

# 66th Avenue Phase 1A

Indian River County

100% Irrigation Plans - December 2017

Station 295+00 to 354+00

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17 of 19_____	ROADWAY IRRIGATION DETAIL & NOTES
18 thru 19 of 19_____	ROADWAY IRRIGATION NOTES

## DEVELOPMENT TEAM

### Client

Indian River County  
1840 25th Street  
Vero Beach, FL 32960  
Project Engineer:  
Richard B Szpyrka, P.E.

### Civil Engineer

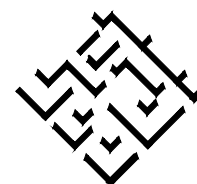
Arcadis  
Hank Deibel, P.E.  
2018 Vista Parkway  
West Palm Beach, FL 33411  
P: 561.697.7000

### Landscape Architect

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P: 772.467.1301

### Irrigation Consultant

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Okeechobee, FL 34951  
P: 866.928-1533



***Lucido & Associates***

***Land Planning/Landscape Architecture***

***Lic. #LC-0000335***

***100 Avenue A, Suite 2A, Ft. Pierce, FL 34950 772-467-1301, Fax 772-467-1303***



## IRRIGATION HEAD LEGEND

CONTROL NOTES:

1. CONTRACTOR TO PROGRAM THE CONTROLLER(S) TO RUN BUBBLER AND SHRUB ZONES TWO AT A TIME (BUBBLER WITH BUBBLER AND SHRUB WITH SHRUB) TO MAINTAIN FLOW ABOVE THE PUMP'S MINIMUM 5 GPM FLOW AND BELOW 65 GPM.

Key / Location:

Project Team:  
**Client**  
Indian River County  
1940 25th Street  
Vero Beach, FL 32960  
Project Engineer:  
Etienne B. Bourgeois, P.E.  
**Civil Engineer**  
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**66th Avenue**  
Phase 1A  
Indian River County  
**Roadway Irrigation**  
**Plan**

Date	By	Description
9/9/16	JJ	North Extension Irrigation
12/11/2017	JJ	100% CD

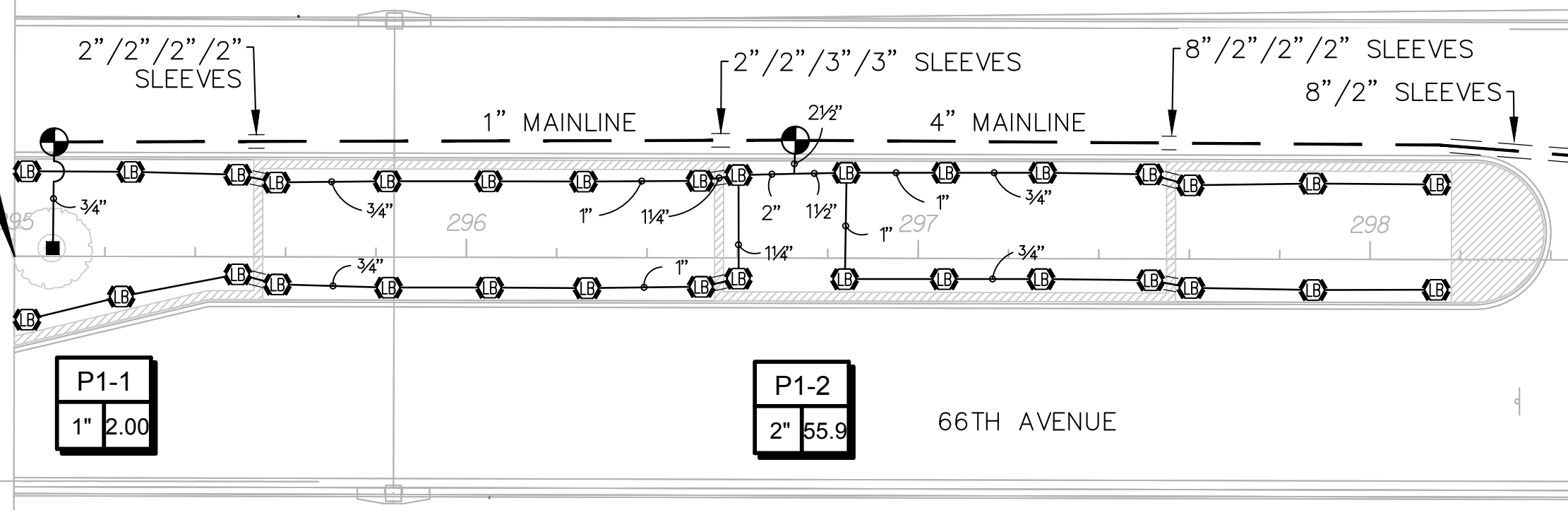

NORTH

SCALE: 1" = 30'

7.5' 15' 30'

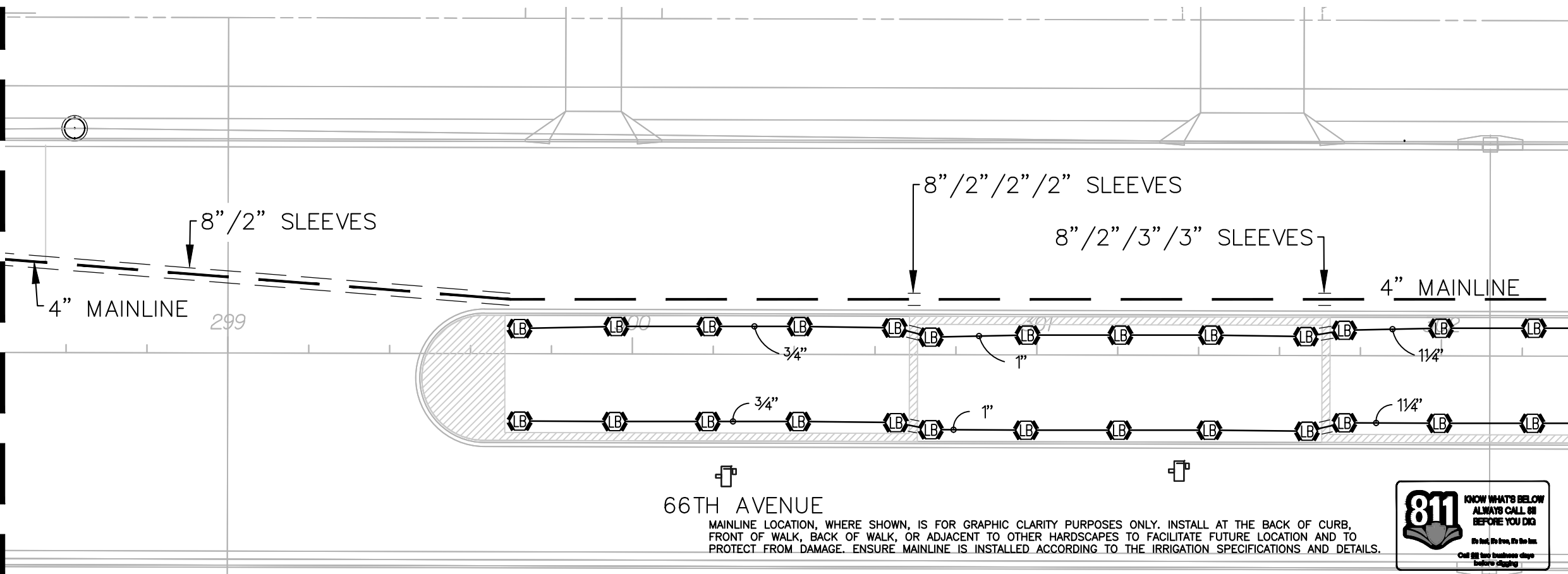
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Manager	JJ	
Project Number	16-260	<b>2 of 19</b>
Municipal Number	00-000	
Computer File	16-260_66thAve_Roadway_IR.dwg	

BEGIN PROJECT  
STA. 295+00



SEE BELOW FOR CONTINUATION

SEE ABOVE FOR CONTINUATION



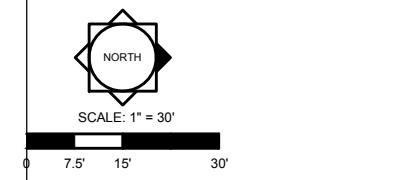
SEE SHEET 3 FOR CONTINUATION

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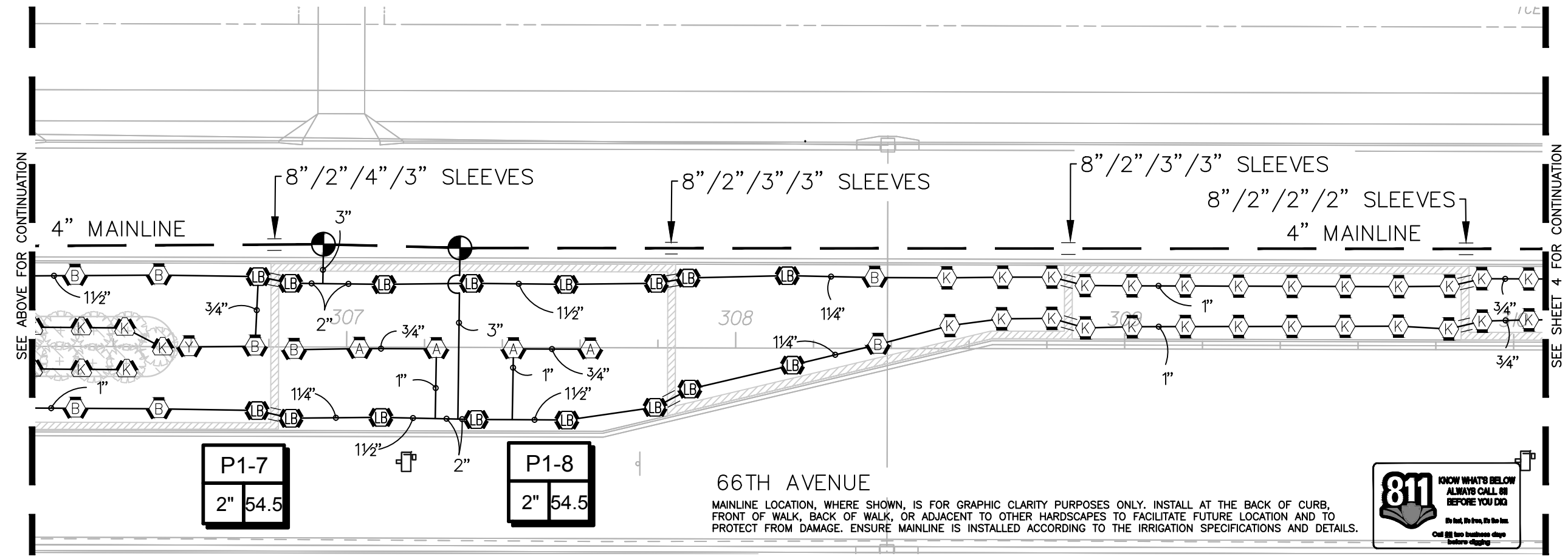
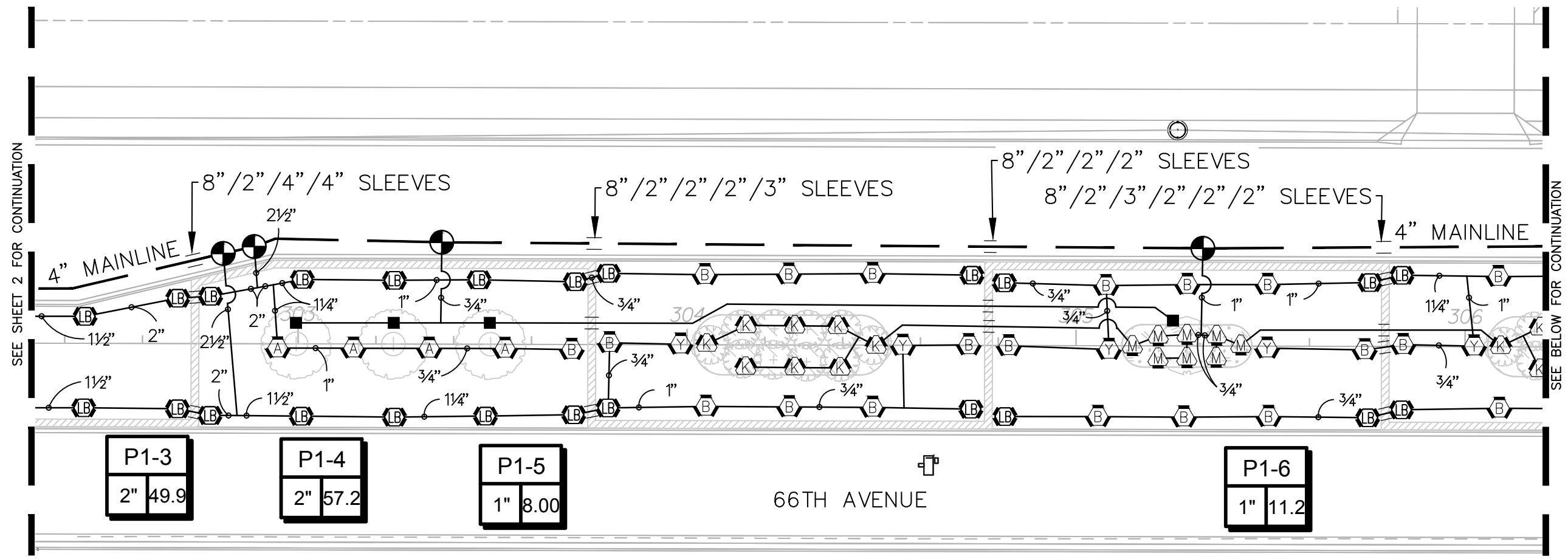
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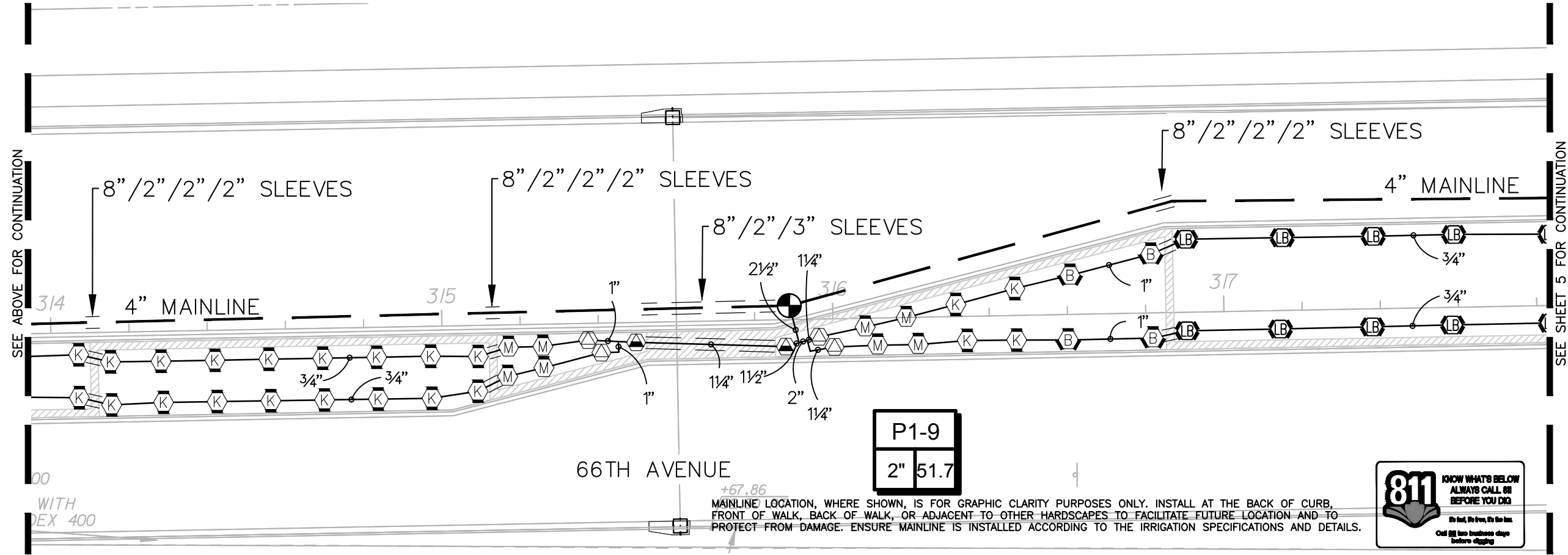
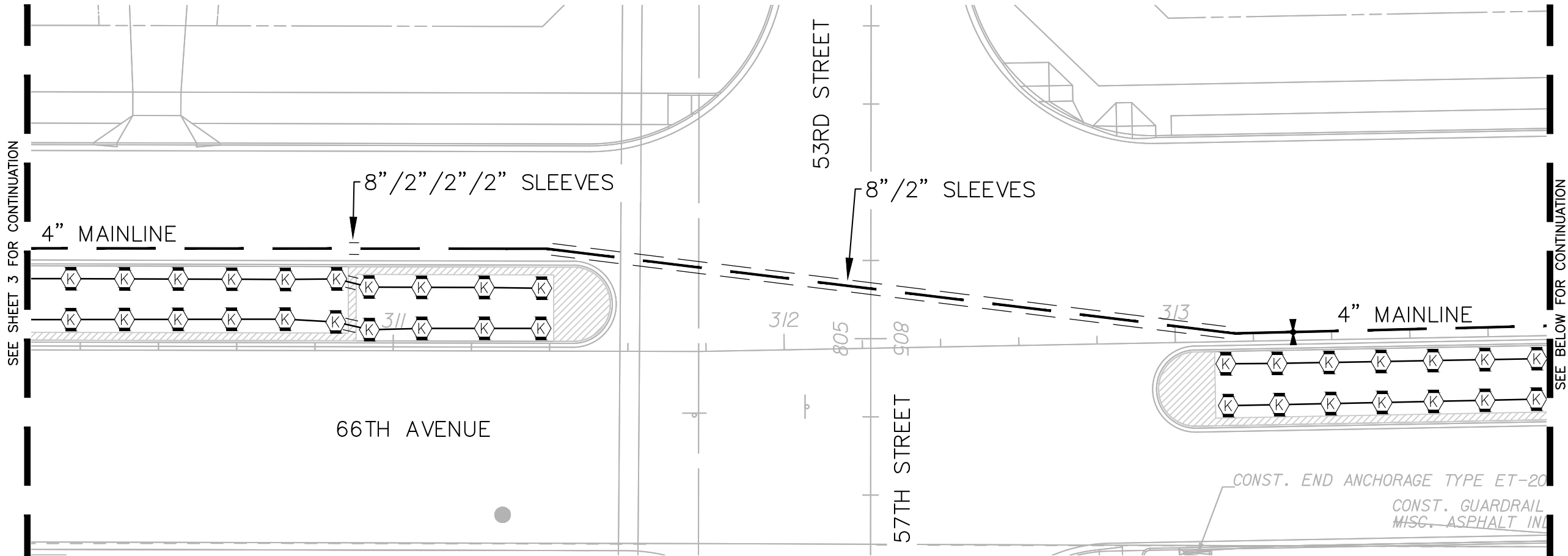
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Project Number	16-260	<b>3 of 19</b>
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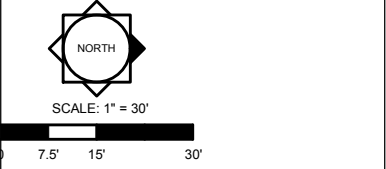


