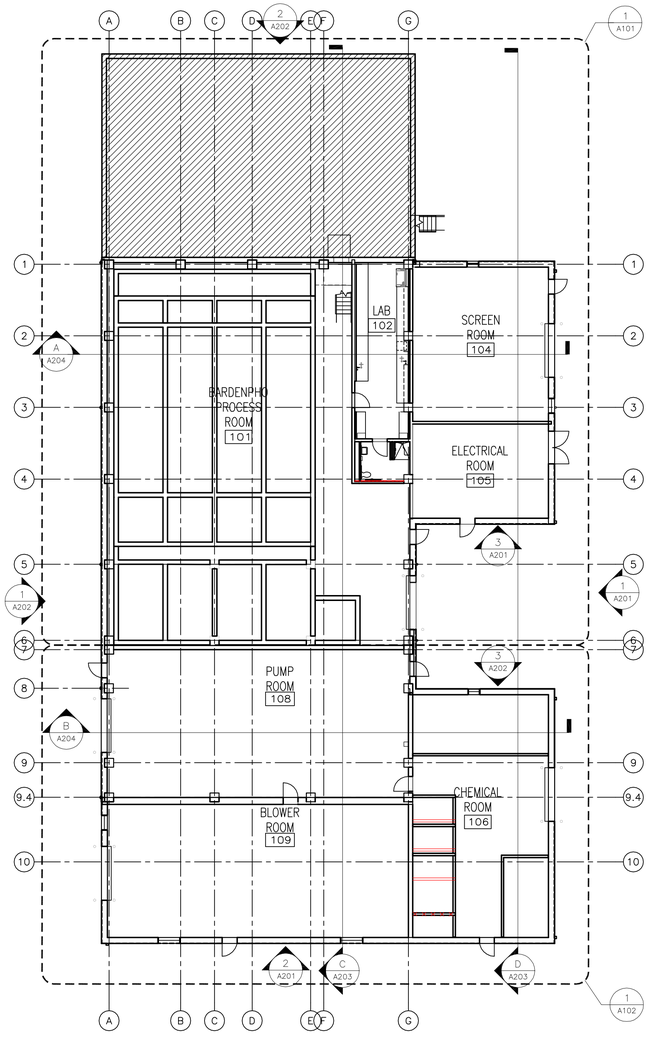
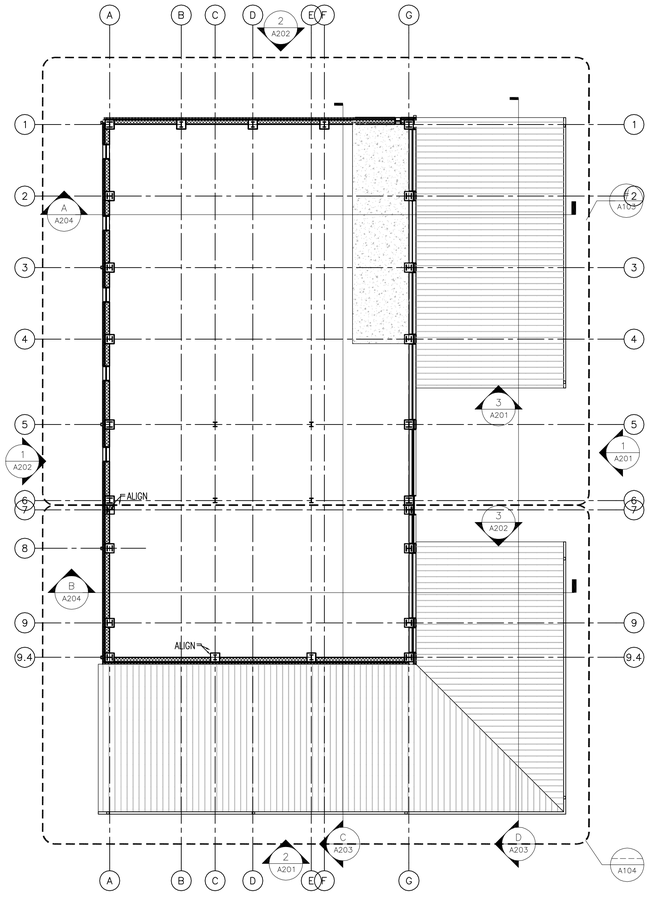
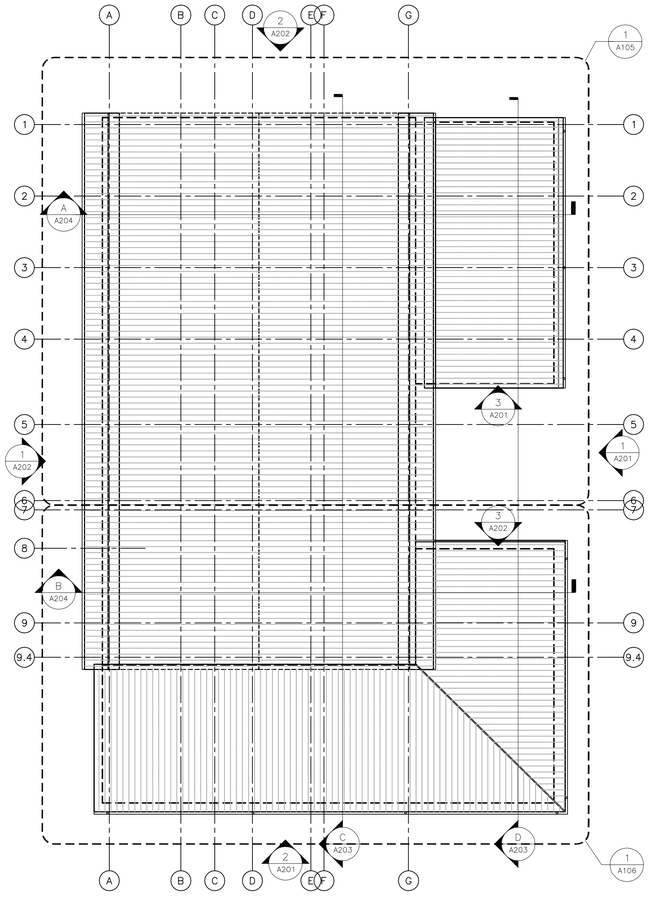


PROCESS BUILDING – FIRST FLOOR PLAN
SCALE: 1/16" = 1'-0"

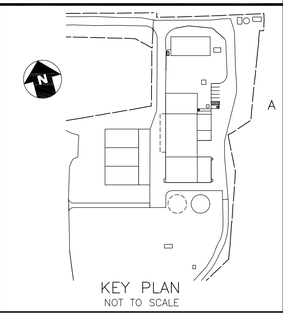


PROCESS BUILDING – SECOND FLOOR PLAN
SCALE: 1/16" = 1'-0"



PROCESS BUILDING – ROOF PLAN
SCALE: 1/16" = 1'-0"

RECORD DRAWING SET
JANUARY 2015



WORCESTER COUNTY

STATE OF MARYLAND
BRIAN A. MATHIAS
No. 21431
REGISTERED ARCHITECT

PROFESSIONAL CERTIFICATION.
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND,
LICENSE NO. 9410
EXPIRATION DATE 02/14/2015.

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

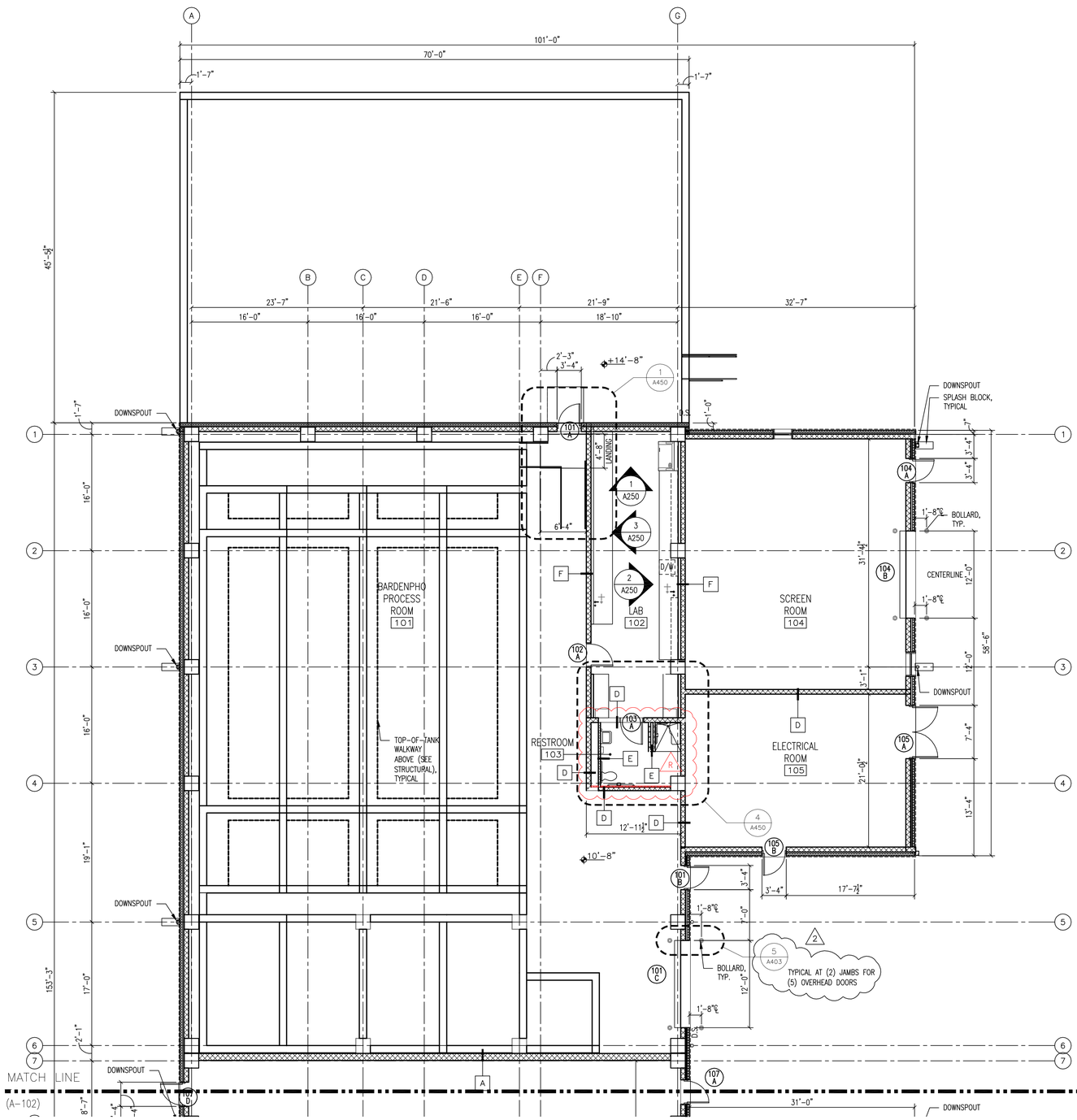
SHEET TITLE
PROCESS BUILDING
FLOOR & ROOF PLANS

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

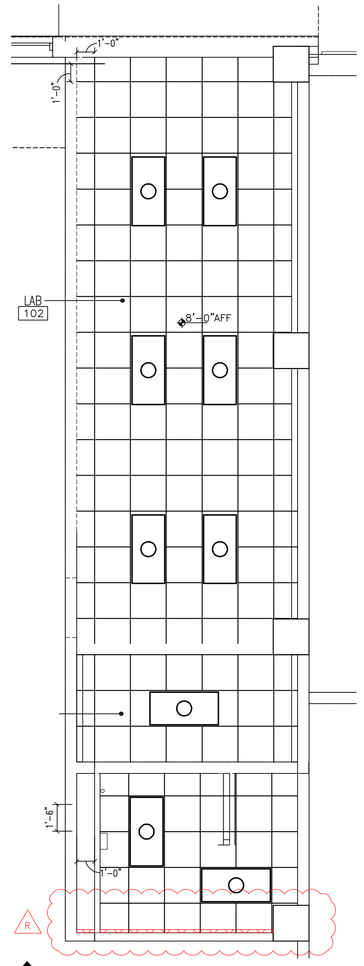
CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BCB
CH'D. BY: BAM

A-001

SHEET 25 OF 128



PROCESS BUILDING – FIRST FLOOR PLAN
SCALE: 1/8" = 1'-0"



PROCESS BUILDING – REFLECTED CEILING PLAN
SCALE: 1/4" = 1'-0"

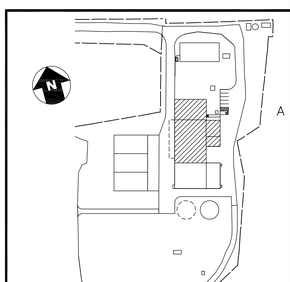
R 2 BATHROOM WALLS CHANGED FROM 4" CMU TO 6" METAL STUD WITH GREENBOARD DRYWALL.

DRAWING LEGEND

- NEW WALL
- WALL TAG (B)
- NEW DOOR WITH DOOR TAG (104 A)
- NEW WINDOW TAG (1)
- ALIGN — FACE OF WALLS
- ROOM NAME AND TAG (XXX / NA01)
- ELEVATION MARKER
- EXTERIOR ELEVATION SYMBOL (XX / X–XXX)
- MATCH LINE
- COLUMN LINE AND GRID (A)
- ENLARGED VIEW SYMBOL (XX / X–XXX)
- EXTERIOR LIGHT FIXTURE SEE ELECTRICAL (L)
- C.J. — FACE OF WALLS

4' 0 4' 8'
SCALE: ⅛" = 1'-0"

2' 0 2' 4'
SCALE: ¼" = 1'-0"



RECORD DRAWING SET
JANUARY 2015

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Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

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LICENSE NO. 9410
EXPIRATION DATE 02/14/2011

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING
FIRST FLOOR PLAN

MARK	DATE	DESCRIPTION
1	FEB. 2011	ADDENDUM 2
2	NOV. 2014	RECORD DRAWINGS

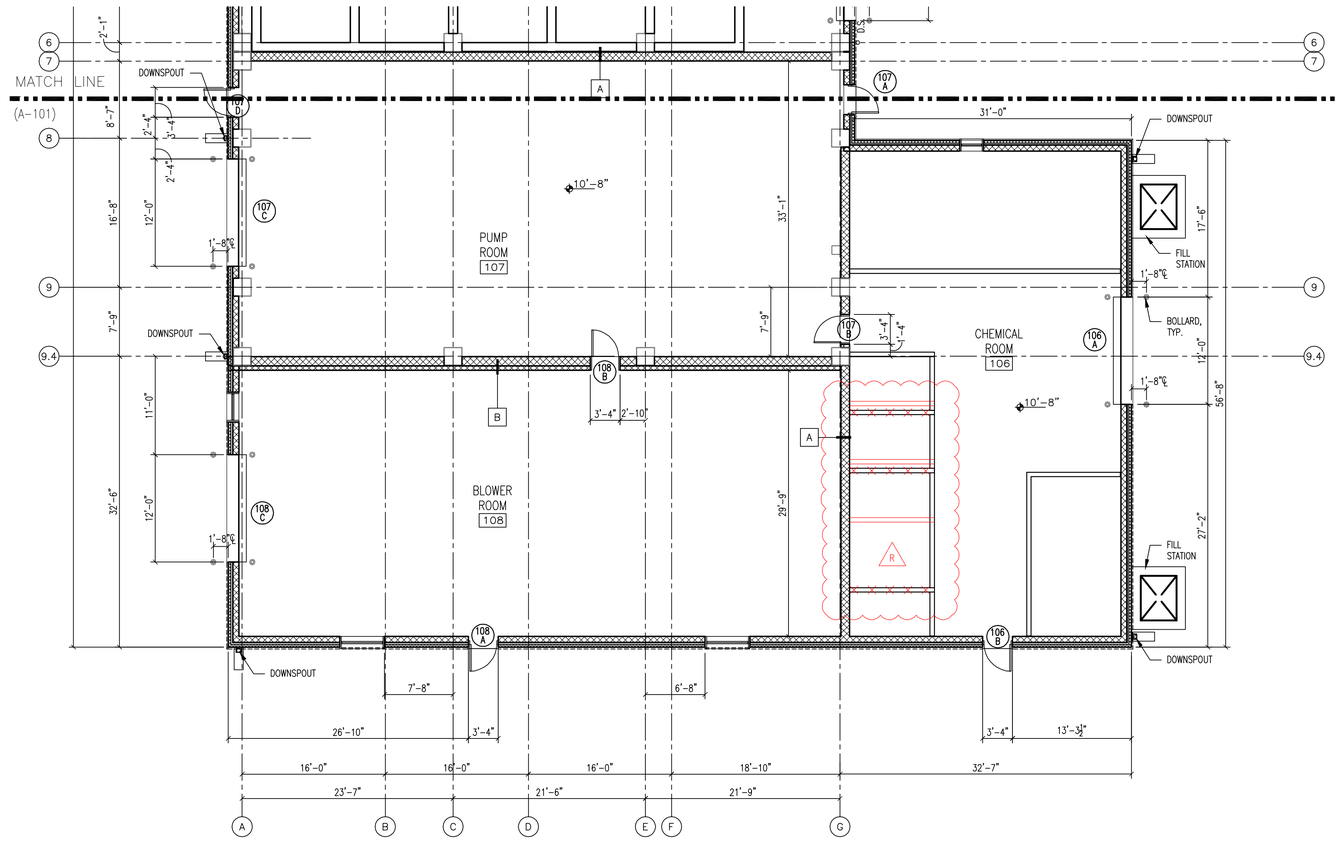
CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BCB
CH'D. BY: BAM

A-101

SHEET 26 OF 128

DRAWING LEGEND

- NEW WALL
- NEW DOOR WITH DOOR TAG (104 / A)
- ALIGN — FACE OF WALLS
- ELEVATION MARKER
- MATCH LINE
- A — COLUMN LINE AND GRID
- L — EXTERIOR LIGHT FIXTURE SEE ELECTRICAL
- B — WALL TAG
- 1 — NEW WINDOW TAG
- XXX / NA01 — ROOM NAME AND TAG
- XX / X–XXX — EXTERIOR ELEVATION SYMBOL
- XX / X–XXX — ENLARGED VIEW SYMBOL
- C.J. — FACE OF WALLS

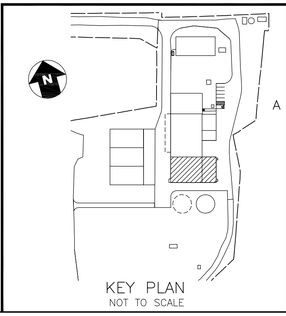


PROCESS BUILDING – FIRST FLOOR PLAN

SCALE: 1/8" = 1'–0"

SCALE: ⅛"= 1'–0"

RECORD DRAWING SET JANUARY 2015



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LICENSE NO. 9410
EXPIRATION DATE 02/14/2015

CONSULTANT

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Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING
FIRST FLOOR PLAN

MARK	DATE	DESCRIPTION
A	NOV. 2014	RECORD DRAWINGS

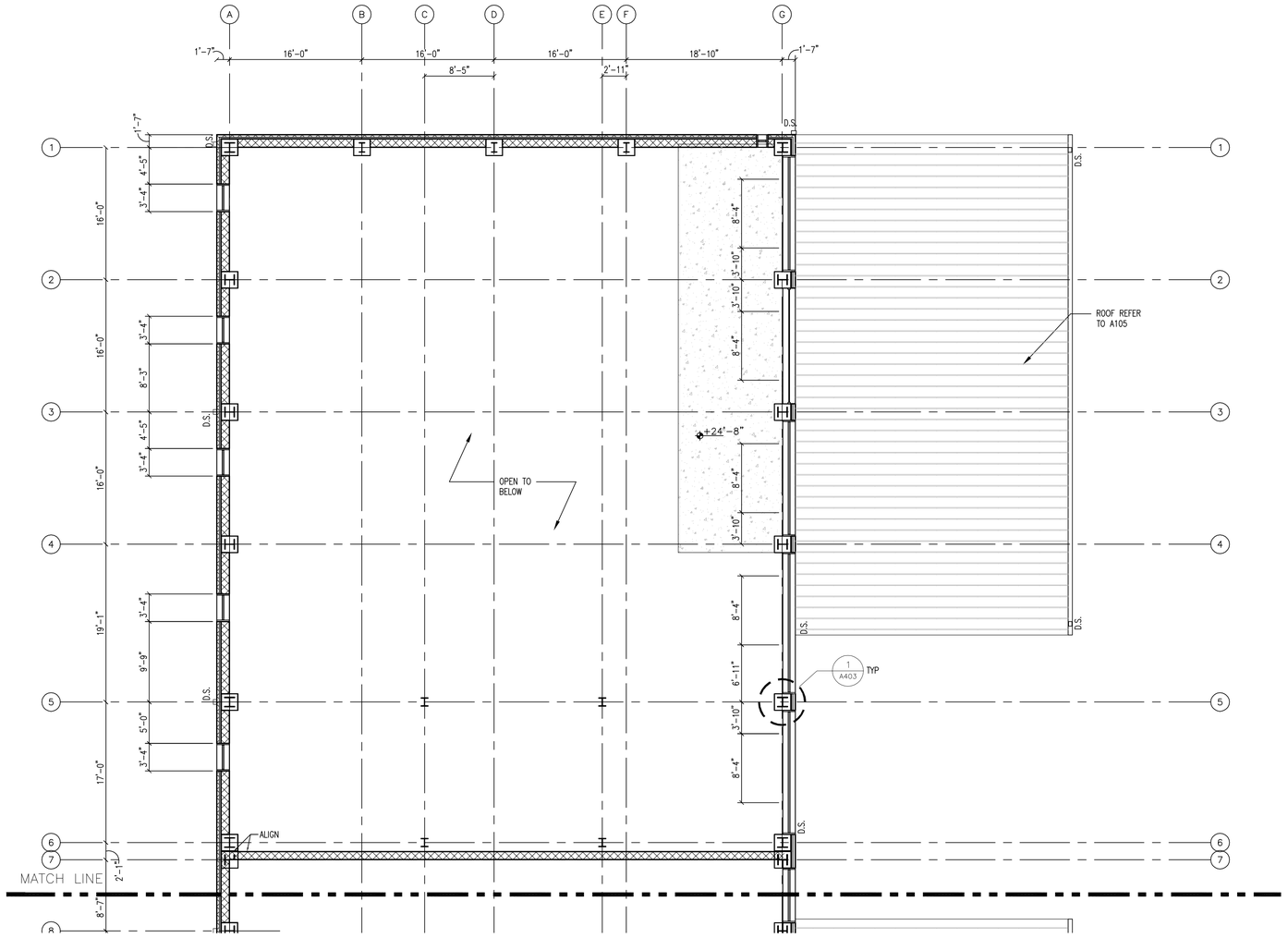
CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BCB
CH'D. BY: BAM

A-102

SHEET 27 OF 128

DRAWING LEGEND

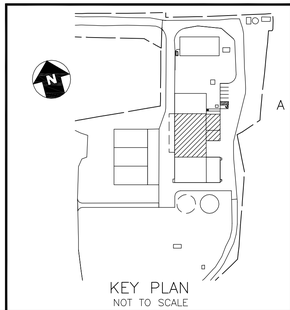
- NEW WALL
- WALL TAG
- NEW DOOR WITH DOOR TAG (104 / A)
- NEW WINDOW TAG (1)
- FACE OF WALLS (ALIGN)
- ROOM NAME AND TAG (XXX / NA01)
- ELEVATION MARKER
- EXTERIOR ELEVATION SYMBOL (XX / X-XXX)
- MATCH LINE
- ENLARGED VIEW SYMBOL (XX / X-XXX)
- COLUMN LINE AND GRID (A)
- EXTERIOR LIGHT FIXTURE SEE ELECTRICAL (L)
- FACE OF WALLS (C.J.)



SCALE: 1/8"= 1'-0"

PROCESS BUILDING - FIRST FLOOR PLAN - ELEV. 10.67
SCALE: 1/8" = 1'-0"

RECORD DRAWING SET JANUARY 2015



WORCESTER COUNTY

STATE OF MARYLAND — CHRISTOPHER B. CAMPBELL — 21552 — REGISTERED PROFESSIONAL ENGINEER

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND,
LICENSE NO. 21552
EXPIRATION DATE 02/14/2013.

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING
FIRST FLOOR PLAN - ELEV. 10.67

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

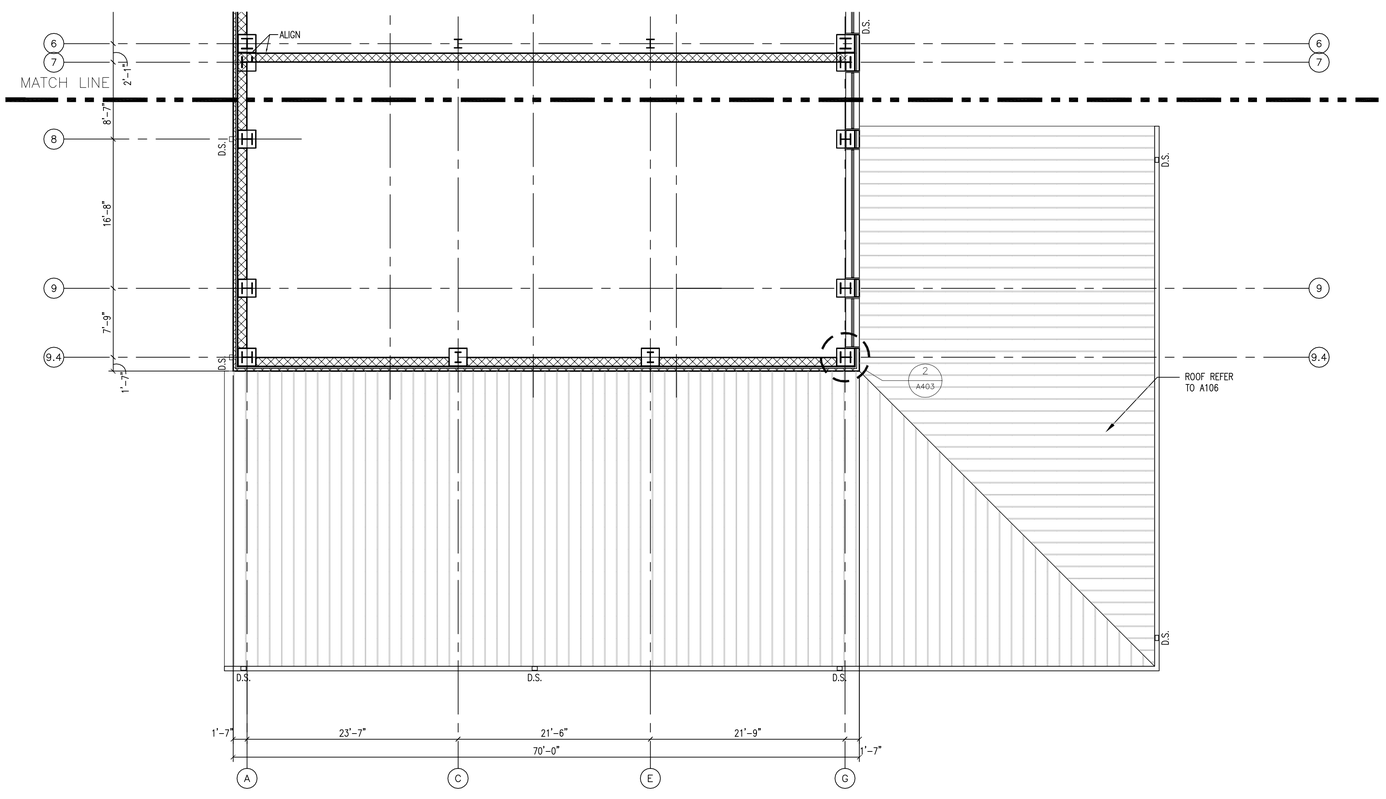
CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BCB
CH'D. BY: BAM

A-103

SHEET 28 OF 128

DRAWING LEGEND

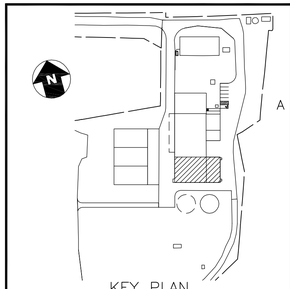
- NEW WALL
- NEW DOOR WITH DOOR TAG (104 / A)
- ALIGN — FACE OF WALLS
- ELEVATION MARKER
- MATCH LINE
- A — COLUMN LINE AND GRID
- L — EXTERIOR LIGHT FIXTURE SEE ELECTRICAL
- B — WALL TAG
- 1 — NEW WINDOW TAG
- XXX / NA01 — ROOM NAME AND TAG
- XX / X–XXX — EXTERIOR ELEVATION SYMBOL
- XX / X–XXX — ENLARGED VIEW SYMBOL
- C.J. — FACE OF WALLS



PROCESS BUILDING - SECOND FLOOR PLAN - ELEV. 26.42
SCALE: 1/8" = 1'-0"

SCALE: ⅛"= 1'-0"

RECORD DRAWING SET
JANUARY 2015



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LICENSE NO. 9410
EXPIRATION DATE 02/14/2011

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Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

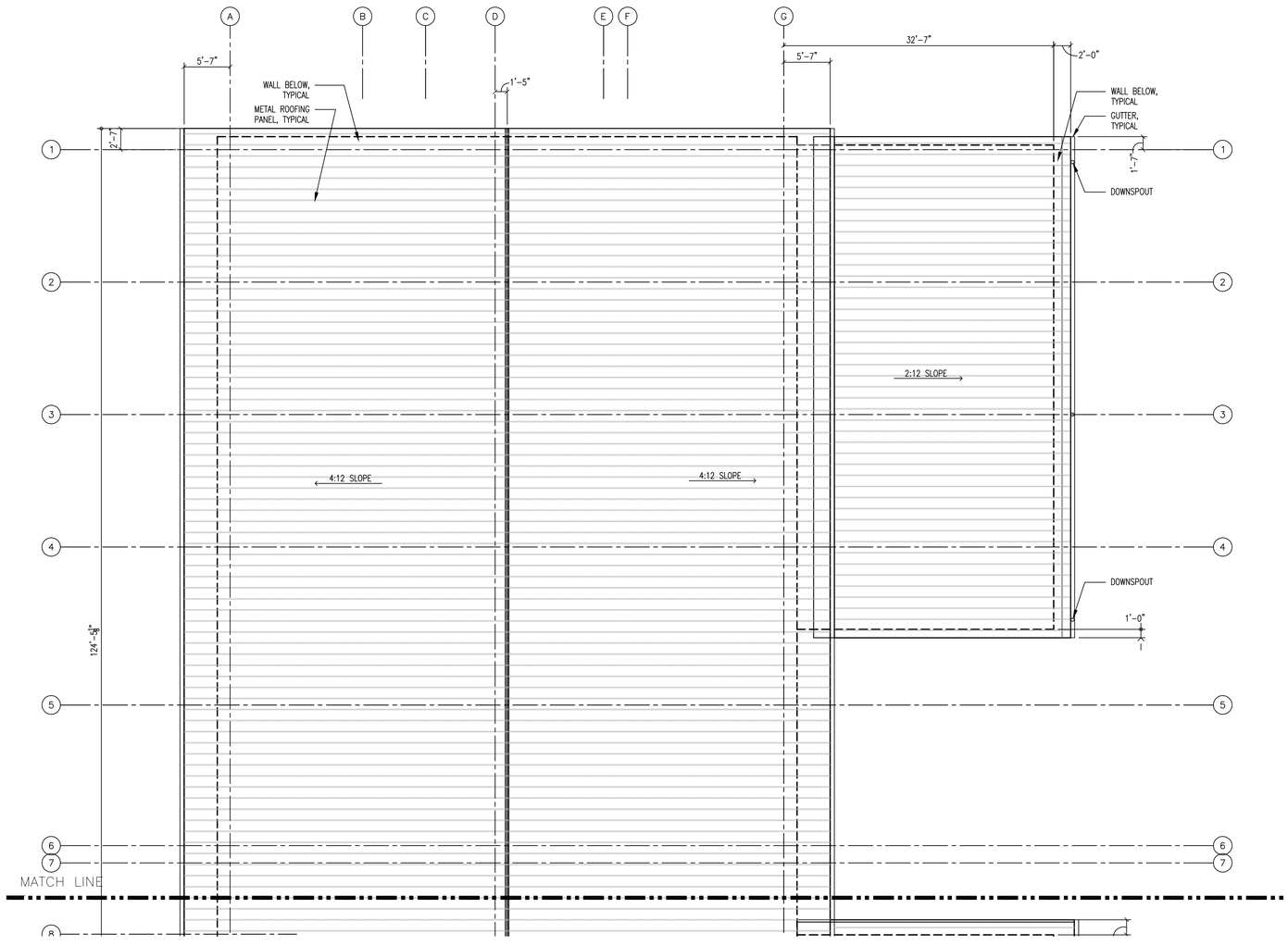
PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING
SECOND FLOOR PLAN - ELEV. 26.42

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BCB
CH'D. BY: BAM

A-104

SHEET 29 OF 128



DRAWING LEGEND

- NEW WALL
- WALL TAG (B)
- NEW DOOR WITH DOOR TAG (104 A)
- NEW WINDOW TAG (1)
- FACE OF WALLS (ALIGN)
- ROOM NAME AND TAG (XXX NA01)
- ELEVATION MARKER
- EXTERIOR ELEVATION SYMBOL (XX X-XXX)
- MATCH LINE
- COLUMN LINE AND GRID (A)
- ENLARGED VIEW SYMBOL (XX X-XXX)
- EXTERIOR LIGHT FIXTURE SEE ELECTRICAL (L)
- FACE OF WALLS (C.J.)

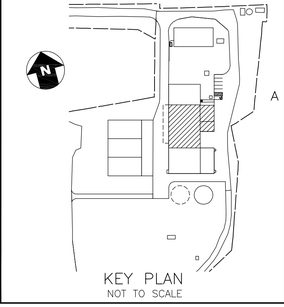
PROCESS BUILDING – ROOF PLAN

SCALE: 1/8" = 1'-0"

4' 0 4' 8'

SCALE: 1/8"= 1'-0"

RECORD DRAWING SET JANUARY 2015



KEY PLAN
NOT TO SCALE

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 9410 EXPIRATION DATE 02/14/2015.

CONSULTANT

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Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING
ROOF PLAN

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

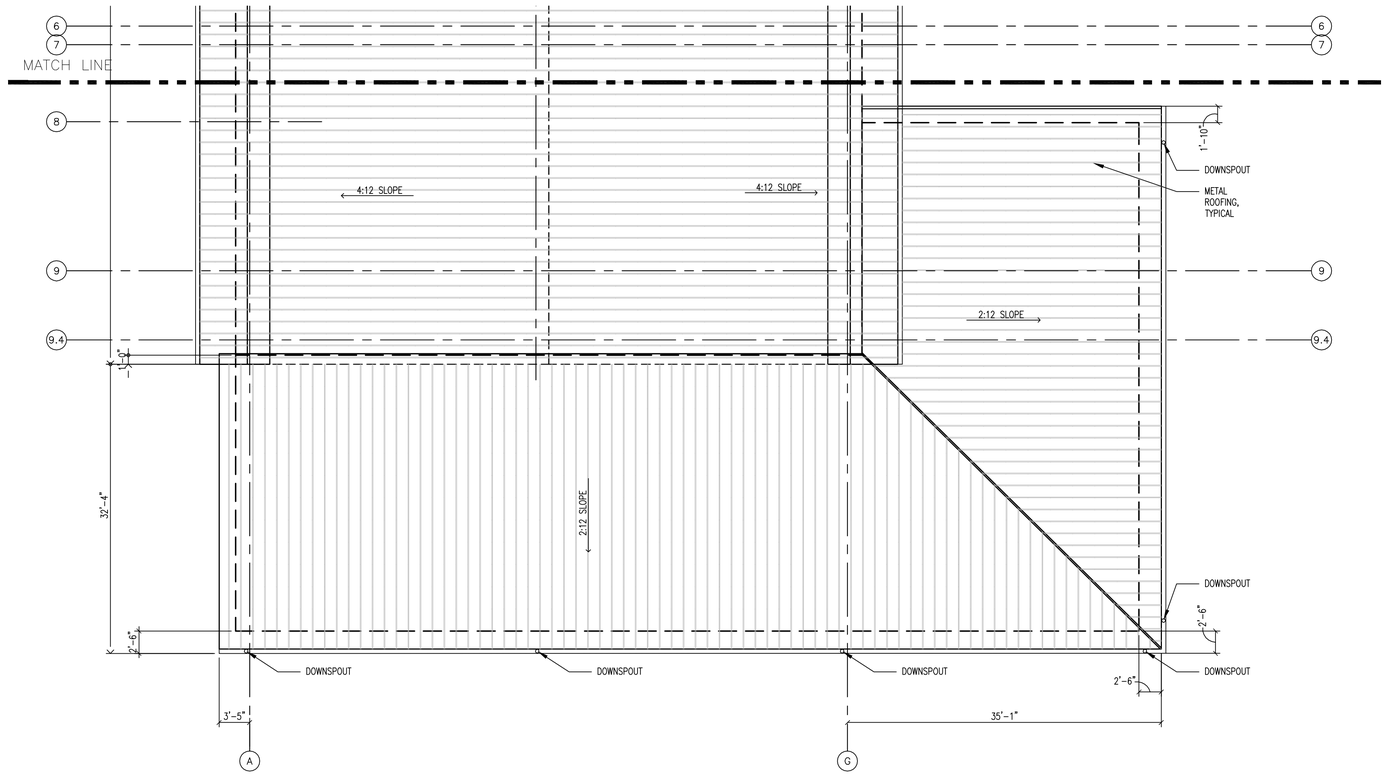
CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BCB
CH'D. BY: BAM

A-105

SHEET 30 OF 128

DRAWING LEGEND

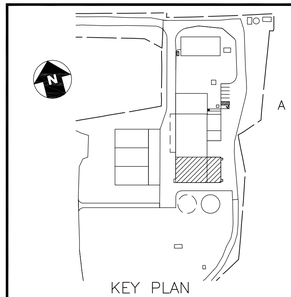
- NEW WALL
- WALL TAG
- NEW DOOR WITH DOOR TAG (104 / A)
- NEW WINDOW TAG (1)
- FACE OF WALLS (ALIGN)
- ROOM NAME AND TAG (XXX / NA01)
- ELEVATION MARKER
- EXTERIOR ELEVATION SYMBOL (XX / X-XXX)
- MATCH LINE
- ENLARGED VIEW SYMBOL (XX / X-XXX)
- COLUMN LINE AND GRID (A)
- EXTERIOR LIGHT FIXTURE SEE ELECTRICAL (L)
- C.J. FACE OF WALLS



PROCESS BUILDING - ROOF PLAN
SCALE: 1/8" = 1'-0"

4' 0 4' 8'
SCALE: ⅛"= 1'-0"

RECORD DRAWING SET
JANUARY 2015



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LICENSE NO. 9410
EXPIRATION DATE 02/14/2011

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152 0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

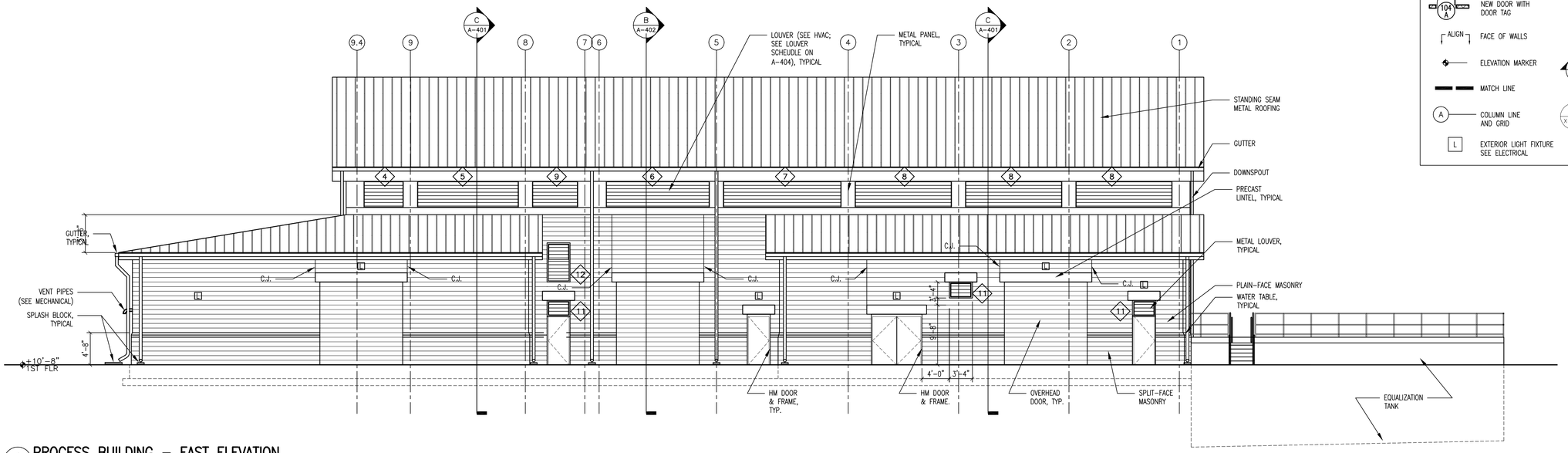
SHEET TITLE
PROCESS BUILDING
ROOF PLAN

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

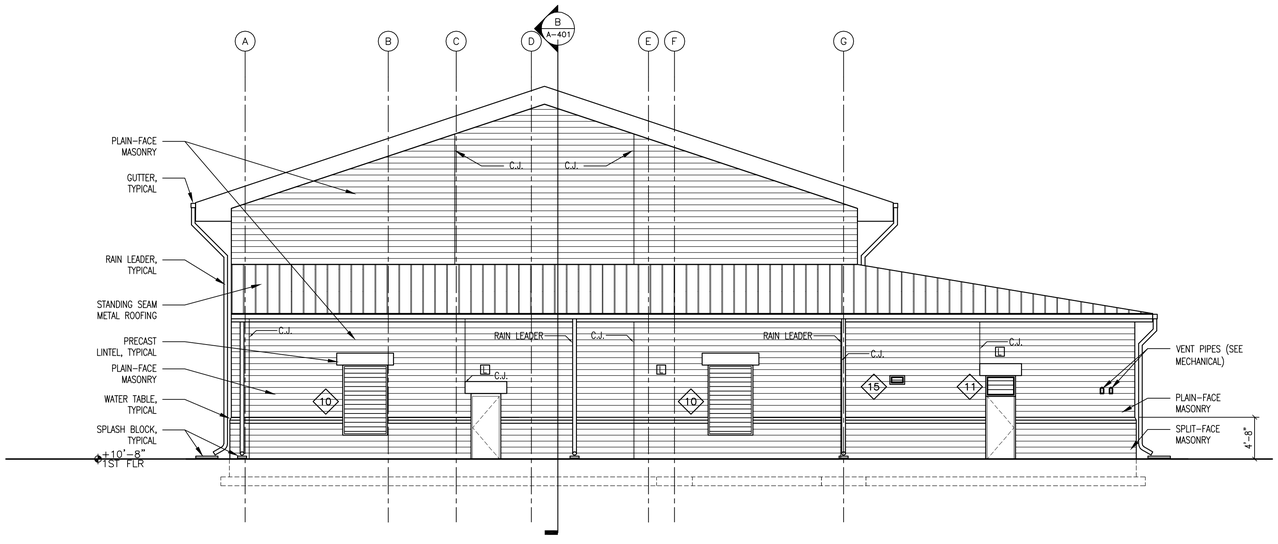
CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BCB
CH'D. BY: BAM

A-106

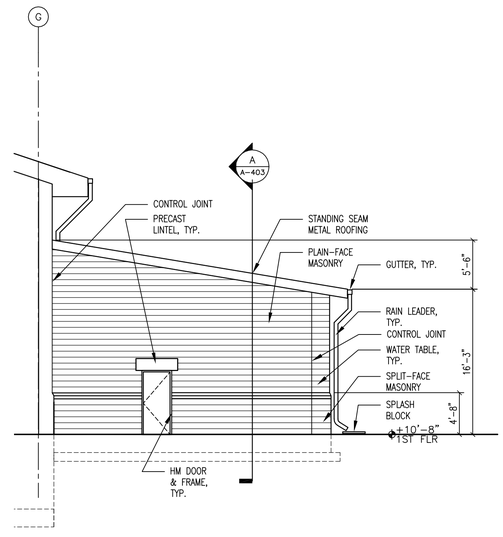
SHEET 31 OF 128



1 A001 PROCESS BUILDING – EAST ELEVATION
SCALE: 1/8"=1'-0"



2 A001 PROCESS BUILDING – SOUTH ELEVATION
SCALE: 1/8"=1'-0"



3 A001 PROCESS BUILDING – PARTIAL ELEVATION – SOUTH
SCALE: 1/8"=1'-0"

4' 0 4' 8'
SCALE: 1/8"= 1'-0"

RECORD DRAWING SET JANUARY 2015

DRAWING LEGEND

- NEW WALL
- WALL TAG
- NEW DOOR WITH DOOR TAG
- NEW WINDOW TAG
- ALIGN FACE OF WALLS
- ROOM NAME AND TAG
- ELEVATION MARKER
- EXTERIOR ELEVATION SYMBOL
- MATCH LINE
- COLUMN LINE AND GRID
- ENLARGED VIEW SYMBOL
- EXTERIOR LIGHT FIXTURE SEE ELECTRICAL
- C.J. FACE OF WALLS

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LICENSE NO. 9410 EXPIRATION DATE 02/14/2015

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING
ELEVATIONS

MARK	DATE	DESCRIPTION
A	NOV. 2014	RECORD DRAWINGS

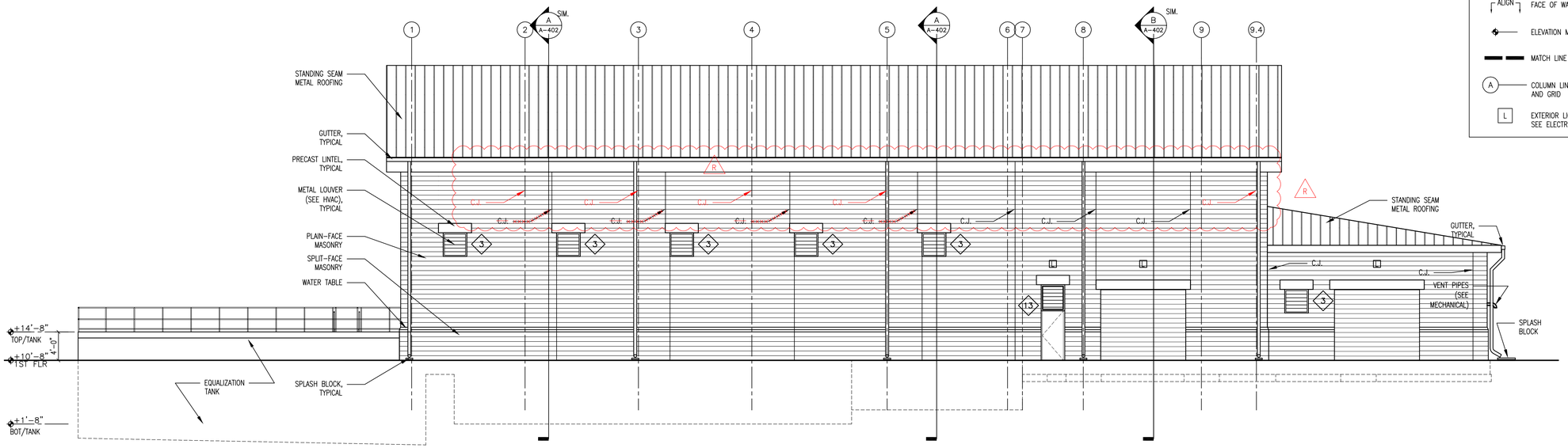
CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BCB
CH'D. BY: BAM

A-201

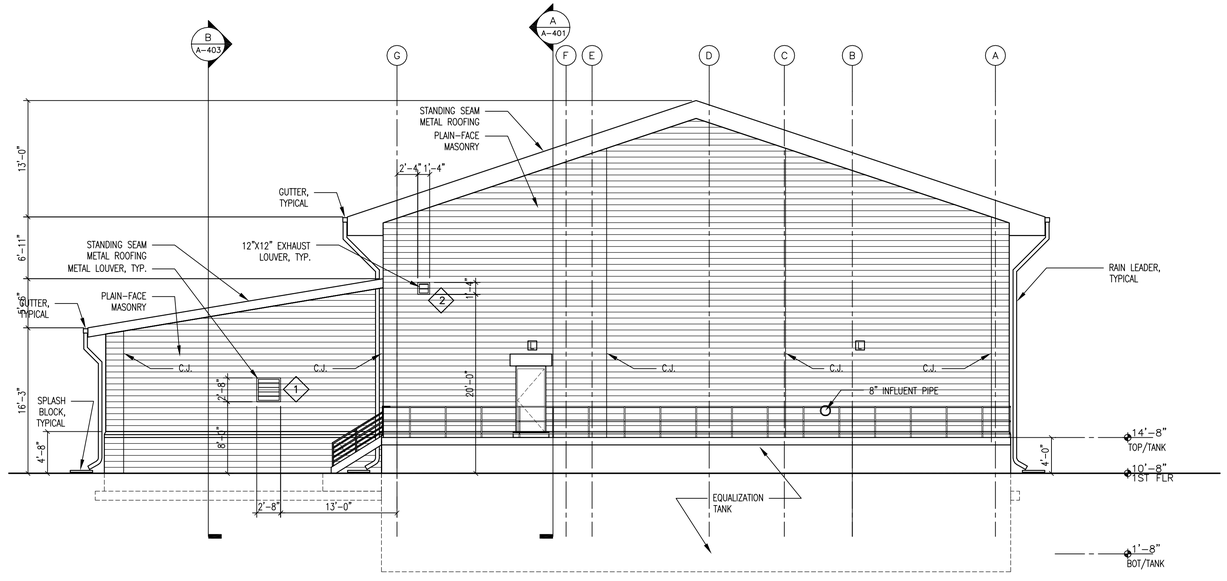
SHEET 32 OF 128

DRAWING LEGEND

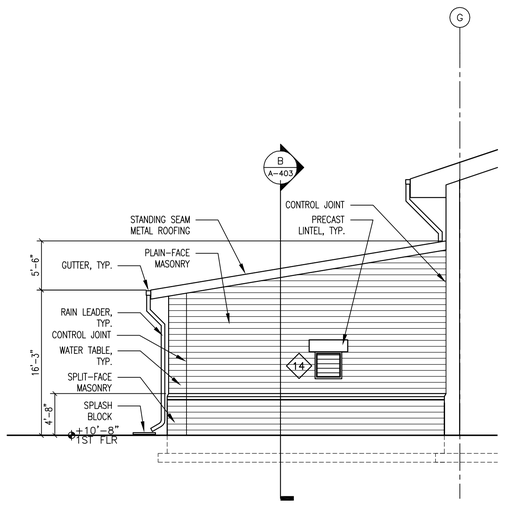
- NEW WALL
- WALL TAG (B)
- NEW DOOR WITH DOOR TAG (104 / A)
- NEW WINDOW TAG (1)
- FACE OF WALLS (ALIGN)
- ROOM NAME AND TAG (XXX / NA01)
- ELEVATION MARKER
- EXTERIOR ELEVATION SYMBOL (XX / X-XXX)
- MATCH LINE
- ENLARGED VIEW SYMBOL (XX / X-XXX)
- COLUMN LINE AND GRID (A)
- EXTERIOR LIGHT FIXTURE SEE ELECTRICAL (L)
- FACE OF WALLS (C.J.)



1 / A001 PROCESS BUILDING – WEST ELEVATION
SCALE: 1/8"=1'-0"



2 / A001 PROCESS BUILDING – NORTH ELEVATION
SCALE: 1/8"=1'-0"



3 / A001 PROCESS BUILDING – PARTIAL ELEVATION – NORTH
SCALE: 1/8"=1'-0"

4' 0 4' 8'
SCALE: 1/8"= 1'-0"

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

STATE OF MARYLAND — JAMES B. CHILDS — REGISTERED ARCHITECT

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LICENSE NO. 9410
EXPIRATION DATE 02/14/2015

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

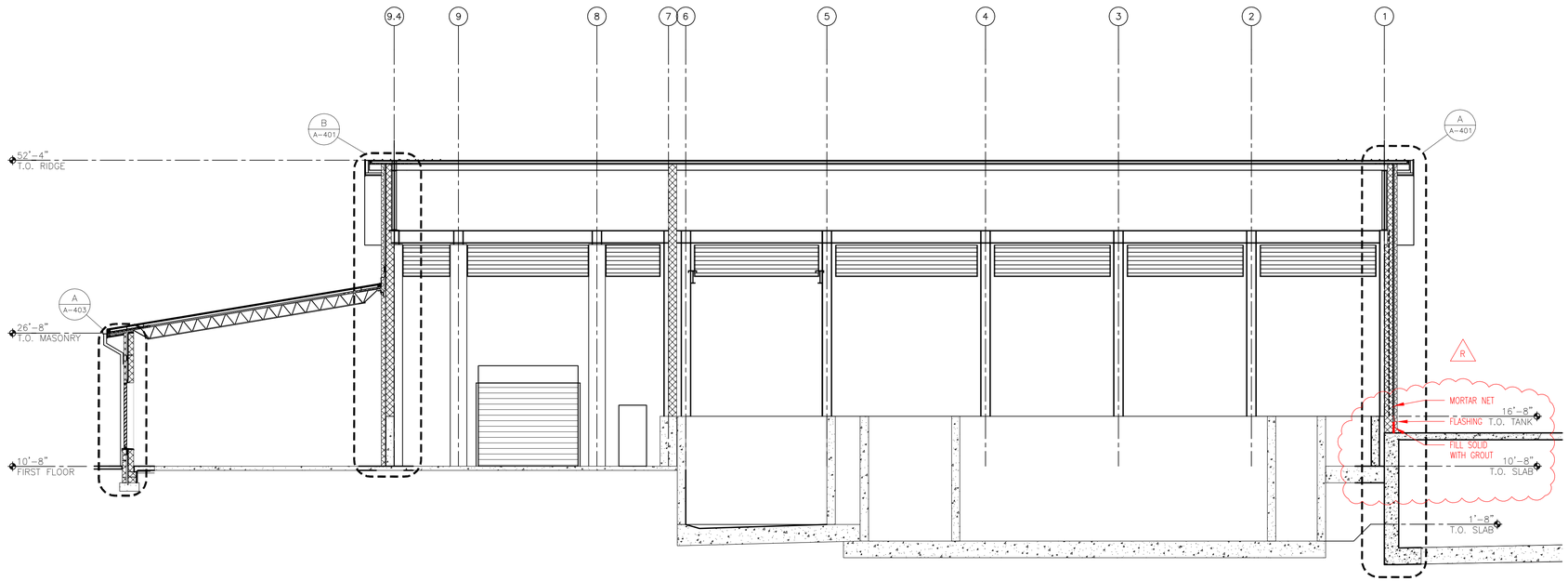
SHEET TITLE
PROCESS BUILDING
ELEVATIONS

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

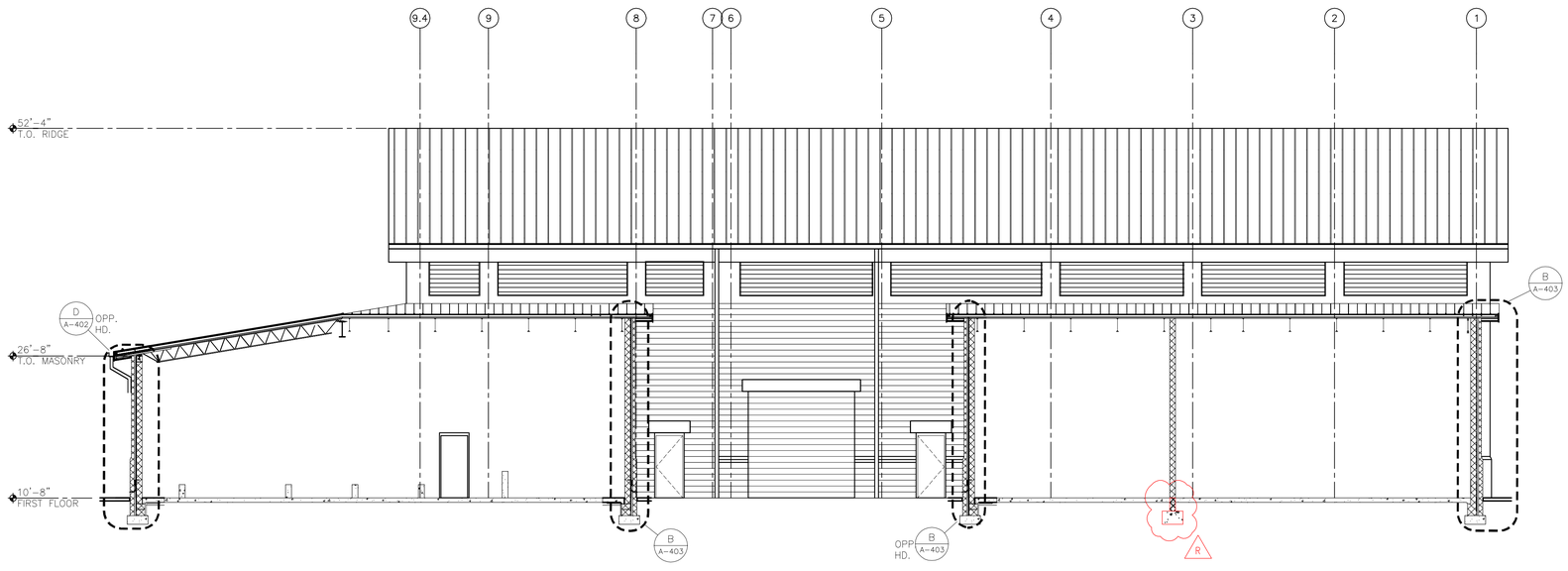
CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BCB
CH'D. BY: BAM

A-202

SHEET 33 OF 128



C A001 SECTION C–C
SCALE: 1/8"=1'-0"



D A001 SECTION D–D
SCALE: 1/8"=1'-0"

DRAWING LEGEND

- NEW WALL
- B — WALL TAG
- 104 A — NEW DOOR WITH DOOR TAG
- 1 — NEW WINDOW TAG
- ALIGN — FACE OF WALLS
- XXX NA01 — ROOM NAME AND TAG
- ELEVATION MARKER
- XX X-XXX — EXTERIOR ELEVATION SYMBOL
- MATCH LINE
- A — COLUMN LINE AND GRID
- XX X-XXX — ENLARGED VIEW SYMBOL
- L — EXTERIOR LIGHT FIXTURE SEE ELECTRICAL
- C.J. — FACE OF WALLS

4' 0 4' 8'
SCALE: ⅛"= 1'-0"

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

STATE OF MARYLAND — JOHN E. SHELTON — 9410 — REGISTERED PROFESSIONAL ENGINEER

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 9410
EXPIRATION DATE 02/14/2015

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

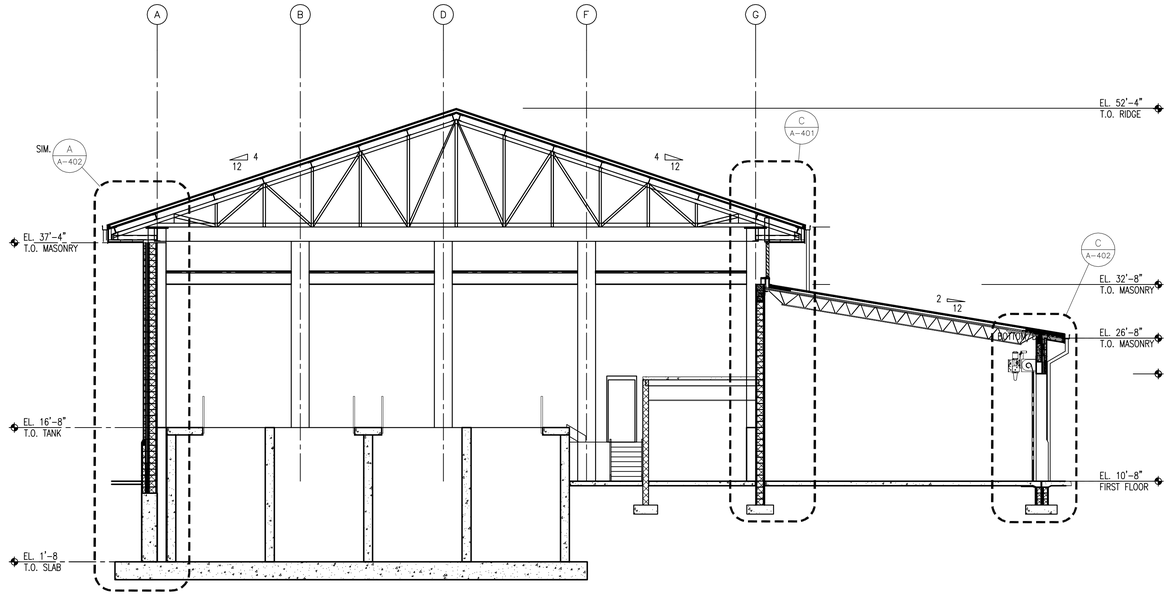
MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BCB
CH'D. BY: BAM

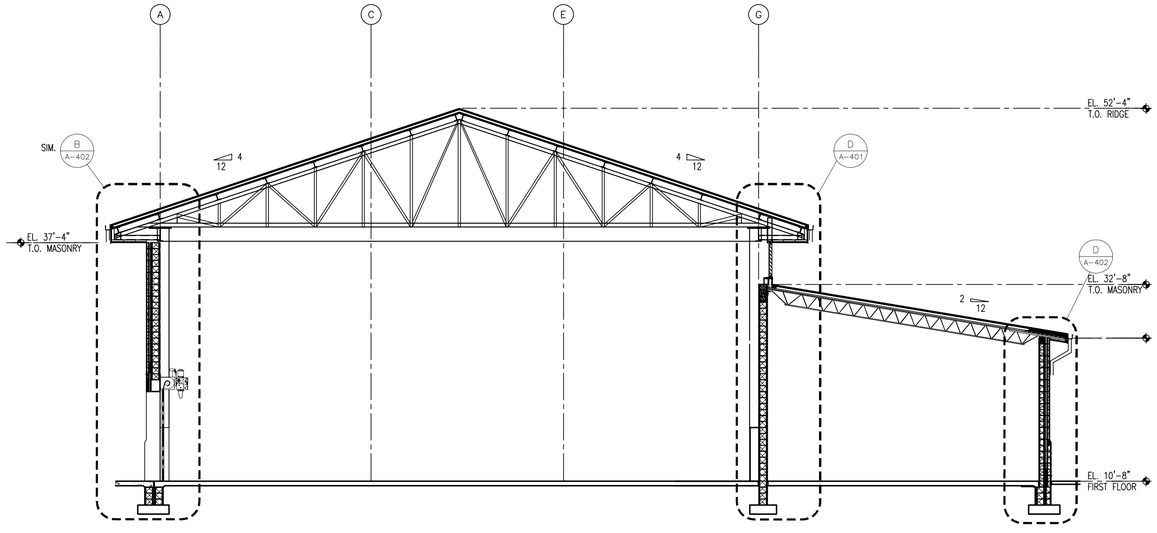
PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING
BUILDING SECTIONS

A-203



A A001 SECTION A–A
SCALE: 1/8"=1'-0"



B A001 SECTION B–B
SCALE: 1/8"=1'-0"

DRAWING LEGEND

- NEW WALL
- WALL TAG
- NEW DOOR WITH DOOR TAG (104 A)
- NEW WINDOW TAG (1)
- FACE OF WALLS (ALIGN)
- ROOM NAME AND TAG (XXX NA01)
- ELEVATION MARKER
- EXTERIOR ELEVATION SYMBOL (XX X-XXX)
- MATCH LINE
- COLUMN LINE AND GRID (A)
- ENLARGED VIEW SYMBOL (XX X-XXX)
- EXTERIOR LIGHT FIXTURE SEE ELECTRICAL (L)
- C.J. FACE OF WALLS

4' 0 4' 8'
SCALE: 1/8"= 1'-0"

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

STATE OF MARYLAND — DAVID A. HILLIS — 9410 — REGISTERED PROFESSIONAL ENGINEER

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 9410
EXPIRATION DATE 02/14/2015

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

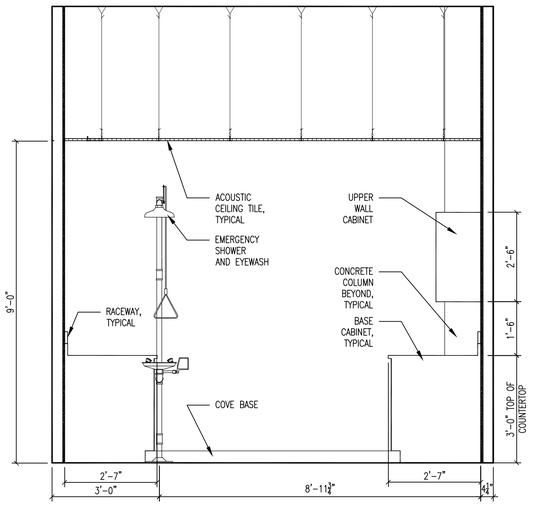
SHEET TITLE
PROCESS BUILDING
BUILDING SECTIONS

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

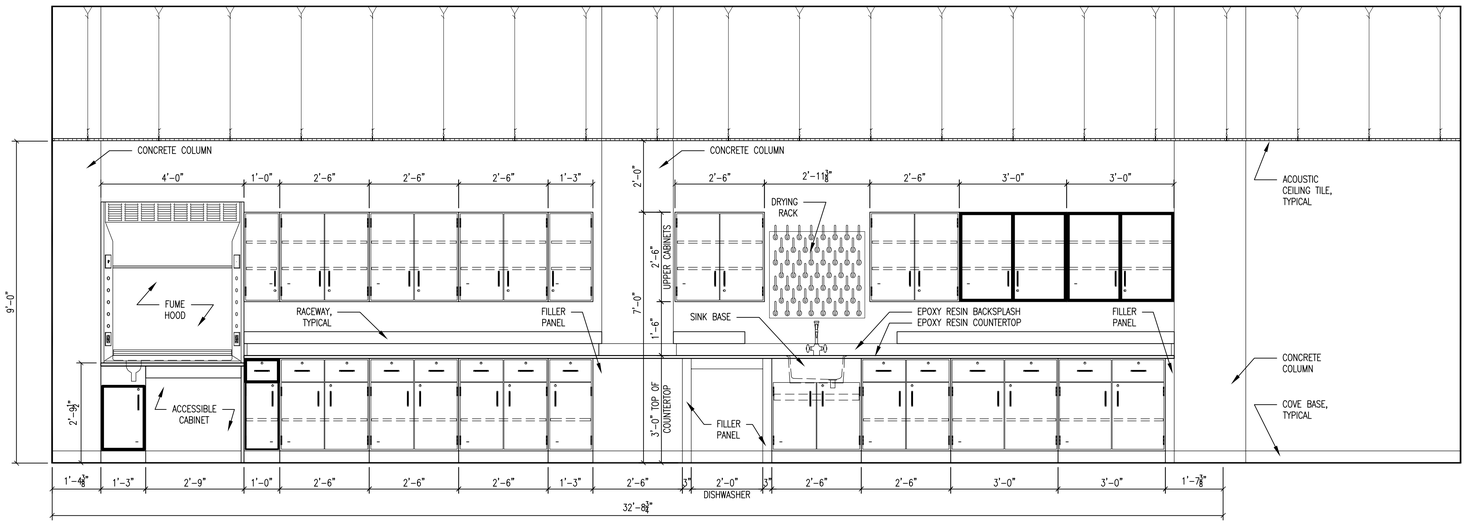
CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BCB
CH'D. BY: BAM

A-204

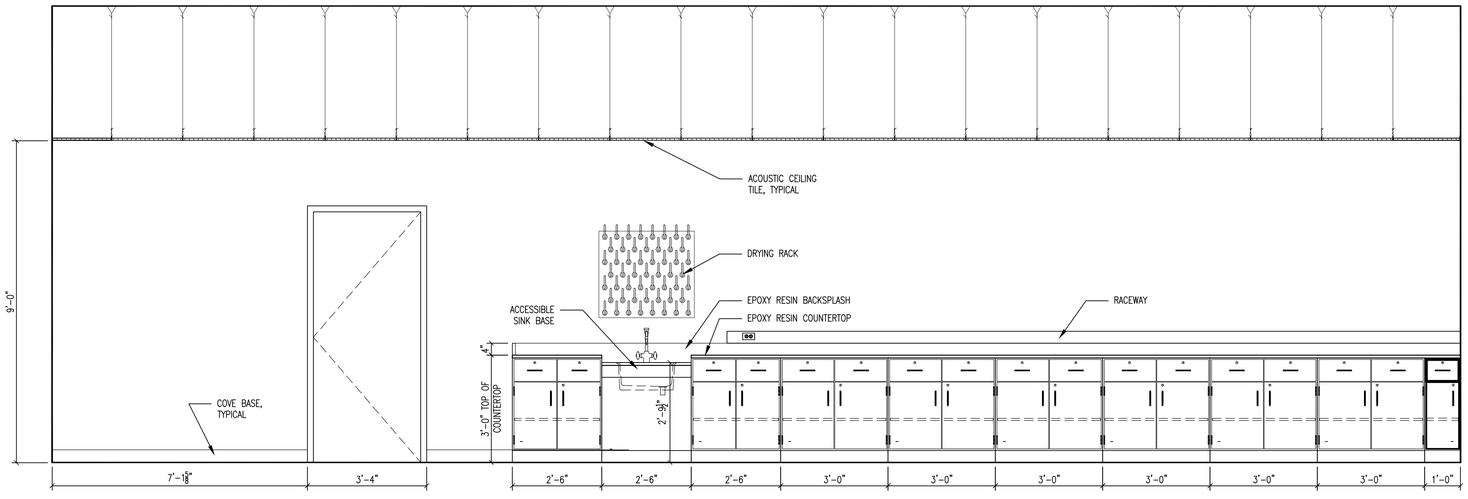
SHEET 35 OF 128



1 A101 PROCESS BUILDING - LAB INTERIOR ELEVATION
SCALE: 1/2"=1'-0"



2 A101 PROCESS BUILDING - LAB INTERIOR ELEVATION
SCALE: 1/2"=1'-0"



3 A001 PROCESS BUILDING - LAB INTERIOR ELEVATION
SCALE: 1/2"=1'-0"

1' 0 1' 2'
SCALE: ½"= 1'-0"

RECORD DRAWING SET
JANUARY 2015

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 9410
EXPIRATION DATE 02/14/2013

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

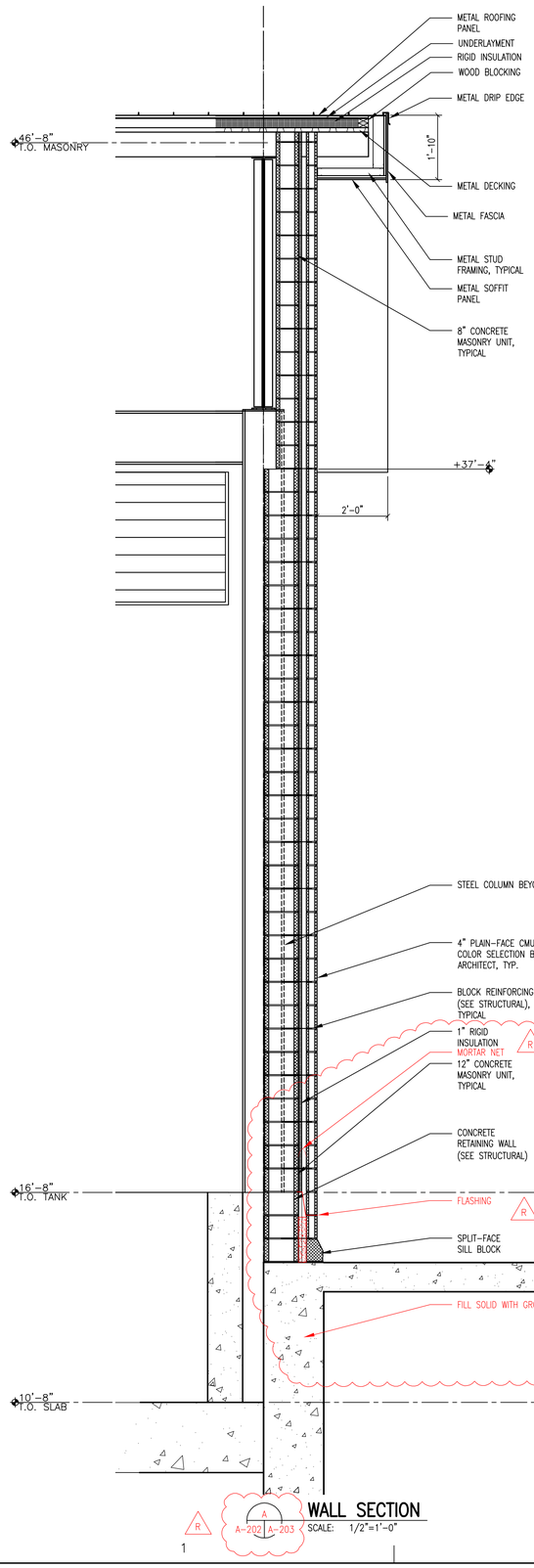
SHEET TITLE
PROCESS BUILDING
INTERIOR ELEVATIONS

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

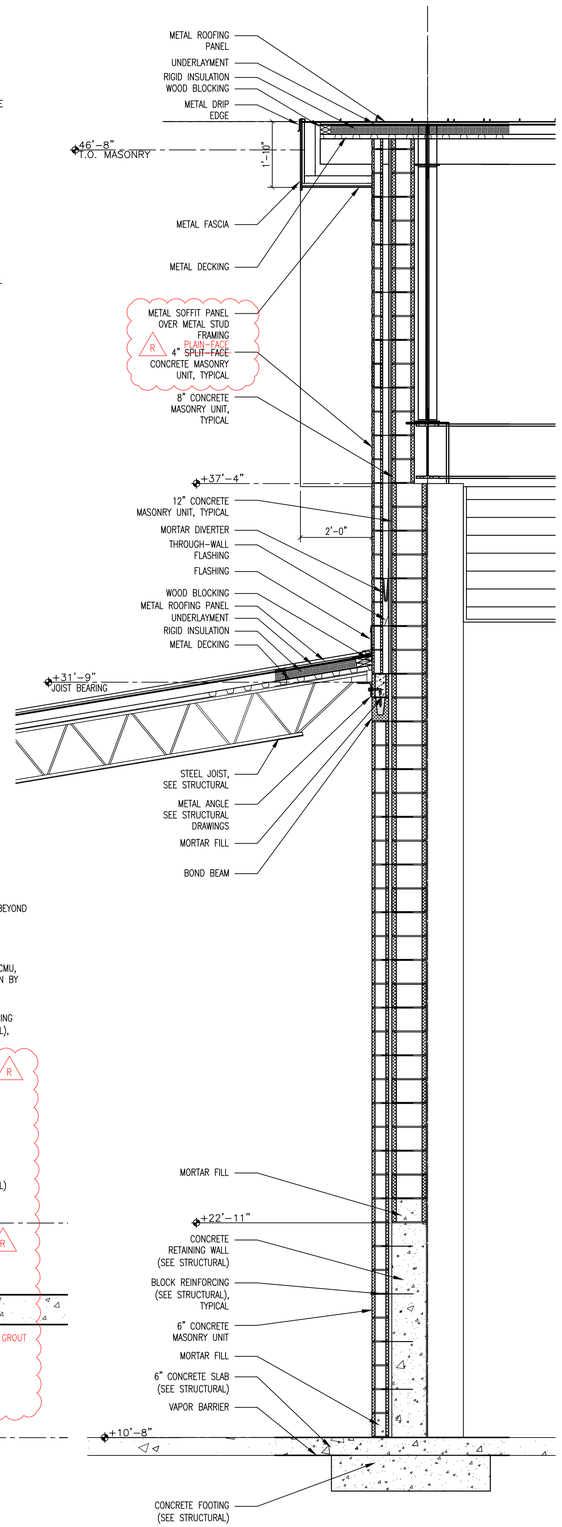
CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BCB
CH'D. BY: BAM

A-250

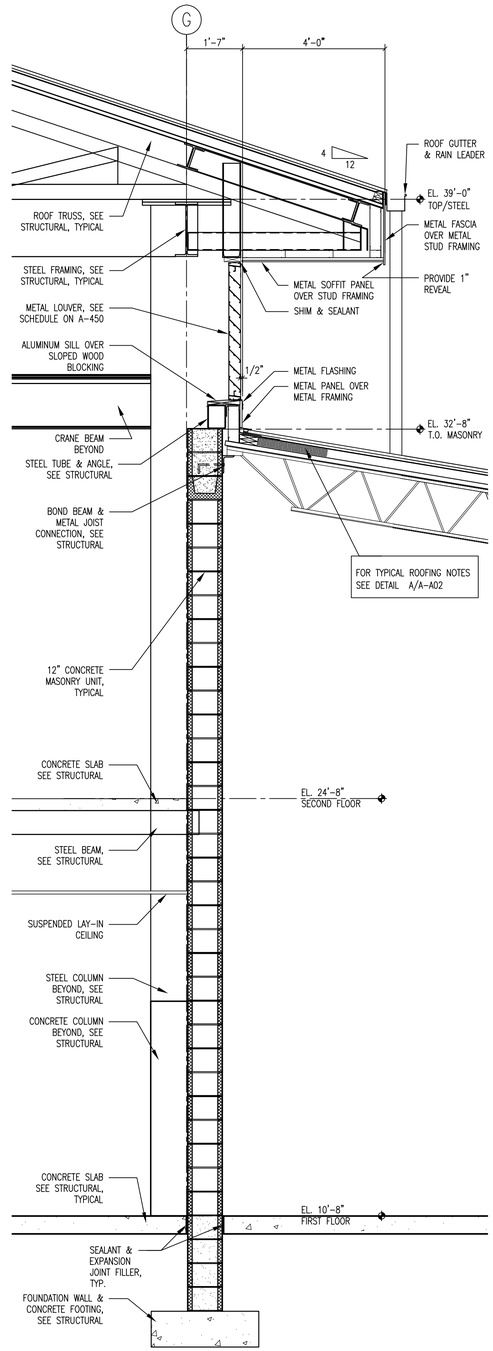
SHEET 36 OF 128



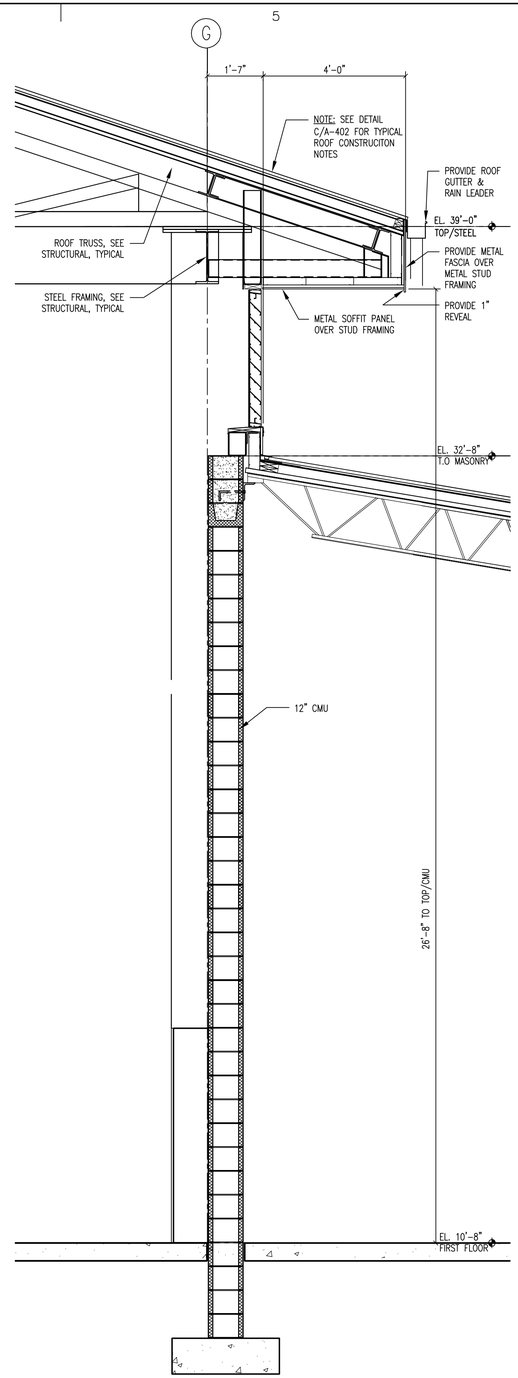
A WALL SECTION
SCALE: 1/2"=1'-0"



B WALL SECTION
A203 SCALE: 1/2"=1'-0"



C WALL SECTION
A204 SCALE: 1/2"=1'-0"



D WALL SECTION
A204 SCALE: 1/2"=1'-0"

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

STATE OF MARYLAND — DAVID B. MCCARTHY — 21502 — REGISTERED PROFESSIONAL ENGINEER

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 9410
EXPIRATION DATE 02/14/2015

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

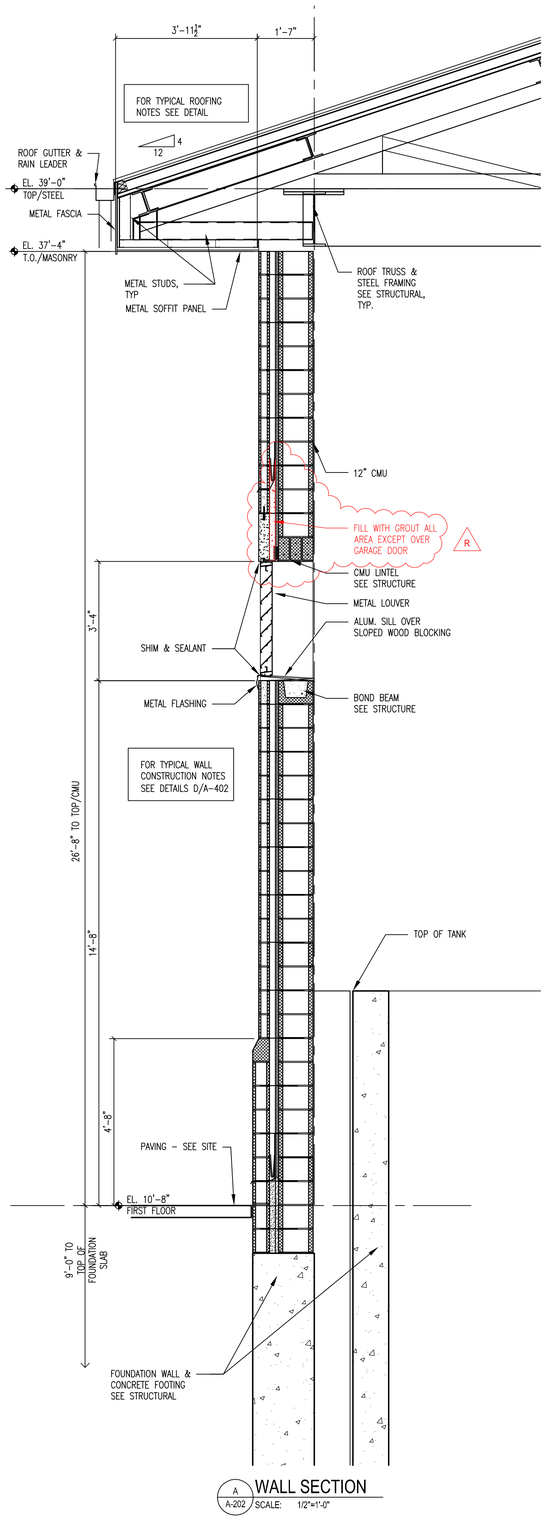
SHEET TITLE
PROCESS BUILDING
WALL SECTIONS

MARK	DATE	DESCRIPTION
A	NOV. 2014	RECORD DRAWINGS

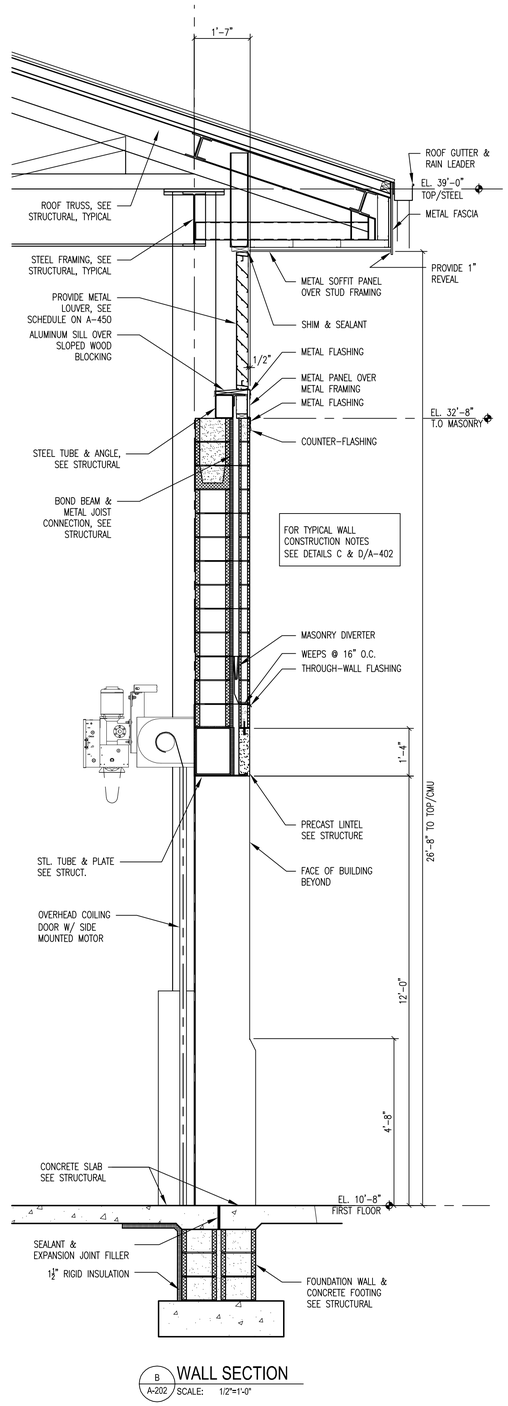
CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BCB
CH'D. BY: BAM

A-401

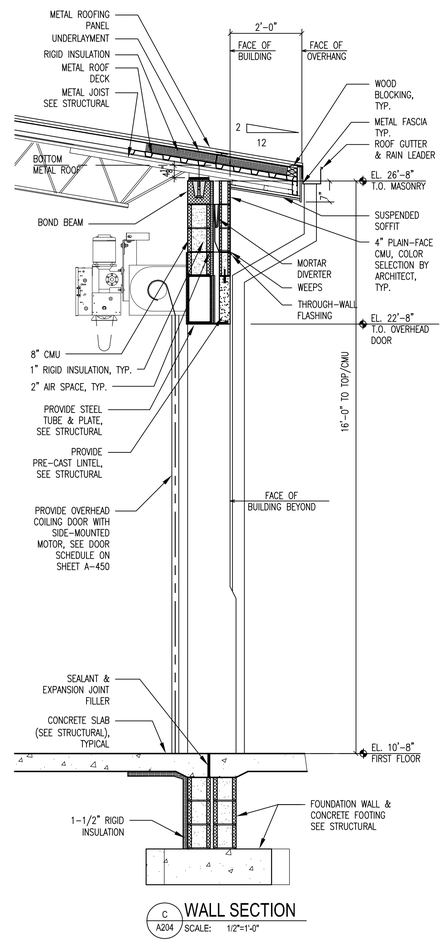
SHEET 37 OF 128



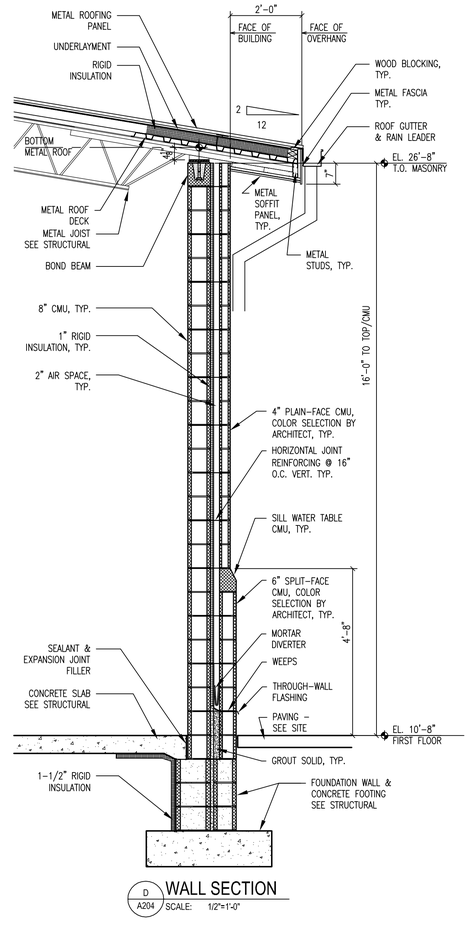
A A-202 WALL SECTION SCALE: 1/2"=1'-0"



B A-202 WALL SECTION SCALE: 1/2"=1'-0"



C A204 WALL SECTION SCALE: 1/2"=1'-0"



D A204 WALL SECTION SCALE: 1/2"=1'-0"

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

STATE OF MARYLAND — JOHN BRUCE BOWEN — No. 9410 — REGISTERED ARCHITECT

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 9410
EXPIRATION DATE 02/14/2015

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

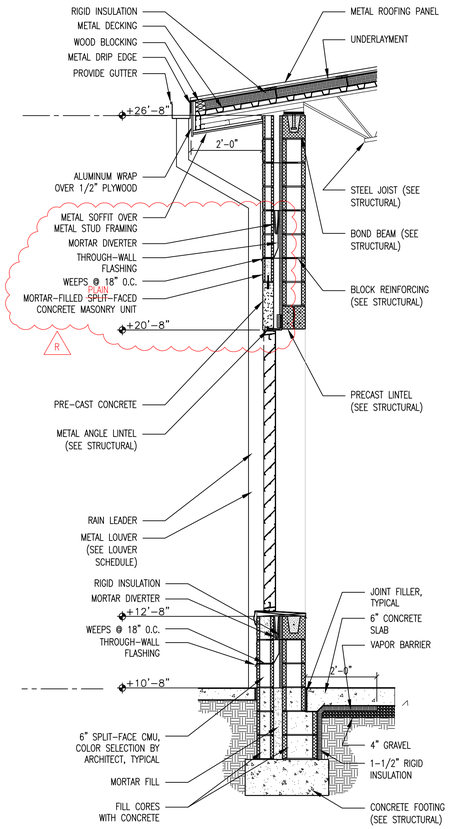
SHEET TITLE
PROCESS BUILDING
WALL SECTIONS

