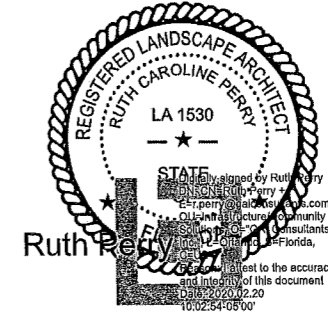


**LAKE COUNTY  
DEPARTMENT OF PUBLIC WORKS  
ENGINEERING DIVISION**

350 N. SINCLAIR AVE  
TAVARES, FLORIDA 32778

**CONTRACT PLANS**

**CR 455 & RIDGEWOOD AVENUE**



*INDEX OF PLAN SHEETS*

<i>SHEET NO.</i>	<i>SHEET DESCRIPTION</i>
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LA.01	LANDSCAPE PLAN
LA.02	LANDSCAPE PLAN
IR.01	IRRIGATION PLAN
IR.02	IRRIGATION NOTES AND DETAILS
E.01	LEGEND, FIXTURE SCHEDULE & SITE ELECTRICAL PLAN
E.02	LIGHTING DETAILS
E.03	ELECTRICAL DETAILS
E.04	ELECTRICAL SPECIFICATIONS
E.05	ELECTRICAL SPECIFICATIONS

*LANDSCAPE & IRRIGATION SHOP DRAWINGS  
TO BE SUBMITTED TO:*

GLENN HERBERT, PLA  
GAI CONSULTANTS  
618 EAST SOUTH STREET, SUITE 700  
ORLANDO, FL 32801  
(321)319-3058

*PLANS PREPARED BY:*

COMMUNITY  
SOLUTIONS  
GROUP

618 E. SOUTH STREET  
SUITE 700  
ORLANDO, FL 32801  
407 423-8398

A GAI CONSULTANTS, INC SERVICE GROUP  
CERTIFICATE OF AUTHORIZATION: E89951

*GOVERNING STANDARDS AND SPECIFICATION:  
LAKE COUNTY, FLORIDA STANDARDS AND SPECIFICATION,  
FLORIDA DEPARTMENT OF TRANSPORTATION  
DESIGN STANDARDS DATED FY 2017/2018,  
AND STANDARD SPECIFICATIONS FOR ROAD AND  
BRIDGE CONSTRUCTION DATED 2018,  
AS AMENDED BY CONTRACT DOCUMENTS*

*FOR DESIGN STANDARDS MODIFICATION CLICK ON "DESIGN STANDARS"  
AT THE FOLLOWING WEB SITE:  
[HTTP://WWW.DOT.STATE.FL.US/RDDDESIGN/](http://www.dot.state.fl.us/rddesign/)*

*NOTE: THE SCALE OF THESE PLANS MAY  
HAVE CHANGED DUE TO REPRODUCTION.*

*FINAL PLANS  
06-07-2019*

48 HOURS BEFORE YOU DIG  
CALL SUNSHINE  
1-800-432-4770  
IT'S THE LAW IN FLORIDA  
FL. STATUTE 653.851 (1979) REQUIRES  
MIN. OF 2 DAYS AND MAX. OF 6 DAYS  
NOTICE BEFORE YOU EXCAVATE.

KEY SHEET REVISIONS		
DATE	BY	DESCRIPTION

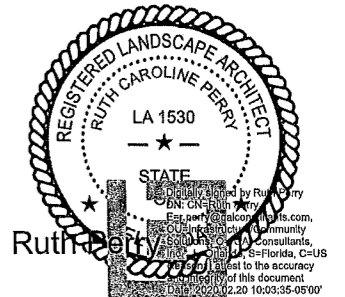
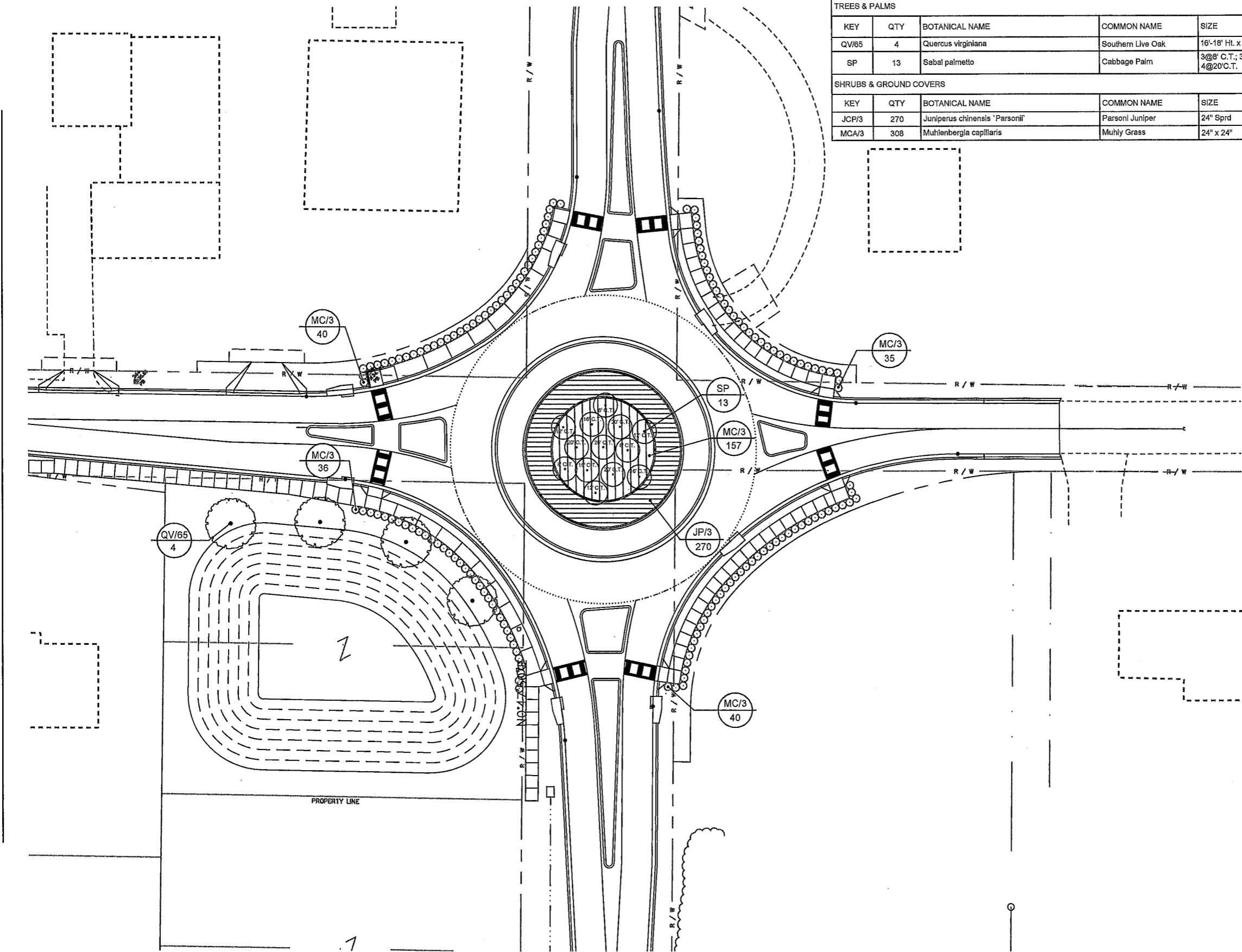
LAKE COUNTY PROJECT MANAGER: WILLIAM WHITE

FISCAL YEAR	SHEET NO.
2019	CS.01

A180985.00

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TREES & PALMS						
KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	REMARKS
QV/65	4	Quercus virginiana	Southern Live Oak	16'-18' Ht. x 8'-10' Sprd.	35' O.C.	65 Gal, 4" Cal., Full Canopy
SP	13	Sabal palmetto	Cabbage Palm	3@8' C.T.; 3@12' C.T. 3@16' C.T.; 4@20' C.T.	A.S.	Regenerated Heads
SHRUBS & GROUND COVERS						
KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	REMARKS
JCP/3	270	Juniperus chinensis 'Parsonii'	Parson Juniper	24" Sprd	30" O.C.	3 Gal, Full
MCA/3	308	Muhlenbergia capillaris	Muhly Grass	24" x 24"	36" O.C.	3 Gal, Full



