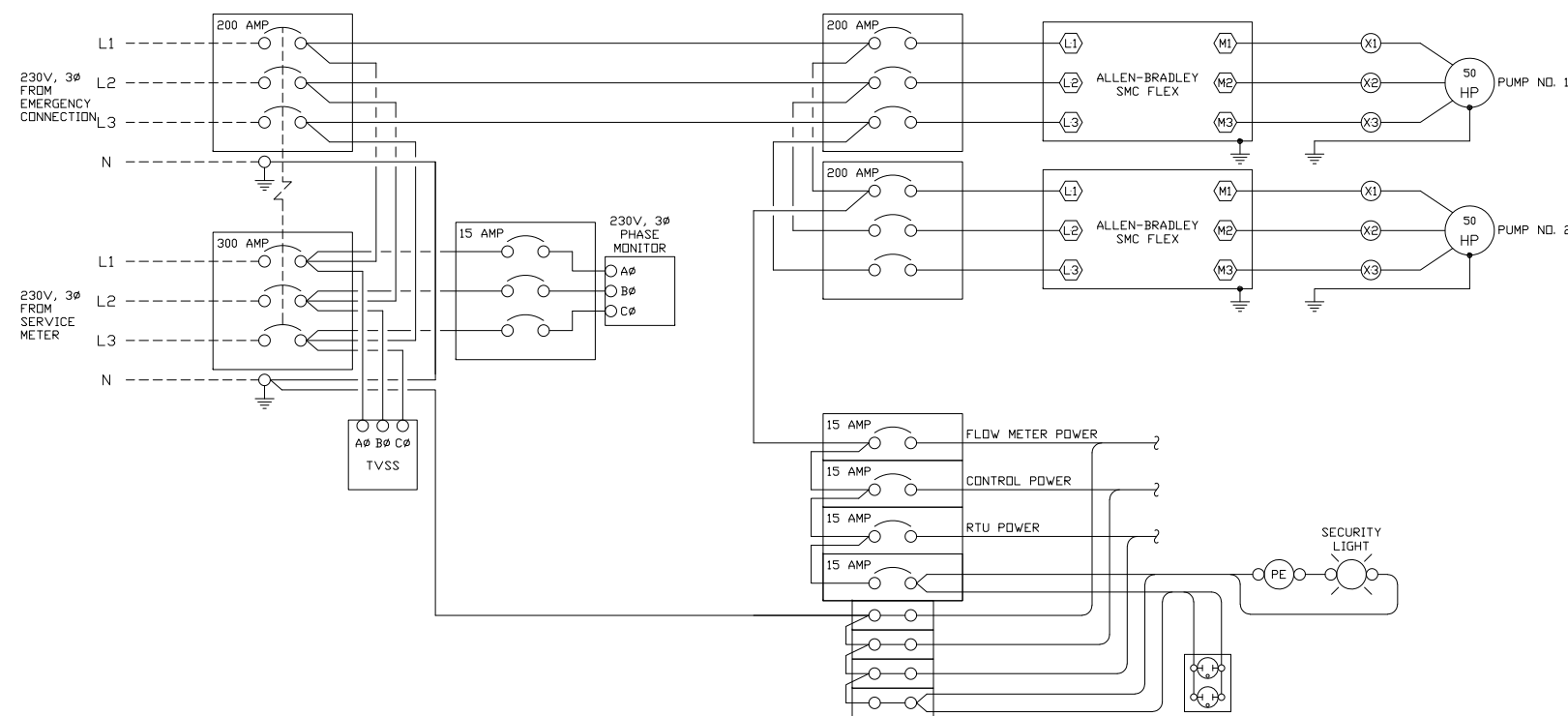
- NOTES:
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SHEET E03.02

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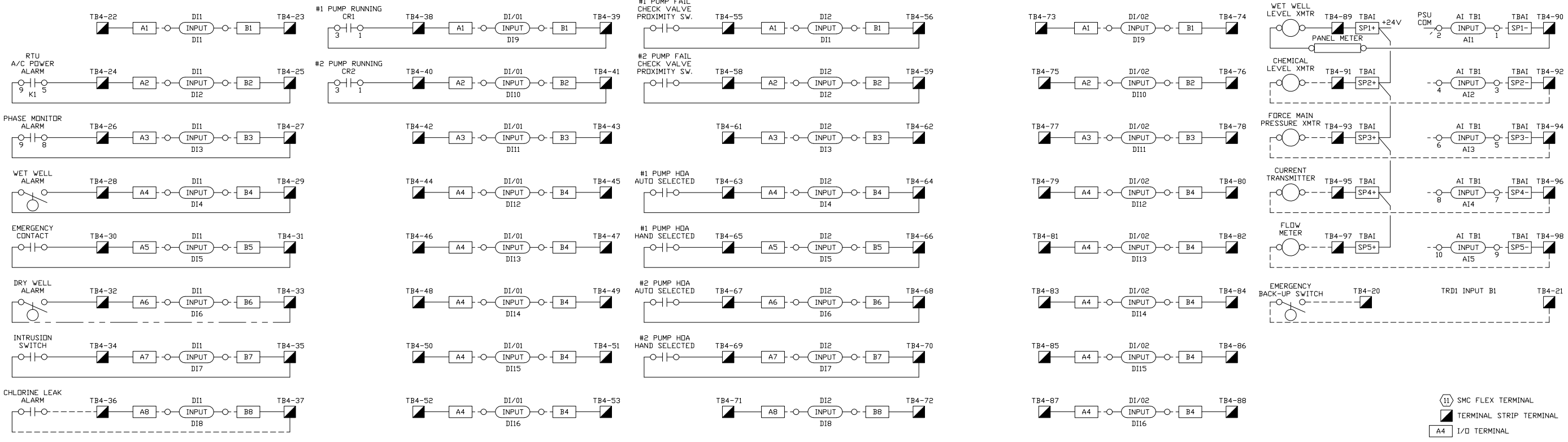
Approved by: _____ Date Issued: OCTOBER 2018 SCALE: N.T.S.

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Note 2: Normally opened contact. Install additional relay to interface with power supply

Note 3: Normally opened contact. Wired in series for two-door cabinets.



11 SMC FLEX TERMINAL
 12 TERMINAL STRIP TERMINAL
 A4 I/O TERMINAL

SHEET TITLE

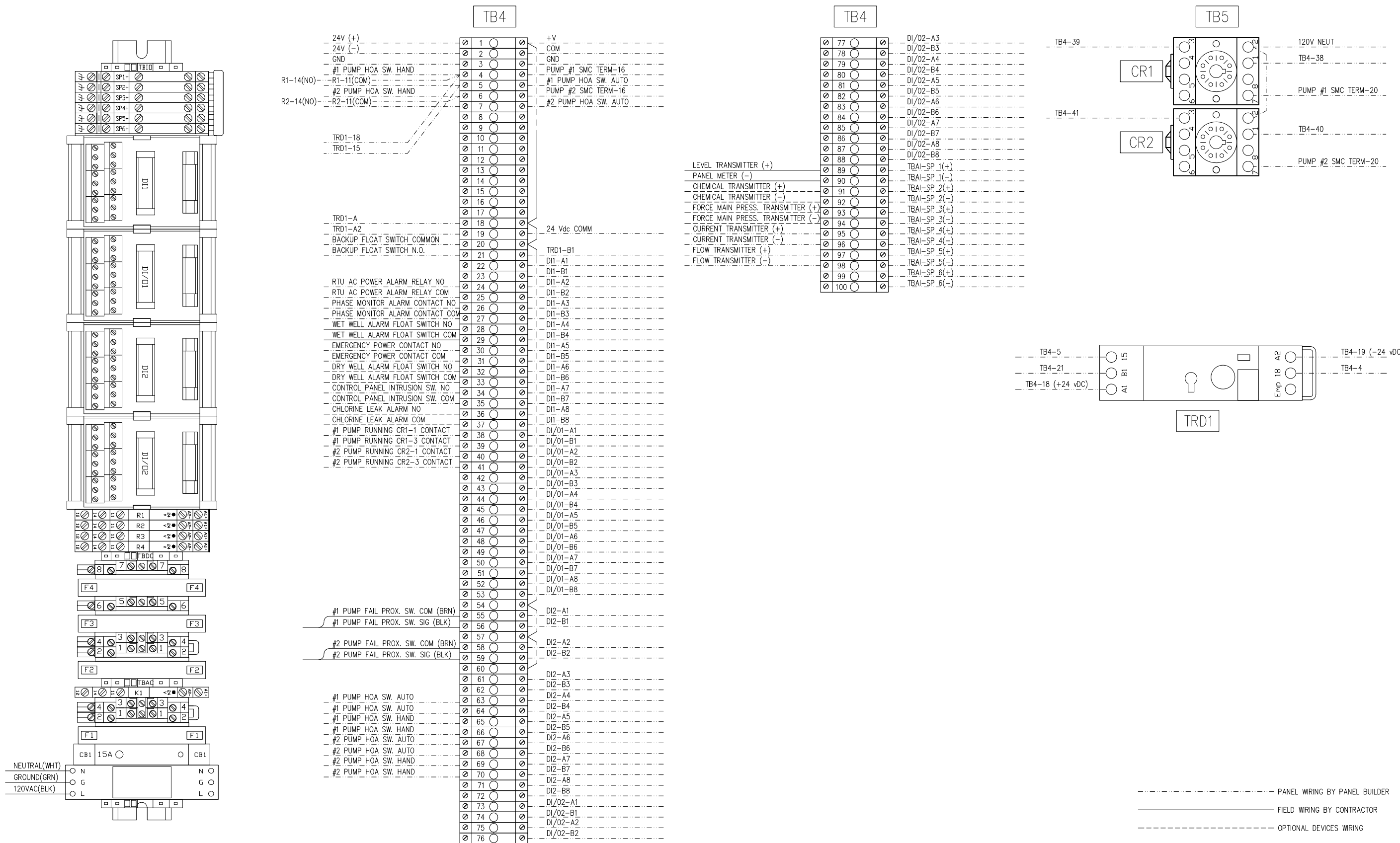
PUMP STATION CONTROL PANEL WIRING DIAGRAM
 (230V, 20-50HP)

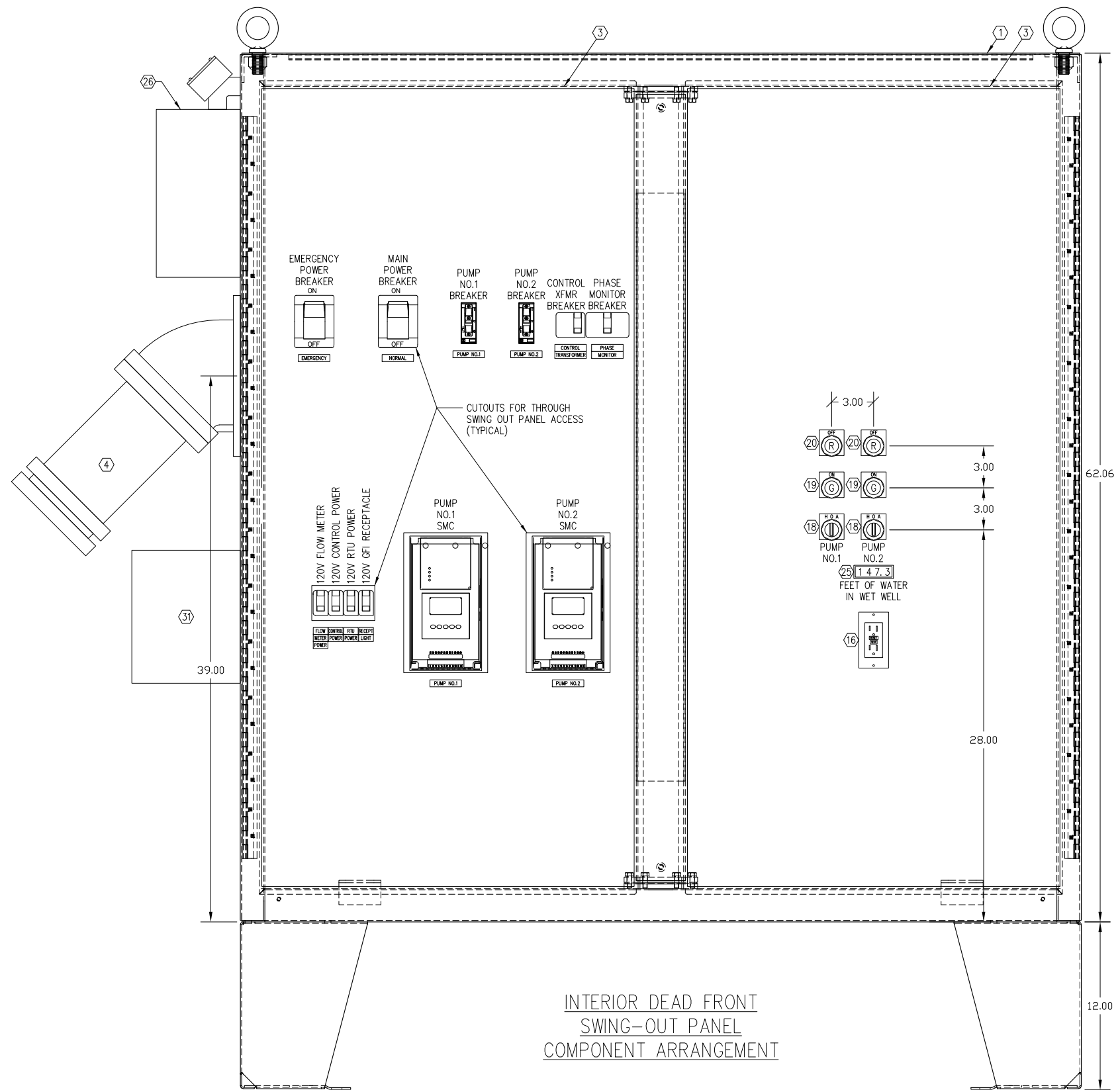
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 COMPUTER FILE: ...WSI\PROG\1600-WBS Specs\01-2018 Specification Update\007-Detail

N.T.S.





NOTES:
 1 REFERENCE DRAWING E-10 FOR BILL OF MATERIALS AND INTERNAL ARRANGEMENT OF THE ELECTRICAL COMPONENTS.

SHEET TITLE

PUMP STATION CONTROL PANEL LAYOUT
 (480V, 40-100HP)

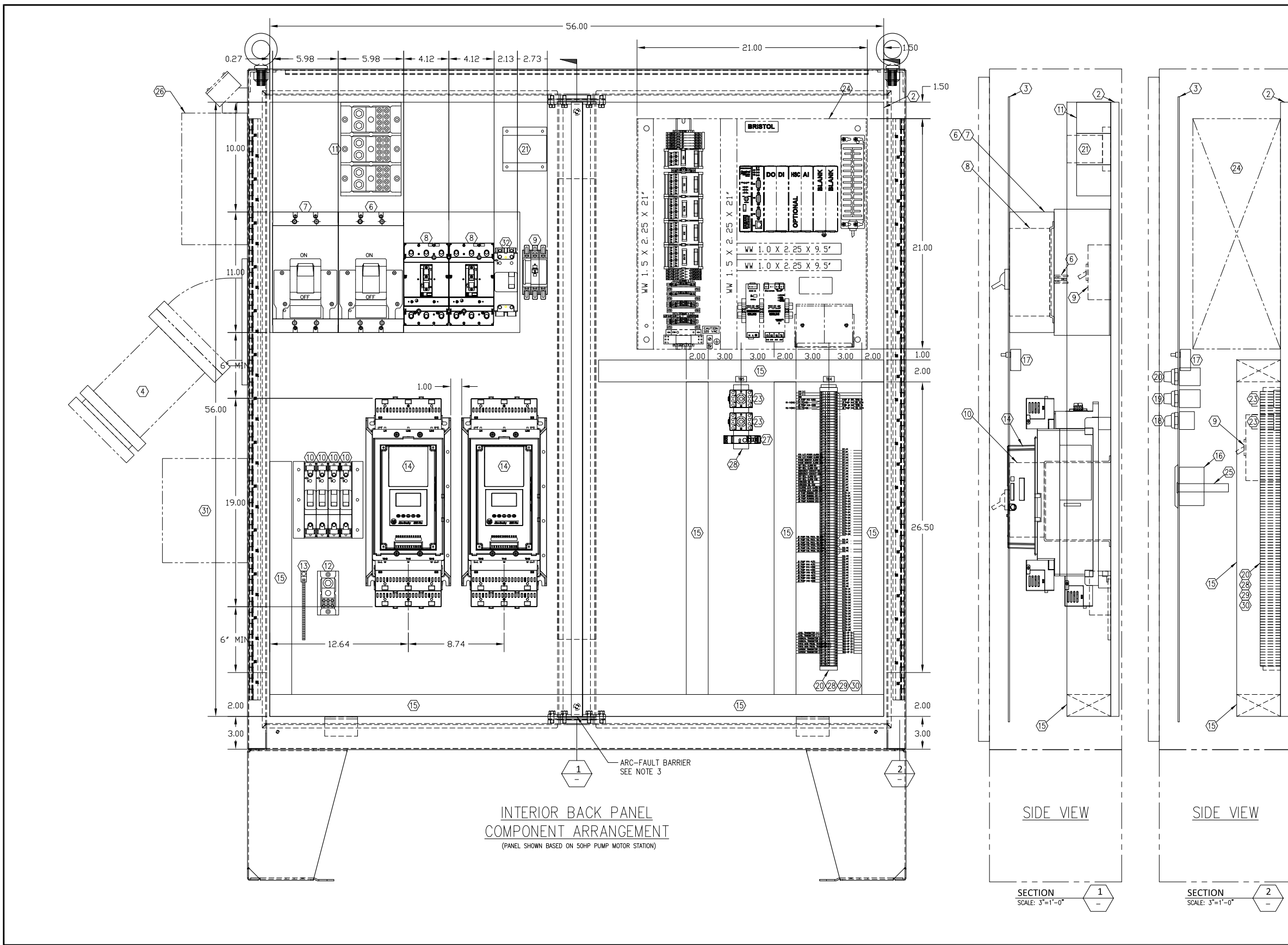
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Approved by: _____ Date Issued: OCTOBER 2018
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SCALE
 N.T.S.



