Technical Specifications – Bid Submittal

Central (Gifford) Wastewater Treatment Facility (WWTF) Generator and ATS Replacement

Prepared For:
Indian River County Department of Utility Services

Prepared By:
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PROJECT NO. 044572075

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SECTION 01000

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SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 WORK COVERED BY THESE CONTRACT DOCUMENTS

A. Furnish all equipment and materials necessary to construct all mechanical, structural and electrical improvements required to demolish the existing solids handling generator, bulk fuel tank, and main switchgear; provide a service feeder from the existing main electrical building feed to the solids handling building ATS; and complete the replacement of the main electrical generator, fuel day tank and piping, and ATS unit as depicted on the construction drawings and in these specifications to provide a complete and functional system.

B. Contractor shall minimize service interruptions and coordinate all service interruptions with the Owner. Demolition of existing solids handling generator shall be complete **after** the proposed system has been functionally tested, accepted by the owner, and successfully placed in operation in accordance with the contract documents and any requirements set forth in:
   a. Florida Building Code (FBC) – The Indian River County Building Department
   b. Indian River County - Standard Construction Specifications and Details

C. The scope of work includes, but is not limited to, the following components as depicted in the contract documents:
   1. Installation of standby emergency generator power as required so that the facility is not without back-up emergency power during the replacement of the main electrical generator and ATS unit and the demolition of the solids handling generator unit. Standby emergency generator power will be required at the solids handling building and the main electrical building until the new generator system is fully functional and approved by the Owner.
   2. Demolition of the existing main electrical generator and ATS unit, generator silencer, rain hood, fuel piping, fuel day tank, radiator exhaust duct, and battery packs. Louver wall on inlet air plenum shall be temporarily removed to replace existing generator and day tank. Masonry wall on the exterior wall of the inlet air plenum shall be demolished and replaced once new generator is installed.
   3. Installation of a new main electrical generator and ATS unit, generator silencer, rain hood, fuel piping, fuel day tank, radiator exhaust duct, and battery starter packs. Installation of an underground service feed to the existing solids handling building ATS from the main electrical building feed. Load testing and functional testing of the new generator shall be completed prior to placing the generator into permanent service.
   4. Demolition of the existing solids handling generator, generator silencer, roof thimble, rain hood, fuel piping, fuel bulk tank (ConVault Tank), radiator exhaust duct, battery packs, and louver wall. Louver wall shall be block filled after removal of existing solids handling generator and generator components. Demolition of the Solids handling building switchgear equipment.
   5. Provide and install all electrical required to support instrumentation and control system as shown on drawings.

6. Furnish all labor and materials necessary for Programmable Logic Controller (PLC) and Supervisory Control and Data Acquisition (SCADA) operator display programming, including but not limited to database modifications, new control strategies, and removal of old control programming and SCADA displays rendered obsolete after the existing solids handling generator is demolished.
7. Provide all miscellaneous electrical including switches, terminations, fittings, wiring, conduit, junction boxes, etc. not specified but obviously necessary for a complete working system in place.
8. Furnish all labor and materials necessary to remove, regrade, and restore asphalt surface, and provide site restoration, grassing, and grading as shown and in accordance with the contract documents.

D. Contractor's Duties:
   1. Except as specifically noted, provide and pay for:
      a. Mobilization and demobilization.
      b. Labor, materials, and equipment.
      c. Tools, construction equipment, and fuel.
      d. Electric, water, and utilities required for construction.
      e. Freight and sales tax.
      f. Testing and laboratory services.
      g. Surveying and field engineering.
      h. Record Information in a format acceptable to the Owner and Engineer. Information will be used by the Engineer for Record Drawing development.
      i. Compliance with all conditions of the permits issued for this project.
      j. Construction dewatering (if required).
      k. Any other incidental labor, materials, and equipment required to construct the project.

1.2 CONTRACTS

A. Construct the Work under a Lump Sum contract.
B. Subcontractors (when used) shall work directly for the contractor.

1.3 WORK BY OTHERS AND FUTURE WORK

A. The Owner reserves the right to add to the work in accordance with the Contract Documents.
B. The Owner reserves the right to direct purchase significant pieces of equipment and/or materials.
C. No work is planned to be performed by the Owner. Contractor is responsible for coordinating ordering and delivery with suppliers.

1.4 WORK SEQUENCE

A. Sequence of work will be discussed and decided prior to the start of the project. The contractor shall proceed in a manner that is logical for the progression of work.
B. Certain areas may be assigned priority to accommodate the Owner's needs.
C. The contractor shall be required to coordinate the work sequence and schedule with the Owner.

D. The following provides a recommendation for the sequence of work for generator and ATS improvements:
   1. Complete utility exploration and soft digs along proposed alignment of electrical feed from main electrical building to Solids Handling Electrical Building.
   2. Construct electrical conduit, conductors, pull boxes and wall mounted boxes as shown on the construction drawings.
      a. Conduit alignment shown on plans is schematic and shall be coordinated with subsurface utility explorations by Contractor.
   3. Construct rental ATS inside main electrical building.
      a. Coordinate shutdown with WWTF operations to remove and install temporary cable connections.
      b. Shutdown duration shall not exceed two (2) hours.
   4. Install rental trailer mounted emergency generator.
   5. Demolish existing ATS and install new inside main electrical building.
      a. Coordinate shutdown with WWTF operations to remove and install permanent cabling connections to existing generator.
      b. Install temporary cabling from new ATS to rental generator.
   6. Demolish the existing main electrical generator and ATS unit, generator silencer, rain hood, fuel piping, fuel day tank, radiator exhaust duct, and battery packs. Louver wall on inlet air plenum (south side) shall be temporarily removed to remove and replace existing generator and day tank. Masonry wall on exterior wall of the inlet air plenum shall be demolished and replaced as shown in the construction drawings.
   7. Install new main electrical generator and ATS unit, generator silencer, rain hood, fuel piping, fuel day tank, radiator exhaust duct, and battery starter packs.
   8. The contractor may elect to proceed with either of the following events depending on lead time of equipment:
      a. Coordinate shutdown of Solids Handling Building to remove and replace existing 800A ATS. Shutdown duration shall not exceed four (4) hours.
      b. Demolish existing 800A ATS. Install new 800A ATS and complete connections to service transformer, MCC and newly installed emergency feeder from Main Electrical Building.
      c. Demolish existing solids handling generator, generator silencer, roof thimble, rain hood, fuel piping, fuel bulk tank (ConVault Tank), radiator exhaust duct, battery packs, and louver.
      d. Coordinate fuel tank closure/removal registration with Brevard Environmental Remediation and Compliance Section.
      e. Louver wall shall be block filled after removal of existing solids handling generator and generator components as shown in the construction drawings.
   9. Once the new generator has been installed and connected to both the new main electrical building ATS and the existing solids handling building ATS, load testing and functional testing of the new generator shall be completed prior to placing the generator into permanent service.

1.5 CONTRACTOR-FURNISHED PRODUCTS AND RESPONSIBILITIES

A. Products furnished to the site and paid for by Contractor: All products necessary to complete the work described herein these contract documents and specifications to provide a complete and functional
B. Contractor's Responsibilities:
   1. Review and incorporate Owner-reviewed shop drawings, product data, and samples into the construction of the project.
   2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
   3. Repair or replace items damaged after receipt.
   4. Arrange and pay for product delivery to site.
   5. Handle, store, protect and install all delivered products.
   6. Submit claims for transportation damage and replace damaged, defective, or deficient items.
   7. Arrange for manufacturers' warranties, inspections, and service.

1.6 PERMITS REQUIRED

A. Contractor shall obtain any required dewatering permits required for the execution of the work.
B. Contractor shall prepare and submit permit application and plans to the Indian River County Building Department. The Contractor will be responsible to submit the permit application, obtain the permit and associated subcontractor permits. IRCDUS will pay permit processing fee.
C. Contractor shall prepare and submit fuel tank closure paperwork with the Brevard County Natural Resources Management for removal of the 2,000-gallon diesel fuel tank for the solids handling facility generator that is to also be removed.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

- END OF SECTION -

SECTION 01030

HURRICANE PREPAREDNESS

PART 1 - GENERAL

1.1 HURRICANE PREPAREDNESS PLAN

A. The Contractor's attention is drawn to the possibility of hurricane or severe storm conditions occurring at the site of work during the course of Contract Work.

B. Within fourteen (14) days of the date of the Notice to Proceed, the Contractor shall submit to the Engineer and Owner a Hurricane Preparedness Plan specific to this project. The plan should outline the necessary measures which the Contractor proposes to perform at no additional cost to the Owner in case of a hurricane or severe weather warning.

C. In the event of inclement weather, or whenever the Owner shall direct, the Contractor shall, and will, cause Subcontractors to protect carefully the Work and materials against damage or injury. Work and materials damaged due to inclement weather shall be removed and replaced at the expense of the Contractor.

1. Hurricane Watch: Upon designation of a hurricane watch, the Contractor shall be responsible for storing all loose supplies and strapping down or removing large materials and equipment on the job site that may pose a danger. In addition, the Contractor shall remove all bulkheads and plugs in pipelines that would impede drainage in the case of flooding. Structures that may be in danger of floatation shall be flooded. The Contractor shall also cooperate with the Owner in protecting any other structures at the site.
2. Hurricane Warning: No mobile "temporary facility" under the control of or on the property of the Owner shall be staffed during a hurricane warning. Contractor facilities meeting these criteria shall be evacuated. Reasonable steps shall be taken to protect all such facilities and their contents from damage and to avoid the facility causing damage to the surroundings.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

- END OF SECTION -

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SECTION 01050
FIELD ENGINEERING AND SURVEYING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Provide and pay for field engineering and surveying services required for the project.
B. Owner's representative will identify existing control points, as required.
C. Related requirements in other parts of the project manual:
   1. Conditions of the Contract.
D. Related requirements specified in other sections and divisions:
   1. Section 01010 - Summary of Work.
   2. Section 01720 – Project Record Drawings.

1.2 QUALIFICATIONS OF SURVEYOR

A. Qualified Land Surveyor registered in the state of Florida.

1.3 SURVEY REFERENCE POINTS

A. Existing basic horizontal and vertical control points for the project are those designated on the drawings.
B. Contractor shall locate and protect survey control and reference points.

1.4 PROJECT SURVEY REQUIREMENTS

A. Establish lines, grades, and elevations by instrumentation or similar appropriate means utilizing recognized engineering survey practices.
B. Horizontal alignment for the proposed construction will be controlled by right-of-way lines, property line, and existing structures. The Contractor shall be responsible to establish reference lines and necessary offsets to establish piping alignment, and equipment and structure location.
C. Vertical alignment for the proposed construction will be based on the existing grades and benchmark identified on the drawings. The Contractor shall be responsible to establish proposed grades. The grade stakes shall be provided by the Contractor.

1.5 RECORDS

A. Maintain a complete, accurate log of all control and survey work as it progresses.
B. Submit a copy of the site drawing and certificate signed by land surveyor that the elevations and locations of the Work are in conformance with the Contract Documents.

1.6 SUBMITTALS

A. Deliver Submit name and address of Surveyor/Engineer or Owner.
B. On request, submit copies of field notes.

1.7 EXAMINATION

A. Contractor is responsible for verifying survey control points prior to initiation of work.

B. Contractor shall promptly notify Engineer of any discrepancies discovered.

1.8 QUALITY CONTROL

A. Quality control of the Work shall be the Contractor's responsibility and Contractor shall make every effort to produce the best quality of work, as specified on the drawings and specifications.

B. Twenty-four (24) hour notification to the Engineer by the Contractor shall be required for all specified field investigations unless otherwise noted.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

- END OF SECTION –

SECTION 01150

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 SCOPE OF THIS SECTION

A. The following explanation of the Measurement and Payment for the Schedule of Payment items is provided; however, the omission or reference to any item shall not alter the intent of the Bid Form or relieve the Contractor of the necessity of constructing a complete project under this Contract.

B. The quotations prepared by the Contractor for the various items of work are intended to establish a total price for completion of the work in its entirety. Should the Contractor feel that the cost for any particular work item has not been established by the Bid Items or this Section, the Contractor shall notify the Owner prior to submitting a Bid. If no notice is provided by Contractor to the Owner at least three days prior to the date Bids are due, Owner will expect that the submitted Bid includes all costs to complete the Work in its entirety.

C. The Owner reserves the right to increase or decrease the quantity of any item or portion of the work during the progress of construction in accordance with the terms of the Contract.

D. Unit prices, if used, are used as a means for computing the bid, for Contract purposes, for periodic payments, for determining value of additions or deletions.

E. Payment shall be made for the items listed on the Bid Form on the basis of the work actually performed and completed, such work including but not limited to, the furnishing of all necessary labor, materials, equipment, tools, transportation, delivery, disposal of waste and surplus material, and backfilling as shown in the plans, and all other appurtenances to complete the construction and installation of the work as shown on the drawings and described in the specifications.

F. Where quantities are shown they are approximate and are given only as a basis of calculation upon which the award of the contract is to be made. The Owner or ENGINEER do not assume any responsibility for the final quantities, nor shall CONTRACTOR claim misunderstanding because of such estimate of quantities. Final payment will be made only for the satisfactorily completed quantity of each item.

1.2 SUBMITTALS

A. Project Unit Costs and Payment Information:
   1. Schedule of Values to provide a breakdown of the work within each unit price item.
   2. Application for Payment
   3. Final Application for Payment
   4. Submittals shall be in accordance with Section 01300.

1.3 SCHEDULE OF VALUES

A. Contractor shall prepare a detailed schedule of values for Owner’s review with the signed Agreement to the Owner. The schedule shall contain sufficient detail quantifying the component

parts of Work for the purpose of making monthly progress payments during the construction period. Monthly progress payments will be based on the percentage of work demolished, procured, prepared, installed, completed, and accepted by the Owner.

B. The schedule shall contain sufficient detail for proper identification of work accomplished. The sum of all scheduled items shall equal the total value of the contract. The sum of the breakdown of each Bid Item shall equal the total value of the Bid Item.
C. Unit Price Work: Reflect unit price quantity and price breakdown from the conformed bid form.
D. Lump Sum Work:
   1. Reflect Schedule of Values
   2. List Bonds and Insurance, Mobilization, Demobilization, Facility Startup and Contract Closeout separately.
   3. Breakdown Divisions 1 through 4 with appropriate subdivision of each Specification.
E. An unbalanced, front end loaded schedule will not be accepted by Owner.

1.4 APPLICATION FOR PAYMENT

A. Include accepted schedule of values for each portion of work and the unit price breakdown for the work to be paid on a unit price basis, and a listing of Owner selected equipment, if applicable, and allowances, as appropriate.
B. Preparation:
   1. List each Change Order and Written Amendment executed prior to date of submission as a separate line item.
   2. Submit application for payment, a listing of materials on hand as applicable, and such supporting data as may be requested by the Owner/Engineer.
   3. Include Owner's Application for Payment Cover Sheet and partial or full releases of liens, as appropriate, for all subcontractors, suppliers, and Contractor.

1.5 COSTS INCLUDED IN PAYMENT ITEMS

A. No separate payment will be made for the following items and the cost of such work shall be included in the applicable pay items of work.
   1. Clearing and grubbing.
   2. Trench excavation, including necessary pavement removal, except as otherwise specified.
   3. Structural fill, backfill, density testing and grading.
   4. Replacement of unpaved roadways, grass and shrubbery plots.
   5. Cleanup.
   6. Foundation and borrow materials, except as hereinafter specified.
   7. Testing and placing existing AND new systems in operation, as described in the contract documents.
   8. Any material and equipment required to be installed and utilized for tests.
   9. Maintaining the existing quality of service during construction.
   10. Maintaining or detouring of the traffic, with all equipment and manpower to comply with Roadway and Traffic Standards, FDOT Indices 600, 601, 602, 603, 605, 607, 611, 612, 613, 616, 617, 618, 619, 625, 628, 630, and 635.
   11. Appurtenant work as required for a complete and operable system.

12. Cost for security (if special circumstances apply, approval must be received by the Engineer, in writing).
13. Record drawings.
14. Distribution of door hangers.
15. Material storage areas.
16. Disposal of excess fill and debris.
17. Scheduling and calling for utility locates.

B. Cleanup: Contractor's attention is called to the fact that cleanup is considered a part of the work of construction. No payment will be made until cleanup is essentially complete.

C. Work Outside Authorized Limits: No payment will be made for work constructed outside the authorized limits of work.

1.6 CHANGE ORDER PROCEDURE

A. As defined in the General Conditions, a Change Order is a written order to the CONTRACTOR signed by the Owner authorizing an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Time which is issued after the execution of the Agreement.

B. The following procedure shall be used in processing Change Orders:

C. For Additions to the Work:

1. The Owner shall issue a written order to the CONTRACTOR directing them to accomplish the additional work. The CONTRACTOR shall review the order and if they feel that the additional work entitles them to additional payment or additional time, they may submit a claim as prescribed in the General Conditions of the Contract.

D. For Deletions from the Work:

1. The Owner shall issue a written order to the CONTRACTOR directing them to make the change. If the Owner feels that the contract price should be reduced as a result of the change, the Owner shall make a claim for the reduction as provided in the General Conditions of the Contract.

E. Cost of the changes in the work shall be determined in accordance with the requirements spelled out in the General Conditions of the Contract. Modifications to incorporate the changes in cost will be made as the amount of any change is determined.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 BID ITEMS

A. <u>Bid item #1 – Mobilization and Planning</u>

1. The quantity to be paid for under this Section shall be on a lump sum basis. The Contractor's lump sum price shall include full compensation for all work related to mobilization and demobilization, and any other related work, except for any work designated to be paid for separately or to be specifically included in the costs of other work under the Contract.

2. Basis of Payment: Payment shall be made at the Contract Lump Sum Price and shall include, but not be limited to, the preparatory work and operations in mobilizing for beginning work on the project, including those operations necessary for the movement of personnel, equipment, supplies and incidentals to the project site and establishment of temporary provisions, controls, and utilities. This item shall include those permits that are required to be obtained by the contractor. This item shall also include field surveying/layout and complete record drawings in accordance with the project specifications and the applicable standards.
3. The items specified in this Section consist of the costs of any pre and post construction expenses necessary for the start and completion of the project, excluding the cost of construction materials. The sum of mobilization and demobilization shall not exceed 8% of the contract price. Partial Payments for mobilization shall be as follows:

Construction Percent Complete Lump	Allowable Percent of Sum for Mobilization
5%	25%
10%	50%
25%	75%
100%	100%

B. Bid Item #2 – Bonds and Insurance
1. Method of Measurement: The quantity to be paid for under this Section shall be on a lump sum basis. The work specified in this Section consists of securing the appropriate bonds and insurance policies in the amounts specified by the contract documents.
2. Basis of Payment: Payment shall be made at the Contract Lump Sum Price and shall include all compensation for bonds, insurance and indemnification in accordance with the Contract documents.

C. Bid Item #3 – Demolition of Existing Facilities
1. Method of Measurement: The quantity to be paid for under this Section shall be on a lump sum basis, based on the percentage of the Item completed, and accepted by Owner.
2. Basis of Payment: Payment shall be made at the Contract Lump Sum Price and shall include, but not limited to, furnishing all materials, labor, and equipment required to:
   a. Provide temporary standby emergency generator power and install underground service feed to the existing solids handling building ATS from the main electrical building feed to provide power to the solids handling building and main electrical building and any other items required for a complete and functional temporary standby emergency generator system such that both facilities are not without back-up emergency power.
   b. Demolish the existing solids handling generator, generator silencer, roof thimble, rain hood, fuel piping, fuel bulk tank (ConVault Tank), radiator exhaust duct, battery packs, and louver wall. Block fill of louver wall after removal of existing solids handling generator and generator components as shown in the construction drawings.
   c. Demolish the existing main electrical generator and ATS unit, generator silencer, rain hood, fuel piping, fuel day tank, radiator exhaust duct, and battery packs. Louver wall on inlet air plenum shall be temporarily removed to remove and replace existing generator and day tank. Masonry wall replacement on exterior wall of the inlet air plenum shown in the construction drawings.

D. Bid Item #4 – Generator and ATS Improvements
   1. Method of Measurement: The quantity to be paid for under this Section shall be on a lump sum basis, based on the percentage of the Item completed, and accepted by Owner.
   2. Basis of Payment: Payment shall be made at the Contract Lump Sum Price and shall include, but not limited to, furnishing all materials, labor, and equipment required to install, start up, and test the new main electrical generator and ATS unit, generator silencer, rain hood, fuel piping, fuel day tank, radiator exhaust duct, and battery starter packs.

E. Bid Item #5 – Undefined Conditions Allowance
   1. Included in this allowance is work associated with undefined conditions or reasonably anticipated conditions associated with the Work. This is an allowance, to be used solely at the discretion of the Owner and any to be completed under this item must be specifically approved in writing by the Owner, prior to the Work being initiated. Owner must approve in writing the mutually agreed upon total cost and additional time (if any) associated with said Work. Any work completed by the Contractor, under this Bid/Pay Item without the Owner's prior written approval will not be approved for payment by the Owner. The Owner reserves the right to award any, all, or none of the money associated with this allowance.

3.2 NON-PAYMENT FOR REJECTED OR UNUSED PRODUCTS

A. Payment will not be made for following:
   1. Loading, hauling, and disposing of rejected material.
   2. Quantities of excavated material wasted or disposed of in manner not called for under Contract Documents.
   3. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents.
   4. Material not unloaded from transporting vehicle.
   5. Defective Work not accepted by Owner.
   6. Material remaining on hand after completion of Work.

3.3 PARTIAL PAYMENT FOR STORED MATERIALS AND EQUIPMENT

A. Partial Payment: No partial payments will be made for materials and equipment delivered or stored for this project.

B. Final Payment: Will be made only for products incorporated in Work; remaining products, for which partial payments have been made, shall revert to Contractor unless otherwise agreed, and partial payments made for those items will be deducted from final payment.

C. Final Payment will not be made until all Record Drawings are acceptable to Owner/Engineer, Operation and Maintenance Manuals are final and acceptable to Owner/Engineer, final release of liens have been received for Contractor, Sub-contractor, suppliers, and vendors, all spare parts have been received (by Owner), and all punch list items are complete and acceptable to Owner/Engineer.

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SECTION 01300
SUBMITTALS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Contractor shall submit to the Engineer, shop drawings, estimated construction progress schedule, project data and samples required by specification sections.

1.2 SCHEDULES

A. Prepare and submit a Construction Schedule.
B. Prepare and submit a separate schedule listing dates for submission of shop drawings and projected return dates.
C. Schedules shall be updated and re-submitted on a monthly basis throughout the duration of the project.
D. Prepare and submit two-week look ahead schedules bi-weekly throughout duration of the project.
E. Coordinate all work with OWNER operations staff. Construction activities that impact operations require 48 hours advance notice and approval from the OWNER.

PART 2 - PRODUCTS

2.1 SHOP DRAWINGS

A. Original drawings, prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate portions of the Work; showing fabrication, layout, setting or erection details including, but not limited to the following:
   1. Concrete mix designs (with specific locations), grouts, etc.
   2. Reinforced masonry units
   3. Paintings, coatings, liners, etc.
   4. Color Samples
   5. Electrical Equipment and Wiring
   6. Mechanical equipment
   7. Generator and Ventilation Systems
   8. Structural metal fabrication drawings
   9. Fuel System Piping, Valves, and Accessories
   10. Fuel System Day Tank
   11. Electrical wiring diagrams
   12. Panel fabrication drawings
B. Prepare submittals by a qualified detailer.
C. Identify details by reference to sheet numbers and detail shown on Contract Drawings.

2.2 PROJECT DATA

A. Manufacturer's standard schematic drawings:
   1. Modify drawings to delete information which is not applicable to project.
   2. Supplement standard information to provide additional information applicable to project.
B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data.
   1. Clearly mark each copy to identify pertinent materials, products or models.
   2. Show dimensions and clearances required.
   3. Show performance characteristics and capacities.
   4. Show wiring diagrams and controls.

2.3 SAMPLES

A. Physical examples to illustrate materials, equipment or workmanship, and to establish standards by which completed work is judged.
B. Office samples of sufficient size and quantity to clearly illustrate:
   1. Functional characteristics of product or material, with integrally related parts and attachment devices.
   2. Full range of color samples.

2.4 PAY REQUESTS

A. Pay Requests shall be made in accordance with the requirements of the Agreement between Owner and Contractor. Payment requests shall include updated schedules as required in required 01300-1.2.

PART 3 - EXECUTION

3.1 SUBMISSION REQUIREMENTS

A. Schedule submissions at least 14 days before dates reviewed submittals will be needed.
B. Submit number of copies of Shop Drawings, Project Datum and Samples which Contractor requires for distribution plus 4 copies for the Owner and Engineer.
C. Accompany submittals with transmittal letter, in duplicate, containing:
   1. Date.
   2. Project title and number.
   3. Contractor's name and address.
   4. Notification of deviations from Contract Documents.
   5. Other pertinent data.
D. Submittals must include:
   1. Date of submittal and revision dates.
   2. Project title and number.
   3. The names of:
      a. Engineer.
      b. Contractor.
      c. Subcontractor.
      d. Supplier.

e. Manufacturer.
f. Separate detailer when pertinent.
4. Identification of product or material.
5. Relation to adjacent structure or materials.
6. Field dimensions, clearly identified as such.
7. Identification of deviations from Contract Documents.
8. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with Contract Documents.

3.2 RESUBMISSION REQUIREMENTS

A. Shop Drawings:
1. Revise initial drawings as required and resubmit as specified for initial submittal.
2. Clearly indicate on shop drawings all changes or revisions which have been made other than those requested by Engineer.
3. Re-submittals without all comments from original review addressed will be returned to the contractor.

B. Project Data and Samples:
1. Submit new datum and samples as required for initial submittal.

3.3 DISTRIBUTION OF SUBMITTALS AFTER REVIEW

A. Distribute copies of Shop Drawings and Project Datum which carry Engineer's stamp, to:
1. Contractor's file.
2. Job site file.
3. Record Documents file.
4. Other prime contractors.
5. Subcontractors.
6. Supplier.
7. Fabricator.

B. Distribute samples as directed.

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SECTION 01510
TEMPORARY UTLITIES

PART 1 - GENERAL

1.1 DESCRIPTION

A. The contractor is responsible for furnishing, installing, and maintaining temporary utilities required for construction and removal of temporary utilities once the project has been completed to the satisfaction of the Owner.

B. Contractor is responsible for maintaining emergency back-up power through the entire construction duration for both the Solids Handling Building and the Main Electrical Building and all equipment serviced by these buildings. The contractor will be responsible for the provision of a sound attenuated standby generator during interruptions in service required for the construction of the project.

1.2 REQUIREMENTS OF REGULATORY AGENCIES

A. Comply with National Electric Code.

B. Comply with federal, state, and local codes and regulations, and with utility company requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

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

2.2 TEMPORARY ELECTRICITY AND LIGHTING

A. The Contractor must maintain power to all existing buildings and areas.

B. The Contractor is responsible for providing and paying for all power required for his operations.

C. Contractor is responsible for arranging power for his office trailers(s), power tools, etc., at his own expense. The Contractor shall pay the costs of all power used.

D. The Contractor shall provide a temporary, sound attenuated stand-by generator to ensure the facility has a backup emergency power source at all times during the project construction. See Section 01010 – Summary of Work and Section 016001 – Electrical Demolition for additional details. The contractor shall be responsible for any temporary cables, connections, generator, and fuel that may be required for generator operation.

PART 3 - EXECUTION

3.1 GENERAL

A. Comply with applicable requirements herein.

B. Maintain and operate systems to ensure continuous service.

3.2 REMOVAL

A. Completely remove temporary materials and equipment when their use is no longer required.
B. Clean and repair damage caused by temporary installations or use of temporary facilities.
C. Restore existing facilities used for temporary services to specified, or to original, condition.

- END OF SECTION -

SECTION 01600
MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. The contractor is responsible for transportation, handling, storage, and protection of all proposed equipment to be delivered to the site as part of this project.
B. The contractor is responsible for coordinating all deliveries to the project site with the OWNER.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 TRANSPORTATION AND HANDLING

A. Deliver manufactured materials and products to the project site as needed for installation, undamaged, in original packages, containers, or bundles, as packaged by the manufacturer with manufacturer's name, brand, seals, and labels intact. Materials other than those designated within the specifications shall not be delivered to the project site.

3.2 STORAGE AND PROTECTION

A. Protect and preserve all materials until final acceptance of the project. Store all materials in a manner to facilitate inspection and to prevent damage, contamination, intermixing, or theft.
B. Miscellaneous metal, reinforcement bars, welded wire fabric, and masonry reinforcement materials shall be stored to prevent contact with the ground and from being damaged by its own weight or by other loads. Reinforcement which has become muddy shall be cleaned before use.
C. Store cementitious materials in weathertight sheds on elevated floors away from damp surfaces.
D. Do not use and dispose of materials that have been stored for longer than their maximum recommended shelf life or beyond their recommend shelf date.
E. Store and protect all material and equipment in accordance with manufacturer's recommendations.

3.3 PROTECTION OF EQUIPMENT

A. Keep products clean by elevating above ground or floor and by using suitable coverings. Take such precautions as are necessary to protect apparatus and materials from damage. Failure to protect materials is sufficient cause for rejection of the apparatus or material in question.
B. Protect factory finish from damage during construction operations and until acceptance of the project. Satisfactorily restore any finishes that become stained or damaged.

- END OF SECTION -

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SECTION 01700
PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 DESCRIPTION

A. Comply with requirements stated in the Agreement between Owner and Contractor and in Specifications for administrative procedures in closing out the Work.

1.2 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Section 01720 - Project Record Drawings
B. Section 01730 – Operating and Maintenance Manuals

1.3 SUBSTANTIAL COMPLETION

A. Substantial completion shall be defined as beneficial use of all proposed equipment. Beneficial use will not occur until the new generator, fuel system, ATS and all other components shown herein have been constructed, tested, and accepted by the Owner and Engineer of record. All warranties of major equipment shall start once the beneficial use date has been designated.
B. The Contractor shall deliver to the Engineer the Record Drawings and a draft copy of the Operations and Maintenance manuals for review and deliver to the Owner a complete set of all spare parts.
C. When Contractor considers the Work is substantially complete, Contractor shall submit to Engineer:
   1. A written notice that the Work or designated portion thereof, is substantially complete.
D. Within a reasonable time after receipt of such notice, Engineer will perform a field investigation to determine the status of completion.
E. Should Engineer determine that the Work is not substantially complete:
   1. Engineer will promptly notify the Contractor in writing, giving the reasons therefore.
   2. Contractor shall remedy the deficiencies in the Work and send a second written notice of substantial completion to the Engineer.
   3. Engineer will reinvestigate the Work.
F. When the Engineer finds that the Work is substantially complete, he will:
   1. Prepare and deliver to Owner a tentative Certificate of Substantial Completion, with a tentative list of items to be completed or corrected before final payment.
   2. After consideration of any objections made by the Owner and when Engineer considers the Work substantially complete, he will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.

1.4 FINAL SITE REVIEWS

A. When Contractor considers Work is complete, he shall submit written certification that:
   1. Contract Documents have been reviewed.
   2. Work has been investigated for compliance with Contract Documents.

3. Work has been completed in accordance with Contract Documents.
4. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
5. Work is completed and ready for Final Investigation.

B. Engineer will perform a field investigation to verify the status of completion with reasonable promptness after receipt of such certification.

C. Should Engineer consider that the Work is incomplete or defective:
1. Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work.
2. Contractor shall take immediate steps to remedy the stated deficiencies and send a second written certification to Engineer that the Work is complete.
3. Engineer will reinvestigate the Work.

D. When the Engineer finds that the Work is acceptable under the Contract Documents, he shall request the Contractor to make closeout submittals.

1.5 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

A. Project Record Drawings to the requirements specified.

B. Operating and Maintenance Manuals to the requirements specified. Applicable Warranties from material and equipment manufacturers shall be included in all manuals.

C. Contractor's affidavit of payment of debts and claims.
1. Contractor's release or waiver of liens.

D. Separate releases or waivers of liens for subcontractors, suppliers and others with lien rights against property of Owner, together with list of those parties.

1.6 FINAL ADJUSTMENTS OF ACCOUNTS

A. Submit a final statement of accounting to Engineer.

B. Statement shall reflect all adjustments to the Contract Sum:
1. The original Contract Sum.
2. Additions and deductions resulting from:
a. Previous Change Orders.
b. Allowances.
c. Unit Prices.
d. Deductions for uncorrected Work.
e. Deductions for liquidated damages.
f. Deductions for re-inspection payments.
g. Other adjustments.
3. Total Contract Sum, as adjusted.
4. Previous payments.
5. Sum remaining due.

C. Engineer will prepare a final Change Order reflecting approved adjustments to the Contract Sum which was not previously made by Change Orders.

1.7 FINAL APPLICATION FOR PAYMENT

A. Contractor shall submit the final Application for Payment in accordance with procedures and requirements stated in the Condition of the Contract.

1.8 FINAL CERTIFICATE FOR PAYMENT

A. Engineer will issue final certificate in accordance with provisions of the Contract Documents.

1.9 POST-CONSTRUCTION INSPECTION

A. Prior to expiration of one year from Date of Substantial Completion, Engineer will make visual field investigation of Project in company with Owner and Contractor to determine whether correction of Work is required, in accordance with provisions of the Contract Documents.
B. For Guarantees beyond one year, Engineer will make field investigations at request of Owner, after notification to Contractor.
C. Engineer will promptly notify Contractor, in writing, of any observed deficiencies.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

- END OF SECTION –

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SECTION 01720
PROJECT RECORD DRAWINGS

PART 1 - GENERAL

1.1 PROJECT RECORD DOCUMENTS

A. Maintain at the site for the Owner one record copy of:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other Modifications to the Contract.
   5. Engineer Field Orders or written instructions.
   6. Reviewed Shop Drawings.
   7. Field test records.

1.2 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Conditions of the Contracts
B. Section 01700 – Project closeout

1.3 MAINTENANCE OF DOCUMENTS

A. Store documents in approved location apart from documents used for construction.
B. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
C. Make documents available at all times for inspection by Engineer and Owner. Record drawing information shall be maintained concurrently with Pay Requests and updated project schedules.

1.4 MARKING DEVICES

A. Provide ink marking pens for recording information in a color code.

1.5 RECORDING

A. Label each document "PROJECT RECORD" in neat large printed letters.
B. Record information currently with construction progress.
   1. Do not conceal any work until required information is recorded.
C. Drawings shall be drawn to record actual construction:
   1. Field changes of dimension and detail.
   2. Changes made by Field Order or by Change Order.
   3. Details not on original Contract Drawings.
D. Specifications and Addenda; Legibly mark each Section to record:
   1. Manufacturer, trade name, catalog number, and supplier of each item actually installed.
   2. Changes made by Field Order or by Change Order.

1.6 SUBMITTAL

A. At Contract Close-out, Record Documents shall be submitted to Engineer in the following formats for Owner:
   1. One set on 24” x 36”.
B. Accompany submittal with transmittal letter in duplicate, containing:
   1. Date.
   2. Project title and number.
   3. Contractor's name and address.
   4. Title and number of each record document.
   5. Signature of Contractor or his authorized representative.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

- END OF SECTION -

SECTION 01730
OPERATION AND MAINTENANCE MANUALS

PART 1 - GENERAL

1.1 RELATED INFORMATION

A. Compile product data and related information appropriate for Owner's maintenance and operation of products furnished under the Contract.
   1. Prepare operating and maintenance data as specified in this Section and as referenced in other pertinent sections of Specifications.
B. Instruct Owner's personnel in the maintenance of products and in the operation of equipment and systems.
C. Related Requirements Specified in Other Sections.
   1. Section 01300 - Submittals
   2. Section 01720 - Project Record Drawings

1.2 FORM OF SUBMITTALS

A. Prepare data in the form of an instructional manual and electronic format for use by Owner's personnel.
B. Hard-Copy Format:
   1. Size: 8-1/2 in. x 11 in.
   2. Text: Manufacturer's printed data, or neatly typewritten.
   3. Drawings:
      a. Provide reinforced punch binder tab, bind in with text.
      b. Fold larger drawings to the size of the text pages.
   4. Provide fly-leaf for each separate product, or each piece of operating equipment.
      a. Provide typed description of product, and major component parts of equipment.
   5. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:
      a. Title of Project.
      b. Identity of separate structure as applicable.
      c. Identity of general subject matter covered in the manual.
C. Binders:
   1. Commercial quality expandable catalog binders with durable and cleanable plastic covers.
   2. When multiple binders are used, correlate the data into related consistent groupings.
D. Electronic format shall be in .pdf file format. Copies of specific manuals shall either be scanned or converted to .pdf format and submitted on CD disc to Owner. Submit after approval of hard copies from Engineer.

1.3 CONTENT OF MANUAL

A. Neatly typewritten table of contents for each volume, arranged in a systematic order.
   1. Contractor, name of responsible principal, address and telephone number.

2. A list of each product required to be included, indexed to the content of the volume.
3. List, with each product, the name, address and telephone number of:
   a. Subcontractor or installer.
   b. Maintenance contractor, as appropriate.
   c. Identify the area of responsibility of each.
   d. Local source of supply for parts and replacement.
4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.

B. Product Data:
1. Include only those sheets which are pertinent to the specific product.
2. Annotate each sheet to:
   a. Clearly identify the specific product or part installed.
   b. Clearly identify the data applicable to the installation.
   c. Delete references to inapplicable information.

C. Drawings:
1. Supplement product data with drawings as necessary to clearly illustrate relations of component parts of equipment and systems.
2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
3. Do not use Project Record Documents as maintenance drawings.

D. Written text, as required to supplement product data for the particular installation:
1. Organize in a consistent format under separate headings for different procedures.
2. Provide a logical sequence of instructions for each procedure.

E. Copy of each warranty issued.
1. Provide information sheet for Owner's personnel, give:
   a. Proper procedures in the event of failure.
   b. Instances which might affect the validity of warranties.

1.4 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit six (6) complete copies of manual in final form and two compact discs (CD) in PDF format. CD shall include bookmarks and chapters to closely duplicate that of the paper copy.

B. Content, for each unit of equipment and system, as appropriate:
1. Description of unit and component parts.
   a. Function, normal operating characteristics, and limiting conditions.
   b. Performance curves, engineering data and tests.
   c. Complete nomenclature and commercial number of all replaceable parts.
2. Operating procedures:
   a. Start-up, break-in, routine and normal operating instructions.
   b. Regulation, control, stopping, shut-down and emergency instructions.
   c. Summer and winter operating instructions.
   d. Alignment, adjusting and checking.
3. Servicing and lubrication schedule:
   a. List of lubricants required for each piece of equipment.

b. Schedule for manufacturer recommended maintenance.

4. Manufacturer's printed operating and maintenance instructions.
5. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
6. Other data as required under pertinent sections of specifications.

1.5 SUBMITTAL SCHEDULE

A. Submit one copy of completed data in final form fifteen days prior to final inspection or acceptance. Electronic submittal for initial review is acceptable.
   1. Copy will be returned after final inspection or acceptance, with comments.
B. Submit specified number of copies of approved data in final form 10 days after final inspection or acceptance.

1.6 INSTRUCTION OF OWNER'S PERSONNEL

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

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

- END OF SECTION -

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SECTION 02016

EXISTING UTILITIES AND UNDERGROUND STRUCTURES

PART 1 - GENERAL

1.1 GENERAL

A. The plans depict the approximate location of the existing utilities. The locations of those facilities (horizontal and vertical) were obtained from record drawings. Guarantee is not made that all existing underground utilities are shown or that the location of those shown are entirely accurate. Finding the actual location of any existing utilities is the contractor's responsibility and shall be done before he commences any work in the vicinity. Furthermore, the contractor shall be fully responsible for any and all damages due to the contractor's failure to exactly locate and preserve any and all underground utilities.

1.2 CONTRACTOR'S RESPONSIBILITIES

A. Contractor shall notify the Sunshine State One Call of Florida (SSOCF) service at 811, 48 hours prior to digging.
B. Locate the cables, ducts, conduit, pipeline, etc. in advance of the proposed construction.
C. Notify Engineer of any substantial changes and/or conflicts that would require a deviation in the plans. Late discovery of existing underground utilities does not constitute "required" deviations should early discovery prevent them.
D. Repair any damage done to existing utilities at no additional expense to the Owner.
E. Remove or modify those utilities scheduled to be removed or modified on the plans.

1.3 PRECONSTRUCTION VIDEO

A. At least one (1) week prior to the start of construction, the contractor shall have video recordings taken of the entire project area. This area includes but is not limited to, the entire site work area, the construction staging area, site access driveways, the areas around all of the existing structures, generator rooms and air plenum areas, buildings, and all portions of the electrical rooms. Such recordings shall be provided to the Owner and Engineer before the commencement of construction. These recordings shall serve as record of the conditions as they existed prior to the start of the work. They will be used in the event of a dispute that arises from restoration or damage claims. The contractor shall pay particular attention to any existing damage within the work area and ensure that these items are documented on the video prior to construction.
B. Video tapes are to be delivered to the Owner and Engineer on a DVD in a standard video format that is able to be viewed on a Windows operating system. All videotapes shall become the property of the Owner.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

- END OF SECTION -

SECTION 02065
DEMOLITION

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The Contractor shall furnish all supervised labor, materials, equipment, and incidentals required for the removal of the items necessary to be removed in order construct the project as indicated on the plans and in accordance with the specifications. Removal of items that provide emergency back up power to facilities shall not be demolished until temporary emergency backup power has been established.
B. The Contractor is responsible for removal of all debris from the site and proper disposal of debris.

1.2 CONDITION OF STRUCTURES

A. By submitting a bid, the Contractor affirms that the Contractor has carefully examined the site and all conditions affecting the Work. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner insofar as practicable.

1.3 RULES AND REGULATIONS

A. The Building Code of the State of Florida shall control the demolition, modification or alteration of the existing site.
B. No blasting shall be done on site.

1.4 SUBMITTALS

A. Contractor shall follow sequence of demolition and construction of proposed equipment as described herein.
B. Provide a detailed sequence of demolition and removal work as part of the Contractor's schedule.

1.5 ACCESS

A. Conduct demolition and modification operations, and the removal of equipment and debris to ensure minimum interference with roads and walks both on-site and off-site and to ensure minimum interference with occupied or used facilities.
B. Special attention is directed towards maintaining safe and convenient access to the existing facilities by Owner’s operations personnel and associated vehicles.
C. Do not close or obstruct streets, walks or other occupied or used facilities without permission from the Engineer. Provide alternate routes around closed or obstructed traffic in access ways.

1.6 PROTECTION

A. The Contractor shall conduct construction activities to minimize damage to adjacent buildings, structures, utilities, storm drainage, and other facilities, including persons.

1.7 DAMAGE

A. The Contractor shall immediately report damage caused to adjacent facilities by demolition operations. The Contractor shall promptly make all required repairs as directed by the Engineer and at no cost to the Owner.

1.8 UTILITIES

A. It shall be the Contractor's responsibility to maintain existing utilities in service and protect against damage during demolition operations.

1.9 POLLUTION CONTROL

A. For pollution control, use sprinkling, temporary enclosures, and other suitable methods as necessary to limit the amount of dust and dirt rising and scattering in the air to the lowest level of air pollution practical for the conditions of work. Comply with the governing regulations.
B. Clean adjacent structures and improvements of all dust, dirt, and debris caused by demolition operations. Return areas to conditions existing prior to the start of work.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 REMOVAL OF EXISTING EQUIPMENT, PIPING AND APPURTENANCES

A. Subject to the constraints of maintaining the existing utilities in operation; existing pumping equipment, valves, piping, and appurtenances not necessary for the operation of the new facility shall remain the property of the Owner unless otherwise directed by the Owner. The Contractor shall remove, clean, and prepare for storage all equipment to remain as directed by the Owner. If the Owner elects not to retain ownership of a certain item, the item shall become the property of the Contractor and shall be removed from the site at the Contractor's expense.
B. If the Owner elects not to retain ownership of a certain item, the item shall become the property of the Contractor and shall be removed from the site at the Contractor's expense.
C. All equipment and materials to be stored for reinstallation or salvage shall be properly protected from damage.
D. Any items of equipment damaged or lost due to the Contractor's carelessness, mishandling, or faulty procedures and/or workmanship shall be repaired or replaced in kind to the satisfaction of the Engineer.

- END OF SECTION -

SECTION 02200

EARTHWORK, EXCAVATION, AND BACKFILL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. The work covered by this section consists of furnishing all labor, equipment, and materials, and performing all earthwork operations to include:
   1. Excavation and backfill of structures, foundations, and pavements.
   2. Surface preparation for structures, foundations, and pavements.
   3. Excavation and backfill of pipe trenches
   4. Site grading
   5. Soil compaction and stabilization requirements
   6. Soil testing

1.2 REFERENCES

A. Florida Department of Transportation Standard Specifications for Road and Bridge Construction, Latest Edition.

B. American Society for Testing and Materials (ASTM)

D698	Moisture-Density Relationship of Soils.
D1556	Standard Method of Test for Density of Soil in Place by Sand Cone Method.
D1557	Method for Test for Moisture-Density Relations of Soils Using a 10-Pound Rammer and 18-Inch Drop.
D2487	Classification of Soils for Engineering Purposes
D2922	Density of Soil and Soil-Aggregate in Place by Nuclear Methods

1.3 RELATED SECTIONS SPECIFIED ELSEWHERE

A. Drawings and general provisions of the Contract, including the General and Supplementary Conditions and Division 1 Specification sections, apply to this section.
B. Section 01410 - Testing Laboratory Services
C. Section 02016 - Existing Utilities and Underground Structures
D. Section 02150 – Dewatering
E. Section 15100 – Piping and Valves

1.4 FIELD MEASUREMENTS AND COORDINATION

A. Verify that survey benchmark, control point, and intended elevations for the work are as shown on the Drawings.
B. Verify that work associated with lower elevation utilities is complete before placing higher elevation utilities.
C. Maintain carefully all benchmarks, monuments and other reference points; if disturbed or destroyed, replace at no expense to Owner.

1.5 SUBSURFACE SOILS DATA

A. Owner and Engineer make no representations or statements as to site or soil conditions and therefore do not assume any responsibility for actual site or soil conditions. It shall be Contractor's responsibility to determine for himself existing site and/or soil conditions.

PART 2 - PRODUCTS

2.1 EXCAVATION

A. All excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

2.2 SOURCE QUALITY CONTROL

A. If tests for a material type fail three times, the Engineer may reject the source supplier and require the contractor to submit a new source for approval, at no additional cost to the Owner. The on-site soils are considered acceptable material and may be used, provided that it meets the specified requirements.

B. Quality control of the work shall be the Contractor's responsibility and Contractor shall make every effort to produce the best quality work as specified on the Drawings and in these Specifications.

2.3 STRUCTURAL FILL AND BACKFILL

A. Fill and backfill under and around all structures shall be suitable approved imported or on-site material. Material shall be free of organic material, shall have not more than 10 percent by dry weight passing the U.S. Standard No. 200 sieve, and shall have no rocks larger than 1 inches in size.

B. On site organic soils or other on-site soils with more than 10% by dry weight passing the U.S. Standard No. 200 sieve are not suitable for use as fill under structures, pavers, pavements, and concrete.

2.4 EARTHFILL

A. On-site excavated material free from roots, trash, and rocks larger than 1 inch.

2.5 WATER FOR COMPACTION

A. Contractor shall furnish potable water, as required. Contractor may coordinate with the Owner to arrange for a hydrant meter for water during construction. Costs associated with the hydrant meter shall be paid for by the Contractor.

2.6 EQUIPMENT

A. All equipment shall be suitable and adequate to perform the work specified. Compaction equipment shall be vibratory type.

PART 3 - EXECUTION

3.1 PREPARATION

A. Identify required lines, levels, contours, and datum locations. Protect bench marks, survey control points, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
B. Locate, identify, and protect utilities that remain from damage.

3.2 STRIPPING TOPSOIL

A. Stripping of topsoil shall be performed prior to any cutting, excavation, removal and/or replacement or fill materials.
B. Strip topsoil from area within boundaries of proposed construction lines to a depth of approximately 4-inches. The top materials stripped shall be removed and disposed of off-site, unless authorized for use on the site by the Owner/Engineer.
C. Stripping of topsoil shall ensure that entire site is stripped and scraped clean of all brush, weeds, grass, roots, vegetation, etc.

3.3 CUTTING

A. Except as otherwise specified, after stripping of topsoil all site areas which are above elevation required shall be cut to subgrades required by drawings.