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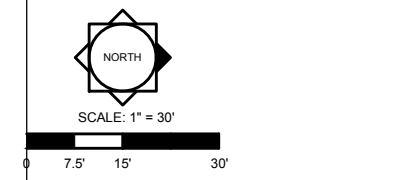
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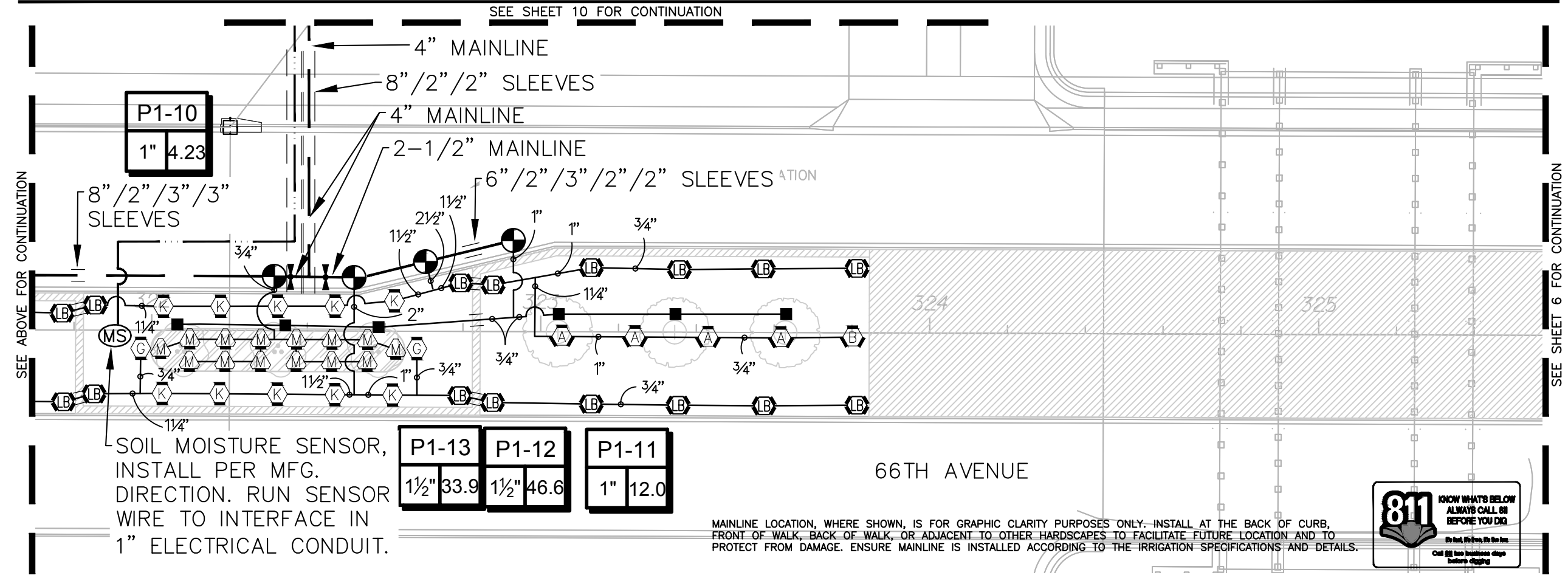
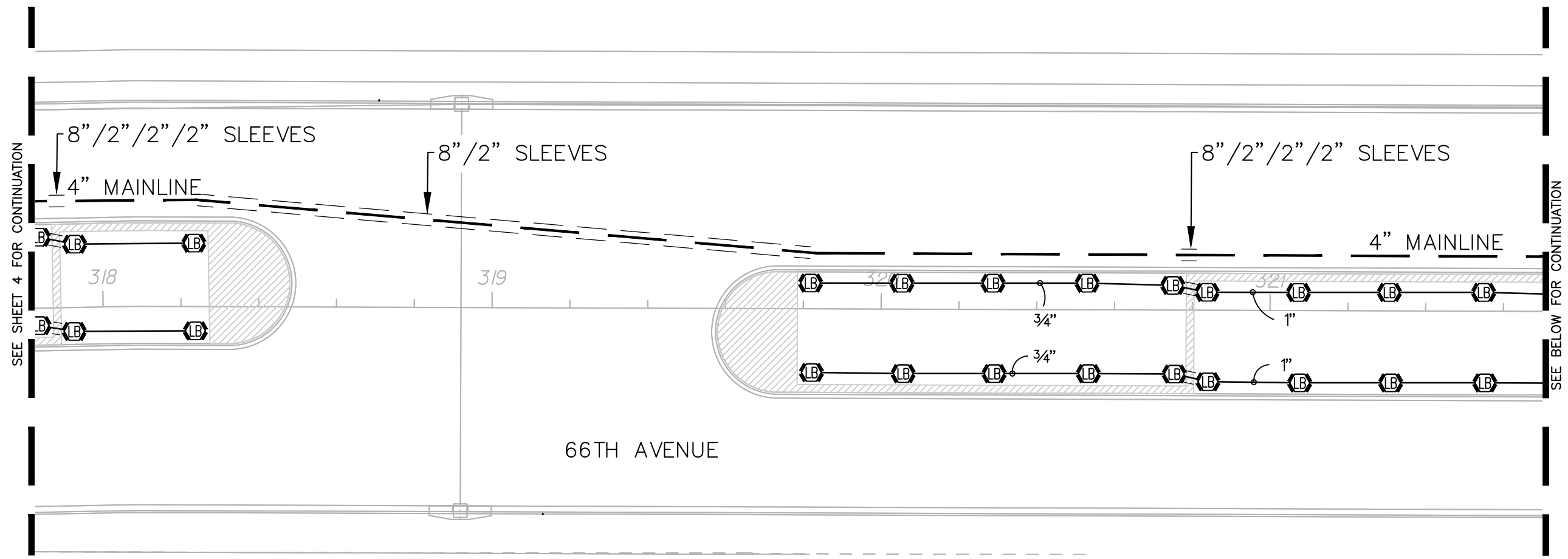
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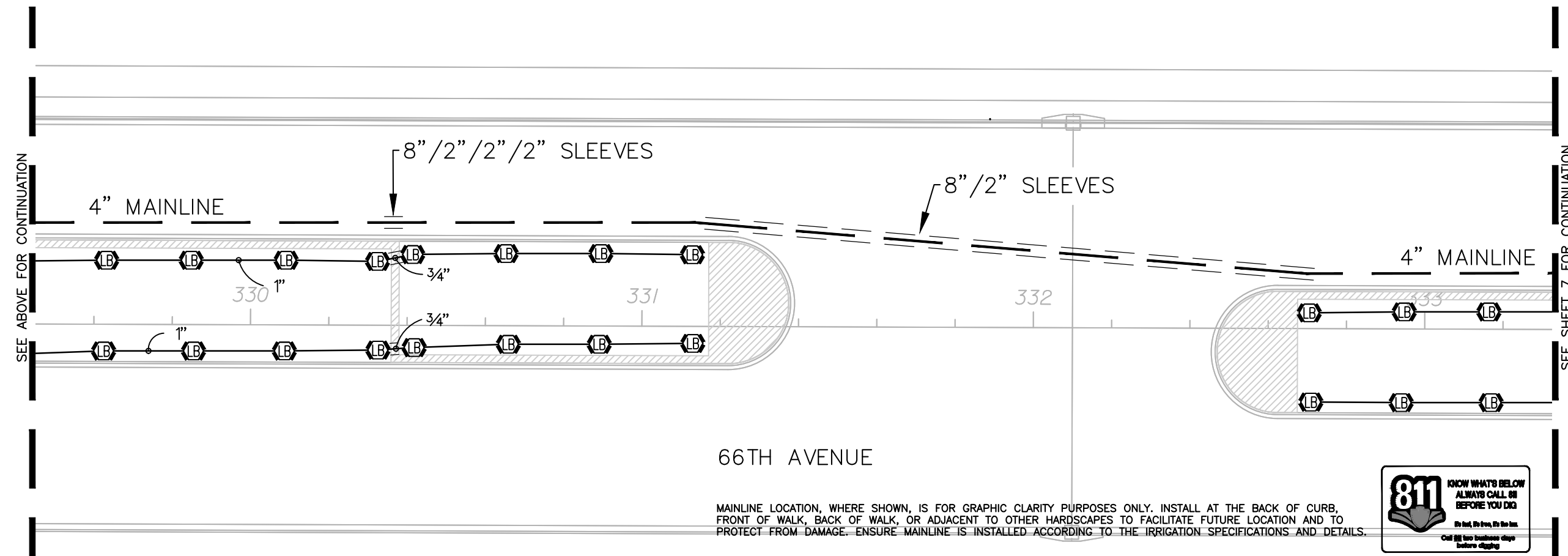
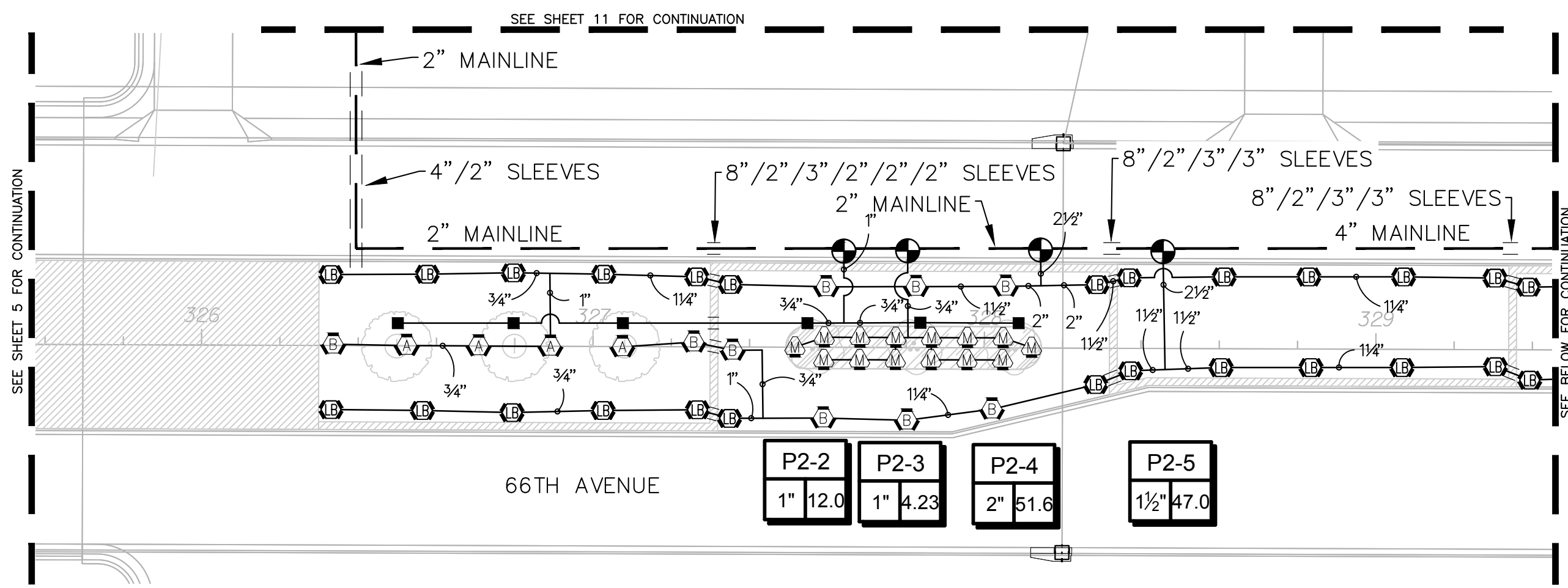
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66TH AVENUE

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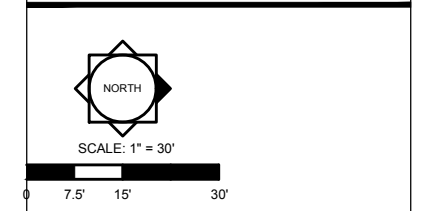
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# **66th Avenue** Phase 1A Indian River County Roadway Irrigation Plan

Date	By	Description
9/9/16	JJ	North Extension Irrigation
12/11/2017	JJ	100% CD



Designer	JJ	Sheet
Manager	JJ	
Project Number	16-260	<b>6 of 19</b>
Municipal Number	00-000	
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Project Engineer:  
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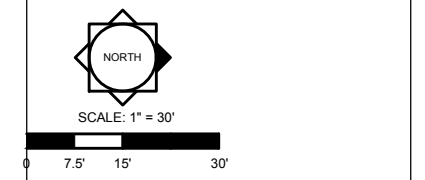
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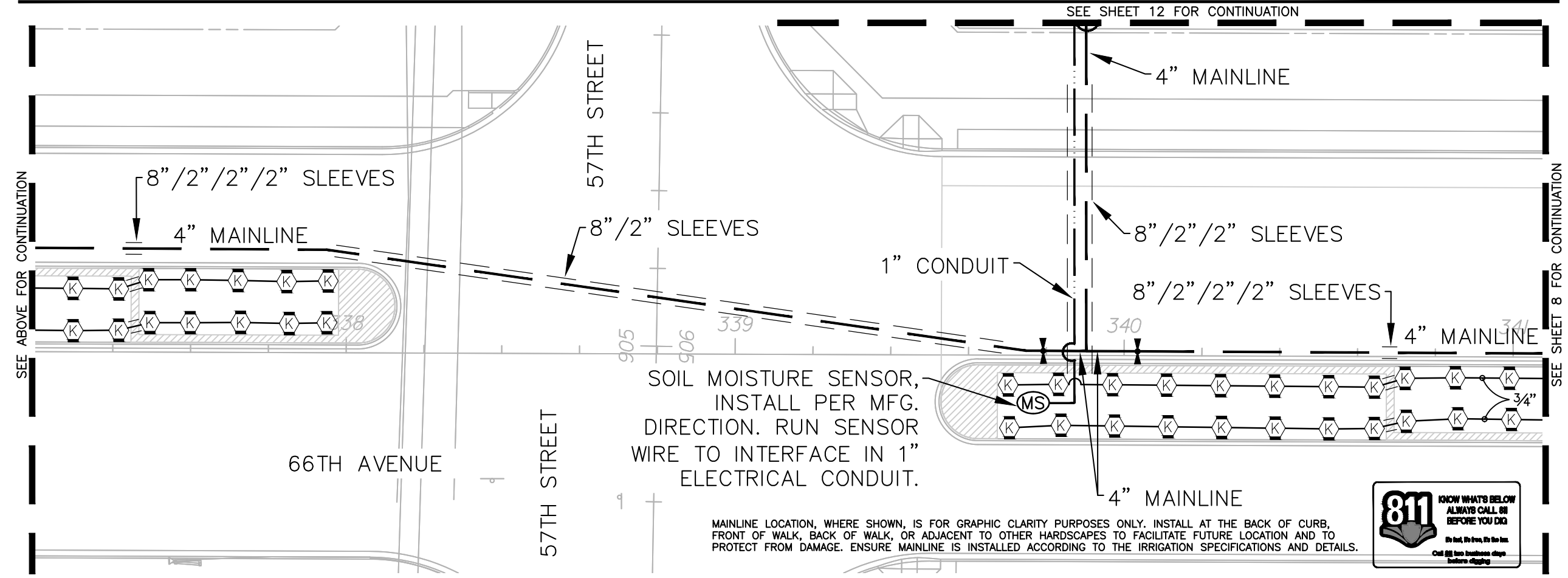
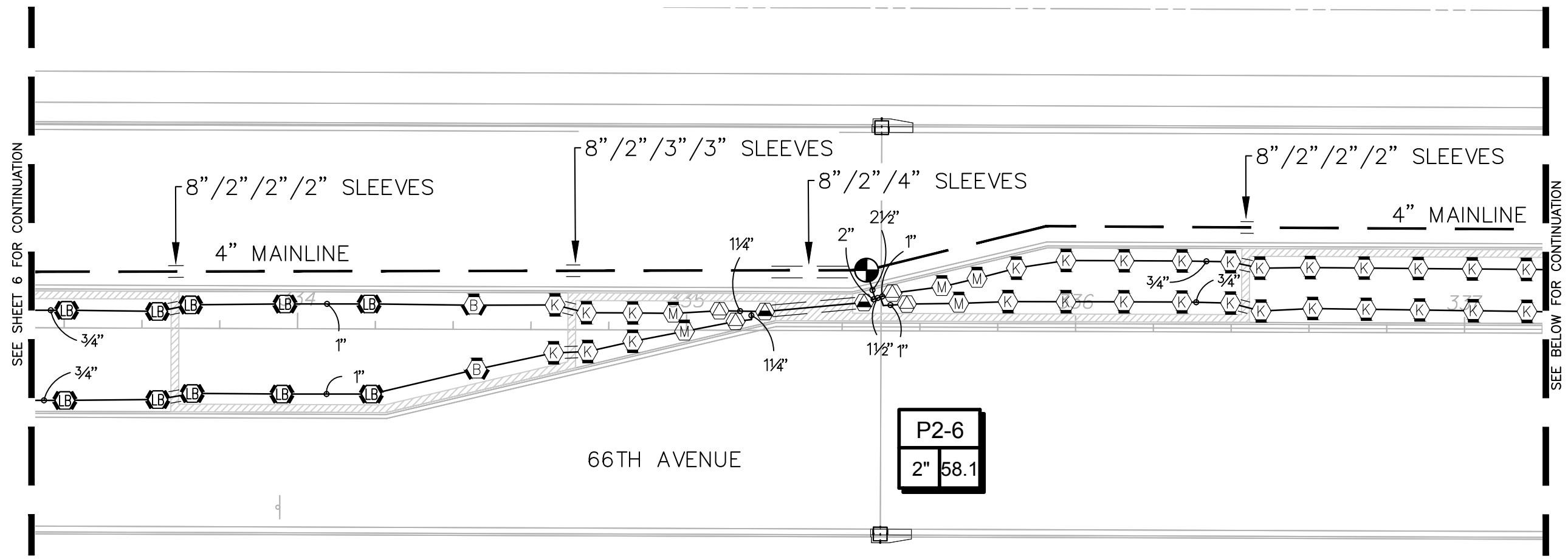
Irrigation Consultant  
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**66th Avenue**  
Phase 1A  
Indian River County  
**Roadway Irrigation**  
**Plan**