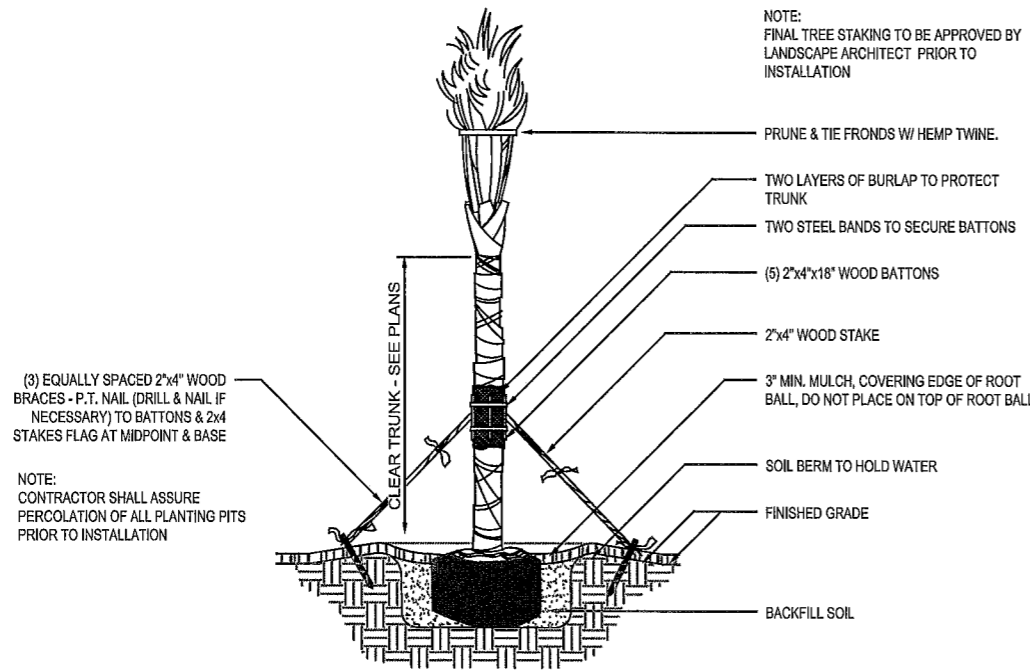
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**COMMUNITY SOLUTIONS GROUP**  
 618 E. SOUTH STREET  
 SUITE 700  
 ORLANDO, FL 32801  
 407 423-8398  
A GAI CONSULTANTS, INC SERVICE GROUP  
 CERTIFICATE OF AUTHORIZATION: EB9991

LAKE COUNTY		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID

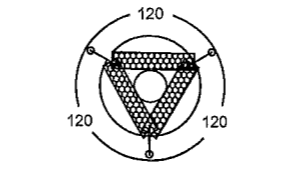
LANDSCAPE PLAN  
 SHEET NO.  
**LA.01**

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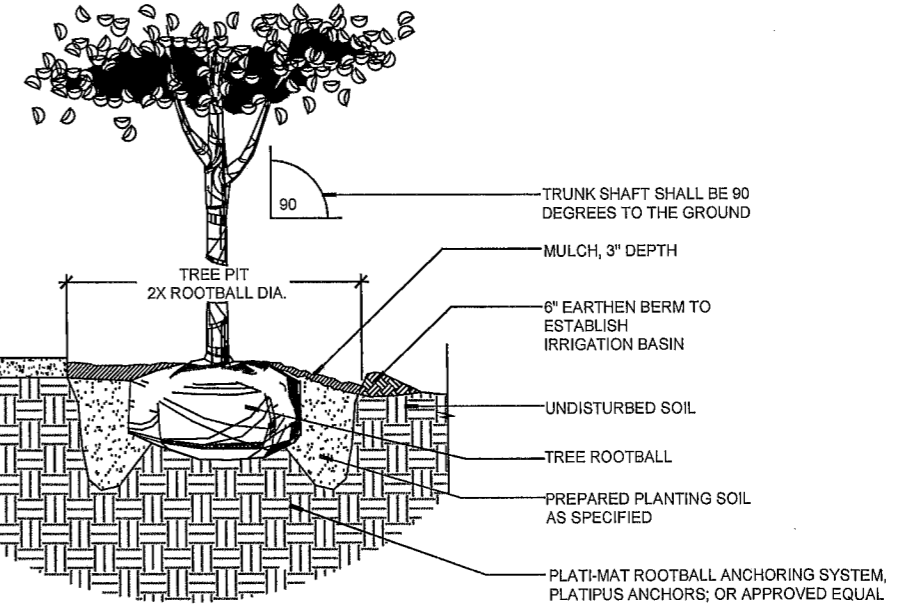
**1** SABAL PALM DETAIL  
 LA.02 N.T.S.

PLAN VIEW OF ANCHORING SYSTEM

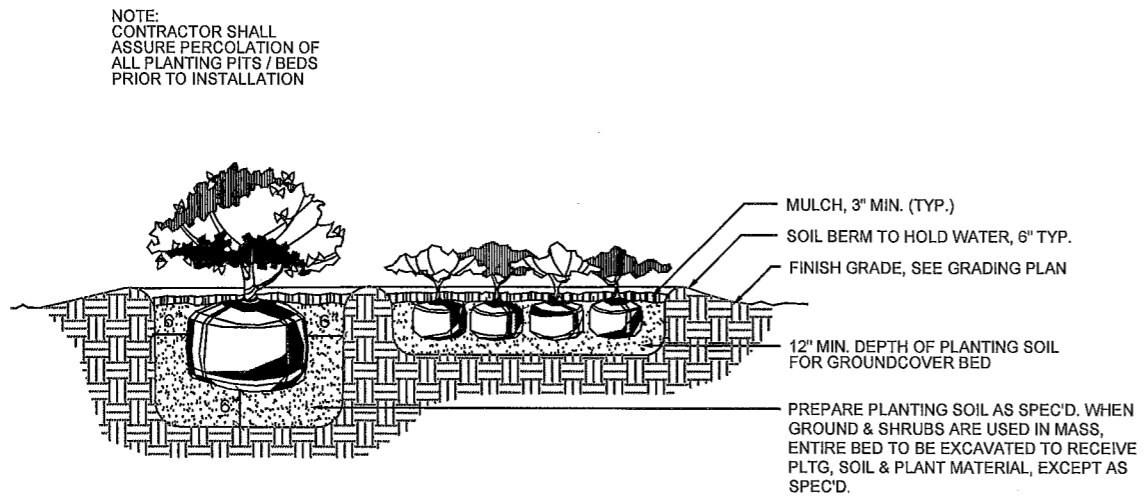


ADJACENT HARDSCAPE, WHERE APPLICABLE

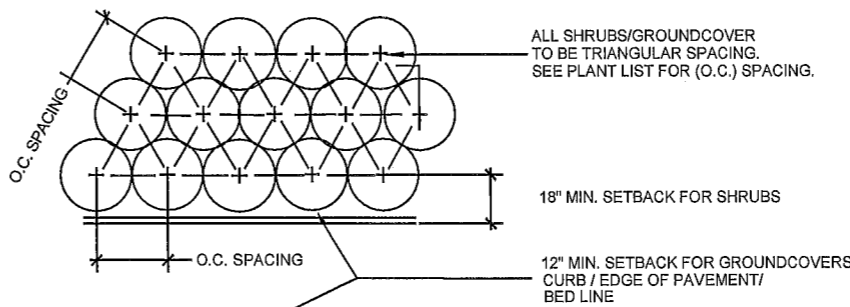
NOTE: CONTRACTOR SHALL ASSURE PERCOLATION OF ALL PLANTING PITS PRIOR TO INSTALLATION



**2** LARGE TREE DETAIL (65 Gal.)  
 LA.02 N.T.S.

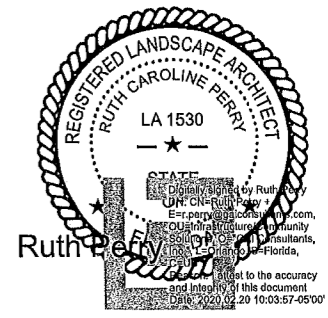


**3** SHRUB AND GROUNDCOVER DETAIL  
 LA.02 N.T.S.



NOTES:  
 1. THE PERIMETER OF ALL CURVED PLANTING BEDS SHALL BE PLANTED AT WITH A ROW OF PLANTS AS SHOWN IN THIS DETAIL, AT THE O.C. SPACING SHOWN IN THE PLANT LIST.  
 2. INTERIOR PORTIONS OF EACH BED SHALL BE PLANTED IN A TRIANGULAR PATTERN AS SHOWN IN THIS DETAIL, AT THE O.C. SPACING SHOWN IN THE PLANT LIST.  
 3. SETBACKS ARE APPLICABLE AGAINST ALL HARDSCAPE SURFACES AND SOD EDGES.