BILL OF MATERIAL				
ITEM	DESCRIPTION	MANUFACTURER	CATALOG NO.	QTY.
1	STAINLESS STEEL TYPE 4X ENCLOSURE w/FLOOR STAND KIT	HOFFMAN	A-62H6012SSLP A-FK1212SS	1
2	ENCLOSURE BACK PANEL	HOFFMAN	A-60P60	1
3	DEAD FRONT SWING-OUT PANEL KIT	-	-	2
4	EMERGENCY POWER RECEPTACLE - 400A, 3ø, 4 WIRE, w/45° ADAPTER & SCREW CAP	CROUSE-HINDS	AR40422	1
5	WALKING BEAM MECHANICAL INTERLOCK ASSEMBLY	SQUARE-D	LA6WB	1
6	BREAKER-300A, THREE POLE	SQUARE-D	LAL36300WB	1
7	BREAKER-200A, THREE POLE AUXILIARY CONTACT 1A/1B ON EMERG. BKR	SQUARE-D	LAL36200WB SQ-D OPTION 1212	1
8	BREAKER 200A, THREE POLE	SQUARE-D	JDL36200	2
9	BREAKER 10A, THREE POLE	SQUARE-D	QOU310	1
10	BREAKER 15A, SINGLE POLE	SQUARE-D	BDL16015	4
11	POWER TERMINAL BLOCK	SQUARE-D	9080BA365208	1
12	POWER TERMINAL BLOCK	SQUARE-D	9080BA163106	1
13	EQUIPMENT GROUND BAR w/ #1-4/0 COPPER LUG	SQUARE-D	PK15GTA-L	1
14	FLEX SMART MOTOR CONTROLLER (SMC), 135A, w/PUMP CONTROL LINE/LOAD LUGS	ALLEN-BRADLEY	150-F135NBDB	2
15	TERMINAL COVERS		199-LF1 150-TC1	4
16	WIREWAY DUCT 2"x4" w/COVER	HOFFMAN	A-200400WH A-200CWH	-
17	SERVICE RECEPTACLE 15A, 125VAC w/COVER	LEVITON	6599-W	1
18	MICRO SWITCH - SPDT, 15A	HONEYWELL	BZ-2RQ1-A2	2
19	3 POSITION SELECTOR SWITCH w/"H-O-A" LEGEND PLATE	ALLEN-BRADLEY	800T-J2B 800T-X511	2
20	PILOT LIGHT - w/GREEN LENSE w/"ON" LEGEND PLATE	ALLEN-BRADLEY	800T-QH10G 800T-X530	2
21	PILOT LIGHT - w/RED LENSE w/"OFF" LEGEND PLATE	ALLEN-BRADLEY	800T-QH10R 800T-X527	2
22	PHASE MONITOR	DIVERSIFIED ELEC.	SLA-440-ALE	1
23	TERMINAL	PHOENIX CONTACT	UK 5	60
24	GENERAL PURPOSE DPDT 120VAC RELAY w/RELAY SOCKET	SQUARE-D	KP12P14V20 NR51	2
25	RTU	BRISTOL-BABCOCK	-	1
26	PANEL METER (see NOTE 1) LEGEND: FEET OF WATER IN WETWELL	NEWPORT	205-PA1-R-CO	1
27	TRANSIENT VOLTAGE SURGE SUPPRESSOR	APT	TE/04/XAL/15/4S	1
28	GENERAL PURPOSE TIMING RELAY	ALLEN-BRADLEY	700-FEB1TU22	1
29	35mm SYMMETRICAL DIN RAIL	PHOENIX CONTACT	NS 35/7.5 0801733	A/R
30	TERMINAL END COVER	PHOENIX CONTACT	D-UK 4/10 3003020	A/R
31	TERMINAL END CLAMP	PHOENIX CONTACT	CLIPFIX 35 3022218	A/R
32	RESIN ENCAPSULATED TRANSFORMER 2kVA 480-120/240VAC, 1ø, NEMA 4X STAINLESS BREAKER 15A, DOUBLE POLE	SQUARE-D	4X2S40FSS BDL26015	1

MOTOR HP	MAIN BREAKER	EMERG. BREAKER	SMC BREAKER	SMC RATING	EMERG. RECEPT.
100	300	200	200	135A	400
75	250	200	150	108A	400
60	225	125	110	85A	100
50	200	100	100	85A	100
40	175	100	80	60A	100

BREAKERS & GENERATOR RECEPTACLE SIZE CHART

NOTES:

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SHEET TITLE

PUMP STATION CONTROL PANEL LAYOUT
(480V, 40-100HP)

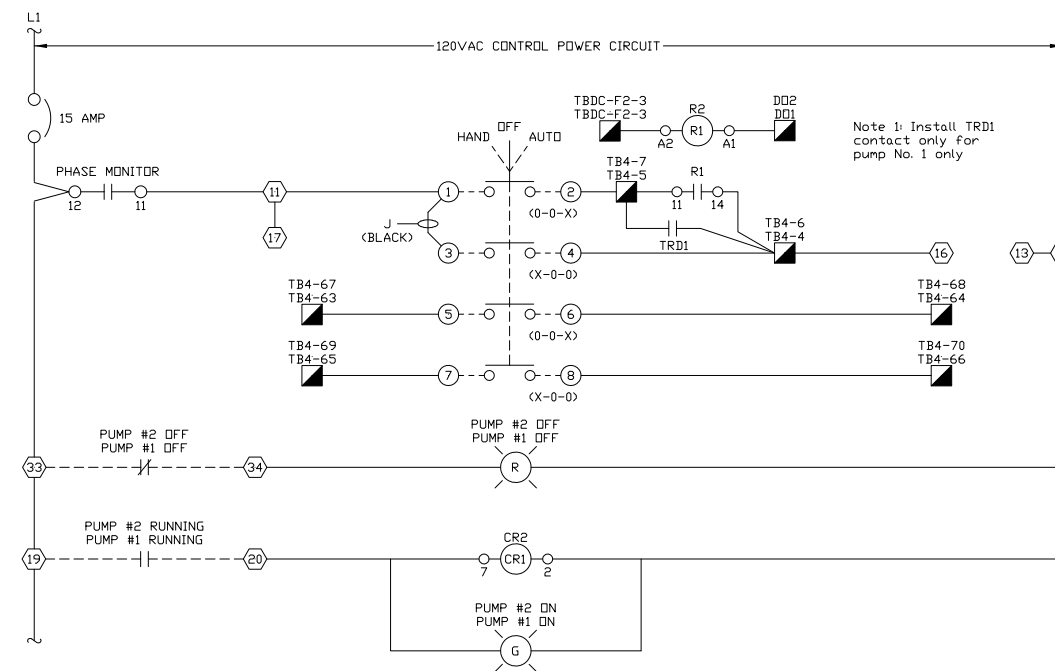
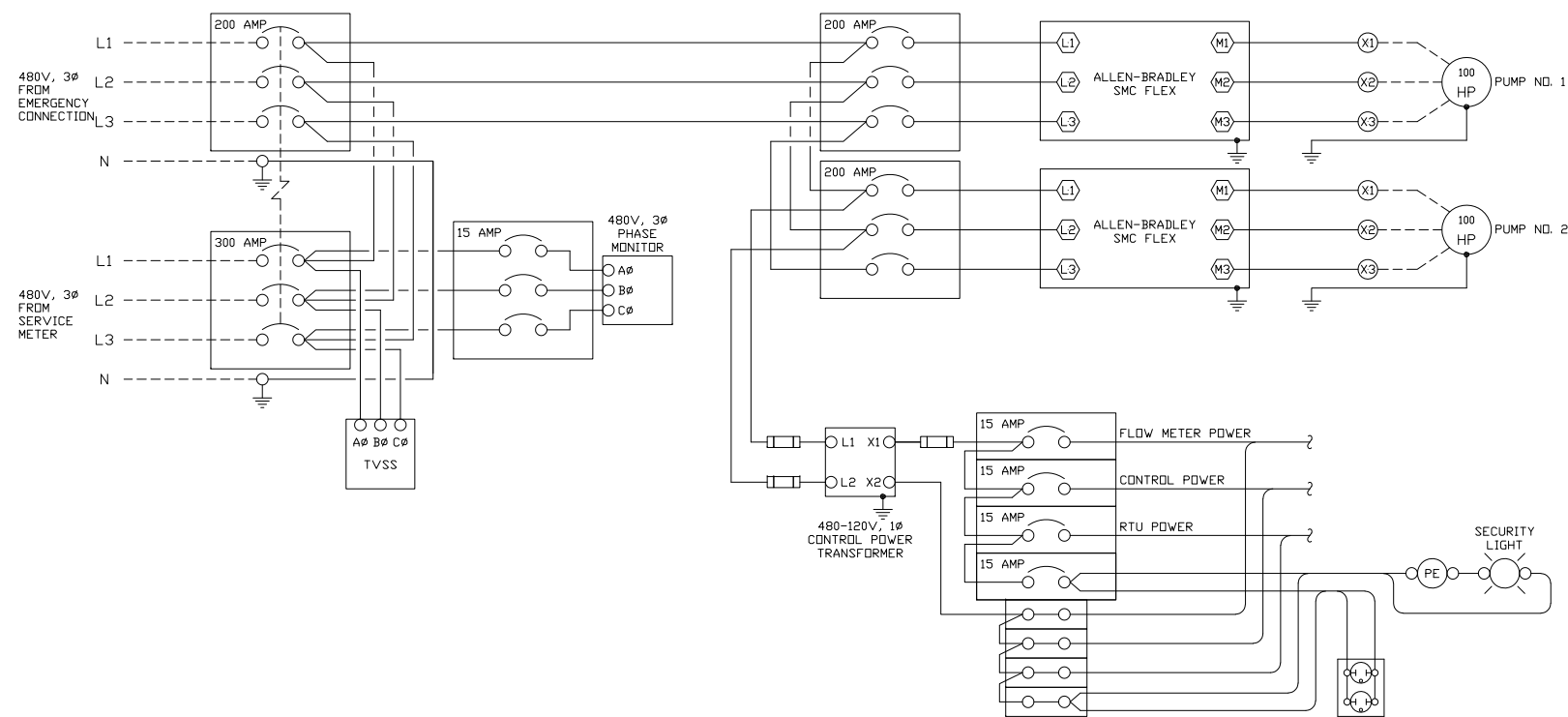
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SHEET

E04.02

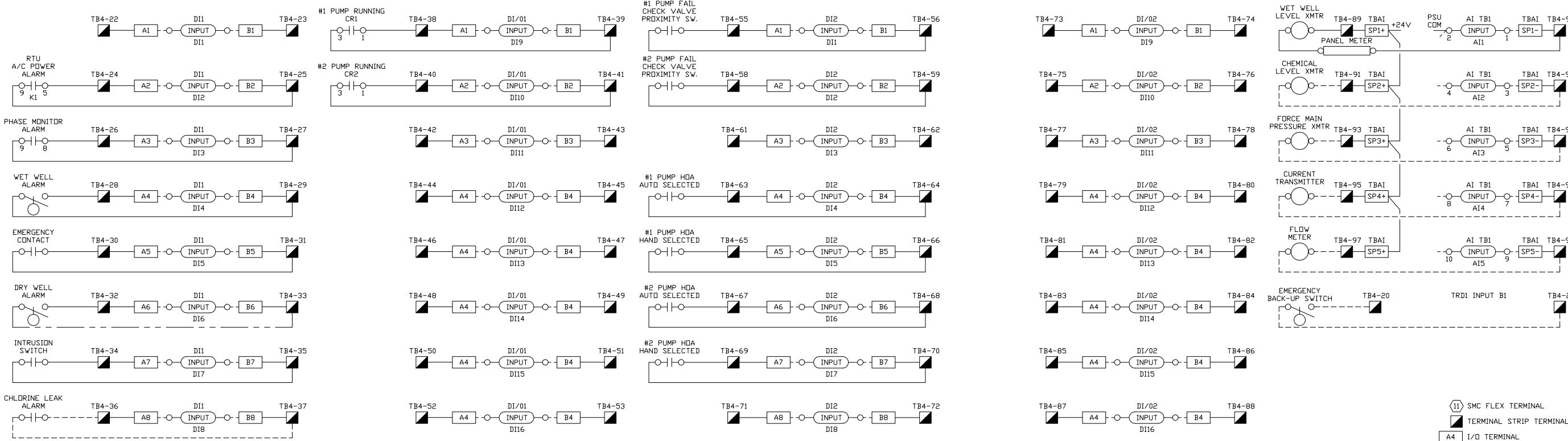
Approved by: _____ Date Issued: OCTOBER 2018
COMPUTER FILE: ...WS\PROG\1600-WBS Specs\01-2018 Specification Update\007-Detail.dwg

SCALE
N.T.S.



Note 2: Normally opened contact. Install additional relay to interface with power supply

Note 3: Normally opened contact. Wired in series for two-door cabinets.



Ⓜ SMC FLEX TERMINAL
 ▣ TERMINAL STRIP TERMINAL
 A4 I/O TERMINAL

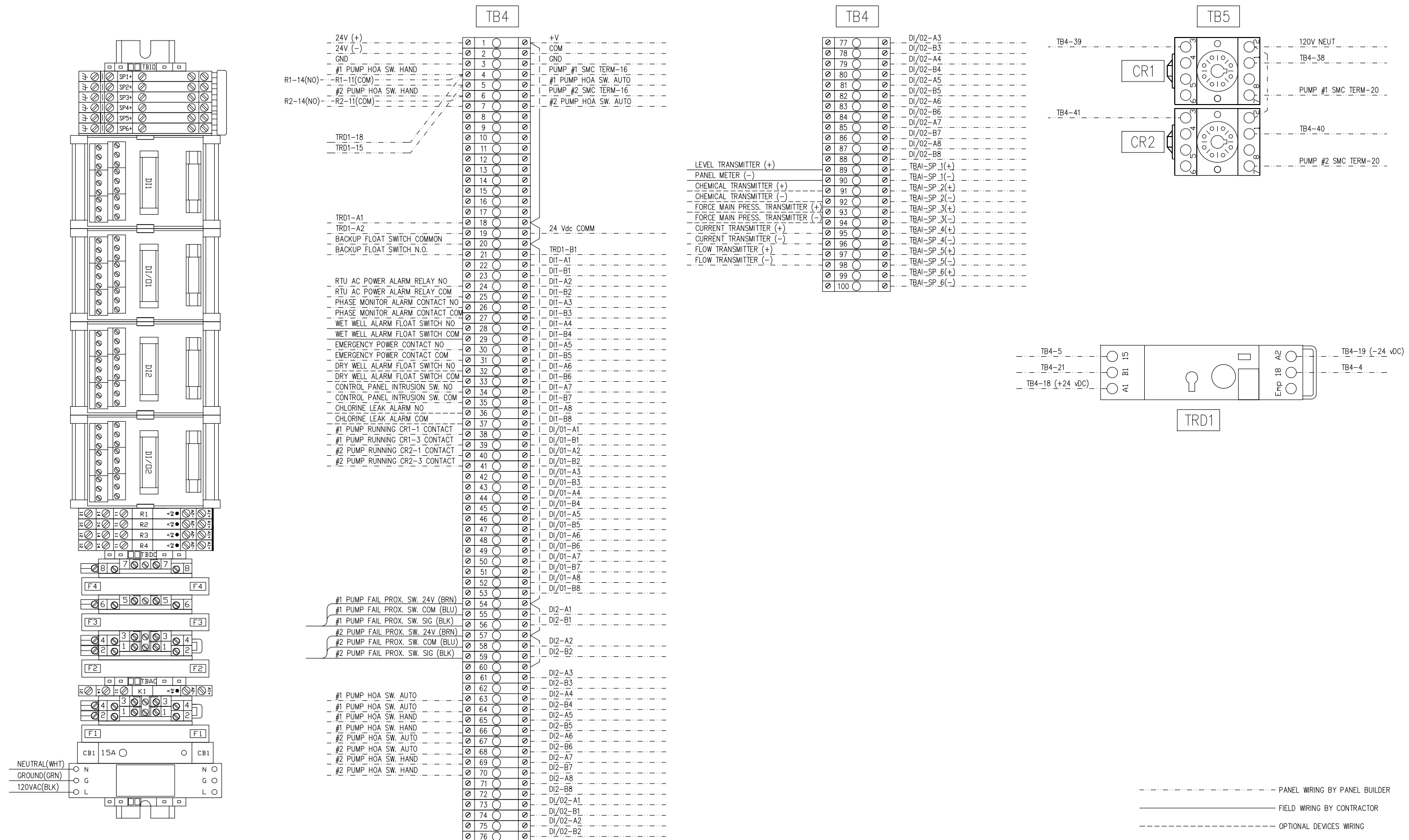
PUMP STATION CONTROL PANEL WIRING DIAGRAM
 (480V, 40-100HP)

City of Tallahassee
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Approved by: _____ Date Issued: OCTOBER 2018
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SCALE: N.T.S.



SECTION 02 41 16.13 - BUILDING DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Demolition and removal of buildings and site improvements.
 - 2. Removing below-grade construction.
 - 3. Disconnecting, capping or sealing, and removing site utilities.

1.3 DEFINITIONS

- A. Demolish: Completely remove and legally dispose of off-site.
- B. Recycle: Recovery of demolition waste for subsequent processing in preparation for reuse.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor

1.5 SUBMITTALS

- A. Qualification Data: For demolition firm.
 - 1. Contractor shall apply for a Building Permit (Demolition) with necessary support documentation with the Leon County – Department of Development and Support and Environmental Management. Contractor is responsible for Permit Review
 - 2. Fees and coordination with Leon County – Department of Development Support and Environmental Management. Contractor shall abide by any building abatement requirements, testing, permit rules, conditions and regulation as determined by the Agency.
 - 3. Temporary interruption of utility services.
 - 4. Shutoff and capping or re-routing of utility services.

Section 024116.13 – Building Demolition

- B. Proposed Protection Measures: Submit informational report, including drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
 - 1. Adjacent Buildings: Detail special measures proposed to protect adjacent buildings and site features to remain.
- C. Schedule of Building Demolition Activities: Indicate the following:
 - 1. Detailed sequence of demolition work, with starting and ending dates for each activity.
 - 2. Temporary interruption of utility services.
 - 3. Shutoff and capping or re-routing of utility services.
- D. Building Demolition Plans: Drawings indicating the following;
 - 1. Items to be demolished.
 - 2. Items to be cleared.
 - 3. Locations of items to be protected.
- E. Pre-demolition: Photographs or Video: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by building demolition operations.
- F. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
- G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.6 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Standards: Comply with ANSI A10.6 and NFPA 241.

Section 024116.13 – Building Demolition

- D. Pre-demolition Conference: Conduct conference at Project site to comply with Permit conditions. Review methods and procedures related to building demolition including, but not limited to, the following:
1. Inspect and discuss condition of construction to be demolished.
 2. Review structural load limitations of existing structures.
 3. Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Review and finalize protection requirements.
 5. Review procedures for noise control and dust control.
 6. Review procedures for protection of adjacent buildings.

1.7 PROJECT CONDITIONS

- A. Buildings to be demolished will be vacated and their use discontinued before start of the Work.
- B. Buildings immediately adjacent to demolition area will be occupied. Conduct building demolition so operations of occupied buildings will not be disrupted.
1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.
 2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.
 - a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.
- C. Leon County assumes no responsibility for buildings and structures to be demolished.
1. Conditions existing at time of inspection for bidding purpose will be maintained by Leon County Engineer or Designee as far as practical.
 2. Before building demolition, Leon County Engineer or Designee will remove all belongings.
- D. Hazardous Materials: It is known that hazardous materials will be encountered in the Work.
1. Contractor shall review the Asbestos Report provided as part of the Contract documents to determine the presence and location of hazardous materials and develop a removal and mitigation plan that complies with State and Federal program regulations for the removal, handling, and disposal of hazardous materials.
 2. Contractor shall coordinate material safety data sheets for materials that are known to be present in the buildings and structures to be demolished because of building operations or processes performed there.

Section 024116.13 – Building Demolition

- E. On-site storage or sale of removed items or materials is not permitted.

1.8 COORDINATION

- A. Arrange demolition schedule so as not to interfere with operations of adjacent occupied buildings.

PART 2 - PRODUCTS [(Not Used)]

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.
- B. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.
- C. Contractor shall provide report documentation that hazardous materials have been remediated before proceeding with building demolition operations.

3.2 PREPARATION

- A. Refrigerant: Remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction before starting demolition.
- B. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities serving buildings and structures to be demolished.
- C. Contractor shall coordinate shut-off of indicated utilities.
- D. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
- E. Cut off pipe or conduit a minimum of 24 inches below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.
- F. Existing Utilities: Refer to Special Provisions for the project for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.
- G. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or

Section 024116.13 – Building Demolition

structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.

- H. Strengthen or add new supports when required during progress of demolition.

3.3 DEMOLITION GENERAL

- A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.
- B. Existing Utilities: Maintain utility services to remain and protect from damage during demolition operations.
- C. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Leon County Engineer or Designee and authorities having jurisdiction.
- D. Provide temporary services during interruptions to existing utilities, as acceptable to Leon County Engineer or Designee and authorities having jurisdiction.
- E. Provide at least 72 hours' notice to occupants of affected buildings if shutdown of service is required during changeover.
- F. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated.
- G. Protect adjacent buildings and facilities from damage due to demolition activities.
- H. Protect existing site improvements, appurtenances, and landscaping to remain.
- I. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
- J. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- K. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
- L. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
- M. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

Section 024116.13 – Building Demolition

- N. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, pollution.

3.4 DEMOLITION BY MECHANICAL MEANS

- A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- B. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- C. Remove structural framing members and lower to ground by method suitable to minimize ground impact and dust generation.
- D. Below-Grade Construction: Demolish foundation walls and other below-grade construction. Remove below Grade construction, including basements, foundation walls and footings, completely.
- E. Remove below-grade construction, including basements, foundation walls, and footings, completely.
- F. Utilities.: Demolish and remove existing utilities and below-grade utility structures.

3.5 DEMOLITION BY EXPLOSIVES

- A. SHALL NOT BE USED.**

3.6 SITE RESTORATION

- A. Below-Grade Areas: Rough grade below-grade areas ready for further excavation or new construction.
- B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

3.7 REPAIRS

- A. Promptly repair damage to adjacent buildings caused by demolition operations.

3.8 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site.

Section 024116.13 – Building Demolition

- B. Remove demolition waste materials from Project site and legally dispose of them in an EPA-approved landfill acceptable to authorities having jurisdiction. Provide documentation of disposal of all debris.
- Do not allow demolished materials to accumulate on-site.
 - Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- C. Do not burn demolished materials.

3.9 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began

END OF SECTION

See LEM18-00072

 Approved By: Anna Padilla 1/17/2019

GOODWILL DONATION STATION PARKING LOT RELOCATION

DRIVEWAY CONNECTION PERMIT APPLICATION

December 2018

PREPARED FOR:

**DEPARTMENT OF DEVELOPMENT SUPPORT AND ENVIRONMENTAL MANAGEMENT
435 N. MACOMB ST., 2ND FLOOR
TALLAHASSEE, FLORIDA 32301
850-606-1300**

PREPARED BY:

**STANTEC CONSULTING SERVICES INC.
2316 KILLEARN CENTER BLVD., SUITE 102
TALLAHASSEE, FLORIDA 32309
850.878.5001**





GOODWILL DONATION CENTER
DRIVEWAY CONNECTION PERMIT

DECEMBER 2018

Application

Dept. of Development Support
and Environmental Management
435 N. Macomb St., 2nd Floor
Tallahassee, Florida 32301
850-606-1300
www.leonpermits.org



LPR# _____

LDR# _____

LB# _____

DRIVEWAY CONNECTION PERMIT APPLICATION

CLASS II, III & IV

Check One:

- CLASS II (40 ≤ ADT ≤ 1000 VPD) Fee: \$500.00
- CLASS III (ADT > 1000 VPD) Fee: \$1,500.00
- CLASS IV (Public/Private Roads) Fee: \$1,500.00

PROPERTY INFORMATION

Parcel Tax I.D. # 11-07-20-212-000-0 Number of Connections to Public Streets: 1

Location/Address: 3401 North Meridian Road

Subdivision Name: N/A

OWNER INFORMATION

Owner: Leon County Public Works Cell #: N/A Work #: N/A

Mailing Address: 2280 Miccosukee Road, Tallahassee, Florida 32308

Email Address: N/A

APPLICANT/AGENT INFORMATION

Builder: Charles Wu - Leon County Director Engineering Services Cell#: _____ Work#: (850)606-1500

Mailing Address: 2280 Miccosukee Road, Tallahassee, Florida 32308

Email Address: WuC@leoncountyfl.gov

The applicant shall submit a completed application along with a site plan drawing in accordance with regulations and standards approved by Leon County in the *Driveway and Street Connection Guidelines and Procedures Manual*, adopted April 12, 2016, as amended. The manual is available online at www.leonpermits.org, or at the DSEM offices at 435 North Macomb Street.

