STRUCTURAL NOTES

GENERAL

1. THE APPLICABLE BUILDING CODE IS THE INTERNATIONAL BUILDING CODE (IBC) 2015 AND THE 2017 FLORIDA BUILDING CODE, 6TH EDITION.

2. THE REQUIREMENTS INDICATED ON THIS SHEET ARE INTENDED AS A BASIC SUMMARY OF THE MATERIAL AND CONSTRUCTION REQUIREMENTS FOR THE PROJECT. ADDITIONAL, MORE STRINGENT REQUIREMENTS ARE GIVEN IN THE PROJECT DETAIL DRAWINGS AND SPECIFICATIONS.

3. ALL STRUCTURAL RELATED SHOP DRAWINGS SHALL BE REVIEWED BY THE ENGINEER PRIOR TO CONSTRUCTION.

4. STRUCTURES MAY BE BUOYANT WHEN EMPTY DURING CONSTRUCTION. CONTRACTOR SHALL PROTECT STRUCTURES AGAINST FLOTATION UNTIL CONSTRUCTION IS COMPLETE.

5. CONTRACTOR TO COORDINATE LAYOUT, SIZE AND HEIGHT OF EQUIPMENT PADS WITH OTHER DISCIPLINE DRAWINGS AND WITH THE EQUIPMENT SUPPLIER PRIOR TO CONSTRUCTION OF FLOOR SLABS TO WHICH EQUIPMENT PADS WILL BE CONSTRUCTED.

6. CONTRACTOR TO COORDINATE PIPE PENETRATIONS WITH OTHER DISCIPLINE DRAWINGS AND PROVIDE SLEEVES, EMBEDMENTS AND EXTRA REINFORCING STEEL AT OPENINGS PER STANDARD DETAILS.

CAST-IN-PLACE CONCRETE

1. A MINIMUM 28 DAY COMPRESSIVE STRENGTH (f'c) OF 4,000 PSI WAS UTILIZED IN THE DESIGN OF STRUCTURAL REINFORCED CONCRETE. SEE SPECIFICATIONS FOR CONSTRUCTION STRENGTH REQUIREMENTS.

2. THE LOCATION OF ALL CONSTRUCTION JOINTS AND OTHER TYPES OF JOINTS, OTHER THAN THOSE SPECIFIED OR SHOWN ON THE PLANS, SHALL BE ACCEPTABLE TO THE ENGINEER PRIOR TO PLACING CONCRETE.

REINFORCING STEEL

1. ALL REINFORCING BAR SHALL BE GRADE 60, DEFORMED, ASTM A615, UNLESS NOTED OTHERWISE.

2. DIMENSIONS TO REINFORCING BARS ARE TO BAR CENTERLINES, UNLESS NOTED OTHERWISE. BAR COVER IS THE CLEAR DISTANCE BETWEEN THE BAR AND THE CONCRETE SURFACE.

3. NO WELDING OF REINFORCING BARS SHALL BE PERMITTED UNLESS APPROVAL IS OBTAINED FROM THE ENGINEER PRIOR TO CONSTRUCTION.

POST-INSTALLED ANCHORS

1. POST-INSTALLED ANCHORS SHALL INCLUDE ADHESIVE ANCHORS (THREADED RODS, BOLTS OR REINFORCING BARS), EXPANSION ANCHORS, AND UNDERCUT ANCHORS INSTALLED INTO HARDENED CONCRETE OR MASONRY. SEE THE ANCHORAGE IN CONCRETE AND MASONRY SPECIFICATION SECTION FOR ADDITIONAL REQUIREMENTS.

2. POST-INSTALLED ANCHORS SHALL ONLY BE USED WHERE INDICATED ON THE DRAWINGS. CONTRACTOR SHALL OBTAIN APPROVAL FROM ENGINEER PRIOR TO USING POST-INSTALLED ANCHORS FOR MISSING OR MISPLACED CAST-IN-PLACE ANCHORS.

3. CARE SHALL BE TAKEN TO AVOID CONFLICTS WITH EXISTING REINFORCING STEEL AND OTHER EMBEDDED ITEMS WHEN DRILLING HOLES. REINFORCING BARS SHALL NOT BE DAMAGED DURING DRILLING OR ANCHOR INSTALLATION. HOLES SHALL BE DRILLED AND CLEANED PER THE PRODUCT MANUFACTURER'S INSTRUCTIONS. ANCHORS SHALL BE INSTALLED PER THE PRODUCT MANUFACTURER'S INSTRUCTIONS AT NOT LESS THAN MINIMUM EDGE DISTANCES AND/OR SPACINGS INDICATED IN THE MANUFACTURER'S LITERATURE.

4. SUBSTITUTION REQUESTS FOR PRODUCTS OTHER THAN THOSE LISTED IN THE SPECIFICATION OR INDICATED ON THE DRAWINGS SHALL BE SUBMITTED TO ENGINEER FOR REVIEW AND APPROVAL. PRODUCT ICC-ESR EVALUATION REPORTS SHALL BE INCLUDED WITH THE SUBMITTAL PACKAGE. IF REQUESTED, CALCULATIONS PREPARED BY A REGISTERED PROFESSIONAL ENGINEER USING METHODS AND PROCEDURES REQUIRED BY THE BUILDING CODE MAY BE REQUIRED AS PART OF THE SUBMITTAL PACKAGE.

5. UNLESS NOTED OTHERWISE, THE MINIMUM EMBEDMENT PROVIDED FOR ADHESIVE ANCHORED REINFORCING BARS SHALL DEVELOP THE FULL TENSILE STRENGTH OF THE BAR.

6. SPECIAL INSPECTION WILL BE PROVIDED FOR ALL POST-INSTALLED ANCHORS.

STAINLESS STEEL

1. STAINLESS STEEL BOLTS SHALL CONFORM TO ASTM F593, ALLOY GROUP 1 OR 2, UNLESS NOTED OTHERWISE. MINIMUM YIELD STRENGTH SHALL BE 45 KSI.

2. STAINLESS STEEL PLATES SHALL CONFORM TO ASTM A240, TYPE 316L.

3. STAINLESS STEEL STRUCTURAL SHAPES SHALL CONFORM TO ASTM A1069 OR ASTM A276, TYPE 316L.

ALUMINUM

1. UNLESS NOTED OTHERWISE, ALUMINUM ALLOY IN ALL ALUMINUM STRUCTURAL MATERIALS SHALL BE 6061-T6. PIPE AND TUBING FOR GUARDRAIL AND HANDRAIL SHALL BE ALLOY 6061-T6 OR 6005A-T61

2. ALL ALUMINUM SURFACES IN CONTACT WITH CONCRETE OR DISSIMILAR METALS SHALL BE COATED OR COVERED WITH A HEAVY COAT OF EPOXY ENAMEL TO PREVENT ALUMINUM-CONCRETE REACTION OR ELECTROLYTIC ACTION.

STRUCTURAL STEEL

1. ROLLED WIDE FLANGE SHAPES SHALL HAVE A MINIMUM YIELD STRENGTH OF 50 KSI; CHANNELS, PLATES, AND ANGLES A MINIMUM OF 36 KSI; STRUCTURAL PIPES A MINIMUM OF 35 KSI; ROUND STRUCTURAL TUBES A MINIMUM OF 46 KSI, AND RECTANGULAR STRUCTURAL TUBES A MINIMUM OF 50 KSI.

2. WELDING SHALL BE DONE WITH A FILLER MATERIAL HAVING A MINIMUM TENSILE STRENGTH OF 70 KSI.

3. BOLTED CONNECTIONS SHALL USE 3/4" DIA ASTM A325 BOLTS WITH THE THREADS EXCLUDED FROM THE SHEAR PLANE, UNLESS NOTED OTHERWISE.

4. CARBON STEEL OR GALVANIZED STEEL ANCHOR RODS AND ANCHOR BOLTS SHALL CONFORM TO ASTM F1554 GRADE 36.

5. HOLES FOR ANCHOR RODS AND ANCHOR BOLTS IN COLUMN BASE PLATES SHALL BE AS FOLLOWS:

   BOLT/ROD 3/4" TO 1" - 5/16" OVERSIZE
   BOLT/ROD 1" TO 2" - 1/2" OVERSIZE
   BOLTS/RODS OVER 2" - 1" OVERSIZE

   AT THE CONTRACTOR'S OPTION, OVERSIZE HOLES LARGER THAN THOSE LISTED ABOVE MAY BE USED, PROVIDED THAT 3/8" PLATE WASHERS ARE ALSO USED AND FIELD WELDED WITH A 5/16" FILLET TO THE BASE PLATE ALONG A MIN OF 3 SIDES.

SOIL AND FOUNDATIONS

1. FOUNDATION CONSTRUCTION SHALL NOT BEGIN UNTIL ANY REQUIRED SPECIAL INSPECTION HAS BEEN COMPLETED AND THE CONTRACTOR NOTIFIED TO PROCEED.

2. TO FACILITATE SCHEDULING, AT LEAST 48 HOURS ADVANCE NOTICE SHALL BE GIVEN TO THE ENGINEER PRIOR TO THE REQUIRED INSPECTIONS.

3. UNLESS NOTED OTHERWISE, BACKFILL SHALL NOT BE PLACED AGAINST WALLS WHICH SUPPORT A CONCRETE SLAB OR WALKWAY UNTIL THE TOP SLAB OR WALKWAY HAS BEEN PLACED IN ITS ENTIRETY AND ALL CONCRETE HAS REACHED THE SPECIFIED DESIGN STRENGTH.

4. THE FOLLOWING NET ALLOWABLE BEARING PRESSURES WERE UTILIZED IN THE DESIGN OF THE FOUNDATIONS.

   MAT FOUNDATIONS ..... 3,000 PSF

LOADING CRITERIA

1. DEAD LOAD ..... CALCULATED

2. LIVE LOADS:
   - OPERATING AND PROCESS FLOORS..... 150 PSF
   - STAIRS, SERVICE PLATFORMS & LANDINGS..... 100 PSF
   - ELECTRICAL AND CONTROL ROOM FLOORS..... 250 PSF
   - ALL FLOORS NOT INDICATED..... 100 PSF
   - ROOF..... 20 PSF(UNREDUCED)

3. LATERAL EARTH PRESSURE (EQUIVALENT FLUID PRESSURE)
   - NON-SATURATED..... 57 PSF/FT
   - SATURATED..... 90 PSF/FT

4. LATERAL SURCHARGE..... EQUIVALENT TO 2 FEET OF SOIL WHERE ADJACENT TO A ROADWAY

5. COMPACTIVE SURCHARGE LOAD..... 400 PSF AT FINISH GRADE ELEVATION DECREASING LINEARLY AT SAME RATE AS BACKFILL LOAD INCREASES. FOR WALLS 8 FEET OR LESS IN HEIGHT, USE CRITERIA 4 ABOVE AS COMPACTIVE SURCHARGE.

6. HYDROSTATIC FLUID PRESSURE..... 63 PSF/FT

7. WIND LOAD:
   - ULTIMATE DESIGN WIND SPEED..... 200 MPH
   - NOMINAL DESIGN WIND SPEED..... 155 MPH
   - EXPOSURE..... D
   - RISK CATEGORY..... III

8. SEISMIC LOAD:
   - MAPPED MCE SHORT PERIOD SPECTRAL RESPONSE ACCELERATION (S_S)..... 0.021g
   - MAPPED MCE ONE SECOND PERIOD SPECTRAL RESPONSE ACCELERATION (S_1)..... 0.013g
   - DESIGN SPECTRAL RESPONSE ACCELERATION AT SHORT PERIODS (S_{DS})..... 0.022g
   - DESIGN SPECTRAL RESPONSE ACCELERATION AT ONE SECOND PERIOD (S_{D1})..... 0.021g
   - SITE CLASS..... D
   - RISK CATEGORY..... III
   - SEISMIC DESIGN CATEGORY..... A

9. SNOW LOAD:
   - GROUND SNOW LOAD (P_g)..... ZERO

10. DESIGN FLOOD ELEVATION (DFE)..... EL +8.00 USGS

ISSUED FOR CONSTRUCTION

DATE	REVISIONS AND RECORD OF USE	NO.	BY	CHK	APP

ELIAS A. POURLADIAN ★ LICENSE No 66809 ★ STATE OF FLORIDA ★ PROFESSIONAL ENGINEER

Date:
Engineer of Record: ELIAS POURLADIAN
Florida License No.: NO. 66809

BLACK & VEATCH
Black & Veatch Corporation
2255 N University Drive, Suite 210
Coral Springs, FL 33065
Certificate No. 8132

CITY OF KEY WEST
DENNIS STREET STORMWATER PUMP STATION

STRUCTURAL GENERAL NOTES

DESIGNED:	AT/JE/HD
DETAILED:	TSH
CHECKED:	EAP
APPROVED:	EAP
DATE:	MARCH 2019

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 193108

S-001
SHEET 12 OF 39

PLOTTED: 3/1/2019 7:39:06 AM
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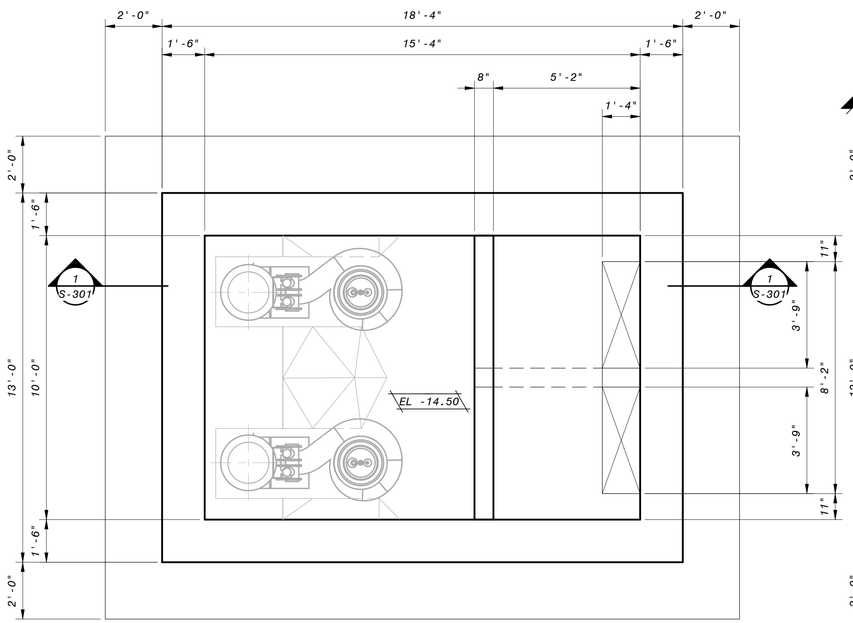
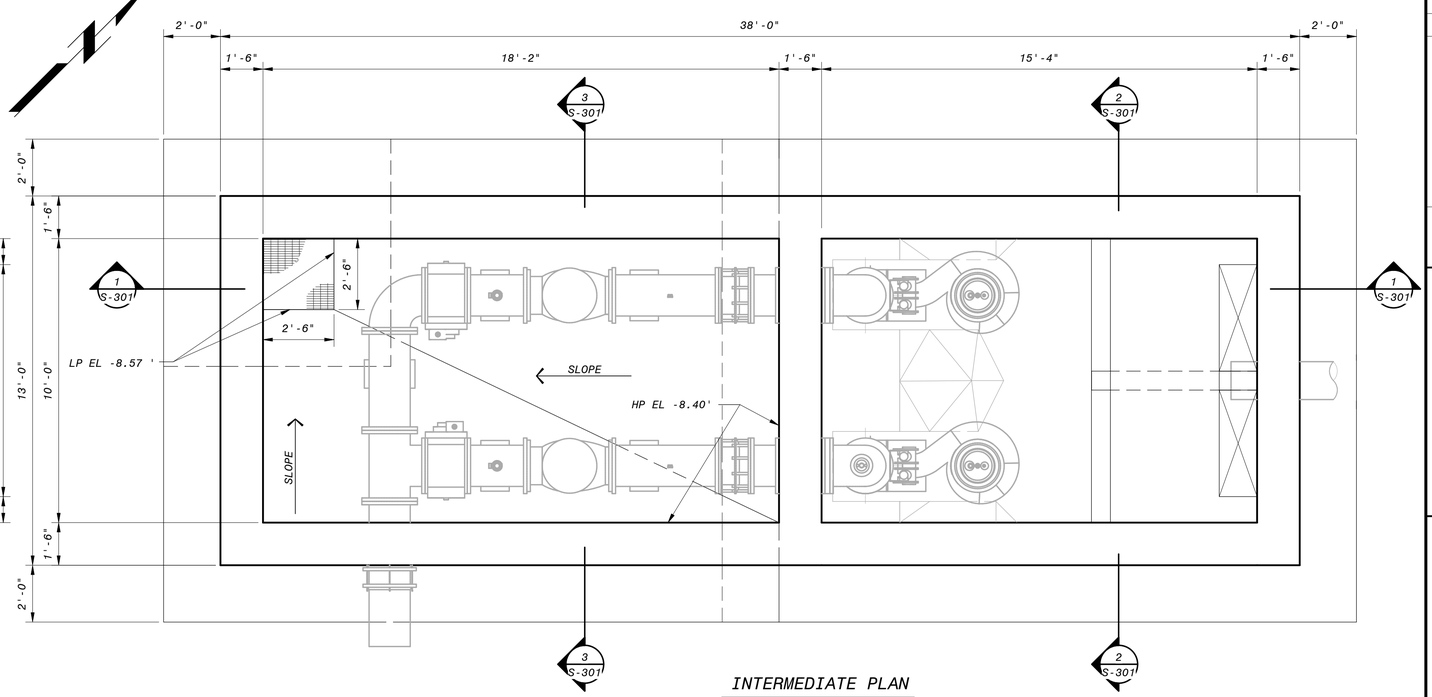