3.4 PROOF ROLLING

A. Not Used.

3.5 FILLING

A. Except as otherwise specified, after stripping of topsoil all site areas which are below elevation required shall be compacted as specified and then over such areas clean granular fill placed and compacted in layers not exceeding 12" in uncompacted thickness. Each layer of fill shall be compacted to at least 95% of the modified proctor maximum dry density (ASTM D1557). Filling and compaction shall continue until subgrades required for various areas are reached. All holes and depressions caused from removal of trees, stumps, etc. shall be filled and compacted. Fill shall be good clean material as previously specified.

3.6 EXCAVATION UNDER STRUCTURES AND PAVEMENT AREAS

A. Excavation shall be performed to elevations and dimensions required by drawings with suitable allowance made for construction operations and inspections. Excavation carried to depths below required elevations shall be replaced in layers a maximum of 4" in depth and compacted in a manner to achieve a minimum density of 98% of the maximum dry density as determined by a modified proctor in accordance with ASTM D-1557. Contractor may place additional concrete in lieu of replacing and compacting excess excavation as specified above to fill excess cut. Correction of excess cut shall be responsibility of Contractor at no additional cost to Owner.
B. Compact disturbed load bearing soil in direct contact with foundations to achieve a minimum density of 98% of the maximum dry density as determined by a modified proctor in accordance with ASTM D-1557.
C. Slope banks with machine to angle of repose or provide necessary shoring.

D. Do not interfere with 45 degree bearing splay of existing foundations without providing adequate means of shoring protection.
E. Grade top perimeter of excavation to prevent surface water from draining into excavation.
F. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
G. Correct areas over excavated in accordance with this section.
H. Remove excavated material unsuitable for backfill from site.
I. When muck or other deleterious materials is encountered in the excavation, it shall be completely removed within the area of the structure or pavement and to a depth where acceptable material is encountered. After removal of all muck or other deleterious material, the area shall be backfilled with approved fill material to the specified grade.

3.7 TRENCH EXCAVATION AND PREPARATION

A. Excavation: Excavate as required for the installation of all piping, utilities, conduits, and appurtenances.
B. Trench Width: Cut trenches sufficiently wide to enable installation, compaction and inspection. The maximum width will not be limited except where excessive trench width would cause damage to adjacent structures or piping.
C. Grade: Excavate the bottom of the trench to the line and grade shown, or as established by the Engineer with proper allowance for pipe bedding.
D. All trench work shall comply with the Trench Safety Act of 1990, with latest revisions.
E. Piping shall be installed in a dry trench.
F. When acceptable material is encountered in the trench, the bottom shall be excavated and graded to the depth required so as to provide a uniform and continuous bearing and support for the pipe on solid and undisturbed ground at every point between bell holes.
G. Bell holes shall be provided at each joint to permit the joint to be made properly. At no time shall the bells support the pipe when in the trench.
H. When muck or other deleterious materials is encountered in the trench, it shall be completely removed for the width of the trench at the pipe and to a depth where acceptable material is encountered. After removal of all muck or other deleterious material, the trench shall be backfilled with bedding material to the bottom of pipe grade.
I. See the Indian River County's Standards for additional requirements.

3.8 MAINTENANCE OF EXCAVATION

A. The excavation shall be maintained at a dry condition at all times.
B. All side slopes shall be such that material will not slide into the bottom of the excavation and any material doing so shall be immediately removed. Trench side slopes shall be in accordance with local codes, OSHA requirements, and the Trench Safety Act.
C. All excavated material shall be piled in a manner that will not endanger the work and that will avoid obstructing sidewalks and driveways. Hydrants under pressure, valve pit covers, valve boxes, curb stop boxes, fire and police call boxes, or other utility controls shall be left unobstructed and accessible until the work is completed.
D. Trees, shrubbery, fences, poles, bollards and all other property and surface structures shall be protected unless their removal is shown on the drawings or authorized by the Engineer.

3.9 BACKFILL UNDER STRUCTURES AND PAVEMENT AREAS

A. Backfilling of excavated areas under, around or over building and structural appurtenances and pavement or pavers shall be performed with clean fill materials which are free of debris, organics, trash or other deleterious substances. Suitable compaction equipment shall be used to obtain density described previously for entire depth of backfilling. Each layer of backfill under structures, pavements, and pavers shall be compacted to a minimum of 98% of the maximum dry density as determined by a modified proctor in accordance with ASTM D-1557. Each layer of compacted backfill shall not exceed 12-inches in thickness. The completed, compacted surface shall be at the proper final subgrade elevation.

B. Verify that the specified density extends to 12 inches below the bottom of the structure or pavement base course to be installed.

3.10 TRENCH BACKFILLING

A. Haunch Backfill: Carefully place Pipe Bedding material so as not to damage the pipe in maximum 6 inch loose lifts and compact to the pipe centerline. Use hand-held compaction equipment.

B. Pipe Zone: Backfill with Pipe Bedding material in maximum 12 inch loose lifts and compact to a point 12 inches above the pipe crown.

C. Under Pavement/Paver Areas, and Structures: In areas where backfill settlement must be held to a minimum, backfill above the pipe zone with Pipe bedding material in maximum 12 inch loose lifts and compact to a minimum 98 percent of the maximum dry density (ASTM D 1557) up to the subgrade elevation.

D. Outside Pavement/Paver Areas: In areas where backfill settlement is not critical, backfill above the pipe zone with earthfill material to a density equal to or greater than the soil adjacent to the pipe trench, but not less than 90 percent of the maximum dry density (ASTM D 1557), to final grade.

E. No material shall be used for backfill which contains muck or other deleterious material or material with an excessive void content. All backfill shall be composed of select clean granular material.

F. All trenches and excavation shall be backfilled immediately after all pipe and joints have been investigated and approved by the Engineer or Utility Department, subject to satisfactory pressure and leakage test results, as required.

G. Backfill, in general, shall be kept up with the rate of pipe laying. No more than 200 feet of pipe trench shall be open at one time at any one project location.

H. Refer to Indian River County's Standards for additional requirements.

3.11 BACKFILL AROUND STRUCTURES

A. Obtain Owner/Engineer's acceptance of concrete work and attained concrete strength prior to backfilling.

B. Backfill with Structural Backfill material placed in maximum 12 inch loose lifts and compacted to a minimum 95 percent of maximum dry density as determined by the modified proctor test (ASTM D 1557).

C. Compact backfill adjacent to structures with equipment that will not damage the structure.

D. Backfill with flowable fill or other material shall be only if reviewed and approved by the Engineer.

3.12 SITE GRADING

A. Fill and contour site areas with Earthfill material to elevations shown and as required to prepare the site for landscape grading and sodding.
B. Place materials in maximum 12-inch loose lifts and compact as required to limit subsequent settlement.

3.13 COMPACTION TESTING

A. In-situ compaction testing shall be performed by the Owner's laboratory.
B. Compaction testing shall be done by nuclear density equipment or other approved methods. (ASTM D-2937, D-1557, D-2922)
C. Density testing shall be performed as follows:
   1. Pipe Trenches: 1 test per lift per 100 feet of pipe.
   2. Fill Under Structures: 1 test per lift under pump pad.
   3. Fill Under Pavement Areas: 1 test per lift per 2,000 square feet of compacted surface area.
D. Test results in a specific location are only representative of a larger area if the contractor has used consistent compaction means and methods and the soils are practically uniform throughout. If it is determined by the Owner/Engineer that there are variations in the compaction methods and/or soil uniformity, additional testing may be required.

3.14 FINAL AND FINISH GRADING

A. Using clean topsoil, perform all final and finish grading in all yard and planting areas indicated on drawings. Topsoil shall be placed to a minimum of 6" thickness, rototilled to a minimum depth of 8", leveled and finish graded in all areas.
B. Final grading shall be performed and grades shaped to finished elevations indicated. Finish grades (top of the soil) shall be approximately 1-1/2" below edges of pathways, curbs and other paved or concrete slabs. After sod installation, the top of the sod shall not be more than 1/2" below or shall be flush with the grade established by any adjacent paved or curbed surface.
C. The Contractor shall verify that all finish subgrades are correct prior to beginning installation of sod and planting materials. Upon completion of the project work, the Contractor shall prepare "record drawings" verifying that all finish grades are in accordance with the contract documents and shall submit same to the Owner/Engineer for review and acceptance prior to requesting final inspection of the project. The "record drawings" shall be prepared by a surveyor registered in the State of Florida.
D. Upon project completion, all areas of site within immediate construction and adjacent areas shall be completely cleaned of all debris occasioned by this construction of this construction. Particular attention is called to any cement, mortar, masonry drippings and plaster which shall be completely removed from planting and lawn areas and shall be disposed of off-site.
E. All areas adjacent to site and all areas not within contract construction areas shall be left in reasonably same condition as they were found prior to commencement of construction.
F. Any damage to the existing adjacent facilities including adjacent lakes or roads, and related areas such as, but not limited to, finish grades, slopes, grass sod, structures, pipe, etc. shall be repaired and restored to a proper and appropriate condition acceptable to the Owner/Engineer.

3.15 EXCESS MATERIAL

A. Remove all excess suitable material from the site and dispose of at Contractor’s expense.
B. Unsuitable materials shall also be removed and disposed of off-site at Contractor's expense.

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SECTION 02485
GRASSING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The Contractor shall furnish all labor, equipment, and materials necessary for grassing all areas disturbed by his operations and any other areas on the plans indicated to receive grassing. It is the intent of this specification that damaged areas are to be replaced in kind, with sod to be used for all maintained yard areas. The Owner/Engineer shall designate those areas to receive seed and those areas to receive sod. Owner/Engineer shall also designate the type of seed/sod to be used in each area. Contractor shall take all steps practical to minimize the area required to be sodded or seeded. All grassing shall be in accordance with Section 570-1 through 570-5 of the 2021 FDOT Standard Specifications for Road and Bridge Construction, except as modified herein.

1.2 STORAGE OF MATERIALS

A. The Contractor shall provide space for storage of sod prior to placement in a manner that will not endanger or restrict pedestrian or vehicular traffic or interfere with other aspects of the work.

PART 2 - PRODUCTS

2.1 SOD

A. Types: Sod shall be St. Augustine Floratam, Argentine Bahia, Centipede, or Bermuda, depending on type of existing sod in adjacent area to be matched. Sod shall be well matted with roots. Where sodding will adjoin, or be in sufficiently close proximity to private lawns, types of sod other than those listed above may be used if desired by the affected property owners and approved by the Engineer. Sod shall be delivered in commercial-size rectangles, preferably 12-inch by 24-inch or larger.

B. Condition: The sod shall be sufficiently thick to secure a dense stand of live grass. The sod shall be live, fresh, and uninjured at the time of planting. It shall have a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. It shall be reasonably free of weeds and other grasses. It shall be planted as soon as possible after being dug and shall be kept moist from the time it is planted.

2.2 SEED

A. General: All seed shall meet the requirements of the State Department of Agriculture and Consumer Services and all applicable State laws. The seed shall have been harvested from the previous year's crop. When a low percentage of grass seed or native seed germination causes the quality of the seed to fall below the minimum pure live seed percentage as to specified below, the Contractor may elect, subject to the approval of the Engineer, to increase the rate of

application sufficiently to obtain the minimum germination rate specified. No payment will be made for the added seed.

B. Delivery and Storage: Each of the species or varieties of seed shall be furnished and delivered in separate labeled bags. During handling and storage, the seed shall be cared for in such a manner that it will be protected from damage by heat, moisture, rodents, and other causes. All permanent and temporary grass seed shall have been tested within a period of six months of the date of planting.

C. Purity and Germination: All permanent and temporary grass seed shall have a minimum percent of purity and germination as follows:

D. Argentine Bahia Grass Seed shall have a minimum pure seed content of 95 percent, with a minimum germination of 80 percent.

E. Pensacola Bahia Grass Seed shall have a minimum pure seed content of 95 percent, with a minimum active germination of 40 percent and a total germination of 80 percent, including firm seed.

F. Bermuda Grass Seed shall be of common variety with a minimum germination of 85 percent.

G. Annual Type Rye Grass Seed shall have a minimum pure seed content of 95 percent, with a minimum germination of 90 percent.

2.3 MULCH

A. The mulch material used shall normally be dry mulch. Dry mulch shall be straw or hay, consisting of oat, rye, of wheat straw, or of pangola, peanut, coastal Bermuda, or Bahia grass hay. Only deteriorated mulch which can readily be cut into the soil shall be used.

2.4 GRASSING EQUIPMENT

A. Seed Spreader: The seed spreader shall be an approved mechanical hand spreader or other approved type of spreader.

B. Equipment for Cutting Mulch into Soil: The mulching equipment shall be of a type capable of cutting the specified materials uniformly into the soil, and to the required depth. Harrows will not be allowed.

C. Rollers: A cultipacker, traffic roller, or other suitable equipment will be required for rolling the grassed areas.

PART 3 - EXECUTION

3.1 GENERAL CONSTRUCTION METHODS

A. Seeding and mulching operations will not be permitted when wind velocities exceed 15 miles per hour. Seed shall be sown only when the soil is moist and in proper condition to induce growth. No seeding shall be done when the ground is frozen, unduly wet, or otherwise not in a tillable condition. Whenever a suitable length of right-of-way or adjacent area has been graded, it shall be made ready, when directed by the Engineer, and grassed in accordance with these specifications. Grassing shall be incorporated into the project at the earliest practical time in the lift of the contract.

3.2 SODDING

A. Preparation of Area to be Sodded: The ground which is to receive sod shall have been graded to proper elevations (2" below sodded grade) to match pre-construction conditions or proposed grades. All disturbed swales and ditches shall have been restored to their pre-construction condition or better. The pre-construction grade shall be maintained and the prepared soil shall be loose and reasonably smooth. It shall be reasonably free of large clods, roots, patches of existing grass, and other material which will interfere with the sod-laying operations or subsequent mowing and maintenance operations.

B. Laying of Sod: Sod shall be installed in all areas so designated by Owner/Engineer. Sod shall be carefully placed so that each piece abuts flush to all surrounding sod, regardless of whether surrounding sod is new or existing. Where new sod is to be placed adjacent to existing sod, the new sod must be cut in to match the elevation of the existing sod. Uneven sod which might cause mowing problems will be rejected. New sod laid on top of existing sod will also be rejected. All sod placed on steep slopes (greater than 1:1) shall be pinned with a wooden pin to keep it in place.

C. Rolling: Immediately after completion of the sod laying, the entire sodded area shall be rolled thoroughly with the equipment specified. At least two trips over the entire area will be required.

D. Watering: Newly-sodded areas are to be watered by Contractor as necessary to keep sod alive until the Contractor is closed out. Dead sod shall be replaced by Contractor prior to contract closeout.

3.3 SEEDING

A. Sequence of Operations: The operations involved in the work shall proceed in the following sequence: preparation of the ground, seeding, spreading, and cutting in mulch.

B. Preparation of Area to be Seeded: The ground over which the seed is to be sown shall be prepared by disk-harrowing and thoroughly pulverizing the soil to a suitable depth. The prepared soil shall be loose and reasonably smooth. It shall be reasonable free of large clods, roots, and other material which will interfere with the work or subsequent mowing and maintenance operations.

C. Application of Seed: While the soil is still loose, the seed shall be scattered uniformly over the grassing area and immediately mixed into the seed bed to a depth of one-half inch. Unless other types of seed are called for, permanent-type grass seed shall be a mixture of 20 parts of Bermuda seed and 80 parts of Pensacola Bahia seed. Quick-growing type grass seed shall be a species which will provide an early ground cover during the particular season when planting is done and will not later compete with permanent grass. The separate types of seed used shall be thoroughly dry-mixed immediately before sowing. Seed which has become wet shall not be used.

D. Mulching: When mulching is called for, approximately two inches, loose thickness, of the mulch material shall then be applied uniformly over the seeded area, and the mulch material cut into the soil with the equipment specified, so as to produce a loose mulched thickness of three to four inches. Care shall be exercised that the materials are not cut too deeply into the soil. No artificial watering of the mulch shall be done before it is applied.

E. Rolling: Immediately after completion of the seeding, the entire grassed or mulched area shall be rolled thoroughly with the equipment specified. At least two trips over the entire area will be required.

F. Watering: Newly seeded areas are not to be watered to force the seed germination, but only to sustain grass growth. Water will only be used on vegetated areas when permitted by the Engineer.

G. Operations on Steep Slopes: On steep slopes when mulching is called for, the mulch material may be anchored down in lieu of being cut into the soil by use of a machine. Anchoring may be done by either of the following methods:

1. Placing a layer of soil, approximately two inches thick by nine inches wide, along the upper limits of the mulch, and spotting soil piles over the rest of the area at a maximum spacing of four feet.
2. Spreading a string net over the mulch, using stakes driven flush with the top of the mulch, at six-foot centers, and stringing parallel and perpendicular, with diagonals in both directions.

H. Maintenance: The Contractor shall, at his expense, maintain the planted areas in a satisfactory condition until final acceptance of the project. Such maintenance shall include the filling, leveling, and repairing of any washed or eroded areas, as may be necessary. The Engineer, at any time, may require replanting of any areas in which the establishment of the grass stand does not appear to be developing satisfactorily. If a planted area must be replanted due to the Contractor's negligence, carelessness, or failure to provide routine maintenance of such areas, such replacement shall be at the Contractor's expense. If replanting is necessary due to factors determined to be beyond the control of the Contractor, payment for replacement will be made under the appropriate contract pay items.

- END OF SECTION -

SECTION 02510
PAVING AND SURFACING

PART 1 - GENERAL

1.1 SCOPE

A. The work covered by this section of the Specifications consists of furnishing all labor, materials, equipment and supplies and performing all operations for the construction of pavements under this Contract.

1.2 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Section 01010 - Summary of Work
B. Section 02200 – Earthwork, Excavation and Backfill

1.3 REFERENCED SPECIFICATIONS

A. It is the intent of these Specifications that the Florida State Department of Transportation "Standard Specifications for Road and Bridge Construction", latest edition, referred to herein and on the construction drawings as "DOT Std. Spec's", be used where applicable for the various items of work, and that where such wording therein refers to the State of Florida and its Department of Transportation and personnel such working is intended to be replaced with that wording which would provide proper terminology; thereby making such "Standard Specifications for Road and Bridge Construction" the standard specifications for this project unless otherwise shown on the construction drawings or indicated in the Contract Documents. Said "DOT STD. Spec's" shall include current Supplemental Specifications issued by the Fla. DOT.

1.4 SUBMITTALS

A. Submit in accordance with Section 01300.
B. Submit name of all material sources to the Engineer. Provide materials from the same approved source throughout the project. All material sources shall be Florida DOT approved.
C. Submit proposed job-mix design to the Engineer for review.
D. Submit written certifications that each material conforms to these specifications.

PART 2 - PRODUCTS

2.1 BASE MATERIALS

A. Limerock material shall meet the requirements of Section 911 of the DOT Std. Specs.
B. Coquina (shell rock) material shall meet the requirements of section 915 DOT Standard Specifications, including an average LBR of not less than 100. A coquina certification specification shall be submitted per Section 01300. Contractor to bid and use only one base material throughout the project.

2.2 PRIME AND TACK COATS

A. The materials used for prime and tack coats shall meet the requirements of Section 300 of the DOT Std. Specs.

2.3 ASPHALTIC CONCRETE

A. Type S-I: The material used for Type S-I Asphaltic Concrete shall meet the requirements of the Fla. DOT Std. Specs latest edition.

2.4 EQUIPMENT

A. All equipment associated with the operations of pavement placement and related work shall be entirely suitable for the applicable operations performed and shall be maintained in good condition.

2.5 QUALITY CONTROL

A. Quality control of the work shall be the Contractor's responsibility and said Contractor shall make every effort to produce the best quality work as specified on the Plans and in these Specifications.
B. Density tests on the compacted subgrade and base shall be performed by an independent testing laboratory at locations designated by the Engineer.

PART 3 - EXECUTION

3.1 SUBGRADE AND SHOULDER STABILIZATION (TYPE C)

A. The pavement subgrade and roadway shoulders shall be prepared, graded, stabilized and compacted to the lines and grades as shown on the Plans in accordance with Type C Stabilization in Section 160 of the DOT Std. Specs. Both shoulder and subgrade to provide minimum 75 lb. Florida Bearing Value or a minimum limerock bearing ratio of 40. Subgrade shall be compacted to not less then 98 percent of the maximum density as determined by AASHTO T-180.
B. Stabilized subgrade may be substituted using 12” minimum shell or limerock base and as approved by the Engineer.

3.2 BASE

A. Shell or limerock shall be prepared, graded and compacted to the lines and grades as shown on the Plans and in accordance with Section 200 of the DOT Std. Specs. Base shall be compacted to not less than 98 percent of the maximum density as determined by AASHTO T-180.

3.3 PRIME AND TACK COAT

A. Base shall receive a prime coat with cover material in accordance with Section 300 of the DOT Std. Specs.
B. Pavement overlays shall receive a tack coat in accordance with Section 300 of the DOT Std. Specs.

3.4 ASPHALTIC CONCRETE SURFACE COURSE

A. Asphaltic concrete surface course shall be constructed to a minimum thickness as specified on the Plans.
B. Asphaltic concrete surface course shall be constructed in accordance with Sections 320 and 330 of the DOT Std. Specs.

C. All existing exposed edges which abut to new Asphaltic Concrete Surface Course shall be saw cut in a straight and neat appearing line.

D. All asphaltic concrete surface course pavement replacement shall be placed by mechanical spreading and screeding equipment as specified in Article 320-6.1 of the DOT Std. Specs. unless otherwise indicated. This will require at least an 8 ft. width for surface course placement unless specialty equipment is used which has received prior approval of the Engineer.

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SECTION 02800
SITE RESTORATION

PART 1 - GENERAL

1.1 GENERAL

A. All applicable provisions of the General Conditions are part of this section. Payment for all labor, equipment and materials shall be as set out in the General Conditions and Agreement. Any conflict between the Project Plans and Technical Specifications shall be constructed according to the Project Plans.

1.2 DESCRIPTION OF WORK

A. Work includes the restoration of driveways, lawn areas, trees and plants, roadways, and any other existing improvement affected by the proposed work. This section includes furnishing equipment, labor and materials, and performing all necessary and incidental operations to perform the required work.

1.3 TEMPORARY RESTORATION

A. The Contractor shall be aware and make provisions as necessary to provide temporary resurfacing if required by the governmental agency having jurisdiction for roadways, drives and/or sidewalks. If required, the Contractor will provide temporary resurfacing after final backfill over the open cut, for a period specified by the agency, prior to final roadway replacement.

1.4 QUALITY ASSURANCE

A. The work in this section shall generally conform to the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, hereafter called the FDOT Standard Specifications.
B. Florida Grades and Standards for Nursery Plants, Part 1 shall be used when determining quality of plants and shrubs.

1.5 SUBMITTALS

A. Certification: Certification of quality by producer, nursery or manufacturer shall be delivered to Owner 10 days prior to use.

PART 2 - PRODUCTS

2.1 SOD

A. The sod used for restoration shall match the existing in the area. St. Augustine sod shall be replaced with St. Augustine Floratam. In areas without well-established sod, Argentine Bahia sod shall be used.
B. The sod shall be sufficiently thick to secure a dense stand of live grass, with a minimum thickness of two inches. The sod shall be live, fresh and uninjured at the time of planting. It

shall be planted as soon as possible after being dug and shall be shaded and kept moist from the time it is dug until it is planted. The sod shall be approved by the Owner before placing.

2.2 PLANTS

A. Existing damaged plants shall be replaced by plants of equal type, quality and size whenever possible. All new plants shall be sound, healthy, vigorous and free from defects, decay, disfiguring, bark abrasions, plant diseases, insect pests, their eggs or larvae. The new plants shall be approved by the Owner before placing.
B. Existing plants may be removed, preserved, and replaced at the Contractor's option. Plants shall be handled by an approved nursery.
C. Plants shall be watered and cared for until new growth appears. Dead and dying plants shall be immediately replaced. Plants used shall be in accordance with the "Grades and Standards", Florida No. 1 or better. Plants shall conform to the sizes indicated by the Owner.

2.3 GRASSING

A. Technical Specifications shall conform to Section 570 “Grassing (By Seeding), Florida Department of Transportation’s Standard Specifications for Road and Bridge Construction, 1991 or latest edition.

2.4 PLANTER MULCH

A. Mulch for planter areas shall be Cypress Bark, clean, bright and free from weeds, moss, sticks, and other debris. Bark size shall not be over 2-1/2 inch diameter.

2.5 WATER

A. The water used in the grassing operations may be obtained from any approved spring, pond, lake, stream or municipal water system. The water shall be free of excess and harmful chemicals, acids, alkalis, or any substance which might be harmful to plant growth or obnoxious to traffic. Salt water shall not be used.

2.6 EQUIPMENT

A. Fertilizer Spreader: The device for spreading fertilizer shall be capable of uniformly distributing the material at the specified rate.
B. Seed Spreader: The seed spreader shall be an approved mechanical hand spreader or other approved type of spreader.
C. Rollers: A cultipacker, traffic roller, or other suitable equipment will be required for rolling the grassed areas.

2.7 BASE COURSES (SUBBASE)

A. Technical specifications shall conform to Section 200 through 286 Florida Department of Transportation's Standard Specifications for Road and Bridge Construction, 1991 or latest edition.
B. Typically subbase as specified in Section 240 is used on City projects with density requirements shown on plans and details.
C. It is the responsibility of the Contractor to provide all materials to assure base courses meet the above-mentioned specifications.

2.8 ASPHALTIC CONCRETE & PORTLAND CEMENT CONCRETE PAVEMENT

A. The standard technical specifications for the above-mentioned items shall meet the specifications as set forth in Sections 300 through 370 of the Florida Department of Transportation's Standard Specifications of Road and Bridge Construction, 1991 or latest edition. Materials for these items shall meet the requirements in Sections 901, 902, 916, and 917 of the same specifications.

B. Certification by means of a job mix formula, as in Section 331- 4.3 F.D.O.T. Specifications, shall be submitted by the Contractor to the Engineer before the asphalt is placed on the project. If said certification is not submitted to the Engineer, the materials may be rejected or at the discretion of the Engineer, asphalt may be allowed to be placed at the risk of the Contractor.

2.9 PORTLAND CEMENT CONCRETE

A. The standard technical specifications for Portland Cement Concrete shall meet the specifications as set forth in Section 345 of the Florida Department of Transportation's Standard Specifications for Road and Bridge Construction, 1991 or latest edition.

B. Materials for Portland Cement Concrete shall meet the requirements in Sections 901, 902, 921, 923, and 924 of the same specifications.

C. Certification as noted in Section 345-4.3 of the F.D.O.T. Specifications shall be obtained by the Contractor from the supplier, stating that the materials meet the above stated specifications and be submitted to the Engineer before the concrete is placed on the project. If said certification is not submitted to the Engineer, the concrete may be rejected or at the discretion of the Engineer, concrete may be allowed to be placed at the risk of the Contractor.

D. Synthetic fibers are used at 1 1/2 pounds per cubic yard of concrete and can be introduced with the aggregates or after all of the above ingredients have been blended or mixed.

2.1 CONCRETE CURB & GUTTER

A. All curb and gutter shall conform to Section 520 of the Florida Department of Transportation's Standard Specifications for Road and Bridge Construction, 1991 or latest edition, or as specified in the project plans and details.

2.2 CONCRETE SIDEWALK

A. All sidewalk shall conform to Section 522 of the Florida Department of Transportation's Standard Specifications for Road and Bridge Construction, 1991 or latest edition, or as specified in the project plans and details.

2.3 JOINT MATERIAL

A. Perform joint filler, one-half inch thick, conforming to AASHTO M153 or AASHTO M213.

PART 3 - EXECUTION

3.1 LANDSCAPING RESTORATION

A. General: All seeding sodding, and landscaping shall conform to Sections 570, 575, and 580 of the Florida Department of Transportation's Standard Specifications for Road and Bridge Construction, 1991 or latest edition, or as specified in the project plans and details. Regarding the warranty, the Contractor must provide (a) one (1) year warranty from date of final acceptance including coverage of plants from death or unhealthy conditions, and (2) replacement plants shall be of same size and species as specified, planted in the next growing season, with a new warranty commencing on date of replacement.

B. Lawn Areas: Any lawn area affected by the required work shall be restored to a condition equal or better than the conditions existing before the commencement of work.

C. Balled Plants: Plants where required shall be adequately balled with firm natural balls of soil, sized as set forth in "Grades and Standards". Balls shall be firmly wrapped with burlap or equally approved strong cloth. No balled plant will be planted if the ball is cracked or broken before or during the process of planting.

D. Option: Plants may be furnished as container grown instead of balled if all other requirements are met.

E. Preparation of Plant Pits: All plant pits shall be circular in outline and have vertical sides. Tree pits shall be two feet wider than the width of the ball and one foot deeper than the depth of the ball. Shrubs that are either B&B or 3-gallon containers shall have pits that are two feet wider than the width of the plant ball and 6-inches deeper than the depth of the ball. Smaller shrubs shall have pits that are at least one foot wider than the width of the plant ball and 6-inches deeper than the ball depth.

F. Setting Plant: All plants except as otherwise specified, shall be centered in pits. Deep planting shall be avoided and unless otherwise specified, plants shall be set at such a level that after settlement they will bear the same relation to the required grade as they have to the natural grade before being transplanted.
Balled and burlapped plants and palm trees shall be placed on 6-inches to 12-inches of tamped planting mixture and adjusted so as to be at the proper level. The rope and burlap shall be cut away and the burlap folded down to the bottom of the pit. Very large B&B plants shall remain wrapped until fully backfilled and then just the upper portion of the burlap shall be removed. Backfill of planting mix shall be placed halfway up the pit and then water tamped. After this water has drained away, backfill around the edge of the pit to form a saucer and fill area three times with water.

G. Water: Water to be used initially during plant installation shall be furnished by the Contractor.

3.2 SOD PLACEMENT

A. Sod is required in all disturbed areas.

B. The areas over which the sod is to be placed shall be scarified or loosened to suitable depth. On areas where the soil is sufficiently loose, particularly on shoulders and fill slopes, the Engineer may, at his discretion, authorize the elimination of the ground preparation. Immediately before sod is placed, 12-8-8 fertilizer shall be applied at the rate of approximately 500 pounds per acre, by broadcasting and raking into the planting area.

C. Sod shall be firmly embedded by light tamping. Wherever necessary to prevent an erosion condition caused by vertical edges at the outer limits of the sodded area, the sod shall be tamped so as to produce a featheredge at the outer limits. The sod shall be kept in a moist condition after it is planted. Water shall not be applied between the hours of 8:00 a.m. and 4:00 p.m., nor when there is danger of freezing. On areas where the sod may slide, due to height and slope, the Engineer may direct that the sod be pegged, with pegs driven through the sod blocks into firm earth, at suitable intervals.

D. Maintenance: Contractor shall, at his expense, maintain the planted areas in a satisfactory condition until final acceptance of the project. Such maintenance shall include watering, filling, leveling and repairing of any washed or eroded areas as may be necessary.

3.3 SEEDING

A. Seeding and fertilizer shall only be used in areas where dirt is existing, and no grass or grass/weed mixture is present.

B. Execution of seeding shall be in accordance to Section 570 of the Florida Department of Transportation's Standard Specifications for Road and Bridge Construction, 1991 or latest edition.

3.4 EXCAVATION AND EMBANKMENT

A. All excavated material which is suitable shall be used in the formation of embankments or shoulders, or for backfilling as directed. Excavated material which will be suitable when dry shall be allowed to dry and be used as required. All materials removed which are considered unsuitable or spoil material shall be disposed of outside the limits of the site at the Contractor's expense.

B. All other technical specifications shall conform to Section 120 Florida Department of Transportation's Standard Specifications for Road and Bridge Construction, 1991 or latest edition, or as specified in the project plans and details.

3.5 PAVEMENT PLACEMENT

A. Asphalt pavement shall be removed by saw cutting on a straight line with edges as vertical as possible. Concrete pavement or asphalt surfaced concrete shall be removed by cutting with a concrete saw in as straight a line and vertically as possible.

B. Prior to replacing concrete or asphalt pavement, a subbase and base course corresponding to the required materials and thicknesses specified on the Construction Drawings shall be installed. The Contractor will have tests made by an independent testing laboratory to verify that the required compaction densities are obtained.

C. Non-asphalt pavement replacement shall be replaced of like material and thickness in accordance to the Construction Drawings. Asphalt or built-up asphalt pavement replacement shall be replaced with like material or concrete as directed by the Engineer. Where asphalt or built-up asphalt pavement is replaced by concrete, the concrete shall have a minimum of 6-inches in thickness and be reinforced with 6 by 6 No. 6 gage welded wire fabric or as specified within the construction drawings. Where the pavement replacement is of like material, it shall be replaced in thickness equal to or better than that existing at the time of removal.

D. Road cuts shall be repaired with a temporary asphalt patch the same day as cut and maintained for a period of 90 days prior to placing the final wearing surface.
E. Unless the base is sealed or other temporary paving applied over driveway areas to be repaved, pavement shall be replaced not later than three weeks after completion of backfill.

3.6 CURB REMOVAL AND REPLACEMENT

A. Curb removal and replacement required in the construction of this work shall be done by the Contractor. Reasonable care shall be exercised in removing the curb, saw cutting curb is required to obtain a vertical roughened surface without spalling fractures, and the Contractor shall either stockpile or dispose of this material as directed by the Engineer. Curb shall be replaced of like material and design in a manner and condition equal to or better than that existing at the time of removal. Materials and methods of replacing State Highway sidewalks or curbs shall conform to the FDOT Standard Specifications. It shall be the Contractor's responsibility to verify existing curb/gutter grades and place the new curb/gutter to these same grades.

3.7 CONCRETE SIDEWALK

A. Concrete sidewalk shall be removed by saw cutting on a straight line with edges as vertical as possible. The new sidewalk segments shall match the existing sidewalk as to width, thickness, and elevation, and have a medium broom finish.
B. Expansion joints between the sidewalk and the curb or driveway or at fixed objects and sidewalk intersections shall be 1/2-inch joints formed with a performed joint filler.

3.8 TESTS

A. The Contractor shall furnish facilities for making all density tests and make such restorations as may be necessary due to test operations. All density tests on backfill or base replacement will be made by a commercial testing laboratory employed by the Contractor and at such locations as may be recommended by the Engineer. If the densities as determined by the specified tests fall below the required minimums, the Contractor shall pay for all retests.

- END OF SECTION -

SECTION 03100
CONCRETE FORMWORK

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Formwork for cast-in place concrete, with shoring, bracing, and anchorage.
B. Openings for other work.
C. Form accessories.
D. Form stripping.

1.2 RELATED SECTIONS SPECIFIED ELSEWHERE

A. Section 03200 - Concrete Reinforcement
B. Section 03300 - Cast-in-Place Concrete

1.3 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.
B. ACI 318 - Building Code Requirements for Reinforced Concrete.
C. ACI 347 - Recommended Practice for Concrete Formwork.
D. PS 1 - Construction and Industrial Plywood.
E. 2017 Florida Building Code

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 318.
B. Maintain one copy of each document on site.

1.5 REGULATORY REQUIREMENTS

A. Conform to applicable code for design, fabrication, erection, and removal of formwork.

1.6 COORDINATION

A. Coordinate this Section with other Sections of work which require attachment of components to formwork.
B. Coordinate formwork with reinforcement installation to provide sufficient concrete cover over reinforcement.

1.7 DESIGN

A. All formwork shall be designed by a Florida Registered structural engineer. Special attention shall be given to the additional hydraulic pressures imparted by concrete containing superplasticizer admixture. The contractor is specifically cautioned that not all of the specified superplasticizer admixtures will cure at the same rate.

PART 2 - PRODUCTS

2.1 WOOD FORM MATERIALS

A. Form Materials: At the discretion of the Contractor.
B. All form lumber shall be free from warp, holes, loose knots, dressed to uniform width and thickness. All forming shall conform to ACI 347.
   1. Unexposed concrete surfaces: No. 2 common lumber or better lumber
   2. Exposed concrete surfaces: commercial standard, moisture resistant, concrete form plywood.

2.2 FORMWORK ACCESSORIES

A. Wall Form Ties: Removable Snap-off type, 316 stainless steel, fixed length, cone type, with waterproofing rubber washer, 1-1/2 inch back break dimension, free of defects that could leave holes larger than 1-inch in concrete surface.
B. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete. Diesel oil or motor oil will not be permitted.
C. Corners Chamfer, wood strip type; 3/4 x 3/4 inch size; maximum possible lengths.
D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify lines, levels, and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

A. Earth forms are not permitted.

3.3 ERECTION - FORMWORK

A. Erect formwork, shoring, and bracing to achieve design requirements, in accordance with requirements of ACI 318.
B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
D. Align joints and make watertight. Keep form joints to a minimum.
E. Obtain approval before framing openings in structural members which are not indicated on Drawings.
F. Provide chamfer strips on external corners of all exposed concrete elements.
G. Induce camber on existing roof slab structure prior to casting concrete.

3.4 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
C. Do not apply form release agent where concrete surfaces will receive special finishes applied coverings which are affected by agent. Soak inside surfaces of untreated forms with clean water.
D. Keep surfaces coated prior to placement of concrete.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.
B. Locate and set in place items which will be cast directly into concrete.
C. Coordinate with work of other sections in forming and placing openings, slots, regrets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
D. Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.
E. Install waterstops continuous without displacing reinforcement. Heat seal joints watertight. Conform to manufacturers recommendations.
F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
G. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.6 CONSTRUCTION JOINTS

A. Construct and locate as indicated on the drawings and so as not to impair the strength of the structure and only at locations approved by the Engineer. Form keys in cold joints shown on the drawings.

3.7 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.
B. Clean formed cavities of debris prior to placing concrete.
C. Use compressed air to remove remaining foreign matter.

3.8 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 318.
B. Camber slabs and beams 1/4 inch per 10 feet in accordance with ACI 318.

3.9 FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.
B. Do not reuse wood formwork more than three times for concrete surfaces to be exposed to view.

3.10 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads. Determination of form removal timing is the Contractor's

responsibility and shall be in accordance with ACI 347, except that the Engineer reserves the right to delay form removal for a period not to exceed 14 days after the pour.

B. Do not remove forms, shores and bracing until concrete has gained sufficient strength to carry its own weight, and construction and design loads which are liable to be imposed upon it. Verify strength of concrete by compressive test results.
C. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
D. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.
E. Remove formwork progressively and in accordance with code requirements and so that no shock loads or unbalanced loads are imposed on the structure.
F. Re-shore structural members where required due to design requirements of construction conditions and as required to permit progressive construction.

- END OF SECTION -

SECTION 03200
CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Reinforcing steel bars, wire fabric, and accessories for cast-in-place and precast concrete.

1.2 RELATED SECTIONS SPECIFIED ELSEWHERE

A. Section 01300 - Submittals
B. Section 03100 - Concrete Formwork
C. Section 03300 - Cast-in-Place Concrete

1.3 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.
B. ACI 318 – Building Code Requirements for Reinforced Concrete
C. ACI SP-66 - American Concrete Institute -Detailing Manual.
D. ANSI/ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.
E. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
F. ANSI/AWS D1.4 - Structural Welding Code for Reinforcing Steel.
G. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
H. ASTM A704 - Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.
I. AWS D12.1 - Welding Reinforcement Steel, Metal Inserts, and Connections in Reinforced Concrete Construction.
J. CRSI -Concrete Reinforcing Steel Institute -Manual of Practice.
K. CRSI 63 -Recommended Practice For Placing Reinforcing Bars.
L. CRSI 65 - Recommended Practice For Placing Bar Supports, Specifications, and Nomenclature.
M. 2017 Florida Building Code

1.4 SUBMITTALS

A. Submit shop drawings under provisions of Section 01300.
B. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel and wire fabric, bending and cutting schedules, and supporting and spacing devices.
C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 318.
B. Maintain one copy of document on site.

1.6 QUALIFICATIONS

A. Welders' Certificates: Submit under provisions of Section 01300 Manufacturer's Certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.7 COORDINATION

A. Coordinate with placement of formwork, formed openings, and other Work.

1.8 STORAGE

A. Reinforcing steel shall be clean, new stock, properly marked and tagged for identification prior to placing. Store reinforcing to avoid excessive rusting or coating with grease, oil, dirt, or other objectionable materials.

PART 2 - PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A615, 60-ksi yield grade; deformed billet steel bars, unfinished.
B. Welded Steel Wire Fabric: ASTM A185 Plain Type; in flat sheets unfinished.
C. Ties: Shall be No. 16 gauge minimum, fully annealed, black steel wire.
D. Hooks and Bends in Reinforcement shall conform to ACI 315 unless otherwise noted on the drawings.

2.2 ACCESSORY MATERIALS

A. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture.
B. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather-exposed Concrete Surfaces: Plastic coated steel or stainless steel type; size and shape as required.

2.3 FABRICATION

A. Fabricate concrete reinforcing in accordance with ACI 318.
B. Locate reinforcing splices not indicated on drawings, at point of minimum stress. Review location of splices with Engineer.

PART 3 - EXECUTION

3.1 PLACEMENT

A. Fabrication, detailing and placement of reinforcing steel shall conform to CRSI Manual of Standard Practice, ACI 315 and ACI 318. Reinforcement shall be carefully placed, rigidly supported and well tied with bar supports and spacers.
B. Reinforcement shall be accurately placed and securely tied at intersections with 16 gauge black annealed wire. It shall be maintained in proper position by chairs, bar supports, or other devices approved by the Engineer.
C. All splices and laps shall be as shown on the drawings, or 36 bar diameters, whichever is greater.
D. Concrete protection of reinforcing shall be not less than the following or as shown on the drawings if greater:
    1. Concrete cast against and permanently exposed to earth or exposed to corrosive environment -- 3 inches.

2. Concrete cast against forms, but exposed to earth or weather:
   a. No. 6 through No. 11 bars -- 2 inches
   b. No. 5 bars, or equivalent, and smaller -- 1-1/2 inches.
3. Concrete cast against forms, but not exposed to earth or weather (interior construction):
   a. Slabs, walls and joists:
      1) No. 14 and No. 18 bars -- 1-1/2 inches
      2) No. 11 bars and smaller for liquid retaining structures -- 2 inches
      3) No. 11 bars and smaller elsewhere -- 3/4 inch
   b. Beams and Columns, including primary reinforcement, ties, stirrups, and spirals -- 1-1/2 inches.

E. The clear distance between parallel bars in a layer shall be the nominal diameter of the bar, but not less than one inch. Wherever conduits, piping, inserts or sleeves interfere with the placing of reinforcing steel as shown, the Contractor shall consult with the Engineer before pouring concrete. The bending or field cutting of bars around openings or sleeves will not be permitted.
F. Clean bars of loose scale, heavy deposits or rust and oil, wax or other coatings that may reduce or destroy bonding, before placing. Check and clean again if necessary before concrete is poured.
G. Concrete beam sizes may be increased as required for architectural details or to fit block coursing, subject to Engineer approval.
H. Reinforcing steel in footings shall be assembled as mats with bars equally spaced and wired together at each intersection before concrete is placed.
I. Center all footings on wall, pier or column above unless otherwise indicated.
J. Dowel column and wall reinforcing to footing or pile cap with same size and number of dowels as vertical bars above.
K. Dowels shall be hooked "L" at bottom and shall be lapped 36 bar diameter with the column or wall reinforcing above.
L. Concrete columns shall be tied columns unless otherwise indicated.
M. Provide one layer 6 x 6 - W2.9 x W2.9 WWF in slabs on grade including walkways and sidewalks unless otherwise indicated.

3.2 COORDINATION

A. Coordinate work with other trades in order to eliminate interference before concrete is poured.

3.3 CLEANUP

A. In accordance with General Conditions.

- END OF SECTION -

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SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 NOTICE

A. Engineer shall be given a minimum of 48 hours advance notice to all concrete placements and no concrete shall be placed without approval of Engineer.

1.2 WORK INCLUDED

A. Cast-in-place concrete foundations, walls, slab-on-grade, equipment pads, underground concrete vaults and structures, pipe supports, curbs, and sidewalks. All cast-in-place concrete for this project shall be ready mix per this specification. Pre-mixed, bagged mixes shall not be utilized for any purpose on the project unless specifically approved by the engineer.

1.3 RELATED SECTIONS SPECIFIED ELSEWHERE

A. Section 01300 – Submittals
B. Section 01410 – Testing Laboratory Services
C. Section 03100 - Concrete Formwork
D. Section 03200 - Concrete Reinforcement

1.4 REFERENCES

A. ACI 301 - Specifications for Structural Concrete for Buildings.
B. ACI 318 - Building Code Requirements for Reinforced Concrete
C. ASTM C33 - Concrete Aggregates.
D. FDOT Standard Specifications for Road and Bridge Construction
E. ASTM C94 - Ready-mixed Concrete.
F. ASTM C150 - Portland cement.
G. ASTM C260 - Air Entraining Admixtures for Concrete.
H. ASTM C494 – Chemical Admixtures for Concrete
I. ASTM C618 – Pozzolonic Materials.

1.5 QUALITY ASSURANCE

A. Perform Work: in accordance with ACI 301 and FDOT Standard Specifications.
B. Obtain materials for same source throughout the Work.
C. Submit manufacturer's certification that materials meet specification requirements.
D. Submit ready-mix delivery tickets, ASTM C94-78.

1.6 TESTS

A. Testing and analysis of concrete will be performed under provisions of this Section and Section 01410.

B. Submit proposed mix design of each class of concrete to Engineer for review prior to commencement of work in accordance with Submittal Section. Submittal shall include proposed location for each class of concrete.
C. Independent Testing laboratory shall take cylinders and perform slump and air entrainment tests in accordance with ACI 301.
D. Provide 5 cylinders per set. Test one at 3 days, one at 7 days, two at 28 days, and hold one.
E. Slump tests shall be taken for every truck delivery and each set of test cylinders taken.
F. In general, cylinders shall be taken for each concrete pour event, and every 50 cubic yards placed.
G. All tests failing minimum specified criteria shall be billed to and paid for by the Contractor.

1.7 SUBMITTALS

A. Submit product data under provisions of Section 01300 for Fine and Coarse aggregates, admixtures, concrete mix design, joint devices, attachment accessories, and curing compounds.
B. Field test reports: Submit field test reports for all cylinder tests.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: ASTM C150 -Type II Cement.
B. Fine and Coarse Aggregates: ASTM C33.
   1. Conform to ASTM C33: Local aggregates not complying with this standard may be used provided it can be shown by special test or a record of past performance these aggregates produce concrete or adequate strength and durability.
   2. Fine Aggregate: Clean, washed natural sand of hard, sound, uncoated grains. Manufactured clean, washed, hard sand may be used for structures other than water retention structures.
   3. Course Aggregates: Clean, washed, sound and crushed.
   4. Aggregate Size Requirements: Use largest practicable aggregate size for each condition of placement subject to limitations stipulated in paragraph 3.3, ACI Code 318.
C. Water: Clean potable water.

2.2 ADMIXTURES

A. Air Entrainment: All concrete shall entrain from two to four percent air, whether batched with or without other admixtures. Conform to ASTM C260. Use Darex II AEA or equal.
B. Water-reducing admixture may be used and must meet ASTM C-494 as a Type A and Type D. Use WRDA 64 or equal. Add in accordance with ACI-350.
C. Use of calcium chloride is not permitted.
D. Air entraining agent to normal weight concrete mix if used, shall not exceed 4%.
E. Superplasticizer: A superplasticizer admixture may be used on all structures if approved by the Engineer. Superplasticizer shall be used on all water retention structures. The superplasticizer shall satisfy the following requirements.
   1. Conform to ASTM C494, Type F or Type G.

2. Superplasticizer admixture shall be added to the mix at the batch plant unless otherwise approved by the Engineer.
3. Provide documentation showing, at a 6-inch slump plus or minus 1-inch, the relative durability factors of air entrained concrete as determined in accordance with ASTM C-666, Procedure A, as compared to the same air entrained concrete mix at a 2-inch slump or minus 1-inch without superplasticizer admixture.
4. A qualified concrete technician employed by the manufacturer shall be available to assist in proportioning concrete materials for optimum use, to advise on proper use of the superplasticizer admixture and adjustment of concrete mix proportions to meet job site and climatic conditions.
5. Approved Products:
   a. Sikament 300, Sika Chemical Corp. or Engineered approved equal.
   b. Pozzolith 440 N, Master Builders Company, or Engineer approved equal.

2.3 CURING MATERIALS

A. Chemical Curing: Curing compounds shall be liquid, membrane forming and shall conform to ASTM C309, as approved by the Engineer. The liquid compound shall not reduce the adhesion of tile, paint, roofing, waterproofing or other material to be applied to the concrete. No liquid compound shall be allowed to cure a first pour of concrete that will receive a second pour. The use of a curing compound in lieu of water spray curing is subject to the Engineer's approval and will, generally, not be approved as an alternate to impervious membrane and spray mist curing.
B. Impervious Membrane Sheeting: Kraft paper or 4 mil polyethylene sheeting, in accordance with ASTM C171 may be used with approval of the Engineer.