The applicant/owner for self, heirs, assigns and successors in interest, binds and obligates self to save and hold Leon County harmless from any and all damages, claims or injuries caused in whole or in part by applicant that may occur by reason of this construction, said facility design, maintenance or continuing existence of connection.

This permit authorizes work within the County right-of-way only. Additional permitting will be required for any activity outside the right-of-way.

The applicant/owner binds and obligates by way of the approved permit to construct the driveway connection in accordance with the approved permit. Failure to do so shall result in enforcement action.

Applicant's Signature: Charles Wu 12/14/2018



Leon County

Board of County Commissioners

301 South Monroe Street, Tallahassee, Florida 32301
(904) 606-5302 www.leoncountytfl.gov

Commissioners

JIMBO JACKSON
District 2
Chairman

BRYAN DESLOGE
District 4
Vice Chairman

BILL PROCTOR
District 1

RICK MINOR
District 3

KRISTIN DOZIER
District 5

MARY ANN LINDLEY
At Large

NICK MADDOX
At Large

VINCENT S. LONG
County Administrator

HERBERT W.A. THIFLE
County Attorney

November 29, 2018

**RE: Letter of Authorization
Public Works Projects**

To Whom It May Concern:

This letter shall serve to authorize the following employees of Leon County to procure regulatory permits, as authorized representatives of Leon County, for County Public Works projects:

Mr. Brent Pell, P.E., Public Works Director

Mr. Charles Wu, P.E., Director of Engineering Services

Sincerely,

Vincent S. Long
County Administrator

VSL/djw



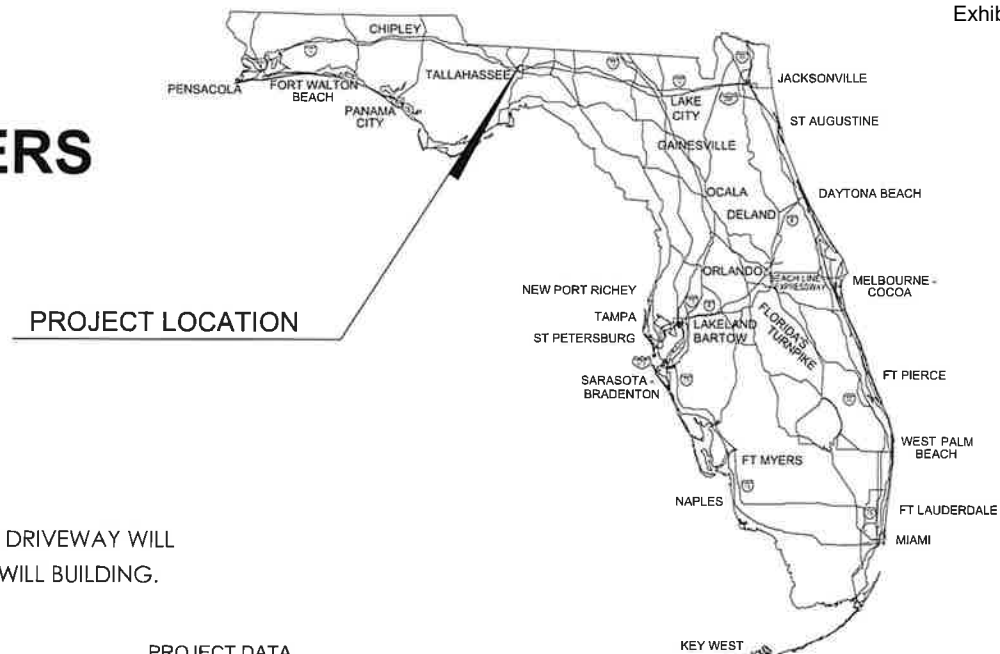
GOODWILL DONATION CENTER
DRIVEWAY CONNECTION PERMIT

DECEMBER 2018

Plans

LEON COUNTY BOARD OF COUNTY COMMISSIONERS PUBLIC WORKS DEPARTMENT

SITE PLAN FOR GOODWILL DONATION STATION PARKING LOT RELOCATION

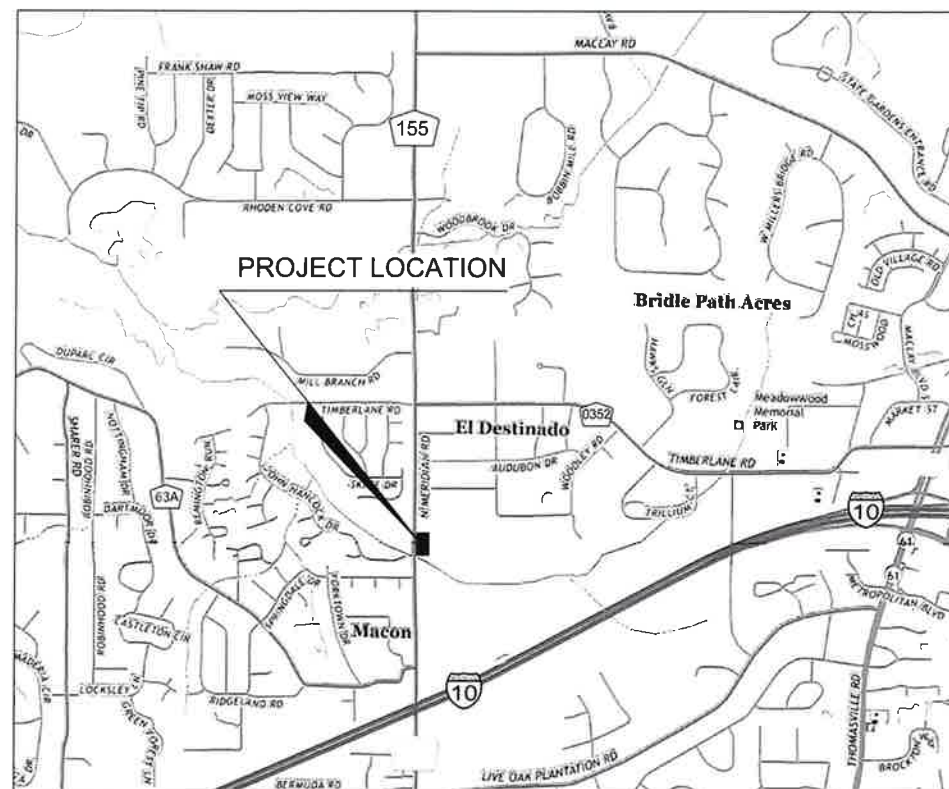


LEON COUNTY DRIVEWAY PERMIT SUBMITTAL

CONSTRUCTION OF A CLASS II DRIVEWAY CONNECTION WITHIN THE LEON COUNTY RIGHT-OF-WAY. THE DRIVEWAY WILL PROVIDE A CONNECTION FROM NORTH MERIDIAN ROAD TO THE NORTH SIDE OF THE EXISTING GOODWILL BUILDING.

SHEET INDEX

SHEET NO	SHEET TITLE
G-000	COVER SHEET
G-001	GENERAL NOTES AND LEGEND
C-100	EXISTING CONDITIONS PLAN
C-102	SITE GEOMETRY PLAN
C-103	GRADING AND DRAINAGE PLAN
C-107	INTERSECTION SITE DISTANCE TRIANGLE
C-108	DRIVEWAY PLAN, PROFILE, AND SECTION
C-501	CIVIL DETAILS
C-503	GRAVEL PAVEMENT DETAILS
C-506	TRAFFIC CONTROL DETAILS
C-507	TRAFFIC CONTROL DETAILS
C-508	TRAFFIC CONTROL DETAILS
C-509	TRAFFIC CONTROL DETAILS



LOCATION MAP



PROJECT DATA	
PARCEL I.D. NO.:	11-07-20-212-000-0 11-07-20-213-000-0
PROJECT NAME:	GOODWILL DONATION STATION PARKING LOT RELOCATION
PROJECT SPONSOR:	LEON COUNTY BOARD OF COUNTY COMMISSIONERS LEON COUNTY PUBLIC WORKS CHARLES WU (850) 606-1500 2280 MICCOSUKEE ROAD TALLAHASSEE, FL 32308
OWNER:	EDWARD M. MITCHELL 1330 CAPITAL CIRCLE NE TALLAHASSEE, FL 32308 (850) 547-6000
PREPARED BY:	STANTEC CONSULTING SERVICES INC. 2316 KILLEARN CENTER BLVD, STE 102 TALLAHASSEE, FL 32309 (850) 878-5001
ENGINEER OF RECORD:	CHRIS E. BROCKMEIER, P.E. FL. REG. NO. 56859 2316 KILLEARN CENTER BLVD, STE 102 TALLAHASSEE, FL 32309 (850) 878-5001
SURVEYOR OF RECORD:	NOBLES CONSULTING GROUP, INC. 2844 PABLO AVENUE TALLAHASSEE, FL 32308 (850) 385-1179

- COMMISSIONERS:**
- WILLIAM C. PROCTOR, JR**
DISTRICT 1
 - JIMBO JACKSON**
DISTRICT 2
 - RICK MINOR**
DISTRICT 3
 - BRYAN DESLOGE**
DISTRICT 4
 - KRISTIN DOZIER**
DISTRICT 5
 - MARY ANN LINDLEY**
AT-LARGE
 - NICK MADDOX**
AT-LARGE

VINCENT S. LONG
COUNTY ADMINISTRATOR

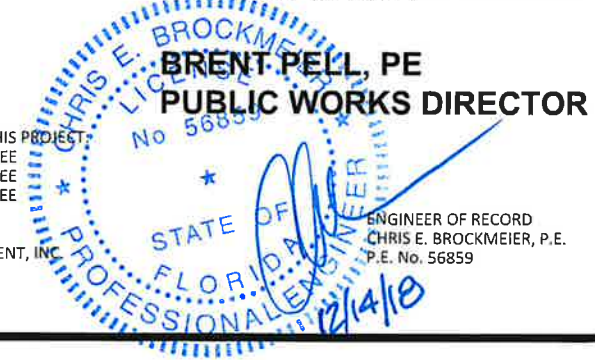
BRENT PELL, PE
PUBLIC WORKS DIRECTOR




Stantec
Stantec Consulting Services Inc.
2316 KILLEARN CENTER BOULEVARD, SUITE 102
TALLAHASSEE, FL 32309
Tel. 850.878.5001
www.stantec.com C.A.No. 27013

PROPOSED UTILITY PROVIDERS FOR THIS PROJECT:

WATER	CITY OF TALLAHASSEE
SEWER	CITY OF TALLAHASSEE
ELECTRIC	CITY OF TALLAHASSEE
PHONE	CENTURY LINK
CABLE	COMCAST, INC.
SOLID WASTE	WASTE MANAGEMENT, INC.



GOVERNING DESIGN STANDARDS:
Florida Department of Transportation, FY2017-18 Design Standards eBook (DSeB) and applicable Design Standards Revisions (DSRs) at the following website:
<http://www.fdol.gov/ir/design/DesignStandards/Standards.shtml>

Florida Department of Transportation, FY2018-19 Standard Plans for Road and Bridge Construction (eBook) and 2018 FDOT Design Manual and applicable revisions at the following website:
<http://www.fdol.gov/design/standardplans/current/default.shtml>

GOVERNING STANDARD SPECIFICATIONS:
Florida Department of Transportation, JULY 2017 Standard Specifications for Road and Bridge Construction at the following website:
<http://www.fdol.gov/programmanagement/implemented/SpecBooks>

DECEMBER 2018
Project Number: 215613796

NOTE:
THE SCALE OF THESE PLANS MAY HAVE
CHANGED DUE TO REPRODUCTION.



2316 Kilgore Center Blvd, Suite 102
Tallahassee, FL 32309
www.stantec.com C.A. No. 27013

The Consultant and its employees shall be responsible for all drawings. DDG (DDG) is the drafter of all drawings and shall be responsible for the accuracy of all drawings. The Client shall be responsible for the accuracy of all information provided to the Consultant. The Consultant shall not be responsible for any information not provided to the Consultant.

GENERAL NOTES

- 1. EXISTING TOPOGRAPHY AND IMPROVEMENTS SHOWN ARE BASED ON SURVEY INFORMATION BY NOBLES CONSULTING GROUP, INC.
2. THE FDOT 2017-18 DESIGN STANDARDS ARE INCORPORATED IN THESE PLANS BY REFERENCE.
3. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE FDOT 2018 STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.
4. ALL DISTURBED AREAS NOT PAVED SHALL BE SODED, PINNED AND PROVIDED WITH TEMPORARY IRRIGATION.
5. CONTRACTOR SHALL SOD ALL SLOPES 4:1 AND STEEPER.
6. ALL SOD SHALL BE CENTIPEDE.
7. GEOTECHNICAL REPORT BY ENVIRONMENTAL GEOTECHNICAL SPECIALISTS INC., DATED JUNE 2018 FOR THE SITE IS AVAILABLE.
8. ALL DIMENSIONS ARE FROM BACK OF CURB EDGE OF PAVEMENT, OR OUTSIDE FACE OF BUILDING UNLESS OTHERWISE NOTED.
9. SIGNING, STRIPING AND MARKINGS SHALL BE IN ACCORDANCE WITH THE MUTCD AND FDOT INDEX #711-001.
10. TRAFFIC CONTROL STRIPING AND MARKINGS SHALL BE THERMOPLASTIC UNLESS OTHERWISE NOTED ON THE PLANS. PARKING SPACES MAY BE PAINTED.
11. HANDICAP RAMPS AND CROSSWALKS PER THE LATEST FLORIDA ACCESSIBILITY CODE, ADAAG AND FDOT STANDARD INDEX #522-001, 522-002.
12. ALL WATER AND SANITARY SEWER MAINS AND SERVICES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF TALLAHASSEE STANDARD SPECIFICATIONS FOR THE DESIGN AND CONSTRUCTION OF WATER AND WASTEWATER FACILITIES, 2018 AND THE PLUMBING CODE, LATEST EDITION.
13. THE CONTRACTOR SHALL NOT SUBSTITUTE ANY ARTICLE, DEVICE, PRODUCT, MATERIAL OR FIXTURE, OR ANY FORM OR TYPE OF CONSTRUCTION, FOR THAT WHICH IS INDICATED IN THE APPROVAL PLANS WITHOUT THE EXPRESSED WRITTEN APPROVAL OF THE ENGINEER.
14. CONTRACTOR SHALL AS-BUILT POND (GRAVEL PARKING AREA) PRIOR TO BACKFILLING WITH GRAVEL.
15. IT IS THE CONTRACTOR'S RESPONSIBILITY TO SECURE THE WORK AREAS DURING CONSTRUCTION REGARDLESS OF WHETHER WORK IS ACTIVELY OCCURRING, TO PROTECT THE PUBLIC AS WELL AS PROPERTY ON THE SITE.
16. ALL WORK SHALL COMPLY WITH THE APPLICABLE STANDARDS IN THE POLICIES, SPECIFICATIONS AND PROCEDURES FOR THE CONSTRUCTION AND PLACEMENT OF UTILITIES IN LEON COUNTY, FLORIDA.
17. CONTRACTOR SHALL SUBMIT A MAINTENANCE OF TRAFFIC PLAN DESIGN FOR APPROVAL BY THE LEON COUNTY PUBLIC WORKS ENGINEER PRIOR TO COMMENCING ANY CONSTRUCTION ACTIVITY FOR THE PROJECT, INCLUDING IF NECESSARY A LEON COUNTY ROAD CLOSURE REQUEST APPLICATION.

DEMOLITION & EROSION CONTROL

- 1. CONTRACTOR IS RESPONSIBLE FOR THE CONSTRUCTION AND MAINTENANCE DURING CONSTRUCTION OF ALL SEDIMENTATION AND EROSION CONTROL DEVICES.
2. SEDIMENTATION AND EROSION CONTROL DEVICES SHALL BE CONSTRUCTED AS NECESSARY. IN ADDITION TO THOSE SHOWN ON THE PLANS, TO PROTECT ADJACENT PROPERTY OWNERS FROM SEDIMENTATION DURING CONSTRUCTION.
3. CONTRACTOR IS RESPONSIBLE FOR CONTACTING LEON COUNTY DEPARTMENT OF DEVELOPMENT SUPPORT AND ENVIRONMENTAL MANAGEMENT, ENVIRONMENTAL INSPECTION DIVISION, TO INSPECT SEDIMENTATION CONTROLS PRIOR TO CONSTRUCTION COMMENCEMENT.
4. CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION STAKEOUT AND TESTING. COPIES OF ALL TEST RESULTS FOR SITE WORK SHALL BE PROVIDED TO THE ENGINEER.
5. THE LOCATION OF ALL EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION COMMENCEMENT. ANY CONFLICTS WITH PROPOSED IMPROVEMENTS SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY. SUNSHINE ONE CALL NUMBER: 1-800-432-4770.
6. CONTRACTOR IS RESPONSIBLE FOR CONTINUATION OF SERVICE TO OCCUPIED BUILDINGS DURING CONSTRUCTION AND REPAIR OR REPLACEMENT OF ANY EXISTING UTILITIES IMPACTED BY CONSTRUCTION.
7. CONTRACTOR SHALL REFER TO DEMOLITION AND EROSION CONTROL MAP FOR LIMITS OF CLEARING, TREE REMOVAL, AND EROSION CONTROL.
8. CONTRACTORS IS RESPONSIBLE FOR PROVIDING SIGNED AND SEALED AS-BUILTS SHOWING ALL IMPROVEMENTS CONSTRUCTED UNDER THIS CONTRACT. AS-BUILTS SHALL INCLUDE BOTH ABOVE GROUND AND BURIED UTILITIES INCLUDING ANY EXISTING UTILITIES NOT SHOWN ON THESE PLANS BUT ENCOUNTERED DURING CONSTRUCTION PROCESS. AS-BUILTS SHALL BE SIGNED AND SEALED BY A FLORIDA REGISTERED SURVEYOR. CONTRACTOR SHALL CONTACT ENGINEER FOR SPECIFIC REQUIREMENTS.
9. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING SAFE VEHICULAR AND PEDESTRIAN ACCESS ROUTED AROUND THE PROPOSED CONSTRUCTION AREA THROUGHOUT THE CONSTRUCTION SEQUENCE.

- 10. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF UNFORESSEEN MATERIALS CONFLICTING WITH CONSTRUCTION INDICATED ON PLANS.
11. ALL MONITORING WELLS ON-SITE SHALL BE PROTECTED.
12. ALL EXCAVATED SOILS SHALL BE STOCKPILED IN LOCATION(S) INDICATED ON PLANS IF SHOWN. APPROPRIATE SEDIMENTATION CONTROLS SHALL BE INSTALLED AROUND THE STOCKPILE.
13. CONTRACTOR IS RESPONSIBLE TO PROTECT EXISTING UTILITIES NOT SCHEDULED FOR REMOVAL FROM DAMAGE DURING CONSTRUCTION.
14. CONTRACTOR IS RESPONSIBLE TO BE FAMILIAR WITH THE EXISTING CONDITION OF THE SITE PRIOR TO CONSTRUCTION.
15. CONTRACTOR SHALL BE RESPONSIBLE FOR ADDITIONAL SEDIMENT AND EROSION CONTROLS, AND TREE PROTECTION MEASURES THAT MAY BE REQUIRED BY THE LEON COUNTY ENVIRONMENTAL INSPECTOR DURING CONSTRUCTION.

UTILITY NOTES

- 1. STORM SEWER, SANITARY SEWER AND WATER SYSTEM MUST BE INSTALLED PRIOR TO THE CONSTRUCTION OF CURB, BASE AND PAVEMENT, APPROVAL BY LOCAL AUTHORITY MUST BE OBTAINED PRIOR TO FURTHER CONSTRUCTION.
2. PIPE LENGTHS SHOWN ARE FROM CENTER OF STRUCTURE TO CENTER OF STRUCTURE.
3. ALL STORMWATER DRAIN PIPE JOINTS WITHIN 6 FEET OF PAVING SHALL BE WRAPPED WITH FDOT APPROVED FABRIC UNLESS OTHERWISE NOTED OR STATED BY THE ENGINEER.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXISTING MANHOLES, INLETS, CLEANOUTS, VALVE BOXES, ETC., AND THEY SHALL BE ADJUSTED AS NECESSARY TO MATCH FINISHED GRADE.
5. CONTRACTOR SHALL COORDINATE AND MAKE PAYMENT FOR ALL ADJUSTMENT OF OVERHEAD UTILITIES AT DRIVEWAY CONNECTION TO PROVIDE A MINIMUM OF 16 FEET VERTICAL CLEARANCE.