**5** TRIANGULAR PLANT SPACING DETAIL  
 LA.02 N.T.S.



DATE	REVISIONS	DATE	REVISIONS

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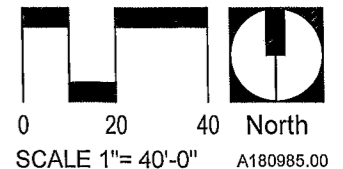
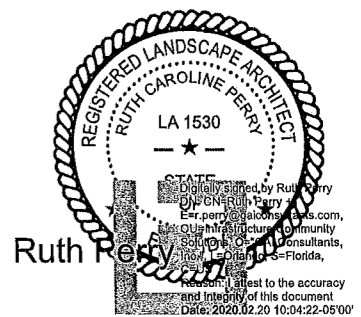
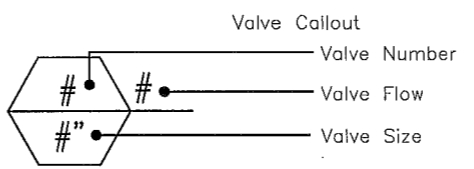
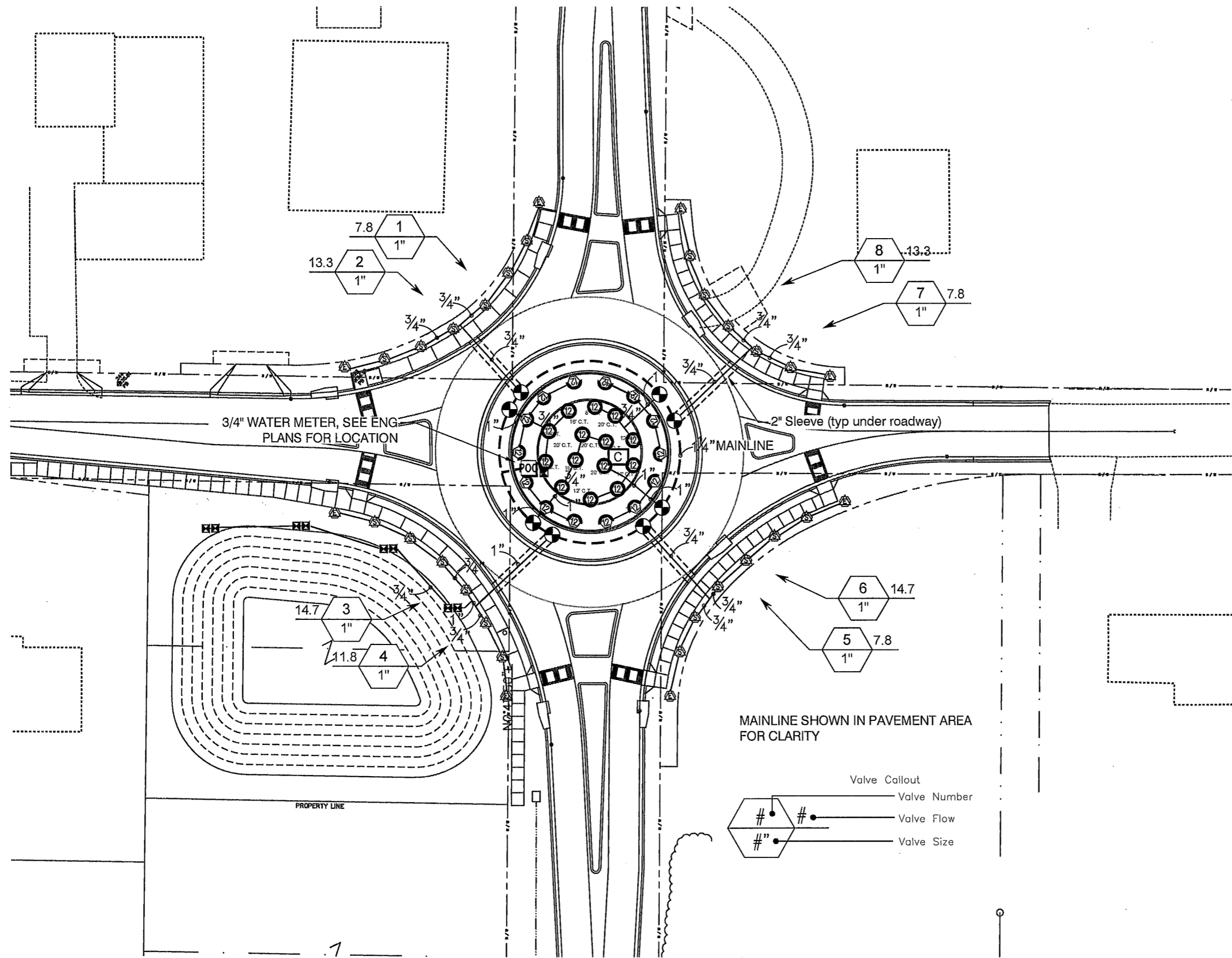
LAKE COUNTY		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID

**LANDSCAPE PLAN**  
 SHEET NO. LA.02

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ORLANDO, FL 32801  
407 423-8398

AGM CONSULTANTS, INC SERVICE GROUP  
CERTIFICATE OF AUTHORIZATION: EB9951

LAKE COUNTY		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID

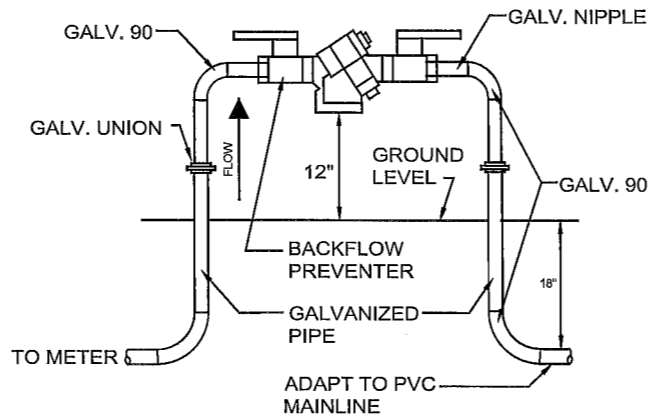
IRRIGATION PLAN

SHEET NO.  
IR.01

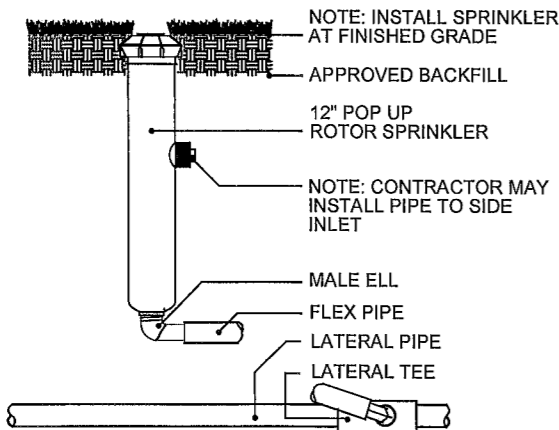
# LEGEND

SYMBOL	MANUFACTURER/MODEL	ARC	PSI	GPM	RADIUS
	Hunter PROS-06-CV-R 12' radius	180	30	1.30	12'
	Hunter PROS-06-CV-R 12' radius	360	30	2.70	12'
	Hunter PROS-06-CV-R 5' strip spray	SS	30	1.30	5'x30'
	Hunter PROS-06-CV-R 5' strip spray	ES	30	.65	5'x15'
	Hunter PCB-R Flood Bubbler	30	.50		

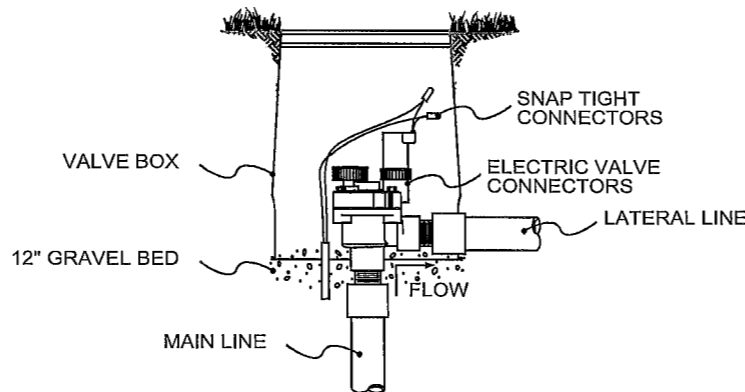
SYMBOL	MANUFACTURER/MODEL/DESCRIPTION
	Hunter ICV Valve in Green Valve Box
	Hunter IIC2, 8 station, plastic pedestal w/ Rain Sensor
	Water Meter 3/4" by others to produce a minimum of 20 gpm @ 40 psi.
	Wilkins 975 XL 1" Backflow Preventer
	Irrigation Lateral Line: PVC Class 200
	Irrigation Mainline: PVC Class 200
	Irrigation Sleeve: PVC Sch 40



**1 BACKFLOW PREVENTER**  
IR.02 N.T.S.



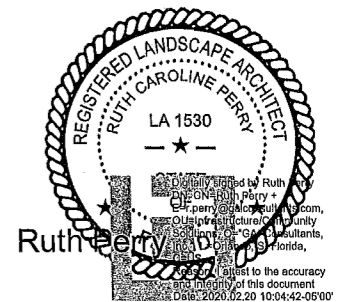
**2 12" POP UP SPRINKLER**  
IR.02 N.T.S.