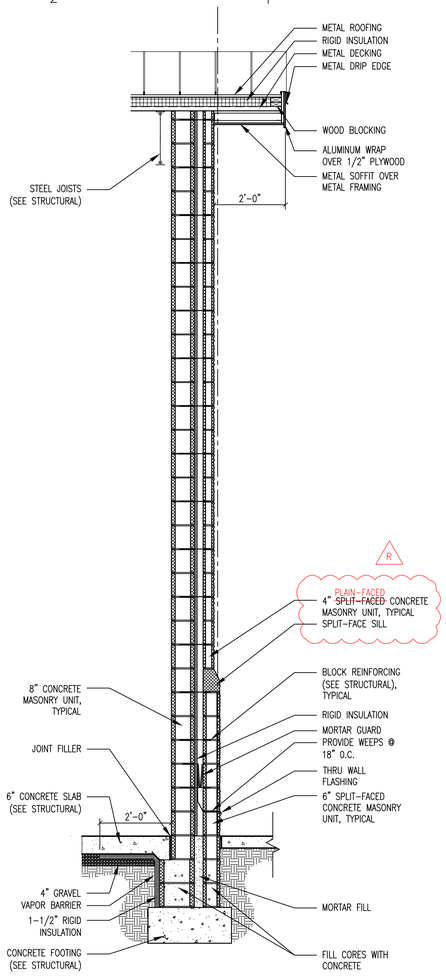
MARK	DATE	DESCRIPTION
A	NOV. 2014	RECORD DRAWINGS

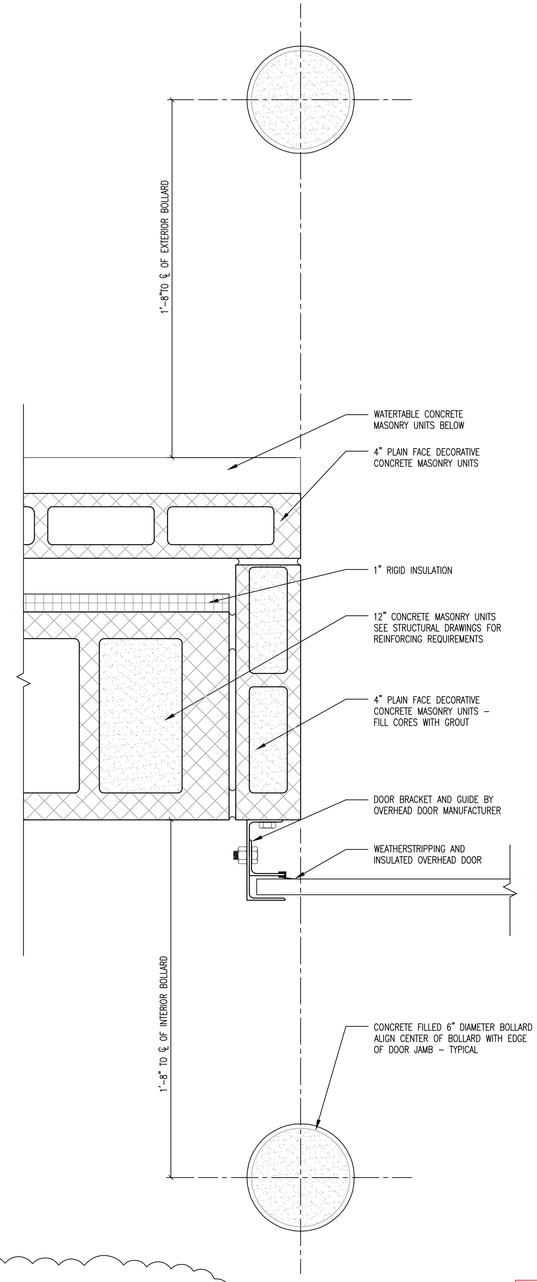
CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BCB
CH'D. BY: BAM

A-402

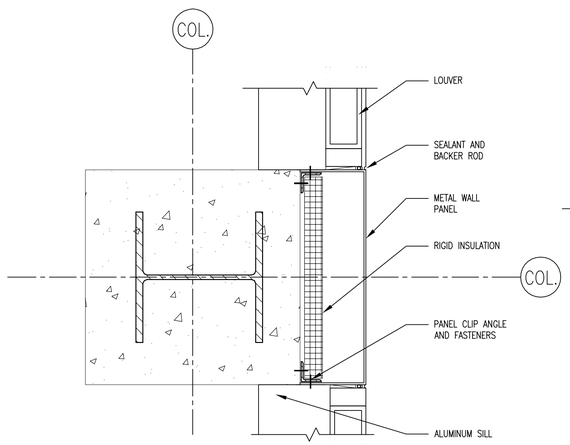
SHEET 38 OF 128





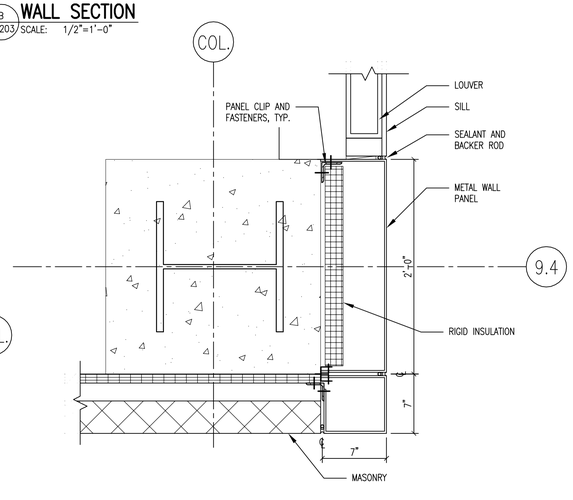


A-203 WALL SECTION
SCALE: 1/2"=1'-0"



A-103 PLAN DETAIL
SCALE: 1-1/2"=1'-0"

B-203 WALL SECTION
SCALE: 1/2"=1'-0"



A-104 PLAN DETAIL
SCALE: 1-1/2"=1'-0"

A102 OVERHEAD-DOOR JAMB DETAIL
SCALE: 3"=1'-0"

1' 0 1' 2'
SCALE: 1/2"= 1'-0"

2" 0 2" 4"
SCALE: 3" = 1'-0"

RECORD DRAWING SET JANUARY 2015

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 9410
EXPIRATION DATE 02/14/2015

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING
WALL SECTIONS & BUILDING DETAILS

MARK	DATE	DESCRIPTION
1	FEB. 2011	ADDENDUM 2
2	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BCB
CH'D. BY: BAM

A-403

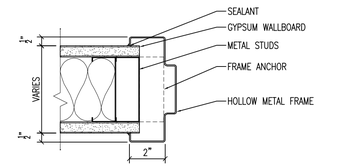
SHEET 39 OF 128

DOOR AND FRAME SCHEDULE

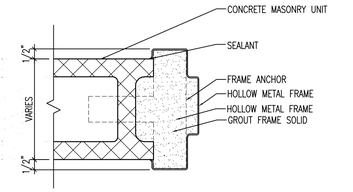
MARK	DOOR SIZE WD	DOOR SIZE HGT	DOOR SIZE THK	DOOR MATL	DOOR EL	FRAME MATL	FRAME EL	FRAME DETAIL HEAD	FRAME DETAIL JAMB	FRAME DETAIL SILL	LOUVER WD	LOUVER HGT	FIRE RATING LABEL	HARD-WARE SET NO	NOTES
101A	3'-0"	7'-0"	1 3/4"	HM	C	HM	1	3	3	1	0"	0"	--	1	--
101B	3'-0"	7'-0"	1 3/4"	HM	C	HM	1	3	3	1	0"	0"	--	1	--
101C	12'-0"	12'-0"	1"	STEEL	A2	STEEL	--	--	--	--	0"	0"	--	--	EXPLOSION-PROOF MOTOR & CONTROLS
102A	3'-0"	7'-0"	1 3/4"	HM	B	HM	1	2	2	--	0"	0"	--	4	--
103A	3'-0"	7'-0"	1 3/4"	HM	C	HM	1	2	2	--	0"	0"	--	4	--
104A	3'-0"	7'-0"	2"	HM	C	HM	2	3	3	1	3'-0"	2'-0"	--	1	--
104B	12'-0"	12'-0"	1"	STEEL	A2	STEEL	--	--	--	--	0"	0"	--	--	EXPLOSION-PROOF MOTOR & CONTROLS
105A	7'-0"	7'-0"	1 3/4"	HM	D	HM	3	3	3	1	6'-0"	2'-0"	--	2	--
105B	3'-0"	7'-0"	2"	HM	C	HM	1	3	3	1	3'-0"	2'-0"	--	1	--
106A	12'-0"	12'-0"	1"	STEEL	A2	STEEL	--	--	--	--	0"	0"	--	--	--
106B	3'-0"	7'-0"	1 3/4"	HM	C	HM	1	3	3	1	0"	0"	--	1	--
107A	3'-0"	7'-0"	1 3/4"	HM	C	HM	2	2	2	--	0"	0"	--	3	--
107B	3'-0"	7'-0"	1 3/4"	HM	C	HM	1	2	2	--	0"	0"	--	3	--
107C	12'-0"	10'-0"	1"	STEEL	A1	STEEL	--	--	--	--	0"	0"	--	--	--
107D	3'-0"	7'-0"	1 3/4"	HM	C	HM	2	2	2	--	0"	0"	--	3	--
108A	3'-0"	7'-0"	1 3/4"	HM	C	HM	1	2	2	--	0"	0"	--	3	--
108B	3'-0"	7'-0"	1 3/4"	HM	C	HM	1	2	2	--	0"	0"	--	3	--
108C	12'-0"	10'-0"	1"	STEEL	A1	STEEL	--	--	--	--	0"	0"	--	--	--

LOUVER SCHEDULE

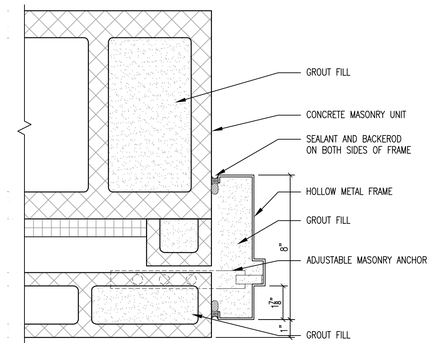
MARK	ROUGH OPENING WIDTH	ROUGH OPENING HEIGHT	FRAME WIDTH	FRAME HEIGHT	TYPE	MATERIAL	NOTES
1	2'- 8"	2'- 8"	2'- 7 3/4"	2'- 7 3/4"	1	--	--
2	1'- 4"	1'- 4"	1'- 3 3/4"	1'- 3 3/4"	1	--	--
3	3'- 4"	3'- 4"	3'- 3 3/4"	3'- 3 3/4"	1	--	--
4	5'- 9"	4'- 0"	5'- 8 3/4"	3-10 3/4"	1	--	BLANK OFF
5	14'- 8"	4'- 0"	14'- 7 3/4"	3-10 3/4"	1	--	BLANK OFF
6	15'- 0"	4'- 0"	14'-11 3/4"	3-10 3/4"	1	--	--
7	17'- 1"	4'- 0"	17'- 0 3/4"	3-10 3/4"	1	--	--
8	14'- 0"	4'- 0"	13'-11 3/4"	3-10 3/4"	1	--	--
9	6'- 7"	4'- 0"	6'- 6 3/4"	3-10 3/4"	1	--	BLANK OFF
10	5'- 0"	7'-10"	4'-11 3/4"	7'- 9 3/4"	2	--	ACOUSTICAL
11	3'- 0"	2'- 0"	2'-11 3/4"	1'-11 3/4"	1	--	--
12	3'- 0"	5'- 4"	2'-11 3/4"	5'- 3 3/4"	1	--	--
13	3'- 0"	3'- 4"	2'-11 3/4"	3'- 3 3/4"	1	--	--
14	2'- 8"	2'- 8"	2'- 7 3/4"	2'- 7 3/4"	1	--	--
15	1'- 4"	8"	1'- 3 3/4"	7 3/4"	1	--	--



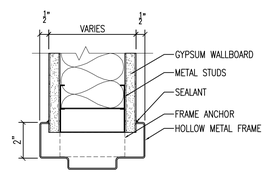
JAMB DETAIL 1
3"=1'-0"



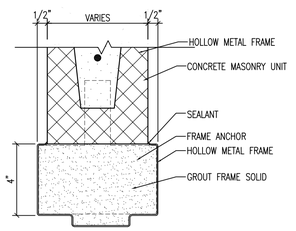
JAMB DETAIL 2
3"=1'-0"



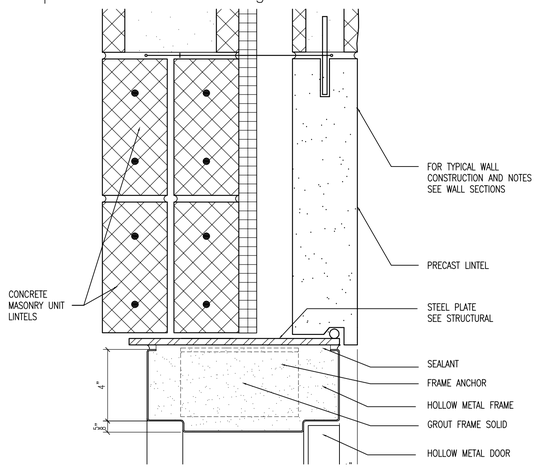
JAMB DETAIL 3
3"=1'-0"



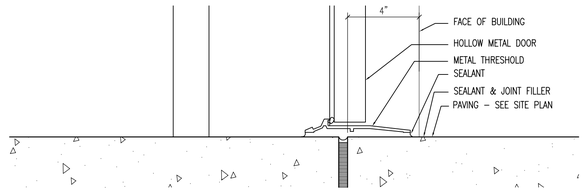
HEAD DETAIL 1
3"=1'-0"



HEAD DETAIL 2
3"=1'-0"

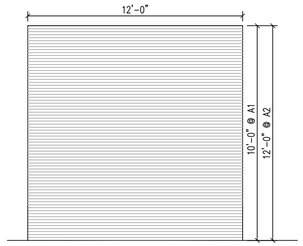


EXTERIOR HEAD DETAIL 3
3" = 1'-0"

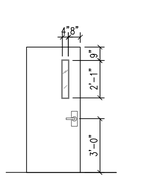


EXTERIOR DOOR SILL 1
3" = 1'-0"

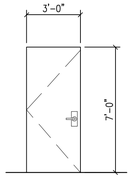
RECORD DRAWING SET
JANUARY 2015



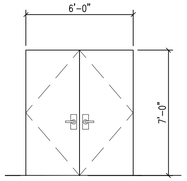
DOOR TYPE A1 & A2
1/4"=1'-0"



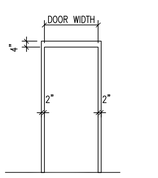
DOOR TYPE B
1/4"=1'-0"



DOOR TYPE C
1/4"=1'-0"



DOOR TYPE D
1/4"=1'-0"



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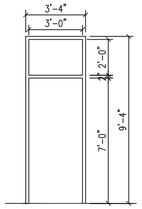

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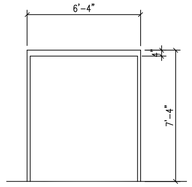

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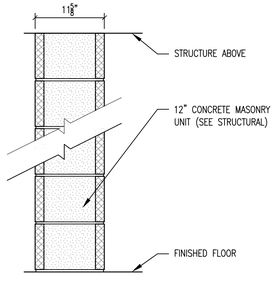
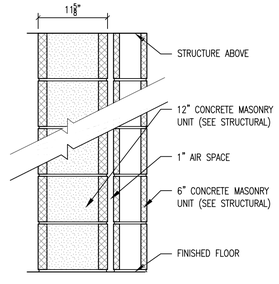
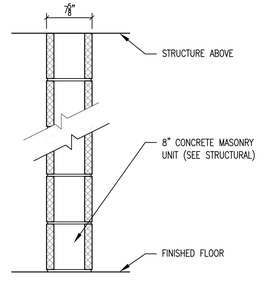


WALL TYPE A
1" = 1'-0"

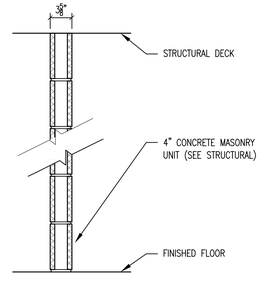


WALL TYPE B
1" = 1'-0"

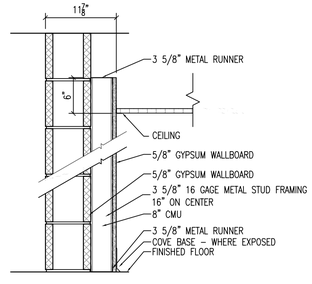
WALL TYPE C – NOT USED
1" = 1'-0"



WALL TYPE D
1" = 1'-0"



WALL TYPE E
1" = 1'-0"



WALL TYPE F
1" = 1'-0"

FINISH SCHEDULE

NUMBER	ROOM NAME	WALLS N	WALLS E	WALLS S	WALLS W	FLOOR	CEILING
101	PROCESS ROOM	PT	PT	PT	PT	--	--
102	LAB	PT	PT	PT	PT	~~CRF~~VT	ACT
103	RESTROOM	PT	PT	PT	PT	--	ACT
104	SCREEN ROOM	PT	PT	PT	PT	--	--
105	ELECTRICAL ROOM	PT	PT	PT	PT	--	--
106	CHEMICAL ROOM	PT	PT	PT	PT	CRF	--
107	PUMP ROOM	PT	PT	PT	PT	--	--
108	BLOWER ROOM	PT	PT	PT	PT	--	--

R

NOTES:
1. PT – PAINT, COLOR TO BE SELECTED BY OWNER
2. CRF – CHEMICAL RESISTANT FLOORING
3. ACT – ACOUSTICAL CEILING TILE
4. VT – VINYL TILE

PROFESSIONAL CERTIFICATION.
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 9410
EXPIRATION DATE 02/14/2015

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

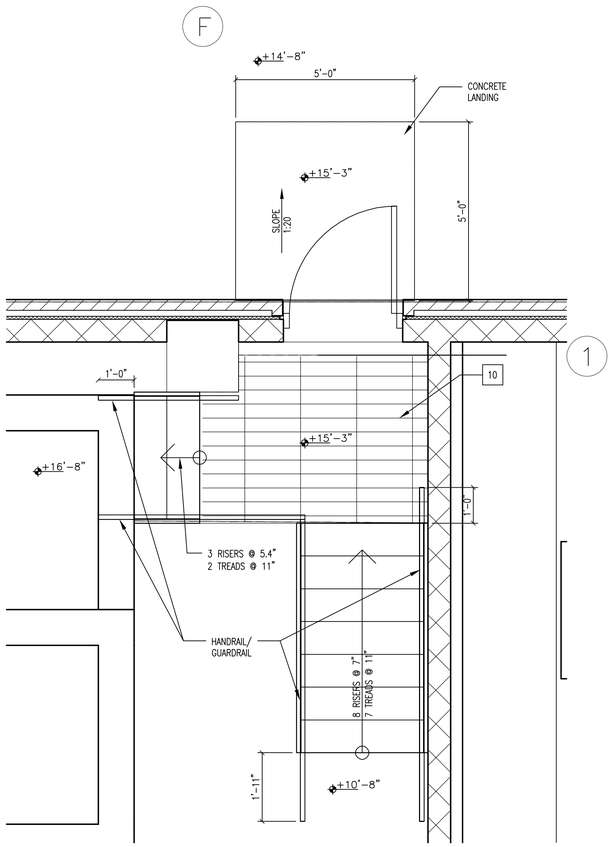
SHEET TITLE
PROCESS BUILDING
SCHEDULES, WALL TYPES, & DETAILS

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

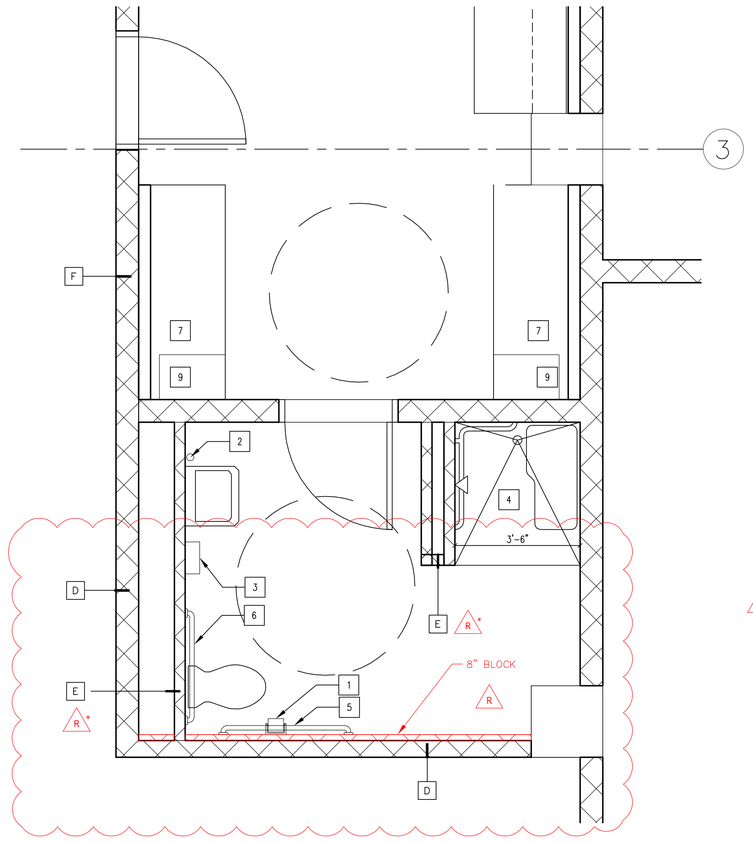
CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BCB
CH'D. BY: BAM

A-404

SHEET 40 OF 128



1 A101 PROCESS BUILDING - ENLARGED FIRST FLOOR STAIR PLAN
SCALE: 1/2"=1'-0"



4 A101 PROCESS BUILDING - ENLARGED FIRST FLOOR TOILET ROOM
SCALE: 1/2"=1'-0"

1 PAPER TOWEL DISPENSER
2 SOAP DISPENSER
3 TOILET PAPER DISPENSER
4 MODULAR SHOWER UNIT
5 42-INCH GRAB BAR
6 36-INCH GRAB BAR
7 DESK, NOT IN CONTRACT
8 NOT USED
9 FILE CABINET BENEATH CASEWORK, NOT IN CONTRACT
10 FRP GRATE LANDING AND STAIRS

R * 2 BATHROOM WALLS CHANGED FROM 4" CMU TO 6" METAL STUD WITH GREENBOARD DRYWALL. TYPE E WALLS NEXT TO THE TOILET, SINK AND SHOWER.

DRAWING LEGEND

- NEW WALL
- B — WALL TAG
- 104 A — NEW DOOR WITH DOOR TAG
- 1 — NEW WINDOW TAG
- ALIGN — FACE OF WALLS
- XXX NA01 — ROOM NAME AND TAG
- ELEVATION MARKER
- XX X-XXX — EXTERIOR ELEVATION SYMBOL
- MATCH LINE
- XX X-XXX — ENLARGED VIEW SYMBOL
- A — COLUMN LINE AND GRID
- C.J. — FACE OF WALLS
- L — EXTERIOR LIGHT FIXTURE SEE ELECTRICAL

WORCESTER COUNTY

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LICENSE NO. 9410
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72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING
ENLARGED PLANS

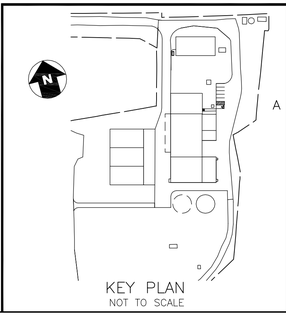
MARK	DATE	DESCRIPTION
A	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BCB
CH'D. BY: BAM

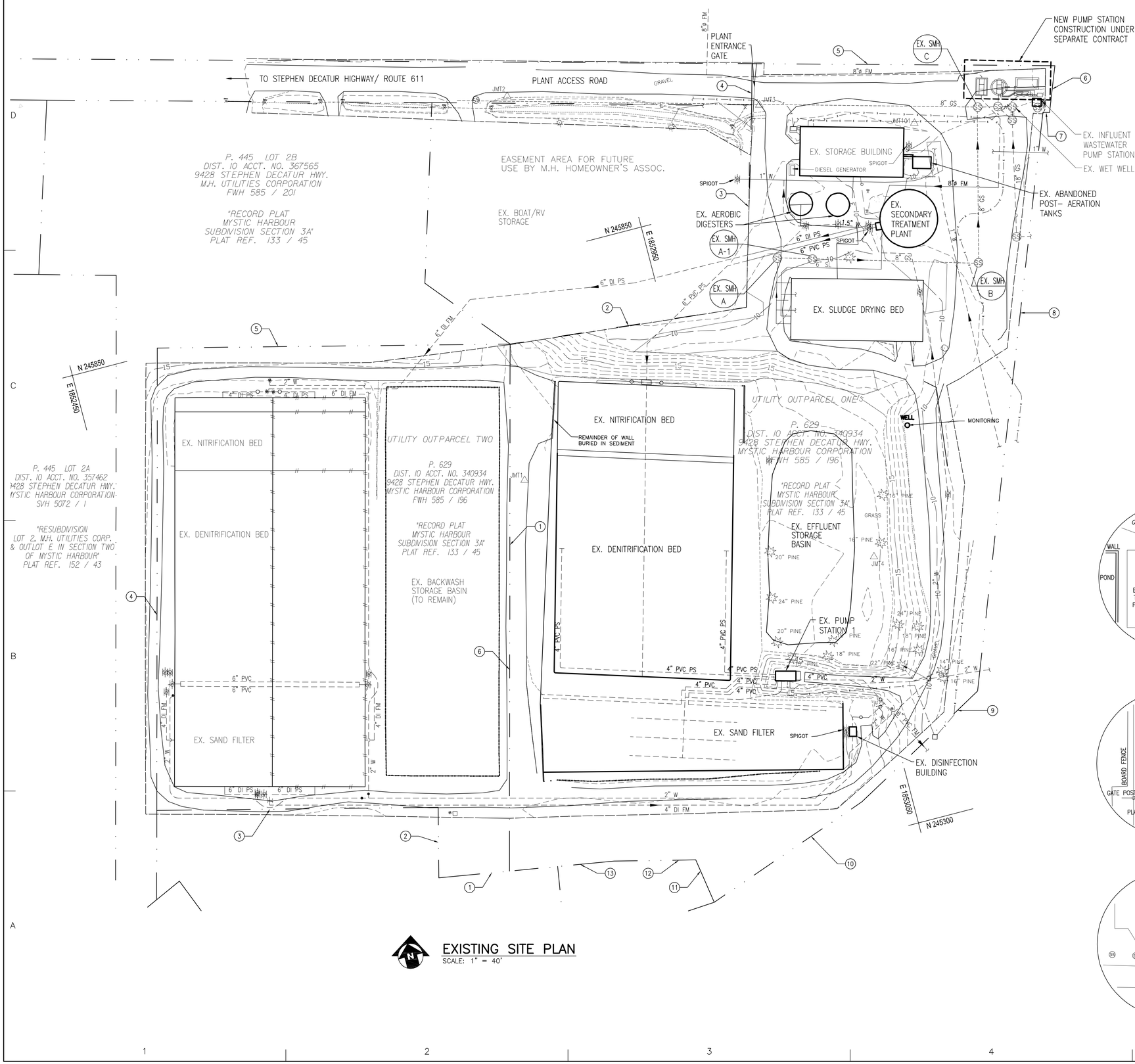
A-450

SHEET 41 OF 128

RECORD DRAWING SET
JANUARY 2015



KEY PLAN
NOT TO SCALE



EXISTING SITE PLAN
SCALE: 1" = 40'

GENERAL SHEET NOTES:

1. TOPOGRAPHY, BENCHMARK AND CONTROL POINTS INFORMATION ARE BASED ON FIELD RUN SURVEY ON MAY 2008 PREPARED BY JMT.
2. ALL STAKING, RESTAKING, AND CUT SHEETS SHALL BE PERFORMED BY A REGISTERED LAND SURVEYOR OR PROFESSIONAL ENGINEER AT THE CONTRACTOR'S EXPENSE.
3. CONTRACTOR SHALL COORDINATE WITH OTHER CONTRACTORS ON SITE PRIOR TO DOING ANY CONSTRUCTION IN THE AREA LABELED 'CONSTRUCTION UNDER SEPARATE CONTRACT.'

PARCEL 1 METES AND BOUNDS

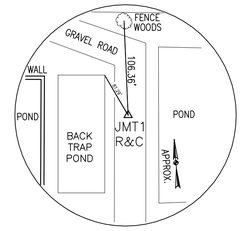
1	N 14°42'11" E	448.25'
2	S 84°12'57" E	203.41'
3	N 16°07'48" E	172.28'
4	N 15°00'46" E	35.00'
5	S 74°59'14" E	257.56'
6	S 21°02'20" W	40.07'
7	N 75°02'28" W	5.68'
8	S 21°04'29" W	495.27'
9	S 60°51'06" W	136.04'
10	S 70°25'18" W	152.08'
11	N 08°52'05" W	39.29'
12	N 76°11'10" W	69.31'
13	N 80°49'41" W	89.56'

PARCEL 2 METES AND BOUNDS

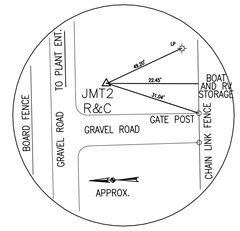
1	N 80°49'41" E	60.31'
2	N 14°02'07" E	60.00'
3	N 76°00'31" W	239.27'
4	N 14°42'11" E	300.00'
5	S 76°00'31" E	448.25'
6	S 14°42'11" W	40.07'

BENCHMARK DATA
MARYLAND STATE PLANE NAD 1983/1991 NAVD 1988 DATUMS

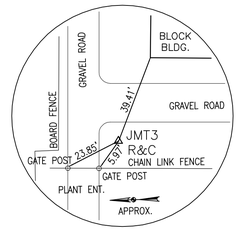
POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
JMT1	245666.6965	1852799.5949	17.810	R&C
JMT2	245986.3555	1852867.7223	7.540	R&C
JMT3	245925.0308	1853073.3864	7.640	R&C
JMT4	245528.6840	1853070.6457	17.980	R&C
JMT101	245876.7884	1853197.0632	7.895	R&C



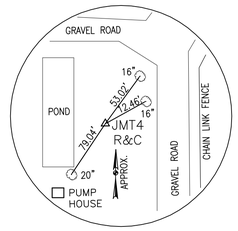
JMT1



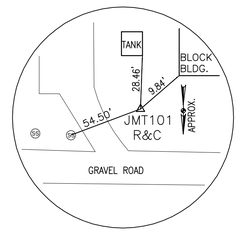
JMT2



JMT3



JMT4



JMT101

SCALE: 1"= 40'–0"

RECORD DRAWING SET JANUARY 2015

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 20330
EXPIRATION DATE 01/29/2012.

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
EXISTING SITE PLAN

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

C-101

SHEET 9 OF 128

File: Q:\SWO\070462_MysticHarbourWWTPImprProj\Cad_EPI\4-040\AS-BUILTS\DWG\C-101 EXISTING SITE PLAN_UTILITIES.dwg
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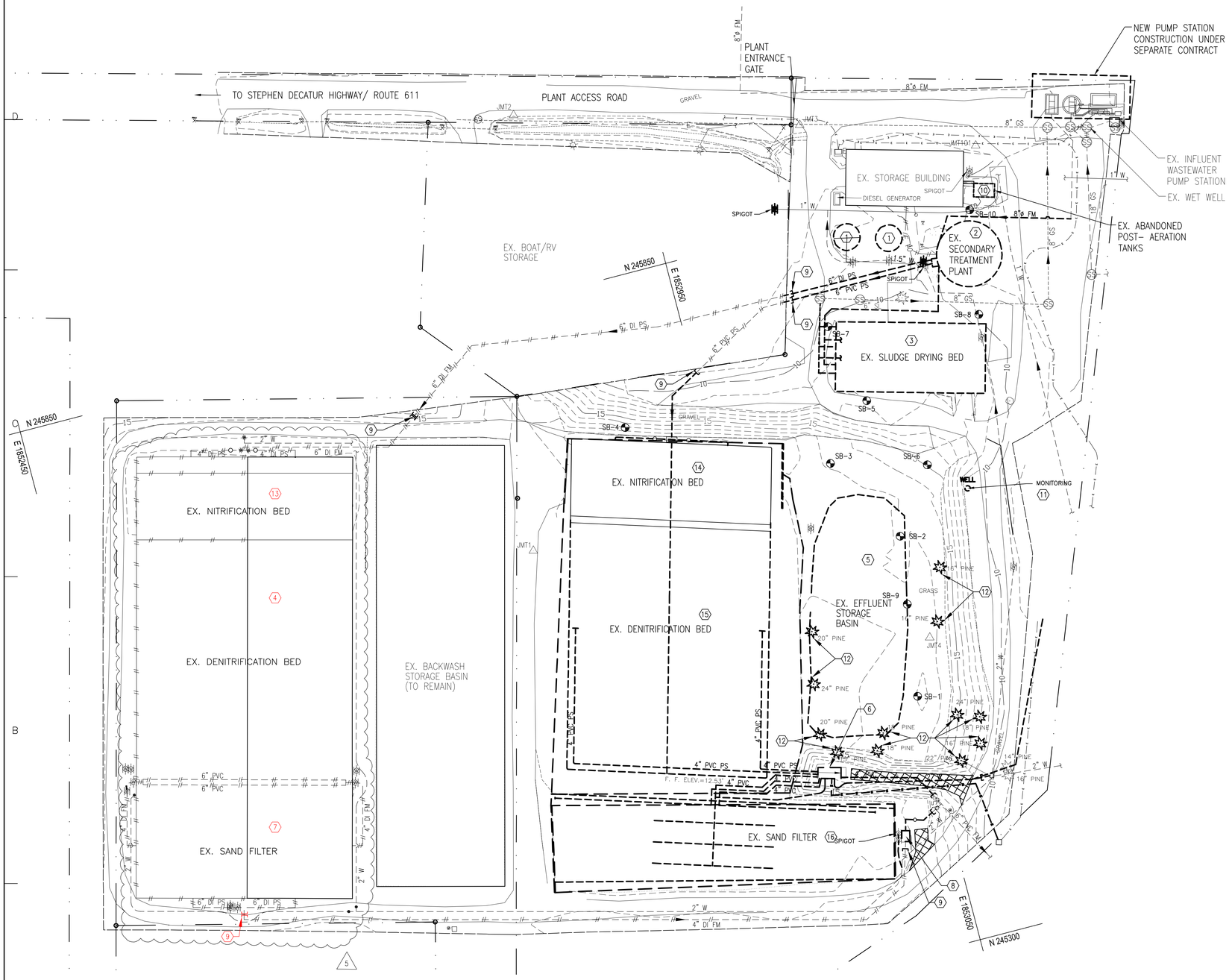

DEMOLITION SITE PLAN
SCALE: 1" = 40'

GENERAL SHEET NOTES:

1. CONTRACTOR SHALL COORDINATE ALL UTILITY, PROCESS, AND PIPING SHUTDOWNS WITH COUNTY AT LEAST 48 HOURS PRIOR TO SHUTDOWN.
2. EXISTING UTILITIES DIRECTLY CONFLICTING WITH PROPOSED CONSTRUCTION SHALL BE DEMOLISHED. ALL OTHER UTILITIES NO LONGER IN USE SHALL BE PLUGGED AND ABANDONED IN PLACE.
3. DEMOLITION OF EXISTING SECONDARY TREATMENT PLANT INCLUDES REMOVAL OF TANK, CONCRETE FOUNDATION, AND ALL MECHANICAL EQUIPMENT, PIPING, INSTRUMENTATION, CONTROL PANELS, AND ELECTRICAL CONNECTIONS ASSOCIATED WITH THE SECONDARY TREATMENT PLANT. ALL ELECTRICAL AND CONTROL WIRING SHALL BE DEMOLISHED BACK TO THE NEAREST PANEL UNLESS SHOWN OTHERWISE, SEE SHEET E-101 FOR DETAILS.
4. DEMOLITION OF EXISTING AEROBIC DIGESTERS INCLUDES REMOVAL OF TANK, CONCRETE FOUNDATION, AND ALL MECHANICAL EQUIPMENT, PIPING, INSTRUMENTATION, CONTROL PANELS, AND ELECTRICAL CONNECTIONS ASSOCIATED WITH THE DIGESTERS. ALL ELECTRICAL AND CONTROL WIRING SHALL BE DEMOLISHED BACK TO THE NEAREST PANEL UNLESS SHOWN OTHERWISE, SEE SHEET E-101 FOR DETAILS.
5. CONTRACTOR IS RESPONSIBLE FOR REMOVING AND DISPOSING OF DEMOLISHED MATERIAL IN A SAFE AND LEGAL MANNER IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS.
6. DRAWINGS DO NOT SHOW LOCATIONS OF ALL EQUIPMENT, PIPING, CONTROL PANELS, AND WIRING TO BE DEMOLISHED. CONTRACTOR IS RESPONSIBLE FOR SCHEDULING SITE VISIT WITH WORCESTER COUNTY PRIOR TO BIDDING TO DETERMINE FULL SCOPE OF DEMOLITION WORK.
7. MATURE TREES SHALL NOT BE DISTURBED UNLESS OTHERWISE NOTED. SMALL BUSHES MAY BE REMOVED AS NEEDED. INDIVIDUAL MATURE TREES REMOVED SHALL BE REPLACED OFFSITE BY THE COUNTY.

SHEET KEYNOTES:

1. DEMOLISH EXISTING AEROBIC DIGESTER, SEE GENERAL NOTE 4.
2. DEMOLISH EXISTING SECONDARY TREATMENT PLANT, SEE GENERAL NOTE 3.
3. DEMOLISH EXISTING SLUDGE DRYING BED
4. ~~ABANDON EXISTING DENITRIFICATION BED~~ BACKFILL EXISTING DENITRIFICATION BED WITH COMPACTED BACKFILL OR FILL MATERIAL. SEE SHEET C-504 FOR DETAILS. (5)
5. EXISTING STORAGE BASIN TO BE FILLED. DRAIN POND, EXCAVATE TO SUBGRADE MATERIAL TO REMOVE ALL UNSUITABLE MATERIALS AND BACKFILL TO FINISHED GRADE WITH COMPACTED BACKFILL OR FILL MATERIAL. SEE SHEET C-501 FOR DETAILS.
6. DEMOLISH EXISTING PUMP STATION 1 – SEE SHEET M-502 FOR DETAILS.
7. ~~ABANDON EXISTING SAND FILTER~~ BACKFILL EXISTING SAND FILTER WITH COMPACTED BACKFILL OR FILL MATERIAL. SEE SHEET C-504 FOR DETAILS. (5)
8. DEMOLISH EXISTING DISINFECTION SYSTEM – SEE SHEET M-501 FOR DETAILS.
9. CAP ABANDONED PIPES 5' FROM PROPERTY LINE OR BUILDING.
10. DEMOLISH EXISTING ABANDONED POST-AERATION TANKS.
11. DEMOLISH EXISTING MONITORING WELL IN ACCORDANCE WITH ALL COUNTY & MDE REQUIREMENTS.
12. REMOVE EXISTING PINE TREES.
13. ~~ABANDON EXISTING NITRIFICATION BED.~~ BACKFILL EXISTING NITRIFICATION BED WITH COMPACTED BACKFILL OR FILL MATERIAL. SEE SHEET C-504 FOR DETAILS. (5)
14. DEMOLISH EXISTING NITRIFICATION BED. EXCAVATE TO SUBGRADE MATERIAL TO REMOVE ALL UNSUITABLE MATERIALS AND BACKFILL TO FINISHED GRADE WITH COMPACTED BACKFILL OR FILL MATERIAL. SEE SHEET C-501 FOR DETAILS.
15. DEMOLISH EXISTING DENITRIFICATION BED. EXCAVATE TO SUBGRADE MATERIAL TO REMOVE ALL UNSUITABLE MATERIALS AND BACKFILL TO FINISHED GRADE WITH COMPACTED BACKFILL OR FILL MATERIAL. SEE SHEET C-502 FOR DETAILS.
16. DEMOLISH EXISTING SAND FILTER. EXCAVATE TO SUBGRADE MATERIAL TO REMOVE ALL UNSUITABLE MATERIALS AND BACKFILL TO FINISHED GRADE WITH COMPACTED BACKFILL OR FILL MATERIAL. SEE SHEET C-503 FOR DETAILS.

LEGEND:

- = DEMOLISH
- = ABANDON
- = FENCE LINE
- = PAVEMENT REMOVAL
- = PROPERTY LINE

20' 0 20' 40'
SCALE: 1"= 40'-0"

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 20330 EXPIRATION DATE 01/29/2012.

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
DEMOLITION SITE PLAN

MARK	DATE	DESCRIPTION
1	MAR. 2014	REVISION 5
2	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

C-102

SHEET 10 OF 128

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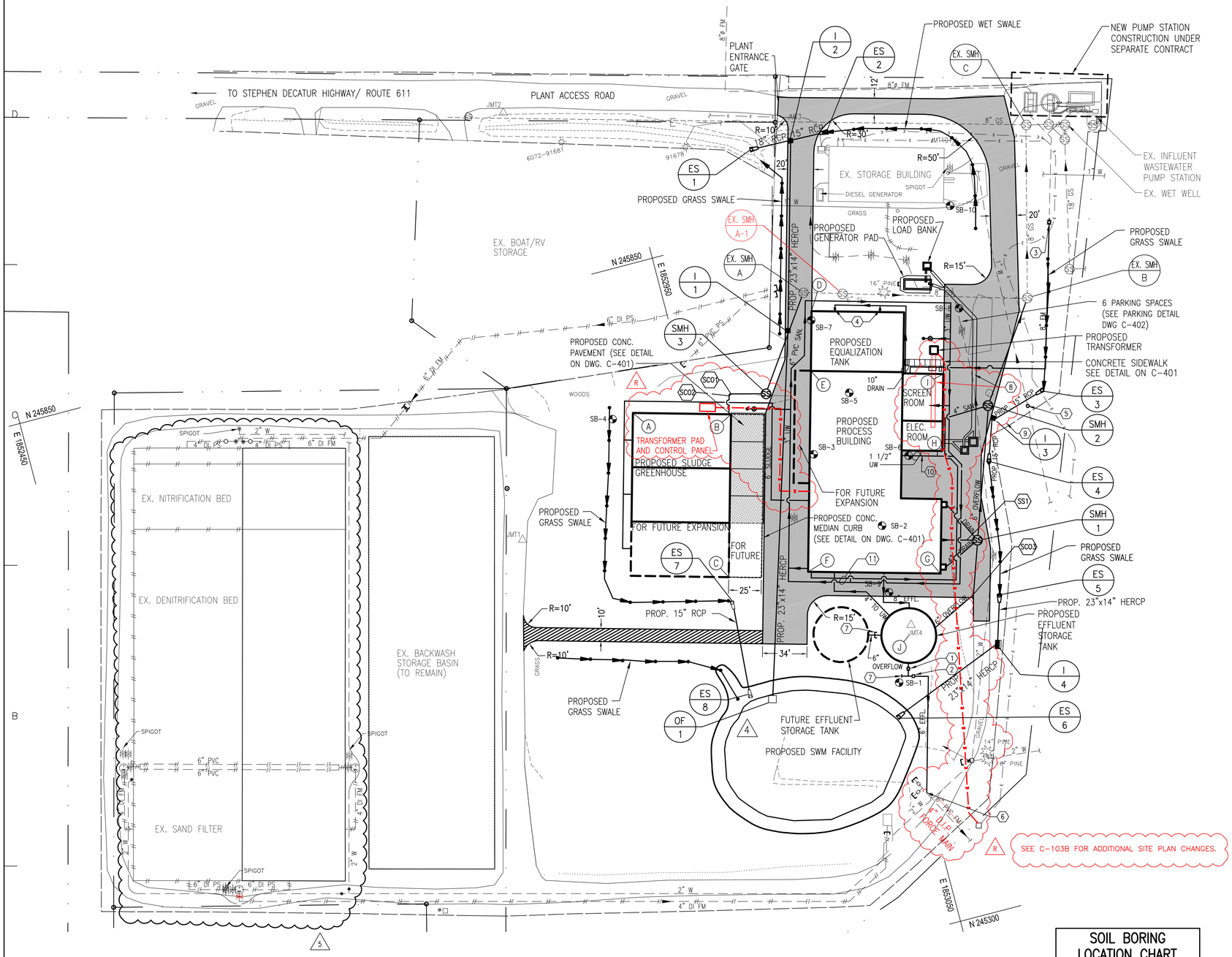

PROPOSED SITE PLAN
SCALE: 1" = 40'

SOIL BORING LOCATION CHART

POINT	NORTHING	EASTING
SB-1	245488.3700	183050.7224
SB-2	245607.7502	1853068.3603
SB-3	245673.7546	1853031.5821
SB-4	245738.6435	1852889.5115
SB-5	245712.4012	1853069.7873
SB-6	245654.3932	1853101.5965
SB-7	245781.3616	1853070.3778
SB-8	245753.7492	1853167.4013
SB-9	245566.7321	1853063.2911
SB-10	245831.3358	1853180.5854

RECORD DRAWING SET
JANUARY 2015

GENERAL SHEET NOTES:

1. CONTRACTOR SHALL COORDINATE ALL UTILITY AND PLANT SHUTDOWNS WITH WORCESTER COUNTY. CONTRACTOR SHALL NOTIFY COUNTY A MINIMUM OF 1 WEEK PRIOR TO SHUTDOWN.
2. SEE DRAWING C-105 FOR EROSION AND SEDIMENT CONTROL REQUIREMENTS.
3. ALL ABOVE GRADE PIPING SHALL BE INSULATED AND HEAT TRACED. SEE SPECIFICATION SECTION 11260 FOR REQUIREMENTS.
4. SEE DWG. C-104 FOR GRADING AND ADDITIONAL PAVEMENT DETAILS
5. SEE DWG. C-402 FOR DETAIL OF NEW SANITARY MANHOLES.
6. SEE DWG. C-403 AND C-404 FOR SWM AND STORM DRAIN DETAILS.
7. SEE DWG. C-202 FOR STORM DRAIN PROFILE AND SCHEDULE.
8. GEOTECHNICAL REPORT AND SOIL BORING LOGS ARE INCLUDED IN CONTRACT SPECIFICATIONS.
9. ALL PIPING SHALL HAVE A MINIMUM DEPTH OF COVER OF 36" BELOW FINISHED GRADE UNLESS OTHERWISE NOTED.

SHEET KEYNOTES:

1. 6" PLUG VALVE
2. 6" MAGMETER
3. 8" PLUG VALVE WITH VALVE BOX
4. 10" PLUG VALVE
5. ~~2" VALVE W/ VALVE BOX~~ SHOWN ON C-103B (R)
6. TIE INTO EX. 6" PVC FM W/ 6" 45° FITTING
7. 6" BLIND FLANGE
8. ELECTRICAL DUCT BANK – SEE DRAWING E-104 FOR DETAILS.
9. ~~METER AND METER PIT BY COUNTY~~ SHOWN ON C-103B (R)
10. CONDENSING UNITS – SEE DRAWING H-101 FOR DETAILS.
11. (2) 3" PVC UTILITY WATER PIPES IN SHARED TRENCH.

LEGEND

- PROPOSED GRAVEL ACCESS ROAD
- PROPOSED POROUS ASPHALT PAVEMENT
- PROPOSED CONCRETE PAD
- RD/ D – ROLL UP DOOR/ DOOR

BUILDING LOCATION CHART

COORDINATE ID	NORTHING	EASTING	DESCRIPTION
A	245739.27	1852905.78	NW CORNER OF EXTERIOR WALL OF PROPOSED SLUDGE DRYING BED
B	245719.33	1852978.08	NE CORNER OF EXTERIOR WALL OF PROPOSED SLUDGE DRYING BED
C	245599.32	1852944.96	SE CORNER OF EXTERIOR WALL OF PROPOSED SLUDGE DRYING BED
D	245780.07	1853057.71	NW CORNER OF EXTERIOR WALL OF PROPOSED EQUALIZATION TANK
E	245736.12	1853045.59	NW CORNER OF EXTERIOR WALL OF PROPOSED PROCESS BUILDING
F	245588.00	1853004.71	SW CORNER OF EXTERIOR WALL OF PROPOSED PROCESS BUILDING
G	245561.05	1853102.39	SE CORNER OF EXTERIOR WALL OF PROPOSED PROCESS BUILDING
H	245651.42	1853127.33	SE CORNER OF EXTERIOR WALL OF PROPOSED ELECTRICAL ROOM
I	245708.14	1853142.98	NE CORNER OF EXTERIOR WALL OF PROPOSED SCREEN ROOM
J	245529.75	1853036.36	CENTER OF PROPOSED EFFLUENT STORAGE TANK

STAKING

ID #	STATION	NORTHING	EASTING	INVERT ELEV.	RIM ELEV.
ES-1	0+	245911.2	1853046.4	–	N/A
ES-2	0+	245909.9	1853101.0	–	N/A
ES-3	0+	245676.3	1853211.0	–	N/A
ES-4	0+	245637.3	1853160.7	–	N/A
ES-5	0+	245531.3	1853141.2	–	N/A
ES-6	0+	245464.0	1853045.7	–	N/A
ES-7	0+	245577.7	1852942.8	–	N/A
ES-8	0+	245504.4	1852937.6	–	N/A
I-1	0+	245774.9	1853037.6	–	–
I-2	0+	245910.5	1853075.1	–	–
I-3	0+	245665.9	1853171.5	–	–
I-4	0+	245497.4	1853131.3	–	–
OF-1	0+	245296.1	1852952.5	–	–
SC01	0+27.7	245734.40	1852982.11	5.93	9.60
SC02	0+	245733.39	1852980.29	–	–
SC03	0+42.8	245538.82	1853122.33	6.21	10.20
SMH1	1+03.8	245578.5	1853136	5.21	9.92
SMH2	0+88.3	245676.1	1853170	4.14	10.00
SMH3	0+83.1	245727.7	1853008	5.17	9.90

SCALE: 1"= 40'-0"

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. _____
EXPIRATION DATE _____

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	MAR. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
4	FEB. 2011	REVISION 4
5	MAR. 2014	REVISION 5
6	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROPOSED SITE PLAN

CONTRACT NO. #140-10-01
DATE: SEPTEMBER 2012
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

C-103A

SHEET 11A OF 128

File: G:\SMM\07WSC_Mystic\Harbour\WWTP\new\Proj\Civil_ET\1-CADD\AS-BUILTS\DWG\C-103A PROPOSED SITE PLAN.dwg
Jan 14, 2015 - 11:48:19am

GENERAL SHEET NOTES:

1. ALL NEW WATER PIPES AND FITTINGS SHALL BE PVC C-900, DUCTILE IRON AND HDPE PIPE AS SHOWN ON DRAWINGS.
2. THE CONTRACTOR SHALL CONTACT WORCESTER COUNTY DEPARTMENT OF PUBLIC WORKS AT 410-641-5251 AT LEAST 48 HOURS IN ADVANCE OF STARTING CONSTRUCTION. CONTRACTOR SHALL PROVIDE FOR AND MAINTAIN TRAFFIC ACCESS TO THE SITE AT ALL TIMES.
3. LOCATIONS OF THE EXISTING UTILITIES SHOWN ON SITE PLANS ARE ACCORDING TO THE BEST AVAILABLE INFORMATION, AND ARE FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. THE CONTRACTOR SHALL LOCATE AND TAKE THE NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES. CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT LEAST THREE DAYS BEFORE INITIATING ANY SITE IMPROVEMENT WORK, 1-800-441-8355.
4. THE CONTRACTOR, PRIOR TO LAYING A RUN OF PIPE OR OTHER INVOLVED CONSTRUCTION SHALL EXCAVATE WITHIN THE ALIGNMENT AT POINTS OF POSSIBLE CONFLICT TO DETERMINE IF A CONFLICT EXISTS. ANY CONFLICTS SHALL BE COORDINATED BY THE CONTRACTOR WITH THE ENGINEER AND THE UTILITY INVOLVED. THE ENGINEER SHALL DETERMINE THE SOLUTION. EXCAVATING, BACKFILLING AND RESTORATION OF THE TEST HOLES AS REQUIRED FOR UTILITY INVESTIGATIONS SHALL BE CONSIDERED INCIDENTAL TO THE INSTALLATION OF THE UTILITIES AS SHOWN ON THE PLAN.
5. CONTRACTOR SHALL TAKE EVERY MEASURE TO PREVENT ANY AND ALL DAMAGES TO NEIGHBORING PROPERTIES. CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL SUCH DAMAGES AND WILL REPAIR AND/OR REPLACE ANY OBJECT, PLANT OR PIECE OF PROPERTY TO ORIGINAL STATE ON ADJACENT PROPERTIES THAT IS DAMAGED IN ANYWAY DUE TO THIS CONSTRUCTION.
6. IT SHALL BE CLEARLY UNDERSTOOD THAT FAILURE TO MENTION SPECIFICALLY ANY WORK WHICH WOULD NORMALLY BE REQUIRED TO COMPLETE THE PROJECT SHALL NOT RELIEVE THE CONTRACTOR OF HIS/HER RESPONSIBILITY TO COMPLETE SUCH WORK.
7. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LAWS, ORDINANCES, RULES, REGULATIONS AND ORDERS OF ANY PUBLIC BODY HAVING JURISDICTION. THE CONTRACTOR SHALL ERECT AND MAINTAIN, AS REQUIRED BY THE CONDITIONS AND PROGRESS OF THE WORK, ALL NECESSARY SAFEGUARDS FOR SAFETY AND PROTECTION.
8. AFTER TESTING IS COMPLETE AND ALL COMPONENTS OF THIS CONTRACT ARE DEEMED ACCEPTABLE TO THE OWNER, THE CONTRACTOR SHALL SUBMIT THE AS-BUILT DRAWINGS TO THE OWNER. ANY DISCREPANCIES NOTED DURING THE FINAL INSPECTION SHALL BE CORRECTED BY THE CONTRACTOR WITHIN 30 DAYS.
9. ALL STRUCTURES, EQUIPMENT AND INSTALLATION METHODS SHALL BE SUITABLE FOR WATER SERVICE.
10. ~~APPROXIMATELY 150 LINEAR FEET OF 8 INCH HDPE PIPE SHALL BE INSTALLED VIA HORIZONTAL DIRECTIONAL DRILLING FROM THE TEE FITTING AS SHOWN TO THE EXISTING WATERMAIN ON COASTAL DRIVE. INVERT ELEVATION SHALL BE FIELD VERIFIED AND APPROVED BY THE ENGINEER AND/OR THE OWNER.~~ DIRECT BURY 8" C-900.
11. WORCESTER COUNTY STANDARD SPECIFICATIONS AND DETAILS FOR WATER MAINS SHALL BE FOLLOWED, INCLUDING BUT NOT LIMITED TO: WATER STANDARD DETAILS, SECTION 2-B EXCAVATION, SECTION 2-C EXCAVATION BACKFILL, SECTION 2-D TOPSOIL, SEEDING, MULCHING & SODDING, SECTION 2-F PORTLAND CEMENT CONCRETE, AND SECTION 2-H CONCRETE REINFORCING.
12. THE PROPERTY AND RIGHT OF WAY LINES SHOWN ON THESE DRAWINGS ARE APPROXIMATE, AND ARE NOT BASED ON METES AND BOUNDS FIELD RUN SURVEYS OR PROPERTY RECORDS.
13. ALL WORK SHALL BE CONSTRUCTED TO THE SATISFACTION OF WORCESTER COUNTY.
14. 8" C-900 WATER MAIN MOVED BETWEEN LOTS 47-49.

RECORD DRAWING SET
JANUARY 2015

PROPOSED SITE PLAN
SCALE: 1" = 40'

NOTE:
TOTAL LENGTH OF PIPE:
C-900 PIPE: 600 LINEAR FEET (APPROX.)
D.I PIPE: 420 LINEAR FEET (APPROX.)
HDPE: 150 LINEAR FEET (APPROX.)

SCALE: 1"= 40'-0"

CONSULTANT
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72 Loveton Circle Baltimore, Maryland 21152-0949

PROFESSIONAL CERTIFICATION.
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 20330
EXPIRATION DATE 01/29/2013.

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROPOSED SITE PLAN

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

C-103B

SHEET 11B OF 128

File: G:\SAD\570662_MysticHarbourWWTP\Final\Final Cad_EP\14-CAD\VAS-BALTI\CIVIL\C-103B PROPOSED SITE PLAN.dwg
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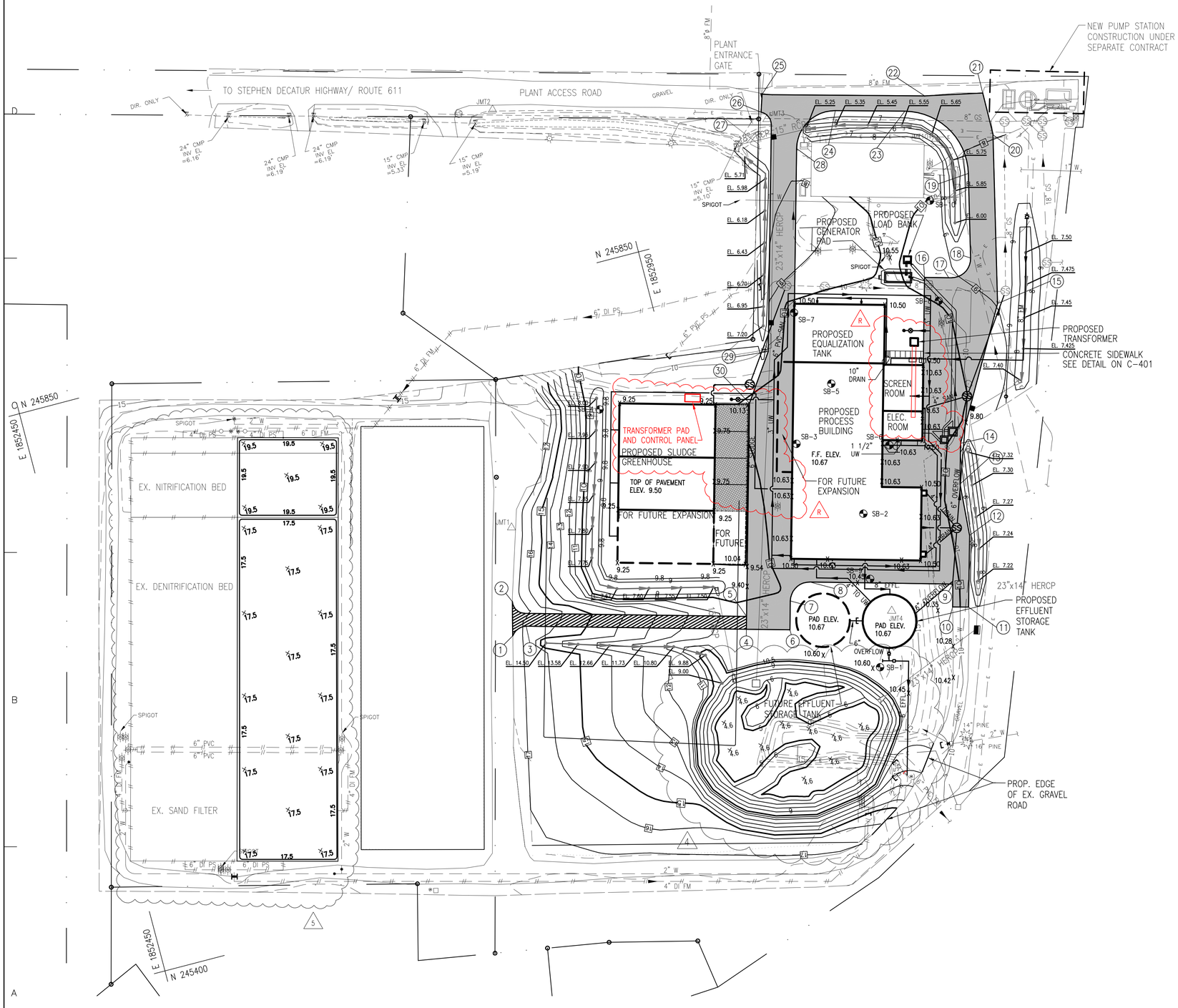

GRADING PLAN
SCALE: 1" = 40'

GENERAL SHEET NOTES:

1. ALL PAVEMENT AND GRADING SHALL BE SLOPED TO CREATE A POSITIVE DRAINAGE TOWARDS PROPOSED OR EXISTING STORM DRAIN INLETS.
2. EXCAVATE TO SUBGRADE MATERIAL IN EXISTING DENITRIFICATION BED AND EXISTING EFFLUENT STORAGE BASIN TO REMOVE ALL UNSUITABLE MATERIALS AND BACKFILL TO FINISH GRADE WITH COMPACTED BACKFILL OR FILL MATERIAL.
3. MATURE TREES SHALL NOT BE DISTURBED UNLESS OTHERWISE NOTED. SMALL BUSHES MAY BE REMOVED AS NEEDED. INDIVIDUAL MATURE TREES REMOVED SHALL BE REPLACED OFFSITE BY THE COUNTY.

LEGEND

- PROPOSED GRAVEL ACCESS ROAD
- PROPOSED POROUS ASPHALT PAVEMENT
- PROPOSED CONCRETE PAVEMENT
- EXISTING GROUND CONTOUR
- 100 — FINISHED GRADE CONTOUR
- 100.0 x — FINISHED GRADE SPOT ELEVATION
- PROPOSED FACILITIES

PAVEMENT GEOMETRIC CHART

COORDINATE ID	NORTHING	EASTING	ELEVATION	DESCRIPTION
①	245584.51	1852779.15	MEET EX.	ACCESS RD – PT
②	245610.56	1852785.63	MEET EX.	ACCESS RD – PT
③	245589.28	1852791.18	16.87	ACCESS RD – PC
④	245543.51	1852957.16	10.30	ACCESS RD – BEGIN
⑤	245553.15	1852959.82	10.30	ACCESS RD – BEGIN
⑥	245534.46	1852989.93	10.30	LIMIT OF FULL DEPTH
⑦	245556.19	1852995.93	10.35	ROAD PC (R=15')
⑧	245566.66	1853014.38	10.40	ROAD PT
⑨	245536.90	1853122.22	10.15	ROAD EDGE
⑩	245519.65	1853117.46	MEET EX.	LIMIT OF FULL DEPTH
⑪	245516.34	1853129.47	MEET EX.	LIMIT OF FULL DEPTH
⑫	245570.34	1853144.38	9.79	ROAD EDGE
⑬	245611.03	1853147.31	9.70	ROAD EDGE
⑭	245641.79	11853155.79	9.55	ROAD EDGE
⑮	245740.07	1853211.27	9.00	ROAD EDGE
⑯	245774.29	1853161.24	9.59	LIMIT OF FULL DEPTH
⑰	245769.24	1853179.55	9.26	ROAD PC (R=15')
⑱	245779.79	1853199.98	8.98	ROAD PT
⑲	245844.21	1853214.96	8.41	ROAD PC (R=50')
⑳	245868.47	1853241.29	7.94	ROAD EDGE
㉑	245902.22	1853241.64	MEET EX.	ROAD EDGE
㉒	245911.41	1853197.19	MEET EX.	ROAD EDGE
㉓	245903.81	1853179.28	7.50	ROAD PT
㉔	245917.99	1853126.71	7.51	ROAD PC (R=30')
㉕	245944.87	1853074.64	MEET EX.	LIMIT OF FULL DEPTH
㉖	245931.47	1853070.30	MEET EX.	LIMIT OF FULL DEPTH
㉗	245919.83	1853075.54	7.66	ROAD PC (R=10')
㉘	245897.00	1853089.98	7.75	ROAD PT
㉙	245749.19	1853028.44	9.54	ROAD EDGE
㉚	245713.79	1853004.15	10.13	ROAD EDGE

20' 0 20' 40'
SCALE: 1"= 40'-0"

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

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LICENSE NO. 20330
EXPIRATION DATE 01/29/2012

CONSULTANT
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Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
GRADING PLAN

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	MAR. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
4	FEB. 2011	REVISION 4
5	MAR. 2014	REVISION 5
6	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: SEPTEMBER 2012
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

C-104

SHEET 12 OF 128

File: Q:\SMD\STORED_Mystic\Harbour\WWTP\Final\Final_ETC\4-CADD\AS-BUILTS\DWG\C-104 GRADING PLAN.dwg
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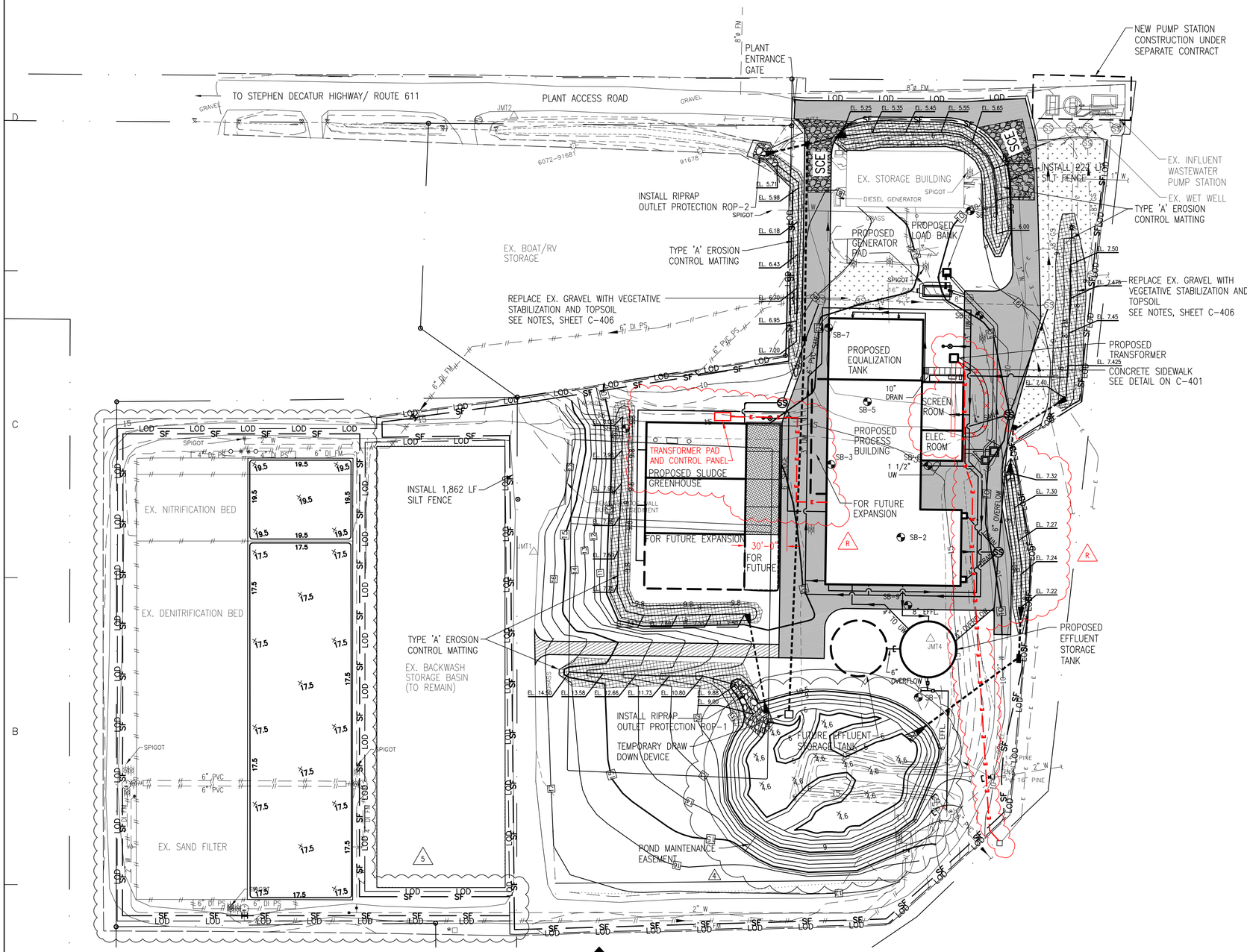

GENERAL SHEET NOTES:

1. ALL PAVEMENT AND GRADING SHALL BE SLOPED TO CREATE A POSITIVE DRAINAGE TOWARDS PROPOSED OR EXISTING STORM DRAIN INLETS.
2. MATURE TREES SHALL NOT BE DISTURBED UNLESS OTHERWISE NOTED. SMALL BUSHES MAY BE REMOVED AS NEEDED. INDIVIDUAL MATURE TREES SHALL BE REPLACED OFFSITE BY THE COUNTY.

SHEET KEYNOTES:

LEGEND

- PROPOSED GRAVEL ACCESS ROAD
- PROPOSED POROUS ASPHALT PAVEMENT
- PROPOSED CONCRETE PAVEMENT
- EXISTING GROUND CONTOUR
- FINISHED GRADE CONTOUR
- 100.0 x FINISHED GRADE SPOT ELEVATION
- PROPOSED FACILITIES
- LOD LIMIT OF DISTURBANCE
- SF SILT FENCE
- PROPOSED DITCH CENTERLINE
- PROPOSED PIPE
- PROPOSED FLARED END SECTION
- PROPOSED TYPE A SOIL STABILIZATION MATTING
- VEGETATIVE STABILIZATION
- SCE STABILIZED CONSTRUCTION ENTRANCE

OPERATIONS & MAINTENANCE PLAN:

1. POND TO BE INSPECTED AFTER EVERY LARGE RAIN EVENT FOR DEBRIS AND OTHER OBSTRUCTIONS. REMOVE ANY DEBRIS AND/OR OBSTRUCTIONS FROM OUTFALL STRUCTURE IMMEDIATELY. REMAINING DEBRIS TO BE REMOVED IN A TIMELY FASHION.
2. OUTFALL STRUCTURE TO BE INSPECTED AFTER EACH MAJOR RAINFALL (i.e. 1" OF RAIN IN A 24-HOUR PERIOD). ANY DAMAGE TO OUTLET STRUCTURE SHALL BE REPAIRED IMMEDIATELY. SEDIMENT SHALL BE REMOVED FROM THE GRASS CHANNELS. REMOVED SEDIMENT SHALL BE PLACED IN SUCH A MANNER THAT IT WILL NOT ERODE FROM THE SITE.
3. TRASH AND DEBRIS TO BE REMOVED REGARDLESS OF RAINFALL AMOUNTS EVERY THREE (3) MONTHS.
4. ALL GRASS COVER TO BE MAINTAINED TO A HEIGHT OF 4" OR LESS IN GRASS SWALES.
5. POND DEPTHS TO BE MEASURED EVERY 10 YEARS, OR AT THE REQUEST OF THE CURRENT REGULATORY AUTHORITY TO DETERMINE IF SEDIMENT REMOVAL IS REQUIRED.
6. RIPRAP SHOULD BE INSPECTED ANNUALLY AND AFTER MAJOR STORMS. IF RIPRAP HAS BEEN DAMAGED, REPAIRS SHOULD BE MADE PROMPTLY TO PREVENT A PROGRESSIVE FAILURE. IF REPAIRS ARE NEEDED REPEATEDLY AT ONE LOCATION, THE SITE SHOULD BE EVALUATED TO DETERMINE IF THE ORIGINAL DESIGN CONDITIONS HAVE CHANGED.
7. INSPECT CHANNELS ON A REGULAR BASIS AND AFTER MAJOR RAINFALL EVENTS. SEDIMENT SHALL BE REMOVED AND THE CHANNEL RESTORED TO THE ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 OF THE DESIGN DEPTH OF THE CHANNEL. SEDIMENT REMOVED FROM THE CHANNEL SHALL BE DEPOSITED IN A PROTECTED AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE. GRASS CHANNELS ARE TO BE MOWED ON A REGULAR BASIS.
8. PERVIOUS PAVEMENT SURFACES SHOULD BE SWEPT AND VACUUMED TO REDUCE SEDIMENT ACCUMULATION AND ENSURE CONTINUED SURFACE POROSITY. SWEEPING SHOULD BE PERFORMED AT LEAST TWICE ANNUALLY WITH A COMMERCIAL CLEANING UNIT. WASHING SYSTEMS AND COMPRESSED AIR UNITS SHOULD NOT BE USED TO PERFORM SURFACE CLEANING.
9. DRAINAGE PIPES, INLETS, STONE EDGE DRAINS AND OTHER STRUCTURES WITHIN OR DRAINING TO THE SUBBASE SHOULD BE CLEANED OUT AT REGULAR INTERVALS.

EROSION AND SEDIMENT CONTROL PLAN
SCALE: 1" = 40'

TOTAL FILL: 2,500 CY

RECORD DRAWING SET
JANUARY 2015

SEQUENCE OF CONSTRUCTION:

1. CONTACT THE WORCESTER COUNTY DEPARTMENT OF REVIEW AND PERMITTING AT (410) 632-1200 TO SCHEDULE A PRE-CONSTRUCTION MEETING AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO COMMENCING ANY SITE WORK. FAILURE TO DO SO MAY RESULT IN AN IMMEDIATE STOP WORK ORDER.
2. INSTALL STABILIZED CONSTRUCTION ENTRANCE AS SHOWN AND AS DIRECTED BY ENGINEER. CLEAR AND GRUB FOR PERIMETER CONTROLS.
3. INSTALL PERIMETER CONTROLS (SILT FENCE) AS SHOWN ON PLANS. REFER TO C-405 FOR DETAILS. 5
4. INSTALL SANITARY SEWER FROM PROPOSED MANHOLE SMH-3 TO EXISTING MANHOLE A. INSTALL STORM DRAIN SYSTEM, INCLUDING RIPRAP OUTLET PROTECTION AT END SECTION.
5. CONSTRUCT TEMPORARY SEDIMENT BASIN, INCLUDING OUTLET STRUCTURE AND DRAWDOWN DEVICE.
6. CONSTRUCT REMAINING SITE IMPROVEMENTS. STABILIZE PROPOSED GRASS SWALES ACCORDING TO VEGETATIVE STABILIZATION NOTES IMMEDIATELY AFTER CONSTRUCTION.
7. STABILIZE ALL DISTURBED AREAS PER VEGETATIVE STABILIZATION NOTES.
8. ONCE ALL DISTURBED AREAS ARE STABILIZED, CONVERT TEMPORARY SEDIMENT BASIN TO PERMANENT STORMWATER MANAGEMENT FACILITY.
9. WITH APPROVAL OF INSPECTOR, REMOVE SEDIMENT CONTROLS.

20' 0 20' 40'
SCALE: 1"= 40'-0"

WORCESTER COUNTY

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CONSULTANT
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Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	2/2011	REVISION 4
2	3/2014	REVISION 5
3	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
EROSION AND SEDIMENT CONTROL PLAN

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

C-105

SHEET 13 OF 128

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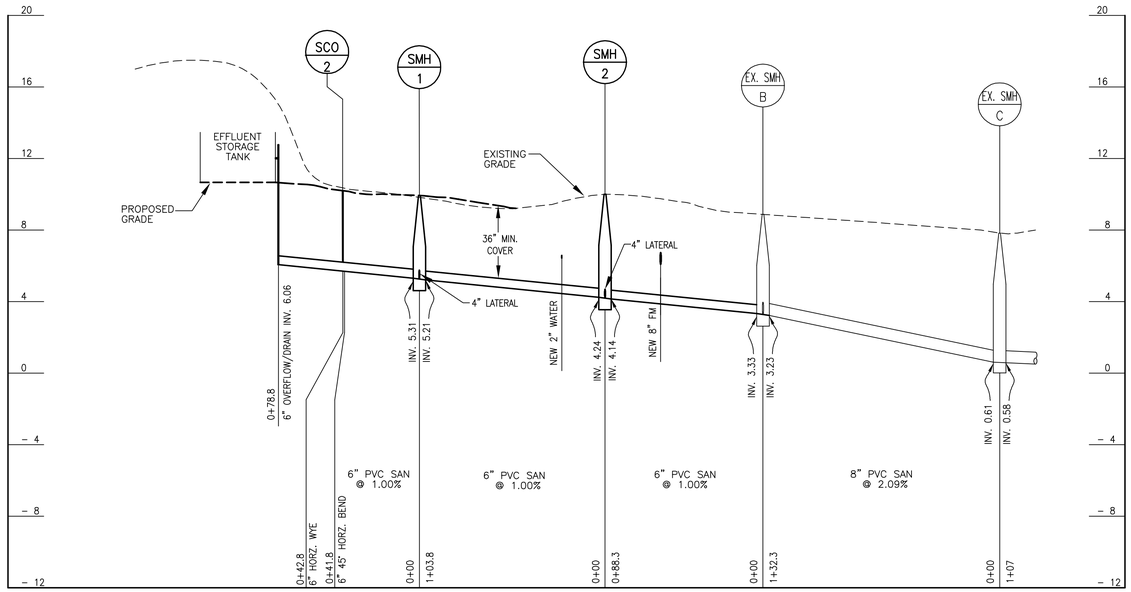
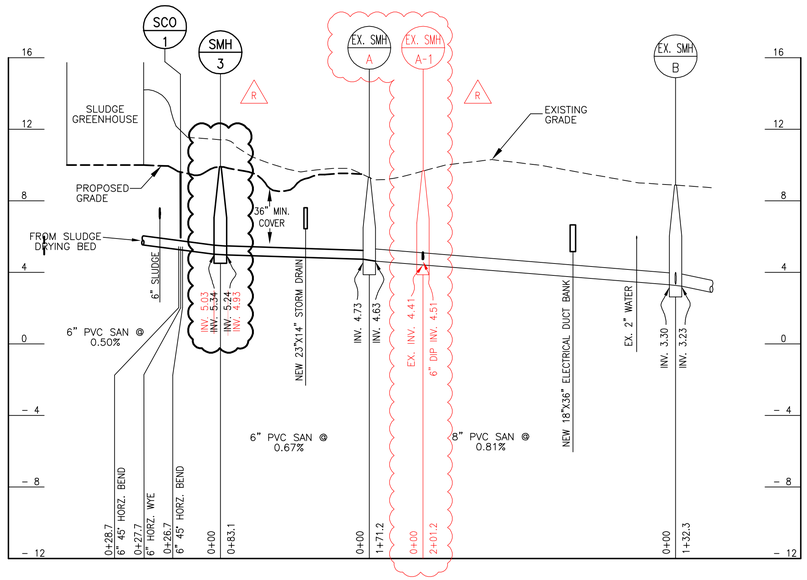


PROCESS BUILDING SANITARY LINE

SCALE: HORIZ. 1" = 40'
VERT. 1" = 4'



SLUDGE DRYING BED DRAIN LINE

SCALE: HORIZ. 1" = 40'
VERT. 1" = 4'

GENERAL SHEET NOTES:

1. ALL GRAVITY SEWER PIPE SHALL BE PVC SDR 35 GASKETED JOINT BELL AND SPIGOT TYPE.
2. CONTRACTOR SHALL REBUILD MANHOLE CHANNEL FOR ALL NEW PIPE PENETRATIONS INTO EXISTING MANHOLES. THE CHANNEL SHALL BE RESHAPED AS NECESSARY TO PROVIDE SMOOTH CONTOUR BETWEEN INCOMING AND OUTGOING PIPES. THE CONTRACTOR SHALL CORE DRILL EXISTING MANHOLE FOR ALL NEW PIPE PENETRATIONS AND INSTALL A PIPE TO MANHOLE FLEXIBLE CONNECTOR PER MANUFACTURER RECOMMENDATIONS.

20' 0 20' 40'
SCALE: 1"= 40'–0"

2' 0 2' 4'
SCALE: 1"= 4'–0"

RECORD DRAWING SET
JANUARY 2015

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LICENSE NO. 20330
EXPIRATION DATE 01/29/2013.

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MARK	DESCRIPTION	DATE
1	RECORD DRAWINGS	NOV. 2014

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROPOSED SEWER PROFILES

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

C-201

SHEET 14 OF 128

File: Q:\SMD\070662_Mystic Harbour\WWTP Treat Proc\ut_LEV1-CADD\AS-BUILTS\DWG\C-201 EXISTING SEWER PROFILE.dwg
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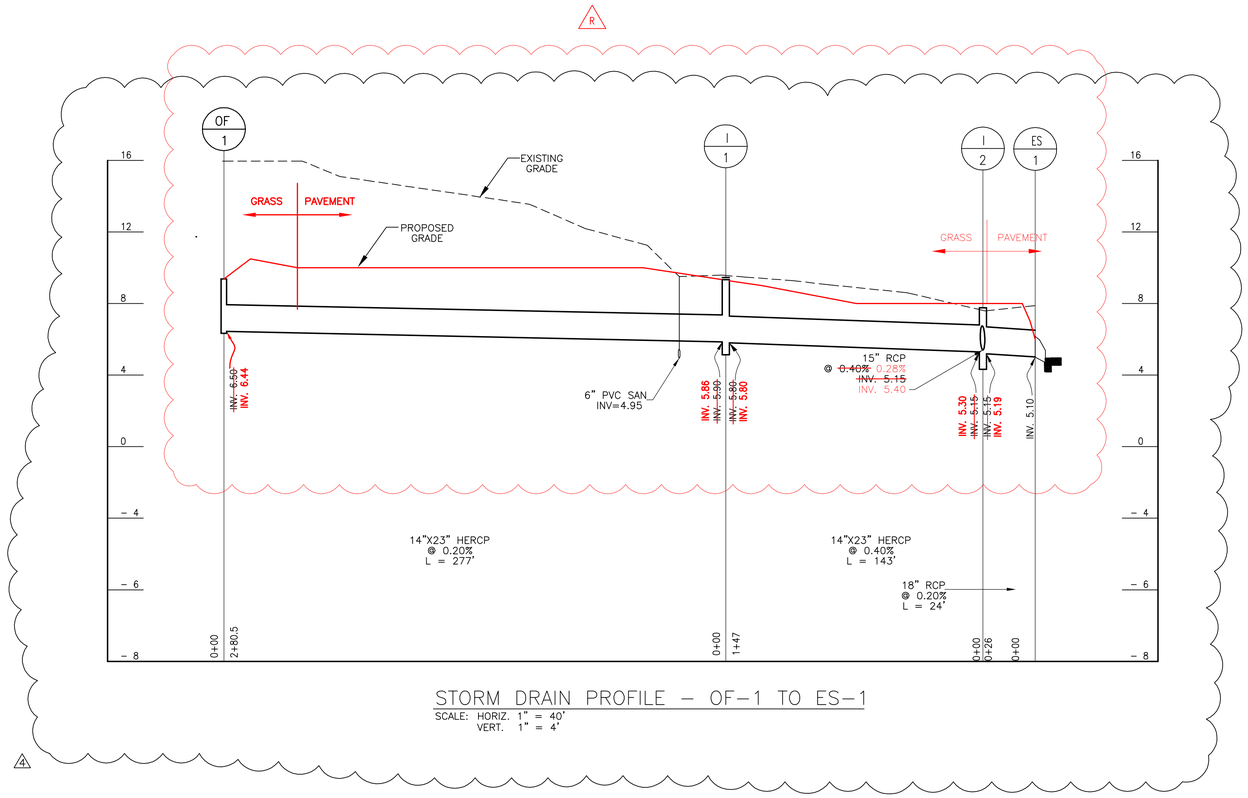
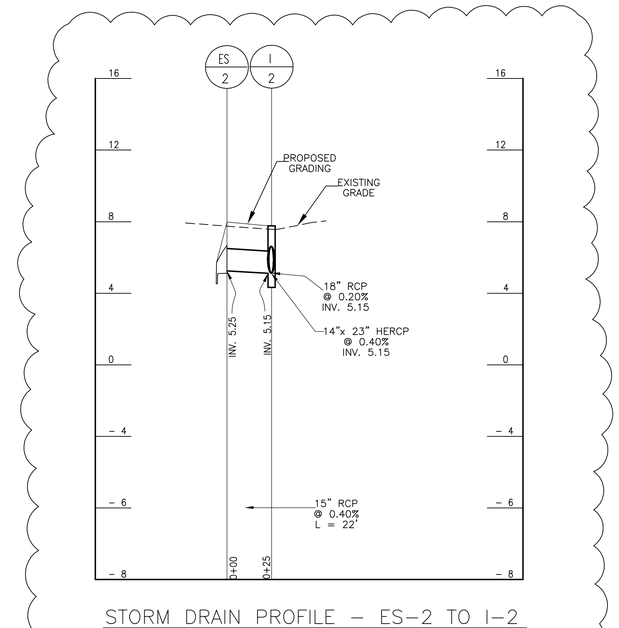


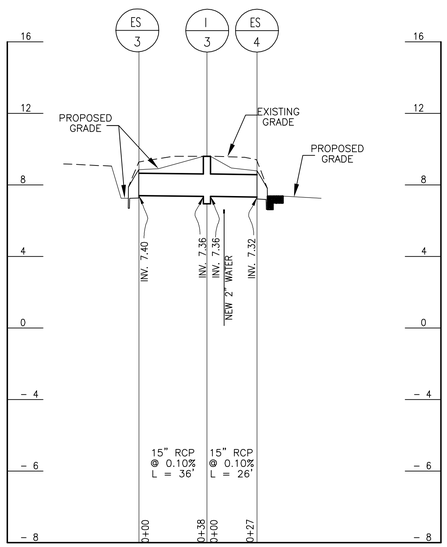
STORM DRAIN PROFILE – OF–1 TO ES–1

SCALE: HORIZ. 1" = 40'
VERT. 1" = 4'



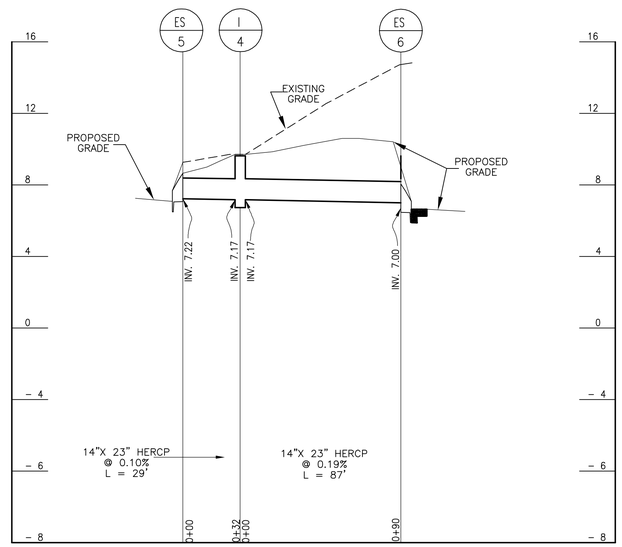
STORM DRAIN PROFILE – ES–2 TO I–2

SCALE: HORIZ. 1" = 40'
VERT. 1" = 4'



STORM DRAIN PROFILE – ES–3 TO ES–4

SCALE: HORIZ. 1" = 40'
VERT. 1" = 4'



STORM DRAIN PROFILE – ES–5 TO ES–6

SCALE: HORIZ. 1" = 40'
VERT. 1" = 4'

STRUCTURE TABLE			
STRUCTURE NO.	TYPE	REFERENCE	REMARKS
I–1	STD. TYPE 'S' INLET	MD–374.73	MD–379.05–01 GRATE
I–2	STD. TYPE 'S' INLET	MD–374.73	MD–379.05–01 GRATE
I–3	STD. TYPE 'S' INLET	MD–374.73	MD–379.05–01 GRATE
I–4	STD. TYPE 'S' INLET DOUBLE GRATE TANDEM	MD–384.01	MD–379.05–01 GRATE
ES–1	18" DIA END SECTION	MD–374.70	
ES–2	15" DIA END SECTION	MD–368.01	
ES–3	15" DIA END SECTION	MD–368.01	
ES–4	15" DIA END SECTION	MD–368.01	
ES–5	14"X23" DIA END SECTION	MD–369.00	
ES–6	14"X23" DIA END SECTION	MD–369.00	

20' 0 20' 40'
SCALE: 1"= 40'–0"

2' 0 2' 4'
SCALE: 1"= 4'–0"

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

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EXPIRATION DATE 01/29/2012

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON®
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROPOSED STORM DRAIN PROFILES

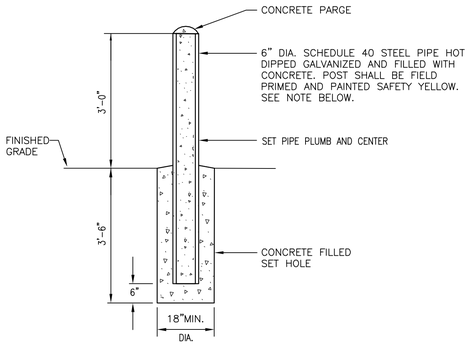
MARK	DATE	DESCRIPTION
4	FEB. 2011	REVISION 4
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

C-202

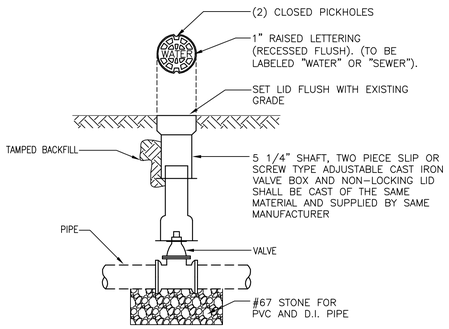
SHEET 15 OF 128

File: Q:\1MW\07066_Mystic\Harbour\WWTP\Tech\Prod\ut_LEV1-CADD\AS-BUILTS\DWG\C-202 STORM DRAIN PROFILE.dwg
Jan 16, 2015 - 4:25:53pm



BOLLARD NOTE: PIPE BOLLARDS SHALL BE FIELD PRIMED WITH TNEMEC SERIES 27 F.C. TYPOXY OR SERIES 69 HI-BUILD EPOXOLINE (4.0 TO 6.0 MILS DFT) OR EQUAL AND FIELD FINISHED WITH TNEMEC SERIES 73, 74 OR 75 ENDURA-SHIELD (2.0 TO 3.0 MILS DFT) OR EQUAL.

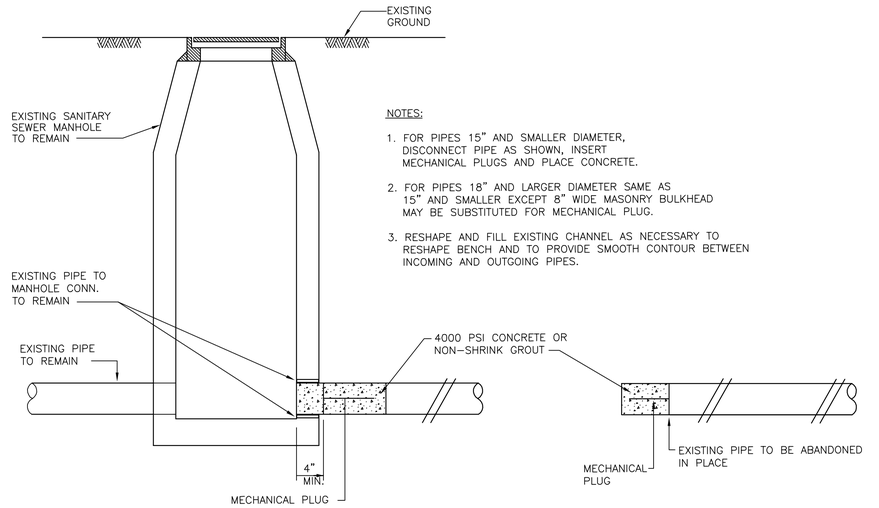
1 C-401 **BOLLARD DETAIL**
SCALE: NOT TO SCALE



NOTES:

1. VALVE BOX SHALL BE CENTERED OVER VALVE.
2. VALVE BOX SHALL NOT CONTACT MAIN OR VALVE.
3. ONLY MANUFACTURED EXTENSIONS SHALL BE ALLOWED.
4. VALVE OPERATING NUT MUST BE EXTENDED SO THAT THE DEPTH IS NO GREATER THAN 5' FROM THE SURFACE USING A MANUFACTURER APPROVED EXTENSION KIT.