CONSTRUCTION SEQUENCE

- 1. CONTRACTOR SHALL CONDUCT A PRE-CONSTRUCTION MEETING PRIOR TO INITIATING ANY SITE WORK. SECURE APPROVAL TO COMMENCE CONSTRUCTION FROM LEON COUNTY DEPARTMENT OF DEVELOPMENT SUPPORT AND ENVIRONMENTAL MANAGEMENT, ENVIRONMENTAL INSPECTION DIVISION.
2. CONTRACTOR SHALL DESIGNATE A STORMWATER MANAGEMENT CONTROL OFFICER AT THE PRE-CONSTRUCTION MEETING.
3. POST ALL APPLICABLE PERMIT PLACARDS. THE PERMIT PLACARDS SHALL NOT BE NAILED TO TREES.
4. FLAG OR STAKE THE PROPOSED LIMITS OF CLEARING PRIOR TO INITIATING CLEARING.
5. CONSTRUCT TREE BARRICADES OR FENCES AROUND PROTECTED TREES. CONSTRUCT SEDIMENTATION CONTROL DEVICES.
6. DESIGNATE VEHICULAR PATHWAYS WITHIN THE LIMITS OF THE SITE.
7. DESIGNATE EMPLOYEE PARKING AREAS, MATERIALS STORAGE AREAS, AND TOPSOIL STORAGE AREAS.
8. DESIGNATE REFUELING AREAS AWAY FROM THE WATER BODIES OR WATERCOURSES ONSITE.
9. CONSTRUCT STORMWATER MANAGEMENT FACILITY (GRAVEL PARKING AREA), OBTAIN APPROVAL FROM ENVIRONMENTAL INSPECTOR PRIOR TO PROCEEDING WITH OTHER SITEWORK.
10. CONSTRUCT NEW RAMP ON NORTH SIDE OF BUILDING.
11. FINAL GRADE, SOD ALL DISTURBED AREAS.
12. DEMO PARCEL NO. 11-07-20-213-000-0 UPON COMPLETION AND APPROVAL OF SITE IMPROVEMENTS FOR PARCEL NO. 11-07-20-212-000-0.
13. APPROXIMATELY TWO WEEKS PRIOR TO REQUESTING THE FINAL ENVIRONMENTAL INSPECTION, THE FOLLOWING DOCUMENTS MUST BE SUBMITTED TO THE LEON COUNTY ENVIRONMENTAL INSPECTOR FOR REVIEW:
a. RECORD DRAWINGS AND THE ENGINEER'S COMPLIANCE REPORT IN ACCORDANCE WITH THE LAND DEVELOPMENT CODE, LEON COUNTY, FLORIDA, CHAPTER 10, ENVIRONMENTAL MANAGEMENT.
b. A LEON COUNTY STORMWATER OPERATING PERMIT WILL BE PROVIDED FOR THE GRAVEL PARKING AREA.

DRIVEWAY CONSTRUCTION NOTES

- 1. CONTRACTOR SHALL SUBMIT A MAINTENANCE OF TRAFFIC PLAN SHEET/DESIGN FOR APPROVAL BY THE LEON COUNTY PUBLIC WORKS ENGINEER AND CITY OF TALLAHASSEE PRIOR TO COMMENCING ANY CONSTRUCTION ACTIVITY FOR THE PROJECT.

- 2. ALL TRAFFIC CONTROL DEVICES SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT) STANDARDS AND LEON COUNTY STANDARDS. ALL TRAFFIC CONTROL DEVICES SHALL BE APPROVED BY THE COUNTY ENGINEER.
3. THE CONTRACTOR SHALL NOTIFY LEON COUNTY AT LEAST 48 HOURS IN ADVANCE TO SCHEDULE DRIVEWAY INSTALLATION INSPECTION A MINIMUM OF THREE (3) TIMES DURING THE CONSTRUCTION OF THE PROPOSED CLASS 2 DRIVEWAY. LEON COUNTY INSPECTIONS TO BE SCHEDULED, BUT NOT LIMITED TO THE FOLLOWING DRIVEWAY CONSTRUCTION PHASES:
PRELIMINARY DRIVEWAY LAYOUT
DRIVEWAY GRADING AND PRELIMINARY STAKEOUT, LENGTH, SLOPE CROSS SECTION, PROFILE, CULVERT INSTALLATION
LINEAR GRADING AND PAVEMENT INSTALLATION
INSTALLATION OF DRIVEWAY ASPHALT TYPICAL SECTION AND GRADING OF ADJACENT ROADSIDE DITCH AREAS FOR FINAL GRADING WITHIN LEON COUNTY RIGHT-OF-WAY.
FINAL INSPECTION:
FINAL APPROVAL OF CONSTRUCTION WORK UNDER THE CLASS 2 DRIVEWAY CONNECTION PERMIT.
4. ALL COMMENTS FROM LEON COUNTY INSPECTOR SHALL BE COMPLETED/ADDRESSED BY THE CONTRACTOR PRIOR TO PROCEEDING WITH THE NEXT DRIVEWAY CONSTRUCTION INSPECTION BY LEON COUNTY.
5. TRAFFIC CONTROL FOR INTERSECTIONS SHALL BE IN ACCORDANCE WITH INDEX 600, 602, 603, 615, 616, OR 625, AS APPLICABLE. ALL CLOSURES SHALL BE LIMITED TO ONE LANE AND AT ALL TIMES, AS A MINIMUM, ONE-LANE, TWO-WAY OPERATION SHALL BE MAINTAINED THROUGH THE USE OF FLAGGERS, STREET NAME SIGNS, STOP SIGNS, AND STOP BARS SHALL BE RELOCATED AS NECESSARY AND MAINTAINED BY THE CONTRACTOR UNTIL WORK IS ACCEPTED.
6. PRE-CONSTRUCTION NOTE:
CONTRACTOR MUST SCHEDULE AND HAVE AN ON-SITE PRE-CONSTRUCTION MEETING WITH REPRESENTATIVES FROM THE CITY OF TALLAHASSEE-OWNER, LEON COUNTY, TESTING LABORATORY, PAVING CONTRACTOR AND ANY OTHER INTERESTED PARTY PRESENT.
7. SOD LIMITS: SOD AREAS WITHIN 32" OF PAVEMENT & SLOPES GREATER THAN 1:3. OTHER DISTURBED AREAS MAY BE REPAIRED BY SEEDING OR HYDROSEEDING. SEE FDOT SPECIFICATION SECTION 570 FOR DETAILS.
8. ALL STRIPING WITHIN LEON COUNTY RIGHT-OF-WAY SHALL BE THERMOPLASTIC MATERIAL.
9. CONTRACTOR SHALL COORDINATE WITH LEON COUNTY PUBLIC WORKS DEPARTMENT AT LEAST 14 DAYS IN ADVANCE OF THE IMPLEMENTATION OF A LANE CLOSURE/RESTRICTION TRAFFIC CONTROL OPERATION TO AVOID POTENTIAL CONFLICTS.
10. TRAFFIC CONDITIONS, ACCIDENTS AND OTHER UNFORESSEEN EMERGENCY CONDITIONS MAY REQUIRE LEON COUNTY TO RESTRICT OR REMOVE LANE CLOSURES OR CHANNELIZATIONS. THE CONTRACTOR SHALL RESPOND AND PROVIDE ADJUSTMENTS AS DIRECTED BY LEON COUNTY WITHOUT DELAY UNDER THESE CONDITIONS. THE COST FOR THIS SERVICE SHALL BE INCLUDED IN THE BID PRICE.
11. THE MAXIMUM LENGTH OF ANY LANE CLOSURE SHALL BE 5,280 LF. THE CONTRACTOR SHALL COORDINATE LANE CLOSURES WITH ANY ADJACENT PROJECTS TO ENSURE THAT THIS LIMIT IS NOT EXCEEDED.
12. THE CONTRACTOR SHALL EXCAVATE ONLY THE AREA OF THE PROPOSED DRIVEWAY WHICH CAN BE BROUGHT BACK WITHIN THE DROP-OFF CRITERIA OF INDEX 600 WITHIN THE SAME DAY OPERATION PERIOD. IF ANY EXCAVATED AREA REMAINS OPEN BEYOND THE ONE DAY OPERATION, THE CONTRACTOR SHALL PROVIDE BARRIERS IN ACCORDANCE WITH THE DROP-OFF CRITERIA OF INDEX 600. NO ADDITIONAL PAYMENT WILL BE MADE TO COVER THE COST ASSOCIATED WITH THE ADDITIONAL PROTECTION.
13. ALL LANES ON MERIDIAN ROAD MUST BE REOPENED TO NORMAL TRAFFIC WITHIN 12 HOURS DURING AN EVACUATION NOTICE OF A HURRICANE OR OTHER CATASTROPHIC EVENT AND SHALL REMAIN OPEN FOR THE DURATION OF THE EVACUATION OR EVENT AS DIRECTED BY LEON COUNTY.
14. ALL LEON COUNTY AND FDOT APPROVED ROADWAY SIGNS LOCATED WITHIN THE RIGHT-OF-WAY SHALL BE MAINTAINED DURING CONSTRUCTION. EXISTING STREET AND ROAD NAME SIGNS ON THE PROJECT ARE TO BE TEMPORARILY RELOCATED DURING CONSTRUCTION AND KEPT VISIBLE AT ALL TIMES FOR THE FACILITATION OF ACCESS BY EMERGENCY VEHICLE TRAFFIC.

LEGEND table with columns for abbreviations and full names. Includes items like ACP ASBESTOS CEMENT PIPE, NTS NOT TO SCALE, and various material and utility symbols.

LEGEND table for TOPOGRAPHY, DEMOLITION, EROSION & SEDIMENT CONTROL, PAVING, DRAINAGE, and UTILITIES. Includes symbols for contours, spot elevations, and various pipe and manhole types.

CALL 2 BUSINESS DAYS BEFORE YOU DIG IT'S THE LAW! DIAL 811. Know what's below. Call before you dig. SUNSHINE STATE ONE CALL OF FLORIDA, INC.

Revision table with columns for Rev, Appd, and Issued. Shows revision history for the drawing.

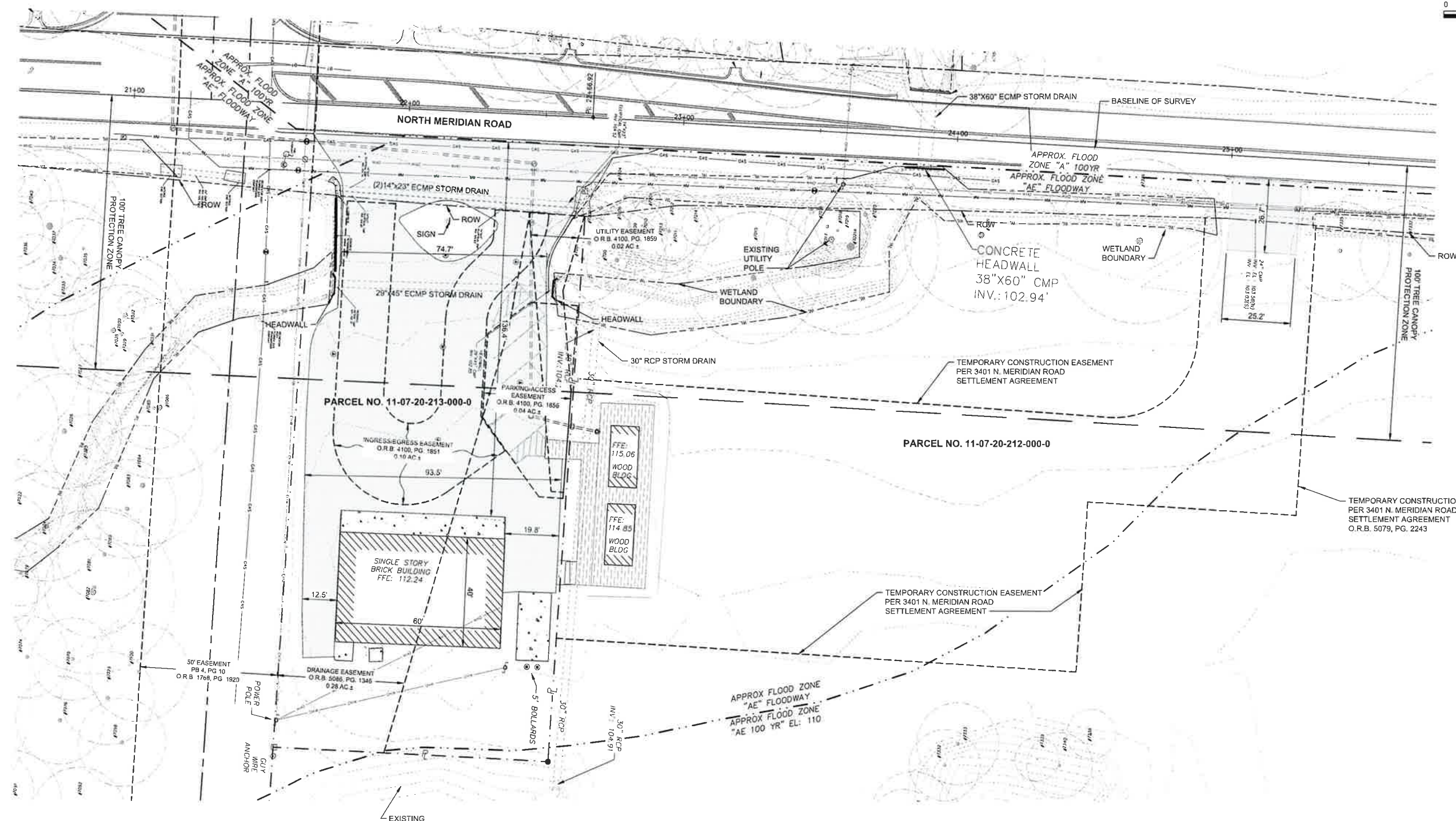
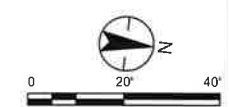
Professional Engineer seal for Chase Brinkman, State of Florida, License No. 56859. Includes project information and drawing details.

Vertical text on the left margin: V:\15\active\154\3796\civ\atweng\02_goo\wll_cosp\l_inet\13796-02-C-001.dwg 2018/12/14 3:29 PM By: Williams, Nicholas



2316 Clearwater Center Blvd., Suite 102
TALLAHASSEE, FL 32309
www.stantec.com C.A. No. 27013

The Contractor shall verify and be responsible for all dimensions, DO NOT scale the drawing. Any errors or omissions shall be reported to Stantec without delay. The Contractor shall design and construct the improvements in accordance with the City of Tallahassee's standards and specifications. Stantec is not responsible for any errors or omissions in the design or construction of the improvements.



Revision	By	App'd	Y/M/D
1	ASAP PERMIT		11/12/20
	ISSUED		Y/M/D

Client/Project
LEON COUNTY
PUBLIC WORKS DEPARTMENT
MERIDIAN ROAD
DRAINAGE IMPROVEMENTS
TALLAHASSEE, FL
EXISTING CONDITIONS PLAN

Seal

Project Number:	215613796		
File Name:	13796-02.C100		
JG	CEB	AIM	11/12/07
Dunn	CPH	Dign	Y/M/D
Drawing No.:	C-100		
Revision	Sheet		
0	of		

Legend

- Wooden Deck/Ramp
- Concrete Pad
- Existing Asphalt Pavement
- Existing Building

Existing Impervious Area		
Category	Parcel No. 11-07-20-213-000-0	Parcel No. 11-07-20-212-000-0
Asphalt Pavement (sf)	12,495	677
Wooden Deck/Ramp (sf)	58	1,218
Building (sf)	2,396	456
Concrete Pads (sf)	880	0
Total Area(sf)	15,829	2,351

PROJECT BENCHMARKS				
BM No.	Easting	Northing	Elevation	Description
1	2038313.3583'	545469.7286'	106.65'	BM SITE BOX CUT IN HEADWALL
2	2038646.4561'	546612.3339'	115.41'	FCM 4"X4" NO ID
3	2038530.3662'	545595.7018'	106.88'	FCM 4"X4" PRM 5051



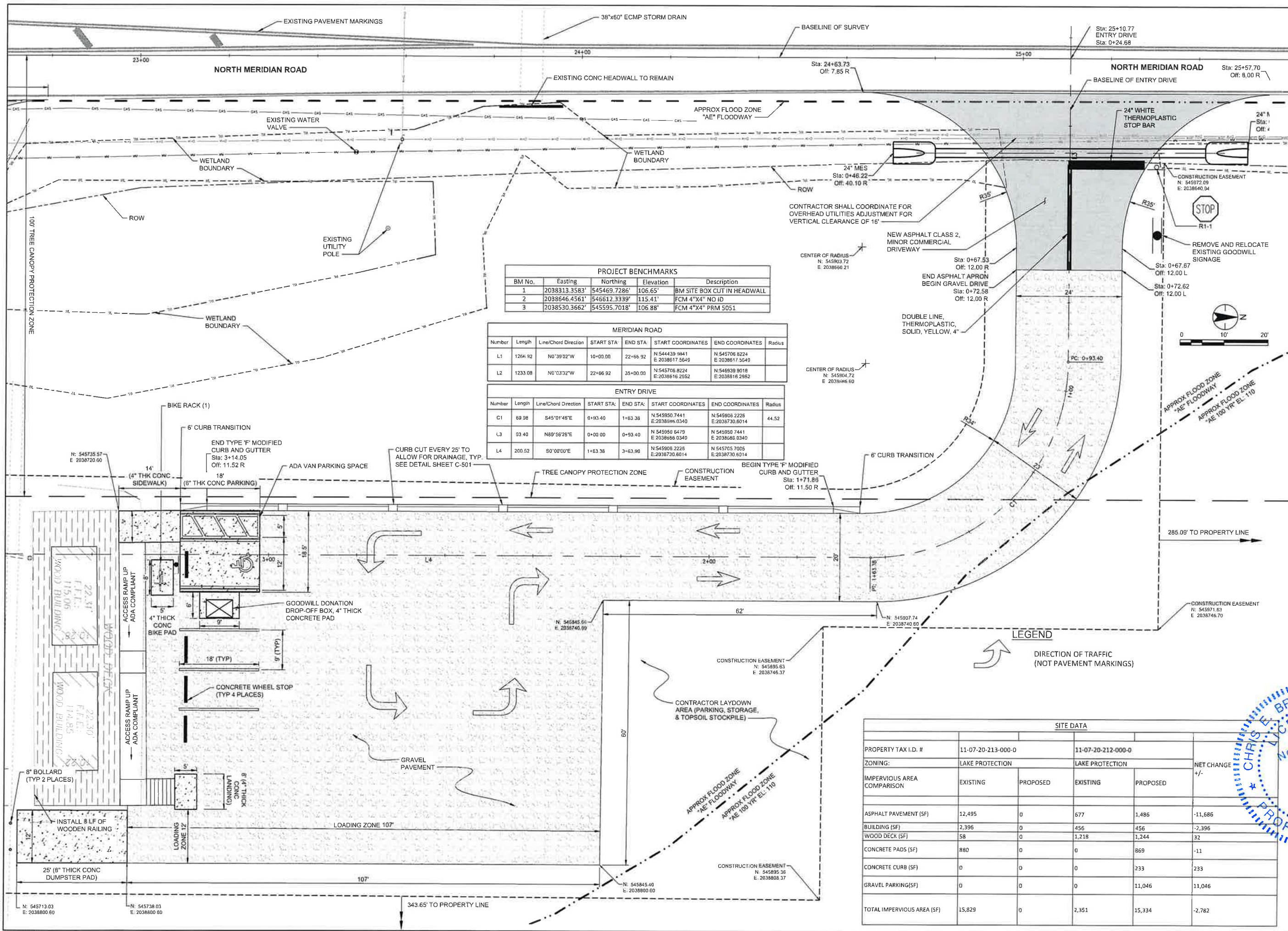
The Contractor shall verify and be responsible for all dimensions, DO NOT scale the drawing. Any errors or omissions shall be reported to Stantec without delay. The Contractor shall design and construct the improvements in accordance with the City of Tallahassee's standards and specifications. Stantec is not responsible for any errors or omissions in the design or construction of the improvements.

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 2018/12/07 2:28 PM By: Williams, Nicholas



2316 Kilcom Center Blvd, Suite 102
TALLAHASSEE, FL 32309
www.stantec.com C.A. No. 27013

The Contractor shall verify the site conditions and be responsible for all dimensions, DDD/DGT scale. The Contractor shall be responsible for all dimensions, DDD/DGT scale. The Contractor shall be responsible for all dimensions, DDD/DGT scale. The Contractor shall be responsible for all dimensions, DDD/DGT scale.