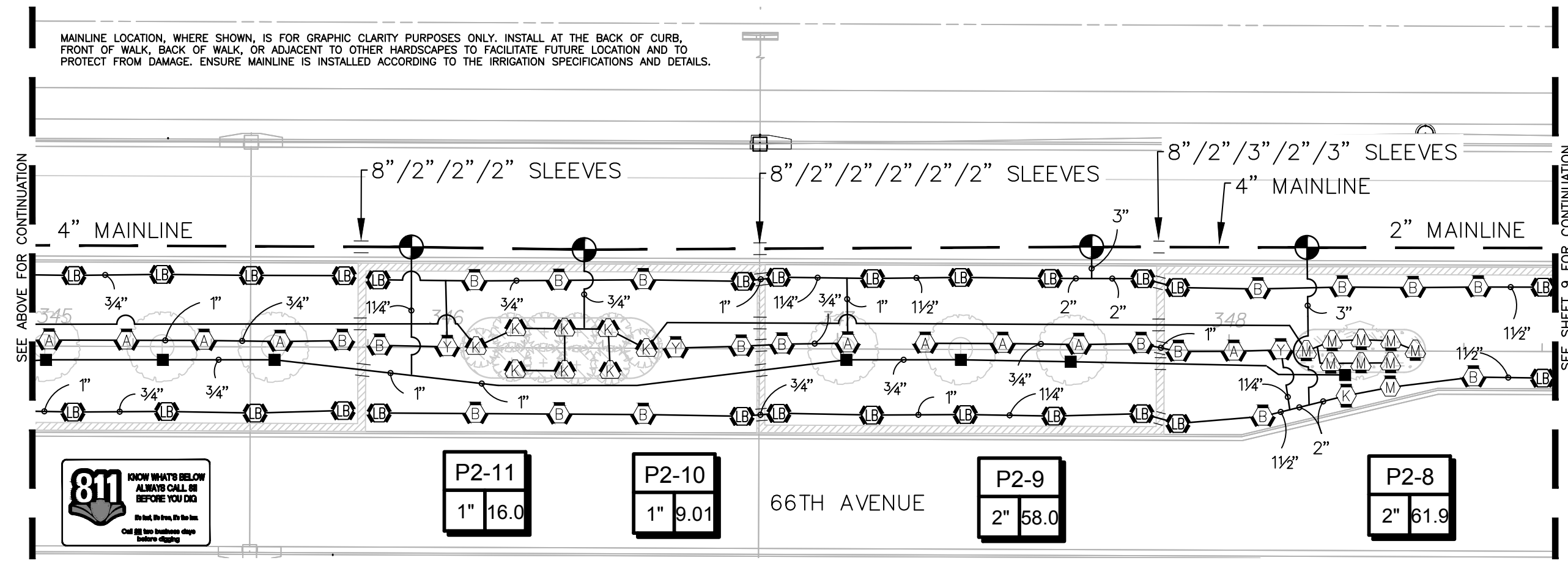
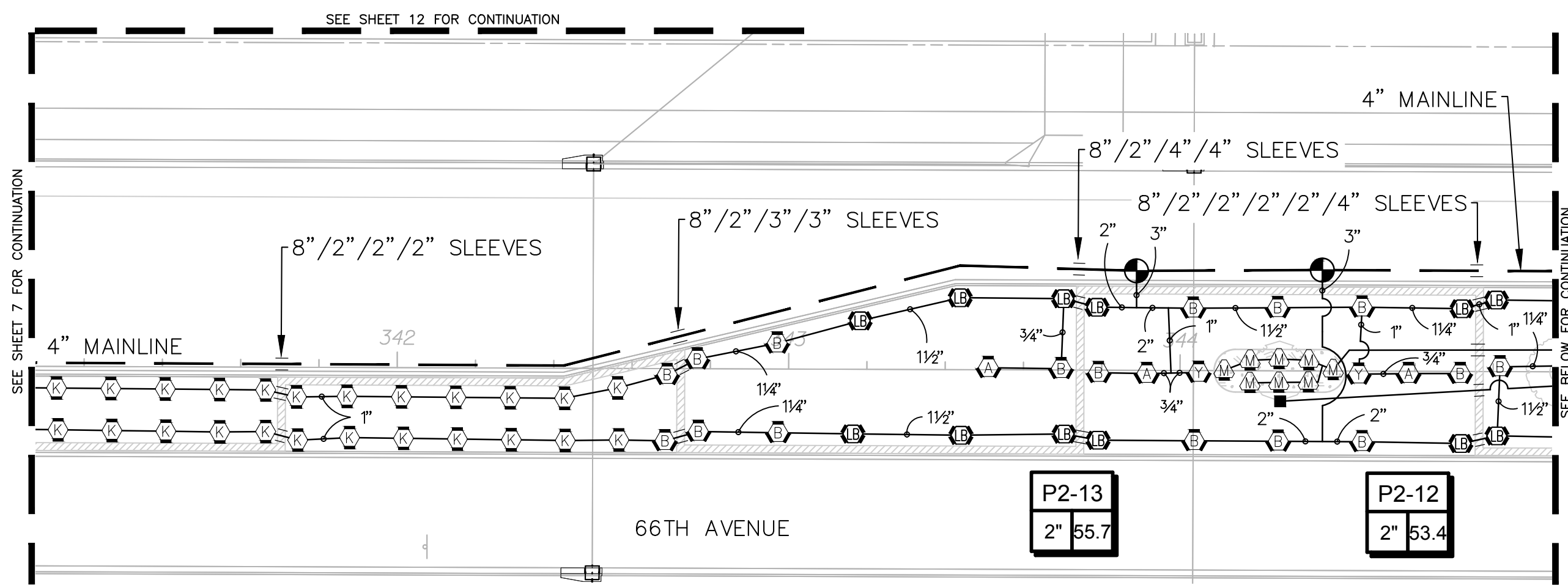
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Designer	JJ	Sheet
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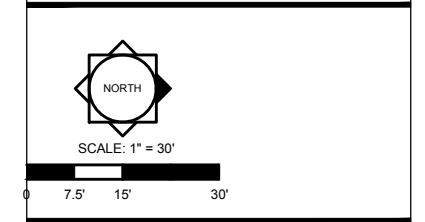




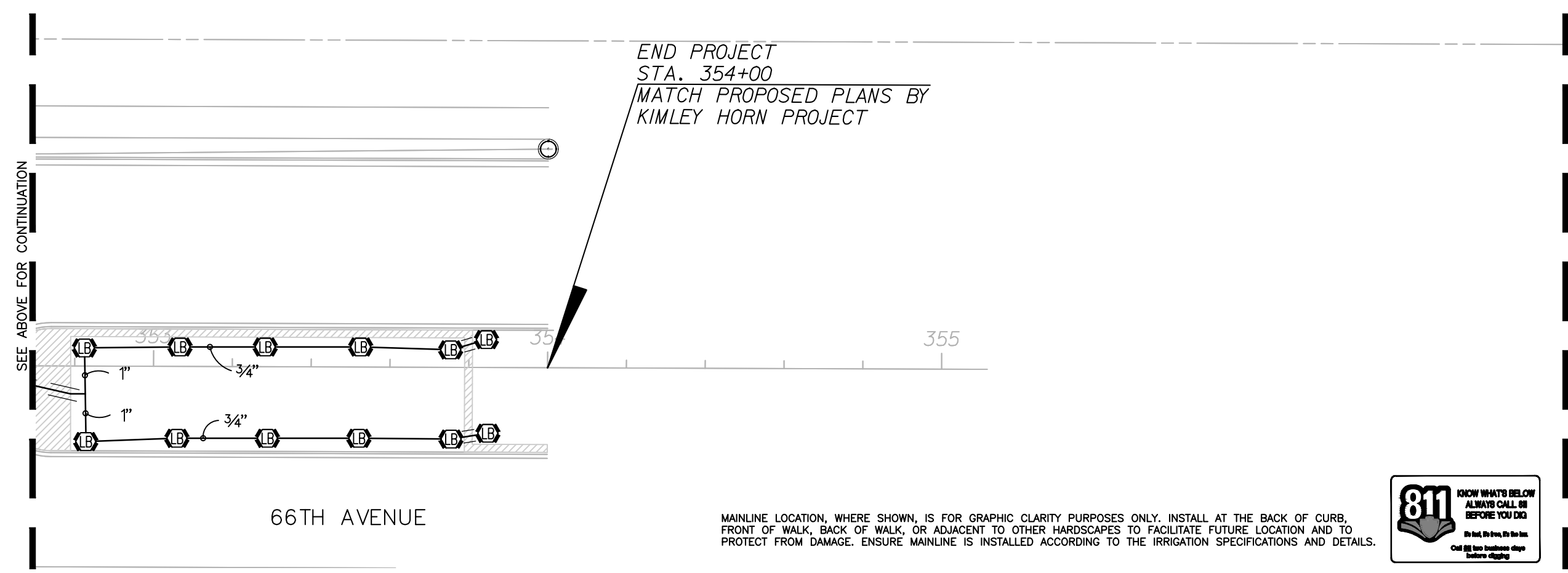
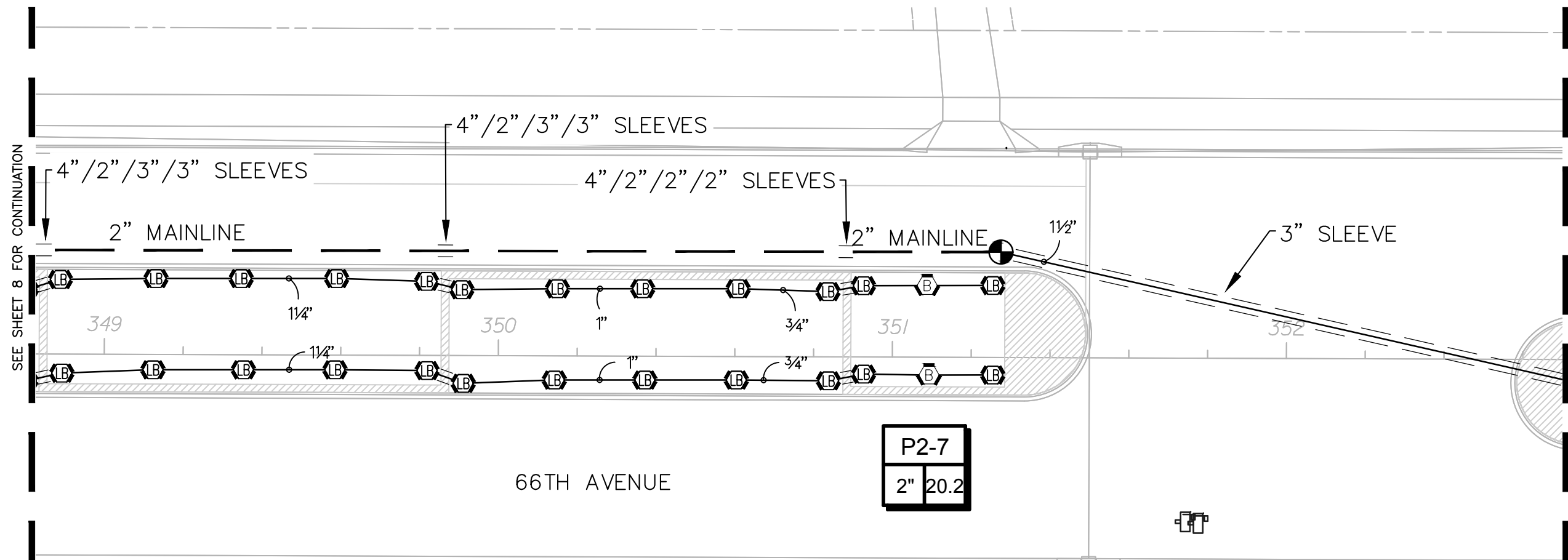
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**66th Avenue**  
 Phase 1A  
 Indian River County  
 Roadway Irrigation  
 Plan  
  
 Date By Description  
 9/9/16 JJ North Extension Irrigation  
 12/11/2017 JJ 100% CD

Date	By	Description
9/9/16	JJ	North Extension Irrigation
12/11/2017	JJ	100% CD



Designer JJ Sheet  
 Manager JJ  
 Project Number 16-260  
 Municipal Number 00-000  
 Computer File 16-260\_66thAve\_Roadway\_IR.dwg  
  
**8 of 19**



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**66th Avenue**  
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9/9/16	JJ	North Extension Irrigation
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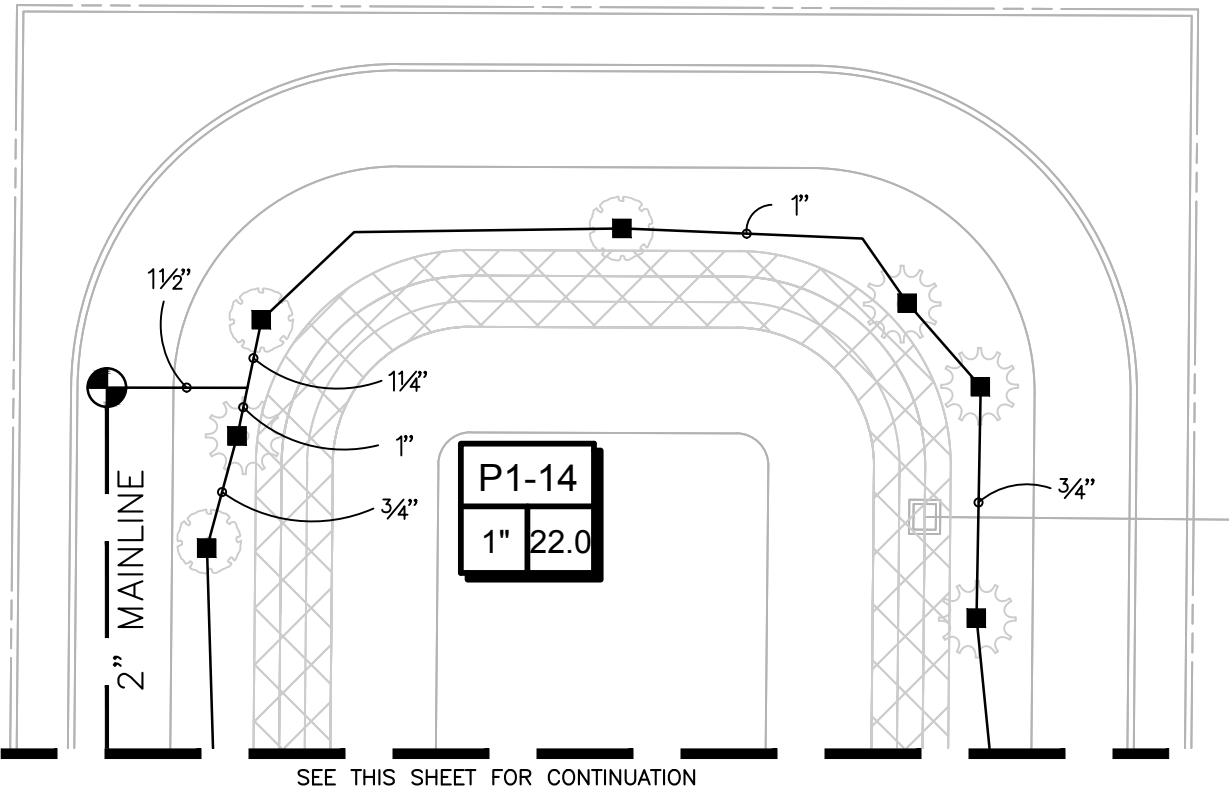
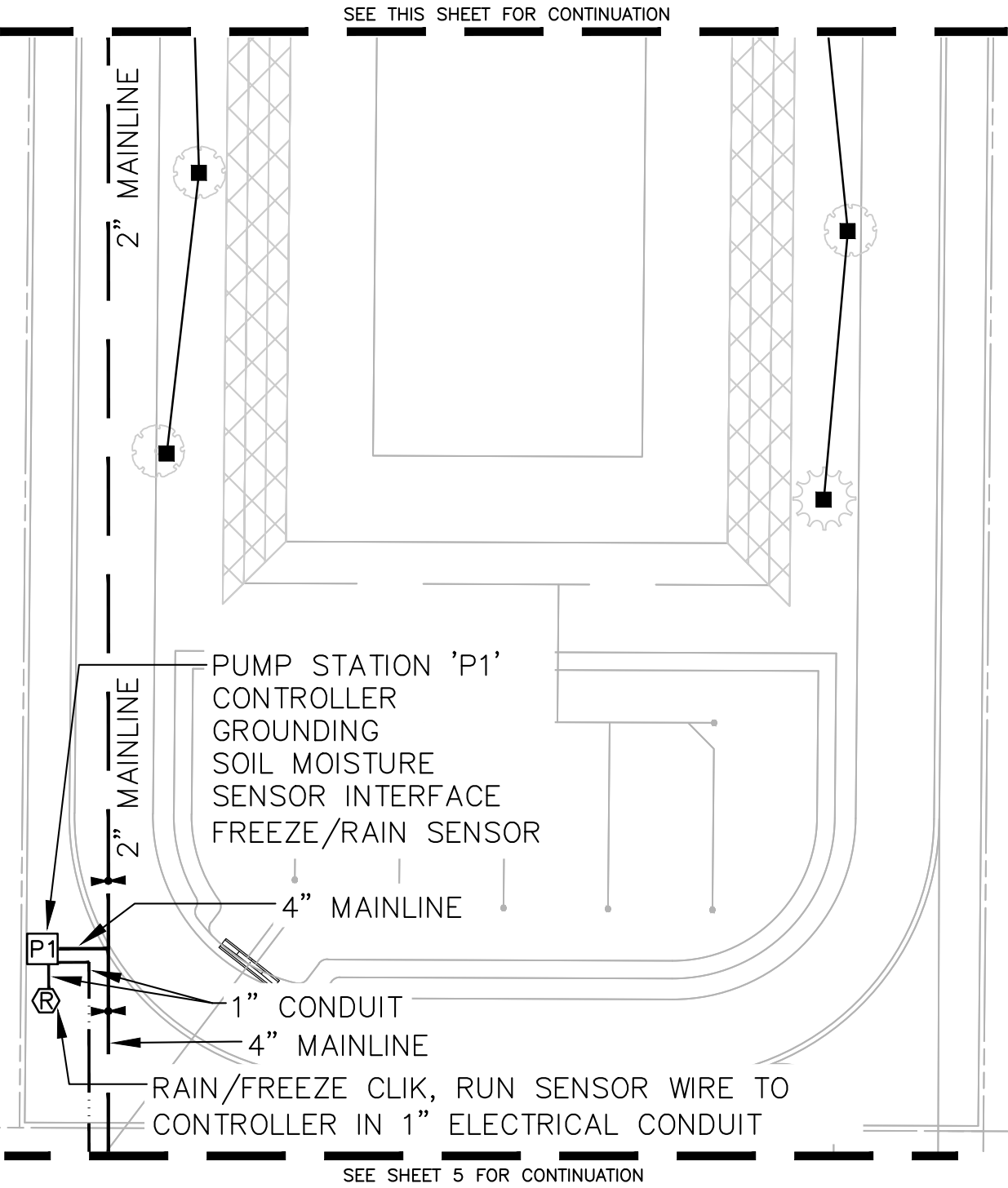
NORTH