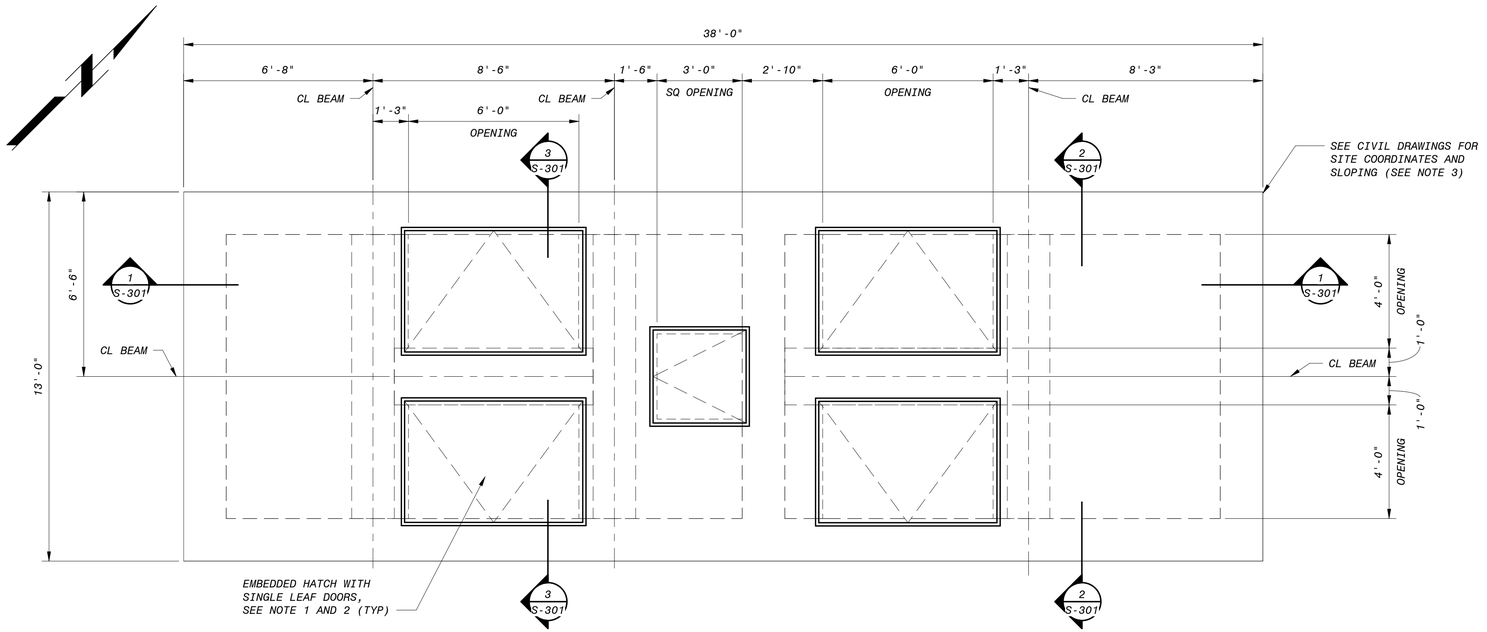
FOUNDATION LEVEL

3/8" = 1'-0"



INTERMEDIATE PLAN

3/8" = 1'-0"



TOP PLAN

3/8" = 1'-0"

NOTES:

1. HATCH WITH FRAME AND DRAINAGE COUPLING EMBEDDED IN CONCRETE SLAB SHALL BE RATED FOR DIRECT H-20 TRAFFIC LOAD WITH IMPACT FACTOR OF 30%.
2. HATCH DOORS TO OPEN 90 DEGREES MAXIMUM.
3. TOP OF SLAB ELEVATION TO MATCH SLOPING OF ADJACENT ROAD WHILE MAINTAINING 1'-6" MINIMUM TOP SLAB THICKNESS. REFER TO CIVIL DRAWINGS.

ISSUED FOR CONSTRUCTION

DATE	REVISIONS AND RECORD OF USE	NO.	BY	CHK	APP

ELIAS A. POURLADIAN LICENSE No 86809 STATE OF FLORIDA PROFESSIONAL ENGINEER

Date:
Engineer of Record: ELIAS POURLADIAN
Florida License No.: NO. 86809

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CITY OF KEY WEST
DENNIS STREET STORMWATER
PUMP STATION

STRUCTURAL
PUMP STATION PLANS

DESIGNED: AT/JE/HD
DETAILED: TSH
CHECKED: EAP
APPROVED: EAP
DATE: MARCH 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
193108

S-101
SHEET
13 OF 39

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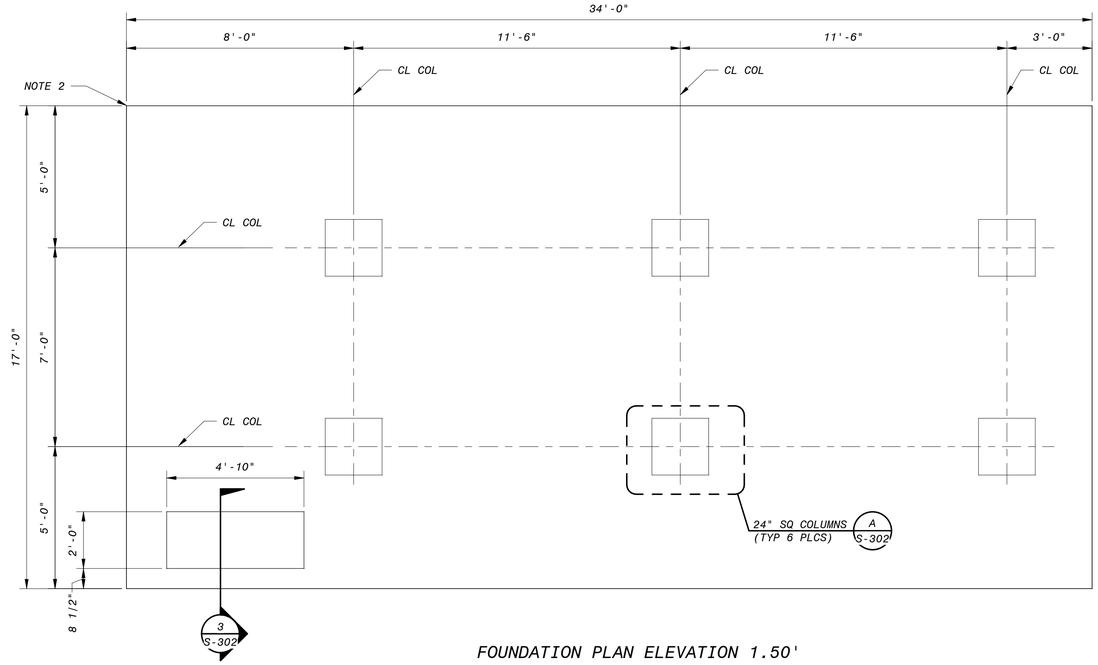
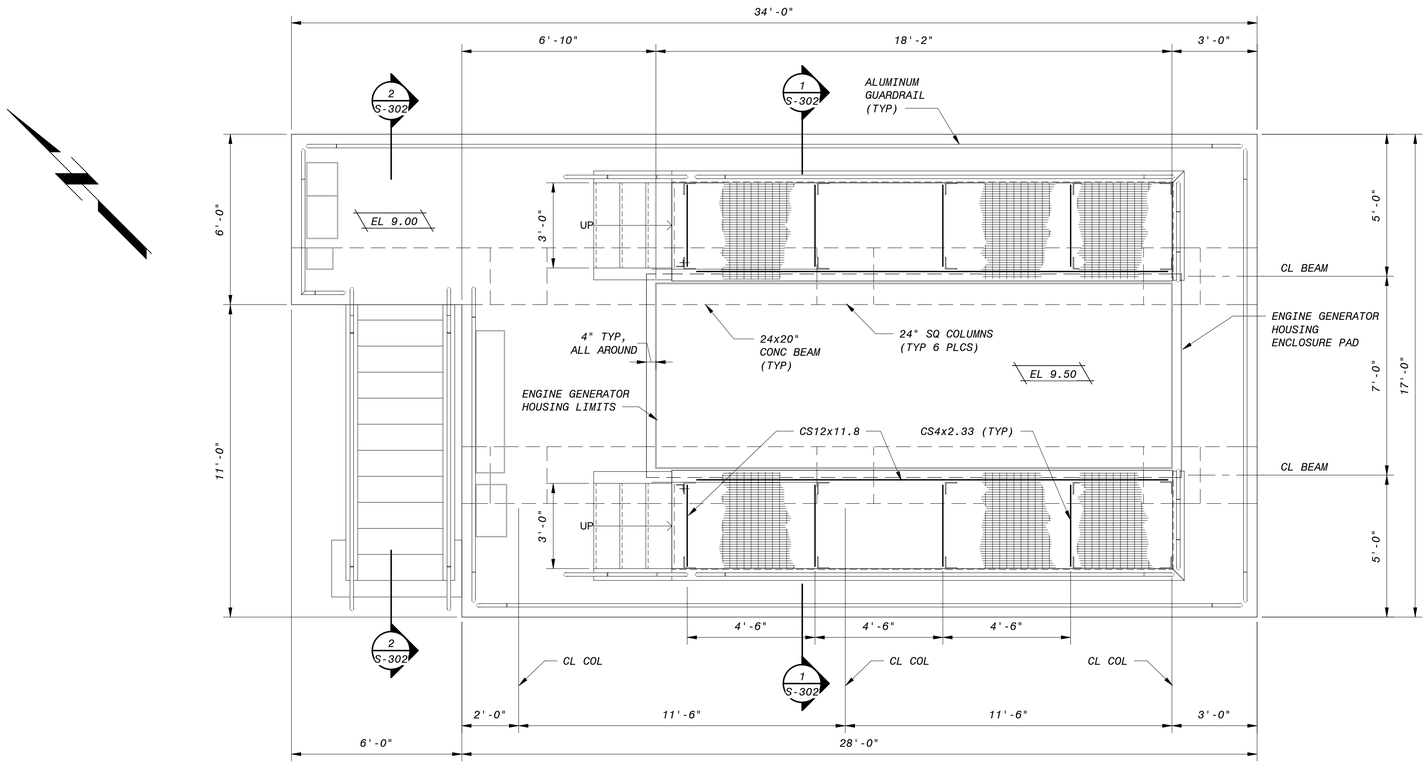


FOUNDATION PLAN ELEVATION 1.50'

3/8" = 1'-0"



OPERATING LEVEL ELEVATION 7.00'

3/8" = 1'-0"

GENERAL NOTES:

1. GENERATOR MANUFACTURER TO DESIGN GENERATOR HOUSING ENCLOSURE ANCHORAGE.
2. SEE CIVIL DRAWINGS FOR SITE COORDINATES.
3. CONTRACTOR TO COORDINATE ALUMINUM PLATFORM STRUCTURE WITH GENERATOR ENCLOSURE OPENINGS AND ELEVATION.

ISSUED FOR CONSTRUCTION

DATE	REVISIONS AND RECORD OF USE	NO.	BY	CHK	APP

ELIAS A. POURLADIAN ★ LICENSE No 86809 ★ STATE OF FLORIDA ★ PROFESSIONAL ENGINEER

Date:
Engineer of Record: ELIAS POURLADIAN
Florida License No.: NO. 86809

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Certificate No. 8132

CITY OF KEY WEST
DENNIS STREET STORMWATER
PUMP STATION IMPROVEMENTS

STRUCTURAL
ENGINE GENERATOR PLATFORM
PLANS

DESIGNED: AT/JE/HD
DETAILED: TSH
CHECKED: EAP
APPROVED: EAP
DATE: MARCH 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

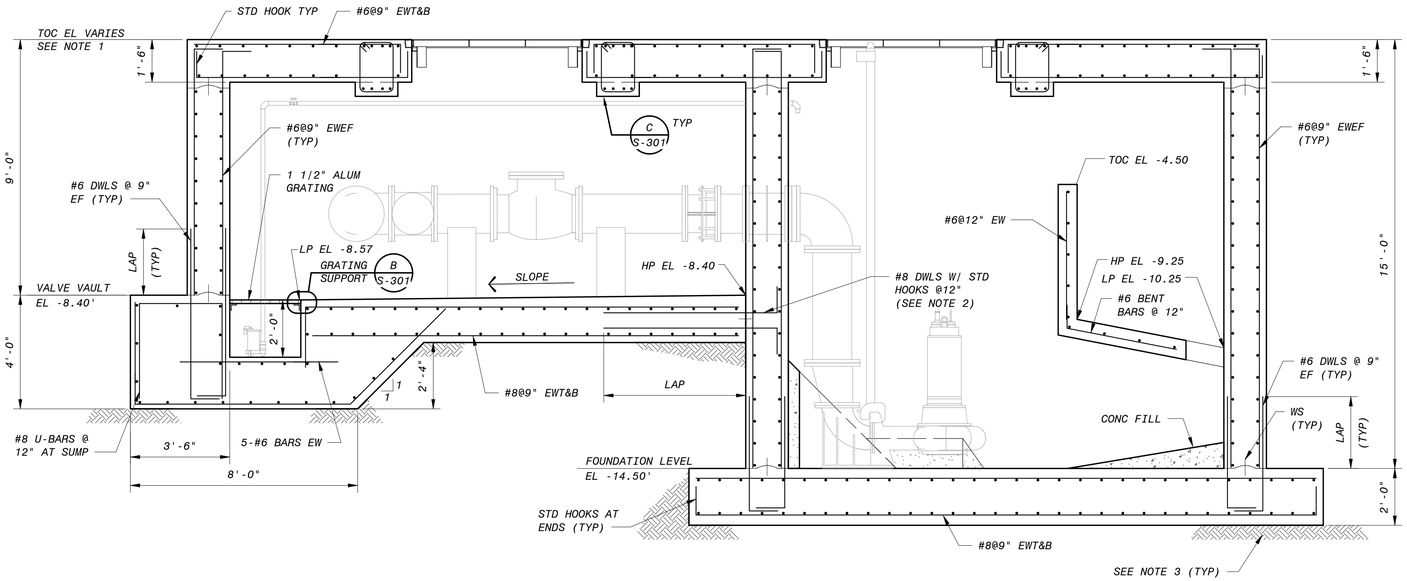
PROJECT NO. 193108

S-102
SHEET 14 OF 39

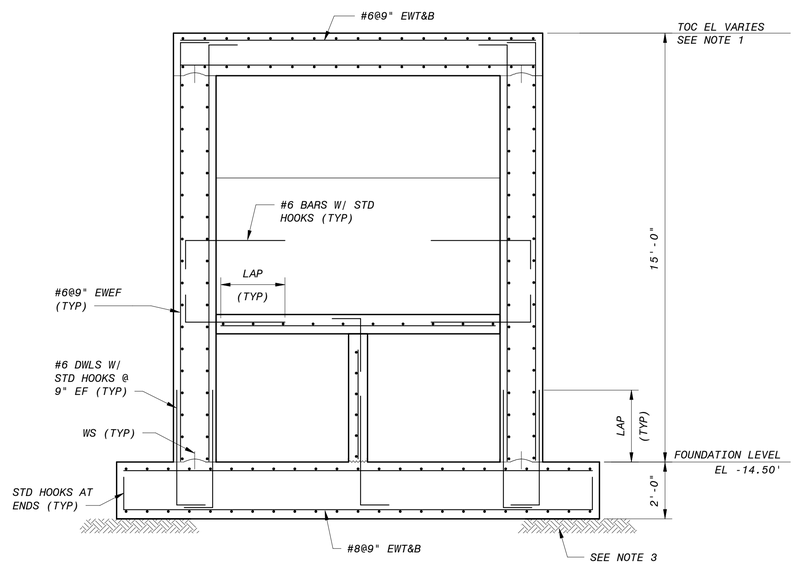
PLOTTED: 3/11/2019 9:48:23 AM
D7000

NOTES:

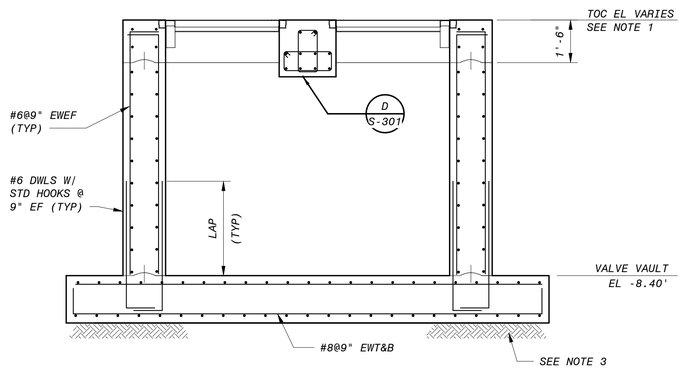
1. TOC EL TO MATCH SLOPING OF ADJACENT ROAD WHILE MAINTAINING 1'-6" MINIMUM TOP SLAB THICKNESS. REFER TO CIVIL DRAWINGS.
2. THREADED MECHANICAL INSERTS MAY BE USED AT CONTRACTOR'S OPTION.
3. 6" DEEP STRUCTURAL FILL COMPACTED 98%. SUBGRADE PREPARED IN ACCORDANACE WITH SPECIFICATIONS.