**3 ELECTRIC VALVE**  
IR.02 N.T.S.

# NOTES

1. THE PLANS AND DRAWINGS ARE DIAGRAMMATIC OF THE WORK TO BE PERFORMED. SOME COMPONENTS MAY BE SHOWN OUTSIDE THE WORK AREA FOR CLARITY. THE WORK SHALL BE EXECUTED IN A MANNER TO AVOID CONFLICTS WITH UTILITIES AND OTHER ELEMENTS OF CONSTRUCTION, INCLUDING LANDSCAPE MATERIALS. ALL DEVIATIONS FROM THE PLANS SHALL BE APPROVED BY THE OWNER'S REPRESENTATIVE BEFORE BEING INSTALLED. THE CONTRACTOR SHALL NOT WILLFULLY INSTALL ANY ASPECT OF THE IRRIGATION SYSTEM AS SHOWN ON THE PLANS AND DRAWINGS, WHEN IT IS OBVIOUS IN THE FIELD THAT OBSTRUCTIONS, GRADE DIFFERENCES, OR DISCREPANCIES EXIST THAT MIGHT NOT HAVE BEEN KNOWN DURING THE DESIGN OF THE IRRIGATION SYSTEM. IN THE EVENT THAT NOTIFICATION OF THE CONFLICT IS NOT APPROVED BY THE OWNER'S REPRESENTATIVE, THE CONTRACTOR WILL ASSUME FULL RESPONSIBILITY FOR ALL REVISIONS.
2. THE IRRIGATION SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE PLANS, IRRIGATION SYSTEM SPECIFICATIONS AND ALL CONTRACT DOCUMENTS. THE CONTRACTOR SHALL COMPLY WITH ALL PREVAILING LOCAL CODES, ORDINANCES, AND REGULATIONS.
3. CONTRACTOR SHALL VERIFY ALL SITE CONDITIONS, INCLUDING UTILITY LOCATIONS, BEFORE INSTALLATION OF THE IRRIGATION SYSTEM. ALL UTILITIES AND STRUCTURES MAY NOT BE SHOWN ON THE PLANS - CONTRACTOR TO VERIFY. COORDINATE ALL IRRIGATION SYSTEM CONSTRUCTION WITH EXISTING AND NEW PLANTINGS TO AVOID CONFLICT OR INTERFERENCE WITH LOCATION OF PIPING, SLEEVING, CABLES, AND SERVICE UTILITIES. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING INSTALLATION WITH ALL OTHER CONSTRUCTION ON SITE, ESPECIALLY LANDSCAPE INSTALLATION. IRRIGATION SYSTEM SHALL BE RELOCATED AT NO ADDITIONAL COST FOR ANY CONFLICT WITH LANDSCAPE INSTALLATION OR ANY OTHER SITE CONSTRUCTION OR EXISTING CONDITIONS. ALL COMPONENTS THAT ARE NOT CONTAINED WITHIN THE SPECIFIC AREAS SHOWN OR CALLED OUT ON THE DRAWINGS WILL NOT BE ACCEPTED. ALL PIPING AND OTHER COMPONENTS ARE TO REMAIN WITHIN THE PROPERTY OF THE OWNER.
4. WHERE EXISTING OR NEW TREES, LIGHT STANDARDS, SIGNS, ELECTRONIC CONTROLLERS AND/OR OTHER OBJECTS ARE AN OBSTRUCTION TO AN IRRIGATION SPRINKLER'S PATTERN, THE COMPONENT AND PIPING SHALL BE RELOCATED AS NECESSARY TO OBTAIN PROPER COVERAGE OF AN IRRIGATION SPRINKLER'S PATTERN, THE COMPONENT AND PIPING SHALL BE RELOCATED AS NECESSARY TO OBTAIN THE PROPER COVERAGE WITHOUT DAMAGING THE OBSTRUCTION. OWNER'S REPRESENTATIVE SHALL DETERMINE WHETHER AN OBSTRUCTION OCCURS OR NOT.
5. COMPONENT SPACING ARE MAXIMUM. DO NOT EXCEED SPACING SHOWN OR NOTED ON THE PLANS. COMPONENT SPACING MAY BE ADJUSTED TO ACCOMMODATE CHANGES IN TERRAIN AND PLANTING LAYOUT AS LONG AS THE MODIFIED SPACING DO NOT EXCEED THE SPACING SHOWN IN THE PLANS. UNLESS SHOWN OTHERWISE, CONTRACTOR SHALL PROVIDE 100% COVERAGE.
6. ALL MATERIALS AND EQUIPMENT SHOWN SHALL BE NEW AND INSTALLED AS DETAILED ON THE PLANS. IF THE DRAWINGS DO NOT THOROUGHLY DESCRIBE THE TECHNIQUES TO BE USED, THE INSTALLER SHALL FOLLOW THE INSTALLATION METHODS AND INSTRUCTIONS RECOMMENDED BY THEIR MANUFACTURER.
7. CONTRACTOR TO PROVIDE INSTALLATION SHOP DRAWINGS AND MANUFACTURER PRODUCT INFORMATION FOR ALL IRRIGATION COMPONENTS.
8. ALL TRENCHES SHALL BE BACKFILLED WITH CLEAN, DEBRIS-FREE MATERIALS. CLEAN SAND SHALL BE USED FOR BEDDING MATERIAL IF PARENT SOIL CANNOT BE ADEQUATELY RID OF ROCK AND OTHER EXTRANEIOUS DEBRIS. PULLING PIPE SHALL BE PROHIBITED.
9. ALL SOLVENT WELDING SHALL BE PRECEDED BY PRIMING OF THE FITTINGS AND PIPE AS RECOMMENDED BY THE MANUFACTURER.
10. IRRIGATION CONTRACTOR TO INSTALL CHRISTY ZONE TAGS WITH THE CORRESPONDING CONTROLLER ZONE NUMBER.
11. ALL CHANGES OF DIRECTION MAINLINE FITTINGS SHALL BE ACCOMPLISHED VIA THE USE OF DUCTILE IRON ELBOWS AND TEES W/ PROPER THRUST BLOCKING. INSTALL PVC GASKET SERVICE TEES AT VALVE LOCATIONS.
12. ALL IRRIGATION LINES UNDER PAVEMENT SHALL BE INSTALLED WITHIN SCH. 40 PVC SLEEVES AS NOTED.
13. IRRIGATION LATERAL LINES TO BE BURIED AT A DEPTH OF 12".
14. IRRIGATION MAINLINES TO BE BURIED AT A DEPTH OF 24".
15. ALL COMPONENTS INSTALLED BY THE IRRIGATION CONTRACTOR, SHALL BE LOCATED ON THE "AS-BUILT" DRAWINGS. THE MAINLINE, CONTROL VALVES, ISOLATION VALVES, GROUND RODS AND SPLICED BOXES SHALL BE LOCATED WITH A MEASUREMENT FROM TWO FIXED POINTS.
16. IRRIGATION CONTRACTOR SHALL SECURE ANY AND ALL NECESSARY PERMITS FOR THE WORK PRIOR TO COMMENCEMENT OF HIS OPERATIONS ON-SITE. COPIES OF THE PERMITS SHALL BE SENT TO THE LANDSCAPE SUPERVISOR.
17. INSTALL LEEMCO RESTRAINTS FOR ALL MAINLINE ISOLATION VALVES PER MANUFACTURE SPECIFICATIONS.
18. ALL VALVE BOX COVERS SHALL BE BOLTED SHUT.
19. INSTALL A NIBCO T113 2" ISOLATION PRIOR TO GROUPS OF VALVES AND INSTALL A 12" VALVE BOX.
20. IRRIGATION CONTRACTOR SHALL VERIFY THE METER PROVIDES A MINIMUM FLOW OF 20 GPM AT 40 PSI PRIOR TO INSTALLATION OF THE IRRIGATION SYSTEM. IF THE MINIMUM FLOW AND PRESSURE IS NOT AVAILABLE CONTACT LANDSCAPE ARCHITECT PRIOR TO MOVING FORWARD WITH THE INSTALLATION.






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DATE	REVISIONS	DATE	REVISIONS	LAKE COUNTY			IRRIGATION NOTES AND DETAILS	SHEET NO.
				ROAD NO.	COUNTY	FINANCIAL PROJECT ID		IR.02

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A GAI CONSULTANTS, INC SERVICE GROUP  
CERTIFICATE OF AUTHORIZATION: ED9901

A180985.00

# SYMBOL LEGEND

-  GRADE MOUNTING LED FLOODLIGHT SEE MOUNTING DETAIL 1/E.02
-  IN-GRADE PULLBOX. SEE DETAIL 1/E.03
-  BRANCH CIRCUIT CONDUCTORS IN CONDUIT, CROSSMARKS INDICATE NUMBER OF CONDUCTORS. EQUIPMENT GROUND REQUIRED BUT NOT SHOWN. TWO CONDUCTORS PLUS GROUND UNLESS OTHERWISE SHOWN.

# LIGHT FIXTURE SCHEDULE

Mark	Lamp Data		Fixture Description	Fixture Data			Voltage	Notes
	No.	Type		Manufacturer	Catalog Number	Mount		
A	-	LED (20W)	LED FLOODLIGHT ADJUSTABLE STANCHION MOUNTED WITH GLARE SHIELD	KIM LIGHTING	KFL1-8L-20-3K7-WF UNV-K-BL-HS-SM18-BL	GRADE	120	

**LIGHTING FIXTURE GENERAL NOTES:**

A. PROJECT MUST BE BID AS SPECIFIED. ANY ALTERNATE TO THE BASE (AS SPECIFIED) BID MUST BE ACCOMPANIED BY A CREDIT TO THE OWNER WHICH WILL BE EVALUATED BY THE SPECIFIER.