2.4 CONCRETE MIX

A. Mix concrete in accordance with ASTM C94.
B. Provide concrete to satisfy the following requirements:
   1. Compressive Strength (28 days): 3000 psi for sidewalks and curbs, 4000 psi all other locations.
   2. Water/Cement ratio: maximum 0.45 without admixtures by weight.
   3. Fly Ash Content: maximum 15% of cement content, Type F only.
   4. Slump 4 ± 1 inch regular, 6 ± 1 inch with superplasticizer, 6-8 inch pea rock pump mix.
C. Use set-retarding admixtures during hot weather only when approved by Engineer.
D. Air entrainment: Total air content required (air-entrained and entrapped air) shall be as follows, and as measured in accordance with ASTM C231:

Nominal Maximum Size of Coarse aggregate, in.	Total Air Content Percentage by volume
3/8	7 to 11
2	6 to 10
3/4	6 to 10
1	6 to 10
1-1/2	5 to 9

4 to 8	2.5 to 5.5
3.5 to 6.5	1.5 to 4.5
3 to 6	

E. Superplasticizer shall be used in all reinforced concrete walls that are water holding structures; i.e., clearwell, containment walls, etc.

2.5 ACCESSORIES

A. Vapor Barrier: 10 mil thick clear polyethylene film, type recommended for below-grade application.
B. Non-Shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days.
C. Water Stop (PVC): 4" x 3/16" water stop, Dumbell polyvinylchloride Greenstreak - Style 741 or approved equivalent.
D. Water Stop (Other): Bentonite type strips Rx101, or applicable to condition, as manufactured by Volclay, or equal.
E. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture.
F. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic coated steel or Stainless steel type; size and shape as required. Do not use concrete or clay bricks to support reinforcing.
G. Backing rod and sealant as indicated on drawings for construction joints.
H. Sealing Materials: Material for sealing and filling joints and for sealing pre-molded filler strip, shall conform to ASTM D1190 for “Concrete Joint Sealer; Hot-Poured Elastic Type.”
I. Curbs: Construct roadway and sidewalk curbs as shown on the drawings and in accordance with local codes and regulations. Construct all other curbs that support equipment or structural wall systems as indicated on the drawings.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.
B. Verify site dewatering conditions. All foundations shall be cast in the dry.
C. Verify requirements for concrete cover over reinforcement.
D. Clean forms of trash, wood, excess steel, and deleterious materials.

3.2 PREPARATION

A. Install vapor barrier under all slabs, footings, and other concrete exposed to earth. Lap joints a minimum of 6 inches. Do not disturb or damage vapor barrier while placing concrete. Repair damaged vapor barrier.

B. In locations where new concrete is dowelled to existing work, drill holes in existing concrete, clean holes, insert steel dowels and epoxy in accordance with manufacturer's installation instructions keeping the minimum embedment depth specified on drawings.
C. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

3.3 PLACING CONCRETE

A. Notify Engineer and Owner's Representative minimum 48 hours prior to commencement of concreting operations.
B. Place concrete in accordance with ACI 301 and FDOT Standard Specifications.
C. Hot Weather Placement ACI 301.
D. Cold Weather Placement ACI 301.
E. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.
F. Use Ready-Mixed Concrete: Conform to ASTM C94. Plant and truck mixers subject to examination by Engineer.
G. Water and Mixing: Mix concrete at least 10 minutes, 5 minutes of which is at the job, after the last addition of water. Retempering in truck is prohibited. Any concrete in truck longer than 1-1/2 hours after the water has been added at the plant, or any that has become harsh or non-plastic, shall be rejected based solely upon the Engineer's discretion.
H. Load Tickets: Shall include all information required by ASTM C94 and be legible, showing quantities of all constituents in the batch, and bearing signature of plant inspector or bonded weighmaster. Maintain all tickets on file for inspection by the Engineer. All tickets shall show the mix number. Tickets not showing the mix number shall cause the load to be immediately rejected.
I. Slumps: At point of delivery to forms the concrete slump requirements shall conform to this section of the specifications.
J. Place concrete continuously between predetermined construction and control joints. Do not break or interrupt successive pours such that cold joints occur.
K. Contractor shall be responsible for means and methods to ensure concrete is poured in a dry area.
L. All concrete shall be placed with the aid of mechanical vibrating equipment supplemented by hand forking or spading. Contractor needs to use mechanical vibrating equipment for consolidating concrete and should have a minimum of (2) two operable vibrators on the job. Vibration shall be transmitted directly to the concrete and not through the forms.
M. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
N. Saw cut curb joints within 24 hours after placing. Use 3/16 inch thick blade, cut 1/4 of slab thickness.
O. Screed floors level, maintaining surface flatness of maximum 1/4 inch in 10 ft.

3.4 FINISHING

A. Provide formed concrete walls, columns, beams, Class 5 finish above the water line.

B. Finish building slabs and miscellaneous horizontal concrete surfaces in accordance with ACI 301, steel trowel finish.
C. Sidewalks shall have a light broom finish.

3.5 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury. Concrete shall be kept moist for fourteen days after pouring. Vertical forms may be left in place and horizontal surfaces continuously moistened with water via spray misting. If forms are removed, impervious membrane sheeting or chemical curing may be used if approved by the Engineer. The Engineer shall have the right to determine when the forms may be removed and whether a curing compound can be used in lieu of spray misting.
B. Water cure concrete surfaces in accordance with ACI 301 for 7 days or apply curing compound.
C. Contractor shall use curing compounds for vertical surfaces.

3.6 PATCHING

A. Notify Engineer immediately upon removal of forms. No surfaces are to be patched or backfilled prior to being reviewed by the Engineer.
B. Patch imperfections as requested by the Engineer or his field representative in accordance with ACI 301 and FDOT Standard Specifications.
C. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Engineer upon discovery.

3.7 DEFECTIVE CONCRETE

A. Modify or replace concrete not conforming to required levels, lines, details, elevations, dimensions, tolerances, or specified requirements.
B. Repair or replace concrete not properly placed will be determined by the Engineer or Owner’s Representative.
C. Unless the removal of a defective slab is required by the Engineer, defective surfaces, such as honeycomb, shall be cut out entirely until homogeneous concrete is met, even if it means going through the slab.
D. Such areas shall be coated with an approved epoxy bonding material, which shall be applied in accordance with the manufacturer's instruction, before damp packing the area with a mix consisting of one part of Portland cement and two parts of sand and fine gravel, epoxy and sand mix, or any combination of materials and mixes as the situation dictates in the opinion of the Engineer.
E. The water content of the damp-pack material shall be such that a ball of the mix may be squeezed in the hand without bringing free water to the surface.
F. Damp-pack material shall be tamped into place and finished to match adjacent concrete surfaces.
G. Particular care shall be taken that no sagging of the material will occur.
H. The bond between any two layers of damp-pack shall be improved through the use of an approved epoxy bond agent.

I. Surfaces which have been damp-packed shall be kept continuously damp during and for a period of not less than seven days after completing the damp-pack operation, by polyethylene coverings thoroughly taped to the original concrete surface in a manner that loss of moisture, evidence by lack of water droplets on the inside surface of the polyethylene, is avoided. If this moisture condition cannot be maintained, a continuous water cure may be required by the Engineer.
J. Under no circumstances shall Contractor apply a plaster coat over the honeycomb areas to conceal the existence of the honeycomb in the concrete.
K. Neither Embeco nor calcium chloride shall be used for filling honeycomb areas, nor shall they be mixed with damp-pack material.
L. Any concrete with excess air entraining agent will be rejected.

3.8 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of Section 01410.
B. Contractor will be required to contact Testing Lab to be present for concrete deliveries.
C. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

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SECTION 04340
REINFORCED MASONRY SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Concrete masonry units.
B. Reinforcement, anchorage, and accessories.

1.2 RELATED SECTIONS

A. Section 03200 Concrete Reinforcement
B. Section 03300 - Cast-in-place Concrete

1.3 REFERENCES

A. ACI 530 – Specification for Masonry Structures
B. ASTM A615 Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
C. ASTM C90 Hollow Load Bearing Concrete Masonry Units.
D. ASTM C140 – Standard Test Method of Sampling and Testing Concrete Masonry Unit.
E. ASTM C270 – Standard Specifications for Mortar for Unit Masonry.
F. ASTM C94 – Standard Specifications for Ready-Mixed Concrete.
G. ASTM C476 – Standard Specifications for Grout for Masonry.
H. 2020 Florida Building Code, or latest edition

1.4 SUBMITTALS

A. Submit manufacturer's certificate under provisions of Section 01300 that products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Installer: Company specializing in performing the work of this Section with minimum three years documented experience.
B. Masonry construction and materials shall conform to all requirements of “Specifications for Masonry Structures (ACI 530.1/ASCE 6/TMS 602),” published by the American Concrete Institute, Detroit, Michigan, except as modified by the requirements of these Plans and Contract documents.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Damaged masonry units, damaged structure components, and damaged packaged material shall not be accepted.
B. Failure to detect defective work or material shall not in any way prevent later rejection when the defect is discovered, nor shall it obligate the Engineer for Final Acceptance.
C. The Owner shall have the right to have tested, at the Contractor’s expense, using the prism test method, masonry units for compressive strength, should any of the masonry units fail to meet certification or inspection as determined by the Engineer, as described in these Specifications.

1.7 REGULATORY REQUIREMENTS

A. Conform to Florida Building Code and all local building code requirements.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. Hollow Load Bearing Block Units: ASTM C90, Grade N, Type II; normal weight. Block shall be smooth finish block. Strength Fm' shall be minimum of 1500psi unless otherwise indicated. Reinforced wall units shall be 2 cell end blocks with cell aligned vertically when constructed.
B. Masonry Units: Nominal modular size as shown. Provide special units for 90 degree corners, bond beams, lintels.
C. Masonry Units shall be free from chips and cracks on all exposed surfaces.
D. Blocks will be sampled and tested in accordance with ASTM C-140.
E. Block color to match existing building.

2.2 REINFORCEMENT AND ANCHORAGE

A. Single Wythe Joint Reinforcement: Ladder type; hot dip galvanized after fabrication cold drawn steel conforming to ANSI/ASTM A82, 3/16 inch side rods with 3/16 inch cross ties.
B. Reinforcing Steel: ASTM A615, 60 ksi yield grade, deformed billet bars, unprotected finish.
C. Wall Ties: Minimum 16 gauge galvanized steel, 1-1/4" wide.
D. Dovetail Anchors: 16 gauge corrugated galvanized steel, 1" wide, sized to fit dovetail slots.
E. Dovetail Slots: 2 gauge galvanized steel with filler, 1" wide x 5/8" x 1" deep.

2.3 MORTAR

A. Mortar for unit masonry: Conform to ASTM C270, and unless otherwise shown or required, shall be of type as follows:
    1. Type M (2500 psi)
B. Mortar and grout for reinforced masonry: The mortar shall be specified in accordance with ASTM C270. The grout shall be specified in accordance with ASTM C476.
C. Grout fill for masonry: 4000 psi strength at 28 days; 8"-11" slump (see ACI 2. 6B-2). If not Ready-mix, use ASTM C476. Premixed type in accordance with ASTM C94.
D. Water: Clean and potable.

2.4 MORTAR MIXING

A. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C270 or C476. If water is lost by evaporation, retemper within 1½ hours of mixing. Do not retemper mortar after 1½ hours of mixing.

2.5 MORTAR JOINTS

A. Head and bed joints shall be 3/8" thick, except that the thickness of the bed joint of the starting course placed over the foundation not be less than ¼" and not more than ¾".
B. Face shells of bed mortar joints shall be fully mortared. Webs shall be fully mortared in all courses of the pilasters, in the starting course of the foundation, and where adjacent cells or cavities are to be fully grouted.

C. Construct concave mortar joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.
B. Verify items provided by other Sections of work are properly sized and located.
C. Verify that built in items are in proper location, and ready for roughing into masonry work.
D. Beginning of installation means installer accepts existing conditions.

3.2 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.
B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
C. All load bearing concrete masonry units shall be laid in running bond. Course one unit and one mortar joint to equal inches. Use tooled joints on all proposed interior masonry surfaces.

3.3 PLACING AND BONDING

A. Lay hollow masonry units with full face shell bedding on head and bed joints.
B. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.
C. Remove excess mortar as Work progresses.
D. Interlock external corners and intersections (unless otherwise noted on the Plans).
E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
G. Mortar joints shall be full between unit face shells. No gaps in mortar joints are permitted. All gaps shall be corrected and filled as work progresses.

3.4 REINFORCEMENT AND ANCHORAGES REINFORCED UNIT MASONRY

A. Install horizontal joint reinforcement 16 inches on center.
B. Place masonry joint reinforcement in first horizontal joints above and below openings. Extend minimum 24 inches each side of opening.
C. Lap joint reinforcement ends minimum 6 inches. Extend minimum 24 inches each side of openings without lap joints.
D. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
E. Anchors: 24 inches o/c where unit masonry abuts existing masonry and concrete.
F. Wall ties: Bond intersecting interior walls with wall ties at each course (where continuous reinforcing is not provided).

3.5 LINTELS

A. Install precast concrete lintels over window openings, louver openings, door openings and pipe openings as required.

B. Maintain minimum 8 inch bearing on each side of opening.
C. Lintels shall be marked for proper installation (arrow "up" to indicate the top of the beam).

3.6 ENGINEERED MASONRY

A. Lay masonry units with core cells vertically aligned and cavities between wythes clear of mortar and unobstructed.
B. Place mortar in masonry unit bed joints back 1/4 inch from edge of unit grout spaces, bevel back and upward. Permit mortar to cure 7 days before placing grout.
C. Reinforce masonry unit cores and cavities with reinforcement bars and grout as indicated below (unless otherwise noted on the Plans).
    1. First cell of blocks abutting joints of door frames.
    2. One cell at free end of partitions and walls.
    3. At bearing points, fill masonry cells with grout minimum one cell.
D. Retain vertical reinforcement in position at top and bottom of cells and at intervals as indicated on Plans, but not exceeding 64 bar diameters. Splice reinforcement in accordance with Drawings and ACI 530.
E. Wet masonry unit surfaces in contact with grout just prior to grout placement.
F. Grout spaces less than 2 inches in width with fine grout using low lift grouting techniques. Grout spaces 2 inches or greater in width with course grout using high or low lift grouting techniques.
G. When grouting is stopped for more than one hour, terminate grout 1 1/2 inch below top of upper masonry unit to form a positive key for subsequent grout placement.
H. High Lift Grouting: Provide cleanout opening no less than 6 inches high at the bottom of each cell to be grouted by cutting exterior face shell of masonry unit.
    1. Clean out masonry cells and cavities with high pressure water spray. Permit complete water drainage. Request the Engineer to inspect the cells and cavities. Allow 2 days advance notice of inspection.
    2. After cleaning and cell inspection, seal openings with masonry units.
    3. Pump grout into spaces. Maintain water content in grout to intended slump without aggregate segregation.
    4. Limit grout lift to 48 inches and rod for grout consolidation. Wait 30 minutes before placing next lift.

3.7 BUILT IN WORK

A. As work progresses, build in metal door frames, fabricated metal frames, louver block, anchor bolts, plates, and other items furnished by other Sections.
B. Build in items plumb and level.
C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.

3.8 TOLERANCES

A. Maximum Variation from Unit to Adjacent Unit: 1/32 inch.
B. Maximum Variation from Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.

C. Maximum Variation from Plumb: 1/4 inch per story non cumulative; 1/2 inch in two stories or more.
D. Maximum Variation From Level Coursing: 1/8 inch in 3 feet and 1/4 inch in 10 feet; 1/2 inch in 30 feet.
E. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.

3.9 CUTTING AND FITTING

A. Cut and fit for chases, pipes, conduit, doors and sleeves. Coordinate with other Sections of work to provide correct size, shape, and location.
B. Cut masonry units with motor-driven saw designed to cut masonry with clean sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units without cutting wherever possible. Use dry cutting saws to cut concrete masonry units.

3.10 REPAIR, POINTING AND CLEANING

A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints at corners, openings and adjacent work to provide a neat, uniform appearance, properly prepared for application of caulking or sealant compounds.
C. Clean exposed CMU masonry by dry brushing at the end of each day's work and after final pointing to remove mortar spots and droppings. Comply with recommendations in NCMA TEK Bulletin No. 28.

3.11 PROTECTION OF FINISHED WORK

A. Protect finish installation from damage by subsequent construction activities.
B. Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.

- END OF SECTION –

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SECTION 05500
MISCELLANEOUS METALS

PART 1 - GENERAL

1.1 SCOPE

A. This Section includes the furnishing and installation of fabricated metal work which applies to all sections, unless otherwise noted.

1.2 REFERENCE SPECIFICATIONS AND STANDARDS ARE REFERRED TO BY ABBREVIATION AS FOLLOWS:

A.	The Aluminum Association	AA
B.	American Institute of Steel Construction	AISC
C.	American National Standards Institute	ANSI
D.	American Society for Testing and Materials	ASTM
E.	American Welding Society	AWS
F.	National Association of Architectural Metal Manufacturers	NAAMM
G.	Steel Structures Painting Council	SSPC

1.3 QUALITY ASSURANCE

A. Portions of the design not shown shall be completed by the fabricator in accordance with the latest edition of Specifications for Design, Fabrication and Erection of Structural Steel for Buildings of the AISC.
B. Shop fabricated connections may be bolted or welded. Field connections shall be bolted.
C. Burning/torching for enlarging holes will not be acceptable except with written permission of the Engineer.
D. Responsibility for all errors in fabrication and correct fitting of structures shown on the shop drawings is the Contractor's responsibility.

1.4 REGULATORY REQUIREMENTS

A. Metal fabrication materials shall meet the requirements of the following ASTM Standards and Specifications, but limited to.
   1. Aluminum Alloy, plate and sheet B209-3003-H14, extruded trim B308-6063-T5 & T6, structure shapes B308-6061-T5, structural pipe and tube B429, castings B214.
   2. Structural steel, plates and shapes A36, plate and steel for forming A283 Grade C.
   3. Structural bolts, specifically called out on the Plans A-325.
   4. Other bolts, unless otherwise noted, A-307.
   5. Steel stud anchors for embedded plates, A-108, grade 1020, 60 ksi.
   6. Galvanizing, A123.
B. Comply with the provisions of the following standards except as otherwise shown or specified.
   1. AA Specifications for aluminum structures.
   2. AISC Specifications for design, fabrication and erection of structural steel for buildings.

3. AWS code for welding in building construction.

1.5 SUBMITTALS

A. Submit shop drawings and manufacturer's descriptive literature as applicable for all metal fabrications in accordance with Section 01300. No items shall be fabricated prior to reviewing approval by Engineer. Minimum scale of drawings and elevations shall be 3/4 in. equals 1 ft., details enlarged to adequate size for clarity, show anchorage.

B. Where certain equipment and the like require unique support, provide such members only after careful coordination of shop drawings for the equipment.

1.6 PRODUCT HANDLING

A. Use all means necessary to protect the Products of this Section before, during, and after installation and to protect the installed work and materials of all other trades.

B. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

C. Coordinate delivery of metal fabrications with work of other Sections.

1.7 FASTENERS

A. Provide fasteners for all items under this Section. All nuts, bolts, washers, back up rings, etc. shall be 316 SS unless otherwise called out on the drawings or specified elsewhere herein.

1.8 DIMENSIONS

A. Verify critical dimensions of the work on the job. Form items to accurate sizes and shapes, with sharp lines and angles. Punch and shear to leave smooth surfaces. Weld permanent connections, grind exposed welds smooth. Avoid screws and bolts where possible unless otherwise noted. When used and where exposed, Countersink heads and draw up tight. Provide holes and connections for work of other trades.

1.9 PAINTING

A. Shop painting of ferrous items, except those galvanized, shall be as specified in Section 09900 - Painting.

1.10 DISSIMILAR MATERIALS

A. Protect aluminum in contact with concrete and dissimilar material with 1/4" neoprene, or bitumastic coating.

1.11 PIPE SUPPORTS

A. Pipe support straps shall be 316 Stainless steel unless otherwise noted.

B. Metal pipe support fabrication shall be 316 Stainless steel unless otherwise noted.

PART 2 - PRODUCTS

2.1 SHOP FABRICATED PRODUCTS

A. Provide anchor bolts as shown as well as for fabricated and structural metal items. Do not paint bolts.

B. Provide inserts and sleeves for concrete as shown and as required.
C. Provide miscellaneous metal frames and supports fabricated of structural shapes and plates.

2.2 MISCELLANEOUS METALS

A. Unless noted otherwise on the drawings or specified differently in other sections, all miscellaneous metal fabrications shall be 316 stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.
B. Beginning of installation means erector accepts existing conditions.

3.2 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

3.3 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.
B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
C. Field weld components indicated on shop drawings.
D. Perform field welding in accordance with AWS D1.1.
E. Obtain Engineer approval prior to site cutting or making adjustments not scheduled.
F. Verify that supports and anchors are correctly positioned.
G. Verify that opening sizes and dimensional variations are acceptable to suit grading, railing, and stairs tolerances.
H. Perform cutting, drilling, flashing and fitting required for installation of metal fabrications. Set the work accurately, provide temporary bracing and anchors in formwork for items to be built into masonry and concrete. Field weld joints not shop welded because of size limitations.

3.4 TOLERANCES

A. Conform to ANSI/NAAMM A202.1.
B. Maximum space between sections: ¼ inch.
C. Maximum variation from top surface plane of sections: ¼ inch.

- END OF SECTION -

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SECTION 05700

ANCHORS, FASTENERS & INJECTION ADHESIVES

PART 1 - GENERAL

1.1 SCOPE

A. This Section includes anchors, fasteners, and injection adhesive for general use in securing materials in place and doweling new reinforcement to existing structures. Fasteners and anchors indicated or specified in other sections have precedence over those specified in this Section. It includes the following types of fasteners and adhesives:
   1. Screws.
   2. Bolts.
   3. Expansion anchors (stud anchors, sleeve anchors).
   4. Adhesive anchors (stud anchors, reinforcement dowels)
   5. Reinforcing bars.

B. Related Work Specified Elsewhere:
   1. Concrete: SECTION 03300.
   2. Miscellaneous Metals: SECTION 05500.

1.2 REFERENCES

A. Applicable Standards:
   1. American Society for Testing and Materials (ASTM):
      a. F436 - Hardened Steel Washers.
      b. F467 - Nonferrous Nuts for General Use.
      c. F468 - Nonferrous Bolts, Hex Cap Screws, and Studs for General Use.
   2. Expansion Anchor Manufacturers Institute (EAMI).
   3. Federal Specifications (FS):
      a. FF-B-561 - Bolts, (screw), Lag.
      b. FF-B-575 - Bolts, Hexagon and Square.

1.3 SUBMITTALS

A. Submit as specified in Section 01300.

B. Includes, but not limited to, the following:
   1. Manufacturer's data indicating strength capabilities of anchors, fasteners, and adhesives to be used.

C. Sample of type requested by Engineer.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store anchors and fasteners in manufacturer's original packaging, with labels intact and legible.

B. Store and handle to prevent corrosion or damage prior to installation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Expansion Anchors:
   1. Red Head, Phillips Drill Company.
   2. Ramset.
   3. Rawl.
   4. (WEJ-IT).
   5. Hilti
B. Self-Drilling Fasteners:
   1. Buildex, Division of Illinois Tool Work, Inc.
C. Adhesive Anchors:
   1. Hilti
   2. Redhead

2.2 GENERAL REQUIREMENTS

A. Anchors and fasteners indicated or specified are to establish a type, minimum size and spacing.
B. Determine proper size and length considering the following factors:
   1. Weight to be supported.
   2. Shear strength of fastener.
   3. Material and thickness to which fastener will be inserted.
   4. Thickness of item to be fastened.
C. Expansion anchors shall conform to FF-S-325.
   1. Stud Anchors: Group II, Type 4, Class 1, zinc plated.
   2. Sleeve Anchors: Group II, Type 3, Class 3.
D. Self-drilling fasteners shall be one of the following materials:
   1. 410 stainless steel that is case hardened and cadmium or zinc plated.
   2. Plastic headed on a 410 stainless screw.
   3. 302 stainless steel Scots cap on a 410 stainless steel screw.
E. Washers shall be as a minimum of material compatible with or same material as fastener.

2.3 ANCHORS AND FASTENERS

A. Based upon material to be fastened, select appropriate fasteners listed below.
   1. Framing and Miscellaneous Lumber: including nailers, blocking, sleepers, furring.
      a. To Concrete Masonry Units, Brick, Concrete:
         1) Multi-set or wedge anchors for attachment to concrete.
         2) Sleeve anchors for attachment to masonry and tile.
         3) Cast-in-Place Bolts.
         4) Self-Drilling Fasteners. Hex head, No. 1/4 x 2-3/4 inches, spaced 16 inches o.c.
      b. To Steel Angles, Plates:
         1) Bolts: 3/8-inch diameter minimum, 2 per width, spaced 16 inches o.c., countersink head, 2 washers per bolt.
         2) Self-Drilling Screws: Header Teks/4, reamer wings, Phillips flat head No. 12-24 x 2-1/2 inches, spaced 12 inches oc.

c. To Steel:
1) Structural Steel - Plymetal Teks/3 Self-Drilling Fasteners:
a) Reamers wings, pilot point, flat head No. 2 12-24 x 2-1/2 inches for steel to .250-inches, spaced 12 inches oc.
2) Light Gauge Steel, Studs - Self-Drilling Fasteners: Pilot point, trumpet head.
3) Bolts: 5/16-inch diameter minimum.
d. To Concrete Masonry Units:
1) Sleeve Expansion Anchors: Hex nut, 5/16-inch diameter minimum, spaced 16 inches oc.
2) Cast-in-Place Bolts: As indicated.
3) Tapcon Concrete Anchors: Hex head, No. 1/4 x 1-3/4-inch.
e. To Concrete:
1) Stud Expansion Anchors: Size and thickness as required by thickness and size of plywood, but not less than 3/8-inch diameter (see Drawings for size).

2. Steel Angles or Plate:
a. To Concrete Masonry Units, Brick, Concrete:
1) Stud Expansion Anchors: Size and thickness as required by thickness and size of steel.
2) Cast-in-Place Bolts: 3/8-inch diameter minimum, threaded one end, length as indicated.
3) Tapcon Concrete Anchors: Hex head, No. 1/4- x 1-3/4-inch.
b. To Steel:
1) Bolts and Welding: Specified in SECTION 05120.
2) Teks/5 Self-Drilling Fasteners: Hex head (1/2-inch steel drilling capability), No. 12-24 x 1-1/4-inch or 1-1/2-inch.

3. Sheet Metal:
a. To Wood:
1) Common or Box Nails: Length as required to penetrate substance 1 inch minimum.
2) Self-Drilling Fasteners: Slotted, hex head.
3) Wood Screws: Round Head.
b. To Steel: Up to 0.175-inch steel.
1) Teks/2 Self-Drilling Sheet Metal Screws: Hex head, 10 - 16 x 3/4-inch hex washer head, spaced 6 inches oc.
c. To Steel: Up to 0.25-inch steel.
1) Teks/4 Self-Drilling Sheet Metal Screws: Hex head, 12 - 24 x 7/8-inch hex washer head, spaced 6 inches oc.
d. To Concrete Masonry Units, Brick, Concrete:
1) Tapcon Concrete Anchors: Slotted hex head.
e. To Sheet Metal:
1) Teks/2 Self-Drilling Sheet Metal Screws: Hex head 10 - 16 x 1/2-inch, spaced 6 inches oc.

4. Miscellaneous Equipment (including mounting clips for conduit and pipe; hanger straps; junction, control and switch boxes; metal furring channels, hanging tie wires):
a. To Concrete Masonry Units, Brick, Concrete:

1) Tapcon Concrete Anchors: Slotted hex head.

b. To Steel:

1) Self-drilling fasteners with wings, pilot point, slotted hex head:

a) 12-14 x 3/4-inch Teks/3 (drilling capacity up to 0.210-inch)

b) 12-24 x 7/8-inch Teks/4 (drilling capacity up to 0.250-inch)

c) 12-24 x 1-1/4-inch Teks/5 (drilling capacity up to 0.500-inch)

5. Fasteners and anchors as specified on the Plans.

PART 3 - EXECUTION

3.1 PREPARATION

A. Inspect areas to receive anchors or fasteners for defects which would affect proper installation and strength capacities. Correct all the defects.

3.2 INSTALLATION

A. Install fasteners conforming to manufacturer's recommended procedures.

B. Space fasteners as indicated and specified. If not indicated, space as required to adequately support loads to be imposed. Space expansion anchors in accordance with EAMI Standards and manufacturer’s installation instructions.

C. Place washers under all bolt heads and nuts, and under lag bolt heads.

D. Tighten fasteners to proper tension.

E. Runway beam tolerances shall be in accordance with crane manufacturer’s recommendations.

- END OF SECTION -

SECTION 08331

OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following types of overhead coiling doors:
   1. Insulated service doors.

1.2 DEFINITIONS

A. Operation Cycle: One complete cycle of a door begins with the door in the closed position. The door is then moved to the open position and back to the closed position.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide overhead coiling doors capable of withstanding the effects of gravity loads and the following loads and stresses without evidencing permanent deformation of door components:
   1. Wind Load: Door shall meet requirements of the latest edition of the South Florida Building Code and shall have Metro Dade Product Approval for large missile protection.

B. Operation-Cycle Requirements: Design overhead coiling door components and operator to operate for not less than 10,000 cycles.

1.4 SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes. Provide roughing-in diagrams, operating instructions, and maintenance information. Include the following:
   1. Setting drawings, templates, and installation instructions for built-in or embedded anchor devices.
   2. Summary of forces and loads on walls and jambs.

B. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for units with factory-applied finishes.

C. Samples for Verification: Of each type of exposed finish required, prepared on Samples of size indicated below and of same thickness and material indicated for Work. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.
   1. Curtain Slats: 12-inch length.

D. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer who is an authorized representative of the overhead coiling door manufacturer for both installation and maintenance of units required for this Project.
B. Source Limitations: Obtain overhead coiling doors through one source from a single manufacturer.
   1. Obtain operators and controls from the overhead coiling door manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
B. Manufacturer: Subject to compliance with requirements, provide products by one of the following:
   1. Overhead Door Corporation or approved equal.

2.2 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtain: Fabricate overhead coiling door curtain of interlocking slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of material thickness recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
   1. Steel Door Curtain Slats: Structural-quality, cold-rolled galvanized steel sheets complying with ASTM A 653, with G90 zinc coating.
   2. Insulation: Fill slat with manufacturer's standard rigid cellular polystyrene or polyurethane-foam-type thermal insulation complying with maximum flame-spread and smoke-developed indices of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within metal slat faces.
   3. Inside Curtain Slat Face: To match material of outside metal curtain slat and as follows:
      a. Galvanized Steel Sheet Thickness: Not less than 0.028 inch.
B. Windlocks: Malleable-iron castings secured to curtain slats with galvanized rivets or high-strength nylon, as required to comply with wind load.
C. Bottom Bar: Consisting of 2 angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch thick, either galvanized or stainless-steel or aluminum extrusions to suit type of curtain slats.
   1. Astragal: Provide a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene, between angles or fitted to shape, as a cushion bumper for interior door.
D. Curtain Jamb Guides: Fabricate curtain jamb guides of steel angles, or channels and angles, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Build up units with not less than 3/16-inch- thick, galvanized steel sections complying with ASTM A 36, and ASTM A 123. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain and a continuous bar for holding windlocks.

2.3 HOODS AND ACCESSORIES

A. Hood: Form to entirely enclose coiled curtain and operating mechanism at opening head and act as weatherseal. Contour to suit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Provide closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sag.
   1. Fabricate steel hoods, for steel doors, of not less than 0.028-inch thick, hot-dip galvanized steel sheet with G90 zinc coating, complying with ASTM A 653.
   2. Shape: Square.
   3. Exterior Mounted Door: Fabricate hood with sealant-joint bead profile for applying joint sealant.

B. Weatherseals: Provide replaceable, adjustable, continuous, compressible weather-stripping gaskets fitted to bottom and at top of exterior doors, unless otherwise indicated. At door head, use 1/8-inch- thick, replaceable, continuous sheet secured to inside of curtain coil hood.
   1. In addition, provide replaceable, adjustable, continuous, flexible, 1/8-inch- thick seals of flexible vinyl, rubber, or neoprene at door jambs for a weathertight installation.

C. Slide Bolt: Fabricate with side locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.

D. Chain Lock Keeper: Suitable for padlock.

2.4 COUNTERBALANCING MECHANISM

A. General: Counterbalance doors by means of adjustable-tension steel helical torsion spring, mounted around a steel shaft and contained in a spring barrel connected to door curtain with required barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of hot-formed, structural-quality, welded or seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

C. Provide spring balance of one or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Provide cast-steel barrel plugs to secure ends of springs to barrel and shaft.

D. Fabricate torsion rod for counterbalance shaft of cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Provide mounting brackets of manufacturer's standard design, either cast-iron or cold-rolled steel plate with bell-mouth guide groove for curtain.

2.5 FINISHES, GENERAL

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are

acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 STEEL AND GALVANIZED STEEL FINISHES

A. Factory Primer for Field Finish: Apply manufacturer's standard primer, compatible with field-applied finish according to coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

B. Thermoset Finish: Apply manufacturer's standard baked finish consisting of primer and thermosetting topcoat according to coating manufacturer's written instructions for cleaning, pretreatment, application, thermosetting, and minimum dry film thickness.

2.7 DOOR OPERATOR

A. General: Door shall be operated manually.

2.8 INSTALLATION

A. General: Install door and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports according to Shop Drawings, manufacturer's written instructions, and as specified.

2.9 ADJUSTING

A. Lubricate bearings and sliding parts; adjust doors to operate easily, free from warp, twist, or distortion and fitting weathertight for entire perimeter.

2.10 DEMONSTRATION

A. Startup Services: Engage a factory-authorized service representative to perform startup services and to train Owner's maintenance personnel as specified below:
   1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
   2. Review data in the maintenance manuals. Refer to Division 1 Section "Operation and Maintenance Data."
   3. Schedule training with Owner with at least 7 days' advance notice.

- END OF SECTION -

SECTION 09900
PAINTING

PART 1 - GENERAL

1.1 SCOPE

A. Furnish all labor, surface preparation and coating material, tools, rigging, lighting, ventilation, and other related items of equipment and materials necessary to clean, prepare, coat, cure and cleanup a complete coating system on all interior and exterior exposed items and surfaces throughout the project, except as otherwise specified or shown on the drawings.
   1. Surface preparation, priming, and coats of paint specified are in addition to shop priming and surface treatment specified under other sections of the work.
   2. The scope of work shall include the coating of existing equipment and surfaces which are modified by this project. Color shall match existing unless otherwise noted and shall not look like patchwork - coating shall be extended to the nearest break-line, corner, etc. as may be necessary.

B. The work includes field painting of the new CMU inlet air plenum wall. Wall shall generally match the color of the existing building.

C. Paint all new and existing called out exposed surfaces normally painted in the execution of a new project. Where items or surfaces are not specifically mentioned, or are not specifically excluded from the painting work, paint these the same as adjacent similar materials or areas.

D. Clean, prepare, coat, and cure all surfaces in strict accordance with the manufacturer's published recommendations and specifications.

E. Perform all work by the use of skilled workpersons in a safe and productive manner using equipment and procedures consistent with good coating practices.

F. Colors are indicated on the Painting Schedule in this section or shown on the drawings. If color or finish is not designated, the Engineer will select these from standard colors available for the materials system specified.

1.2 PAINTING NOT INCLUDED

A. The following categories of work are not included as part of the field-applied finish work, or are included in other sections of these specifications.
   1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under the various sections for structural steel, miscellaneous metal, metal fabrications, hollow metal work, and similar items. Also, for fabricated components such as shop-fabricated or factory-built mechanical and electrical equipment or accessories.
   2. Pre-Finished Items: Unless unit is part of an assembly to be painted to match, i.e. - motor, or otherwise shown or specified, do not include painting when factory-finishing or installer finishing is specified.
   3. Concealed Surfaces: Unless otherwise shown or specified, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts. Painting of

galvanized work that will be concealed in the completed work is not required. Do not paint structural steel to be encased in concrete, nor structural steel specified not to be painted elsewhere. Except for touch-up as specified in Part 3, painting of shop primed structural steel and ferrous metals that will be concealed in the completed work is not required.

4. Finished Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting, unless otherwise specified.
5. Operating Parts and Labels: Moving parts of operating units, mechanical and electrical parts such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting unless otherwise specified.
   a. Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.
6. Other Surfaces: Do not paint sprinkler heads, fire detection heads, integrally colored stucco, brick masonry, cast stone, stone masonry, or architectural precast concrete, unless otherwise specified.

1.3 RELATED SECTIONS SPECIFIED ELSEWHERE

A. Section 01300 - Submittals

1.4 REFERENCES

A. ANSI/ASTM D16 - Definitions of terms relating to paint, varnish, lacquer, and related products.
B. ASTM D2016 - Test method for moisture content of wood.
C. Steel Structures Painting Council (SSPC).

1.5 DEFINITIONS

A. Conform to ANSI/ASTM D16 for interpretation of terms used in this section.

1.6 QUALITY ASSURANCE

A. Furnish all coating materials by a single manufacturer. Solvent, thinners, and other miscellaneous materials can be supplied by the same manufacturer or by a supplier approved by the manufacturer.
B. Furnish a statement to the Engineer from the coatings manufacturer that materials to be used by the Contractor comply with the manufacturer's recommendations.
C. The Engineer reserves the right to require qualification of the product manufacturer and applicator, including satisfactory completion of at least two (2) projects of this nature.
D. Manufacturer's Inspection Meeting: After set-up for painting but before commencing work, conduct a meeting at the site among representatives of the paint manufacturer, contractor, painting contractor, and Engineer to inspect the facility and review procedures recommended by the manufacturer for the prevailing conditions.

1.7 REGULATORY REQUIREMENTS

A. Comply with all federal, state, and local health and fire regulations when handling and applying paint and coating products.

1.8 SUBMITTALS

A. Manufacturer's Data: Submit manufacturer's technical information including paint label analysis, surface preparation and application instructions for each material proposed for use. Indicate the surfaces to which each material is to be applied.

B. Samples; Painting: Submit samples for Engineer's review of color and texture only. Provide a listing of material and application for each coat of each finish sample.

C. Manufacturer's Certificate: Submit a written certification from the paint manufacturer that materials furnished for the work meet or exceed specified requirements.

D. Prepare a detailed painting schedule. List each Painting System to be used by Painting System Number, define extent and limits of each system and colors (by name and number) where appropriate.

1.9 PRODUCT DELIVERY AND STORAGE

A. Deliver all materials to the jobsite in original, new and unopened packages and containers bearing manufacturer's name and label, and the following information;
   1. Name or title of material.
   2. Fed. Spec. number, if applicable.
   3. Manufacturer's stock number and date of manufacture.
   4. Manufacturer's name.
   5. Contents by volume, for major pigment and vehicle constituents.
   6. Thinning instructions.
   7. Application instructions.
   8. Color name and number.

B. Store paint materials and painting tools and equipment, including solvents and cleaning material, in a well ventilated, dry area away from high heat. Do not store in buildings or structures in use or being constructed, nor leave overnight therein. Follow manufacturer's recommendations for the safe storage of paints and solvents.

C. Take precautions to prevent fire hazards and spontaneous combustion.

1.10 SAFETY

A. Make all necessary provisions regarding materials, equipment, personnel, procedures, and practices, to assure that the work is done safely and that the working area is maintained free of all health and safety hazards.

B. Observe manufacturer's health and safety precautions when storing, handling, and applying coating materials and cleanup materials containing solvents and/or chemical ingredients.

C. Direct personnel's attention to all product warnings and information given on the labels of all products.

D. Ensure that personnel mixing and applying coating materials are equipped with adequate protective clothing and devices (including respirators).

E. Permit no smoking in the working area.

F. Permit no item which may produce sparks or open flames in the immediate working area.

G. Post warning signs outside of the work to apprise personnel of the hazards in the area. Erect barriers where necessary.

H. Return partially used coating materials that are to be retained to their original containers at the completion of each work day. Tightly reseal containers, wipe material spills, clean and return the containers to the designated storage area.
I. Remove waste coating materials and contaminated disposable items from the job site and dispose of them at the completion of each work day. Dispose of all items and materials in strict accordance with local, state, and federal regulations.

1.11 JOB CONDITIONS

A. Apply water-base paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50 degrees F and 90 degrees F unless otherwise permitted by the paint manufacturers printed instructions.
B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 45 degrees F and 95 degrees F unless otherwise permitted by the paint manufacturers printed instructions.
C. Do not apply paint in rain, fog or mist; or when the relative humidity exceeds 85%; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instructions.
D. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.
E. Exercise caution when attempting to paint in windy conditions. The Contractor is responsible for all damage caused by wind blown paint.

PART 2 - PRODUCTS

2.1 COLORS AND FINISHES

A. Paint colors, surface treatments, gloss, and finishes are indicated or specified in the "schedules" of the contract documents. Color and gloss not indicated or specified shall match the Owner's existing color scheme.
B. Final acceptance of colors will be from samples applied on the job.
C. Paint Coordination: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Furnish information to manufacturer's, fabricators, suppliers and others where necessary on the characteristics of the finish materials to be used, to ensure compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required.

2.2 UNDERCOATS AND THINNERS

A. Undercoats: Provide undercoat paint produced by the same manufacturer as the finish coats.
B. Thinners: Use only thinners approved by the paint manufacturer, and use only within recommended limits.

2.3 ACCEPTABLE MANUFACTURER'S

A. All coating references herein are to Tnemec Co., Inc., or Ameron. All coatings to be in contact with potable water must appear on the current Florida Department of Environmental Protection list of approved paint and protective coatings and be rated NSF approved for potable water.

2.4 PAINTING SYSTEMS

A. Provide a minimum dry film thickness, noted as D.F.T., for the applications listed in the schedule of finishes.

B. Touch-up shop-applied and field applied prime coats wherever damaged or bare and keep touched-up as necessary before and after installation or erection of the items, to maintain protection of the metal from rust and corrosion. Clean and touch-up with the same type of primer as initially used.

C. Note: Color for all surfaces in contact with potable water to be white or ivory to conform to State of Florida, EPA, and FDA Regulations for contact with potable water. All potable water piping shall be Blue.

2.5 SCHEDULE OF FINISHES

A. Concrete and Masonry

1. Exterior (Block)

System:	Acrylic
Block Filler:	Series 54
D.F.T.:	100± SF/Gal
First Coat:	156 - Color W.B. Enviro-Crete
D.F.T. (Mils.):	4.0 - 8.0
Second Coat:	156 - Color W.B. Enviro-Crete
D.F.T. (Mils):	4.0 - 8.0
Min D.F.T. (Mils)	8.0 - 16.0

2. Exterior (Concrete and Stucco)

System:	High Build Acrylic Emulsion
First Coat:	156 - Color W.B. Enviro-Crete
D.F.T. (Mils):	4.0 - 8.0
Second Coat:	156 - Color W.B. Enviro-Crete
D.F.T. (Mils):	4.0 - 8.0
Min D.F.T. (Mils):	10.0

3. Flooring

System:	Waterborne Epoxy
First Coat:	Enviro-Pox, Series 287
D.F.T. (Mils):	2.0 - 4.0
Second Coat:	Enviro-Pox, Series 287
D.F.T. (Mils):	2.0 - 4.0
Total Coats:	2.0
Total D.F.T. (Mils)	4.0 - 8.0

2.6 SCHEDULE OF COLORS:

A. Newly constructed inlet air plenum wall shall match existing building colors.

PART 3 - EXECUTION

3.1 FIELD OBSERVATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer. Do not paint over conditions detrimental to the formation of a durable paint bond and film.
B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application. Do not proceed with the work until unsatisfactory conditions have been corrected.
C. Provide all necessary equipment, labor, rigging, lighting and other equipment to facilitate inspections.
D. The Engineer may inspect the Work at any time for compliance with the requirements of the specifications.
E. The Engineer reserves the right to approve each phase of the Work before further work is done, to halt all Work deemed to be improper or not in compliance with the specification, and to require the Contractor to promptly correct all improper practices or deficient Work.
F. The Contractor is responsible for any expenses incurred in association with corrective measures required as the result of improper practices and/or defective or deficient work.

3.2 GENERAL REQUIREMENTS

A. Provide adequate explosion – proof lighting sufficient to illuminate clearly the working area without shadows during all surface preparation and coating operations.
B. Maintain adequate and continuous explosion – proof ventilation in confirmed areas during all surface preparation and coating operations and during all recoat and curing periods. Provide ventilation of sufficient capacity to maintain a clear atmosphere that is well below explosive and toxic limits. Arrange the ventilation system, including all fans and temporary duct work, so that no still air spaces exist in any area.
C. Heating devices used to create and/or maintain temperature conditions in compliance with the specification requirements are to be explosion proof and of the type that do not exhaust sooty or oily residues or any other contaminants into the air. Heating devices are not to be used when existing temperature and humidity conditions may create dew point conditions.
D. Use equipment that is explosion proof and non-sparking. Spray equipment must be recommended by or acceptable to the coatings manufacturer.
E. Apply caulking material only after the last coat of paint has been applied and has dried hard. Caulking material used must be of a type that is compatible with the specified coating system.

3.3 SURFACE PREPARATION

A. Perform preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate conditions.
B. Surface preparation shall be conducted to prevent material from contaminating the existing water treatment process.
C. Fiberglass and PVC materials shall be solvent cleaned according to SSPC-SP1 and scarified by best practical means. Every precaution should be taken to ensure that NO sanding dust is drawn into the degasifiers. Painting contractor to furnish all necessary barrier, drapes, etc. to prevent contamination of the Finish Water.

3.4 MATERIAL PREPARATION

A. Mix and prepare painting materials in accordance with manufacturer's direction.
B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.
C. Stir materials before application to produce a mixture of uniform density, and stir as required during the application of the materials. Do not stir surface film into the materials. Remove the film and if necessary, strain the material before using.

3.5 APPLICATION

A. General
   1. Conform to articles "General Requirements" and "Surface Preparation" prior to beginning coating application.
   2. Apply paint as specified and in accordance with the manufacturer's printed instructions. Unless otherwise recommended in the manufacturer's printed instructions or specified elsewhere (e.g. Bid Form, Painting System) use brushes for applying first coat on wood and use standard industrial spray equipment, either airless or conventional for applying first coat on metals other than sheetmetal and items fabricated from sheetmetal. For other coats on wood, metal and other substrates, use applicators and techniques best suited for the type of material being applied.
   3. Apply additional coats when undercoats, stains or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance. Give special attention to insure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
   4. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces.
   5. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only before final installation of equipment.
   6. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.
   7. Paint the back sides of access panels, and removable or hinged covers to match the exposed surfaces.
   8. Finish exterior doors on tops, bottoms and side edges the same as the exterior faces, unless otherwise indicated or specified.
   9. Sand lightly between each succeeding enamel or varnish coat.
   10. Omit the field prime coat on shop-primed and touch-up painted metal surfaces which are not to be finish painted and which will not be exposed to view in the completed work. Do not omit primer on metal surfaces specified to be finish coated or on metal surfaces that will be exposed to view in the completed work.
   11. Putty nail holes and joints after prime coat is dry.
   12. Change colors at corner of stop where colors differ between adjoining rooms or spaces and where door frames match wall colors.

13. Provide a finished coating system free of all runs, sags, cracks, blisters, pinholes, excessive or deficient fill thickness, or any other defects. Correct any such deficiencies by proper removal of the defect and/or recoating.
14. Apply the first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration. Sandblasted surfaces are not to be left uncoated overnight.
15. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
16. Provide minor tinting to each coat of paint in order to differentiate between coats.

B. Minimum Coating Thickness
   1. Apply each material at not less than the manufacturer's recommended spreading rate, to establish a total dry film thickness as specified or, if not specified, as recommended by the coating manufacturer.
   2. Painting of Mechanical and Electrical Work
      a. Limit painting of mechanical and electrical work to those items exposed in equipment rooms and occupied spaces, and on the exterior of buildings or structures.

3.6 CLEAN-UP AND PROTECTION

A. Clean-up
   1. During the progress of the work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each work day.
   2. Upon completion of painting work, clean window glass and other paint – spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or damage finished surfaces.