SCALE: 1" = 30'



Designer	JJ	Sheet
Manager	JJ	<b>9 of 19</b>
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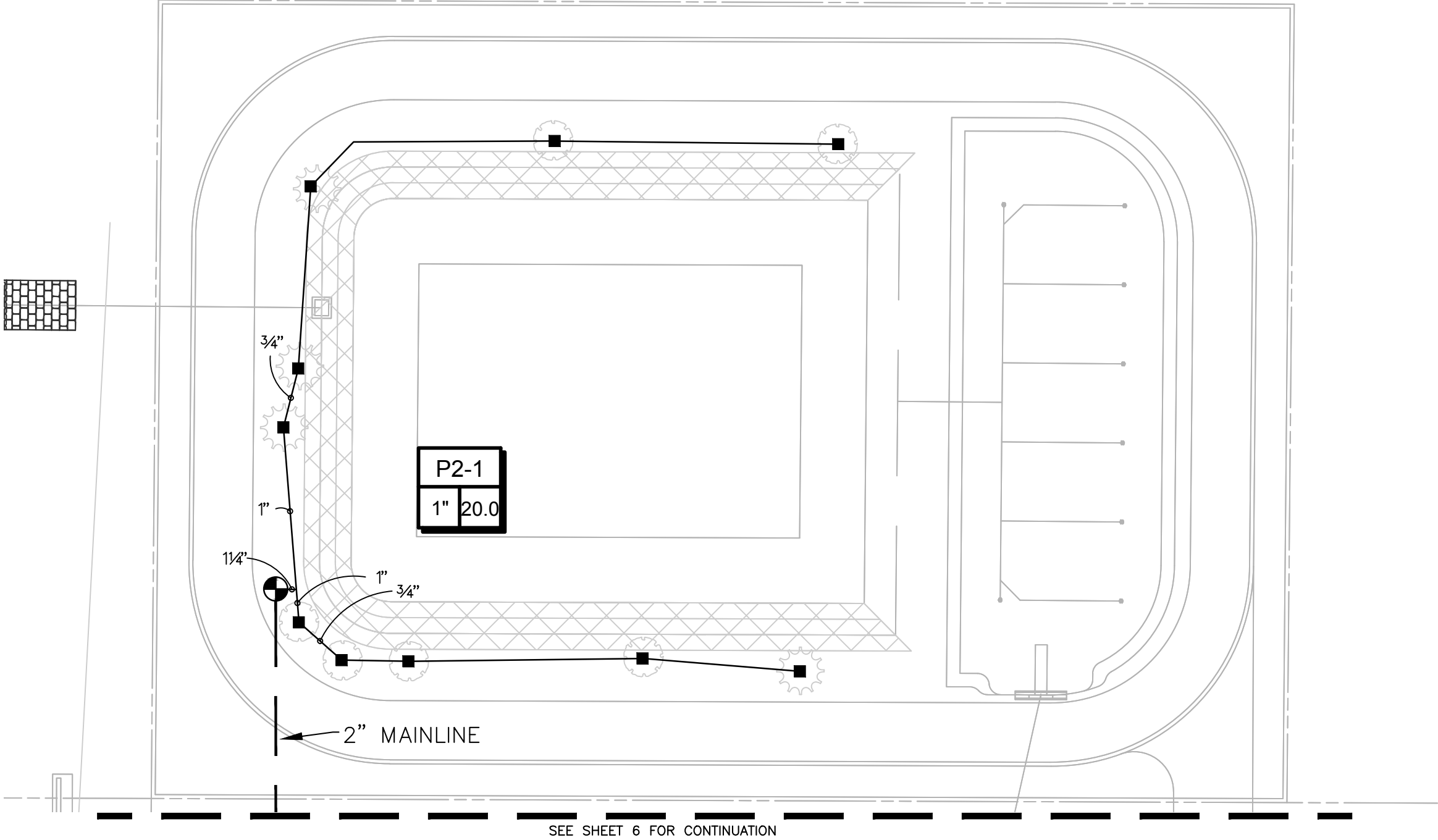
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0 7.5' 15' 30'

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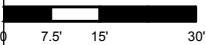
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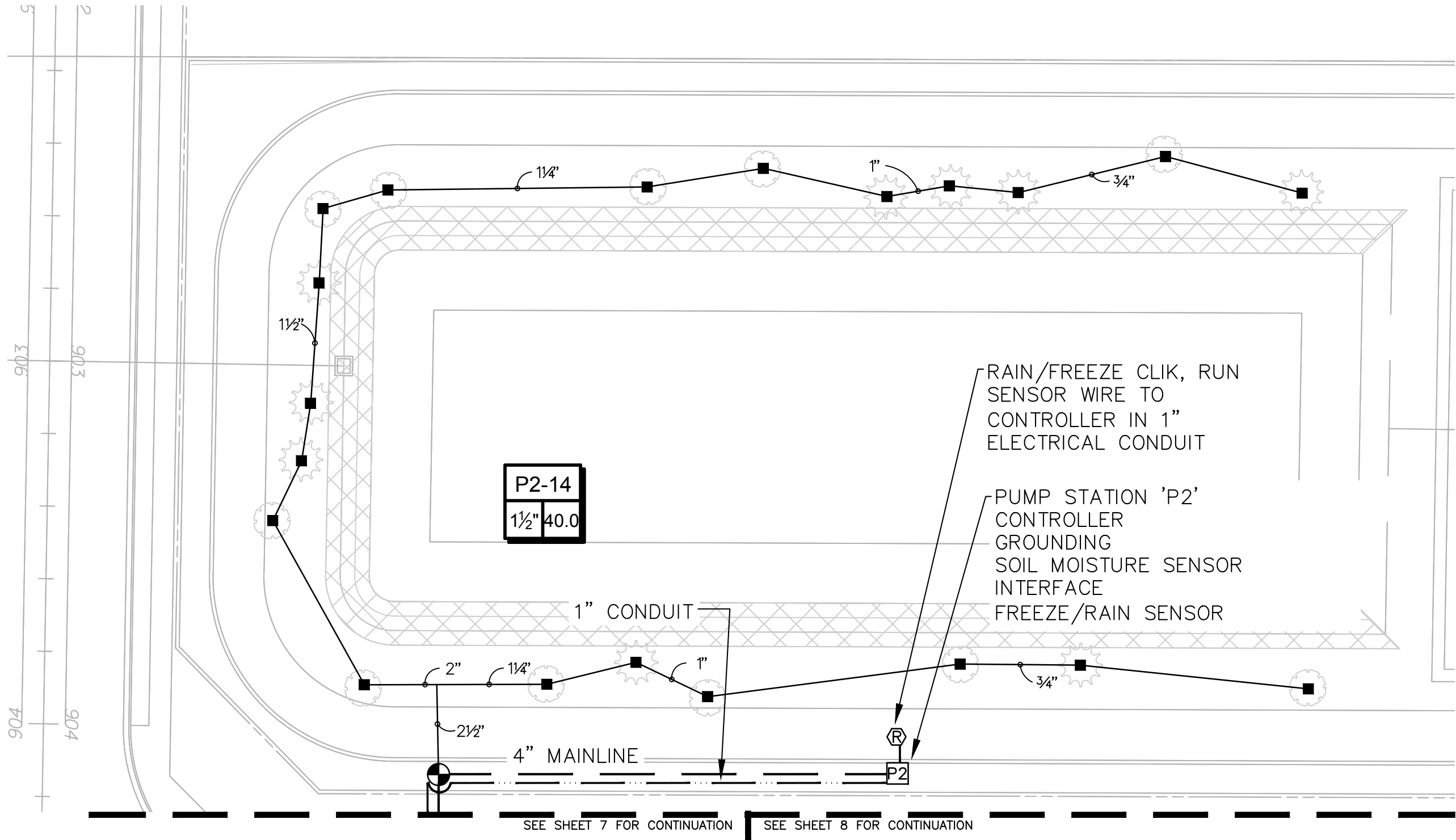
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## 66th Avenue

Phase 1A

Indian River County

### Roadway Irrigation Plan

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12/11/2017	JJ	100% CD



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0 7.5' 15' 30'

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General  
The pump station shall be a prefabricated self contained pumping station designed to produce 65 GPM at 175 TDH. Station electrical requirements to be 230 volt 3 phase. The Manufacture must have minimum 5 Years experience in manufacturing and servicing of VFD Irrigation pumping stations.

1.2  
System Piping: SCH 40 Galvanized Steel.

1.3  
Bolts: All bolts used in the assembly of the pump station shall be cadmium plated or 316 stainless steel to retard corrosion. All bolts used within one mile of the salt water location shall be 316 stainless steel. All bolts used to connect equipment to the aluminum pump skid shall be 316 stainless steel.

1.4  
All skid wiring shall conform to the National Electric Code (NEC) standards current addition and all applicable local building codes. It shall be the pump station manufactures responsibility to verify the stations compliance with the local building codes. All wiring from control panel to the electric motors shall be in liquid-type conduit with type THWN copper conductors rated not less than 600 VAC and of the proper size to carry the full load amperage of the motors without exceeding 80% capacity of the conductor. A grounding cable sized to the requirements of NEC shall be run to each motor. There shall be no splices between the motor starters and the motor connection boxes. If applicable, the water level float switch shall be 16 gauge stranded copper conductors rated at 600 volt VAC. No liquid tight conduit shall exceed 6 feet in length.

## 2.0 PUMPS

2.1 DISCHARGE HEAD  
The discharge head shall be galvanized steel construction. There shall be a threaded hub to pass the submersible cable.

2.2 COLUMN  
The drop column shall be galvanized threaded steel.

2.3 SUBMERSIBLE PUMP ASSEMBLY  
The pump shall be 4" stainless steel to fit in 4" well. The impellers and stages are glass filled Noryl for maximum efficiency. Pump shall have ceramic shaft sleeve and rubber discharge bearing to eliminated sand wear. The pump shall have a 2" inline check valve at the discharge of the pump assembly. The pump assembly shall be as manufactured by Franklin Electric, Goulds or approved equal.

2.4 MOTOR  
The motor shall be a submersible type designed for continuous underwater operation and with a combination of a maximum water temperature and minimum velocity past the motor. The service factor shall be of 1.15. The motor shall be of a water filled type and fitted with a segmented plate type thrust bearing. Motor leads shall be protected by a stainless steel cable guard for the entire length of the bowl assembly. The motor rating shall be selected so that the load at design is not greater than the name plate rating at 1.0 service factor and at no point on the curve shall the load exceed the name plate rating plus 10 %. The motor shall be manufactured by Franklin Electric. The power cable shall be sized per manufacture specification and shall not exceed 3% voltage drop. The pump riser pipe and the well casing and the motor shall be bonded together with a copper wire sized in accordance with the National Electric Code article 250 table 122 Equipment Grounding Conductor.

3.0 PUMP STATION ENCLOSURE  
The entire pump station including valves, manifold, control panel and VFD shall be housed in an aluminum pump enclosure. The enclosure shall be hinged to easy access to all components. The enclosure shall be constructed of 5356 .080 aluminum sheet. The hinge shall be 316 stainless steel with stainless hardware.

## 5.0 VALVES

5.1 PUMP CHECK VALVE  
Pump check valve shall be in line single disc check. Check valve shall be as manufactured by Nibco or approved equal.

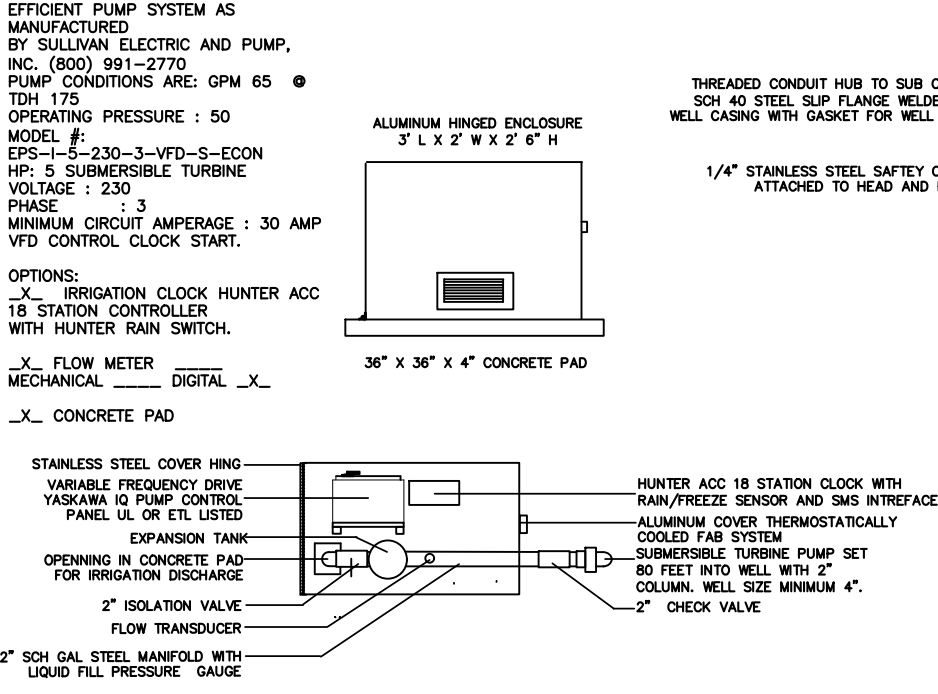
5.3 STATION ISOLATION VALVE  
Station isolation valve shall brass ball valve as manufactured by Nibco or approved equal.

## 6.0 VARIABLE SPEED MOTOR CONTROLS

6.1.13 VARIABLE FREQUENCY DRIVE  
The variable frequency drive (VFD) shall be sine-coded, pulse width modulated through insulated gate bipolar transistors (IGBT's). The VFD shall have microprocessor control logic with adjustable acceleration and deceleration, critical frequency rejection, 4 – 20 MA process follower input, run and fault contacts for customer use, overload capability of 150% for 60 seconds; 200% peak, current limited stall prevention during acceleration, deceleration and run conditions, auto restart after momentary power loss, electronic motor overload, current limiting DC bus fuse, isolated operator controls, heat sink over temperature protection, DC bus charge lamp, volts to hertz adjustment, carrier frequency of .38–15 kHz with turn of time of 2–3 micro seconds and digital operator interface to select parameters and view operating conditions. The drive shall operate at or above the 10 kHz range for cooler motor operation and noise suppression. The VFD shall have input for flow sensing and flow totalization using Badger 220B flow transducer. The VFD shall be Yaskawa IQ pump no exceptions.