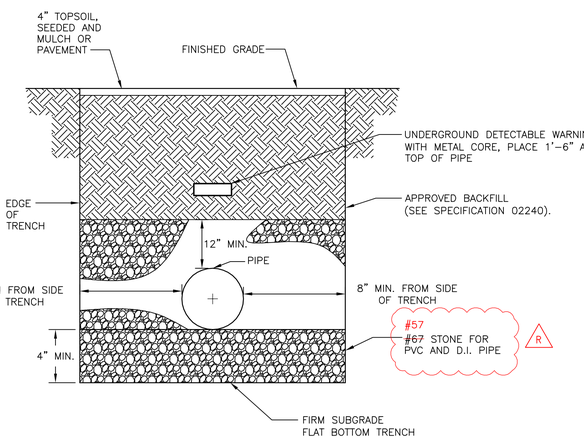
2 C-401 **VALVE BOX DETAIL**
SCALE: NOT TO SCALE



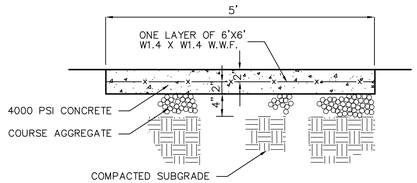
NOTES:

1. FOR PIPES 15" AND SMALLER DIAMETER, DISCONNECT PIPE AS SHOWN, INSERT MECHANICAL PLUGS AND PLACE CONCRETE.
2. FOR PIPES 18" AND LARGER DIAMETER SAME AS 15" AND SMALLER EXCEPT 8" WIDE MASONRY BULKHEAD MAY BE SUBSTITUTED FOR MECHANICAL PLUG.
3. RESHAPE AND FILL EXISTING CHANNEL AS NECESSARY TO RESHAPE BENCH AND TO PROVIDE SMOOTH CONTOUR BETWEEN INCOMING AND OUTGOING PIPES.

3 C-401 **PIPE ABANDONMENT**
SCALE: NOT TO SCALE



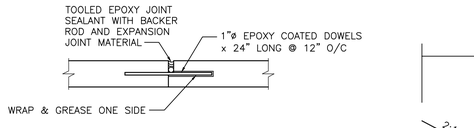
4 C-401 **PIPE TRENCH DETAIL**
SCALE: NOT TO SCALE



NOTES:

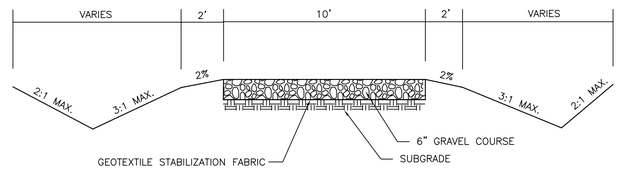
1. PROPOSED CONCRETE WALK TO HAVE 2 1/2" TROWELED EDGES, SCORE JOINTS 5' O.C.
2. PROVIDE A 1/2" THICK PREFORMED EXPANSION JOINT W\ 1/2" DEEP SEALANT 10' O.C. OR WHERE WALK CHANGES OR ABUTS A STRUCTURE.
3. FLOAT WALKS AND PROVIDE A LIGHT BROOM FINISH.

12 C-401 **CONCRETE SIDEWALK – DETAIL**
SCALE: NOT TO SCALE



NOTE:
1. JOINT SPACING @ 15' O/C MAX.

10 C-401 **TYPICAL CONCRETE PAVEMENT GREENHOUSE PAD – JOINT DETAIL**
SCALE: NOT TO SCALE

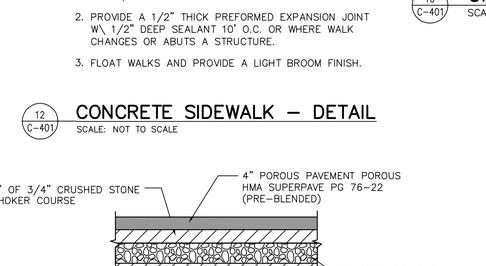


6 C-401 **GRAVEL ACCESS ROAD**
SCALE: NOT TO SCALE

NOTES:

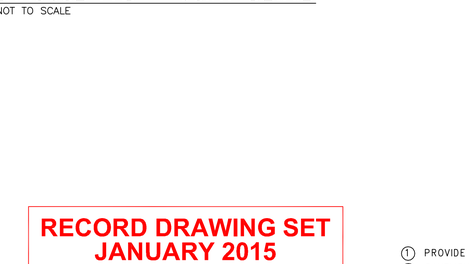
1. YARD HYDRANTS SHALL BE KUPFERLE ECLIPSE NO. 2A HYDRANT OR APPROVED EQUAL.
2. HYDRANTS SHALL BE SELF-DRAINING, NON-FREEZING, COMPRESSION TYPE WITH 1 1/2" MAIN OPENING. INLET SHALL BE 1 1/2" FIP. OUTLET SHALL BE 1 1/2" MALE CAM & GROOVE CONNECT.
3. PRINCIPAL INTERIOR OPERATING PARTS SHALL BE REMOVABLE FROM THE HYDRANT FOR SERVICING WITHOUT REMOVAL OF HYDRANT.

5 C-401 **YARD HYDRANT DETAIL**
SCALE: NOT TO SCALE

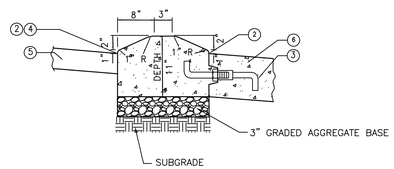


8 C-401 **TYPICAL ROADWAY PAVEMENT FULL DEPTH – DETAIL**
SCALE: NOT TO SCALE

7 C-401 **TYPICAL GREENHOUSE PAVEMENT FULL DEPTH – DETAIL**
SCALE: NOT TO SCALE



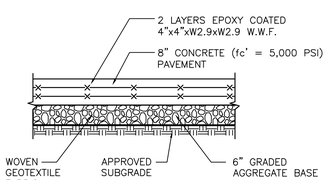
9 C-401 **PAVEMENT JOINT DETAIL**
SCALE: NOT TO SCALE



1. PROVIDE KEY AND LONGITUDINAL TIE BAR WHERE RIGID PAVEMENT IS ADJACENT TO CURB.
2. PAVEMENT CONSTRUCTION JOINT
3. LONGITUDINAL TIE DEVICE "J" BAR MODIFIED
4. FLOW LINE
5. POROUS PAVEMENT (SEE FULL DEPTH PAVEMENT DETAIL – THIS SHEET)
6. CONCRETE PAVEMENT (SEE CONCRETE PAVEMENT DETAIL – THIS SHEET)

RECORD DRAWING SET JANUARY 2015

11 C-401 **MODIFIED CONCRETE MEDIAN CURB– DETAIL**
SCALE: NOT TO SCALE



NOTE: CONSTRUCT CONCRETE JOINT EVERY 21 FT.

10 C-401 **TYPICAL CONCRETE PAVEMENT GREENHOUSE PAD – DETAIL**
SCALE: NOT TO SCALE

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 20330
EXPIRATION DATE 01/29/2013

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
CIVIL DETAILS

C-401

SHEET 16 OF 128

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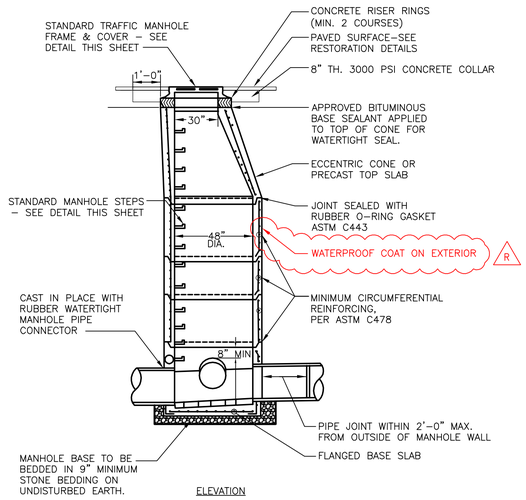
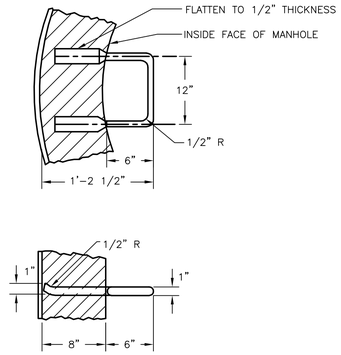


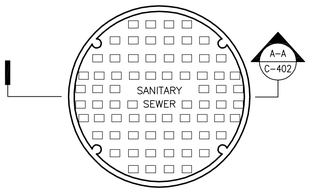
ELEVATION

1 C–402 **STANDARD PRECAST MANHOLE DETAIL**
SCALE: NOT TO SCALE

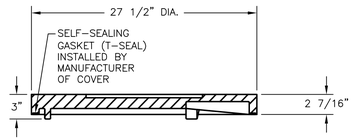


NOTES:
1. POLYPROPYLENE ENCASED STEPS MANUFACTURED IN ACCORDANCE WITH ASTM C478–7AA MAY BE USED.
2. MANHOLE STEPS SHALL BE SLIP RESISTANT.
3. MANHOLE STEPS AT 12" ON CENTER IN VERTICAL ALIGNMENT.

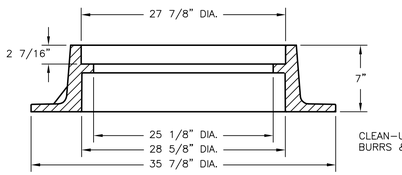
2 C–402 **MANHOLE STEP DETAIL**
SCALE: NOT TO SCALE



MANHOLE COVER



SECTION A–A



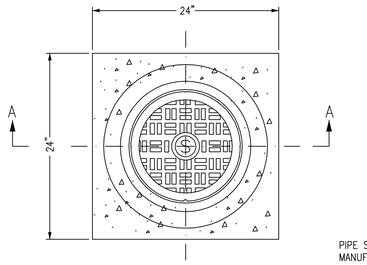
CLEAN–UP AND REMOVE ALL BURRS & SHARP CORNERS

MANHOLE FRAME

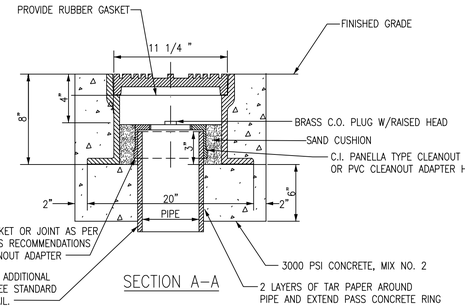
MANHOLE SCHEDULE		
MH NO.	MH SIZE	TYPE OF MANHOLE
SMH1	48"	STANDARD
SMH2	48"	STANDARD
SMH3	48"	STANDARD

NOTES:
1. OUTER FRAME & COVER, MACHINED ON THE BEARING SURFACE.
2. MATERIAL–GRAY IRON ASTM A–48, CLASS 35B; WEIGHT–APPROX. 400 LBS.
3. ALL CASTINGS ARE OF HEAVY DUTY AND SUITABLE FOR H–20 LOADING.
4. ALL CASTINGS TO RECEIVE 1 SHOP COAT OF ASPHALT PAINT.
5. PROVIDE GRATED COVERS WHERE INDICATED ON PLANS.
6. MANHOLE FRAME AND COVER MODEL R–1683 MANUFACTURED BY NEENAH FOUNDARY OR EQUAL.

4 C–402 **STANDARD TRAFFIC MANHOLE FRAME AND COVER**
SCALE: NOT TO SCALE



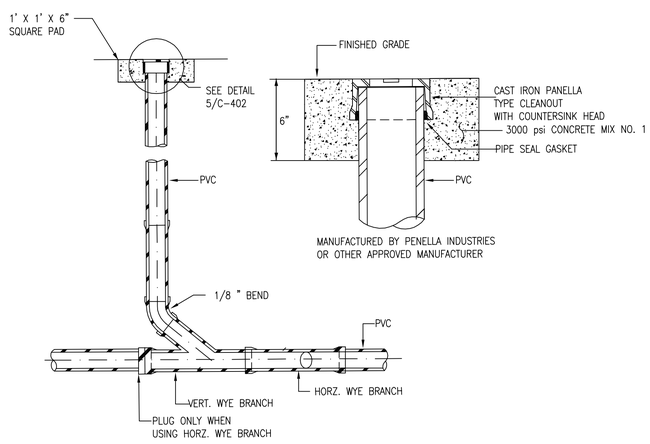
PLAN



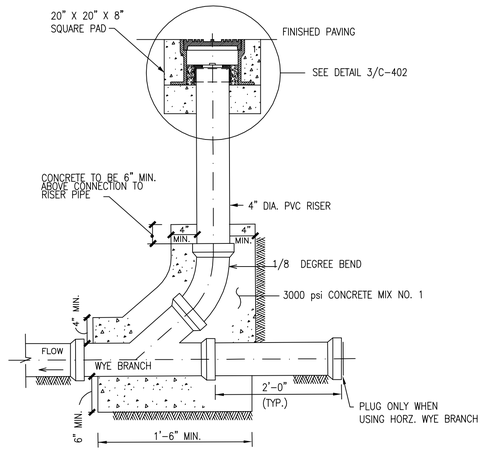
SECTION A–A

NOTES:
1. OUTER FRAME & COVER, MACHINED ON THE BEARING SURFACE.
2. MATERIAL–GRAY IRON ASTM A–48, CLASS 35B; WEIGHT–APPROX. 400 LBS.
3. ALL CASTINGS ARE OF HEAVY DUTY AND SUITABLE FOR H–20 LOADING.
4. ALL CASTINGS TO RECEIVE 1 SHOP COAT OF ASPHALT PAINT.
5. MANHOLE FRAME AND COVER MODEL R–1976 MANUFACTURED BY NEENAH FOUNDARY OR EQUAL.

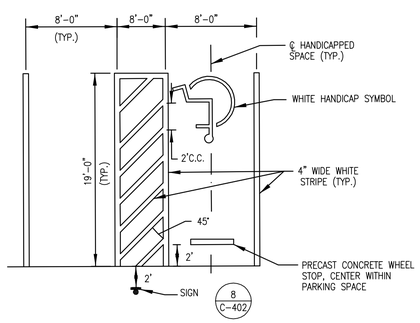
3 C–402 **CLEANOUT COVER ASSEMBLY DETAIL (TRAFFIC AREA)**
SCALE: NOT TO SCALE



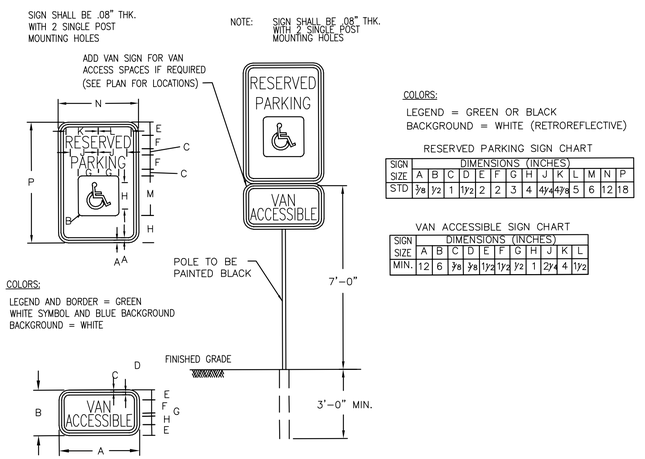
5 C–402 **STANDARD CLEANOUT DETAIL (NON–TRAFFIC AREA)**
SCALE: NOT TO SCALE



6 C–402 **STANDARD CLEANOUT DETAIL (TRAFFIC AREA)**
SCALE: NOT TO SCALE



7 C–402 **TYPICAL HANDICAPPED AND PARKING SPACE DETAIL**
SCALE: NOT TO SCALE



COLORS:
LEGEND AND BORDER = GREEN
WHITE SYMBOL AND BLUE BACKGROUND
BACKGROUND = WHITE

COLORS:
LEGEND = GREEN OR BLACK
BACKGROUND = WHITE (RETROREFLECTIVE)

RESERVED PARKING SIGN CHART

SIGN SIZE	DIMENSIONS (INCHES)												
	A	B	C	D	E	F	G	H	J	K	L	M	N	P
STD	3/8	1/2	1	1 1/2	2	2	3	4	4 1/4	4 3/8	5	6	12	18

VAN ACCESSIBLE SIGN CHART

SIGN SIZE	DIMENSIONS (INCHES)										
	A	B	C	D	E	F	G	H	J	K	L
MIN.	12	6	3/8	3/8	1 1/2	1 1/4	1/2	1	2 1/4	4	1 1/2

8 C–402 **TYPICAL HANDICAP PARKING SIGN**
SCALE: NOT TO SCALE

RECORD DRAWING SET JANUARY 2015

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 20330
EXPIRATION DATE 01/29/2013

PROJECT TITLE: MYSTIC HARBOUR WWTP UPGRADE AND PLANT EXPANSION
SHEET TITLE: CIVIL DETAILS

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

C-402

SHEET 17 OF 128

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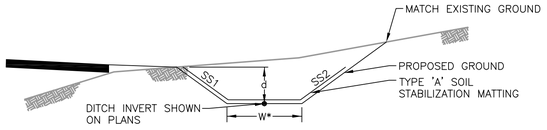
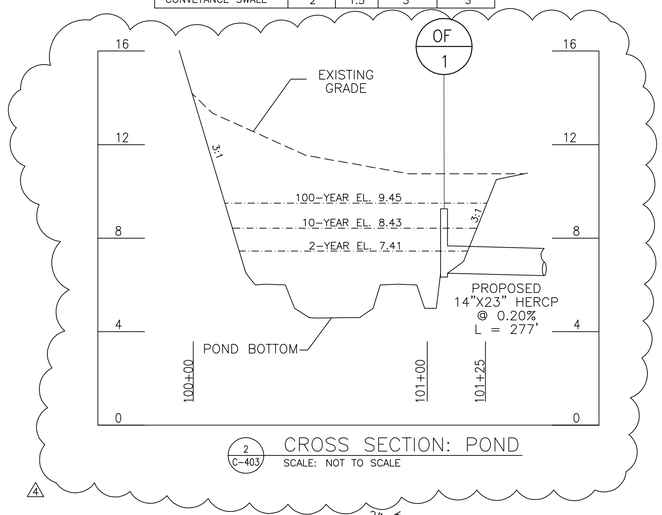


*FOR V-DITCHES AND BENCH DITCHES, W = 0'

1 C-403 TYPICAL SECTION: MATTING-LINED SWALE

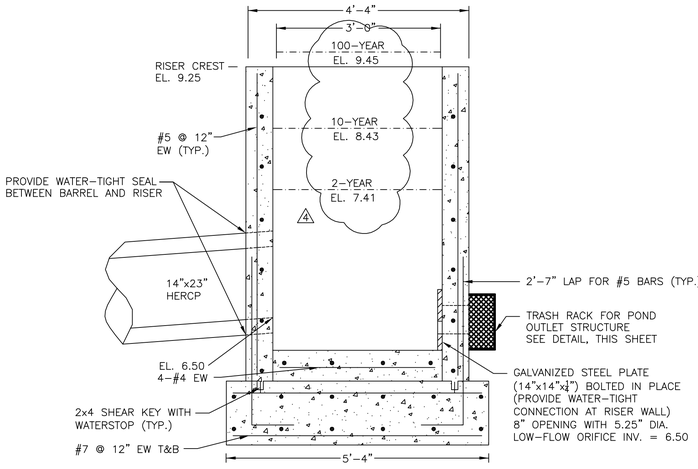
SCALE: NOT TO SCALE

	W (FT)	d (FT)	SS1 (X:1)	SS2 (X:1)
GRASS SWALE				
1	2	1.3	3	3
2	2	2.5	4	4
3	4	1.5	6	6
4	4	1.5	4	4
5	4	2.0	3	3
CONVEYANCE SWALE	2	1.5	3	3

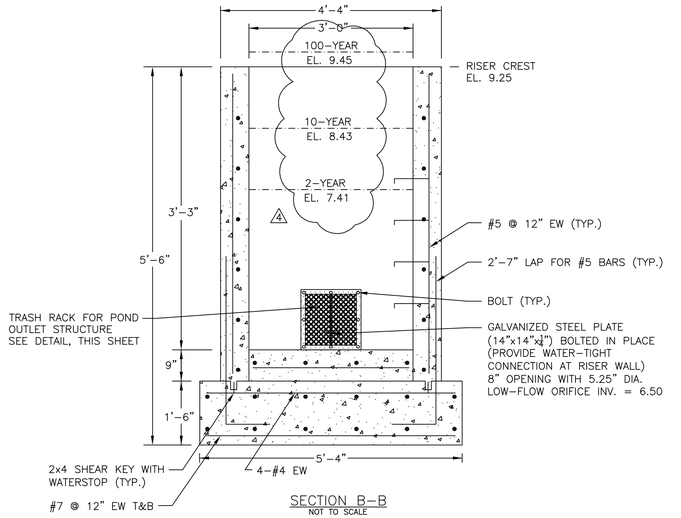


2 C-403 CROSS SECTION: POND

SCALE: NOT TO SCALE



SECTION A-A
NOT TO SCALE



SECTION B-B
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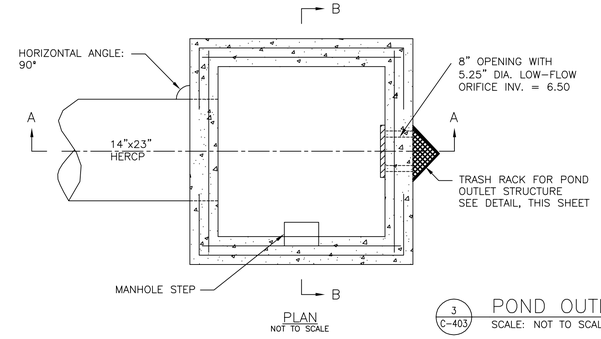
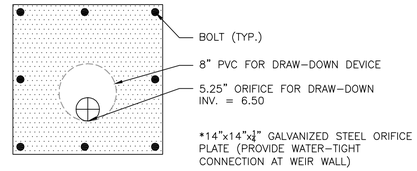


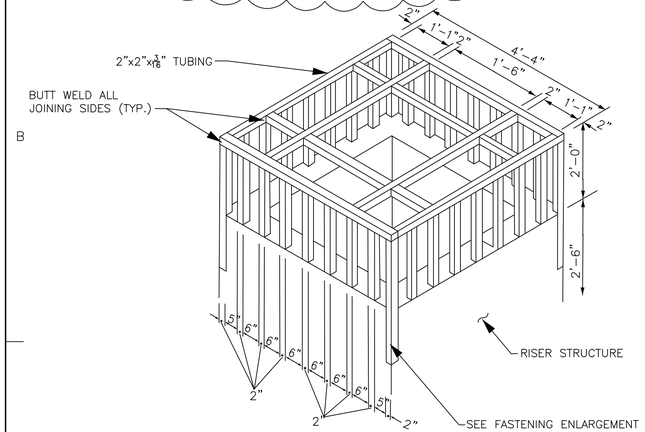
PLAN
NOT TO SCALE

PRE-CAST CONCRETE RISER NOTE:
SHOP DRAWING FOR PRE-CAST CONCRETE RISERS WITH SUPPORTING STRUCTURAL COMPUTATIONS (SIGNED AND SEALED BY A MARYLAND REGISTERED PROFESSIONAL ENGINEER) MEETING ASTM REQUIREMENTS FOR PRE-CAST STRUCTURES MUST BE SUBMITTED TO THE ENGINEER AND THE APPROVAL AGENCY (WORCESTER COUNTY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND RESOURCE MANAGEMENT) FOR APPROVAL PRIOR TO FABRICATION. IF ANY STRUCTURE DIMENSIONS VARY FROM WHAT WAS ORIGINALLY REVIEWED/APPROVED, THEN THE HYDRAULICS, FLOATATION AND STRUCTURAL INTEGRITY WILL HAVE TO BE RE-ANALYZED BY THE CONTRACTOR. PRE-CAST IS AN ACCEPTABLE ALTERNATIVE TO THE CAST-IN-PLACE SHOWN.

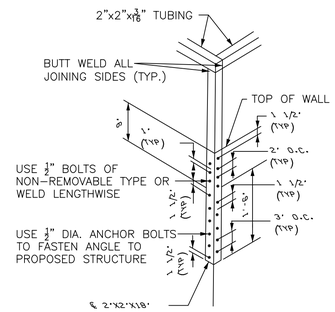


3 C-403 POND OUTLET STRUCTURE & ORIFICE PLATE

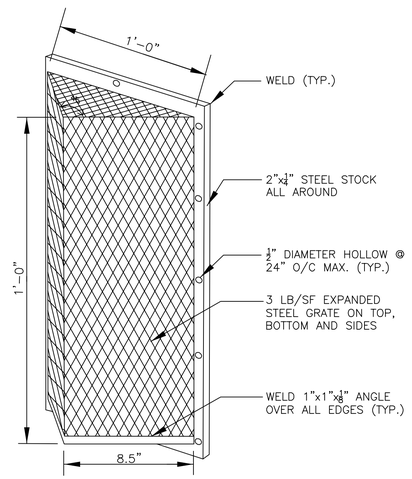
SCALE: NOT TO SCALE



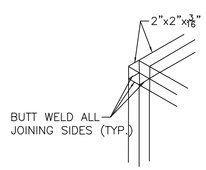
ISOMETRIC VIEW
NOT TO SCALE



FASTENING ENLARGEMENT
NOT TO SCALE



NOTES:
1. CONTRACTOR SHALL FIELD MEASURE THE STRUCTURE DIMENSIONS FOR EXACT FITTING OF TRASH RACK.
2. CONTRACTOR SHALL GALVANIZE ENTIRE RACK AFTER FABRICATION.
3. PROVIDE SHA STANDARD MANHOLE STEPS SPACED 1'-4" CENTER-ON-CENTER ON INSIDE FACE OF WALL.
4. CENTERLINE OF STEPS TO BE CENTERED WITHIN THE X'-X" OPENING.



NOTES:
1. TUBING SHALL BE PLACED AT 90° INTERSECTING ANGLES.
2. NO RUST SHALL BE PERMITTED ON TUBING SURFACES TO BE WELDED.
3. GALVANIZE AFTER FABRICATION (SEE TRASH RACK DETAIL, THIS SHEET).

NOTES:
1. TRASH RACK TO BE CENTERED OVER OPENING.
2. STEEL TO CONFORM TO ASTM A-36.
3. ALL SURFACES TO BE COATED WITH ZRC COLD GALVANIZING COMPOUND AFTER WELDING.
4. TRASH RACK TO BE FASTENED TO THE WALL WITH ½" MASONRY ANCHORS.
5. TRASH RACK TO BE REMOVABLE.

4 C-403 TRASH RACK FOR POND OUTLET STRUCTURE

SCALE: NOT TO SCALE

5 C-403 TRASH RACK FOR POND OUTLET STRUCTURE

SCALE: NOT TO SCALE

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 20330 EXPIRATION DATE 01/29/2012.

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON®
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
STORMWATER MANAGEMENT DETAILS

MARK	DATE	DESCRIPTION
3	FEB. 2011	REVISION 4
4	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

C-403

SHEET 18 OF 128

File: Q:\SMD\07WP62_MysticHarbourWWTPImpProj\Cad_EFY\4-CAD\VG-BUILTS\DWG\C-403 CIVIL DETAILS_SWM.dwg
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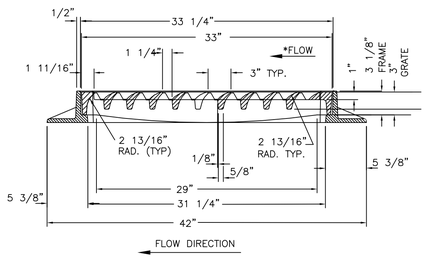
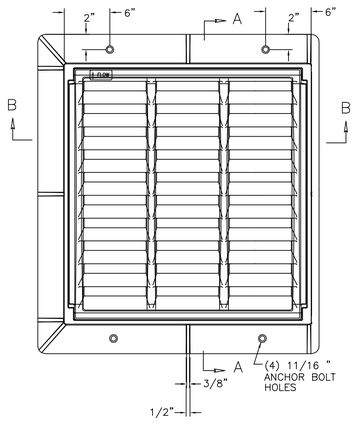
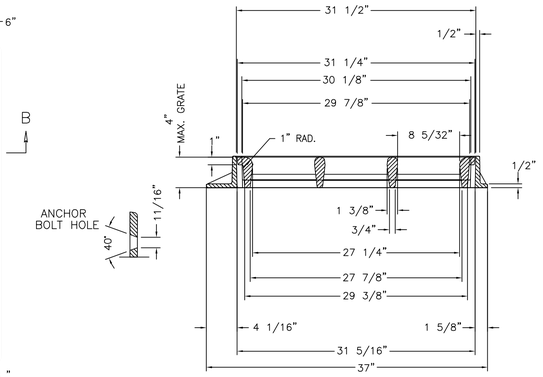


SECTION A–A



PLAN



SECTION B–B

NOTE:

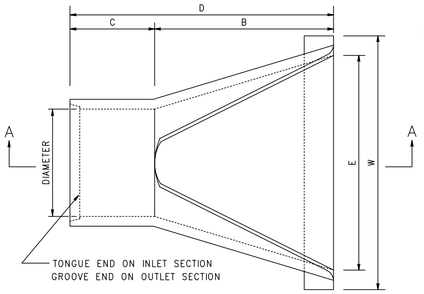
MATERIAL: CAST GRAY IRON ASTM A–48, CLASS 35B
FINISH: NO PAINT
WEIGHT (MIN): FRACE 163#, GRATE 295#

FRAMES TO BE CASTING WITH FLANGE CUT, AS SHOWN, WHEN INLET TO BE PLACED ADJACENT TO CURB OPENING FOR FULL FLANGE/DETAILS, REFER TO THE RESPECTIVE STANDARD PLATES FOR TYPE 'S' INLET.

*CONTRACTOR IS RESPONSIBLE FOR CORRECT ORIENTATION OF THE CV–GRATE TOWARD THE DIRECTION OF FLOW.

1 / C-404 CURVE VANE GRATE WITH FRAME FOR SINGLE TYPE 'S' INLET (S–CV)

SCALE: NOT TO SCALE

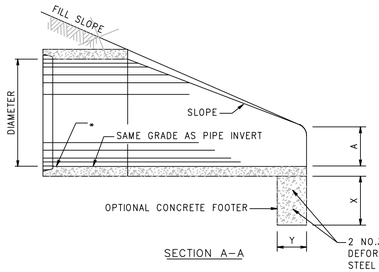


PLAN

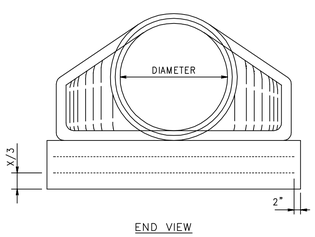
NOTES

1. CONTRACTOR HAS OPTION OF FURNISHING END SECTIONS CONFORMING TO DETAILS ON THIS SHEET OR END SECTIONS CONFORMING TO DETAILS ON STANDARD NO. MD 368.01.
2. END SECTIONS MUST BE REINFORCED TO CONFORM WITH CLASS III PIPE.
3. CONCRETE FOOTER SHALL BE USED WHEN SPECIFIED ON THE PLANS. COST OF CONCRETE FOOTER TO BE INCLUDED IN PRICE OF END SECTION. CONCRETE TO BE MIX. NO.2 RENIFORCEMENT TO BE NO.3 BARS.

* INVERT ELEVATION TO BE AT THE PIPE END OF THE STANDARD END SECTION, ELEVATION TO BE NOTED ON THE CONSTRUCTION PLANS.



SECTION A–A

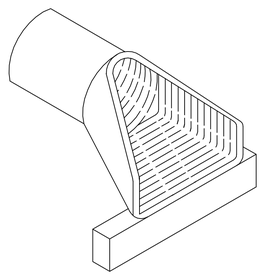


END VIEW

SEE NOTE 3 ABOVE FOR CONCRETE FOOTER

QUANTITIES FOR ESTIMATING PURPOSES ONLY

DIMENSIONS										QUANTITIES	
CONCRETE END SECTION							CONCRETE FOOTER				
DIA.	SLOPE	A	B	C	D	E	W	X	Y	CONC. C.Y.	STEEL LBS.
12"	3:1	4"	2'–0"	4'–0⅜"	6'–0⅜"	2'–0"	3'–0"	12"	9"	0.08	24.00
15"	3:1	6"	2'–3"	3'–10"	6'–1"	2'–6"	3'–6"	12"	9"	0.10	28.50
18"	3:1	9"	2'–3"	3'–10"	6'–1"	3'–0"	4'–0"	12"	9"	0.11	33.00
21"	3:1	9"	3'–0"	3'–1½"	6'–1½"	3'–6"	4'–6"	12"	9"	0.13	37.50
24"	3:1	9½"	3'–7½"	2'–6"	6'–1½"	4'–0"	5'–0"	15"	9"	0.17	42.00
27"	3:1	10½"	4'–1½"	2'–0"	6'–1½"	4'–6"	5'–6"	15"	9"	0.19	46.50
30"	3:1	1'–0"	4'–6"	1'–7¾"	6'–1¾"	5'–0"	6'–0"	15"	9"	0.21	51.00
33"	3:1	1'–2"	4'–7"	2'–2"	6'–9"	5'–6"	6'–6"	15"	9"	0.23	55.50
36"	3:1	1'–3"	5'–3"	2'–10½"	8'–1¾"	6'–0"	7'–3"	15"	9"	0.25	62.25
42"	3:1	1'–6" OR 1'–9"	5'–3"	2'–11"	8'–2"	6'–6"	7'–9"	15"	9"	0.27	66.75
48"	3:1	2'–0"	6'–0"	2'–2"	8'–2"	7'–0"	8'–6"	18"	12"	0.47	73.50
54"	2.4:1	2'–3"	5'–5"	2'–9¾"	8'–2¼"	7'–6"	9'–0"	18"	12"	0.50	78.00

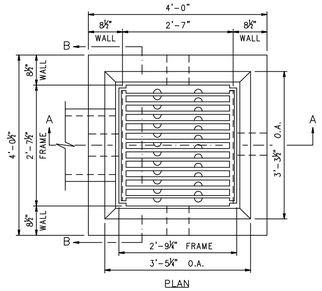


ISOMETRIC VIEW

2 / C-404 STANDARD CONCRETE END SECTION – ROUND CONCRETE PIPE

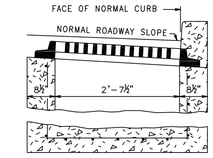
SCALE: NOT TO SCALE

RECORD DRAWING SET JANUARY 2015

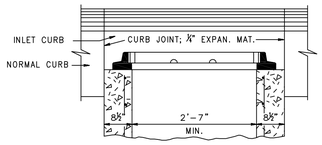


PLAN

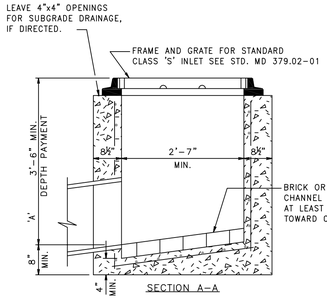
NOTE FOR UNDEPRESSED INLETS, USE NORMAL PAVEMENT SLOPE.



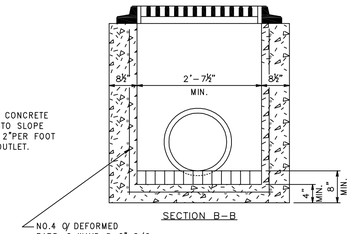
SECTION B–B ADJACENT TO CURB



SECTION A–A ADJACENT TO CURB



SECTION A–A



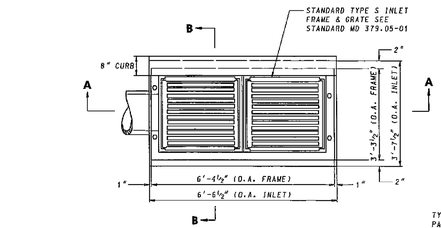
SECTION B–B

NOTES

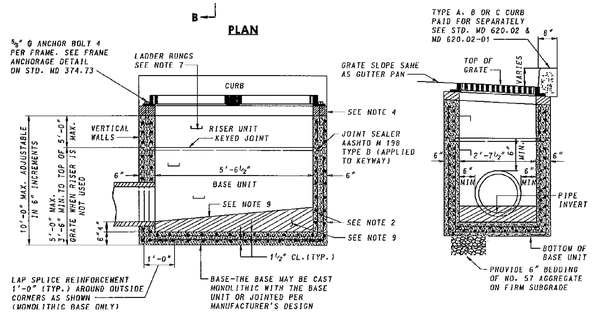
INLET SHALL BE CONSTRUCTED OF REINFORCED CONCRETE (MIX NO.2). SEE LATEST S.H.A. SPECIFICATIONS FOR INLETS.
REINFORCEMENT REQUIRED ON OUTSIDE, AS WELL AS ON INSIDE, OF WALLS BELOW 7'–0" WHEN 'A' IS GREATER THAN 7'–0".
SPACING, SAME AS INSIDE OF WALL.
PLACE½" EXPANSION MATERIAL OF SAME TYPE APPROVED FOR PAVEMENT BETWEEN THE FRAME AND ABUTTING RIGID PAVEMENT, AND BETWEEN ENDS OF INLET CURB AND NORMAL CURB.
SIZE, TYPE AND DIRECTION OF INLET CONNECTION WILL VARY TO SUIT CONDITIONS.
WHEN INLET IS USED ADJACENT TO CURB, SLOPE CURB FACE TO MEET INSIDE EDGE OF FRAME, AS SHOWN IN SECTION 'B–B'– ADJACENT TO CURB.
"BRICK FOR MASONRY", TO COMPLY WITH THE LATEST S.H.A. SPECIFICATIONS.

3 / C-404 STANDARD TYPE 'S' INLET – SINGLE GRATE

SCALE: NOT TO SCALE



PLAN



SECTION A–A

SECTION B–B

NOTES

1. CONCRETE TO BE MIX NO. 6 (4500 PSI).
2. REINFORCEMENT 2 LAYERS OF 4x4–W4.0xW4.0 WELDED WIRE FABRIC.
3. THREADED PLASTIC INSERTS TO BE PROVIDED FOR HANDLING.
4. GRADE AND SLOPE ADJUSTMENTS MIN. 2". MAX. 9" SHALL BE COMPLETED IN THE FIELD USING CONCRETE MIX NO. 6.
5. PIPE OPENINGS TO BE PROVIDED AS REQUIRED. FOR SIZE, LOCATION AND INVERT ELEVATIONS REFER TO THE CONSTRUCTION PLANS.
6. PLACEMENT OF SUBGRADE DRAINAGE WILL BE AS DIRECTED BY THE ENGINEER OR AS NOTED ON THE CONSTRUCTION PLANS.
7. LADDER RUNGS SHALL BE IN ACCORDANCE WITH STANDARD MD 383.51 OR 383.92. RUNGS ARE INCIDENTAL TO THE COST OF THE INLET.
8. MINIMUM DEPTH PAYMENT PER EACH SHALL BE 3'–6" MEASURED FROM THE PIPE INVERT TO THE TOP OF THE GRATE AT ITS HIGHEST POINT. VERTICAL DEPTH PAYMENT PER LINEAR FOOT SHALL INCLUDE ALL DEPTHS IN EXCESS OF 3'–6" INCLUDING ALL APPURTENANCES.
9. CONCRETE OR BRICK INVERT TO BE PROVIDED IN THE FIELD AND SHALL SLOPE 2 IN./FT TOWARD OUTLET OR AS DIRECTED.
10. BASE WALLS UNIT MAY TAPER PER MANUFACTURER'S DESIGN.

4 / C-404 STANDARD TYPE 'S' INLET – DOUBLE GRATE TANDEM

SCALE: NOT TO SCALE

CONSULTANT
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72 Loveton Circle Baltimore, Maryland 21152-0949

PROFESSIONAL CERTIFICATION.
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 20330
EXPIRATION DATE 01/29/2012.

PROJECT TITLE: MYSTIC HARBOUR WWTP UPGRADE AND PLANT EXPANSION

SHEET TITLE: STORMWATER MANAGEMENT DETAILS

MARK	DATE	DESCRIPTION
2	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

C-404

SHEET 19 OF 128

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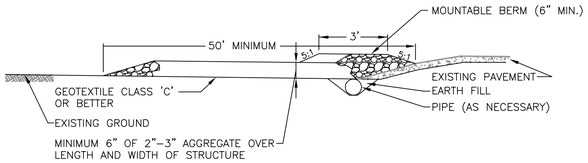

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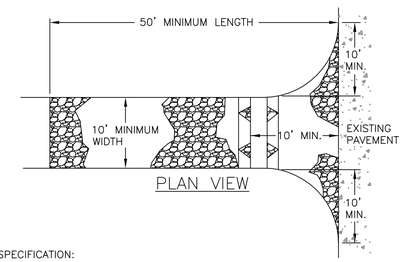


PLAN VIEW

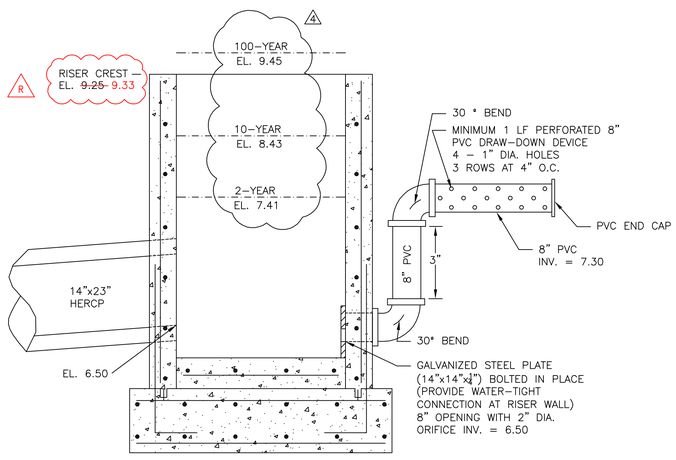
CONSTRUCTION SPECIFICATION:

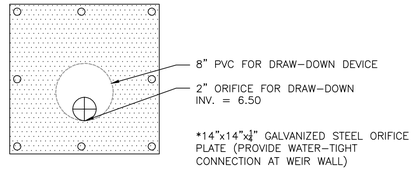
1. LENGTH – MINIMUM OF 50'.
2. WIDTH – 10' MINIMUM; SHOULD BE FLARED AT THE EXISTING ROAD TO PROVIDE A TURNING RADIUS.
3. GEOTEXTILE FABRIC (FILTER CLOTH) SHALL BE PLACED OVER THE EXISTING GROUND PRIOR TO PLACING STONE.
4. STONE – CRUSHED AGGREGATE (2" TO 3") OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT SHALL BE PLACED AT LEAST 6" DEEP OVER THE LENGTH AND WIDTH OF THE ENTRANCE.
5. SURFACE WATER – ALL WATER FLOWING TO OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED THROUGH THE ENTRANCE, MAINTAINING POSITIVE DRAINAGE. PIPE INSTALLED THROUGH THE STABILIZED CONSTRUCTION ENTRANCE SHALL BE PROTECTED WITH A MOUNTABLE BERM WITH 5:1 SLOPES AND A MINIMUM OF 6" STONE OVER THE PIPE. PIPE HAS TO BE SIZED ACCORDING TO THE DRAINGE. WHEN THE SCE IS LOCATED AT A HIGH SPOT AND HAS NO DRAINAGE TO CONVEY, A PIPE WILL NOT BE NECESSARY. PIPE SHOULD BE SIZED ACCORDING TO THE AMOUNT OF RUNOFF TO BE CONVEYED. A 6" MINIMUM WILL BE REQUIRED.
6. LOCATION – A STABILIZED CONSTRUCTION ENTRANCE SHALL BE LOCATED AT EVERY POINT WHERE CONSTRUCTION TRAFFIC ENTERS OR LEAVES A CONSTRUCTION SITE. VEHICLES LEAVING THE SITE MUST TRAVEL OVER THE ENTIRE LENGTH OF THE STABILIZED CONSTRUCTION ENTRANCE.

STABILIZED CONSTRUCTION ENTRANCE

SCALE: NOT TO SCALE

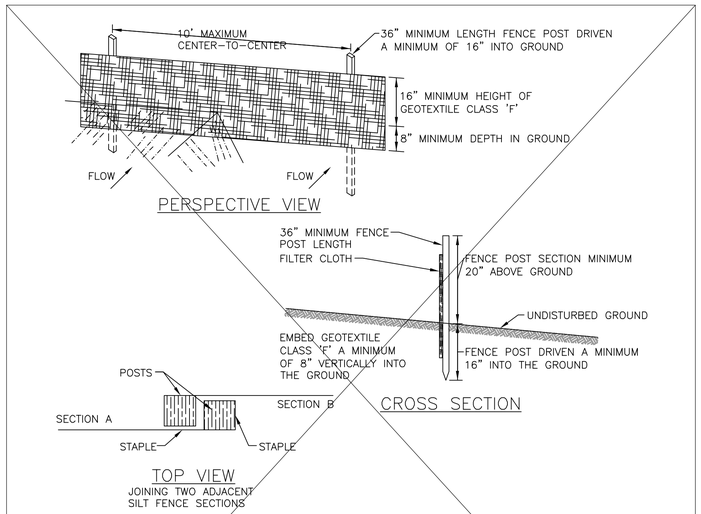
RECORD DRAWING SET
JANUARY 2015





TEMPORARY DRAW–DOWN DEVICE FOR SEDIMENT BASIN & ORIFICE PLATE

SCALE: NOT TO SCALE



PERSPECTIVE VIEW

CROSS SECTION

TOP VIEW
JOINING TWO ADJACENT SILT FENCE SECTIONS

CONSTRUCTION SPECIFICATION:

1. FENCE POSTS SHALL BE A MINIMUM OF 36" LONG DRIVEN 16" MINIMUM INTO THE GROUND. WOOD POSTS SHALL BE 1 ½" X 1 ½" SQUARE (MINIMUM) CUT, OR 1 ¾" DIAMETER (MINIMUM) ROUND AND SHALL BE OF SOUND QUALITY HARDWOOD. STEEL POSTS WILL BE STANDARD T OR U SECTION WEIGHING NOT LESS THAN 1.0 POUND PER LINER FOOT.
2. GEOTEXTILE SHALL BE FASTENED SECURELY TO EACH FENCE POST WITH WIRE TIES OR STAPLES AT TOP AND MID–SECTION AND SHALL MEET THE FOLLOWING REQUIREMENTS FOR GEOTEXTILE CLASS 'F':

TENSILE STRENGTH	50 LBS/IN (MIN.)	TEST: MSMT 509
TENSILE MODULUS	20 LBS/IN (MIN.)	TEST: MSMT 509
FLOW RATE	0.3 GAL–FT²/MINUTE (MAX.)	TEST: MSMT 322
FILTERING EFFICIENCY	75% (MIN.)	TEST: MSMT 322

3. WHERE ENDS OF GEOTEXTILE FABRIC COME TOGETHER, THEY SHALL BE OVERLAPPED, FOLDED AND STAPLED TO PREVENT SEDIMENT BYPASS.
4. SILT FENCE SHALL BE INSPECTED AFTER EACH RAINFALL EVENT AND MAINTAINED WHEN BULGES OCCUR OR WHEN SEDIMENT ACCUMULATION REACHES 50% OF THE FABRIC HEIGHT.

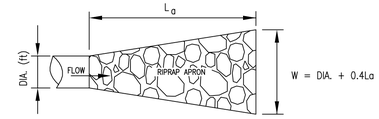
SILT FENCE DESIGN CRITERIA:

SLOPE STEEPNESS	SLOPE LENGTH (MAXIMUM)	SILT FENCE LENGTH (MAXIMUM)
FLATTER THAN 50:1	UNLIMITED	UNLIMITED
50:1 TO 10:1	125 FT	1,000 FT
10:1 TO 5:1	100 FT	750 FT
5:1 TO 3:1	60 FT	500 FT
3:1 TO 2:1	40 FT	250 FT
2:1 AND STEEPER	20 FT	125 FT

NOTE: IN AREAS OF LESS THAN 2% SLOPE AND SANDY SOILS (USDA GENERAL CLASSIFICATION SYSTEM, SOIL CLASS A) MAXIMUM SLOPE LENGTH AND SILT FENCE LENGTH WILL BE UNLIMITED. IN THESE AREAS A SILT FENCE MAY BE THE ONLY PERIMETER CONTROL REQUIRED.

SILT FENCE

SCALE: NOT TO SCALE



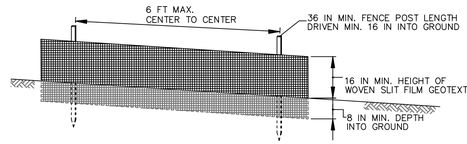
STRUCTURE	LENGTH	WIDTH	THICKNESS	CLASS	QUANTITY
ROP–1	45'	17'	19"	I	66 SY
ROP–2	23'	8.7'	19"	I	19 SY
ROP–3	8.0'	7.0'	19"	I	5 SY
ROP–4	6.4'	6.0'	19"	I	4 SY

4

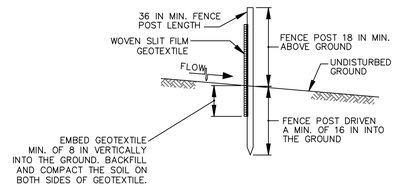
NOTES:
1. SLOPE OF RIPRAP OUTLET EQUAL TO 0%.
2. LINE BOTTOM OF RIPRAP OUTLET PROTECTION WITH FILTER CLOTH. FILTER FABRIC LINING SHALL BE EMBEDDED A MINIMUM OF 4" AND SHALL EXTEND AT LEAST 6" BEYOND THE EDGE OF RIPRAP.

RIPRAP OUTLET PROTECTION

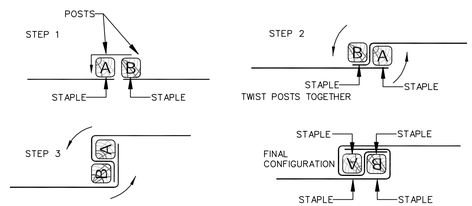
SCALE: NOT TO SCALE MAXIMUM TAILWATER CONDITION (Tw>0.5*DIA)



ELEVATION



CROSS SECTION



JOINING TWO ADJACENT SILT FENCE SECTIONS (TOP VIEW)

5

SILT FENCE

SCALE: NOT TO SCALE

CONSTRUCTION SPECIFICATIONS

1. USE WOOD POSTS 1¾ X 1¾ ± ⅛ INCH (MINIMUM) SQUARE CUT OF SOUND QUALITY HARDWOOD. AS AN ALTERNATIVE TO WOODEN POST USE STANDARD "T" OR "U" SECTION STEEL POSTS WEIGHING NOT LESS THAN 1 POUND PER LINEAR FOOT.
2. USE 36 INCH MINIMUM POSTS DRIVEN 16 INCH MINIMUM INTO GROUND NO MORE THAN 6 FEET APART.
3. USE WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS AND FASTEN GEOTEXTILE SECURELY TO UPSLOPE SIDE OF FENCE POSTS WITH WIRE TIES OR STAPLES AT TOP AND MID-SECTION.
4. PROVIDE MANUFACTURER CERTIFICATION TO THE AUTHORIZED REPRESENTATIVE OF THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT THE GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS.
5. EMBED GEOTEXTILE A MINIMUM OF 8 INCHES VERTICALLY INTO THE GROUND. BACKFILL AND COMPACT THE SOIL ON BOTH SIDES OF FABRIC.
6. WHERE TWO SECTIONS OF GEOTEXTILE ADJOIN: OVERLAP, TWIST, AND STAPLE TO POST IN ACCORDANCE WITH THIS DETAIL.
7. EXTEND BOTH ENDS OF THE SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SILT FENCE.
8. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN SILT FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL FENCE.

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 20330 EXPIRATION DATE 01/29/2012.

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
EROSION & SEDIMENT CONTROL DETAILS

MARK	DATE	DESCRIPTION
4	FEB. 2011	REVISION 4
5	MAR. 2014	REVISION 5
6	NOV. 2014	RECORD DRAWINGS

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C-405

SHEET 20 OF 128

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FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN THREE CALENDAR DAYS FOR THE SURFACE OF ALL PERIMETER CONTROLS, DIKES, SWALES, DITCHES, PERIMETER SLOPES, AND ALL SLOPES GREATER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1) AND SEVEN DAYS FOR ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.

SECTION I – VEGETATIVE STABILIZATION METHODS AND MATERIALS

A. SITE PREPARATION
- i. INSTALL EROSION AND SEDIMENT CONTROL STRUCTURES (EITHER TEMPORARY OR PERMANENT) SUCH AS DIVERSIONS, GRADE STABILIZATION STRUCTURES, BERMS, WATERWAYS OR SEDIMENT CONTROL BASINS.
- ii. PERFORM ALL GRADING OPERATIONS AT RIGHT ANGLES TO THE SLOPE. FINAL GRADING AND SHAPING IS NOT USUALLY NECESSARY FOR TEMPORARY SEEDING.
- iii. SCHEDULE REQUIRED SOIL TESTS TO DETERMINE SOIL AMENDMENT COMPOSITION AND APPLICATION RATES FOR SITES HAVING DISTURBED AREA OVER 5 ACRES.

B. SOIL AMENDMENTS (FERTILIZER AND LIME SPECIFICATIONS)
- i. SOIL TESTS MUST BE PERFORMED TO DETERMINE THE EXACT RATIOS AND APPLICATION RATES FOR BOTH LIME AND FERTILIZER ON SITES HAVING DISTURBED AREAS OVER 5 ACRES. SOIL ANALYSIS MAY BE PERFORMED BY THE UNIVERSITY OF MARYLAND OR A RECOGNIZED COMMERCIAL LABORATORY. SOIL SAMPLES TAKEN FOR ENGINEERING PURPOSES MAY ALSO BE USED FOR CHEMICAL ANALYSIS.
- ii. FERTILIZERS SHALL BE UNIFORM IN COMPOSITION, FREE FLOWING AND SUITABLE FOR ACCURATE APPLICATION BY APPROVED EQUIPMENT. MANURE MAY BE SUBSTITUTED FOR FERTILIZER WITH PRIOR APPROVAL FROM THE APPROPRIATE APPROVAL AUTHORITY. FERTILIZERS SHALL ALL BE DELIVERED TO THE SITE FULLY LABELED ACCORDING TO THE APPLICABLE STATE FERTILIZER LAWS AND SHALL BEAR THE NAME, TRADE NAME OR TRADEMARK AND WARRANTEE OF THE PRODUCER.
- iii. LIME MATERIALS SHALL BE GROUND LIMESTONE (HYDRATED OR BURNT LIME MAY BE SUBSTITUTED) WHICH CONTAINS AT LEAST 50% TOTAL OXIDES (CALCIUM OXIDE PLUS MAGNESIUM OXIDE). LIMESTONE SHALL BE GROUND TO SUCH FINENESS THAT AT LEAST 50% WILL PASS THROUGH AT #100 MESH SIEVE AND 98–100% WILL PASS THROUGH AT #20 MESH SIEVE.
- iv. INCORPORATE LIME AND FERTILIZER INTO THE TOP 3–5" OF SOIL BY DISKING OR OTHER SUITABLE MEANS.

C. SEEDBED PREPARATION
- i. TEMPORARY SEEDING
  - a. SEEDBED PREPARATION SHALL CONSIST OF LOOSENING SOIL TO A DEPTH OF 3" TO 5" BY MEANS OF SUITABLE AGRICULTURAL OR CONSTRUCTION EQUIPMENT, SUCH AS DISC HARROWS OR CHISEL PLOWS OR RIPPERS MOUNTED ON CONSTRUCTION EQUIPMENT. AFTER THE SOIL IS LOOSENED IT SHOULD NOT BE ROLLED OR DRAGGED SMOOTH BUT LEFT IN THE ROUGHENED CONDITION. SLOPED AREAS (GREATER THAN 3:1) SHOULD BE TRACKED LEAVING THE SURFACE IN AN IRREGULAR CONDITION WITH RIDGES RUNNING PARALLEL TO THE CONTOUR OF THE SLOPE.
  - b. APPLY FERTILIZER AND LIME AS PRESCRIBED ON THE PLANS.
  - c. INCORPORATE LIME AND FERTILIZER INTO THE TOP 3" TO 5" OF SOIL BY DISKING OR OTHER SUITABLE MEANS.
- ii. PERMANENT SEEDING
  - a. MINIMUM SOIL CONDITIONS REQUIRED FOR PERMANENT VEGETATIVE ESTABLISHMENT:
    1. SOIL pH SHALL BE BETWEEN 6.0 AND 7.0.
    2. SOLUBLE SALTS SHALL BE LESS THAN 500 PARTS PER MILLION (ppm).
    3. THE SOIL SHALL CONTAIN LESS THAN 40% CLAY BUT ENOUGH FINE GRAINED MATERIAL (>30% SILT PLUS CLAY) TO PROVIDE THE CAPACITY TO HOLD A MODERATE AMOUNT OF MOISTURE. AN EXCEPTION IS IF LOVEGRASS OR SERECIA LESPEDEZA IS TO BE PLANTED, THEN A SANDY SOIL (<30% SILT PLUS CLAY) WOULD BE ACCEPTABLE.
    4. SOIL SHALL CONTAIN 1.5% MINIMUM ORGANIC MATTER BY WEIGHT.
    5. SOIL MUST CONTAIN SUFFICIENT PORE SPACE TO PERMIT ADEQUATE ROOT PENETRATION.
    6. IF THESE CONDITIONS CANNOT BE MET BY SOILS ON SITE, ADDING TOPSOIL IS REQUIRED IN ACCORDANCE WITH SECTION 21 STANDARD AND SPECIFICATION FOR TOPSOIL.
  - b. AREAS PREVIOUSLY GRADED IN CONFORMANCE WITH THE DRAWINGS SHALL BE MAINTAINED IN A TRUE AND EVEN GRADE, THEN SCARIFIED OR OTHERWISE LOOSENED TO A DEPTH OF 3" TO 5" TO PERMIT BONDING OF THE TOPSOIL TO THE SURFACE AREA AND TO CREATE HORIZONTAL EROSION CHECK SLOTS TO PREVENT TOPSOIL FROM SLIDING DOWN A SLOPE.
  - c. APPLY SOIL AMENDMENTS AS PER SOIL TEST OR AS INCLUDED ON THE PLANS.
  - d. MIX SOIL AMENDMENTS INTO THE TOP 3" TO 5" OF TOPSOIL BY DISKING OR OTHER SUITABLE MEANS. LAWN AREAS SHOULD BE RAKED TO SMOOTH THE SURFACE, REMOVE LARGE OBJECTS LIKE STONES AND BRANCHES, AND READY THE AREA FOR SEED APPLICATION. WHERE SITE CONDITIONS WILL NOT PERMIT NORMAL SEEDED PREPARATION, LOOSEN SURFACE BY DRAGGING WITH A HEAVY CHAIN OR OTHER EQUIPMENT TO ROUGHEN THE SURFACE. STEEP SLOPES (STEEPER THAN 3:1) SHOULD BE TRACKED BY A DOZER LEAVING THE SOIL IN AN IRREGULAR CONDITION WITH RIDGES RUNNING PARALLEL TO THE CONTOUR OF THE SLOPE. THE TOPE 1" TO 3" OF SOIL SHOULD BE LOOSE AND FRIABLE. SEEDBED LOOSENING MAY NOT BE NECESSARY ON NEWLY DISTURBED AREAS.

D. SEED SPECIFICATIONS
- i. ALL SEED MUST MEET THE REQUIREMENTS OF THE MARYLAND STATE SEED LAW. ALL SEED SHALL BE SUBJECT TO RE–TESTING BY A RECOGNIZED SEED LABORATORY. ALL SEED USED SHALL HAVE BEEN TESTED WITHIN THE 6 MONTHS IMMEDIATELY PRECEDING THE DATE OF SOWING SUCH MATERIAL ON THIS JOB.

*NOTE: SEED TAGS SHALL BE MADE AVAILABLE TO THE INSPECTOR TO VERIFY TYPE AND RATE OF SEED USED.
- ii. INOCULANT – THE INOCULANT FOR TREATING LEGUME SEED IN THE SEED MIXTURES SHALL BE A PURE CULTURE OF NITROGEN–FIXING BACTERIA PREPARED SPECIFICALLY FOR THE SPECIES. INOCULANTS SHALL NOT BE USED LATER THAN THE DATE INDICATED ON THE CONTAINER. ADD FRESH INOCULANT AS DIRECTED ON PACKAGE. USE FOUR TIMES THE RECOMMENDED RATE WHEN HYDROSEEDING. NOTE: IT IS VERY IMPORTANT TO KEEP INOCULANT AS COOL AS POSSIBLE UNTIL USED. TEMPERATURES ABOUT 75–80°F CAN WEAKEN BACTERIA AND MAKE THE INOCULANT LESS EFFECTIVE.

E. METHODS OF SEEDING
- i. HYDROSEEDING: APPLY SEED UNIFORMILY WITH HYDROSEEDER (SLURRY INCLUDES SEED AND FERTILIZER), BROADCAST OR DROP SEEDER, OR A CULTIPACKER SEEDER.
  - a. IF FERTILIZER IS BEING APPLIED AT THE TIME OF SEEDING, THE APPLICATION RATES AMOUNTS WILL NOT EXCEED THE FOLLOWING: NITROGEN: MAXIMUM OF 100 LBS PER ACRE TOTAL OF SOLUBLE NITROGEN; P2O5 (PHOSPHOROUS): 200 LBS/AC; K20 (POTASSIUM): 200 LBS/AC.
  - b. LIME – USE ONLY GROUND AGRICULTURAL LIMESTONE (UP TO 3 TONS PER ACRE MAY BE APPLIED BY HYDROSEEDING). NORMALLY, NOT MORE THAN 2 TONS ARE APPLIED BY HYDROSEEDING AT ANY ONE TIME. DO NOT USE BURNT OR HYDRATED LIME WHEN HYDROSEEDING.
  - c. SEED AND FERTILIZER SHALL BE MIXED ON SITE AND SEEDING SHALL BE DONE IMMEDIATELY AND WITHOUT INTERRUPTION.
- ii. DRY SEEDING: THIS INCLUDES USE OF CONVENTIONAL DROP OR BROADCAST SPREADERS.
  - a. SEED SPREAD DRY SHALL BE INCORPORATED INTO THE SUBSOIL AT THE RATES PRESCRIBED ON THE TEMPORARY OR PERMANENT SEEDING SUMMARIES OR TABLES 25 OR 26. THE SEEDED AREA SHALL THEN BE ROLLED WITH A WEIGHTED ROLLER TO PROVIDE GOOD SEED TO SOIL CONTACT.
  - b. WHERE PRACTICAL, SEED SHOULD BE APPLIED IN TWO DIRECTIONS PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION.
- iii. DRILL OR CULTIPACKER SEEDING: MECHANIZED SEEDERS THAT APPLY AND COVER SEED WITH SOIL.
  - a. CULTIPACKING SEEDERS ARE REQUIRED TO BURY THE SEED IN SUCH A FASHION AS TO PROVIDE AT LEAST ¾" OF SOIL COVERING. SEEDBED MUST BE FIRM AFTER PLANTING.
  - b. WHERE PRACTICAL, SEED SHOULD BE APPLIED IN TWO DIRECTIONS PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION.

F. MULCH SPECIFICATIONS (IN ORDER OF PREFERENCE)
- i. STRAW SHALL CONSIST OF THOROUGHLY THRESHED WHEAT, RYE OR OAT STRAW, REASONABLY BRIGHT IN COLOR, AND SHALL NOT BE MUSTY, MOLDY, CAKED, DECAYED OR EXCESSIVELY DUSTY AND SHALL BE FREE OF NOXIOUS WEED SEEDS AS SPECIFIED IN THE MARYLAND SEED LAW.
- ii. WOOD CELLULOSE FIBER MULCH (WCFM)
  - a. WCFM SHALL CONSIST OF SPECIALLY PREPARED WOOD CELLULOSE PROCESSED INTO A UNIFORM FIBROUS PHYSICAL STATE.
  - b. WCFM SHALL BE DYED GREEN OR CONTAIN A GREEN DYE IN THE PACKAGE THAT WILL PROVIDE AN APPROPRIATE COLOR TO FACILITATE VISUAL INSPECTION OF THE UNIFORMLY SPREAD SLURRY.
  - c. WCFM, INCLUDING DYE, SHALL CONTAIN NO GERMINATION OR GROWTH INHIBITING FACTORS.
  - d. WCFM MATERIALS SHALL BE MANUFACTURED AND PROCESSED IN SUCH A MANNER THAT THE WOOD CELLULOSE FIBER MULCH WILL REMAIN IN UNIFORM SUSPENSION IN WATER UNDER AGITATION AND WILL BLEND WITH SEED, FERTILIZER AND OTHER ADDITIVES TO FORM A HOMOGENOUS SLURRY. THE MULCH MATERIAL SHALL FORM A BLOTTER–LIKE GROUND COVER, ON APPLICATION, HAVING MOISTURE ABSORPTION AND PERCOLATION PROPERTIES AND SHALL COVER AND HOLD GRASS SEED IN CONTACT WITH THE SOIL WITHOU INHIBITING THE GROWTH OF THE GRASS SEEDLINGS.
  - e. WCFM MATERIAL SHALL CONTAIN NO ELEMENTS OR COMPOUNDS AT CONCENTRATION LEVELS THAT WILL BE PHYTO–TOXIC.
  - f. WCFM MUST CONFROM TO THE FOLLOWING PHYSICAL REQUIREMENTS: FIBER LENGTH TO APPROXIMATELY 10 mm, DIAMETER APPROXIMATELY 1mm, pH RANGE OF 4.0 TO 8.5, ASH CONTENT OF 1.6% MAXIMUM AND WATER HOLDING CAPACITY OF 90% MINIMUM.

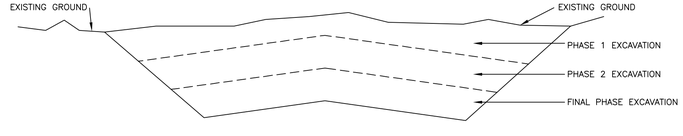
NOTE: ONLY STERILE STRAW MULCH SHOULD BE USED IN AREAS WHERE ONE SPECIES OF GRASS IS DESIRED.

G. MULCHING SEEDED AREAS – MULCH SHALL BE APPLIED TO ALL SEEDED AREAS IMMEDIATELY AFTER SEEDING.
- i. IF GRADING IS COMPLETE OUTSIDE OF THE SEEDING SEASON, MULCH ALONE SHALL BE APPLIED AS PRESCRIBED IN THIS SECTION AND MAINTAINED UNTIL THE SEEDING SEASON RETURNS AND SEEDING CAN BE PERFORMED IN ACCORDANCE WITH THE SPECIFICATIONS.
- ii. WHEN STRAW MULCH IS USED, IT SHALL BE SPREAD OVER ALL SEEDED AREAS AT THE RATE OF 2 TONS/ACRE. MULCH SHALL BE APPLIED TO A UNIFORM LOOSE DEPTH OF BETWEEN 1" AND 2". MULCH APPLIED SHALL ACHIEVE A UNIFORM DISTRIBUTION AND DEPTH SO THAT THE SOIL SURFACE IS NOT EXPOSED. IF A MULCH ANCHORING TOOL IS TO BE USED, THE RATE SHOULD BE INCREASED TO 2.5 TON/ACRE.
- iii. WOOD CELLULOSE FIBER USED AS MULCH SHALL BE APPLIED AT A NET DRY WEIGHT OF 1,500 LB/ACRE. THE WOOD CELLULOSE FIBER SHALL BE MIXED WITH WATER AND THE MIXTURE SHALL CONTAIN A MAXIMUM OF 50 LBS OF WOOD CELLULOSE FIBER PER 100 GALLONS OF WATER.

H. SECURING STRAW MULCH (MULCH ANCHORING) – MULCH ANCHORING SHALL BE PERFORMED IMMEDIATELY FOLLOWING MULCH APPLICATION TO MINIMIZE LOSS BY WIND OR WATER. THIS MAY BE DONE BY ONE OF THE FOLLOWING METHODS (LISTED BY PREFERENCE), DEPENDING UPON SIZE OF AREA AND EROSION HAZARD:
- i. A MULCH ANCHORING TOOL IS A TRACTOR DRAWN IMPLEMENT DESIGNED TO PUNCH AND ANCHOR MULCH INTO THE SOIL SURFACE A MINIMUM OF TWO (2) INCHES. THIS PRACTICE IS MOST EFFECTIVE ON LARGE AREAS, BUT IS LIMITED TO FLATTER SLOPES WHERE EQUIPMENT CAN OPERATE SAFELY. IF USED ON SLOPING LAND, THIS PRACTICE SHOULD BE USED ON THE CONTOUR IF POSSIBLE.
- ii. WOOD CELLULOSE FIBER MAY BE USED FOR ANCHORING STRAW. THE FIBER BINDER SHALL BE APPLIED AT A NET DRY WEIGHT OF 750 LB/ACRE. THE WOOD CELLULOSE FIBER SHALL BE MIXED WITH WATER AND THE MIXTURE SHALL CONTAIN A MAXIMUM OF 50 POUNDS OF WOOD CELLULOSE FIBER PER 100 GALLONS OF WATER.
- iii. APPLICATION OF LIQUID BINDERS SHOULD BE HEAVIER AT THE EDGES WHERE WIND CATCHES MULCH, SUCH AS IN VALLEYS AND ON CRESTS OF BANKS. THE REMAINDER OF AREA SHOULD APPEAR UNIFORM AFTER BINDER APPLICATION. SYNTHETIC BINDERS – SUCH AS ACRYLIC DLR (AGRO–TRACK), DCA–70, PETROSET, TERRA TAX II, TERRA TACK AR OR OTHER APPROVED EQUAL MAY BE USED AT RATES RECOMMENDED BY THE MANUFACTURER TO ANCHOR MULCH.
- iv. LIGHTWEIGHT PLASTIC NETTING MAY BE STAPLED OVER THE MULCH ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS. NETTING IS USUALLY AVAILABLE IN ROLLS OF 4' TO 15' WIDE AND 300' TO 3,000' LONG.

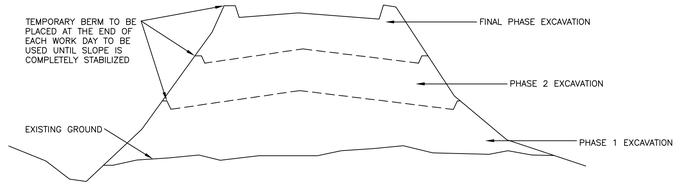
I. INCREMENTAL STABILIZATION – CUT SLOPES
- i. ALL CUT SLOPES SHALL BE DRESSED, PREPARED, SEEDED AND MULCHED AS THE WORK PROGRESSES. SLOPES SHALL BE EXCAVATED AND STABILIZED IN EQUAL INCREMENTS NOT TO EXCEED 15'.
- ii. CONSTRUCTION SEQUENCE (REFER TO FIGURE 3 BELOW):
  - a. EXCAVATE AND STABILIZE ALL TEMPORARY SWALES, SIDE DITCHES OR BERMS THAT WILL BE USED TO CONVEY RUNOFF FROM THE EXCAVATION.
  - b. PERFORM PHASE 1 EXCAVATION, DRESS AND STABILIZE.
  - c. PERFORM PHASE 2 EXCAVATION, DRESS AND STABILIZE. OVERSEED PHASE 1 AREAS AS NECESSARY.
  - d. PERFORM FINAL PHASE EXCAVATION, DRESS AND STABILIZE. OVERSEED PREVIOUSLY SEEDED AREAS AS NECESSARY.

NOTE: ONCE EXCAVATION HAS BEGUN THE OPERATION SHOULD BE CONTINUOUS FROM GRUBBING THROUGH THE COMPLETION OF GRADING AND PLACEMENT OF TOPSOIL (IF REQUIRED) AND PERMANENT SEED AND MULCH. ANY INTERRUPTIONS IN THE OPERATION OR COMPLETING THE OPERATION OUT OF THE SEEDING SEASON WILL NECESSITATE THE APPLICATION OF TEMPORARY STABILIZATION.



J. INCREMENTAL STABILIZATION OF EMBANKMENTS – FILL SLOPES
- i. EMBANKMENTS SHALL BE CONSTRUCTED IN LIFTS AS PRESCRIBED ON THE PLANS.
- ii. SLOPES SHALL BE STABILIZED IMMEDIATELY WHEN THE VERTICAL HEIGHT OF THE MULTIPLE LIFTS REACHES 15', OR WHEN THE GRADING OPERATION CEASES AS PRESCRIBED IN THE PLANS.
- iii. AT THE END OF EACH DAY, TEMPORARY BERMS AND PIPE SLOPE DRAINS SHOULD BE CONSTRUCTED ALONG THE TOP EDGE OF THE EMBANKMENT TO] INTERCEPT SURFACE RUNOFF AND CONVEY IT DOWN THE SLOPE IN A NON–EROSIVE MANNER TO A SEDIMENT TRAPPING DEVICE.
- iv. CONSTRUCTION SEQUENCE: REFER TO FIGURE 4.
  - a. EXCAVATE AND STABILIZE ALL TEMPORARY SWALES, SIDE DITCHES, OR BERMS THAT WILL BE USED TO DIVERT RUNOFF AROUND THE FILL. CONSTRUCT SLOPE SILT FENCE ON LOW SIDE OF FILL AS SHOWN IN THE FIGURE BELOW, UNLESS OTHER METHODS SHOWN ON THE PLANS ADDRESS THIS AREA.
  - b. PLACE PHASE 1 EMBANKMENT, DRESS AND STABILIZE.
  - c. PLACE PHASE 2 EMBANKMENT, DRESS AND STABILIZE.
  - d. PLACE FINAL PHASE EMBANKMENT, DRESS AND STABILIZE. OVERSEED PREVIOUSLY SEEDED AREAS AS NECESSARY.

NOTE: ONCE THE PLACEMENT OF FILL HAS BEGUN THE OPERATION SHOULD BE CONTINUOUS FROM GRUBBING THROUGH THE COMPLETION OF GRADING AND PLACEMENT OF TOPSOIL (IF REQUIRED) AND PERMANENT SEED AND MULCH. ANY INTERRUPTIONS IN THE OPERATION OR COMPLETING THE OPERATION OUT OF THE SEEDING SEASON WILL NECESSITATE THE APPLICATION OF TEMPORARY STABILIZATION.



SECTION II – TEMPORARY SEEDING

VEGETATION – ANNUAL GRASS OR GRAIN USED TO PROVIDE COVER ON DISTURBED AREAS FOR UP TO 12 MONTHS. FOR LONGER DURATION OF VEGETATIVE COVER, PERMANENT SEEDING IS REQUIRED.

A. SEED MIXTURES – TEMPORARY SEEDING
- i. SELECT ONE OR MORE OF THE SPECIES OR MIXTURES LISTED IN TABLE 26 FOR THE APPROPRIATE PLANT HARDINESS ZONE (FROM FIGURE 5) AND ENTER THEM IN THE TEMPORARY SEEDING SUMMARY BELOW, ALONG WITH APPLICATION RATES, SEEDING DATES AND SEEDING DEPTHS. IF THIS SUMMARY IS NOT PUT ON THE PLANS AND COMPLETED, THEN TABLE 26 MUST BE PUT ON THE PLANS.
- ii. FOR SITES HAVING SOIL TESTS PERFORMED, THE RATES SHOWN ON THIS TABLE SHALL BE DELETED AND THE RATES RECOMMENDED BY THE TESTING AGENCY SHALL BE WRITTEN IN. SOIL TESTS ARE NOT REQUIRED FOR TEMPORARY SEEDING.

TEMPORARY SEEDING SUMMARY

SEED MIXTURE (HARDINESS ZONE 7b) FROM TABLE 26					FERTILIZER RATE (10-10-10)	LIME RATE
NO.	SPECIES	APPLICATION RATE (LB/AC.)	SEEDING DATES	SEEDING DEPTHS		
	ANNUAL RYEGRASS	50	2/1 TO 4/30 8/15 TO 11/1	¼" TO ½"	600 LB/AC (15 LB/1000 S.F.)	2 TONS/AC (100 LB/1000 S.F.)

SECTION III – PERMANENT SEEDING

SEEDING GRASS AND LEGUMES TO ESTABLISH GROUND COVER FOR A MINIMUM PERIOD OF ONE YEAR ON DISTURBED AREAS GENERALLY RECEIVING LOW MAINTENANCE.

A. SEED MIXTURES – PERMANENT SEEDING
- i. SELECT ONE OR MORE OF THE SPECIES OR MIXTURES LISTED IN TABLE 25 FOR THE APPROPRIATE PLANT HARDINESS ZONE (FROM FIGURE 5) AND ENTER THEM IN THE PERMANENT SEEDING SUMMARY BELOW, ALONG WITH APPLICATION RATES, SEEDING DATES AND SEEDING DEPTHS. SEEDING DEPTHS CAN BE ESTIMATED USING TABLE 26. IF THIS SUMMARY IS NOT PUT ON THE CONSTRUCTION PLANS AND COMPLETED, THEN TABLE 25 MUST BE PUT ON THE PLANS.

ADDITIONAL PLANTING SPECIFICATIONS FOR EXCEPTIONAL SITES SUCH AS SHORELINES, STREAMBANKS, OR DUNES OR FOR SPECIAL PURPOSES SUCH AS WILDLIFE OR AESTHETIC TREATMENT MAY BE FOUND IN USDA–SCS TECHNICAL FIELD OFFICE GUIDE, SECTION 342 – CRITICAL AREA PLANNING. FOR SPECIAL LAWN MAINTENANCE AREAS, SEE SECTIONS IV SOD AND V TURFGRASS.
- ii. FOR SITES HAVING DISTURBED AREA OVER 5 ACRES, THE RATES SHOWN ON THIS TABLE SHALL BE DELETED AND THE RATES RECOMMENDED BY THE SOIL TESTING AGENCY SHALL BE WRITTEN IN.
- iii. FOR AREAS RECEIVING LOW MAINTENANCE, APPLY UREAFORM FERTILIZER (46–0–0) AT 3 ½ LBS/1,000 SF (150 LB/ACRE), IN ADDITION TO THE ABOVE SOIL AMENDMENTS SHOW IN THE TABLE BELOW, TO BE PERFORMED AT THE TIME OF SEEDING.

PERMANENT SEEDING SUMMARY

SEED MIXTURE (HARDINESS ZONE7b) FROM TABLE 25					FERTILIZER RATE (10-10-10)			LIME RATE
NO.	SPECIES	APPLICATION RATE (LB/AC.)	SEEDING DATES	SITE CONDITIONS	N	P_2O_5	K_2O	
10	TALL FESCUE (80%) HARD FESCUE (20%)	120 30	3/1 TO 5/15 8/15 TO 11/15	WET TO DRY	90 LB/AC (2.0 LB/ 1000 S.F.)	175 LB/AC (4 LB/ 1000 S.F.)	175 LB/AC (4 LB/ 1000 S.F.)	2 TONS/AC (100 LB/ 1000 S.F.)

RECORD DRAWING SET
JANUARY 2015

CONSULTANT
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72 Loveton Circle Baltimore, Maryland 21152-0949

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 20330, EXPIRATION DATE 01/29/2013.

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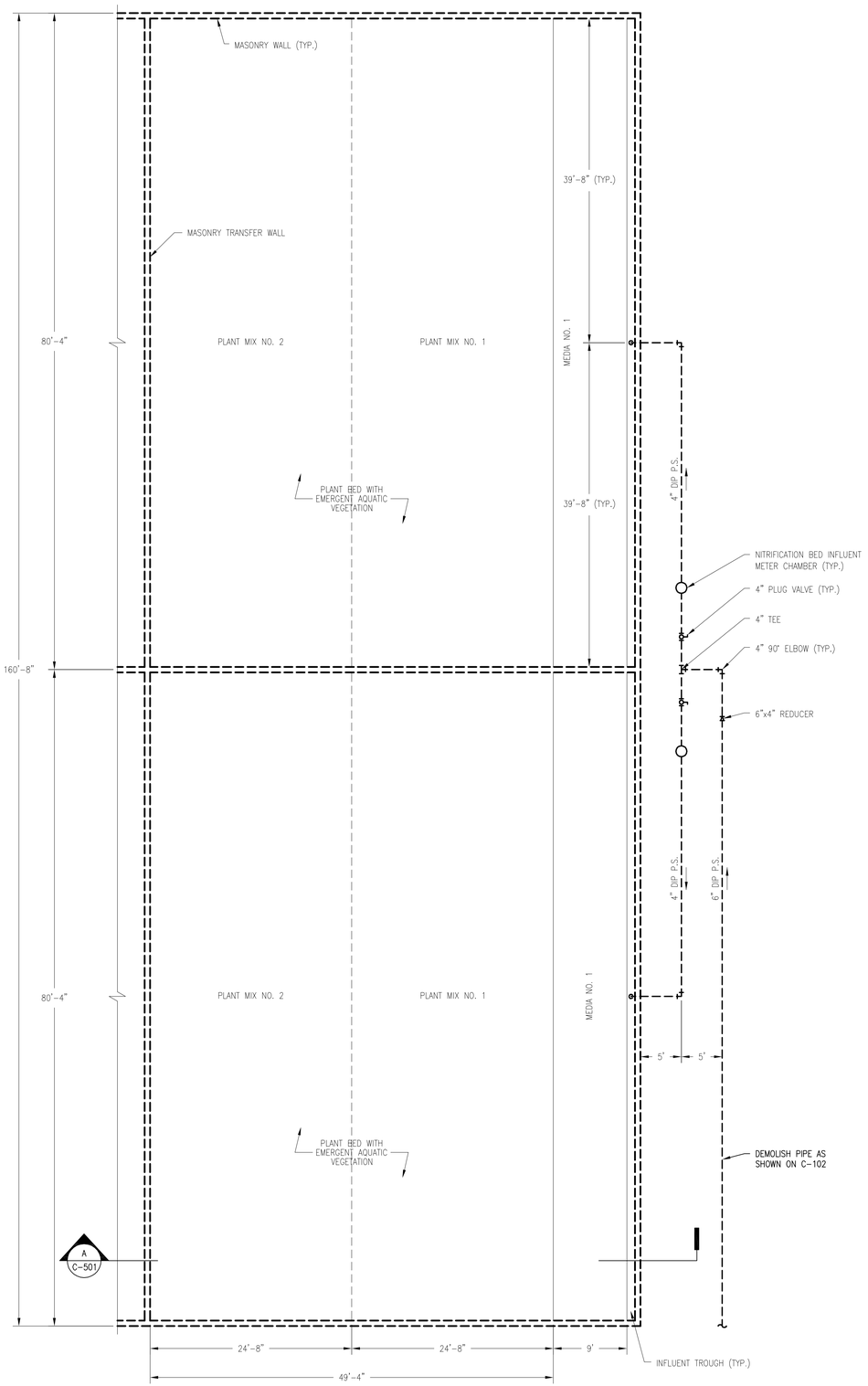
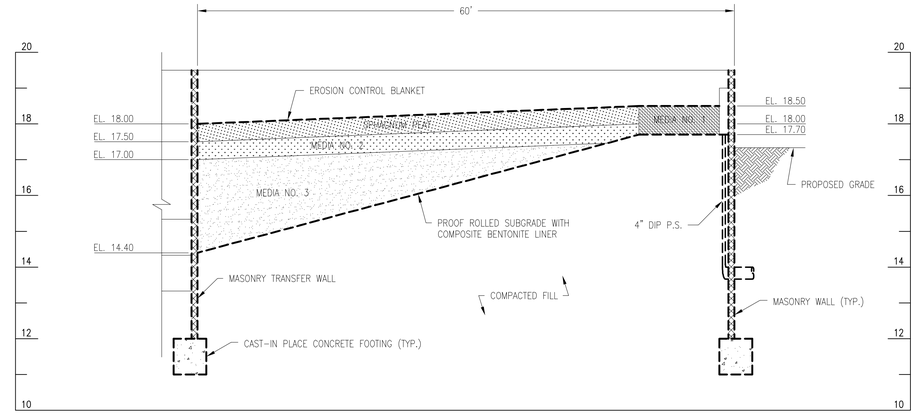


NITRIFICATION BED – DEMOLITION PLAN

SCALE: 1/8" = 1'-0"



NITRIFICATION BED – DEMOLITION SECTION

A C-501 SCALE: HORZ: 1/8" = 1'-0"
VERT: 1/2" = 1'-0"

GENERAL SHEET NOTES:

1. DEMOLISH EXISTING NITRIFICATION BED AS SHOWN ON C-102. COORDINATE WITH WORCESTER COUNTY PRIOR TO START OF DEMOLITION WORK. PROVIDE MINIMUM 1 WEEK NOTICE.
2. REMOVE EXISTING VEGETATION WITHIN BED AND EXCAVATE TO SUBGRADE MATERIAL TO REMOVE ALL UNSUITABLE MATERIAL AND BACKFILL TO FINISHED GRADE WITH COMPACTED BACKFILL OR FILL MATERIAL.
3. VEGETATION AND SOIL HAS BEEN IN CONTACT WITH TREATED WASTEWATER. CONTRACTOR IS RESPONSIBLE FOR PROTECTION OF WORKERS AND PROPER DISPOSAL OF ALL REMOVED MATERIAL.
4. SEE DRAWING E-101 FOR DETAILS OF ELECTRICAL DEMOLITION ASSOCIATED WITH NITRIFICATION BEDS.

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SCALE: 1/8"= 1'-0"

1' 0 1' 2'
SCALE: 1/2"= 1'-0"

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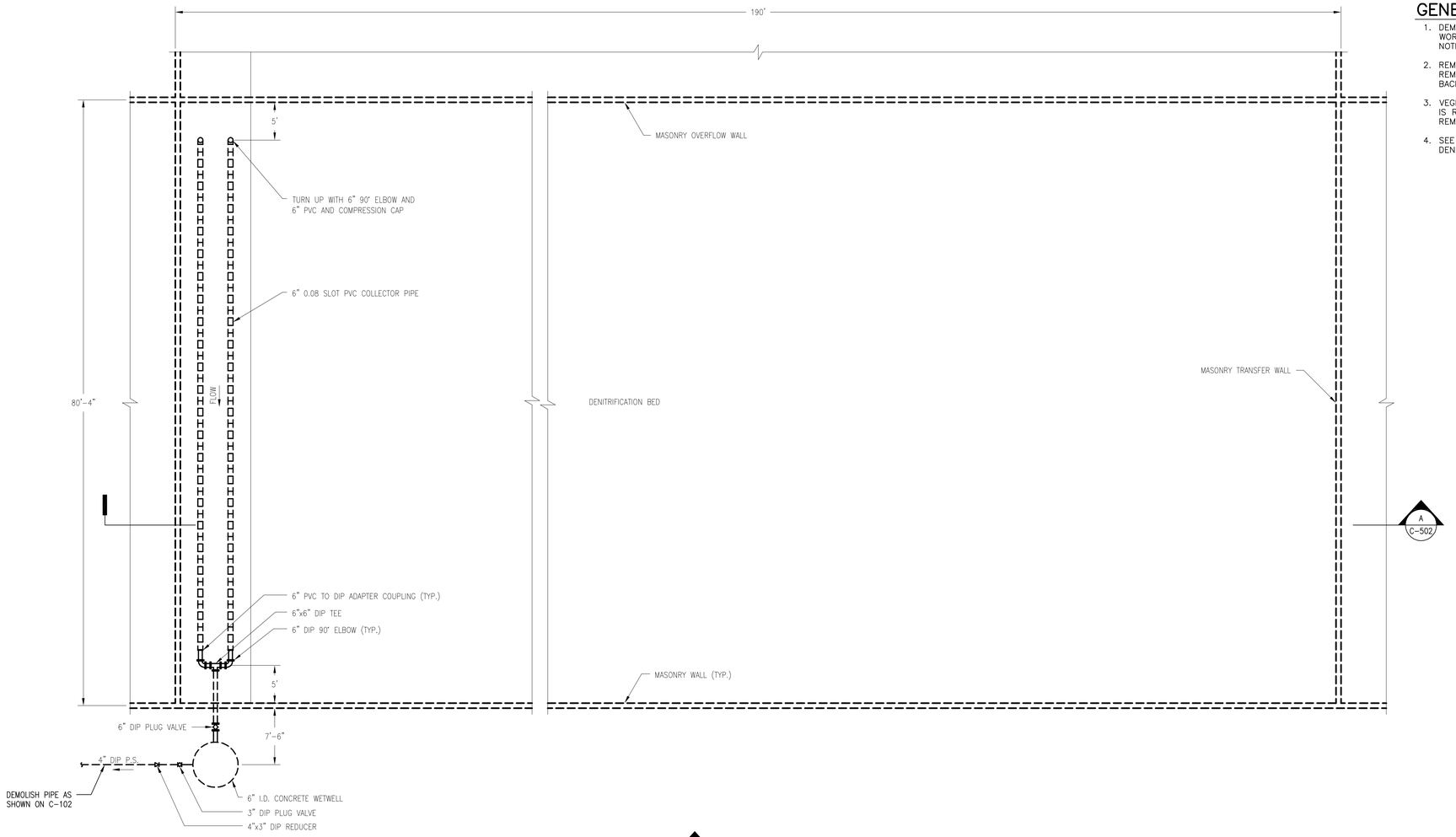
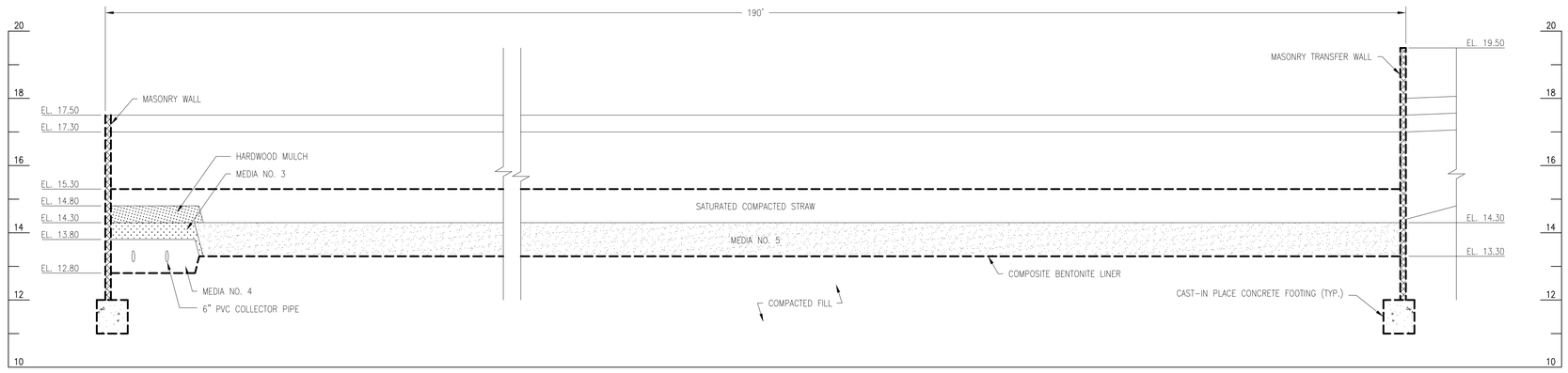
File: Q:\SHARD\70662_Mystic\Harbour\WWTP\ref\Proc\ut_EFLV-CADD\AS-BUILTS\CIVIL\C-501 NITRIFICATION BED DEMO.dwg
Jan 12, 2015 - 8:26:50am



DENITRIFICATION BED – DEMOLITION PLAN

SCALE: 1/8" = 1'-0"



DENITRIFICATION BED – DEMOLITION SECTION

A / C-502

SCALE: HORZ: 1/8" = 1'-0"
VERT: 1/2" = 1'-0"

GENERAL SHEET NOTES:

1. DEMOLISH EXISTING DENITRIFICATION BED AS SHOWN ON C-102. COORDINATE WITH WORCESTER COUNTY PRIOR TO START OF DEMOLITION WORK. PROVIDE MINIMUM 1 WEEK NOTICE.
2. REMOVE EXISTING VEGETATION WITHIN BED AND EXCAVATE TO SUBGRADE MATERIAL TO REMOVE ALL UNSUITABLE MATERIAL AND BACKFILL TO FINISHED GRADE WITH COMPACTED BACKFILL OR FILL MATERIAL.
3. VEGETATION AND SOIL HAS BEEN IN CONTACT WITH TREATED WASTEWATER. CONTRACTOR IS RESPONSIBLE FOR PROTECTION OF WORKERS AND PROPER DISPOSAL OF ALL REMOVED MATERIAL.
4. SEE DRAWING E-101 FOR DETAILS OF ELECTRICAL DEMOLITION ASSOCIATED WITH DENITRIFICATION BEDS.