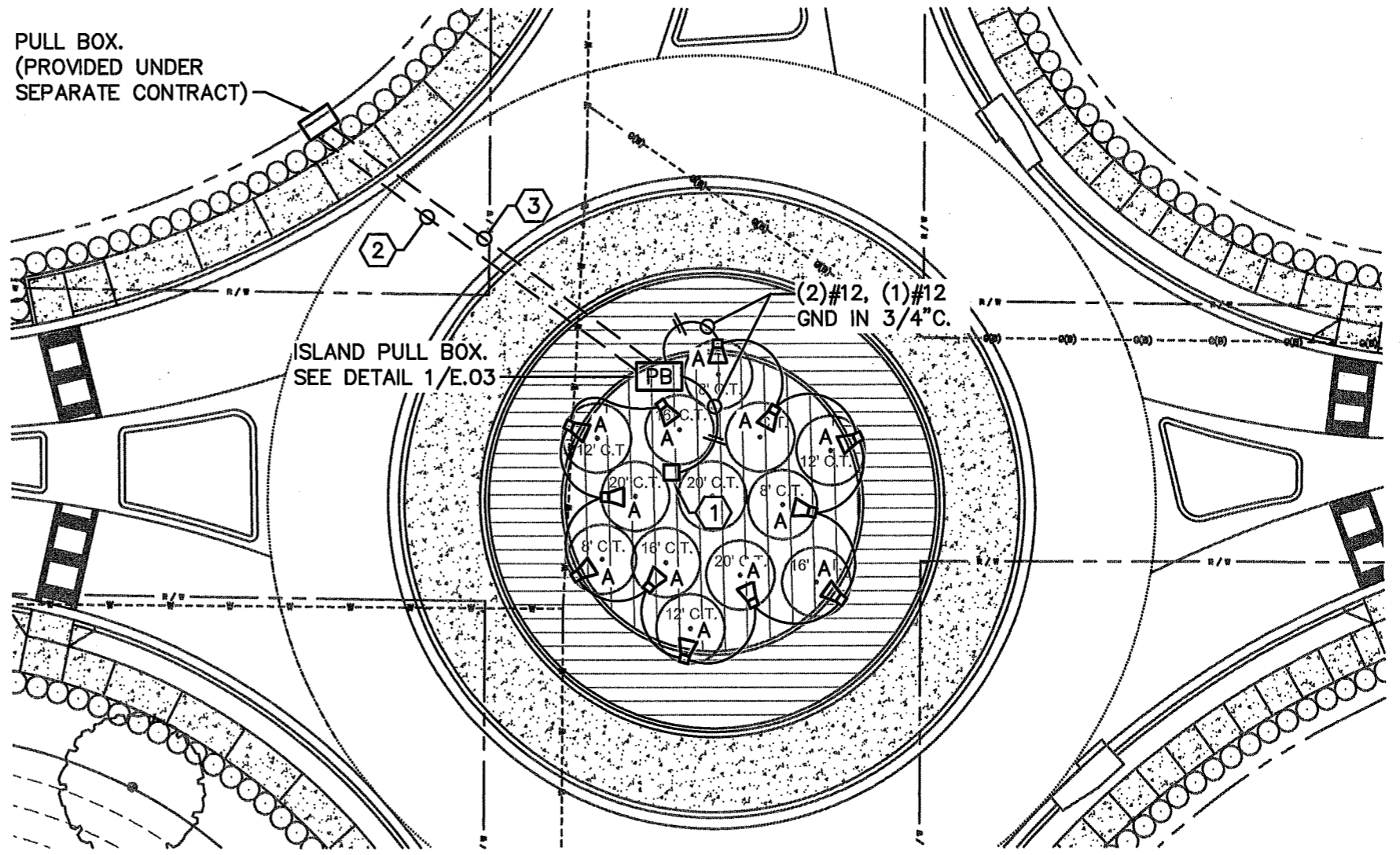
B. CONTRACTOR SHALL PROVIDE ALL REQUIRED FIXTURE MOUNTING HARDWARE.

**REFERENCE NOTES:**

- ① APPROXIMATE LOCATION OF IRRIGATION CONTROLLER, COORDINATE FINAL LOCATION WITH IRRIGATION CONTRACTOR PRIOR TO ROUGH-IN. IRR. CONTROLLER PROVIDED AND INSTALLED BY OTHERS, ELECTRICAL TERMINATIONS BY DIV.-16.
- ② BELLOW GRADE 120-VOLT, 20-AMP GFI PROTECTED IRRIGATION CONTROLLER CIRCUIT. (PROVIDED UNDER SEPARATE CONTRACT)
- ③ BELLOW GRADE 120-VOLT, 20-AMP GFI PROTECTED LIGHTING CIRCUIT. (PROVIDED UNDER SEPARATE CONTRACT)

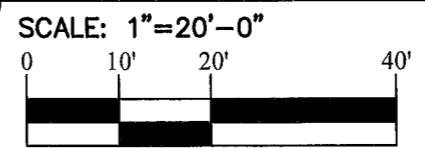
**GENERAL NOTES:**

- 1. POWER DISTRIBUTION SYSTEM AND LIGHTING CONTROLS PROVIDED UNDER SEPARATE CONTRACT.
- 2. CIRCUITRY FROM ISLAND PULL BOX TO POWER DISTRIBUTION SYSTEM AND CONTROLS PROVIDED UNDER SEPARATE CONTRACT.




1  
E.01

**SITE PLAN - ELECTRICAL**



Digitally signed by  
 Wood T. Brazill  
 License No. 58563  
 State of Florida  
 Wood T. Brazill, P.E.  
 P.E.#58563

CONSULTANTS



**Electric Services, Inc.**  
 1746 U.S. Hwy 441 Leesburg, FL 34748  
 (PH) 352-787-1322  
 (FAX) 352-787-7871  
 CA #9435 : EC #1415  
 Job #E1900.07

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DATE	REVISIONS	DATE	REVISIONS

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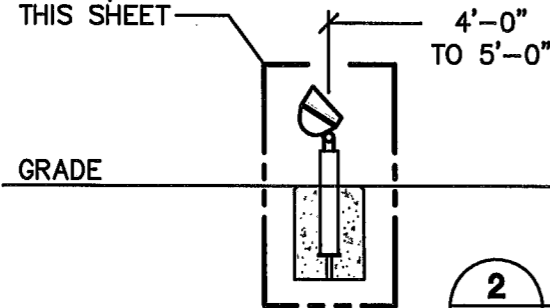
LAKE COUNTY		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID

LEGEND, FIXTURE SCHEDULE AND  
 SITE PLAN - ELECTRICAL

A180985.00  
 SHEET NO.  
 E.01



SEE ENLARGED  
VIEW 2/E.02  
THIS SHEET



**2** **FIXTURE MOUNTING DETAIL.**  
E.02 NOT TO SCALE

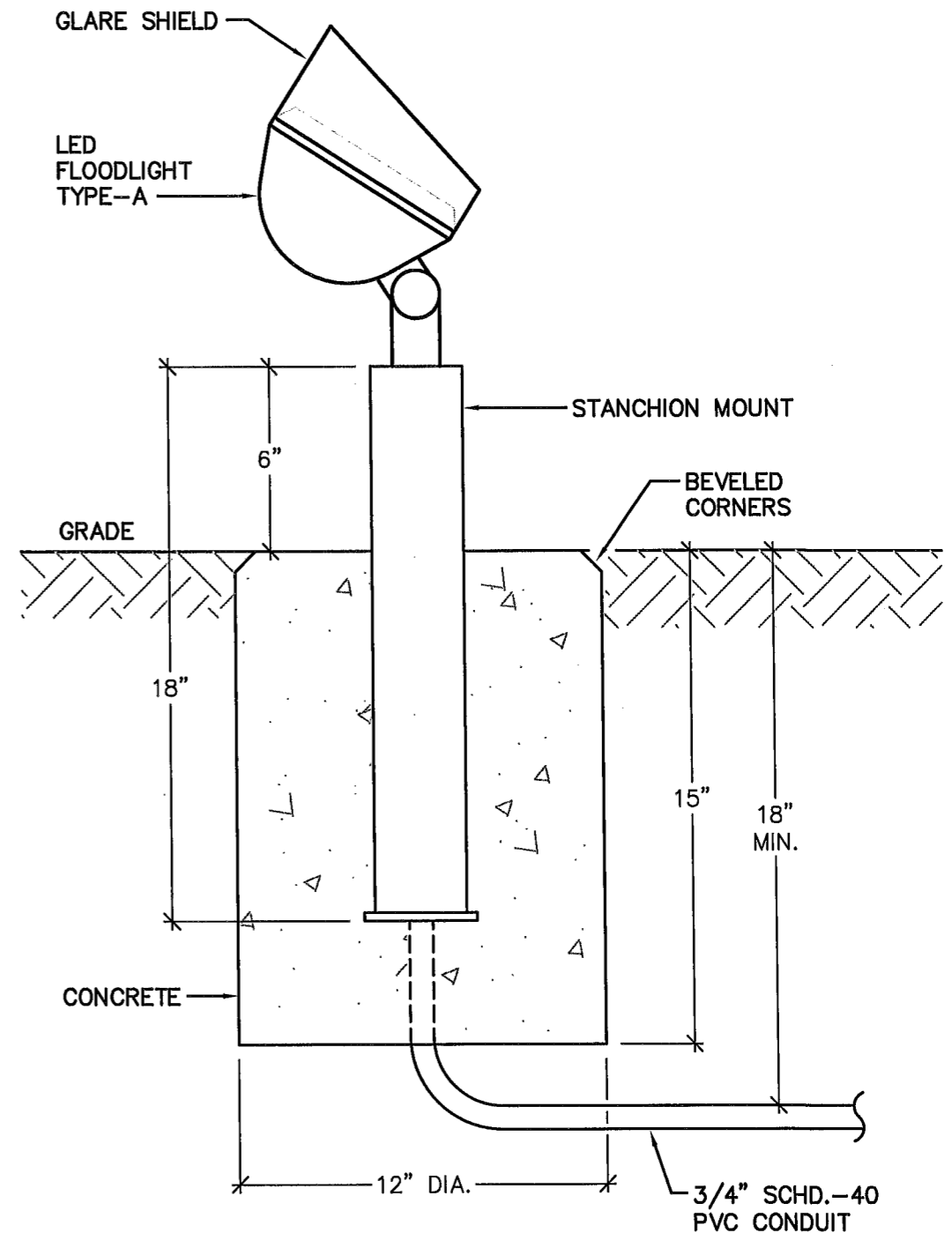
Digitally signed by  
Wood T. Brazill  
DN: cn=Wood T.  
Brazill, o=Electric  
Services, Inc., ou,  
email=wbrazill@elect  
ric-services.com,  
c=US  
Date: 2020.02.20  
16:06:24 -05'00'  
Wood T. Brazill, P.E.  
P.E.#58563



CONSULTANTS  
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(FAX) 352-787-7871  
CA #9435 : EC #1415  
Job #E1900.07

**NOTES:**

ANGLE OF FIXTURE TO BE ADJUSTED  
IN THE FIELD AS COORDINATED WITH  
LANDSCAPE ARCHITECT.