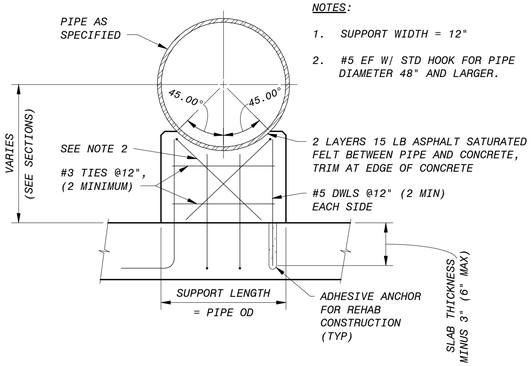
1 SECTION
S-101 3/8" = 1'-0"



2 SECTION
S-101 3/8" = 1'-0"



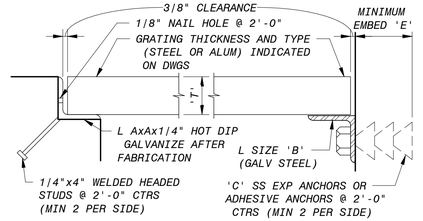
3 SECTION
S-101 3/8" = 1'-0"



NOTES:

1. SUPPORT WIDTH = 12"
2. #5 EF W/ STD HOOK FOR PIPE DIAMETER 48" AND LARGER.

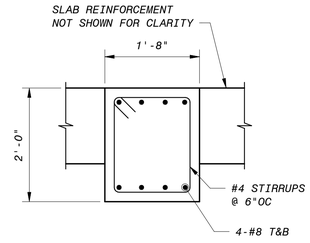
A CONCRETE PIPE SUPPORT SADDLE
NO SCALE



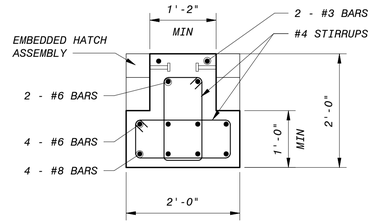
GRATING THICKNESS ('T')	L SIZE AxAx1/4	L SIZE 'B'	'C' EXP ANCHOR	
			DIA	MIN 'E'
1 1/2	1 3/4 x 1 3/4	2 1/2x2 1/2x1/4	1/2"	3 1/4"

* TRIM AND BEVEL UPSTANDING LEG TO FIT

B GRATING SUPPORT
S-301 12" = 1'-0"



C BEAM DETAIL
S-301 3/4" = 1'-0"



D BEAM DETAIL
S-301 3/4" = 1'-0"

ISSUED FOR CONSTRUCTION

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE

ELIAS A. POURLADIAN ★ LICENSE No 86809 ★ STATE OF FLORIDA PROFESSIONAL ENGINEER

Date:
Engineer of Record: ELIAS POURLADIAN
Florida License No.: NO. 86809

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CITY OF KEY WEST
DENNIS STREET STORMWATER
PUMP STATION

STRUCTURAL
PUMP STATION SECTIONS AND DETAILS

DESIGNED:	AT/JE/HD
DETAILED:	TSH
CHECKED:	EAP
APPROVED:	EAP
DATE:	MARCH 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
193108

S-301
SHEET
15 OF 39

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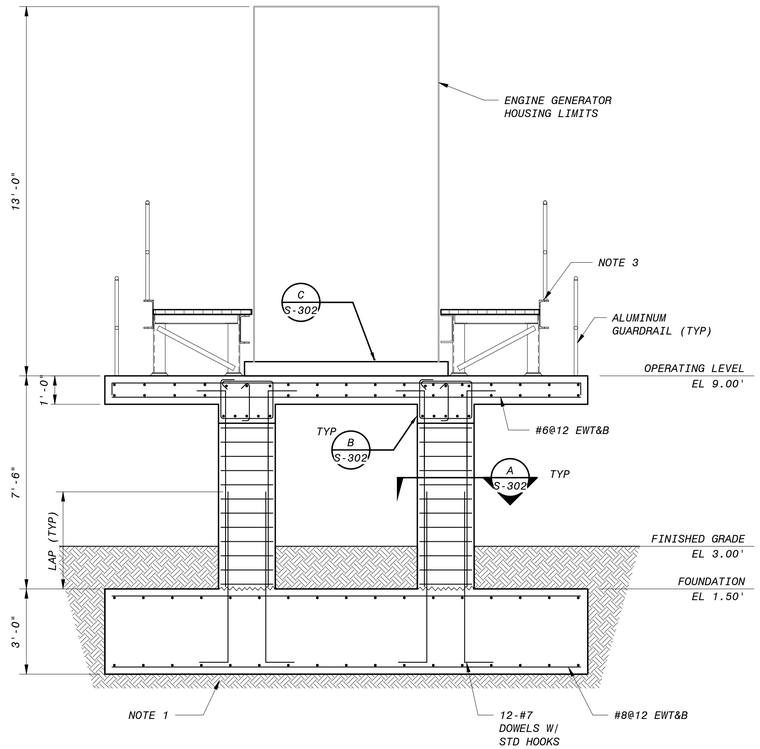
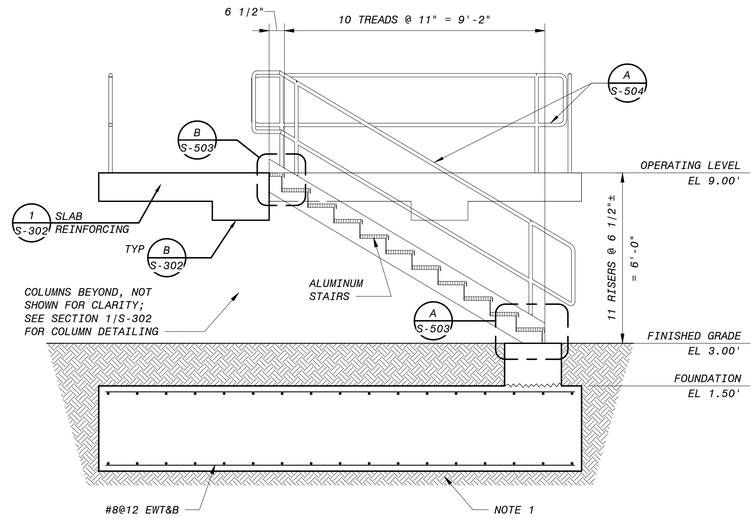


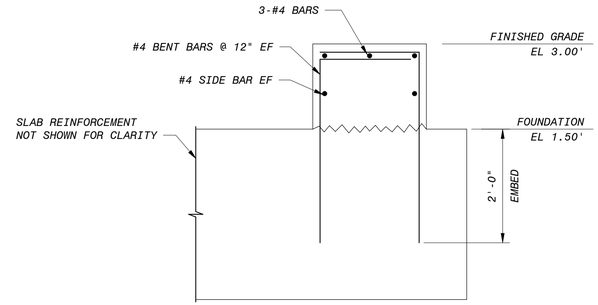
1 SECTION
S-102 3/8" = 1'-0"



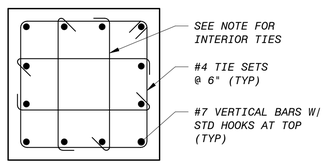
2 SECTION
S-102 3/8" = 1'-0"

NOTES:

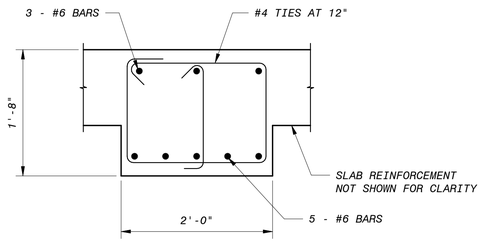
1. 6" DEEP STRUCTURAL FILL COMPACTED 98%. SUBGRADE PREPARED IN ACCORDANCE WITH SPECIFICATIONS.
2. SEE DRAWING S-503 FOR TYPICAL PLATFORM CONNECTION DETAILS.
3. CONTRACTOR TO COORDINATE ALUMINUM PLATFORM STRUCTURE WITH GENERATOR ENCLOSURE OPENINGS AND ELEVATION.



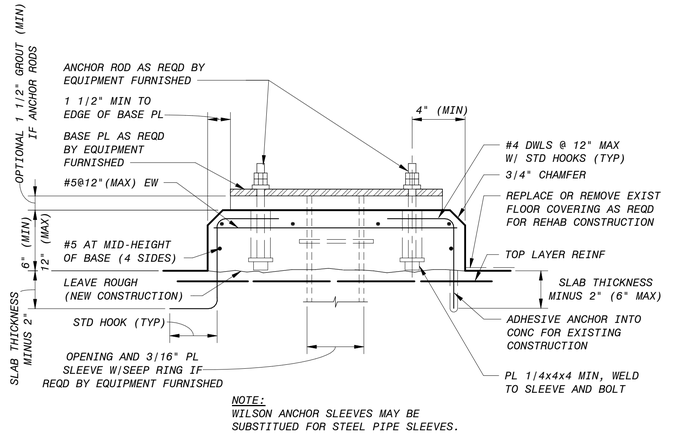
3 SECTION
S-102 3/4" = 1'-0"



A COLUMN DETAIL
S-102 1" = 1'-0"



B BEAM DETAIL
S-302 1" = 1'-0"



NOTE:
WILSON ANCHOR SLEEVES MAY BE SUBSTITUED FOR STEEL PIPE SLEEVES.

C EQUIPMENT PAD DETAIL
S-302 NO SCALE

ISSUED FOR CONSTRUCTION

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE

ELIAS A. POURLADIAN LICENSE No 86809 STATE OF FLORIDA PROFESSIONAL ENGINEER

Date:
Engineer of Record: ELIAS POURLADIAN
Florida License No.: NO. 86809

BLACK & VEATCH

Black & Veatch Corporation
225 N. University Drive, Suite 202
Coral Springs, FL 33065
Certificate No. 8132

CITY OF KEY WEST
DENNIS STREET STORMWATER PUMP STATION IMPROVEMENTS
STRUCTURAL
ENGINE GENERATOR PLATFORM SECTIONS AND DETAILS

DESIGNED: AT/JE/HD
DETAILED: TSH
CHECKED: EAP
APPROVED: EAP
DATE: MARCH 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 193108

S-302
SHEET 16 OF 39

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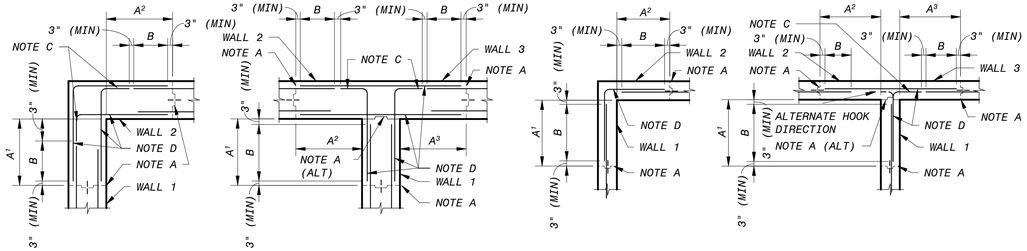


A = VERTICAL CONSTRUCTION JOINT NEAREST TO WALL CORNER.

A (ALT) = ALTERNATE VERTICAL CONSTRUCTION JOINT NEAREST TO WALL CORNER IN T WALL JOINT WHICH DOES NOT REQUIRE WATERSTOP.

A^X = DISTANCE FROM INSIDE CORNER FACE TO NEAREST VERTICAL CONSTRUCTION JOINT IN SIMILARLY NUMBERED WALL. A^X SHALL NOT BE LESS THAN DIMENSIONS INDICATED BY THESE DETAILS; NOR GREATER THAN INDICATED ON PLAN DRAWINGS; BUT IN ANY CASE SHALL NOT EXCEED 30 FEET IN LIQUID CONTAINMENT STRUCTURES OR 40 FEET IN OTHER STRUCTURES. IN T WALL JOINTS WHICH DO NOT REQUIRE WATERSTOP, A1 MAY BE ZERO.

B = OPTIONAL SPLICE LOCATION UNLESS SPECIFICALLY NOTED ON PLAN DRAWINGS. SPLICE LENGTH SHALL NOT BE LESS THAN THAT REQUIRED FOR TOP BARS AS SHOWN IN TABLE ON THIS SHEET. USE SPLICE LENGTH FOR THE SMALLER OF THE TWO BARS BEING SPLICED.

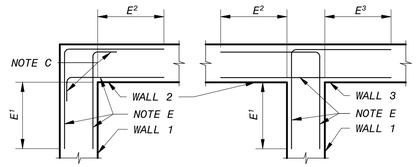
C = STANDARD HOOK

D = TYPICAL CORNER REINFORCEMENT. SIZE SHALL MATCH LARGEST ADJACENT WALL HORIZONTAL REINFORCEMENT; SPACING SHALL MATCH MINIMUM ADJACENT WALL HORIZONTAL REINFORCEMENT SPACING.

MAIN REINFORCEMENT FOR ALL STRUCTURES

TYPICAL HORIZONTAL CORNER REINFORCING DETAILS

NOTES:
1. VERTICAL REINFORCING NOT SHOWN.
2. THESE DETAILS SHALL BE APPLICABLE TO ALL WALL CORNERS UNLESS NOTED OTHERWISE ON THE DRAWINGS.



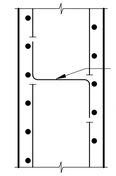
E = WHERE SPECIFICALLY NOTED ON THE DRAWINGS, ADDITIONAL CORNER REINFORCEMENT SHALL BE PLACED IN BOTH FACES OF THE INDICATED CORNER OVER THE FULL HEIGHT. ADDITIONAL CORNER REINFORCEMENT SHALL BE OF THE SAME SIZE AND SPACING AS THE MAIN CORNER REINFORCEMENT. PLACE ADDITIONAL REINFORCEMENT ALTERNATELY WITH, AND EQUAL DISTANCE BETWEEN, MAIN CORNER REINFORCEMENT.

E^X = DISTANCE FROM INSIDE CORNER FACE TO TERMINATION OF ADDITIONAL CORNER REINFORCEMENT IN SIMILARLY NUMBERED WALL. E^X SHALL NOT BE LESS THAN 0.20 THE CLEAR SPAN DISTANCE MEASURED HORIZONTALLY BETWEEN THIS CORNER AND THE NEXT OR 0.40 THE CLEAR SPAN DISTANCE OR CANTILEVERED DISTANCE MEASURED VERTICALLY, WHICHEVER IS SMALLER, BUT NOT LESS THAN 3'-0".

CONTRACTORS OPTION: E BAR TAILS MAY BE SPLICED USING LAPPED SPLICE LENGTHS FOR TOP BARS. SPLICES SHALL NOT BE LOCATED IN THE CORNER AREA COMMON TO BOTH WALLS AND SHALL CLEAR HOOK ENDS BY 3" MIN.

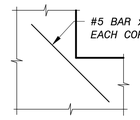
ADDITIONAL REINFORCEMENT WHERE SPECIFICALLY NOTED ON THE DRAWINGS

NOTES
1. DETAILS ON THIS DRAWING APPLY TO ALL DRAWINGS UNLESS OTHERWISE NOTED.
2. WORK THIS DRAWING WITH THE STANDARD CONCRETE JOINT DETAILS.