4' 0 4' 8'
SCALE: ⅛"= 1'-0"

1' 0 1' 2'
SCALE: ½"= 1'-0"

RECORD DRAWING SET JANUARY 2015

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 20330
EXPIRATION DATE 01/29/2012.

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
DENITRIFICATION BED
DEMOLITION PLAN AND SECTION

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

C-502

SHEET 23 OF 128

File: Q:\SMD\07992_MysticHarbourWWTPImprProjCivil_EP\1-CAD\XS-BUILTS\DWG\C-502 DENITRIFICATION BED DEMO.dwg
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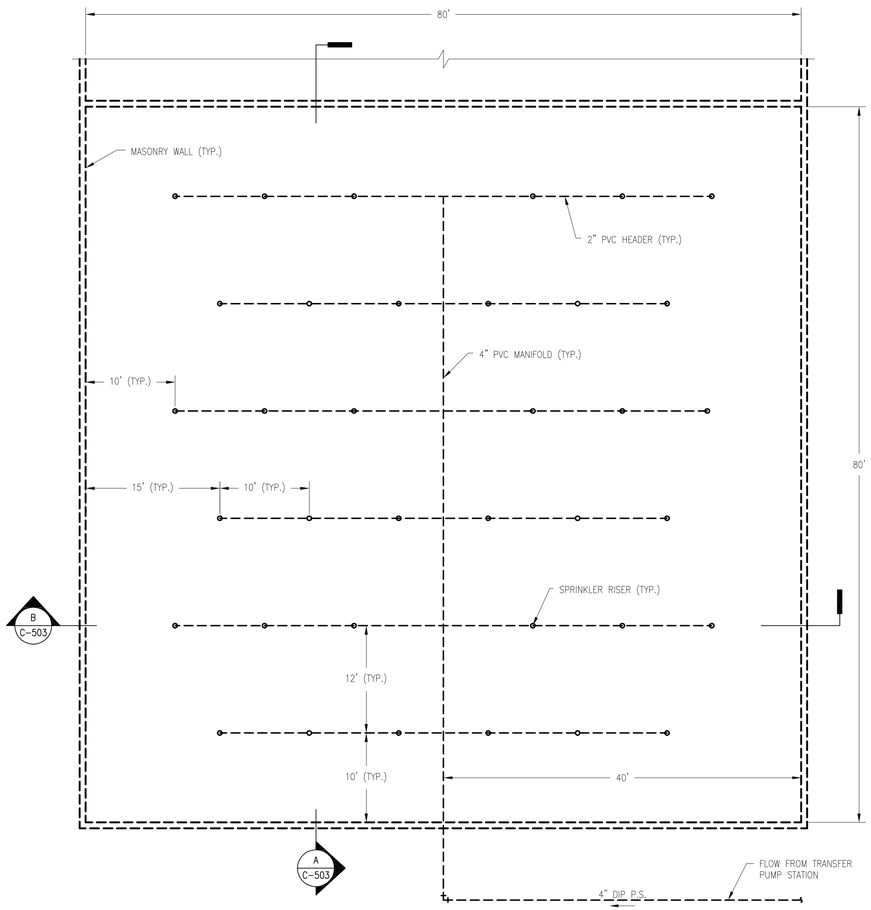
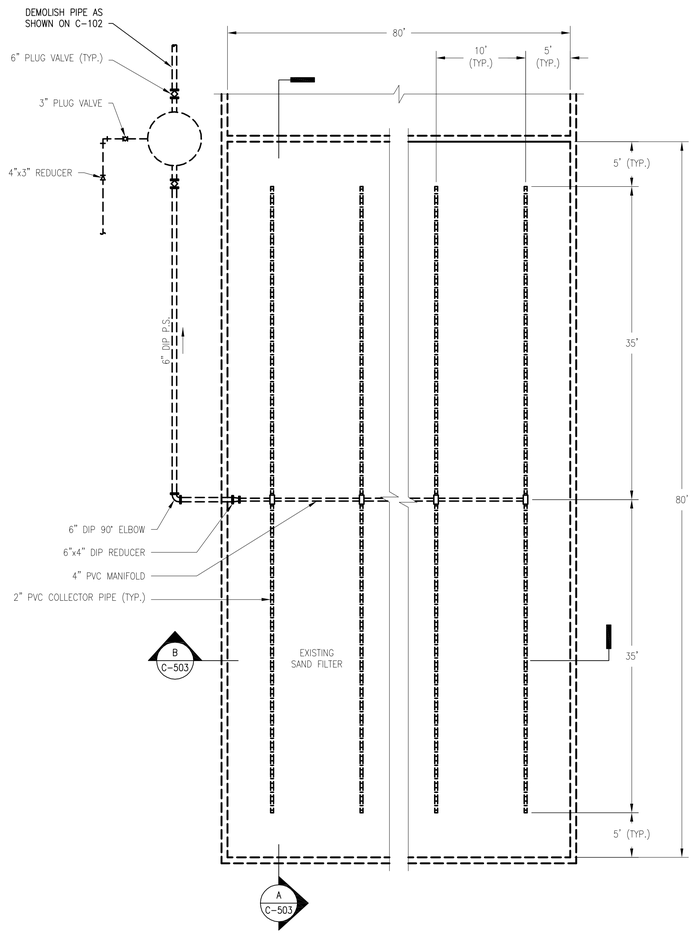


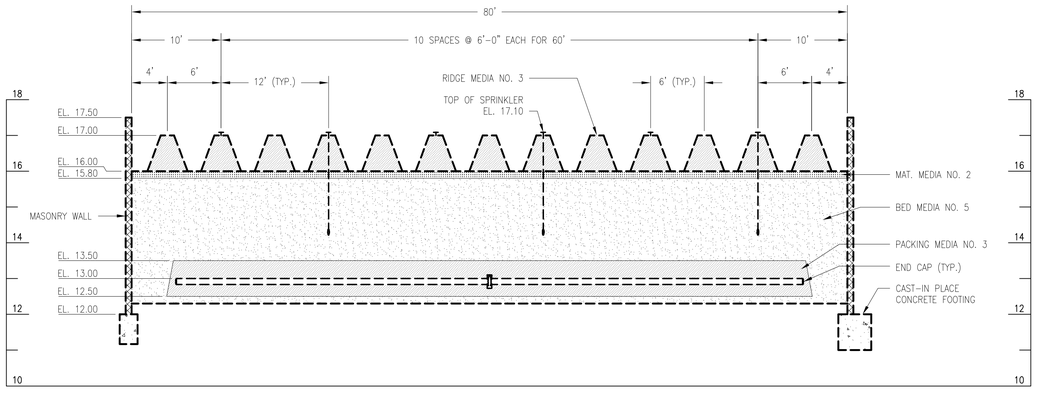
SAND FILTER – DEMOLITION PLAN AT EL. 14.30

SCALE: 1/8" = 1'-0"



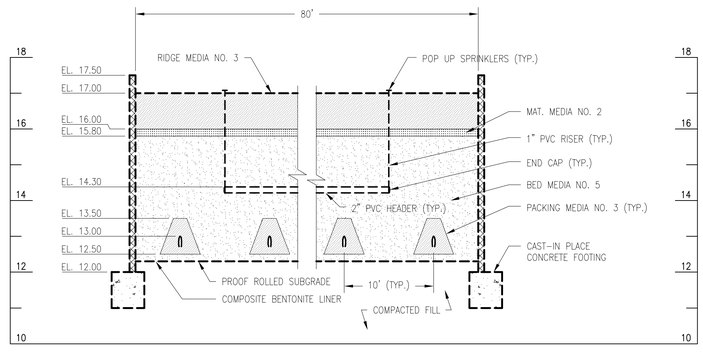
SAND FILTER – DEMOLITION PLAN AT EL. 12.90

SCALE: 1/8" = 1'-0"



SAND FILTER – DEMOLITION SECTION

A C-503 SCALE: HORZ: 1/8" = 1'-0"
VERT: 1/2" = 1'-0"



SAND FILTER – DEMOLITION SECTION

B C-503 SCALE: HORZ: 1/8" = 1'-0"
VERT: 1/2" = 1'-0"

GENERAL SHEET NOTES:

1. DEMOLISH EXISTING SAND FILTER AS SHOWN ON C-102. COORDINATE WITH WORCESTER COUNTY PRIOR TO START OF DEMOLITION WORK. PROVIDE MINIMUM 1 WEEK NOTICE.
2. REMOVE EXISTING VEGETATION WITHIN FILTER AND EXCAVATE TO SUBGRADE MATERIAL TO REMOVE ALL UNSUITABLE MATERIAL AND BACKFILL TO FINISHED GRADE WITH COMPACTED BACKFILL OR FILL MATERIAL.
3. VEGETATION AND SOIL HAS BEEN IN CONTACT WITH TREATED WASTEWATER. CONTRACTOR IS RESPONSIBLE FOR PROTECTION OF WORKERS AND PROPER DISPOSAL OF ALL REMOVED MATERIAL.
4. SEE DRAWING E-101 FOR DETAILS OF ELECTRICAL DEMOLITION ASSOCIATED WITH SAND FILTER.

SCALE: 1/8"= 1'-0"

SCALE: 1/2"= 1'-0"

RECORD DRAWING SET JANUARY 2015

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 20330
EXPIRATION DATE 01/29/2012.

CONSULTANT
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Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
SAND FILTER
DEMOLITION PLANS AND SECTIONS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

C-503

SHEET 24 OF 128

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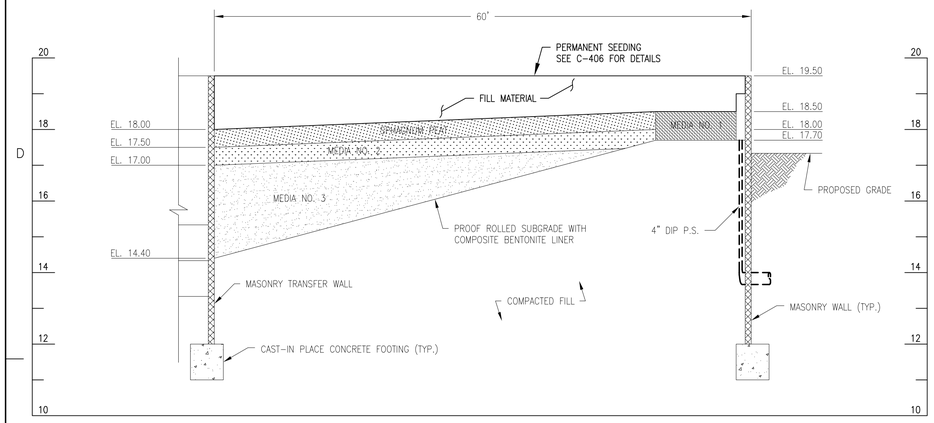
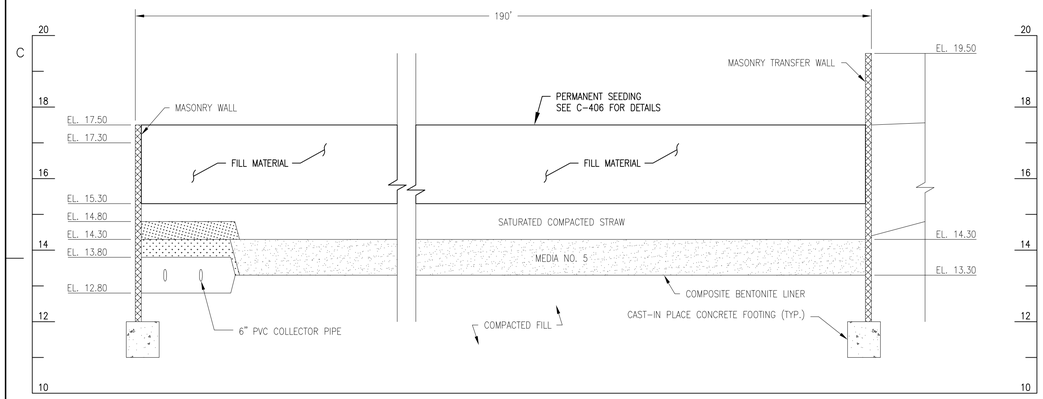


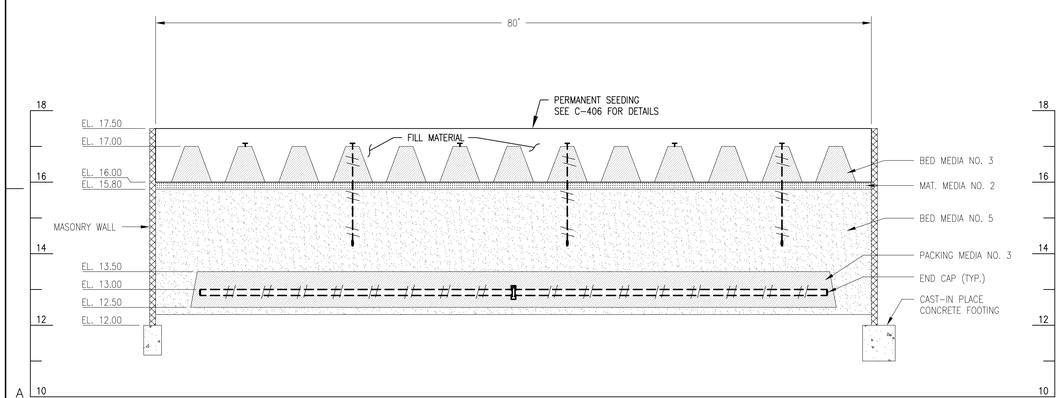
A C-504 NITRIFICATION BED NO. 3 – SECTION

SCALE: HORZ: 1/8" = 1'-0"
VERT: 1/2" = 1'-0"



B C-504 DENITRIFICATION BED NO. 3 – SECTION

SCALE: HORZ: 1/8" = 1'-0"
VERT: 1/2" = 1'-0"



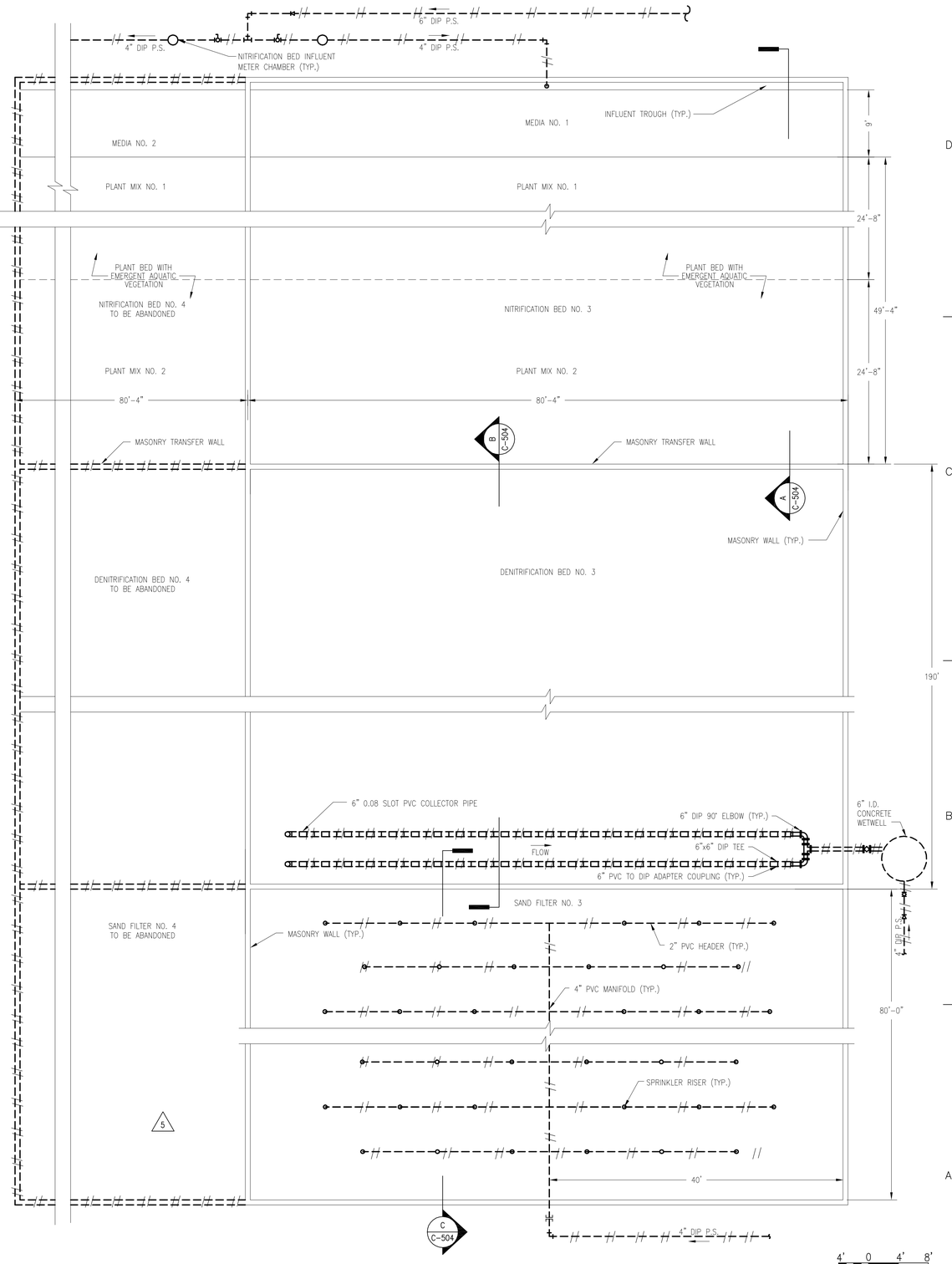
C C-504 SAND FILTER NO. 3 – SECTION

SCALE: HORZ: 1/8" = 1'-0"
VERT: 1/2" = 1'-0"

TOTAL FILL: 2,500 CY

LEGEND:

-#-#-#- = ABANDON



PLAN

SCALE: 1/8" = 1'-0"

SCALE: 1/8" = 1'-0"

SCALE: 1/2" = 1'-0"

RECORD DRAWING SET
JANUARY 2015

PROFESSIONAL CERTIFICATION.
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PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
NITRIFICATION BED, DENITRIFICATION BED
AND SAND FILTER
PLAN AND SECTIONS

MARK	DATE	DESCRIPTION
4	MAR. 2014	REVISION 5
3	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

C-504

SHEET 24B OF 128

File: Q:\SMO\07062_MysticHarbourWWTPImpProvExpn_EFY-14\400\dc-Bid\35\DWL\C-504 DENITRIFICATION BED FILL-IN.dwg
Jan 12, 2015 - 8:43:50am

SYMBOL LEGEND

SYMBOL	DESCRIPTION	MOUNTING HEIGHT
	480/277V PANELBOARD, SURFACE MOUNTED	78" TO TOP
	480/277V PANELBOARD, FLUSH MOUNTED	78" TO TOP
	208/120V PANELBOARD, SURFACE MOUNTED	78" TO TOP
	208/120V PANELBOARD, FLUSH MOUNTED	78" TO TOP
	CONTROL PANEL/CABINET, SURFACE MOUNTED	78" TO TOP
	CONTROL PANEL/CABINET, FLUSH MOUNTED	78" TO TOP
	POWER TRANSFORMER, WITH GROUND	= =
	GENERATOR	= =
	SYSTEM GROUND OR EQUIPMENT GROUND	= =
	CURRENT TRANSFORMER	= =
	POTENTIAL TRANSFORMER	= =
	MOTOR STARTER	= =
	CIRCUIT BREAKER, DRAW OUT TYPE	= =
AF AT 3P L2	CIRCUIT BREAKER ATTRIBUTES: AF = FRAME SIZE AT = TRIP SIZE 3P = QTY. OF POLES L2 = MISC. INFO. LSGI = LONG, SHORT TIME, INSTANTANEOUS, GROUND FAULT TRIP FUNCTIONS	= =
AF P OR AF/NF/P/3R	NON-FUSED DISCONNECT SWITCH, SIZE AS INDICATED WHERE: "AF" – INDICATES AMPERE SWITCH SIZE "NF" – DENOTES NON-FUSED "P" – DENOTES POLE "3R" – DENOTES NEMA TYPE ENCLOSURE	60" TOTOP = =
AF AT 3P L2 OR AF/AT/P/3R	FUSED DISCONNECT SWITCH, SIZE AS INDICATED WHERE: "AF" – INDICATES AMPERE SWITCH SIZE "AT" – INDICATES AMPERE FUSE SIZE "P" – DENOTES POLE "3R" – DENOTES NEMA TYPE ENCLOSURE	60" TOTOP = =
OR	COMBINATION MOTOR STARTER AND DISCONNECT SWITCH	60" TOTOP = =
	MOTOR STARTER	60" TOTOP
XP M	MANUAL MOTOR STARTER WITH MOTOR OVERLOAD PROTECTION. XP INDICATES RATED FOR CLASS 1, DIVISION 1, GROUP D LOCATION.	48" AFF
M	MOTOR TERMINATION	= =
	AUTOMATIC TRANSFER SWITCH	= =
1AL S1	MOTOR STARTER LOCATED IN MCC. "1" INDICATES SECTION POSITION "A" INDICATES BUCKET POSITION "L" INDICATES LEFT OR RIGHT POSITION "S1" INDICATES STARTER TYPE AND SIZE. IN THIS EXAMPLE. SIZE 1 FVNR.	= =
M	METER AS NOTED	
GF	GROUND FAULT SENSOR	= =
DPM	DIGITAL POWER METER	= =
X D	SWITCH, TOGGLE "b" DENOTES SWITCH CONTROL "X=2" DENOTES TWO POLE SWITCH "X=3" DENOTES THREE POLE SWITCH "X=4" DENOTES FOUR POLE SWITCH "WP" DENOTES WEATHER PROOF	AS INDICATED = =
MOD	MOTOR OPERATED DAMPER	= =

SYMBOL	DESCRIPTION	MOUNTING HEIGHT
2	125 VOLT, 2 POLE, 3 WIRE, 20 AMP RECEPTACLE. "2" DENOTES CIRCUIT NUMBER.	42" AFF
	125 VOLT, 2 POLE, 3 WIRE, 20 AMP DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER.	42" AFF
	125 VOLT, 2 POLE, 3 WIRE, 20 AMP DOUBLE DUPLEX RECEPTACLE	42" AFF
GFI WP	125 VOLT, 2 POLE, 3 WIRE, 20 AMP DUPLEX RECEPTACLE GFI DENOTES EQUIPPED WITH INTEGRAL GROUND FAULT INTERRUPTER WP DENOTES WEATHER PROOF	42" AFF
R	SPECIAL PURPOSE RECEPTACLE, WALL MOUNTED	AS INDICATED
XP	EXPLOSION PROOF RECEPTACLE, WALL MOUNTED	AS INDICATED
PBS	PUSHBUTTON STATION AS NOTED	48" AFF
HOA	HAND-OFF-AUTO SELECTOR SWITCH	48" AFF
	EMERGENCY STOP PUSH BUTTON	48" AFF
	WALL MOUNTED LIGHT FIXTURE	10" AFF
	REMOTE EMERGENCY HEAD FIXTURE – EXTERIOR RATED	= =
	1' X 4' SURFACE MOUNTED LIGHT FIXTURE	= =
	SURFACE MOUNTED INDUSTRIAL STRIP LIGHT FIXTURE	AS INDICATED
	SURFACE MOUNTED LIGHT FIXTURE	AS INDICATED
	2' X 4' RECESSED MOUNTED LIGHT FIXTURE	= =
J OR JB	JUNCTION BOX	AS INDICATED
	MCC CIRCUIT NUMBER CONVENTION:	AS INDICATED
	EXAMPLE: CIRCUIT 1AL. NUMBER INDICATES SECTION. FIRST LETTER INDICATES BUCKET TOP POSITION AS SHOWN. SECOND LETTER (IF USED) INDICATES LEFT OR RIGHT POSITION.	AS INDICATED
		= =
		= =
EBU	EMERGENCY BATTERY UNIT WITH OVERHEAD LAMPS	10" AFF

MCC SECTION 1

A B C D E F G H J K L M N O P Q R S T U V W X

THE LINES BETWEEN LETTERS REPRESENT 3" INCREMENTS.

ABBREVIATIONS

A	AMPERES
ADA	AMERICANS WITH DISABILITIES ACT
AFF	ABOVE FINISH FLOOR
AFG	ABOVE FINISH GRADE
AHJ	AUTHORITY HAVING JURISDICTION
AHU	AIR HANDLING UNIT
AIC	AMPERE INTERRUPTING CAPACITY
AL	ALUMINUM
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
ARCH	ARCHITECT
ATS	AUTOMATIC TRANSFER SWITCH
ATC	AUTOMATIC TEMPERATURE CONTROL
AWG	AMERICAN WIRE GAUGE
BFG	BELOW FINISH GRADE
BLDG	BUILDING
C	CONDUIT
CAT	CATALOG
CB	CIRCUIT BREAKER
CBM	CERTIFIED BALLAST MANUFACTURERS
CKT	CIRCUIT
CL	CENTERLINE
CLF	CURRENT LIMITING FUSE
CMS	COMBINATION MOTOR STARTER & DISCONNECT
COL	COLUMN
CPT	CONTROL POWER TRANSFORMER
CT	CURRENT TRANSFORMER
CU	COPPER
DWG	DRAWING
DS	DISCONNECT SWITCH
EC	ELECTRICAL CONTRACTOR
ECB	ENCLOSED CIRCUIT BREAKER
EF	EXHAUST FAN
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
EPO	EMERGENCY POWER OFF
EWC	ELECTRIC WATER COOLER
EX	EXISTING
ETR	EXISTING TO REMAIN
F	FUSE
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FLA	FULL LOAD AMPERES
FMC	FLEXIBLE METAL CONDUIT
FT	FEET, FLOW TRANSMITTER
FVNR	FULL VOLTAGE NON REVERSING (STARTER)
GND,G	GROUND OR GROUNDING
GRH	GAS FIRED RADIANT HEATER
GRMC	GALVANIZED RIGID METALLIC CONDUIT
HOA	HAND, OFF, AUTOMATIC SWITCH
HP	HORSEPOWER
HRV	HEAT RECOVERY AND VENTILATION UNIT
IEEE	INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS
I&C	INSTRUMENTATION AND CONTROL
IMC	INTERMEDIATE METAL CONDUIT
INT	INTERLOCK
KCMIL	THOUSAND CIRCULAR MILS
KVA	KILOVOLT AMPERES
KW	KILOWATTS
LED	LIGHT EMITTING DIODE
LE	LEVEL ELEMENT
LIT	LEVEL INDICATOR / TRANSMITTER
LTG	LIGHTING
LFMC	LIQUID TIGHT FLEXIBLE METAL CONDUIT
MC	METAL CLAD CABLE
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MISC	MISCELLANEOUS
MLO	MAIN LUGS ONLY
MMS	MANUAL MOTOR STARTER/SWITCH
MS	MOTOR STARTER
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRIC CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURES ASSOCIATION
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NO	NORMALLY OPEN OR NUMBER
NTS	NOT TO SCALE
P	POLE
PB	PUSHBUTTON
PNL	PANEL
POS	PROVIDED UNDER OTHER SECTIONS
PPL	PPL ELECTRIC UTILITIES
P.S.T.	PRIMARY SETTLING TANK
PVC	POLYVINYL CHLORIDE
PWR	POWER
QTY	QUANTITY
REL	RELOCATE
REQ'D	REQUIRED
REX	REMOVE EXISTING
RMC	RIGID METAL CONDUIT
RMS	ROOT MEAN SQUARED
RNMC	RIGID NON-METALLIC CONDUIT
RTU	ROOF TOP UNIT
SCADA	SYSTEM CONTROL AND DATA ACQUISITION
SP	SPARE
SS	STAINLESS STEEL
SW	SWITCH
SYM	SYMMETRICAL
TEL	TELEPHONE
TPS	TWISTED PAIR, SHIELDED
TMCB	THERMAL MAGNETIC CIRCUIT BREAKER
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION UNIT
TYP	TYPICAL
UG	UNDERGROUND OR UNDERGRADE
UL	UNDERWRITERS LABORATORIES
VT	VOLTAGE TRANSFORMER
W	WIRE
WH	WATER HEATER
WP	WEATHER PROOF
XFMR	TRANSFORMER
△	DELTA
Y	WYE
ø	PHASE

GENERAL NOTES (APPLICABLE TO ALL ELECTRICAL WORK)

1. PROVIDE ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, COORDINATION, ADDITIONAL DESIGN AND ALL INCIDENTALS NECESSARY TO PROVIDE A COMPLETE AND OPERABLE SYSTEM AS DETAILED ON PLANS TO THE SATISFACTION OF THE ENGINEER AND THE OWNER. COORDINATE ALL WORK WITH THE ENGINEER BEFORE THE START OF WORK. ALL WORK SHALL BE PERFORMED BY A QUALIFIED ELECTRICAL CONTRACTOR LICENSED IN THE STATE OF MARYLAND THAT HAS PREVIOUSLY PERFORMED WORK OF THIS SIZE AND TYPE.
2. PRIOR TO SUBMITTING BID, THE CONTRACTOR SHALL VISIT THE SITE AND BE THOROUGHLY FAMILIAR WITH THE EXISTING CONDITIONS AND PROPOSED CONSTRUCTION. CONTRACTOR SHALL INCLUDE IN THEIR BID ALL MATERIAL, LABOR AND ALL INCIDENTALS FOR A COMPLETE INSTALLATION WHETHER SPECIFICALLY CALLED FOR OR NOT. ALL ERRORS, DISCREPANCIES AND MISSED ITEMS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER DURING THE BIDDING PROCESS BY THE CONTRACTOR. THESE ITEMS SHALL BE INCLUDED IN THE BID PRICE. NO EXTRA COST WILL BE ALLOWED FOR ANY DISCREPANCY WHICH COULD HAVE BEEN NOTICED AT THE SITE VISIT BY THE CONTRACTOR.
3. PERFORM WORK AS REQUIRED BY APPLICABLE CODES, REGULATIONS AND LAWS OF LOCAL, STATE AND FEDERAL GOVERNMENTS AND OTHER AUTHORITIES WITH LAWFUL JURISDICTION. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2008 EDITION OF THE NATIONAL ELECTRICAL CODE. ALL WORK SHALL BE IN ACCORDANCE WITH WORCESTER COUNTY REQUIREMENTS.
4. MATERIAL AND EQUIPMENT SHALL BE UL, NEMA, ANSI, IEEE, ADA & CBM APPROVED FOR INTENDED SERVICE. MATERIAL AND INSTALLATION SHALL MEET REQUIREMENTS OF NATIONAL AND STATE ELECTRICAL CODE.
5. GIVE NOTICES, FILE PLANS, OBTAIN PERMITS AND LICENSES, PAY FEES AND BACK CHARGES, AND OBTAIN NECESSARY APPROVALS FROM AUTHORITIES THAT HAVE JURISDICTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE REQUIRED NOTICES, PERMITS, LICENSES, FEES, BACK CHARGES AND APPROVALS REQUIRED FOR THIS PROJECT.
6. MAINTAIN RECORD DRAWINGS ON SITE. RECORD SET MUST BE COMPLETE AND CURRENT AND AVAILABLE FOR INSPECTION WHEN REQUISITIONS FOR PAYMENT ARE SUBMITTED.
7. GUARANTEE WORK IN WRITING FOR TWO YEARS FROM DATE OF FINAL ACCEPTANCE. REPAIR OR REPLACE DEFECTIVE MATERIALS OR INSTALLATION AT NO COST TO OWNER DURING THE GUARANTEE PERIOD. CORRECT DAMAGE CAUSED IN MAKING NECESSARY REPAIRS AND REPLACEMENTS UNDER GUARANTEE AT NO COST TO OWNER. SUBMIT GUARANTEE TO OWNER BEFORE FINAL PAYMENT.
8. COORDINATE ALL ELECTRICAL ITEMS WITH EXISTING FIELD CONDITIONS. LOCATIONS SHOWN ARE APPROXIMATE AND MAY REQUIRE MINOR ADJUSTMENT IN THE FIELD TO SATISFY THE DESIGN INTENT.
9. DAMAGE TO EXISTING FACILITIES AND EQUIPMENT SHALL BE REPAIRED OR REPLACED IMMEDIATELY BY THE CONTRACTOR AT NO ADDITIONAL EXPENSE TO THE OWNER.
10. THE LOCATIONS SHOWN ON THESE PLANS ARE APPROXIMATE AND REQUIRE COORDINATION WITH ALL OTHER TRADES AND VERIFICATION OF EXISTING CONDITIONS. ROUTING OF CONDUIT IS DIAGRAMMATIC IN NATURE AND NOT INTENDED TO SHOW ALL REQUIRED OFFSETS AND DETAILS. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF ALL EXISTING ASSOCIATED EQUIPMENT AND CONDITIONS. COORDINATE THE LOCATION OF ALL EQUIPMENT AND CONDITIONS WITH THE ENGINEER AND THE OWNER. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL OTHER TRADES' DRAWINGS AND SPECIFICATIONS AND COORDINATING WITH ALL OTHER TRADES DURING BIDDING AND CONSTRUCTION.
11. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING CONTINUITY OF ALL POWER, CONTROL, AND COMMUNICATION FUNCTIONS TO ALL AREAS AFFECTED BY DEMOLITION AND/OR NEW CONSTRUCTION.

GENERAL NOTES (APPLICABLE TO ALL ELECTRICAL WORK)

12. CONTRACTOR SHALL NOT CUT ANY ACTIVE ELECTRICAL OR COMMUNICATIONS LINES DURING CONSTRUCTION. IF THE CONTRACTOR ACCIDENTALLY CUTS A LINE, THEN THEY SHALL CONTACT THE ENGINEER IMMEDIATELY BEFORE PROCEEDING WITH FURTHER WORK.
13. REPAIR AND PATCH ANY DISTURBED AREAS TO MATCH EXISTING CONDITIONS.
14. ELECTRICAL EQUIPMENT AND DEVICES WITHIN DEMOLITION AREA SHOWN TO BE DEMOLISHED OR RELOCATED, SHALL BE DEMOLISHED ALONG WITH ALL ASSOCIATED FEEDER/BRANCH CIRCUITS, AND CONDUITS UNLESS OTHERWISE NOTED. WIRING SHALL BE REMOVED BACK TO SOURCE. REMOVE ALL CONDUITS ASSOCIATED WITH DEMOLISHED EQUIPMENT EXCEPT CONDUITS CONCEALED IN WALLS OR FLOOR SLABS. CONTRACTOR SHALL DISCONNECT, MAKE SAFE, AND REMOVE ALL ASSOCIATED ELECTRICAL EQUIPMENT AND ALL ASSOCIATED CIRCUITRY WITHIN THIS AREA. REMOVE ALL DEMOLISHED ITEMS AND DEBRIS FROM THE WORK SITE AND DISPOSE OF PROPERLY. FIELD VERIFY ALL SUPPLY CIRCUITS FOR DEMOLISHED AND RELOCATED EQUIPMENT. UPDATE ALL PANELBOARD DIRECTORIES. IDENTIFY ALL SPARE CIRCUIT BREAKER POSITIONS AND SHOW DATE WHEN SPARE WAS CONFIRMED.
15. DISCONNECT AND MAKE SAFE ANY EQUIPMENT TO BE REMOVED BY OTHERS (I.E. MOTORS, ETC.). COORDINATE REMOVAL OF EQUIPMENT WITH OTHER TRADES PRIOR TO DEMOLITION.
16. IN ANY AREA REQUIRING THE PERFORMANCE OF ANY TRADE'S WORK, CAREFULLY REMOVE AND STORE ANY OR ALL ELECTRICAL ITEMS IN PATH OF WORK, REINSTALLING AND RECONNECTING SAME AS REQUIRED, IN ACCORDANCE WITH THE PLANS AND/OR AS DIRECTED AFTER COMPLETION OF OTHER TRADE'S WORK IN THAT AREA.
17. PRIOR TO THE START OF DEMOLITION, CONTRACTOR SHALL FIELD VERIFY ALL BRANCH CIRCUITS AND MAINTAIN THOSE CIRCUITS THAT EXTEND OUTSIDE OF THE SCOPE OF WORK.
18. AFTER RENOVATING EXISTING ELECTRICAL WORK, THE CONTRACTOR SHALL INSURE THAT ALL REMAINING AND NEW EQUIPMENT WILL OPERATE PROPERLY.
19. ALL ELECTRICAL WORK INDICATED TO REMAIN SHALL BE SUITABLY PROTECTED TO PREVENT ANY DAMAGE.
20. WHERE ELECTRICAL SYSTEMS PASS THROUGH RENOVATED AREAS TO SERVE OTHER PORTIONS OF THE PREMISES, SYSTEMS SHALL BE SUITABLY PROTECTED TO PREVENT DAMAGE OR RELOCATED AND THE SYSTEMS RESTORED TO NORMAL OPERATION. ANY OUTAGES IN SYSTEMS SHALL BE COORDINATED WITH OWNER. RESTORE POWER TO EXISTING TO REMAIN EQUIPMENT IF INTERRUPTED BY DEMOLISHED CIRCUITS IN THE AREA.
21. CONTRACTOR SHALL SUBMIT FOR APPROVAL, SHOP DRAWINGS FOR ALL EQUIPMENT AND MATERIALS USED ON THE PROJECT. SUBMITTALS SHALL BE APPROVED BY THE ENGINEER BEFORE PURCHASE OF MATERIALS.
22. ALL ELECTRICAL CURRENT CARRYING PARTS SHALL BE COPPER FOR ALL EQUIPMENT.
23. PERMANENTLY LABEL ALL NEW ELECTRICAL EQUIPMENT, INCLUDING BUT NOT LIMITED TO, DEVICE DESIGNATION AND SUPPLY CIRCUIT DESIGNATION. UPDATE PANEL DIRECTORIES TO INCLUDE NEW CIRCUIT INFORMATION RESULTING FROM THIS PROJECT.
24. PROVIDE TEMPORARY POWER AND LIGHTING FOR ALL TRADES AS REQUIRED TO COMPLETE THE PROJECT. ALL TEMPORARY AND INTERIM EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE CODES AND STANDARDS INCLUDING, BUT NOT LIMITED TO, NFPA 110 AND NFPA 70. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THIS REQUIREMENT WITH ALL OTHER TRADES AND INCLUDING ALL ASSOCIATED COST IN BID PRICE.
25. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION THAT IS NOT SHOWN ON THE DRAWINGS.
26. ENGAGE A QUALIFIED ELECTRICAL TESTING COMPANY TO LOCATE ALL UNDERGROUND UTILITIES IN PROPOSED CONSTRUCTION AREAS FOR ALL TRADES BEFORE DIGGING. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING THIS ORGANIZATION AND INCLUDING ALL ASSOCIATED COSTS IN THE BID PRICE.
27. UPON REMOVAL, CONTRACTOR SHALL INVENTORY MAJOR ELECTRICAL ITEMS THAT ARE REMOVED AND PROVIDE A LIST TO THE OWNER FOR THEIR SELECTION OF ITEMS TO BE RETAINED. ALL ITEMS REJECTED BY THE OWNER SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE.
28. ALL WIRING, CABLES AND CONDUCTORS ASSOCIATED WITH REMOVAL OF FEEDERS AND BRANCH CIRCUITS SHALL BE LOOPED, TIED AND RETURNED TO THE OWNER.
29. LIGHTING BALLASTS AND CAPACITORS CONTAINING PCB'S AS DEFINED BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA), SHALL BE DISPOSED OF IN ACCORDANCE WITH ALL APPLICABLE LOCAL, FEDERAL, AND EPA REGULATIONS.
30. ALL MATERIAL MADE REDUNDANT UNDER THIS PROJECT SHALL BE REMOVED IN ITS ENTIRETY. EXISTING LIGHTING FIXTURES AND ALL MATERIAL MADE AVAILABLE AFTER RENOVATIONS SHALL BE PROPERLY REMOVED AND DISPOSED.
31. REMOVE EXISTING UTILITY ELECTRICAL SERVICE ENTRANCE. PROVIDE NEW UTILITY SERVICE ENTRANCE. SERVICE ENTRANCE SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE DELMARVA POWER REQUIREMENTS. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING THIS ORGANIZATION AND INCLUDING ALL ASSOCIATED COST IN THE BID PRICE.
32. PROVIDE CONCRETE FOUNDATION HOUSEKEEPING PAD FOR ALL FLOOR MOUNTED EQUIPMENT.

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 30767
EXPIRATION DATE 09/29/2012

11/22/2002

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
GENERAL ELECTRICAL SYMBOLS & LEGEND

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-001

SHEET 91 OF 128

File: Q:\SMD\070902_MysticHarbourWWTPImpProvDwl_EP\1-CADD\AS-BUILTS\ELECTRICAL\E-001 GENERAL ELECTRICAL SYMBOLS & LEGEND.dwg
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LIGHTING FIXTURE SCHEDULE

LIGHTING FIXTURE SCHEDULE

FIXTURE TYPE	DESCRIPTION	MANUFACTURER	LAMPS NO.	LAMPS TYPE	VOLTAGE
D	INDUSTRIAL, ENCLOSED AND GASKETED, DAMP LOCATION, 3 LAMP, 32W, ACRYLIC, ELECTRONIC BALLAST, INSTANT START	LITHONIA DM 3 32 120 GEB10IS (OR APPROVED EQUAL)	3	32W	120V
B	WALL PACK, WET LOCATION LISTED, 100W METAL HALIDE, MAGNETIC BALLAST WITH PHOTO CELL	LITHONIA TWH 100M 120 PE LPI (OR APPROVED EQUAL)	1	100W	120V
D1	INDUSTRIAL, ENCLOSED AND GASKETED, DAMP LOCATION, 3 LAMP, 32W, ACRYLIC, EMERGENCY BALLAST, INSTANT START	LITHONIA DM 3 32 120 ELDW (OR APPROVED EQUAL)	3	32W	120V
A	HEAVY DUTY INDUSTRIAL, DAMP LOCATION, 3 LAMP, T5, 28W, ACRYLIC, ELECTRONIC BALLAST, INSTANT START	LITHONIA AFP 3 28 120 GEB10IS (OR APPROVED EQUAL)	3	28W	120V
~~X~~	~~CLASS 1, DIVISION 1, GROUP D RATED FLUORESCENT, 2 LAMP, 40W, WITH REFLECTOR~~	~~APPLETON APL SERIES (OR APPROVED EQUAL)~~ R	~~2~~	~~40W~~	~~120V~~
F	PENDANT MOUNT, CLASS I, DIV 1, GROUP D RATED, 175W, PULSE START METAL HALIDE, EXPLOSION PROOF	APPLETON CPP1775 MT (OR APPROVED EQUAL)	1	175W	120V
G	~~BRACKET MOUNT, 150W, INCANDESCENT, CLASS 1, DIVISION 1, GROUP D RATED~~	~~APPLETON ALB1550 (OR APPROVED EQUAL)~~ R	~~1~~	~~150W~~	~~120V~~
H	WALL PACK, RATED FOR CLASS 1, DIV 2, GROUP D LOCATION, 100W METAL HALIDE WITH PHOTO CELL	HUBBELL POM2-H108 (OR APPROVED EQUAL)	1	100W	120V
M	~~BRACKET MOUNT, 100W, INCANDESCENT, CLASS 1, DIV 2, GROUP D RATED 100W~~	~~APPLETON CIB3075 (OR APPROVED EQUAL)~~ R	~~1~~	~~100W~~	~~120V~~
PC	PHOTOCONTROL CELL RATED FOR CLASS 1, DIVISION 2, GROUP D LOCATIONS.	HUBBELL HUB2PC120 (OR APPROVED EQUAL)	–	–	120V
EXIT1	~~EMERGENCY EXIT SIGN, LEAD CALCIUM BATTERY BACK-UP, TWO OVERHEAD LAMPS~~	~~COOPER LIGHTING – SURE LITES LPX70 RWH DH~~ R	~~2~~	~~4.7W~~	~~120V~~
EXIT2	EMERGENCY EXIT SIGN, LEAD CALCIUM BATTERY BACK-UP, TWO OVERHEAD LAMPS, INDUSTRIAL RATED	DAYBRITE – MCPHILBEN NL1RTWL	2	9W	120V
EBU1	EMERGENCY BATTERY PACK UNIT 30W, 12VDC, WITH OVERHEADS, 2 HALOGEN LAMPS, 8W	COOPER LIGHTING – SURE LITES UMB16 (OR APPROVED EQUAL)	2	8W	120V
EBU2	~~CLASS I, DIV 1, GROUP D RATED EXPLOSION PROOF LEAD CALCIUM BATTERY PACK~~	~~APPLETON ELS012 (OR APPROVED EQUAL)~~ R	~~—~~	~~—~~	~~120V~~
RH	~~CLASS I, DIV 1, GROUP D RATED EXPLOSION PROOF, LONG BRACKET MOUNT, 18W, 12V DC, REMOTE HEAD~~	~~APPLETON ALB1050 2812 (OR APPROVED EQUAL)~~	~~1~~	~~18W~~	~~12V DC~~
RH	~~12VDC SINGLE HEAD, 8W HALOGEN LAMP, UL LISTED FOR WET LOCATION~~	~~COOPER LIGHTING – SURELITES 12T8WGY (OR APPROVED EQUAL)~~	~~1~~	~~8W~~	~~12V DC~~
EX	PHOTOLUMINESCENT EXIT SIGN WITH RED LETTERING. ARROW ON SYMBOL INDICATES DIRECTION ON EXIT SIGN.	GLOBRITE 7300 SERIES	–	=	
EBU3	CLASS I, DIV 1, GROUP D RATED EXPLOSION PROOF LEAD CALCIUM BATTERY PACK WITH TWO 18W OVERHEADS	APPLETON ELS22812-F1 (OR APPROVED EQUAL)	2	18W	120V
R	~~HEAVY DUTY INDUSTRIAL FLOOD LIGHT, POLE MOUNTED, 250W METAL HALIDE WITH PHOTOCELL AND BOTTOM VISOR, UL LISTED WET LOCATIONS~~	~~LITHONIA TFA 250M RN 120 CR PER PE1 TFADV (OR APPROVED EQUAL)~~	~~1~~	250W	~~120V~~

NOTES:
1. PROVIDE LAMPS IN ALL LIGHT FIXTURES.
2. PROVIDE ALL NECESSARY ACCESSORIES FOR MOUNTING FIXTURES AS REQUIRED.
3. ARROW ON SYMBOL INDICATES DIRECTION ON EXIT SIGN.
4. ELECTRICAL CONTRACTOR SHALL COORDINATE MOUNTING HEIGHTS AND LOCATIONS OF FIXTURES WITH OTHER TRADES TO AVOID MOUNTING ABOVE PIPES AND OTHER EQUIPMENT.
5. PROVIDE DISCONNECTS FOR FLUORESCENT FIXTURES PER NEC.

GENERAL ELECTRICAL PHASING NOTES (APPLICABLE TO ALL ELECTRICAL WORK)

1. ALL ELECTRICAL WORK SHALL BE PHASED IN COORDINATION WITH OTHER TRADES' REQUIREMENTS.
2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH SPECIFICATION SECTION 01140, "CONSTRUCTION COORDINATION AND SEQUENCING".
3. ONLY ONE MAJOR ELECTRICAL EQUIPMENT ITEM SHALL BE DE-ENERGIZED AT ANY ONE TIME. EQUIPMENT OUTAGES WILL BE ALLOWED ONLY ON ONE MAJOR ELECTRICAL EQUIPMENT ITEM AT ANY ONE TIME UNLESS NOTED OTHERWISE.
4. ALL OUTAGES SHALL BE KEPT TO A MINIMUM. ALL WORK THAT REQUIRES A SUSTAINED EQUIPMENT OUTAGE SHALL BE PERFORMED CONTINUOUSLY AROUND THE CLOCK UNTIL WORK IS COMPLETED UNLESS NOTED OTHERWISE.

HAZARDOUS LOCATION CLASSIFICATION NOTES (APPLICABLE TO ALL ELECTRICAL WORK)

1. THIS PROJECT CONTAINS AREAS THAT ARE CLASSIFIED AS A CLASS I, DIVISION 1, GROUP D AND/OR CLASS I, DIVISION 2, GROUP D HAZARDOUS LOCATION IN ACCORDANCE WITH NFPA 820 AND NFPA 70. HAZARDOUS CLASSIFIED AREAS ARE SHOWN ON THE DRAWINGS.
2. ALL EQUIPMENT AND INSTALLATION METHODS USED IN AND AROUND HAZARDOUS CLASSIFIED AREAS SHALL BE RATED FOR USE IN A CLASS I, DIVISION 1, GROUP D ENVIRONMENT OR A CLASS I, DIVISION 2, GROUP D ENVIRONMENT IN ACCORDANCE WITH ALL APPLICABLE CODES AND STANDARDS INCLUDING, BUT NOT LIMITED TO, NFPA 820 AND NFPA 70.
3. PROVIDE HAZARDOUS SEAL-OFF FITTINGS FOR ALL CONDUITS AND CORDS PASSING FROM HAZARDOUS CLASSIFIED AREA INTO AN UNCLASSIFIED AREA.
4. PROVIDE AIR/VAPOR/WATER TIGHT SEAL FOR ALL CONDUIT PENETRATIONS THROUGH WALLS AND FLOORS PASSING FROM HAZARDOUS CLASSIFIED AREA INTO UNCLASSIFIED AREA.
5. THE USE OF INTRINSICALLY SAFE SYSTEMS SHALL BE PERMITTED FOR USE IN CLASSIFIED AREAS ONLY WHEN CLASSIFIED EQUIPMENT IS NOT AVAILABLE. IN ADDITION TO OTHER REQUIREMENTS, SUBMIT FOR APPROVAL, ALL SHOP DRAWINGS AND CONTROL DRAWINGS FOR THE COMPLETE INTRINSICALLY SAFE SYSTEM INCLUDING ALL EQUIPMENT FROM SOURCE TO DEVICE. PROVIDE REQUIRED ADDITIONAL DESIGN OF THESE SYSTEMS.

GENERATOR SEQUENCE OF OPERATION

STANDBY GENERATOR SEQUENCE OF OPERATIONS:

NOTE: THE CONDUIT AND CONDUCTOR REQUIREMENTS NECESSARY TO IMPLEMENT THIS SEQUENCE OF OPERATIONS IS NOT SHOWN IN THE I&C CABLE SCHEDULES. PROVIDE ALL CONDUIT, CONDUCTORS, TERMINATIONS, LABOR, MATERIALS, TOOLS, EQUIPMENT, ADDITIONAL DESIGN, AND ALL INCIDENTALS NECESSARY TO PROVIDE A COMPLETE AND OPERABLE SYSTEM AS DESCRIBED BELOW. COORDINATE WITH OTHER DISCIPLINES AS REQUIRED.

1. THE ELECTRICAL DISTRIBUTION SYSTEM CONSISTS OF A NORMAL AND OPTIONAL STANDBY DISTRIBUTION SYSTEM. ALL DISTRIBUTION SYSTEMS ARE SUPPLIED BY NORMAL UTILITY POWER UNDER NORMAL OPERATING CONDITIONS. THE OPTIONAL STANDBY DISTRIBUTION SYSTEMS ARE SUPPLIED BY THE 550KW STANDBY GENERATOR UPON LOSS OF NORMAL UTILITY POWER.

2. OPTIONAL STANDBY DISTRIBUTION SYSTEM AT ATS:

   A. LOSS OF NORMAL UTILITY POWER AT THE OPTIONAL STANDBY ATS WILL RESULT IN THE FOLLOWING SEQUENCE OF EVENTS:

   - THE OPTIONAL STANDBY ATS WILL START THE GENERATOR AUTOMATICALLY WITH A TIME DELAY OF 10 SECONDS.
   - THE OPTIONAL STANDBY ATS WILL SWITCH TO GENERATOR POWER AND LOAD WILL BE APPLIED TO THE GENERATOR WITHIN 20 SECONDS FOLLOWING THE 10 SECONDS TIME DELAY.

   B. WHEN THE OPTIONAL STANDBY DISTRIBUTION SYSTEM IS SUPPLIED BY GENERATOR POWER, ALL CONNECTED EQUIPMENT WILL OPERATE IN THE SAME WAY AS WHEN THIS EQUIPMENT IS SUPPLIED BY NORMAL UTILITY POWER. LOAD APPLIED TO THE GENERATOR SHALL BE SEQUENCED IN STEPS AS INDICATED IN SPECIFICATIONS.

   C. WHEN THE OPTIONAL STANDBY DISTRIBUTION SYSTEM IS SUPPLIED BY GENERATOR POWER, THE LOAD BANK AUTOMATIC LOAD STEP CONTROLLER SHALL AUTOMATICALLY SENSE THE TOTAL LOAD SUPPLIED BY THE GENERATOR AND AUTOMATICALLY SWITCH IN/OUT THE APPROPRIATE NUMBER OF LOAD BANK STEPS TO KEEP THE GENERATOR LOADED TO AT LEAST 50% OF ITS RATED CAPACITY TO PREVENT THE GENERATOR FROM WET STACKING DURING GENERATOR RUN TIME.

   D. UPON RETURN OF NORMAL CONTINUOUS STABLE UTILITY POWER FOR 10 CONSECUTIVE MINUTES, THE FOLLOWING SEQUENCE OF EVENTS WILL OCCUR:

   - THE OPTIONAL STANDBY ATS WILL AUTOMATICALLY SWITCH BACK TO NORMAL UTILITY POWER.

   E. UPON SWITCHING OF ATS TO NORMAL UTILITY POWER, THE GENERATOR WILL CONTINUE TO RUN IN COOL DOWN MODE FOR A TIME AS RECOMMENDED BY THE GENERATOR MANUFACTURER AND THEN WILL AUTOMATICALLY SHUT DOWN.

ELECTRICAL CONVENTIONS

LIGHTING

LUMINAIRE TYPE – SEE LUMINAIRE SCHEDULE

A 1 — CIRCUIT NUMBER

a — CONTROL POINT DESIGNATION

SYMBOL	DESCRIPTION
LP2A–1,3,5	HOMERUN TO PANEL "LP2A", CIRCUITS #1,3,5 (VIA 20A–1P C/B'S). PROVIDE INSULATED GROUND CONDUCTOR IN ACCORDANCE WITH SPECIFICATIONS. NUMBER OF CIRCUITS INDICATED BY QUANTITY OF ARROW HEADS. THE USE OF DASHED LINE IN THIS SYMBOL INDICATES A BELOW GRADE HOMERUN.
	HASH MARKS INDICATE QUANTITY OF #12 AWG COPPER CONDUCTORS IN CONDUIT. WHEN NO HASH MARKS ARE INDICATED, CONDUIT SHALL CONTAIN (2) #12 WIRES AND #12 GROUND WIRE. ASSUME 3/4" DIAMETER CONDUIT UNLESS NOTED OTHERWISE. EXAMPLE SHOWN AT LEFT INDICATES 2 HOT, 2 NEUTRAL (LONG LINES), AND 1 GROUND WIRES.
	EXPOSED OR CONCEALED CONDUIT AND/OR WIRING.
	BELOW GRADE CONDUIT AND/OR WIRING.
# / SHT	DETAIL REFERENCE "#" DENOTES DETAIL NUMBER "SHT" DENOTES SHEET NUMBER
# / X Y	SECTION REFERENCE "#" DENOTES SECTION DETAIL NUMBER "X" DENOTES SHEET NUMBER OF PLAN "Y" DENOTES SHEET NUMBER OF SECTION DETAIL
1	SHEET KEYNOTE NUMBER
1	REVISION NUMBER

TYPICAL DEVICE MOUNTING HEIGHTS

NOTES:
1. ALL MOUNTING HEIGHTS SHALL BE MEASURED FROM FINISHED FLOOR TO CENTERLINE OF DEVICE, EXCEPT EXIT SIGNS.
2. DEVICES SHALL BE INSTALLED ON A COMMON VERTICAL CENTERLINE WHEREVER POSSIBLE.
3. ALL DEVICES SHALL BE INSTALLED AT MOUNTING HEIGHTS AS INDICATED ON THIS DETAIL UNLESS OTHERWISE NOTED.

DRY-TYPE TRANSFORMER SCHEDULE

TRANSFORMER	PRIMARY FEEDER INFORMATION		SECONDARY FEEDER INFORMATION							
KVA	VOLTS		VOLTS	# SETS	QTY OF PHASE & NEUTRAL CONDUCTORS	PHASE AND NEUTRAL CONDUCTORS	GROUND CONDUCTOR	CONDUIT SIZE	GROUNDING ELECTRODE CONDUCTOR	COMMENTS
15	480	REFER TO PANEL SCHEDULES	208Y/120	1	4	6	8	1"	8	1
30	480	REFER TO PANEL SCHEDULES	208Y/120	1	4	1	6	1-1/2"	6	1
45	480	REFER TO PANEL SCHEDULES	208Y/120	1	4	1/0	6	2"	6	1
75	480	REFER TO PANEL SCHEDULES	208Y/120	1	4	300	2	2-1/2"	2	1

NOTES:
1. PROVIDE CONCRETE EQUIPMENT HOUSEKEEPING PAD/FOUNDATION FOR TRANSFORMER.

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 30767
EXPIRATION DATE 09/29/2012

11/22/2013

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON®
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
GENERAL ELECTRICAL
PHASING NOTES & FIXTURE SCHEDULE

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-002

SHEET 92 OF 128

File: Q:\SMD\07\0902_MysticHarbourWWTPImpProvCivil_EP\1-CADD\VS-BUILT\ELECTRICAL\E-002 GENERAL ELECTRICAL.dwg
Jan 12, 2015 - 10:39:56am

GENERAL SHEET NOTES:

1. INFORMATION SHOWN ON THIS DRAWING PERTAINING TO EXISTING CONDITIONS HAS BEEN OBTAINED FROM AVAILABLE BUILDING DRAWINGS OR GENERAL FIELD OBSERVATIONS AND MAY NOT INDICATE ACTUAL EXISTING CONDITIONS IN DETAIL OR DIMENSION. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE ACTUAL EXISTING CONDITIONS PRIOR TO FABRICATION OR PERFORMANCE OF ANY WORK. SHOULD CONDITIONS BE DISCOVERED THAT PREVENT EXECUTION OF THE WORK AS INDICATED, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING AND AWAIT DIRECTION BEFORE PROCEEDING WITH THE WORK.
2. UNLESS OTHERWISE NOTED, ELECTRICAL ITEMS SHOWN HEAVY DASHED (- - - - - -) SHALL BE REMOVED AND ELECTRICAL ITEMS SHOWN LIGHT SOLID (————) SHALL BE EXISTING TO REMAIN.
3. REFER TO DRAWINGS E-001 AND E-002 FOR SYMBOL LEGEND, ABBREVIATIONS, AND GENERAL PROJECT NOTES.
4. FIELD VERIFY ALL UNDERGROUND CIRCUIT LOCATIONS BEFORE REMOVING ANY CIRCUITS. CONTACT THE ENGINEER IF EXISTING CONDITIONS DIFFER FROM WHAT IS SHOWN ON THIS DRAWING.

SHEET KEYNOTES:

(1) DISCONNECT EXISTING MOTOR AND REMOVE ITS ASSOCIATED DISCONNECT SWITCH AND ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.

(2) DISCONNECT EXISTING FLOW TRANSMITTER AND REMOVE ITS ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.

(3) DISCONNECT AND REMOVE EXISTING MIXERS CONTROL PANEL AND ITS ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.

(4) DISCONNECT AND REMOVE EXISTING RAS/WAS PUMP CONTROL PANEL AND ITS ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.

(5) DISCONNECT AND REMOVE EXISTING DISCONNECT SWITCH AND ITS ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.

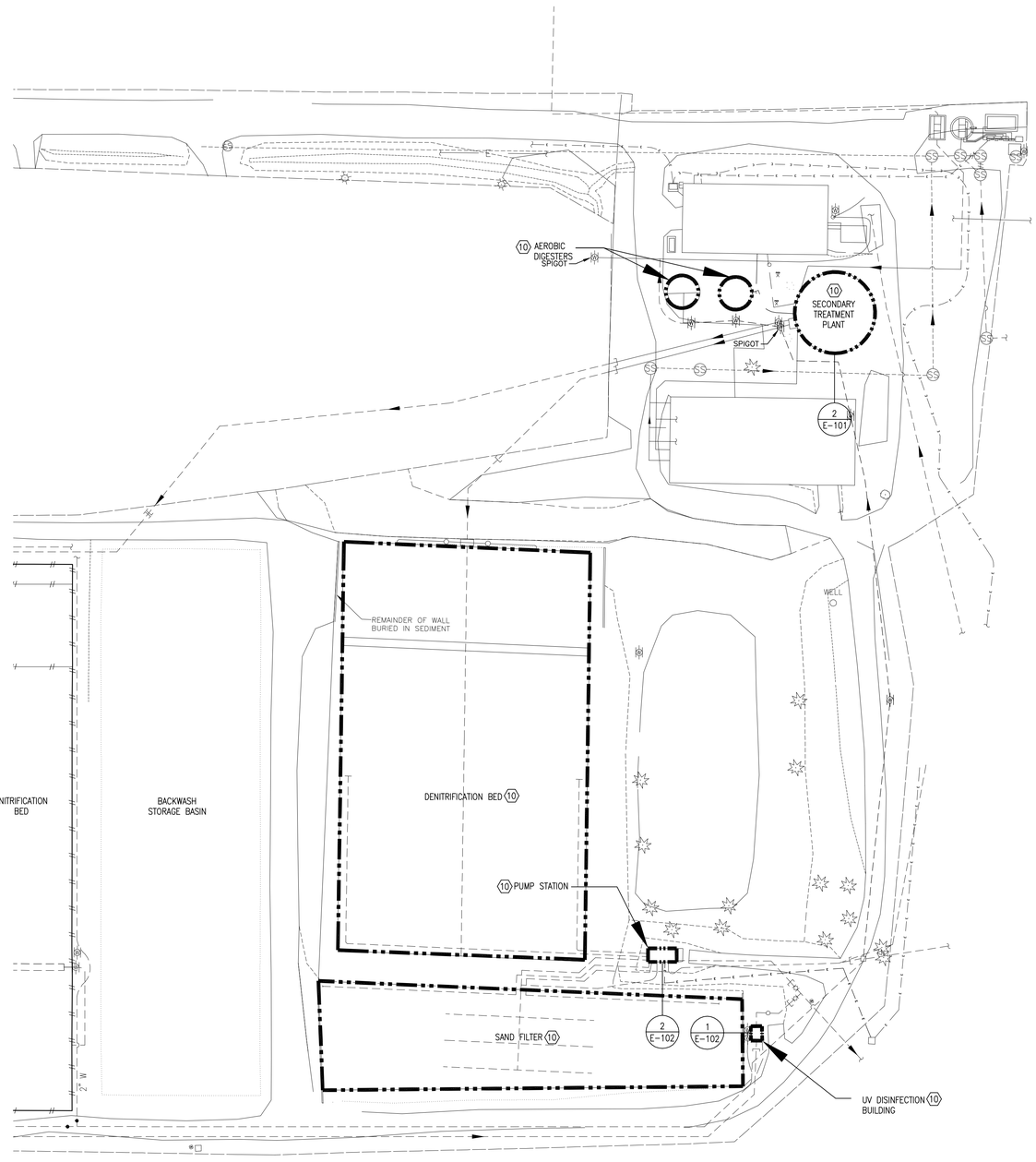
(6) DISCONNECT AND REMOVE EXISTING LIGHT FIXTURE AND ITS ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.

(7) DISCONNECT AND REMOVE EXISTING SUBMERSIBLE PUMPS CONTROL PANEL AND ITS ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.

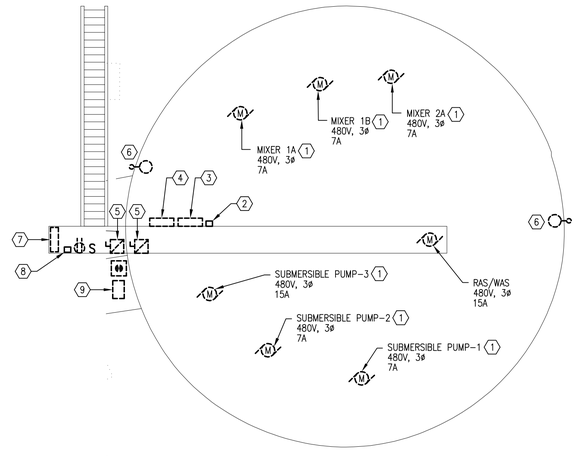
(8) DISCONNECT EXISTING FLOW METER AND REMOVE ITS ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.

(9) DISCONNECT EXISTING CHART RECORDER AND REMOVE ITS ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.

(10) CONTRACTOR SHALL FIELD VERIFY THIS AREA FOR ANY EXISTING ELECTRICAL EQUIPMENT PRIOR TO BID. CONTRACTOR SHALL DISCONNECT AND REMOVE ALL ELECTRICAL EQUIPMENT AND ITS ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.



1 E-101 SCALE: 1" = 40'
SITE PLAN – ELECTRICAL DEMOLITION



2 E-101 SCALE: 1/8" = 1'-0"
EXISTING SECONDARY TREATMENT PLANT – DEMOLITION

4' 0 4' 8'
SCALE: 1/8"= 1'-0"

20' 0 20' 40'
SCALE: 1"= 40'-0"

RECORD DRAWING SET
JANUARY 2015

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MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
ELECTRICAL DEMOLITION - SITE PLAN

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-101

SHEET 93 OF 128

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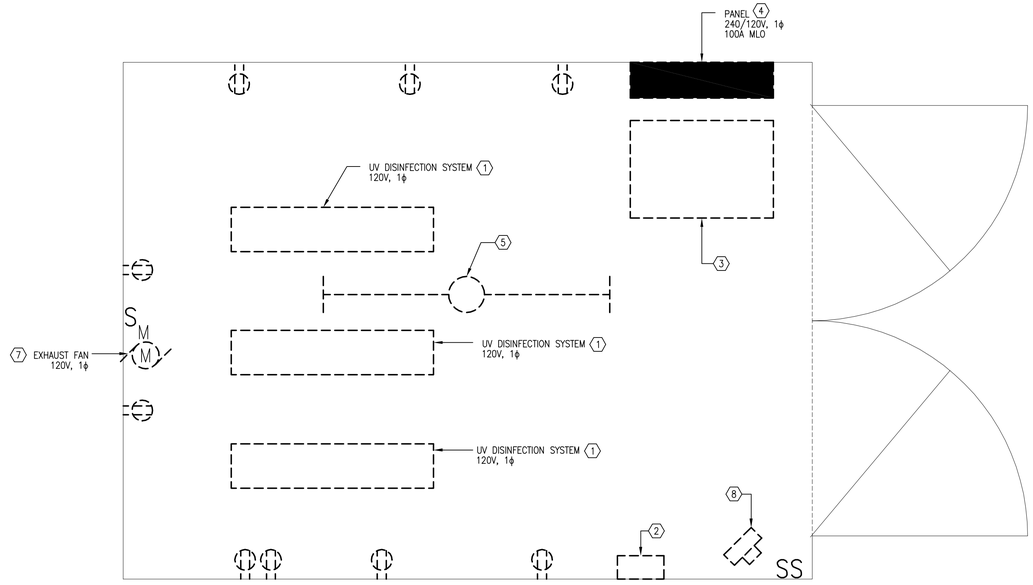
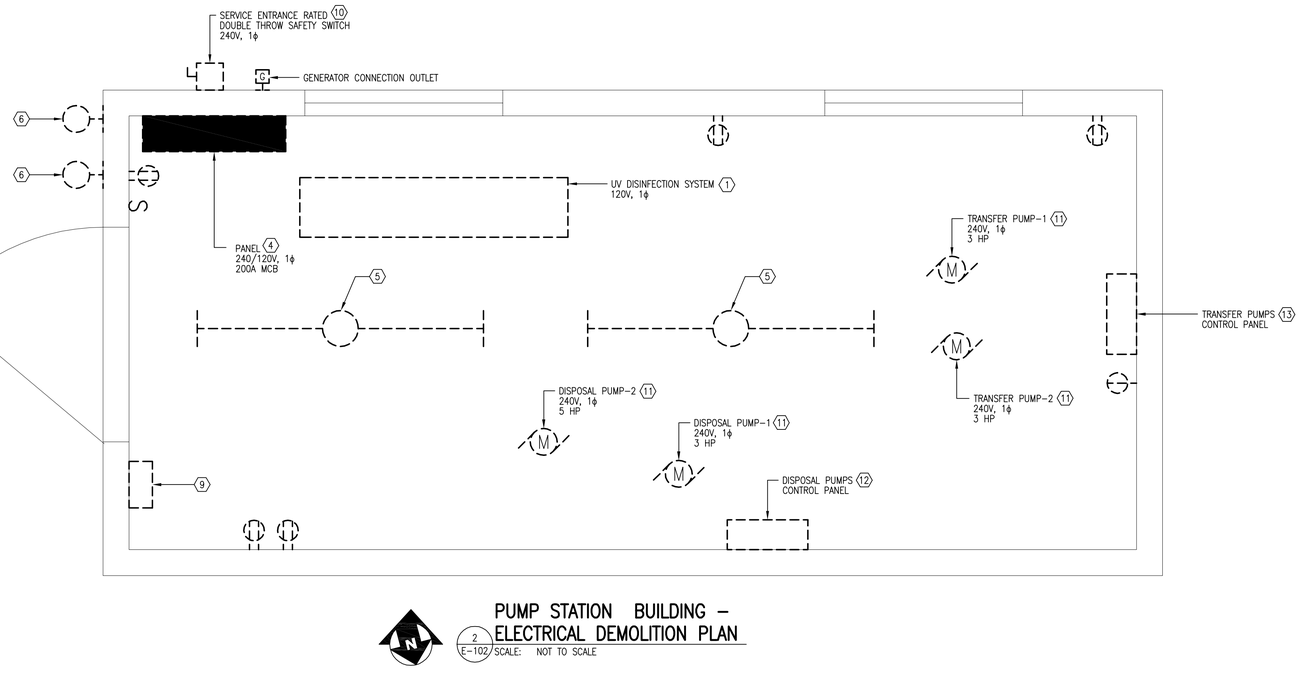


UV DISINFECTION BUILDING – ELECTRICAL DEMOLITION PLAN

1 / E-102 SCALE: NOT TO SCALE



PUMP STATION BUILDING – ELECTRICAL DEMOLITION PLAN

2 / E-102 SCALE: NOT TO SCALE

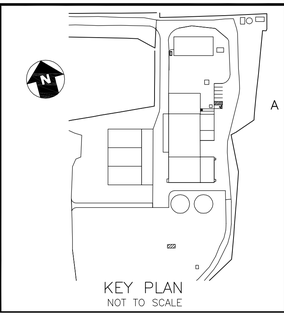
GENERAL SHEET NOTES:

1. INFORMATION SHOWN ON THIS DRAWING PERTAINING TO EXISTING CONDITIONS HAS BEEN OBTAINED FROM AVAILABLE BUILDING DRAWINGS OR GENERAL FIELD OBSERVATIONS AND MAY NOT INDICATE ACTUAL EXISTING CONDITIONS IN DETAIL OR DIMENSION. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE ACTUAL EXISTING CONDITIONS PRIOR TO FABRICATION OR PERFORMANCE OF ANY WORK. SHOULD CONDITIONS BE DISCOVERED THAT PREVENT EXECUTION OF THE WORK AS INDICATED, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING AND AWAIT DIRECTION BEFORE PROCEEDING WITH THE WORK.
2. UNLESS OTHERWISE NOTED, ELECTRICAL ITEMS SHOWN HEAVY DASHED (— — —) SHALL BE REMOVED AND ELECTRICAL ITEMS SHOWN LIGHT SOLID (————) SHALL BE EXISTING TO REMAIN.
3. REFER TO DRAWINGS E-001 AND E-002 FOR SYMBOL LEGEND, ABBREVIATIONS, AND GENERAL PROJECT NOTES.
4. FIELD VERIFY ALL UNDERGROUND CIRCUIT LOCATIONS BEFORE REMOVING ANY CIRCUITS. CONTACT THE ENGINEER IF EXISTING CONDITIONS DIFFER FROM WHAT IS SHOWN ON THIS DRAWING.

SHEET KEYNOTES:

1. DISCONNECT EXISTING UV DISINFECTION SYSTEM AND REMOVE ITS ASSOCIATED DISCONNECT SWITCH AND ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.
2. DISCONNECT EXISTING FLOW TRANSMITTER AND REMOVE ITS ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.
3. DISCONNECT EXISTING SAMPLER AND REMOVE ITS ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.
4. DISCONNECT AND REMOVE EXISTING PANEL AND ITS ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.
5. DISCONNECT AND REMOVE EXISTING LIGHT FIXTURE AND ITS ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.
6. DISCONNECT AND REMOVE EXISTING BEACON LIGHT AND ITS ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.
7. DISCONNECT AND REMOVE EXISTING EXHAUST FAN AND ITS ASSOCIATED DISCONNECT AND ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.
8. DISCONNECT AND REMOVE EXISTING UNIT HEATER AND ITS ASSOCIATED DISCONNECT AND ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.
9. DISCONNECT EXISTING FLOW METER AND REMOVE ITS ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.
10. DISCONNECT AND REMOVE EXISTING SERVICE ENTRANCE DISCONNECT AND ITS ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.
11. DISCONNECT EXISTING MOTOR AND REMOVE ITS ASSOCIATED DISCONNECT SWITCH AND ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.
12. DISCONNECT AND REMOVE EXISTING DISPOSAL PUMP CONTROL PANEL AND ITS ASSOCIATED DISCONNECT AND ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.
13. DISCONNECT AND REMOVE EXISTING TRANSFER PUMP CONTROL PANEL AND ITS ASSOCIATED DISCONNECT AND ASSOCIATED CABLE AND CONDUIT BACK TO THE SOURCE.

RECORD DRAWING SET JANUARY 2015



WORCESTER COUNTY

STATE OF MARYLAND — DAVID P. PRETTYMAN — No. 30767 — PROFESSIONAL ENGINEER — 11/22/2000

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 30767
EXPIRATION DATE 06/29/2012

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
UV DISINFECTION BUILDING & PUMP STATION BUILDING - ELECTRICAL DEMOLITION

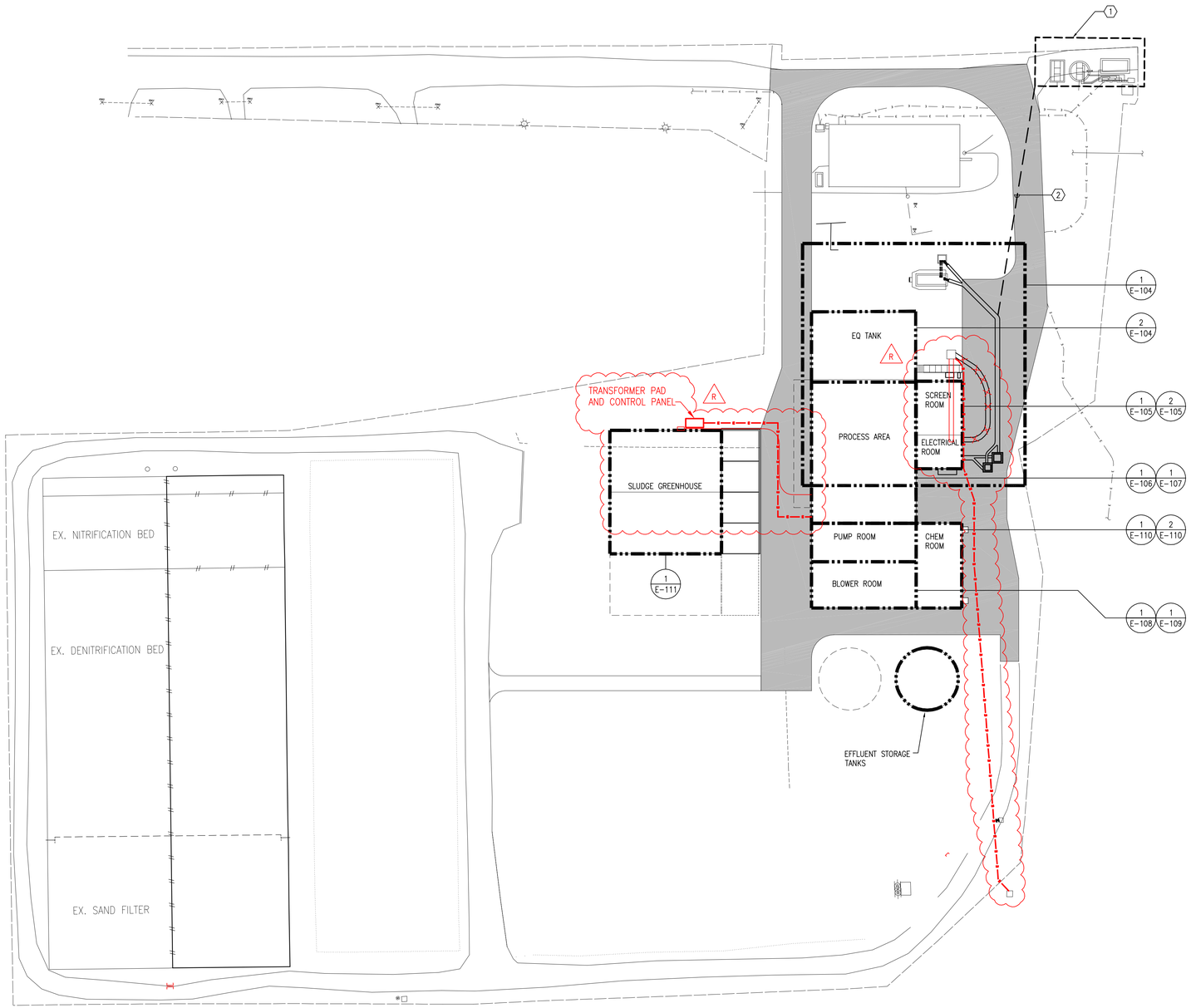
MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-102

SHEET 94 OF 128

File: Q:\SMD\07060_MysticHarbour\WWTPnextPhase\ut_EFLV-CADD\AS-BUILTS\ELECTRICAL\E-102 UV Build.dwg
Jan 12, 2015 - 10:33:08am



GENERAL SHEET NOTES:

1. INFORMATION SHOWN ON THIS DRAWING PERTAINING TO EXISTING CONDITIONS HAS BEEN OBTAINED FROM AVAILABLE BUILDING DRAWINGS OR GENERAL FIELD OBSERVATIONS AND MAY NOT INDICATE ACTUAL EXISTING CONDITIONS IN DETAIL OR DIMENSION. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE ACTUAL EXISTING CONDITIONS PRIOR TO FABRICATION OR PERFORMANCE OF ANY WORK. SHOULD CONDITIONS BE DISCOVERED THAT PREVENT EXECUTION OF THE WORK AS INDICATED, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING AND AWAIT DIRECTION BEFORE PROCEEDING WITH THE WORK.
2. UNLESS OTHERWISE NOTED, ELECTRICAL ITEMS SHOWN HEAVY SOLID (———) SHALL BE NEW AND ELECTRICAL ITEMS SHOWN LIGHT SOLID (———) SHALL BE EXISTING TO REMAIN.
3. REFER TO DRAWINGS E-001 AND E-002 FOR SYMBOL LEGEND, ABBREVIATIONS, AND GENERAL PROJECT NOTES.
4. COORDINATE ALL UNDERGROUND ELECTRICAL UTILITY LOCATIONS WITH ALL OTHER TRADES BEFORE INSTALLING ANY UNDERGROUND ELECTRICAL UTILITIES.

SHEET KEYNOTES:

(1) EXISTING PUMPING STATION – REFER TO E-501 FOR ADDITIONAL ELECTRICAL WORK.

(2) 3" CONDUIT IN CONCRETE ENCASED DUCTBANK WITH (3)#1/0 AND (1)#6G TO POWER EXISTING PUMPING STATION.

1 E-103 SCALE: 1" = 40'

SITE PLAN – ELECTRICAL

20' 0 20' 40'
SCALE: 1"= 40'-0"

RECORD DRAWING SET
JANUARY 2015

11/22/2002

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 30767
EXPIRATION DATE 09/29/2012

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
SITE PLAN - ELECTRICAL

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-103

SHEET 95 OF 128

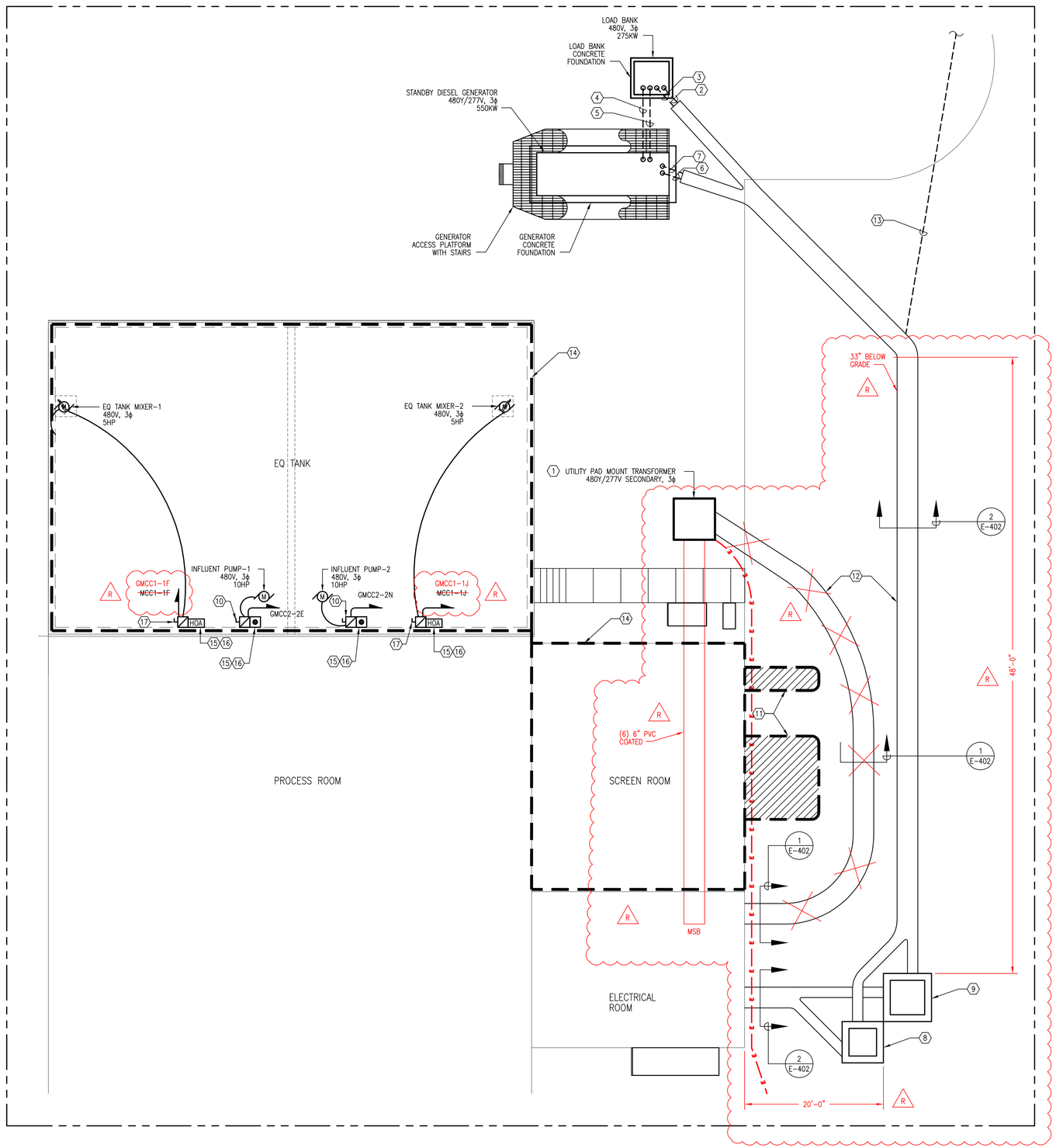
File: Q:\SMD\07066_MysticHarbour\WWTP\mod\Prod_Lft\1-CAD\AS-BUILTS\ELECTRICAL\E-103 PROPOSED SITE PLAN.dwg
Jan 13, 2015 - 1:35:50pm

GENERAL SHEET NOTES:

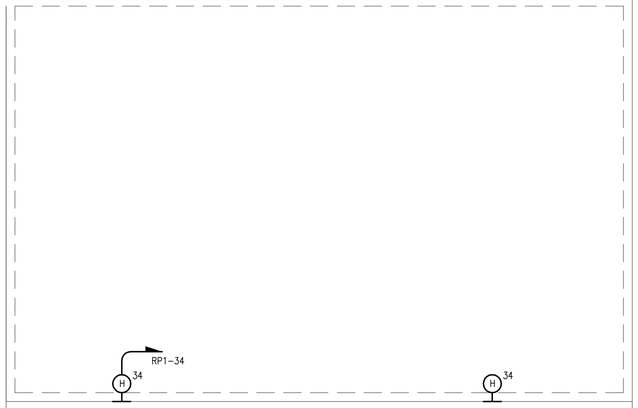
1. INFORMATION SHOWN ON THIS DRAWING PERTAINING TO EXISTING CONDITIONS HAS BEEN OBTAINED FROM AVAILABLE BUILDING DRAWINGS OR GENERAL FIELD OBSERVATIONS AND MAY NOT INDICATE ACTUAL EXISTING CONDITIONS IN DETAIL OR DIMENSION. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE ACTUAL EXISTING CONDITIONS PRIOR TO FABRICATION OR PERFORMANCE OF ANY WORK. SHOULD CONDITIONS BE DISCOVERED THAT PREVENT EXECUTION OF THE WORK AS INDICATED, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING AND AWAIT DIRECTION BEFORE PROCEEDING WITH THE WORK.
2. UNLESS OTHERWISE NOTED, ELECTRICAL ITEMS SHOWN HEAVY SOLID (———) SHALL BE NEW AND ELECTRICAL ITEMS SHOWN LIGHT SOLID (———) SHALL BE EXISTING TO REMAIN.
3. REFER TO DRAWINGS E-001 AND E-002 FOR SYMBOL LEGEND, ABBREVIATIONS, AND GENERAL PROJECT NOTES.
4. REFER TO DRAWINGS E-401 AND E-402 FOR DETAILS AND E-502 TO E-504 FOR MCC AND PANEL SCHEDULES.
5. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH DELMARVA POWER PRIOR TO INSTALLATION OF CONCRETE ENCASED DUCTBANK FOR SERVICE CONDUCTORS. ALL INSTALLATION SHALL BE DONE IN ACCORDANCE WITH DELMARVA POWER REQUIREMENTS.

SHEET KEYNOTES:

1. PROVIDE DELMARVA POWER APPROVED PRE-CAST CONCRETE TRANSFORMER BASE, TRENCH FOR GROUND RING AND ALL EXCAVATION AND BACKFILL.
2. 1" CONDUIT IN CONCRETE ENCASED DUCTBANK WITH CONDUCTORS REQUIRED FOR CONTROL POWER AND CONTROL CONNECTION BETWEEN LOAD BANK AND LOAD BANK REMOTE CONTROL PANEL.
3. 1" INNERDUCT IN CONCRETE ENCASED DUCTBANK WITH CIRCUIT GRP2-20.
4. 1" INNERDUCT IN CONCRETE ENCASED DUCTBANK WITH CONDUCTORS REQUIRED FOR CT SENSOR LOCATED AT GENERATOR.
5. LOAD BANK MAIN POWER SUPPLY CONDUCTORS IN CONCRETE ENCASED DUCTBANK.
6. GENERATOR MAIN POWER SUPPLY CONDUCTORS IN CONCRETE ENCASED DUCTBANK. REFER TO ONE-LINE DIAGRAM ON DRAWING E-501 FOR FEEDER SIZE.
7. CONCRETE ENCASED DUCTBANK AS FOLLOWS (COORDINATE CONDUIT AND CIRCUITS WITH FINAL GENERATOR EQUIPMENT INSTALLED):
   - (1) 1" INNERDUCT– CIRCUITS GRP2-13, GRP2-14
   - (1) 1" INNERDUCT– CIRCUITS GRP2-15,17; GRP2-16
   - (1) 1" INNERDUCT– CONDUCTORS FOR GENERATOR SIGNALS TO SCADA SYSTEM
   - (1) 1" INNERDUCT– CONDUCTORS FOR GENERATOR REMOTE ANNUNCIATOR AND GENERATOR REMOTE MANUAL STOP STATION.
   - (1) 1" INNERDUCT– CONDUCTORS FOR GENERATOR STARTING CIRCUIT TO ATS
   - (1) 1" INNERDUCT– EMPTY SPARE WITH PULL STRING
8. TYPE H1 HANDHOLE FOR INSTRUMENTATION AND CONTROLS CONDUCTORS. SEE DETAIL #3 ON E-402.
9. TYPE H2 HANDHOLE FOR POWER CONDUCTORS. SEE DETAIL #3 ON E-402.
10. 480V, 30A, 3 POLE FUSED DISCONNECT SWITCH RATED FOR CLASS 1, DIVISION 1, GROUP D, WITH 20A FUSE.
11. CLASSIFIED HAZARDOUS AREA BOUNDARY. HATCHED AREA LOCATED WITHIN BOUNDARY IS CLASSIFIED AS CLASS 1, DIVISION 2, GROUP D. ALL EQUIPMENT INSTALLED IN THIS BOUNDARY SHALL BE RATED FOR CLASS 1, DIVISION 2, GROUP D LOCATIONS.
12. CONCRETE ENCASED ELECTRICAL DUCTBANK.
13. 3" CONDUIT IN CONCRETE ENCASED DUCTBANK WITH (3)#1/0 AND (1)#6G TO EXISTING PUMPING STATION.
14. CLASSIFIED HAZARDOUS AREA BOUNDARY. AREA LOCATED WITHIN THE BOUNDARY IS CLASSIFIED AS CLASS 1, DIVISION 1, GROUP D. ALL EQUIPMENT INSTALLED IN THIS BOUNDARY SHALL BE RATED FOR CLASS 1, DIVISION 1, GROUP D LOCATIONS.
15. EQUIPMENT SHALL BE RATED FOR CLASS 1, DIVISION 1, GROUP D LOCATION.
16. PROVIDE CONDUIT AND CONDUCTORS FROM SUPPLY MCC.
17. 480V, 30A, 3 POLE FUSED DISCONNECT SWITCH RATED FOR CLASS 1, DIVISION 1, GROUP D, WITH 15A FUSE.