6.1.1 VFD CONTROL OPERATION  
The Control Logic shall operate the pressurized system at a selectable pressure set point value using a P.I.D. algorithm in the VFD control logic. The setting display shall be in pressure. The VFD control logic will have no significant damaging reductions or increases in pressure. The VFD control logic shall shut down by sensing no water flow. The VFD control logic shall have an automatic method of pressurizing the piping system when pressure drops below a selectable set point pressure (autofill). The VFD Control logic shall have alternation on multiple the pump systems. The VFD control logic shall eliminate any pump that fails to respond to a pump run signal and proceed to the next available pump. The VFD control logic shall have the following safety shut down alarms display on operator interface: loss of prime, low pressure, high pressure, improper power (phase failure, phase reversal or low voltage), VFD failure, and high pump temperature and pump failure. The system shall be capable of auto restart for power loss or external VFD failure ten (10) times before locking system out for manual reset. The system shall be capable low pressure override.

6.1 VFD POWER CONTROL PANEL  
The VFD shall be fed from a power control panel containing disconnect, motor fuses, control transformer, and surge protective device. The components shall be house in a single weatherproof NEMA 4X enclosure. The enclosure shall be fabricated from stainless steel, sun



A

## PUMPS

light resistant fiberglass or aluminum. A removable back panel shall be provided for all component mounting. Padlocking provisions shall be included to prevent unauthorized entry. The enclosure shall be fabricated per NEMA standards and bear a National Testing Laboratory Listing (UL label, ETL or equivalent). All equipment and wiring shall be properly labeled for identification. A complete wiring schematic with all terminals, components and wires identified shall be provided on the inside of the control panel door with weatherproof cover. All wires will be numbered according to diagram for future reference and maintenance. The panel wiring shall be contained where possible in wiring duct and spiral wrap. The use of tie wraps shall be limited.

6.1.1 MAIN DISCONNECT SWITCH  
The power control panel shall be provided with a main disconnect switch. The main disconnect switch shall be rated for maximum connected horsepower and have a "Thru-the-Door" operating handle. The handle shall be rated NEMA 3R and have provisions for locking in the "OFF" position. The door shall not be able to be opened when the switch is in the "ON" position and shall de-energize all components in the enclosure.

6.1.3 OVER CURRENT PROTECTION  
The VFD shall be protected with current limiting UL class RK 5 dual element fuses for motor short circuit protection. Fuses shall be equal to Ferraz Shawmut, Bussman. Circuit breakers or motor circuit protectors are not acceptable.

6.1.4 SURGE PROTECTIVE DEVICE  
All electrical equipment shall be protected by UL listed surge protective device with clamping voltage at or below 1500 Volts @ 100 Amps. Suppressor shall have response time of 3 – 5 nanoseconds. Unit shall meet the following specification: IEEE 587 Category C and UL 1449-1987.

6.1.8 CONTROL TRANSFORMER  
The control transformer shall be size for all external electrical requires including but not limited to the irrigation clock and pump station enclosure cooling. The control transformer shall not any external device extending outside the pump station enclosure. The transformer shall have a dual primary input for use with 480 volt or 240 volt systems. The transformer primary shall be fused with UL Class CC time delay fuses design for the inrush of the transformer. The transformer secondary shall be protected by fuse or circuit breaker and one leg shall be grounded and become the grounded conductor. The transformer shall be as manufactured by Sq D, Acme Transformer Company or equal. No transformer larger than 500va shall be contained in the panel unless provisions for cooling are provided.

6.3.16 DIGITAL FLOW TRANSDUCER  
The flow transducer shall be as manufactured by Data Industrial model #220 B. The flow transducer shall be install to manufacture specification so as to assure its accuracy. The flow transducer shall not be located more than 15 wire feet from the control panel. The transducer control cable shall be pulled in a metallic electrical conduit. The conductor shall be installed so as to not run within 4" parallel to any energized wiring until it interfaces with the VFD.

6.3.17 PRESSURE TRANSDUCER  
The pressure transducer shall be a solid state type with a repeatability of plus/minus 0.02% and as accuracy of plus or minus 0.2%. The transducer output shall be 4 to 20 MA current to PLC. The transducer control cable shall have a maximum wire length of 15 feet and shall be so arrange it will not run parallel within 4" of any other energized wiring until it interfaces with the PLC. The pressure transducer shall connect to the PLC with a shielded cable as recommended by the transducer manufacture.

6.1.31 TESTING LABORATORY  
The pump station control panel shall be listed as a control assembly by a nationally recognized testing laboratory (UL or ETL or equivalent). The panel shall be constructed to UL 508A industrial control panel specifications and the National Electric Code 1996 Edition.

6.1.33 SERVICE  
The manufacture shall have a service company located within 150 miles of the installation

location. The service company shall have a background for at least five (5) years in maintenance and repair of variable speed drive equipment. The service company shall be properly licensed and insured. The service company shall be verified as to their qualification before equipment is approved. The service company shall have an inventory of needed parts for the control system and pump system.

## 11.0 INSTALLATION

11.1  
The pump system manufacturer shall be responsible for the off-loading of the pump system, setting of concrete pad and installation of the suction into well.

11.2  
A licensed electrical contractor shall provide electrical power to the panel. The power shall have a maximum voltage drop of 3% from service equipment with a maximum over all voltage drop of 5%. The electrical feeder shall be installed and sized in accordance with the current edition of the National Electric Code and all applicable building codes. The feeder conduit shall not, under any circumstances, penetrate the top of the control panel. Care shall be taken to see that the panel is properly protected from the weather while it is opened. Care is to be taken to see that metal particles, shavings or sand is kept out of the control component and the bottom of the panel is cleaned out.

11.3 GROUNDING AND BONDING  
The discharge head, steel well casing, pump, motor and pump skid shall be electrically bonded together with a bare solid #4 copper conductor and connected to the control panel equipment ground bar. There shall be a 10' copper ground rod driven at the pump station and connected to the control panel grounding bar. The grounding electrode conductor from the ground rod shall be tested to 10 ohms or less. Additional ground rods shall be installed to achieved 10 ohms or less.

## 12.0 OPERATOR TRAINING

12.1  
A factory trained technician shall conduct a training session at the time of start-up for the designated owner's representative to review the pump system's operation, maintenance and adjustment. Technician shall make one trip of one day for start-up and calibration. All equipment not provided by manufacturer shall be ready before calling for start-up.

12.2  
The manufacturer shall provide the owner complete operation and maintenance manuals including pump performance curves, electrical schematic, panel layout, panel bill of material, specification sheet, station start up sheet showing all design and performance settings, standard operation information, installation information and maintenance information.

13.0 WARRANTY  
The manufacturer shall warranty the pump station from defects do to installation or materials for a period of one (1) year from start up not to exceeding 18 months from delivery.

14.0 MANUFACTURER  
The pumping system shall be Efficient Pumping Systems as manufactured by Sullivan Electric & Pump, Inc., Flo-Boy as manufactured by Flowtronex, Watertronix or approved equal by the engineer. A proposed equal shall have at least ten (10) operating pump systems with references, contacts and phone numbers provided operating for five years of more.

15.0 DISCHARGE PIPING  
The discharge pipe from the pump to connection below ground shall be SCH 40 galvanized to 2' below grade.

16.0 OPTIONAL RUST CHEMICAL INJECTION SYSTEM  
The rust chemical injection system shall have a non metallic tank capable of 30 gallons with rust injection pump.

  
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**66th Avenue**  
Phase 1A  
Indian River County  
**Roadway Irrigation  
Pumps**

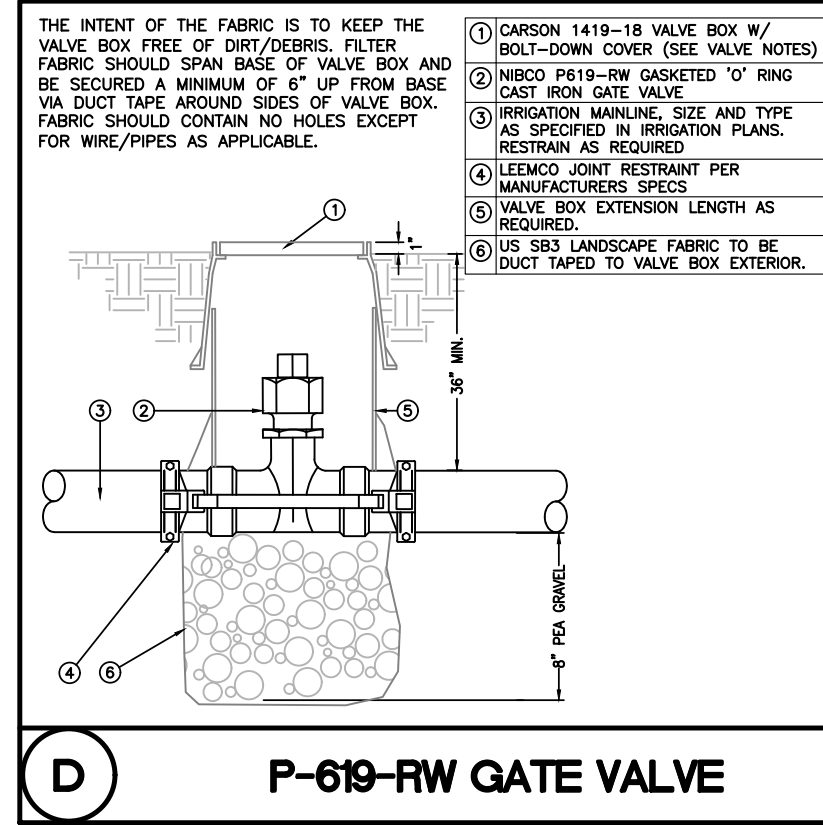
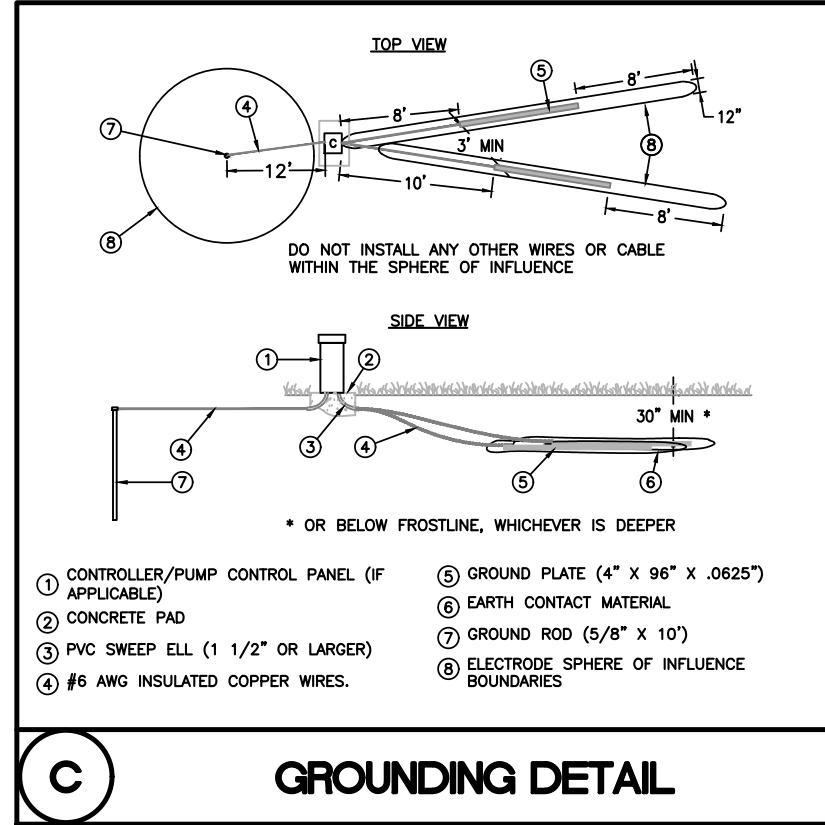
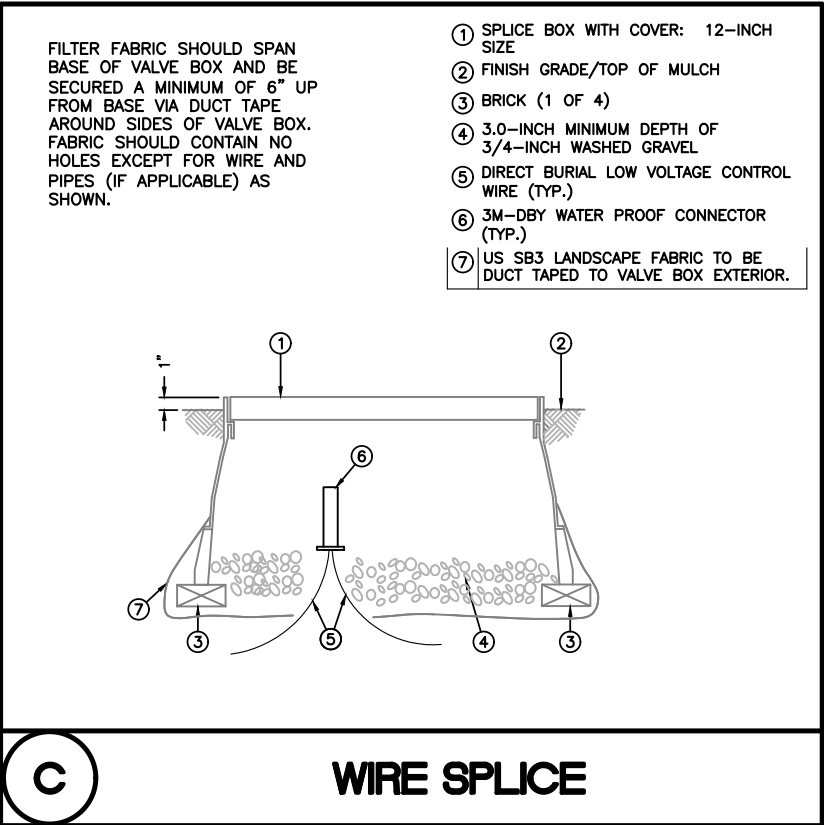
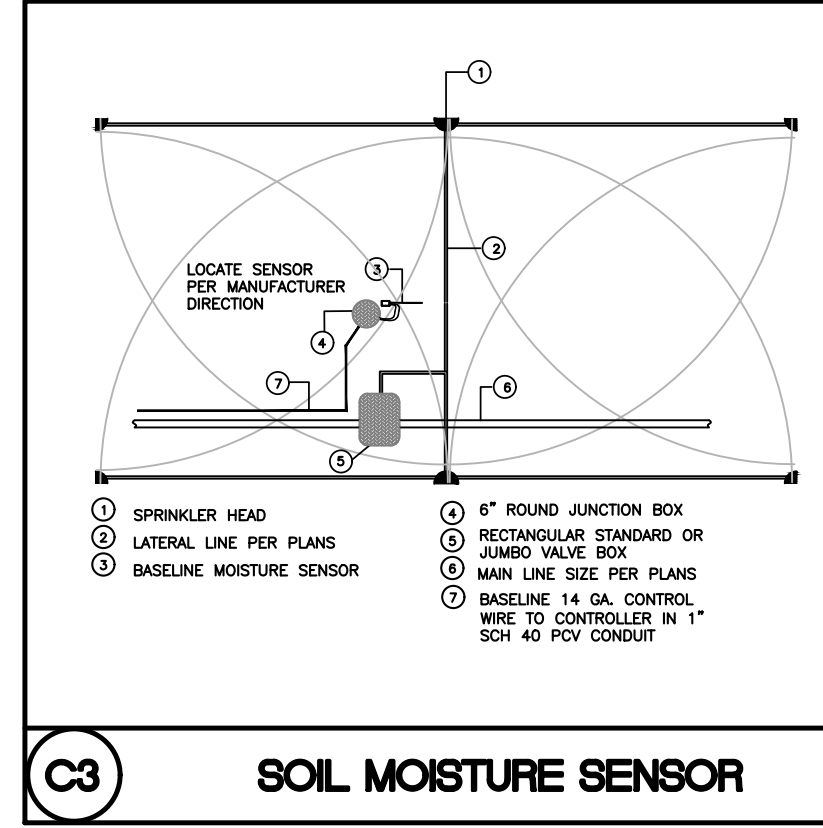
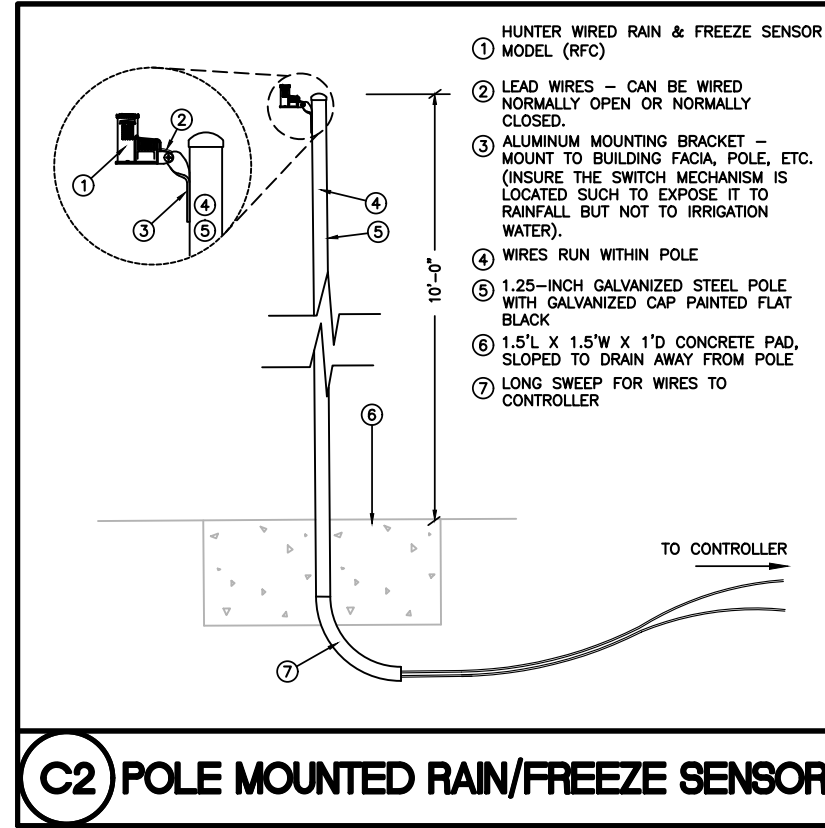
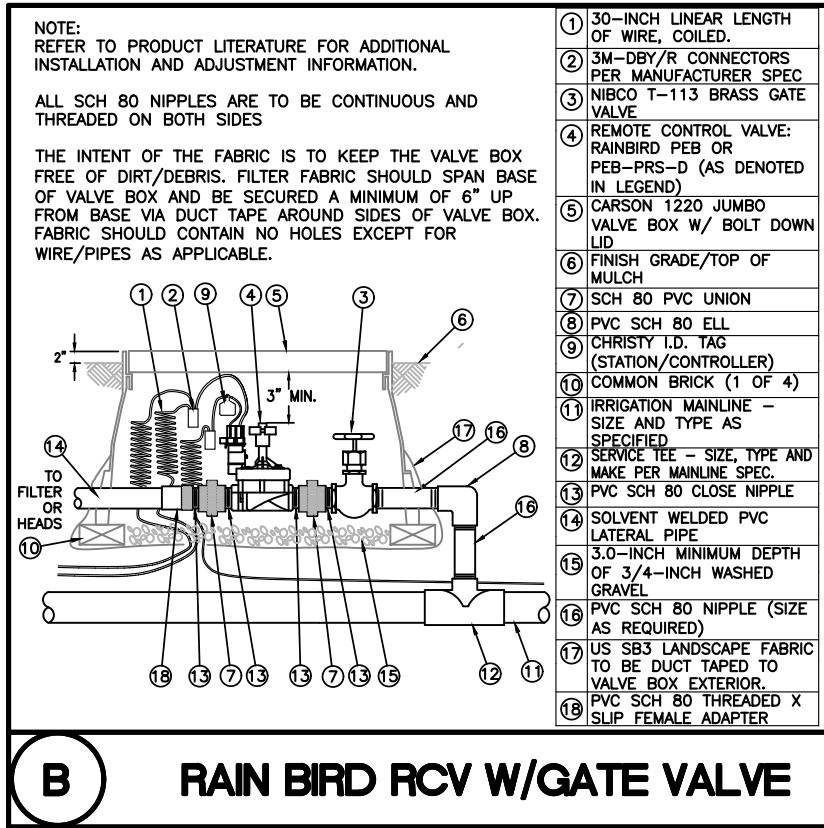
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12/11/2017	JJ	100% CD