Z-BAR SPACERS AT 8' CENTERS EACH DIRECTION. MINIMUM ONE ROW. FABRICATE FROM #2 OR HEAVIER BARS. TIE TO OUTSIDE LAYER OF REINFORCING

SPACERS FOR WALL REINFORCEMENT



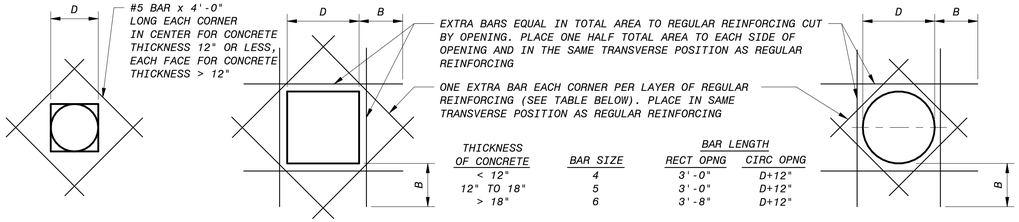
#5 BAR x 4'-0" LONG EACH CORNER IN CENTER

TYPICAL EXTRA REINFORCING AT ISOLATED RE-ENTRANT CORNERS

(TYPICAL REQUIRED UNLESS ADDITIONAL REINFORCEMENT SPECIFICALLY INDICATED AT OPENINGS ON DRAWINGS)

A TYPICAL REINFORCEMENT DETAILS

NO SCALE



THICKNESS OF CONCRETE	BAR SIZE	BAR LENGTH RECT OPNG	BAR LENGTH CIRC OPNG
< 12"	4	3'-0"	D+12"
12" TO 18"	5	3'-0"	D+12"
> 18"	6	3'-8"	D+12"

B = THE REQUIRED LENGTH FOR LAPPED SPLICE FOR TOP BARS AS SHOWN ON THIS SHEET

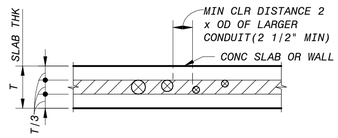
FOR OPENINGS 12" < = D < = 21"

FOR RECTANGULAR OPENINGS 21" < D < = 72"

FOR CIRCULAR OPENINGS 21" < D < = 54"

TYPICAL EXTRA REINFORCING AT OPENINGS 12" TO <= 72"

(TYPICAL REQUIRED UNLESS ADDITIONAL REINFORCEMENT SPECIFICALLY INDICATED AT OPENINGS ON DRAWINGS)



NOTES:

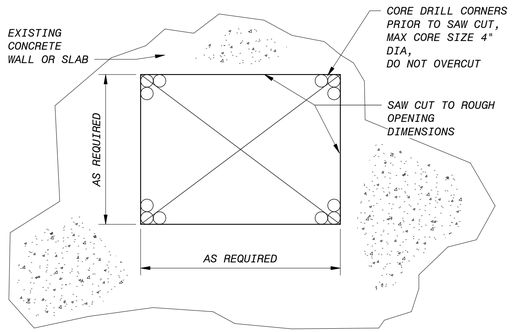
1. PLACE CONDUIT ONLY IN SHADED AREA.
2. FOR CONDUIT REQUIREMENTS SEE THE ELECTRICAL DRAWINGS AND SPECIFICATIONS.

C CONDUIT PLACING DETAIL

NO SCALE

B REINFORCEMENT AT OPENINGS DETAILS

NO SCALE



NOTE:

1. SIZES AND LOCATIONS OF ALL OPENINGS MUST BE APPROVED BY ENGINEER PRIOR TO BEGINNING CUTTING OPERATION

D PROCEDURE FOR CUTTING OR ENLARGING OPENINGS IN EXISTING CONCRETE SLABS OR WALLS

NO SCALE

LENGTH OF LAPPED SPLICES FOR REINFORCEMENT (INCHES)

(UNLESS NOTED OTHERWISE ON THE DRAWINGS)

(f'c=4000 PSI)

BAR SIZE	BEAMS & COLUMNS *TOP BARS	BEAMS & COLUMNS OTHERS	WALLS & SLABS *TOP BARS	WALLS & SLABS OTHERS	BAR SIZE
3	16	16	16	16	3
4	19	16	19	16	4
5	24	18	24	18	5
6	33	26	29	22	6
7	55	42	48	37	7
8	69	53	60	46	8
9	84	65	74	57	9
10	103	79	91	70	10
11	122	94	108	83	11

CONCRETE COVER FOR REINFORCEMENT

LOCATION	MINIMUM COVER
UNFORMED SURFACES ADJACENT TO EXCAVATION	3"
SURFACES INSIDE OF OZONE CONTACTORS EXPOSED TO OZONE IN WATER OR AIR	3"
FORMED OR TOP SURFACES EXPOSED TO WEATHER OR SATURATED AIR, SUBMERGED OR IN CONTACT WITH EARTH, INCLUDING STIRRUPS, TIES OR SPIRALS	2"
OTHER LOCATIONS:	
BARS IN BEAMS OR GIRDERS, INCLUDING STIRRUPS AND COLUMN SPIRALS OR TIES	1 1/2"
SLABS, WALLS AND JOISTS	
#6 AND LARGER	1 1/2"
#5 AND SMALLER	1"

NOTE: TOLERANCES FOR CONCRETE COVER AND THE FABRICATION AND PLACING OF REINFORCEMENT SHALL CONFORM TO ACI 117.

* TOP BARS ARE HORIZONTAL BARS SO PLACED THAT MORE THAN 12" OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR. HORIZONTAL BARS IN WALLS ARE TO BE PROVIDED WITH LAP LENGTHS AS REQUIRED FOR TOP BARS. VERTICAL BARS MAY BE CONSIDERED AS OTHER BARS

ISSUED FOR CONSTRUCTION

DATE	REVISIONS AND RECORD OF USE	NO.	BY	CHK	APP

ELIAS A. POURLADIAN ★ No 86809 ★ STATE OF FLORIDA ★ PROFESSIONAL ENGINEER

Date:
Engineer of Record: ELIAS POURLADIAN
Florida License No.: NO. 86809

BLACK & VEATCH
Black & Veatch Corporation
2525 N University Drive, Suite 210
Coral Springs, FL 33065
Certificate No. 8132

CITY OF KEY WEST
DENNIS STREET STORMWATER PUMP STATION

STRUCTURAL
STANDARD CONCRETE REINFORCING AND MISCELLANEOUS DETAILS

DESIGNED: AT/JE/HD
DETAILED: TSH
CHECKED: EAP
APPROVED: EAP
DATE: MARCH 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 193108

S-501
SHEET 17 OF 39

PLOTTED: 3/1/2019 7:39:17 AM
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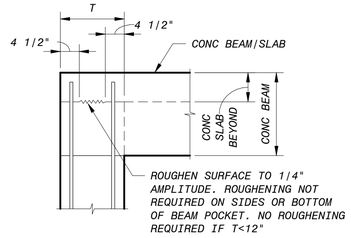
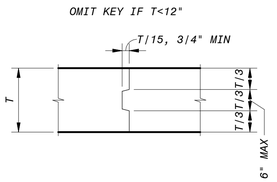
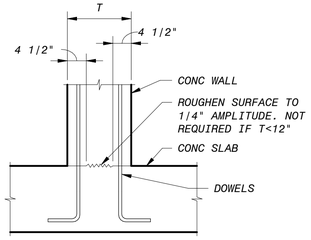


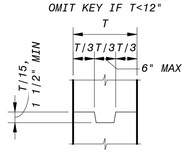
TOP OF WALL TO BEAM/SLAB



SLAB TO SLAB

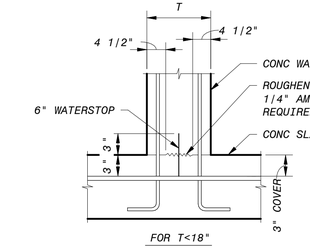


SLAB TO BOTTOM OF WALL

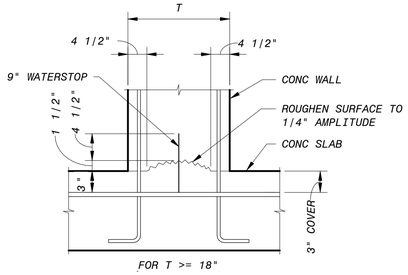


WALL TO WALL

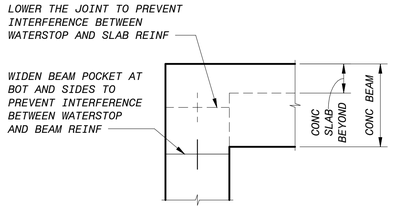
JOINTS WITHOUT WATERSTOPS



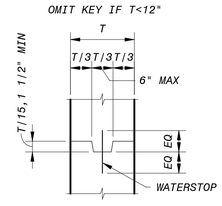
SLAB TO BOTTOM OF WALL



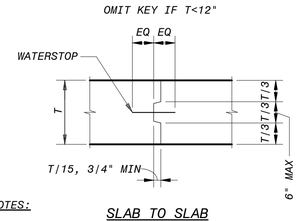
SLAB TO BOTTOM OF WALL



TOP OF WALL TO BEAM/SLAB



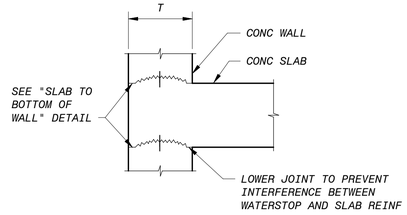
WALL TO WALL



NOTES:

1. UNLESS NOTED OTHERWISE, WATERSTOPS MAY BE STEEL OR PVC.
2. WATERSTOP SIZE SHALL BE 6" FOR WALLS AND SLABS 18" OR LESS IN THICKNESS, AND SHALL BE 9" FOR WALLS AND SLABS THICKER THAN 18".

SLAB TO SLAB



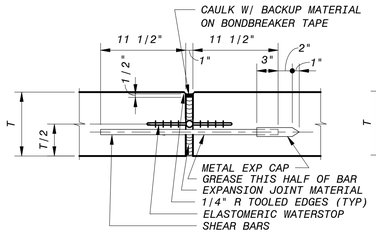
SLAB TO WALL AT INTERMEDIATE ELEVATION

JOINTS WITH WATERSTOPS

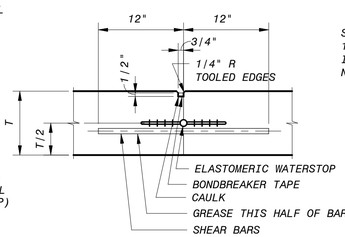
TYPICAL CONSTRUCTION JOINTS

NOTES:

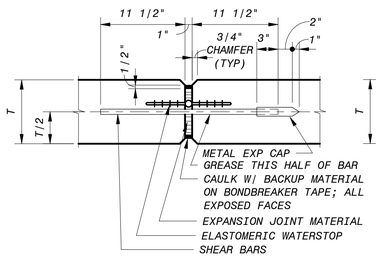
1. REINFORCING STEEL IS CONTINUOUS THROUGH ALL CONSTRUCTION JOINTS
2. "CSJ W/WS" - WITH WATERSTOP
3. "CSJ" - WITHOUT WATERSTOP



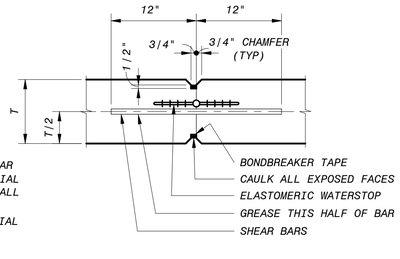
SLABS



SLABS



WALLS



WALLS

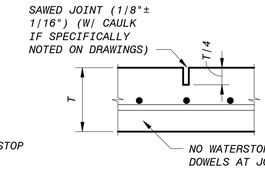
EXPANSION JOINTS

NOTE:
"EJ" W/ WS" - WITH ELASTOMERIC WATERSTOP
"EJ" - WITHOUT ELASTOMERIC WATERSTOP

CONTRACTION JOINTS

NOTE:
"CJ" W/ WS" - WITH ELASTOMERIC WATERSTOP
"CJ" - WITHOUT ELASTOMERIC WATERSTOP

TYPICAL CONTROL JOINTS



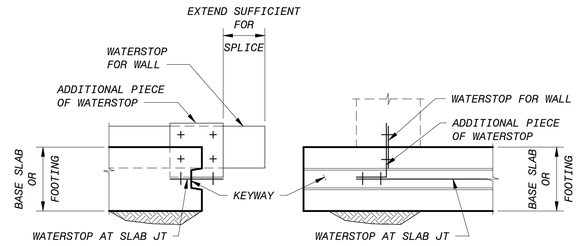
NOTES:

1. TYPICAL CONTROL JOINT NOTES NOT APPLICABLE FOR SAWED CONTRACTION JOINT.
2. "SJ" - NO WATERSTOP
3. JOINT FORMED WITH TOOL OR INSERT STRIP MAY BE SUBSTITUTED FOR SAWED TYPE ONLY WITH PRIOR ACCEPTANCE BY THE ENGINEER.
4. IF SINGLE LAYER REINFORCEMENT, EVERY OTHER BAR IS DISCONTINUOUS AT JOINT. IF 2 LAYER REINFORCEMENT, TOP LAYER IS COMPLETELY DISCONTINUOUS AT JOINT.

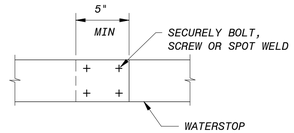
SAWED CONTRACTION JOINT
SLAB-ON-GRADE

NOTES:

1. PROVIDE 3/4" SHEAR BARS @ 1'-6" CTRS ACROSS JOINT UNLESS NOTED OTHERWISE.
2. REINFORCING STEEL SHALL NOT BE EXTENDED ACROSS JOINT UNLESS NOTED OTHERWISE.
3. SHEAR BARS SHALL BE SMOOTH FREE FROM RUST OR SCALE, AND GREASED TO PREVENT BOND (ONE HALF OF BAR ONLY).
4. WATERSTOP SIZE SHALL BE 6" FOR WALLS AND SLABS 18" OR LESS IN THICKNESS, AND SHALL BE 9" FOR WALLS AND SLABS THICKER THAN 18".



METAL WATERSTOP INTERSECTION AT BASE SLAB CONSTRUCTION JOINT



METAL WATERSTOP SPLICE

NOTES

1. DETAILS ON THIS DRAWING APPLY TO ALL DRAWINGS UNLESS OTHERWISE NOTED.
2. WORK THIS DRAWING WITH THE STANDARD CONCRETE REINFORCING DETAILS.
3. AT WALL JOINTS AND AT WALL BASE JOINTS, SECURE ALL ELASTOMERIC WATERSTOPS IN THE CORRECT POSITION USING HOG RINGS OR GROMMETS SPACED AT 12 INCHES ALONG THE LENGTH OF THE WATERSTOP AND WIRE TIE TO ADJACENT REINFORCING STEEL.
4. AT SLAB JOINTS AND FOOTING JOINTS, ENSURE SPACE BENEATH AND AROUND WATERSTOP IS COMPLETELY FILLED WITH CONSOLIDATED CONCRETE. DURING OPERATION MAKE VISUAL INSPECTION OF ENTIRE WATERSTOP AREA. LIMIT CONCRETE PLACEMENT TO ELEVATION OF WATERSTOP IN FIRST LIFT. RAISE ELASTOMERIC WATERSTOPS TO CONFIRM FULL CONSOLIDATION WITHOUT VOIDS. PLACE REMAINING CONCRETE TO FULL DEPTH OF SLAB.