PROJECT BENCHMARKS				
BM No.	Easting	Northing	Elevation	Description
1	2038313.3583	545469.7286	106.65	BM SITE BOX CUT IN HEADWALL
2	2038646.4561	546612.3339	115.41	FCM 4"X4" NO ID
3	2038530.3662	545595.7018	106.88	FCM 4"X4" PRM 5051

MERIDIAN ROAD							
Number	Length	Line/Chord Direction	START STA	END STA	START COORDINATES	END COORDINATES	Radius
L1	1266.92	N0°39'02"W	10+00.00	22+66.92	N:544439.9841 E:2038617.5649	N:545706.8224 E:2038617.5649	
L2	1233.08	N0°03'32"W	22+66.92	35+00.00	N:545706.8224 E:2038616.2952	N:546939.9018 E:2038616.2952	

ENTRY DRIVE							
Number	Length	Line/Chord Direction	START STA	END STA	START COORDINATES	END COORDINATES	Radius
C1	69.98	S45°01'48"E	0+93.40	1+63.38	N:545950.7441 E:2038730.6014	N:545905.2226 E:2038730.6014	44.52
L3	93.40	N89°56'26"E	0+00.00	0+93.40	N:545950.7441 E:2038686.0340	N:545950.7441 E:2038686.0340	
L4	200.52	S0°00'00"E	1+63.38	3+63.90	N:545905.2226 E:2038730.6014	N:545705.7005 E:2038730.6014	

SITE DATA					
PROPERTY TAX I.D. #	11-07-20-213-000-0		11-07-20-212-000-0		
ZONING:	LAKE PROTECTION		LAKE PROTECTION		NET CHANGE +/-
IMPERVIOUS AREA COMPARISON	EXISTING	PROPOSED	EXISTING	PROPOSED	
ASPHALT PAVEMENT (SF)	12,495	0	677	1,486	-11,686
BUILDING (SF)	2,396	0	456	456	-2,396
WOOD DECK (SF)	58	0	1,218	1,244	32
CONCRETE PADS (SF)	880	0	0	869	-11
CONCRETE CURB (SF)	0	0	0	233	233
GRAVEL PARKING(SF)	0	0	0	11,046	11,046
TOTAL IMPERVIOUS AREA (SF)	15,829	0	2,351	15,334	-2,782

Revision	By	Appd.	Y/M/D
1	ASAP PERMIT		
2	ISSUED		

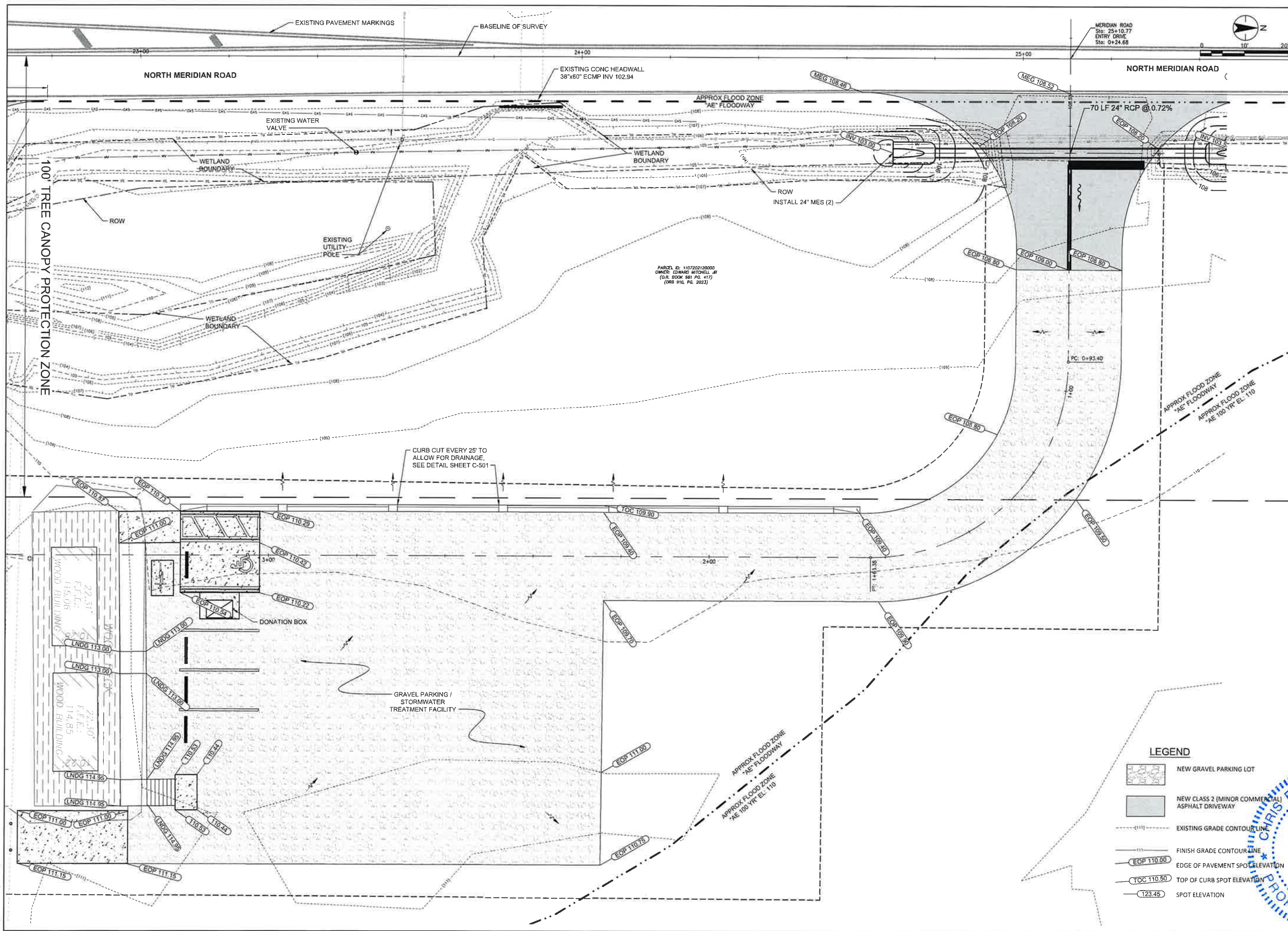
Client/Project: LEON COUNTY PUBLIC WORKS DEPARTMENT
 MERIDIAN ROAD DRAINAGE IMPROVEMENTS
 TALLAHASSEE, FL
 SITE GEOMETRY PLAN
 Chris E. Brockmeier
 Professional Engineer
 Registration No. 56859
 File Number: 215613796
 Date: 11/12/21
 Drawing No. C-102
 Revision Sheet

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 2/18/2021 12:27 PM By: William, Nicholas



2316 Kilegum Center Blvd, Suite 102
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The Contractor and/or its representatives shall be responsible for all dimensions, DO NOT SCALE. The Contractor shall verify all dimensions and elevations on the ground. The Contractor shall be responsible for all dimensions and elevations on the ground. The Contractor shall be responsible for all dimensions and elevations on the ground.



100' TREE CANOPY PROTECTION ZONE

PARCEL ID: 1107202120000
OWNER: EDWARD MITCHELL, JR.
(O.R. BOOK 981 PG. 417)
(DWB 910, PG. 2023)

CURB CUT EVERY 25' TO ALLOW FOR DRAINAGE. SEE DETAIL SHEET C-501

LEGEND

- NEW GRAVEL PARKING LOT
- NEW CLASS 2 (MINOR COMMERCIAL) ASPHALT DRIVEWAY
- EXISTING GRADE CONTOUR LINE
- FINISH GRADE CONTOUR LINE
- EDGE OF PAVEMENT SPOT ELEVATION
- TOP OF CURB SPOT ELEVATION
- SPOT ELEVATION

Revision	By	Appd	Y/M/D
ASAP PERMIT	By	Appd	18/12/20
ISSUED	By	Appd	17/04/20

Client/Project
LEON COUNTY
PUBLIC WORKS DEPARTMENT
MERIDIAN ROAD
DRAINAGE IMPROVEMENTS
TALLAHASSEE, FL
GRADING AND
DRAINAGE PLAN

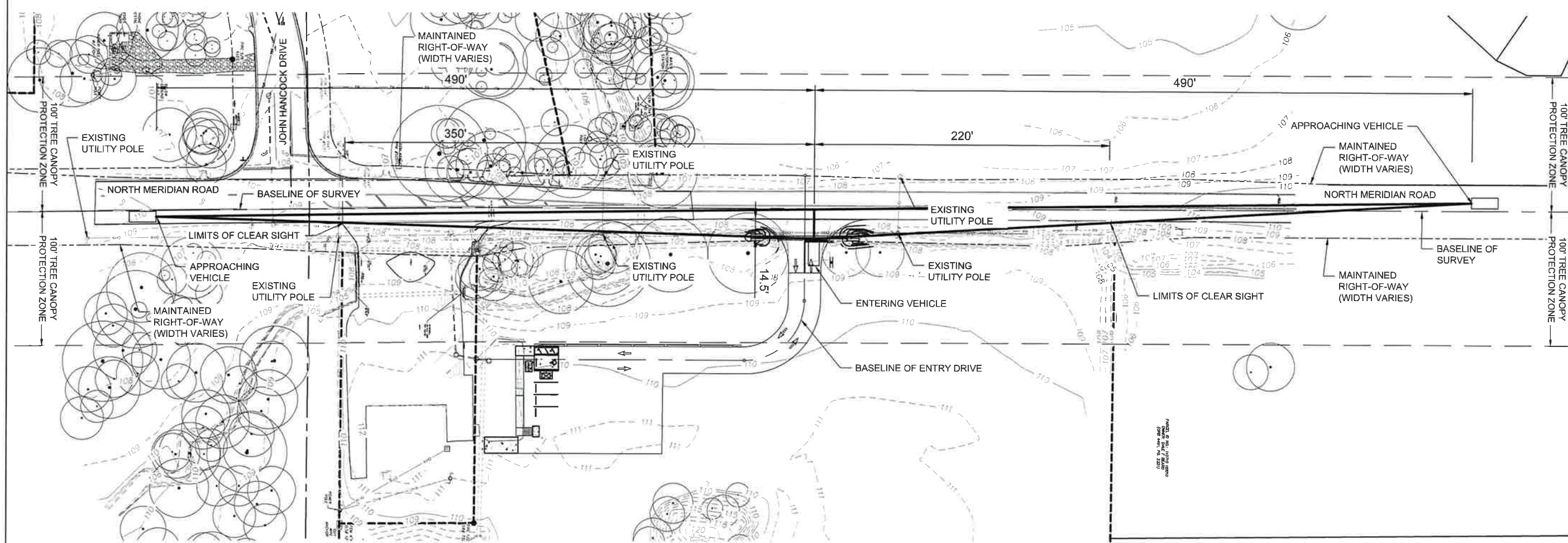
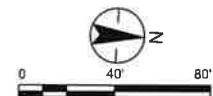
Chris E. Brockmeier
Professional Engineer
FL Registration No. 56859
Project Number: 215613796
File Name: 13776 02/21/20
Date: 02/21/20
Drawing No.: C-103

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2018/12/27 2:27 PM By: William Nicholas



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www.stantec.com C.A. No. 27013

The Contractor shall verify and be responsible for all dimensions. DD NOT SCALE
The Contractor shall verify and be responsible for all dimensions. DD NOT SCALE
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The Contractor shall verify and be responsible for all dimensions. DD NOT SCALE
The Contractor shall verify and be responsible for all dimensions. DD NOT SCALE



NORTH MERIDIAN ROAD
POSTED V = 35 MPH
Dr = 220 FT
DI = 350 FT

Revision	By	App'd	Y/M/D
1	ASAP PERMIT		11/12/07
	ISSUED		Y/M/D

V:\1215\active\1215\3794\civil\drawing\02_goo\pww\map\pww\1215_3794_40_C-107.dwg
2018/12/07 2:27 PM By: Williams, Nicholas

Client/Project
LEON COUNTY
PUBLIC WORKS DEPARTMENT
MERIDIAN ROAD
DRAINAGE IMPROVEMENTS
TALLAHASSEE, FL

INTERSECTION SITE
DISTANCE TRIANGLE

CHRIS E. BROCKMEIER
FL Registration No. 56859

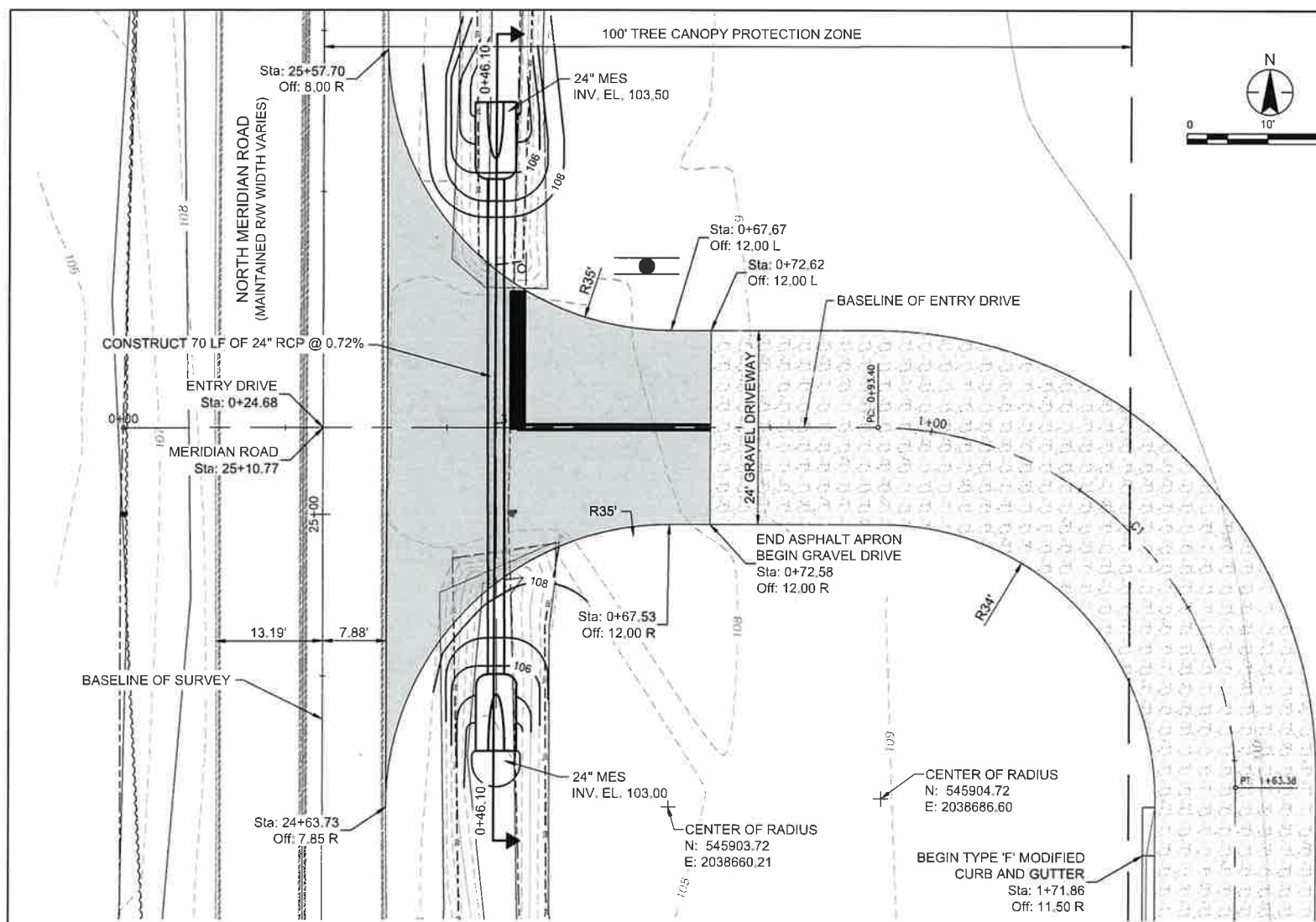
Project Number: 1215613796
As Named: 12-02-C-107

DATE: 12/14/18
BY: [Signature]

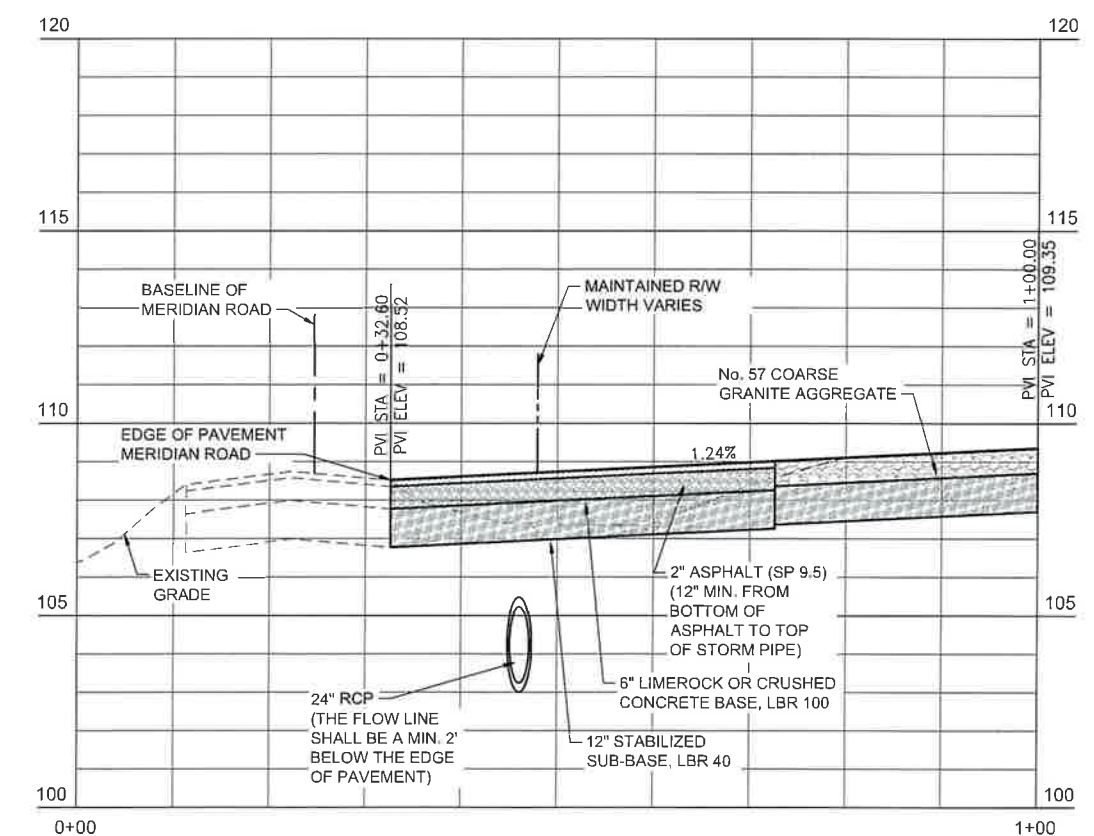
AW
12/12/07
Y/M/D

Drawing No. C-107

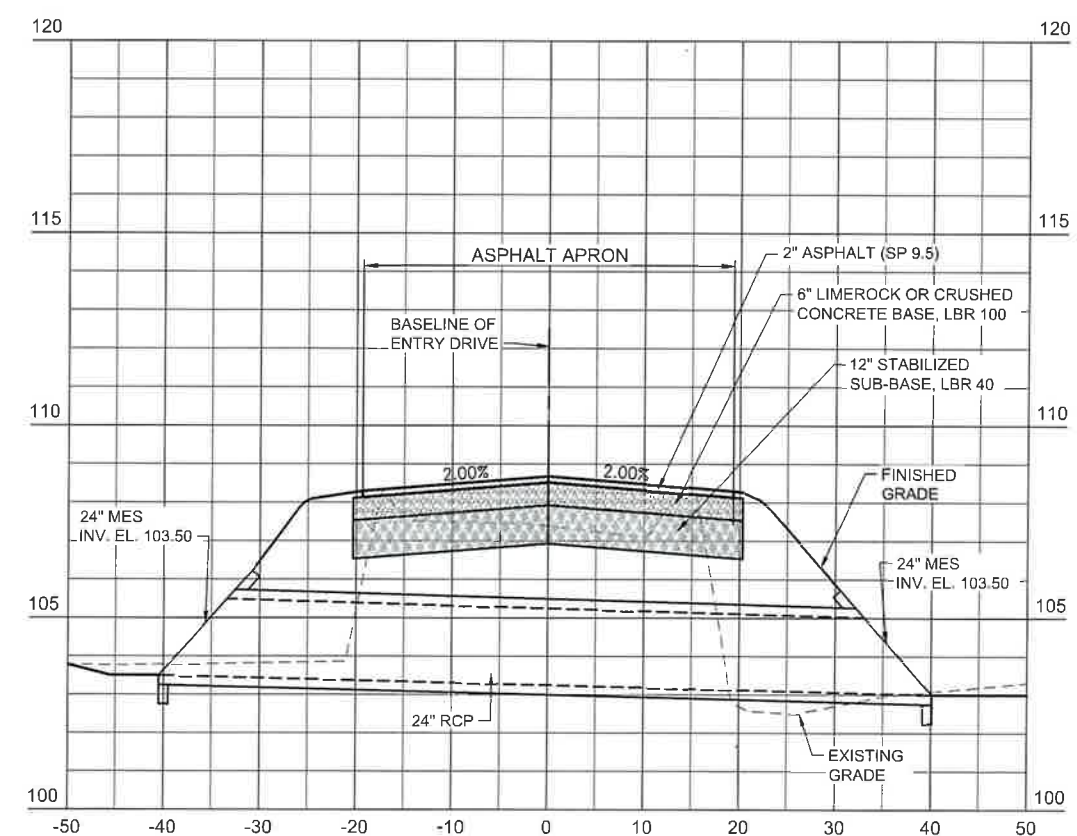
Revision Sheet



CLASS 2 PROPOSED DRIVEWAY GEOMETRY PLAN



DRIVEWAY APRON PROFILE
 SCALE: 1"=10' H, 1"=2.5' V



DRIVEWAY CULVERT SECTION (STATION 0+46.10)
 SCALE: 1"=10' H, 1"=2.5' V

Revision	By	App'd	Y/M/DA
1	ASAP/PERMIT		18.12.07
			Y/M/DA

Project: **LEON COUNTY PUBLIC WORKS DEPARTMENT**
 Location: **MERIDIAN ROAD DRAINAGE IMPROVEMENTS**
 Drawing No. **C-108**