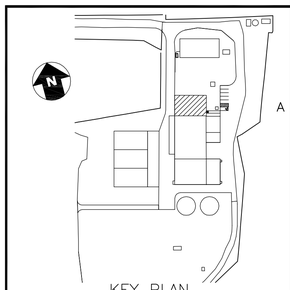


1 E-104 EQUALIZATION TANK – POWER PLAN
SCALE: 1/8" = 1'-0"



2 E-104 EQUALIZATION TANK – LIGHTING PLAN
SCALE: 1/8" = 1'-0"

4' 0 4' 8'
SCALE: 1/8" = 1'-0"



RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

STATE OF MARYLAND — DAVID P. PRETTYMAN — No. 30767 — REGISTERED PROFESSIONAL ENGINEER
11/22/2013

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 30767
EXPIRATION DATE 06/29/2012

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
EQUALIZATION TANK
POWER PLAN AND LIGHTING PLAN

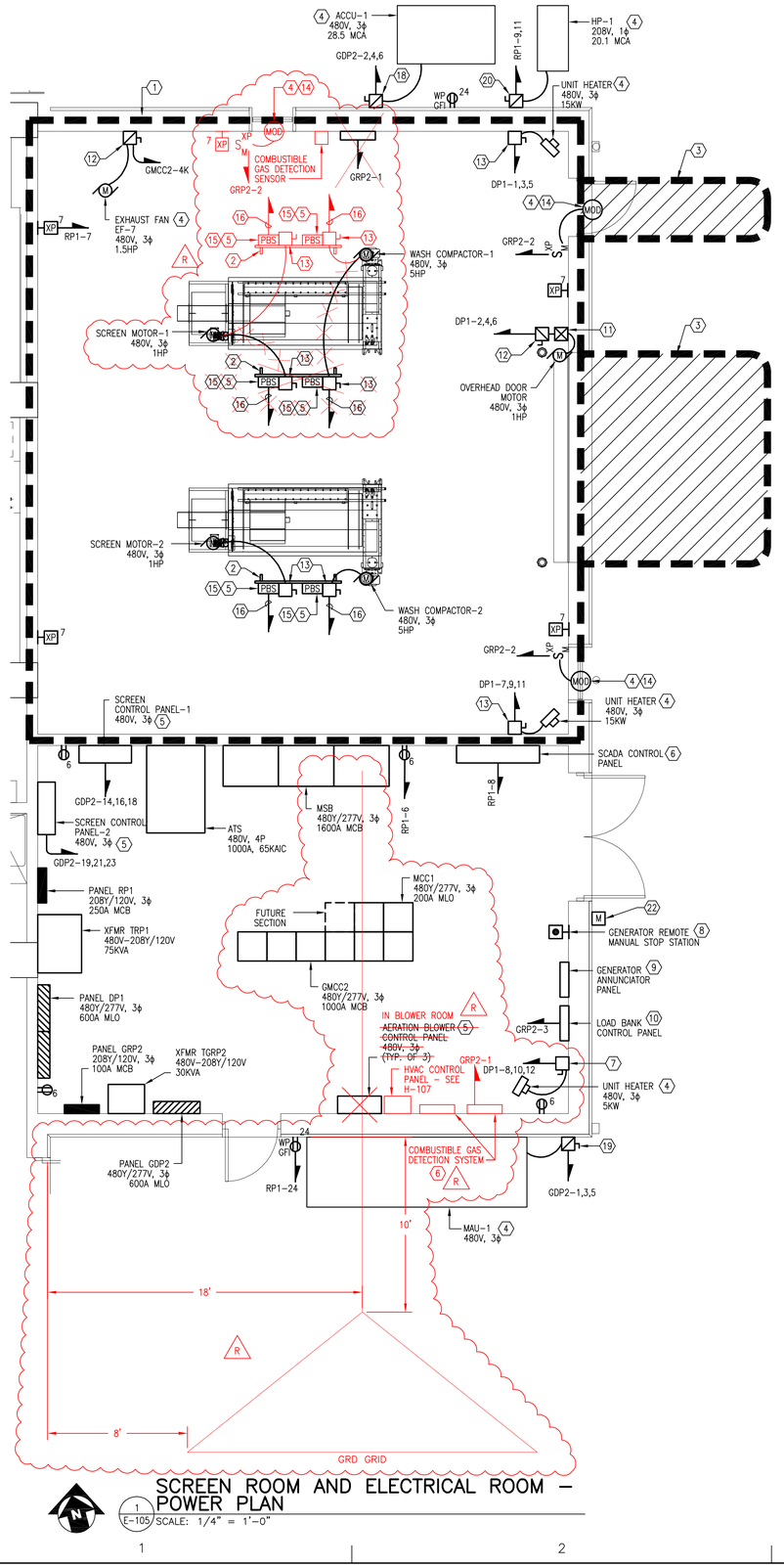
MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

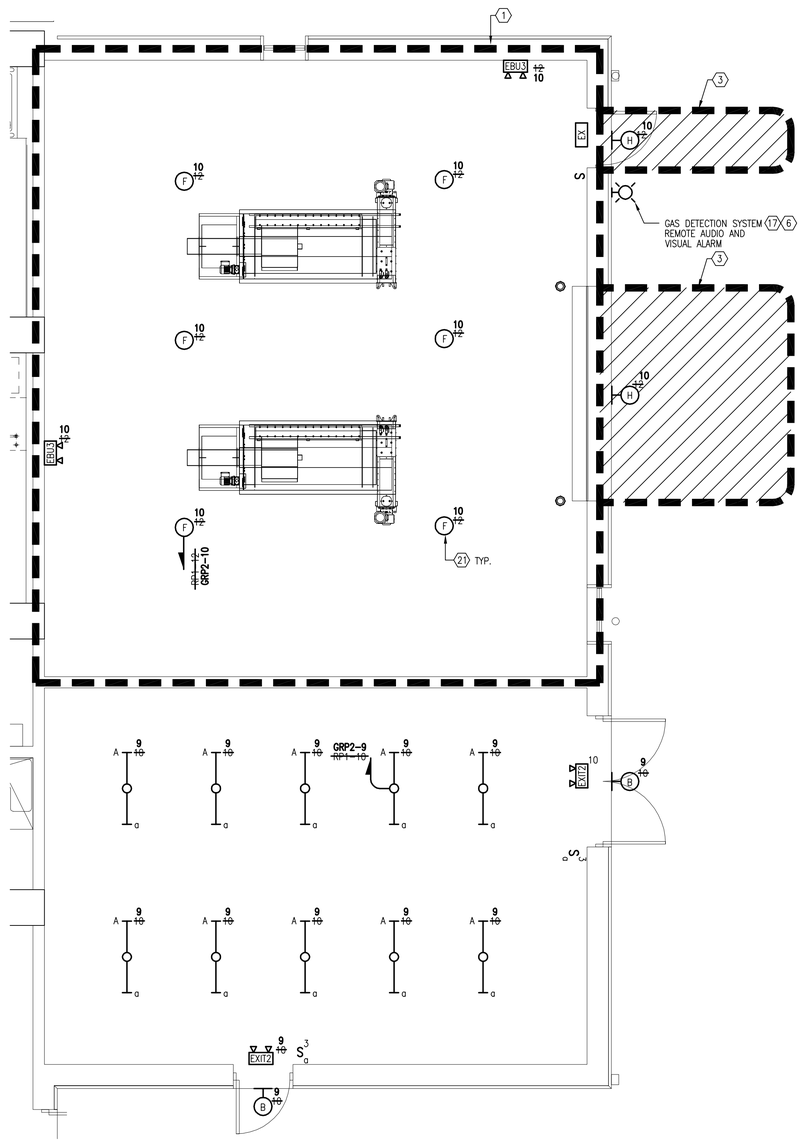
E-104

SHEET 96 OF 128

File: Q:\1MW\07\06\02_MysticHarbour\WWTP\wet\Proc\Cad_Z\T1+CADD\AS-BUILTS\ELECTRICAL\E-104 EQ TANK.dwg
Jan 12, 2015 - 9:57:59am



1 SCREEN ROOM AND ELECTRICAL ROOM – POWER PLAN
E-105 SCALE: 1/4" = 1'-0"



2 SCREEN ROOM AND ELECTRICAL ROOM – LIGHTING PLAN
E-105 SCALE: 1/4" = 1'-0"

GENERAL SHEET NOTES:

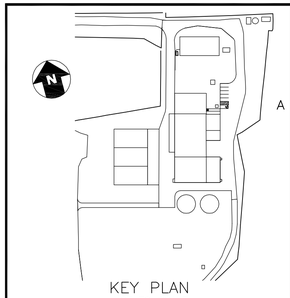
1. INFORMATION SHOWN ON THIS DRAWING PERTAINING TO EXISTING CONDITIONS HAS BEEN OBTAINED FROM AVAILABLE BUILDING DRAWINGS OR GENERAL FIELD OBSERVATIONS AND MAY NOT INDICATE ACTUAL EXISTING CONDITIONS IN DETAIL OR DIMENSION. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE ACTUAL EXISTING CONDITIONS PRIOR TO FABRICATION OR PERFORMANCE OF ANY WORK. SHOULD CONDITIONS BE DISCOVERED THAT PREVENT EXECUTION OF THE WORK AS INDICATED, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING AND AWAIT DIRECTION BEFORE PROCEEDING WITH THE WORK.
2. UNLESS OTHERWISE NOTED, ELECTRICAL ITEMS SHOWN HEAVY SOLID (———) SHALL BE NEW AND ELECTRICAL ITEMS SHOWN LIGHT SOLID (———) SHALL BE EXISTING TO REMAIN.
3. REFER TO DRAWINGS E-001 AND E-002 FOR SYMBOL LEGEND, ABBREVIATIONS, AND GENERAL PROJECT NOTES.
4. REFER TO DRAWINGS E-502 THRU E-504 FOR MCC AND PANEL SCHEDULES AND E-401 TO E-402 FOR ELECTRICAL DETAILS.
5. ALL EMERGENCY AND EXIT LIGHT FIXTURES SHALL BE CONNECTED TO AN UNSWITCHED CIRCUIT.

SHEET KEYNOTES:

1. CLASSIFIED HAZARDOUS AREA BOUNDARY. AREA LOCATED WITHIN THE BOUNDARY IS CLASSIFIED AS CLASS 1, DIVISION 1, GROUP D. ALL EQUIPMENT INSTALLED IN THIS BOUNDARY SHALL BE RATED FOR CLASS 1, DIVISION 1, GROUP D LOCATIONS.
2. PROVIDE UNISTRUT SUPPORT STRUCTURE FOR MOUNTING DISCONNECT AND PUSH BUTTON STATIONS.
3. CLASSIFIED HAZARDOUS AREA BOUNDARY. HATCHED AREA LOCATED WITHIN BOUNDARY IS CLASSIFIED AS CLASS 1, DIVISION 2, GROUP D. ALL EQUIPMENT INSTALLED IN THIS BOUNDARY SHALL BE RATED FOR CLASS 1, DIVISION 2, GROUP D LOCATIONS.
4. EQUIPMENT PROVIDED UNDER DIVISION 15.
5. EQUIPMENT PROVIDED UNDER DIVISION 11.
6. EQUIPMENT PROVIDED UNDER DIVISION 17.
7. 480V, 30A, 3 POLE, NON-FUSED DISCONNECT SWITCH IN NEMA 1 ENCLOSURE.
8. PROVIDE 3/4" CONDUIT AND MANUFACTURER RECOMMENDED CONDUCTORS TO GENERATOR FOR GENERATOR REMOTE MANUAL STOP STATION. PROVIDE LABEL.
9. PROVIDE 1" CONDUIT AND MANUFACTURER RECOMMENDED CONDUCTORS TO GENERATOR FOR GENERATOR REMOTE ANNUNCIATOR PANEL.
10. PROVIDE 1" CONDUIT AND MANUFACTURER RECOMMENDED CONDUCTORS TO LOADBANK FOR LOADBANK REMOTE CONTROL PANEL.
11. CONTROLLER FOR THE OVERHEAD DOOR SUPPLIED BY DOOR MANUFACTURER UNDER DIVISION 8.
12. 480V, 30A, 3 POLE FUSED DISCONNECT SWITCH RATED FOR CLASS I, DIVISION 1, GROUP D, WITH 6A FUSE.
13. 480V, 30A, 3 POLE, NON-FUSED DISCONNECT SWITCH IN CLASS 1, DIVISION 1, GROUP D RATED ENCLOSURE.
14. INTERLOCKED WITH EXHAUST FAN EF-7. ROUTE SUPPLY CIRCUIT THROUGH EF-7 STARTER LOCATED IN GMCC2.
15. PROVIDE CONDUIT AND CONDUCTORS FROM SCREEN CONTROL PANEL AS REQUIRED. REFER TO I&C CABLE AND CONDUIT SCHEDULE.
16. PROVIDE (3)#12 & (1)#12G IN 3/4" C FOR POWER CONNECTION OF EQUIPMENT TO SCREEN CONTROL PANEL LOCATED IN ELECTRICAL ROOM.
17. ILLUMINATED BEACON FLASHING LIGHT IN METAL ENCLOSURE WITH RED GLASS LENSE AND AUDIBLE ALARM IN METAL ENCLOSURE RATED FOR OUTDOOR USE. PROVIDE CONDUIT AND CONDUCTORS FROM GAS DETECTION PANEL AS REQUIRED. REFER TO I&C CABLE AND CONDUIT SCHEDULE. MOUNT 10' AFG
18. 480V, 60A, 3 POLE FUSED DISCONNECT SWITCH IN NEMA 4X STAINLESS STEEL ENCLOSURE WITH 35A FUSE.
19. 480V, 60A, 3 POLE FUSED DISCONNECT SWITCH IN NEMA 4X STAINLESS STEEL ENCLOSURE WITH 50A FUSE.
20. 208V, 60A, 2 POLE FUSED DISCONNECT SWITCH IN NEMA 4X STAINLESS STEEL ENCLOSURE WITH 35A FUSE.
21. MOUNT LIGHT FIXTURE 12' AFF.
22. PROPOSED LOCATION FOR ELECTRIC METER SUPPLIED BY DELMARVA POWER. METER BASE PROVIDED AND INSTALLED BY ELECTRICAL CONTRACTOR.

2' 0 2' 4'
SCALE: 1/4"= 1'-0"

RECORD DRAWING SET JANUARY 2015



WORCESTER COUNTY

STATE OF MARYLAND — DAVID PAUL PRICE — No. 30767 — PROFESSIONAL ENGINEER — 11/22/2013

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 30767 EXPIRATION DATE 06/29/2012

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON®
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
SCREEN ROOM AND ELECTRICAL ROOM - POWER PLAN AND LIGHTING PLAN

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	NOV. 2014	RECORD DRAWINGS

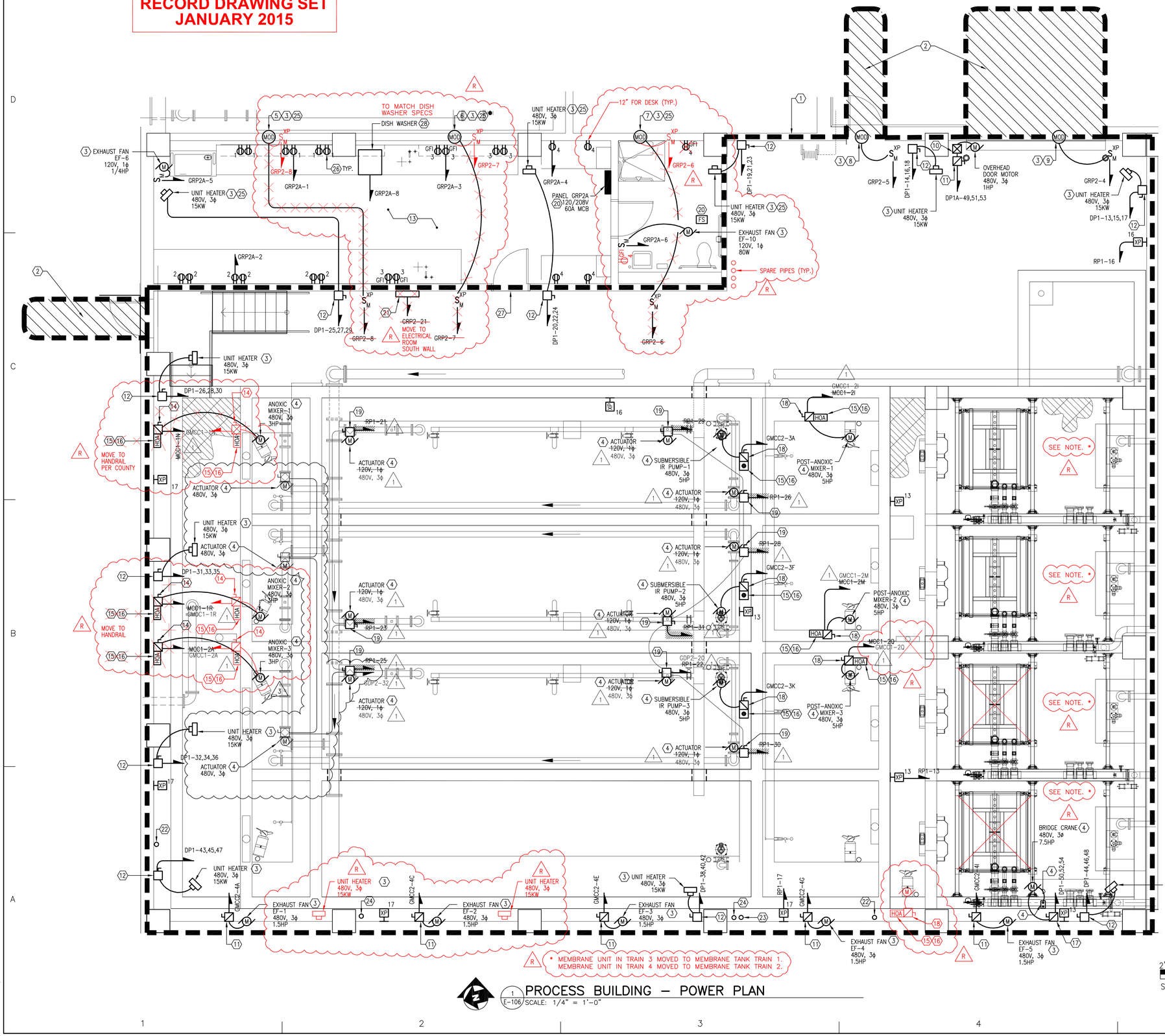
CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-105

SHEET 97 OF 128

File: Q:\SAVE\170662_MysticHarbourWWTPImprovEval_LET\4-CAD\AS-BUILTS\ELECTRICAL\E-105 SCREEN ROOM.dwg
Jan 12, 2015 - 10:42:25am

RECORD DRAWING SET
JANUARY 2015



1 E-106 SCALE: 1/4" = 1'-0"

PROCESS BUILDING – POWER PLAN

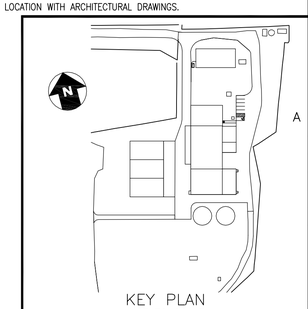
SCALE: ¼"= 1'-0"

GENERAL SHEET NOTES:

1. INFORMATION SHOWN ON THIS DRAWING PERTAINING TO EXISTING CONDITIONS HAS BEEN OBTAINED FROM AVAILABLE BUILDING DRAWINGS OR GENERAL FIELD OBSERVATIONS AND MAY NOT INDICATE ACTUAL EXISTING CONDITIONS IN DETAIL OR DIMENSION. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE ACTUAL EXISTING CONDITIONS PRIOR TO FABRICATION OR PERFORMANCE OF ANY WORK. SHOULD CONDITIONS BE DISCOVERED THAT PREVENT EXECUTION OF THE WORK AS INDICATED, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING AND AWAIT DIRECTION BEFORE PROCEEDING WITH THE WORK.
2. UNLESS OTHERWISE NOTED, ELECTRICAL ITEMS SHOWN HEAVY SOLID (⟶) SHALL BE NEW AND ELECTRICAL ITEMS SHOWN LIGHT SOLID (——) SHALL BE EXISTING TO REMAIN.
3. REFER TO DRAWINGS E-001 AND E-002 FOR SYMBOL LEGEND, ABBREVIATIONS, AND GENERAL PROJECT NOTES.
4. REFER TO DRAWINGS E-502 TO E-505 FOR MCC AND PANEL SCHEDULES AND E-401 TO E-402 FOR ELECTRICAL DETAILS.
5. PROVIDE UNISTRUT METAL SUPPORT STRUCTURES AS NECESSARY TO MOUNT EQUIPMENT AS REQUIRED.

SHEET KEYNOTES:

1. CLASSIFIED HAZARDOUS AREA BOUNDARY. AREA LOCATED WITHIN THE BOUNDARY IS CLASSIFIED AS CLASS 1, DIVISION 1, GROUP D. ALL EQUIPMENT INSTALLED IN THIS BOUNDARY SHALL BE RATED FOR CLASS 1, DIVISION 1, GROUP D LOCATIONS.
2. CLASSIFIED HAZARDOUS AREA BOUNDARY. HATCHED AREA LOCATED WITHIN BOUNDARY IS CLASSIFIED AS CLASS 1, DIVISION 2, GROUP D. ALL EQUIPMENT INSTALLED IN THIS BOUNDARY SHALL BE RATED FOR CLASS 1, DIVISION 2, GROUP D LOCATIONS.
3. EQUIPMENT PROVIDED UNDER DIVISION 15.
4. EQUIPMENT PROVIDED UNDER DIVISION 11.
5. INTERLOCKED WITH EXHAUST FAN EF-1. ROUTE SUPPLY CIRCUIT THROUGH EF-1 STARTER LOCATED IN GMCC2.
6. INTERLOCKED WITH EXHAUST FAN EF-2. ROUTE SUPPLY CIRCUIT THROUGH EF-2 STARTER LOCATED IN GMCC2.
7. INTERLOCKED WITH EXHAUST FAN EF-3. ROUTE SUPPLY CIRCUIT THROUGH EF-3 STARTER LOCATED IN GMCC2.
8. INTERLOCKED WITH EXHAUST FAN EF-4. ROUTE SUPPLY CIRCUIT THROUGH EF-4 STARTER LOCATED IN GMCC2.
9. INTERLOCKED WITH EXHAUST FAN EF-5. ROUTE SUPPLY CIRCUIT THROUGH EF-5 STARTER LOCATED IN GMCC2.
10. CONTROLLER FOR THE OVERHEAD DOOR SUPPLIED BY DOOR MANUFACTURER UNDER DIVISION 8.
11. 480V, 30A, 3 POLE FUSED DISCONNECT SWITCH RATED FOR CLASS I, DIVISION 1, GROUP D, WITH 6A FUSE.
12. 480V, 30A, 3 POLE, NON-FUSED DISCONNECT SWITCH IN CLASS 1, DIVISION 1, GROUP D RATED ENCLOSURE.
13. THIS AREA IS UNCLASSIFIED DUE TO POSITIVE PRESSURIZATION. ALL CONDUITS ENTERING AND LEAVING THIS AREA SHALL BE PROVIDED WITH EXPLOSION-PROOF SEAL OFFS RATED FOR CLASS 1, DIVISION 1, GROUP D LOCATIONS.
14. 480V, 30A, 3 POLE FUSED DISCONNECT SWITCH RATED FOR CLASS I, DIVISION 1, GROUP D, WITH 10A FUSE.
15. EQUIPMENT SHALL BE RATED FOR CLASS 1, DIVISION 1, GROUP D LOCATIONS.
16. PROVIDE CONDUIT AND CONDUCTORS FROM SUPPLY MCC AS REQUIRED.
17. 480V, 30A, 3 POLE FUSED DISCONNECT SWITCH RATED FOR CLASS I, DIVISION 1, GROUP D, WITH 20A FUSE.
18. 480V, 30A, 3 POLE FUSED DISCONNECT SWITCH RATED FOR CLASS I, DIVISION 1, GROUP D, WITH 15A FUSE.
19. DISCONNECT SWITCH PROVIDED WITH ACTUATOR. ~~120V, 30A, 1 POLE, NON-FUSED DISCONNECT SWITCH IN CLASS 1, DIVISION 1, GROUP D RATED ENCLOSURE. MOUNT DISCONNECT ON HANDRAIL OF CATWALKS.~~
20. REFER TO DETAIL 4 ON DRAWING E-402 FOR SHUNT TRIP BREAKER WIRING DIAGRAM.
21. CONBUSTIBLE GAS DETECTION SYSTEM. PROVIDED UNDER DIVISION 17.
22. STUB UP A 1" EMPTY CONDUIT RUN FROM MCC1 IN ELECTRICAL ROOM. CAP AND SEAL THE CONDUIT FOR FUTURE USE.
23. STUB UP A 1" EMPTY CONDUIT RUN FROM GMCC2 IN ELECTRICAL ROOM. CAP AND SEAL THE CONDUIT FOR FUTURE USE.
24. STUB UP A 1" EMPTY CONDUIT RUN FROM PANEL RP1 IN ELECTRICAL ROOM. CAP AND SEAL THE CONDUIT FOR FUTURE USE.
25. EQUIPMENT LOCATED ABOVE LAB CEILING. COORDINATE EXACT LOCATION WITH HVAC DRAWINGS.
26. RECEPTACLES LOCATED ABOVE COUNTER. COORDINATE EXACT LOCATION WITH ARCHITECTURAL DRAWINGS.
27. PROVIDE PERMANENT PLACARD ON LAB DOOR STATING:
"WARNING – PRESSURIZED AREA"
"THIS DOOR MUST BE CLOSED AT ALL TIMES AND MUST BE ACCESSED BY AUTHORIZED PERSONNEL ONLY."
28. COORDINATE EXACT LOCATION WITH ARCHITECTURAL DRAWINGS.



WORCESTER COUNTY

STATE OF MARYLAND — DAVID P. PRETTYMAN — No. 21522 — PROFESSIONAL ENGINEER
11/22/2000

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LICENSE NO. 30767
EXPIRATION DATE 09/29/2012

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING - POWER PLAN

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	SEPT. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
4	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-106

SHEET 98 OF 128

File: G:\MDV\07MWZ_MysticHarbour\WWTP\mep\ProcEnvt_LEV1-CADD\XS-BLK\TS\ELECTRICAL\E-106 REVISED PROPOSED PROCESS AREA-POWER.dwg
Jan 13, 2015 - 11:03pm

GENERAL SHEET NOTES:

1. INFORMATION SHOWN ON THIS DRAWING PERTAINING TO EXISTING CONDITIONS HAS BEEN OBTAINED FROM AVAILABLE BUILDING DRAWINGS OR GENERAL FIELD OBSERVATIONS AND MAY NOT INDICATE ACTUAL EXISTING CONDITIONS IN DETAIL OR DIMENSION. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE ACTUAL EXISTING CONDITIONS PRIOR TO FABRICATION OR PERFORMANCE OF ANY WORK. SHOULD CONDITIONS BE DISCOVERED THAT PREVENT EXECUTION OF THE WORK AS INDICATED, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING AND AWAIT DIRECTION BEFORE PROCEEDING WITH THE WORK.
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3. REFER TO DRAWINGS E-001 AND E-002 FOR SYMBOL LEGEND, ABBREVIATIONS, AND GENERAL PROJECT NOTES.
4. REFER TO DRAWINGS E-502 TO E-505 FOR MCC AND PANEL SCHEDULES AND E-401 TO E-402 FOR ELECTRICAL DETAILS.
5. ALL EMERGENCY AND EXIT LIGHT FIXTURES SHALL BE CONNECTED TO THE UNSWITCHED CIRCUIT.

SHEET KEYNOTES:

1. CLASSIFIED HAZARDOUS AREA BOUNDARY. AREA LOCATED WITHIN THE BOUNDARY IS CLASSIFIED AS CLASS 1, DIVISION 1, GROUP D. ALL EQUIPMENT INSTALLED IN THIS BOUNDARY SHALL BE RATED FOR CLASS 1, DIVISION 1, GROUP D LOCATIONS.
2. CLASSIFIED HAZARDOUS AREA BOUNDARY, HATCHED AREA LOCATED WITHIN BOUNDARY IS CLASSIFIED AS CLASS 1, DIVISION 2, GROUP D. ALL EQUIPMENT INSTALLED IN THIS BOUNDARY SHALL BE RATED FOR CLASS 1, DIVISION 2, GROUP D LOCATIONS.
3. ILLUMINATED BEACON FLASHING LIGHT IN METAL ENCLOSURE WITH RED GLASS LENSE AND AUDIBLE ALARM IN METAL ENCLOSURE RATED FOR OUTDOOR USE. PROVIDE CONDUIT AND CONDUCTORS FROM GAS DETECTION PANEL AS REQUIRED. REFER TO I&C CABLE AND CONDUIT SCHEDULE PROVIDED UNDER DIVISION 17.
4. ILLUMINATED BEACON FLASHING LIGHT IN METAL ENCLOSURE WITH RED GLASS LENSE AND AUDIBLE ALARM IN METAL ENCLOSURE. PROVIDE CONDUIT AND CONDUCTORS FROM FLOW SWITCH AS REQUIRED. REFER TO I&C CABLE AND CONDUIT SCHEDULE PROVIDED UNDER DIVISION 17.
5. THIS AREA IS UNCLASSIFIED DUE TO POSITIVE PRESSURIZATION. ALL CONDUITS ENTERING AND LEAVING THIS AREA SHALL BE PROVIDED WITH EXPLOSION-PROOF SEAL OFFS RATED FOR CLASS 1, DIVISION 1, GROUP D LOCATIONS.
6. MOUNTING HEIGHT FOR LIGHT FIXTURES IS 18' AFF.

R * MEMBRANE UNIT IN TRAIN 3 MOVED TO MEMBRANE TANK TRAIN 1. MEMBRANE UNIT IN TRAIN 4 MOVED TO MEMBRANE TANK TRAIN 2.

1 E-107 PROCESS BUILDING – LIGHTING PLAN
SCALE: 1/4" = 1'-0"

SCALE: 1/4" = 1'-0"

RECORD DRAWING SET JANUARY 2015

KEY PLAN
NOT TO SCALE

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 30767
EXPIRATION DATE 06/29/2012
11/22/2010

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING - LIGHTING PLAN

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-107

SHEET 99 OF 128

File: Q:\SMD\070982_Mystic\Acad\PlotFiles\Proj\Ext_EFLY-D400\Ar-Built\ELECTRICAL\E-107 PROPOSED PROCESS AREA-LIGHTING.dwg
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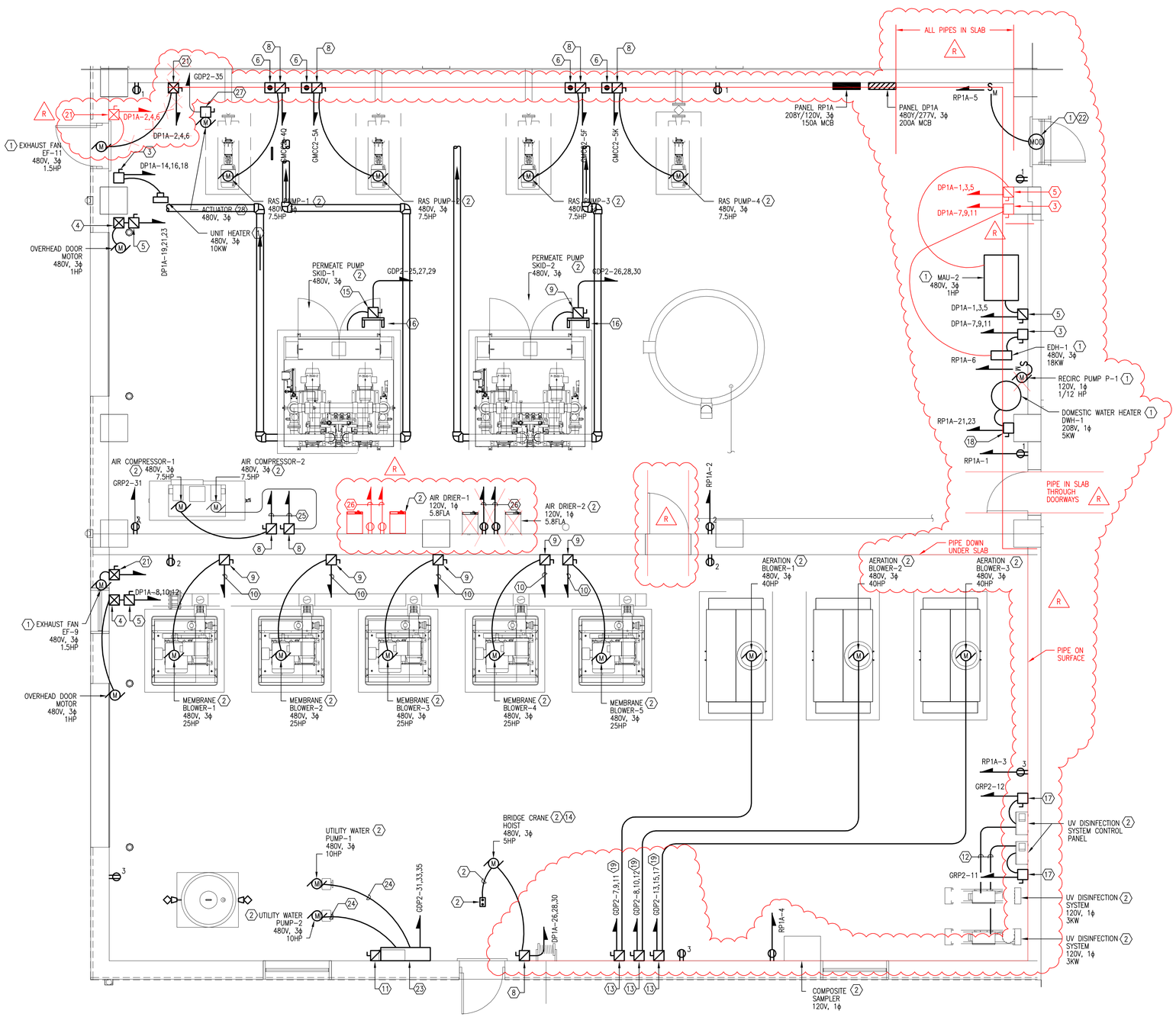


1 / E-108 PUMP ROOM AND BLOWER ROOM – POWER PLAN
SCALE: 1/4" = 1'-0"

GENERAL SHEET NOTES:

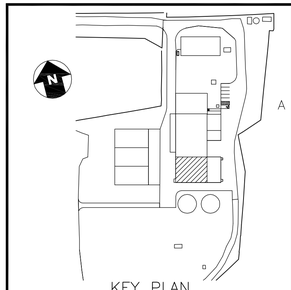
1. INFORMATION SHOWN ON THIS DRAWING PERTAINING TO EXISTING CONDITIONS HAS BEEN OBTAINED FROM AVAILABLE BUILDING DRAWINGS OR GENERAL FIELD OBSERVATIONS AND MAY NOT INDICATE ACTUAL EXISTING CONDITIONS IN DETAIL OR DIMENSION. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE ACTUAL EXISTING CONDITIONS PRIOR TO FABRICATION OR PERFORMANCE OF ANY WORK. SHOULD CONDITIONS BE DISCOVERED THAT PREVENT EXECUTION OF THE WORK AS INDICATED, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING AND AWAIT DIRECTION BEFORE PROCEEDING WITH THE WORK.
2. UNLESS OTHERWISE NOTED, ELECTRICAL ITEMS SHOWN HEAVY SOLID (———) SHALL BE NEW AND ELECTRICAL ITEMS SHOWN LIGHT SOLID (———) SHALL BE EXISTING TO REMAIN.
3. REFER TO DRAWINGS E-001 AND E-002 FOR SYMBOL LEGEND, ABBREVIATIONS, AND GENERAL PROJECT NOTES.
4. REFER TO DRAWINGS E-502 TO E-505 FOR MCC AND PANEL SCHEDULES AND E-401 AND E-402 FOR ELECTRICAL DETAILS.

SHEET KEYNOTES:

1. EQUIPMENT PROVIDED UNDER DIVISION 15.
2. EQUIPMENT PROVIDED UNDER DIVISION 11.
3. 480V, 30A, 3 POLE, NON-FUSED DISCONNECT SWITCH IN NEMA 1 ENCLOSURE.
4. CONTROLLER FOR THE OVERHEAD DOOR SUPPLIED BY DOOR MANUFACTURER UNDER DIVISION 8.
5. 480V, 30A, 3 POLE FUSED DISCONNECT SWITCH IN NEMA 1 ENCLOSURE WITH 6A FUSE.
6. PROVIDE CONDUIT AND CONDUCTORS FROM SUPPLY MCC AS REQUIRED. REFER TO I&C CABLE AND CONDUIT SCHEDULE ON I-501.
7. NOT USED.
8. 480V, 30A, 3 POLE FUSED DISCONNECT SWITCH IN NEMA 1 ENCLOSURE WITH 20A FUSE.
9. 480V, 60A, 3 POLE FUSED DISCONNECT SWITCH IN NEMA 1 ENCLOSURE WITH 60A FUSE.
10. PROVIDE (3)#8 & (1)#10G IN 3/4" C FOR POWER CONNECTION OF EQUIPMENT TO MEMBRANE BLOWER CONTROL PANEL LOCATED IN PERMEATE PUMP SKID-1.
11. 480V, 60A, 3 POLE FUSED DISCONNECT SWITCH IN NEMA 1 ENCLOSURE WITH 35A FUSE.
12. PROVIDE (2)#8 & (1)#10G IN 3/4" C FOR POWER CONNECTION OF EQUIPMENT TO UV DISINFECTION SYSTEM CONTROL PANEL.
13. 480V, 100A, 3 POLE FUSED DISCONNECT SWITCH IN NEMA 1 ENCLOSURE WITH 90A FUSE.
14. ELECTRICAL CONTRACTOR SHALL PROVIDE ELECTRICAL POWER TO CRANE AS PER MANUFACTURER'S REQUIREMENTS.
15. 480V, 400A, 3 POLE FUSED DISCONNECT SWITCH IN NEMA 1 ENCLOSURE WITH 250A FUSE.
16. PROVIDE UNISTRUT METAL SUPPORT FOR MOUNTING DISCONNECT SWITCHES.
17. 120V, 30A, 1 POLE NON-FUSED DISCONNECT SWITCH IN NEMA 1 ENCLOSURE.
18. 208V, 30A, 2 POLE NON-FUSED DISCONNECT SWITCH IN NEMA 1 ENCLOSURE.
19. ROUTE CIRCUIT THROUGH AERATION BLOWER CONTROL PANEL LOCATED IN ELECTRICAL ROOM. REFER TO DRAWING E-105 FOR LOCATION.
20. NOT USED.
21. STARTER FOR EXHAUST FAN. 480V, 30A, 3 POLE, NEMA SIZE "0" COMBINATION MOTOR STARTER IN NEMA 12 ENCLOSURE WITH 6A FUSED DISCONNECT CONSISTING OF HAND-OFF-AUTO SELECTOR SWITCH, CONTROL POWER TRANSFORMER WITH 480V PRIMARY AND 120V SECONDARY, AUXILIARY CONTACTS (2-NORMALLY OPEN & 2-NORMALLY CLOSED), PUSH BUTTONS AND PILOT LIGHTS (RED "RUN" & GREEN "OFF").
22. INTERLOCKED WITH EXHAUST FAN EF-11. ROUTE SUPPLY CIRCUIT THROUGH EF-11 STARTER.
23. UTILITY WATER PUMP CONTROL PANEL. PROVIDED UNDER DIVISION 11.
24. PROVIDE (3)#12 & (1)#12G IN 3/4" C FOR POWER CONNECTION TO UTILITY WATER PUMP CONTROL PANEL.
25. PROVIDE (3)#12 & (1)#12G IN 3/4" C FOR POWER CONNECTION OF AIR COMPRESSOR TO PERMEATE PUMP SKID-1.
26. PROVIDE (2)#12 & (1)#12G IN 3/4" C FOR AIR DRYER RECEPTACLE TO PERMEATE PUMP SKID-1.
27. DISCONNECT SWITCH PROVIDED WITH ACTUATOR.
28. EQUIPMENT PROVIDED UNDER DIVISION 11.

2' 0 2' 4'
SCALE: 1/4"= 1'-0"

RECORD DRAWING SET JANUARY 2015



KEY PLAN
NOT TO SCALE

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 30767 EXPIRATION DATE 06/29/2012

11/22/2013

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PUMP ROOM AND BLOWER ROOM
POWER PLAN

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-108

SHEET 100 OF 128

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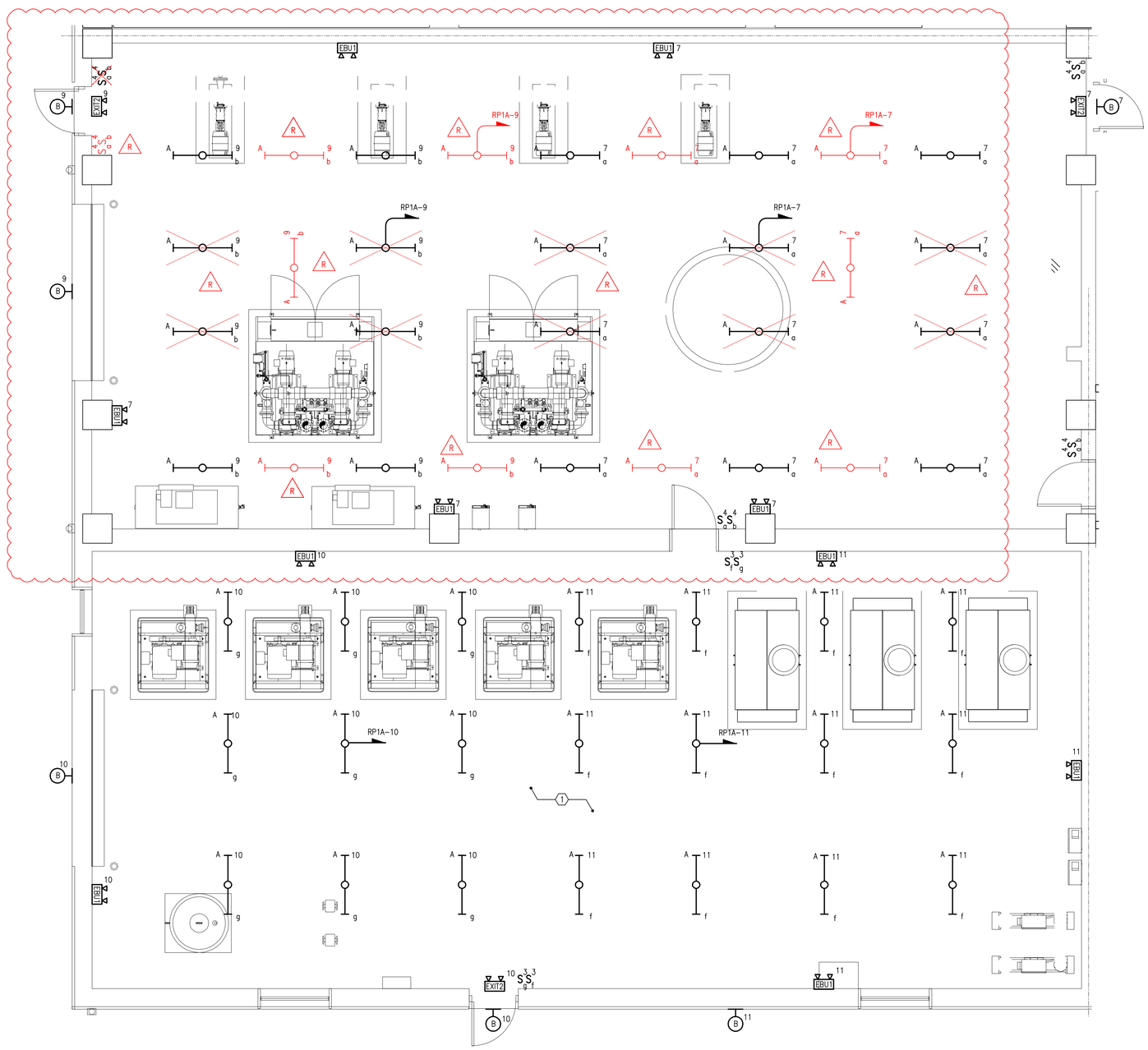


1 PUMP ROOM AND BLOWER ROOM – LIGHTING PLAN
E-109 SCALE: 1/4" = 1'-0"

GENERAL SHEET NOTES:

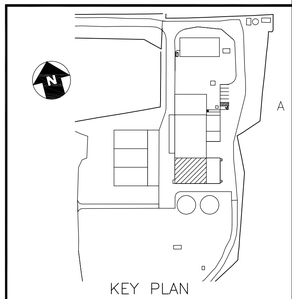
1. INFORMATION SHOWN ON THIS DRAWING PERTAINING TO EXISTING CONDITIONS HAS BEEN OBTAINED FROM AVAILABLE BUILDING DRAWINGS OR GENERAL FIELD OBSERVATIONS AND MAY NOT INDICATE ACTUAL EXISTING CONDITIONS IN DETAIL OR DIMENSION. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE ACTUAL EXISTING CONDITIONS PRIOR TO FABRICATION OR PERFORMANCE OF ANY WORK. SHOULD CONDITIONS BE DISCOVERED THAT PREVENT EXECUTION OF THE WORK AS INDICATED, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING AND AWAIT DIRECTION BEFORE PROCEEDING WITH THE WORK.
2. UNLESS OTHERWISE NOTED, ELECTRICAL ITEMS SHOWN HEAVY SOLID (———) SHALL BE NEW AND ELECTRICAL ITEMS SHOWN LIGHT SOLID (———) SHALL BE EXISTING TO REMAIN.
3. REFER TO DRAWINGS E-001 AND E-002 FOR SYMBOL LEGEND, ABBREVIATIONS, AND GENERAL PROJECT NOTES.
4. REFER TO DRAWINGS E-502 TO E-505 FOR MCC AND PANEL SCHEDULES AND E-401 TO E-402 FOR ELECTRICAL DETAILS.
5. ALL EMERGENCY AND EXIT LIGHT FIXTURES SHALL BE CONNECTED TO AN UNSWITCHED CIRCUIT.

SHEET KEYNOTES:

1. LIGHT FIXTURES SHALL BE MOUNTED IN SUCH A WAY THAT IT DOES NOT OBSTRUCT THE OPERATION OF THE BRIDGE CRANE.

SCALE: 1/4"= 1'-0"

RECORD DRAWING SET JANUARY 2015



WORCESTER COUNTY

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LICENSE NO. 30767
EXPIRATION DATE 09/29/2012

11/22/2013

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON®
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PUMP ROOM AND BLOWER ROOM LIGHTING PLAN

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-109

SHEET 101 OF 128

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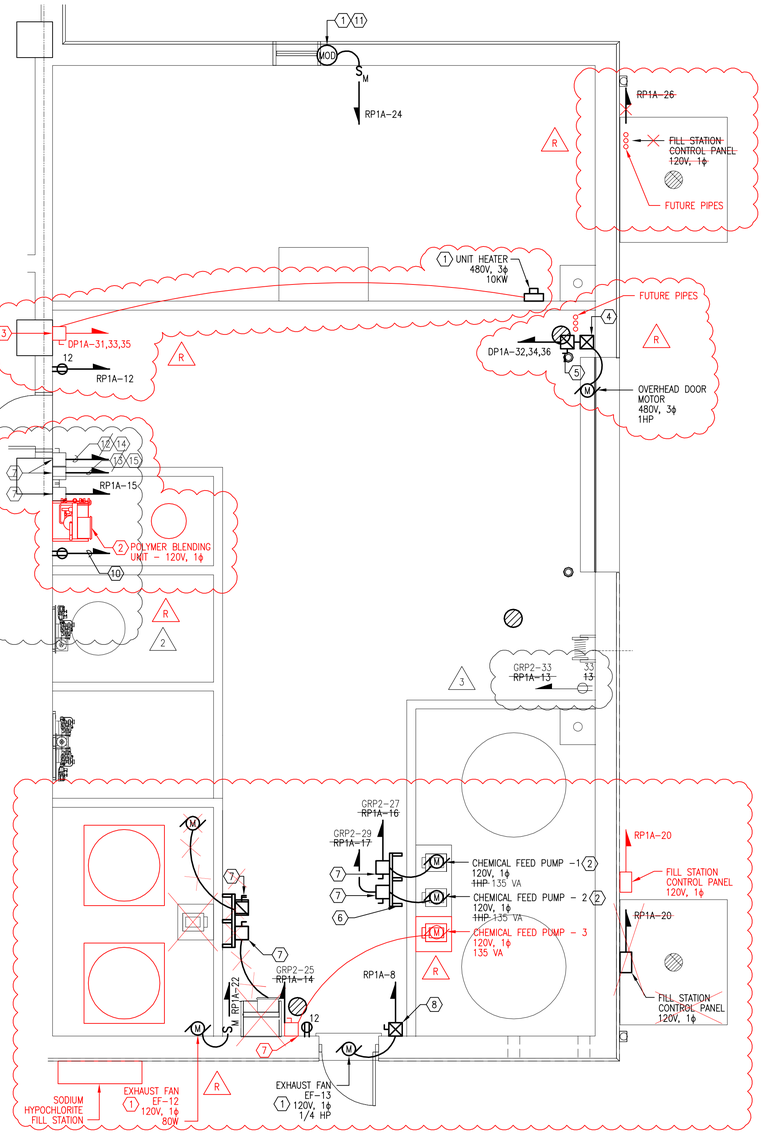
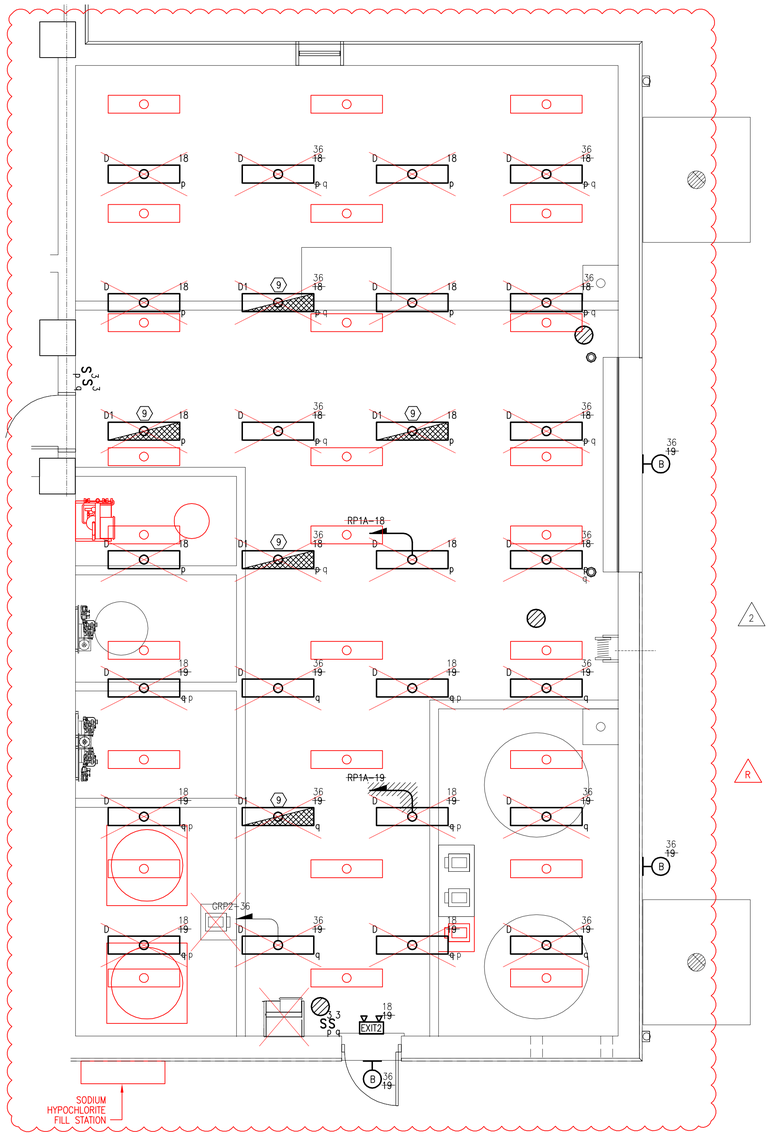


1 E-110 CHEMICAL ROOM – POWER PLAN
SCALE: 1/4" = 1'-0"



1 E-110 CHEMICAL ROOM – LIGHTING PLAN
SCALE: 1/4" = 1'-0"

GENERAL SHEET NOTES:

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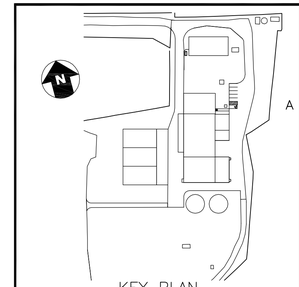
4. REFER TO DRAWINGS E-502 TO E-505 FOR MCC AND PANEL SCHEDULES AND E-401 AND E-402 FOR ELECTRICAL DETAILS.
5. ALL EMERGENCY AND EXIT LIGHT FIXTURES SHALL BE CONNECTED TO AN UNSWITCHED CIRCUIT.

SHEET KEYNOTES:

1. EQUIPMENT PROVIDED UNDER DIVISION 15.
2. EQUIPMENT PROVIDED UNDER DIVISION 11.
3. 480V, 30A, 3 POLE, NON-FUSED DISCONNECT SWITCH IN NEMA 4X SS ENCLOSURE.
4. CONTROLLER FOR THE OVERHEAD DOOR SUPPLIED BY DOOR MANUFACTURER UNDER DIVISION 8.
5. 480V, 30A, 3 POLE FUSED DISCONNECT SWITCH IN NEMA 4X SS ENCLOSURE WITH 6A FUSE.
6. PROVIDE UNISTRUT METAL SUPPORT FOR MOUNTING DISCONNECT SWITCHES.
7. 120V, 30A, 1 POLE, NON-FUSED DISCONNECT SWITCH IN NEMA 4X SS ENCLOSURE.
8. STARTER FOR EXHAUST FAN, 120V, 30A, 1 POLE, NEMA SIZE "0" COMBINATION MOTOR STARTER IN NEMA 4X SS ENCLOSURE WITH 10A FUSED DISCONNECT CONSISTING OF HAND-OFF-AUTO SELECTOR SWITCH, AUXILIARY CONTACTS (2-NORMALLY OPEN & 2-NORMALLY CLOSED), PUSH BUTTONS AND PILOT LIGHTS (RED "RUN" & GREEN "OFF").
9. PROVIDE AN UNSWITCHED HOT LEG OF LOCAL LIGHTING CIRCUIT TO EMERGENCY FIXTURES FOR BATTERY CHARGING AND TO SENSE NORMAL POWER FAILURE.
10. PROVIDE (2)#12 & (1)#12G IN 3/4" C FOR CITRIC ACID MIXER RECEPTACLE TO PERMEATE PUMP SKID-1 LOCATED IN PUMP ROOM. REFER TO DRAWING E-108 FOR LOCATION.
11. INTERLOCKED WITH EXHAUST FAN EF-13. ROUTE SUPPLY CIRCUIT THROUGH EF-13 STARTER.
12. ~~PROVIDE (2)#12 & (1)#12G IN 3/4" C FOR CITRIC ACID PUMP RECEPTACLE TO PERMEATE PUMP SKID-1 LOCATED IN PUMP ROOM. REFER TO DRAWING E-108 FOR LOCATION.~~
13. ~~PROVIDE (2)#12 & (1)#12G IN 3/4" C FOR SODIUM HYPOCHLORIDE PUMP RECEPTACLE TO PERMEATE PUMP SKID-1 LOCATED IN PUMP ROOM. REFER TO DRAWING E-108 FOR LOCATION.~~
14. PROVIDE (2)#12 & (1)#12G IN 3/4" C FOR CITRIC ACID PUMP DISCONNECT SWITCH TO PERMEATE PUMP SKID-1 LOCATED IN PUMP ROOM. REFER TO DRAWING E-108 FOR LOCATION.
15. PROVIDE (2)#12 & (1)#12G IN 3/4" C FOR SODIUM HYPOCHLORIDE PUMP DISCONNECT SWITCH TO PERMEATE PUMP SKID-1 LOCATED IN PUMP ROOM. REFER TO DRAWING E-108 FOR LOCATION.

SCALE: ¼"= 1'-0"

RECORD DRAWING SET JANUARY 2015



PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 30767
EXPIRATION DATE 09/29/2012

11/22/2013

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
CHEMICAL ROOM
POWER PLAN AND LIGHTING PLAN

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	SEPT. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
4	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-110

SHEET 102 OF 128

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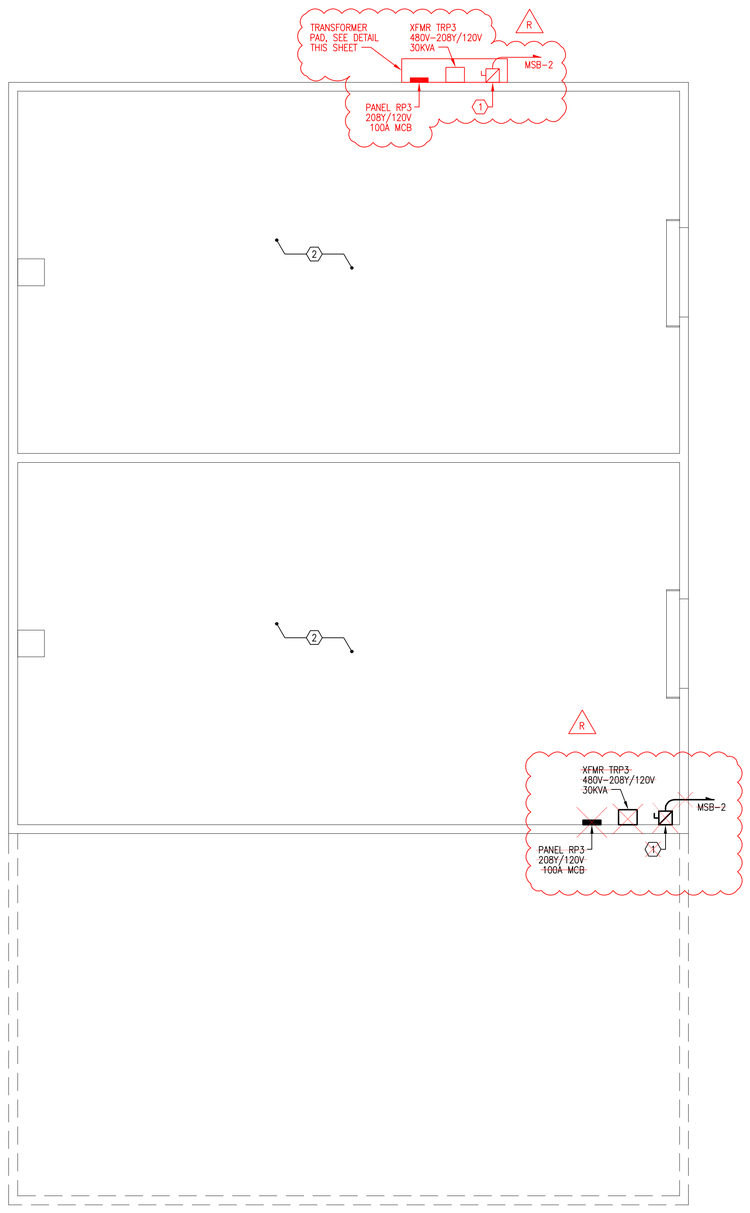
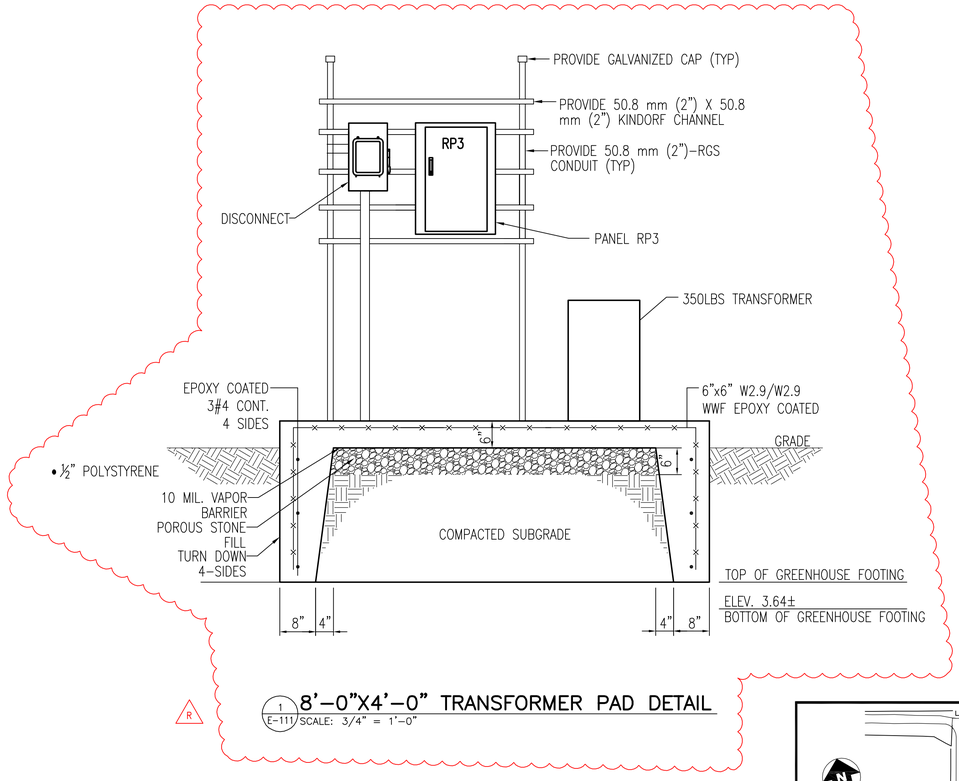


1 E-111 SLUDGE GREENHOUSE POWER PLAN
SCALE: 1/8" = 1'-0"



R 1 E-111 8'–0"X4'–0" TRANSFORMER PAD DETAIL
SCALE: 3/4" = 1'-0"

4' 0 4' 8'
SCALE: ⅛"= 1'-0"

RECORD DRAWING SET JANUARY 2015

GENERAL SHEET NOTES:

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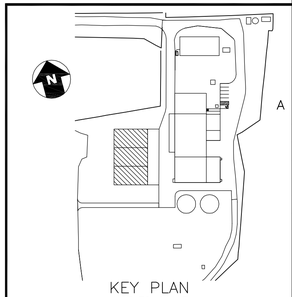
2. UNLESS OTHERWISE NOTED, ELECTRICAL ITEMS SHOWN HEAVY SOLID (———) SHALL BE NEW AND ELECTRICAL ITEMS SHOWN LIGHT SOLID (———) SHALL BE EXISTING TO REMAIN.
3. REFER TO DRAWINGS E-001 AND E-002 FOR SYMBOL LEGEND, ABBREVIATIONS, AND GENERAL PROJECT NOTES.
4. REFER TO DRAWINGS E-502 TO E-505 FOR MCC AND PANEL SCHEDULES AND E-401 AND E-402 FOR ELECTRICAL DETAILS.

SHEET KEYNOTES:

1. 480V, 60A, 3–POLE, SERVICE ENTRANCE RATED, FUSED DISCONNECT IN NEMA 4X SS ENCLOSURE WITH 60A FUSE.
2. ALL ELECTRICAL WORK IN THIS AREA IS PROVIDED UNDER DIVISION 11. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH SPECIFICATIONS UNDER DIVISION 16.



WORCESTER COUNTY

STATE OF MARYLAND — DAVID P. PRETTYMAN — No. 21567 — PROFESSIONAL ENGINEER
11/22/2013

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 30767
EXPIRATION DATE 06/29/2012

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
SLUDGE GREENHOUSE BUILDING PLAN

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-111

SHEET 103 OF 128

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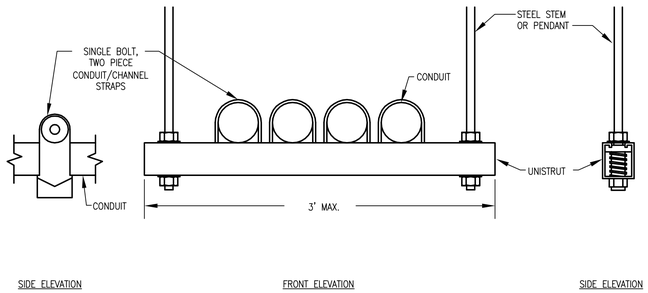
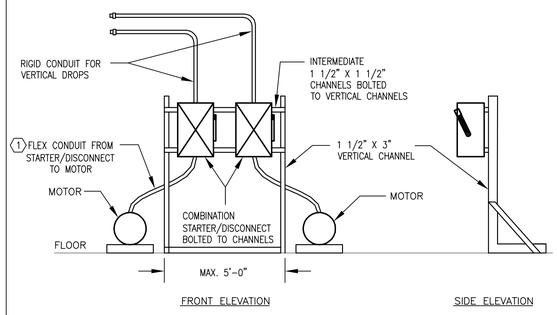


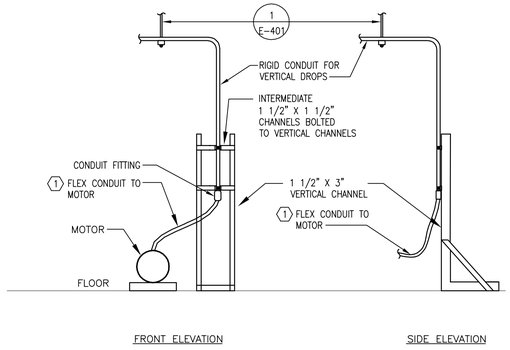
1 E-401 **CONDUIT HANGER DETAIL**
SCALE: NONE



DETAIL KEYNOTES:

1. PROVIDE LIQUID TIGHT FLEXIBLE STEEL CONDUIT WITH PVC JACKET. THE FLEXIBLE CONNECTION SHALL NOT EXCEED 72 INCHES IN LENGTH. SIZE AS INDICATED ON DRAWING.

2 E-401 **CHANNEL SUPPORTED COMBINATION MOTOR STARTER /DISCONNECT SWITCH INSTALLATION DETAIL**
SCALE: NONE



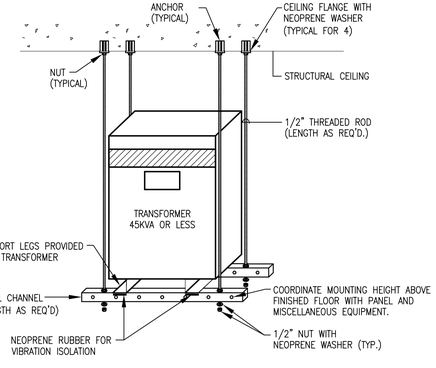
DETAIL KEYNOTES:

1. PROVIDE LIQUIDTIGHT FLEXIBLE STEEL CONDUIT WITH PVC JACKET. THE FLEXIBLE CONNECTION SHALL NOT EXCEED 72 INCHES IN LENGTH. SIZE AS INDICATED ON DRAWING.

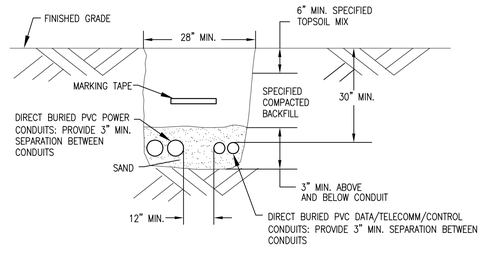
3 E-401 **CHANNEL SUPPORTED CONDUIT INSTALLATION DETAIL**
SCALE: NONE

GENERAL DETAIL NOTES:

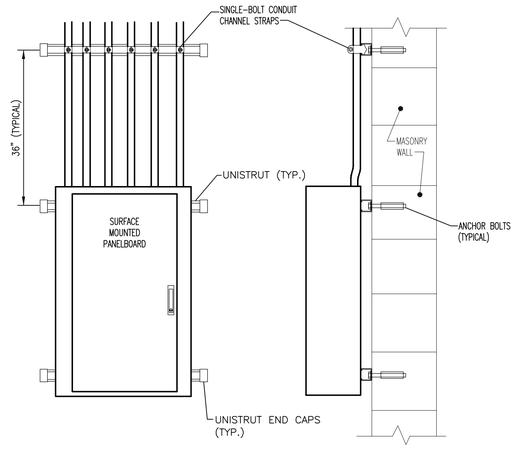
1. COORDINATE THREADED ROD AND METAL CHANNEL WITH STRUCTURAL CONTRACTOR.
2. REFER TO SEISMIC REQUIREMENTS FOR PROPER MOUNTING.
3. ENGINEER SHOULD NOTE THAT MAXIMUM SIZE RECOMMENDED TRAPEZE MOUNTED TRANSFORMER IS A 45 KVA. HOWEVER, IF PROJECT SPECIFICS REQUIRE 75KVA TRANSFORMER MAY BE TRAPEZE MOUNTED, BUT SHOULD BE AVOIDED WHEN POSSIBLE.
4. IF TRANSFORMER IS GREATER THAN 75 KVA, ADDITIONAL STRUCTURAL SUPPORT BEAM IS TO BE ADDED TO ROOM. COORDINATE WITH ARCHITECT.
5. DETAIL MAY BE REVISED TO SHOW MOUNTING FROM A BEAM. COORDINATE WITH JOB CONDITIONS.



4 E-401 **TRANSFORMER CEILING MOUNTING DETAIL**
SCALE: NONE



5 E-401 **DIRECT BURIED CONDUIT DETAIL**
SCALE: NONE



6 E-401 **PANELBOARD WALL MOUNTING DETAIL**
SCALE: NONE

RECORD DRAWING SET JANUARY 2015

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 30767
EXPIRATION DATE 09/29/2012

11/22/2013

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
ELECTRICAL DETAILS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

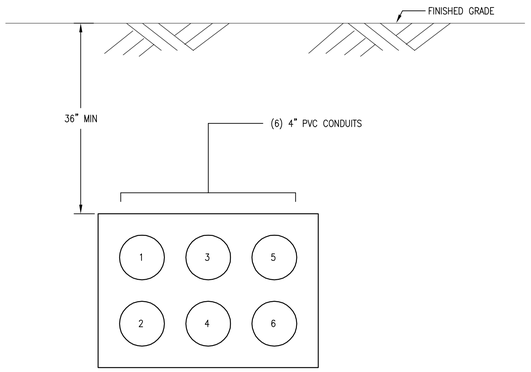
E-401

SHEET 104 OF 128

File: Q:\SMD\07060_AnneArundel\WWTP\revit\rvt_LEV-CADD\AS-BUILTS\ELECTRICAL\E-401 ELEC DETAILS.dwg
Jan 12, 2015 - 11:13:30am

GENERAL DETAIL NOTES:

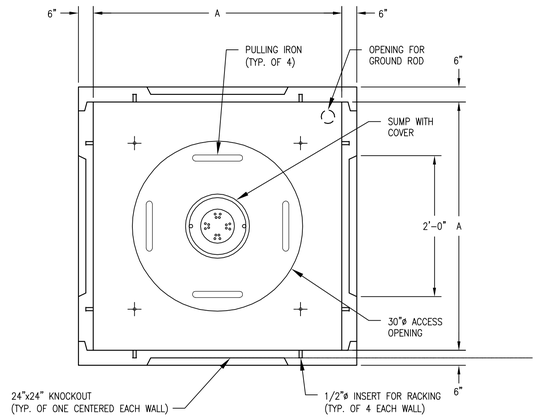
1. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH DELMARVA POWER AND INSTALL CONCRETE ENCASED DUCTBANK AS PER DELMARVA POWER REQUIREMENTS FOR CUSTOMER INSTALLED DUCT SYSTEM.
2. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH CONTRACTORS OF OTHER TRADES AND UTILITIES PRIOR TO INSTALLATION OF CONDUITS TO ENSURE PROPER INSTALLATION.



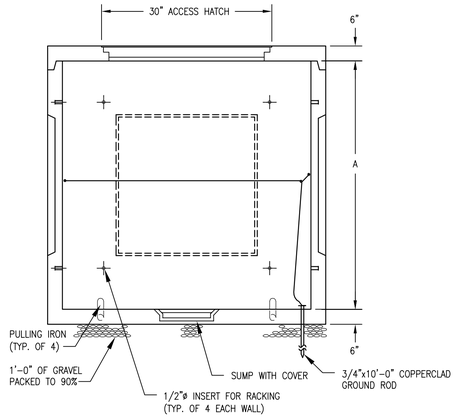
1 E-402 SCALE: NONE — CONCRETE ENCASED DUCTBANK SECTION

GENERAL DETAIL NOTES:

1. HANDHOLE H1: 4'(L)x4'(W)x4'(H) INNER DIMENSIONS. OLD CASTLE PRECAST, INC. MODEL #TE444 OR APPROVED EQUAL.
2. HANDHOLE H2: 5'(L)x5'(W)x5'(H) INNER DIMENSIONS. OLD CASTLE PRECAST, INC. MODEL #TE555 OR APPROVED EQUAL.
3. HANDHOLE STRUCTURE, FRAME AND COVER SHALL BE RATED FOR AASHTO HS-20 TRUCK WHEEL, ROADWAY LOAD APPLICATION.
4. PROVIDE LETTERING ON HANDHOLE COVER AS FOLLOWS:
   HANDHOLE H1: "CONTROL"
   HANDHOLE H2: "ELECTRIC"

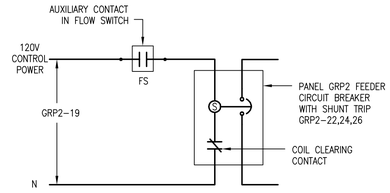


PLAN VIEW



ELEVATION

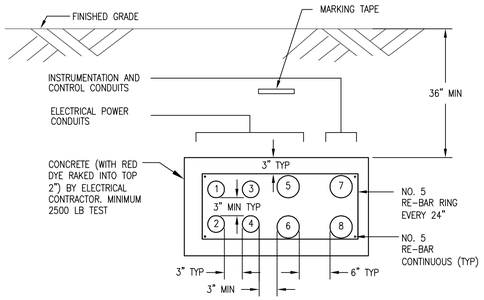
3 E-402 SCALE: NONE — ELECTRIC HANDHOLE DETAIL



4 E-402 SCALE: NONE — SHUNT TRIP CIRCUIT BREAKER WIRING DETAIL

GENERAL DETAIL NOTES:

1. REFER TO DRAWINGS E-401 TO E-403 FOR MCC AND PANELBOARD SCHEDULES.
2. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH CONTRACTORS OF OTHER TRADES AND UTILITIES PRIOR TO INSTALLATION OF CONDUITS TO ENSURE PROPER INSTALLATION.



1,2,3. GENERATOR MAIN POWER SUPPLY CONDUCTORS. 3 SETS OF (4)350KCMIL AND (1)#2/0G IN 3" CONDUIT.

4. (3)#1/0 AND (1)#8G IN 3" CONDUIT TO EXISTING PUMP STATION.

5. 4" CONDUIT WITH (3)-1" INNERDUCTS
   INNERDUCTS:
   5A. GRP2-13, GRP2-14 IN 1" INNERDUCT
   5B. GRP2-15,17 IN 1" INNERDUCT
   5C. GRP2-3 IN 1" INNERDUCT

6. 4" CONDUIT WITH (3)-1" INNERDUCTS
   INNERDUCTS:
   6A. GRP2-16 IN 1" INNERDUCT
   6B. GRP2-20 IN 1" INNERDUCT
   6C. 1" INNERDUCT, SPARE

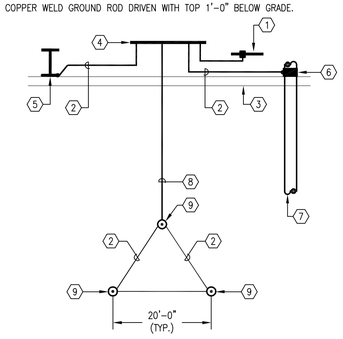
7. 4" CONDUIT WITH (3)-1" INNERDUCTS
   INNERDUCTS:
   7A. GENERATOR SIGNALS TO SCADA IN 1" INNERDUCT
   7B. CONDUCTORS FOR REMOTE ANNUNCITATOR PANEL IN 1" INNERDUCT
   7C. CONDUCTORS FOR SIGNALS TO LOAD BANK CONTROL PANEL IN 1" INNERDUCT

8. 4" CONDUIT WITH (3)-1" INNERDUCTS
   INNERDUCTS:
   8A. CONDUCTORS FOR GENERATOR STARTING CIRCUIT TO ATS IN 1" INNERDUCT
   8B. CONDUCTORS FOR REMOTE E-STOP IN 1" INNERDUCT
   8C. 1" INNERDUCT, SPARE

2 E-402 SCALE: NONE — CONCRETE ENCASED DUCTBANK SECTION

DETAIL KEYNOTES:

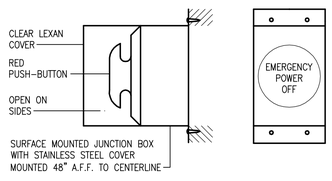
1. EXISTING SWITCHBOARD GROUND BUS.
2. #3/0 BARE CU. GROUND CONDUCTOR IN 1 1/4" CONDUIT.
3. BUILDING EXTERIOR WALL.
4. MAIN SWITCHBOARD GROUND BUS.
5. STRUCTURAL STEEL EXOTHERMIC CONNECTION.
6. GROUNDING CLAMP ON METALLIC PIPE.
7. STREET SIDE OF WATER SERVICE PIPE.
8. 500 KCMIL CU. GROUND CONDUCTOR IN 1 1/4" CONDUIT.
9. 3/4" X 10'-0" LONG COPPER WELD GROUND ROD DRIVEN WITH TOP 1'-0" BELOW GRADE.



5 E-402 SCALE: NONE — ELECTRIC SERVICE GROUNDING ELECTRODE DETAIL

DETAIL NOTES:

1. PROVIDE RED MUSHROOM MOMENTARY CONTACT OPERATOR (SQUARE D #KR-25R OR APPROVED EQUAL) AND TWO CONTACT BLOCKS WITH NORMALLY OPEN CONTACTS (SQUARE D #KA-2 OR APPROVED EQUAL) FOR UNCLASSIFIED LOCATIONS. PUSHBUTTON SHALL BE INSTALLED IN STAINLESS STEEL COVER.
2. FOR CLASS 1, DIVISION 1, GROUP D RATED LOCATIONS, PROVIDE APPLETON EFDB SERIES OR APPROVED EQUAL.



SIDE VIEW FRONT VIEW

6 E-402 SCALE: NONE — PUSH-BUTTON DETAIL - EMERGENCY POWER OFF

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

STATE OF MARYLAND — JOHN D. PARKER — No. 21431 — PROFESSIONAL ENGINEER — 11/22/2013

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 30767 EXPIRATION DATE 09/29/2012

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE: MYSTIC HARBOUR WWTP UPGRADE AND PLANT EXPANSION

SHEET TITLE: ELECTRICAL DETAILS - II

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-402

SHEET 105 OF 128

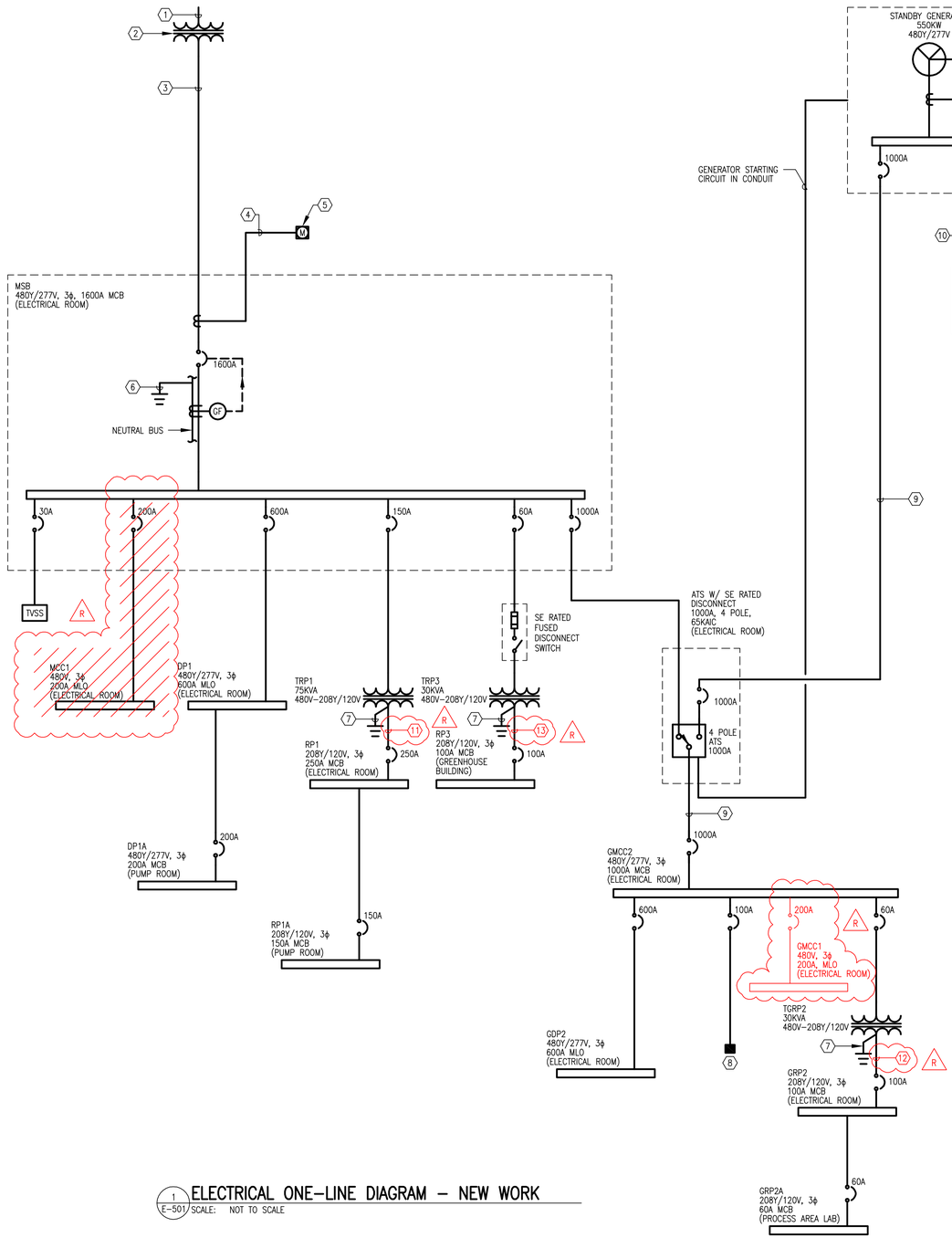
File: Q:\SAD\070662_MysticHarbourWWTPImprovProj\Civil_EP\1-CADD\AS-BUILTS\ELECTRICAL\E-402 ELEC DETAILS.dwg
Jan 12, 2015 - 11:19:14am

GENERAL SHEET NOTES:

1. UNLESS OTHERWISE NOTED, ELECTRICAL ITEMS SHOWN HEAVY SOLID (———) SHALL BE NEW AND ELECTRICAL ITEMS SHOWN LIGHT SOLID (———) SHALL BE EXISTING TO REMAIN.
2. ALL EQUIPMENT SHALL BE PROVIDED BY THE CONTRACTOR UNLESS NOTED OTHERWISE.
3. ALL SERVICE ENTRANCE EQUIPMENT AND INSTALLATION SHALL BE IN ACCORDANCE WITH ALL APPLICABLE DELMARVA POWER REQUIREMENTS.
4. REFER TO DRAWINGS E-001 & E-002 FOR SYMBOL LEGEND, ABBREVIATIONS AND GENERAL PROJECT NOTES.
5. ALL SERVICE ENTRANCE EQUIPMENT AND INSTALLATION SHALL BE IN ACCORDANCE WITH ALL APPLICABLE UTILITY REQUIREMENTS.
6. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH DELMARVA POWER PRIOR TO DEMOLITION OF EXISTING SERVICE EQUIPMENT AND INSTALLATION OF NEW SERVICE EQUIPMENT.

SHEET KEYNOTES:

1. DELMARVA POWER MEDIUM VOLTAGE SERVICE ENTRANCE CONDUCTORS. UNDERGROUND CONDUIT AND CONDUCTORS PROVIDED BY DELMARVA POWER.
2. DELMARVA POWER SERVICE ENTRANCE TRANSFORMER. DELMARVA POWER APPROVED PRE-CAST CONCRETE TRANSFORMER BASE, TRENCH FOR GROUND RING AND ALL EXCAVATION AND BACKFILL PROVIDED BY THE CONTRACTOR. TRANSFORMER AND GROUNDING CONDUCTORS PROVIDED BY DELMARVA POWER.
3. CONCRETE ENCASED DUCTBANK PROVIDED BY THE CONTRACTOR. CONDUCTORS PROVIDED BY DELMARVA POWER.
4. 1-1/4" RMC PROVIDED BY THE CONTRACTOR. CONDUCTORS PROVIDED BY DELMARVA POWER.
5. METER PROVIDED BY DELMARVA POWER. METER BASE PROVIDED AND INSTALLED BY CONTRACTOR.
6. (1)#3/0 GROUNDING ELECTRODE CONDUCTOR TO GROUND ROD(S). BOND NEUTRAL TO GROUND AT THIS LOCATION.
7. GROUNDING ELECTRODE CONDUCTOR TO GROUNDING ELECTRODE(S).
8. MAKE CONNECTION TO EXISTING PUMP STATION BUILDING MAIN SERVICE ENTRANCE DISCONNECT. PRIOR TO THAT, DISCONNECT EXISTING CABLE TO EXISTING PUMP STATION MAIN SERVICE ENTRANCE DISCONNECT. REMOVE ALL EXISTING WIRING BACK TO SOURCE. REMOVE ALL ASSOCIATED EXISTING EXPOSED CONDUIT AND ABANDON IN PLACE ALL CONCEALED AND UNDERGROUND CONDUIT.
9. 3 SETS EACH OF (4)400 KCMIL AND (1)#2/0 G IN 3" CONDUIT.
10. 2 SETS EACH OF (3)250 KCMIL AND (1)#2/0 G IN 2 1/2" CONDUIT.
11. (4)250 KCMIL AND (1)#2/0 G IN 2 1/2" CONDUIT.
12. (4)#3 AND (1)#8/0 G IN 1 1/4" CONDUIT.
13. (4)#3 AND (1)#8/0 G IN 1 1/4" CONDUIT.



1 E-501 ELECTRICAL ONE-LINE DIAGRAM – NEW WORK
SCALE: NOT TO SCALE

2 E-501 ELECTRICAL ONE-LINE DIAGRAM – DEMOLITION
SCALE: NOT TO SCALE

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 30767
EXPIRATION DATE 06/29/2012

11/22/2011

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
ELECTRICAL ONE-LINE DIAGRAM
NEW WORK AND DEMOLITION

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-501

SHEET 106 OF 128

File: Q:\SAD\07062_MysticHarbourWWTPImprovProj\Cad_EFX\1-CADD\AS-BUILTS\ELECTRICAL\E-501 ONE-LINE.dwg
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SWITCHBOARD MSB - (SERVICE ENTRANCE BUILDING)

277/480 VOLT, **3** PHASE, **4** WIRE & GROUND

MAIN BUS AMPS: **2000** MAIN DEVICE AMPS: **1600** AIC: **65K**

Circuit Number	Load Description	Connected KVA Load	Overcurrent Device			Circuit Wiring					Remarks
			Frame	Trip	Pole	NO. OF SETS	NO.	Size	GND	C	
	MAIN BREAKER	-	2000	1600	3	-	-	-	-	-	(1)
1	TVSS		100	30	3	1	4	#10	#10	3/4"	
2	PANEL RP3 (MAXFMR TRP3)	18.01	100	60	3	1	3	#6	#10	1"	
3	PANEL RP4 (MAXFMR TRP4)	38.06	225	160	3	1	3	#2	#6	1-1/4"	
4	SPACE	-	-	-	-	-	-	-	-	-	
5	PANEL DP1	227.01	600	600	3	2	4	#350	#1	3"	
6	GMCC2 (MAATS)	631.54	1200	1000	3	3	4	#400	#2/0	3"	(1)
7	SPACE	-	-	-	3	-	-	-	-	-	
8	SPACE	-	-	-	3	-	-	-	-	-	

TOTAL CONNECTED LOAD	914.70 kVA
TOTAL DEMAND LOAD	958.77 kVA

OPTIONS:
1. SERVICE ENTRANCE RATED FOR USE ON DELMARVA UTILITY SYSTEM.
2. CT COMPARTMENT APPROVED BY DELMARVA UTILITY.
3. GROUND FAULT PROTECTION ON MAIN CIRCUIT BREAKER.
4. FRONT ACCESSIBLE ONLY.
5. DIGITAL POWER METER

NOTES:
(1) GROUND FAULT PROTECTION.