DATE	REVISIONS AND RECORD OF USE	NO.	BY	CHK	APP

ELIAS A. POURLADIAN ★ LICENSE No 66809 ★ STATE OF FLORIDA ★ PROFESSIONAL ENGINEER

Date:
Engineer of Record: ELIAS POURLADIAN
Florida License No.: NO. 66809

BLACK & VEATCH

Black & Veatch Corporation
2855 N. University Drive, Suite 210
Coral Springs, FL 33065
Certificate No. 8132

CITY OF KEY WEST
DENNIS STREET STORMWATER PUMP STATION

STRUCTURAL
STANDARD CONCRETE JOINT DETAILS

DESIGNED:	AT/JE/HD
DETAILED:	TSH
CHECKED:	EAP
APPROVED:	EAP
DATE:	MARCH 2019

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
193108

S-502
SHEET
18 OF 39

ISSUED FOR CONSTRUCTION

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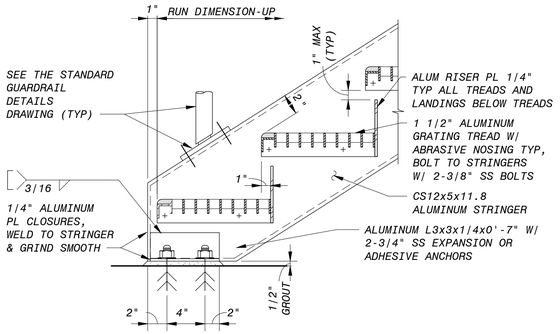
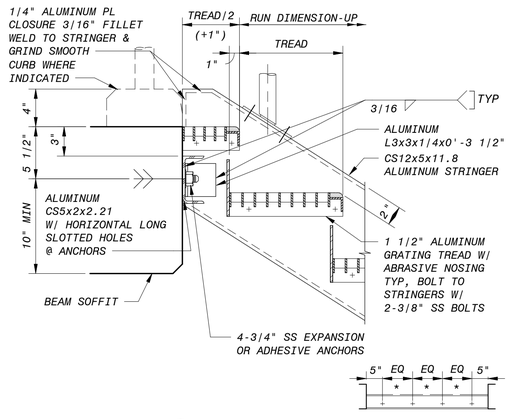
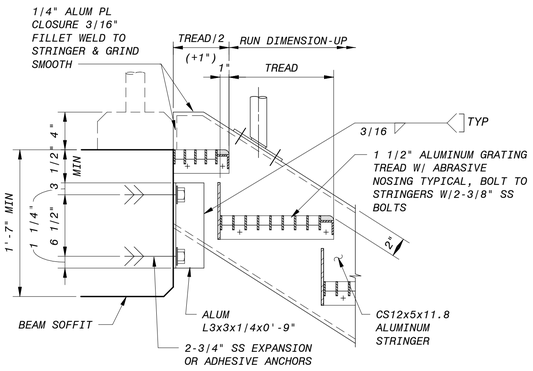


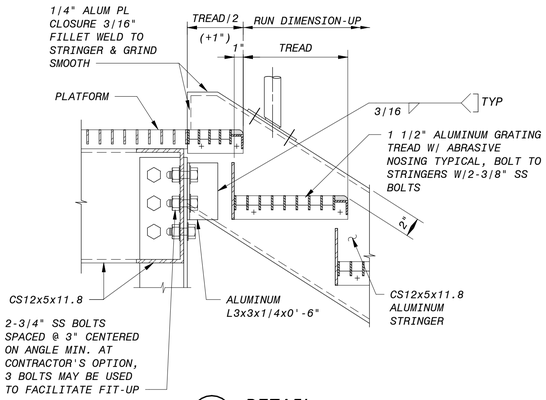
A - DETAIL
1 1/2" = 1'-0"



B - DETAIL
1 1/2" = 1'-0"



B - ALTERNATE DETAIL
1 1/2" = 1'-0"



C - DETAIL
1 1/2" = 1'-0"

D - DETAIL
1 1/2" = 1'-0"

E - DETAIL
1 1/2" = 1'-0"

TYPICAL LANDING BRACING
NO SCALE

ALUMINUM GRATING STAIR NOTES:

1. ALL ALUMINUM SHAPES SHALL BE ALUMINUM ASSOCIATION STANDARD STRUCTURAL SHAPES.
2. DESIGNATION LEGEND FOR ALUMINUM SHAPES:

CS 12 x 5 x 11.8
- CHANNEL
- DEPTH
- WIDTH
- MEMBER WEIGHT LB/FT

L 5 x 5 x 3/8
- ANGLE
- LEG LENGTH
- LEG LENGTH
- LEG THICKNESS

3. WELDS NOT DIMENSIONED ON THE DRAWINGS SHALL BE SIZED TO DEVELOP THE FULL STRENGTH OF THE LEAST STRENGTH COMPONENT OF THE CONNECTION.

STAIR DESIGN NOTES:

1. STAIRS SHALL BE DESIGNED BY THE SUPPLIER IN GENERAL ACCORDANCE WITH DETAILS INDICATED ON THESE DESIGN DRAWINGS. THE DESIGN SHALL COMPLY WITH ALL APPLICABLE PROVISIONS OF THE LOCAL BUILDING CODE, ANSI A117.1 AND OSHA.
2. THE DESIGN SHALL BE SEALED BY AN ENGINEER REGISTERED IN THE STATE OF THE PROJECT. IF REQUESTED, CALCULATIONS SHALL BE SUBMITTED FOR REVIEW.
3. THE COMPLETED FABRICATIONS SHALL SUPPORT THE LOADS AND DEFLECTION CRITERIA INDICATED IN THE STRUCTURAL AND METALS SPECIFICATION
4. THE STAIR DESIGN AND DETAILS SHALL BE COORDINATED WITH THE HANDRAILING AND GUARDRAILING SUPPLIED. STAIR MEMBERS SHALL BE ADEQUATE TO ACCEPT LOADS FROM THE RAIL POSTS BASED UPON THE CRITERIA INDICATED IN THE RAILING SPECIFICATIONS:
5. CONNECTIONS TO THE SUPPORTING STRUCTURE SHALL BE ADEQUATE TO TRANSFER ALL LOADINGS, AND SHALL BE DESIGNED IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS OF THE AISC MANUAL AND ACI 318 APPENDIX D. THE NUMBER AND TYPE OF CONNECTIONS SHALL COMPLY AT A MINIMUM, WITH THESE DESIGN DRAWINGS. ALL NECESSARY BRACKETS, BOLTS, AND ANCHORS SHALL BE PROVIDED.

ISSUED FOR CONSTRUCTION

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE

ELIAS A. POURLADIAN PROFESSIONAL ENGINEER
LICENSE No 66809 ★ STATE OF FLORIDA ★

Date:
Engineer of Record: ELIAS POURLADIAN
Florida License No.: NO. 66809

BLACK & VEATCH
Black & Veatch Corporation
2255 N University Drive, Suite 210
Coral Springs, FL 33065
Certificate No. 8132

CITY OF KEY WEST
DENNIS STREET STORMWATER PUMP STATION
STRUCTURAL
STANDARD ALUMINUM GRATING STAIR DETAILS

DESIGNED: AT/JE/HD
DETAILED: TSH
CHECKED: EAP
APPROVED: EAP
DATE: MARCH 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 193108

S-503
SHEET 19 OF 39

PLOTTED: 3/1/2019 7:39:23 AM
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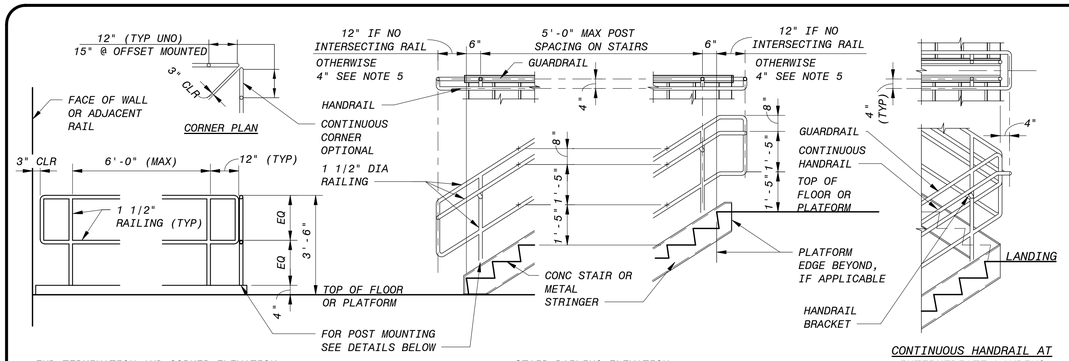
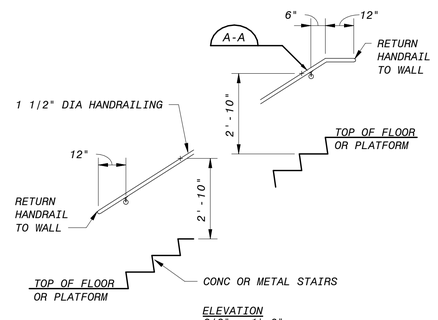


END TERMINATION AND CORNER ELEVATION

STAIR RAILING ELEVATION
SEE NOTE 4 AND 5

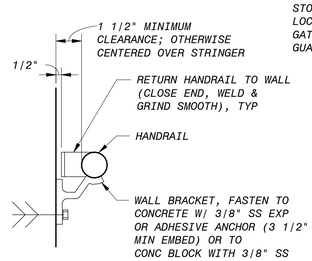
CONTINUOUS HANDRAIL AT INTERMEDIATE LANDING

A TWO RAIL GUARDRAIL
3/8" = 1'-0"

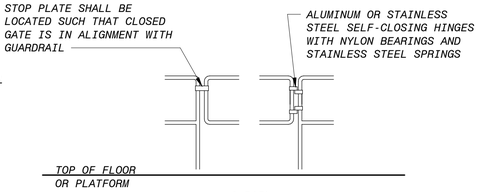


ELEVATION
3/8" = 1'-0"

B WALL MOUNTED HANDRAIL
AS NOTED



DETAIL A-A
1 1/2" = 1'-0"



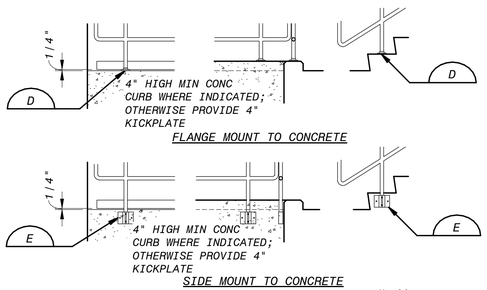
2 RAIL

GATE CONFIGURATION TO MATCH ADJACENT RAILING OR AS PROVIDED BY SELF-CLOSING SAFETY GATE MANUFACTURER IN SAME MATERIAL AS GUARDRAIL. SWING GATE INWARD WITH HINGES LOCATED TO PROVIDE LEAST OBSTRUCTION TO ACCESS.

C SELF-CLOSING SWING GATE
NO SCALE

NOTES:

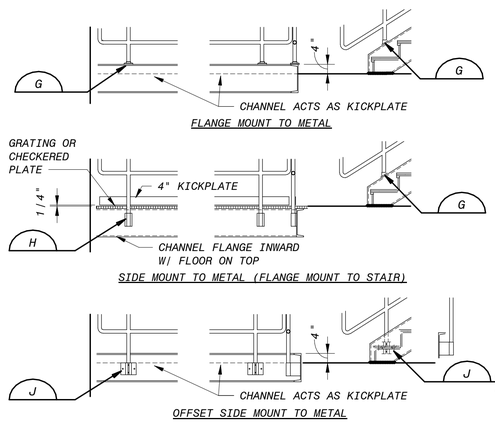
1. *RAILING MATERIAL AND FABRICATION SHALL BE AS INDICATED ON THE DESIGN DRAWINGS AND IN THE PROJECT SPECIFICATIONS FOR HANDRAILING AND GUARDRAILING.*
2. *ALL RAILING AND MOUNTINGS SHALL BE DESIGNED AND FABRICATED IN COMPLIANCE WITH THE MOST STRINGENT REQUIREMENTS OF THE RAILING SPECIFICATIONS, THE APPLICABLE LOCAL BUILDING CODE AND ALL PERTINENT OSHA AND LOCAL SAFETY REGULATIONS.*
3. *GUARDRAIL AND HANDRAIL SHALL BE DESIGNED AND FABRICATED IN CONFIGURATIONS REQUIRED TO FIT THE LOCATIONS INDICATED ON THE DESIGN DRAWINGS. CONTRACTOR SHALL VERIFY FINAL DIMENSIONS BEFORE FABRICATION.*
4. *GUARDRAIL MAY BE REPLACED WITH WALL MOUNTED HANDRAIL AT STAIR EDGES AND STRINGERS LOCATED ADJACENT TO WALLS. IF THE OUTSIDE EDGE OF THE STAIR STRINGER IS MORE THAN 3" FROM THE WALL FACE, GUARDRAIL SHALL BE USED.*
5. *THE INBOARD HANDRAILING AT SWITCHBACK STAIR LANDINGS MUST BE CONTINUOUS FROM ONE STAIR RUN TO THE NEXT. ADJUST INDICATED DIMENSION AS REQUIRED TO ALIGN AND CONNECT RAILINGS OVER THE LANDING EDGE.*
6. *THE GUARDRAIL AND HANDRAIL CONFIGURATIONS ON THIS SHEET WILL NOT SATISFY ADA REQUIREMENTS FOR HANDICAPPED ACCESSIBILITY. AT LOCATIONS ON THE DESIGN DRAWINGS WHERE CONFORMANCE WITH ADA REQUIREMENTS IS SPECIFICALLY NOTED, THE RAILING SUPPLIER SHALL MODIFY THE CONFIGURATIONS TO COMPLY WITH THE MOST STRINGENT REQUIREMENTS OF ANSI 117.1 UNIFORM FEDERAL ACCESSIBILITY STANDARDS AND THE ACCESSIBILITY STANDARDS OF THE AMERICANS WITH DISABILITIES ACT (ADA).*
7. *AT LOCATIONS SPECIFICALLY INDICATED AS REMOVABLE RAILING, GUARDRAILING AND MOUNTING DETAILS SHALL BE MODIFIED AS FOLLOWS:*
   - ** RAILING SHALL BE DETAILED IN SHORT LENGTHS THAT WEIGH NO MORE THAN 50 LBS. EACH PIECE SHALL INCLUDE AT LEAST 2, BUT NOT MORE THAN 3 POSTS. RAIL ENDS SHALL BE TERMINATED SIMILAR TO THE END TERMINATION DETAILS THIS SHEET.*
   - ** MOUNTING DETAILS SHALL BE MODIFIED TO PERMIT RAILING PIECES TO BE REMOVED AND REINSTALLED WITHOUT USE OF TOOLS.*



FLANGE MOUNT TO CONCRETE

SIDE MOUNT TO CONCRETE

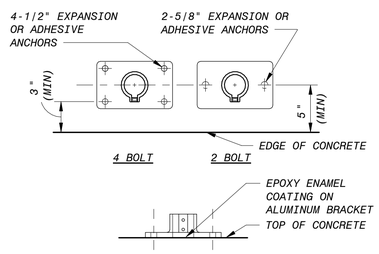
SLEEVE MOUNT TO CONCRETE



FLANGE MOUNT TO METAL

SIDE MOUNT TO METAL (FLANGE MOUNT TO STAIR)

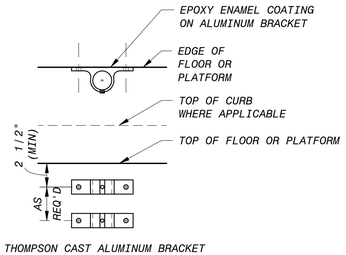
OFFSET SIDE MOUNT TO METAL



THOMPSON CAST ALUMINUM BASE FLANGE (#TBF-3.4 FOR 4 BOLTS,#TBF-3.2 FOR 2 BOLTS), OR ACCEPTABLE EQUAL

ALUMINUM RAILING

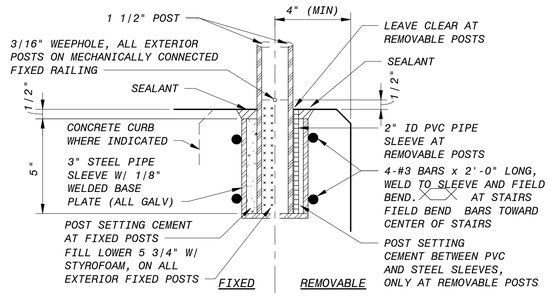
D BASE FLANGE MOUNT
1 1/2" = 1'-0"



THOMPSON CAST ALUMINUM BRACKET (#TSM-1.50), OR ACCEPTABLE EQUAL; W/ 4-1/2" SS EXPANSION OR ADHESIVE ANCHORS

ALUMINUM RAILING

E SIDE MOUNT
1 1/2" = 1'-0"

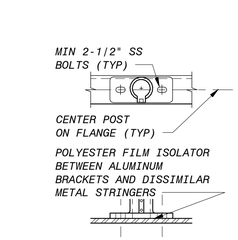


NOTES: 1. FIXED AND REMOVABLE DETAILS SIMILAR EXCEPT AS NOTED.

2. THE REMOVABLE SLEEVE MOUNT DETAIL SHALL NOT BE USED IN WET LOCATIONS SUBJECT TO FREEZING. SUBSTITUTE A REMOVABLE BASE FLANGE OR SIDE MOUNT DETAIL.