CHRIS BROCKMEIER
 PROFESSIONAL ENGINEER
 License No. 56859
 Registration No. 56859

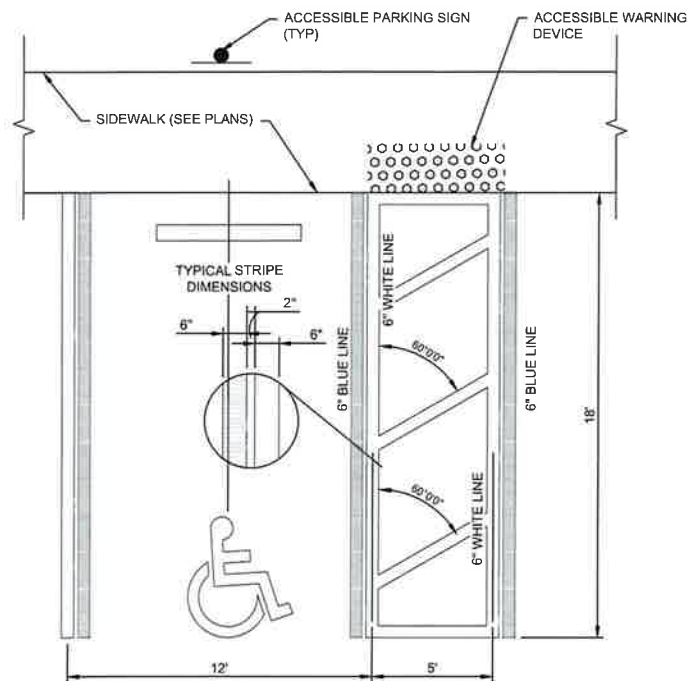
Revision Sheet 0 of



2316 Kilbuck Center Blvd., Suite 102
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The Contractor shall verify and be responsible for all dimensions, DDD (DDF) price and quantities. The Contractor shall be responsible for all dimensions, DDD (DDF) price and quantities. The Contractor shall be responsible for all dimensions, DDD (DDF) price and quantities.

Revision
By: Y1MM/DD
Date: 18/12/07
Issued: Y1MM/DD



FINE \$250 MAX
FTP - 22-06
VAN ACCESSIBLE



FTP - 21-06

A MINIMUM OF ONE "VAN ACCESSIBLE" SIGN SHALL BE POSTED PER SITE.

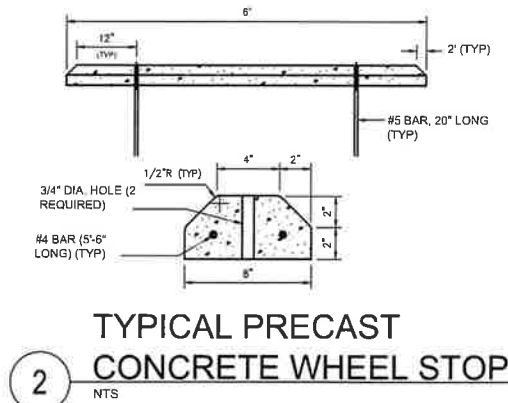
USE OF PAVEMENT SYMBOL IN ACCESSIBLE PARKING SPACES IS OPTIONAL, WHEN USED THE SYMBOL SHALL BE 5" HIGH AND WHITE IN COLOR.

CONTRACTOR TO CONTACT LOCAL AUTHORITIES FOR PARKING FINE AMOUNT.

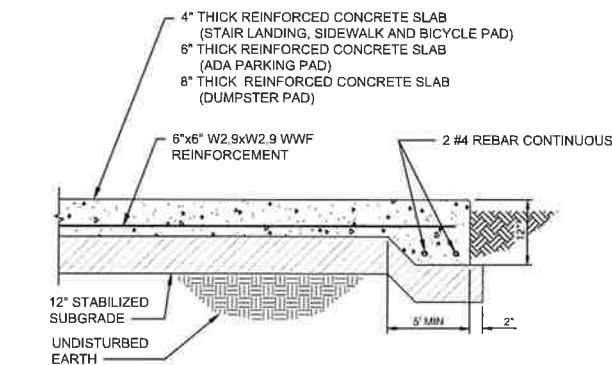
ACCESSIBLE PARKING SIGNS
STANDARD AND ACCESSIBLE SPACES
W/ CURB AND SIDEWALK

UNIVERSAL SYMBOL OF ACCESSIBILITY

1 TYPICAL VAN ACCESSIBLE PARKING SPACE DETAIL

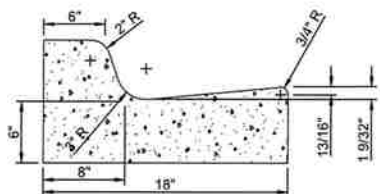


2 TYPICAL PRECAST CONCRETE WHEEL STOP

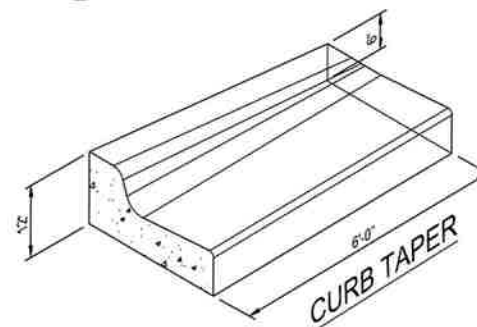


- NOTES:
1. CONTRACTOR SHALL INSTALL 12" OF STABILIZED SUBGRADE SURFACE MINIMUM CBR 35 OR MINIMUM LBR OF 60 COMPACTED AT 100% OF MODIFIED PROCTOR (ASTM D-1557) UNDER ALL CONCRETE PAVING.
2. CONCRETE SHALL HAVE 4,000 PSI AT 28 DAYS
3. FIBER-MESH REINFORCEMENT IN CONCRETE MIX PER MANUFACTURER'S SPECIFICATIONS.

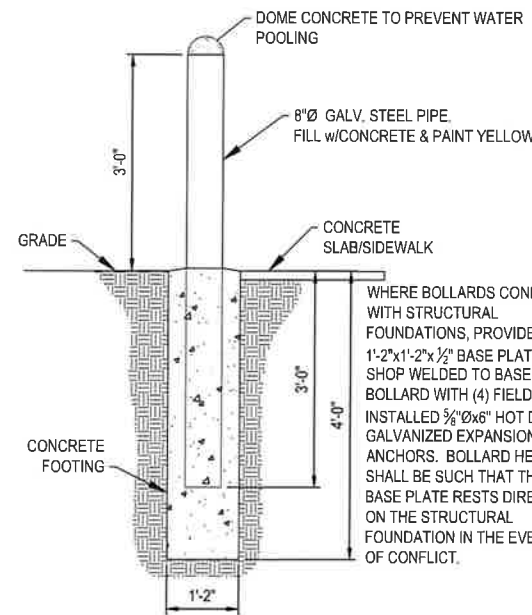
3 CONCRETE PAVEMENT



4 TYPE 'F' MODIFIED CURB AND GUTTER

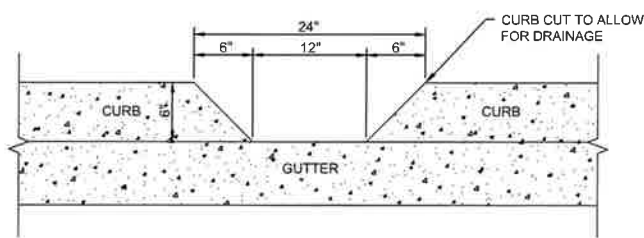


5 CONCRETE CURB TAPER



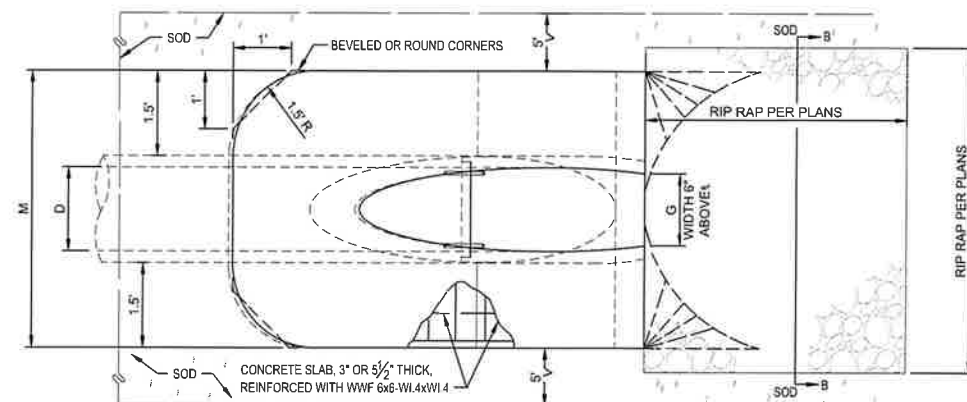
6 FIXED BOLLARD

WHERE BOLLARDS CONFLICT WITH STRUCTURAL FOUNDATIONS, PROVIDE 1'-2"x1'-2"x 1/2" BASE PLATE SHOP WELDED TO BASE OF BOLLARD WITH (4) FIELD INSTALLED 3/8"x6" HOT DIP GALVANIZED EXPANSION ANCHORS. BOLLARD HEIGHT SHALL BE SUCH THAT THE BASE PLATE RESTS DIRECTLY ON THE STRUCTURAL FOUNDATION IN THE EVENT OF CONFLICT.

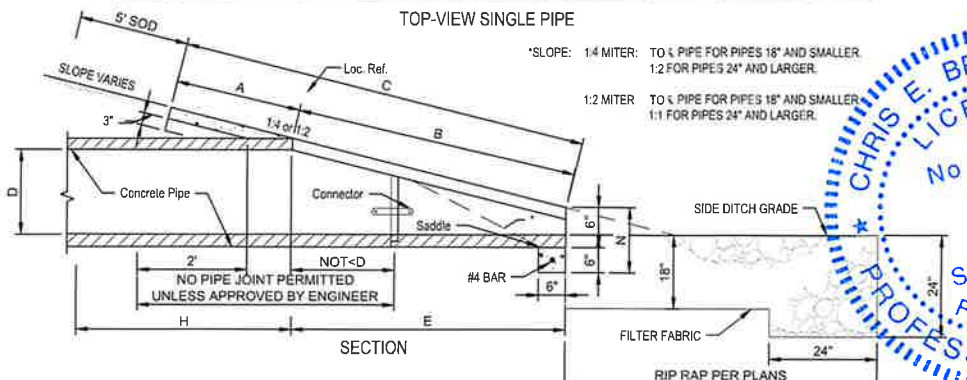


7 CONCRETE CURB CUT DETAIL

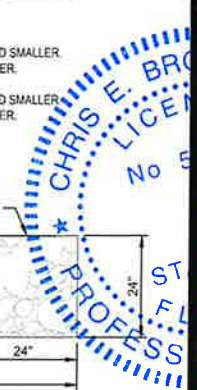
DIMENSIONS AND QUANTITIES													
D	X	A	B	C	E	F	G	H	M SINGLE	M DOUBLE	N	5 1/2" CONCRETE SLAB (CY)	SODDING
24"	3'-5"	2.53'	7.18'	9.71'	7.03'	11'	1.73'	4.0'	5.50'	8.92'	1.25'	0.85	28



8 U-TYPE BICYCLE RACK



9 MITERED END SECTION



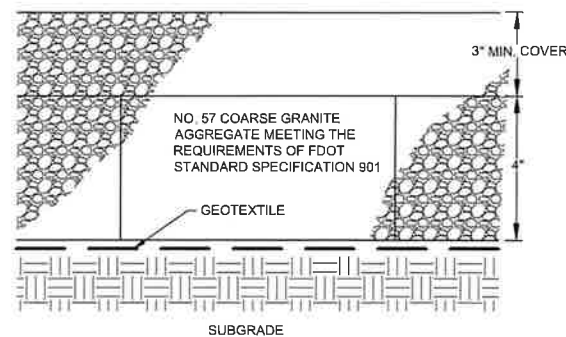
FLORIDA COUNTY LEGAL WORKS DEPARTMENT
PUBLIC WORKS DEPARTMENT
MERCURIAN ROAD
DRAINAGE IMPROVEMENTS
TALLAHASSEE, FL
CIVIL DETAILS
CHRIS E. BROCKMEIER
FL REGISTERED PROFESSIONAL ENGINEER
No. 56859
Drawing No. C-501
Revision Sheet

V:\215\acme\150179\A\civil\Drawings\02_grow\civil_cmap\inee1.dwg (3/29/10 10:50) [cwg]
20/08/12/07 2:20 PM By: Willem, Nicholas

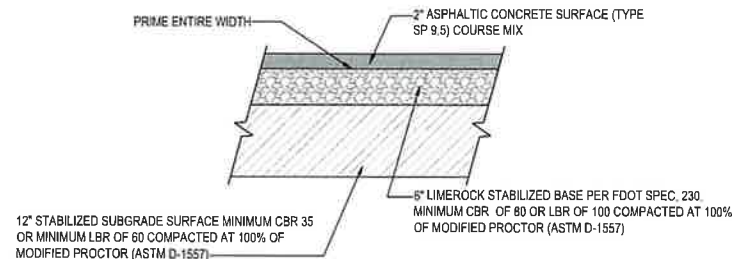


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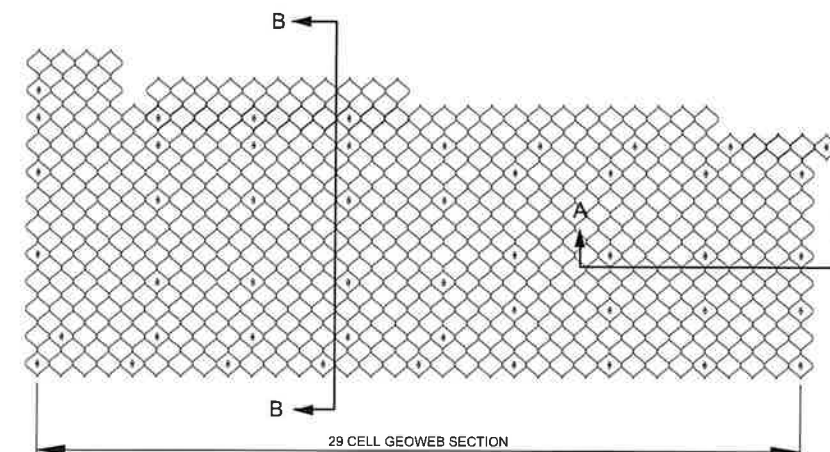
The Contractor shall verify and be responsible for all dimensions, DO NOT scale drawings. The Contractor shall verify and be responsible for all dimensions, DO NOT scale drawings. The Contractor shall verify and be responsible for all dimensions, DO NOT scale drawings.



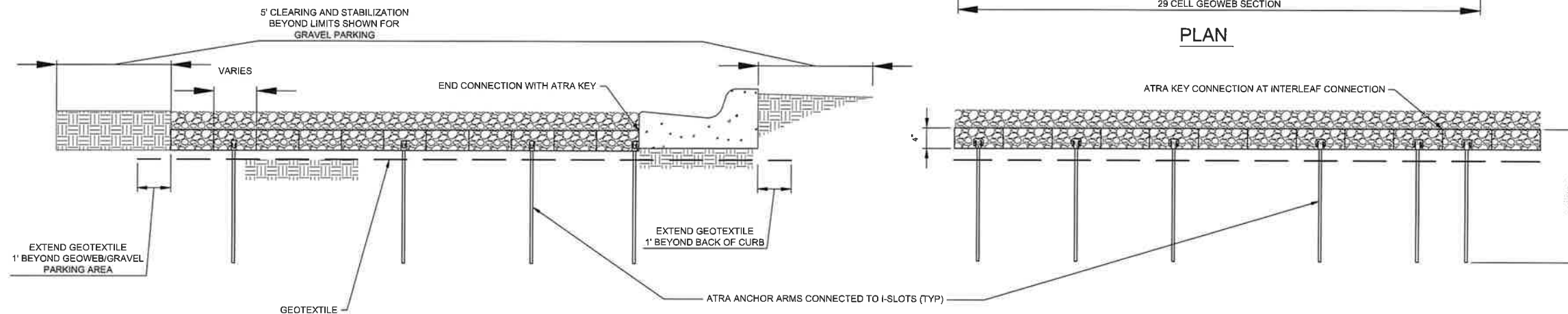
1 GRAVEL PAVEMENT SECTION
NTS



2 ASPHALT PAVEMENT SECTION
NTS



PLAN



SECTION A - A

SECTION B - B

CELL LENGTH IN (CM)	NOMINAL CELL AREA IN ² (CM ²)	CELL EXPANSION RANGE			
		MINIMUM LENGTH IN (CM)	MINIMUM WIDTH IN (CM)	MAXIMUM LENGTH IN (CM)	MAXIMUM WIDTH IN (CM)
20V	44.8 (289)	8.02 (204)	9.2 (234)	9.65 (245)	11.07 (281)

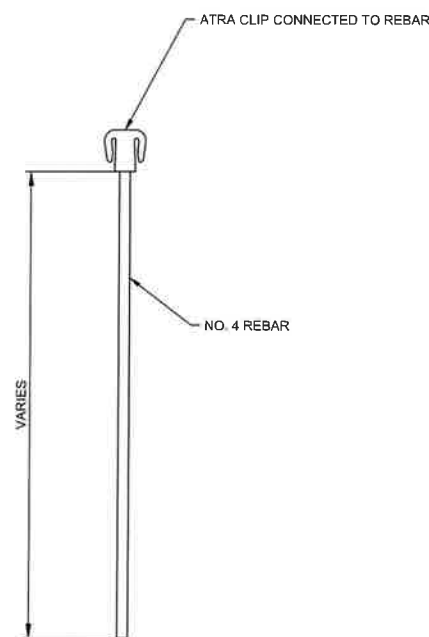
NOTE: ALL DIMENSIONS ARE NOMINAL AND ARE WITHIN MANUFACTURING TOLERANCES

4 GEOWEB CELL SIZE
(OR APPROVED EQUAL, SUBMIT PRODUCT DATA WITH BID SUBMITTAL)

CELLS LONG	MIN EXPANSION		MAX EXPANSION		NOMINAL AREA	
	LENGTH IN (CM)	WIDTH IN (CM)	LENGTH IN (CM)	WIDTH IN (CM)	ft ²	m ²
10	12.0	3.7	9.2	2.8	112	10.4
21	14.0	4.3	16.9	5.1	131	12.1
25	15.7	5.1	20.1	5.1	156	14.5
29	19.4	5.9	23.3	7.1	181	16.8
34	22.7	6.9	27.3	8.3	212	19.7

5 GEOWEB SECTION SIZES
NTS

3 TYPICAL ATRA ANCHOR SYSTEM
NTS

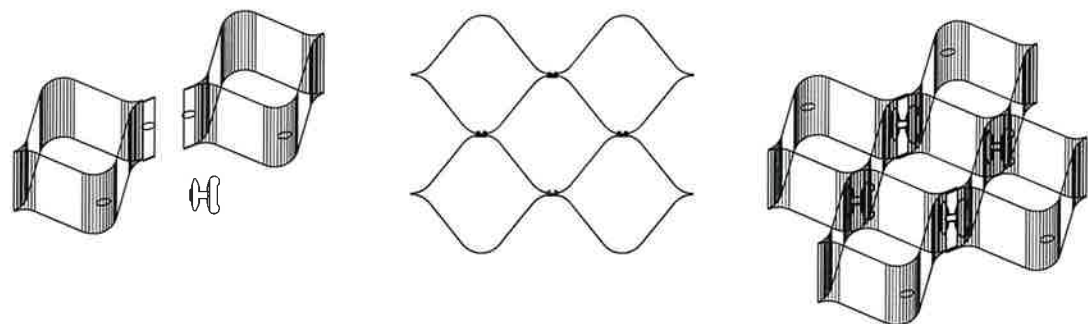


7 ATRA ANCHOR DETAIL
NTS

GW20V41029PT

20V CELL TYPE, 4" DEPTH, 10 CELLS WIDE, 29 CELLS LONG, PERFORATED STRIP w/ INTEGRAL I-SLOT.