GMCC1

VOLTAGE: 480/277V	HORIZONTAL BUS: 600A	A.I.C. RATING: 65,000
LOCATION: OLD GENERATOR ROOM - CONTROL BUILDING	VERTICAL BUS: 300A	200A MLO

CKT NO	SERVES	HP	KVA	CIRCUIT BREAKER P	TRIP	SETS	WIRING NO	SIZE	GND	C	STARTER SIZE	TYPE	AUX	REMARKS	CONN KVA
1A	MAIN LUG COMPARTMENT			3	200A										
1F	EQUALIZATION TANK MIXER - 1	5	6.32	3	20A	1	3	#12	#12	3/4"	1	FVNR	A,B,C,D,E		6.32
1J	EQUALIZATION TANK MIXER - 2	5	6.32	3	20A	1	3	#12	#12	3/4"	1	FVNR	A,B,C,D,E		6.32
1N	ANOXIC MIXER - 1	3	3.99	3	15A	1	3	#12	#12	3/4"	1	FVNR	A,B,C,D,E		3.99
1R	ANOXIC MIXER - 2	3	3.99	3	15A	1	3	#12	#12	3/4"	1	FVNR	A,B,C,D,E		3.99
2A	ANOXIC MIXER - 3	3	3.99	3	15A	1	3	#12	#12	3/4"	1	FVNR	A,B,C,D,E		3.99
2E	SPACE	-	-	-	-	-	-	-	-	-	-	-	-		-
2I	POST ANOXIC MIXER - 1	5	6.32	3	20A	1	3	#12	#12	3/4"	1	FVNR	A,B,C,D,E		6.32
2M	POST ANOXIC MIXER - 2	5	6.32	3	20A	1	3	#12	#12	3/4"	1	FVNR	A,B,C,D,E		6.32
2O	POST ANOXIC MIXER - 3	5	6.32	3	20A	1	3	#12	#12	3/4"	1	FVNR	A,B,C,D,E		6.32
2U	SPACE	-	-	-	-	-	-	-	-	-	-	-	-		-

MOTOR STARTER AUXILIARY DEVICES

A 120 VOLT CONTROL POWER TRANSFORMER
B RED "ON" INDICATING LIGHT
C GREEN "OFF" INDICATING LIGHT
D HAND-OFF-AUTOMATIC SELECTOR SWITCH
E 2-NO, 2-NC AUXILIARY CONTACTS

TOTAL CONNECTED LOAD IN KVA: 43.57
TOTAL DEMAND LOAD IN KVA: 43.57

GMCC2

VOLTAGE: 480Y/277V	HORIZONTAL BUS: 1200A	A.I.C. RATING: 65,000
LOCATION: OLD POLYMER BUILDING	VERTICAL BUS: 300A	1000A MCB

CKT NO	SERVES	HP	KVA	CIRCUIT BREAKER P	TRIP	SETS	WIRING NO	SIZE	GND	C	STARTER SIZE	TYPE	AUX	REMARKS	CONN KVA
1A	MAIN CIRCUIT BREAKER				1000A										
2A	DIGITAL POWER METER														
2C	TVSS		0.10	3	30A	1	4	#10	#10	3/4"					0.10
2E	SUBMERSIBLE INFLUENT PUMP - 1	10	11.7	3	30A	1	3	#8	#10	3/4"	1	VFD	A,B,C,D,E	(1)	11.7
2N	SUBMERSIBLE INFLUENT PUMP - 2	10	11.7	3	30A	1	3	#8	#10	3/4"	1	VFD	A,B,C,D,E	(1)	11.7
3A	AERATION IR PUMP - 1	5	6.32	3	20A	1	3	#12	#12	3/4"	1	VFD	A,B,C,D,E	(1)	6.32
3F	AERATION IR PUMP - 2	5	6.32	3	20A	1	3	#12	#12	3/4"	1	VFD	A,B,C,D,E	(1)	6.32
3K	AERATION IR PUMP - 3	5	6.32	3	20A	1	3	#12	#12	3/4"	1	VFD	A,B,C,D,E	(1)	6.32
3P	GMCC1		43.57	3	200	1	4	#3/0	#6	2-1/2"				-	43.57
3Q	EXHAUST FAN EF- 1 (PROCESS ROOM)	1.5	2.49	3	15A	1	3	#12	#12	3/4"	1	FVNR	A,B,C,D,E		2.49
4C	EXHAUST FAN EF- 2 (PROCESS ROOM)	1.5	2.49	3	15A	1	3	#12	#12	3/4"	1	FVNR	A,B,C,D,E		2.49
4E	EXHAUST FAN EF- 3 (PROCESS ROOM)	1.5	2.49	3	15A	1	3	#12	#12	3/4"	1	FVNR	A,B,C,D,E		2.49
4G	EXHAUST FAN EF- 4 (PROCESS ROOM)	1.5	2.49	3	15A	1	3	#12	#12	3/4"	1	FVNR	A,B,C,D,E		2.49
4I	EXHAUST FAN EF- 5 (PROCESS ROOM)	1.5	2.49	3	15A	1	3	#12	#12	3/4"	1	FVNR	A,B,C,D,E		2.49
4K	EXHAUST FAN EF-7 (SCREEN ROOM)	1.5	2.49	3	15A	1	3	#12	#12	3/4"	1	FVNR	A,B,C,D,E		2.49
4Q	RAS PUMP - 1	7.5	9.15	3	20A	1	3	#12	#12	3/4"	1	VFD	A,B,C,D,E	(1)	9.15
5A	RAS PUMP - 2	7.5	9.15	3	20A	1	3	#12	#12	3/4"	1	VFD	A,B,C,D,E	(1)	9.15
5F	RAS PUMP - 3	7.5	9.15	3	20A	1	3	#12	#12	3/4"	1	VFD	A,B,C,D,E	(1)	9.15
5K	RAS PUMP - 4	7.5	9.15	3	20A	1	3	#12	#12	3/4"	1	VFD	A,B,C,D,E	(1)	9.15
5P	SPACE	-	-	-	-	-	-	-	-	-	-	-	-	-	
6A	PANEL GDP2		431.3	3	600A	2	3	350KCMIL	#1	3"					349.3
6M	PANEL GRP2 (VIA TX TGRP2 30KVA)		14.90	3	60A	1	3	#4	#10	1-1/4"					18.74
6O	PUMP STATION SERVICE PANEL		49.92	3	100A	1	3	#1/0	#6	1-1/2"					49.92
6Q	SPACE	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MOTOR STARTER AUXILIARY DEVICES

A 120 VOLT CONTROL POWER TRANSFORMER
B RED "ON" INDICATING LIGHT
C GREEN "OFF" INDICATING LIGHT
D HAND-OFF-AUTOMATIC SELECTOR SWITCH
E 2-NO, 2-NC AUXILIARY CONTACTS

(1) PROVIDE BYPASS ACROSS THE LINE CONTACTOR

TOTAL CONNECTED LOAD IN KVA: 555.13
TOTAL DEMAND LOAD IN KVA: 555.13

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 30767 EXPIRATION DATE 09/29/2012

11/22/2012

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
SWITCHBOARD AND MCC SCHEDULES

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	SEPT. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
4	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-502

SHEET 107 OF 128

File: G:\SMD\07062_MysticHarbour\WWTP\ed\Prod\ed_EFLY-CADD\AS-BUILTS\ELECTRICAL\E-502 SCHEDULE.dwg
Jan 12, 2015 - 11:18:32am

PANEL: DP1 (ELECTRICAL ROOM)

SECTION 1

MOUNTING: SURFACE

MAIN: MLO

AMP: 600 VOLT: 277/480

PHASE: 3 4 WIRE + GND

AIC: 65K AMPS RMS SYM

Branch Circuit Load Description	KVA Load A	KVA Load B	KVA Load C	Trip Poles	Circuit Wiring NO	Size	GND	C	Ckt. No.	Phase	Ckt. No.	Circuit Wiring NO	Size	GND	C	Trip Poles	KVA Load A	KVA Load B	KVA Load C	Branch Circuit Load Description
UNIT HEATER - SCREEN RM	5.00			25/3	3	#10	#10	3/4"	1	A	2	3	#12	#12	3/4"	15/3	0.58			OVERHEAD DOOR SCREEN RM
**		5.00		**	**	**	**	-	3	B	4	**	**	**	-	**		0.58		**
**			5.00	**	**	**	**	-	5	C	6	**	**	**	-	**			0.58	**
UNIT HEATER - SCREEN RM	5.00			25/3	3	#10	#10	3/4"	7	A	8	3	#12	#12	3/4"	15/3	1.67			UNIT HEATER - ELECTRICAL RM
**		5.00		**	**	**	**	-	9	B	10	**	**	**	-	**		1.67		**
**			5.00	**	**	**	**	-	11	C	12	**	**	**	-	**			1.67	**
UNIT HEATER - PROCESS RM	5.00			25/3	3	#10	#10	3/4"	13	A	14	3	#10	#10	3/4"	25/3	5.00			UNIT HEATER - PROCESS RM
**		5.00		**	**	**	**	-	15	B	16	**	**	**	-	**		5.00		**
**			5.00	**	**	**	**	-	17	C	18	**	**	**	-	**			5.00	**
UNIT HEATER - PROCESS RM	5.00			25/3	3	#10	#10	3/4"	19	A	20	3	#10	#10	3/4"	25/3	5.00			UNIT HEATER - PROCESS RM
**		5.00		**	**	**	**	-	21	B	22	**	**	**	-	**		5.00		**
**			5.00	**	**	**	**	-	23	C	24	**	**	**	-	**			5.00	**
UNIT HEATER - PROCESS RM	5.00			25/3	3	#10	#10	3/4"	25	A	26	3	#10	#10	3/4"	25/3	5.00			UNIT HEATER - PROCESS RM
**		5.00		**	**	**	**	-	27	B	28	**	**	**	-	**		5.00		**
**			5.00	**	**	**	**	-	29	C	30	**	**	**	-	**			5.00	**
UNIT HEATER - PROCESS RM	5.00			25/3	3	#10	#10	3/4"	31	A	32	3	#10	#10	3/4"	25/3	5.00			UNIT HEATER - PROCESS RM
**		5.00		**	**	**	**	-	33	B	34	**	**	**	-	**		5.00		**
**			5.00	**	**	**	**	-	35	C	36	**	**	**	-	**			5.00	**
PANEL DP1A	18.44			200/3	3	#3/0	#6	3"	37	A	38	3	#10	#10	3/4"	25/3	5.00			UNIT HEATER - PROCESS RM
**		18.44		**	**	**	**	-	39	B	40	**	**	**	-	**		5.00		**
**			18.44	**	**	**	**	-	41	C	42	**	**	**	-	**			5.00	**
	48.44	48.44	48.44	<< PHASE SUB-TOTALS >>													27.25	27.25	27.25	MECH EQUIP. CIRCUIT BREAKERS SHALL BE HACR RATED.

PROVIDE THE FOLLOWING:

PHASE A 75.69 kVA
PHASE B 75.69 kVA
PHASE C 75.69 kVA

227.07 kVA TOTAL CONNECTED LOAD
227.07 kVA TOTAL DEMAND LOAD

PANEL: DP1 (ELECTRICAL ROOM)

SECTION 2

MOUNTING: SURFACE

MAIN: MLO

AMP: 600 VOLT: 277/480

PHASE: 3 4 WIRE + GND

AIC: 65K AMPS RMS SYM

Branch Circuit Load Description	KVA Load A	KVA Load B	KVA Load C	Trip Poles	Circuit Wiring NO	Size	GND	C	Ckt. No.	Phase	Ckt. No.	Circuit Wiring NO	Size	GND	C	Trip Poles	KVA Load A	KVA Load B	KVA Load C	Branch Circuit Load Description
UNIT HEATER - PROCESS RM	5.00			25/3	3	#10	#10	3/4"	43	A	44	3	#10	#10	3/4"	25/3	5.00			UNIT HEATER - PROCESS RM
**		5.00		**	**	**	**	-	45	B	46	**	**	**	-	**		5.00		**
**			5.00	**	**	**	**	-	47	C	48	**	**	**	-	**			5.00	**
OVERHEAD DOOR PROCESS RM	0.58			15/3	3	#12	#12	3/4"	49	A	50	3	#8	#10	3/4"	30/3	3.05			BRIDGE CRANE - PROCESS RM
**		0.58		**	**	**	**	-	51	B	52	**	**	**	-	**		3.05		**
**			0.58	**	**	**	**	-	53	C	54	**	**	**	-	**			3.05	**
SPARE	0.00			20/3	-	-	-	-	55	A	56	-	-	-	-	20/3	0.00			SPARE
**		0.00		**	-	-	-	-	57	B	58	-	-	-	-	**		0.00		**
**			0.00	**	-	-	-	-	59	C	60	-	-	-	-	**			0.00	**
SPACE	0.00			PS/3	-	-	-	-	61	A	62	-	-	-	-	PS/3	0.00			SPACE
**		0.00		*	-	-	-	-	63	B	64	-	-	-	-	*		0.00		**
**			0.00	*	-	-	-	-	65	C	66	-	-	-	-	*			0.00	**
SPACE	0.00			PS/3	-	-	-	-	67	A	68	-	-	-	-	PS/3	0.00			SPACE
**		0.00		*	-	-	-	-	69	B	70	-	-	-	-	*		0.00		**
**			0.00	*	-	-	-	-	71	C	72	-	-	-	-	*			0.00	**
SPACE	0.00			PS/3	-	-	-	-	73	A	74	-	-	-	-	PS/3	0.00			SPACE
**		0.00		*	-	-	-	-	75	B	76	-	-	-	-	*		0.00		**
**			0.00	*	-	-	-	-	77	C	78	-	-	-	-	*			0.00	**
SPACE	0.00			PS/3	-	-	-	-	79	A	80	-	-	-	-	PS/3	0.00			SPACE
**		0.00		*	-	-	-	-	81	B	82	-	-	-	-	*		0.00		**
**			0.00	*	-	-	-	-	83	C	84	-	-	-	-	*			0.00	**
	5.58	5.58	5.58	<< PHASE SUB-TOTALS >>													8.05	8.05	8.05	MECH EQUIP. CIRCUIT BREAKERS SHALL BE HACR RATED.

PROVIDE THE FOLLOWING:

PHASE A 13.63 kVA
PHASE B 13.63 kVA
PHASE C 13.63 kVA

40.89 kVA TOTAL CONNECTED LOAD
40.89 kVA TOTAL DEMAND LOAD

PANEL: DP1A (PUMP ROOM)

MOUNTING: SURFACE

MAIN: 200 MCB

AMP: 600 VOLT: 277/480

PHASE: 3 4 WIRE + GND

AIC: 65K AMPS RMS SYM

Branch Circuit Load Description	KVA Load A	KVA Load B	KVA Load C	Trip Poles	Circuit Wiring NO	Size	GND	C	Ckt. No.	Phase	Ckt. No.	Circuit Wiring NO	Size	GND	C	Trip Poles	KVA Load A	KVA Load B	KVA Load C	Branch Circuit Load Description
MAU-2	0.50			15/3	3	#12	#12	3/4"	1	A	2	3	#12	#12	3/4"	15/3	0.72			EF-11 (PUMP ROOM)
**		0.50		**	**	**	**	-	3	B	4	**	**	**	-	**		0.72		**
**			0.50	**	**	**	**	-	5	C	6	**	**	**	-	**			0.72	**
EDH-1	6.00			30/3	3	#8	#10	3/4"	7	A	8	3	#12	#12	3/4"	15/3	0.72			EF-9 (BLOWER ROOM)
**		6.00		**	**	**	**	-	9	B	10	**	**	**	-	**		0.72		**
**			6.00	**	**	**	**	-	11	C	12	**	**	**	-	**			0.72	**
SPARE	0.00			20/3	-	-	-	-	13	A	14	3	#12	#12	3/4"	15/3	3.33			UNIT HEATER - PUMP RM
**		0.00		**	-	-	-	-	15	B	16	**	**	**	-	**		3.33		**
**			0.00	**	-	-	-	-	17	C	18	**	**	**	-	**			3.33	**
OVERHEAD DOOR PUMP RM	0.58			15/3	3	#12	#12	3/4"	19	A	20	3	#12	#12	3/4"	15/3	0.58			OVERHEAD DOOR BLOWER RM
**		0.58		**	**	**	**	-	21	B	22	**	**	**	-	**		0.58		**
**			0.58	**	**	**	**	-	23	C	24	**	**	**	-	**			0.58	**
SPARE	0.00			20/3	-	-	-	-	25	A	26	3	#12	#12	3/4"	20/3	2.10			BRIDGE CRANE - BLOWER RM
**		0.00		**	-	-	-	-	27	B	28	**	**	**	-	**		2.10		**
**			0.00	**	-	-	-	-	29	C	30	**	**	**	-	**			2.10	**
UNIT HEATER - CHEMICAL RM	3.33			15/3	3	#12	#12	3/4"	31	A	32	3	#12	#12	3/4"	15/3	0.58			OVERHEAD DOOR CHEMICAL RM
**		3.33		**	**	**	**	-	33	B	34	**	**	**	-	**		0.58		**
**			3.33	**	**	**	**	-	35	C	36	**	**	**	-	**			0.58	**
SPACE	0.00			PS/3	-	-	-	-	37	A	38	-	-	-	-	PS/3	0.00			SPACE
**		0.00		*	-	-	-	-	39	B	40	-	-	-	-	*		0.00		**
**			0.00	*	-	-	-	-	41	C	42	-	-	-	-	*			0.00	**
	10.41	10.41	10.41	<< PHASE SUB-TOTALS >>													8.03	8.03	8.03	MECH EQUIP. CIRCUIT BREAKERS SHALL BE HACR RATED.

PROVIDE THE FOLLOWING:

PHASE A 18.44 kVA
PHASE B 18.44 kVA
PHASE C 18.44 kVA

55.32 kVA TOTAL CONNECTED LOAD
55.32 kVA TOTAL DEMAND LOAD

PANEL: RP1 (ELECTRICAL ROOM)

MOUNTING: SURFACE

MAIN: 250 MCB

AMP: 400 VOLT: 120/208

PHASE: 3 4 WIRE + GND

AIC: 10K AMPS RMS SYM

Branch Circuit Load Description	KVA Load A	KVA Load B	KVA Load C	Trip Poles	Circuit Wiring NO	Size	GND	C	Ckt. No.	Phase	Ckt. No.	Circuit Wiring NO	Size	GND	C	Trip Poles	KVA Load A	KVA Load B	KVA Load C	Branch Circuit Load Description
SPARE	0.00			20/1	-	-	-	-	1	A	2	-	-	-	-	20/1	0.00			SPARE
SPARE		0.00		20/1	-	-	-	-	3	B	4	-	-	-	-	20/1		0.00		SPARE
SPARE			0.00	20/1	-	-	-	-	5	C	6	2	#12	#12	3/4"	20/1			0.72	RECEPTACLES - ELEC. RM
RECEPT ACLES-SCREEN RM	0.72			20/1	2	#12	#12	3/4"	7	A	8	2	#8	#10	3/4"	30/1	1.50			SCADA CONTROL PANEL
HP-1		2.10		35/2	2	#8	#10	3/4"	9	B	10	0	0	0	0	20/1		0.00		SPARE
**			2.10	**	**	**	**	**	11	C	12	0	0	0	0	20/1			0.00	SPARE
RECEPT ACLES - PROCESS RM	0.72			20/1	2	#12	#12	3/4"	13	A	14	-	-	-	-	20/1	0.00			SPARE
SPARE		0.72		20/1	-	-	-	-	15	B	16	2	#12	#12	3/4"	20/1		0.72		RECEPTACLES - PROCESS RM
RECEPT ACLES - PROCESS RM			0.72	20/1	4	#12	#12	3/4"	17	C	18	0	0	0	0	20/1			0.00	SPARE
LIGHTING - PROCESS RM	1.80			20/1	2	#12	#12	3/4"	19	A	20	0	0	0	0	20/1	0.00			SPARE
SPARE		0.00		20/1	0	0	0	0	21	B	22	0	0	0	0	20/1		0.00		SPARE
SPARE			0.00	20/1	0	0	0	0	23	C	24	4	#12	#12	3/4"	30/1			0.36	RECEPTACLES - EXTERIOR
SPARE	0.00			20/1	0	0	0	0	25	A	26	0	0	0	0	20/1	0.00			SPARE
SPARE		0.00		20/1	-	-	-	-	27	B	28	0	0	0	0	20/1		0.00		SPARE
SPARE			0.00	20/1	0	0	0	0	29	C	30	0	0	0	0	20/1			0.00	SPARE
SPARE	0.00			20/1	0	0	0	0	31	A	32	-	-	-	-	20/1	0.00			SPARE
PANEL RP-1S		7.97		150/2	4	#70	#6	2"	33	B	34	2	#12	#12	3/4"	20/1		0.30		LIGHTING - EQ. TANK
**			9.35	**	**	**	**	**	35	C	36	-	-	-	-	20/1			0.00	SPARE
**	7.78			**	**	**	**	**	37	A	38	-	-	-	-	20/1	0.00			SPARE
SPARE		0.00		20/1	-	-	-	-	39	B	40	-	-	-	-	20/1		0.00		SPARE
SPARE			0.00	20/1	-	-	-	-	41	C	42	-	-	-	-	20/1			0.00	SPARE
	11.02	10.29	12.17	<< PHASE SUB-TOTALS >>													1.50	2.02	1.08	MECH EQUIP. CIRCUIT BREAKERS SHALL BE HACR RATED.

PROVIDE THE FOLLOWING:

PHASE A 12.52 kVA
PHASE B 12.31 kVA
PHASE C 13.25 kVA

38.08 kVA TOTAL CONNECTED LOAD
37.24 kVA TOTAL DEMAND LOAD

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

STATE OF MARYLAND — JOHN PAUL ROSENBERGER — 21522 — PROFESSIONAL ENGINEER
11/22/2012

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 30767 EXPIRATION DATE 06/29/2012

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
ELECTRICAL PANEL SCHEDULES - I

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	SEPT. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
4	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-503

SHEET 108 OF 128

File: G:\CAD\JOB02_MysticHarbour\WWTP\Revit\Revit_ELT\4-CAD\XG-BUILT\ELECTRICAL\E-503 SCHEDULE.dwg
Jan 11, 2013 - 11:02:22am

PANEL: RP1A (PUMP ROOM)

MOUNTING: SURFACE

MAIN: 150 MCB

AMP: 225 VOLT: 120/208
PHASE: 3 4 WIRE + GND
AIC: 10K AMPS RMS SYM

Branch Circuit Load Description	KVA Load A	KVA Load B	KVA Load C	Trip Poles	Circuit Wiring NO	Size	GND	C	Ckt. No.	Phase	Ckt. No.	Circuit Wiring NO	Size	GND	C	Trip Poles	KVA Load A	KVA Load B	KVA Load C	Branch Circuit Load Description
RECEPTACLES - PUMP ROOM	0.72			20/1	2	#12	#12	3/4"	1	A	2	2	#12	#12	3/4"	20/1	0.72			RECEPTACLES - PUMP RM
RECEPTACLES - BLOWER RM		0.72		20/1	2	#12	#12	3/4"	3	B	4	2	#12	#12	3/4"	20/1		1.00		COMPOSITE SAMPLER
MOD			0.10	15/1	2	#12	#12	3/4"	5	C	6	2	#12	#12	3/4"	15/1			0.25	RECIRC PUMP P-1
LIGHTING - PUMP RM	1.50			20/1	2	#12	#12	3/4"	7	A	8	2	#12	#12	3/4"	15/1	0.70			EF-13 (CHEMICAL RM)
LIGHTING - PUMP RM		1.50		20/1	2	#12	#12	3/4"	9	B	10	2	#12	#12	3/4"	20/1		1.50		LIGHTING - BLOWER RM
LIGHTING - BLOWER RM			1.50	20/1	2	#12	#12	3/4"	11	C	12	2	#12	#12	3/4"	20/1			0.72	RECEPTACLES - CHEMICAL RM
SUMP PUMP RECEPTACLE	1.12			20/1	2	#12	#12	3/4"	13	A	14	2	#12	#12	3/4"	15/1	1.11			CHEMICAL FEED PUMP
POLYMER BLENDING UNIT		0.77		20/1	2	#12	#12	3/4"	15	B	16	2	#12	#12	3/4"	15/1		1.11		CHEMICAL FEED PUMP
CENTRAL VAC PUMP			1.44	20/1	2	#12	#12	3/4"	17	C	18	2	#12	#12	3/4"	20/1			1.50	LIGHTING - CHEMICAL RM
SPARE	0.00			20/1	0	0	0	0	19	A	20	2	#12	#12	3/4"	20/1	0.80			FILL STATION
WATER HEATER PANEL		4.50		60/3	#10	#10	#10	1-1/2"	21	B	22	2	#12	#12	3/4"	15/1		0.25		EF-12 (CHEMICAL RM)
**			2.50	**	**	**	**	**	23	C	24	2	#12	#12	3/4"	15/1			0.10	MOD
SPARE	0.00			20/1	-	-	-	-	25	A	26	2	#12	#12	3/4"	20/1	0.80			FILL STATION
SPARE		0.00		20/1	-	-	-	-	27	B	28	-	-	-	-	20/1		0.00		SPARE
SPARE			0.00	20/1	-	-	-	-	29	C	30	-	-	-	-	20/1			0.00	SPARE
SPARE	0.00			20/1	-	-	-	-	31	A	32	-	-	-	-	20/1	0.00			SPARE
SPARE		0.00		20/1	-	-	-	-	33	B	34	-	-	-	-	20/1		0.00		SPARE
SPARE			0.00	20/1	-	-	-	-	35	C	36	-	-	-	-	20/1			0.00	SPARE
SPARE	0.00			20/1	-	-	-	-	37	A	38	-	-	-	-	20/1	0.00			SPARE
SPARE		0.00		20/1	-	-	-	-	39	B	40	-	-	-	-	20/1		0.00		SPARE
SPARE			0.00	20/1	-	-	-	-	41	C	42	-	-	-	-	20/1			0.00	SPARE
	3.34	5.49	5.21	<< PHASE SUB-TOTALS >>													4.13	3.86	2.57	MECH EQUIP. CIRCUIT BREAKERS SHALL BE HACR RATED.

PROVIDE THE FOLLOWING:

PHASE A 7.47 kVA
PHASE B 9.35 kVA
PHASE C 7.78 kVA

24.60 kVA TOTAL CONNECTED LOAD
24.60 kVA TOTAL DEMAND LOAD

PANEL: GDP2 (ELECTRICAL ROOM)

MOUNTING: SURFACE

MAIN: MLO

AMP: 600 VOLT: 277/480
PHASE: 3 4 WIRE + GND
AIC: 65K AMPS RMS SYM

Branch Circuit Load Description	KVA Load A	KVA Load B	KVA Load C	Trip Poles	Circuit Wiring NO	Size	GND	C	Ckt. No.	Phase	Ckt. No.	Circuit Wiring NO	Size	GND	C	Trip Poles	KVA Load A	KVA Load B	KVA Load C	Branch Circuit Load Description
MAU-1	9.70			50/3	3	#1	#6	1"	1	A	2	3	#8	#10	3/4"	35/3	6.32			ACCU-1
**		9.70		**	**	**	**	-	3	B	4	**	**	**	-	**		6.32		**
**			9.70	**	**	**	**	-	5	C	6	**	**	**	-	**			6.32	**
AERATION BLOWER - 1 PANEL	14.41			100/3	3	#3	#8	1"	7	A	8	3	#3	#8	1"	100/3	14.41			AERATION BLOWER - 2 PANEL
**		14.41		**	**	**	**	-	9	B	10	**	**	**	-	**		14.41		**
**			14.41	**	**	**	**	-	11	C	12	**	**	**	-	**			14.41	**
AERATION BLOWER - 3 PANEL	14.41			100/3	3	#3	#8	1"	13	A	14	3	#12	#12	3/4"	20/3	2.68			SCREEN/ COMPACTOR - 1 PANEL
**		14.41		**	**	**	**	-	15	B	16	**	**	**	-	**		2.68		**
**			14.41	**	**	**	**	-	17	C	18	**	**	**	-	**			2.68	**
SCREEN/ COMPACTOR -2 PANEL	2.68			20/3	3	#12	#12	3/4"	19	A	20	3	#12	#12	3/4"	15/3	1.20			ACTUATORS
**		2.68		*	-	-	-	-	21	B	22	-	-	-	-	*		1.20		**
**			2.68	**	**	**	**	-	23	C	24	-	-	-	-	*			1.20	**
PERMEATE PUMP SKID - 1	39.50			250/3	3	#250	#4	3"	25	A	26	#4	#10	#10	3/4"	60/3	6.10			PERMEATE PUMP SKID - 2
**		39.50		**	**	**	**	-	27	B	28	**	**	**	-	**		6.10		**
**			39.50	**	**	**	**	-	29	C	30	**	**	**	-	**			6.10	**
UTILITY WATER CONTROL PANEL	6.09			40/3	3	#8	#10	3/4"	31	A	32	3	#12	#12	3/4"	15/3	0.60			ACTUATORS
**		6.09		*	**	**	**	-	33	B	34	-	-	-	-	*		0.60		**
**			6.09	*	**	**	**	-	35	C	36	-	-	-	-	*			0.60	**
SPACE	0.00			PS/3	-	-	-	-	37	A	38	3	#12	#12	3/4"	15/3	0.20			ACTUATOR
**		0.00		*	-	-	-	-	39	B	40	-	-	-	-	*		0.20		**
**			0.00	*	-	-	-	-	41	C	42	-	-	-	-	*			0.20	**
	86.79	86.79	86.79	<< PHASE SUB-TOTALS >>													31.51	31.51	31.51	MECH EQUIP. CIRCUIT BREAKERS SHALL BE HACR RATED.

PROVIDE THE FOLLOWING:

PHASE A 118.30 kVA
PHASE B 118.30 kVA
PHASE C 118.30 kVA

354.90 kVA TOTAL CONNECTED LOAD
351.90 kVA TOTAL DEMAND LOAD

PANEL: GRP2 (ELECTRICAL ROOM)

MOUNTING: SURFACE

MAIN: 100 MCB

AMP: 225 VOLT: 120/208
PHASE: 3 4 WIRE + GND
AIC: 10K AMPS RMS SYM

Branch Circuit Load Description	KVA Load A	KVA Load B	KVA Load C	Trip Poles	Circuit Wiring NO	Size	GND	C	Ckt. No.	Phase	Ckt. No.	Circuit Wiring NO	Size	GND	C	Trip Poles	KVA Load A	KVA Load B	KVA Load C	Branch Circuit Load Description
COMBUSTION GAS DETECTION	1.00			20/1	2	#12	#12	3/4"	1	A	2	2	#12	#12	3/4"	20/1	0.20			MOD
LOAD BANK CONTROL PANEL		0.72		20/1	2	#12	#12	3/4"	3	B	4	2	#12	#12	3/4"	20/1		0.10		MOD
MOD			0.10	15/1	2	#12	#12	3/4"	5	C	6	2	#12	#12	3/4"	20/1			0.10	MOD
MOD	0.10			15/1	2	#12	#12	3/4"	7	A	8	2	#12	#12	3/4"	20/1	0.10			MOD
LIGHTING - ELECTRICAL ROOM		0.90		20/1	2	#12	#12	3/4"	9	B	10	2	#12	#12	3/4"	20/1		1.10		LIGHTING - SCREEN ROOM
SUPPLIED FROM PANEL GDP2			1.08	60/3	#8	#8	#8	1"	11	C	12	#8	#8	#8	1"	60/3			1.08	LIGHTING - ELECTRICAL SHED
GENERATOR BATTERY CHARGER	1.20			20/1	2	#12	#12	3/4"	13	A	14	2	#12	#12	3/4"	20/1	0.60			GENERATOR REC. AND LIGHT
GEN. JACKET HEATER		2.00		20/2	2	#12	#12	3/4"	15	B	16	2	#12	#12	3/4"	20/1		0.50		GEN. ANTI-CONDENSATION HTR
**			2.00	**	**	**	**	**	17	C	18	-	-	-	-	20/1			0.00	SPARE
SHUNT TRIP CONTROL POWER	0.10			20/1	2	#12	#12	3/4"	19	A	20	2	#12	#12	3/4"	20/1	1.00			LOADBANK ANTI-COND. HEATER
COMBUSTION GAS DETECTION		1.00		20/1	2	#12	#12	3/4"	21	B	22	3	#4	#10	1-1/2"	60/3		4.16		PANEL GRP2A (1)
TEMPERATURE/ HUMIDITY			0.16	20/1	2	#12	#12	3/4"	23	C	24	**	**	**	**	**			2.16	**
CHEMICAL FEED PUMP	0.20			20/1	2	#12	#12	3/4"	25	A	26	**	**	**	**	**	0.50			**
CHEMICAL FEED PUMP		0.20		20/1	2	#12	#12	3/4"	27	B	28	-	-	-	-	20/1		0.00		SPARE
CHEMICAL FEED PUMP			0.20	20/1	2	#12	#12	3/4"	29	C	30	-	-	-	-	20/1			0.00	SPARE
COMPRESSOR DRAIN PUMP	0.60			20/1	2	#12	#12	3/4"	31	A	32	-	-	-	-	20/1	0.00			SPARE
SPARE		0.00		20/1	-	-	-	-	33	B	34	2	#12	#12	3/4"	20/1		1.50		LIGHTING - EXTERIOR
SPARE			0.00	20/1	-	-	-	-	35	C	36	2	#12	#12	3/4"	20/1			1.20	LIGHTING - CHEMICAL ROOM
LIGHTING - PROCESS ROOM	1.50			20/1	2	#12	#12	3/4"	37	A	38	-	-	-	-	PS/1	4.00			SPACE
SPACE		0.00		PS/1	-	-	-	-	39	B	40	-	-	-	-	PS/1		0.00		SPACE
SPACE			0.00	PS/1	-	-	-	-	41	C	42	-	-	-	-	PS/1			0.00	SPACE
	4.70	4.82	3.40	<< PHASE SUB-TOTALS >>													2.40	7.36	4.46	MECH EQUIP. CIRCUIT BREAKERS SHALL BE HACR RATED.

PROVIDE THE FOLLOWING:

(1) SHUNT TRIP BREAKER

PHASE A 7.10 kVA
PHASE B 12.18 kVA
PHASE C 7.86 kVA

27.14 kVA TOTAL CONNECTED LOAD
26.09 kVA TOTAL DEMAND LOAD

PANEL: GRP2A (PROCESS ROOM LAB)

MOUNTING: SURFACE

MAIN: 60 MCB

AMP: 150 VOLT: 120/208
PHASE: 3 4 WIRE + GND
AIC: 10K AMPS RMS SYM

Branch Circuit Load Description	KVA Load A	KVA Load B	KVA Load C	Trip Poles	Circuit Wiring NO	Size	GND	C	Ckt. No.	Phase	Ckt. No.	Circuit Wiring NO	Size	GND	C	Trip Poles	KVA Load A	KVA Load B	KVA Load C	Branch Circuit Load Description
RECEPTACLES	1.08			20/1	2	#12	#12	3/4"	1	A	2	2	#12	#12	3/4"	20/1	1.08			RECEPTACLES
RECEPTACLES		1.08		20/1	2	#12	#12	3/4"	3	B	4	2	#12	#12	3/4"	20/1		1.08		RECEPTACLES
EXHAUST FAN EF-6			0.25	15/1	2	#12	#12	3/4"	5	C	6	2	#12	#12	3/4"	15/1			0.25	EXHAUST FAN EF- 10
LIGHTING	1.00			20/1	2	#12	#12	3/4"	7	A	8	2	#12	#12	3/4"	20/1	1.00			DISH WASHER
SPARE		0.00		20/1	-	-	-	-	9	B	10	-	-	-	-	20/1		0.00		SPARE
SPARE			0.00	20/1	-	-	-	-	11	C	12	-	-	-	-	20/1			0.00	SPARE
SPARE	0.00			20/1	-	-	-	-	13	A	14	-	-	-	-	20/1	0.00			SPARE
SPARE		0.00		20/1	-	-	-	-	15	B	16	-	-	-	-	PS/1		0.00		SPACE
SPACE			0.00	PS/1	-	-	-	-	17	C	18	-	-	-	-	PS/1			0.00	SPACE
SPACE	0.00			PS/1	-	-	-	-	19	A	20	-	-	-	-	PS/1	0.00			SPACE
SPACE		0.00		PS/1	-	-	-	-	21	B	22	-	-	-	-	PS/1		0.00		SPACE
SPACE			0.00	PS/1	-	-	-	-	23	C	24	-	-	-	-	PS/1			0.00	SPACE
SPACE	0.00			PS/1	-	-	-	-	25	A	26	-	-	-	-	PS/1	0.00			SPACE
SPACE		0.00		PS/1	-	-	-	-	27	B	28	-	-	-	-	PS/1		0.00		SPACE
SPACE			0.00	PS/1	-	-	-	-	29	C	30	-	-	-	-	PS/1			0.00	SPACE
SPACE	0.00			PS/1	-	-	-	-	31	A	32	-	-	-	-	PS/1	0.00			SPACE
SPACE		0.00		PS/1	-	-	-	-	33	B	34	-	-	-	-	PS/1		0.00		SPACE
SPACE			0.00	PS/1	-	-	-	-	35	C	36	-	-	-	-	PS/1			0.00	SPACE
SPACE	0.00			PS/1	-	-	-	-	37	A	38	-	-	-	-	PS/1	0.00			SPACE
SPACE		0.00		PS/1	-	-	-	-	39	B	40	-	-	-	-	PS/1		0.00		SPACE
SPACE			0.00	PS/1	-	-	-	-	41	C	42	-	-	-	-	PS/1			0.00	SPACE
	2.08	1.08	0.25	<< PHASE SUB-TOTALS >>													2.08	1.08	0.25	MECH EQUIP. CIRCUIT BREAKERS SHALL BE HACR RATED.

PROVIDE THE FOLLOWING:

PHASE A 4.16 kVA
PHASE B 2.16 kVA
PHASE C 0.50 kVA

6.82 kVA TOTAL CONNECTED LOAD
6.82 kVA TOTAL DEMAND LOAD

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

STATE OF MARYLAND — DAVID P. PRETTYMAN — No. 21522 — REGISTERED PROFESSIONAL ENGINEER
11/22/2012

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 30767 EXPIRATION DATE 06/29/2012.

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
ELECTRICAL PANEL SCHEDULES - II

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	SEPT. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
4	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-504

SHEET 109 OF 128

File: Q:\1990's\0706\2_Mystic Harbour\WWTP and Pond\Cad_ELT\1-CADD\AS-BUILTS\ELECTRICAL\E-504 SCHEDULE.dwg
Jan 12, 2015 - 11:22:31am

PANEL: RP3 (SLUDGE GREENHOUSE BUILDING)

MOUNTING: SURFACE

MAIN: 100 MCB

AMP: 225 VOLT: 120/208

PHASE: 3 4 WIRE + GND

AIC: 10K AMPS RMS SYM

Branch Circuit Load Description	KVA Load A	KVA Load B	KVA Load C	Trip Poles	Circuit Wiring NO	Size	GND	C	Ckt. No.	Phase	Ckt. No.	Circuit Wiring NO	Size	GND	C	Trip Poles	KVA Load A	KVA Load B	KVA Load C	Branch Circuit Load Description
SPARE	0.00			20/1	0	0	0	0	1	A	2	0	0	0	0	20/1	0.00			SPARE
SPARE		0.00		20/1	0	0	0	0	3	B	4	0	0	0	0	20/1		0.00		SPARE
SPARE			0.00	20/1	0	0	0	0	5	C	6	0	0	0	0	20/1			0.00	SPARE
SPARE	0.00			20/1	0	0	0	0	7	A	8	0	0	0	0	20/1	0.00			SPARE
SPARE		0.00		20/1	0	0	0	0	9	B	10	0	0	0	0	20/1		0.00		SPARE
SPARE			0.00	20/1	0	0	0	0	11	C	12	0	0	0	0	20/1			0.00	SPARE
SPARE	0.00			20/1	0	0	0	0	13	A	14	0	0	0	0	20/1	0.00			SPARE
SPARE		0.00		20/1	0	0	0	0	15	B	16	-	-	-	-	PS/1		0.00		SPACE
SPACE			0.00	PS/1	-	-	-	-	17	C	18	-	-	-	-	PS/1			0.00	SPACE
SPACE	0.00			PS/1	-	-	-	-	19	A	20	-	-	-	-	PS/1	0.00			SPACE
SPACE		0.00		PS/1	-	-	-	-	21	B	22	-	-	-	-	PS/1		0.00		SPACE
SPACE			0.00	PS/1	-	-	-	-	23	C	24	-	-	-	-	PS/1			0.00	SPACE
SPACE	0.00			PS/1	-	-	-	-	25	A	26	-	-	-	-	PS/1	0.00			SPACE
SPACE		0.00		PS/1	-	-	-	-	27	B	28	-	-	-	-	PS/1		0.00		SPACE
SPACE			0.00	PS/1	-	-	-	-	29	C	30	-	-	-	-	PS/1			0.00	SPACE
	0.00	0.00	0.00	<< PHASE SUB-TOTALS >>													0.00	0.00	0.00	

MECH EQUIP. CIRCUIT BREAKERS SHALL BE HACR RATED.

PROVIDE THE FOLLOWING:

PHASE A	0.00	kVA	
PHASE B	0.00	kVA	
PHASE C	0.00	kVA	
	0.00	kVA	TOTAL CONNECTED LOAD
	0.00	kVA	TOTAL DEMAND LOAD

SHEET KEYNOTES:

1. ELECTRICAL CONNECTIONS TO BRANCH CIRCUITS IN PANEL RP-3 WILL BE PERFORMED UNDER DIVISION 11. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH CONTRACTORS OF OTHER TRADES AND PROVIDE AN UPDATED PANELBOARD DIRECTORY FOR RP-3.

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

STATE OF MARYLAND — JOHN PAUL PAPPAS — No. 30767 — PROFESSIONAL ENGINEER — 11/22/2013

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 30767 EXPIRATION DATE 06/29/2012

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	SEPT. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
4	NOV.2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
ELECTRICAL PANEL SCHEDULES - II

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: QMA/RRC
CH'D. BY: DPP

E-505

SHEET 110 OF 128

File: Q:\SNDV\070662_MysticHarbour\WWTP\ed\Prod\ed_EP1-V-CADD\AS-BUILTS\ELECTRICAL\E-505 SCHEDULE.dwg
Jan 12, 2015 - 11:23:56am

MYSTIC HARBOUR WASTEWATER TREATMENT PLANT

UPGRADES AND PLANT EXPANSION

EROSION AND SEDIMENT CONTROL NOTES:

1. FOLLOWING INITIAL DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN SEVEN (7) CALENDAR DAYS ON ALL PERIMETER CONTROLS, DIKES, SWALES, DITCHES, PERIMETER SLOPE, AND SLOPES GREATER 3 TO 1 AND (14) DAYS ON ALL OTHER DISTURBED AREA ON THE SITE.
2. ON ALL SITES WITH DISTURBED AREAS IN EXCESS OF 2 ACRES, APPROVAL OF THE INSPECTION AGENCY SHALL BE REQUESTED UPON COMPLETION OF THE INSTALLATION OF PERIMETER EROSION AND SEDIMENT CONTROLS, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING. OTHER BUILDING OR GRADING APPROVALS MAY NOT BE AUTHORIZED UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE.
3. APPROVAL SHALL BE REQUESTED UPON FINAL STABILIZATION OF ALL SITES WITH DISTURBED AREAS IN EXCESS OF 2 ACRES BEFORE REMOVAL OF SEDIMENT CONTROLS.
4. MAINTENANCE SHALL BE PERFORMED AS NECESSARY TO ENSURE THAT STABILIZED AREAS CONTINUOUSLY MEET THE APPROPRIATE REQUIREMENTS OF "1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL."
5. APPROVED PLANS REMAIN VALID FOR 2 YEARS FROM THE DATE OF APPROVAL, EXCEPT SUFACE MINES AND LANDFILL PLANS WHICH REMAIN VALID FOR 5 YEARS FROM THE DATE OF UNLESS SPECIFICALLY EXTENDED OR RENEWED BY THE APPROVAL AUTHORITY.
6. A MARYLAND DEPARTMENT OF THE ENVIRONMENT NOTICE OF INTENT (NOI) GENERAL PERMIT FOR CONSTRUCTION ACTIVITY IS REQUIRED FOR ALL CONSTRUCTION ACTIVITY IN MARYLAND WITH A PLANNED TOTAL DISTURBANCE OF 1 ACRE OR MORE.
7. AS MANDATED BY THE NOTICE OF INTENT (NOI) GENERAL PERMIT ISSUED BY THE MARYLAND DEPARTMENT OF THE ENVIRONMENT, AN INSPECTION MUST BE PERFORMED ONSITE OF ALL SEDIMENT CONTROLS ON A WEEKLY BASIS AND AFTER EVERY RAINFALL EVENT. ALL SELF INSPECTIONS MUST BE MAINTAINED ALONG WITH ALL APPLICABLE GOVERNING AGENCY INSPECTION REPORTS IN A LOG BOOK, TO BE KEPT ONSITE AT ALL TIMES.

SITE INFORMATION:

TOTAL SITE AREA: 8.1 ACRES

TOTAL SURFACE AREA GRADED/DISTURBED: ~~4.5 ACRES~~ 6.2 ACRES (5 R)

VOLUME OF MATERIAL TO MOVED:

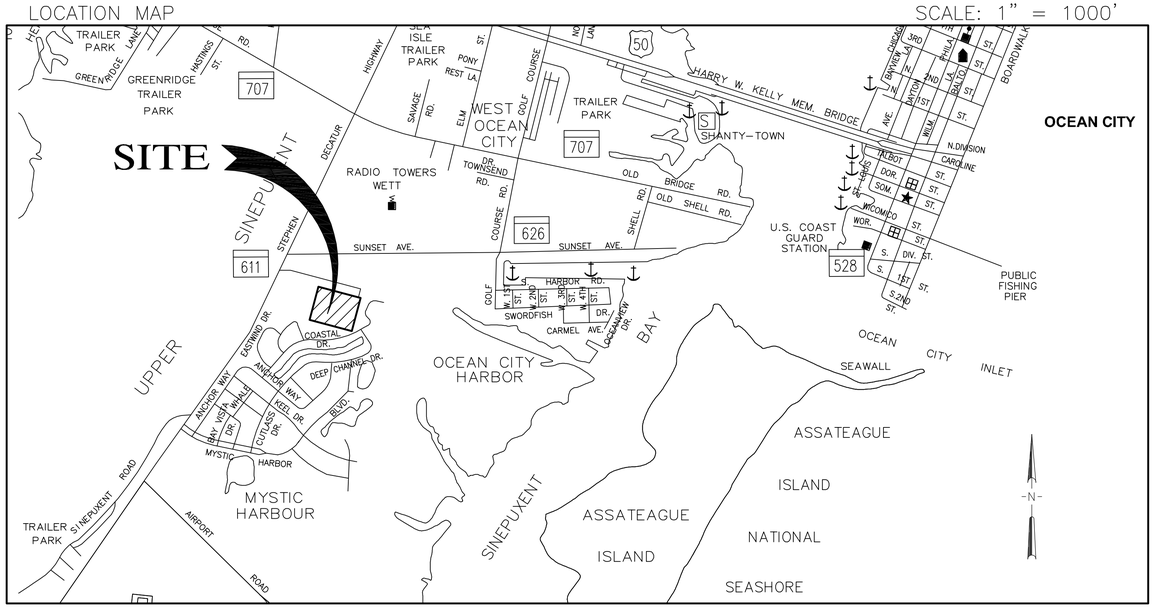
TOTAL CUT: 18,150 CY
TOTAL FILL: ~~4,400 CY~~ 6,900 CY (5 R)

STORMWATER MANAGEMENT NOTES:

1. ALL PHASES OF STORMWATER MANAGEMENT CALCULATIONS, STRUCTURE DESIGN AND CONSTRUCTION WILL ADHERE TO MARYLAND STANDARDS AND SPECIFICATIONS FOR STORMWATER MANAGEMENT AND THE STORMWATER MANAGEMENT PLAN FOR THIS SITE.
2. ALL INFORMATION SET FORTH IN THIS PLAN ACCURATELY CONVEYS THIS SITE'S CONDITIONS TO THE BEST OF MY KNOWLEDGE.
3. ALL STRUCTURAL DEVICES FOR STORMWATER MANAGEMENT WILL BE PROTECTED BY PROPER SOIL EROSION AND SEDIMENT CONTROL DEVICES UNTIL ALL CONTRIBUTING AREAS HAVE PASSED FINAL STABILIZATION INSPECTION.
4. UPON COMPLETION OF THE PROJECT, AN AS-CONSTRUCTED SURVEY, NOTICE OF CONSTRUCTION COMPLETION (NOCC), AND A LETTER OF CERTIFICATION MUST BE SUBMITTED TO THE DEPARTMENT, EXCEPT INDIVIDUAL SINGLE FAMILY DWELLINGS. ONCE REVIEW IS COMPLETE AND APPROVED, A CERTIFICATE OF OCCUPANCY CAN BE ISSUED.
5. CONSTRUCTION OF ALL BMPs WILL BE SUPERVISED, INSPECTED AND CERTIFIED BY JOHNSON, MIRMIRAN & THOMPSON, INC.

AFFORESTATION MITIGATION REQUIREMENTS UNDER THE FOREST CONSERVATION ACT WILL BE MET BY PLANTING ON AN OFFSITE COUNTY PROPERTY.

LOCATION MAP SCALE: 1" = 1000'



TAX MAP #27 PARCEL 629 GRIDS ADC MAP #8 GRID# K11

- THE SITE LOCATION IS LOCATED WITHIN THE ATLANTIC COASTAL BAYS CRITICAL AREA.
- THE SITE LOCATION IS NOT LOCATED WITHIN THE 100 YEAR FLOODPLAIN.
- THE SITE LOCATION DOES NOT CONTAIN ANY JURISDICTIONAL WETLANDS.

OWNER:

THE COUNTY COMMISSIONERS OF
WORCESTER COUNTY
GOVERNMENT OFFICE CENTER
1 WEST MARKET STREET, ROOM 103
SNOW HILL, MD 21863
410-632-1194

MR. JOHN ROSS, P.E., DEPUTY DIRECTOR*
WORCESTER COUNTY, MD DEPARTMENT OF PUBLIC WORKS
410-641-5251

* THIS CONTACT IS RESPONSIBLE FOR THE WORK ON-SITE. IF THERE IS A SEDIMENT AND/OR EROSION CONTROL ISSUE, THIS PERSON IS TO BE CONTACTED BY MDE.

DEVELOPER:

THE COUNTY COMMISSIONERS OF
WORCESTER COUNTY
GOVERNMENT OFFICE CENTER
1 WEST MARKET STREET, ROOM 103
SNOW HILL, MD 21863
410-632-1194

ENGINEER:

JOHNSON, MIRMIRAN AND THOMPSON, INC.
72 LOVETON CIRCLE
SPARKS, MD 21152-0949
410-329-3100

OWNER/DEVELOPER CERTIFICATION:

I/WE HEREBY CERTIFY THAT (1) ANY CLEARING, GRADING, CONSTRUCTION AND/OR DEVELOPMENT, OR ALL OF THESE, WILL BE DONE PURSUANT TO THIS PLAN, (2) THAT RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE CERTIFICATION OF TRAINING AT THE DEPARTMENT-APPROVED TRAINING PROGRAM (GREEN-CARD CERTIFICATION FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. CERTIFICATION MAY BE WAIVED BY THE APPROVAL AUTHORITY ON ANY PROJECT INVOLVING FOUR OR FEWER RESIDENTIAL UNITS) AND AS APPLICABLE PER COUNTY AND (3) THE DEVELOPER WILL PROVIDE ONE COPY OF A RED LINE AS-BUILT DRAWING OF EACH FACILITY REQUIRING A STATE POND PERMIT. I/WE ALSO CERTIFY THAT THE SITE WILL BE INSPECTED AT THE END OF EACH WORKING DAY AND THAT ANY NEEDED MAINTENANCE WILL BE COMPLETED SO AS TO ENSURE THAT ALL SEDIMENT CONTROL PRACTICES ARE LEFT IN OPERATIONAL CONDITION. I/WE AUTHORIZE THE RIGHT OF ENTRY FOR PERIODIC ON-SITE EVALUATION BY WORCESTER COUNTY SOIL CONSERVATION DISTRICT BOARD OF SUPERVISORS OR THEIR AUTHORIZED AGENTS.

SIGNATURE OWNER/DEVELOPER _____ DATE 11/18/10
PRINTED NAME John S. Ross TITLE Deputy Director, DPW

ENGINEER'S CERTIFICATION
I CERTIFY THAT THIS PLAN OF EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE AND THAT THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE WORCESTER COUNTY SOIL CONSERVATION DISTRICT AND THE CURRENT STATE OF MARYLAND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL. I HAVE REVIEWED THIS EROSION AND SEDIMENT CONTROL PLAN WITH THE OWNER/DEVELOPER.

SIGNATURE _____ DATE 11/22/2010
PRINTED NAME Bruce A. McClure MD LICENSE # 20330

CONTRACT DRAWINGS
CONTRACT # 140-10-01

WORCESTER COUNTY, MARYLAND
DEPARTMENT OF PUBLIC WORKS

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 20330 EXPIRATION DATE 01/25/2012.

BOARD FOR PROFESSIONAL ENGINEERS 20330 BRUCE ALAN MCCLURE STATE OF MARYLAND 11/22/2010

RECORD DRAWING SET
JANUARY 2015

WATER & WASTEWATER DIVISION
WORCESTER COUNTY, MARYLAND
JOHN S. ROSS, P.E. 11/18/10 DATE

DEPARTMENT OF PUBLIC WORKS
WORCESTER COUNTY, MARYLAND
JOHN H. TUSTIN, P.E. 11/18/10 DATE
DIRECTOR OF DEPT. OF PUBLIC WORKS

1 MAR. 2014 REVISION 5 (5 R)

DATE: ~~NOVEMBER 2010~~ MARCH 2014
~~128~~ ~~127~~ SHEETS IN SET
SHEET 1 OF 128
DRAWING NO. G-001

INDEX OF DRAWINGS

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RECORD DRAWING SET
JANUARY 2015

THE WATER AND / OR SEWER FACILITIES TO BE CONSTRUCTED IN ACCORDANCE WITH THESE PLANS ARE APPROVED BY WORCESTER COUNTY WATER AND WASTEWATER DIVISION.

11/18/10
JOHN S. ROSS, P.E.
WORCESTER COUNTY, WATER & WASTEWATER DIVISION

THE WATER AND / OR SEWER FACILITIES TO BE CONSTRUCTED IN ACCORDANCE WITH THESE PLANS ARE APPROVED BY WORCESTER COUNTY DEPARTMENT OF PUBLIC WORKS.

11/18/10
JOHN H. TUSTIN, P.E., DIRECTOR
WORCESTER COUNTY, DEPARTMENT OF PUBLIC WORKS

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 20330
EXPIRATION DATE 01/29/2012.

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
INDEX OF DRAWINGS

MARK	DATE	DESCRIPTION
4	MAR. 2014	REVISION 5
5	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

G-002

SHEET 2 OF 128

LEGEND

EXISTING GROUND CONTOUR

100

FINISHED GRADE CONTOUR

100.0 x

FINISHED GRADE SPOT ELEVATION

CHAIN LINK FENCE

GUARD RAIL

PROPERTY LINE

CURB LINE

PROPOSED CURB & GUTTER LINE

E

UNDERGROUND ELECTRIC

T

UNDERGROUND TELEPHONE DUCTBANK

S

EXISTING SEWER AND MANHOLE

W

WATER MANHOLE, WATER VALVE BOX

D

EXISTING DRAIN AND MANHOLES

PROPOSED STORM DRAIN

WATER LINE AND VALVE

SF

SILT FENCE

LOD

LIMIT OF DISTURBANCE

C C

CUT SLOPE – TOP

F F

FILL SLOPE – TOE

VFD

VARIABLE FREQUENCY DRIVE

FM

FLOW METER

M

MOTOR

INLINE STRAINER

BALL VALVE

QUICK CONNECT

BUTTERFLY VALVE

R A/R

AIR RELEASE VALVE

LIGHT POLE

POWER POLE

YARD HYDRANT

T TELEPHONE MANHOLE

E ELECTRIC HANDHOLE

E ELECTRIC MANHOLE

PLANT NORTH

N PLANT NORTH WITH TRUE NORTH

A A102 SECTION LETTER

DRAWING WHERE SECTION IS SHOWN

SECTION TITLE

SECTION LETTER — A A102 SECTION — SECTION SCALE: 1"=30'

DRAWING WHERE SECTION IS FIRST CALLED OUT

SECTIONS

DETAIL NO. 1 A102

DRAWING WHERE DETAIL IS SHOWN

DETAIL TITLE

DETAIL NO. 1 A102 DETAIL 1 — DRAWING SCALE: 1"=30'

DRAWING WHERE DETAIL IS FIRST CALLED OUT

DETAILS

ABBREVIATIONS

BLDG	BUILDING
BM	BENCH MARK
BOD5	5 DAY BIOLOGICAL OXYGEN DEMAND
C&G	CURB AND GUTTER
CFS	CUBIC FEET PER SECOND
CHEM	CHEMICAL
CIP	CAST IRON PIPE
℄	CENTER LINE
CL	CLASS
CONT.	CONTINUOUS
$FeCl_3$	FERRIC CHLORIDE
CVR	COVER
D	DRAIN
DET.	DETAIL
DFT	DRY FILM THICKNESS
DI	DUCTILE IRON
DIA.	DIAMETER
DIP	DUCTILE IRON PIPE
DWG.	DRAWING
E	EAST, ELECTRICAL
EA.	EACH
ELEC.	ELECTRICAL
E.F.	EACH FACE
EL	ELEVATION
EQ.	EQUAL, EQUALIZATION
E.W.	EACH WAY
EX., EXIST.	EXISTING
EXH	EXHAUST
FC	FLEXIBLE COUPLING
F.F.	FINISHED FLOOR
FH	FIRE HYDRANT
FIP	FEMALE IRON PIPE
FLG	FLANGE OR FLANGED
FM	FORCE MAIN
FRP	FIBERGLASS REINFORCED PLASTIC
FT.	FEET
G	GAS
GAL	GALLONS
GPM	GALLONS PER MINUTE
GS	GRAVITY SEWER
HDPE	HIGH–DENSITY POLYETHYLENE
HORZ.	HORIZONTAL
HWL	HIGH WATER LEVEL
I	INLET
ID	INSIDE DIAMETER
INFO.	INFORMATION
INV	INVERT
IR	INTERNAL RECYCLE
JB	JUNCTION BOX
LF	LINEAR FEET
MAX.	MAXIMUM
MBR	MEMBRANE BIOREACTOR
MIN.	MINIMUM
MH	MANHOLE
MJ	MECHANICAL JOINT
N	NORTH
NO.	NUMBER
NTS	NOT TO SCALE
O/C	ON CENTER
OVF	OVERFLOW
P	PHOSPHORUS
PC	POINT OF CURVATURE
PD	PLANT DRAIN
PE	POLYETHYLENE , PLAIN END
PEN.	PENETRATION
PI	POINT OF INTERSECTION
PS	PRESSURE SEWER
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
R, RAD.	RADIUS
RAS	RETURN ACTIVATED SLUDGE
RED.	REDUCER
RCP	REINFORCED CONCRETE PIPE
REV	REVISION
S	SEWER/SANITARY, SOUTH
SB	SOIL BORING
SCH.	SCHEDULE
SD	STORM DRAIN
SL	SAMPLE LINE
SS	STAINLESS STEEL, SANITARY SEWER
STA	STATION
STD	STANDARD
STL	STEEL
SUB.	SUBMERSIBLE
SWD	SIDE WALL DEPTH
SWM	STORMWATER MANAGEMENT
TDH	TOTAL DYNAMIC HEAD
TEMP.	TEMPORARY
TKN	TOTAL KJELDAHL NITROGEN
TS&V	TAPPING SLEEVE AND VALVE
TSS	TOTAL SUSPENDED SOLIDS
TYP.	TYPICAL
UW	UTILITY WATER
V	VALVE
VERT.	VERTICAL
W	WATER, WEST
WAS	WASTE ACTIVATED SLUDGE
W.V.	WATER VALVE
WWF	WELDED WIRE FABRIC

GENERAL NOTES

1. THE CONTRACTOR SHALL PROVIDE SEDIMENT CONTROL MEASURES TO PROTECT STOCKPILE AREAS AND STORAGE AREAS. ALL AREAS USED BY THE CONTRACTOR FOR STAGING OPERATIONS SHALL BE FULLY RESTORED BY THE CONTRACTOR UPON COMPLETION OF THE PROJECT. IF THE STAGING AREA IS PAVED, IT SHALL BE RESTORED TO ITS ORIGINAL CONDITION. IF THE STAGING AREA IS UNPAVED, IT SHALL BE RE–GRADED, TOPSOILED, SEEDED AND MULCHED TO THE SATISFACTION OF THE ENGINEER. ALL COSTS ASSOCIATED WITH RESTORATION OF THE STAGING AREA SHALL BE AT THE CONTRACTOR'S EXPENSE. IF THE ENGINEER DETERMINES THAT A SATISFACTORY STAND OF GRASS DOES NOT EXIST AT THE TIME OF FINAL INSPECTION, THE CONTRACTOR SHALL ESTABLISH A SATISFACTORY STAND OF GRASS AND ALL COSTS ASSOCIATED WITH RE–ESTABLISHING A SATISFACTORY STAND OF GRASS SHALL BE BORNE BY THE CONTRACTOR.

2. THE CONTRACTOR SHALL CONTACT WORCESTER COUNTY DEPARTMENT OF PUBLIC WORKS AT 410–641–5251 AT LEAST 48 HOURS IN ADVANCE OF STARTING CONSTRUCTION.

3. ALL INVERT ELEVATIONS ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY ALL EXISTING AND PROPOSED INVERT ELEVATIONS PRIOR TO ORDERING PRECAST STRUCTURES. INVERT ELEVATIONS OF DRAINAGE INLETS AND PIPES MAY BE MODIFIED AS DIRECTED BY THE ENGINEER TO MEET CONDITIONS ENCOUNTERED DURING INSTALLATION OF DRAINAGE STRUCTURES.

4. ALL DRAINAGE PIPES AND DITCHES SHALL BE CONSTRUCTED ON A UNIFORM GRADE BETWEEN INVERT ELEVATIONS NOTED ON THE PLANS UNLESS INDICATED OTHERWISE ON THE PLANS OR DETAILS.

5. THE LOCATION AND LENGTH OF DRAINAGE PIPE SHALL BE VERIFIED BY THE CONTRACTOR BEFORE ORDERING.

6. ALL EXISTING STORM DRAIN STRUCTURES, SEWER MANHOLES, UTILITY MANHOLES, INLETS, VALVE BOXES, VAULTS, ETC. SHALL BE ADJUSTED BY THE CONTRACTOR TO MEET THE FINISHED GRADE ELEVATION AS NOTED ON THE PLANS, UNLESS THESE APPURTENANCES ARE ABANDONED UNDER THIS CONTRACT.

7. ANY DISTURBED AREAS NOT PAVED OR LANDSCAPED SHALL RECEIVE 4" TOPSOIL, SEEDING AND MULCH, PER SEDIMENT CONTROL INSPECTOR APPROVAL, UNLESS OTHERWISE NOTED ON THE PLANS.

8. MATERIALS REMOVED DURING CONSTRUCTION INCLUDING ASPHALT, SIGNS, LIGHT POLES, ETC. SHALL BECOME THE CONTRACTOR'S PROPERTY UNLESS OTHERWISE NOTED ON THE PLANS OR IN THE SPECIAL PROVISIONS AND SHALL BE DISPOSED OFFSITE AT APPROVED FACILITY.

9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESETTING ANY SIGN POST OR OTHER APPURTENANCES REMOVED DURING THE CONSTRUCTION TO FACILITATE HIS WORK, EXCEPT WHERE SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

10. OWNER SHALL SET HORIZONTAL AND VERTICAL CONTROL PRIOR TO CONSTRUCTION.

11. THE CONTRACTOR SHALL PROVIDE TEMPORARY SEED AND MULCH FOR ALL AREAS WHERE SOIL IS EXPOSED AND SILT FENCE IS NOT SPECIFIED, BY THE CLOSE OF EACH BUSINESS DAY.

12. THE CONTRACTOR SHALL MAINTAIN PLANT ROADS AND STREETS IN A BROOM SWEPT CONDITION AT ALL TIMES.

13. THE CONTRACTOR SHALL USE ONLY NEW MATERIALS, PARTS, AND PRODUCTS. ALL MATERIALS SHALL BE STORED SO AS TO ASSURE THE PRESERVATION OF THEIR QUALITY AND FITNESS FOR THE INTENDED WORK.

14. THE CONTRACTOR SHALL MAINTAIN TRAFFIC AT ALL TIMES DURING CONSTRUCTION AND COORDINATE WITH THE ENGINEER. ALL WORK SHALL BE PERFORMED IN A MANNER THAT WILL ENSURE THE LEAST OBSTRUCTION TO TRAFFIC. COORDINATE WITH PLANT SUPERVISOR FOR ANY TEMPORARY CLOSING OF PLANT ROADS.

15. LOCATIONS OF THE EXISTING UTILITIES SHOWN ON SITE PLANS ARE ACCORDING TO THE BEST AVAILABLE INFORMATION, AND ARE FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. THE CONTRACTOR SHALL LOCATE AND TAKE THE NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES. CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT LEAST THREE DAYS BEFORE INITIATING ANY SITE IMPROVEMENT WORK, 1–800–441–8355.

16. ALL UTILITIES PLOTTED ON THE DRAWINGS ARE FROM THE BEST AVAILABLE INFORMATION. THE CONTRACTOR, PRIOR TO LAYING A RUN OF PIPE OR OTHER INVOLVED CONSTRUCTION, SHALL EXCAVATE WITHIN THE ALIGNMENT AT POINTS OF POSSIBLE CONFLICT TO DETERMINE IF A CONFLICT EXISTS. ANY CONFLICTS SHALL BE COORDINATED BY THE CONTRACTOR WITH THE ENGINEER AND THE UTILITY INVOLVED. THE ENGINEER SHALL DETERMINE THE SOLUTION. EXCAVATING, BACKFILLING AND RESTORATION OF THE TEST HOLES AS REQUIRED FOR UTILITY INVESTIGATIONS SHALL BE CONSIDERED INCIDENTAL TO THE INSTALLATION OF THE UTILITIES AS SHOWN ON THE PLANS.

17. THE OWNER WILL BE RESPONSIBLE FOR PERFORMING TEST PITS. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER ON REQUIRED LOCATIONS OF TEST PITS.

18. CONTRACTOR SHALL OBTAIN ALL THE NECESSARY PERMITS FOR THE EXECUTION OF THIS CONTRACT.

19. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LAWS, ORDINANCES, RULES, REGULATIONS AND ORDERS OF ANY PUBLIC BODY HAVING JURISDICTION. THE CONTRACTOR SHALL ERECT AND MAINTAIN, AS REQUIRED BY THE CONDITIONS AND PROGRESS OF THE WORK, ALL NECESSARY SAFEGUARDS FOR SAFETY AND PROTECTION.

20. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ALL MATERIALS FOR APPROVAL TO THE OWNER PRIOR TO COMMENCEMENT OF CONSTRUCTION. ALL MATERIALS ORDERED AND INSTALLED PRIOR TO THE OWNER'S REVIEW AND ACCEPTANCE WILL BE AT THE CONTRACTOR'S RISK.

21. THE CONTRACTOR SHALL OPEN ONLY THAT SECTION OF TRENCH OR ACCESS PITS WHICH CAN BE BACKFILLED AND STABILIZED AT THE END OF EACH WORKING DAY. STEEL PLATES SHALL BE USED ON ANY TRENCH OR ACCESS PITS WHICH MUST REMAIN OPEN OVERNIGHT. THIS REQUIREMENT DOES NOT APPLY TO AREAS COMPLETELY CLOSED AND SECURE FROM VEHICULAR OR PEDESTRIAN TRAFFIC.

22. FINAL APPROVED SET OF PLANS AND SPECIFICATIONS MUST BE MAINTAINED ON THE JOB SITE. FAILURE TO COMPLY WITH THIS PROVISION SHALL BE CONSIDERED CAUSE TO STOP THE WORK.

23. THE CONTRACTOR SHALL MAINTAIN ONE COMPLETE SET OF CONTRACT DRAWINGS ON WHICH HE SHALL NOTE, IN RED, THE ALIGNMENTS AND INVERTS OF ALL UNDERGROUND UTILITIES INSTALLED OR ENCOUNTERED DURING THE PROSECUTION OF THE WORK. ALL DISCREPANCIES BETWEEN THE PLAN LOCATIONS AND ELEVATIONS OF BOTH THE EXISTING AND PROPOSED UTILITIES SHALL BE SHOWN ON THE AS–BUILT DRAWINGS TO BE MAINTAINED BY THE CONTRACTOR IN THE FIELD.

24. ROUTINE PERIODIC INSPECTIONS DURING CONSTRUCTION WILL BE PROVIDED BY THE OWNER. THESE INSPECTIONS DO NOT RELIEVE THE CONTRACTOR FROM HIS OBLIGATION AND RESPONSIBILITY FOR CONSTRUCTING ITEMS OF THIS CONTRACT IN STRICT ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE OWNER.

25. AFTER TESTING IS COMPLETE AND ALL COMPONENTS OF THIS CONTRACT ARE DEEMED ACCEPTABLE TO THE OWNER, THE CONTRACTOR SHALL SUBMIT THE AS–BUILT DRAWINGS TO THE OWNER. ANY DISCREPANCIES NOTED DURING THE FINAL INSPECTION SHALL BE CORRECTED BY THE CONTRACTOR WITHIN 30 DAYS.

26. THE PROPERTY AND RIGHT OF WAY LINES SHOWN ON THESE DRAWINGS ARE APPROXIMATE, AND ARE NOT BASED ON METES AND BOUNDS FIELD RUN SURVEYS OR PROPERTY RECORDS.

RECORD DRAWING SET
JANUARY 2015

GENERAL NOTES (CONTINUED)

27. STRUCTURES AND/OR THRUST BLOCKING HAVE BEEN DESIGNED BASED ON THE FOLLOWING.
   A. A MINIMUM 3,000 PSF SOIL BEARING CAPACITY.
   B. A MINIMUM 28 DAY CONCRETE COMPRESSIVE STRENGTH OF 3,500 PSI (EXCEPT FOR PRECAST CONCRETE AND THRUST COLLARS).
   C. TEST PRESSURE (WORKING 93 PSI PLUS 85 PSI SURGE) IS 178 PSI (MAX.).
   D. DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO BE 3.5 FT. OR DEEPER.
   E. EXISTING SOIL CONDITIONS ARE NOT SOFT OR ORGANIC.
   F. ELEVATION OF GROUNDWATER TABLE IS LOCATED BELOW THE BLOCK/STRUCTURE.
   G. ALL DIMENSIONS FOR THRUST BLOCKS ARE MINIMUMS EXCEPT WHERE LARGER DIMENSIONS WILL INTERFERE WITH PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINT FITTINGS.

28. DIFFERING SITE CONDITIONS AND/OR DIFFERING MATERIAL PROPERTIES SHALL REQUIRE WORCESTER COUNTY DPW APPROVAL OF SPECIAL DESIGN DETAILS PREPARED BY THE DESIGN ENGINEER PRIOR TO INITIATING OR RESUMING CONSTRUCTION ACTIVITIES.

29. THE CONTRACTOR SHALL ALLOW SUFFICIENT TIME FOLLOWING EXCAVATIONS FOR INSPECTION AND EVALUATION OF EXISTING SOIL SUBGRADE CONDITIONS BY THE CONSTRUCTION ENGINEER (AGENT FOR WORCESTER COUNTY DPW). THE CONSTRUCTION ENGINEER SHALL INSPECT ALL STRUCTURE AND THRUST BLOCKING SUBGRADE AND PIPELINE SUBGRADE FOLLOWING EXCAVATION AND PRIOR TO CONSTRUCTION OF NEW WORK TO CONFIRM DESIGN CONDITIONS ARE MET AND SUBGRADE CONDITIONS ARE SUITABLE FOR CONSTRUCTION. IN THE EVENT THE SOIL BEARING CAPACITY IS LESS THAN THE MINIMUM DESIGN VALUE, THE CONSTRUCTION ENGINEER SHALL CAUSE AFFECTED CONSTRUCTION TO CEASE AND SHALL NOTIFY THE DESIGN ENGINEER FOR RE–DESIGN TO ACCOMMODATE THE REDUCED SOIL BEARING CAPACITY.

30. IN THE EVENT THE SUBGRADE CONDITION IS UNSTABLE, DUE TO UNSUITABLE MATERIALS AND/OR GROUNDWATER INFILTRATION/INTRUSION INTO THE SURROUNDING SOILS, AS DETERMINED BY THE CONSTRUCTION ENGINEER, THE CONTRACTOR SHALL, AS DIRECTED BY THE CONSTRUCTION ENGINEER, REMOVE THE UNSUITABLE MATERIAL AND FILL WITH TYPE "A" SELECT GRANULAR MATERIAL.

31. IN THE EVENT THE UNSUITABLE SUBGRADE CONDITION IS CAUSED BY THE CONTRACTOR'S ACTIVITIES OR NEGLIGENCE IN FAILING TO MAINTAIN THE EXCAVATION IN A DEWATERED CONDITION, THE CONTRACTOR SHALL REMOVE THE UNSUITABLE MATERIAL AND BACKFILL WITH TYPE "A" SELECT GRANULAR MATERIAL AT NO ADDITIONAL EXPENSE TO THE OWNER.

32. THE EXISTING TOPOGRAPHY SHOWN ON THESE DRAWINGS IS BASED ON STATE OF MARYLAND HORIZONTAL PLANE COORDINATE SYSTEM 1983/1991 AND NORTH AMERICAN VERTICAL DATUM 1988. TOPOGRAPHY INFORMATION SHOWN IS BASED ON FIELD SURVEYS BY AXIS GEOSPATIAL, LLC CONDUCTED ON MAY 2008.

33. THE CONTRACTOR SHALL TAKE EVERY PRECAUTION TO AVOID CONSTRUCTION ACTIVITIES WHICH DISTURB ENVIRONMENTALLY SENSITIVE AND/OR WETLAND AREAS. THE CONTRACTOR SHALL VERIFY THE LOCATION OF THESE AREAS PRIOR TO CONSTRUCTION. ANY DAMAGES TO THESE AREAS RESULTING FROM THE CONTRACTOR'S ACTIVITIES OR NEGLIGENCE SHALL BE REPAIRED TO THE SATISFACTION OF THE DIRECTOR OF THE WORCESTER COUNTY DEPARTMENT OF PUBLIC WORKS AND THE MARYLAND DEPARTMENT OF THE ENVIRONMENT.

34. CONTRACTOR SHALL REFER TO MECHANICAL AND ELECTRICAL SHEETS FOR LOCATION AND DETAILS OF PIPING OR CONDUIT WITHIN 5 FEET OF NEW AND EXISTING STRUCTURES.

35. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER FOR THE LOCATION AND SIZE OF THE CONTRACTOR'S TEMPORARY LAY DOWN, STORAGE AREA AND CONSTRUCTION TRAILER. THIS AREA SHALL BE RESTORED TO ITS ORIGINAL CONDITION BY THE CONTRACTOR UPON COMPLETION OF CONSTRUCTION.

36. ALL PAVING AND SURFACING RESTORATION ON WORCESTER COUNTY PROPERTY SHALL BE REPLACED IN KIND, UNLESS OTHERWISE NOTED ON CONTRACT DRAWINGS.

37. EXISTING CURB AND GUTTER AND SIDEWALK SHALL BE REMOVED TO THE NEAREST JOINT AND REPLACED AS REQUIRED. NO PATCHING WILL BE ALLOWED. THE CURB AND GUTTER AND SIDEWALK CONSTRUCTION SHALL BE REPLACED IN KIND, UNLESS OTHERWISE NOTED ON CONTRACT DRAWINGS.

38. THE CONTRACTOR SHALL SHORE, BRACE, UNDERPIN, SECURE AND PROTECT AS MAY BE NECESSARY, ALL FOUNDATIONS AND OTHER PARTS OF EXISTING STRUCTURES AND/OR ROADWAYS AND ASSOCIATED APPURTENANCES ADJACENT TO, ADJOINING AND IN THE VICINITY OF THE AREA THAT MAY BE AFFECTED BY EXCAVATIONS OR OTHER OPERATIONS CONNECTED WITH THE WORK.

39. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ANY EXISTING FENCES, PAVING, SIDEWALKS, LIGHT POLES, BOLLARDS, ETC., DAMAGED OR REMOVED DURING CONSTRUCTION.

40. THE PROPOSED UTILITIES (BY OTHERS) AS SHOWN ON THESE DRAWINGS ARE BASED ON DRAWINGS PREPARED BY OTHERS. THE CONTRACTOR SHALL VERIFY THE LOCATION OF THESE UTILITIES PRIOR TO CONSTRUCTION AND RECOMMEND ADJUSTMENTS TO THE PROPOSED UTILITIES AS REQUIRED TO AVOID CONFLICTS DURING CONSTRUCTION. ALL RECOMMENDED ADJUSTMENTS SHALL BE APPROVED BY THE DIRECTOR OF THE WORCESTER COUNTY DEPARTMENT OF PUBLIC WORKS. ANY DAMAGES TO THESE UTILITIES RESULTING FROM THE CONTRACTOR'S ACTIVITIES OR NEGLIGENCE SHALL BE REPAIRED TO THE SATISFACTION OF THE DIRECTOR OF THE WORCESTER COUNTY DEPARTMENT OF PUBLIC WORKS.

41. ALL WORK SHALL BE CONFINED WITHIN THE LIMITS OF COUNTY OWNED PROPERTY AND RIGHT–OF–WAY.

42. CONTRACTOR SHALL TAKE EVERY MEASURE TO PREVENT AND ALL DAMAGE TO NEIGHBORING PROPERTIES. CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL SUCH DAMAGE AND WILL REPAIR AND / OR REPLACE ANY OBJECT, PLANT OR PIECE OF PROPERTY TO ORIGINAL STATE ON ADJACENT PROPERTIES THAT IS DAMAGED IN ANY WAY DUE TO THIS CONSTRUCTION.

43. WORCHESTER COUNTY STANDARD SPECIFICATIONS FOR WATER AND SEWER MAINS SHALL BE FOLLOWED, INCLUDING BUT NOT LIMITED TO: SECTION 2–B EXCAVATION, SECTION 2–C EXCAVATION BACKFILL, SECTION 2–D TOPSOIL, SEEDING, MULCHING & SODDING, SECTION 2–F PORTLAND CEMENT CONCRETE, AND SECTION 2–H CONCRETE REINFORCING.

SITE CONDITIONS AND FACILITY COORDINATION

1. THE CONTRACTOR SHALL PROVIDE ALL LABOR, EQUIPMENT, TOOLS, APPLIANCES, MATERIALS AND INCIDENTALS, AND SHALL PERFORM ALL OPERATIONS REQUIRED TO COMPLETELY FINISH ALL WORK IN THE MANNER APPROVED BY THE ENGINEER

2. THE WORK INCLUDES ALL REQUIREMENTS TO PROVIDE FULLY FINISHED AND OPERABLE PLANT FACILITIES INCLUDING MISCELLANEOUS ITEMS AND OPERATIONS AS SHALL BE INDICATED, SHOWN, SPECIFIED OR REQUIRED TO COMPLETE THE WORK IN STRICT CONFORMITY WITH THE CONTRACT DOCUMENTS.

3. THE WORK ALSO INCLUDES ALL SPECIFIED, INDICATED AND SHOWN MECHANICAL AND ELECTRICAL EQUIPMENT, APPLIANCES, APPURTENANCES, FURNISHINGS, INSTRUMENTATION AND CONTROLS, ACCESSORIES, TESTS AND SUNDRY PARTS AND MATERIAL AS SHALL BE NECESSARY AND REQUIRED FOR A COMPLETELY OPERABLE INSTALLATION SATISFACTORY TO THE ENGINEER.

4. THE CONTRACTOR MUST PROVIDE HIS OWN LABOR, EQUIPMENT AND DEVICES TO DEWATER, FLUSH, WASH AND CLEAN THE WORK AREAS AND SHALL PROVIDE THE FACILITIES NECESSARY TO ASSURE AGAINST LEAKAGE OF WATER, FOAM, SEWAGE, SLUDGE, OR SIMILAR SUBSTANCE INTO THE WORK AREA.

5. THE CONTRACTOR SHALL PROVIDE MONITORING AND SAFETY PERSONNEL AND EQUIPMENT CRITICAL FOR WORKER PROTECTION WHEN WORKING WITHIN CONFINED SPACES TO CONTINUOUSLY MEASURE AND ALARM WHEN CONDITIONS OF TOXICITY OR EXPLOSIVE CONDITIONS ARE APPROACHED.

6. THE CONTRACTOR IS NOTIFIED THAT PATHOGENS EXIST IN THE WASTEWATER FLOWS WHICH MAY BE HARMFUL TO HUMAN HEALTH. THE CONTRACTOR SHALL INCLUDE ALL SAFETY EQUIPMENT AND MATERIALS NECESSARY TO PROTECT WORKERS. ALL MEDICAL MONITORING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE INCLUDED IN THE BASE BID.

7. THE CONTRACTOR SHALL HAVE THOROUGH KNOWLEDGE OF THE SYSTEMS BEING RENOVATED AND SHALL PROVIDE QUALIFIED AND LICENSED PERSONNEL TO OPERATE SYSTEMS IN ACCORDANCE WITH THE SPECIFIED STARTUP AND OPERATIONS PERIODS.

8. CONTRACTOR IS NOTIFIED THAT ANY DISRUPTION IN PLANT OPERATION REQUIRES PRIOR APPROVAL OF PLANT SUPERVISOR.

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 20330 EXPIRATION DATE 01/29/2012.

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
LEGEND, GENERAL NOTES, AND SITE CONDITIONS & FACILITY COORDINATION

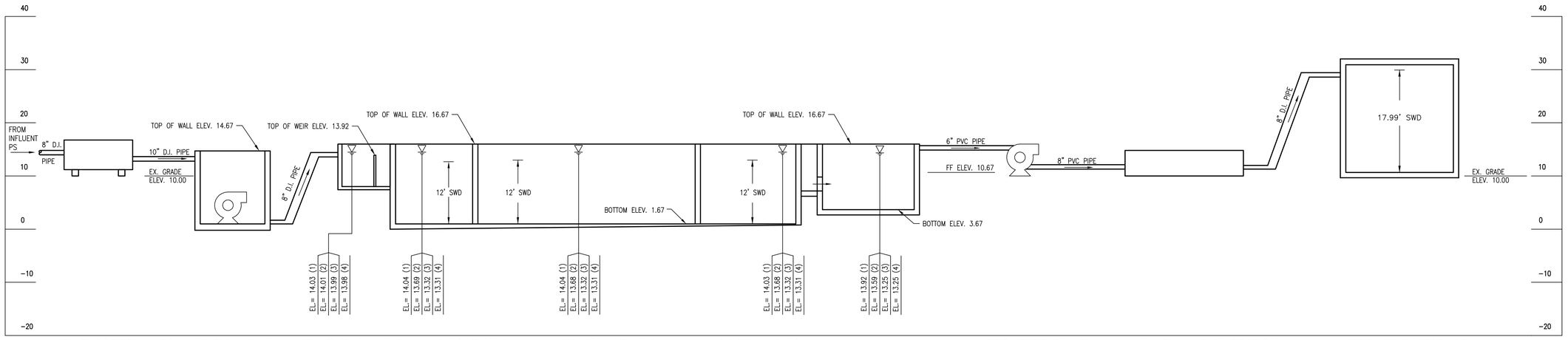
MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

G-003

SHEET 3 OF 128

File: Q:\SMD\07062_MysticHarbour\WWTP\Plans\Post_EFL\1-G003_LEGEND_NOTES.dwg
Jan 21, 2015 - 10:23:11am



HYDRAULIC PROFILE

SCALE: HORIZ. N.T.S.
VERT: 1"=10'

GENERAL SHEET NOTES:

1. WATER LEVEL ELEVATIONS ARE BASED ON THREE OF FOUR TRAINS BEING OPEN AND ONLINE AT FUTURE FLOWS. HIGHER HYDRAULIC ELEVATIONS WILL RESULT WHEN COMPONENTS OF THE TREATMENT PLANT ARE NOT OPERATING. TRAINS ARE SIZED TO ACCOMMODATE 150,000 GPD/TRAIN UNDER AVERAGE FLOW CONDITIONS.

LEGEND:

EL.= ____ (1) PEAK DAILY FLOW
EL.= ____ (2) MAXIMUM MONTHLY FLOW
EL.= ____ (3) FUTURE AVERAGE FLOW
EL.= ____ (4) CURRENT AVERAGE FLOW

QUANTITY	PEAK FLOW
DAY	0.9 MGD, 300% IR
MONTH	0.675 MGD, 300% IR
FUTURE AVERAGE	0.45 MGD, 300% IR
CURRENT AVERAGE	0.25 MGD, 300% IR, 2 TRAINS

RECORD DRAWING SET JANUARY 2015

5' 0 5' 10'
SCALE: 1"= 10'−0"

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CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
HYDRAULIC PROFILE

CONTRACT NO. #140−10−01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

G-004

SHEET 4 OF 128

File: Q:\SWD\07062_MysticHarbourWWTPImprProj\Civil_UFY\4-DADV\AS-BUILTS\GENERAL\G-004 HYDRAULIC PROFILE.dwg
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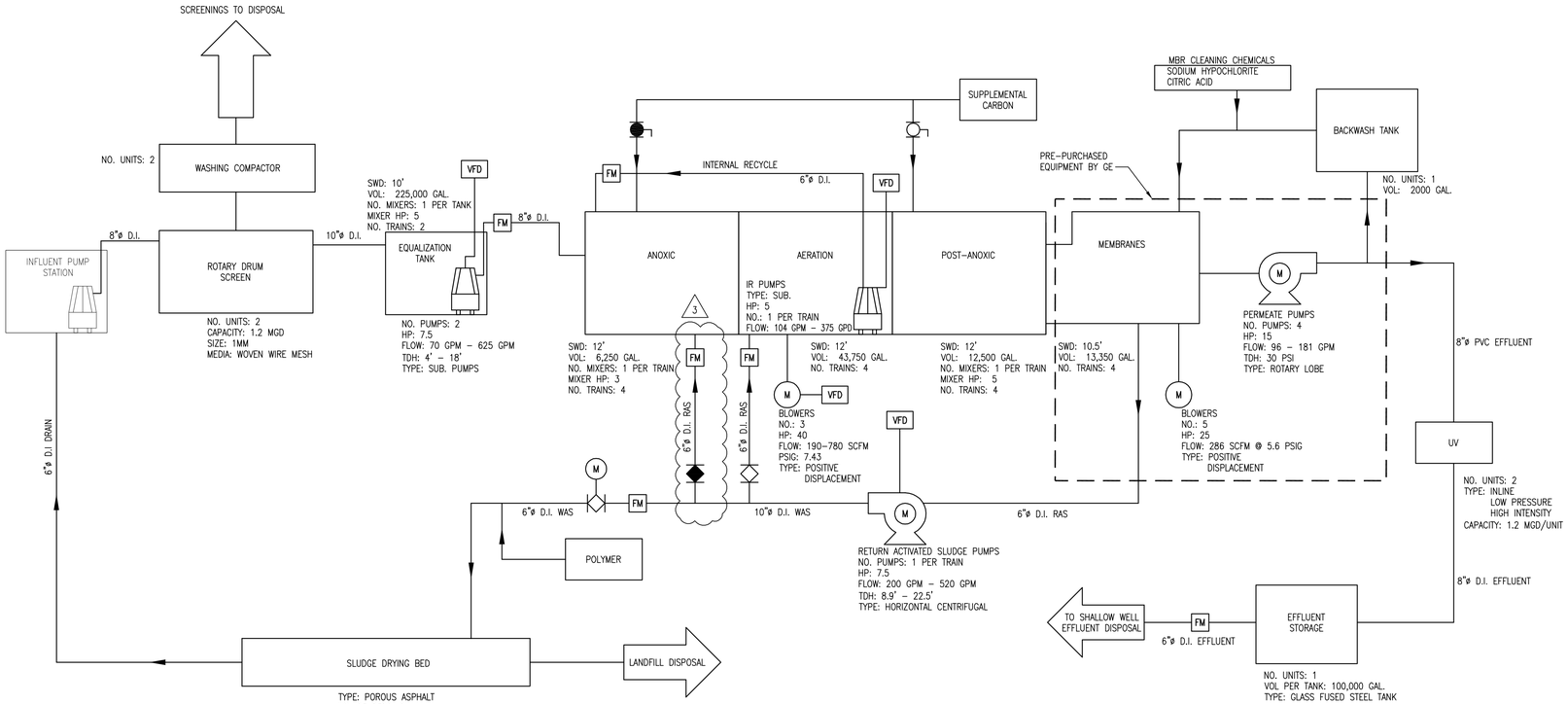

PROCESS FLOW DIAGRAM

SCALE: NOT TO SCALE

PLANT DESIGN FLOWS

CURRENT AVERAGE DESIGN FLOW	0.25 MGD
CURRENT PEAK DESIGN FLOW	0.50 MGD
FUTURE AVERAGE DESIGN FLOW	0.45 MGD
FUTURE PEAK DESIGN FLOW	0.90 MGD
ULTIMATE AVERAGE DESIGN FLOW	0.60 MGD
ULTIMATE PEAK DESIGN FLOW	1.20 MGD
INFLUENT EQUALIZATION	0.225 MGD
EFFLUENT STORAGE	0.10 MGD
FUTURE EFFLUENT STORAGE	0.45 MGD

WASTEWATER CHARACTERISTICS

PLANT INFLUENT		PLANT EFFLUENT	
MONTHLY AVERAGE			
BOD5	200mg/L	BOD5	10mg/L
TSS	200mg/L	TSS	10mg/L
TP	10mg/L	TP	**
TKN	30mg/L	TN	<3mg/L

**THE CURRENT NPDES PERMIT FOR THE MYSTIC HARBOUR WWTP DOES NOT INCLUDE AN EFFLUENT PHOSPHORUS LIMIT. PROVISIONS HAVE BEEN INCORPORATED INTO THE DESIGN TO ALLOW FOR THE ADDITION OF A FERRIC CHLORIDE CHEMICAL FEED SYSTEM FOR PHOSPHORUS REMOVAL SHOULD THIS BE REQUIRED BY FUTURE PERMIT REVISIONS.

GENERAL SHEET NOTES:

1. THE FOLLOWING EQUIPMENT HAS BEEN PRE–PURCHASED BY THE COUNTY FROM GE AND SHALL BE PROVIDED TO THE CONTRACTOR FOR INSTALLATION. SEE SPECIFICATION SECTION 11700 FOR COMPLETE BILL OF MATERIALS.
   - MEMBRANE CASSETTE SKID (1 PER TRAIN, 4 TOTAL)
   - PERMEATE SKID (2 TOTAL)
   - MEMBRANE AERATION BLOWERS (5 TOTAL)
   - CHEMICAL CLEANING SKID (2 TOTAL)
   - CITRIC ACID TANK AND MIXER
   - AIR COMPRESSOR (2 TOTAL)
   - AIR DRYER (2 TOTAL)
   - SODIUM HYPOCHLORITE TANK
2. FOR CHEMICAL FEED SYSTEMS PROCESS FLOW DIAGRAMS, SEE DRAWING G–006.
3. FOR UTILITY WATER PROCESS FLOW DIAGRAM, SEE DRAWING G–007.
4. INFLUENT PUMP STATION IS NOT INCLUDED IN THE SCOPE OF WORK FOR THIS CONTRACT.

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 20330
EXPIRATION DATE 01/29/2013.

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
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72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS FLOW DIAGRAM

MARK	DATE	DESCRIPTION
1	SEPT. 2012	REVISION 3
2	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

G-005

SHEET 5 OF 128

File: Q:\SMD\07062_MysticHarbourWWTPImprovProj\Cad_EP\V4–0400\AS–BUILTS\G5HERA\\G–005 ProcessFlowDiagram.dwg
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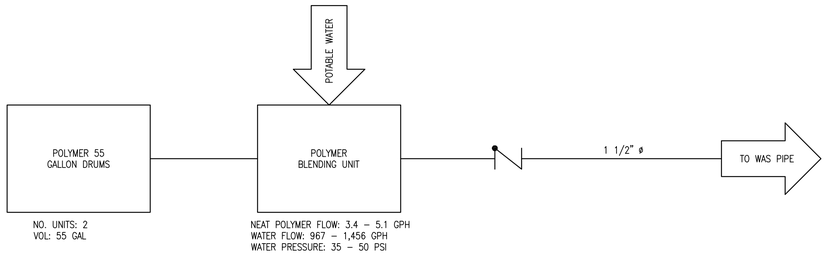
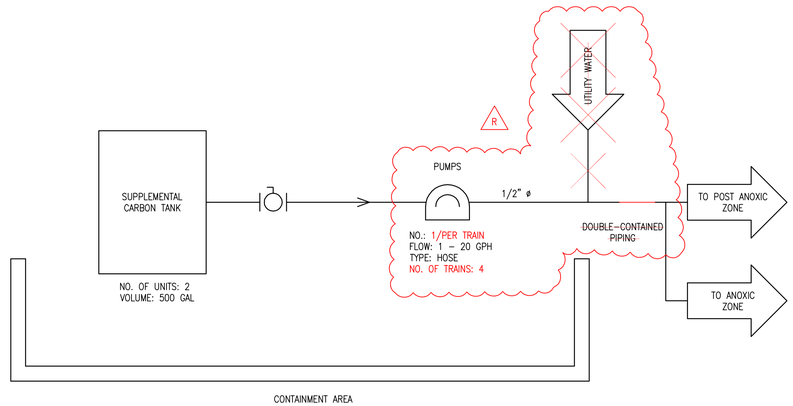


POLYMER PROCESS FLOW DIAGRAM

SCALE: NOT TO SCALE



SUPPLEMENTAL CARBON PROCESS FLOW DIAGRAM

SCALE: NOT TO SCALE

RECORD DRAWING SET
JANUARY 2015

PROFESSIONAL CERTIFICATION.
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LICENSE NO. 20330
EXPIRATION DATE 01/29/2013.

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROPOSED PROCESS FLOW DIAGRAM
CHEMICAL FEED

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

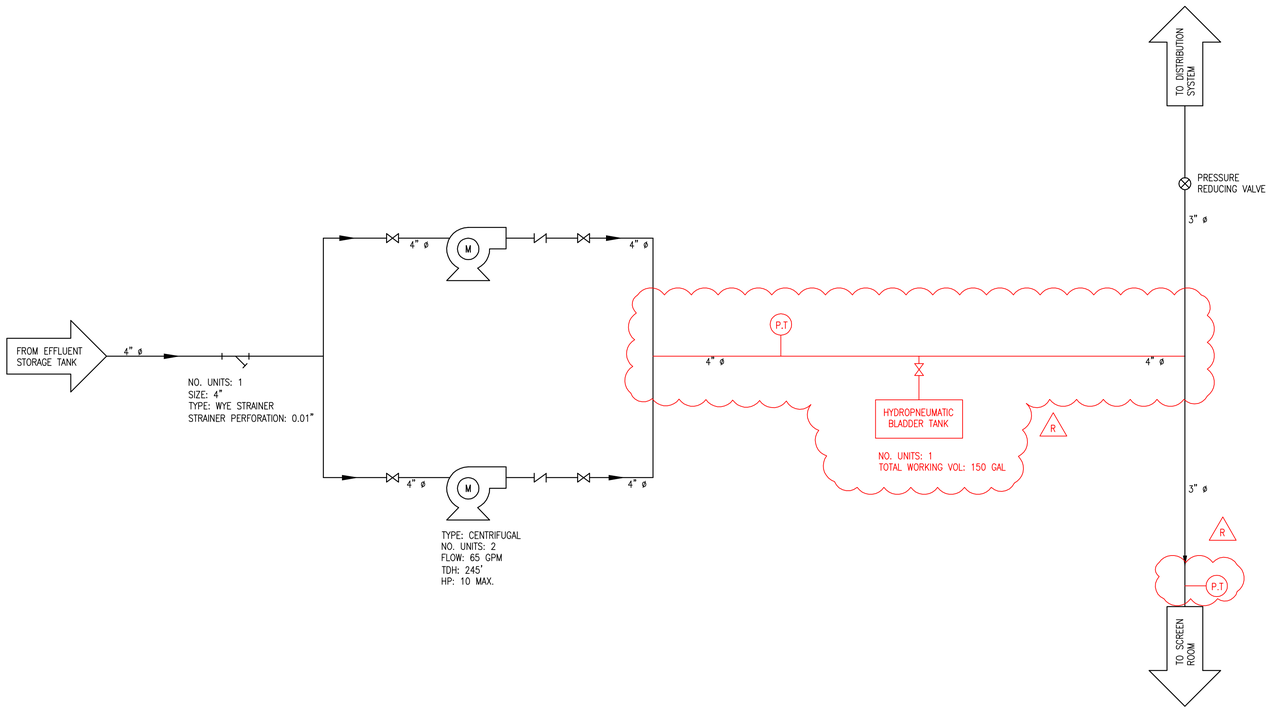
G-006

SHEET 6 OF 128

File: Q:\SWD\070502_WorkSpace\MWTP\Proc\Fed_LIT\4-CAD\AS-BUILTS\GENERAL\G-006 CHEMICAL FEED PFD.dwg
Jan 21, 2015 - 10:37:54am

GENERAL SHEET NOTES:

1. REFER TO DRAWING M-105 FOR DETAILS OF UTILITY WATER SYSTEM.



UTILITY WATER PROCESS FLOW DIAGRAM

SCALE: NOT TO SCALE

RECORD DRAWING SET JANUARY 2015

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 20330 EXPIRATION DATE 01/29/2013.