F SLEEVE MOUNT
3" = 1'-0"

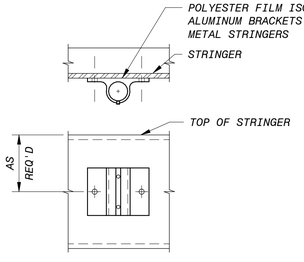
POST MOUNTED TO CONCRETE



THOMPSON CAST ALUMINUM BASE FLANGE (#TBF-2) AT HORIZONTAL STRINGER OR (#ABF-1) AT STAIR STRINGER OR ACCEPTABLE EQUAL

ALUMINUM RAILING

G BASE FLANGE MOUNT
1 1/2" = 1'-0"

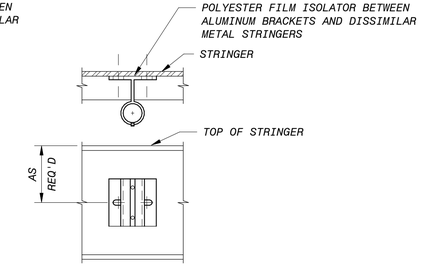


THOMPSON CAST ALUMINUM BRACKET (#TSM-1.50) OR ACCEPTABLE EQUAL; W/ MIN 2-1/2" SS BOLTS

ALUMINUM RAILING

H SIDE MOUNT
1 1/2" = 1'-0"

POST MOUNTED TO METAL



THOMPSON CAST ALUMINUM (#SMB-2) OR (#SMB-3) OR ACCEPTABLE EQUAL; W/ MIN 2-1/2" SS BOLTS

ALUMINUM RAILING

J OFFSET SIDE MOUNT
1 1/2" = 1'-0"

ISSUED FOR CONSTRUCTION

DATE	REVISIONS AND RECORD OF USE	NO.	BY	CHK	APP

ELIAS A. POURLADIAN ★ LICENSE No 66809 ★ STATE OF FLORIDA ★ PROFESSIONAL ENGINEER

Date:
Engineer of Record: ELIAS POURLADIAN
Florida License No.: NO. 66809

BLACK & VEATCH

Black & Veatch Corporation
2855 University Drive, Suite 210
Coral Springs, FL 33065
Certificate No. 8132

CITY OF KEY WEST
DENNIS STREET STORMWATER PUMP STATION

STRUCTURAL
STANDARD 2 RAIL IBC GUARDRAIL DETAILS

DESIGNED:	AT/JE/HD
DETAILED:	TSH
CHECKED:	EAP
APPROVED:	EAP
DATE:	MARCH 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 193108

S-504
SHEET 20 OF 39

PLOTTED: 3/1/2019 7:39:26 AM
D7000

PROCESS MECHANICAL ABBREVIATIONS & GENERAL NOTES

GENERAL ABBREVIATIONS

ABV	ABOVE
ACC	AREA CONTROL CENTER
ACP	ASBESTOS CEMENT PIPE
AD	ACCESS DOOR
ADWF	AVERAGE DRY WEATHER FLOW
AFC	ABOVE FINISHED CONCRETE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AL	ALUMINUM
ALT	ALTERNATE
AN	ANAEROBIC
APPROX	APPROXIMATE(LY)
ASSY	ASSEMBLY
AUTO	AUTOMATIC
AUX	AUXILIARY
AVG	AVERAGE
AX	ANOXIC
BET	BETWEEN
BF	BLIND FLANGE
BFF	BELOW FINISH FLOOR
BL	BOTTOM LEVEL
BLDG	BUILDING
BLW	BELOW
BNR	BIOLOGICAL NUTRIENT REMOVAL
BOD	BOTTOM OF DUCT ELEVATION, BIOCHEMICAL OXYGEN DEMAND
BOF	BOTTOM OF FOOTING
BOT	BOTTOM
C-C	CENTER TO CENTER
C/C	CENTER TO CENTER
C/L	CENTERLINE
CAP	CAPACITY
CB	CATCH BASIN
CCP	CONCRETE CYLINDER PIPE
CCSP	CONCRETE LINED AND COATED STEEL PIPE
CF	CUBIC FEET
CI	CAST IRON
CIP	CAST IRON PIPE
CIRC	CIRCUMFERENCE
CL2	CHLORINE
CLR	CHLORINATOR
CMC	CEMENT MORTAR COATED
CML	CEMENT MORTAR LINED
CNTL	CONTROL
CO	CLEANOUT
CO2	CARBON DIOXIDE
COD	CHEMICAL OXYGEN DEMAND
CONT	CONTINUED(OUS)
CP	COMPRESSOR
CPLG	COUPLING
CPVC	CHLORINATED POLYVINYL CHLORIDE
CRN	CRANE
CSP	CORRUGATED STEEL PIPE
CTF	CENTRIFUGE
CTR	CENTER
CTS	CORROSION/CATHODIC TEST STATION
CU	CUBIC
CY	CUBIC YARD
D	DRAIN
DET	DETAIL
DI	DUCTILE IRON
DIA	DIAMETER
DIAG	DIAGRAM
DIFF	DIFFERENTIAL
DIP	DUCTILE IRON PIPE
DMJ	DISMANTLING JOINT
DN	DOWN
DO	DISSOLVED OXYGEN
DWG	DRAWING
E	EAST, EASTING
EA	EACH
ECC	ECCENTRIC
EE	EACH END
EFF	EFFICIENCY, EFFLUENT
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRICAL
ELL	ELBOW
EO	ELECTRICALLY OPERATED
EPWWF	EQUALIZED PEAK WET WEATHER FLOW
EQ	EQUAL
EQUIP	EQUIPMENT
EXIST	EXISTING
FAB	FABRICATE(D)(TION)
FL	FLOW LINE
FLEX	FLEXIBLE
FLG	FLANGE(D)
FM	FORCE MAIN
FPC	FLEXIBLE PIPE COUPLING
FR	FLOW RATE
FRP	FIBERGLASS REINFORCED PIPE
FSL	FACULTATIVE SLUDGE LAGOON
FT	FEET
FUT	FUTURE
GA	GAGE
GALV	GALVANIZED
GEN	GENERAL, GENERATOR
GPD	GALLONS PER DAY
GPM	GALLONS PER MINUTE
GR	GRADE
HDPE	HIGH DENSITY POLYETHYLENE
HDR	HEADER
HOR	HORIZONTAL
HP	HIGH POINT, HIGH PRESSURE
HR	HEAT RESERVOIR
HT	HEIGHT
HWTR	HIGH WATER
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IJS	INFLUENT JUNCTION STRUCTURE
IN	INCH
INF	INFLUENT
INS	INSULATE(D)(ION)
INV	INVERT
L	LENGTH
LB	POUND
LDLD	LINED DEDICATED LAND DISPOSAL
LEV	LEVEL
LF	LINEAR FOOT
LG	LONG
LP	LOW POINT, LOW PRESSURE
LT	LEFT
LWR	LOWER
MAN	MANUAL(LY)
MAX	MAXIMUM
MECH	MECHANICAL
MFR	MANUFACTURE(R)
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MI	MALLEABLE IRON
MIN	MINIMUM, MINUTE
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
ML	MILLILITER
N	NORTH, NORTHING
N/A	NOT APPLICABLE
NAOH	SODIUM HYDROXIDE
NIC	NOT IN CONTRACT
NO./#	NUMBER
NOX	NITRATES AND NITRITES
NPSH	NET POSITIVE SUCTION HEAD
NPSHR	NET POSITIVE SUCTION HEAD REQUIRED
NRS	NON-RISING STEM
NTS	NOT TO SCALE
OD	OUTSIDE DIAMETER
OPNG	OPENING
OPP	OPPOSITE
ORP	OXIDATION REDUCTION POTENTIAL
P	PROCESS, PNEUMATIC
P&ID	PROCESS AND INSTRUMENTATION DIAGRAM
PC	PIPE COUPLING
PCP	PLAIN CONCRETE PIPE
PEPS	PRIMARY EFFLUENT PUMPING STATION
PERC	PERCOLATION
PF	PRESSURIZED FLOW
PL	PROPERTY LINE, PIPELINE
PMO	PROJECT MANAGEMENT OFFICE
POP	PNEUMATIC OPERATOR
PPM	PARTS PER MILLION
PRES	PRESSURE
PROP	PROPELLER
PSI	POUNDS PER SQUARE INCH
PSL	PIPE SLEEVE
PVC	POLYVINYL CHLORIDE
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
RCCP	REINFORCED CONCRETE CYLINDER PIPE
RED	REDUCE(R)
REG	REGULATOR
REQ'D	REQUIRED
RH	RIGHT HAND
RL	REDUCED LEVEL
RT	RIGHT
S	SOUTH, SILENCER, SLOPE
SCH	SCHEDULE
SECT	SECTION
SHT	SHEET
SIM	SIMILAR
SL	SLOPE
SO2	SULFUR DIOXIDE
SPEC	SPECIFICATION(S)
SPG	SPACING
SQ	SQUARE
STD	STANDARD
TBD	TO BE DETERMINED
TD	TANK DRAIN
THD	THREADED
TO	TOP OF
TYP	TYPICAL
UD	UNDER DRAIN
UG	UNDER GROUND
UN	UNION
UON	UNLESS OTHERWISE NOTED
VAR	VARIES, VARIABLE
VCP	VITRIFIED CLAY PIPE
VERT	VERTICAL
W	WEST, WIDTH
W/	WITH
W/O	WITHOUT
WF	WIDE FLANGE
WM	WALL MOUNTED
WS	WATER SURFACE
WSL	WATER SURFACE LEVEL
WSTP	WATERSTOP
WT	WATERTIGHT, WEIGHT

MISC

YCO	YARD CLEANOUT
Ø	ROUND, DIAMETER

PIPING SYSTEM ABBREVIATIONS

A	AERATION AIR
AA	AGITATION AIR
ASH	ASH PNEUMATIC
BD	BOILER BLOWDOWN
BF	BOILER FEEDWATER
BSC	BIOLOGICAL SCUM
CAA	CHANNEL AERATION AIR
CC	CENTRIFUGE CAKE
CD	CHEMICAL DRAIN
CEN	CENTRATE
CF	CENTRIFUGE FEED
CFA	CONDENSATE FOUL AIR
CFE	CHLORINATED FINAL EFFLUENT
CL	LOW PRESSURE CONDENSATE
CLG	CHLORINE GAS
CLL	CHLORINE LIQUID
CLS	CHLORINE SOLUTION
CLV	CHLORINE VACUUM
CM	MEDIUM PRESSURE CONDENSATE
CPA	CHEMICAL PADDING AIR
CS	CIRCULATING SLUDGE
CSO	CAUSTIC SODA
CV	CHEMICAL VENT
D	DRAIN
DFE	DECHLORINATED FINAL EFFLUENT
DIZ	DEIONIZED WATER
DS	DIGESTED SLUDGE
DSSG	DIGESTED SLUDGE/SLUDGE GAS
ED	EQUIPMENT DRAIN
ENS	ESB WASHDOWN SYSTEM
FAE	FOUL AIR EXHAUST
FBW	FILTERED BACKWASH WATER
FC	FERRIC CHLORIDE
FE	FINAL EFFLUENT
FILT	FILTRATE
FOSC	FOAM SUPPRESSING CHEMICAL
FOG	FATS, OILS, AND GREASE
FTE	FILTERED EFFLUENT
GC	GAS CIRCULATION
GLY	GLYCOL/WATER COOLANT
GRI	GRIT
GRC	GAS RECIRCULATION COMPRESSOR
GRO	GRIT OVERFLOW
HCL	HYDROCHLORIC ACID
HNG	HIGH PRESSURE NATURAL GAS
HOH	HIGH PRESSURE HYDRAULIC OIL
HOL	LOW PRESSURE HYDRAULIC OIL
HR	HEAT RESERVOIR RETURN
HS	HEAT RESERVOIR SUPPLY
HSO	HARVESTED SLUDGE
HSO	SULFURIC ACID
HTV	HIGH TEMPERATURE VENT
IA	INSTRUMENT AIR
LSG	LOW PRESSURE SLUDGE GAS
MG	MIXED GAS
ML	MIXED LIQUOR
MLF	MIXED LIQUOR FERMENTER
MLR	MIXED LIQUOR RECYCLE
MS	MIXED SLUDGE
MSCS	MIXED SLUDGE/CIRCULATING SLUDGE
MSDS	MIXED SLUDGE/DIGESTER SLUDGE
MSG	MEDIUM PRESSURE SLUDGE GAS
OCA	ODOR CONTROL AIR
ODG	OXYGEN DRY GAS
OF	OVERFLOW
OFSG	OVERFLOW/SLUDGE GAS
OHP	OXYGEN HIGH PRESSURE
OLPD	OXYGEN LOW PRESSURE DISCHARGE
OLPS	OXYGEN LOW PRESSURE SUCTION
P	PRE-AERATION AIR
PAS	PRIMARY AND ACTIVATED SLUDGE
PCH	HIGH PRESSURE PROCESS CONDENSATE
PCL	LOW PRESSURE PROCESS CONDENSATE
PCR	PROCESS CONDENSATE RETURN
PD	PUMPED DRAINAGE
PE	PRIMARY EFFLUENT
PEJ	PRIMARY EFFLUENT JETTING
PERM	PERMEATE
PF	PRESSURIZED FLOW
POL	POLYELECTROLYTE
PRS	PROCESS SAMPLING
PS	PRIMARY SLUDGE
PSC	PRIMARY SCUM
PSCS	PRIMARY SLUDGE/CIRCULATING SLUDGE
PSG	PRIMARY SLUDGE AND GRIT
PSO	POLYMER SOLUTION
PSR	PRIMARY SLUDGE RECIRCULATION
PSS	PROCESS STEAM SUPPLY
RAS	RETURN ACTIVATED SLUDGE
RG	REFRIGERANT GAS
RL	REFRIGERANT LIQUID
RS	RAW SEWAGE
RWL	RAIN WATER LEADER
RWP	RAIN WATER PIPE
S	STEAM
SA	SERVICE AIR
SBIS	SODIUM BISULFITE
SCD	SCUM DECANT
SCLS	SODIUM HYPOCHLORITE SOLUTION
SCO	SCUM OVERFLOW
SCR	STEAM CLEAN RINSE
SCS	STEAM CLEAN SUPPLY
SD	SANITARY DRAIN
SE	SECONDARY EFFLUENT
SG	SLUDGE GAS
SHS	SODIUM HYDROXIDE SOLUTION
SME	SAMPLE-EFFLUENT
SMI	SAMPLE-INFLUENT
SMML	SAMPLE MIXED LIQUOR
SMO	SAMPLE OXYGEN
SMP	SAMPLE-PRIMARY EFFLUENT
SMS	SLUDGE SAMPLE-SLUDGE
SN	SUPERNATANT
SOG	SULFUR DIOXIDE GAS
SOL	SULFUR DIOXIDE LIQUID
SOS	SULFUR DIOXIDE SOLUTION
SOV	SULFUR DIOXIDE VACUUM
SPC	SUPPLEMENTAL CARBON
SR	SCREENINGS
SRA	SCUM REMOVAL AIR
SRF	SCREENINGS FEED
SRO	SCREENINGS OVERFLOW
SSC	SECONDARY SCUM
SSE	SIDESTREAM EFFLUENT
STD	STORM DRAIN
SWAS	SAMPLE-WASTE ACTIVATED SLUDGE
TA	THICKENER AIR
TD	TANK DRAIN
TE	THICKENER EFFLUENT
TS	THICKENED SLUDGE
TSO	THICKENED OVERFLOW
TS	TRANSFER SLUDGE
TSC	THICKENED SCUM
TWAS	THICKENED WASTE ACTIVATED SLUDGE
UA	UTILITY AIR
UD	UNDER DRAIN
V	VENT
VA	VACUUM
VS	STEAM VENT
WAS	WASTE ACTIVATED SLUDGE
WFBW	FILTERED BACKWASH WATER
WFP	WATER FIRE PROTECTION
WFSW	FILTERED SURFACE WASH WATER
WHWC	WASTE HEAT COOLING WATER RETURN-COGEN
WHWR	WASTE HEAT COOLING WATER RETURN
WHWS	WASTE HEAT COOLING WATER SUPPLY
WI	WETLANDS INFLUENT
WML	WASTE MIXED LIQUOR
WN	NON-POTABLE WATER
WNM	NON-POTABLE WATER, MONITORING
WNS	NON-POTABLE WATER SOFT
WP	POTABLE WATER
WPS	POTABLE WATER SOFT
WR	RECLAIMED WATER
WRF	RECLAMATION WATER, FILTERED
WRH	RECLAIMED WATER HIGH PRESSURE
WRL	RECLAIMED WATER LOW PRESSURE
WRS	FOAM SUPPRESSING SPRAY WATER
WS	SERVICE WATER

NOT ALL PIPING SYSTEMS LISTED ARE USED IN THIS DESIGN.