**2** **ENLARGED VIEW**  
E.02 NOT TO SCALE

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DATE	REVISIONS	DATE	REVISIONS

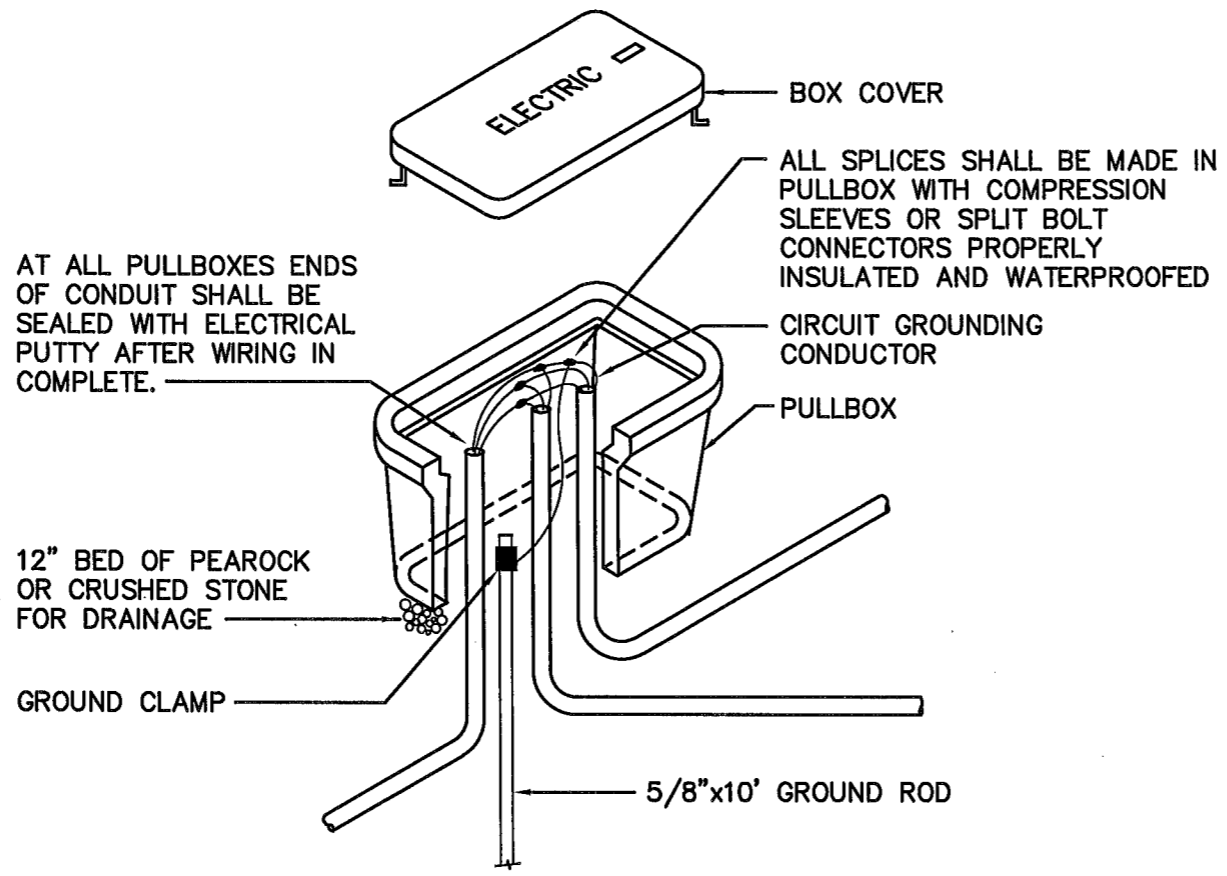
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618 E. SOUTH STREET  
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A GAI CONSULTANTS, INC SERVICE GROUP  
CERTIFICATE OF AUTHORIZATION: EB9051

LAKE COUNTY		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID

LIGHTING DETAILS - ELECTRICAL

SHEET NO.  
E.02

A180985.00




**1** TYPICAL IN-GRADE PULL BOX WIRING DETAIL  
 E.03 NOT TO SCALE

**NOTES:**

1. BOX SHALL BE QUAZITE, 13"x24"x18" WITHOUT BOTTOM, WITH UL LABEL. NATURAL GRAY COLOR UNLESS SPECIFIED OTHERWISE.
2. COVER LOGO SHALL READ "ELECTRIC".
3. PROVIDE 6 TO 8 INCHES OF GRAVEL OR CRUSHED ROCK BASE FOR DRAINAGE.
4. BOXES MAY BE NESTED FOR DEEP CONDUIT AND FOR MORE WORKING ROOM.
5. SPLICES AND TAPS FOR CONDUCTORS SHALL BE UL LISTED FOR WET LOCATIONS.
  - A. CONNECTIONS FOR UP TO (2) #6 OR (2) #8 + (1-2) #10 AND OTHER LISTED COMBINATIONS BY KING SAFETY PRODUCTS, FOR (2) #10 OR (1) #10 + (2) #12 MAY ALSO BE TWISTER DB PLUS CAT. NO. 30-260, 30-360, BY IDEAL, OR OTHER TYPE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION. THE CONNECTIONS LISTED BELOW ARE ALSO ACCEPTABLE.
  - B. CONNECTIONS FOR CONDUCTOR COMBINATIONS AND SIZES NOT LISTED BY IDEAL OR KING SHALL BE BOLTED OR CRIMPED. INSULATION SHALL BE NON-HARDENING, AND UL LISTED FOR DIRECT BURIAL, RAYCHEM RAYVOLVE RVC WITH SEALANT STRIP OR OTHER TYPE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION.
6. PULL BOX SIZE MAY NEED TO BE INCREASED TO ACCOMMODATE QUANTITY AND SIZE OF RACEWAYS AS COORDINATED IN THE FIELD. THERE SHALL BE NO ADDITIONAL COST TO THE OWNER.
7. LOCATE PULL BOX IN GRASS AREA WHEN POSSIBLE. COORDINATE ELEVATION WHEN LOCATED IN SIDEWALK. NO BOXES SHALL BE LOCATED IN DRIVE OR ROADWAYS.


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 Jmcsh

CONSULTANTS



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 CA #9435 : EC #1415  
 Job #E1900.07

Digitally signed by  
 Wood T. Brazill  
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DATE	REVISIONS	DATE	REVISIONS	COMMUNITY SOLUTIONS	LAKE COUNTY			SHEET NO.
				618 E. SOUTH STREET SUITE 700 ORLANDO, FL 32801 407 423-8398 <small>A GAI CONSULTANTS, INC SERVICE GROUP          CERTIFICATE OF AUTHORIZATION: EB9851</small>	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	DETAILS - ELECTRICAL



# DIVISION 16 ELECTRICAL SPECIFICATIONS

## SECTION 16028 – CODES, FEES, AND STANDARDS

### CODES AND FEES

UNLESS SPECIFICALLY NOTED TO THE CONTRARY, FURNISH ALL EQUIPMENT, MATERIALS LABOR, AND INSTALL AND TEST IN ACCORDANCE WITH APPLICABLE SECTIONS OF THE FOLLOWING CODES AND STANDARDS:

- NFPA-70 (2014) NATIONAL ELECTRICAL CODE
- ACCESSIBILITY REQUIREMENTS MANUAL, DEPARTMENT OF COMMUNITY AFFAIRS
- 2017 FLORIDA BUILDING CODE
- 2017 FLORIDA FIRE PREVENTION CODE
- ANSI: AMERICAN STANDARDS INSTITUTE, INC.
- ASTM: AMERICAN SOCIETY FOR TESTING AND MATERIALS
- NEMA: NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
- NESC: NATIONAL ELECTRIC SAFETY CODE
- NFPA: NATIONAL FIRE PROTECTION ASSOCIATION
- UL: UNDERWRITERS' LABORATORIES, INC.
- APPLICABLE LOCAL CODES

OBTAIN PERMITS AND INSPECTIONS FROM AUTHORITIES HAVING JURISDICTION. DELIVER CERTIFICATES OF INSPECTION TO THE OWNER AT TIME OF ACCEPTANCE INSPECTION.