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
UTILITY WATER FLOW DIAGRAM

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

G-007

SHEET 7 OF 128

File: Q:\SMD\070662_MysticHarbourWWTPImprovPhaseEval_EP\14-CADD\AS-BUILTS\GENERAL\G-007 Utility Water Flow Diagram.dwg
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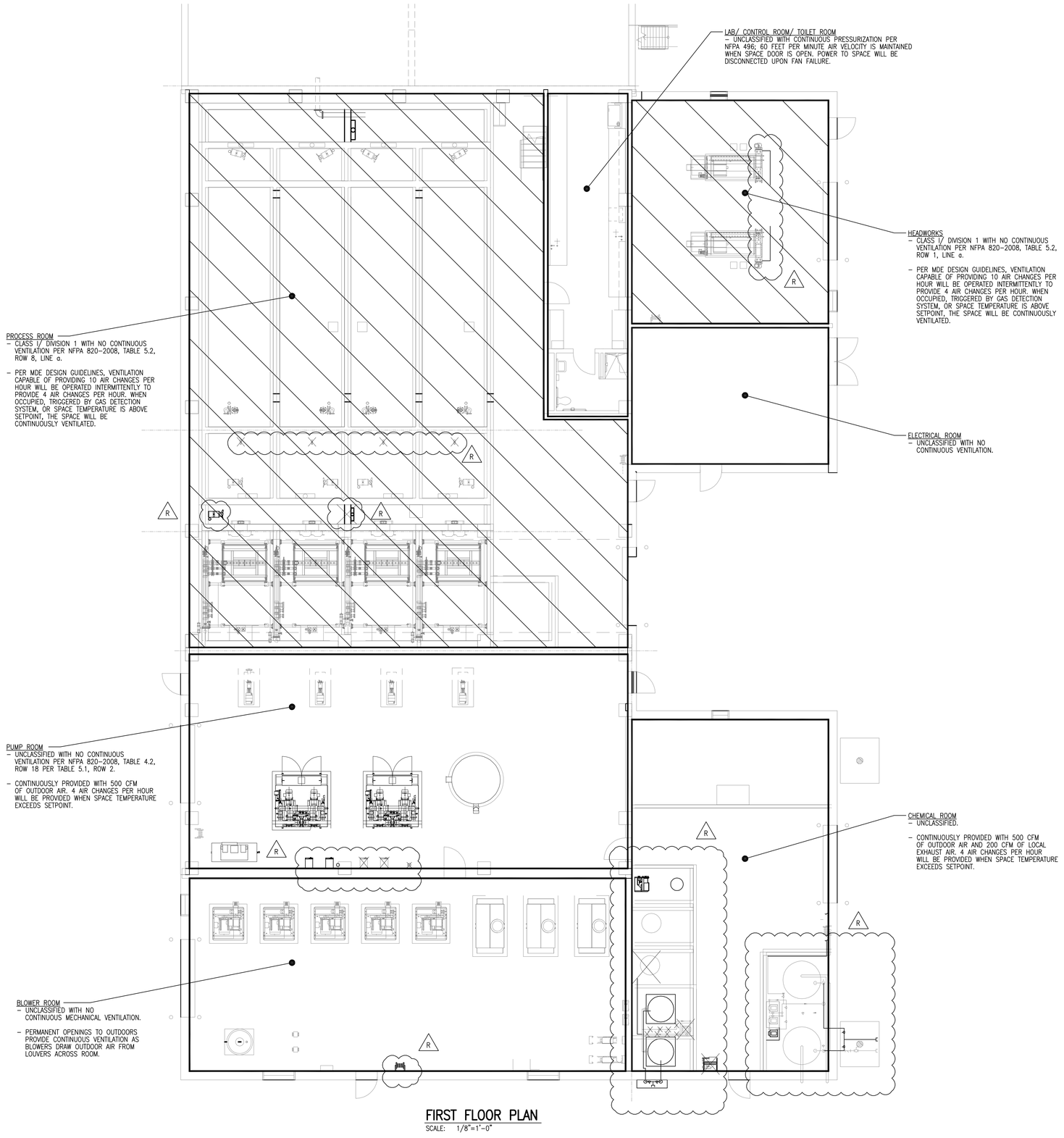

FIRST FLOOR PLAN

SCALE: 1/8"=1'–0"

4' 0 4' 8'

SCALE: 1/8" = 1'–0"

RECORD DRAWING SET
JANUARY 2015

PROFESSIONAL CERTIFICATION.
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 20330
EXPIRATION DATE 01/29/2013.

CONSULTANT

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Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
AREA CLASSIFICATION PLAN

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: RSS
CH'D. BY: MWK

G-008

SHEET 8 OF 128

HVAC & PLUMBING LEGEND

SYMBOL	DESCRIPTION
	SOIL, WASTE, OR SANITARY PIPE
AR	ACID RESISTANT SANITARY PIPE
GI	GREASE INTERCEPTOR SANITARY PIPE
	STORM WATER PIPE
OI	OIL INTERCEPTOR STORM WATER PIPE
	FOUNDATION DRAIN TILE
CD	CONDENSATE DRAIN PIPE
	VENT PIPE
AR	ACID RESISTANT VENT PIPE
	DOMESTIC COLD WATER PIPE
	DOMESTIC HOT WATER PIPE
	DOMESTIC HOT WATER RETURN PIPE
T	DOMESTIC TEMPERED WATER PIPE
S	SPRINKLER SUPPLY PIPE
F	FIRE LINE PIPE
A	COMPRESSED AIR PIPE
G	NATURAL GAS PIPE
V	VACUUM PIPE
DTS	DUAL TEMP WATER SUPPLY PIPE
DTR	DUAL TEMP WATER RETURN PIPE
CHS	CHILLED WATER SUPPLY PIPE
CHR	CHILLED WATER RETURN PIPE
HWS	HEATING WATER SUPPLY PIPE
HWR	HEATING WATER RETURN PIPE
STM	STEAM PIPE
SCR	STEAM CONDENSATE RETURN
FOS	FUEL OIL SUPPLY PIPE
FOR	FUEL OIL RETURN PIPE
CO CO	CLEANOUT (WALL/FLOOR)
H	HUMIDISTAT
T	THERMOSTAT OR TEMPERATURE SENSOR
	PIPE CAP
	BRANCH TAKE OFF
	PIPE DROP TEE
	PIPE RISE TEE
	AUTOMATIC CONTROL VALVE (2 WAY)
	AUTOMATIC CONTROL VALVE (3 WAY)
	SHUT-OFF VALVE
	GLOBE VALVE
	UNION
	STRAINER W/BLOWDOWN VALVE
	PIPE GUIDE
	PIPE ANCHORS
	SOLENOID VALVE
	PRESSURE REDUCING VALVE
	ECCENTRIC REDUCER
	CONCENTRIC REDUCER
	PRESSURE RELIEF VALVE
	BALANCING VALVE (W/MEMORY STOP)
	BACKWATER VALVE
	BUTTERFLY VALVE
	HOSE END DRAIN VALVE
	BACKFLOW PREVENTER
	CHECK VALVE; (ARROW INDICATES DIRECTION OF FLOW)
	FLOOR DRAIN
	ROOF DRAIN
	WALL HYDRANT
	HOSE BIBB
	FIRE DEPARTMENT CONNECTION (SIAMESE)
	SPRINKLER HEAD
F 20 GPM	FLOW METER FITTING (NUMERALS INDICATE FLOW REQUIRED)
FS	FLOW SWITCH

SYMBOL	DESCRIPTION
	GAUGE COCK
	VACUUM BREAKER
	FLANGED PIPE CONNECTION
	FLEXIBLE CONNECTION (PIPING)
	EXPANSION JOINT
	FLOW DIRECTION ARROW
	VALVE IN VERTICAL PIPE
30 PSI	PRESSURE RELIEF VALVE (NUMERALS INDICATE SETTING)
	WATER HAMMER ARRESTER
UC	UNDERCUT DOOR
	AIR FLOW
DL	DOOR LOUVER
	AUTOMATIC AIR VENT
	MANUAL AIR VENT
	PRESSURE GAUGE w/GAUGE COCK
	THERMOMETER
X	INDICATES CONTINUATION ON SANITARY RISER DIAGRAM (X DENOTES RISER DIAGRAM)
18"x12" D R	DUCT (FIRST FIGURE SIDE SHOWN)
	DROP IN DIRECTION OF ARROW
	RISE IN DIRECTION OF ARROW
SD	SMOKE DETECTOR
	AIR MEASURING DEVICE
	SUPPLY AIR DIFFUSER
	RETURN AIR GRILLE
	EXHAUST AIR GRILLE
F	FIRE DAMPER
S	SMOKE DAMPER
F/S	COMBINATION FIRE/SMOKE DAMPER
	MANUAL VOLUME DAMPER
	SQUARE TO ROUND DUCT TRANSITION
	FLEXIBLE CONNECTION
	DUCTWORK SOUND LINING, 1"THICK
AD	ACCESS DOOR
	MOTOR OPERATED DAMPER
EP	EXPLOSION PROOF MOTOR OPERATED DAMPER: DAMPER/ACTUATOR SUITABLE FOR INSTALLATION IN CLASS I, DIVISION 1 SPACE
	DUCT TRANSITION
	RECTANGULAR BRANCH TAKE-OFF
	BELL MOUTH BRANCH TAKE-OFF
	ROUND BRANCH TAKE-OFF
	CIRCULAR AIR DIFFUSER
	CIRCULAR DUCT DROP OFF BOTTOM
	SUPPLY AIR DEVICE WITH 2'x2' LAY-IN PANEL
	RETURN AIR DEVICE WITH 2'x2' LAY-IN PANEL
	SUPPLY AIR DEVICE WITH PLENUM AND 2'x2' LAY-IN PANEL
	RETURN AIR DEVICE WITH PLENUM AND 2'x2' LAY-IN PANEL
	SUPPLY/OUTSIDE AIR DUCT RISER
	RETURN AIR DUCT RISER
	EXHAUST/RELIEF AIR DUCT RISER
	ELBOW WITH DOUBLE THICKNESS TURNING VANES
	ROUND DUCT RISER
SPS	STATIC PRESSURE SENSOR
E	EMERGENCY FAN DISCONNECT SWITCH
SA	SOUND ATTENUATOR. LETTER DESIGNATES SPECIFIC UNIT. SEE SCHEDULE.
	DIAMETER
	POINT OF CONNECTION, NEW TO EXISTING
	POINT OF DISCONNECTION FROM EXISTING
1	SYMBOL FOR SPECIFIC NOTE. NOTE APPLIES TO DRAWING ON WHICH IT OCCURS.

ABBREVIATIONS

@	AT
A	COMPRESSED AIR PIPE
AAV	AUTOMATIC AIR VENT
ABV	ABOVE
ACV	AUTOMATIC CONTROL VALVE
AD	ACCESS DOOR
ADR	AREA DRAIN
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
ALUM	ALUMINUM
AMD	AIR MONITORING DEVICE
APD	AIR PRESSURE DROP
APPROX	APPROXIMATELY
AR	ACID RESISTANT
ATC	AUTOMATIC TEMPERATURE CONTROL
ATTEN	ATTENUATOR
AWT	AVERAGE WATER TEMPERATURE
BDD	BACKDRAFT DAMPER
BFP	BACKFLOW PREVENTOR
BHP	BRAKE HORSEPOWER
BLDG	BUILDING
BLW	BELOW
BMCS	BUILDING MANAGEMENT CONTROL SYSTEM
BP	BYPASS
BTM	BOTTOM
BTU/HR	BRITISH THERMAL UNITS PER HOUR
BV	BALANCING VALVE
BWV	BACKWATER VALVE
C	COMMON
°C	DEGREES CELSIUS
CA	CONDITIONED OUTDOOR AIR
CC	COOLING COIL
CCP	COOLING COIL PUMP
CD	CONDENSATE DRAIN
CDR	CONDENSER WATER RETURN PIPE
CDS	CONDENSER WATER SUPPLY PIPE
CFM	CUBIC FEET PER MINUTE
CHR	CHILLED WATER RETURN PIPE
CHS	CHILLED WATER SUPPLY PIPE
CI	CAST IRON
CLG	CEILING
CO	CLEANOUT
CONC	CONCRETE
CONN	CONNECT, CONNECTION
CONT'N	CONTINUATION
CV	CHECK VALVE
CW	DOMESTIC COLD WATER
CX	CONNECT TO EXISTING
D	SUPPLY AIR DIFFUSER OR DEEP, DEPTH
DAM	DUCT AIR MONITOR
DB	DECIBEL OR DRY BULB
DDC	DIRECT DIGITAL CONTROL
DESG	DESIGNATION
DF	DRINKING FOUNTAIN
DHC	DUCT HEATING COIL
DIA, ø	DIAMETER
DIFF	DIFFERENTIAL
DL	DOOR LOUVER
DN	DOWN
DPR	DAMPER
DPS	DIFFERENTIAL PRESSURE SENSOR
DR	MISCELLANEOUS DRAINAGE
DTR	DUAL TEMPERATURE RETURN
DTS	DUAL TEMPERATURE SUPPLY
DWG	DRAWING
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EDB	ENTERING DRY BULB
EFF	EFFICIENCY
EF	EXHAUST FAN
EJ	EXPANSION JOINT
ELEC	ELECTRIC
ELEV	ELEVATION OR ELEVATOR
ESP	EXTERNAL STATIC PRESSURE
EWB	ENTERING WET BULB
EWT	ENTERING WATER TEMPERATURE
EX	EXISTING
EXH	EXHAUST
EXP	EXPANSION
F	FILTER
°F	DEGREES FAHRENHEIT
F&T	FLOAT & THERMOSTATIC
FC	FLEXIBLE CONNECTION
FD	FIRE DAMPER OR FOUNDATION DRAINAGE
FDC	FIRE DEPARTMENT CONNECTION
FDR	FLOOR DRAIN
FDV	FIRE DEPARTMENT VALVE
FHC	FIRE HOSE CABINET
FL	FLOOR
FLA	FULL LOAD AMPERES
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FSP	FIRE STANDPIPE
FT, '	FOOT, FEET OR FLASH TANK
FT HD	FEET OF HEAD
FZ	FREEZE STAT
FU	FIXTURE UNITS
G	NATURAL GAS PIPE OR RETURN/EXHAUST GRILLE
GAL	GALLON, GALLONS
GALV	GALVANIZED
GEN	GENERATOR
GI	GREASE INTERCEPTOR
GPM	GALLONS PER MINUTE
H	HIGH, HEIGHT
H2O	WATER
HB	HOSE BIBB
HED	HOSE END DRAIN VALVE
HP	HORSEPOWER
HPC	HIGH PRESSURE CONDENSATE PIPE
HPS	HIGH PRESSURE STEAM PIPE
HW	DOMESTIC HOT WATER
HWC	DOMESTIC HOT WATER CIRCULATING
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
HZ	HERTZ
IGV	INLET GUIDE VANE
IN, "	INCH, INCHES
INV	INVERT
ISOL	ISOLATION
IW	INDUSTRIAL WASTE
KW	KILOWATTS
L	LONG, LENGTH
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LBS/HR	POUNDS PER HOUR
LDB	LEAVING DRY BULB
LF	LINEAR FEET
LPC	LOW PRESSURE CONDENSATE PIPE
LPS	LOW PRESSURE STEAM PIPE
LRA	LOCKED ROTOR AMPERES
LSD	LINEAR SLOT DIFFUSER
LWB	LEAVING WET BULB
LWT	LEAVING WATER TEMPERATURE
MA	MIXED AIR
MAV	MANUAL AIR VENT
MAX	MAXIMUM
MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
MECH	MECHANICAL
MFD	MOTORIZED FIRE DAMPER
MFR	MANUFACTURER
MIN	MINIMUM
MOD	MOTOR OPERATED DAMPER
MTD	MOUNTED
MVD	MANUAL VOLUME DAMPER
NC	NOISE CRITERIA OR NORMALLY CLOSED
NIC	NOT IN CONTRACT
NOM	NOMINAL
NO	NORMALLY OPEN
No	NUMBER
OA	OUTDOOR AIR
OAI	OUTDOOR AIR INTAKE
OAT	OUTDOOR AIR TEMPERATURE
OC	ON CENTER
OED	OPEN END DUCT WITH 1/2" FRAMED WIRE MESH SCREEN
OFD	OVERFLOW DRAIN
OI	OIL INTERCEPTOR
OS&Y	OUTSIDE STEM & YOKE VALVE
%	PERCENT
PC	PUMPED CONDENSATE PIPE
PD	PRESSURE DROP OR PUMP DISCHARGE
PH	PHASE
POD	POINT OF DISCONNECTION
PR	PRESSURE RELIEF
PRESS, P	PRESSURE
PRG	PRESSURE RELIEF GRILLE
PRV	PRESSURE REDUCING VALVE
PS	PRESSURE SENSOR
PSI	POUNDS PER SQUARE INCH POUNDS
PSIG	PER SQUARE INCH GAUGE
PUH	PROPELLER UNIT HEATER
R	RETURN/EXHAUST/SUPPLY AIR REGISTER
RA	RETURN AIR
RAD	RADIATOR
RDR	ROOF DRAIN
REQ'D	REQUIRED
RF	RETURN FAN
RH	RELATIVE HUMIDITY
RHS	REHEAT WATER SUPPLY
RHR	REHEAT WATER RETURN
RL	REFRIGERANT LIQUID
RLA	RUNNING LOAD AMPERES
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION
RV	RELIEF VENT
RX	REMOVE EXISTING
S	SPRINKLER SUPPLY PIPE
SA	SUPPLY AIR
SAN	SANITARY, SOIL, WASTE
SAT	SATURATED
SD	SMOKE DAMPER
SENS	SENSIBLE
SEP	SEPARATOR
SF	SUPPLY FAN OR SQUARE FEET
TG	TRANSFER GRILLE
SL	SOUND LINING, SOUND LINED
S/M	SHEET METAL
SP	STATIC PRESSURE
SPD	STATIC PRESSURE DROP
SPEC	SPECIFICATION
SQ	SQUARE
SQ FT	DROP SQUARE FOOT
SPR	SPRINKLER LINE
SS	START/STOP
S/S	STAINLESS STEEL
STL	STEEL
STM	STEAM PIPE
SCR	STEAM CONDENSATE RETURN PIPE
SW	STORM WATER
△T	TEMPERATURE CHANGE
TA	TRANSFER AIR
TEMP, T	TEMPERATURE
TG	TRANSFER GRILLE
TS	TAMPER SWITCH
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
TW	DOMESTIC TEMPERED WATER PIPE
UC	UNDERCUT DOOR
UH	UNIT HEATER
UON	UNLESS OTHERWISE NOTED
V	VOLTS, VACUUM PIPE
VCP	VITRIFIED CLAY PIPE
VCPX	VITRIFIED CLAY PIPE-EXTRA STRENGTH
VD	VOLUME DAMPER
VEL	VELOCITY
VENT	VENTILATION
VF	VENTILATION FAN
VFD	VARIABLE FREQUENCY DRIVE
VIB	VIBRATION
ISOL VLV	ISOLATION VALVE
VP	SANITARY VENT PIPE
VTR	VENT THROUGH ROOF
W	WIDTH
W/	WITH
WB	WET BULB
WC	WATER COLUMN
WH	WALL HYDRANT
ZN	ZONE
W/O	WITHOUT

DESIGNATIONS

EQUIPMENT

DWH-	DOMESTIC HOT WATER HEATER DESIGNATION
EF-	EXHAUST FAN DESIGNATION
FCU-	FAN COIL UNIT DESIGNATION
HP-	HEAT PUMP DESIGNATION
MAU-	MAKE-UP AIR UNIT DESIGNATION
UH-	UNIT HEATER DESIGNATION
P-	PLUMBING FIXTURE DESIGNATION

X / X — SECTION REFERENCE: (SEE DATA BELOW FOR DETAILS)

/ SHT — DRAWING TITLE (SCALE)

DETAIL = LETTER / SECTION = NUMBER

SHEET NUMBER FROM WHICH THE PARTIAL, SECTION, ELEVATION, OR DETAIL IS DRAWN

PLAN NORTH / TRUE NORTH — NORTH ARROW

NECK SIZE — 12"x12" D — XXX CFM — AIR DEVICE DESIG. (D/R/G) — AIR FLOW (TO BE BALANCED)

GENERAL NOTES

1. WORK SHALL CONFORM TO THE CONTRACT DRAWINGS, SPECIFICATIONS AND THE LATEST APPLICABLE INTERNATIONAL MECHANICAL AND PLUMBING CODE AND THE NATIONAL ELECTRIC CODE. WORK SHALL BE PERFORMED IN ACCORDANCE WITH NFPA 70, THE NATIONAL ELECTRICAL CODE, THE NATIONAL ELECTRICAL SAFETY CODE, OSHA AND NATIONAL SAFETY CODE REQUIREMENTS.
2. THE SCOPE OF WORK INDICATED IN THESE DOCUMENTS SHALL INCLUDE MECHANICAL AND ELECTRICAL SYSTEMS, FULLY ADJUSTED, TESTED AND READY TO USE. PROVIDE ITEMS NECESSARY TO COMPLETE THE SYSTEMS. EXAMINE WORK INDICATED FOR TRADES IN ORDER TO DETERMINE THE EXTENT OF THE WORK REQUIRED TO BE COMPLETED.
3. IT IS THE INTENTION OF THESE DRAWINGS TO CALL FOR FINISHED WORK, TESTED AND READY FOR OPERATION. WHEREVER THE WORD "PROVIDE" IS USED, IT SHALL MEAN "FURNISH AND INSTALL COMPLETE, TESTED AND READY FOR USE."
4. THE DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW EVERY COMPONENT AND/OR ACCESSORY REQUIRED FOR A COMPLETE INSTALLATION. THE CONTRACTOR SHALL PROVIDE ITEMS NECESSARY FOR A PROPERLY WORKING SYSTEM IN COMPLIANCE WITH ACCEPTED INDUSTRY STANDARDS AND MANUFACTURER'S RECOMMENDATIONS.
5. PRIOR TO BID, THE CONTRACTOR SHALL VISIT THE SITE AND IDENTIFY ITEMS THAT MAY AFFECT THEIR BID. PRIOR TO THE INSTALLATION, FABRICATION, REMOVAL, OR RELOCATION OF ANY WORK, THE CONTRACTORS SHALL REVIEW THE ACTUAL CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED AND SHALL COORDINATE WORK WITH THE PLANS, EXISTING EQUIPMENT AND SYSTEMS, BUILDING STRUCTURE AND WORK OF OTHER TRADES. WHERE CONFLICTS OCCUR, OR IF CONNECTIONS THERETO CAN NOT BE MADE, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER PRIOR TO MATERIAL FABRICATION OR INSTALLATION.
6. WHERE THE WORK OF VARIOUS TRADES WILL BE INSTALLED IN CLOSE PROXIMITY TO ONE ANOTHER OR WHERE THERE IS EVIDENCE THAT THE WORK OF ONE TRADE WILL INTERFERE WITH WORK OF ANOTHER, THE CONTRACTOR SHALL WORK OUT SPACE CONDITIONS TO MAKE A SATISFACTORY ADJUSTMENT. IF THE CONTRACTOR ALLOWS ONE TRADE TO INSTALL HIS WORK BEFORE COORDINATING WITH WORK OF OTHER TRADES THE CONTRACTOR SHALL MAKE NECESSARY CHANGES TO CORRECT THE CONDITIONS IN A MANNER ACCEPTABLE TO THE OWNER AND THE CONTRACTOR SHALL BEAR THE COST OF SUCH CORRECTIONS.
7. THE CONTRACTOR SHALL LOCATE EQUIPMENT WHICH MUST BE SERVICED, OPERATED, OR MAINTAINED IN FULLY ACCESSIBLE POSITION. EQUIPMENT SHALL INCLUDE, BUT NOT BE LIMITED TO, VALVES, MOTORS, CONTROLLERS, DRAIN PANS, ETC. IF REQUIRED FOR ACCESSIBILITY, FURNISH ACCESS DOORS FOR THE PURPOSE. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ALLOW FOR BETTER ACCESSIBILITY.
8. WORK IN OCCUPIED SPACE SHALL BE COORDINATED WITH THE OWNER. SHOULD ANY OUTAGES BE REQUIRED IN THE COURSE OF THIS PROJECT, THE CONTRACTOR SHALL COORDINATE SUCH OUTAGES WITH THE OWNER'S DESIGNATED REPRESENTATIVE, SCHEDULING ANY OUTAGES DURING THE NON WORKING HOURS, SO AS NOT TO EFFECT FACILITY OPERATIONS, 72 HOURS NOTICE WILL BE REQUIRED PRIOR TO ANY OUTAGE. NO OUTAGE MAY BE EXECUTED PRIOR TO APPROVAL OF THE OWNER'S DESIGNATED REPRESENTATIVE AND THE FACILITY MANAGER.
9. THE CONTRACTOR SHALL LEAVE THE ENTIRE MECHANICAL SYSTEM INSTALLED UNDER THIS CONTRACT IN PROPER WORKING ORDER AND SHALL, WITHOUT CHARGE, REPLACE ANY WORK OR MATERIALS WHICH DEVELOP DEFECTS, EXCEPT FROM ORDINARY WEAR AND TEAR, WITHIN ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.
10. THE CONTRACTOR SHALL, DURING THE ONE YEAR WARRANTY PERIOD, BE RESPONSIBLE FOR PROPER REPAIR AND ADJUSTMENTS OF MECHANICAL SYSTEMS AND EQUIPMENT, APPARATUS, DEVICES ETC. INSTALLED BY HIM, AND DO WORK NECESSARY TO ENSURE EFFICIENT AND PROPER FUNCTIONING.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR, AND SHALL INCUR FINANCIAL RESPONSIBILITIES FOR, ANY DAMAGES CAUSED BY OR RESULTING FROM DEFECTS IN HIS WORK.
12. WHEREVER PIPES, CONDUITS, OR OTHER ITEMS PASS THROUGH FIRE RATED WALLS AND FLOORS, THE SPACE BETWEEN THE ITEM AND THE MASONRY OR THE SPACE BETWEEN THE ITEM AND THE SLEEVE SHALL BE ADEQUATELY FIRE STOPPED WITH A NON COMBUSTIBLE, NON MELTING MATERIAL IN ACCORDANCE WITH NFPA STANDARDS.
13. WALL OPENINGS RESULTING FROM DEMOLITION SHALL BE CLOSED AND FINISHED TO MATCH EXISTING ADJACENT MATERIALS AND FINISHES.
14. FINISHES DAMAGED DURING THE PROJECTS SHALL BE REPAIRED TO MATCH EXISTING ADJACENT MATERIALS AND FINISHES.

R 15. PVC TO TAKE PLACE OF CAST IRON PIPE, ONLY FOR SOIL PIPE.

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

PROFESSIONAL ENGINEER — STATE OF MARYLAND — MICHAEL W. LEWIS — 22-10 — PROFESSIONAL ENGINEER

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 35328 EXPIRATION DATE 09/28/2012

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

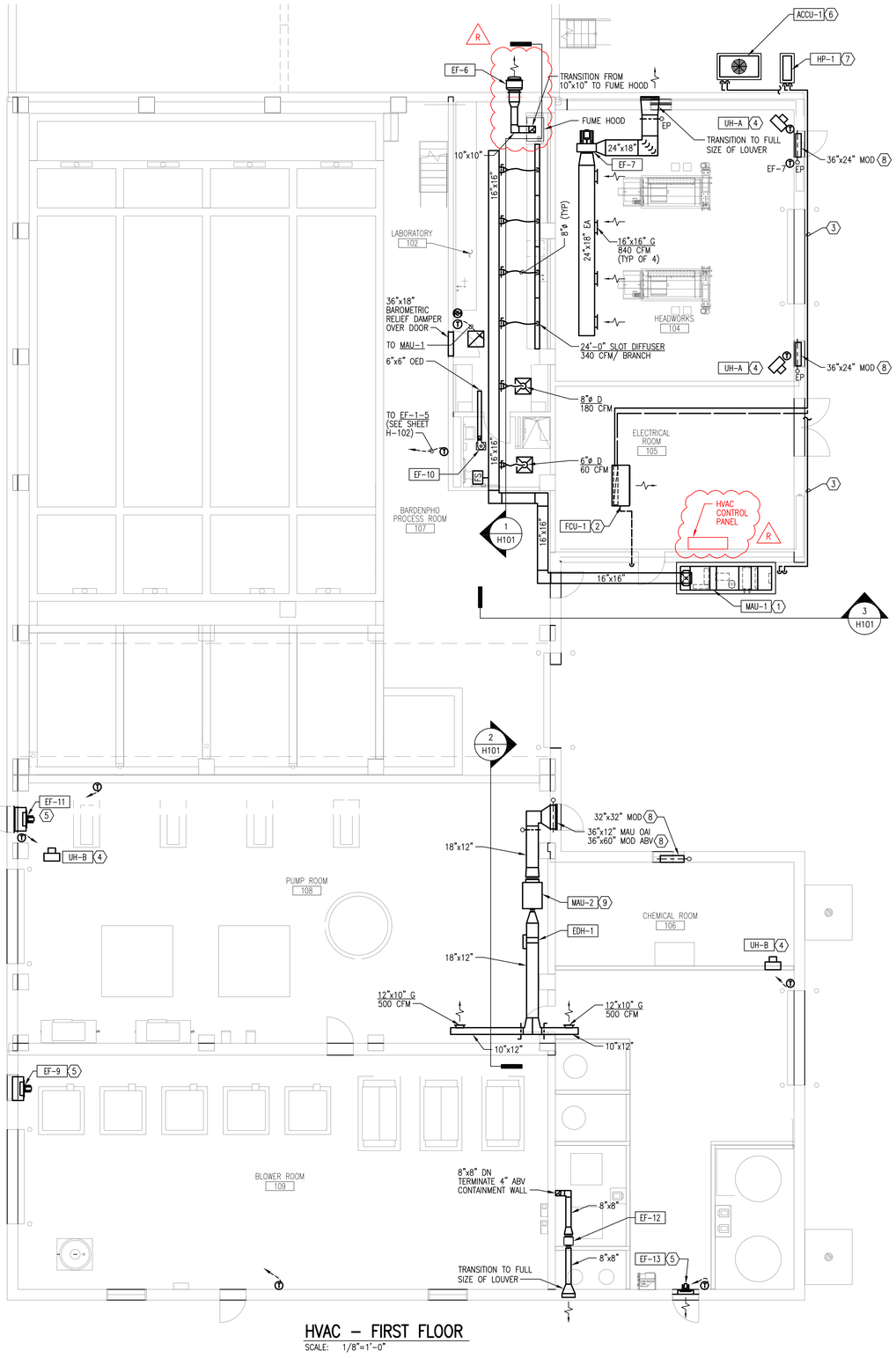
SHEET TITLE
HVAC LEGEND, ABBREVIATIONS, DESIGNATIONS AND NOTES

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: AFR
CH'D. BY: MWK

H-001

SHEET 83 OF 128



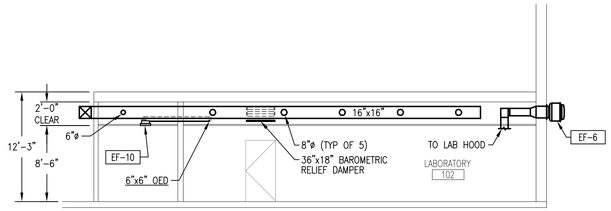
HVAC – FIRST FLOOR
SCALE: 1/8"=1'-0"

GENERAL SHEET NOTES:

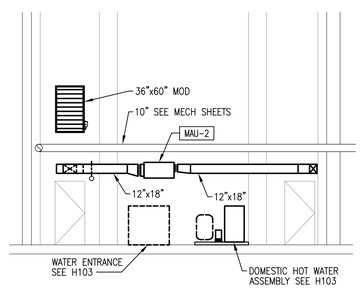
1. THE DRAWINGS ARE DIAGRAMMATIC; COORDINATE SYSTEM INSTALLATION WITH OTHER TRADES.
2. DO NOT LOCATE DUCTWORK OR PIPING ABOVE ELECTRICAL PANELS OR EQUIPMENT.

SHEET KEYNOTES:

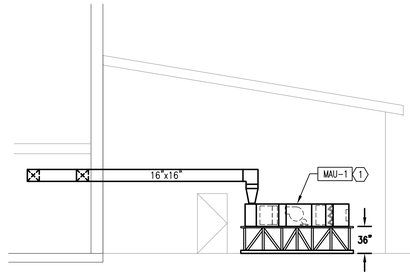
1. MAKE UP AIR UNIT MOUNTED ON METAL SUPPORTS ON CONCRETE PAD.
2. FAN COIL UNIT SUSPENDED FROM STRUCTURE ROUTE CONDENSATE OUT WALL AND DOWN, DISCHARGING 6" ABOVE GRADE.
3. ROUTE REFRIGERANT PIPING PER MANUFACTURER'S RECOMMENDATION. ATTACH PIPING TO OUTSIDE WALL, STACKING VERTICALLY.
4. UNIT HEATER SUSPENDED FROM STRUCTURE WITH REMOTE THERMOSTAT. PROVIDE EQUIPMENT RATED FOR SPACE CLASSIFICATION AS SCHEDULED.
5. SIDEWALL EXHAUST FAN WITH BACKDRAFT DAMPER; COORDINATE INSTALLATION AND EXACT DAMPER SIZE WITH ARCHITECTURAL LOUVER. PROVIDE EQUIPMENT RATED FOR SPACE CLASSIFICATION AS SCHEDULED.
6. AIR COOLED CONDENSING UNIT MOUNTED ON CONCRETE PAD. INSTALL WITH MANUFACTURER RECOMMENDED WORKING CLEARANCES.
7. HEAT PUMP MOUNTED ON CONCRETE PAD. INSTALL WITH MANUFACTURER RECOMMENDED WORKING CLEARANCES.
8. MOTOR OPERATED DAMPER MOUNTED INSIDE ARCHITECTURAL LOUVER; COORDINATE WITH LOUVER INSTALLATION FOR REQUIRED DAMPER DIMENSIONS. PROVIDE EXPLOSION PROOF ACTUATORS WHERE NOTED, AND AS DICTATED BY SPACE CLASSIFICATION.
9. MAKE-UP AIR UNIT. SUPPORT UNIT AND ASSOCIATED DUCTWORK FROM STRUCTURE ABOVE OR ADJACENT WALL.



1/H101 HVAC – ELEVATION
SCALE: 1/8"=1'-0"



2/H101 HVAC – ELEVATION
SCALE: 1/8"=1'-0"



3/H101 HVAC – ELEVATION
SCALE: 1/8"=1'-0"

4' 0 4' 8'
SCALE: 1/8"= 1'-0"

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

STATE OF MARYLAND
MARK WILLIAM KELLER
No. 22410
PROFESSIONAL ENGINEER
12-10

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 35328
EXPIRATION DATE 09/26/2012

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

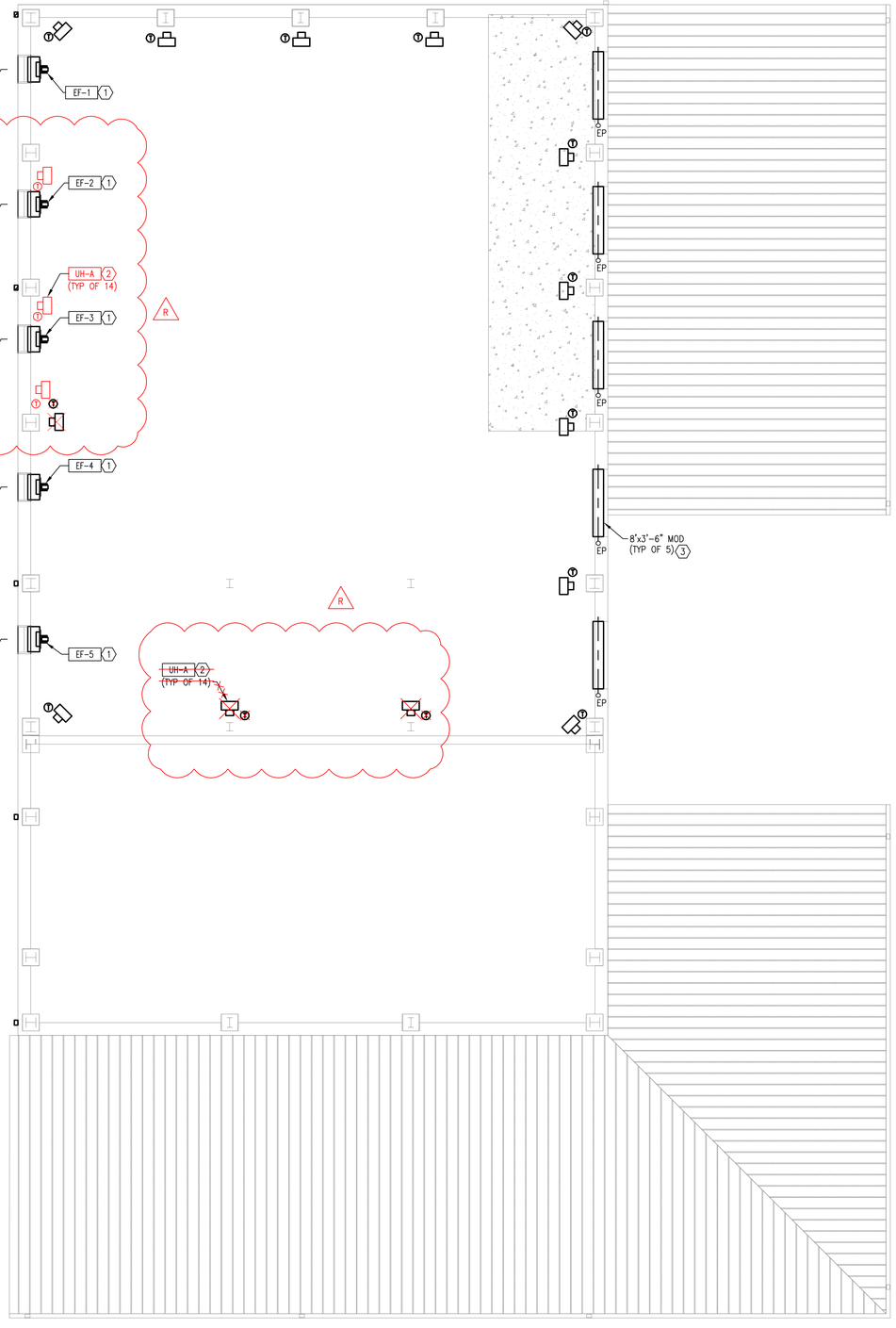
SHEET TITLE
HVAC FLOOR PLAN

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: AFR
CH'D. BY: MWK

H-101

SHEET 84 OF 128



HVAC – SECOND FLOOR
SCALE: 1/8"=1'-0"

GENERAL SHEET NOTES:

1. THE DRAWINGS ARE DIAGRAMMATIC; COORDINATE SYSTEM INSTALLATION WITH OTHER TRADES.
2. DO NOT LOCATE DUCTWORK OR PIPING ABOVE ELECTRICAL PANELS OR EQUIPMENT.

SHEET KEYNOTES:

(1) SIDEWALL EXHAUST FAN WITH BACKDRAFT DAMPER; COORDINATE INSTALLATION AND EXACT DAMPER SIZE WITH ARCHITECTURAL LOUVER. PROVIDE EQUIPMENT RATED FOR SPACE CLASSIFICATION AS SCHEDULED.

(2) UNIT HEATER SUSPENDED FROM STRUCTURE WITH REMOTE THERMOSTAT. PROVIDE EQUIPMENT RATED FOR SPACE CLASSIFICATION AS SCHEDULED.

(3) MOTOR OPERATED DAMPER MOUNTED INSIDE ARCHITECTURAL LOUVER; CENTER DAMPER AND BLANK OFF UNUSED PORTION OF LOUVER WITH 2" INSULATED DOUBLE WALL PANEL. PROVIDE EXPLOSION PROOF ACTUATORS WHERE NOTED, AND AS DICTATED BY SPACE CLASSIFICATION.

SCALE: 1/8"= 1'-0"

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

STATE OF MARYLAND
GYM MEHER
No. 35328
PROFESSIONAL ENGINEER
11-22-10

PROFESSIONAL CERTIFICATION.
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 35328
EXPIRATION DATE 09/26/2012

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
HVAC FLOOR PLAN

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: AFR
CH'D. BY: MWK

H-102

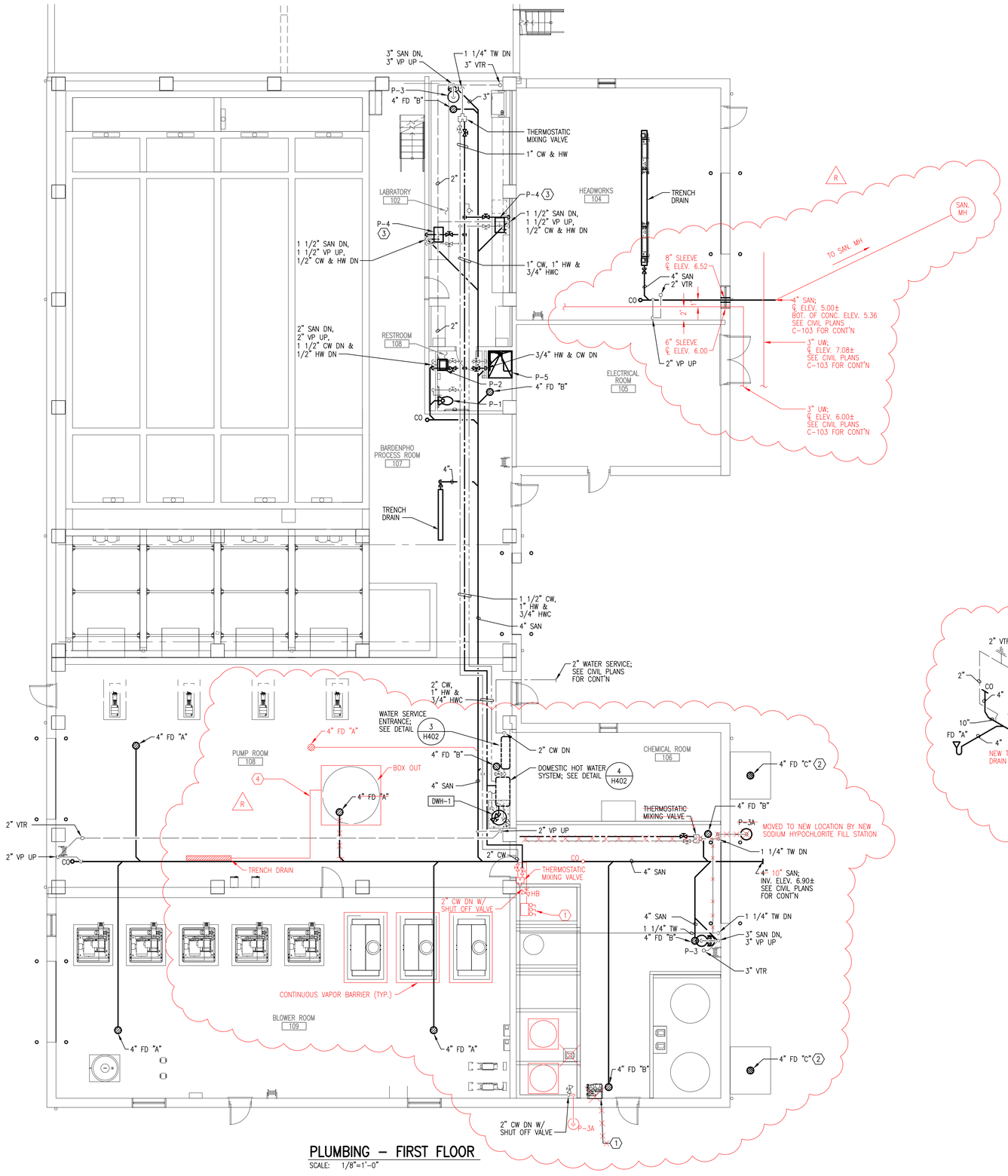
SHEET 85 OF 128

GENERAL SHEET NOTES:

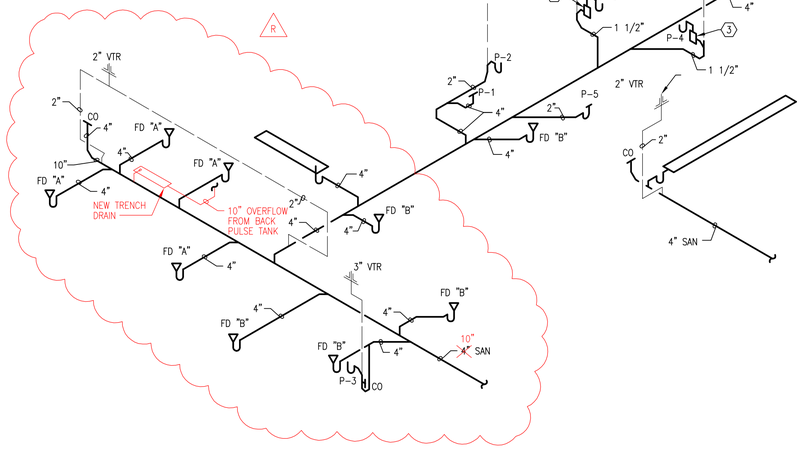
1. THE DRAWINGS ARE DIAGRAMMATIC; COORDINATE SYSTEM INSTALLATION WITH OTHER TRADES.
2. DO NOT LOCATE DUCTWORK OR PIPING ABOVE ELECTRICAL PANELS OR EQUIPMENT.

SHEET KEYNOTES:

1. REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER, MOUNT 48" AFF FOR CONNECTION TO POLYMER BLENDING UNIT.
2. SEE CIVIL PLANS FOR EXTERIOR FLOOR DRAIN PIPING.
3. ACID NEUTRALIZATION TANK IN CASEWORK BELOW SINK. PROVIDE WITH ACID RESISTANT TAILPIECE AND INLET PIPING; INSTALL PER MANUFACTURER'S RECOMMENDATIONS WITH REQUIRED CLEARANCES FOR MAINTENANCE. EQUAL TO T&C PLASTICS MODEL NT-5.
4. 10" OVERFLOW FROM BACK PULSE TANK RUNS TO TRENCH DRAIN.



PLUMBING – FIRST FLOOR
SCALE: 1/8"=1'-0"



PLUMBING – SANITARY RISER
SCALE: 1/8"=1'-0"

SCALE: 1/8" = 1'-0"

RECORD DRAWING SET
JANUARY 2015

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 35328
EXPIRATION DATE 09/29/2012

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

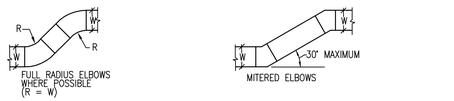
PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PLUMBING FLOOR PLAN

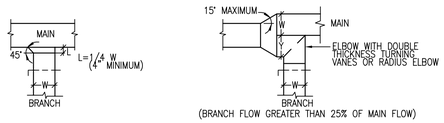
MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	MAR. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
A	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: SEPTEMBER 2012
SCALE: AS SHOWN
DWN. BY: AFR
CH'D. BY: ICI

H-103



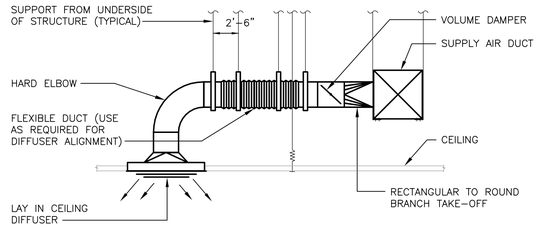
DUCT OFFSETS

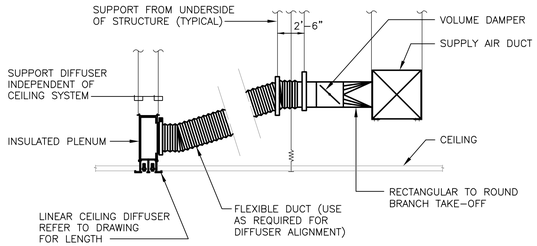


BRANCH TAKE-OFFS

LOW VELOCITY ELBOWS

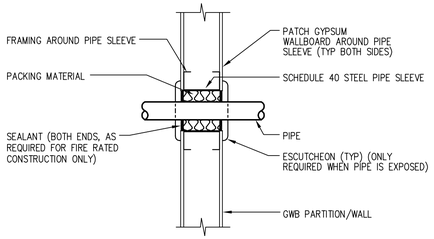
1/H401 DUCT FITTINGS
SCALE: NONE





NOTES:
1. DUCT INSULATION SHALL BE PROVIDED AS SPECIFIED.
2. PROVIDE ADDITIONAL ROUND, RIGID SHEET METAL DUCTWORK AS REQUIRED TO LIMIT FLEXIBLE DUCT LENGTH TO 8'-0" MAXIMUM.
3. MAXIMUM SAG OF FLEXIBLE DUCT SHALL BE LIMITED TO 1/2" PER FOOT.

2/H401 DIFFUSER / BRANCHLINE
SCALE: NTS



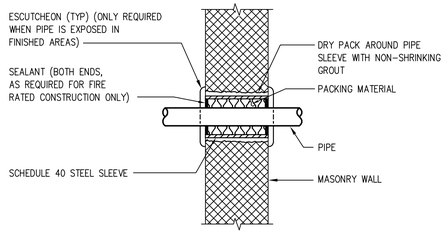
NOTES:

THIS DETAIL APPLIES TO BOTH INSULATED AND NON-INSULATED PIPE.

FOR FIRE RATED CONSTRUCTION PROVIDE APPROPRIATE APPROVED THROUGH-PENETRATION FIRESTOP ASSEMBLY TO MAINTAIN THE FIRE RATING OF THE WALL ASSEMBLY.

DETAIL FOR DOMESTIC PLUMBING ONLY.

3/M401 PIPE THROUGH INTERIOR METAL/WOOD STUD GWB PARTITION OR WALL
SCALE: NOT TO SCALE



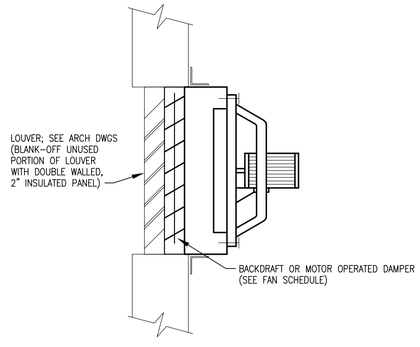
NOTES:

THIS DETAIL APPLIES TO BOTH INSULATED AND NON-INSULATED PIPE.

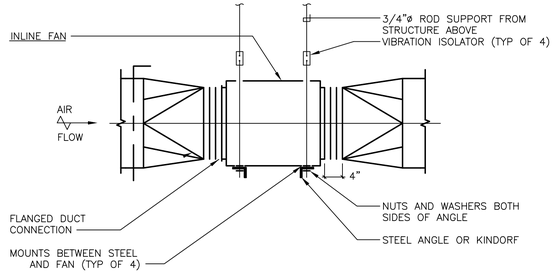
FOR FIRE RATED CONSTRUCTION PROVIDE APPROPRIATE APPROVED THROUGH-PENETRATION FIRESTOP ASSEMBLY TO MAINTAIN THE FIRE RATING OF THE WALL ASSEMBLY.

DETAIL FOR DOMESTIC PLUMBING ONLY.

4/H401 PIPE THROUGH INTERIOR MASONRY PARTITION OR WALL
SCALE: NOT TO SCALE



5/H401 SIDEWALL FAN
SCALE: NONE



NOTE:
1. PROVIDE FLEXIBLE CONNECTIONS BEFORE AND AFTER UNIT.

6/H401 INLINE FAN INSTALLATION
SCALE: NONE

RECORD DRAWING SET
JANUARY 2015

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 35328
EXPIRATION DATE 09/26/2012

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	MAR. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
4	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

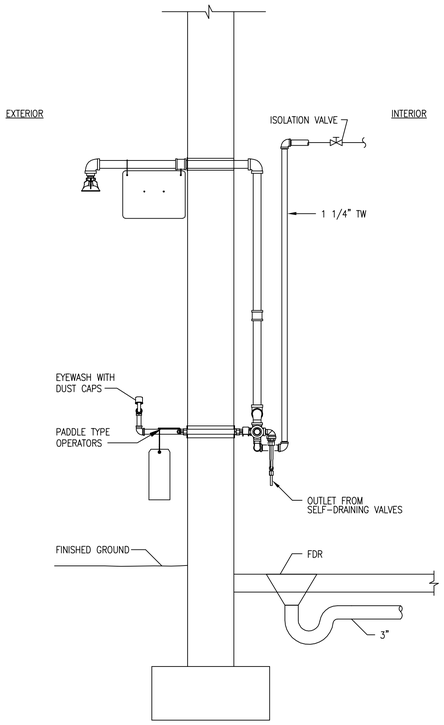
SHEET TITLE
HVAC DETAILS

CONTRACT NO. #140-10-01
DATE: SEPTEMBER 2012
SCALE: AS SHOWN
DWN. BY: AFR
CH'D. BY: MWK

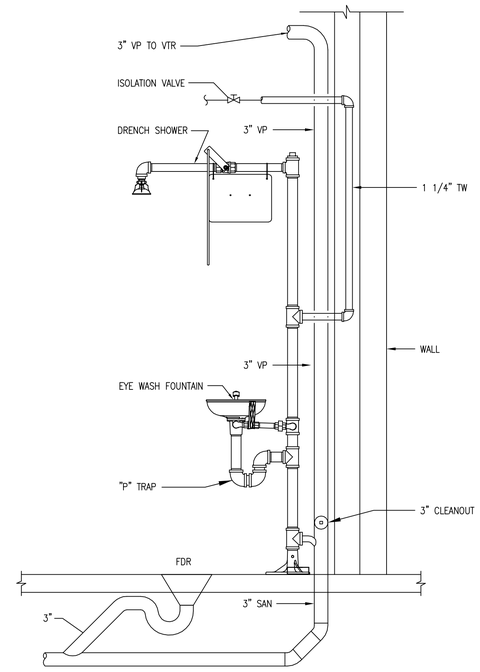
H-401

SHEET 87 OF 128

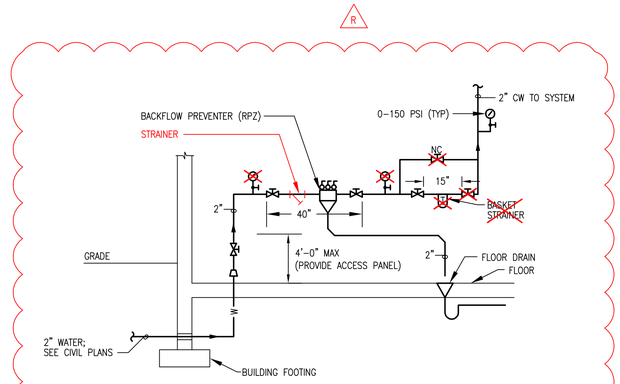
RECORD DRAWING SET
JANUARY 2015



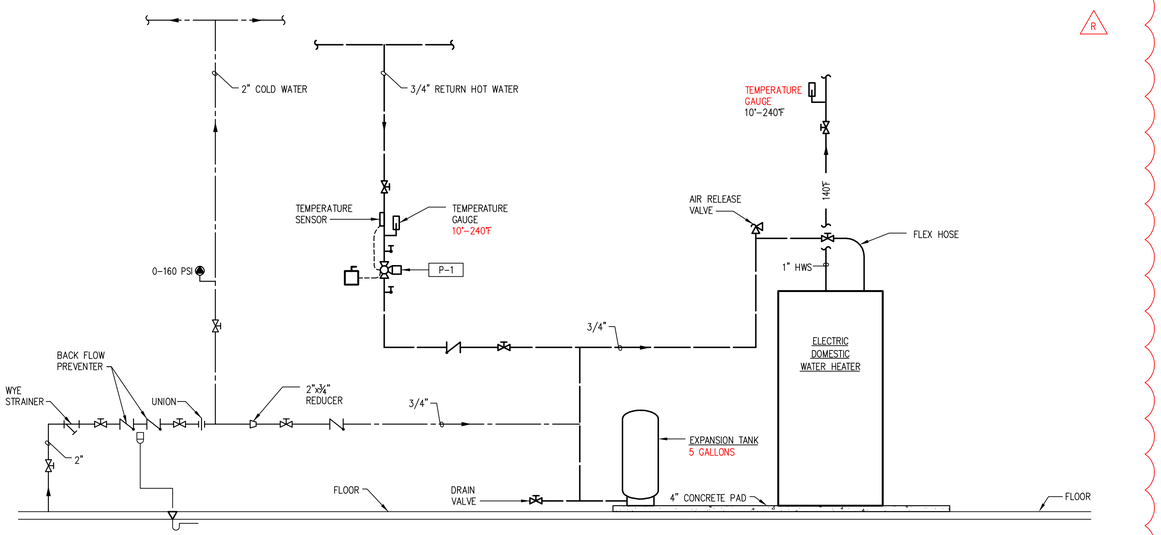
1 H402 FROST PROOF EMERGENCY SHOWER/EYEWASH (P-3A)
SCALE: NOT TO SCALE



2 H402 EMERGENCY SHOWER/EYEWASH (P-3)
SCALE: NOT TO SCALE

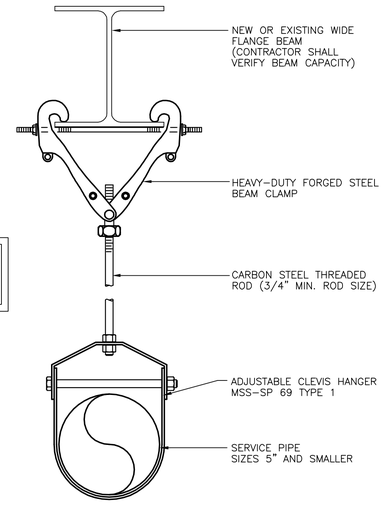


3 H402 WATER SERVICE ENTRANCE
SCALE: NOT TO SCALE



4 H402 DOMESTIC HOT WATER SYSTEM
SCALE: NOT TO SCALE

MAX. HANGER LOADING		
PIPE SIZE	ROD DIA.	MAX. SPACING
1/2" THRU 2"	1/2"	8'



NOTE:
1. THIS DETAIL SHALL BE USED AS A GUIDE. ALL HANGERS SHALL MEET THE REQUIREMENTS OF THE SPECIFICATION.

5 H402 HANGER SUPPORT
SCALE: NONE

PROFESSIONAL CERTIFICATION.
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 35328
EXPIRATION DATE 09/26/2012

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PLUMBING DETAILS

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: AFR
CH'D. BY: ICI

H-402

SHEET 88 OF 128

FAN SCHEDULE

DESIG.	SERVICE	SPACE CLASSIFICATION	CFM	SP IN. W.G.	FAN RPM	MOTOR HP (WATTS)	TYPE	DRIVE	ELEC	MAX SONES	RECOMMENDED ROOF/WALL OPENING	FAN PANEL SIZE	DAMPER SIZE	APPROX WEIGHT (LBS)	BASIS	NOTES
EF-1	PROCESS ROOM	CLASS I/DIV. 1	6500	0.20	1,750	1 1/2	SIDE WALL EXHAUST	DIRECT	460/3	24.0	22.5"X22.5"	26"X26"	40"X40"	39	GREENHECK SE1	3
EF-2	PROCESS ROOM	CLASS I/DIV. 1	6500	0.20	1,750	1 1/2	SIDE WALL EXHAUST	DIRECT	460/3	24.0	22.5"X22.5"	26"X26"	40"X40"	39	GREENHECK SE1	3
EF-3	PROCESS ROOM	CLASS I/DIV. 1	6500	0.20	1,750	1 1/2	SIDE WALL EXHAUST	DIRECT	460/3	24.0	22.5"X22.5"	26"X26"	40"X40"	39	GREENHECK SE1	3
EF-4	PROCESS ROOM	CLASS I/DIV. 1	6500	0.20	1,750	1 1/2	SIDE WALL EXHAUST	DIRECT	460/3	24.0	22.5"X22.5"	26"X26"	40"X40"	39	GREENHECK SE1	3
EF-5	PROCESS ROOM	CLASS I/DIV. 1	6500	0.20	1,750	1 1/2	SIDE WALL EXHAUST	DIRECT	460/3	24.0	22.5"X22.5"	26"X26"	40"X40"	39	GREENHECK SE1	3
EF-6	LAB HOOD	UNCLASSIFIED	360	0.50	1,329	1/4	CENTRIFUGAL SIDEWALL	BELT	115/1	10.0	12.5"X12.5"	--	10"X10"	60	GREENHECK CWB	3
EF-7	HEADWORKS	CLASS I/DIV. 1	3300	0.60	1,770	1 1/2	UTILITY SET	BELT	460/3	10.0	--	--	24"X18"	221	GREENHECK BISW	2, 3
EF-9	BLOWER ROOM	UNCLASSIFIED	6500	0.20	1,750	1 1/2	SIDE WALL EXHAUST	DIRECT	460/3	24.0	22.5"X22.5"	26"X26"	40"X40"	39	GREENHECK SE1	3
EF-10	TOILET ROOM	UNCLASSIFIED	100	0.35	950	(80)	CEILING EXHAUST	DIRECT	120/1	2.0	--	--	--	10	GREENHECK SP	
EF-11	PUMP ROOM	UNCLASSIFIED	6500	0.20	1,750	1 1/2	SIDE WALL EXHAUST	DIRECT	460/3	24.0	22.5"X22.5"	26"X26"	36"X36"	39	GREENHECK SE1	3
EF-12	CHEMICAL ROOM	UNCLASSIFIED	200	0.50	1,050	(80)	INLINE CABINET	DIRECT	120/1	4.0	--	--	--	25	GREENHECK CSP	1
EF-13	CHEMICAL ROOM	UNCLASSIFIED	2000	0.20	1,160	1/4	SIDE WALL EXHAUST	DIRECT	120/1	10.0	18.5"X18.5"	22"X22"	24"X24"	30	GREENHECK SE1	4

NOTES:
1.) PROVIDE FAN WITH DISCONNECT FOR FIELD INSTALLATION, SUITABLE FOR SPACE CLASSIFICATION.
2.) PROVIDE FAN WITH MOTOR OPERATED DAMPER SUITABLE FOR SPACE CLASSIFICATION.
3.) PROVIDE FAN WITH GRAVITY BACKDRAFT DAMPER SUITABLE FOR SPACE CLASSIFICATION.
4.) DAMPER SIZE IS SMALLER THAN LOUVER. CENTER DAMPER AND FAN PLENUM AND BLANK OFF UNUSED PORTION OF LOUVER WITH 2" INSULATED, DOUBLE WALL PANEL.

MAKE-UP AIR UNIT SCHEDULE

DESIG.	SUPPLY FAN				HEATING			COOLING						DIMENSIONS			ELECTRICAL	MAXIMUM OPERATING WEIGHT (LBS)	BASIS	NOTES
	CFM	ESP INCH H_20	TSP INCH H_20	MOTOR HP	EAT (°F)	LAT (°F)	KW	EAT (°F)		LAT (°F)		TOTAL MBH	SENS. MBH	L (INCHES)	W (INCHES)	H (INCHES)	VOLTS/ PHASE			
					DB	DB		DB	WB	DB	WB									
MAU-1	1,600	0.60	2.3	1.5	13.0	80.0	35	93.0	75.0	57.0	56.0	108	65	139	36	30	460/3	1,600	JOHNSON CONTROLS	1
MAU-2	1,000	0.50	1.5	1	--	--	--	--	--	--	--	--	--	40	30	21	460/3	300	JOHNSON CONTROLS AHI	1

NOTES:
1.) SEE CONTROLS SEQUENCES FOR UNIT CONFIGURATION AND ANCILLARY CONTROL EQUIPMENT REQUIRED.

DUCTLESS SPLIT SYSTEM SCHEDULE

EVAPORATOR DATA						OUTDOOR SECTION DATA									
DESIG.	CFM	MOTOR FLA	COOLING CAPACITY (MBH)	HEATING CAPACITY (MBH)	BACK-UP HEATER (KW)	DESIG.	LIQUID LINE SIZE (IN.)	VAPOR LINE SIZE (IN.)	REFRIG.	ELECTRICAL				BASIS
										VOLT	MCA	MOP	SEER	
FCU-1	565	0.82	31.2	37.4	1.95	HP-1	3/8"	5/8"	R-410A	208/1	20.1	35	15.1	SANYO 36THHW72R

AIR COOLED CONDENSING UNIT SCHEDULE

DESIG.	SERVICE	TOTAL CAPACITY	AMBIENT OUTDOOR TEMP °F	REFRG.	DIMENSIONS (IN.)			ELECTRIC			WEIGHT LBS	BASIS
					L	W	H	VOLT	MCA	MOP		
ACCU-1	MAU-1	MAU-1	95	R-410-A	59	32	50	460/3	28.5	35	500.0	JOHNSON CONTROLS SERIES 20

ELECTRIC DUCT HEATER SCHEDULE

DESIG.	SERVES	DUCT SIZE	CFM	ΔP (inches w.c.)	KW	VOLT/PH	BASIS	NOTES
EDH-1	MAU-2	18"x12"	1000	0.1	18	460/3	INDEECO	1

NOTES:
1.) PROVIDE UNIT WITH FINNED TUBULAR HEATING COIL AND FACTORY INSTALLED DISCONNECT & SCR CONTROL.

UNIT HEATER SCHEDULE

DESIG.	SPACE CLASSIFICATION	kW	CFM	ELECTRICAL	BASIS	NOTES
UH-A	CLASS I/DIV. 1	15	1450	480/3	QMARK GUX	1
UH-B	UNCLASSIFIED	10	650	480/3	DAYTON 2YU	1

NOTES:
1.) PROVIDE UNIT WITH LINE VOLTAGE THERMOSTATE SUITABLE FOR SPACE CLASSIFICATION.

FLOOR DRAIN SCHEDULE

DESIG.	TYPE	BASSIS OF DESIGN MODEL NUMBER (ZURN)	
A	FLOOR DRAIN	Z-512-DG	
B	FLOOR DRAIN	Z-415	"TYPE N" STRAINER
C	FLOOR DRAIN	Z-550	GALVANIZED GRATE

PLUMBING FIXTURE SCHEDULE

No	FIXTURE	ROUGH-IN CONNECTION				REMARKS
		CW	HW	TW	SAN	
P-1	WATER CLOSET	1/2"	–	–	–	ADA
P-2	LAVATORY	1/2"	1/2"	–	1 1/2"	ADA
P-3	EMERGENCY EYEWASH/SHOWER	–	–	1 1/2"	FD	INDOOR
P-3A	EMERGENCY EYEWASH/SHOWER	–	–	1 1/2"	–	OUTDOOR
P-4	LAB SINK	1/2"	1/2"	–	2"	*
P-5	SHOWER	1/2"	1/2"	–	2"	

* SINK BY DIVISION 12, REFER TO SPECIFICATIONS FOR PLUMBING REQUIREMENTS

MISCELLANEOUS PLUMBING EQUIPMENT

DESIG.	DESCRIPTION/CAPACITY	MANUFACTURER AND MODEL NUMBER
DWH-1	DOMESTIC WATER HEATER; 50 GALLON STORAGE, 208-1PH, 34 GPH RECOVERY AT 60° TEMP RISE (5 KW)	EQUAL TO: A.O. SMITH DEL
P-1	DOMESTIC HOT WATER CIRCULATING PUMP; BRONZE CONSTRUCTION, 5 GPM @ 20 FT/HD, 1725 RPM, 120V-1PH, 1/12 HP	EQUAL TO TACO RED BARON

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

STATE OF MARYLAND — MATTHEW K. WELLER — No. 35328 — PROFESSIONAL ENGINEER — 12-22-12

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 35328
EXPIRATION DATE 09/26/2012

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON®
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

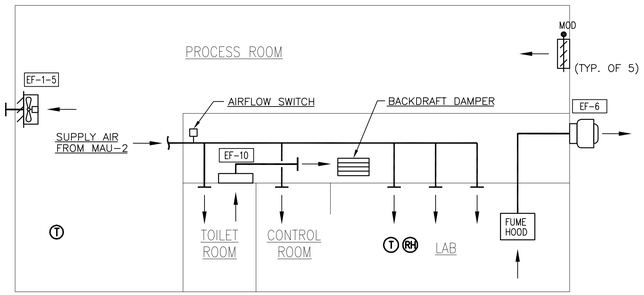
SHEET TITLE
HVAC SCHEDULES

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	MAR. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
4	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: SEPTEMBER 2012
SCALE: AS SHOWN
DWN. BY: AFR
CH'D. BY: MWK

H-501

SHEET 89 OF 128

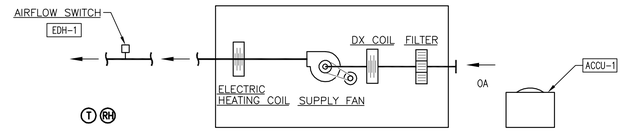


PROCESS ROOM

A. GENERAL

EXHAUST FAN (EF-1,2,3,4,5) RUNS ON TIMER TO PROVIDE 4 AIR CHANGES PER HOUR (25 MINUTES/HOUR). FANS SHALL ALSO RUN WHEN SPACE IS OCCUPIED, ANY TIME TEMPERATURE EXCEEDS 85° F (ADJUSTABLE), OR UPON A SIGNAL FROM THE PROCESS CONTROL SYSTEM (GAS DETECTION SYSTEM). MOTOR OPERATED DAMPERS (MOD) AT MAKE-UP AIR LOUVERS SHALL OPEN WHEN FANS ARE ENERGIZED.

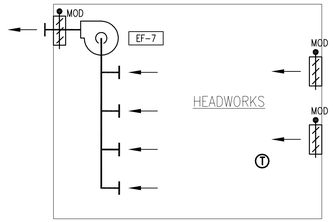
EXHAUST FANS (EF-6 & 10) SHALL BE CONTROLLED BY INDIVIDUAL LOCAL SWITCHES.



MAKE-UP AIR UNIT: MAU-1

A. GENERAL

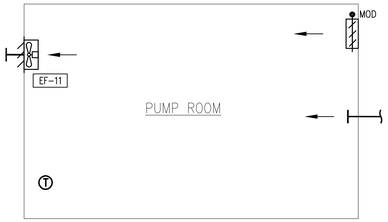
MAKE-UP AIR UNIT (MAU-1) SHALL CONTINUOSLY RUN. A DX COOLING COIL AND MODULATING ELECTRIC HEATING COIL SHALL CONTROL SUPPLY AIR TEMPERATURE TO MAINTAIN SPACE SETPOINT OF 72 F(ADJUSTABLE). THE MAU SHALL MAINTAIN SPACE HUMIDITY BELOW 60% (ADJUSTABLE) BY CONTROLLING THE DX COOLING TO MAINTAIN HUMIDITY WHILE MODULATING THE ELECTRIC HEAT TO MAINTAIN SPACE TEMPERATURE. A FLOW SWITCH, WITH TWO SETS OF DRY CONTACTS, IN THE SUPPLY DUCTWORK SHALL MONITOR AIR FLOW AND BE USED TO SHUT-DOWN POWER TO THE LAB/CONTROL/TOILET ROOM WHEN AIR FLOW STOPS.



HEADWORKS

A. GENERAL

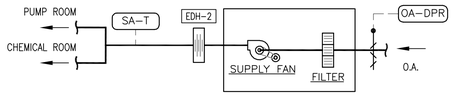
EXHAUST FAN (EF-7) RUNS ON TIMER CAPABLE OF PROVIDING 10 AIR CHANGES PER HOUR AND WILL BE OPERATED INTERMITTENTLY TO PROVIDE 4 AIR CHANGES PER HOUR (25 MINUTES/HOUR). FANS SHALL ALSO RUN WHEN SPACE IS OCCUPIED, ANY TIME TEMPERATURE EXCEEDS 85° F (ADJUSTABLE), OR UPON A SIGNAL FROM THE PROCESS CONTROL SYSTEM (GAS DETECTION SYSTEM). MOTOR OPERATED DAMPERS (MOD) AT MAKE-UP AIR LOUVERS AND FAN DISCHARGE SHALL OPEN WHEN FAN IS ENERGIZED.



PUMP ROOM

A. GENERAL

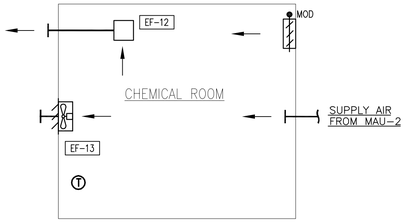
EXHAUST FAN (EF-11) SHALL RUN AND PROVIDE 4 AIR CHANGES PER HOUR WHEN SPACE TEMPERATURE EXCEEDS 85° F (ADJUSTABLE). MOTOR OPERATED DAMPER (MOD) AT MAKE-UP AIR LOUVER SHALL OPEN WHEN FAN IS ENERGIZED.



MAKE-UP AIR UNIT: MAU-2

A. GENERAL

MAKE-UP AIR UNIT (MAU-1) SHALL CONTINUOUSLY RUN OA DAMPER SHALL BE OPEN WHEN MAU RUNS.. THE ELECTRIC DUCT HEATER SHALL MODULATE TO MAINTAIN SUPPLY AIR TEMPERATURE AT 70°F (ADJUSTABLE).

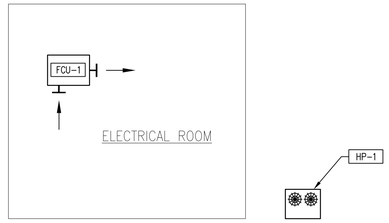


CHEMICAL ROOM

A. GENERAL

EXHAUST FAN (EF-13) SHALL RUN AND PROVIDE 4 AIR CHANGES PER HOUR WHEN SPACE TEMPERATURE EXCEEDS 85° F (ADJUSTABLE). MOTOR OPERATED DAMPER (MOD) AT MAKE-UP AIR LOUVER SHALL OPEN WHEN FAN IS ENERGIZED.

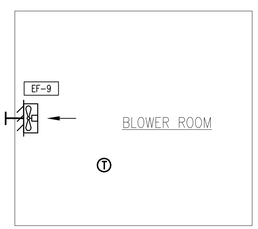
EXHAUST FAN (EF-12) SHALL CONTINUOUSLY RUN.



ELECTRICAL ROOM

A. GENERAL

FAN COIL UNIT (FCU-1) SHALL RUN TO MAINTAIN SPACE TEMPERATURE OF 75°F (ADJUSTABLE).



BLOWER ROOM

A. GENERAL

EXHAUST FAN (EF-9) SHALL RUN WHEN TEMPERATURE EXCEEDS 85° F (ADJUSTABLE).

UNIT HEATERS: UH-#

A. GENERAL

UNIT HEATER SHALL CYCLE TO MAINTAIN 60° F (ADJUSTABLE).

RECORD DRAWING SET
JANUARY 2015

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
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HVAC CONTROLS

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: AFR
CH'D. BY: MWK

H-601

SHEET 90 OF 128

INSTRUMENT IDENTIFICATION TABLE

FIRST LETTER			SUCCEEDING LETTERS		
LETTER	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		AUTOMATIC	ALARM	USER'S CHOICE
B	BURNER, COMBUSTION		USER'S CHOICE	STOP	
C	CONTROLLER	CV=CONTROL VALVE		CONTROL	CO=OPEN VALVE CC=CLOSE VALVE
D	DOOR	DIFFERENTIAL		START	
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)	FAIL / FAULT	FB=FEEDBACK	
G	STROKE		GLASS VIEWING DEVICE		
H	USER'S CHOICE		HIGH		
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL	LS=LIMIT SWITCH	LOW, LOCAL		
M	MOTOR	MB=MOMENTARY START MD=MOMENTARY STOP	MANUAL		MIDDLE OR INTERMEDIATE MP = MANUAL PURGE
N	USER'S CHOICE		RUN	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		OVERLOAD		
P	PRESSURE, VACUUM		POINT (TEST CONNECTION)		
Q	QUANTITY	INTEGRATE, TOTALIZE	HAND POSITION		
R	RADIATION		REMOTE	RECORD	
S	SPEED, FREQUENCY	SAFETY		SWITCH	SP=SETPOINT
T	TEMPERATURE	TQ=TORQUE		TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECHAN, ANALYSIS	VB=VFD BYPASS	VFD	VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION	Z AXIS		DRIVER, ACTUATOR,	

FLOW STREAM IDENTIFICATION

- CLS — CHLORINE SOLUTION
- EFF — EFFLUENT
- IFF — INFLUENT
- ML — MIXED LIQUOR
- PERM — PERMEATE
- RAS — RETURN ACTIVATED SLUDGE
- SMP — SAMPLE
- STW — STORM WATER
- SW — SEAL WATER
- WAS — WASTE ACTIVATED SLUDGE
- WS — WATER SUPPLY

*IDENTIFICATION MAY BE FOLLOWED BY A NUMBER TO DIFFERENTIATE AMONG SIMILAR FLOW STREAMS. FOR EXAMPLE, CH1 & CH2 WOULD REPRESENT TWO DIFFERENT CHEMICAL FLOW STREAMS.

FLOW STREAM & INSTRUMENT LINE SYMBOLS

- MIXED LIQUOR FLOW STREAM
- XX — MAIN FLOW STREAM
- XX — SECONDARY FLOW STREAM
- XX — OTHER FLOW STREAM

CLOSED CONDUITS (DASHED LINE INDICATES ALTERNATE FLOW STREAM)

- XX — OPEN CHANNEL OR TANK FLOW STREAM
  NOTE XX: FLOW STREAM IDENTIFICATION
- ELECTRIC POWER
- ELECTRIC SIGNAL
- FACTORY WIRED ELECTRIC SIGNAL
- INDICATES SERIAL DATA SIGNAL
- PNEUMATIC SIGNAL
- INSTRUMENT SUPPLY OR CONNECTION TO PROCESS
- NN – PIPE DIAMETER (INCHES)
- XXX – PIPE SERVICE – SEE FLOW STREAM ID LIST
- YYY – PIPE MATERIAL – SEE LIST OF ABBREVIATIONS
- X — X — SIGNAL CONTINUATION ON SAME DRAWING. X = 1,2,3,ETC.
- NEW PIPE — EXISTING PIPE

PRIMARY ELEMENT SYMBOLS

FLOW		LEVEL	
M	ELECTROMAGNETIC	SONIC	
	ULTRASONIC CLAMP–ON OR DOPPLER	R	RADAR
	ULTRASONIC FLOW ELEMENT		FLOAT
	VENTURI		WEIR

ACTUATOR SYMBOLS

- PNEUMATIC
- M XX — ELECTRIC
  NOTE: PZ, HZ, OR MZ INDICATES
- S XX — SOLENOID

NOTE: ON LOSS OF PRIMARY POWER (PNEUMATIC OR ELECTRICAL)
XX: FO = FAIL OPEN
FC = FAIL CLOSED
FI = FAIL TO INTERMEDIATE POSITION
BLANK = FAIL TO LAST POSITION

3 VALVE & GATE SYMBOLS

- BUTTERFLY VALVE
- GLOBE, GATE, OR OTHER IN–LINE VALVE
- KNIFE GATE VALVE
- DIAPHRAGM VALVE
- PINCH VALVE
- CHECK VALVE
- THREE WAY VALVE (ARROWS INDICATE FLOW PATTERN)
- RUBBER DIFFUSER/CHECK VALVE
- PLUG VALVE
- BALL VALVE, NORMALLY OPEN
- BALL VALVE, NORMALLY CLOSED
- PRESSURE RELIEF (SAFETY) VALVE
- SLIDE GATE
- UNCLASSIFIED GATE
- THREADED HOSE FLUSHING CONNECTION WITH BALL VALVE NORMALLY CLOSED

MISCELLANEOUS SYMBOLS

- (REGULATED SIDE) PRESSURE REGULATOR
- PT — PRESSURE TRANSMITTER
- PRESSURE SENSING DIAPHRAGM
- FUSE
- DISCONNECT
- J — JUNCTION BOX
- THERMOSTATICALLY CONTROLLED ELECTRIC CABINET HEATER
- PM — POWER MONITOR
- VFD — VARIABLE FREQUENCY DRIVE
- HOA SWITCH (CMC TYPE)
- * — CABLE WITH CONNECTORS ON EACH END MATING CONNECTORS IN EACH PANEL. THIS SYMBOL REPRESENTS MULTIPLE CABLES / CONNECTORS PER MCC (ONE CABLE / CONNECTOR COMBINATION PER BUCKET).
- PULSATION DAMPENER
- BASKET STRAINER/FILTER

EQUIPMENT SYMBOLS

- XX — MOTOR
- XX — CENTRIFUGAL PUMP (DRY PIT)
- SUBMERSIBLE PUMP
- ELECTRIC DIAPHRAGM PUMP
- UV DISINFECTION SYSTEM
- XX — CENTRIFUGAL COMPRESSOR OR BLOWER
- M — SUBMERSIBLE MIXER
- PROGRESSIVE CAVITY PUMP
- VERTICAL CENTRIFUGAL SUMP PUMP
- PERISTALTIC PUMP

4 INSTRUMENT & FUNCTION SYMBOLS

NEW	EXISTING	DESCRIPTION
		FIELD MOUNTED
		FACE OF PANEL MOUNTED
		INTERIOR OF PANEL MOUNTED
		MOTOR CONTROL CENTER MOUNTED
		PANEL FACE MOUNTED PILOT LIGHT
		INSTRUMENTS SHARING COMMON HOUSING
		INTERIOR OF PANEL MOUNTED PILOT LIGHT
ABC 123	ABC 123	LETTERS INDICATE INSTRUMENT FUNCTION AND LOOP PER SCHEDULE
		PROGRAMMABLE CONTROLLER LOOP
		SOFTWARE DISPLAYED DATA

INPUT & OUTPUT SIGNALS TO DISTRIBUTED PROCESS CONTROLLERS

- ABC123 — ANALOG INPUT (AI)
- ABC123 — ANALOG MODULATING OUTPUT (AO)
- ABC123 — DIGITAL INPUT (DI)
- ABC123 — CONTROL OUTPUT (DO) X
- ABC123 — BOOLEAN (VIRTUAL) AI
- ABC123 — BOOLEAN (VIRTUAL) AO
- ABC123 — BOOLEAN (VIRTUAL) DI
- ABC123 — BOOLEAN (VIRTUAL) DO

NOTE: ABC123 IS I/O DESIGNATION

EQUIPMENT TAGGING

L–NNN

- L M = MECHANICAL EQUIPMENT
  P = PUMP
  T = TANK
  V = VALVE
- NNN = LOOP NUMBER

ABBREVIATIONS

CBM	CABLE BY MANUFACTURER	MR	MASTER RELAY
CI	CAST IRON	OCS	OPERATOR CONTROL STATION
CP	CONTROL PANEL	PP	POWER PANEL
CS	CARBON STEEL	RIO	REMOTE INPUT/OUTPUT
DI	DUCTILE IRON	SCM	SCUM
DIG	DUCTILE IRON GLASS LINED	SLG	SLUDGE
DCU	DISTRIBUTED CONTROL UNIT	SMP	SUMP
ESD	EMERGENCY SHUT DOWN	SP	SETPOINT
ETM	ELAPSED TIME METER	SS	STAINLESS STEEL
ETR	EXISTING TO REMAIN	TSP	TWISTED SHIELDED PAIR
FB	FEEDBACK	UPS	UNINTERRUPTABLE POWER SUPPLY
FC	FAIL CLOSED	XP	EXPLOSION PROOF
FER	FERRIC CHLORIDE		
FO	FAIL OPEN		
IE	INSTRUMENT ENCLOSURE		
I/O	INPUT/OUTPUT		
JB	JUNCTION BOX		
LEL	LOWER EXPLOSIVE LIMIT		
MB	MODBUS		
MB+	MODBUS+		
MCC	MOTOR CONTROL CENTER		

INSTRUMENT & FUNCTION TAGGING

- LLL — FUNCTIONAL INSTRUMENT IDENTIFICATION LETTERS FROM INSTRUMENT IDENTIFICATION TABLE
- L — LETTER SUFFIX TO DISTINGUISH BETWEEN INSTRUMENTS IN LOOP WITH SAME FUNCTIONAL INDEBTIFICATION. (USED AS REQUIRED)
- NNN — LOOP NUMBER

SPECIAL NOTATIONS

XXX

(BLANK)	PANEL MOUNTED LIGHT
CLSD	VALVE/GATE IS CLOSED
CR	CONTROL RELAY
CV	CONTROL VALVE
DS	DOOR SWITCH
FST	FAST
HOA	HAND/OFF/AUTO
HS	HAND SWITCH
I/I	CURRENT TO CURRENT TRANSMITTER
ISB	INTRINSIC SAFETY BARRIER
KWT	KILOWATT TRANSMITTER
LED	ANALOG SIGNAL TO LED INDICATOR
L/R	LOCAL/REMOTE SWITCH
LOR	LOCAL/OFF/REMOTE
MR	MASTER RELAY
OIT	OPERATOR INTERFACE TERMINAL
O/L	OVERLOAD
OPEN	VALVE/GATE IS OPEN
OOS	OUT OF SERVICE
PB	PUSHBUTTON
PP	PROCESS PORTAL
PY	PRESSURE SENSOR
R	RELAY
SLW	SLOW
SRG	SURGE PROTECTOR
SS	SELECTOR SWITCH
S/S	START/STOP
SV	SOLENOID VALVE
TMR	TIMER
VFD	VARIABLE FREQUENCY DRIVE

ANALYSIS INSTRUMENTS

CG	COMBUSTIBLE GAS
CH4	METHANE
DO	DISSOLVED OXYGEN
HC	HYDROCARBONS
NO3	NITRATE NITROGEN
O2	OXYGEN
P	PHOSPHORUS
PH	pH
SS	SUSPENDED SOLIDS

AE XXX — NOTE XXX:

TAPPED OR SAMPLED SENSOR

GENERAL NOTES

1. THIS IS A GENERAL P&ID LEGEND SHEET. SOME SYMBOLS OR NOTATIONS MAY NOT BE USED ON THIS PROJECT.

2. ELECTRICAL SYMBOLS ARE DEFINED ON THE ELECTRICAL SYMBOL SHEET.

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 20330, EXPIRATION DATE 01/29/2012.

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON®
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE: MYSTIC HARBOUR WWTP UPGRADE AND PLANT EXPANSION

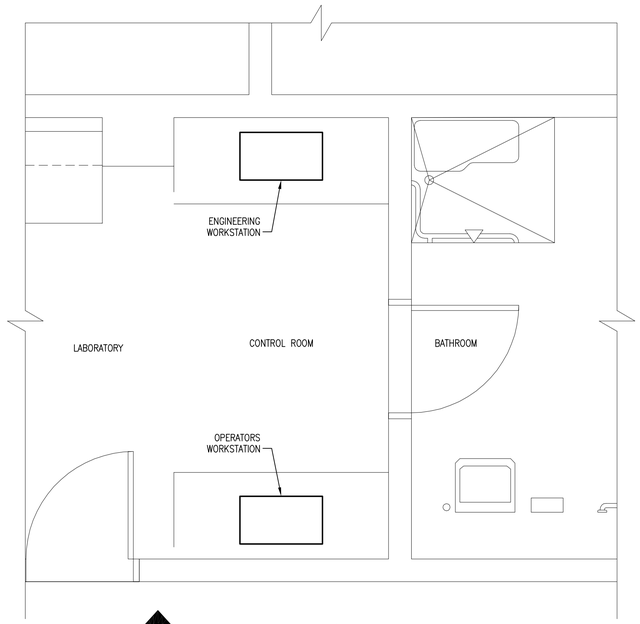
SHEET TITLE: P&ID SYMBOLS AND SCHEDULES INSTRUMENTATION NOTES

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

I-001

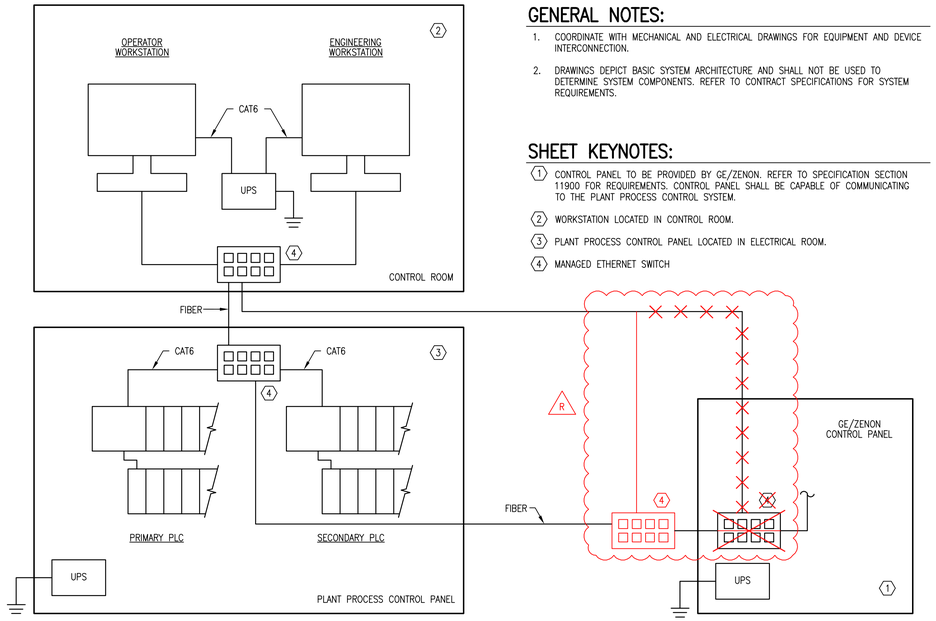
SHEET 111 OF 128

File: Q:\SMD\070902_MysticHarbourWWTPImprovDist\Cad_EP\1-040\IG-BUILT\INSTRUMDWGS\I-001_AbbreviationsA.dwg
Jan 12, 2015 - 11:53:53am



PROCESS CONTROL ROOM – PLAN

SCALE: NOT TO SCALE



PROCESS CONTROL SYSTEM ARCHITECTURE

SCALE: NOT TO SCALE

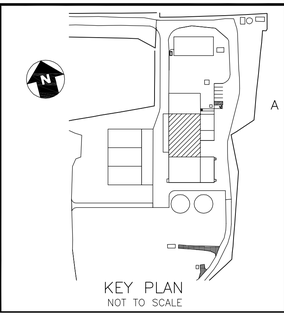
GENERAL NOTES:

1. COORDINATE WITH MECHANICAL AND ELECTRICAL DRAWINGS FOR EQUIPMENT AND DEVICE INTERCONNECTION.
2. DRAWINGS DEPICT BASIC SYSTEM ARCHITECTURE AND SHALL NOT BE USED TO DETERMINE SYSTEM COMPONENTS. REFER TO CONTRACT SPECIFICATIONS FOR SYSTEM REQUIREMENTS.