GEOWEB® PRODUCT CODE FORMAT



- GEOWEB CONNECTION NOTES:**
- THE TOP EDGES OF ADJACENT CELL WALLS SHALL BE FLUSH WHEN CONNECTING.
 - ALIGN THE I-SLOTS FOR INTERLEAF AND END TO END CONNECTIONS.
 - THE GEOWEB PANELS SHALL BE CONNECTED WITH ATRA KEYS AT EACH INTERLEAF AND END TO END CONNECTION.

6 ATRA KEY CONNECTION DETAILS
NTS

NOTES:

- REMOVE ALL VEGETATION TO AT LEAST FIVE (5) FEET BEYOND THE EXTENT OF THE PARKING LOT.
- EXCAVATE AREA TO A DEPTH OF SEVEN (7) INCHES BELOW THE FINAL GRADE AND SMOOTH THE EXCAVATED SURFACE, REMOVING ALL ROOTS GREATER THAN ONE (1) INCH IN DIAMETER.
- PROOF ROLL THE AREA USING A NON-VIBRATING 5-TON ROLLER OR FULLY LOADED DUMP TRUCK UNTIL THE SUBGRADE IS FIRM AND UNYIELDING AS APPROVED BY THE ENGINEER.
- PLACE A WOVEN GEOTEXTILE FABRIC (PROPEX GEOTEXT 2X2HF OR APPROVED EQUIVALENT TO THE EXTENT OF THE PARKING LOT. OVERLAP EDGES BY AT LEAST ONE (1) FOOT.
- PLACE A GEOWEB (PRESTO GW20V 4-INCH OR APPROVED EQUIVALENT) OVER THE GEOTEXTILE AND SECURE THE SECTIONS TOGETHER USING ATRA KEYS IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
- AFTER THE GEOWEB HAS BEEN PLACED AND SECURED, BACKFILL THE GEOWEB USING A NO. 57 COARSE GRANITE AGGREGATE MEETING THE REQUIREMENTS OF FDOT STANDARD SPECIFICATION 901.
- THE COARSE AGGREGATE SHALL EXTEND ABOVE THE GEOWEB A MINIMUM OF THREE (3) INCHES.
- WHEN ATRA ANCHORS ARE USED FOR ANCHORAGE, ENSURE ANCHOR BEARS AGAINST CELL WALL AND ARM IS ENGAGED THROUGH THE I-SLOT.
- ADDITIONAL GEOTECH INFORMATION CAN BE FOUND IN THE GEOTECHNICAL INVESTIGATION (EGS, JUNE 2018)

Revision	By	App'd	Y/M/D
1	ASAP/FERM		11/12/07
			11/14/07

LEON COUNTY PUBLIC WORKS DEPARTMENT
MARIAN ROAD
DRAINAGE IMPROVEMENTS
TALLAHASSEE, FL

GRVEL PAVEMENT DETAILS

CHRIS BROCKMEIER
Professional Engineer
No. 215613796

JG CEB AIM 11/12/07
Dun Chut Dign YFMMDD

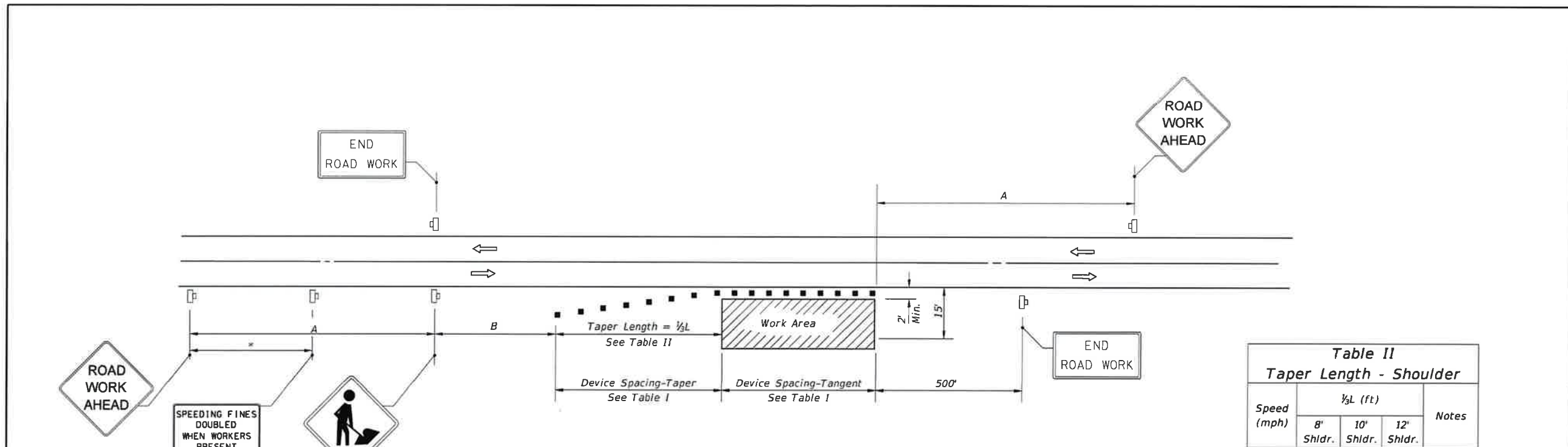
Drawing No. **C-503**

Revision Sheet



2316 Kilgore Center Blvd., Suite 102
TALLAHASSEE, FL 32309
www.stantec.com C.A. No. 27013

The Contractor shall verify and certify that all dimensions, DD and/or notes are correct and that the work is completed in accordance with the approved plans. The Contractor shall be responsible for the accuracy of the information provided and shall be liable for any errors or omissions. The Contractor shall be responsible for the accuracy of the information provided and shall be liable for any errors or omissions.



Speed	Spacing (ft.)	
	A	B
40 mph or less	200	200
45 mph	350	350
50 mph or greater	500	500

*Midway between signs.

Speed (mph)	Max. Distance Between Devices (ft.)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50
50 to 70	25	50	50	100

Speed (mph)	1/2 L (ft)			Notes
	8' Shldr.	10' Shldr.	12' Shldr.	
25	28	35	42	L = WS ² / 60
30	40	50	60	
35	55	68	82	
40	72	90	107	L = WS
45	120	150	180	
50	133	167	200	
55	147	183	220	
60	160	200	240	
65	173	217	260	
70	187	233	280	

8' minimum shoulder width
 1/2 L = Length of shoulder taper in feet
 W = Width of total shoulder in feet (combined paved and unpaved width)
 S = Posted speed limit (mph)

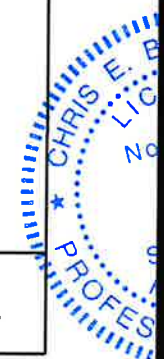
- SYMBOLS**
- Work Area
 - Channelizing Device (See Index No. 600)
 - Work Zone Sign
 - Lane Identification + Direction of Traffic

- GENERAL NOTES**
- When four or more work vehicles enter the through traffic lanes in a one hour period or less (excluding establishing and terminating the work area), the advanced FLAGGER sign shall be substituted for the WORKERS sign. For location of flaggers and FLAGGER signs, see Index No. 603.
 - SHOULDER WORK sign may be used as an alternate to the WORKER symbol sign only on the side where the shoulder work is being performed.
 - When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
 - For general TCZ requirements and additional information, refer to Index No. 600.

- DURATION NOTES**
- Signs and channelizing devices may be omitted if all of the following conditions are met:
 - Work operations are 60 minutes or less.
 - Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.

CONDITIONS
 WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA CLOSER THAN 15' BUT NOT CLOSER THAN 2' TO THE EDGE OF TRAVEL WAY.

LAST REVISION 07/01/15	DESCRIPTION:	FY 2017-18 DESIGN STANDARDS	TWO-LANE, TWO-WAY, WORK ON SHOULDER	INDEX NO. 602	SHEET NO. 1 of 1
REVISION					



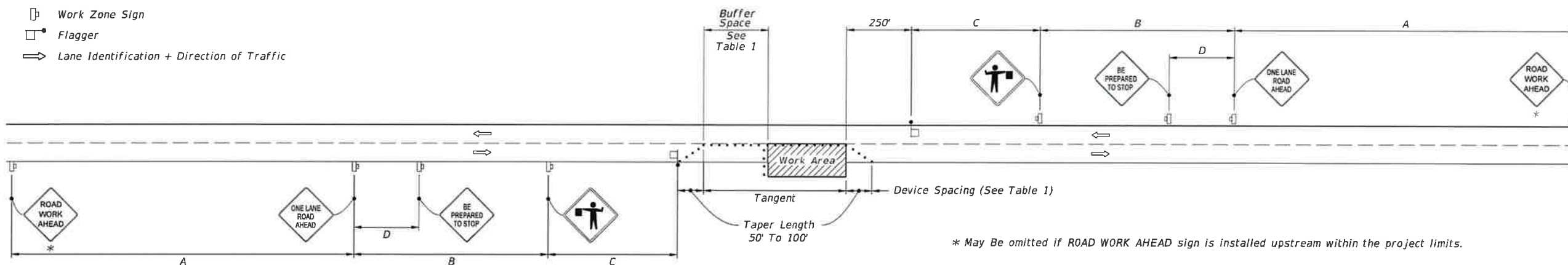
CHRIS E. BROCKMEIER
 FL Registration No. 56859
 2316 Kilgore Center Blvd., Suite 102
 Tallahassee, FL 32309
 (904) 833-1111
 www.stantec.com

18/12/07	AM	18/12/07
Drawn	Checked	Design
YYMMDD	YYMMDD	YYMMDD

Drawing No. C-506
 Revision Sheet

SYMBOLS:

- Work Area
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Flagger
- Lane Identification + Direction of Traffic



WITHOUT TEMPORARY RAISED RUMBLE STRIPS

GENERAL NOTES:

1. Special Conditions may be required in accordance with these notes and the following sheets:
 - A. Railroad Crossings:
 - a. If an active railroad crossing is located closer to the Work Area than the queue length plus 300 feet, extend the Buffer Space as shown on Sheet 3.
 - b. If the queuing of vehicles across an active railroad crossing cannot be avoided, provide a uniformed traffic control officer or flagger at the highway-rail grade crossing to prevent vehicles from stopping within the highway-rail grade crossing, even if automatic train warning devices are in place.
 - B. If the Work Area encroaches on the Centerline, use the Layout for Temporary Lane Shift to Shoulder on Sheet 3 only if the Existing Paved Shoulder width is sufficient to provide for an 11' lane between the Work Area and the Edge of Existing Paved Shoulder. Reduce the posted speed when appropriate.
2. Temporary Raised Rumble Strips:
 - A. Use when both of the following conditions are met concurrently:
 - a. Existing Posted Speed is 55 mph or greater;
 - b. Work duration is greater than 60 minutes.
 - B. Use a consistent Strip color throughout the work zone.
 - C. Place each Rumble Strip Set transversely across the lane at locations shown.
 - D. Use Option 1 or Option 2 as shown on Sheet 2. Use only one option throughout work zone.
3. Additional one-way control may be provided by the following means:
 - A. Flag-carrying vehicle;
 - B. Official vehicle;
 - C. Pilot vehicles;
 - D. Traffic signals.

When flaggers are the sole means of one-way control, the flaggers must be in sight of each other or in direct communication at all times.
4. When a side road intersects the highway within the TTC zone, place additional TTC devices in accordance with other applicable TCZ Indexes.
5. The two channelizing devices directly in front of the work area may be omitted provided vehicles in the work area have high-intensity rotating, flashing, oscillating, or strobe lights operating.
6. When Buffer Space cannot be attained due to geometric constraints, use the greatest attainable length, not less than 200 ft, for posted speeds greater than 25 mph.
7. ROAD WORK AHEAD and the BE PREPARED TO STOP signs may be omitted if all of the following conditions are met:
 - A. Work operations are 60 minutes or less.
 - B. Speed limit is 45 mph or less.
 - C. There are no sight obstructions to vehicles approaching the work area for a distance equal to the Buffer Space shown in Table 1.
 - D. Vehicles in the work area have high-intensity, rotating, flashing, oscillating, or strobe lights operating.
 - E. Volume and complexity of the roadway has been considered.
 - F. If a railroad crossing is present, vehicles will not queue across rail tracks.
 - G. AFADs are not in use.
8. See Index 600 for general TCZ requirements and additional information.
9. Automated Flagger Assistance Devices (AFADs) may be used in accordance with Specifications Section 102, 990 and the APL vendor drawings.

Posted Speed	DEVICE SPACING				Distance Between Signs				Buffer Space
	Maximum Spacing of Cones or Tubular Markers		Maximum Spacing of Type I or Type II Barricades/Panels/Drums		A	B	C	D	
	On a Taper	On a Tangent	On a Taper	On a Tangent					
25	20'	50'	20'	50'	200'	200'	200'	100'	155'
30	20'	50'	20'	50'	200'	200'	200'	100'	200'
35	20'	50'	20'	50'	200'	200'	200'	100'	250'
40	20'	50'	20'	50'	200'	200'	200'	100'	305'
45	20'	50'	20'	50'	350'	350'	350'	175'	360'
50	20'	50'	20'	100'	500'	500'	500'	250'	425'
55	20'	50'	20'	100'	2640'	1500'	1000'	500'	495'
60	20'	50'	20'	100'	2640'	1500'	1000'	500'	570'
65	20'	50'	20'	100'	2640'	1500'	1000'	500'	645'
70	20'	50'	20'	100'	2640'	1500'	1000'	500'	730'

CONDITIONS
 WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCR OACH THE AREA BETWEEN THE CENTERLINE AND A LINE 2' OUTSIDE THE EDGE OF TRAVEL WAY.

10/12/2016 1:07:16 PM

V:\2156\csh\15613796\civ\Academy\02_good\1\137%_02_C508_Traffic.dwg

LAST REVISION 01/01/16	DESCRIPTION:	FY 2017-18 DESIGN STANDARDS	TWO-LANE, TWO-WAY, WORK WITHIN THE TRAVEL WAY	INDEX NO. 603	SHEET NO. 1 of 3
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Professional Engineer
 Chris E. Brockmeier
 License No. 15613796
 State of Florida
 Tallahassee, FL

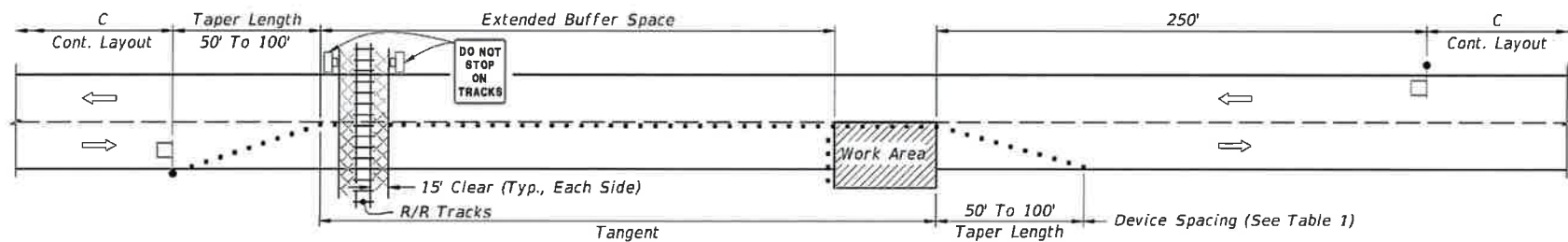
FLORIDA DEPARTMENT OF TRANSPORTATION
 PUBLIC WORKS DEPARTMENT
 MERIDIAN ROAD
 DRAINAGE IMPROVEMENTS
 TALLAHASSEE, FL

TRAFFIC CONTROL DETAILS

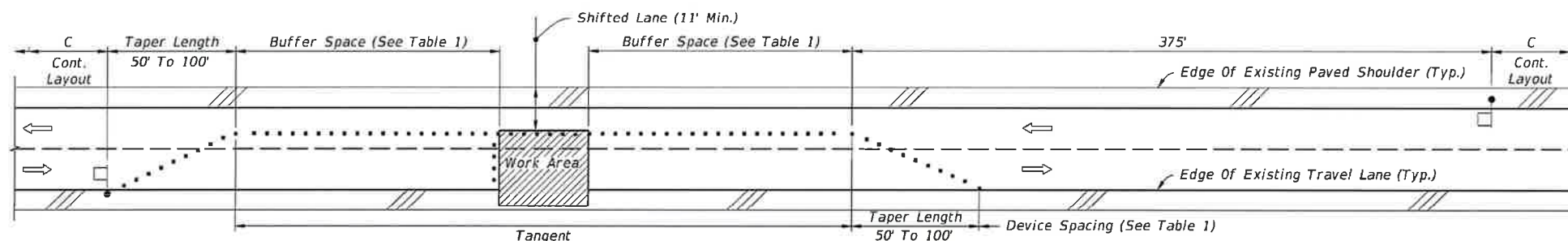
Revision Sheet
 0 of

SYMBOLS:

-  Work Area
-  Channelizing Device (See Index No. 600)
-  Work Zone Sign
-  Flagger
-  Lane Identification + Direction of Traffic



TEMPORARY RAILROAD CROSSING BUFFER SPACE EXTENSION



TEMPORARY LANE SHIFT TO SHOULDER WHEN WORK AREA ENCREACHES ON THE CENTERLINE

SPECIAL CONDITIONS

Cross Reference:
 1. See General Note #1, Sheet 1 for more information.

SPECIAL CONDITIONS

LAST REVISION 01/01/16	DESCRIPTION:	FDOT FY 2017-18 DESIGN STANDARDS	TWO-LANE, TWO-WAY, WORK WITHIN THE TRAVEL WAY	INDEX NO. 603	SHEET NO. 3 of 3
---------------------------	--------------	--	--	------------------	---------------------

Professional Engineer Seal for Chris E. Brockmeier, State of Florida, License No. 181207. The seal includes the text 'FLORIDA STATE ENGINEER' and 'CHRIS E. BROCKMEIER'.

JG	CEB	AIM	18.12.07
Dwg	Check	Dwg	11/11/10
Drawing No. C-509			
Revision Sheet of			

V:\215613\215613.dwg
 2018/12/07 2:28 PM By: Williams, Nicholas

10/12/2016 1:07:22 PM



April 5, 2019
ECT No. 190194-0100

Via Electronic Mail

Ms. Theresa Heiker, P.E.
Engineering Services Division
Leon County Public Works Department
2280 Miccosukee Road
Tallahassee, FL 32308

**Re: 3401 N. Meridian Road Asbestos Survey
Parcel No. 11-07-20-212-000-0
Tallahassee, Florida**

Dear Ms. Heiker:

Environmental Consulting & Technology, Inc. (ECT) has completed the National Emissions Standards for Hazardous Air Pollutants (NESHAP) asbestos survey at the above reference property in accordance with the Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations 1910.1001 and NESHAP. An electronic copy of the report is attached for your review.

We appreciate this opportunity to be of service under our Continuing Supply Agreement with Leon County. If you should have any questions, please do not hesitate to contact Susan McConnell at (850) 383-0009 or via email at smcconnell@ectinc.com.

Sincerely,

ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC.

Handwritten signature of Susan M. McConnell in blue ink.

Susan M. McConnell, LEP
Certified Asbestos Building Inspector

Handwritten signature of Kathryn M. Emby in blue ink.

Kathryn M. Emby, E.I.
Certified Asbestos Building Inspector

SMM/kme
Attachments

Cc: Chris Brockmeier, Stantec

2507 Callaway Rd,
Suite 102
Tallahassee, FL
32303

(850) 383-0009

FAX
(850) 383-0008

N:\ASBESTOS\LEONCOUNTY\RPT COVER LETTER.DOC.

**NESHAP Asbestos Demolition Survey Report
3401 N. Meridian Road
Tallahassee, Leon County, Florida**

**Prepared For:
Leon County Public Works
2280 Miccosukee Road
Tallahassee, Florida 32308**

April 2019
ECT No. 190194-0100

Document Review

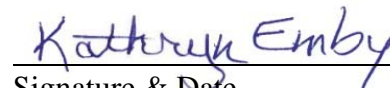
The dual signatory process is an integral part of Environmental Consulting & Technology, Inc.'s (ECT's) Document Review Policy No. 9.03. All ECT documents undergo technical/peer review prior to dispatching these documents to any outside entity.