B. Protection
   1. Protect open water holding tanks and basins of the existing water treatment plant.
   2. Protect work of other trades, whether to be painted or not, against damage from painting and finishing work.
   3. Protect surfaces that might otherwise be damaged by dripping, splashing, or spraying of paint. Correct any damage by cleaning, repairing or replacing and repainting as acceptable to the Engineer.
   4. Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after the completion of paint operations.
   5. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.
   6. Repair of damage caused by overspray is the contractor's responsibility.

3.7 WARRANTY

A. If within one year after the date of Substantial Completion, any Work is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER'S written instructions, either correct such defective Work, or, if it has been rejected by OWNER, remove it

from the site and replace it with nondefective Work. If CONTRACTOR does not promptly comply with terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective Work corrected or the rejected Work removed and replaced, and all direct and indirect costs of such removal and replacement, including compensation for additional professional services, will be charged to the CONTRACTOR.

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SECTION 11900
DIESEL FUEL SYSTEM

PART 1 - GENERAL

1.1 SCOPE

1. Work under this section consists of furnishing all materials, supplies, equipment, and labor required to install new fuel piping, fittings and supports.

1.2 RELATED SPECIFICATIONS

A. Drawings and general provisions of the Contract, including the General and Supplementary Conditions and Division 1 Specification sections, apply to this section.
B. Section 01300 – Submittals
C. Section 09900 – Painting

1.3 QUALITY CONTROL

A. All components must be products of qualified manufacturers regularly engaged in the manufacturer of fuel system components.
B. All components must comply with DEP 62-761 (F.A.C.) and DEP 62-762 (F.A.C.).

1.4 SUBMITTALS

A. Shop Drawings
   1. Manufacturer's literature, illustrations, specifications and engineering data of primary and secondary fuel piping and fittings.
   2. Submit in accordance with Section 01300.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. All aboveground (or exposed) piping and pipe fittings associated with the diesel fuel system shall be threaded Schedule 40 316 stainless steel pipe and fittings. Piping shall be painted gray in accordance with Section 09900 and labeled "Diesel Fuel" at intervals of 48 inches in high visibility adhesive marking labels.
B. Underground fuel piping and fittings to shall be double walled in accordance with FDEP requirements. Piping, fittings and accessories must be listed on the FDEP approved products list. Underground double wall fuel piping and accessories shall be Flexworks by OPW or approved equal. Swivel Bolt-on couplings shall be by OPW Flexworks or approved equal.
C. All underground fuel piping to be installed within a 4" corrugated flexible conduit. Flexible conduit to be a OPW Dual Layer Access Pipe or approved equal.
D. Primary piping to be tested to 30 psi and secondary piping shall be pressure tested to 10 psi. All tests shall be witnessed and accepted by the Engineer.

2.2 TRANSITION PIPE SUMP

A. Transition pipe sump shall be model PSTF-4630 by OPW Flexworks or approved equal.
B. Pipe transition through concrete pad to be rigid pipe model PTA-4175 as manufactured by OPW Flexworks or approved equal.
C. Test boots shall be by OPW Flexworks or approved equal.

2.3 VALVES

A. Stainless Steel Ball Valves: All steel ball valves shall be constructed of 316 stainless steel, including handle, stem, stem nuts, washers, stop plate, body and ball. Body, bolts and nuts shall be stainless steel. Ball valves shall be designed for a pressure not less than 600 psig. Valves shall have a female NPT inlet/outlet connections. Ball valves shall be Model 691BSS Full Port Locking Ball Valves as manufactured by Morrison Bros. Co.
B. Stainless Steel Pressure Relief Valves: Pressure relief valves shall be constructed of 316 stainless steel and have a spring range of 25 – 50 psi. All wetted parts shall be suitable for the conveyed fluid. The pressure relief valves shall be Model 076S Expansion Relief Valves manufactured by Morrison Bros. Co. or approved equivalent.
C. Stainless Steel Check Valves: Check valves shall be constructed of 316 stainless steel and manufactured by FNW Model Number 200 CWP or approved equivalent.
D. Stainless Steel Foot Valves: Foot valves shall be constructed of 304 stainless steel and contain a 20 mesh inlet screen as manufactured by Morrison Bros. Co. Model Number 934 Stainless Steel Single Poppet Foot valve or approved equivalent.
E. Anti-siphon Valves: Anti-siphon valves shall be installed in accordance with FDEP and local regulations. Anti-siphon valves shall be a 316 stainless steel body solenoid valve with manual override as manufactured by Magnatrol or approved equivalent. A stainless steel strainer shall be installed prior to the solenoid valve and shall be manufactured by Magnatrol or approved equivalent.

PART 3 - EXECUTION

3.1 PIPING

A. Contractor shall not fill any new lines with fuel without prior approval from the Engineer.
B. Fuel lines shall be cleaned with dry air to purge lines of all debris. All lines shall be properly flushed and tested with nitrogen or other non-contaminant to prevent fuel contamination.
C. Prior to connecting fuel lines to the existing tanks or above ground fuel piping, Contractor shall perform tightness testing on new pipes. Tightness testing shall be conducted in accordance with DEP 62-761.
D. Piping Stress: All piping, fittings and other equipment shall be installed so that no pipe stress is transferred to the equipment. Pipe/fittings shall remain aligned with connections removed. Contractor will demonstrate the lack of pipe stress prior to start up.
E. Leakage Test: The Contractor will provide and install a suitable pressure gauge, acceptable to the Engineer, for the test. The Contractor will provide all other necessary apparatus including a pump, flow measuring device, piping connections and fittings and the necessary labor to conduct the tests. The test shall be of two hour duration. During the test, the pipe being tested

shall be maintained at a pressure of not less than 30 psi. Upon completion of all leakage testing, all fuel oil feed piping shall be completely cleared of all water by purging with a dry inert gas. Suitable safety precautions shall be taken by the Contractor.

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SECTION 16000
ELECTRICAL GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The general provisions of the Contract, including General Conditions, apply to all the work specified in the Electrical 16000 Sections.

1.2 LAWS, PERMITS, FEES AND NOTICES

A. Secure and pay all permits, fees and licenses necessary for the proper execution of the work. Submit all notices and comply with all laws, ordinances, rules and regulations of any public agency bearing on the work. Contractor shall be licensed Electrical Contractor in the county of construction.

1.3 DEPARTURES

A. If any departures from the Contract Drawings or Specifications are deemed necessary, details of such departures and the reasons therefore shall be submitted to the Owner and Engineer for advance written approval, prior to departure.

B. Contractor shall schedule the work including installation and demolition based on availability of the equipment and installation materials. Suggestion of order of installation is to provide and install the proposed new emergency circuit between the plant's electrical building and the plant's solids building ATS switch. Then schedule the demolition and replacement of the Generator or the two ATS switches depending of which equipment has the earlier delivery.

C. The Owner and Engineer will consider different approaches and schedules to demo and replace the equipment based on availability and delivery of the equipment, and the Contractor's recommendation based on a submitted plan outlining the steps to carefully prepare, provide temporary rental equipment, and demolition approach, replacement and reinstallation of former power and control wires as called out on the drawings and other specifications.

1.4 GUARANTEES

A. Furnish written guarantee covering all materials, workmanship, labor and equipment for a period of one (1) year from the date of acceptance as described in the Contract General Conditions.

B. The Owner reserves the right to operate and use all materials and equipment failing to meet the requirements of the Contract Documents until such unacceptable materials and equipment are replaced or repaired to the satisfaction of the Engineer.

1.5 AS-BUILT INFORMATION

A. A set of "red-lined" electrical drawings shall be carefully maintained at the job site. Actual conditions are to be put on the drawings in red on a daily basis so the drawings will continuously show locations and routes of cable trays, conduits, pull-boxes, circuit numbers, and other information required by the Engineer.

1.6 **JOB SITE VISIT**

A. Visit the project site before submitting a bid. Verify all dimensions shown and determine the characteristics of existing facilities which will affect performance of the work, but which may not be shown on drawings or described within these Specifications.

1.7 **CLEANUP**

A. Maintain a continuous cleanup during the progress of the work and use appointed storage areas for supplies. The premises shall be kept free from accumulations of waste materials and rubbish.

1.8 **CUTTING AND PATCHING**

A. Cut and prepare all openings, chases and trenches required for the installation of equipment and materials. Repair, remodel and finish in strict conformance with the quality of workmanship and materials in the surroundings. Obtain written permission from the Engineer for any alterations to structural members before proceeding.

1.9 **MAINTENANCE**

A. Cut and prepare all openings, chases and trenches required for the installation of equipment and materials. Repair, remodel and finish in strict conformance with the quality of workmanship and materials in the surroundings. Obtain written permission from the Engineer for any alterations to structural members before proceeding.

1.10 **WATERPROOFING**

A. Whenever any work penetrates any waterproofing, seal and render the work waterproof. All work shall be accomplished so as not to void or diminish any waterproofing bond or guarantee.
B. All conduit penetrations into cabinets, disconnects, enclosures, control panels, terminal boxes, and the like shall include duct seal.

1.11 **TESTS**

A. Conduct an operating test of equipment prior to the Engineer's approval. The equipment shall be demonstrated to operate in accordance with the requirements of these Specifications. The tests shall be performed in the presence of the Engineer or an authorized representative. The Electrical Contractor shall furnish all instruments, electricity and personnel required for the tests.

1.12 **SUMMARY OF ELECTRICAL WORK**

A. Provide all labor, materials, tools, supplies, equipment and temporary utilities to complete the work shown on the drawings and specified herein. Temporary All systems are to be completely installed and fully operational. Specifically, the work includes, but is not necessarily limited to:
   1. Temporary construction power as needed, this shall include scheduling and maintaining any system and power shut downs to a minimum as emergency power is shifted from the existing equipment to temporary rental equipment to facilitate the demolition and replacement of the 1,000-kW generator and also the 2,000 Amp ATS switch at the plant's main electrical room. Refer to the drawings, power will be connected to the M2 Main and

rental ATS for the generator replacement to avoid dealing with major FPL normal power shutdowns, see the drawings.

2. Similarly, the replacement of the existing 800Amp ATS switch at the solids building, shall be properly planned, and carried out with the least amount of disruption to the plant's operation.
3. Demolition and removal of existing generator and related power and control wires, temporarily disconnecting the existing wires.
4. Provide megger testing of these existing power and control wires to determine that they may be reused after new equipment is installed.
5. Provide rental generator with temporary SO cord power wires and temporary control wires from rental generator unit to existing ATS switch.
6. Disconnect of existing genset and terminate temp SO cords to rental unit. After installation of new generator unit disconnect rental unit and connect power and control wires at ATS from new generator – this step is to be completed after megger testing existing power wires, so they may be reused (make sure they are good to be reused).
7. Replace existing daytank with new, provide 120/208V power from former daytank panelboard circuit, extend wire and conduit as required. Similarly, provide power to the new battery charger, and new generator jacket water heater circuits, and alternator heater circuit. Reuse existing 120/208V branch circuits from former generator for new equivalent circuits. Contractor shall extend former circuits and raceways as required, match existing wires and conduit size. Provide replacement and installation of exhaust fan (ceiling mounted), see the drawings.
8. At this time provide testing of the generator to make sure it performs as expected per generator vendor's requirements.
9. Provide and setup rental ATS switch and temporarily provide SO Cords and connect to new generator power and control circuits to allow for the safe demolition of the existing ATS switch. M-2 Main shall be used along with Kirk switch interlocks to allow for the safe disconnect of all the normal M-1 power, and emergency circuits from at the existing ATS switch terminal lugs.
10. The existing wires are to be reused and therefore megger Test the existing wires to make sure these may be reused.
11. Provide the new genset annunciator and vendor cable installation at the new ATS front panel; The Contractor shall provide cutout and install genset annunciator at front panel of new ATS switch.

B. Provide all labor, materials, tools, supplies, equipment and temporary utilities to complete the work shown on the drawings and specified herein for the installation of miscellaneous emergency power circuits to the generator, like the jacket water heaters, battery charger, batteries, controls wires between generator and ATS switch, the Generator and the daytank and main fuel tank. The Contractor shall use former 120/208V branch circuits, extend wire and conduit as required, match existing wires of former circuits.

C. The Contractor shall schedule sometime in the process of replacement and installation of the new Generator and ATS switch equipment the generator Load bank test shall be performed, refer to generator specifications.

1.13 CODES AND STANDARDS

A. General Applicable provisions of the following codes and standards and other codes and standards required by the State of Florida and local jurisdictions are hereby imposed on a general basis for electrical work (in addition to specific applications specified by individual work sections of these specifications):
   1. U.L.: Electrical materials shall be approved by Underwriters' Laboratories, Inc. This applies to materials which are covered by U.L. standards. Factory applied labels are required.
   2. National Electrical Code 2017 edition and any local amendments adopted by the local jurisdiction.
   3. OSHA: Standards of the Occupational Safety and Health Administration are to be complied with.
   4. NEMA: National Electrical Manufacturers Association Standards are to be met wherever standards have been established by that agency and proof is specifically required with material submittals for switchboards, motor control centers, panelboards, cable trays, motors, switches, circuit breakers and fuses.
   5. ANSI: America National Standards Institute
   6. NESC: National Electrical Safety Code, latest edition.
   7. Florida building code, latest edition.

1.14 ELECTRICAL TEMPORARY FACILITIES

A. The Electrical Contractor shall include in his bid the cost of furnishing, installing, maintaining and removing all materials and equipment required to provide temporary light and power to perform his work during construction and until work is completed.

B. Safety
   1. All reasonable safety requirements shall be observed to protect workers and the public from shock and fire hazards. Ground fault interrupters shall be employed in accordance with codes.
   2. Ground wires are required in all circuits. Ground poles are required on all outlets. All metallic cases shall be grounded.
   3. Raintight cabinets shall be used for all equipment employed in wet areas.

1.15 EXCAVATING FOR ELECTRICAL WORK

A. General
   1. Excavation or drilling, backfill and repair of paving and grassing is to be in the bid of the Electrical Contractor. The actual work need not be performed by electrical trades. However, the Electrical Contractor is responsible for all excavation, drilling, dewatering, backfilling, tamping and repair of pavements and grassing required in support of electrical work. All areas disturbed by electrical work shall be repaired to their original condition, or as indicated on the drawings.

B. Coordination
   1. The Electrical Contractor must check for existing utilities before commencing any excavation or drilling.
   2. Contract drawings and other trades are to be consulted to avoid interferences with other utilities on this project.

3. In the event of damage to existing utilities, the Engineer shall be immediately notified, and damage shall be immediately repaired.
4. The Owner is to be consulted to ascertain locations of existing interferences by referring to "As Built" drawings and Owner's experience. The excavations are to be scheduled at the Owner's convenience.
5. The Contractor shall also coordinate ahead of time for all planned shut downs and switchovers of power and any controls.

C. Precautions
1. The Electrical Contractor must take every reasonable precaution to avoid interferences. In the vicinity of a suspected interference, excavations shall be dug by hand.

1.16 **ELECTRICAL SUBMITTALS**

A. Submittals for Approval
1. Refer to Contract General Conditions for additional instructions on the General Conditions and this Section, the more stringent requirements shall apply.
2. Shop Drawings and manufacturer's data sheets are required for all electrical materials.
3. Submittals will not be accepted for partial systems. Submit all materials for each specification section at one time. Submittals must be arranged, correlated, indexed and bound in orderly sets for ease of review.
4. Samples are to be supplied for any substitute as requested by the Engineer.
5. The following numbers of copies are required:

Shop drawings	6 sets
Samples	1 each
Manufacturer's data	6 sets
Certifications	6 sets
Test reports	6 sets
Warranties/Guarantees	6 sets

6. Submit shop drawings, manufacturer's data and certifications on all items of electrical work prior to the time such equipment and materials are to be ordered. Order no equipment or materials without approval from the Engineer. Submittals will not be accepted for partial system submittals; submit all data at one time. Submittals will be promptly returned, approved, approved as noted, or not approved. Items "approved as noted" must be changed to comply with the Engineer's comments and need not be resubmitted for "approved" status. Items "not approved" are not suitable, requiring complete new submittals.
7. Time delays caused by rejection of submittals are not cause for extra charges to Owner or time extensions. Contractor shall be responsible for investigating existing systems or shop drawings in order to fully integrate the new equipment into the system. Adequate shop drawings may or may not exist for all existing systems.

B. Operation and Maintenance Manuals

1. Submit to the Engineer five (5) copies of all manufacturer's service installation and operation manuals, instructions and bulletins. These manuals shall be subject to review of the Engineer. If acceptable they shall be forwarded to the Owner. If not acceptable they shall be returned to the Contractor for revision and resubmittal. Manuals shall contain, but not be limited to, the following:
   a. Brief description of system and basic features.
   b. Manufacturer's name and model number for all components in the system.
   c. List of local factory authorized service companies.
   d. Operating instructions.
   e. Maintenance instructions
   f. Trouble shooting instructions
   g. Manufacturer's literature describing each piece of equipment.
   h. Power and control wiring diagrams
   i. Parts lists

1.17 **ELECTRICAL PRODUCTS**

A. Standards Products
   1. Unless otherwise indicated in writing by the Engineer, the products to be furnished under this Specification shall be the manufacturer's latest design. Units of equipment and components of the same purpose and rating shall be interchangeable throughout the project. All products shall be newly manufactured. Defective equipment or equipment damaged in the course of installation or test, shall be replaced or repaired in a manner meeting with the approval of the Engineer at no additional expense to the Owner.

B. Delivery, Storage and Handling
   1. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels and similar information needed for distinct identification; adequately packaged or protected to prevent deterioration during shipment, storage and handling. Store in a dry, well ventilated, indoor space, except where prepared and protected by the manufacturer specifically for exterior instructions for storage locations.

C. Substitutions
   1. Comply with instructions in the Contract General Conditions and Special Conditions and obtain pre-approval of the Engineer regarding substitutions.

1.18 **ELECTRICAL IDENTIFICATION**

A. Color Coding Conductor colors shall be in accordance with the N.E.C. and NFPA requirements for single phase, three phase, and DC power circuits, including grounding and neutrals.

B. Nameplates
   1. The following items shall be equipped with nameplates: All motors, motor starters, motor control centers, pushbutton stations, control panels, time switches, disconnect or relays in separate enclosures, receptacles, wall switches, high voltage boxes and cabinets. All light switches and outlets shall carry a phenolic plate with the supply identified. Special Electrical systems shall be identified at junction and pull boxes, terminal cabinets and equipment racks.

2. Nameplates shall adequately describe the function of the particular equipment involved. Nameplates for panelboards and switchboards shall include the panel designation, voltage and phase of the supply. For example, “Panel A, 277/480V, 3-phawe, 4-wire”. The name of the machine on the motor nameplates for a particular machine shall be the same as the one used on all motor starters, disconnect and P.B. station nameplates for that machine. Normal power nameplates shall be laminated phenolic plastic, white front and back with black core, with lettering etched through the outer covering; black engraved letters on white background. Lettering shall be 3/16 inch high at pushbutton stations, thermal overload switches, receptacles, wall switches and similar devices, where the nameplate is attached to the device plate. At all other locations, lettering shall be ¼ inch high, unless otherwise detailed on the Drawings. Nameplates shall be securely fastened to the equipment with No. 4 Phillips, round-head, cadmium plated, steel self-tapping screws or nickel-plated brass bolts. Motor nameplates may be non-ferrous metal not less than 0.003 inch thick, die stamped. In lieu of separate plastic nameplates, engraving directly on device plates is acceptable. Engraved lettering shall be filled with contrasting enamel. Equipment nameplate schedule for all equipment shall be submitted with shop drawing submittal for Engineer’s approval.

1.19 **SKILLED ELECTRICAL CRAFTSMEN**

A. Contractor shall employ and staff the project with skilled Craftsmen experienced in the project requirements.
B. As a minimum, a Licensed Journeyman Electrician shall be present on the project at all times.
C. Other skilled persons shall be present as the project requirements dictate including manufacturers representatives, start-up technicians, Engineers, etc.

- END OF SECTION –

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SECTION 16001

ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Contractor shall take precautionary and safety measures to assure the safety of his personnel. All wires shall be identified and disconnected from power sources before removal.
B. Contractor shall coordinate with the Owner, Engineer.
C. The general demolition scope shall also include the following minimum requirements whether indicated on plans or not.
   1. Before demolition, Contractor shall verify that the equipment is no longer needed or that the demolition will not adversely effect plant operation.
   2. Removal of all exposed unused conduit. Removal of all abandoned wire within raceways, cabinets, outlet boxes, trenches and the like associated with equipment shown to be removed on plans.
   3. Removal of all hangers and support systems which are not needed as a result of the demolition.
   4. Contractor shall cover all openings as a result of demolition and removals including but not limited to the following:
      a. Cabinets and enclosures
      b. Wall and masonry openings.
      c. Cut conduit, instrumentation line, etc. flush with slab, fill with concrete.
D. Operational Systems
   1. To the fullest extent possible, all required systems shall remain operational. Contractor shall replace and/or repair existing facilities which may be damaged due to equipment removals.
   2. Where required wiring passes through or uses enclosures or raceways shown for demolition. Contractor shall provide raceways and wire as required to keep those systems operational.
   3. Contractor shall remove existing equipment in an orderly, planned and coordinated fashion. All replacement equipment shall be on site and ready to install immediately after the removal of existing equipment.
   4. Where demolition interrupts the normal automatic control of the station, Contractor shall provide full time manual control until automatic control is restored. Contractor shall obtain permission of the Owner before removing automatic control.

1.2 SPECIFIC EQUIPMENT REMOVALS

A. The following include but do not limit the specific pieces of equipment for the removal and disposition.

1. Demo existing transfer switches and adjacent fill section. Provide temporary rental equipment in support of the disconnect of the former equipment, its demolition and eventual replacement.
2. Reuse former power and control wires, the Contractor shall include labor and equipment to perform megger testing of the existing wires to determine that these may be reused. In the event a wire, or several wires test bad then the Contractor shall provide replacement wires of the same type and AWG gauge as the existing one. The replacement cost shall be based on a pre-determined cost per linear foot that the Contractor shall provide prices to replace 600MCM copper cable, 250MCM copper cable, #14 and #12 copper cables of the same insulation type as the existing one as add alternate bid items.
3. In the even that wires need to be extended to properly terminate them at the new replacement ATS or generator mainline breaker, then approved hi press methods of extending the same gauge wires Shall be used. Provide during shop drawing submittal method Contractor plans to use to extend power wires, in case this is needed.
4. Review other plans especially civil and mechanical and provide demolition as may be required in support of those efforts.

1.3 DISPOSITION OF EQUIPMENT

A. Except as otherwise indicated, all removed or demolished electrical equipment shall become the property of the Contractor. All rubble shall be disposed of by the Contractor.
B. Contractor shall load, transport, and dispose of all or demolished equipment including any removed equipment like all enclosed gear, cabinets, raceways, wire and cable, supports, ATS equipment including fill enclosure section, circuit breakers, panel covers, light fixtures, rigid galvanized steel conduit and the like.

- END OF SECTION -

SECTION 16050

BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUBMITTALS

A. Submit data sheets on all items per Section 16000.

1.2 CODES AND STANDARDS

A. General applicable provisions of the following codes and standards and other codes and standards required by the State of Florida and local jurisdictions are hereby imposed on a general basis for electrical work (in addition to specific applications specified by individual work sections of these specifications):
   1. U.L.: Electrical materials shall be approved by the Underwriters' Laboratories, Inc. This applies to materials which are covered by U.L. standards. Factory applied labels are required.
   2. National Electrical Code
   3. OSHA: Standard of the Occupational Safety and Health Administration are to be complied with.
   4. NEMA: National Electrical Manufacturers Association Standards are to be met wherever standards have been established by that agency, and proof is specifically required with material submittals for switchboards, motor control centers, panelboards, cable trays, motors, switches, circuit breakers, and fuses.
   5. ANSI: American National Standards Institute
   6. NESC: National Electrical Safety Code

PART 2 - PRODUCTS

2.1 GROUNDING MATERIALS

A. All ground rods shall be 20 foot 5/8" copperclad, unless otherwise indicated.
B. Around wires shall be soft drawn copper sized per National Electrical Code, unless otherwise indicated.

2.2 CONDUIT

A. PVC Conduit
   1. PVC conduit shall be Schedule 80 or Schedule 40 unless otherwise noted and shall be U.L. approved. Comply with Federal Spec WC-1094 and NEMA TC-1.
B. Flexible Conduit
   1. All flexible conduits shall be liquidtight, made of corrosion resistant plated steel with extruded polyvinyl covering and watertight connectors.
C. Refer to schedule in plans for requirements.

2.3 CABLE, WIRE AND CONNECTORS

A. 600 Volt Power Wiring
   1. Individual conductors shall be rated for 600 volts and shall meet the requirements below:
      a. Conductors shall be stranded.
      b. All wire shall be brought to the job in unbroken packages and shall bear the date of manufacturing; not older than 12 months.
      c. Type of wire shall be THWN except where required otherwise by the contract drawings.
      d. No wire smaller than No. 12 gauge shall be used unless specifically indicated.
      e. Conductor metal shall be copper.
      f. All conductors shall be meggered after installation. Megger testing shall exceed 50 mega ohms.
   2. Multi-conductor cables shall be type TC UL 1277 THWN, PVC jacketed 600V with conductor and quantities as indicated.

B. Instrumentation and Control Cable
   1. Process instrumentation wire shall be 16 gauge twisted pair, 600 V., aluminum tape shielded, polyvinyl chloride jacketed, as manufactured by the American Insulated Wire Co., Eaton Corp., or equal. Multiconductor cables with individually shielded twisted pairs shall be installed where indicated.
   2. Multiconductor control cable shall be stranded 14 gauge, 600 V. THWN insulated overall shielded with PVC jacket, as manufactured by the American Insulate Wire Co., Eaton Corp., or equal.
   3. Refer to other specifications and drawings for other signal type of cables, like ethernet, Modbus, and other low voltage communications cables.

2.4 TERMINATIONS AND SPLICES (600 VOLTS AND LESS)

A. Terminations of power cable shall be by means of U.L. approved connectors. All connectors shall meet U.L. 486B and shall be compatible with the conductor material.

B. Terminate all control and instrumentation cable with fork type compression lugs.

C. Splicing of power, control, or instrumentation wiring will not be allowed except by written approval of the Engineer. Where splicing is allowed, splices shall be made with approved compression connectors, and splices shall be made waterproof regardless of location.

2.5 BOXES

A. Boxes for wiring devices, switches and receptacles installed outdoors shall be weatherproof fiberglass with polycarbonate cover plates.

2.6 PULL BOXES AND SPLICE BOXES

A. Location
   1. Units used outdoor or in a damp or corrosive environment shall be 316 ss or fiberglass unless otherwise indicated on plans.
   2. Units used indoors in dry and clean environments shall be NEMA 1.

B. Size
   1. Units shall be sized per NEC as minimum.

C. Required Units

1. Plans depict minimum requirements. Additional units shall be provided as may be required to complete raceway systems.

2.7 **MOUNTING AND SUPPORTING ELECTRICAL EQUIPMENT**

A. Furnish and install all supports, hangers, and inserts required to mount fixtures, conduits, cables, pull boxes, and other equipment.
B. Support system used indoors in clean, dry and air-conditioned areas shall be galvanized steel.
C. Perforated straps and wires are not permitted for supporting electrical devices. Anchors shall be of approved types.
D. All supports, hangers, hardware, etc. used outdoors or in in non-air-conditioned indoor areas or in hazardous areas shall be non-ferrous, corrosion resistant or 316 stainless steel. Supports shall be selected to avoid galvanic reactions. Support devices shall be submitted for approval.
E. Provide trapeze, bridge systems or wall bracketed cantilevered system to support the raceway system.
F. Spacing of support systems shall be per NEC. Provide spacing of conduits according to the NEC and the materials used. For PVC conduit, refer to NEC table 347-8.
G. Plans depict minimum requirements. Provide additional units as required to complete raceway system.
H. Refer to material schedule on plans. These specified requirements shall apply to all requirements not included in the material schedule.

2.8 **DUCT SEAL**

A. Provide Garvin Industries' duct seal or an approved equal
B. Provide and install duct seal at all conduit ends for all new conduit installations.
C. Duct seal shall be used to seal around junction boxes, control panels and the like. It shall be a permanently soft, non toxic compound. It shall also not affect other plastic materials or corrode metals.
D. Duct seal shall be applied to the control panel conduit penetrations, ATS enclosure penetrations, analog and discrete terminal boxes conduit penetrations, MCC conduit penetrations, Generator main line breaker penetrations, and disconnects. Apply to each penetration but not more than 20-2" conduits per panel.

PART 3 - EXECUTION

3.1 **GROUNDING**

A. Provide ground system as indicated on the drawings and as required by the National Electrical Code.
B. All raceways require grounding conductors. Metallic raceways are not adequate grounding paths. Bonding conductors through the raceway systems shall be continuous from main switch ground buses to panel ground bars of the panelboards, and from panel grounding bars of panelboards and motor control centers to branch circuit outlets, motors, lights, etc. THESE GROUND CONDUCTORS ARE REQUIRED THROUGHOUT THE PROJECT REGARDLESS OF WHETHER CONDUIT RUNS
SHOW GROUND CONDUCTORS ON THE DRAWINGS.

C. All connections made below grade shall be of the exothermic type.
D. The grounding system test shall not exceed a 48 hour span dry resistance of 10 ohms. Additional grounding to meet this requirement shall be installed at no extra cost. Grounding and bonding connections shall not be painted.

3.2 **CONDUIT**

A. Locations:
Conduits shall be used as follows:
1. Refer to schedule on plans.

B. Installation
1. Conduits subjected to rough handling or usage shall be removed from the premises.
2. Conduits must be kept dry and free of water or debris with approved pipe plugs or caps. Care shall be given that plugs or caps be installed before pouring of concrete.
3. Where conduits pass through exterior concrete walls or fittings below grade, the entrances shall be made watertight.
4. Infurred ceilings, conduit runs shall be supported from structure, not furring.
5. Conduits entering panelboards, pull boxes, or outlet boxes shall be secured in place by galvanized locknuts and bushings, one (1) locknut outside and one (1) locknut inside of box with bushing on conduit end. The locknuts shall be tightened against the box without deforming the box. Bushings shall be of the insulating type.
6. Field conduit bends shall be made with standard tools and equipment manufactured especially for conduit bending.
7. Where embedded conduits cross expansion joints, furnish and install offset expansion joints or sliding expansion joints. Sliding expansion joints shall be made with straps and clamps.
8. Exposed runs of conduits shall be installed with runs parallel or perpendicular to walls, structural members or intersections of vertical planes and ceilings, with right angle turns consisting of symmetrical bends. No attempts are made in plans to show required pull boxes, gutters, etc. necessary for the construction of the raceway system but the Contractor shall provide these raceways as may be required.
9. Conduits in structural slabs shall be placed between the upper and the lower layers of reinforcing steel, requiring careful bending of conduits. Conduits embedded in concrete slabs shall be spaced not less than eight (8) inches on centers or as widely spaced as possible where they converge at panels or junction boxes. Conduits running parallel to slab supports, such as beams, columns and structural walls shall be installed not less than 12 inches from such supporting elements. To prevent displacement during concrete pour, saddle supports for conduit, outlet boxes, junction boxes, inserts, etc., shall be secured.
10. Conduit runs shall always be concealed except where indicated on plans.
11. Pull lines shall be installed in all empty conduits. All pull wires shall be identified with conduit number at each end.
12. Where conduits are run individually, they shall be supported by approved pipe straps secured by means of toggle bolts or tapcons on hollow masonry; tapcons on concrete or solid masonry; machine screws or bolts on metal surfaces and wood screws on wood construction. The use of perforated straps or wires will not be permitted.

13. Wire shall not be installed until all work of any nature that may cause damage is completed, including pouring of concrete. Mechanical means shall not be used in pulling in wires No. 8 or smaller.
14. Underground conduits not under concrete slabs are to be buried at least two (2) feet below finished grade for circuits rated 600 volts or less, except under traffic areas where motor vehicles may cross. Under traffic areas, conduits are to be buried at least three (3) feet below finished grade.
15. All conduits shall be cleaned by pulling a brush swab through before installing cables.
16. All conduits shall be sealed at each end with electrical putty. Special care shall be taken at all equipment where entrance of moisture could be detrimental to equipment. Approved backing gauze is required prior to the installation of conduit putty.
17. At MOST two (2) feet of flexible conduit shall be used at connections of all motors, transformers, motor operated valve and gates, instruments and other items of equipment where vibration is present. It shall be supported where required with stainless steel bands.
18. PVC conduit shall be supported to walls and slabs using carlon snap strap conduit wall hangers. Two hole PVC conduit clamps shall not be permitted.

3.3 WIRES, CABLES AND CONNECTIONS

A. Cables pulled into conduits shall be pulled using pulling eyes attached to conductors.
B. Shields shall be grounded at only one termination point.

3.4 BOXES

A. Installation of boxes shall be in accordance with the National Electrical Code requirements.
B. Boxes shall be mounted plumb and level in accessible locations and mounting shall be secure, vibration resistant and galvanically compatible. Hardware shall be used that is specifically intended for the purpose. When mounted in corrosive, damp or wet locations, stainless steel hardware shall be utilized.

3.5 WIRING DEVICES

A. Wiring devices shall be installed in device boxes approved for the application. All connections shall be made with screw terminals. Wiring devices shall be Leviton or approved equal.
B. Wire devices on UPS systems shall be isolated ground, colored orange.
C. Cover plates shall be provided as follows except as otherwise noted.
   1. Interior finished area – brush alum.
   2. Wet areas – gasketed plastic with flip cover.
D. Receptacles installed outdoors, below grade, or in areas other than clean and dry environments shall be GFI and weatherproof. Receptacles shall be weatherproof with cords plugged in.

3.6 SUPPORTING DEVICES

A. All items shall be supported from the structural portion of the building and studs, except standard ceiling mounted lighting fixtures and small devices may be supported from ceiling system where permitted by the Engineer. However, no sagging of the ceiling will be permitted. Supports and hangers shall be types approved by Underwriters' Laboratories.

B. All floor-mounted devices (switchboards, motor control centers, transformers, etc.) shall be securely anchored to the floors. Where recommendations are made by manufacturer, these recommendations shall be followed.

3.7 **CLEANING**

A. All electrical equipment enclosures shall be thoroughly cleaned before acceptable by the Owner. As a minimum, Contractor shall remove all debris including stripped wire insulation, dirt, empty Dunkin Donut cups, etc.

- END OF SECTION -

SECTION 16200

INDOOR GENERATOR

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. Work included:

1. The work covered by this portion of the specifications consists of having an Owner purchased indoor type generator unit for emergency use, from one of the approved listed vendors of a diesel electric generator for standby continuous use. It shall include all necessary equipment and accessories as specified in these specifications, and as shown in the drawings. The indoor unit shall be provided with a control panel and main line breaker, along with any additional equipment required for a completely functional system.
2. The unit specified herein shall be installed by the Owner's contractor performing the demo of the existing diesel generator units, and the two automatic transfer switches as called out under the bid documents. Under the Contractor performing the demolition of the existing equipment, and installation of the new equipment, along with temporary rental of an ATS switch, and a portable 800kW trailer mounted generator to facilitate the demolition and replacement of the existing 2000Amp ATS switch and the 1000kW generator. Refer to the drawings for the proposed sequence of demolition and installation.
3. Coordinate with Contractor and ATS manufacturer and provide all labor and materials for a complete and functional system.
4. Unit shall be a TIER 2/3 type generator that meets the EPA TIER 2/3 requirements.
5. The Unit shall be installed in the existing generator room at the main electrical building, reuse the existing conduits and reuse the existing support 120/208V branch circuits for battery charger, daytank and daytank fuel pumps, and jacket water heaters and alternator heater. The existing 5,000 gallon above ground fuel tank shall be reused and connected to the new day tank and new generator. Provide all labor and mechanical piping and equipment to properly connect the existing 5,000 gallon fuel tank to the new daytank.
6. The unit shall be provided with the Silencer manufactured by GT Exhaust, model # A201-6112-4-S304-29-B; which is a 12" super critical silencer end, including all necessary silencer piping compatible with this model to extend the exhaust from the engine to the silencer location as shown in the drawings. The Contractor is responsible to provide all mounting hardware and labor as required to install the critical grade silencer and its components, including the proposed routing and the exhaust piping as indicated on the Contract Documents.

1.2 MANUFACTURER

A. The unit shall be completely built, tested and shipped by one manufacturer who has been regularly engaged in the manufacturing of such equipment. The manufacturer and local dealer shall be limited to the following:

1. Cummins Systems Power

Javier Mazarredo
2. Caterpillar/Pantropic Power.
   Robert Butt
3. FDDA-Detroit Diesel/MTU
   Lenin Hernandez

1.3 CODES

A. All equipment shall be provided per the requirements of the following codes as applicable for the intended use and installation.
   1. NFPA 70, latest edition (National Electrical Code).
   2. NFPA 110, Emergency and Standby Power Systems, latest edition.
   3. NFPA 30, Flammable and Combustible Liquids, latest edition.
   4. UL2200, the complete generator set shall be UL listed.
   5. American Society of Mechanical ENGINEERs (ASME)
   6. Diesel Engine Manufacturers Association (DEMA)
   7. Electrical Generating Systems Association (EGSA)
   8. International Standards Organization (ISO)
   9. Institute of Electrical and Electronics ENGINEERs (IEEE)
   10. National Electric Manufacturers Association (NEMA)
   11. Occupational Safety and Health Administration (OSHA)

1.4 SUBMITTALS

A. Provide 6 copies of shop drawings. As a minimum include:
   1. Engine manufacturer, model number, power output parameters, plans and elevations of the units, entrance points for power, control and fuel, storage and foundation requirements.
   2. Engine Generator/Exciter control cubical.
   3. Fuel consumption rate curves at ¼, 2/4, ¾, 4/4 loads.
   4. Exhaust mufflers and vibration isolators.
   5. Battery charger, batteries and battery racks.
   6. Day Tank and fuel connection points.
   7. Cooling water requirements of radiator.
   8. Engine cooling air requirements and radiator fan capacity.
   9. Electrical diagrams including schematic and interconnection wiring diagrams for all equipment to be provided.
   10. Legends for all devices on all diagrams.
   11. Sequence of operation, explanations of all portions of schematic wiring diagrams.
   12. Provide load calculations including starting and running kVA.
   13. Transient voltage response calculation, no voltage transient shall dip below 25%.

B. The specified kW shall be for continuous electrical service during interruption of the normal utility source. These ratings must be substantiated by manufacturers standard published curves. Special ratings or maximum ratings are not acceptable.

C. O&M Manuals
   1. Five sets of O&M manuals shall be provided.

1.5 WARRANTY

A. Equipment furnished under this section shall be guaranteed against defective parts and workmanship under terms of the manufacturers and dealer's standard warranty. But, in no event shall it be for a period of less than five (5) years from the date of the Owner's acceptance of the unit.

PART 2 - PRODUCTS

2.1 ENGINE

A. Engine shall be water-cooled 4 cycle inline or vee type compression ignition diesel. It shall met specifications when operating on No. 2 domestic burner oil. The engine shall be equipped with fuel, lube oil, coolant, exhaust system, silencer, fuel transfer pump, fuel priming pump, fuel water separator, service run time meter, engine driven water pump, engine driven alternator for batteries, batteries, instrument/control panel including: lube oil pressure gauge, tachometer, system voltage, jacket water temperature gauge, system diagnostics code display, other auxiliary equipment as may be required for proper operation of the units. Provide jacket water heaters, dual, 480V, 6kW each maximum.

B. An electronic governor system shall provide automatic isochronous frequency regulation. The governing system dynamic capabilities shall be controlled as a function of engine coolant temperature to provide fast, stable operation at varying engine operating temperature conditions. The control system shall actively control the fuel rate and excitation as appropriate to the state of the generator set. Fuel rate shall be regulated as a function of starting, accelerating to start disconnect speed, accelerating to rated speed, and operating in various isochronous or parallel states.

C. The engine/generator set shall be mounted on a structural steel sub-base and shall be provided with suitable quad spring vibration isolators.

D. Safety devices for protection of the units shall be provided as per the generator supplier and shall minimally include: shutoffs for high water temperature, low oil pressure, overspeed and engine overcrank.

E. Guards shall be provided over all exposed moving parts per OSHA.

2.2 ALTERNATOR

A. The AC generator shall be synchronous, 2/3 pitch, revolving field, drip-proof construction, single pre-lubricated sealed bearing, air cooled by a direct drive centrifugal blower fan, and directly connected to the engine with flexible drive disc. All insulation system components shall meet NEMA MG1 temperature limits for Class H insulation system. Actual temperature rise measured by resistance method at full load shall not exceed 105 degrees Centigrade.

B. The generator shall be capable of delivering rated output (kW) at rated frequency and power factor at any voltage not more than 5 percent above or below rated voltage.

C. A permanent magnet exciter generator (PMG) shall be included to provide a reliable source of excitation power for optimum motor starting and short circuit performance. The PMG and controls shall be capable of sustaining circuit performance. The PMG and controls shall be

capable of sustaining and regulating current supplied to a single phase or three phase fault at approximately 300% of rated current for not more than 10 seconds.

D. The subtransient reactance of the alternator shall not exceed 12 percent based on the standby rating of the generator set.
E. Space Heater – Alternator shall be provided with 120V, 100W max. space heater interlocked with generator run relay.
F. For system 750kW above alternator shall be form wound. Units below 750kW shall be random wound.

2.3 COOLING SYSTEM

A. Radiator – An engine mounted radiator with blower type fan shall be sized to maintain safe operation at 122 degrees Fahrenheit maximum ambient temperature. The Contractor and Generator Vendor shall coordinate and provide the metal sheet and supports between the generator radiator and the radiator exhaust vents.
B. The engine cooling system shall be pretreated by the engine supplier for the inhibiting of internal corrosion.
C. The radiator shall exhaust through the building.

2.4 DAY TANK

A. Provide a day tank with a differential level control, U.L. 142 listed. Construction of the day tank shall be all seam welded of heavy gauge steel with internal reinforcements. A machine formed fuel supply suction tube with all fittings, except the drain, located above the normal “full” level. Finish shall be epoxy coated interior with the day tank’s exterior chemically treated to resist corrosion, primed and finish painted in Simplex blue. Manufacturer shall be Simplex, Pryco, or an approved equal. Unit shall be provided with rupture basin. Unit shall fit into the space allowed where the former daytank was installed. Reuse former power circuits from panelboard to power new daytank.
B. Provide Simplex or Pryco Daytank with control panel.
C. Unit shall be furnished with two fully integrated, pre-plumed and pre-wired fuel pumps; one is used as a backup; refer to plans ns for additional requirements.
D. Unit shall be U.L. listed.
E. Provide 150% rupture basin with integral leak detection sensor and alarm. A separate alarm control panel shall be provided or the alarm may be sent to the generator control panel.
F. Day tank shall be sized for 200 gallons, ¾ load full consumption rate as a minimum.
G. Fuel supply and return solenoid valves shall be provided, installed and wired as may be required.
H. Day tank shall operate with the existing 5,000-gallon main fuel tank.
I. Supply and return fuel pumps shall be provided.
J. Provide all instrumentation and control signals per plans.

2.5 MAIN FUEL TANK MEASURING AND SENSORS

A. Provide a digital display of the fuel tank level, based on the daytank’s level system level, and interstitial leak detectors.

B. Provide discrete and analog connection of the level to the plant's PLC/SCADA system, see drawings and other specifications.

2.6 EXHAUST SILENCER

A. Exhaust Silencer – Critical type critical grade silencer, muffler companion flanges, and flexible braided stainless steel exhaust fittings properly sized shall be furnished according to the manufacturer's recommendations. A silencer rain cap with counter weight shall be provided.
B. Silencer shall be located within the building or as otherwise indicated on plans. Provide all exhaust piping and proper support as required.
C. Exhaust silencer and flex shall have insulation blankets installed.

2.7 AUTOMATIC STARTING SYSTEM

A. Starting Motor – A DC electric starting system with positive engagement drive shall be provided. The motor voltage shall be as recommended by the engine manufacturer.
B. Automatic control – Fully automatic generator start/stop controls in the generator control panel shall be provided. Controls shall provide shutdowns for low oil pressure, emergency stop, high water temp, engine overspeed, low coolant level, overcrank, internal fault shutdown. Controls shall include a 30 second cranking cycle with lock out. Lock out shall have remote reset capability.
C. Batteries
    1. A lead acid storage battery set of the heavy duty special starting type shall be provided. Battery voltage shall be compatible with the starting system. Battery set shall be rated for no less than 1250 cold cranking amps. Free standing corrosion resistant battery racks and necessary cables shall be provided. Batteries shall be unit mounted.
D. Battery Charger
    1. Current limiting battery charger shall be furnished to automatically recharge the batteries. Charger shall be the float charging type furnished to properly charge the batteries. It shall include overload protection, silicone diode full wave rectifiers, voltage surge suppressor, DC ampmeter, DC voltmeter, fused AC input. Input power shall be 120V single phase. A battery charger fail alarm contact shall be provided.

2.8 GENERATOR CONTROL PANEL

A. Generator Set Control
    1. The generator set shall be provided with a microprocessor-based control system that is designed to provide automatic starting, monitoring and control functions for the generator set. The control system shall also be designed to allow local monitoring and control of the generator set and remote monitoring and control as described in this specification.
    2. The control shall be mounted on the generator set. The control shall be vibration isolated and prototype tested to verify the durability of all components in the system under the vibration conditions encountered.
    3. The generator set mounted control shall include the following features and functions:
B. Generator set A/C output metering
    1. The generator set shall be provided with a metering set including the following features and functions:

a. Analog voltmeter, ammeter, frequency meter, and kilowatt (KW) meter. Voltmeter and ammeter shall display all three phases. Ammeter and KW meter scales shall be color coded in the following fashion: readings from 0-90% of generator set standby rating: green, readings from 90-100% of standby rating: amber; readings in excess of 100%: red.
b. Digital metering set, 0.5% accuracy, to indicate generator RMS voltage and current, frequency, output current, output KW, KW-hours, and power factor. Generator output voltage shall be available in line-to-line and line-to-neutral voltages, and shall display all three phase voltages (line to neutral or line to line) simultaneously.
c. Both analog and digital metering are required. The analog and digital metering equipment shall be driven by the single microprocessor, to provide consistent readings and performance.

C. Generator Set Alarm and Status Display

1. The generator set shall be provided with alarm and status indicating lamps to indicate non-automatic generator status and existing warning and shutdown conditions. The lamps shall be high intensity LED type. The lamp condition shall be clearly apparent under bright room lighting conditions. The generator set control shall indicate the existence of the following alarm and shutdown conditions on an alphanumeric digital display panel:

Low oil pressure (alarm)
Low oil pressure (shutdown)
Oil pressure sender failure (alarm)
Low coolant temperature (alarm)
High coolant temperature (alarm)
High coolant temperature (shutdown)
Engine temperature sender failure (alarm)
Low coolant level (alarm or shutdown—selectable)
Fail to crank (shutdown)
Fail to start/overcrank (shutdown)
Overspeed (shutdown)
Low DC voltage (alarm)
High DC voltage (alarm)
Weak battery (alarm)
Low fuel-daytank (alarm)
High AC voltage (shutdown)
Low AC voltage (shutdown)
Under frequency (shutdown)
Over current (warning)
Over current (shutdown)
Short circuit (shutdown)
Ground fault (alarm)
Over load (alarm)
Emergency stop (shutdown)

2. Provide form “A” contacts for each of the above to be used in SCADA system.
3. Provide additional signal per plans.
4. Provide signal to trip the remote generator circuit breaker in the event of overcurrent or other shutdown. Unit shall auto reset on return to normal condition.

2.9 GENERATOR RATINGS

A. The generator shall be a minimum of 1,000 kW (1,250kVA), 0.8 PF, and shall also start and operate the electrical loads listed in the oneline diagram electrical sheet. All loads are considered fully loaded. Supplier shall submit load calculations showing the starting and running of the generator loads described in the electrical oneline diagram under generator loads.
B. Provide load calculations during shop drawings based on the oneline generator loads for review and approval.

2.10 GENERATOR CIRCUIT BREAKER

A. The generator circuit breaker shall be 100% rated 1600 amp LSI, 480V, 3 phase. Refer to the drawings with a fault current interrupting rating exceeding the generator output.
B. Provide oversized, unit mounted, generator circuit breaker enclosure, similar in size as the existing 1000kW Caterpillar unit and along the same side of the new generator as the existing, and as shown on the drawings so the installation Contractor is able to reuse the existing power and control conduits that sub up below the generator breaker enclosure.

2.11 FLUIDS

A. Unit shall be provided with all fluids, fully fuelled and ready for immediate use.

2.12 SPACE

A. Dimensions are critical. Unit shall fit within the plan view space allowed.
B. Unit requiring more space shall be rejected.