  
NORTH  
SCALE: 1" = NTS  


Designer	JJ	Sheet
Manager	JJ	
Project Number	16-260	
Municipal Number	00-000	
Computer File	16-260_66thAve_Roadway_IR.dwg	

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**66th Avenue**  
Phase 1A  
Indian River County  
**Roadway Irrigation  
Details**

Date By Description  
9/9/16 JJ North Extension Irrigation  
12/11/2017 JJ 100% CD



Designer JJ Sheet  
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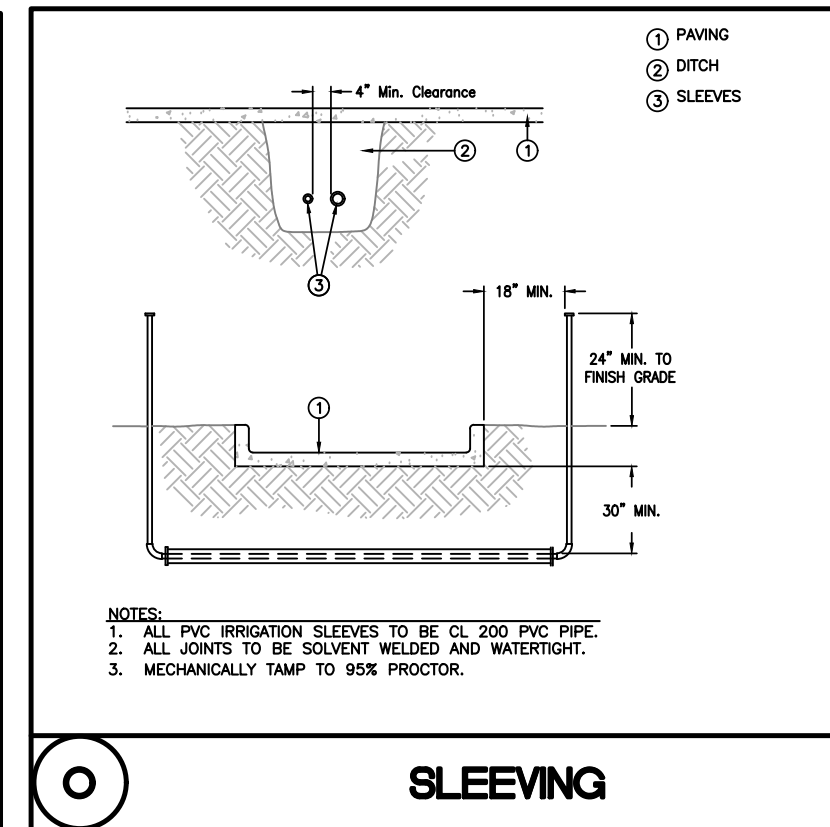
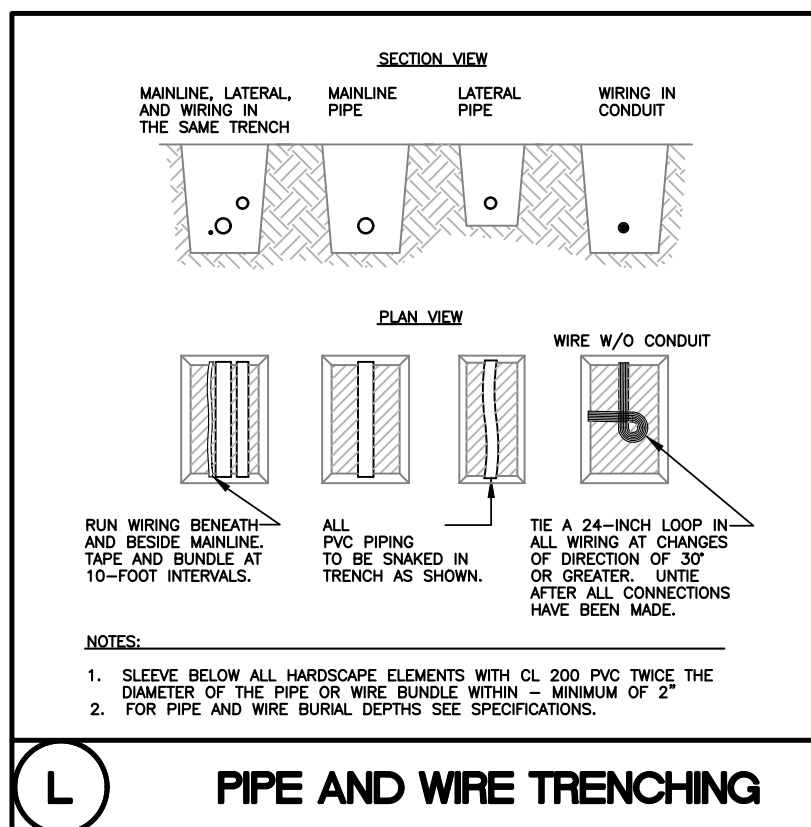
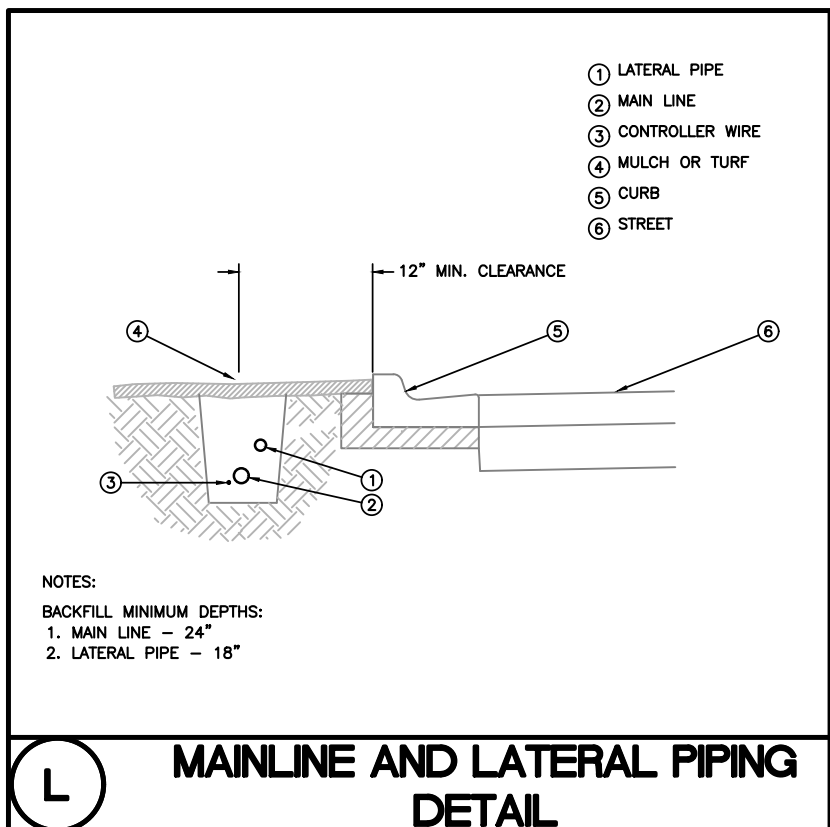
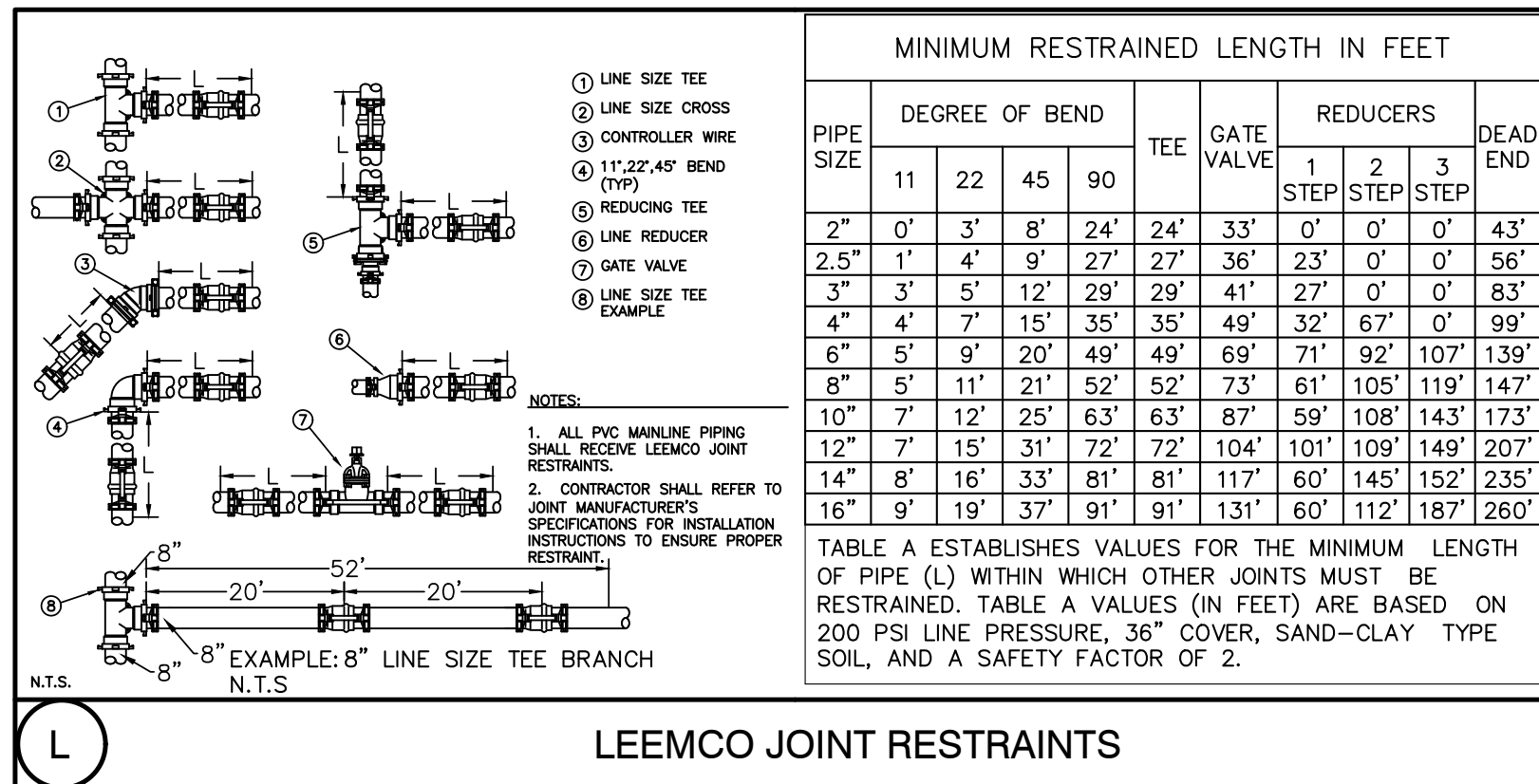
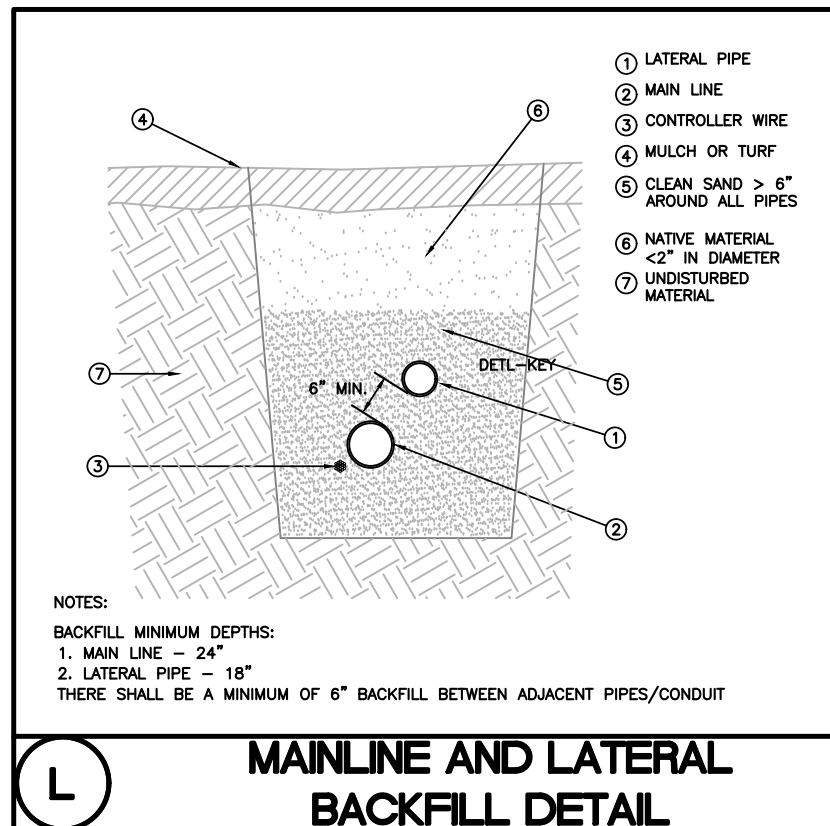