This document has been authored and reviewed by the following employees:

Susan M. McConnell
Author & Asbestos Inspector

 April 5, 2019
Signature & Date

Kathryn Emby
Peer Review &
Asbestos Inspector & Management Planner

 April 5, 2019
Signature & Date

Mona P. Johnson, P.G., LAC
Peer Review &
Licensed Asbestos Consultant
Florida License No. AX89

 April 5, 2019
Signature & Date

Prepared By:
Environmental Consulting & Technology, Inc.
2507 Callaway Road, Suite 102
Tallahassee, Florida 32303
Phone: (850) 383-0009
Fax: (850) 383-0008
www.ectinc.com

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- Appendix B—Asbestos Laboratory Report and Chain of Custody
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List of Acronyms and Abbreviations

ACM	Asbestos-containing material
AHERA	Asbestos Hazard Emergency Response Act
CFR	Code of Federal Regulations
ECT	Environmental Consulting & Technology, Inc.
EPA	U.S. Environmental Protection Agency
LAC	Licensed Asbestos Consultant
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NVLAP	National Voluntary Laboratory Accreditation Program
OSHA	Occupational Safety and Health Administration
PLM	Polarized light microscopy
VFT	Vinyl floor tile

1.0 Introduction

Environmental Consulting & Technology, Inc. (ECT) has completed an EPA NESHAP demolition survey of suspect ACM at the building located at 3401 N. Meridian Road in Tallahassee, Leon County, Florida. The structure is approximately 2,400 square feet and was formerly a convenience store. The structure was unoccupied at the time of the survey and has been vacant for several years.

On March 26, 2019, ECT personnel conducted a NESHAP demolition survey, and collected bulk samples of suspect ACM for laboratory analysis, to determine asbestos content and type using PLM. Twenty (20) bulk samples of suspect ACM were collected for laboratory analysis. Asbestos was detected in the black roof mastic.

The following sections discuss the asbestos survey purpose, procedures, methodology, conclusions and recommendations.

2.0 Asbestos Facility Survey

2.1 Survey Purpose and Procedures

ECT conducted a demolition asbestos survey of suspect ACM at the building located at 3401 N. Meridian Road in Tallahassee, Leon County, Florida. The objective of the survey was to determine the condition and quantity of the suspect ACM that will be impacted during demolition activities. The survey was performed in general accordance with the EPA NESHAP survey requirements, to comply with OSHA regulations governing asbestos-related activities, and under the EPA AHERA sampling protocols to determine the number of bulk samples collected.

The survey was conducted on March 26, 2019, by Ms. Susan McConnell, certified asbestos building inspector, and Mr. Michael Gray, technician (see Appendix A for ECT certifications), on representative suspect building materials to investigate and/or determine the location, quantity, type, condition, and potential for damage of suspect friable and non-friable ACM. EPA identifies friable materials as those that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. Consideration was also given to materials that could be reduced to powder by the forces (e.g., cutting and grinding) expected to act upon the suspect ACM during renovation activities. The survey activities represent ECT's understanding of the locations and materials that will potentially be impacted in interior areas of the building.

A total of 20 bulk samples of suspect ACM were collected from the structure and submitted to a NVLAP accredited laboratory for analysis. Table 1 presents a description of all samples collected for this current survey. Photographic documentation of select sample locations was obtained and is available upon request.

2.2 Asbestos Survey Methodology

The bulk samples of suspect ACM collected were analyzed by a NVLAP accredited laboratory (NVLAP ID#101151-0) using PLM (EPA 600/R-93/116). This methodology identifies the quantity and type of asbestos, if any, in the sample being analyzed. Any material containing one percent or

more asbestos is considered to be an ACM according to the EPA NESHAP regulations (Chapter 40 CFR Part 763).

2.3 Facility Description

The structure consists of one single-story building. The following materials were observed in the structure:

- Concrete floor.
- Concrete block walls.
- Vinyl baseboard with black mastic.
- Wall paneling (nailed only, no glue observed).
- Caulking.
- Sealant.
- Refrigeration panels.
- Asphalt roof.

Suspect ACM sampled include concrete floor and block, vinyl baseboard mastic (black), four types of caulk (gray and yellow), one type of sealant, refrigeration panels, and asphalt roof. The materials appeared to be in good condition at the time of the survey.

2.4 Laboratory and Survey Results

A total of 20 bulk samples of suspect ACM were collected for laboratory analysis from the structure surveyed during the site visit. A total of 24 individual samples were inspected at the laboratory from the 20 bulk samples submitted. Below is a description of the ACM material and the type of asbestos identified:

SAMPLE NUMBER	MATERIAL	FUNCTIONAL SPACE	% ASBESTOS/TYPE	APPROXIMATE QUANTITY	EPA CATEGORY
MER-17	Black roofing mastic	Roof	2% Chrysotile	2,880 sf	I Non-friable

Table 1 is a summary of the current survey results, and Figure 1 shows the sample location and area of ACM. A copy of the laboratory report and chain of custody documentation is provided in Appendix B.

3.0 Conclusions and Recommendations

3.1 Conclusions

ECT has completed the NESHAP demolition asbestos survey of the building located at 3401 N. Meridian Road in Tallahassee, Leon County, Florida. A total of 20 bulk samples of suspect ACM were collected on March 26, 2019 and submitted for laboratory analysis of asbestos content using PLM methodology. The analysis detected 2% Chrysotile asbestos (serpentine mineral group) in the black roof mastic.

3.2 Recommendations

It is the understanding of ECT that the building identified in this survey is scheduled for demolition in the near future. ECT recommends that the ACM identified be removed by an accredited abatement contractor and disposed of as ACM prior to the demolition activities. **Should building materials be discovered during demolition other than those surveyed and sampled as described herein, such materials should be assumed to be ACM and treated accordingly, until determined to be non-ACM by laboratory analysis.**

Please note that a 10-day notification is required to the local NESHAP regulatory agency prior to demolition and/or abatement activities.

4.0 Limitations

All professional opinions presented in this NESHAP asbestos demolition survey are based solely on the scope of work conducted and sources referred to in this report. The data presented by ECT were collected and analyzed using generally accepted industry methods and practices at the time the report was generated. This report represents the conditions, locations, and materials that were observed at the time the fieldwork was performed.

This report is designed to aid the building owner, construction manager, and general contractors in locating any identified ACBM. It is not to be used as a proposal or a project specification document. It is the responsibility of the contractor to obtain precise measurements of the ACM prior to submitting an abatement proposal.

Table

TABLE 1. ASBESTOS SURVEY AND ASSESSMENT FORM

Facility Name: 3401 N. Meridian Road
 Address: Tallahassee, Leon County, Florida

Consultant: ECT
 ECT Project No.: 190194-0100
 Survey Date: March 26, 2019

Sample No.	Material	HA	Functional Space	Condition	Approximate Quantity (Square Feet)	Damage Potential	Friable Y/N	Asbestos Type & Percentage	EPA NESHAP Category
MER- 1	Black vinyl baseboard	1	Main Area	Good		High	No	NAO	
MER- 1	Black mastic for vinyl baseboard	1	Main Area	Good		High	No	NAO	
MER- 2	Black vinyl baseboard	1	Main Area	Good		High	No	NAO	
MER- 2	Black mastic for vinyl baseboard	1	Main Area	Good		High	No	NAO	
MER- 3	Gray Caulk	2	Windows - interior portion	Good		High	No	<1% Chrysotile	
MER- 4	Gray Caulk	2	Windows - interior portion	Good		High	No	<1% Chrysotile	
MER- 5	Gray Caulk	3	Windows - exterior portion	Good		High	No	<1% Chrysotile	
MER- 6	Gray Caulk	3	Windows - exterior portion	Good		High	No	<1% Chrysotile	
MER- 7	Yellow Caulk	4	Main Area - sink	Good		High	No	NAO	
MER- 8	Yellow Caulk	4	Main Area - sink	Good		High	No	NAO	
MER- 9	Gray sealant	5	Walkin Cooler	Good		Low	No	NAO	
MER- 10	Gray sealant	5	Walkin Cooler	Good		Low	No	NAO	
MER- 11	White Refrigeration panel with yellow insulation	6	Walkin Cooler	Good		Low	No	NAO	
MER- 12	White Refrigeration panel with yellow insulation	6	Walkin Cooler	Good		Low	No	NAO	
MER- 13	Gray concrete floor w/dark gray specs	7	Main Area - entry way	Good		High	No	NAO	
MER- 14	Gray concrete floor w/dark gray specs	7	Main Area - entry way	Good		High	No	NAO	
MER- 15	Gray concrete block	8	Exterior Wall - SW corner	Good		High	No	NAO	
MER- 16	Gray concrete block	8	Exterior Wall - NW corner	Good		High	No	NAO	

TABLE 1. ASBESTOS SURVEY AND ASSESSMENT FORM

Facility Name: 3401 N. Meridian Road
 Address: Tallahassee, Leon County, Florida

Consultant: ECT
 ECT Project No.: 190194-0100
 Survey Date: March 26, 2019

Sample No.	Material	HA	Functional Space	Condition	Approximate Quantity (Square Feet)	Damage Potential	Friable Y/N	Asbestos Type & Percentage	EPA NESHAP Category
MER- 17	Black asphalt roof with silver flashing	9	Roof - NE corner	Good		High	No	NAO	
MER- 17	Black roofing mastic	9	Roof - NE corner	Good	2,880	High	No	2% Chrysotile	Cat I - Non Friable
MER- 18	Black asphalt roof with silver flashing	9	Roof - NE corner	Good		High	No	NAO	
MER- 18	Black roofing mastic	9	Roof - NE corner	Good		High	No	NAO	
MER- 19	Light gray caulk	10	Main Area - ceiling	Good		High	No	NAO	
MER- 20	Light gray caulk	10	Main Area - ceiling	Good		High	No	NAO	

Note: NAO = No Asbestos Observed.
 HA = Homogenous Area.

Source: EMSL 2019; ECT 2019

Figure



FIGURE 1.
ASBESTOS CONTAINING MATERIAL LOCATION MAP
3401 N. MERIDIAN ROAD, TALLAHASSEE, LEON COUNTY, FLORIDA

Source: Leon County Property Appraiser, 2019; ECT, 2019



Appendix A

Environmental Consulting & Technology, Inc. Personnel Certifications



Northeast Florida Safety Council, Inc.

This certifies that

Susan McConnell

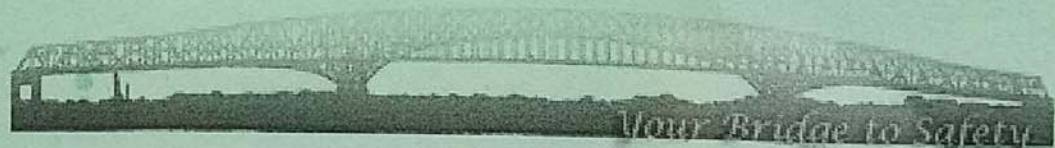
has successfully completed the
Asbestos Building Inspector Refresher - 4 Hour

Fred Alvarez

Instructor

Completion Date 4/4/2018

Expires 4/4/2019



Certificate valid only if imprinted with Program Watermarks

Vern Roberts Environmental Training, Inc.
13987 94th Avenue N Seminole, FL 33776
727-593-3067
Asbestos Survey & Mechanical (inspector) Refresher
Training

This is to Certify that
Katherine M. Emby

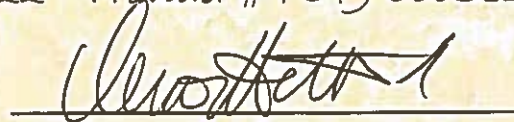
Has completed the requisite training for asbestos accreditation
under TSCA TITLE II

Date of Examination 1/15/2019

Date of Course: 1/15/2019 Expiration Date 1/15/2020

Certificate # 01151902AM

Course # FL49-0006322 Provider # FL49-0003810



Instructor

Vern Roberts Environmental Training, Inc.
13987 94th Avenue N Seminole, FL 33776
727-593-3067
Asbestos Management Planner Refresher Training

This is to Certify that
Kathryn M. Emby

Has completed the requisite training for asbestos accreditation
under TSCA TITLE II
Date of Examination 1/15/2019

Date of Course: 1/15/2019 Expiration Date 1/15/2020

Certificate # 01151902PM

Course # FL49-000636323 Provider # FL49-0003810



Instructor

Vern Roberts Environmental Training, Inc.
13987 94th Avenue N Seminole, FL 33776
727-593-3067
Asbestos Survey & Mechanical (inspector) Refresher
Training

This is to certify that
Mona Johnson, PG, FLAC

Has completed the requisite training for asbestos accreditation
under TSCA TITLE II

Date of Examination 1/15/2019

Date of Course: 1/15/2019 Expiration Date 1/15/2020

Certificate # 01151901AM

Course # FL49-0006322 Provider # FL49-0003810



Instructor



RICK SCOTT, GOVERNOR

JONATHAN ZACHEM, SECRETARY



STATE OF FLORIDA
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION
ASBESTOS LICENSING UNIT

THE ASBESTOS CONSULTANT HEREIN IS LICENSED UNDER THE
PROVISIONS OF CHAPTER 469, FLORIDA STATUTES

JOHNSON, MONA PHILLIPS

ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC.
3701 NW 98TH STREET
GAINESVILLE FL 32606-5004

LICENSE NUMBER: AX89

EXPIRATION DATE: NOVEMBER 30, 2020

Always verify licenses online at MyFloridaLicense.com



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Appendix B

Asbestos Laboratory Report and Chain of Custody Documentation



EMSL Analytical, Inc.

3303 PARKWAY CENTER COURT Orlando, FL 32808

Tel/Fax: (407) 599-5887 / (407) 599-9063

<http://www.EMSL.com> / orlandolab@emsl.com

Attachment A

EMSL Order: 341905164

Exhibit 6

Customer ID: ECT162

Customer PO: 190191-0100

Project ID:

Attention: Susan McConnell
Environmental Consulting & Technology
2507 Callaway Road
Suite 102
Tallahassee, FL 32303

Phone: (850) 383-0009

Fax: (850) 383-0008

Received Date: 03/27/2019 11:30 AM

Analysis Date: 04/01/2019 - 04/02/2019

Collected Date: 03/27/2019

Project: 3401 N.Meridian Rd/190194

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
MER-1-Vinyl Baseboard 341905164-0001	Interior Walls - Black Vinyl Baseboard With Black Mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
MER-1-Mastic 341905164-0001A	Interior Walls - Black Vinyl Baseboard With Black Mastic	Brown Fibrous Homogeneous	10% Cellulose	90% Non-fibrous (Other)	None Detected
MER-2-Vinyl Baseboard 341905164-0002	Interior Walls - Black Vinyl Baseboard With Black Mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
MER-2-Mastic 341905164-0002A	Interior Walls - Black Vinyl Baseboard With Black Mastic	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
MER-3 341905164-0003	Windows-Inside - Gray Caulk	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	<1% Chrysotile
MER-4 341905164-0004	Windows-Inside - Gray Caulk	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	<1% Chrysotile
MER-5 341905164-0005	Windows-Outside - Gray Caulk	Gray/Tan/Yellow Non-Fibrous Heterogeneous		100% Non-fibrous (Other)	<1% Chrysotile
MER-6 341905164-0006	Windows-Outside - Gray Caulk	Various Non-Fibrous Heterogeneous		100% Non-fibrous (Other)	<1% Chrysotile
MER-7 341905164-0007	Main Room-Sink - Yellow Caulk	White Non-Fibrous Heterogeneous		100% Non-fibrous (Other)	None Detected
MER-8 341905164-0008	Main Room-Sink - Yellow Caulk	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
MER-9 341905164-0009	Walkin Cooler - Gray Sealant	Gray Non-Fibrous Heterogeneous		100% Non-fibrous (Other)	None Detected
MER-10 341905164-0010	Walkin Cooler - Gray Sealant	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
MER-11 341905164-0011	Walkin Cooler - White Panels With Yellow Insulation	White/Silver/Yellow Non-Fibrous Heterogeneous		100% Non-fibrous (Other)	None Detected
MER-12 341905164-0012	Walkin Cooler - White Panels With Yellow Insulation	White/Silver/Yellow Non-Fibrous Heterogeneous		100% Non-fibrous (Other)	None Detected
MER-13 341905164-0013	Main Room - Gray Concrete Floor With Dark Gray Specs	Gray/White Non-Fibrous Homogeneous		30% Quartz 15% Ca Carbonate 55% Non-fibrous (Other)	None Detected
MER-14 341905164-0014	Main Room - Gray Concrete Floor With Dark Gray Specs	Gray/White Non-Fibrous Homogeneous		30% Quartz 15% Ca Carbonate 55% Non-fibrous (Other)	None Detected

Initial report from: 04/02/2019 10:50:06



EMSL Analytical, Inc.

3303 PARKWAY CENTER COURT Orlando, FL 32808

Tel/Fax: (407) 599-5887 / (407) 599-9063

<http://www.EMSL.com> / orlandolab@emsl.com

Attachment A

EMSL Order: 341905164

Exhibit 6

Customer ID: ECT162

Customer PO: 190191-0100

Project ID:

Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
MER-15 341905164-0015	Exterior Wall-SW Corner - Gray Concrete Block	Gray/Black/Clear Non-Fibrous Homogeneous		30% Quartz 15% Ca Carbonate 55% Non-fibrous (Other)	None Detected
MER-16 341905164-0016	Exterior Wall-NW Corner - Gray Concrete Block	Gray Non-Fibrous Homogeneous		30% Quartz 15% Ca Carbonate 55% Non-fibrous (Other)	None Detected
MER-17-Asphalt 341905164-0017	Roof-NE Corner - Silver Flashing And Black Asphalt	Gray/Black/Silver Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
	<i>Silver material is metal - unable to analyze via PLM</i>				
MER-17-Mastic 341905164-0017A	Roof-NE Corner - Silver Flashing And Black Asphalt	Black Non-Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile
MER-18-Asphalt 341905164-0018	Roof-NE Corner - Silver Flashing And Black Asphalt	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
	<i>Silver material is metal - unable to analyze via PLM</i>				
MER-18-Mastic 341905164-0018A	Roof-NE Corner - Silver Flashing And Black Asphalt	Black Fibrous Homogeneous	20% Cellulose 5% Synthetic	75% Non-fibrous (Other)	None Detected
MER-19 341905164-0019	Interior Ceiling - Light Gray Caulk	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
MER-20 341905164-0020	Interior Ceiling - Light Gray Caulk	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Analyst(s)

Carlos Rivadeneyra (12)

Nashira McCall (12)

Carlos Rivadeneyra, Laboratory Director
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method"), but augmented with procedures outlined in the 1993 ("final") version of the method. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. All samples received in acceptable condition unless otherwise noted. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. EMSL recommends gravimetric reduction for all non-friable organically bound materials prior to analysis. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Orlando, FL NVLAP Lab Code 101151-0

Initial report from: 04/02/2019 10:50:06

EMSL Analytical, Inc.

CHAIN OF CUSTODY

Attachment A
ASBESTOS
Exhibit 6
407-599-9063 (fax)

3303 Parkway Center Court, Orlando, FL 32808

341905164

Representative: Susan McConnell

Your Company

Name: ECT

Street: 2507 Callaway Road

Box #: Suite 102

City/State: Tallahassee, FL Zip: 32303

EMSL-Bill to:

ECT

attn: Susan McConnell

Street: 2507 Callaway Road

Box #: Suite 102

City/State: Tallahassee, FL Zip: 32303

Phone Results to:

Name: Susan McConnell

Telephone #: 850-383-0009

Project

Name/Number: 3401 N. Meridian Rd/190194

Fax Results to:

Name: Susan McConnell

Fax #: 850-383-0008

Purchase

Order #: 190194-0100

MATRIX

TURNAROUND

<input type="checkbox"/> Air	<input type="checkbox"/> Floor Tile	<input type="checkbox"/> Soil	<input type="checkbox"/> 3 Hours	<input type="checkbox"/> 6 Hours	<input type="checkbox"/> Same Day*	<input type="checkbox"/> 12 Hours
<input type="checkbox"/> Bulk	<input type="checkbox"/> Drinking Water	<input type="checkbox"/> Dust	<input type="checkbox"/> 24 Hours	<input type="checkbox"/> 48 Hours	<input type="checkbox"/> 3 Days	<input checked="" type="checkbox"/> 4 Days
<input type="checkbox"/> Wipe	<input type="checkbox"/> Wastewater		<input type="checkbox"/> 6-10 Days			

PCM

NIOSH 7400

OSHA

Other: _____

TEM AIR

AHERA

NIOSH 7402

Level I

Level II

TEM WATER

Wastewater

Drinking Water

EPA 100.1

Water-NY Wastewater

Water-NY Drinking Water

PLM

EPA 600

NOB

Point Count

Other: _____

TEM BULK

Drop Mount (Qualitative)

Chatfield

Chatfield/ SEM QC

Conventional (Quantitative)

EMSL Method

NOB

NOB/ SEM QC

Micro Vac - Quantitative

Micro Vac - Qualitative

TEM WIPE

Quantitative

Qualitative

XRD

Asbestos

Silica

SEM

Qualitative

Quantitative

OTHER

Relinquished: Susan McConnell *JM*

Received: NC

Total Samples: 20

Date: 3/26/2019 Time: 11:06 AM

Date: 3/27/19 Time: 11:30