EQUIPMENT PREFIXES

AA	ATOMIC ABSORPTION UNIT
ACC	AREA CONTROL CENTER
AE	ANALYZER ELEMENT
AHF	ACTIVE HARMONIC FILTER
AMD	AIR MONITORING DEVICE
ARV	AIR RELEASE VALVE
AV	ANGLE VALVE
B	BLOWER
BFP	BACKFLOW PREVENTER, BELT FILTER PRESS
BFV	BUTTERFLY VALVE
BKHD	BULKHEAD
BKR	BREAKER
BSN	BAR SCREEN
BV	BALL VALVE
C	CRANE
CAV	COMBINATION AIR VALVE
CFR	CHEMICAL FEEDER
COM	COMMINUTOR
CON	CONVEYOR
CP	COMPRESSOR
CPNL	CONTROL PANEL
CSN	COMMINUTING SCREEN
CENT	CENTRIFUGE
CTS	CATHODIC PROTECTION TEST STATION
CV	CHECK VALVE
CYL	CYLINDER
DE	DENSITY METER
DPR	DAMPER
DF	DRIVE UNIT
FE	FLOW ELEMENT
FDK	FILTER, DISK
FG	FLAP GATE
FLC	FLOCCULATOR
FLP	FLUID POWER UNIT
FLT	FILTER
FM	FLOW METER
FX	FLASH MIXER
FN	FAN
FP	FILTER PRESS
GV	GLOBE VALVE
HDR	GRINDER
GEN	GENERATOR
GV	GATE VALVE
I	HOIST
HEX	HEAT EXCHANGER
K	INCINERATOR
IR	INLET RELIEF
KGV	KNIFE GATE VALVE
M	MAGNETIC CLUTCH
MD	MOTORIZED DAMPER
MBR	MEMBRANE BIO REACTOR
MME	MISCELLANEOUS MECHANICAL EQUIPMENT
MW	MONITOR WELL
MV	MUD VALVE
MVU	MOBILE VENTILATION UNIT
MX	MIXER
N	NEUTRALIZATION TANK
O	ODOR CONTROL UNIT
ORF	ORFICE (PIPING)
ORF	ODOR REMOVAL FILTER
ORP	OXIDATION REDUCTION POTENTIAL
OU	ODOR REDUCTION UNIT
P	PUMP
PCHV	PINCH VALVE
PDIT	PRESSURE DIFFERENTIAL INDICATOR TRANSMITTER
PG	PRESSURE GAUGE
PMH	PROCESS MANHOLE
POP	PNEUMATIC OPERATOR
PRS	PRESSURE REDUCING STATION
PRV	PRESSURE REGULATING (REDUCING VALVE, PRESSURE RELIEF
PSV	POP SAFETY VALVE
PV	PLUG VALVE
PVL	PRESSURE VESSEL
S	SILENCER
SBR	SCRUBBER
SCRN	SCREEN
SEP	SEPARATOR
SG	SLUICE GATE
T	SPEED INDICATOR
TG	SLIDE GATE
TNK	TANK
TBN	TURBINE
V	SOLENOID VALVE
VB	VALVE BOX
VFT	VACUUM FILTER
VP	VACUUM PUMP
VRV	VACUUM RELEASE VALVE
VS	VACUUM SYSTEM
VSC	VARIABLE SPEED COUPLING (ECC)
W	WEIR
WG	WEIR GATE
WRP	WEIR, ROTATING PIPE

NOT ALL EQUIPMENT LISTED IS USED IN THIS DESIGN.

GENERAL NOTES

1. LEGEND & ABBREVIATION SHEETS ARE GENERAL. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT.
2. LAY PIPE TO UNIFORM GRADE BETWEEN INDICATED ELEVATION POINTS.
3. SIZE OF FITTINGS SHOWN ON DRAWINGS SHALL CORRESPOND TO ADJACENT STRAIGHT RUN OF PIPE, UNLESS OTHERWISE INDICATED. TYPE OF JOINT AND FITTING MATERIAL SHALL BE THE SAME AS SHOWN FOR ADJACENT STRAIGHT RUN OF PIPE.
4. ALL REQUIRED HANGERS, SUPPORTS, BRACES, INSERTS, AND ACCESSORIES ARE NOT SHOWN ON THE DRAWINGS. PIPE SUPPORTS FOR 12-INCH DIAMETER AND SMALLER PIPES SHALL BE DESIGNED AND FURNISHED BY THE CONTRACTOR IN ACCORDANCE WITH THE SPECIFICATIONS AND UTILIZING CONTRACTOR SELECTED SUPPORTS FROM THE SUPPORT DETAILS, OR THE SPECIFIC DETAIL CALLED FOR BY THE DRAWINGS.
5. ALL JOINTS SHALL BE WATERTIGHT.
6. ALL FLEXIBLE CONNECTORS AND COUPLING ADAPTERS SHALL BE PROVIDED WITH THRUST PROTECTION AS SPECIFIED, UNLESS OTHERWISE NOTED. THRUST PROTECTION SHALL BE ADEQUATE FOR TEST PRESSURES SPECIFIED.
7. ALL BURIED PIPING SPECIFIED TO BE PRESSURE TESTED, EXCEPT FLANGED, WELDED, OR SCREWED PIPING, SHALL BE PROVIDED WITH THRUST PROTECTION AS SPECIFIED, UNLESS OTHERWISE NOTED.
8. NUMBER AND LOCATION OF UNIONS AND COUPLINGS SHOWN ON DRAWINGS IS ONLY APPROXIMATE. CONTRACTOR SHALL PROVIDE ALL UNIONS AND COUPLINGS REQUIRED BY THE SPECIFICATIONS AND NECESSARY TO FACILITATE CONVENIENT REMOVAL OF VALVES AND MECHANICAL EQUIPMENT.
9. WHERE A GROOVED END COUPLING IS SHOWN, IT SHALL BE THE RIGID JOINT TYPE, UNLESS OTHERWISE SPECIFIED. WHERE A FLANGED COUPLING ADAPTER IS SHOWN, A STANDARD FLANGE SHALL BE JOINED TO THE COUPLING ADAPTER.
10. CONTRACTOR SHALL ORIENT VALVES AS SHOWN ON DRAWINGS AND IN ACCORDANCE WITH VALVE SPECIFICATIONS.

ISSUED FOR CONSTRUCTION

DATE	REVISIONS AND RECORD OF USE	NO.	BY	CHK	APP

TAMMY M. MARTIN — LICENSE No 73892 — STATE OF FLORIDA — PROFESSIONAL ENGINEER

Date:
Engineer of Record: TAMMY M. MARTIN
Florida License No.: NO. 73892

BLACK & VEATCH
Black & Veatch Corporation
2601 Cattlemen Road, Suite 210
Coral Springs, FL 33065
Certificate No. 8132

CITY OF KEY WEST
DENNIS STREET STORMWATER
PUMP STATION IMPROVEMENTS

MECHANICAL
ABBREVIATIONS & GENERAL NOTES

DESIGNED: Designer
DETAILED: Author
CHECKED: Checker
APPROVED: Approver
DATE: MARCH 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
193108

M-001
SHEET
21 OF 39

PLOTTED: 2/28/2019 5:11:28 PM
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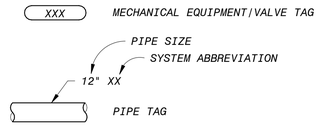
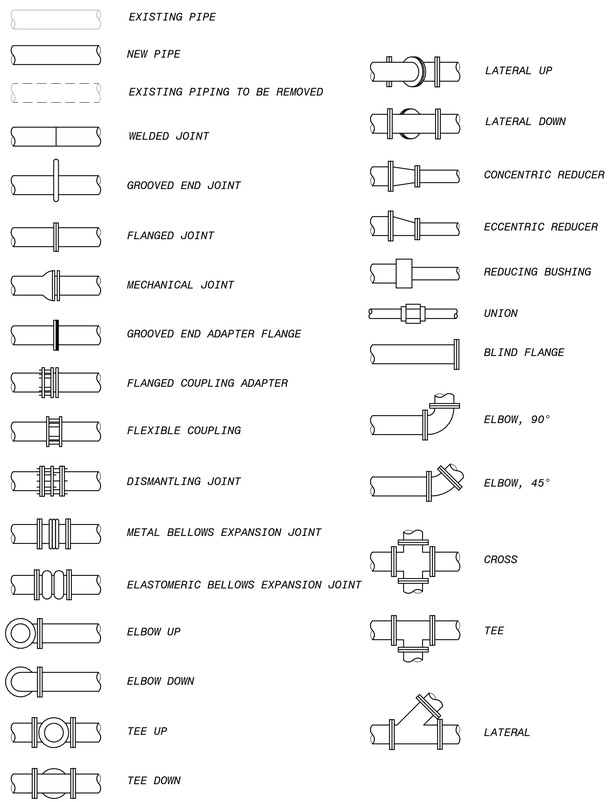
PROCESS MECHANICAL LEGENDS

PIPE, EQUIPMENT & VALVE TAG LEGEND



PIPE & FITTINGS LEGEND



NOTE: ONLY FLANGED END CONNECTIONS ARE SHOWN. FITTINGS WITH OTHER END CONNECTION TYPES ARE SHOWN SIMILARLY ON THESE CONSTRUCTION DOCUMENTS. REFER TO PIPING SPECIFICATIONS.

ISSUED FOR CONSTRUCTION

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE

T. M. MARTIN ★ LICENSE No 73892 ★ STATE OF FLORIDA ★ PROFESSIONAL ENGINEER ★

Date:
Engineer of Record: TAMMY M. MARTIN
Florida License No.: NO. 73892

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CITY OF KEY WEST
DENNIS STREET STORMWATER
PUMP STATION IMPROVEMENTS

MECHANICAL
LEGENDS

DESIGNED: Designer
DETAILED: Author
CHECKED: Checker
APPROVED: Approver
DATE: MARCH 2019

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
193108

M-002
SHEET
22 OF 39

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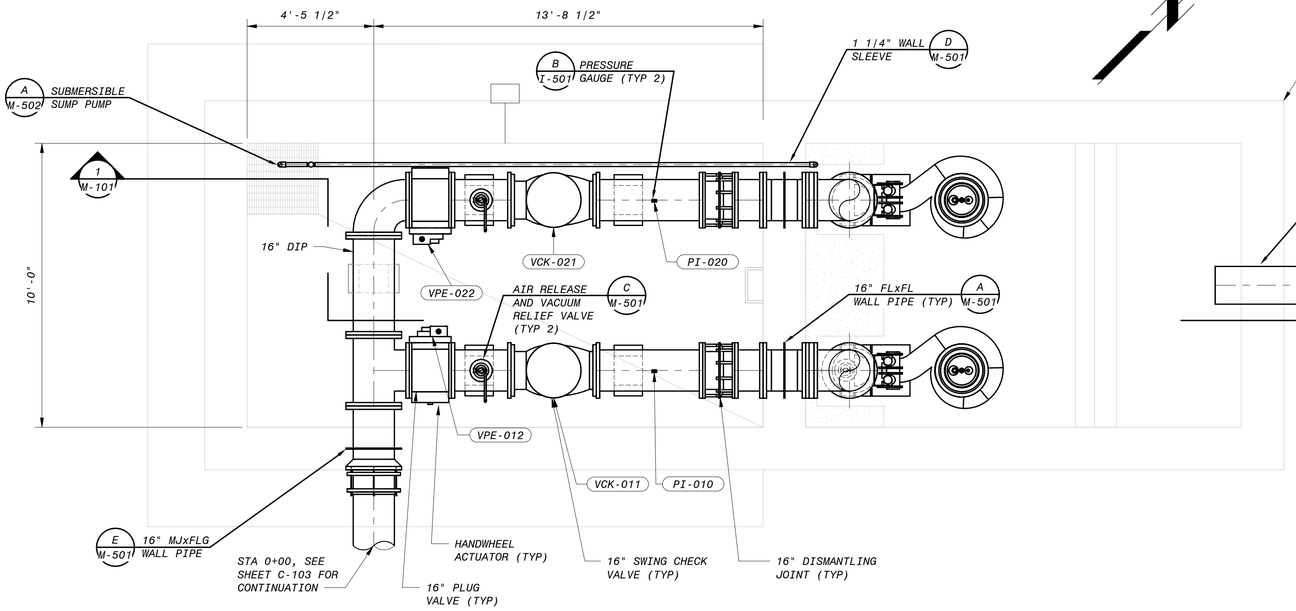
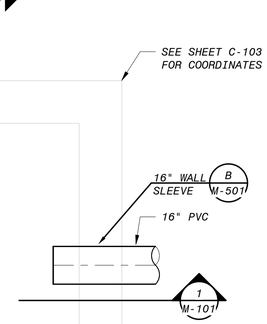
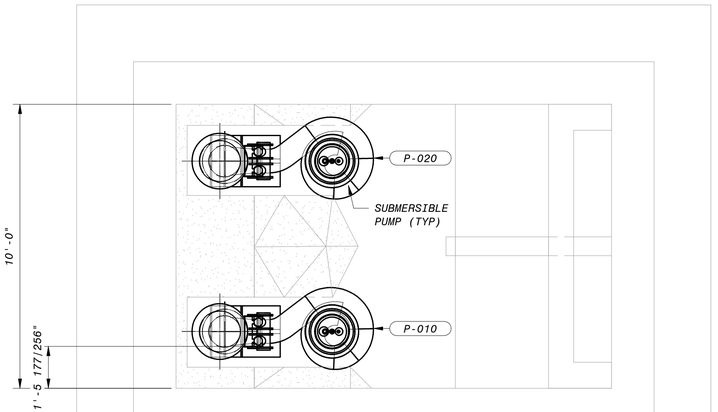


VALVE VAULT

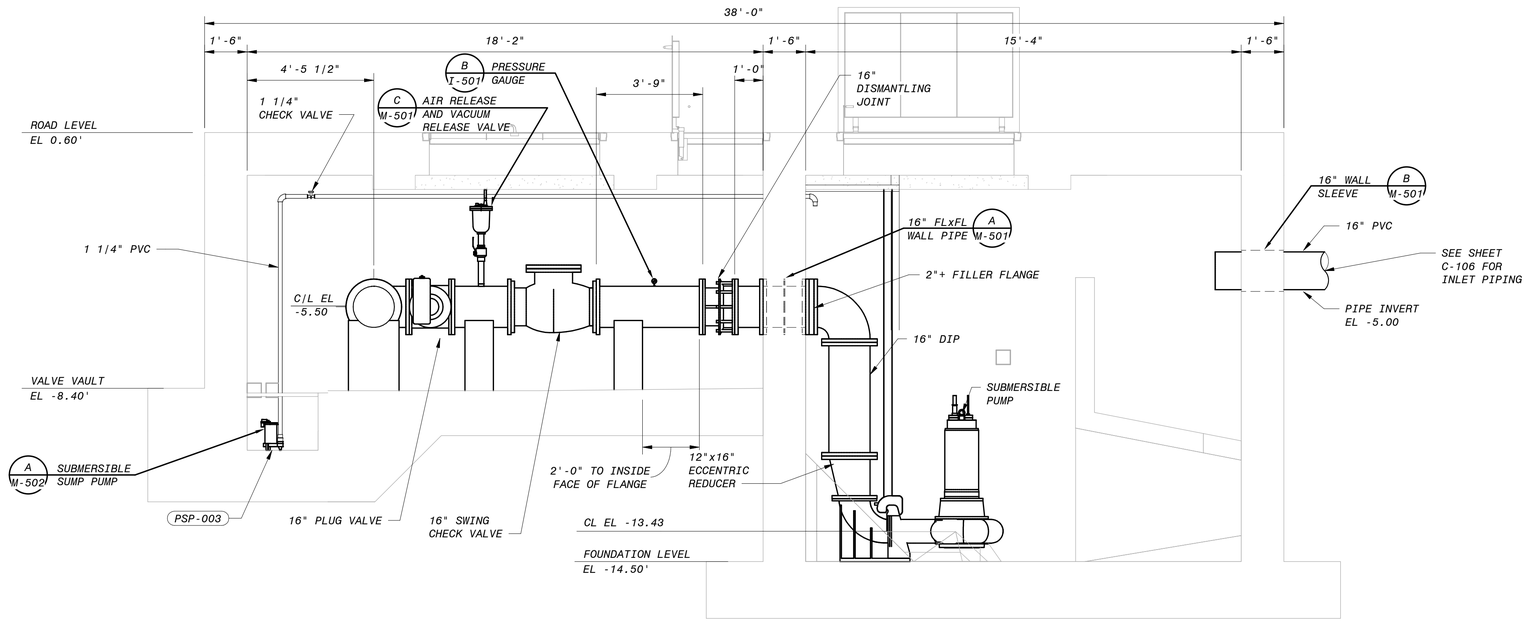
3/8" = 1'-0"





FOUNDATION LEVEL

3/8" = 1'-0"



1 SECTION

3/8" = 1'-0"

NOTES:

1. REFER TO STRUCTURAL SHEET S-101 FOR A ROAD LEVEL PLAN VIEW OF THE STRUCTURE.

ISSUED FOR CONSTRUCTION

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE

TAMMY M. MARTIN LICENSE No 73892 STATE OF FLORIDA PROFESSIONAL ENGINEER

Date:
Engineer of Record: TAMMY M. MARTIN
Florida License No.: NO. 73892

BLACK & VEATCH

Black & Veatch Corporation
225 N. University Drive, Suite 210
Coral Springs, FL 33065
Certificate No. 8132

CITY OF KEY WEST
DENNIS STREET STORMWATER PUMP STATION

MECHANICAL
PUMP STATION PLANS AND SECTIONS

DESIGNED: MLM
DETAILED: JPS
CHECKED: ICB
APPROVED: TMM
DATE: MARCH 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 193108