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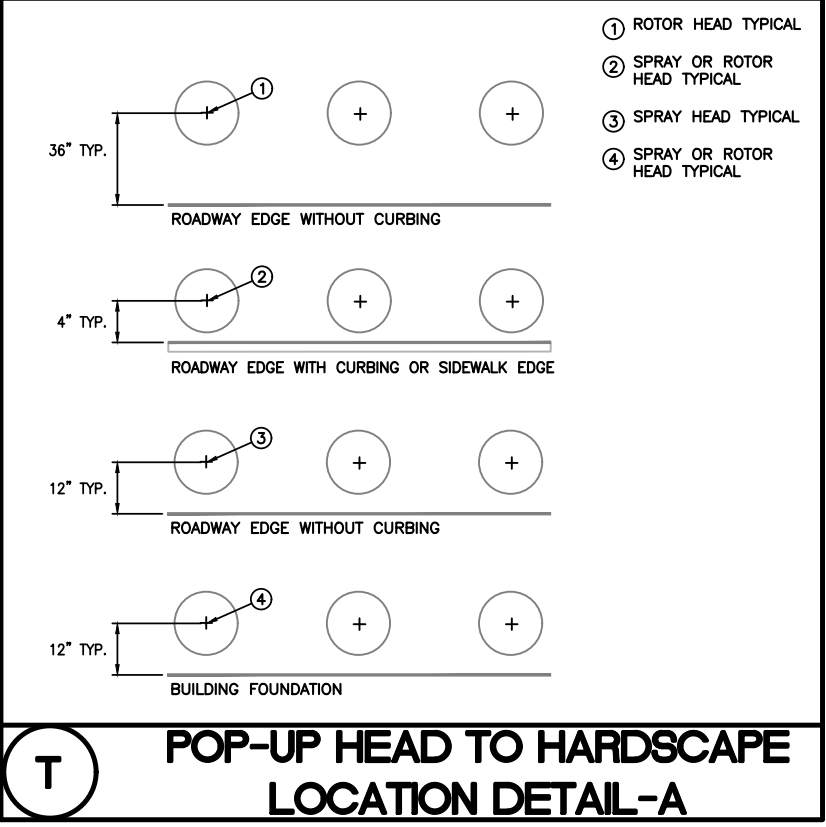
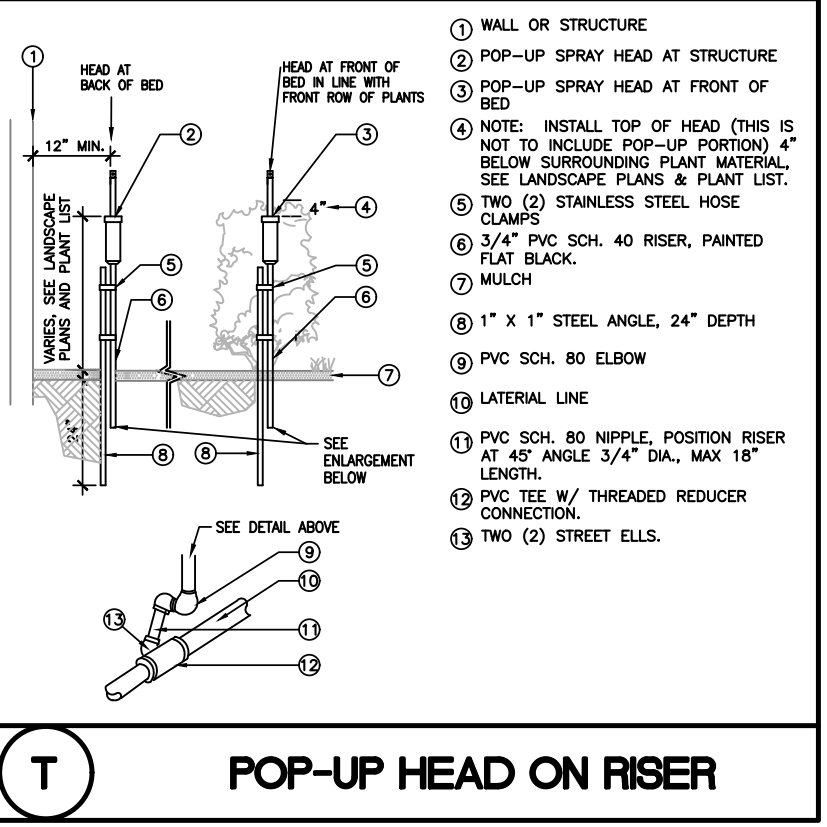
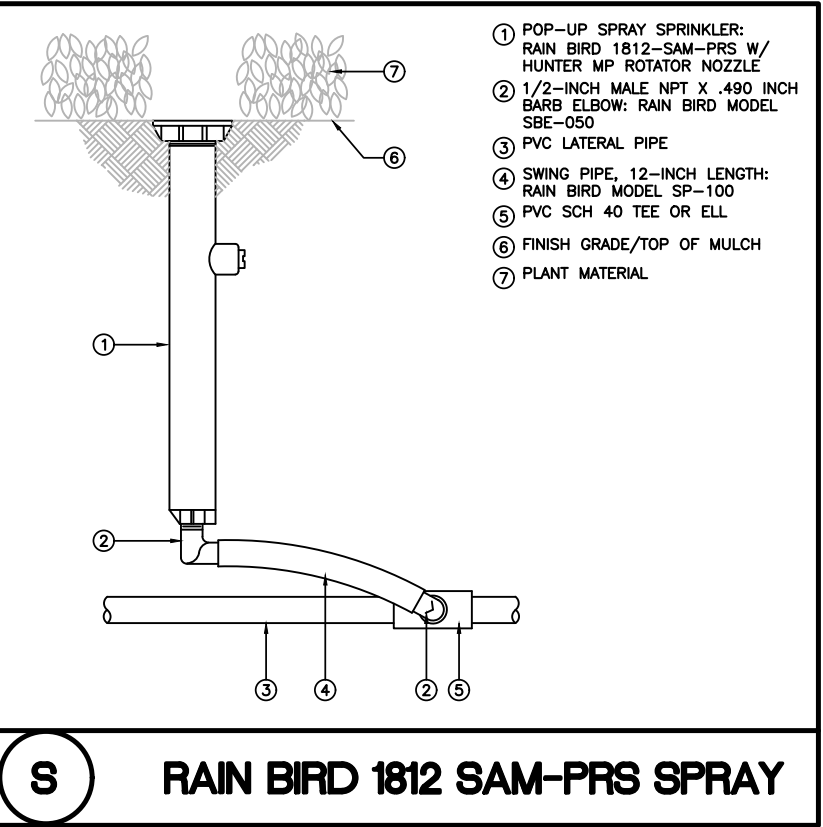
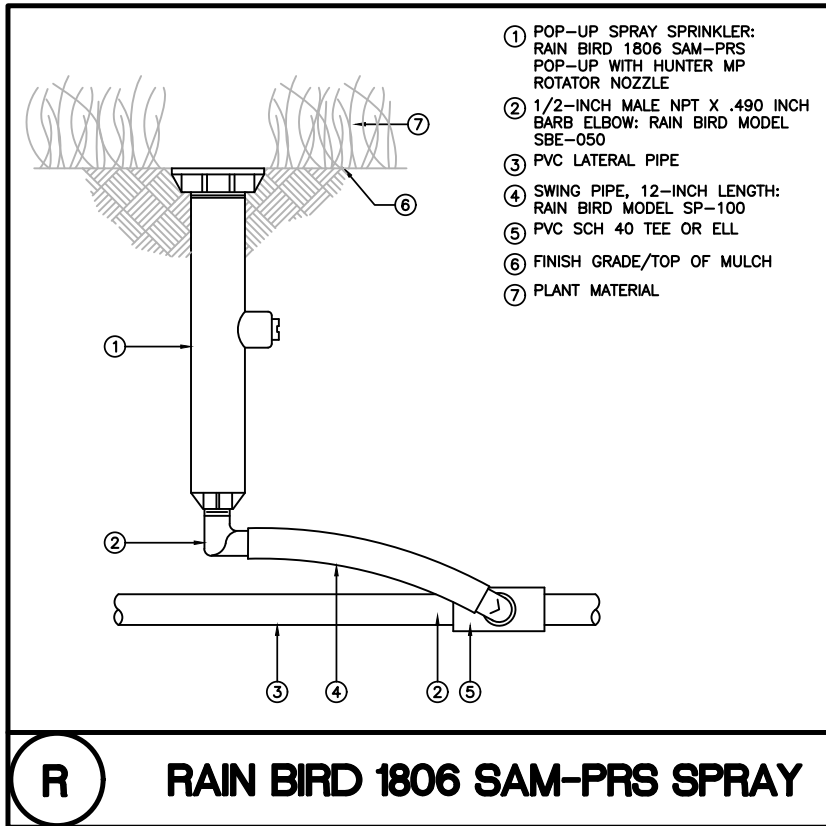
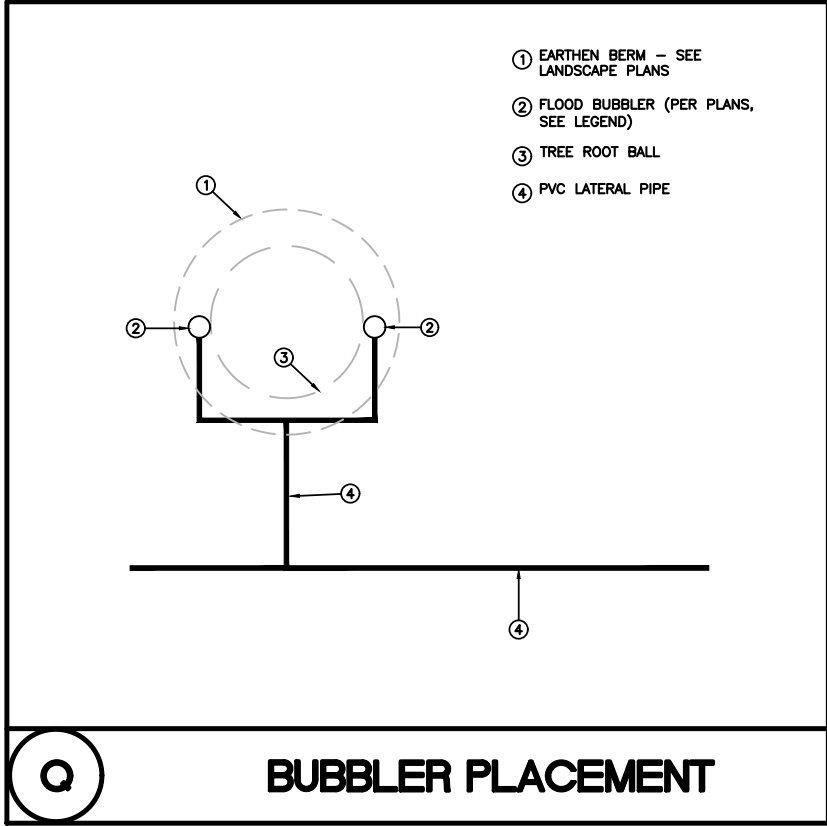
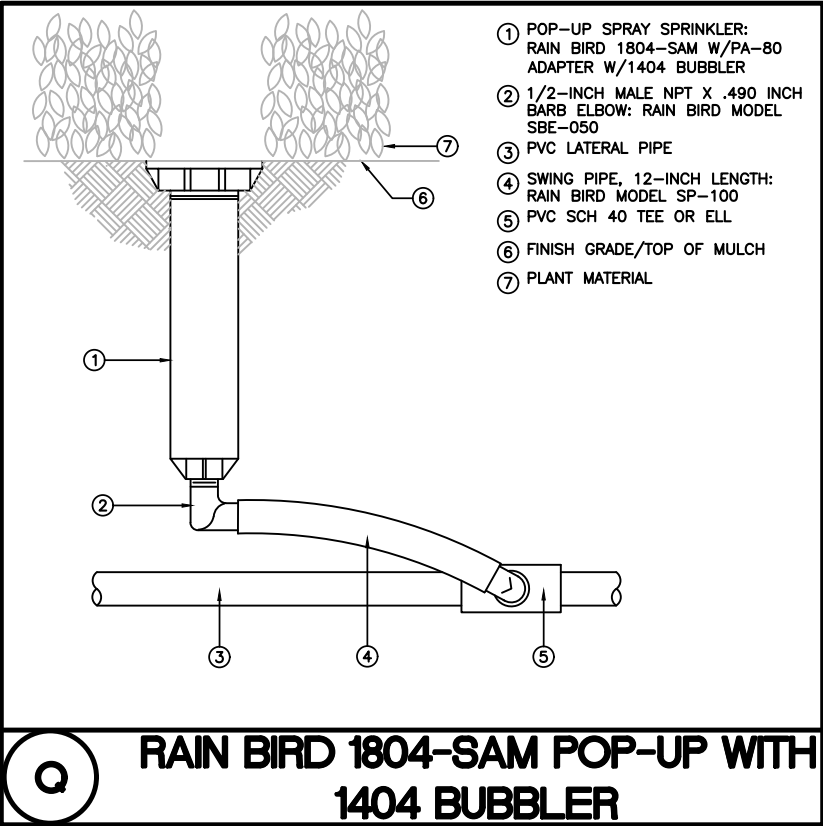
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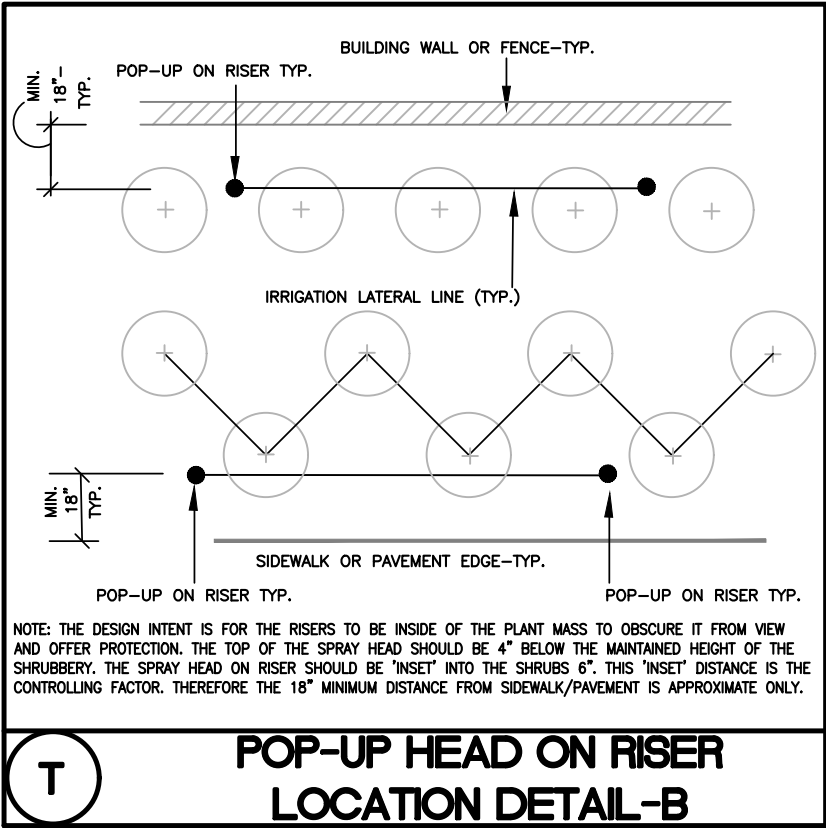
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**66th Avenue**  
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IRRIGATION NOTES & SPECIFICATIONS

Irrigation design based on the Lucido & Associates Landscape Plan dated August 2016. Contractor shall refer to these plans to coordinate sprinkler and pipe locations.

The system has been designed to conform with the requirements of all applicable codes, laws, ordinances, rules, regulations and conventions. Should any conflict exist, the requirements of the codes shall prevail. It is the responsibility of the owner/installation contractor to ensure the entire system is installed as designed. Irrigation contractor responsible for obtaining all required permits according to federal, state and local laws.

The scope of work is shown on the plans, notes and details. The Irrigation Contractor shall be certified as a CERTIFIED IRRIGATION CONTRACTOR by the Irrigation Association. The certification shall be current and in good standing.

THE WORK

The work specified in this section consists of furnishing all components necessary for the installation, testing, and delivery of a complete, fully functional automatic landscape irrigation system that complies with the irrigation plans, specifications, notes, and details. This work shall include, but not be limited to, the providing of all required material if applicable (pump(s), backflows, pipes, valves, fittings, controllers, wire, primer, glue, etc.), layout, protection to the public, excavation, assembly, installation, back filling, compacting, repair of road surfaces, controller and low voltage feeds to valves, cleanup, maintenance, guarantee and as-built plans.

All irrigated areas shall provide 100% head-to-head coverage from a fully automatic irrigation system with a rain/freeze shut off device. If the shut off device is a rain sensor, it shall be installed to prevent activation by adjacent heads and in a visually un-obtrusive location approved by owner. Zones are prioritized first by public safety and then by hydraulic concerns. This sequencing will be a mandatory punch list item.

These plans have been designed to satisfy/exceed the Florida Building Code (FBC) Appendix F and the Florida Irrigation Society Standards and Specifications for Turf and Landscape Irrigation Systems, fourth

edition. All products should be installed per manufacturer's recommendation. Contractor shall verify all underground utilities 72 hours prior to commencement of work.

It is the responsibility of the irrigation contractor to familiarize themselves with all grade differences, location of walls, retaining walls, structures and utilities. Do not willfully install the sprinkler system as shown on the drawings when it is obvious in the field that unknown obstruction, grade differences or differences in the area dimensions exist that might not have been considered in the engineering. Such obstructions, or differences, should be brought to the attention of the owner's authorized representative. In the event this notification is not performed, the irrigation contractor shall assume full responsibility for any revisions necessary.

Irrigation contractor shall repair or replace all items damaged by their work. Irrigation contractor shall coordinate their work with other contractors for the location and installation of pipe sleeves and laterals through walls, under roadways and paving, etc.

The contractor shall take immediate steps to repair, replace, or restore all services to any utilities which are disrupted due to their operations. All costs involved in disruption of service and repairs due to negligence on the part of the contractor shall be their responsibility.

POINT OF CONNECTION (P.O.C.)

There are two P.O.C.s on this project. Both P.O.C.s are new Sullivan Electric 5hp Pump Stations model #EPS-I-5-230-3-VFD-S-ECON each utilizing a new 4" well as the water source. Each P.O.C. must be capable of delivering a minimum of 65 GPM at 50 PSI downstream of the pump discharge.

Contractor to verify these minimum conditions can be met prior to ordering of materials and the beginning of installation. If the conditions can not be met, the contractor must notify the designer prior to proceeding with the work. If the contractor does not do so, the contractor proceeds at their own risk and becomes responsible for any future work required to make the system perform as required.

THE PIPE

Pipe locations shown on the plan are schematic and shall be adjusted in the field. When laying out mainlines place a maximum of 18" away from either the back of curb, front of walk, back of walk, or other hardscape to allow for ease in locating and protection from physical damage. Install all lateral pipe near edges of pavement or against buildings whenever possible to allow space for plant root balls. Always install piping inside project's property boundary.

All pipes are to be placed in planting beds. If it is necessary to have piping under hardscapes, such as roads, walks, and patios, the pipes must be sleeved using Class 200 PVC with the sleeve diameter being twice the size of the pipe it is carrying with a minimum sleeve size of 2". No sleeve shall have turns or fittings that prevent a pipe from being manually pushed/pulled through after it is installed.

Pipe sizes shall conform to those shown on the drawings. No substitutions of smaller pipe sizes shall be permitted, but substitutions of larger sizes may be approved. All damaged and rejected pipe shall be removed from the site at the time of said rejection.

Mainline shall be Class 200 gasketed 'pantone purple' PVC with Leemco Ductile iron fittings and mechanical joint restraints (sized per plans).