### STANDARDS

ALL MATERIALS SHALL BE NEW, FREE OF DEFECTS, AND SHALL BE UL LISTED, BEAR THE UL LABEL OR BE LABELED OR LISTED WITH AN APPROVED, NATIONALLY RECOGNIZED ELECTRICAL TESTING AGENCY. WHERE NO LABELING OR LISTING SERVICE IS AVAILABLE FOR CERTAIN TYPE OF EQUIPMENT, TEST DATA SHALL BE SUBMITTED TO PROVE TO THE OWNER THAT EQUIPMENT MEETS OR EXCEEDS AVAILABLE STANDARDS.

## SECTION 16050 – BASIC REQUIREMENTS

### 1.1 RELATED DOCUMENTS

THE OTHER CONTRACT DOCUMENTS COMPLEMENT THE REQUIREMENTS OF THIS SECTION.

### 1.2 SCOPE

THE WORK SHALL INCLUDE, BUT NOT BE LIMITED TO, FURNISHING A COMPLETE ELECTRICAL SYSTEM AS SHOWN ON THE DRAWINGS.

DRAWINGS FOR THE WORK ARE DIAGRAMMATIC, INTENDED TO CONVEY THE SCOPE OF THE WORK AND TO INDICATE THE GENERAL ARRANGEMENT AND LOCATIONS OF THE WORK. BECAUSE OF THE SCALE OF THE DRAWINGS, CERTAIN BASIC ITEMS SUCH AS CONDUIT FITTINGS, ACCESS PANELS, SLEEVES, PULL AND JUNCTION BOXES MAY NOT BE SHOWN. WHERE SUCH ITEMS ARE REQUIRED BY CODE OR BY OTHER SECTIONS, SUCH ITEMS SHALL BE INCLUDED.

EQUIPMENT SPECIFICATION MAY NOT DEAL INDIVIDUALLY WITH MINUTE ITEMS SUCH AS COMPONENTS, PARTS, CONTROLS AND DEVICES WHICH MAY BE REQUIRED TO PRODUCE THE EQUIPMENT PERFORMANCE SPECIFIED OR AS REQUIRED TO MEET THE EQUIPMENT WARRANTIES. WHERE SUCH ITEMS ARE REQUIRED, THEY SHALL BE INCLUDED BY THE SUPPLIER OF THE EQUIPMENT, WHETHER OR NOT SPECIFICALLY INDICATED.

COORDINATE WITH ALL TRADES IN SUBMITTAL OF SHOP DRAWINGS. SHOP DRAWINGS SHALL DETAIL SPACE CONDITIONS TO THE SATISFACTION OF ALL CONCERNED TRADES, SUBJECT TO REVIEW AND FINAL ACCEPTANCE BY THE ARCHITECT. IN THE EVENT THAT THE CONTRACTOR INSTALLS HIS WORK BEFORE COORDINATING WITH OTHER TRADES OR SO AS TO CAUSE ANY INTERFERENCE WITH WORK OF OTHER TRADES, THE NECESSARY CHANGES SHALL BE MADE IN THE WORK TO CORRECT THE CONDITION, AT NO ADDITIONAL COST TO THE OWNER.

### 1.3 TEMPORARY LIGHTING AND POWER

FURNISH, INSTALL AND MAINTAIN TEMPORARY LIGHTING AND POWER TO BE USED BY ALL TRADES DURING CONSTRUCTION. THE ENTIRE SYSTEM SHALL BE GROUNDED. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL UTILITY COSTS FOR TEMPORARY SERVICE.

### 1.4 SUPERVISION OF THE WORK

PROVIDE FIELD SUPERINTENDENT WHO HAS HAD A MINIMUM OF FOUR (4) YEARS PREVIOUS SUCCESSFUL EXPERIENCE ON PROJECTS OF COMPARABLE SIZES AND COMPLEXITY. SUPERINTENDENT SHALL BE PRESENT AT ALL TIMES THAT WORK UNDER THIS DIVISION IS BEING INSTALLED OR AFFECTED.

### 1.5 DELIVERY AND STORAGE

HANDLE, STORE AND PROTECT EQUIPMENT AND MATERIALS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND WITH THE REQUIREMENTS OF NAPA 70B, APPENDIX J, TITLED "EQUIPMENT STORAGE AND MAINTENANCE DURING CONSTRUCTION". REPLACE DAMAGED OR DEFECTIVE ITEMS WITH NEW ITEMS.

### 1.6 ELECTRICAL CONNECTIONS

CONNECTIONS SHALL BE TIGHTENED TO THE TORQUE VALUES RECOMMENDED BY THAT DEVICE MANUFACTURERS INSTRUCTIONS. IF THESE VALUES ARE NOT LISTED, TIGHTEN TO POUND-INCH OR POUND-FOOT VALUES RECOMMENDED IN UL STANDARD 486B, A SUMMARY OF WHICH MAY BE FOUND IN SECTION 110-14 OF THE NATIONAL ELECTRIC CODE HANDBOOK.

### 1.7 TESTS

SYSTEMS SHALL BE TESTED BY THE CONTRACTOR AND PLACED IN PROPER WORKING ORDER PRIOR TO DEMONSTRATING SYSTEMS TO OWNER.

AFTER WORK IS COMPLETED, A LOAD BALANCE TEST SHALL BE MADE FOR EACH PANELBOARD TO DEMONSTRATE THAT WITH FULL LIGHTING AND MECHANICAL LOAD, THE BALANCE BETWEEN PHASES IS WITHIN 15% UNBALANCED BEYOND THIS LIMIT SHALL BE CORRECTED, MAINTAINING PROPER PHASE RELATION TO NEUTRAL AT ALL TIMES.

PERFORM SUCH TESTS AS REQUIRED BY AUTHORITIES HAVING JURISDICTION OVER THE SITE.

## 1.8 DEMONSTRATIONS

PRIOR TO ACCEPTANCE OF THE WORK, THE CONTRACTOR SHALL DEMONSTRATE TO THE OWNER, OR HIS DESIGNATED REPRESENTATIVE, ALL FEATURES AND FUNCTIONS OF ALL SYSTEMS AND SHALL INSTRUCT THE OWNER IN THE PROPER OPERATION OF THE SYSTEMS. EACH SYSTEM SHALL BE DEMONSTRATED ONCE.

THE DEMONSTRATIONS SHALL CONSIST OF NOT LESS THAN THE FOLLOWING:

- POINT OUT THE ACTUAL LOCATION OF EACH COMPONENT OF A SYSTEM AND DEMONSTRATE ITS FUNCTION AND ITS RELATIONSHIP TO OTHER COMPONENTS WITHIN THE SYSTEM.

SYSTEMS TO BE DEMONSTRATED SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:

- POWER DISTRIBUTION SYSTEMS
- LIGHTING AND LIGHTING CONTROL SYSTEMS

CONTRACTOR SHALL FURNISH THE NECESSARY TRAINED PERSONNEL TO PERFORM THE DEMONSTRATIONS AND INSTRUCTIONS, AND SHALL ARRANGE TO HAVE THE MANUFACTURER'S REPRESENTATIVES PRESENT TO ASSIST WITH THE DEMONSTRATIONS.

CONTRACTOR SHALL ARRANGE WITH THE OWNER, THE ARCHITECT AND THE ENGINEER, THE DATES AND TIMES FOR PERFORMING EACH DEMONSTRATION.

## 1.9 IDENTIFICATION

CONTRACTOR SHALL PROVIDE IDENTIFICATION FOR WIRING SYSTEMS AND EQUIPMENT.

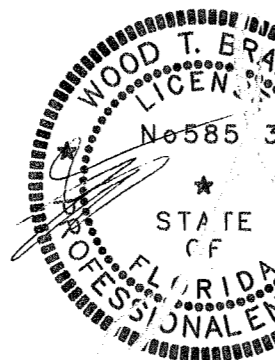
LETTERING FOR IDENTIFICATION SHALL BE OF SIGN PAINTERS QUALITY OR STENCIL LETTERING. PAINT SHALL BE FAST DRYING SIGN ENAMEL. ALL PULL AND JUNCTION BOXES FOR THESE SYSTEMS IN SERVICE AREAS, ABOVE ACCESSIBLE CEILINGS AND IN ACCESSIBLE CHASES SHALL HAVE ONE-HALF INCH HIGH BLACK LETTERING IDENTIFYING THE SYSTEM. LETTERING PRINTED NEATLY AND LEGIBLY WITH PERMANENT "MAGIC MARKER" IS ACCEPTABLE FOR LETTERING OF BOXES ABOVE CEILINGS.

POWER AND LIGHTING CIRCUITS SHALL HAVE CONDUCTORS COLOR CODED OR BANDED, IN EACH JUNCTION AND PULL BOX.

### NAMEPLATES:

- THE FOLLOWING ITEMS SHALL BE EQUIPPED WITH NAME-PLATES: ALL MOTOR STARTERS, PUSHBUTTON STATIONS, CONTROL PANELS, TIME SWITCHES, DISCONNECT SWITCHES, PANELBOARDS, TRANSFORMERS, CONTACTORS OR RELAYS IN SEPARATE ENCLOSURES, POWER RECEPTACLES WHERE THE NOMINAL VOLTAGE BETWEEN ANY PAIR OR CONTACTS IS GREATER THAN 150V, ALL SWITCHES CONTROLLING OUTLETS OR EQUIPMENT WHERE THE OUTLETS ARE NOT LOCATED WITHIN SIGHT OF THE CONTROLLING SWITCH, AND CABINETS. SPECIAL ELECTRICAL SYSTEMS SHALL BE IDENTIFIED AT TERMINAL CABINETS AND EQUIPMENT RACKS.