Location of Mainline breaker and control panel are critical and shall match as close as possible existing locations for former unit. The goal is to reuse the power conductors, after these are meggered, and only extend these via a high press (approved method) if needed with the same gauge conductors as the existing ones.

PART 3 - EXECUTION

3.1 TESTS

A. The unit shall be tested at rated frequency and voltage.
B. Following installation, the following tests shall be performed by the system manufacturer’s local dealer representative(s) in the presence of the Owner’s Engineer or designated appointee:
   1. Pre-start checks:
      a. Oil level
      b. Water level
      c. Tank fuel level
      d. Battery connection and charge condition

e. Engine to control interconnects
f. Engine generator intake/exhaust obstructions

C. Supplier shall provide onsite operation tests
1. Load – One hour operation at 80% of full load rating. Two hours operation at 100% of full load rating. After the first half hour stabilization period at full load, the following shall be recorded at fifteen minute intervals:
a. Voltage, amps and frequency.
b. Fuel pressure, oil pressure and water temperature.
c. Exhaust gas temperature at engine exhaust outlet.
d. Ambient temperature
e. Kilowatts
f. Power factor
g. kVARS
h. Generator temperature
2. Test shall utilize resistive load banks for the full load. Minimum load shall be equal to the nameplate rating of the engine/generator set in kW. Generator supplier shall supply all load banks equipment necessary for connecting generator to load banks. Supplier shall provide all labor and material to perform test.
3. Proper operation of controls, engine shutdown and safety devices shall be demonstrated.
4. Should these tests indicate that the equipment does not meet the specified performance requirements, National Electrical Code and local codes, the cost of all corrective measures shall be borne by the Supplier.

3.2 STARTUP AND INSTRUCTION

A. Before start up, the Supplier shall provide the services of an on-site technician to confirm proper connection of external equipment. If acceptable to the Supplier and the Owner, the unit may be start up tested.
B. At no additional cost to the Owner, the generator Supplier shall provide start up assistance and coordination as required.
C. Operating and maintenance procedures shall be explained to the Owner's personnel by the dealer's factory trained representative.
D. A minimum of one manday shall be provided for instructing the Owner's staff in the care and maintenance of the unit. Training shall be provided by the Supplier.
E. Proper operation of controls, engine shutdown and safety devices shall be demonstrated.

3.3 SYSTEM SERVICE CONTRACT

A. Supplier shall make available to the Owner, this standard service contract which the Owner may or may not choose to exercise. This contract is separate from the warranty requirements contained herein.

3.4 SCHEDULE OIL SAMPLING

A. The Supplier of the equipment must provide a quarterly oil sampling analysis for a period of one year form the date of acceptance. This scheduled oil sampling shall be of the atomic

absorption spectrophotometry method as opposed to the spectrographic analysis method and shall be accurate to within a fraction of one part per million for the following elements:

1. Iron
2. Chromium
3. Copper
4. Aluminum
5. Silicon
6. In addition the sample shall be tested for the presence of water, fuel dilution, and antifreeze.

B. All equipment needed to take oil samples shall be provided in a kit at the time of acceptance and shall include the following:
   1. Sample gun kit (1)
   2. Bottles (4)
   3. Mailers (4)
   4. Written instructions (1)

C. Immediate notification shall be provided to the Owner when analysis results shows any critical reading. If readings are normal, a report stating that the equipment is operating within established requirements shall be provided.

D. This scheduled oil sampling program shall be made available to the Owner beyond the mandatory one (1) year specified above and shall be optional for the Owner to continue that program after that time period has elapsed.

- END OF SECTION -

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SECTION 16250
AUTOMATIC TRANSFER SWITCH

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Automatic transfer switches (ATS) with delayed transition.

1.2 REFERENCES

A. Transfer switches shall be designed and manufactured to the latest revision of UL-1008 and shall be provided with a UL label.

1.3 SUBMITTALS

A. Submittals shall be provided in accordance with the general conditions but not less than six (6) copies.
B. Detailed fully engineered drawings shall be provided. Standard product data sheet will be rejected.

1.4 QUALIFICATIONS

A. To be considered for approval, a manufacturer shall be specialized in manufacturing products specified in this Section with a minimum of ten (10) years documented experience.

1.5 WARRANTY

A. Manufacturer shall warrant specified equipment to be free from defects in materials and workmanship for one (1) year from date of installation.

1.6 INTEGRATION

A. Units shall be provided to fully integrate with the standby generator system and switchboard. Coordination shall be required.
B. The replacement unit for the 2,000 Amp ATS shall include a fill section especially sized and made to fill in the same space as the total space taken by the former ATS switch. Refer to the ATS elevation detail drawings which depict for the two approved ATS vendors the adjacent fill section.

PART 2 - PRODUCTS

2.1 MODEL

A. Model shall be Cutler Hammer, SQ D or an approved equal. Any substitutes shall integrate into the switchboard line up and shall be front accessible. The low voltage switchgear shall consist of an indoor, non-walk-in enclosure containing circuit breakers and the necessary accessory components all factory assembled (except for necessary shipping splits) and operationally checked.

B. The integrated Automatic switch switchgear assembly shall withstand the effect of closing, carrying and interrupting currents up to the assigned maximum short circuit rating.
C. Voltage rating shall be as indicated on the drawings. The entire assembly shall be suitable for 600 voltage maximum AC service. System voltage shall be 480/277-volt, 3 phase, 4 wire with ground.
D. The ampacity of the Low Voltage ATS gear shall be determined by the loading of the feeder circuits. The main bus rating shall be 2000A. The switch shall be of the automatic power sensing, delayed transition type, using 3 pole, mechanically held contactors activated by two solenoids. The switch shall be UL approved standard 1008, rated to carry full name plate current at all times. A manual handle shall be provided for emergency operation.
E. The assembly shall be rated to withstand mechanical forces exerted during short-circuit conditions when connected directly to a power source having available fault current of 65,000 amperes symmetrical at rated voltage.
F. All circuit interruption shall be accomplished by the circuit breaker and without the aid of limiter fuses. The circuit breaker short-time ratings shall be as specified on the drawings.
G. The assembly is designed for use on 60 Hz electrical systems up to 600VAC. The assembly shall be properly braced to the ratings of the circuit breaker installed within the assembly.
H. Any items not specifically mentioned but which are obviously necessary for proper operation are implied in this specification.
I. ATS Minimum Features:
    1. Voltage sensing on all three phases on normal and emergency sources with automatic low voltage and phase loss detection. Adjustable over/under frequency sensor shall be provided on the emergency source.
    2. Adjustable time delay after line failure before engine start, 0-5 minutes. The ATS switch shall have a programmable module built in so it can be preset to exercise based on a weekly or monthly schedule and adjustable running times with or without generator power (ATS switch transfer to emergency power)
    3. Automatic transfer to generator when voltage is present. Through the menu/keypad there shall also be a manual mode to manually make the switch transfer as needed for testing.
    4. Adjustable time delay on retransfer when normal power is available, 2-30 minutes. Push button to cancel time delay on return to normal.
    5. Adjustable time delay for engine running unloaded after transfer to normal source, 2-30 minutes.
    6. 4-Pilot lights
        a. Green for switch in normal position.
        b. Red for switch in emergency position.
        c. Green for normal power available.
        d. Red for emergency power available.
    7. 4-Position selector switch, maintained, front door mounted on outside:
        a. Off – Switch position remains constant; generator shall not crank.
        b. Auto – Normal automatic control.
        c. Test – Test operation of the transfer system and standby generator by simulating line power loss. System shall remain in the test mode until selector switch in returned to the

auto mode which will allow normal retransfer, logic and/or time delays shall be provided to allow switch mode change without undesired actions.

d. Engine test – start engine without ATS transfer.

8. Status contacts (form A) wired to terminals for inputs to PLC:
   a. Switch in normal position.
   b. Switch in emergency position.
   c. Normal voltage present.
   d. Emergency voltage present.
9. Engine start contact (Form A) wired to terminals for engine start.
10. Short circuit withstand rating shall be 65,000 amps minimum.
11. Provide adjustable time delay for transition period in the neutral position with the pole of the switch de-energized.
12. Unit shall be integrated into switchboard enclosure. Unit shall be front accessible only. **Limit unit dimensions to what is shown on the electrical room floor plan. Including the ATS portion and the Fill adjacent left side cabinet portion. New ATS layout shall be similar to former ATS.**
13. Provide lugs for cable connections to generator as required. Provide bus connections to switchboard.
14. Unit shall be U.L. labeled.
15. Installation Contractor shall be responsible for all field power and control wiring. Provide all enclosure and electrical grounding terminations as required by ATS vendor and to match at minimum existing installation.
16. Provide engraved warning plate on the front of switch. Use white letters on red background. Minimum size shall be 6” x 4”.
    a. ½” text – Warning
    b. ¼” text – TO DISCONNECT POWER:
       1) TURN ATS TO OFF
       2) OPEN GENERATOR CB
       3) OPEN MAIN
17. Provide digital multi-meter Cutler Hammer IQ 200 Series with front panel display volts, amps, kWD etc. or equal. Provide Ethernet output and connections to plantwide SCADA. Refer to drawings. Provide software including drivers as may be required. Provide potential and current transformers as may be required.
18. Provide cutout along door for the Generator’s vendor annunciator panel to be mounted onto the front door of the 2,000 Amp ATS switch.
19. Provide adjacent Fill section of switchgear similar to existing ATS to fill former space and sized to fit between the two existing switchgear enclosed Mains M1 and M2, similar to the existing ATS and its fill section.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install ATS in accordance with manufacturers written instructions and the National Electrical Code.

3.2 FIELD QUALITY CONTROL

A. Inspect ATS visually.
B. Perform several manual operations.
C. Verify circuit continuity and megger each conductor. Minimum megger valve shall be 50 mega-ohms.
D. Check tightness of all connections using calibrated torque wrench per manufacturers recommended torque values.

3.3 ADJUSTING

A. Adjust time delay setting to values as required for proper operation of the power system. Provide settings per Owner's instructions.

3.4 TESTING

A. Test manual operation of the unit under load. Test all automatic features of ATS including transfer from normal to emergency and from emergency to normal, remote generator start control. Provide testing in the presence of the Owner and Engineer.

3.5 TRAINING

A. Provide a minimum of four (4) hours training.

3.6 PROGRAMMING

A. Program switch features per Engineer/Owner requirements.
B. Provide typewritten listing of final parameter setting with O&M manuals.

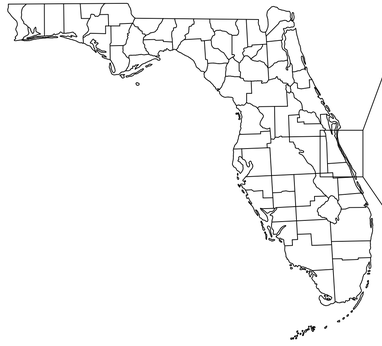
- END OF SECTION -

CONSTRUCTION PLANS FOR
CENTRAL (GIFFORD) WWTF
GENERATOR AND ATS REPLACEMENT

PREPARED FOR

INDIAN RIVER COUNTY
DEPARTMENT OF UTILITY SERVICES

MAY 2023



LOCATION MAP
N.T.S.

BOARD OF COUNTY COMMISSIONERS

CHAIRMAN	JOE EARMAN	DISTRICT 3
VICE–CHAIRMAN	SUSAN ADAMS	DISTRICT 1
COMMISSIONER	JOSEPH FLESCHER	DISTRICT 2
COMMISSIONER	DERYL LOAR	DISTRICT 4
COMMISSIONER	LAURA MOSS	DISTRICT 5

SEAN LIESKE, – DIRECTOR OF UTILITIES

SHEET LIST

BID SUBMITTAL

NOT FOR CONSTRUCTION

NICHOLAS P.O. BLACK, PE #84908
(MECHANICAL, STRUCTURAL, SITE CIVIL)

MICHAEL GUIDA, PE #60755
(ELECTRICAL)

No.	REVISIONS	DATE	BY

Kimley»Horn

1920 WEKIVA WAY SUITE 200, WEST PALM BEACH, FL 33411
PHONE: 561–845–0665 FAX: 561–863–8175
WWW.KIMLEY–HORN.COM REGISTRY NO. 696

KHA PROJECT	044572075
DATE	MAY 2023
SCALE	AS SHOWN
DESIGNED BY	AGG
DRAWN BY	DC
CHECKED BY	NPOB

CENTRAL (GIFFORD) WWTF
GENERATOR AND ATS REPLACEMENT
PREPARED FOR
INDIAN RIVER COUNTY
DEPARTMENT OF UTILITY SERVICES
INDIAN RIVER COUNTY FLORIDA

LICENSED PROFESSIONAL

NICHOLAS P.O. BLACK

FLORIDA LICENSE NUMBER
84908

DATE: _____

COVER SHEET

SHEET NUMBER
G-1
1 OF 26

CONSTRUCTION SEQUENCE NOTES

1. COMPLETE UTILITY EXPLORATION AND SOFT DIGS ALONG PROPOSED ALIGNMENT OF ELECTRICAL FEED FROM MAIN ELECTRICAL BUILDING TO SOLIDS HANDLING ELECTRICAL BUILDING.
2. CONSTRUCT ELECTRICAL CONDUIT, CONDUCTORS, PULL BOXES AND WALL MOUNTED BOXES AS SHOWN ON THE CONSTRUCTION DRAWINGS.
   a. CONDUIT ALIGNMENT SHOWN ON PLANS IS SCHEMATIC AND SHALL BE COORDINATED WITH SUBSURFACE UTILITY EXPLORATIONS BY CONTRACTOR.
3. CONSTRUCT RENTAL ATS INSIDE MAIN ELECTRICAL BUILDING.
   a. COORDINATE SHUTDOWN WITH WWTF OPERATIONS TO REMOVE AND INSTALL TEMPORARY CABLE CONNECTIONS.
   b. SHUTDOWN DURATION SHALL NOT EXCEED TWO (2) HOURS.
4. INSTALL RENTAL TRAILER MOUNTED EMERGENCY GENERATOR.
5. DEMOLISH EXISTING ATS AND INSTALL NEW INSIDE MAIN ELECTRICAL BUILDING.
   a. COORDINATE SHUTDOWN WITH WWTF OPERATIONS TO REMOVE AND INSTALL PERMANENT CABLING CONNECTIONS TO EXISTING GENERATOR.
   b. INSTALL TEMPORARY CABLING FROM NEW ATS TO RENTAL GENERATOR.
6. DEMOLISH THE EXISTING MAIN ELECTRICAL GENERATOR AND ATS UNIT, GENERATOR SILENCER, RAIN HOOD, FUEL PIPING, FUEL DAY TANK, RADIATOR EXHAUST DUCT, AND BATTERY PACKS. LOUVER WALL ON INLET AIR PLENUM (SOUTH SIDE) SHALL BE TEMPORARILY REMOVED TO REMOVE AND REPLACE EXISTING GENERATOR AND DAY TANK. MASONRY WALL ON EXTERIOR WALL OF THE INLET AIR PLENUM SHALL BE DEMOLISHED AND REPLACED AS SHOWN IN THE CONSTRUCTION DRAWINGS.
7. INSTALL NEW MAIN ELECTRICAL GENERATOR AND ATS UNIT, GENERATOR SILENCER, RAIN HOOD, FUEL PIPING, FUEL DAY TANK, RADIATOR EXHAUST DUCT, AND BATTERY STARTER PACKS.
8. THE CONTRACTOR MAY ELECT TO PROCEED WITH EITHER OF THE FOLLOWING EVENTS DEPENDING ON LEAD TIME OF EQUIPMENT:
   a. COORDINATE SHUTDOWN OF SOLIDS HANDLING BUILDING TO REMOVE AND REPLACE EXISTING 800A ATS. SHUTDOWN DURATION SHALL NOT EXCEED FOUR (4) HOURS.
   b. DEMOLISH EXISTING 800A ATS. INSTALL NEW 800A ATS AND COMPLETE CONNECTIONS TO SERVICE TRANSFORMER, MCC AND NEWLY INSTALLED EMERGENCY FEEDER FROM MAIN ELECTRICAL BUILDING.
   c. DEMOLISH EXISTING SOLIDS HANDLING GENERATOR, GENERATOR SILENCER, ROOF THIMBLE, RAIN HOOD, FUEL PIPING, FUEL BULK TANK (CONVAULT TANK), RADIATOR EXHAUST DUCT, BATTERY PACKS, AND LOUVER.
   d. COORDINATE FUEL TANK CLOSURE/REMOVAL REGISTRATION WITH BREVARD COUNTY DEPARTMENT OF HEALTH.
   e. LOUVER WALL SHALL BE BLOCK FILLED AND REPLACED WITH AN OVERHEAD DOOR AFTER REMOVAL OF EXISTING SOLIDS HANDLING GENERATOR AND GENERATOR COMPONENTS AS SHOWN IN THE CONSTRUCTION DRAWINGS.
9. ONCE THE NEW GENERATOR HAS BEEN INSTALLED AND CONNECTED TO BOTH THE NEW MAIN ELECTRICAL BUILDING ATS AND THE EXISTING SOLIDS HANDLING BUILDING ATS, LOAD TESTING AND FUNCTIONAL TESTING OF THE NEW GENERATOR SHALL BE COMPLETED PRIOR TO PLACING THE GENERATOR INTO PERMANENT SERVICE.

ABBREVIATIONS

ADD'L	ADDITIONAL
ALT	ALTERNATE
APPROX	APPROXIMATE
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AVG	AVERAGE
BFV	BUTTERFLY VALVE
BI	BLACK IRON
BLDG	BUILDING
B.O.	BOTTOM OF
BV	BALL VALVE
CL, ℄	CENTER LINE
CLR	CLEAR(ANCE)
CONCR.	CONCRETE
CONST.	CONSTRUCT(ION)
CONT.	CONTINUE(D)
DEMO	DEMOLITION/DEMOLISH
DIM	DIMENSION
EQUIP	EQUIPMENT
E.W.	EACH WAY
EXIST.	EXISTING
HP	HORSEPOWER
MECH	MECHANICAL
MISC	MISCELLANEOUS
NO., #	NUMBER
O.C.(E.W.)	ON CENTER (EACH WAY)
PROP.	PROPOSED
REBAR	REINFORCING STEEL
SPEC(S)	SPECIFICATIONS(S)
SST	STAINLESS STEEL
STD	STANDARD
T.O.	TOP OF
TYP	TYPICAL
UG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
W/	WITH
W/O	WITHOUT
WTP	WATER TREATMENT PLANT
WW	WASTEWATER

GENERAL NOTES:

1. OWNER – INDIAN RIVER COUNTY DEPARTMENT OF UTILITY SERVICES (IRCDUS)
   CONTRACTOR – UTILITY CONTRACTOR AND ALL UTILITY SUBCONTRACTORS.
   ENGINEER – ENGINEER RESPONSIBLE FOR INSPECTION AND CERTIFICATION.
2. ALL WORK IS TO BE PERFORMED IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REQUIREMENTS (INDIAN RIVER COUNTY DEPARTMENT OF UTILITY SERVICES STANDARDS). PRIOR TO COMMENCEMENT OF WORK, NOTIFICATION TO THE OWNER IS REQUIRED AND THE CONTRACTOR SHALL OBTAIN ALL NECESSARY LICENSES AND PERMITS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS. SIGNAGE CONSTRUCTION SHALL CONFORM TO THE APPLICABLE REGULATIONS OF THE OWNER.
3. CONTRACTOR TO FIELD VERIFY LOCATION OF ALL EXISTING SUBSURFACE AND SURFACE UTILITIES PRIOR TO CONSTRUCTION. NOTHING ON THESE CONTRACT DRAWINGS SHALL BE CONSTRUED AS A GUARANTEE THAT UTILITIES INDICATED AS EXISTING ARE IN THE LOCATION INDICATED OR THAT THEY ACTUALLY EXIST, OR THAT OTHER EXISTING UTILITIES ARE NOT WITHIN THE AREA OF OPERATIONS. PRIOR TO COMMENCEMENT OF WORK, THE CONTRACTOR SHALL MAKE ALL NECESSARY INVESTIGATIONS TO DETERMINE THE EXISTENCE, LOCATIONS, AND ELEVATIONS OF EXISTING UTILITIES IN THE WORK AREA. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR THE PROTECTION OF EXISTING UTILITIES AND STRUCTURES WITHIN THE CONSTRUCTION ZONE. DAMAGE TO STRUCTURES, UTILITIES, AND EQUIPMENT TO REMAIN SHALL BE REPAIRED TO PRE–CONSTRUCTION CONDITIONS BY THE CONTRACTOR AT HIS EXPENSE, IN ACCORDANCE WITH STATE AND LOCAL REQUIREMENTS.
4. THE LOCATION OF EXISTING UTILITIES SHOWN IN THE DRAWINGS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. IN ADDITION, VERIFICATION OF THE EXISTENCE OF "OTHER" UTILITIES (NOT SHOWN IN THE DRAWINGS) WITHIN THE AREA OF CONSTRUCTION SHALL BE REQUIRED. SHOULD THERE BE UTILITY CONFLICTS, INFORM THE ENGINEER AND NOTIFY THE RESPECTIVE UTILITY OWNERS TO RESOLVE UTILITY CONFLICTS AND RESULTING UTILITY ADJUSTMENTS AS REQUIRED.
5. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING UTILITY COMPANIES TO IDENTIFY AND LOCATE ANY UNDERGROUND UTILITIES WITHIN THE PROJECT LIMITS. THE CONTRACTOR SHALL ASSIST UTILITY COMPANIES IN THE EFFORTS TO FIELD VERIFY UNDERGROUND UTILITIES. IF CONFLICTS EXIST, THE CONTRACTOR SHALL FIELD ADJUST TO AVOID THE CONFLICT AND REQUEST APPROVAL FROM THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.
6. CONTRACTOR SHALL CONTACT ENGINEER IMMEDIATELY IF AN EXISTING UTILITY LOCATION OR ELEVATION IS DIFFERENT FROM THAT SHOWN ON THE DRAWINGS, IF THERE APPEARS TO BE A CONFLICT, AND/OR IF A UTILITY IS DISCOVERED THAT IS NOT SHOWN ON THE DRAWINGS.
7. PROTECT EXISTING STRUCTURES, UTILITIES, AND EQUIPMENT FROM DAMAGE. DAMAGE OR DISTURBANCE TO STRUCTURES, UTILITIES, AND EQUIPMENT TO REMAIN SHALL BE REPAIRED OR REPLACED BY THE CONTRACTOR TO PRE–CONSTRUCTION CONDITIONS AT NO COST TO THE OWNER, IN ACCORDANCE WITH THE OWNER AND OWNER'S REPRESENTATIVE.
8. IN SITUATIONS WHERE DRAWINGS DO NOT CONTAIN DETAILS FOR SPECIFIC APPLICATIONS, CONTRACTOR SHALL REFER TO THE "INDIAN RIVER COUNTY DEPARTMENT OF UTILITY SERVICES, WATER AND WASTEWATER UTILITY STANDARDS," LATEST EDITION.
9. CONTRACTOR RESERVES THE RIGHT TO KEEP ANY REMOVED EQUIPMENT THAT IS NOT REQUESTED BY THE OWNER. ANY EQUIPMENT NOT REQUESTED BY OWNER SHALL BE DISPOSED OF BY THE CONTRACTOR.
10. CONTRACTOR SHALL MAINTAIN ALL EXISTING ON–SITE DITCHES, PIPES, AND OTHER DRAINAGE STRUCTURES FREE FROM OBSTRUCTION UNTIL OWNER ACCEPTS WORK. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES CAUSED BY FAILURE TO MAINTAIN DRAINAGE STRUCTURES IN OPERABLE CONDITIONS.
11. CONTRACTOR SHALL BARRICADE OPEN EXCAVATIONS OCCURRING AS PART OF THIS WORK.
12. CONTRACTOR SHALL NOT CREATE TRIPPING HAZARDS SUCH AS SURFACE MOUNTED CONDUITS WITHOUT THE APPROVAL OF THE ENGINEER.
13. THE CONTRACTOR SHALL PROVIDE ACCESS AND COORDINATE WITH THE OWNER AND/OR OTHER CONTRACTORS WORKING ON THE WELL SITES.
14. CONTRACTOR TO COORDINATE WASTEWATER TREATMENT PLANT SHUTDOWNS WITH IRCDUS STAFF AND THE OWNER'S REPRESENTATIVE.
15. NO CONSTRUCTION SHALL COMMENCE UNTIL ALL REQUIRED PERMITS AND APPROVALS HAVE BEEN SECURED AND A NOTICE–TO–PROCEED IS ISSUED.
16. PRIOR TO COMMENCEMENT OF ANY EXCAVATION, COMPLY WITH FLORIDA STATUTE CHAPTER 556 FOR THE PROTECTION OF UNDERGROUND UTILITIES.
17. CONTRACTOR IS RESPONSIBLE TO PROVIDE SHORING IN CONFORMANCE WITH THE PROVISIONS OF SECTIONS 553.60–553.64, F.S., THE "TRENCH SAFETY ACT", TO PROTECT EXISTING PAVEMENT, STRUCTURES, AND FOUNDATIONS.
18. BACKFILL MATERIAL SHALL BE PLACED AND COMPACTED IN ACCORDANCE WITH THE FDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, SECTION 125–8.
19. EXCAVATED MATERIAL IN EXCESS OF THE QUANTITY REQUIRED FOR BACKFILL OR ANY MATERIAL CONSIDERED UNUSABLE FILL SHALL BE DISPOSED OF AT THE EXPENSE OF THE CONTRACTOR.
20. ANY MATERIAL TO BE STOCKPILED FOR PERIODS GREATER THAN 24 HOURS SHALL BE PROTECTED BY APPROPRIATE EROSION CONTROL DEVICES. COST TO BE INCLUDED IN THE CONTRACTOR'S CONSTRUCTION PRICE.
21. ALL GRASSED AREAS DISTURBED BY CONSTRUCTION SHALL BE REPLACED IN KIND UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
22. AS–BUILT RECORDS FOR UTILITIES SHALL BE PREPARED IN STATE PLANE COORDINATES BY FLORIDA PROFESSIONAL LAND SURVEYOR. UTILITY FACILITIES TO BE SHOWN IN AS–BUILT LOCATIONS.
23. IF A HURRICANE WATCH IS ISSUED BY THE NATIONAL WEATHER SERVICE, THE CONTRACTOR SHALL PROTECT THE WORK SITE INCLUDING REMOVING OR SECURING ALL MATERIALS, EQUIPMENT, DEBRIS, AND ANY OBJECTS THAT COULD BECOME A PROJECTILE AND PROVIDE EROSION CONTROL AT NO ADDITIONAL COST TO THE OWNER.
24. CONTRACTOR SHALL MAINTAIN A CLEAN AND SECURE WORK SITE. GENERAL CLUTTER AND DEBRIS SHALL BE DISPOSED OF AT A LEGAL DISPOSAL SITE ON A WEEKLY BASIS.
25. THE CONTRACTOR SHALL FULLY SOD ALL AREAS DISTURBED BY CONSTRUCTION.THE TYPE OF SOD SHALL MATCH EXISTING AND SHALL BE BAHIA FOR NON–IRRIGATED AREAS. GRASSING AND SODDING MATERIALS WITHIN RIGHT–OF–WAY SHALL BE IN ACCORDANCE WITH THE FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT) STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION SECTION 981 GRASSING AND SODDING MATERIALS, SECTION 982 COMMERCIAL FERTILIZER, SECTION 983 WATERING FOR GRASSING AND SECTION 987 FINISH SOIL LAYER MATERIALS AND THE CONTRACT SPECIFICATIONS, WHICHEVER MORE STRINGENT.
26. ALL VALVES ARE TO BE TAGGED IN ACCORDANCE WITH IRCDUS SPECIFICATIONS.
27. THE CONTRACTOR SHALL MAINTAIN A CURRENT SET OF RED–LINED CONSTRUCTION PLANS ON JOB SITE.
28. THE CONTRACTOR SHALL BE RESPONSIBLE AT ALL TIMES THROUGHOUT THE DURATION OF CONSTRUCTION FOR THE PROTECTION OF EXISTING AND NEWLY INSTALLED UTILITIES FROM DAMAGE OR DISRUPTION OF SERVICE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TAKING SUCH MEASURES AS NECESSARY TO PROTECT THE HEALTH, SAFETY AND WELFARE OF THOSE PERSONS HAVING ACCESS TO THE WORK SITE.
29. THE CONTRACTOR SHALL SCHEDULE INSPECTIONS AND TESTS A MINIMUM OF 48 HOURS IN ADVANCE WITH THE OWNER AND ENGINEER.
30. THERE SHALL BE 36" MINIMUM COVER FROM FINISHED GRADE TO TOP OF PIPE, UNLESS OTHERWISE NOTED.
31. ALL TRENCHING, PIPE–LAYING, BACKFILL AND PRESSURE TESTING MUST COMPLY WITH ALL APPLICABLE FEDERAL, STATE, COUNTY AND HEALTH DEPARTMENT STANDARDS AND REGULATIONS.
32. UNLESS OTHERWISE NOTED, ALL HARDWARE/MATERIAL SHALL BE TYPE 316L STAINLESS STEEL.

BID SUBMITTAL

NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY

Kimley»Horn

1920 WEKIVA WAY SUITE 200, WEST PALM BEACH, FL 33411
PHONE: 561–845–0665 FAX: 561–863–8175
WWW.KIMLEY–HORN.COM REGISTRY NO. 696

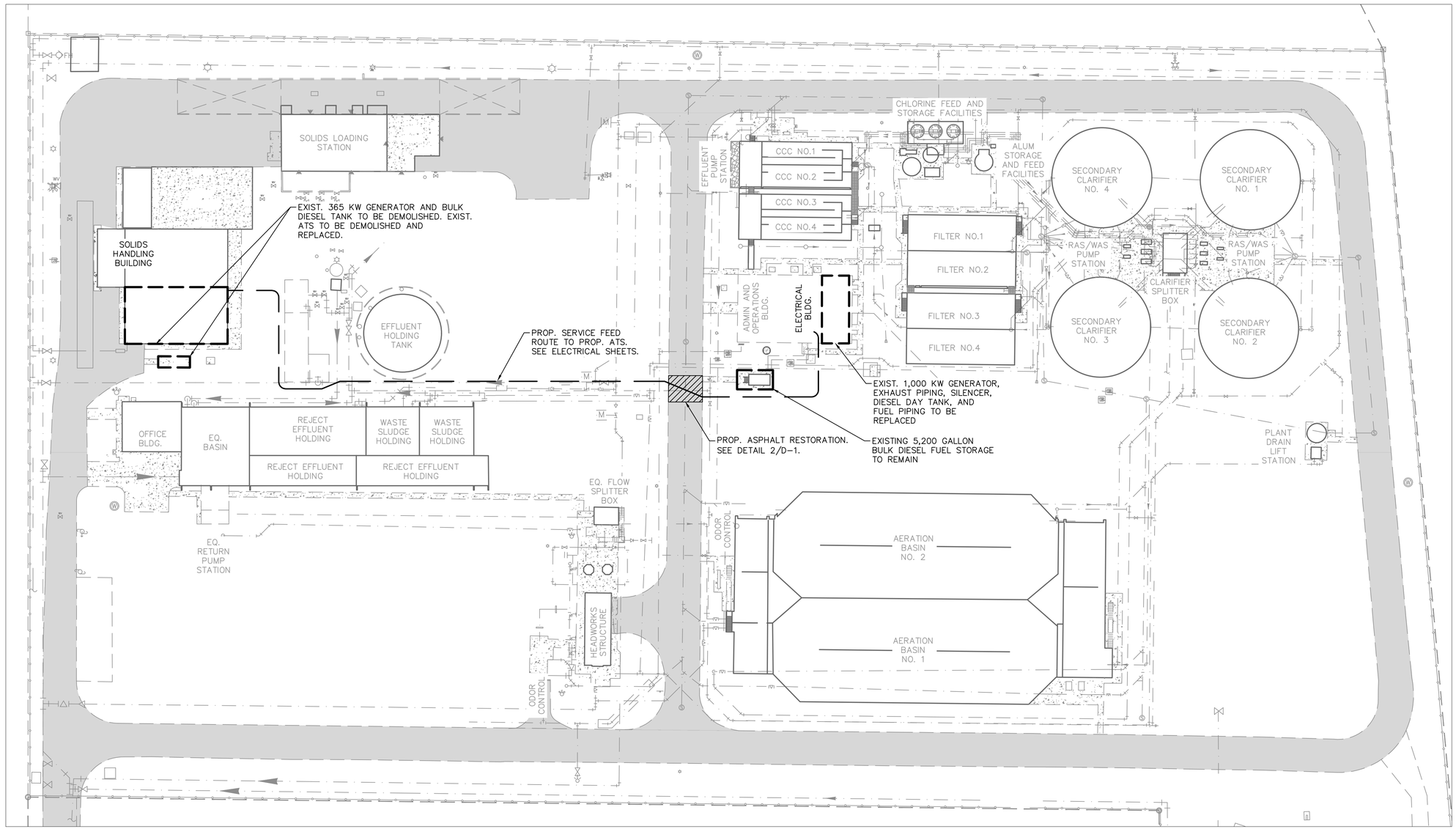
KHA PROJECT	044572075
DATE	MAY 2023
SCALE	AS SHOWN
DESIGNED BY	AGG
DRAWN BY	DC
CHECKED BY	NPOB

CENTRAL (GIFFORD) WWTF
GENERATOR AND ATS REPLACEMENT
PREPARED FOR
INDIAN RIVER COUNTY
DEPARTMENT OF UTILITY SERVICES
INDIAN RIVER COUNTY FLORIDA

LICENSED PROFESSIONAL
NICHOLAS P.O. BLACK
FLORIDA LICENSE NUMBER 84908
DATE: ____

GENERAL NOTES AND SUGGESTED CONSTRUCTION SEQUENCE

SHEET NUMBER
G-2



SITE PLAN

SCALE: 1" = 40'

GRAPHIC SCALE IN FEET
0 20 40 80

NORTH

GENERAL NOTES:

1. CONTRACTOR SHALL COORDINATE WORK WITH THE OWNER AND PROVIDE 48–HOURS NOTICE PRIOR TO DEMOLITION.
2. CONTRACTOR SHALL CONFIRM SIZE, MATERIAL, AND LOCATION OF ALL MECHANICAL EQUIPMENT AND FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS TO ACCOMMODATE PROPOSED EQUIPMENT AS REQUIRED.
3. CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO ORDERING MATERIALS AND CONSTRUCTION.
4. CONTRACTOR SHALL FIELD LOCATE EXISTING UTILITIES AND SHALL PROTECT AND MAINTAIN THE INTEGRITY OF ANY AND ALL EXISTING UNDERGROUND UTILITIES. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY AND ALL DAMAGES DUE TO CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE EXISTING UTILITIES. CONTRACTOR WILL BE REQUIRED TO REPAIR/REPLACE ANY DAMAGED UTILITIES TO OWNERS SATISFACTION.
5. ALL AREAS IMPACTED BY CONSTRUCTION SHALL BE RESTORED PER SPECIFICATIONS.
6. CONTRACTOR SHALL HAND DIG ALL PROPOSED BURIED ELECTRICAL CONDUIT.

BID SUBMITTAL

NOT FOR CONSTRUCTION

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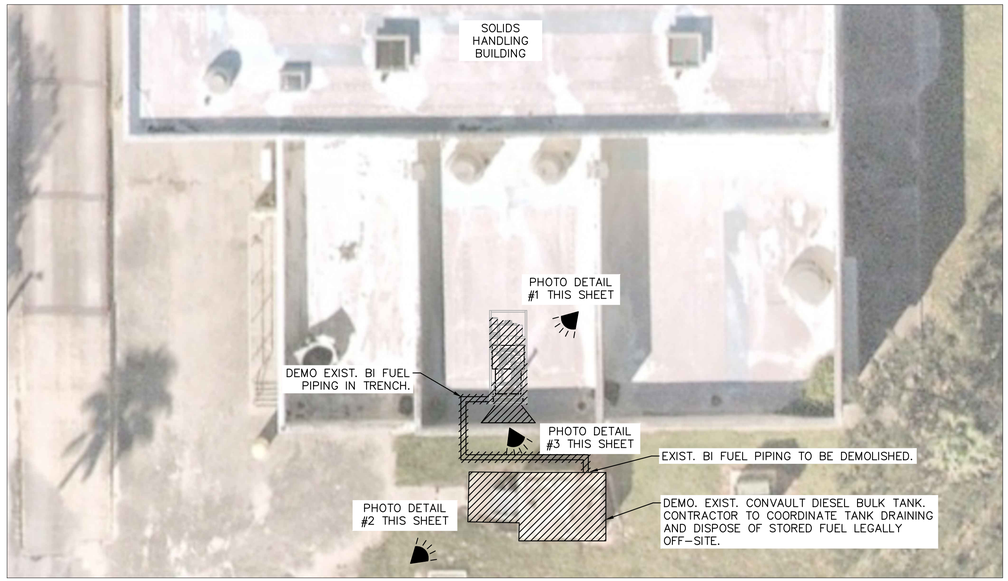
NICHOLAS P.O. BLACK

FLORIDA LICENSE NUMBER
84908

DATE: _____

SITE PLAN

SHEET NUMBER
C-1
3 OF 26

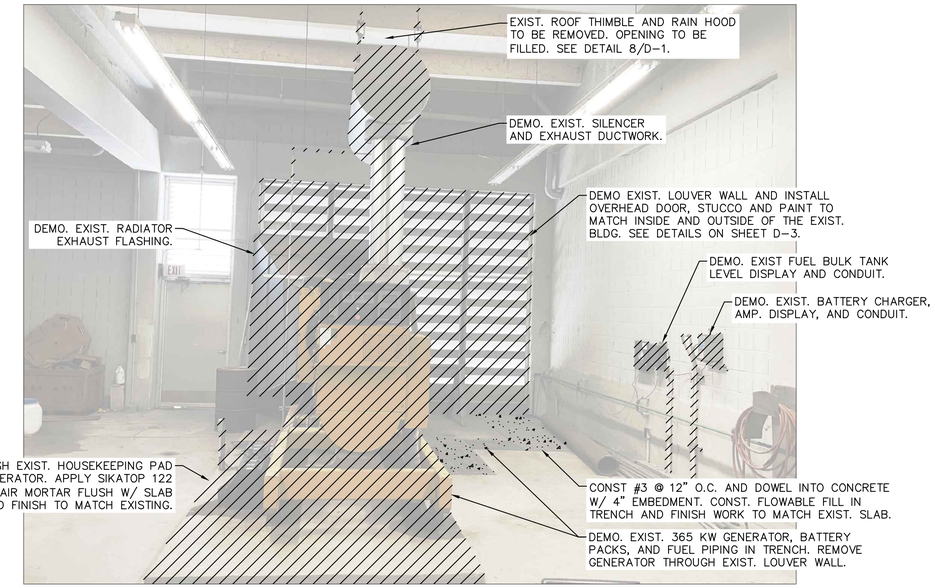


SOLIDS HANDLING BUILDING SITE PLAN

SCALE: 1" = 10'

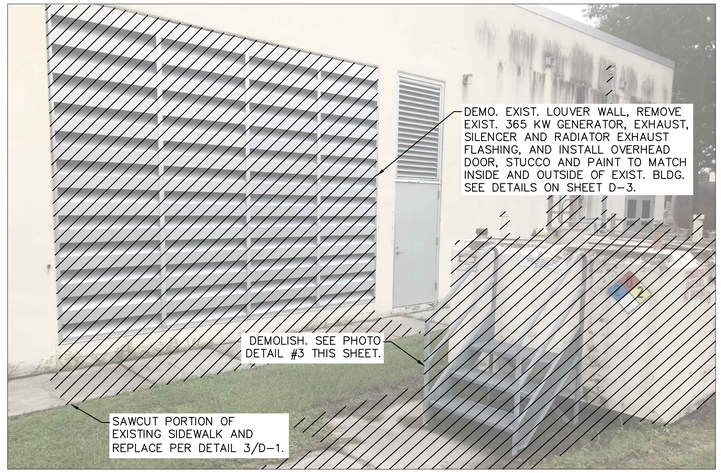
GRAPHIC SCALE IN FEET
0 5 10 20

NORTH



1 / M-1 PHOTO DETAIL #1

Scale: N.T.S



2 / M-1 PHOTO DETAIL #2

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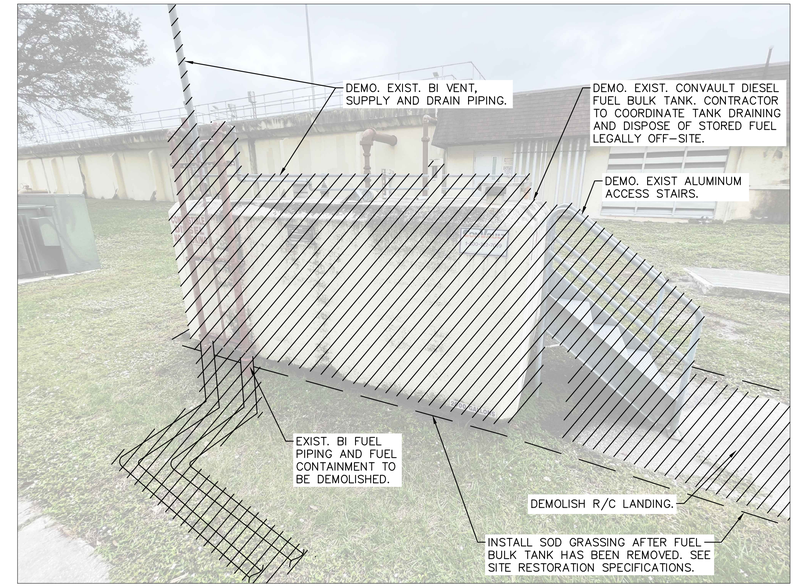

3 / M-1 PHOTO DETAIL #3

Scale: N.T.S

GENERAL NOTES:

1. GENERATOR TO BE REMOVED THROUGH EXIST. LOUVER WALL. REMOVE EXIST. LOUVER WALL AND INSTALL OVERHEAD DOOR W/ CMU FILL EITHER SIDE. STUCCO AND COAT TO MATCH EXIST. CONTRACTOR TO COORDINATE GENERATOR REMOVAL WITH OWNER AND ENGINEER.
2. ALL MATERIALS TO BE DEMOLISHED SHALL BE DISPOSED OF LEGALLY OFF-SITE. COORDINATE WITH OWNER FOR ITEMS TO BE RETURNED AFTER DEMOLITION.
3. HYDRAULIC AND OTHER ENGINE FLUIDS TO BE COMPLETELY DRAINED AND DISPOSED OF LEGALLY OFF-SITE PRIOR TO REMOVAL OF EXIST. GENERATOR AND DEMOLITION OF FUEL PIPING.
4. CONTRACTOR SHALL REMOVE GENERATOR AND COORDINATE CONSTRUCTION PHASING PER SPECIFICATIONS.

BID SUBMITTAL

NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY

Kimley»Horn

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PHONE: 561-845-0665 FAX: 561-863-8175
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CENTRAL (GIFFORD) WWTF
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INDIAN RIVER COUNTY FLORIDA

LICENSED PROFESSIONAL
NICHOLAS P.O. BLACK
FLORIDA LICENSE NUMBER
84908
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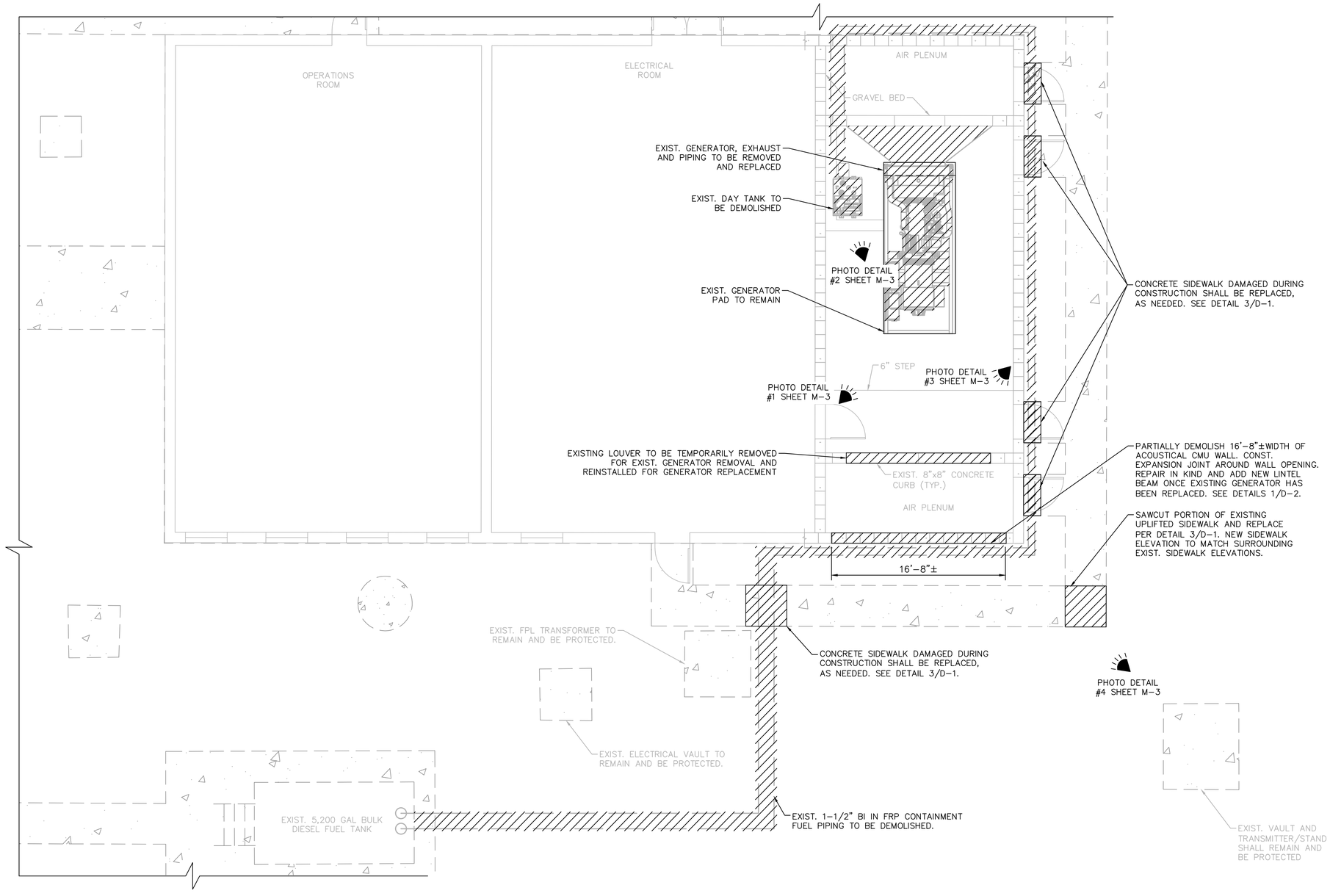
SOLIDS HANDLING BUILDING GENERATOR AND BULK FUEL TANK DEMOLITION

SHEET NUMBER
M-1
4 OF 26

Plotted By:Gomu, Daniel Sheet Set:CENTRAL (GIFFORD) WWTF GENERATOR AND ATS REPLACEMENT Layout:M-1 SOLIDS HOLDING GENERATOR LOUVER AND FUEL TANK DEMOLITION May 19, 2023 10:45:13am K:\WPB_Civil\044572075 - Gifford WWTP Generator and ATS Replacement\CAD\Presenters\M-1 SOLIDS HANDLING BLDG. GENERATOR, AND BULK FUEL TANK DEMOLITION.dwg



GENERAL NOTES:

1. GENERATOR TO BE REMOVED THROUGH EXIST. LOUVER WALL. CONTRACTOR TO COORDINATE GENERATOR REMOVAL WITH OWNER AND ENGINEER.
2. ALL MATERIALS TO BE DEMOLISHED SHALL BE DISPOSED OF LEGALLY OFF-SITE. COORDINATE WITH OWNER FOR ITEMS TO BE RETURNED AFTER DEMOLITION.
3. HYDRAULIC AND OTHER ENGINE FLUIDS TO BE COMPLETELY DRAINED AND DISPOSED OF LEGALLY OFF-SITE PRIOR TO REMOVAL OF EXIST. GENERATOR AND DEMOLITION OF FUEL PIPING.
4. CONTRACTOR SHALL REMOVE GENERATOR AND COORDINATE CONSTRUCTION PHASING PER SPECIFICATIONS.
5. CONTRACTOR SHALL HAND DIG ALL PROPOSED BURIED ELECTRICAL CONDUIT.