Contractor to ensure all mainline piping is properly restrained using mechanical joint fittings, restraining collars, threaded rods, thrust blocks, etc., as and where required. Contractor shall refer to pipe manufacturers recommended installation practices for further direction.

PVC pipe joint compound and primer: The PVC cement shall be Weld-On 711 (grey, slow-drying, heavy duty) and the primer shall be Weld-On P70 (purple tinted, compatible with cement), or approved equals.

ELECTRICAL POWER SUPPLY

Electrical supply for irrigation pumps, controllers, sensors, & relays to be provided by irrigation contractor. Contractor to coordinate with local utilities for the installation of, and connection to, site available power supplies for required electrical components as set forth in the irrigation plans.

All electrical work is to comply with the National Electrical Code and any, and all, other applicable electrical codes, laws and regulations. A licensed electrician shall perform all electrical hook-ups. Power for each controller shall be a dedicated 120 volt, 20 amp circuit unless otherwise specified in the plans. Power for each pump to be according to pump specifications indicated in these plans.

WIRING

Irrigation control wire shall be thermoplastic solid copper, single conductor, low voltage irrigation controller wire; suitable for direct burial and continuous operation at rated voltages.

Tape and bundle control wires every 10' and run alongside the mainline. At all turns in direction make a 2' coil of wire. At all valve boxes coil wire around a 3/4" piece of PVC pipe to make a coil using 30 linear inches of wire. Make electrical connections with 3MDBY/R connectors.

Number all wires, using an electrical book of numbers, according to the plans. Number wires in all valve boxes, junction boxes and at the controller.

Wire sized, numbered and colored as follows:

- South Pump 'P1' control system:
- #10 white for common
- #10 spare black common
- #10 individual color coded hot wire
- #10 spare yellow hot wire

- North Pump 'P2' control system:
- #12 white for common
- #12 spare black common
- #12 individual color coded hot wire
- #12 spare yellow hot wire

Spare wires


Leaving each controller, run three spare wires in both directions (six spare wires total). Install as 1 common spare (2 total) and 2 hot wires (4 total). Loop these wires into each RCV along their path and terminate in the last valve box controlled by the wires respective controller. The loop into each valve box shall extend up into the valve box a minimum of 8" and be readily accessible by opening the valve box lid. These wires must be all numbered and color coded as required in these plans.

Controller and Pump station Control Panel grounding – Contractor to utilize 4"x96"x0.0625" copper grounding plates, 5/8"x10' copper clad grounding rods, 'One Strike' CAD wells at all connection points, #6 insulated copper wire, and earth contact material. Install these and other required components as outlined in the detail. Contractor to verify that the earth to ground resistance does not exceed 10 ohms. Contractor shall provide a written certification, on a licensed electrical contractors letter head, showing the date of the test, controller/pump location, and test results. Each controller/pump shall be so grounded and tested. Each component must have its own separate grounding grid, unless they are sitting side by side, in which case up to two controllers can share a common grounding grid.

LAYOUT

Lay out irrigation system mainlines and lateral lines. Make the necessary adjustments as required to take into account all site obstructions and limitations prior to excavating trenches.

Stake all sprinkler head locations. Adjust location and make the necessary modifications to nozzle types, etc. required to ensure 100% head to head coverage. Refer to the Edge of Pavement Detail on the Irrigation Detail Sheet.



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66th Avenue

Phase 1A

Indian River County

Roadway Irrigation

Details & Notes

Date

By

Description

9/9/16


JJ

North Extension Irrigation

12/11/2017


JJ

100% CD



NORTH

SCALE: 1" = NTS



Designer

JJ

Sheet

Manager

JJ

Project Number

16-260

Municipal Number

00-000

Computer File

16-260\_66thAve\_Roadway\_IR.dwg

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Spray heads shall be installed 4” from sidewalks or curbed roadways and 12” from uncurbed roadways and building foundations. Rotors shall be installed 4” from sidewalks or curbed roadways, 12” from building foundations, and 36” from uncurbed roadways.

Shrub heads shall be installed on 3/4” Sch 40 PVC risers. The risers shall be set at a minimum of 18” off sidewalks, roadway curbing, building foundations, and/or any other hardscaped areas. Shrub heads shall be installed to a standard height of 4” below maintained height of plants and shall be installed a minimum of 6” within planted masses to be less visible and offer protection. Paint all shrub risers with flat black or forest green paint, unless irrigation system will utilize reuse water; in this case the risers shall be purple PVC and shall not be painted.

Locate valves prior to excavation. Ensure that their location provides for easy access and that there is no interference with physical structures, plants, trees, poles, etc. Valve boxes must be placed a minimum of 12” and a maximum of 15” from the edge of pavement, curbs, etc. and the top of the box must be 2” above finish grade. No valve boxes shall be installed in turf areas without approval by the irrigation designer – only in shrub beds. Never install in sport field areas.

#### VALVES

Sequence all valves so that the farthest valve from the P.O.C. operates first and the closest to the P.O.C. operates last. The closest valve to the P.O.C. should be the last valve in the programmed sequence.

Adjust the flow control on each RCV to ensure shut off in 10 seconds after deactivation by the irrigation controller.

Using an electric branding iron, brand the valve I.D. letter/number on the lid of each valve box. This brand must be 2”–3” tall and easily legible.

#### EQUIPMENT

All pop–up heads and shrub risers shall be pressure compensating. All pop–up heads shall be mounted on flex–type swing joints. All rotors shall be installed with PVC triple swing joints unless otherwise detailed.

All sprinkler equipment, not otherwise detailed or specified on these plans, shall be installed as per manufacturer’s recommendations and specifications, and according to local and state laws.

#### TRENCHING

Excavate straight and vertical trenches with smooth, flat or sloping bottoms. Trench width and depth should be sufficient to allow for the proper vertical and horizontal separation between piping as shown in the pipe installation detail on the detail sheet.

Protect existing landscaped areas. Remove and replant any damaged plant material upon job completion. The replacement material shall be of the same genus and species, and of the same size as the material it is replacing. The final determination as to what needs to be replaced and the acceptability of the replacement material shall be solely up to the owner or owner’s representative.

#### INSTALLATION

**Solvent Weld Pipe:** Cut all pipe square and deburr. Clean pipe and fittings of foreign material; then apply a small amount of primer while ensuring that any excess is wiped off immediately. Primer should not puddle or drip from pipe or fittings. Next apply a thin coat of PVC cement; first apply a thin layer to the pipe, next a thin layer inside the fitting, and finally another very thin layer on the pipe. Insert the pipe into the fitting. Insure that the pipe is inserted to the bottom of the fitting, then turn the pipe a 1/4 turn and hold for 10 seconds. Make sure that the pipe doesn’t recede from the fitting. If the pipe isn’t at the bottom of the fitting upon completion, the glue joint is unacceptable and must be discarded.

Pipes must cure a minimum of 30 minutes prior to handling and placing into trenches. A longer curing time may be required; refer to the manufacturer’s specifications. The pipe must cure a minimum of 24 hours prior to filling with water.

**Gasketed Pipe:** With pipe in the trench, cut pipe square, deburr, and place beveled edge on male portion of pipe, if not using a piece with a factory bevel. Clean pipe and fittings of foreign material; then apply a small amount of pipe grease to the rubber gasket on the female end. Fully insert the male end of the pipe into the bell end of adjacent pipe until the bevel is fully seated into the bell. Restrain pipe as required.

#### BACK FILL

The Back fill 6” below, 6” above, and around all piping shall be of clean sand and anything beyond that in the trench can be of native material but nothing larger than 2” in diameter. All piping and excavations shall be backfilled and compacted to a density of 95% modified Proctor, or greater.

Main line pipe depth measured to the top of pipe shall be:  
24” minimum for 3/4”–2 1/2” PVC with a 30” minimum at vehicular crossings;  
30” minimum for 3” & 4” PVC with a 36” minimum at vehicular crossings.

Lateral line depths measured to top of pipe shall be:  
18” minimum for 3/4”–3” PVC with a 30” minimum at vehicular crossings

Contractor shall backfill all piping, both mainline and laterals, prior to performing any pressure tests. The pipe shall be backfilled with the exception of 2’ on each side of every joint (bell fittings, 90’s, tees, 45’s, etc.). These joints shall not be backfilled until all piping has satisfactorily passed its appropriate pressure test as outlined below.

#### FLUSHING

Prior to the placement of valves, flush all mainlines for a minimum of 10 minutes or until lines are completely clean of debris, whichever is longer.

Prior to the placement of heads, flush all lateral lines for a minimum of 10 minutes or until lines are completely clean of debris, whichever is longer.

Use screens in heads and adjust heads for proper coverage avoiding excess water on walls, walks and paving.

#### TESTING

Soil: At a minimum of 2 locations on the site, soil tests for infiltration and texture shall be performed according to the USDA Soil Quality Test Kit Guide. The tests shall be documented in a USDA Soil Worksheet. (All of the above is available at [http://soils.usda.gov/sqi/assessment/test\\_kit.html](http://soils.usda.gov/sqi/assessment/test_kit.html)) The completed worksheet shall be submitted to the owners representative for review/approval. Do not proceed without written direction from the owner/owner’s representative.

Schedule testing with Owner’s Representative a minimum of three (3) days in advance of testing.

Mainline: Remove all remote control valves and cap using a threaded cap on SCH 80 nipple. Hose bibs and gate valves shall not be tested against during a pressure test unless authorized by written permission from the owner. Fill mainline with water and pressurize the system to 125 PSI using a hydrostatic pump. Monitor the system pressure at two gauge locations; the gauge locations must be at opposite ends of the mainline. With the same respective pressures, monitor the gauges for two hours. There can be no loss in pressure at either gauge for solvent–welded pipe. For gasketed pipe, testing requires measurement of the water pumped into the mainline system, using a hydrostatic pump, to maintain 125 PSI – this water volume shall be no more than the result of the following formula:

$$L=(ND\sqrt{P})/7400$$

where L=Allowable leakage in gallons per hour  
N=Number of joints in pipe tested  
D=Nominal diameter of pipe (in inches)  
P=Average Test Pressure (in PSI)

If these parameters are exceeded, locate the problem; repair it; wait 24 hours and retry the test. This procedure must be followed until the mainline passes the test.

**Lateral Lines:** The lateral lines must be fully filled to operational pressure and visually checked for leaks. Any leaks detected must be repaired.

Operational Testing –Once the mainline and lateral lines have passed their respective tests, and the system is completely operational, a coverage test and demonstration of the system is required. The irrigation contractor must demonstrate to the owner, or his/her representative, that proper coverage is obtained and the system works automatically from the controller. This demonstration requires each zone to be turned on, in the proper sequence as shown on the plans, from the controller. Each zone will be inspected for proper coverage and function. The determination of proper coverage and function is at the sole discretion of the owner or owner’s representative.

Upon completion of the operational test, run each zone until water begins to puddle or run off. This will allow you to determine the number of irrigation start times necessary to meet the weekly evapotranspiration requirements of the planting material in each zone. In fine sandy soils, it is possible no puddling will occur. If this is experienced, then theoretical calculations for run times will be required for controller programming.


#### SUBMITTALS

**Pre–Construction:** Deliver five (5) copies of submittals to Owner’s Representative within ten (10) working days from date of Notice to Proceed. Furnish information in 3–ring binder with table of contents and index sheet. Index sections for different components and label with specification section number and name of component. Furnish submittals for components on material list. Indicate which items are being supplied on catalog cut sheets when multiple items are shown on one sheet. Incomplete submittals will be returned without review. In lieu of hardcopies, an electronic package in PDF format can be submitted.

#### After project completion:

As a condition of final acceptance, the irrigation contractor shall provide the owner with:

1. Irrigations As–builts – shall be provided utilizing a sub–foot Global Navigation Satellite System (GNSS) to accurately locate all mainlines, sleeves, remote control valves, gate valves, independent wire runs, wire splice boxes, controllers, high voltage supply sources/conduit path, control mechanisms, sensors, wells and water source connections in Florida East State Plane, NAD 83, and CORS 96 format. The data collected shall be in POINT format and include an ID for each data point with Manufacturer, Type, Size, and Depth. All mainline and independent runs of wire shall be located every 30’ for straight runs and at every change of direction. Sleeves will be located at end points and every 20’ of length. All underground items shall include depth in inch format. These POINTS once collected shall be imported into an AutoCAD DWG geo–referenced base file to be labeled accordingly. The completed AS–Built shall be a Geo–Referenced DWF file and delivered to the owner on a compact disk (CD).
2. Controller charts – Upon completion of ”as–built” prepare controller charts; one per controller. Indicate on each chart the area controlled by a remote control valve (using a different color for each zone). This chart shall be reduced to a size that will fit inside of the controller door. The reduction shall be hermetically sealed inside two 2ml pieces of clear plastic.



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66th Avenue


Phase 1A

Indian River County

Roadway Irrigation

Notes

Date	By	Description
9/9/16	JJ	North Extension Irrigation
12/11/2017	JJ	100% CD



NORTH

SCALE: 1" = NTS

Designer	JJ	Sheet
Manager	JJ	
Project Number	16-260	
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3. Grounding Certification – Provide ground certification results for each controller and pump panel grounding grid installed. This must be on a licensed electrician letter head indicating location tested (using IR plan symbols), date, time, test method, and testing results.

INSPECTIONS AND COORDINATION MEETINGS REQUIRED – Contractor is required to schedule, perform, and attend the following, and demonstrate to the owner and/or owners representative to their satisfaction, as follows:

1. Pre-construction meeting – Designer and contractor to review entire install process and schedule with owner/general contractor.
2. Mainline installation inspection(s) – all mainline must be inspected for proper pipe, fittings, depth of coverage, backfill, and installation method
3. Mainline pressure test – All mainline shall be pressure tested according to this design's requirements
4. Flow Meter calibration – All flow meters must be calibrated, provide certified calibration report for all flow meters.
5. USDA Soil Quality Tests for infiltration/texture
6. Coverage and operational test
7. Final inspection
8. Punch list inspection

FINAL ACCEPTANCE

Final acceptance of the irrigation system will be given after the following documents and conditions have been completed and approved. Final payment will not be released until these conditions are satisfied.

1. All above inspections are completed, documented, and approved by owner.
2. Completion and acceptance of 'as-built' drawings.
3. Acceptance of required controller charts and placement inside of controllers.
4. All other submittals have be made to the satisfaction of the owner.

GUARANTEE: The irrigation system shall be guaranteed for a minimum of one calendar year from the time of final acceptance.

## MINIMUM RECOMMENDED IRRIGATION MAINTENANCE PROCEDURES

1. Every irrigation zone should be checked monthly and written reports generated describing the date(s) each zone was inspected, problems identified, date problems repaired, and a list of materials used in the repair. At minimum, these inspections should include the following tasks:

- A. Turn on each zone from the controller to verify automatic operation.
- B. Check schedules to ensure they are appropriate for the season, plant and soil type, and irrigation method. Consult an I.A. certified auditor for methods used in determining proper irrigation scheduling requirements.
- C. Check remote control valve to ensure proper operation.
- D. Check setting on pressure regulator to verify proper setting, if present.
- E. Check flow control and adjust as needed; ensure valve closure within 10–15 seconds after deactivation by controller.
- F. Check for leaks – mainline, lateral lines, valves, heads, etc.
- G. Check all heads as follows:

1. Proper set height (top of sprinkler is 1" below mow height)
2. Verify head pop-up height – 6" in turf, 12" in ground cover, and pop-up on riser in shrub beds.

3. Check wiper seal for leaks – if leaking, clean head and re-inspect.
4. If still leaking, replace head with the appropriate head with pressure regulator and built-in check valve.
5. All nozzles checked for proper pattern, clogging, leaks, correct make model, etc. – replace as needed
6. Check for proper alignment – perfectly vertical; coverage area is correct; minimize over spray onto hardscapes.
7. Riser height raised/lowered to accommodate plant growth patterns and ensure proper coverage.
8. Verify the pop-up riser retracts after operation. If not, repair/replace as needed.
- H. Check controller/C.C.U. grounds for resistance (10 ohms or less) once per year. Submit written reports.
- I. Check rain shut-off device monthly to ensure it functions properly.
- J. Inspect all filters monthly and clean/repair/replace as needed.
- K. Inspect backflow devices by utilizing a properly licensed backflow inspector. This should be done annually, at minimum.
- L. Inspect all valve boxes to ensure they are in good condition, lids are in place and locked.
- M. Check pump stations for proper operation, pressures, filtration, settings, etc. – refer to pump station operations manual.
- N. Check and clean intake screens on all suction lines quarterly, at minimum. Clean and/or repair, as needed.
- O. Winterize, if applicable, as weather in your area dictates. Follow manufacturer recommendations and blow out all lines and equipment using compressed air. Perform seasonal startup of system as per manufacturer recommendations.
- P. Conduct additional inspections, maintenance tasks, etc. that are particular for your site.

## Soil Moisture Sensor

1. Place all soil moisture sensor wiring in 1" SCH 40 PVC conduit
2. Soil moisture sensor should be placed in the middle of a spray or drip area as per manufacturer's recommendations.
3. Controller shall be set to the Florida Automated Weather Network's urban scheduler settings using the SMS as a moisture cut off device (like a rain switch) per manufacturer directions.



Key / Location:

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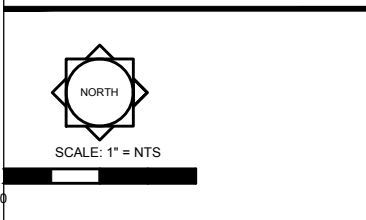
## 66th Avenue

## Phase 1A

Indian River County

# Roadway Irrigation Notes

Date	By	Description
9/9/16	JJ	North Extension Irrigation
12/11/2017	JJ	100% CD



Designer JJ Sheet  
 Manager JJ **19 of 19**  
 Project Number 16-260  
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