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									ROAD NO.	COUNTY	FINANCIAL PROJECT ID		E.04

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 Electric Services, Inc.

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- NAMEPLATES SHALL ADEQUATELY DESCRIBE THE FUNCTION OF THE PARTICULAR EQUIPMENT INVOLVED. WHERE NAMEPLATES ARE DETAILED ON THE DRAWINGS, INSCRIPTION AND SIZE OF LETTERS SHALL BE AS SHOWN ON THE SHOP DRAWINGS SUBMITTED FOR APPROVAL. NAMEPLATES FOR PANELBOARD SHALL INCLUDE THE PANEL DESIGNATION, VOLTAGE, PHASE, AND SOURCE. FOR EXAMPLE, "PANEL 3PA, 120/208V, 3-PHASE, 4-WIRE, FED FROM XFMR T-3A. THE NAME OF THE MACHINE ON THE 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.

- NAMEPLATES SHALL BE LAMINATED PHENOLIC PLASTIC, BLACK FRONT WITH WHITE CORE, SELF ADHESIVE BACK WITH LETTERING ETCHED THROUGH THE OUTER COVERING. WITH PLATED OR STAINLESS STEEL SCREWS. NAMEPLATES TO IDENTIFY EMERGENCY AND FIRE ALARM DEVICES SHALL BE RED LAMINATE.

PANELBOARDS SHALL HAVE TYPE-WRITTEN CIRCUIT DIRECTORIES INSTALLED INSIDE THE DOORS UNDER TRANSPARENT PLASTIC COVERS.

1.10 SUBMITTALS

PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

- WITHIN THIRTY (30) DAYS AFTER AWARD OF THE CONTRACT, THE CONTRACTOR SHALL SUBMIT TO THE ARCHITECT, FOR APPROVAL, A LIST OF MANUFACTURERS' NAMES OF MATERIAL AND EQUIPMENT HE PROPOSES TO PROVIDE. IN THE EVENT ANY ITEMS OF MATERIAL OR EQUIPMENT CONTAINED THEREIN FAIL TO COMPLY WITH THE CONTRACT DOCUMENTS, SUCH ITEMS WILL BE REJECTED.

- ALL SUBMITTALS SHALL BE A MINIMUM OF SIX (6) COPIES AND SHALL BE BOUND IN A THREE RING BINDER. SUBMITTALS SHALL BE DIVIDED WITH TABBED SEPARATORS INDICATING SPECIFICATION SECTION NUMBERS. ALL PRODUCT DATA SHALL BE CLEARLY MARKED IN INK WITH THE CORRESPONDING EQUIPMENT IDENTIFICATION NUMBERS AS INDICATED IN THE CONTRACT DOCUMENTS.

- MARK-OUT ITEMS ON PRODUCT DATA SHEETS WHICH CONSTITUTE INFORMATION NOT PERTAINING TO THE EQUIPMENT SPECIFIED.

SUBMITTAL DATA FOR ELECTRICAL EQUIPMENT SHALL CONSIST OF SHOP DRAWINGS AND/OR CATALOG CUTS SHOWING TECHNICAL DATA NECESSARY TO EVALUATE THE MATERIAL OR EQUIPMENT, TO INCLUDE DIMENSIONS, WIRING DIAGRAMS, PERFORMANCE CURVES, RATINGS, CONTROL SEQUENCE AND OTHER DESCRIPTIVE DATA NECESSARY TO DESCRIBE FULLY THE ITEM PROPOSED AND ITS OPERATING CHARACTERISTICS. ANY SUBMITTAL DATA IN THE FOLLOWING ELECTRICAL SECTIONS, SPECIFIC TO THAT SECTION, IS IN ADDITION TO SUBMITTAL REQUIREMENTS OF THIS SECTION.

1.11 RECORD DRAWINGS

AT THE JOB SITE, MAINTAIN A SET OF PRINTS ON WHICH ARE RECORDED ALL FORMAL FIELD CHANGES AND OTHER PORTIONS OF THE WORK THAT VARY SIGNIFICANTLY FROM THE CONTRACT DOCUMENTS. INDICATE ACTUAL ROUTING OF ELECTRICAL FEEDERS.

DELIVER RECORD DRAWINGS TO THE ARCHITECT IN THE QUANTITY AND MANNER SPECIFIED IN DIVISION 1 - GENERAL REQUIREMENTS.

1.12 MAINTENANCE MANUALS

PROVIDE THREE (3) MAINTENANCE MANUALS CONTAINING PRODUCT DATA, SHOP DRAWINGS, WIRING DIAGRAMS, INSTRUCTIONS AND PART LISTS FOR MAINTAINING AND OPERATION ELECTRICAL SYSTEMS AND EQUIPMENT. INCLUDE A DESCRIPTION OF NORMAL ADJUSTMENTS AND A LIST OF ITEMS REQUIRING PERIODIC MAINTENANCE AND THE FREQUENCY REQUIRED. PROVIDE OWNER WITH ANY SPECIAL TOOLS REQUIRED.

DELIVER MAINTENANCE MANUALS TO THE OWNER AT THE TIME OF THE DEMONSTRATION OF SYSTEMS AND EQUIPMENT.

SECTION 16111 - RACEWAYS

APPROVED RACEWAY MATERIALS INCLUDE GRS, IMC AND EMT. SCHEDULE-40 PVC RACEWAYS ARE PERMITTED FOR UNDERGROUND ONLY. NO OTHER RACEWAY MATERIALS ARE PERMITTED WITHOUT PRIOR AUTHORIZATION.

HOT-DIPPED GALVANIZED (GRS), THREADED TYPE CONFORMING TO ANSI C80.1 AND UL 6. USE WHERE EXPOSED TO THE EXTERIOR AND AT ALL CONCRETE PENETRATIONS. BITUMASTIC COATING REQUIRED AT CONCRETE PENETRATIONS.

ELECTRICAL METALLIC TUBING (EMT) AND INTERMEDIATE METAL CONDUIT (IMC)

HOMERUNS SHALL BE DEFINED AS ORIGINATING AT THE BRANCH OVER CURRENT DEVICE AND CONTINUE TO THE FIRST BRANCH EQUIPMENT, DEVICE OR FIXTURE.

SECTION 16120 - WIRES AND CABLES (600 VOLTS AND LESS)

WIRE AND CABLE

ALL CONDUCTORS SHALL BE COPPER.

TYPE THHN/THWN, SINGLE CONDUCTOR, NO. 12 MINIMUM FOR GENERAL USE WIRING.

ALL SPECIFIED CONDUCTOR SIZES HAVE BEEN SIZED TO ACCOMMODATE FOR VOLTAGE DROP AS REQUIRED BY FBC 13-413 AND NEC 210.19(A)(1) FPN #4.

CONDUCTOR SIZES FOR LIGHTING, RECEPTACLES AND SMALL MOTOR BRANCH CIRCUITS, WITH LESS THAN 30 AMPERE CONNECTED LOAD, MAY NOT BE SHOWN ON DRAWING. CONDUCTORS FOR SUCH CIRCUITS SHALL BE SIZED AS FOLLOWS:

120 VOLT CIRCUITS: CONDUCTOR SIZE FOR BRANCH CIRCUITS 75 FEET IN LENGTH FOR BRANCH CIRCUIT PANEL TO CENTER OF LOAD SHALL NOT BE SMALLER THAN No. 12; UP TO 125 FEET NOT SMALLER THAN No. 10, UP TO 175 FEET NOT SMALLER THAN No. 8.

277 VOLT CIRCUITS: CONDUCTOR SIZE FOR BRANCH CIRCUITS 150 FEET IN LENGTH FOR BRANCH CIRCUIT PANEL TO CENTER OF LOAD SHALL NOT BE SMALLER THAN No. 12; UP TO 200 FEET NOT SMALLER THAN No. 10, UP TO 350 FEET NOT SMALLER THAN No. 8.

EACH MULTIWIRE BRANCH CIRCUIT SHALL BE PROVIDED WITH MEANS THAT WILL SIMULTANEOUSLY DISCONNECT ALL UNGROUNDED CONDUCTORS AT THE POINT WHERE THE BRANCH CIRCUIT ORIGINATES.

SECTION 16450 - GROUNDING

CONDUCTORS

PROVIDE ELECTRICAL GROUNDING CONDUCTORS FOR GROUNDING CONNECTIONS MATCHING POWER SUPPLY WIRING MATERIALS AND SIZED ACCORDING TO NEC. CONDUCTORS SHALL BE COPPER.

SECTION 16500 - LIGHTING FIXTURES


FABRICATE OF SHEET STEEL, DIE-FORMED TO PROVIDE STRUCTURAL

TREAT FIXTURES FOR ACCEPTANCE OF BAKED WHITE HIGH REFLECTANCE ENAMEL OR PORCELAIN ENAMEL FINISH COAT.

PROVIDE FIXTURES, AS SCHEDULED ON THE DRAWINGS.

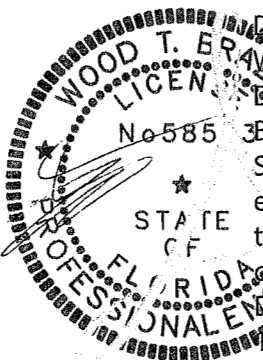
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