EXISTING ELECTRICAL BUILDING PLAN

24x36 SHEET SIZE: 3/16"= 1'-0"
11x17 SHEET SIZE: 3/32"= 1'-0"

0 4 8
SCALE FEET

3/16"= 1'-0"

NORTH

BID SUBMITTAL

NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY

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DEPARTMENT OF UTILITY SERVICES
INDIAN RIVER COUNTY FLORIDA

LICENSED PROFESSIONAL

NICHOLAS P.O. BLACK

FLORIDA LICENSE NUMBER
84908

DATE: ____

MAIN ELECTRICAL BUILDING GENERATOR AND DAY FUEL TANK DEMOLITION PLAN

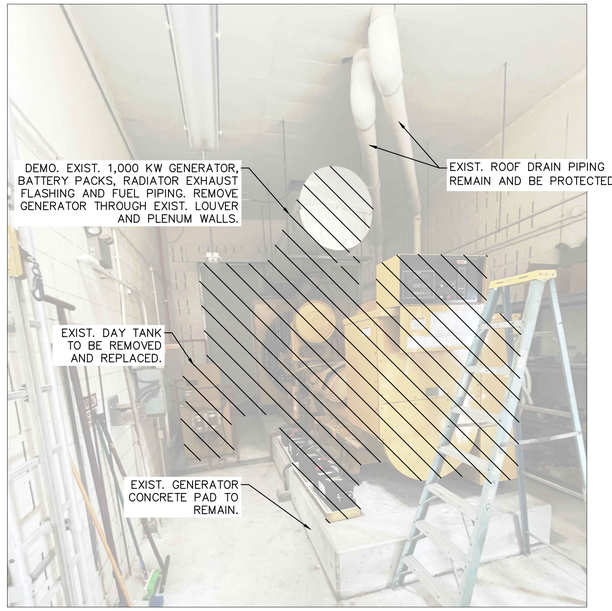
SHEET NUMBER

M-2

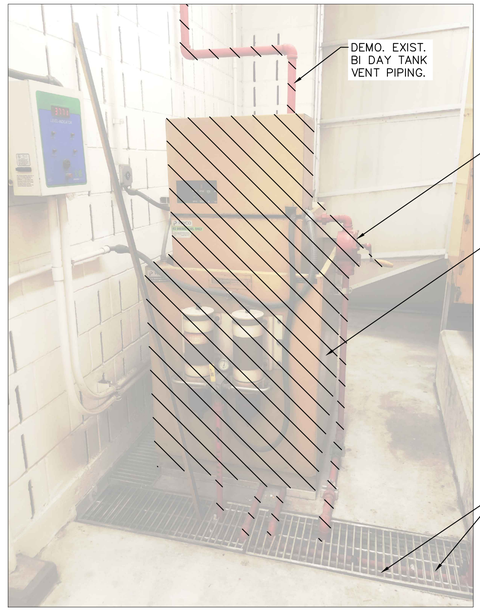
5 OF 26

GENERAL NOTES:

1. GENERATOR TO BE REMOVED THROUGH EXIST. LOUVER WALL. CONTRACTOR TO COORDINATE GENERATOR REMOVAL WITH OWNER AND ENGINEER.
2. ALL MATERIALS TO BE DEMOLISHED SHALL BE DISPOSED OF LEGALLY OFF-SITE. COORDINATE WITH OWNER FOR ITEMS TO BE RETURNED AFTER DEMOLITION.
3. HYDRAULIC AND OTHER ENGINE FLUIDS TO BE COMPLETELY DRAINED AND DISPOSED OF LEGALLY OFF-SITE PRIOR TO REMOVAL OF EXIST. GENERATOR AND DEMOLITION OF FUEL PIPING.
4. CONTRACTOR SHALL REMOVE GENERATOR AND COORDINATE CONSTRUCTION PHASING PER SPECIFICATIONS.



1 / M-2 PHOTO DETAIL #1
Scale: N.T.S



2 / M-2 PHOTO DETAIL #2
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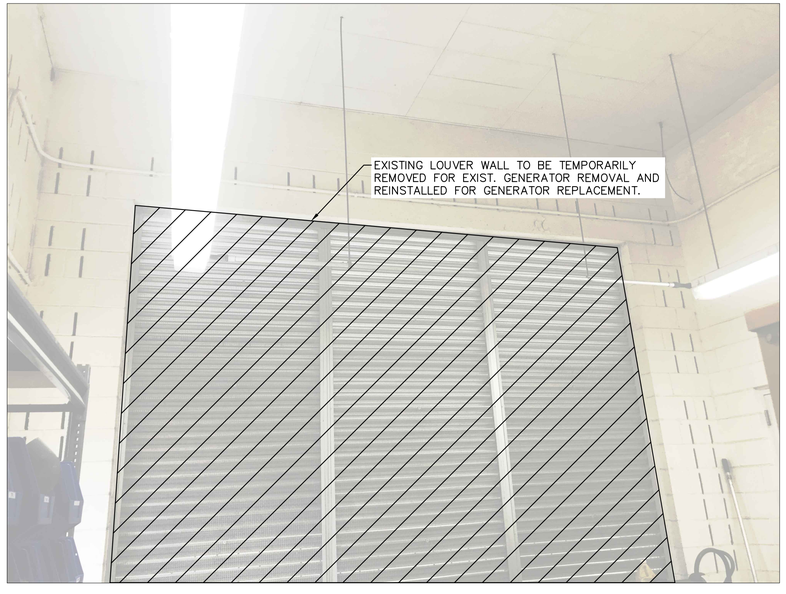
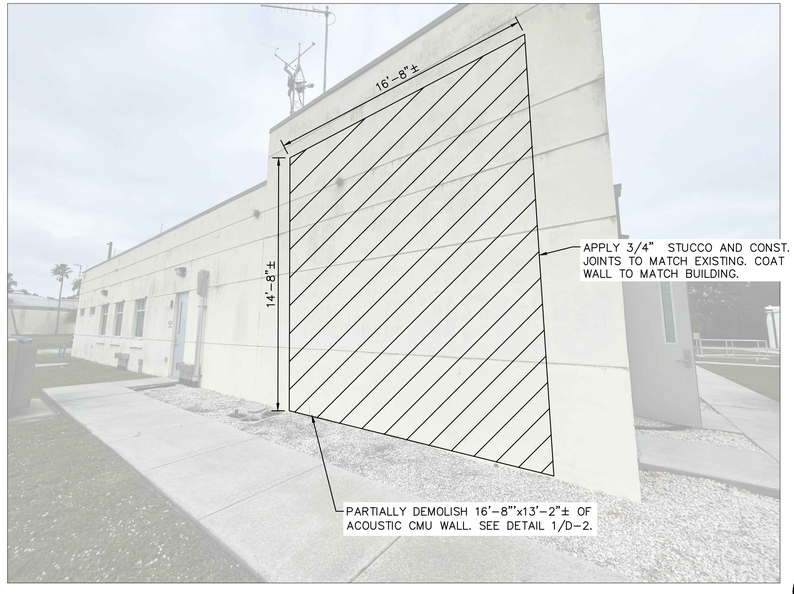


3 / M-2 PHOTO DETAIL #3
Scale: N.T.S



4 / M-2 PHOTO DETAIL #4
Scale: N.T.S

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No.	REVISIONS	DATE	BY

Kimley»Horn

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WWW.KIMLEY-HORN.COM REGISTRY NO. 696

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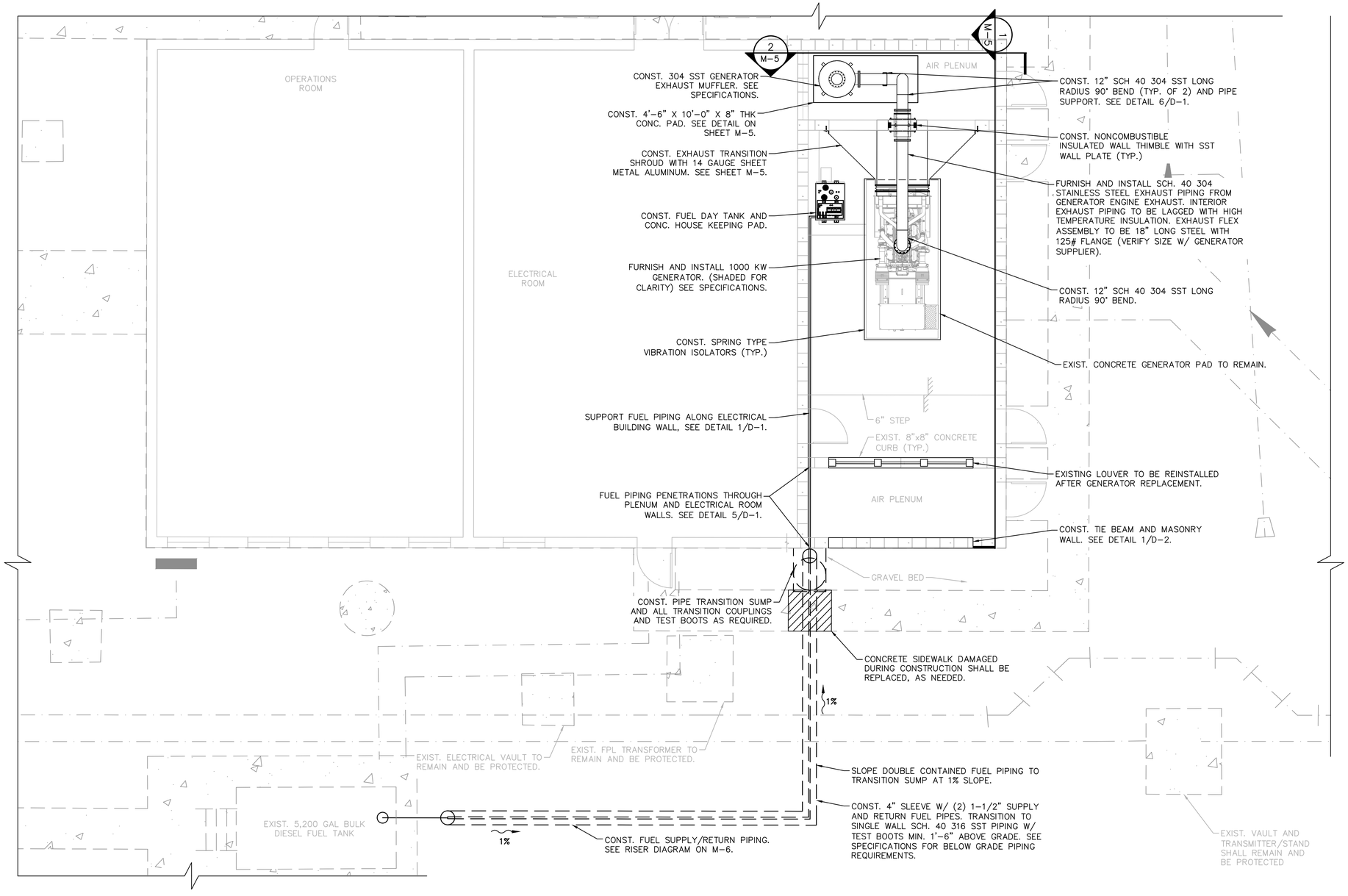
CENTRAL (GIFFORD) WWTF
GENERATOR AND ATS REPLACEMENT
PREPARED FOR
INDIAN RIVER COUNTY
DEPARTMENT OF UTILITY SERVICES
INDIAN RIVER COUNTY FLORIDA

LICENSED PROFESSIONAL
NICHOLAS P.O. BLACK
FLORIDA LICENSE NUMBER
84908
DATE: ____

MAIN ELECTRICAL BUILDING GENERATOR AND DAY FUEL TANK DEMOLITION PHOTO DETAILS

SHEET NUMBER
M-3
6 OF 26



PROPOSED ELECTRICAL BUILDING SITE PLAN

24x36 SHEET SIZE: 1/8"= 1'-0"
11x17 SHEET SIZE: 1/32"= 1'-0"

0 4 8
SCALE FEET

NORTH

GENERAL NOTES:

1. CONTRACTOR SHALL CONFIRM SIZE, MATERIAL, AND LOCATION OF ALL MECHANICAL EQUIPMENT AND FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS TO ACCOMMODATE PROPOSED EQUIPMENT AS REQUIRED.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO ORDERING MATERIALS AND CONSTRUCTION.
3. CONTRACTOR SHALL FIELD LOCATE EXISTING UTILITIES AND SHALL PROTECT AND MAINTAIN THE INTEGRITY OF ANY AND ALL EXISTING UNDERGROUND UTILITIES. THE CONTRACTOR WILL BE RESPONSIBLE FOR ANY AND ALL DAMAGES DUE TO CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE EXISTING UTILITIES. CONTRACTOR WILL BE REQUIRED TO REPAIR/REPLACE ANY DAMAGED UTILITIES TO OWNERS SATISFACTION.
4. ALL AREAS IMPACTED BY CONSTRUCTION SHALL BE RESTORED PER SPECIFICATIONS.
5. CONTRACTOR SHALL HAND DIG ALL PROPOSED BURIED ELECTRICAL CONDUIT AND BELOW GRADE FUEL PIPING.

BID SUBMITTAL

NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY

Kimley»Horn

1920 WEKIVA WAY SUITE 200, WEST PALM BEACH, FL 33411
PHONE: 561-845-0665 FAX: 561-863-8175
WWW.KIMLEY-HORN.COM REGISTRY NO. 696

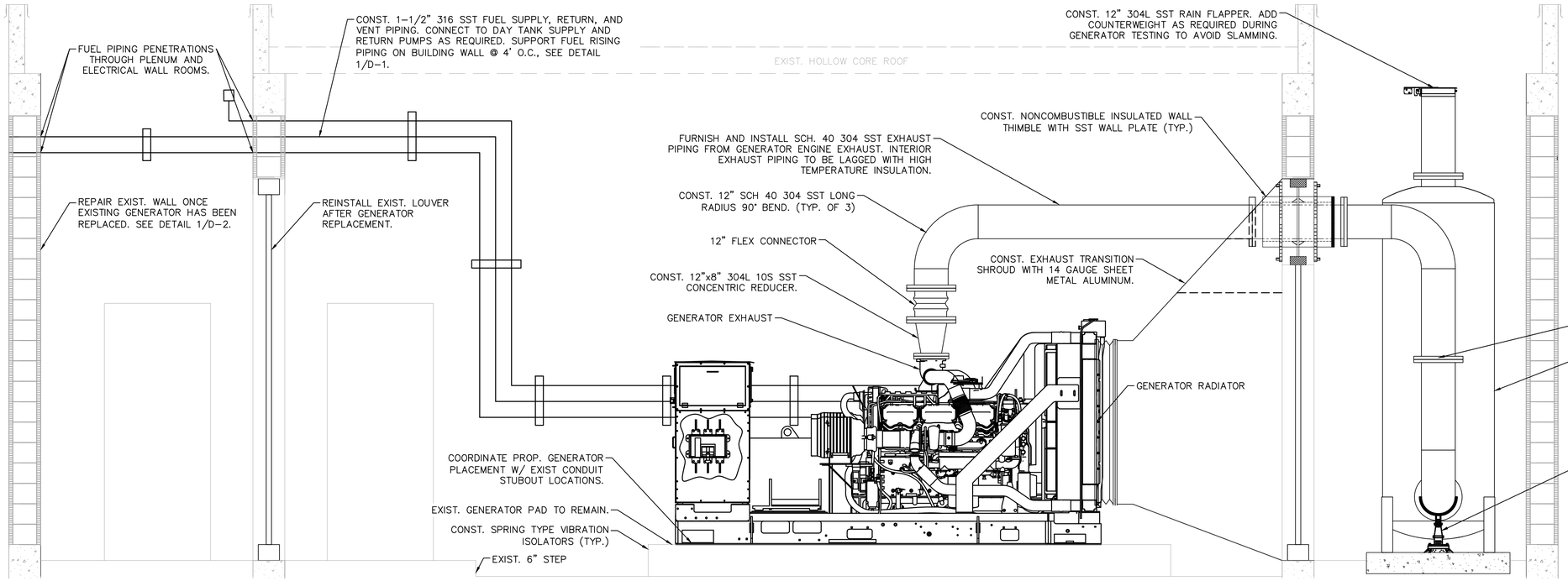
KHA PROJECT 044572075
DATE MAY 2023
SCALE AS SHOWN
DESIGNED BY AGG
DRAWN BY DC
CHECKED BY NPOB

CENTRAL (GIFFORD) WWTF
GENERATOR AND ATS REPLACEMENT
PREPARED FOR
INDIAN RIVER COUNTY
DEPARTMENT OF UTILITY SERVICES
INDIAN RIVER COUNTY FLORIDA

LICENSED PROFESSIONAL
NICHOLAS P.O. BLACK
FLORIDA LICENSE NUMBER
84908
DATE: ____

MAIN ELECTRICAL BUILDING GENERATOR AND DAY FUEL TANK REPLACEMENT PLAN

SHEET NUMBER
M-4
7 OF 26



GENERAL NOTES:

1. CONTRACTOR SHALL CONFIRM SIZE, MATERIAL, AND LOCATION OF ALL MECHANICAL EQUIPMENT AND FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS TO ACCOMMODATE PROPOSED EQUIPMENT AS REQUIRED.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO ORDERING MATERIALS AND CONSTRUCTION.
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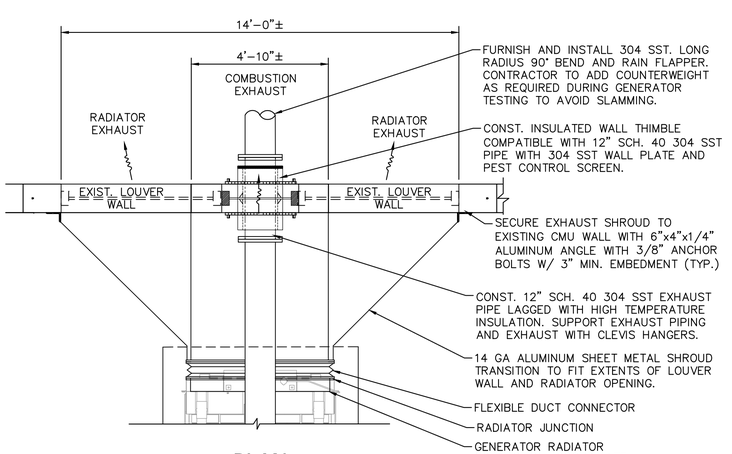
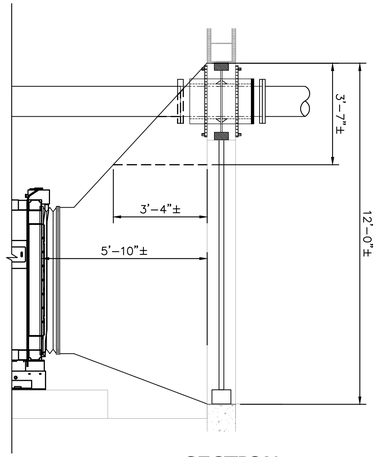
4. ALL AREAS IMPACTED BY CONSTRUCTION SHALL BE RESTORED PER SPECIFICATIONS.
5. CONTRACTOR SHALL HAND DIG ALL PROPOSED BURIED ELECTRICAL CONDUIT.

PROPOSED GENERATOR ROOM SECTION

24x36 SHEET SIZE: 1/2"= 1'-0"
11x17 SHEET SIZE: 1/4"= 1'-0"
SCALE 0 1 2 3 FEET



PLAN

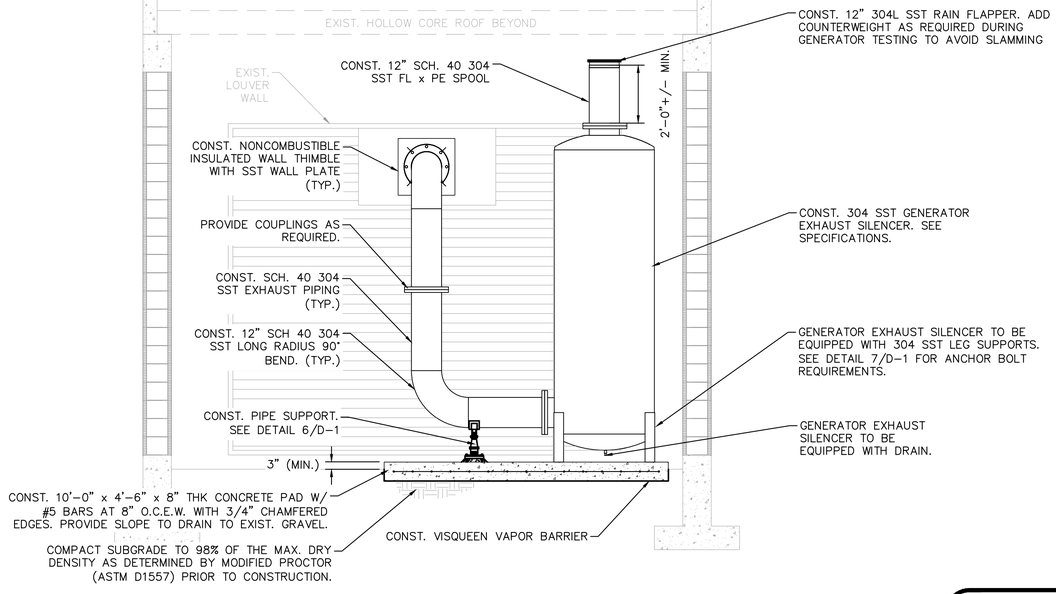


SECTION

EXHAUST SHROUD AND THIMBLE DETAILS

24x36 SHEET SIZE: 3/8"= 1'-0"
11x17 SHEET SIZE: 3/16"= 1'-0"
SCALE 0 1 2 3 4 FEET

NOTES:
1. EXHAUST SHROUD SHALL FABRICATED WITH CUT OUT TO FACILITATE INSTALLATION OF GENERATOR SILENCER AND EXHAUST THIMBLE. CONTRACTOR VERIFY CUT OUT DIMENSIONS, AND COORDINATE OPENING SIZE WITH GENERATOR MANUFACTURER. OPENING SHALL BE MINIMUM 1.5 TIMES LARGER THAN RADIATOR EXHAUST AREA.
2. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS AND ALTER DIMENSIONS AS NEEDED TO CONSTRUCT A FULLY FUNCTIONAL GENERATOR RADIATOR AND COMBUSTION EXHAUST SYSTEM.



EXHAUST SILENCER DETAIL

24x36 SHEET SIZE: 3/8"= 1'-0"
11x17 SHEET SIZE: 3/16"= 1'-0"
SCALE 0 1 2 3 4 FEET

BID SUBMITTAL

NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY

Kimley»Horn

1920 WEKIVA WAY SUITE 200, WEST PALM BEACH, FL 33411
PHONE: 561-845-0665 FAX: 561-863-8175
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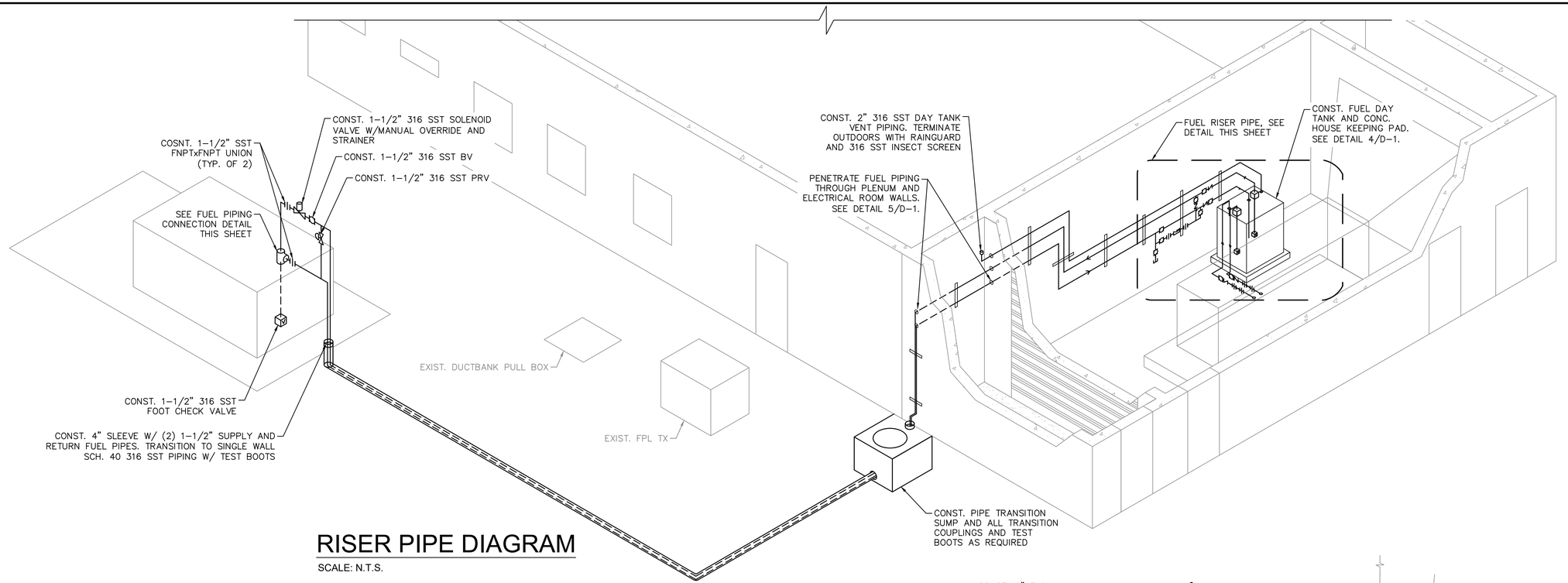
INDIAN RIVER COUNTY FLORIDA

LICENSED PROFESSIONAL
NICHOLAS P.O. BLACK
FLORIDA LICENSE NUMBER
84908
DATE: _____

MAIN ELECTRIC BLDG.
GENERATOR AND DAY FUEL
TANK REPLACEMENT SECTION

SHEET NUMBER
M-5
8 OF 26

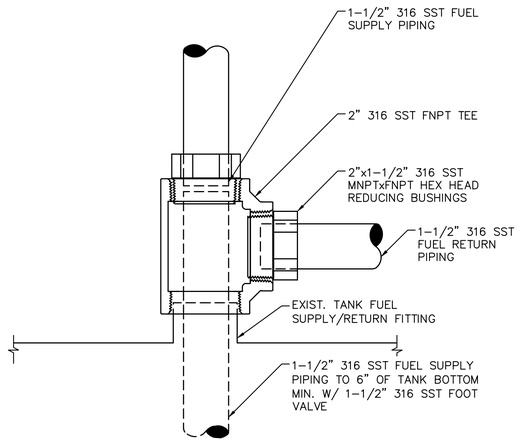


RISER PIPE DIAGRAM

SCALE: N.T.S.

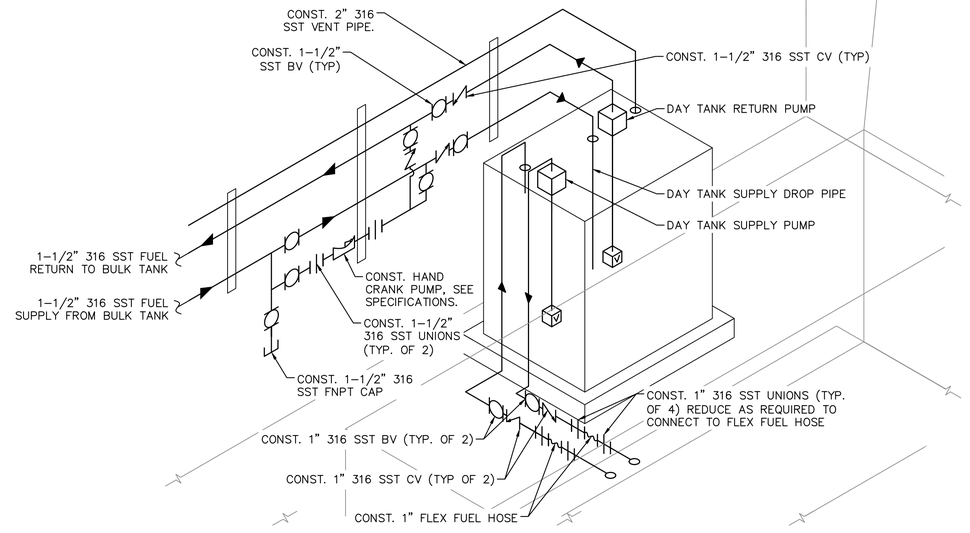
GENERAL NOTES:

1. DIESEL FUEL PIPING TO BE ATTACHED TO WALLS AND FLOOR WITH 316 SST UNISTRUT CHANNEL AND PIPE CLAMPS.
2. MODIFY/REPLACE EXISTING GRATING TO ROUTE WITHIN TRENCH.
3. PROVIDE AND CONST. PRIMING TEE AND PRESSURE RELIEF VALVE ON FUEL SUPPLY PIPE BETWEEN DAY AND BULK TANK. THE PRESSURE RELIEF VALVE IS TO BE A 1/4" BRASS RELIEF VALVE BY MORRISON BROTHERS AND SHALL BE PIPED TO DISCHARGE IN THE FUEL RETURN PIPING.
5. CONTRACTOR SHALL HAND DIG ALL PROPOSED BURIED ELECTRICAL CONDUIT.



BULK FUEL TANK CONNECTION DETAIL

SCALE: N.T.S.



RISER PIPE DETAIL

SCALE: N.T.S.

BID SUBMITTAL

NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY

Kimley»Horn
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1920 WEKIVA WAY SUITE 200, WEST PALM BEACH, FL 33411
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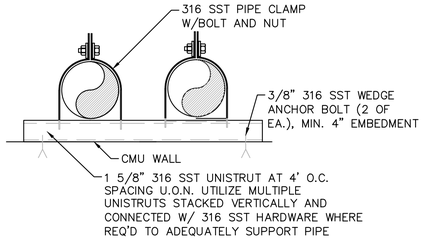
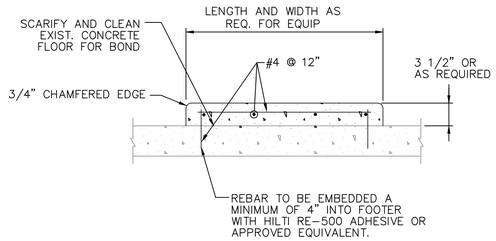
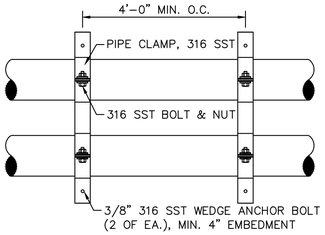
FUEL RISER DIAGRAM

SHEET NUMBER
M-6
9 OF 26

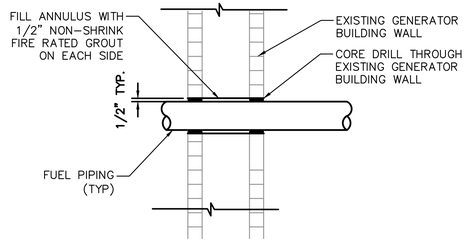




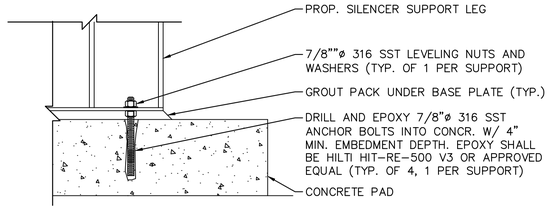
4 D-1 **HOUSE KEEPING PAD DETAIL**
Scale: N.T.S.



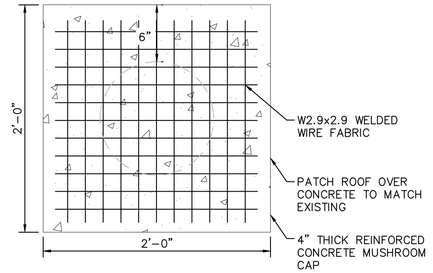
1 D-1 **UNISTRUT PIPE SUPPORT DETAIL**
Scale: N.T.S.

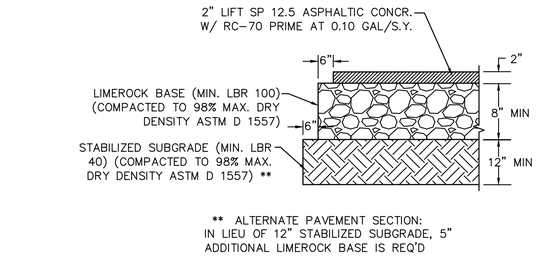


5 D-1 **WALL PENETRATION DETAIL**
Scale: N.T.S.

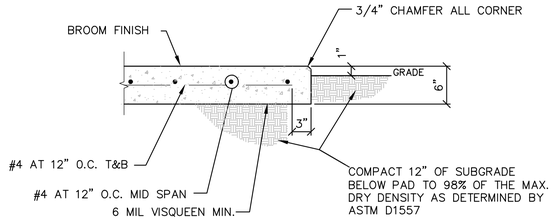


7 D-1 **SILENCER ANCHOR BOLT**
Scale: N.T.S.

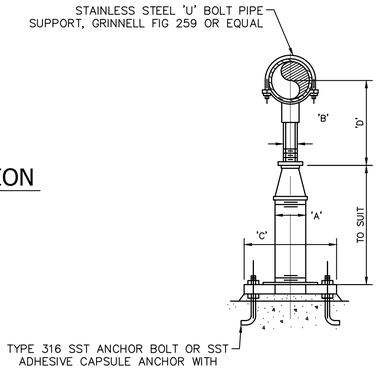




2 D-1 **HEAVY DUTY ASPHALTIC CONCRETE PAVEMENT SECTION**
Scale: N.T.S.



3 D-1 **SIDEWALK DETAIL**
Scale: N.T.S.

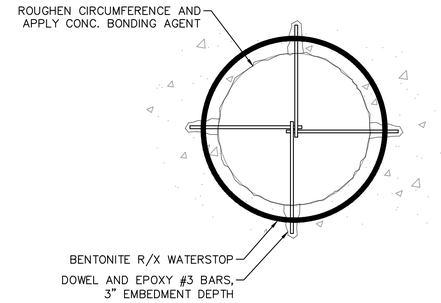


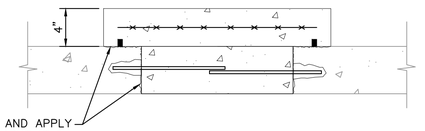
ADJUSTABLE PIPE SUPPORT APPROX DIMENSIONS IN INCHES					
PIPE SIZE	A	B	C	D MIN.	D MAX.
8	3	2 1/2	9	13 5/8	16 1/2
10	3	2 1/2	9	14 5/8	18 1/4
12	3	2 1/2	9	15 5/8	19 3/4
14	4	3	11	18 5/8	20 3/4

NOTE

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO PROCUREMENT AND/OR FABRICATION.
2. A FABRICATED SUPPORT PIECE MAY BE UTILIZED ONLY IF ACCEPTABLE TO ENGINEER AND OWNER. SUBMIT SHOP DRAWING OF SUPPORT PRIOR TO PROCUREMENT AND/OR FABRICATION.

6 D-1 **ADJUSTABLE PIPE SUPPORT**
Scale: N.T.S.





8 D-1 **ROOF PENETRATION REPAIR DETAIL**
Scale: N.T.S.

BID SUBMITTAL

NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY

Kimley»Horn

1920 WEKIVA WAY SUITE 200, WEST PALM BEACH, FL 33411
PHONE: 561-845-0665 FAX: 561-863-8175
WWW.KIMLEY-HORN.COM REGISTRY NO. 696

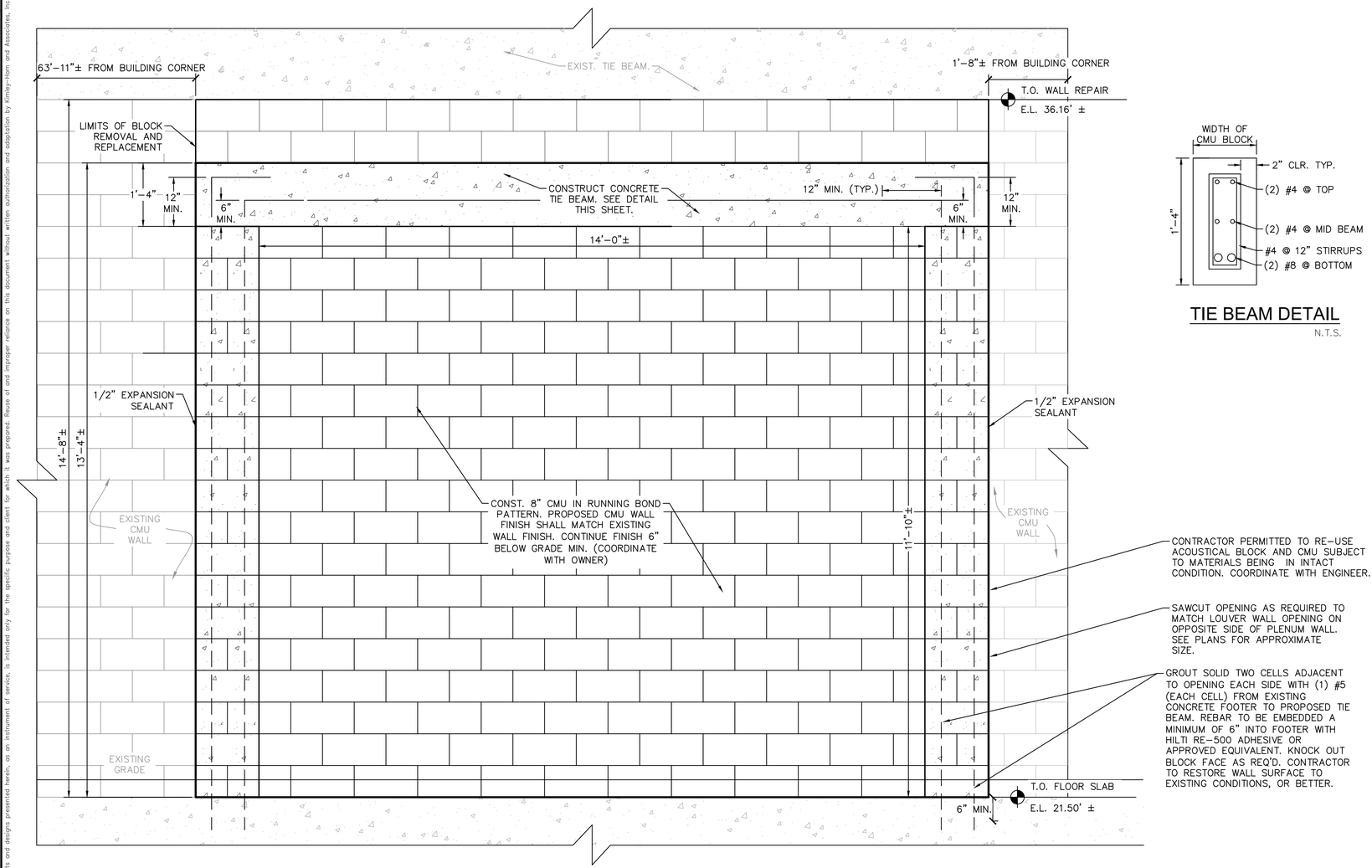
KHA PROJECT 044572075
DATE MAY 2023
SCALE AS SHOWN
DESIGNED BY AGG
DRAWN BY DC
CHECKED BY NPOB

CENTRAL (GIFFORD) WWTF GENERATOR AND ATS REPLACEMENT
PREPARED FOR
INDIAN RIVER COUNTY
DEPARTMENT OF UTILITY SERVICES
INDIAN RIVER COUNTY FLORIDA

LICENSED PROFESSIONAL
NICHOLAS P.O. BLACK
FLORIDA LICENSE NUMBER
84908
DATE: _____

CONSTRUCTION DETAILS

SHEET NUMBER
D-1
10 OF 26



1 / D-2 MASONRY WALL REPAIR DETAIL

N.T.S.

TIE BEAM DETAIL

N.T.S.

BID SUBMITTAL

NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY

Kimley»Horn

1920 WEKIVA WAY SUITE 200, WEST PALM BEACH, FL 33411
PHONE: 561-845-0665 FAX: 561-863-8175
WWW.KIMLEY-HORN.COM REGISTRY NO. 696

KHA PROJECT	044572075
DATE	MAY 2023
SCALE	AS SHOWN
DESIGNED BY	AF
DRAWN BY	AG
CHECKED BY	NOPB

CENTRAL (GIFFORD) WWTF GENERATOR AND ATS REPLACEMENT

PREPARED FOR

INDIAN RIVER COUNTY
DEPARTMENT OF UTILITY SERVICES

INDIAN RIVER COUNTY FLORIDA

LICENSED PROFESSIONAL

ANGELINA FAIRCHILD

FLORIDA LICENSE NUMBER 43958

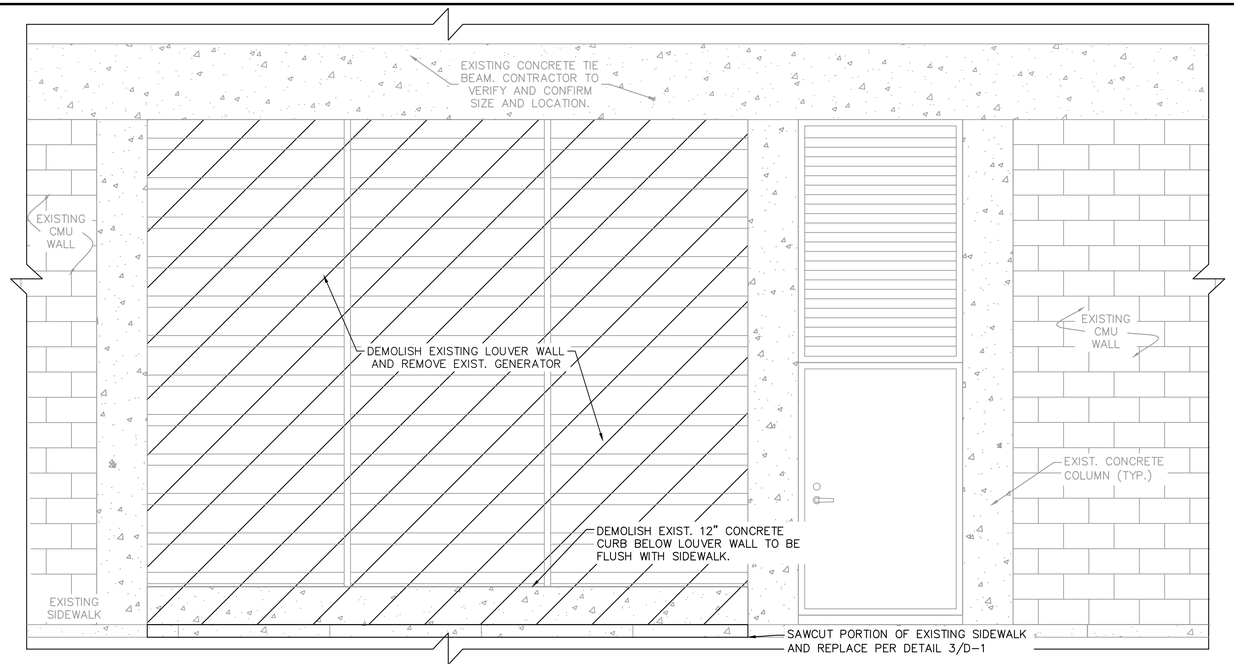
DATE: _____

CONSTRUCTION DETAILS CONTINUED

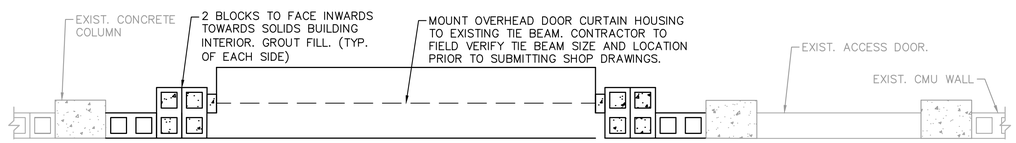
SHEET NUMBER

D-2

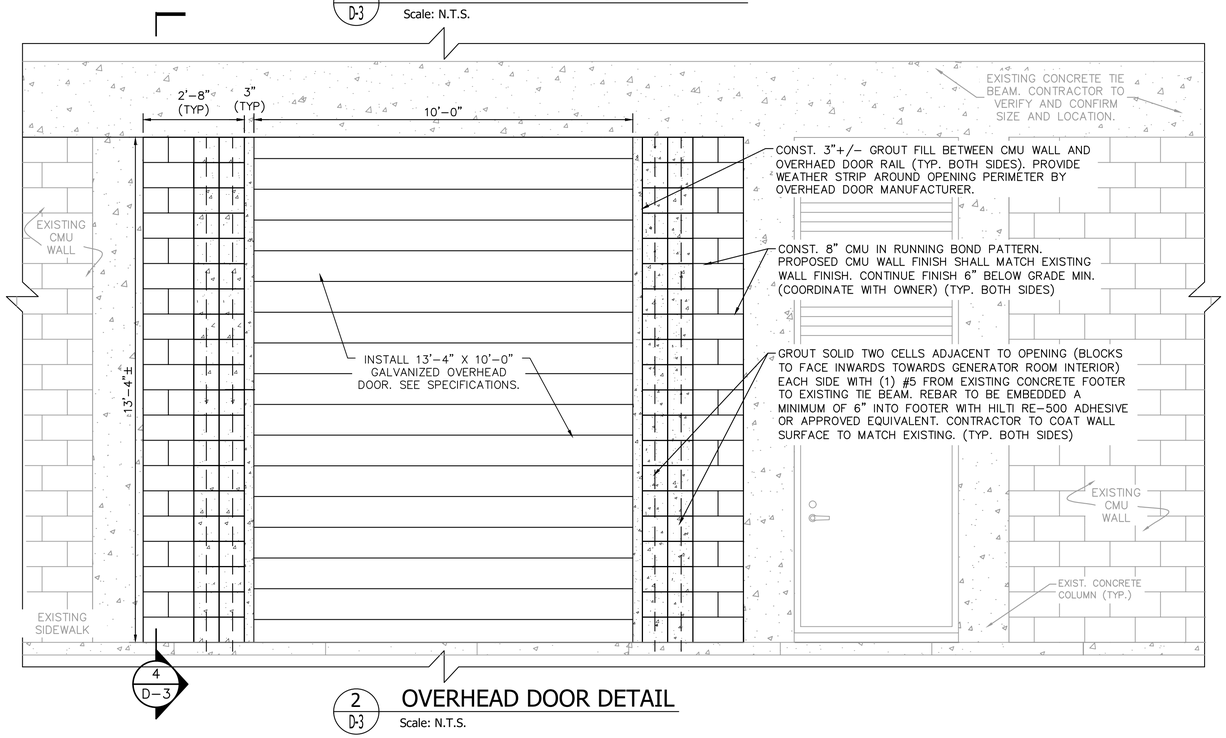
11 OF 26



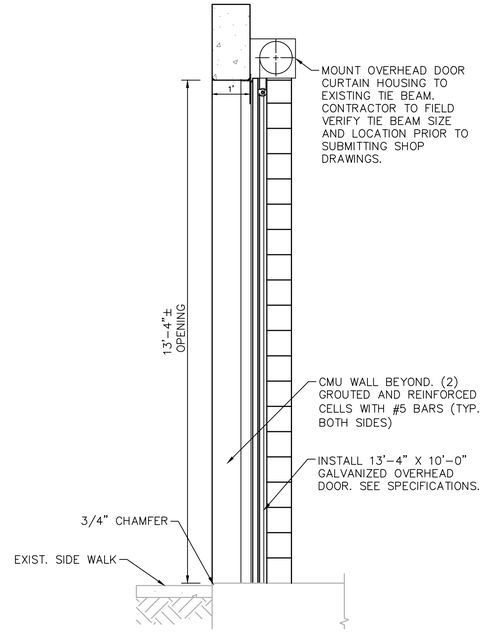
1 D-3 **LOUVERWALL REMOVAL DETAIL**
Scale: N.T.S.