M-101
SHEET 23 OF 39

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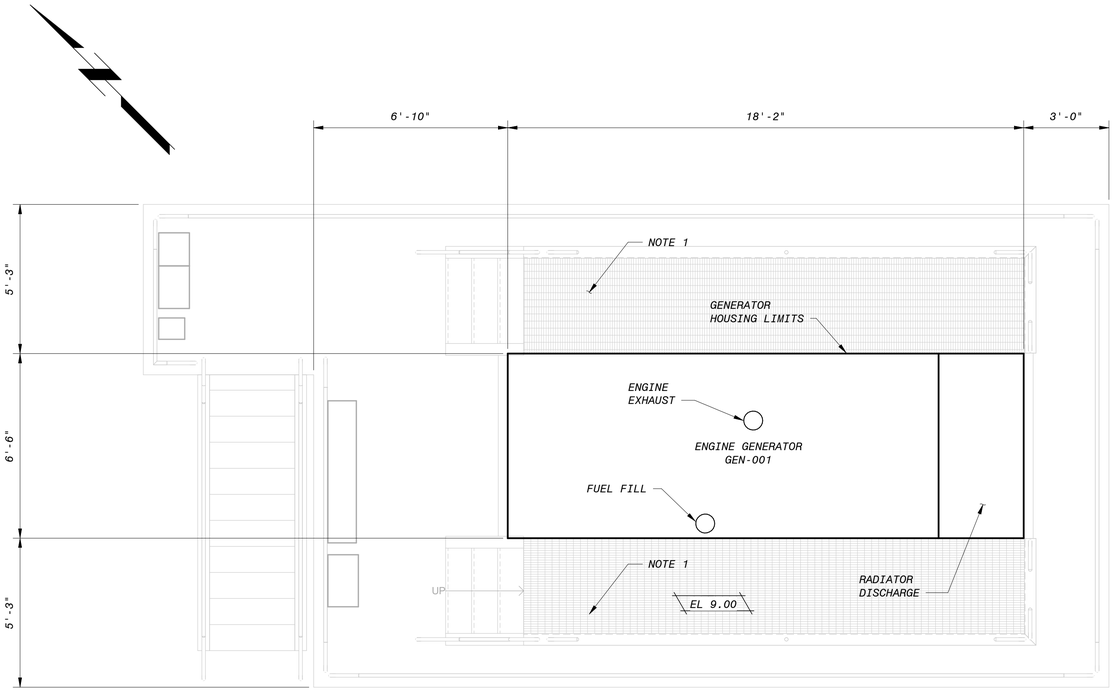

NOTE:

1. ACCESS PLATFORMS NOT SHOWN FOR CLARITY

OPERATING LEVEL - MECHANICAL PLAN

3/8" = 1'-0"

ISSUED FOR CONSTRUCTION

DATE	REVISIONS AND RECORD OF USE	NO.	BY	CHK	APP

TAMMY M. MARTIN LICENSE No 73892 STATE OF FLORIDA PROFESSIONAL ENGINEER

Date:
Engineer of Record: TAMMY M. MARTIN
Florida License No.: NO. 73892

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Black & Veatch Corporation
2525 N. University Drive, Suite 210
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CITY OF KEY WEST
DENNIS STREET STORMWATER
PUMP STATION IMPROVEMENTS

MECHANICAL
ENGINE GENERATOR PLATFORM
PLAN AND SECTIONS

DESIGNED: MLM
DETAILED: JPS
CHECKED: TMM
APPROVED: ICB
DATE: MARCH 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
193108

M-102
SHEET
24 OF 39

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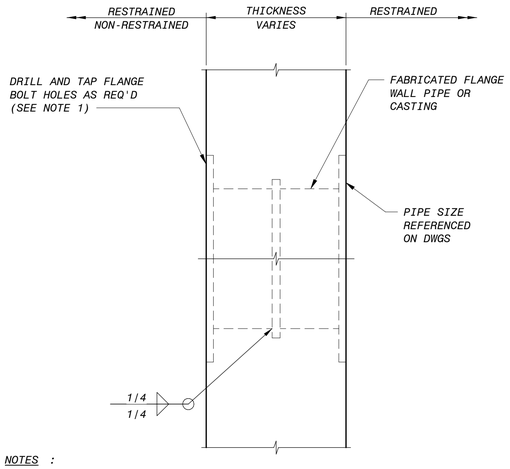
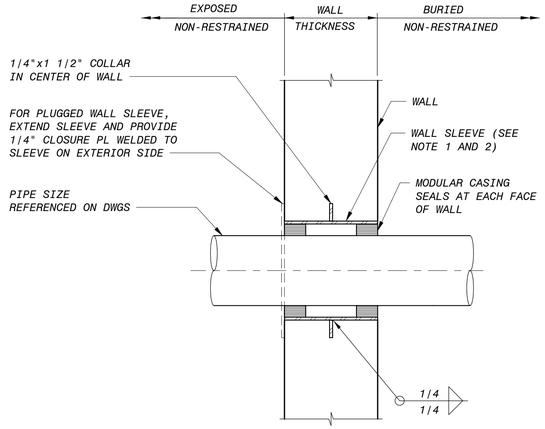


NOTES :

1. WALL PIPE MATERIAL SHALL BE DUCTILE IRON, STEEL OR AS INDICATED ON THE DRAWINGS. STEEL PIPE SHALL BE SCHEDULE 40 FOR PIPE 20 INCHES AND SMALLER, 3/8" FOR PIPE LARGER THAN 20", AND COATINGS SAME AS CONNECTING PIPE.
2. IF CONNECTING STEEL PIPE THICKNESS IS GREATER THAN 3/8", STEEL WALL PIPE THICKNESS SHALL BE INCREASED TO MATCH CONNECTING PIPE.
3. ANNULAR COLLAR SHALL BE SAME MATERIAL AS PIPE, 1/4" X 2" FOR PIPE 20" AND SMALLER, AND 3/8" X 3" FOR PIPE LARGER THAN 20".
4. WALL PIPE SHALL BE FLUSH WITH FACE OF WALL.
5. WALL PIPE SHALL BE ORIENTED SO THAT THE BOLT HOLES STRADDLE THE TOP CENTERLINE.

A FLANGED WALL PIPE
NO SCALE

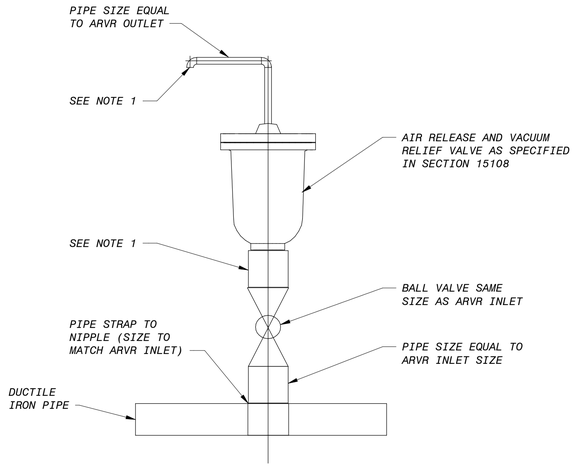


FOR PIPE DIAMETER LARGER THAN 6 INCH

NOTES:

1. WALL SLEEVE, SCHEDULE 40 STEEL PIPE FOR 12" AND SMALLER SLEEVES, 1/4" STEEL PIPE FOR SLEEVES LARGER THAN 12", AND HOT DIP GALVANIZED AFTER FABRICATION, 304 SS, OR OTHER MATERIAL AS SPECIFIED OR INDICATED ON DRAWINGS. COORDINATE WALL SLEEVE DIAMETER WITH MODULAR CASING SEAL MANUFACTURER.
2. FOR PIPE LARGER THAN 6", DIP MJ WALL SLEEVE AND PLASTIC PIPE WITH EQUIVALENT DIP OUTSIDE DIAMETER MAY NE USED AS AN ALTERNATE TO STEEL WALL SLEEVE.
3. FOR BURIED PVC PIPING, CONTRACTOR SHALL PROVIDE AN ADDITIONAL FIELD JOINT AS CLOSE AS PRACTICAL TO FACE OF WALL, BUT NOT CLOSER THAN 5 FEET.

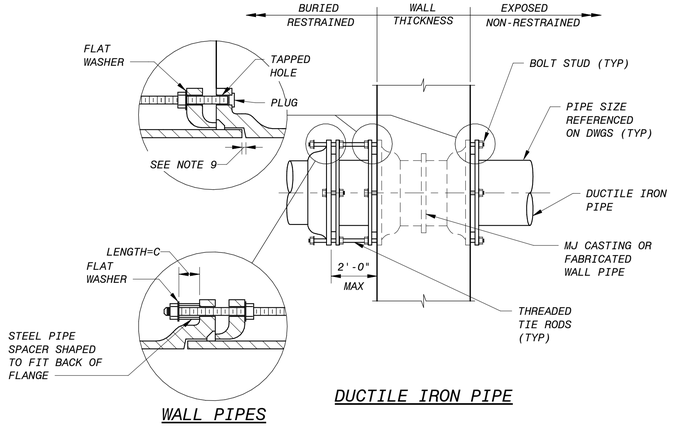
B EXTERIOR WALL SLEEVE FOR PLASTIC PIPE
NO SCALE



NOTE:

1. MATERIAL SHALL BE STEEL OR STAINLESS STEEL.

C AIR RELEASE AND VACUUM RELIEF VALVE ASSEMBLYVALVE ASSEMBLY
NO SCALE



WALL PIPES

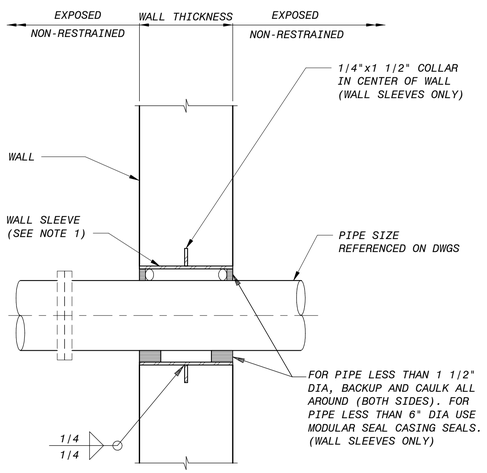
DUCTILE IRON PIPE

MECHANICAL JOINT TIE ROD SCHEDULE						
NOMINAL PIPE SIZE (INCHES)	MAX PRESSURE (PSI) (NOTE 2)	TIE BOLTS		PIPE SPACERS		
		NO. OF RODS (NOTE 3)	DIA OF RODS (INCHES)	DIA (INCHES)	LENGTH (INCHES)	PIPE SCHEDULE
16	150 OR LESS 250	4 6	3/4	1	3 1/2	80

NOTES:

1. MECHANICAL JOINT OR PUSH-ON STYLE FITTINGS MAY BE FURNISHED WHERE RESTRAINED JOINTS ARE NOT CALLED FOR ON THE DRAWINGS OR PIPE SCHEDULE.
2. PRESSURE SHALL BE THE PRESSURE AT WHICH THE PIPE IS HYDROSTATICALLY TESTED, OR IF THERE IS NO HYDROSTATIC FIELD TEST, IT SHALL BE THE SPECIFIED SHOP TEST PRESSURE.
3. UNLESS OTHERWISE INDICATED, TIE RODS SHALL BE SPACED UNIFORMLY AROUND THE PIPE, BEGINNING WITH THE FIRST TWO AT THE HORIZONTAL CENTERLINE OF THE PIPE, SUBJECT TO THE APPROVAL OF THE ENGINEER.
4. EXCEPT WHERE TIE RODS ARE REQUIRED, BOLTS FOR FOLLOWER RINGS SHALL BE BOLT-STUDS ON WALL PIPE. ALL BOLT HOLES IN WALL PIPE SHALL BE TAPPED. WALL PIPES SHALL BE ORIENTED SO THAT THE BOLT HOLES STRADDLE THE TOP CENTERLINE.
5. AT CONTRACTOR'S OPTION, 4" THROUGH 48" MAY BE FURNISHED AS MECHANICAL JOINT STYLE TIE RODS, OR POSITIVE LOCKING SEGMENTS AND/OR RINGS SUCH AS AMERICAN JOINT STYLE PIPE 14" THROUGH 36" SIZE MAY BE FURNISHED AS FLEX RING STYLE RESTRAINED JOINTS AND 42" THROUGH 64" SIZE MAY BE FURNISHED AS LOC RING STYLE RESTRAINED JOINTS, OR U.S. PIPE "TR-FLEX", OR GRIFFIN PIPE "SNAP-LOCK".
6. FOR BURIED PIPING, CONTRACTOR SHALL PROVIDE AN ADDITIONAL FIELD JOINT AS CLOSE AS PRACTICAL TO FACE OF WALL, BUT NO MORE THAN 5 FEET.
7. USE WAX TAPE TO PROTECT ALL BURIED FERROUS SURFACES, INCLUDING PAINTED SURFACES. FOR PROTECTION OF ADJACENT PIPE BARREL SURFACES, SHRINK WRAP MAY BE USED IN LIEU OF WAX TAPE. SEE SPECIFICATIONS.
8. WHERE PIPE IS REQUIRED ON ONE SIDE ONLY, PROVIDE MJxPE WALL PIPE.
9. FOR PIPING FLEXIBILITY, PROVIDE GAP LARGE ENOUGH TO FACILITATE PIPE ASSEMBLY AND DISASSEMBLY AT ASSOCIATED FLANGE PIPE JOINTS.

E HARNESSED MECHANICAL JOINTS WITH TIE RODS
NO SCALE



FOR PIPE SMALLER THAN 6 INCH DIAMETER

NOTES:

1. SCHEDULE 40 GALV STEEL PIPE SLEEVE. SIZE TO PROVIDE 3/4" ANNULAR SPACE AROUND PIPE FOR ALL BEAM SLEEVES AND FOR WALL SLEEVES FOR PIPES SMALLER THAN 1 1/2" DIAMETER. FOR PIPE SMALLER THAN 6" DIAMETER, COORDINATE WALL SLEEVE DIAMETER WITH MODULAR CASING SEAL MANUFACTURER.
2. WALL SLEEVE, SCHEDULE 40 STEEL PIPE FOR 12" AND SMALLER SLEEVES, 1/4" STEEL PIPE FOR SLEEVES LARGER THAN 12", AND HOT DIP GALVANIZED AFTER FABRICATION, 304 SS, OR OTHER MATERIAL AS SPECIFIED OR INDICATED ON DRAWINGS. COORDINATE WALL SLEEVE DIAMETER WITH MODULAR CASING SEAL MANUFACTURER.
3. FIRESAFING TO BE PROVIDED AT ALL RATED WALLS INDICATED ON THE DRAWINGS AND INSTALLED PER ACCEPTED UL RATED SYSTEM.
4. TO MINIMIZE SLEEVE SIZE, PROVIDE A SCREW-ON FLANGE, GROOVED COUPLING, OR MECHANICAL COUPLING WITH ANCHOR STUDS ON ONE SIDE OF OPENING.

D CONCRETE WALL SLEEVE
NO SCALE

ISSUED FOR CONSTRUCTION

DATE	REVISIONS AND RECORD OF USE	NO.	BY	CHK	APP

TAMMY M. MARTIN LICENSE No 73892 STATE OF FLORIDA PROFESSIONAL ENGINEER

Date:
Engineer of Record: TAMMY M. MARTIN
Florida License No.: NO. 73892

BLACK & VEATCH

Black & Veatch Corporation
2555 N. University Drive, Suite 210
Coral Springs, FL 33065
Certificate No. 8132

CITY OF KEY WEST
DENNIS STREET STORMWATER PUMP STATION

MECHANICAL
DETAILS 1 OF 2

DESIGNED: MLM
DETAILED: JPS
CHECKED: TMM
APPROVED: ICB
DATE: MARCH 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
193108

M-501
SHEET
25 OF 39

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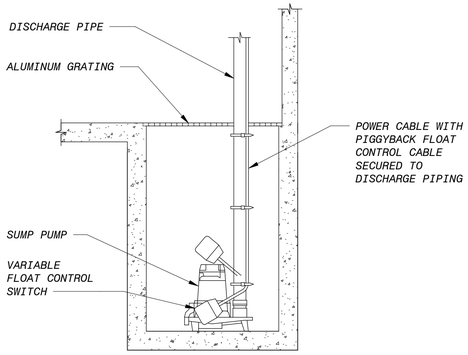

SECTION

A
M-101

SUBMERSIBLE SUMP PUMP

NO SCALE

ISSUED FOR CONSTRUCTION

DATE	REVISIONS AND RECORD OF USE	NO.	BY	CHK	APP

TAMMY M. MARTIN LICENSE No 73892 ★ STATE OF FLORIDA ★ PROFESSIONAL ENGINEER

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Florida License No.: NO. 73892

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Coral Springs, FL 33065
Certificate No. 8132

CITY OF KEY WEST
DENNIS STREET STORMWATER PUMP STATION

MECHANICAL
DETAILS 2 OF 2

DESIGNED: MLM
DETAILED: JPS
CHECKED: TMM
APPROVED: ICB
DATE: MARCH 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
193108

M-502
SHEET
26 OF 39

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