3 D-3 **OVERHEAD DOOR AND WALL LAYOUT PLAN**
Scale: N.T.S.



2 D-3 **OVERHEAD DOOR DETAIL**
Scale: N.T.S.



4 D-3 **OVERHEAD DOOR SECTION**
Scale: N.T.S.

BID SUBMITTAL

NOT FOR CONSTRUCTION

No.	REVISIONS	DATE	BY

Kimley»Horn

1920 WEKIVA WAY SUITE 200, WEST PALM BEACH, FL 33411
PHONE: 561-845-0665 FAX: 561-863-8175
WWW.KIMLEY-HORN.COM REGISTRY NO. 696

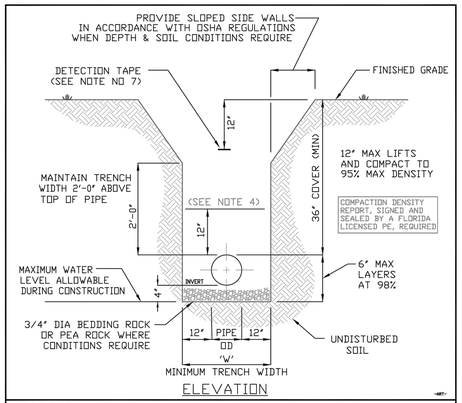
KHA PROJECT	044572075
DATE	MAY 2023
SCALE	AS SHOWN
DESIGNED BY	AF
DRAWN BY	AG
CHECKED BY	NPOB

CENTRAL (GIFFORD) WWTF GENERATOR AND ATS REPLACEMENT
PREPARED FOR
INDIAN RIVER COUNTY
DEPARTMENT OF UTILITY SERVICES
INDIAN RIVER COUNTY FLORIDA

LICENSED PROFESSIONAL
ANGELINA FAIRCHILD
FLORIDA LICENSE NUMBER
43958
DATE: _____

CONSTRUCTION DETAILS CONTINUED

SHEET NUMBER
D-3
12 OF 26

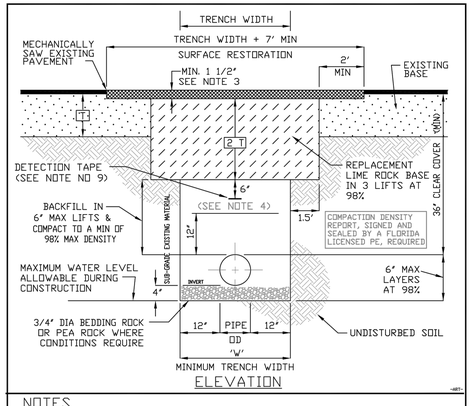


ELEVATION

NOTES

1. WHERE SOIL CONDITIONS CANNOT BE MAINTAINED AS SHOWN ABOVE, PROVIDE METHOD OF CONSTRUCTION TO IRCDUS FOR APPROVAL.
2. SHEETING WILL BE REQUIRED AS DETERMINED IN THE FIELD IN ACCORDANCE WITH OSHA REGULATIONS.
3. COMPACTION PERCENTAGES SHOWN REFER TO AASHTO T-180 MODIFIED PROCTOR METHOD.
4. MECHANICAL COMPACTION NOT ALLOWED BELOW THIS LEVEL (OTHER THAN HAND VIBRATORY MEANS.
5. COMPACTION REPORTS REQUIRED.
6. MINIMUM TRENCH WIDTH "W" = PIPE O.D. PLUS 2'-0".
7. 2" DETECTION TAPE WITH METALLIC BACKING TO BE INSTALLED OVER MAIN 6' BELOW BOTTOM OF BASE COURSE. TAPE TO BE MARKED "CAUTION-WATER LINE BELOW", "CAUTION-FORCE MAIN BELOW", OR "CAUTION-REUSE MAIN BELOW". TRACE WIRE SHALL BE USED CONTINUOUSLY ON ALL PIPE. SEE TRACE WIRE DETAIL M-13.
8. ALL RESTORATION IN EASEMENTS OR RIGHT-OF-WAYS OR WHEN REQUIRED BY OTHER JURISDICTIONAL AGENCIES SHALL CONFORM TO IRCDUS SPECIFICATIONS OR THE OTHER JURISDICTIONAL AGENCY SPECIFICATION, WHICHEVER IS MORE STRINGENT.
9. ALL PIPE TO BE LOCATED A MINIMUM OF 5' O.C. (TYPICAL) FROM EDGE OF PAVEMENT., PER FDOT INDEX 105.
10. EXCAVATABLE FLOWABLE FILL IS ALLOWED WITH PRIOR APPROVAL OF PROPOSED MATERIAL STRENGTH BY COUNTY PUBLIC WORKS ENGINEER OR DESIGNEE.

INDIAN RIVER COUNTY DEPARTMENT OF UTILITY SERVICES		TRENCH DETAIL (UNPAVED EASEMENTS) MARCH 2018	DRAWING NO. M-1

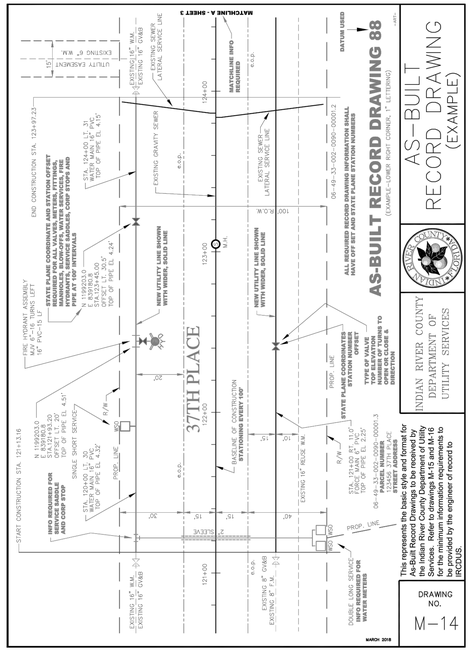


ELEVATION

NOTES

1. WHERE SOIL CONDITIONS CANNOT BE MAINTAINED AS SHOWN ABOVE, PROVIDE METHOD OF CONSTRUCTION TO IRCDUS FOR APPROVAL.
2. SHEETING WILL BE REQUIRED AS DETERMINED IN THE FIELD IN ACCORDANCE WITH OSHA REGULATIONS.
3. NEW SURFACE MATERIALS SHALL BE CONSISTENT IN DEPTH WITH EXISTING MATERIALS AND SHALL HAVE LAPPED JOINTS, (1-1/2" MIN. THK). PAVEMENT MATERIAL TYPE TO BE SPECIFIED.
4. MECHANICAL COMPACTION NOT ALLOWED BELOW THIS LEVEL (OTHER THAN HAND VIBRATORY MEANS.
5. COMPACTION PERCENTAGES SHOWN REFER TO AASHTO T-180 MODIFIED PROCTOR METHOD.
6. ALL ROADWAY RESTORATION SHALL COMPLY WITH INDIAN RIVER COUNTY PUBLIC WORKS/FDOT STANDARDS (SEE PUBLIC WORKS FOR TYPICAL CONSTRUCTION DRAWINGS.)
7. COMPACTION REPORTS REQUIRED BY IRCDUS.
8. MINIMUM TRENCH WIDTH "W" = PIPE O.D. PLUS 2'-0".
9. 2" DETECTION TAPE WITH METALLIC BACKING TO BE INSTALLED OVER MAIN 6' BELOW BOTTOM OF BASE COURSE. TAPE TO BE MARKED "CAUTION-WATER LINE BELOW", "CAUTION-FORCE MAIN BELOW", OR "CAUTION-REUSE MAIN BELOW". TRACE WIRE SHALL BE USED CONTINUOUSLY ON ALL PIPE. SEE TRACE WIRE DETAIL M-13.
10. COMPACT SHOULDER TO A MINIMUM OF 98% OF MAXIMUM DENSITY IN RIGHT-OF-WAY.
11. ALL PIPE TO BE LOCATED A MINIMUM OF 5' O.C. (TYPICAL) FROM EDGE OF PAVEMENT. ALL RESTORATION (SODDING) SHALL BE PER FDOT INDEX 105.
12. EXCAVATABLE FLOWABLE FILL IS ALLOWED WITH PRIOR APPROVAL OF PROPOSED MATERIAL STRENGTH BY COUNTY PUBLIC WORKS ENGINEER OR DESIGNEE.

INDIAN RIVER COUNTY DEPARTMENT OF UTILITY SERVICES		TRENCH DETAIL (PAVED AREAS & SHOULDERS) MARCH 2018	DRAWING NO. M-2



GENERAL NOTES

1. All As-Built Record Drawings shall meet the minimum requirements of the Chapter AJ-17, Florida Administration Code Pursuant to Section 472 of the Florida Statutes
2. All As-Built Record Drawings shall be in State Plane Coordinates. State Plane Coordinates shall be based on the Florida State Plane Horizontal data (East Zone); or Florida High Precision Geodetic Network (superstation) and NAD 83/1999 - final adjustment, or the most current datum adopted by Indian River County.
3. Florida State Plane Horizontal data and station off-set shall be tied to valves, meters, fittings, manholes, blow-offs, water services, fire hydrants, service saddles, corp stops and pipe (pipe at 200' intervals).
4. All elevations shown shall be based on 1988 NAVD (North American Vertical Datum).
5. All As-Built Record Drawings shall be tied to a minimum of one (1) permanent reference monument (P.R.M.) at the end of each project. One P.R.M. shall be tied to a minimum of one (1) section corner or one-quarter (1/4) section corner whichever is closest to the project. State plane coordinates shall be physically shown on the drawing next to the P.R.M. used.
6. Horizontal Control Monumentation for utility lines shall be a minimum of two (2) points at a maximum of 1,400 feet between points and shown on all plans.
7. Vertical Control (when required) for linear utility lines, such as water and sewer, shall have a maximum of 1,100 feet between existing construction or established benchmarks.
8. All incoming As-Built Record Drawings (24"x36") shall state in 1" lettering "RECORD DRAWING" and the datum used in 1" lettering in the lower right hand side of the drawing original and/or copies along with as-built date. All incoming Record Drawings shall be received on a CD as an electronic copy, AutoCad 2015 format, or latest version, with a tie to a minimum of two (2) state plane coordinates. (NOTE: Prior to submitting the electronic copy, one (1) copy of each as-built shall be submitted for review and approval. After all approvals, (3) **three** (24"x36") signed and sealed copies of each as-built shall be submitted. All Record Drawings shall be in a minimum scale of 1"=40'.
9. A minimum text size of 1/8" is required on all construction/route survey and Record Drawings.
10. All As-Built Record Drawings shall be certified by the project engineer or contracting surveyor.

INDIAN RIVER COUNTY DEPARTMENT OF UTILITY SERVICES		AS-BUILT RECORD DRAWING GENERAL NOTES MARCH 2018	DRAWING NO. M-15

GENERAL INFORMATION REQUIREMENTS
FOR ALL CONSTRUCTION/ROUTE SURVEY AND AS-BUILT RECORD DRAWINGS

1. Existing right-of-way limits and/or easements within the limits of construction.
2. Survey baseline stationing every 100', control points set every 500', and at angle change of direction.
3. Show cross section elevations at grade every 100' for gravity sewer line construction and 500' for water line and force main construction. Elevations that reflect any significant change in grade between the previously stated footage shall be shown on plans.
4. Existing parcels, tracts, and lot corner locations shown with front footage dimensions per plat when platted. If construction project is along back of lots, then show back lot dimensions.
5. Existing roadway edge of pavement or edge of dirt road.
6. Existing utilities as located in field (water, sewer, telephone, electric, cable TV, etc.) (NOTE: Sunshine One to be contacted by surveying firm prior to survey locate; with the intent of county excavation.)
7. Existing utilities as associated with number 5 above (example: valves, meters, manholes, etc.)
8. Existing curbs, driveway widths and types.
9. Existing drainage pipe crossings and driveway culverts (type, sizes and invert elevations.)
10. Existing swales and/or ditches and elevations every 100' at top and bottom if within area of construction.
11. Existing fences.
12. Existing trees and/or shrubbery.
13. All other non-movable items such as mailboxes, flag poles, etc.
14. All street names.
15. All commercial and single/multi family residence must have parcel I.D. indicated on the plan.

INDIAN RIVER COUNTY DEPARTMENT OF UTILITIES SERVICES		GENERAL INFORMATION REQUIREMENTS SEPTEMBER 2021	DRAWING NO. M-16 (A)

INFORMATION REQUIREMENTS
FOR ALL AS-BUILT RECORD DRAWINGS

In addition to the requirements specified in Drawings M-16 and M-16(A), the following shall be included on all As-Built Record Drawings before acceptance by the Indian River County Department of Utility Services.

1. All as-built drawings (24"x36") shall state in 1" lettering "AS-BUILT" located in the bottom right hand side of the drawing original and/or copies, along with the as-built date.
2. All utility as-built construction located within the rights-of-way, easements and alike shall be tied to the respective rights-of way, easements, etc., every 1,000 feet and change of direction.
3. All as-builts shall clearly depict as-built utility lines that were constructed along with their respective easement (if required). As-builts will not be accepted unless the verbiage "Proposed" and/or "To Be constructed" have been revised to read "AS-Built". As-built Construction drawings with, to be constructed terminology, will not be accepted.
4. All as-builts shall be certified by the project engineer or contracting surveyor.
5. All projects, which utilize lift stations, shall specify on plans as to whether or not subject lift stations are to remain private or are to be dedicated to the county.
6. All fire hydrants and valves shall be located with state plane coordinates, station number and off-set and shall be clearly identified on the as-built drawing.
7. All valves shall be clearly identfied by size, type, top elevation and direction/number of turns to open or close each valve.
8. Horizontal directional bores shall have a profile or cross section drawing and include the bore log.
9. The contractor is to provide the name of business or residence, street address and tax I.D. number for all properties adjacent to line extesions.
10. Shown with a thin dashed line, top elevations of As-Built utility lines and existing utility lines shall be shown for all utility crossings.
11. Baseline of construction and station of items to be on the centerline of the roadway.
12. As-Built utility lines shall be shown with a wider solid line.
13. Top of pipe elevations & stationing to be typed, listed, sealed & submitted for the engineer to locate the air release valves as construction proceeds.
14. All as-builts shall be complete and approved before commencement of field test.

INDIAN RIVER COUNTY DEPARTMENT OF UTILITIES SERVICES		AS-BUILT REQUIREMENTS SEPTEMBER 2021	DRAWING NO. M-16 (B)

ROUTE SURVEY REQUIREMENTS

1. All surveys that are required for engineering design use, and are located within a distance of one (1) mile from any Indian River County Global Positioning System (G.P.S.) control project monuments, shall be tied into the GPS monument from one (1) permanent reference point or the subdivision corner that is along the survey route and shall then be tied to the survey base line.
2. Existing right-of-way limits and/or easements within the limits of construction.
3. Survey baseline stationing every 100', control points set every 500', and at angle change of direction.
4. Show cross section spot elevations at grade every 100' for gravity sewer line construction and 100' for water line and force main construction. Elevations that reflect any significant change in grade between the previously stated footage shall be shown on plans.
5. Existing parcels, tracts, and lot corner locations shown with front footage dimensions per plat when platted. If construction project is along back of lots, then show back lot dimensions.
6. Existing roadway edge of pavement or edge of dirt road.
7. Existing utilities as located in field (water, sewer, telephone, electric, cable TV, street lights, etc.) (NOTE: Sunshine One to be contacted by surveying firm prior to survey locate; with the intent of county excavation.)
8. Existing utilities as associated with Note 6 above (example: valves, meters, manholes, etc.)
9. Existing curbs, sidewalks, driveway widths and types.
10. Existing drainage pipe crossings, catch basins, manholes, and driveway culverts (type, sizes and invert elevations.)
11. Existing swales and/or ditches. Take cross section spot elevations every 100' at top and bottom if within area of construction.
12. Existing fences.
13. Existing trees and/or shrubbery.
14. All other non-movable items such as mailboxes, flag poles, etc.
15. All street names. Street names shall appear on every printable sheet.
16. All commercial and single/multi family residence must have parcel I.D. and street address indicated on the plan.
17. All fire hydrants and fire hydrant valves shall be clearly identified.
18. All utility valves shall be clearly identified.
19. Route surveys performed for water assessment projects may require residential well locations.

INDIAN RIVER COUNTY DEPARTMENT OF UTILITY SERVICES		ROUTE SURVEY REQUIREMENTS MARCH 2018	DRAWING NO. M-17

GENERAL NOTES
(continued)

11. All As-Built Record Drawings shall clearly depict utility lines that were constructed along with their respective easement (if required). As-Built Record Drawings will not be accepted unless the verbiage "PROPOSED" and/or "TO BE CONSTRUCTED" have been deleted on the drawing. As-Built Record Drawings with "PROPOSED" or"TO BE CONSTRUCTED" terminology will not be accepted.
12. All new utility construction located within the rights-of-way, easements and alike shall be tied to the respective rights-of-way, easement, etc. every 1,000 feet and change of direction.
13. All As-Built Record Drawings shall be complete and approved before commencement of field test.
14. Baseline of construction and station of items to be located on the center of the roadway, unless conditions warrant and approved by IRCDUS. Baseline stationing shall be every 100', control points set at every 500' and at angle change of direction.
15. All new utility construction lines on all As-Built Record Drawings shall be shown with a wider, solid line. Existing utility lines shall be shown with a thinner, dashed line.
16. Top of pipe elevations & stationing to be typed, listed, sealed & submitted by the engineer for locating the air release valves as construction proceeds.
17. Show top elevation of the utility lines that were constructed and show existing utility lines for all utility crossings.
18. Pump station power supply from FP&L or COVB electric power pole or transformer to the pump station electric panel shall be included on the As-Built Record Drawing.
19. All fire hydrants and fire hydrant valves shall be located by state plane coordinates, station number and offset and shall be clearly identified on the As-Built Record Drawing.
20. All newly constructed valves shall be clearly identified by size, type, top elevation and direction/number of turns to open or close valve.

INDIAN RIVER COUNTY DEPARTMENTOF UTILITIES SERVICES		AS-BUILT RECORD DRAWING GENERAL NOTES (CONTINUED) MARCH 2018	DRAWING NO. M-16

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2023 KIMLEY-HORN AND ASSOCIATES, INC.
1920 WEKIVA WAY SUITE 200, WEST PALM BEACH, FL 33411
PHONE: 561-845-0665 FAX: 561-863-8175
WWW.KIMLEY-HORN.COM REGISTRY NO. 696

KHA PROJECT	044572075
DATE	MAY 2023
SCALE	AS SHOWN
DESIGNED BY	AGG
DRAWN BY	DC
CHECKED BY	NPOB

CENTRAL (GIFFORD) WWTF GENERATOR AND ATS REPLACEMENT
PREPARED FOR
INDIAN RIVER COUNTY
DEPARTMENT OF UTILITY SERVICES
INDIAN RIVER COUNTY FLORIDA

LICENSED PROFESSIONAL
NICHOLAS P.O. BLACK
FLORIDA LICENSE NUMBER
84908
DATE: ____

IRCDUS STANDARD CONSTRUCTION DETAILS

SHEET NUMBER
D-4
13 OF 26

GENERAL ELECTRICAL NOTES

1. READ THE SPECIFICATIONS
   REFER TO THE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. THERE ARE REQUIREMENTS NOTED IN THE SPECIFICATIONS WHICH ARE NOT INDICATED ON THE DRAWINGS.

2. SCHEMATIC NATURE
   PLAN VIEWS ARE SCHEMATIC IN NATURE AND MEANT TO SHOW THE SCHEMATIC ARRANGEMENT OF EQUIPMENT AND CONDUIT.

3. APPROVED SHOP DRAWINGS
   USE APPROVED SHOP DRAWINGS FOR LAY OUT OF EQUIPMENT. THE CONTRACT DOCUMENTS WILL VARY FROM THE SHOP DRAWINGS. INFORM THE ENGINEER IMMEDIATELY IF THERE ARE LAY OUT ISSUES OR INADEQUATE SPACE FOR EQUIPMENT OR CLEARANCES. LAND CONDUITS IN OPENINGS OF ENCLOSURES PER THE APPROVED SHOP DRAWINGS, DO NOT USE THE CONTRACT DRAWINGS.

4. CLEARANCES
   IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO MEET N.E.C. CLEARANCES ABOUT EQUIPMENT.

5. ROUTING
   CONDUIT ROUTING IS SCHEMATIC IN NATURE. CONDUIT ROUTING IS SHOWN FOR CLARITY ON THE CONTRACT DRAWINGS. ROUTE CONDUITS AS MAY BE REQUIRED.

6. FUTURES FACILITIES
   WHERE FUTURE FACILITIES ARE INDICATED. CONDUIT ROUTING SHALL ACCOUNT FOR SUCH FACILITIES.

7. RESPONSIBILITIES
   BIDDERS, SUPPLIERS, EQUIPMENT VENDORS, GENERAL CONTRACTOR, SUB CONTRACTORS AND OTHER SIMILAR ENTITIES ARE REQUIRED TO READ ALL THE CONTRACT DOCUMENTS INCLUDING DRAWINGS AND SPECIFICATIONS.

8. HOMERUNS
   CONTRACTOR SHALL COORDINATE HOME RUNS BETWEEN PLAN VIEWS. WHERE ANY CONDUIT IS SHOWN IN ANY PLAN VIEW IT SHALL BE INSTALLED THE ENTIRE LENGTH AS MAY BE REQUIRED.

9. EQUIPMENT DEMOLITION & INSTALLATION
   CONTRACTOR SHALL COORDINATE ALL DEMO WORK WITH PLANT PERSONNEL, SCHEDULE AND EQUIPMENT SHUTDOWNS AT LEAST TWO WEEKS IN ADVANCE OF WORK.

10. SCOPE OF WORK
    1. COORDINATE ALL POWER SHUTDOWNS AND CONNECTIONS OF POWER & CONTROL WIRES TO TEMPORARY AND NEW EQUIPMENT.
    2. PERFORM DEMOLITION OF EXISTING GENERATORS & ATS SWITCHES, SEPARATELY, AS INDICATED IN DRAWINGS AND SPECIFICATIONS.
    3. PROVIDE AND CONNECT TEMPORARY RENTAL GENERATOR & TEMPORARY RENTAL ATS, SEPARATELY, AS INDICATED IN DRAWINGS AND SPECIFICATIONS.
    4. PROVIDE AND INSTALL EMERGENCY FEEDER TO SOLIDS BLDG AS INDICATED IN DRAWINGS AND SPECIFICATIONS.
    5. PROVIDE CONFIGURATION AND TESTING OF NEW GENERATOR AND ATS EQUIPMENT. PROVIDE TRAINING OF COUNTY PERSONNEL WITH NEW GENERATOR & NEW ATS EQUIPMENT.

ELECTRICAL ABBREVIATIONS

37C	37 CONDUCTOR CABLE	OHC	OPEN–HOLD–CLOSE
ATB	ANALOG TERMINAL BOX	OHU	OVER HEAD ELEC UTILITIES
AXS	AUTO TRANSFORMER STARTER	OL	OVER LOAD RELAY
CR	CONTROL RELAY	PB	PUSH BUTTON
CP	CONTROL PANEL	PDP	POWER DIST. PANEL
CPB	CONTROL PULL BOX	PIT	PRESS INDICATING TRANSMITTER
CS	CONTROL STATION	PM	POWER MONITOR
CSD	CONTROL SYSTEM DESIGN INC.	PMB	PARK MAINTENANCE BLDG
CTB	CONTROL TERM. BOX	PNLBD	PANELBOARD
DISC	DISCONNECT SWITCH	PPB	POWER PULL BOX
DMM	DIGITAL MULTIMETER	PSA	PANEL SURGE ARRESTOR
DS	DOOR SWITCH	PSCP	PUMP STATION CONTROL PANEL
DTB	DISCRETE TERMINAL BOX	PTB	POWER TERMINAL BOX
EN	ETHERNET	R–I/O CBL	REMOTE I/O CABLE
ETM	ELAPSED TIME METER	R,G,A	RED, GREEN, AMBER PILOT LIGHT
F	FUSE	RGS	RIGID GALV. STEEL
FCP	FLYGT CONTROL PANEL	RO	READ OUT
FO	FIBER OPTIC	SA	SURGE ARRESTER
FO–E–CBL	FIBER OPTIC ETHERNET CABLE	SS	SELECTOR SWITCH OR 316 STAINLESS STEEL
FO6PMB	F/O WELL 6 TO PMB		
FSA	FIELD SURGE ARRESTOR	SWBD	SWITCH BOARD
GFI	GROUND FAULT INTERRUPTER	STB	SIGNAL TERMINAL BOX
HOA	HAND–OFF–AUTO	TC	TIME CLOCK
HOR	HAND–OFF–REMOTE	TFRO	TROPICAL FARMS REVERSE OSMOSIS
IPB	INST. PULL BOX	TOT	TOTALIZER
ITB	INST. TERMINAL BOX	TS	TEST SWITCH
LA	LIGHTNING ARRESTER	VCP	VENDOR CP
LIT	LEVEL INDICATING TRANSMITTER	VFD	VARIABLE FREQUENCY DRIVE
LOR	LOCAL–OFF–REMOTE	WP	WEATHER PROOF
M	MOTOR STARTER	WW	WIRE WAY
MB+	MODBUS PLUS	WWCP	WET WELL CONTROL PANEL
MCC	MOTOR CONTROL CENTER	ZSL	POSITION SWITCH CLOSED
MLO	MAIN LUG ONLY	ZSO	POSTION SWITCH OPEN
NF	NON FUSED		

ELECTRICAL LEGEND

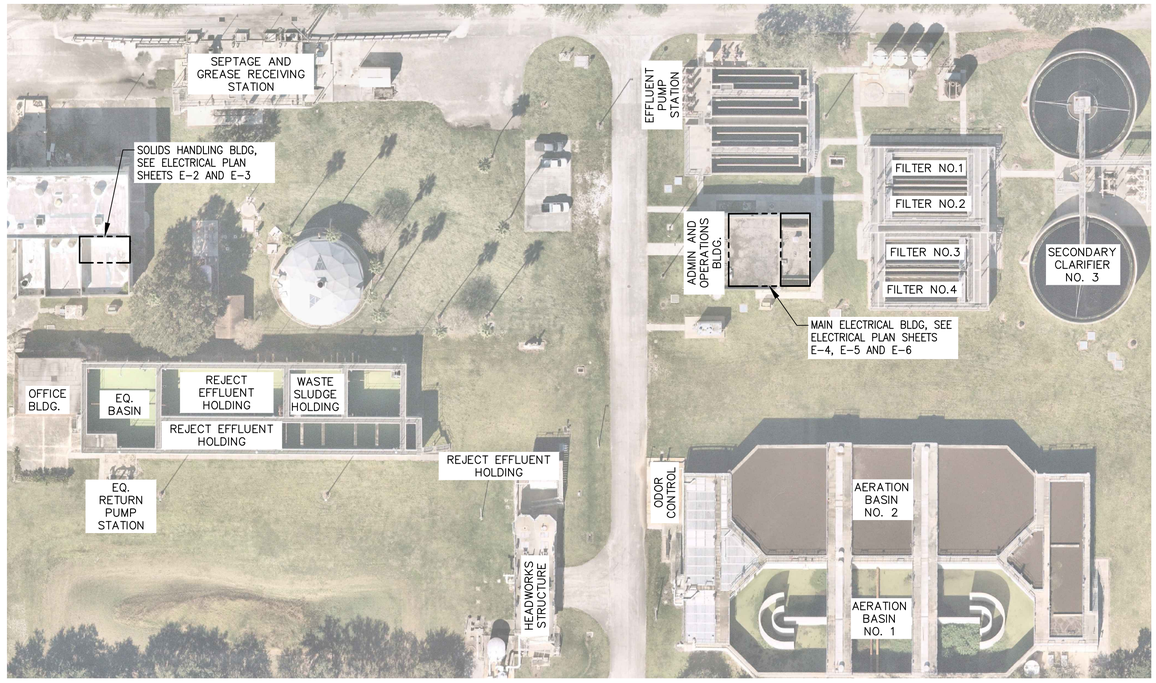
- RACEWAY EXPOSED
- LIGHTING RACEWAY CONCEALED
- RACEWAY CONCEALED
- RACEWAY TURNED UP/DOWN
- (5) MOTOR
- TRANSFORMER
- FUSE
- CIRCUIT BREAKER
- CAPACITOR
- LIGHTNING ARRESTER
- SAFETY DISCONNECT SWITCH, HP RATED
- GROUND
- DUPLEX, 14" AFF
- SIMPLEX, 14" AFF
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- LEVEL SWITCH, FLOAT SWITCH
- PRESSURE SWITCH
- LIMIT SWITCH
- THERMAL SWITCH
- HEATER
- (G) PILOT LIGHT
- C01 / C02 DENOTES SEPARATE CONDUITS WITH SEPARATE WIRE
- A–3 DENOTES PANELBOARD A, CIRCUIT 3
- ETM ELAPSED TIME METER
- SELECTOR SWITCH
- PUSH BUTTON ON–OFF SWITCH
- $ SWITCH 48"AFF,
- $3 SWITCH 48"AFF, 3–WAY
- ENCLOSED COMBINATION STARTER
- J JUNCTION BOX
- PANELBOARD, ELECTRICAL EQUIP. ENCL
- //// CROSS HATCH DENOTES DELETION
- MS MANUAL MOTOR STARTER
- RED, MAINTAINED PUSH BUTTON
- TIMING CONTACT
- FLOW SWITCH
- CONTROL RELAY, MOTOR STARTER, ETC.
- C01 DENOTES CONDUIT TAG 01

GENERAL NOTES

1. THE FOLLOWING SHALL ESTABLISH THE MINIMUM LEVEL OF QUALITY FOR MATERIALS.
2. THE FOLLOWING SHALL APPLY UNLESS OTHERWISE INDICATED BY DRAWINGS
3. THE FOLLOWING SHALL NOT APPLY TO POWER TRANSFORMERS, LIGHT FIXTURES AND LIGHT POLES, THOSE ELEMENTS ARE NOTED OR INDICATED ELSEWHERE

LEGEND

N/A	NOT APPLICABLE
316 SS	316 STAINLESS STEEL
EMT	ELECTRICAL METALLIC TUBING, GALV. STEEL
ALUMINUM	ALUMINUM RIGID CONDUIT 6063 ALLOY, NOT ALUMINUM EMT



AERIAL SITE PLAN

SCALE AS NOTED

NORTH

GRAPHIC SCALE IN FEET
0 25 50 100

MATERIAL SCHEDULE

LOCATION	CONDUIT	ENCLOSURE MATERIALS	ENCLOSURE NEMA RATING	FASTENERS, STRUT, THREADED ROD, ETC.	REMARKS
EXTERIOR					
BELOW GRADE	PVC SCHED. 80	CONCRETE BOXES	N/A	316 SS	
ABOVE GRADE	PVC COATED ALUMINUM	316 SS	4X	316 SS	INCLUDING FITTINGS
INTERIOR					
EXPOSED	ALUMINUM	ALUMINUM	12	316 SS	

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No.	REVISIONS	DATE	BY

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WWW.KIMLEY–HORN.COM REGISTRY NO. 696

KHA PROJECT	044572075
DATE	MAY 2023
SCALE	AS SHOWN
DESIGNED BY	JLR
DRAWN BY	YGC
CHECKED BY	MAG

CENTRAL (GIFFORD) WWTF
GENERATOR AND ATS REPLACEMENT
PREPARED FOR
INDIAN RIVER COUNTY
DEPARTMENT OF UTILITY SERVICES
INDIAN RIVER COUNTY FLORIDA

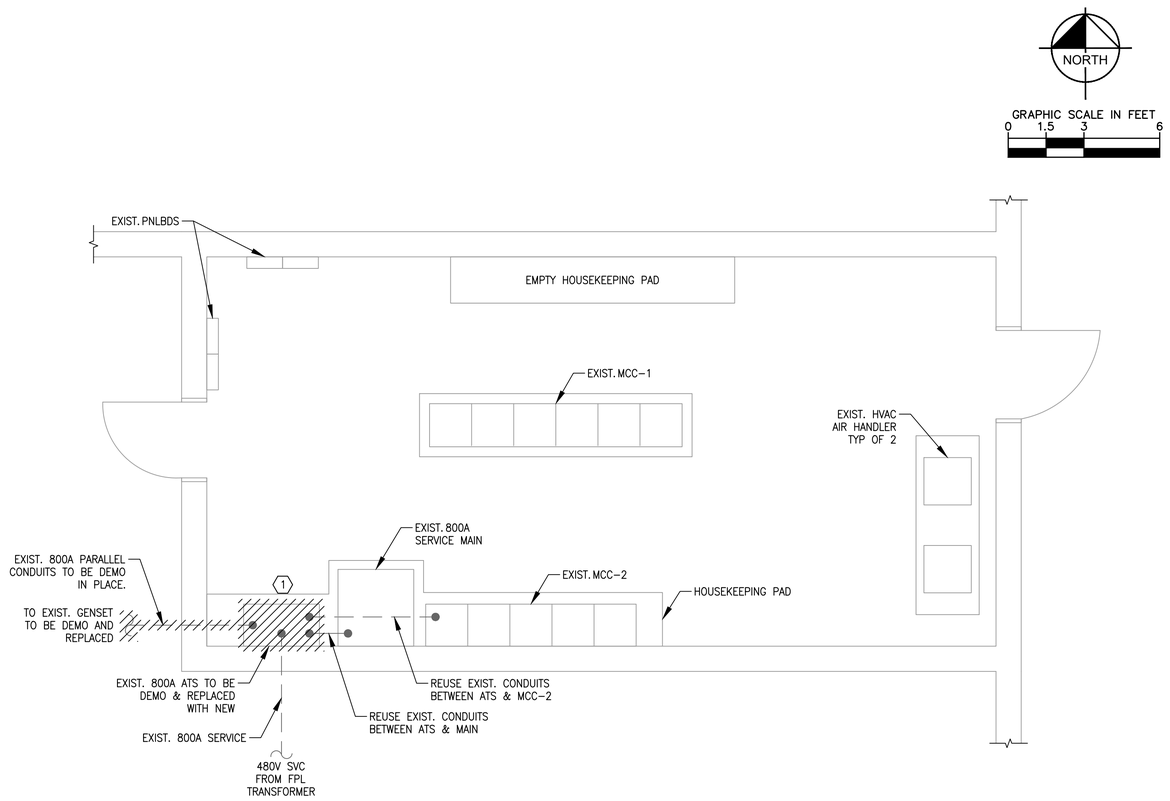
LICENSED PROFESSIONAL
MICHAEL A. GUIDA
FLORIDA LICENSE NUMBER
60755
DATE: ____

ELECTRICAL NOTES & LEGEND

SHEET NUMBER
E-1
14 OF 26

SOLIDS BUILDING GENERATOR DEMO PLAN

SCALE AS NOTED



SOLIDS BUILDING ELECTRICAL ROOM DEMO PLAN

SCALE AS NOTED

SPECIFIC ELECTRICAL NOTES

1. DEMO EXISTING 800A ATS SWITCH, REPLACE WITH NEW AND REUSE CONDUITS & WIRES FROM EXISTING MAIN & MCC.
2. REMOVE EXISTING WIRES FROM ATS TO GENERATOR; FIRE SEAL FORMER CONDUIT PENETRATIONS.
3. DEMO EXISTING DIESEL TANK AND RELATED EQUIPMENT. PROPERLY DISPOSE OF EXISTING DIESEL FUEL, COORDINATE WITH OWNER.
4. DEMO IN PLACE FORMER POWER AND CONTROL CONDUITS, REMOVE ALL FORMER WIRES.
5. DEMO EXISTING LOUVER & REPLACE WITH ROLL-UP DOOR, SEE OTHER DRAWINGS.

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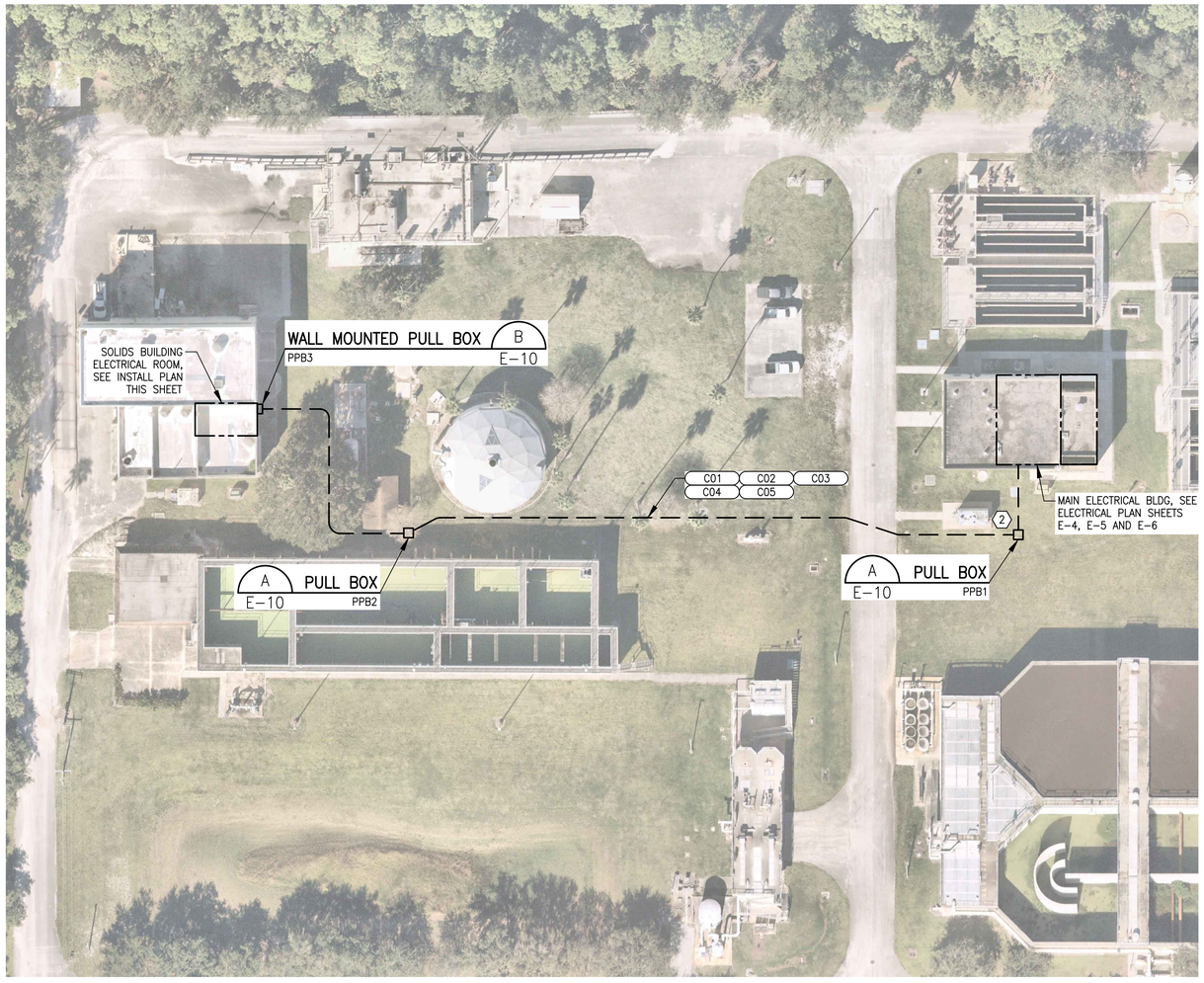
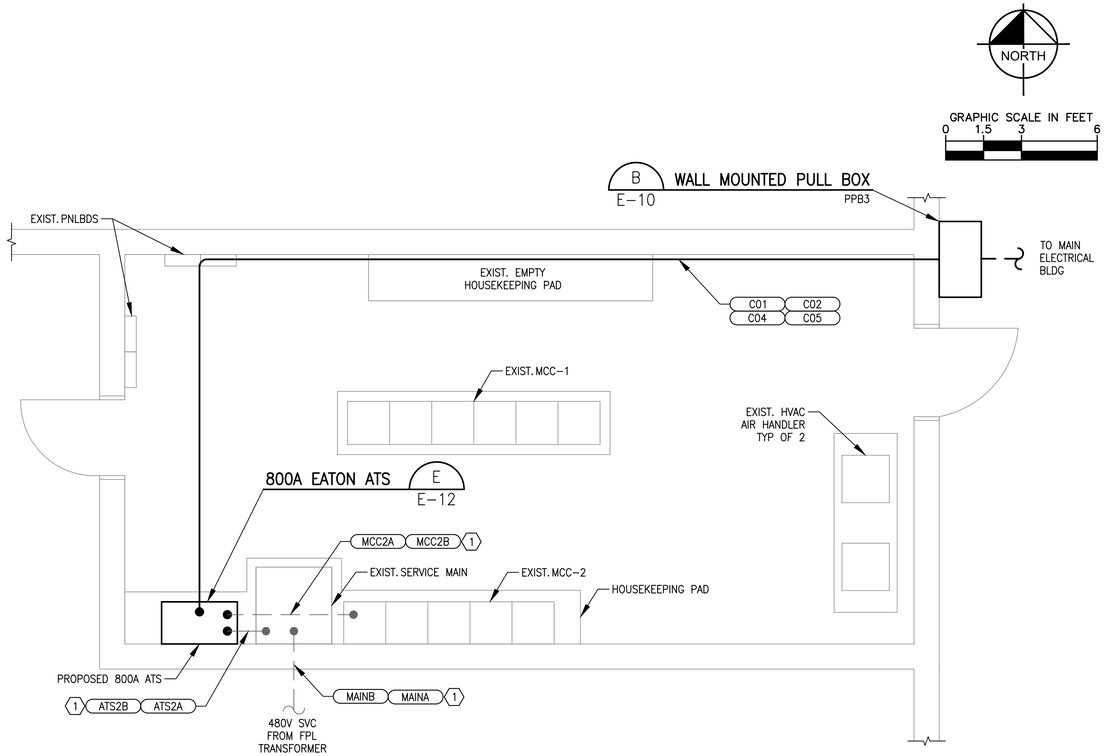
SOLIDS BLDG ELECTRICAL ROOM DEMO PLAN

SHEET NUMBER
E-2
15 OF 26



SOLIDS BUILDING EMERGENCY FEEDER INSTALL PLAN

SCALE AS NOTED



SOLIDS BUILDING ELECTRICAL ROOM INSTALL PLAN

SCALE AS NOTED

SPECIFIC ELECTRICAL NOTES

1. REUSE EXISTING POWER AND CONTROL WIRES IN EXISTING CONDUITS, EXTEND FORMER CIRCUITS AS REQUIRED. PROVIDE POLARIS TAPS OR COMPRESSION SPLICE TYPE TAPS TO EXTEND WIRES.
2. INSTALL NEW U.G. POWER FEEDER FROM WWTP ELECTRICAL BUILDING MCC-2 400A BRANCH BUCKET. LABEL THIS CIRCUIT AS EMERGENCY FEEDER TO SOLIDS BUILDING ATS SWITCH.

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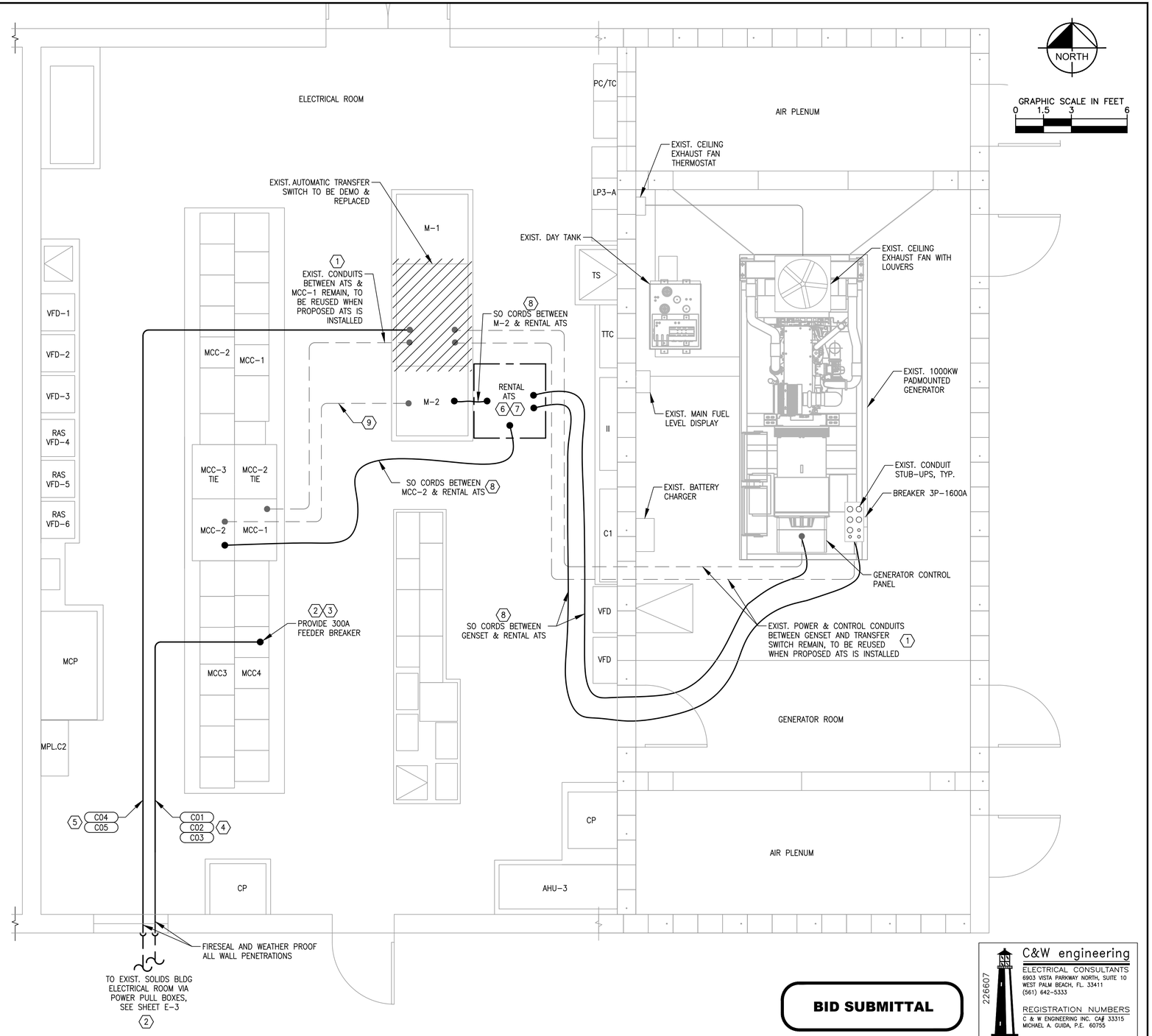
SOLIDS BLDG ELECTRICAL ROOM INSTALL PLAN

SHEET NUMBER
E-3
16 OF 26

SPECIFIC ELECTRICAL NOTES

1. AFTER ATS HAS BEEN REPLACED, REUSE EXISTING POWER AND CONTROL WIRES IN EXISTING CONDUITS, EXTEND FORMER CIRCUITS AS REQUIRED. PROVIDE POLARIS TAPS OR COMPRESSION SPLICE TYPE TAPS TO EXTEND WIRES.
2. INSTALL NEW U.G. POWER FEEDER FROM WWTP ELECTRICAL BUILDING MCC-4 400A BRANCH BUCKET. LABEL THIS CIRCUIT AS EMERGENCY FEEDER TO SOLIDS BUILDING ATS SWITCH.
3. PROVIDE A 3 POLE, 300A BREAKER (MATCH MODEL AND AIC RATING OF EXISTING BREAKERS AT MCC).
4. PROVIDE NEW CONDUITS W/400MCM WIRES, AND SPARE CONDUIT FROM MCC-4 TO LOCATION IN SOLIDS BUILDING ELECTRICAL ROOM AND 800A ATS SWITCH.
5. INCLUDE A 1" CONDUIT WITH 9#14 FROM GENERATOR CONTROL PANEL TO 800A ATS IN SOLIDS BLDG FOR GENERATOR CONTROL.
6. PROPOSED LOCATION OF 3P-1600A RENTAL ATS TO BE USED DURING DEMOLITION OF EXISTING ATS & INSTALLATION OF NEW.
7. CONTRACTOR SHALL PROVIDE RENTAL ATS SWITCH ALONG WITH TEMPORARY SO CORD WIRING, PREPARE AND CONNECT THE RENTAL ATS SWITCH AND TEMPORARY CONNECTIONS TO THE EXISTING 1000KW GENERATOR (THIS WILL REQUIRE A TEMPORARY DISCONNECT OF THE POWER AND CONTROL WIRES FROM THE EXISTING 2000A ATS SWITCH AND THE 1000KW GENERATOR).
8. PROVIDE ALL SO CORD CONNECTIONS BETWEEN TEMP RENTAL ATS AND M-2 MAIN IN ORDER TO ISOLATE AND BYPASS M-1 MAIN AND EXISTING PARALLEL WIRING CONNECTIONS TO THE 2000A ATS SWITCH AT MCC, ALSO SO CORD CONNECTIONS BETWEEN TEMP RENTAL ATS AND MCC-2; AND SO CORD POWER & CONTROL CONNECTIONS BETWEEN TEMP RENTAL ATS AND EXISTING GENERATOR.
9. TEMPORARILY DISCONNECT EXISTING FEEDERS BETWEEN M-2 MAIN AND MCC-2 MAIN LUGS DURING USE OF TEMPORARY ATS SWITCH, RECONNECT AFTER EXISTING 2000A ATS HAS BEEN REMOVED AND REPLACED.



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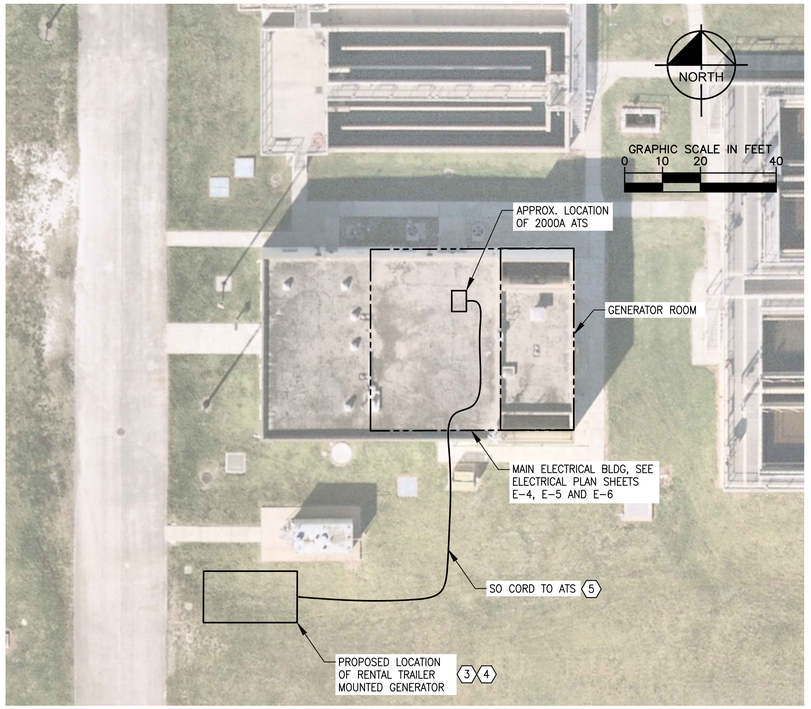
DATE: _____

MAIN ELECTRICAL BLDG ATS DEMO

SHEET NUMBER
E-4
17 OF 26

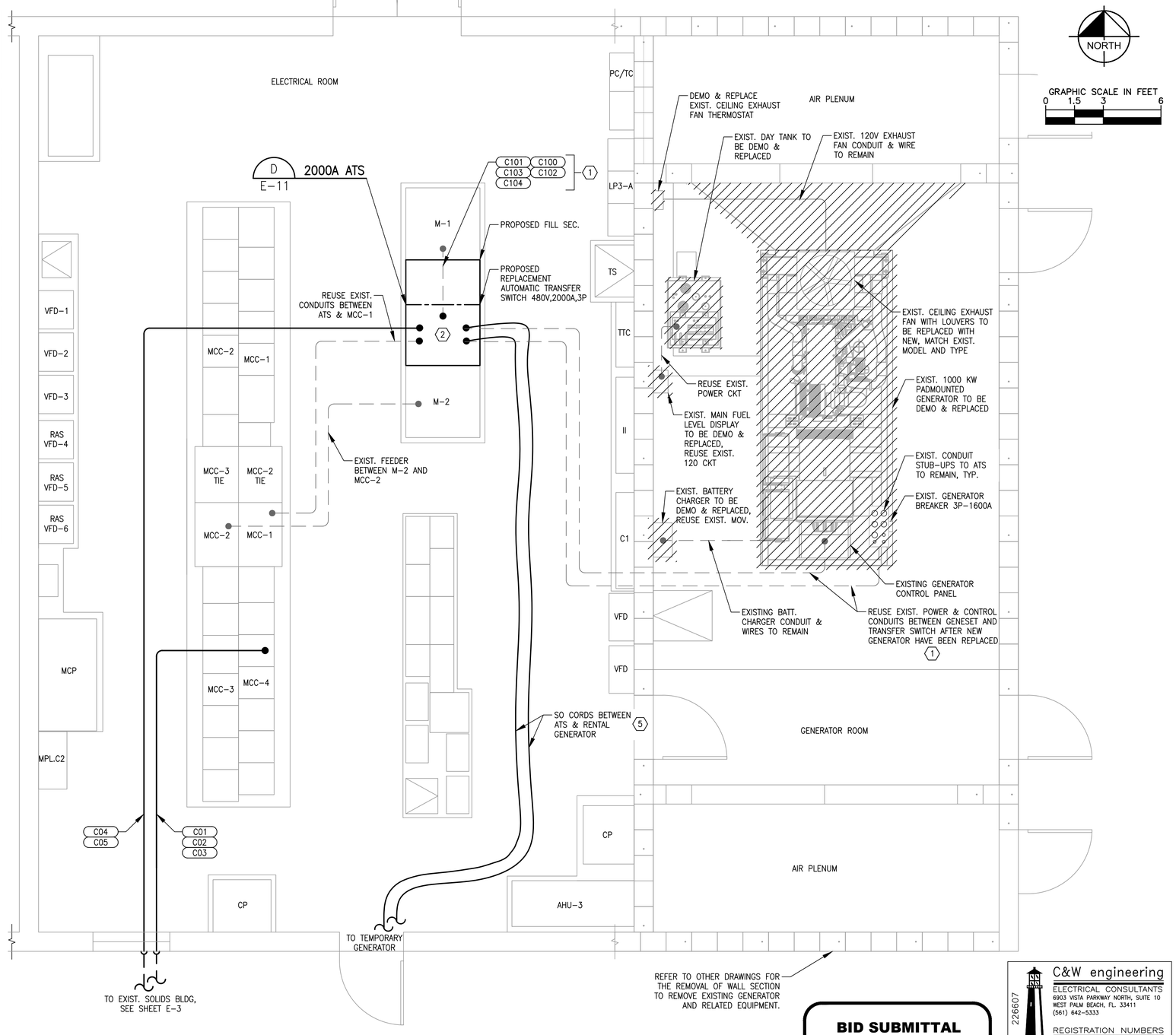


PROPOSED LOCATION OF TEMPORARY GENERATOR

SCALE AS NOTED

SPECIFIC ELECTRICAL NOTES

1. REUSE EXISTING POWER AND CONTROL WIRES IN EXISTING CONDUITS, EXTEND FORMER CIRCUITS AS REQUIRED. PROVIDE POLARIS TAPS OR COMPRESSION SPLICE TYPE TAPS TO EXTEND WIRES.
2. PROVIDE AND INSTALL NEW ATS SWITCH, TERMINATE ALL WIRING FOR POWER & CONTROL AS REQUIRED.
3. PROPOSED LOCATION OF 750KW 480V,3ø,4W WYE RENTAL TRAILER MOUNTED GENERATOR TO BE USED DURING DEMOLITION OF EXISTING GENERATOR & INSTALLATION OF NEW.
4. CONTRACTOR SHALL PROVIDE RENTAL 750KW GENERATOR ALONG WITH TEMPORARY SO PREPARE AND CONNECT THE RENTAL GENERATOR AND TEMPORARY CONNECTIONS TO THE EXISTING ATS (THIS WILL REQUIRE THE TEMPORARY DISCONNECT OF THE POWER AND CONTROL WIRES FROM THE 2000A ATS SWITCH AND THE EXISTING 1000KW GENERATOR.
5. PROVIDE ALL SO CORD CONNECTIONS BETWEEN TEMP RENTAL GENERATOR AND ATS.



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LICENSED PROFESSIONAL
MICHAEL A. GUIDA
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DATE: ____

MAIN ELECTRICAL BLDG GENERATOR DEMO

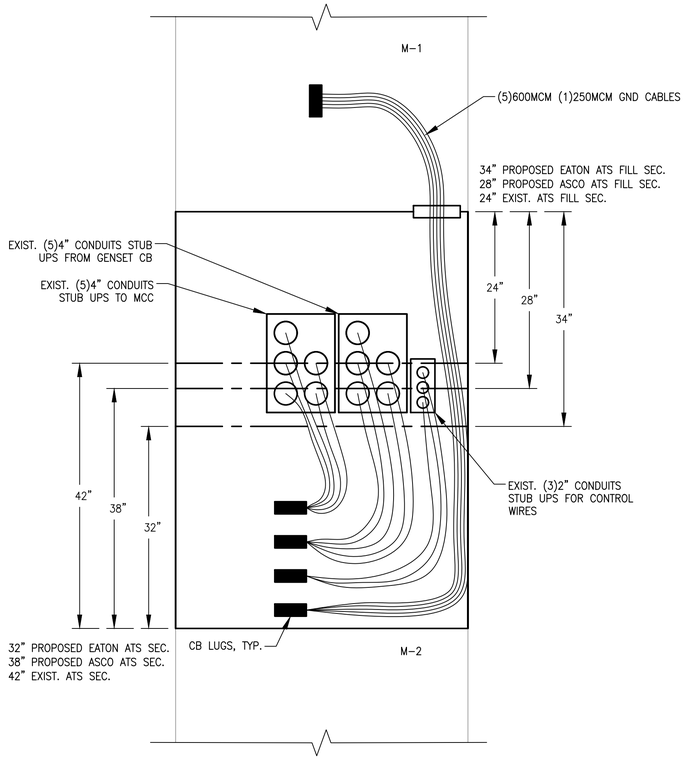
SHEET NUMBER
E-5
18 OF 26

SPECIFIC ELECTRICAL NOTES

1. REUSE EXISTING POWER AND CONTROL WIRES IN EXISTING CONDUITS, EXTEND FORMER CIRCUITS AS REQUIRED. PROVIDE POLARIS TAPS OR COMPRESSION SPLICE TYPE TAPS TO EXTEND WIRES.
2. PROVIDE DIGITAL DISPLAY OF FUEL LEVEL SIMILAR TO EXISTING FUEL LEVEL UNIT.
3. CONTRACTOR SHALL EXTEND EXISTING 208V CIRCUIT FOR GENERATOR JACKET WATER HEATERS.
4. TAGS REPRESENT POWER ONLY, NO CONDUITS.
5. CONTRACTOR SHALL PROVIDE ALL MOUNTING HARDWARE AND EXHAUST PIPE EXTENSIONS AS REQUIRED TO INSTALL A FULLY FUNCTIONING SILENCER AS INDICATED ON DRAWINGS AND SPECS.

ADD ALTERNATIVE BID ITEM

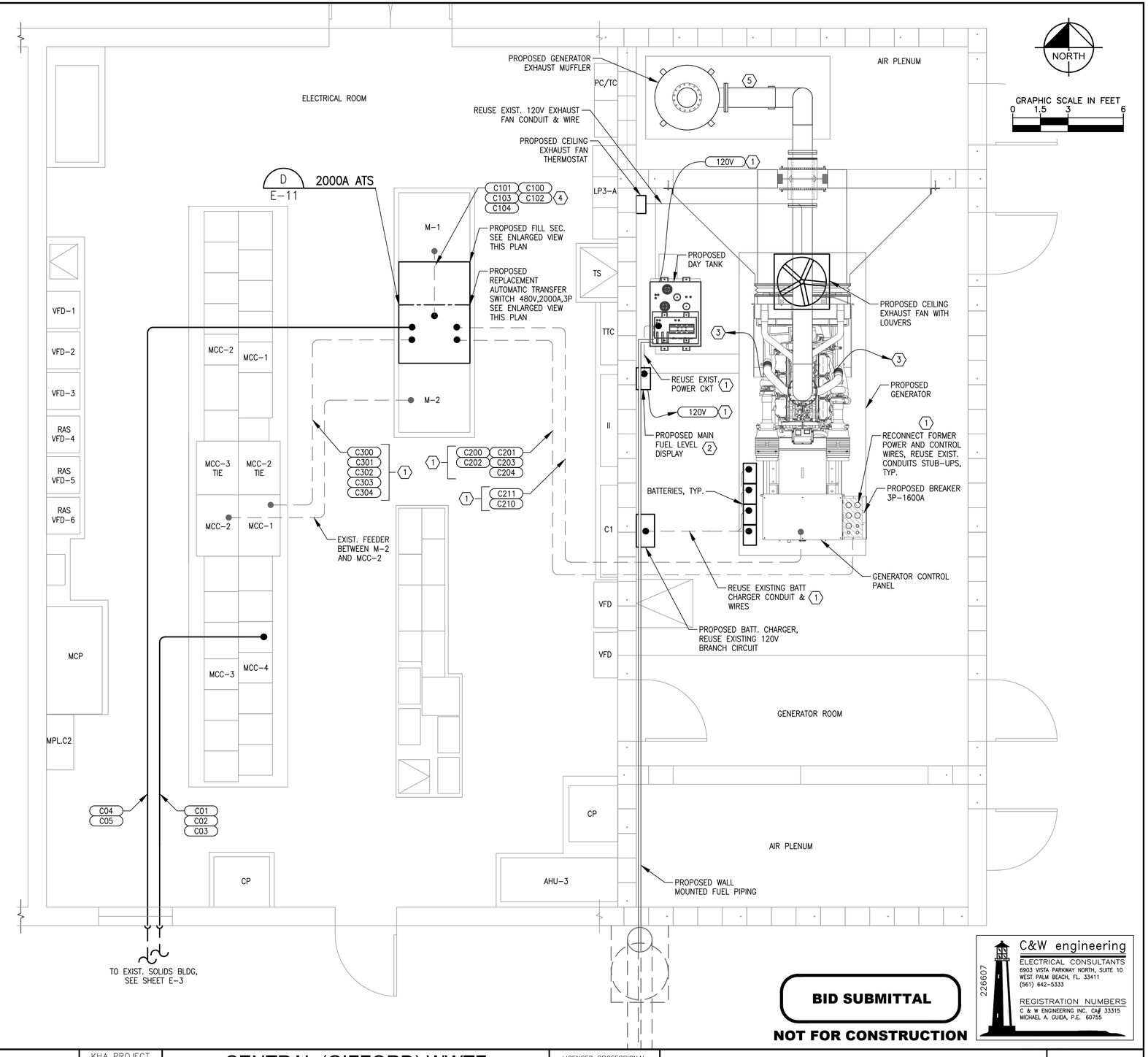
1. CONTRACTOR SHALL PROVIDE AS AN ADD ALTERNATE BID ITEM PER FOOT COST TO REPLACE ANY OF THE POWER OR CONTROL WIRES.



NOTE: ABOVE LOCATIONS OF CONDUIT STUBUPS AND ATS TERMINAL LUGS ARE APPROXIMATE

ENLARGED VIEW OF PROPOSED ATS

NTS



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INDIAN RIVER COUNTY FLORIDA

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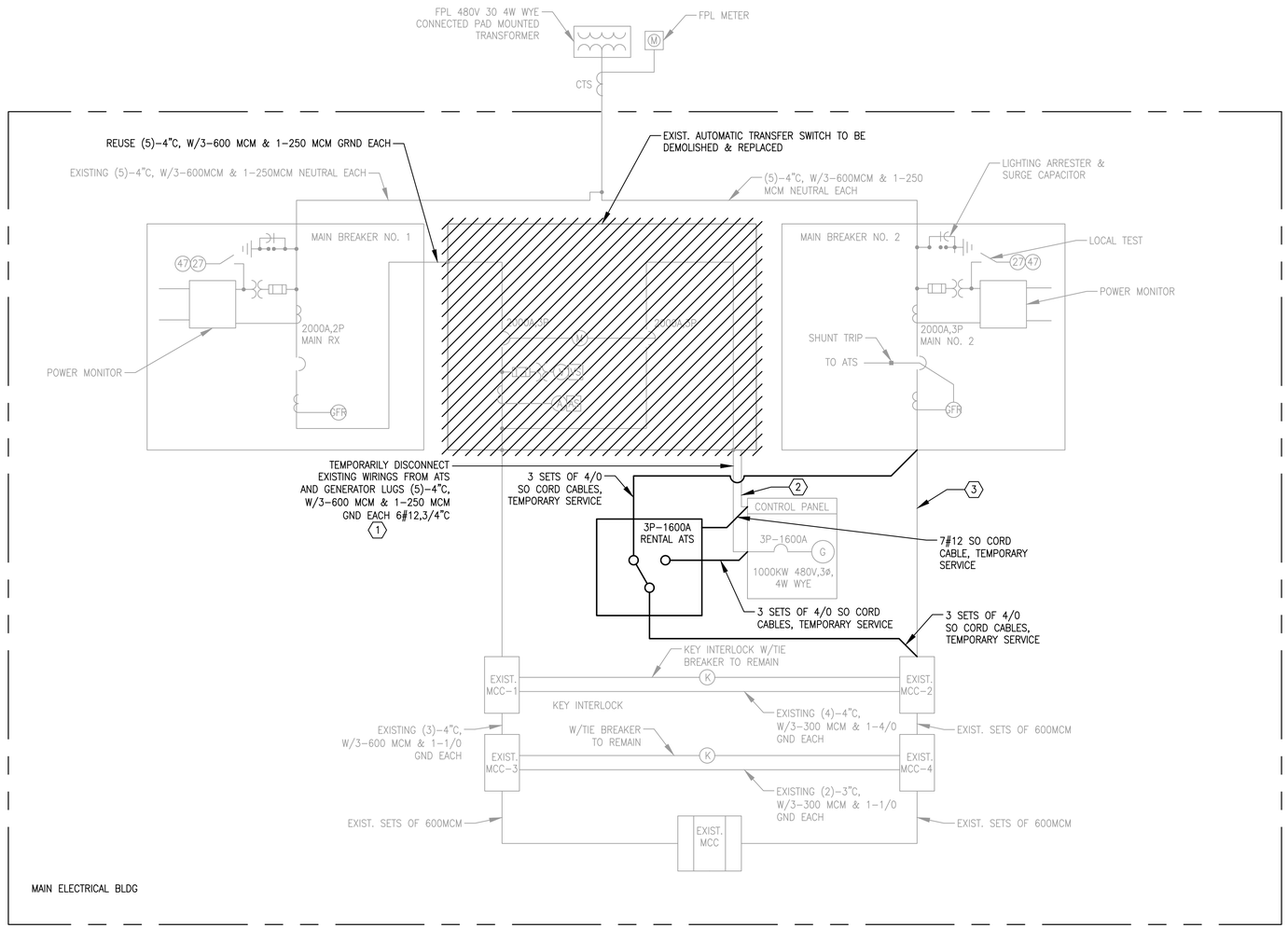
DATE: _____

MAIN ELECTRICAL BLDG ELECTRICAL INSTALL PLAN

SHEET NUMBER
E-6
19 OF 26



SPECIFIC ELECTRICAL NOTES

1. CONTRACTOR SHALL ATTEMPT TO REUSE EXIST. PARALLEL POWER WIRES AFTER MEGGER TESTING. IN THE EVENT MEGGER TEST FAILS OR EXISTING SET OF WIRES CANNOT BE REUSED, CONTRACTOR IS TO PROVIDE, ALONG WITH BID, ADD ALTERNATE BIDS TO REPLACE 5 SETS OF 600 MCM, 1-250MCM GND BETWEEN EACH.
2. TEMPORARILY DISCONNECT CONTROL WIRING FROM ATS BEING REMOVED.
3. DISCONNECT WIRES FROM EXIST. M-2 AND USE SO CORD TO CONNECT TO RENTAL ATS, WIRES TO BE RECONNECTED AT END OF 2000A ATS REPLACEMENT.

BID SUBMITTAL

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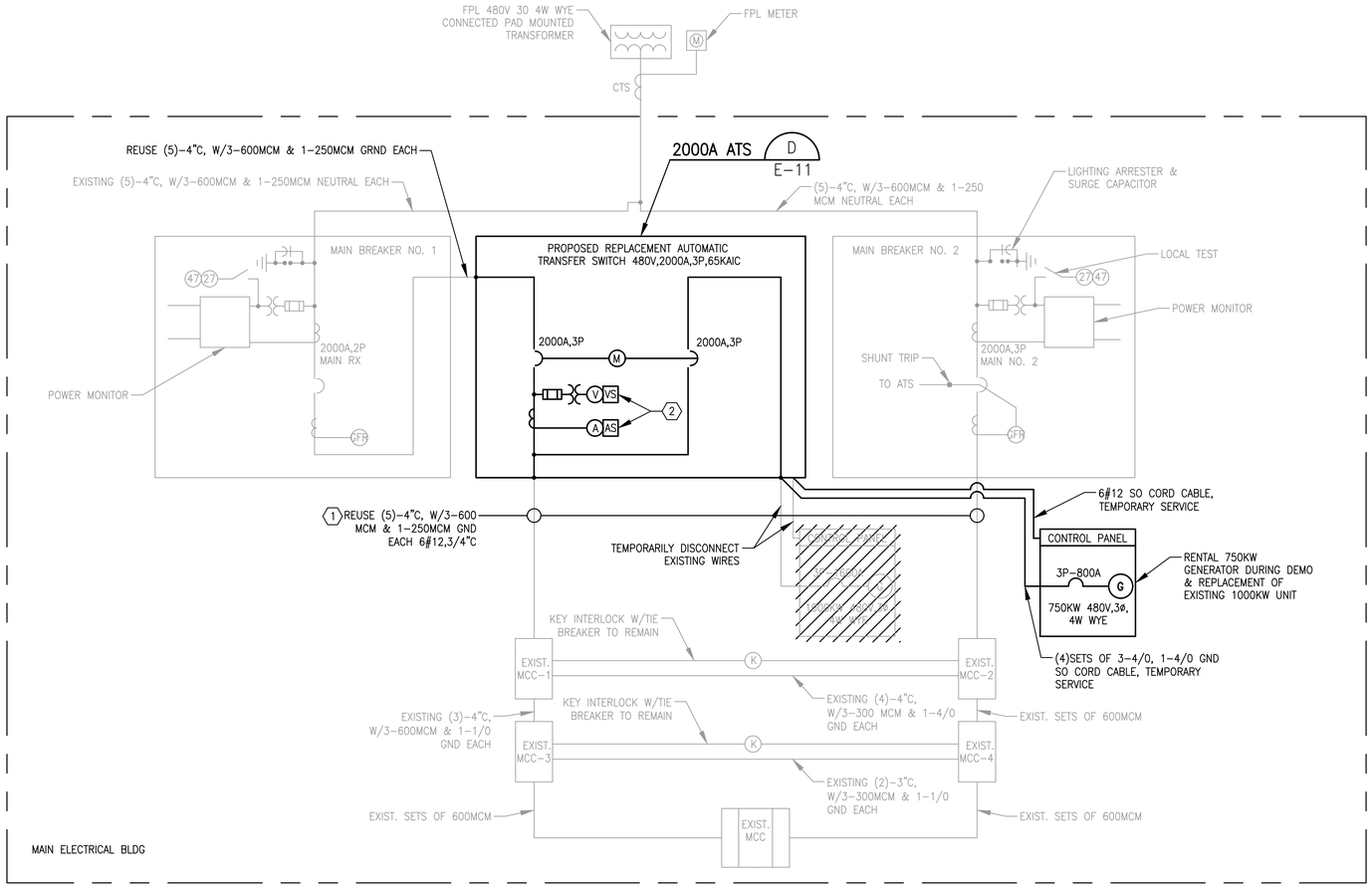
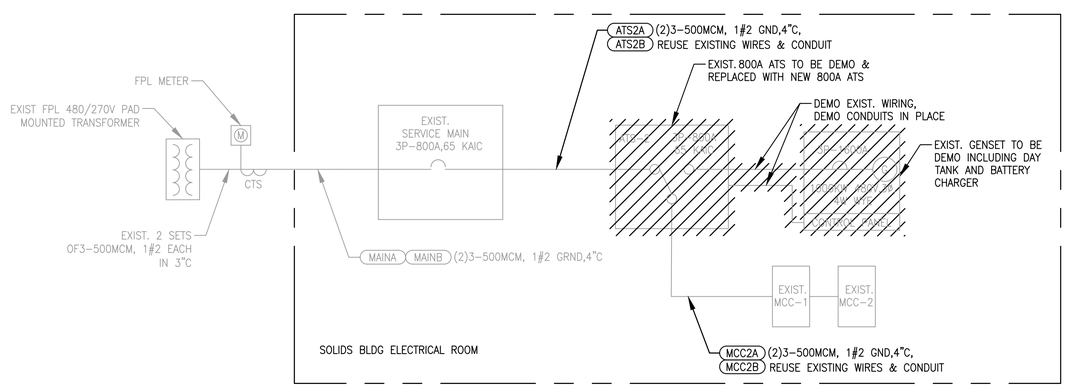
ELECTRICAL DEMO ATS ONELINE DIAGRAM

SHEET NUMBER
E-7
20 OF 26





SPECIFIC ELECTRICAL NOTES

1. CONTRACTOR SHALL ATTEMPT TO REUSE EXIST. PARALLEL POWER WIRES AFTER MEGGER TESTING. IN THE EVENT MEGGER TEST FAILS OR EXISTING SET OF WIRES CANNOT BE REUSED, CONTRACTOR IS TO PROVIDE, ALONG WITH BID, ADD ALTERNATE BIDS TO REPLACE FORMER SETS OF 600MCM, 1-250MCM GND BASED OF TOTAL LINEAR FOOT REPLACEMENT.
2. PROVIDE DIGITAL POWER METERING PER SPECIFICATIONS AT CENTER POLE (LOAD) SIDE.

BID SUBMITTAL

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6903 VISTA PARKWAY NORTH, SUITE 10
WEST PALM BEACH, FL. 33411
(561) 642-5333
REGISTRATION NUMBERS
C & W ENGINEERING INC. CA# 33315
MICHAEL A. GUIDA, P.E. 60755

No.	REVISIONS	DATE	BY

Kimley»Horn

1920 WEKIVA WAY SUITE 200, WEST PALM BEACH, FL 33411
PHONE: 561-845-0665 FAX: 561-863-8175
WWW.KIMLEY-HORN.COM REGISTRY NO. 696

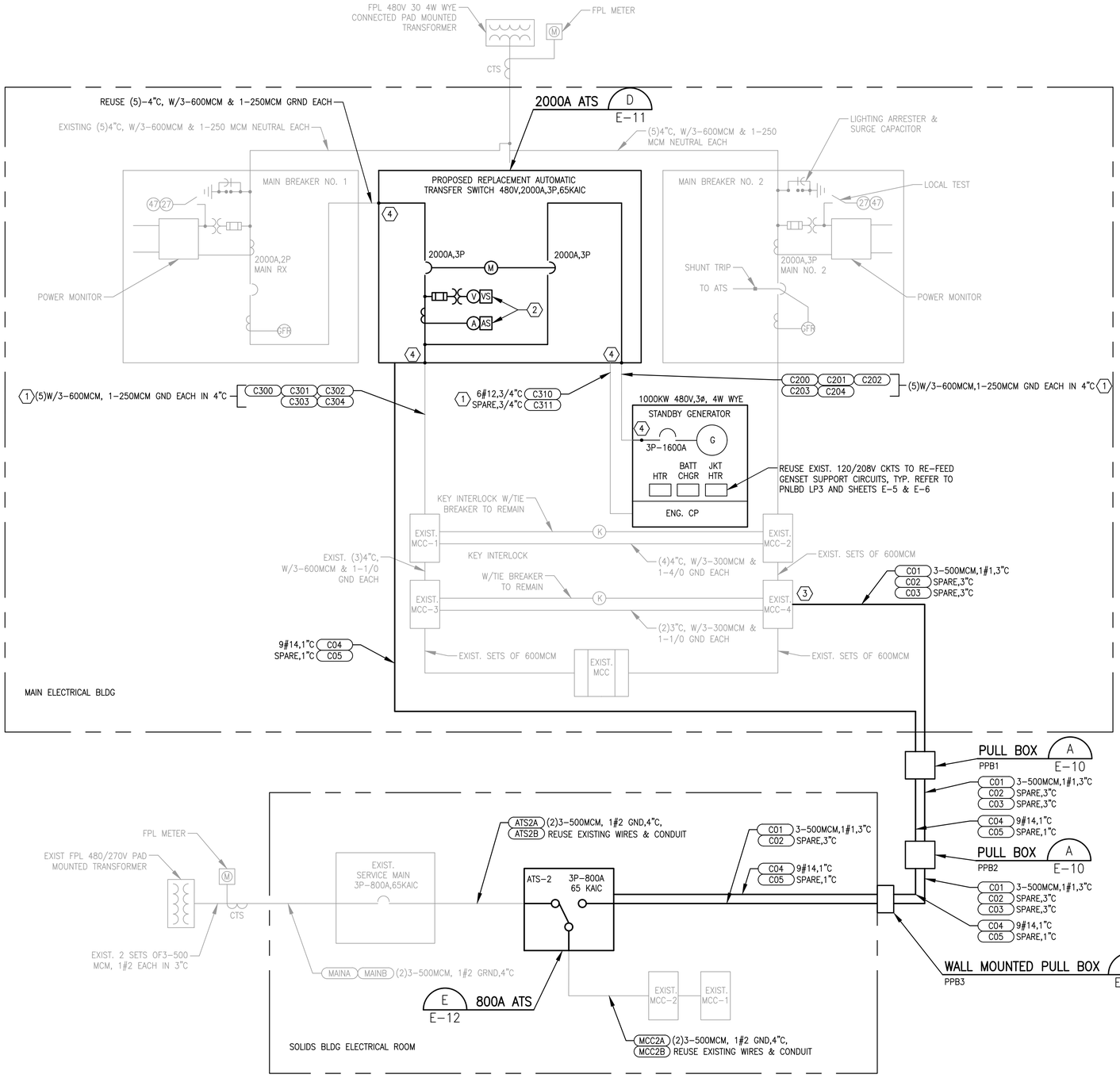
KHA PROJECT	044572075
DATE	MAY 2023
SCALE	AS SHOWN
DESIGNED BY	JLR
DRAWN BY	YGC
CHECKED BY	MAG

CENTRAL (GIFFORD) WWTF
GENERATOR AND ATS REPLACEMENT
PREPARED FOR
INDIAN RIVER COUNTY
DEPARTMENT OF UTILITY SERVICES
INDIAN RIVER COUNTY FLORIDA

LICENSED PROFESSIONAL
MICHAEL A. GUIDA
FLORIDA LICENSE NUMBER
60755
DATE: _____

ELECTRICAL DEMO GENERATOR ONELINE DIAGRAM

SHEET NUMBER
E-8
21 OF 26



LOADS BASED OF POWER CO. 12 MONTH LOAD HISTORY:

-THE SOLIDS BUILDING 12 MONTH PEAK KW DEMAND LOAD OF 65KWD=92.1A PEAK AMPS. THIS LOAD IS BEING ADDED TO EXISTING MCC TO PROVIDE EMERGENCY POWER TO THE SOLIDS BUILDING.

-PEAK 12 MONTH HISTORY ON PLANT LOAD (DOES NOT INCLUDE SOLIDS BUILDING) IS 406KWD=575A.

-TOTAL COMBINED LOAD IS 667.1A.

SPECIFIC ELECTRICAL NOTES

1. CONTRACTOR SHALL REUSE EXIST. PARALLEL POWER WIRES AFTER MEGGER TESTING. IN THE EVENT MEGGER TEST FAILS OR EXISTING SET OF WIRES CANNOT BE REUSED, CONTRACTOR IS TO PROVIDE, ALONG WITH BID, ADD ALTERNATE BIDS TO REPLACE PER FOOT COST OF 600MCM, 1-250MCM GND.
2. PROVIDE A SMART METER W/ETHERNET COMM TO PLC TO PROVIDE V, A, KW, KVA, P.F., AND POWER QUALITY READINGS.
3. PROVIDE A 3P-300A CB, MATCH AIC RATING AND MODEL OF EXIST. MCC BREAKERS.
4. REUSE EXISTING PARALLEL WIRES AND CONDUIT, TORQUE LUGS TO WIRE SIZE REQUIREMENTS.

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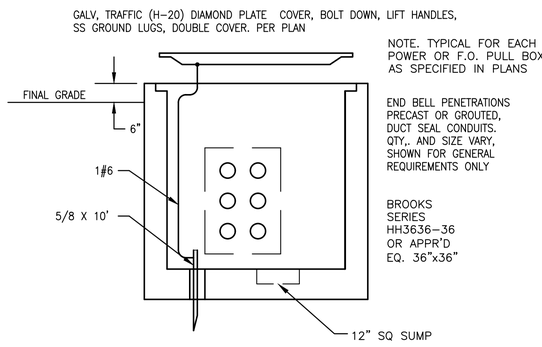
FLORIDA LICENSE NUMBER 60755
DATE: _____

ELECTRICAL INSTALL ONELINE DIAGRAM

SHEET NUMBER
E-9
22 OF 26



PULL BOX

NTS

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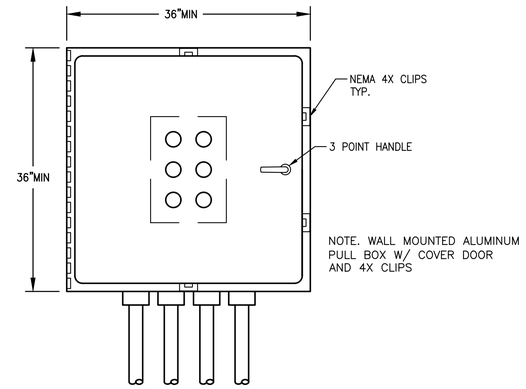

WALL MOUNTED PULL BOX

NTS

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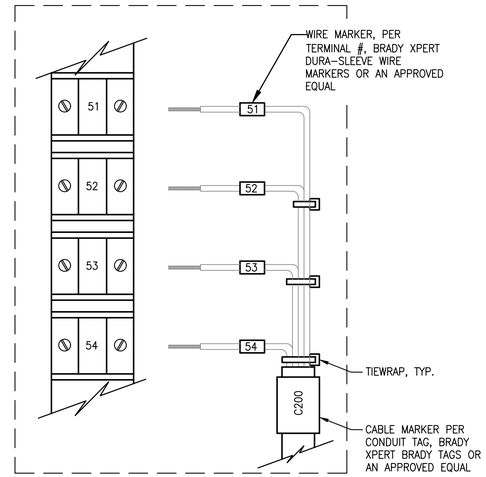
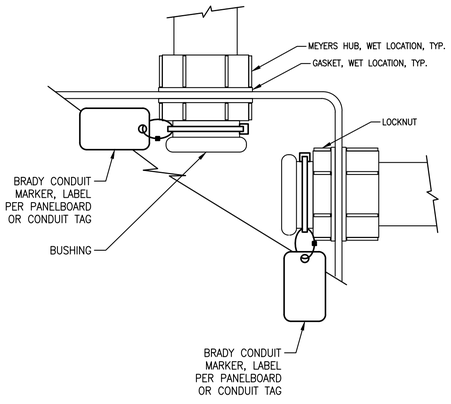


TERMINATION EXAMPLE DETAIL

NTS



CONDUIT TERMINATION DETAIL

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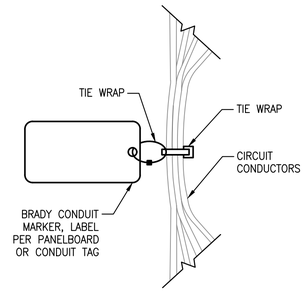
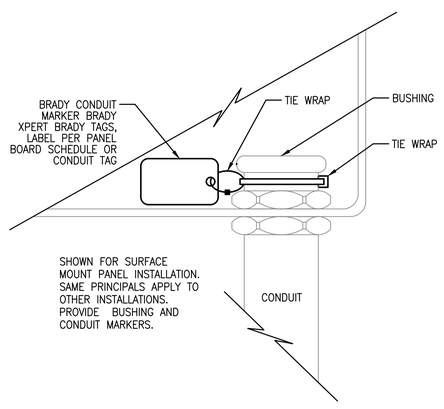


CIRCUIT MARKER DETAIL

NTS



CONDUIT DETAIL

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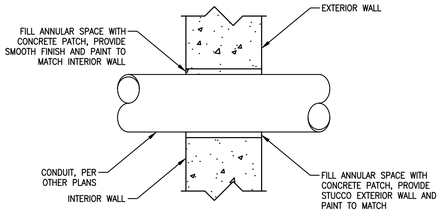

WALL CONDUIT PENETRATION DETAIL

NTS

C

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C&W engineering
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6903 VISTA PARKWAY NORTH, SUITE 10
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(561) 642-5333
REGISTRATION NUMBERS
C & W ENGINEERING INC. CA# 33315
MICHAEL A. GUIDA, P.E. 60755

No.	REVISIONS	DATE	BY

Kimley»Horn
© 2023 KIMLEY-HORN AND ASSOCIATES, INC.
1920 WEKIVA WAY SUITE 200, WEST PALM BEACH, FL 33411
PHONE: 561-845-0665 FAX: 561-863-8175
WWW.KIMLEY-HORN.COM REGISTRY NO. 696

KHA PROJECT	044572075
DATE	MAY 2023
SCALE	AS SHOWN
DESIGNED BY	JLR
DRAWN BY	YGC
CHECKED BY	MAG

CENTRAL (GIFFORD) WWTF
GENERATOR AND ATS REPLACEMENT
PREPARED FOR
INDIAN RIVER COUNTY
DEPARTMENT OF UTILITY SERVICES
INDIAN RIVER COUNTY FLORIDA

LICENSED PROFESSIONAL
MICHAEL A. GUIDA
FLORIDA LICENSE NUMBER
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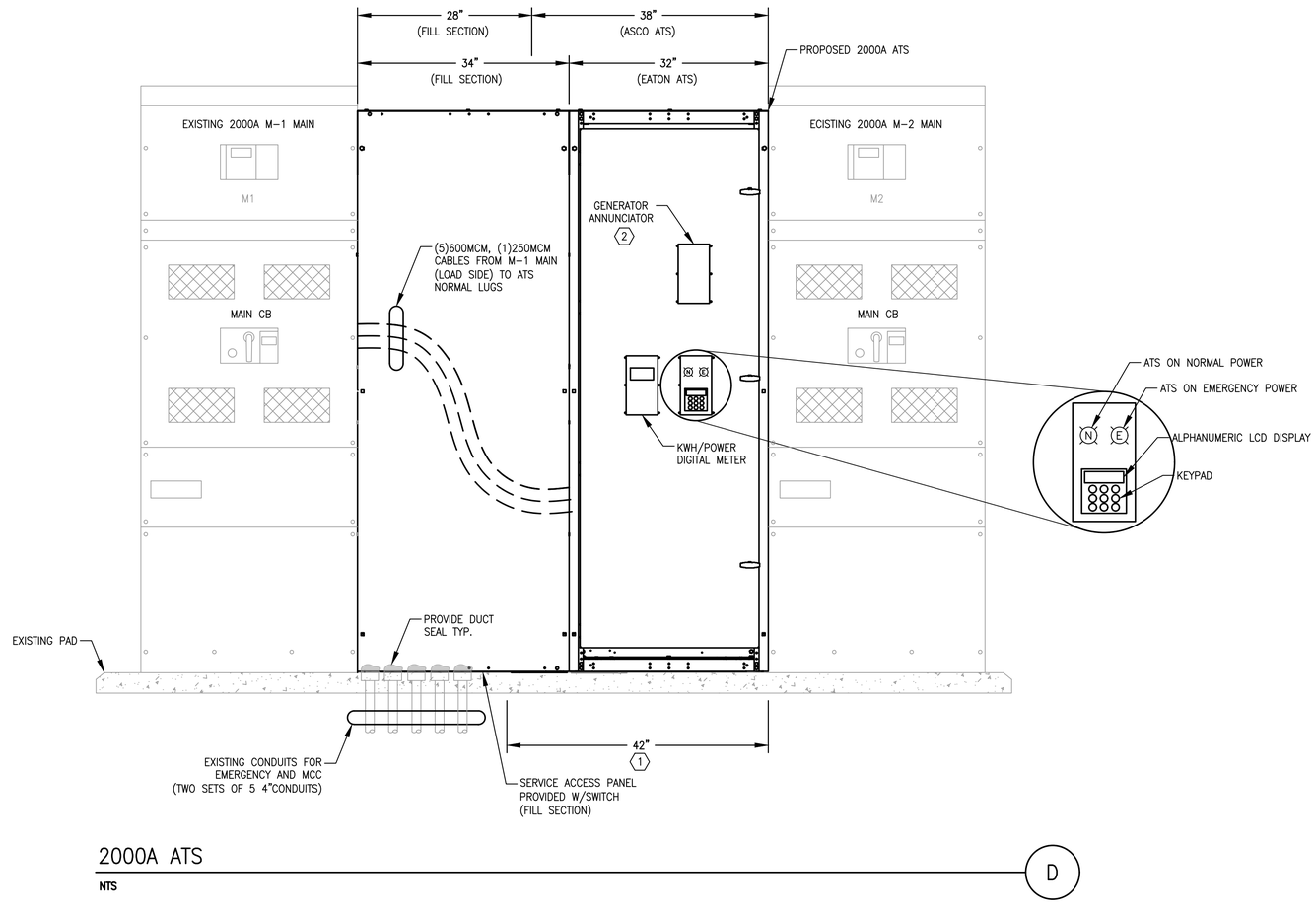
DATE: _____

ELECTRICAL DETAILS

SHEET NUMBER
E-10
23 OF 26



2000A ATS

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D

SPECIFIC ELECTRICAL NOTES

1. FORMER SIZE OF ATS SWITCH SECTION ALL FEED AT BOTTOM 42" ORIGINAL AREA.
2. CONTRACTOR SHALL INSTALL ANNUNCIATOR COMM. CABLE FROM GENERATOR CONTROL PANEL TO 2000A ATS SWITCH, USE EXIST. CONDUIT WITH #14 SIGNAL WIRES.

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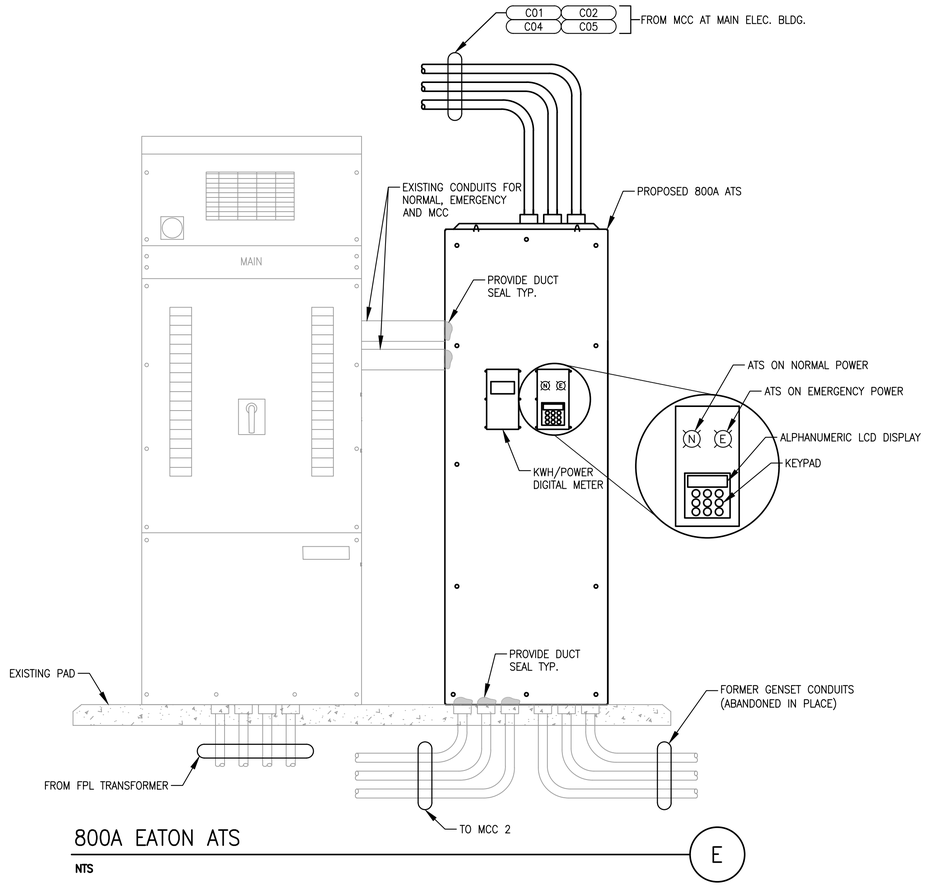
2000A ATS ELEVATION

SHEET NUMBER
E-11
24 OF 26



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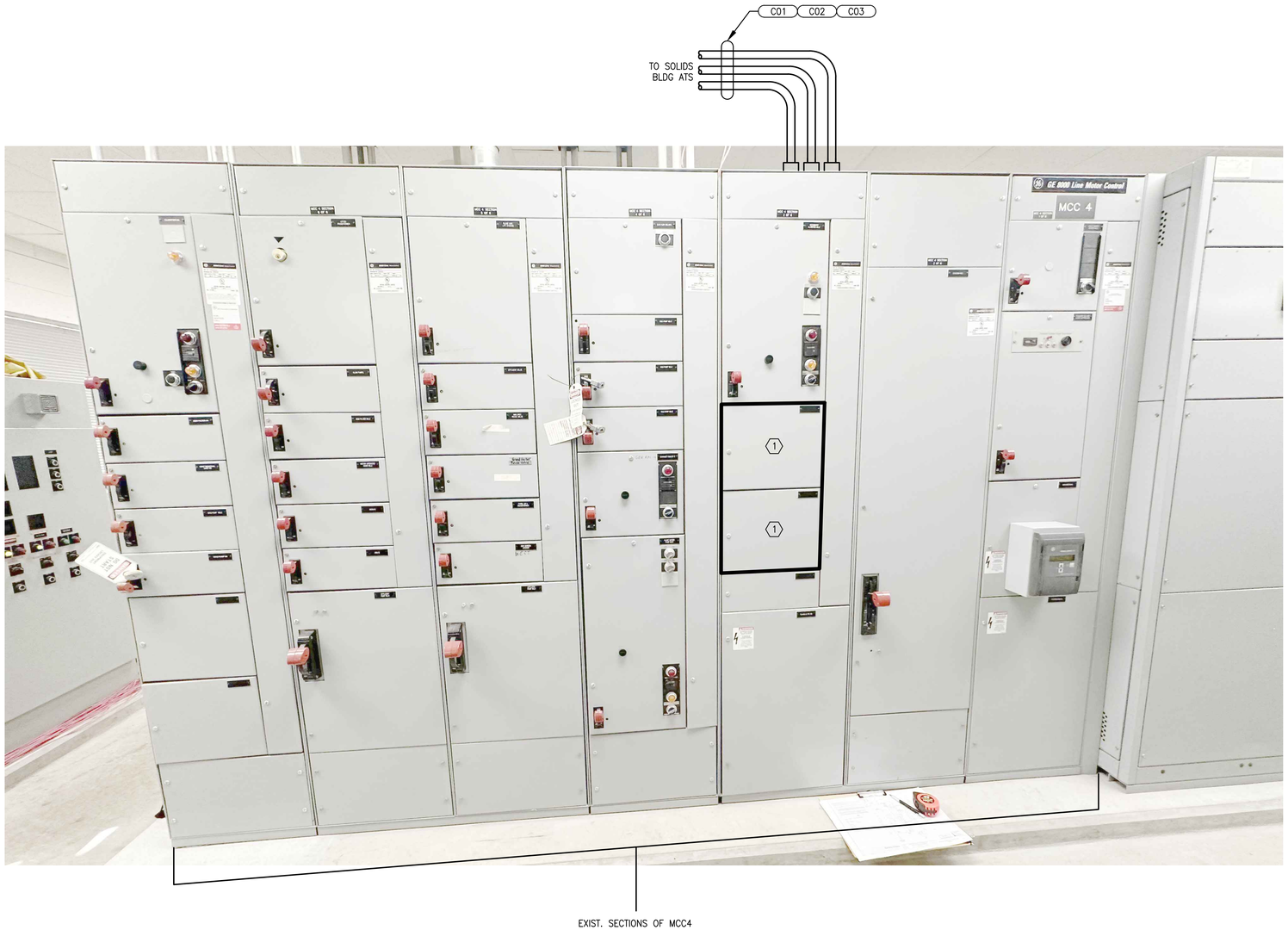
800A ATS ELEVATION

SHEET NUMBER

E-12

25 OF 26



SPECIFIC ELECTRICAL NOTES

(1) CONTRACTOR SHALL USE SPARE BUCKET OF MCC4 TO ADD A 3P-300A FEEDER BREAKER, MATCH MODEL AND AIC RATING TO EXIST. BREAKERS. PROVIDE ALL LABOR AND MATERIALS AS REQUIRED.

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DATE: _____

MCC4 MODIFICATIONS PICTURE

SHEET NUMBER
E-13
26 OF 26