SHEET KEYNOTES:

1. CONTROL PANEL TO BE PROVIDED BY GE/ZENON. REFER TO SPECIFICATION SECTION 11900 FOR REQUIREMENTS. CONTROL PANEL SHALL BE CAPABLE OF COMMUNICATING TO THE PLANT PROCESS CONTROL SYSTEM.
2. WORKSTATION LOCATED IN CONTROL ROOM.
3. PLANT PROCESS CONTROL PANEL LOCATED IN ELECTRICAL ROOM.
4. MANAGED ETHERNET SWITCH

RECORD DRAWING SET
JANUARY 2015



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DESCRIPTION	DATE	MARK
RECORD DRAWINGS	NOV. 2014	1

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS CONTROL SYSTEM ARCHITECTURE

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

I-002

SHEET 112 OF 128

File: Q:\SMD\07062_MysticHarbour\WWTP\ed\Proc\ed_I-FLY-CADD\AS-BUILTS\INSTRUMENTATION\I-002_PCS Architecture.dwg
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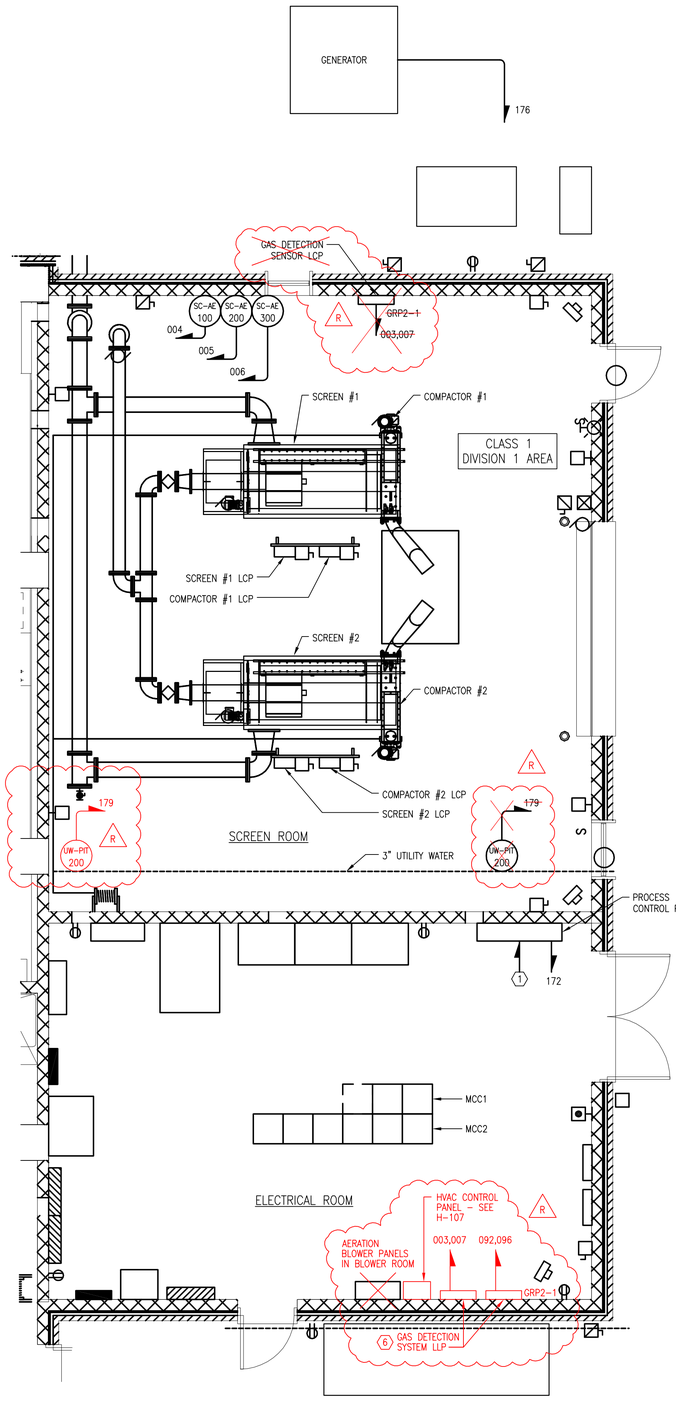
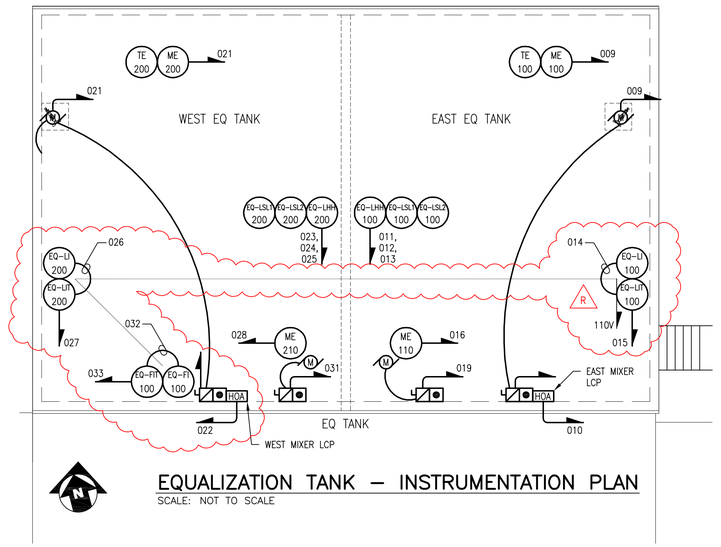


SCREEN AND ELECTRICAL ROOM – INSTRUMENTATION PLAN

SCALE: NOT TO SCALE



EQUALIZATION TANK – INSTRUMENTATION PLAN

SCALE: NOT TO SCALE

GENERAL NOTES

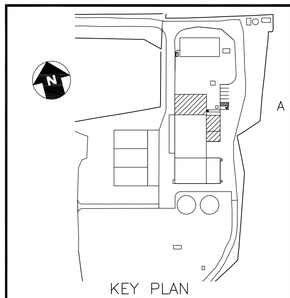
1. PROVIDE CONDUIT AND WIRING PER MANUFACTURER'S RECOMMENDATION AS NECESSARY TO CONNECT LCP TO ASSOCIATED CONTROLS LOCATED IN ELECTRICAL ROOM.

SHEET KEYNOTES

(1) THE FOLLOWING CONDUIT RUNS ARE TO BE SENT TO THE PROCESS CONTROL PANEL FROM THE MCC:

001	034	062	105
002	039	067	106
008	040	068	110
017	045	073	111
018	048	076	115
020	053	081	116
029	054	082	120
030	059	087	121

RECORD DRAWING SET JANUARY 2015



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LICENSE NO. 20330
EXPIRATION DATE 01/29/2012.

CONSULTANT

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PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
EQUALIZATION TANK
POWER PLAN AND LIGHTING PLAN

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: SEPTEMBER 2012
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

I-101

SHEET 113 OF 128

File: Q:\SAD\070662_MysticHarbourWWTPImprovProj\CAD\VS-BUILTS\INSTRUMENTATION\I-101 EQ TANK SCREEN AND ELEC ROOMS.dwg
Jan 16, 2015 - 4:08:53pm

CLASS 1
DIVISION 1 AREA

PROCESS ROOM

ANOXIC MIXER #1 LCP
ANOXIC MIXER #2 LCP
ANOXIC MIXER #3 LCP
ANOXIC MIXER #4 LCP

ANOXIC ZONE 1
ANOXIC ZONE 2
ANOXIC ZONE 3
ANOXIC ZONE 4

AERATION ZONE TRAIN 1
AERATION ZONE TRAIN 2
AERATION ZONE TRAIN 3
AERATION ZONE TRAIN 4

POST-ANOXIC ZONE TRAIN 1
POST-ANOXIC ZONE TRAIN 2
POST-ANOXIC ZONE TRAIN 3
POST-ANOXIC ZONE TRAIN 4

POST-ANOXIC MIXER #1 LCP
POST-ANOXIC MIXER #2 LCP
POST-ANOXIC MIXER #3 LCP

MBR CHANNEL

MEMBRANE TANK TRAIN 1
MEMBRANE TANK TRAIN 2
MEMBRANE TANK TRAIN 3
MEMBRANE TANK TRAIN 4

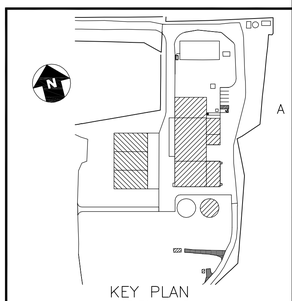
SEE NOTE *

R * MEMBRANE UNIT IN TRAIN 3 MOVED TO MEMBRANE TANK TRAIN 1.
MEMBRANE UNIT IN TRAIN 4 MOVED TO MEMBRANE TANK TRAIN 2.

PROCESS BUILDING – INSTRUMENTATION PLAN

SCALE: NOT TO SCALE

RECORD DRAWING SET
JANUARY 2015



KEY PLAN
NOT TO SCALE

WORCESTER COUNTY

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LICENSE NO. 20330
EXPIRATION DATE 01/29/2012

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PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING - POWER PLAN

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	MAR. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
4	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: SEPTEMBER 2012
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

I-102

SHEET 114 OF 128

File: Q:\SMD\070662_MysticHarbor\WWTP\Final\Proc\Cad_ELT\4-CADD\AS-BUILTS\INSTRUMENTATION\I-102 REV PROPOSED PROCESS AREA.dwg
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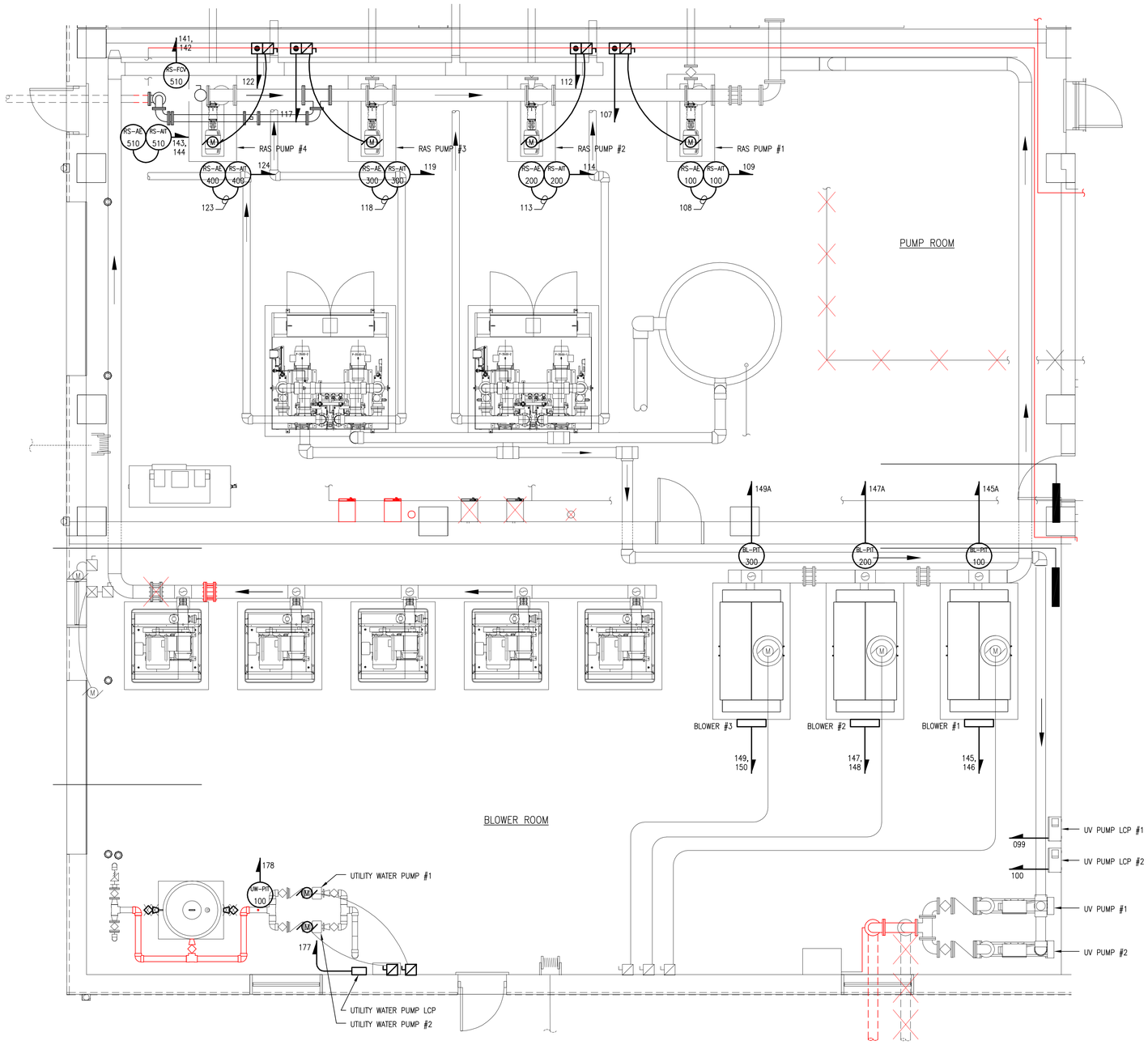
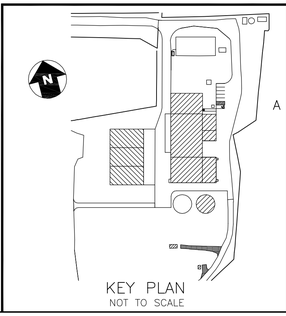


PUMP ROOM AND BLOWER ROOM – INSTRUMENTATION PLAN

SCALE: NOT TO SCALE

RECORD DRAWING SET JANUARY 2015



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LICENSE NO. 20330
EXPIRATION DATE 01/29/2012.

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PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PUMP ROOM AND BLOWER ROOM POWER PLAN

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: SEPTEMBER 2012
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

I-103

SHEET 115 OF 128

File: Q:\SMD\07065_MysticHarbor\WWTP\Inst\Inst\Inst_EFLV-CADD\AS-BUILTS\INSTRUMENTATION\I-103 NEW PUMP AND BLOWER ROOM-POWER.dwg
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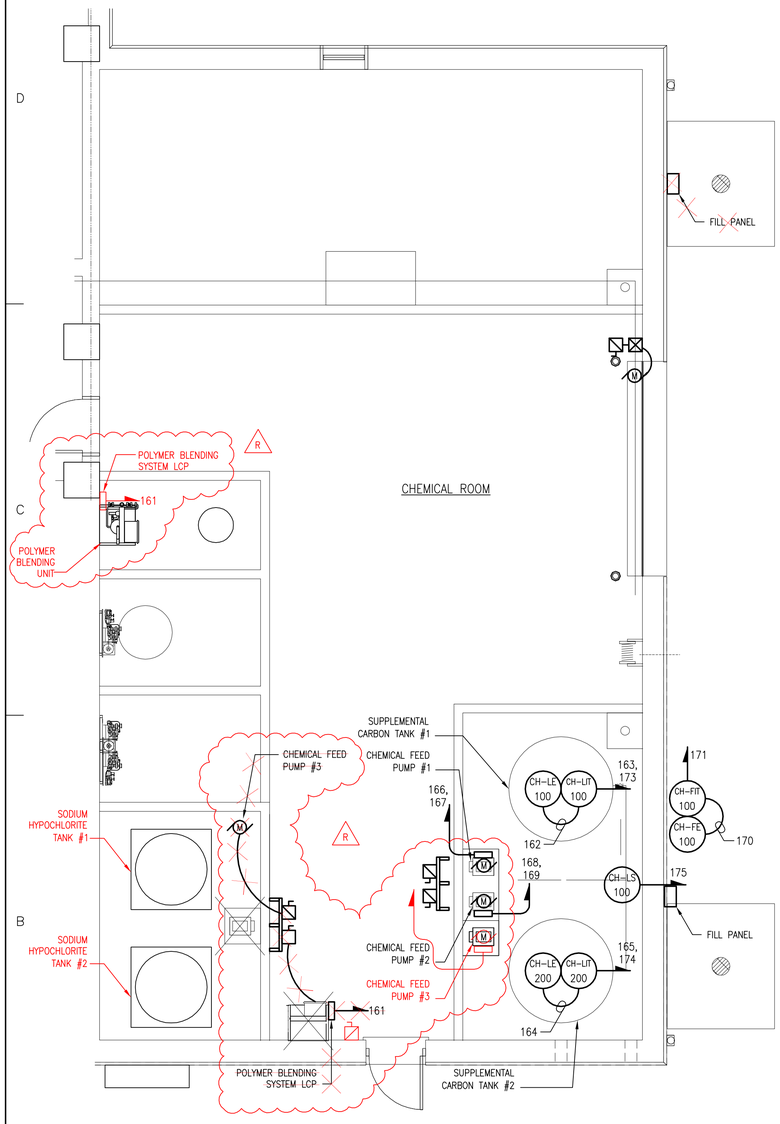
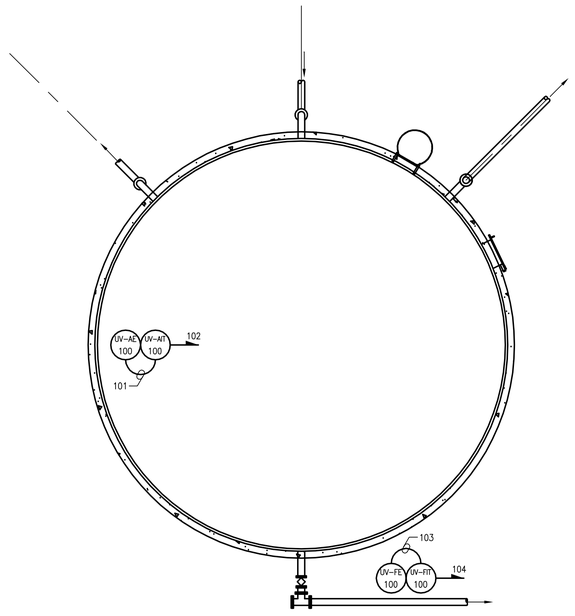
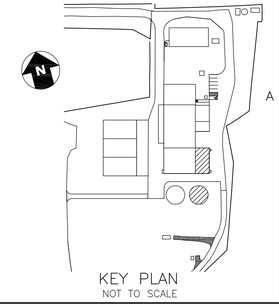


CHEMICAL ROOM – INSTUMENTATION PLAN
SCALE: NOT TO SCALE



PLAN – EFFLUENT STORAGE TANK – ELEV. 9.58
SCALE: NOT TO SCALE


KEY PLAN
NOT TO SCALE

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

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EXPIRATION DATE 01/29/2012.

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PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
CHEMICAL ROOM AND EFFLUENT TANK I&C PLAN

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

I-104

SHEET 116 OF 128

File: Q:\Job\07062_Mystic\cad\MFP\Print\Civil_I_P1(4-0400)\AS-BUILTS\INSTRUMENTATION\I-104 CHEM ROOM.dwg
Jan 16, 2015 - 4:09:31pm

TYPICAL OF 2 SCREENS/COMPACTORS: 1(100,110), 2(200,210)

I/O TAG

PROCESS CONTROLLER

ELECTRICAL ROOM

PROCESS

SCO0S100 SCMF100 SCMA100 SCMN100 SCMF110 SCMA110 SCMN110 SS R

SCREEN NO. 1 OUT OF SERVICE
SCREEN NO. 1 FAIL
SCREEN NO. 1 IN AUTO
SCREEN NO. 1 RUNNING
COMPACTOR NO. 1 FAIL
COMPACTOR NO. 1 IN AUTO
COMPACTOR NO. 1 RUNNING
SCREEN RUN AUTO

EQLHH100 EQ00S100 EQMN100 EQMD100 EQMF100 EQLI100 EQMD110 EQSC110 EQMA110 EQ00S110 EQMN110 EQM0110 EQS110 EQMA210 EQ00S210 EQMN210 EQM0210 EQSC210 EQSI210 EQMD210 EQLI200 EQMN200 EQ00S210 EQMF200 EQMD200 EQLHH200 EQFI100 SCA2100 SCA100 SCA300

EAST TANK FLOOD
EAST MIXER ON
EAST MIXER OUT OF SERVICE
EAST MIXER FAILURE
EAST MIXER START/STOP
EAST TANK LEVEL
EAST PUMP START/STOP
EAST PUMP SPEED CONTROL
EAST PUMP IN AUTO
EAST PUMP OUT OF SERVICE
EAST PUMP RUNNING
EAST PUMP OVERLOAD
EAST PUMP SPEED
WEST PUMP IN AUTO
WEST PUMP OUT OF SERVICE
WEST PUMP RUNNING
WEST PUMP OVERLOAD
WEST PUMP SPEED CONTROL
WEST PUMP SPEED
WEST PUMP START/STOP
WEST TANK LEVEL
WEST MIXER ON
WEST MIXER OUT OF SERVICE
WEST MIXER FAILURE
WEST MIXER START/STOP
WEST TANK FLOOD
PLANT INFLUENT FLOW
HEADWORKS H_2S
HEADWORKS LEL
HEADWORKS O_2

MCC
MCC VFD
PCP
HIGH LEVEL PUMP START (HAND WIRED)
OOS 100
NEMA 7
LOCAL CONTROL STATION
8-INFL-DIP
SCREEN NO. 1
SCREENINGS
SCREEN NO. 2
WASHER COMPACTOR NO. 1
WASHER COMPACTOR NO. 2
FROM INFLUENT PUMP STATION
FLOAT PANEL
OOS 200
FIT 100
CBM
FE 100
TO BIOLOGICAL PROCESS TANKS REFER TO DRAWING I-202
POWER FROM PCP
LHH 100
LIT 100
LH 100
LE 100
LSL1 100
LSL2 100
FAST
ME 100
TE 100
OOS 110
ME 110
LH 200
LIT 200
LE 200
LHH 200
LSL1 200
LSL2 200
WEST
TE 200
ME 200
OOS 210
ME 210
EQUALIZATION TANK

CLASS 1, DIVISION 1 AREA

GENERAL NOTES:

1. CONTRACTOR SHALL REVIEW DOCUMENTS TO IDENTIFY AREAS CLASSIFIED AS CLASS 1, DIVISION 1 AREA. CONTRACTOR SHALL PROVIDE AND INSTALL ALL ELECTRICAL EQUIPMENT TO BE SUITABLE FOR THE CLASSIFIED SPACE PER NFPA 820.

   THE EQUIPMENT AND DEVICES SHOWN ARE LOCATED IN A CLASS 1, DIVISION 1 AREA. REFER TO ELECTRICAL DRAWINGS FOR INSTALLATION REQUIREMENTS.

SHEET KEYNOTES:

1. FINE SCREEN CONTROL PANEL TO BE INSTALLED IN THE ELECTRICAL ROOM.
2. LOCAL CONTROL STATION TO BE MOUNTED LOCALLY TO THE SCREEN. REFER TO SPECIFICATION SECTION 11100 FOR DETAILED REQUIREMENTS.
3. EQUIPMENT CONTROL TO BE INSTALLED WITHIN THE MCC.
4. PROVIDE ALARM RELAY TO COMMUNICATE HAZARDOUS CONDITIONS ALARM TO EXHAUST CONTROL SYSTEM.
5. LOW-LEVEL CUT-OFF
6. VISUAL AND AUDIBLE ALARM TO BE INSTALLED AT ENTRANCE. PROVIDE REMOTE RESET CAPABILITY FROM PLANT NETWORK.

VISUAL/AUDIBLE ALARM
GAS MONITORING PANEL
CABLE BY MANUFACTURER
AIT 100 AIT 200 AIT 300
AE 100 AE 200 AE 300
H_2S LEL O_2

RECORD DRAWING SET
JANUARY 2015

HEADWORKS P&ID
SCALE: NOT TO SCALE

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LICENSE NO. 20330
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72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
HEADWORKS P&ID
INSTRUMENTATION PLAN

MARK	DATE	DESCRIPTION
2	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

I-201

SHEET 117 OF 128

File: G:\JMM\07062_MysticHarbourWWTP\ProcDrwg_LEFT\4-CADD\AS-BUILTS\INSTRUMENTATION\I-201_Fine Screen P&I.dwg
Jan 11, 2013 - 8:46:42am

TYPICAL OF 4 PROCESS TRAINS: 1(100,110,120), 2(200,210,220), 3(300,310,320), 4(400,410,420)

NO. OF TRAINS IN OPERATION
TOTAL INFLUENT FLOW
% INTERNAL RECYCLE

PLC

BPMD100 BPOOS100 BPMN100 BPMF100 — ANOXIC MIXER #1 START/STOP; ANOXIC MIXER #1 RUNNING; ANOXIC MIXER #1 OUT OF SERVICE; ANOXIC MIXER #1 FAIL
BPAI110 — AERATION TANK #1 DO
BPFI110 — AERATION TANK #1 IR FLOW
BPMA110 BPOOS110 BPMD110 BPMN110 BPMF110 BPML110 BPSI10 — PUMP SPEED; VFD IN AUTO; PUMP RUN; PUMP OUT OF SERVICE; PUMP FAIL; PUMP START/STOP; MOTOR LEAK
BPSC110 — SPEED CONTROL
BPMD120 BPOOS120 BPMN120 BPMF120 — POST-ANOXIC MIXER #1 START/STOP; POST-ANOXIC MIXER #1 RUNNING; POST-ANOXIC MIXER #1 OUT OF SERVICE; POST-ANOXIC MIXER #1 FAIL
BPAI120 — EFFLUENT NO3 CONCENTRATION
BPAI200 BPAI100 BPAI300 — HEADWORKS H_2S; HEADWORKS LEL; HEADWORKS O_2
BPFS100 — VENTILATION FAIL

ELECTRICAL ROOM

MCC ① — OOS 100 LOCAL CONTROL STATION — CBM
MCC ② VFD — OOS 110 — ME 110 — PB 110 E-STOP
MCC ① — OOS 120 LOCAL CONTROL STATION — CBM
MCC
MCC ① — R — FS 100 — DUCTWORK — LABORATORY

CLASS 1, DIVISION 1 AREA

PROCESS

FROM EQUALIZATION TANK REFER TO DRAWING I-201
8-INFL-DIP

FROM RAS REFER TO DRAWING I-204

FIT 110 — FI 110 — M

	ANOXIC ZONE	AERATION ZONE	POST ANOXIC ZONE	MBR
1	TE 100, ME 100, M, W	CBM, AIT 110, AE 110 DO	TE 120, ME 120, M, W	MBR (P&ID PROVIDED BY GE, SEE DRAWING 200347-D-004)
2	M, W	CBM, AIT 210, AE 210 DO; ME 210, PB 210 E-STOP	TE 220, ME 220, M, W	MBR (P&ID PROVIDED BY GE)
3	M, W	CBM, AIT 310, AE 310 DO; ME 310, PB 310 E-STOP	TE 320, ME 320, M, W	MBR (P&ID PROVIDED BY GE)
4 (FUTURE)	M, W	CBM, AIT 410, AE 410 DO; ME 410, PB 410 E-STOP	TE 420, ME 420, M, W	MBR (P&ID PROVIDED BY GE)

AT 120, AE 120 NO3

8-PERM-DIP

TO UV DISINFECTION REFER TO DRAWING I-203

VISUAL/AUDIBLE ALARM — GAS MONITORING PANEL — CABLE BY MANUFACTURER

AIT 100, AIT 200, AIT 300 — CABLE BY MANUFACTURER

AE 100 H_2S, AE 200 LEL, AE 300 O_2

SHEET KEYNOTES:

1. SUBMERSIBLE MIXER CONTROL TO BE INSTALLED IN THE MCC, UNLESS SPECIFIED OTHERWISE. REFER TO SPECIFICATION SECTION 11303 FOR DETAILED REQUIREMENTS.
2. SUBMERSIBLE PUMP CONTROL TO BE INSTALLED IN THE MCC. REFER TO SPECIFICATION SECTION 11345 AND 16269 FOR DETAILED REQUIREMENTS.
3. SINGLE PHASE, 120V, UNINTERRUPTED POWER FROM PROCESS CONTROL PANEL LOCATED IN THE ELECTRICAL ROOM.
4. PROVIDE ALARM RELAY TO COMMUNICATE HAZARDOUS CONDITIONS ALARM TO EXHAUST CONTROL SYSTEM.
5. VISUAL AND AUDIBLE ALARM TO BE INSTALLED AT ENTRANCE. PROVIDE REMOTE RESET CAPABILITY FROM PLANT NETWORK.

RECORD DRAWING SET
JANUARY 2015

BIOLOGICAL PROCESS P&ID
SCALE: NOT TO SCALE

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 20330
EXPIRATION DATE 01/29/2012.

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON®
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
BIOLOGICAL PROCESS P&ID
INSTRUMENTATION PLAN

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

I-202

SHEET 118 OF 128

File: Q:\SWO\070662_MysticHarbourWWTPImprovProjCivil_EP\1-CADD\XS-BSLTS\INSTRUMENTATION\I-202_Biological Process P&ID.dwg
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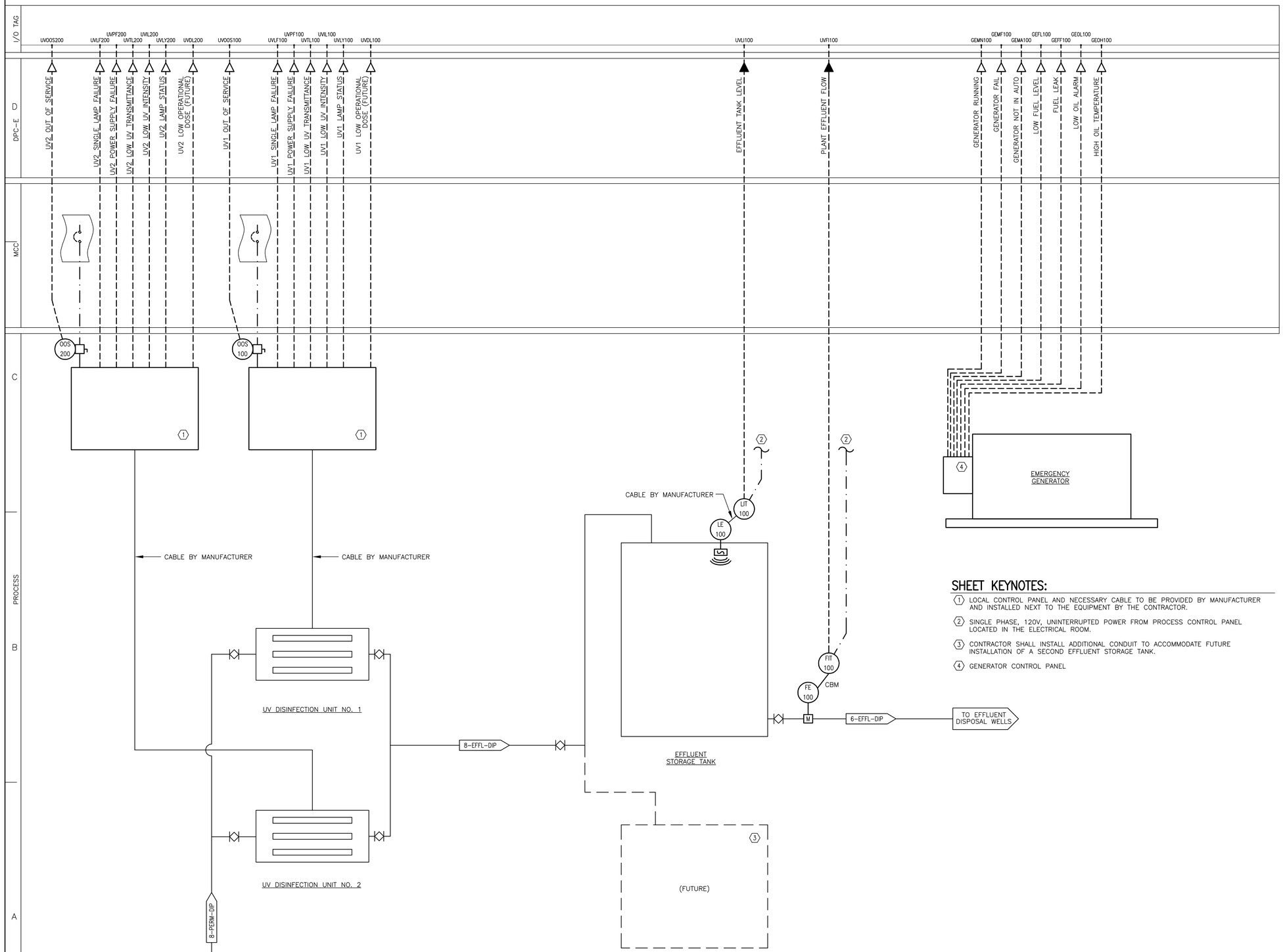

SHEET KEYNOTES:

1. LOCAL CONTROL PANEL AND NECESSARY CABLE TO BE PROVIDED BY MANUFACTURER AND INSTALLED NEXT TO THE EQUIPMENT BY THE CONTRACTOR.
2. SINGLE PHASE, 120V, UNINTERRUPTED POWER FROM PROCESS CONTROL PANEL LOCATED IN THE ELECTRICAL ROOM.
3. CONTRACTOR SHALL INSTALL ADDITIONAL CONDUIT TO ACCOMMODATE FUTURE INSTALLATION OF A SECOND EFFLUENT STORAGE TANK.
4. GENERATOR CONTROL PANEL

UV DISINFECTION P&ID

SCALE: NOT TO SCALE

RECORD DRAWING SET
JANUARY 2015

CONSULTANT
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Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

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LICENSE NO. 20330
EXPIRATION DATE 01/29/2013

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
UV DISINFECTION / EMERGENCY GENERATOR P&ID
INSTRUMENTATION PLAN

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

I-203

SHEET 119 OF 128

File: Q:\SMD\070962_MysticHarbourWWTP\Hmd\Proj\Cad_EP\1-CADD\AS-Built\INSTRUMENTATION\I-203_UV System P&ID.dwg
Jan 12, 2015 - 11:48:33am

RECORD DRAWING SET
JANUARY 2015

TYPICAL OF 4 RAS PUMPS: 1(100), 2(200), 3(300), 4(400)

NO. OF TRAINS IN OPERATION
TOTAL INFLUENT FLOW
% RAS RETURN

TOTAL RAS FLOW

REQUIRED WAS FLOW

TYPICAL OF 4 RAS CONTROL VALVES: 1(110), 2(210), 3(310), 4(410)

NO. OF TRAINS IN OPERATION
TOTAL INFLUENT FLOW
% RAS RETURN

TO ANOXIC ZONE

RSSC100 RSMD100 RSMA100 RSMN100 RSOOS100 RSMF100 RSSI100 RSPI100
RSZC510 RSZI510 RSZD510 RSZB510 RSZA510 RSZF510
RSZC110 RSZF110 RSZI110 RSZD110 RSZB110 RSZA110 RSFI110 RSFI510
RSZC111 RSZF111 RSZI111 RSZD111 RSZB111 RSZA111 RSFI111

SPEED CONTROL
RAS PUMP NO. 1 START/STOP
RAS PUMP NO. 1 IN AUTO
RAS PUMP NO. 1 RUN
RAS PUMP NO. 1 OUT OF SERVICE
RAS PUMP NO. 1 FAIL
RAS PUMP NO. 1 % SPEED
RAS PUMP NO. 1 DISCHARGE PRESSURE
VALVE POSITION CONTROL
WAS VALVE POSITION
WAS VALVE OPENED
WAS VALVE CLOSED
WAS VALVE IN AUTO
WAS VALVE FAILURE
VALVE FAILURE
VALVE POSITION CONTROL
VALVE POSITION
VALVE OPENED
VALVE CLOSED
VALVE IN AUTO
TRAIN #1 RAS FLOW
WAS FLOW
VALVE FAILURE
VALVE POSITION CONTROL
VALVE POSITION
VALVE OPENED
VALVE CLOSED
VALVE IN AUTO
TRAIN #1 RAS FLOW

PLC
ELECTRICAL ROOM
PROCESS

VFD
MCC
OOS 100
MCC
MCC
MCC

PB 100 | OOS 100 | PIT 100 | PE 100 | E-STOP | RETURN SLUDGE PUMP NO. 1
PB 200 | PIT 200 | PE 200 | E-STOP | RETURN SLUDGE PUMP NO. 2
PB 300 | PIT 300 | PE 300 | E-STOP | RETURN SLUDGE PUMP NO. 3
PB 400 | PIT 400 | PE 400 | E-STOP | RETURN SLUDGE PUMP NO. 4 (FUTURE)

MBR #1 (P&ID PROVIDED BY GE, SEE DRAWING 200347-D-004)
MBR #2 (P&ID PROVIDED BY GE)
MBR #3 (P&ID PROVIDED BY GE)
MBR #4 (P&ID PROVIDED BY GE)

12-RAS-DIP
12-RAS-DIP
12"x6" REDUCER
6-WAS-DIP
TO SLUDGE GREENHOUSE

FCV 110 FIT 110 FE 110
FCV 111 FIT 111 FE 111
FCV 210 FIT 210 FE 210
FCV 211 FIT 211 FE 211
FCV 310 FIT 310 FE 310
FCV 311 FIT 311 FE 311
FCV 410 FIT 410 FE 410 (FUTURE)
FCV 411 FIT 411 FE 411 (FUTURE)
FCV 510 FIT 510 FE 510

TO ANOXIC ZONE TRAIN #1 REFER TO DRAWING I-202
TO AERATION ZONE TRAIN #1 REFER TO DRAWING I-202
TO ANOXIC ZONE TRAIN #2 REFER TO DRAWING I-202
TO AERATION ZONE TRAIN #2 REFER TO DRAWING I-202
TO ANOXIC ZONE TRAIN #3 REFER TO DRAWING I-202
TO AERATION ZONE TRAIN #3 REFER TO DRAWING I-202
TO ANOXIC ZONE TRAIN #4 REFER TO DRAWING I-202
TO AERATION ZONE TRAIN #4 REFER TO DRAWING I-202

RETURN SLUDGE P&ID
SCALE: NOT TO SCALE

SHEET KEYNOTES:

1. RAS PUMP VFD TO BE INSTALLED IN THE MCC.
2. SINGLE PHASE, 120V, UNINTERRUPTED POWER FROM PROCESS CONTROL PANEL LOCATED IN THE ELECTRICAL ROOM.

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LICENSE NO. 20330
EXPIRATION DATE 01/25/2013.

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

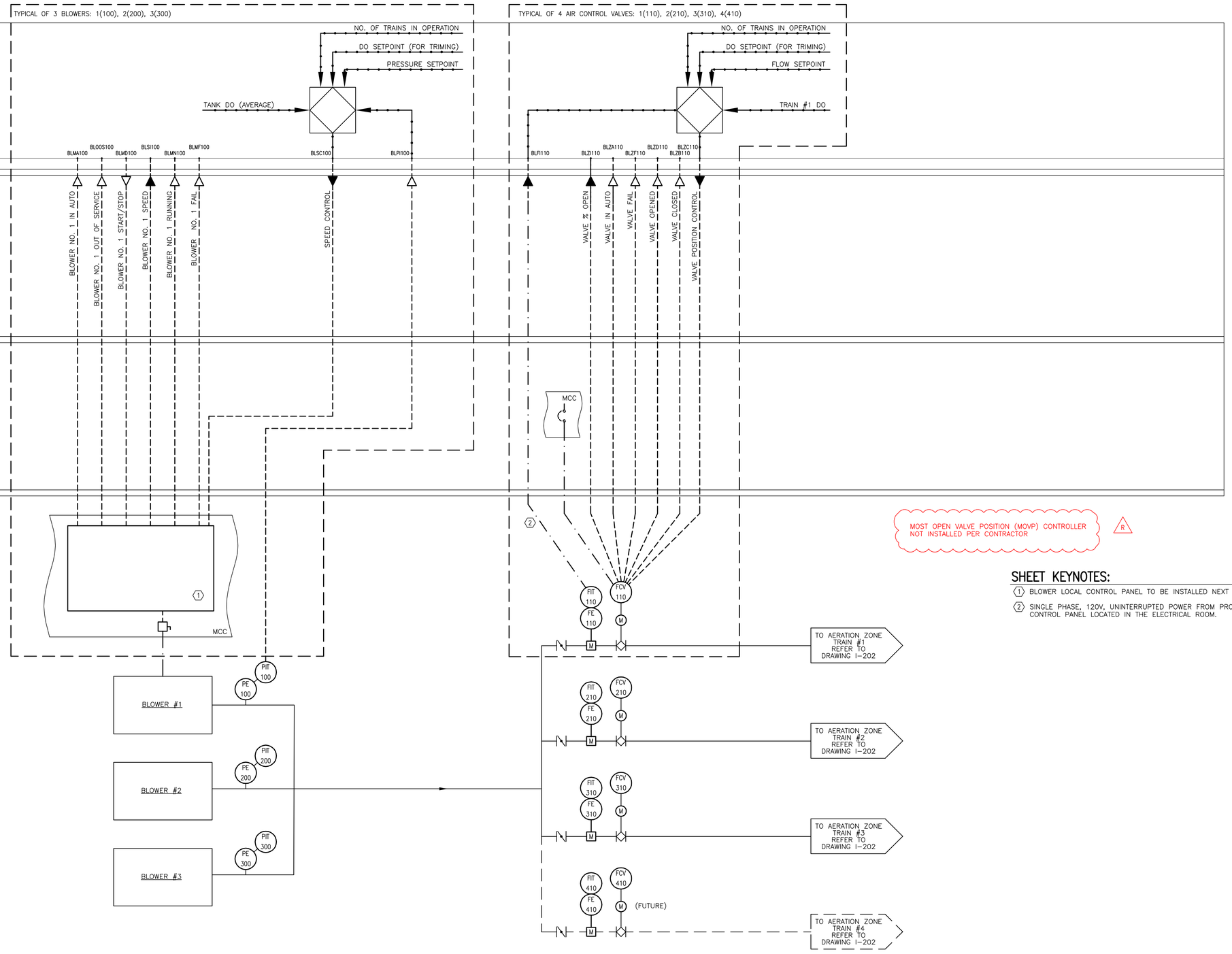
SHEET TITLE
RETURN SLUDGE P&ID
INSTRUMENTATION PLAN

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	MAR. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
4	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: SEPTEMBER 2012
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

I-204

SHEET 120 OF 128



SHEET KEYNOTES:

1. BLOWER LOCAL CONTROL PANEL TO BE INSTALLED NEXT TO BLOWER.
2. SINGLE PHASE, 120V, UNINTERRUPTED POWER FROM PROCESS CONTROL PANEL LOCATED IN THE ELECTRICAL ROOM.

PROCESS AIR P&ID

SCALE: NOT TO SCALE

RECORD DRAWING SET
JANUARY 2015

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

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LICENSE NO. 20330
EXPIRATION DATE 01/29/2013.

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS AIR P&ID
INSTRUMENTATION PLAN

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

I-205

SHEET 121 OF 128

File: Q:\1MW\07WSZ_MysticHarbor\WWTP\wwProcEval_EFLV-CADD\AS-BUILTS\INSTRUMENTATION\I-205_PROCESS AIR P&ID.dwg
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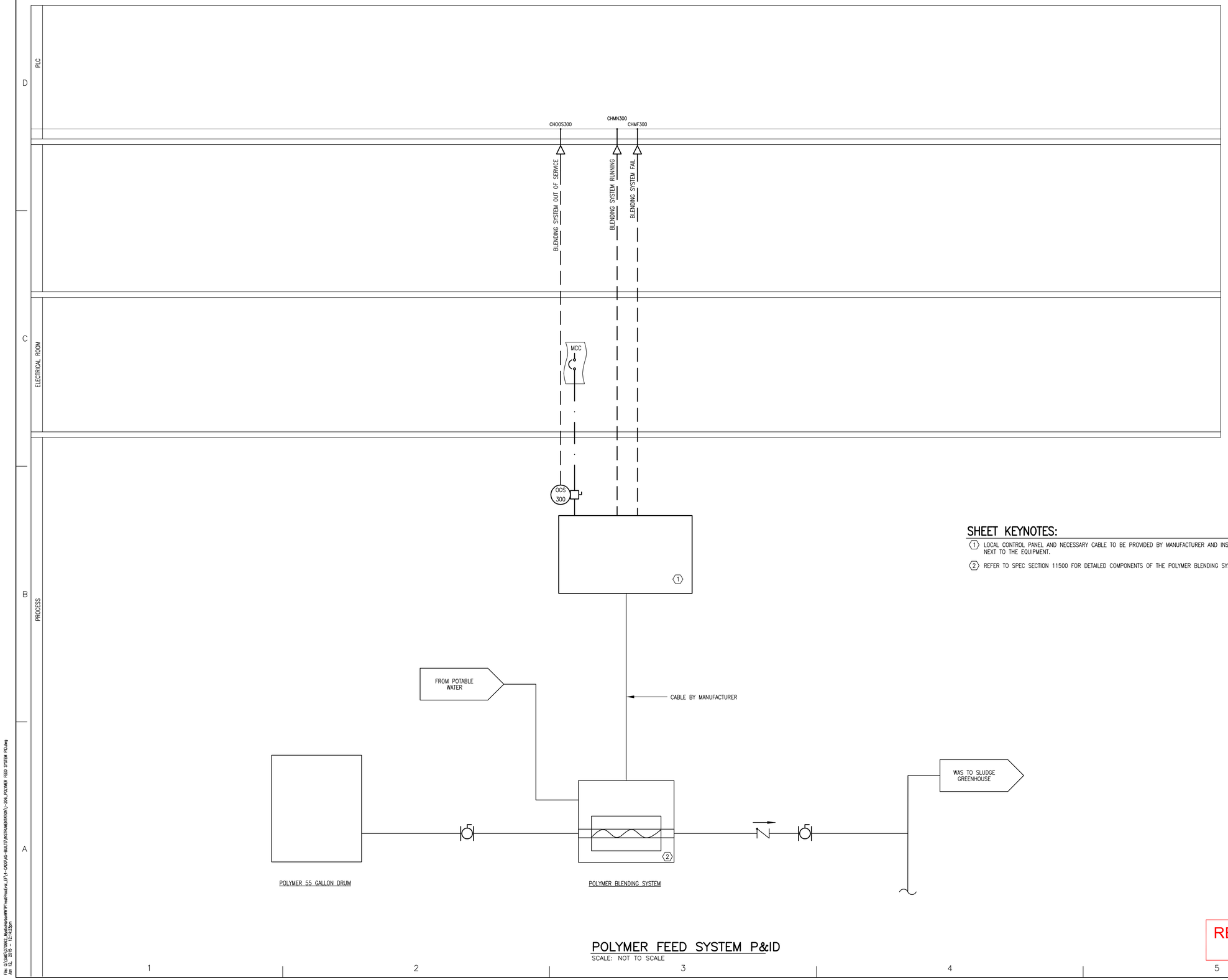

SHEET KEYNOTES:

1. LOCAL CONTROL PANEL AND NECESSARY CABLE TO BE PROVIDED BY MANUFACTURER AND INSTALLED LOCALLY NEXT TO THE EQUIPMENT.
2. REFER TO SPEC SECTION 11500 FOR DETAILED COMPONENTS OF THE POLYMER BLENDING SYSTEM.

POLYMER FEED SYSTEM P&ID

SCALE: NOT TO SCALE

RECORD DRAWING SET
JANUARY 2015

File: Q:\SWD\070662_MysticHarbour\WWTP\Instr\Prod\vol_I\I-1-CADD\AS-BUILTS\INSTRUMENTATION\I-206_POLYMER FEED SYSTEM P&ID.dwg
Jan 12, 2015 - 12:42:53pm

PROFESSIONAL CERTIFICATION.
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LICENSE NO. 20330
EXPIRATION DATE 01/29/2013.

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Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

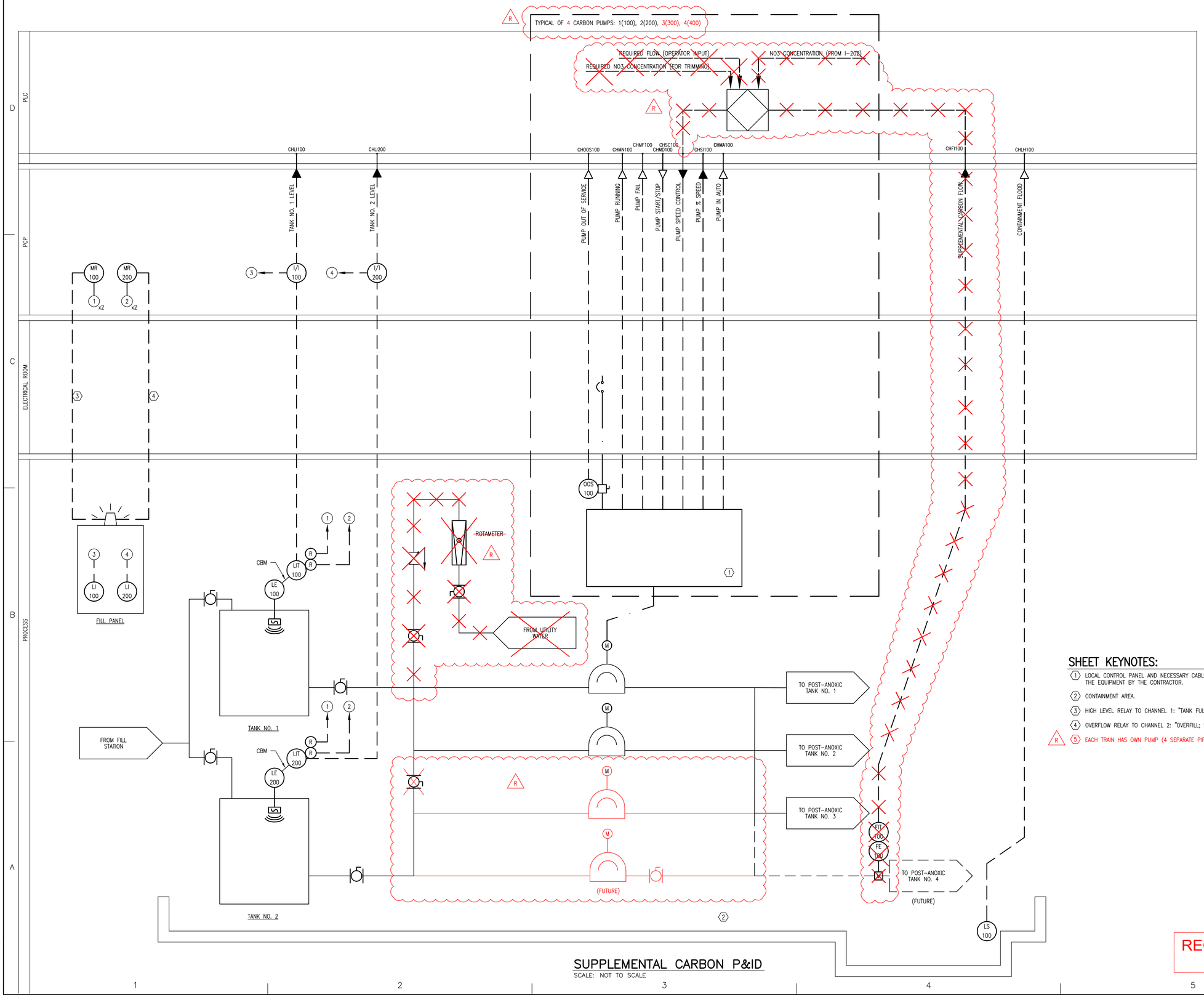
PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
POLYMER FEED SYSTEM P&ID
INSTRUMENTATION PLAN

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

I-206



SUPPLEMENTAL CARBON P&ID

SCALE: NOT TO SCALE

SHEET KEYNOTES:

1. LOCAL CONTROL PANEL AND NECESSARY CABLE TO BE PROVIDED BY MANUFACTURER AND INSTALLED NEXT TO THE EQUIPMENT BY THE CONTRACTOR.
2. CONTAINMENT AREA.
3. HIGH LEVEL RELAY TO CHANNEL 1: "TANK FULL; STOP FILLING"
4. OVERFLOW RELAY TO CHANNEL 2: "OVERFILL; STOP FILLING"
5. (R) EACH TRAIN HAS OWN PUMP (4 SEPARATE PIPES)

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

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LICENSE NO. 20330
EXPIRATION DATE 01/29/2012

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Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
SUPPLEMENTAL CARBON FEED SYSTEM P&ID
INSTRUMENTATION PLAN

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	MAR. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
4	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: SEPTEMBER 2012
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

I-207

SHEET 123 OF 128

File: Q:\SMO\07WK2_MysticHarbourWWTP\Hmp\Proj\Civil_EP\1-CADD\XS-BUILT\INSTRUMENTATION\I-207_SUPPLEMENTAL CARBON FEED SYSTEM P&ID.dwg
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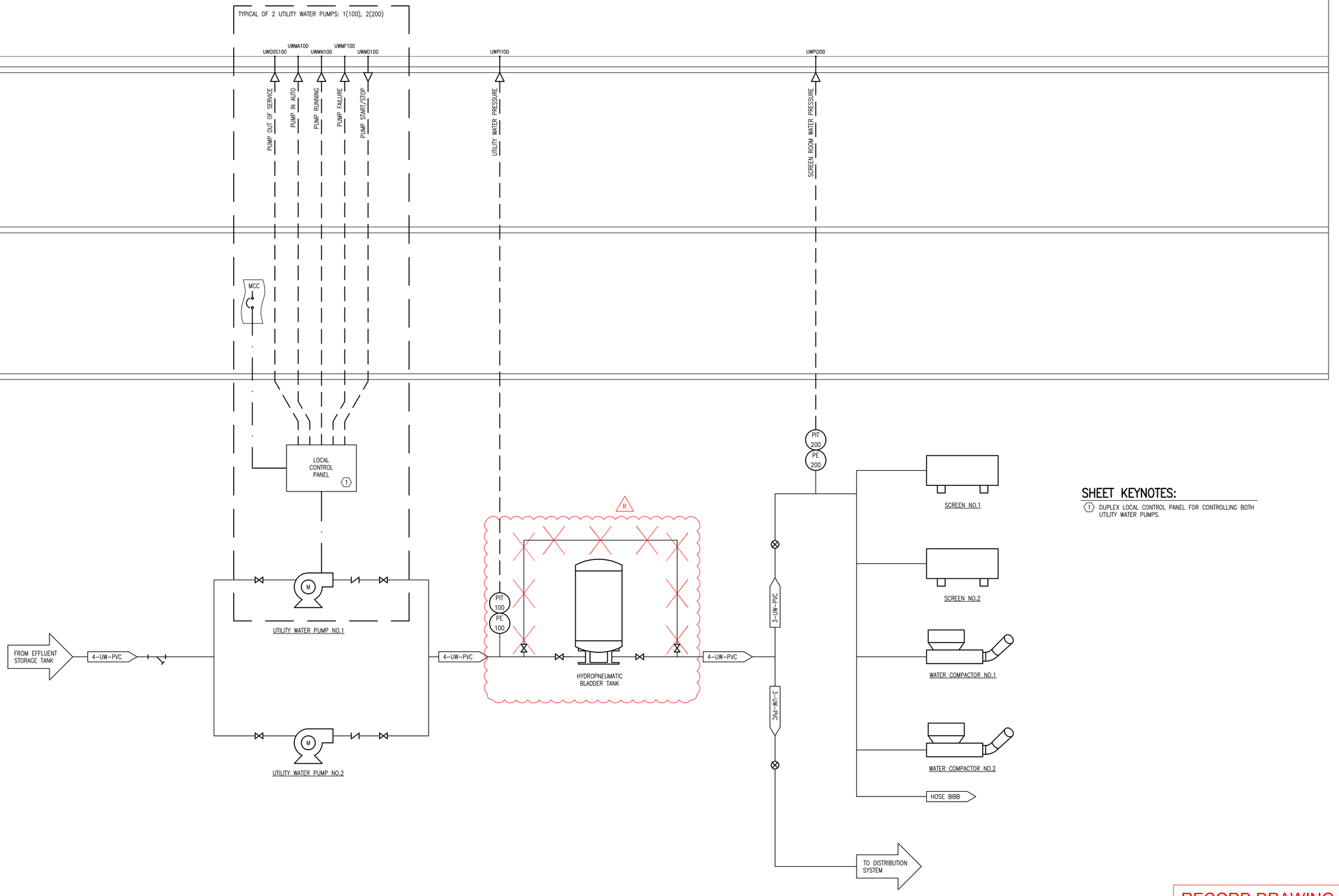

SHEET KEYNOTES:

1. DUPLEX LOCAL CONTROL PANEL FOR CONTROLLING BOTH UTILITY WATER PUMPS.

UTILITY WATER SYSTEM P&ID

SCALE: NOT TO SCALE

RECORD DRAWING SET
JANUARY 2015

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROFESSIONAL CERTIFICATION.
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LICENSE NO. 20330
EXPIRATION DATE 01/29/2012.

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
UTILITY WATER SYSTEM P&ID
INSTRUMENTATION PLAN

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

I-208

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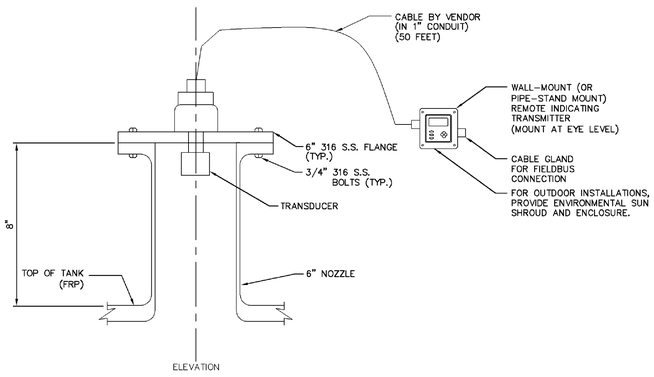
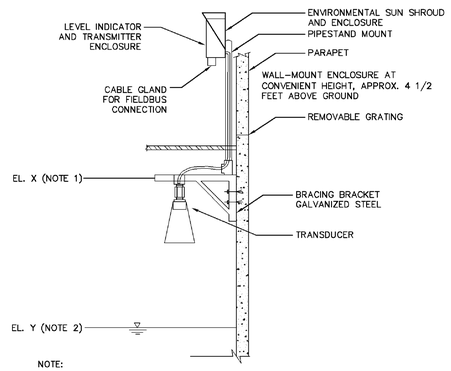


ULTRASONIC LEVEL TRANSDUCER (FRP TANK FLANGE MOUNTED)

SCALE: NOT TO SCALE

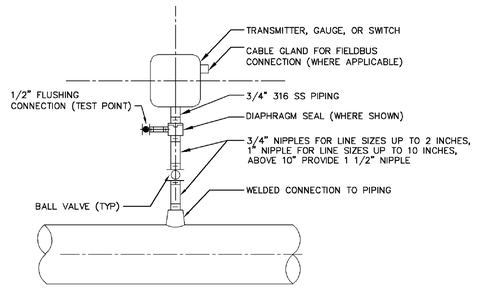


NOTE:

1. FINAL ELEVATION X SHALL BE DETERMINED BASED ON MANUFACTURER RECOMMENDATIONS.
2. ELEVATION Y IS GIVEN BY NOMINAL WATER LEVEL AS SHOWN ON CONTRACT DRAWINGS.

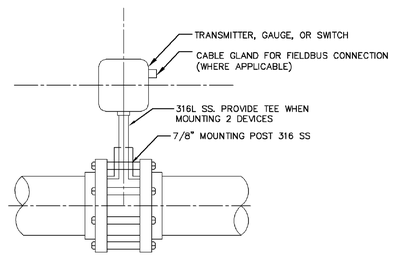
ULTRASONIC LEVEL TRANSDUCER

SCALE: NOT TO SCALE



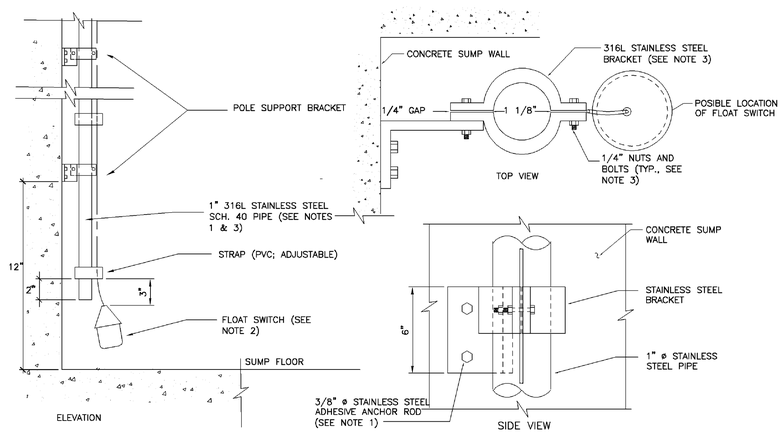
PRESSURE DEVICE (WITH DIAPHRAGM SEAL MOUNTING)

SCALE: NOT TO SCALE



PRESSURE DEVICE WITH (WITH ISOLATOR RING MOUNTING)

SCALE: NOT TO SCALE



SUMP FLOAT MOUNTING

SCALE: NOT TO SCALE

NOTES:

1. POLES SHALL BE MOUNTED 3 INCHES FROM A CORNER OF THEIR RESPECTIVE SUMPS.
2. THE FLOATS SHALL INITIALLY BE MOUNTED 2 INCHES FROM THE FLOORS OF THEIR RESPECTIVE SUMPS.
3. ALL BRACKETS, NUTS, BOLTS, ANCHOR RODS AND POLES SHALL MATCH PROCESS FLUID SECTION 17310.

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION.
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LICENSE NO. 20330
EXPIRATION DATE 01/29/2012.

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
DETAILS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

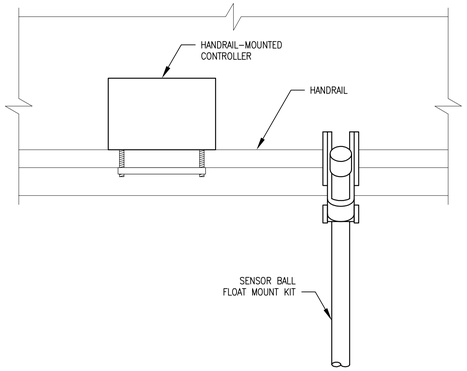
I-401

SHEET 125 OF 128

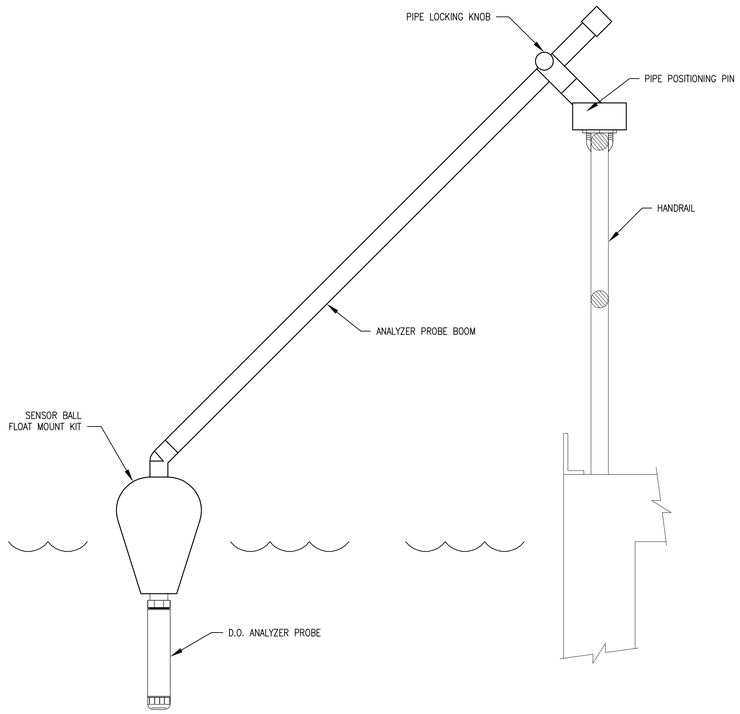
File: Q:\SHDS\070663_WorcesterMWTP\Tech\Proc\Fed_EFLV1-CADD\AS-BUILTS\INSTRUMENTATION\I-401_Details.dwg
Jan 12, 2015 - 12:19:08pm

NOTES:

1. POLE MOUNTING KIT TO BE PROVIDED BY MANUFACTURER.
2. COORDINATE FIELD LOCATION WITH OWNER.



PLAN



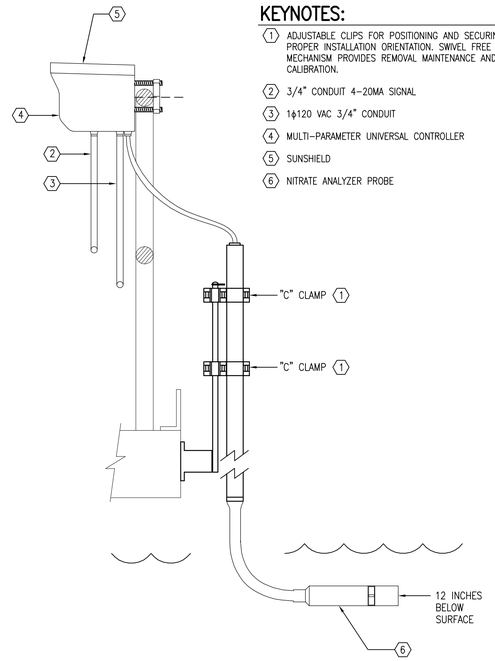
SECTION

DISSOLVED OXYGEN ANALYZER PROBE – DETAIL

SCALE: NOT TO SCALE

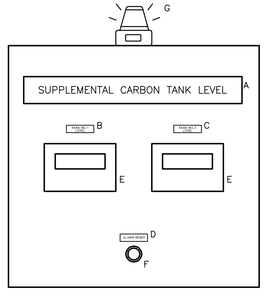
KEYNOTES:

1. ADJUSTABLE CLIPS FOR POSITIONING AND SECURING PROPER INSTALLATION ORIENTATION. SWIVEL FREE MECHANISM PROVIDES REMOVAL MAINTENANCE AND CALIBRATION.
2. 3/4" CONDUIT 4-20MA SIGNAL
3. 1ϕ120 VAC 3/4" CONDUIT
4. MULTI-PARAMETER UNIVERSAL CONTROLLER
5. SUNSHIELD
6. NITRATE ANALYZER PROBE



NITRATE ANALYZER PROBE – DETAIL

SCALE: NOT TO SCALE



ITEM	DESCRIPTION	TEXT SIZE
A	"SUPPLEMENTAL CARBON TANK LEVEL" LABEL	1/2"
B	"TANK NO. 1 LEVEL" LABEL	1/4"
C	"TANK NO. 2 LEVEL" LABEL	1/4"
D	"ALARM RESET" LABEL	1/4"
E	TANK LEVEL INDICATOR	1/4"
F	ALARM RESET PUSH BUTTON	1/4"
G	VOICE/STROBE ALARM	1/4"

NOTES:

1. THE CONTRACTOR SHALL DEVELOP SUBMIT PANEL LAYOUT FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.
2. THE FILL PANEL SHALL BE INSTALLED WITH ITS BASE A MINIMUM 3'-0" FROM THE GROUND ELEVATION.

CHEMICAL FILL PANEL – DETAIL

SCALE: NOT TO SCALE

RECORD DRAWING SET
JANUARY 2015

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
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PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
DETAILS

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

I-402

SHEET 126 OF 128

File: G:\CAD\CIVIL_Worksheets\WWTP\ReadFiles\Ext_STV1-CADD\AS-BUILTS\NITRIFICATION\I-402_Details.dwg
Jan 12, 2015 - 12:23:09pm

RUN NO.	FROM	TO	DESCRIPTION	WIRE NO. /SIZE	TYPE	CONDUIT /RACEWAY	SIGNAL TYPE	REMARKS
001	~~SCP MCC~~	PCP	SCRN NO. 1 OUT OF SERVICE	2-#14	THWN	1"	DI	SCOOS100
-	~~SCP MCC~~	PCP	SCRN NO. 1 IN AUTO	2-#14	THWN	-	DI	SCMA100
-	~~SCP MCC~~	PCP	SCRN NO. 1 RUNNING	2-#14	THWN	-	DI	SCMN100
-	~~SCP MCC~~	PCP	SCRN NO. 1 FAIL	2-#14	THWN	-	DI	SCMF100
-	~~SCP MCC~~	PCP	COMPACTOR NO. 1 IN AUTO	2-#14	THWN	-	DI	SCMA110
-	~~SCP MCC~~	PCP	COMPACTOR NO. 1 RUNNING	2-#14	THWN	-	DI	SCMN110
-	~~SCP MCC~~	PCP	COMPACTOR NO. 1 FAIL	2-#14	THWN	-	DI	SCMF110
002	~~SCP MCC~~	PCP	SCRN NO. 2 OUT OF SERVICE	2-#14	THWN	1"	DI	SCOOS200
-	~~SCP MCC~~	PCP	SCRN NO. 2 IN AUTO	2-#14	THWN	-	DI	SCMA200
-	~~SCP MCC~~	PCP	SCRN NO. 2 RUNNING	2-#14	THWN	-	DI	SCMN200
-	~~SCP MCC~~	PCP	SCRN NO. 2 FAIL	2-#14	THWN	-	DI	SCMF200
-	~~SCP MCC~~	PCP	COMPACTOR NO. 2 IN AUTO	2-#14	THWN	-	DI	SCMA210
-	~~SCP MCC~~	PCP	COMPACTOR NO. 2 RUNNING	2-#14	THWN	-	DI	SCMN210
-	~~SCP MCC~~	PCP	COMPACTOR NO. 2 FAIL	2-#14	THWN	-	DI	SCMF210
003	LCP	PCP	HEADWORKS H2S LEVEL	2#16	TSP	3/4"	AI	SCAI100
-	LCP	PCP	HEADWORKS LEL LEVEL	2#16	TSP	-	AI	SCAI200
-	LCP	PCP	HEADWORKS O2 LEVEL	2#16	TSP	-	AI	SCAI300
004	SC-AE100	LCP	HEADWORKS H2S LEVEL	NOTE 1	NOTE 1	3/4"	AI	
005	SC-AE200	LCP	HEADWORKS LEL LEVEL	NOTE 1	NOTE 1	3/4"	AI	
006	SC-AE300	LCP	HEADWORKS O2 LEVEL	NOTE 1	NOTE 1	3/4"	AI	
007	LCP	BEACON	HEADWORKS ALARM	2-#14	THWN	3/4"	DI	HAZARDOUS GAS ALARM
008	MCC	PCP	EAST MIXER ON	2-#14	THWN	3/4"	DI	EQMN100
-	MCC	PCP	EAST MIXER OUT OF SERVICE	2-#14	THWN	-	DI	EQOOS100
-	MCC	PCP	EAST MIXER FAIL	2-#14	THWN	-	DI	EQMF100
-	PCP	MCC	EAST MIXER START/STOP	2-#14	THWN	-	DO	EQMD100
009	MIXER	LCP	EAST MIXER MOTOR MONITORING	NOTE 1	NOTE 1	3/4"	DI	TEMPERATURE AND MOISTURE LEAK SENSORS
010	LCP	MCC	EAST MIXER ~~ON~~ HAND	2-#14	THWN	3/4"	DI	
-	LCP	MCC	EAST MIXER ~~OUT OF SERVICE~~ OFF	2-#14	THWN	-	DI	
-	LCP	MCC	EAST MIXER ~~FAIL~~ AUTO	2-#14	THWN	-	DI	
-	MCC	LCP	EAST MIXER START/STOP	2-#14	THWN	-	DO	
011	FLOAT-JB	PCP	EAST TANK FLOOD	2-#14	THWN	3/4"	DI	EQLHH100
012	FLOAT-JB	LCP	MIXER LOW LEVEL CUT-OFF	2-#14	THWN	3/4"	DI	HARDWIRED CUT-OFF TO MIXER LOCAL CONTROL PANEL
013	FLOAT-JB	MCC	EAST PUMP LOW LEVEL CUT-OFF	2-#14	THWN	3/4"	DI	HARDWIRED CUT-OFF TO MCC
014	EQ-LI100	EQ-LIT100	EAST TANK LEVEL	NOTE 1	NOTE 1	3/4"	AI	
015	EQ-LIT100	PCP	EAST TANK LEVEL	2-#16	TSP	3/4"	AI	EQLI100
016	MOTOR	MCC	EQ PUMP NO. 1 MOTOR MOISTURE LEAK	NOTE 1	NOTE 1	3/4"	DI	MOISTURE LEAK SENSORS
017	MCC	PCP	EAST PUMP IN AUTO	2-#14	THWN	1"	DI	EQMA110
-	MCC	PCP	EAST PUMP OUT OF SERVICE	2-#14	THWN	-	DI	EQOOS110
-	MCC	PCP	EAST PUMP RUNNING	2-#14	THWN	-	DI	EQMN110
-	MCC	PCP	EAST PUMP OVERLOAD	2-#14	THWN	-	DI	EQMO110
-	PCP	MCC	EAST PUMP START/STOP	2-#14	THWN	-	DO	EQMD110
018	VFD	PCP	EAST PUMP SPEED	2#16	TSP	3/4"	AI	EQSI110
-	PCP	VFD	EAST PUMP SPEED CONTROL	2#16	TSP	-	AO	EQSC110
019	EQ-PB110	MCC	EAST PUMP EMERGENCY PUSH BUTTON	2-#14	THWN	3/4"	DI	EAST PUMP E-STOP
020	MCC	PCP	WEST MIXER ON	2-#14	THWN	3/4"	DI	EQMN200
-	MCC	PCP	WEST MIXER OUT OF SERVICE	2-#14	THWN	-	DI	EQOOS200
-	MCC	PCP	WEST MIXER FAIL	2-#14	THWN	-	DI	EQMF200
-	PCP	MCC	WEST MIXER START/STOP	2-#14	THWN	-	DO	EQMD200
021	MIXER	LCP	WEST MIXER MOTOR MONITORING	NOTE 1	NOTE 1	3/4"	DI	TEMPERATURE AND MOISTURE LEAK SENSORS
022	LCP	MCC	WEST MIXER ~~ON~~ HAND	2-#14	THWN	3/4"	DI	
-	LCP	MCC	WEST MIXER ~~OUT OF SERVICE~~ OFF	2-#14	THWN	-	DI	
-	LCP	MCC	WEST MIXER ~~FAIL~~ AUTO	2-#14	THWN	-	DI	
-	MCC	LCP	WEST MIXER START/STOP	2-#14	THWN	-	DO	
023	FLOAT-JB	PCP	WEST TANK FLOOD	2-#14	THWN	3/4"	DI	EQLHH200
024	FLOAT-JB	LCP	MIXER LOW LEVEL CUT-OFF	2-#14	THWN	3/4"	DI	
025	FLOAT-JB	MCC	WEST PUMP LOW LEVEL CUT-OFF	2-#14	THWN	3/4"	DI	
026	EQ-LI200	EQ-LIT200	WEST TANK LEVEL	NOTE 1	NOTE 1	3/4"	AI	
027	EQ-LIT200	PCP	WEST TANK LEVEL	2-#16	TSP	3/4"	AI	EQLI200
028	MOTOR	MCC	EQ PUMP NO. 2 MOTOR MOISTURE LEAK	NOTE 1	NOTE 1	3/4"	DI	MOISTURE LEAK SENSORS
029	MCC	PCP	WEST PUMP IN AUTO	2-#14	THWN	1"	DI	EQMA210
-	MCC	PCP	WEST PUMP OUT OF SERVICE	2-#14	THWN	-	DI	EQOOS210
-	MCC	PCP	WEST PUMP RUNNING	2-#14	THWN	-	DI	EQMN210
-	MCC	PCP	WEST PUMP OVERLOAD	2-#14	THWN	-	DI	EQMO210
-	PCP	MCC	WEST PUMP START/STOP	2-#14	THWN	-	DO	EQMD210
030	VFD	PCP	WEST PUMP SPEED	2#16	TSP	3/4"	AI	EQSI210
-	PCP	VFD	WEST PUMP SPEED CONTROL	2#16	TSP	-	AO	EQSC210
031	EQ-PB210	MCC	WEST PUMP EMERGENCY PUSH BUTTON	2-#14	THWN	3/4"	DI	WEST PUMP E-STOP
032	EQ-FI100	EQ-FIT100	PLANT INFLUENT FLOW	NOTE 1	NOTE 1	3/4"	AI	
033	EQ-FIT100	PCP	PLANT INFLUENT FLOW	2#16	TSP	3/4"	AI	EQFI100
034	MCC	PCP	ANOXIC MIXER NO. 1 RUNNING	2-#14	THWN	3/4"	DI	BPMN100
-	MCC	PCP	ANOXIC MIXER NO. 1 OUT OF SERVICE	2-#14	THWN	-	DI	BPOOS100
-	MCC	PCP	ANOXIC MIXER NO. 1 FAIL	2-#14	THWN	-	DI	BPMF100
-	PCP	MCC	ANOXIC MIXER NO. 1 START/STOP	2-#14	THWN	-	DO	BPMD100
035	MIXER	LCP	ANOXIC MIXER TEMP AND MOISTURE	NOTE 1	NOTE 1	3/4"	DI	TEMPERATURE AND MOISTURE LEAK SENSORS
036	LCP	MCC	ANOXIC MIXER NO. 1 ~~RUNNING~~ HAND	2-#14	THWN	3/4"	DI	
-	LCP	MCC	ANOXIC MIXER NO. 1 ~~OUT OF SERVICE~~ OFF	2-#14	THWN	-	DI	
-	LCP	MCC	ANOXIC MIXER NO. 1 ~~FAIL~~ AUTO	2-#14	THWN	-	DI	
-	MCC	LCP	ANOXIC MIXER NO. 1 START/STOP	2-#14	THWN	-	DO	
037	BP-AE110	BP-AIT110	AERATION TANK NO. 1 DO	NOTE 1	NOTE 1	3/4"	AI	
038	BP-AIT110	PCP	AERATION TANK NO. 1 DO	2#16	TSP	3/4"	AI	BPAI110
039	MCC	PCP	TANK NO. 1 IR PUMP VFD IN AUTO	2-#14	THWN	1"	DI	BPMA110
-	MCC	PCP	TANK NO. 1 IR PUMP RUNNING	2-#14	THWN	-	DI	BPMN110
-	MCC	PCP	TANK NO. 1 IR PUMP ~~AVAILABLE~~ OUT OF SERVICE	2-#14	THWN	-	DI	BPOOS110
-	MCC	PCP	TANK NO. 1 IR PUMP FAIL	2-#14	THWN	-	DI	BPMF110
-	PCP	MCC	TANK NO. 1 IR PUMP START/STOP	2-#14	THWN	-	DO	BPMD110
040	MCC	PCP	TANK NO. 1 IR PUMP SPEED	2#16	TSP	3/4"	AI	BPSI110
-	PCP	MCC	TANK NO. 1 IR PUMP SPEED CONTROL	2#16	TSP	-	AO	BPSC110
041	BP-PB110	MCC	TANK NO. 1 IR PUMP EMERGENCY PUSH BUTTON	2-#14	THWN	3/4"	DI	
042	BP-FI110	BP-FIT110	TANK NO. 1 IR PUMP FLOW	NOTE 1	NOTE 1	3/4"	AI	
043	BP-FIT110	PCP	TANK NO. 1 IR PUMP FLOW	2#16	TSP	3/4"	AI	BPFI110
044	MOISTURE	MCC	TANK NO. 1 IR PUMP MOISTURE SENSOR	NOTE 1	NOTE 1	3/4"	DI	BPML 110
045	MCC	PCP	POST ANOXIC MIXER NO. 1 RUNNING	2-#14	THWN	3/4"	DI	BPMN120
-	MCC	PCP	POST ANOXIC MIXER NO. 1 OUT OF SERVICE	2-#14	THWN	-	DI	BPOOS120
-	MCC	PCP	POST ANOXIC MIXER NO. 1 FAIL	2-#14	THWN	-	DI	BPMF120
-	PCP	MCC	POST ANOXIC MIXER NO. 1 START/STOP	2-#14	THWN	-	DO	BPMD120
046	MIXER	LCP	POST ANOXIC MIXER NO. 1 TEMP AND MOISTURE	NOTE 1	NOTE 1	3/4"	DI	
047	LCP	MCC	POST ANOXIC MIXER NO. 1 ~~RUNNING~~ HAND	2-#14	THWN	3/4"	DI	
-	LCP	MCC	POST ANOXIC MIXER NO. 1 ~~OUT OF SERVICE~~ OFF	2-#14	THWN	-	DI	
-	LCP	MCC	POST ANOXIC MIXER NO. 1 ~~FAIL~~ AUTO	2-#14	THWN	-	DI	
-	MCC	LCP	POST ANOXIC MIXER NO. 1 START/STOP	2-#14	THWN	-	DO	
048	MCC	PCP	ANOXIC MIXER NO. 2 RUNNING	2-#14	THWN	3/4"	DI	BPMN200
-	MCC	PCP	ANOXIC MIXER NO. 2 OUT OF SERVICE	2-#14	THWN	-	DI	BPOOS200
-	MCC	PCP	ANOXIC MIXER NO. 2 FAIL	2-#14	THWN	-	DI	BPMF200

RUN NO.	FROM	TO	DESCRIPTION	WIRE NO. /SIZE	TYPE	CONDUIT /RACEWAY	SIGNAL TYPE	REMARKS
-	PCP	MCC	ANOXIC MIXER NO. 2 START/STOP	2-#14	THWN	-	DO	BPMD200
049	MIXER	LCP	ANOXIC MIXER NO. 2 TEMP AND MOISTURE	NOTE 1	NOTE 1	3/4"	DI	TEMPERATURE AND MOISTURE LEAK SENSORS
050	LCP	MCC	ANOXIC MIXER NO. 2 ~~RUNNING~~ HAND	2-#14	THWN	3/4"	DI	
-	LCP	MCC	ANOXIC MIXER NO. 2 ~~OUT OF SERVICE~~ OFF	2-#14	THWN	-	DI	
-	LCP	MCC	ANOXIC MIXER NO. 2 ~~FAIL~~ AUTO	2-#14	THWN	-	DI	
-	MCC	LCP	ANOXIC MIXER NO. 2 START/STOP	2-#14	THWN	-	DO	
051	BP-AE210	BP-AIT210	AERATION TANK NO. 2 DO	NOTE 1	NOTE 1	3/4"	AI	
052	BP-AIT210	PCP	AERATION TANK NO. 2 DO	2#16	TSP	3/4"	AI	BPAI210
053	MCC	PCP	TANK NO. 2 IR PUMP VFD IN AUTO	2-#14	THWN	1"	DI	BPMA210
-	MCC	PCP	TANK NO. 2 IR PUMP RUNNING	2-#14	THWN	-	DI	BPMN210
-	MCC	PCP	TANK NO. 2 IR PUMP ~~AVAILABLE~~ OUT OF SERVICE	2-#14	THWN	-	DI	BPOOS210
-	MCC	PCP	TANK NO. 2 IR PUMP FAIL	2-#14	THWN	-	DI	BPMF210
-	PCP	MCC	TANK NO. 2 IR PUMP START/STOP	2-#14	THWN	-	DO	BPMD210
054	MCC	PCP	TANK NO. 2 IR PUMP SPEED	2#16	TSP	3/4"	AI	BPSI210
-	PCP	MCC	TANK NO. 2 IR PUMP SPEED CONTROL	2#16	TSP	-	AO	BPSC210
055	BP-PB210	MCC	TANK NO. 2 IR PUMP EMERGENCY PUSH BUTTON	2-#14	THWN	3/4"	DI	
056	BP-FI210	BP-FIT210	TANK NO. 2 IR PUMP FLOW	NOTE 1	NOTE 1	3/4"	AI	
057	BP-FIT210	PCP	TANK NO. 2 IR PUMP FLOW	2#16	TSP	3/4"	AI	BPFI210
058	MOISTURE	MCC	TANK NO. 2 IR PUMP MOISTURE SENSOR	NOTE 1	NOTE 1	3/4"	DI	BPML 210
059	MCC	PCP	POST ANOXIC MIXER NO. 2 RUNNING	2-#14	THWN	3/4"	DI	BPMN220
-	MCC	PCP	POST ANOXIC MIXER NO. 2 OUT OF SERVICE	2-#14	THWN	-	DI	BPOOS220
-	MCC	PCP	POST ANOXIC MIXER NO. 2 FAIL	2-#14	THWN	-	DI	BPMF220
-	PCP	MCC	POST ANOXIC MIXER NO. 2 START/STOP	2-#14	THWN	-	DO	BPMD220
060	MIXER	LCP	POST ANOXIC MIXER NO. 2 TEMP AND MOISTURE	NOTE 1	NOTE 1	3/4"	DI	
061	LCP	MCC	POST ANOXIC MIXER NO. 2 ~~RUNNING~~ HAND	2-#14	THWN	3/4"	DI	
-	LCP	MCC	POST ANOXIC MIXER NO. 2 ~~OUT OF SERVICE~~ OFF	2-#14	THWN	-	DI	
-	LCP	MCC	POST ANOXIC MIXER NO. 2 ~~FAIL~~ AUTO	2-#14	THWN	-	DI	
-	MCC	LCP	POST ANOXIC MIXER NO. 2 START/STOP	2-#14	THWN	-	DO	
062	MCC	PCP	ANOXIC MIXER NO. 3 RUNNING	2-#14	THWN	3/4"	DI	BPMN300
-	MCC	PCP	ANOXIC MIXER NO. 3 OUT OF SERVICE	2-#14	THWN	-	DI	BPOOS300
-	MCC	PCP	ANOXIC MIXER NO. 3 FAIL	2-#14	THWN	-	DI	BPMF300
-	PCP	MCC	ANOXIC MIXER NO. 3 START/STOP	2-#14	THWN	-	DO	BPMD300
063	MIXER	LCP	ANOXIC MIXER NO. 3 TEMP AND MOISTURE	NOTE 1	NOTE 1	3/4"	DI	TEMPERATURE AND MOISTURE LEAK SENSORS
064	LCP	MCC	ANOXIC MIXER NO. 3 ~~RUNNING~~ HAND	2-#14	THWN	3/4"	DI	
-	LCP	MCC	ANOXIC MIXER NO. 3 ~~OUT OF SERVICE~~ OFF	2-#14	THWN	-	DI	
-	LCP	MCC	ANOXIC MIXER NO. 3 ~~FAIL~~ AUTO	2-#14	THWN	-	DI	
-	MCC	LCP	ANOXIC MIXER NO. 3 START/STOP	2-#14	THWN	-	DO	
065	BP-AE310	BP-AIT310	AERATION TANK NO. 3 DO	NOTE 1	NOTE 1	3/4"	AI	
066	BP-AIT310	PCP	AERATION TANK NO. 3 DO	2#16	TSP	3/4"	AI	BPAI310
067	MCC	PCP	TANK NO. 3 IR PUMP VFD IN AUTO	2-#14	THWN	1"	DI	BPMA310
-	MCC	PCP	TANK NO. 3 IR PUMP RUNNING	2-#14	THWN	-	DI	BPMN310
-	MCC	PCP	TANK NO. 3 IR PUMP ~~AVAILABLE~~ OUT OF SERVICE	2-#14	THWN	-	DI	BPOOS310
-	MCC	PCP	TANK NO. 3 IR PUMP FAIL	2-#14	THWN	-	DI	BPMF310
-	PCP	MCC	TANK NO. 3 IR PUMP START/STOP	2-#14	THWN	-	DO	BPMD310
068	MCC	PCP	TANK NO. 3 IR PUMP SPEED	2#16	TSP	3/4"	AI	BPSI310
-	PCP	MCC	TANK NO. 3 IR PUMP SPEED CONTROL	2#16	TSP	-	AO	BPSC310
069	BP-PB310	MCC	TANK NO. 3 IR PUMP EMERGENCY PUSH BUTTON	2-#14	THWN	3/4"	DI	
070	BP-FI310	BP-FIT310	TANK NO. 3 IR PUMP FLOW	NOTE 1	NOTE 1	3/4"	AI	
071	BP-FIT310	PCP	TANK NO. 3 IR PUMP FLOW	2#16	TSP	3/4"	AI	BPFI310
072	MOISTURE	MCC	TANK NO. 3 IR PUMP MOISTURE SENSOR	NOTE 1	NOTE 1	3/4"	DI	BPML 310
073	MCC	PCP	POST ANOXIC MIXER NO. 3 RUNNING	2-#14	THWN	3/4"	DI	BPMN320
-	MCC	PCP	POST ANOXIC MIXER NO. 3 OUT OF SERVICE	2-#14	THWN	-	DI	BPOOS320
-	MCC	PCP	POST ANOXIC MIXER NO. 3 FAIL	2-#14	THWN	-	DI	BPMF320
-	PCP	MCC	POST ANOXIC MIXER NO. 3 START/STOP	2-#14	THWN	-	DO	BPMD320
074	MIXER	LCP	POST ANOXIC MIXER NO. 3 TEMP AND MOISTURE	NOTE 1	NOTE 1	3/4"	DI	
075	LCP	MCC	POST ANOXIC MIXER NO. 3 ~~RUNNING~~ HAND	2-#14	THWN	3/4"	DI	
-	LCP	MCC	POST ANOXIC MIXER NO. 3 ~~OUT OF SERVICE~~ OFF	2-#14	THWN	-	DI	
-	LCP	MCC	POST ANOXIC MIXER NO. 3 ~~FAIL~~ AUTO	2-#14	THWN	-	DI	
-	MCC	LCP	POST ANOXIC MIXER NO. 3 START/STOP	2-#14	THWN	-	DO	
076	MCC	PCP	ANOXIC MIXER NO. 4 RUNNING	NOTE 2	-	3/4"	DI	BPMN400
-	MCC	PCP	ANOXIC MIXER NO. 4 OUT OF SERVICE	NOTE 2	-	-	DI	BPOOS400
-	MCC	PCP	ANOXIC MIXER NO. 4 FAIL	NOTE 2	-	-	DI	BPMF400
-	PCP	MCC	ANOXIC MIXER NO. 4 START/STOP	NOTE 2	-	-	DO	BPMD400
077	MIXER	LCP	ANOXIC METER NO. 4 TEMP AND MOISTURE	NOTE 2	-	3/4"	DI	TEMPERATURE AND MOISTURE LEAK SENSORS
078	LCP	MCC	ANOXIC MIXER NO. 4 RUNNING	NOTE 2	-	3/4"	DI	
-	LCP	MCC	ANOXIC MIXER NO. 4 OUT OF SERVICE	NOTE 2	-	-	DI	
-	LCP	MCC	ANOXIC MIXER NO. 4 FAIL	NOTE 2	-	-	DI	
-	MCC	LCP	ANOXIC MIXER NO. 4 START/STOP	NOTE 2	-	-	DO	
079	BP-AE410	BP-AIT410	AERATION TANK NO. 4 DO	NOTE 2	-	3/4"	AI	
080	BP-AIT410	PCP	AERATION TANK NO. 4 DO	NOTE 2	-	3/4"	AI	BPAI410
081	MCC	PCP	TANK NO. 4 IR PUMP VFD IN AUTO	NOTE 2	-	1"	DI	BPMA410
-	MCC	PCP	TANK NO. 4 IR PUMP RUNNING	NOTE 2	-	-	DI	BPMN410
-	MCC	PCP	TANK NO. 4 IR PUMP ~~AVAILABLE~~ OUT OF SERVICE	NOTE 2	-	-	DI	BPOOS410
-	MCC	PCP	TANK NO. 4 IR PUMP FAIL	NOTE 2	-	-	DI	BPMF410
-	PCP	MCC	TANK NO. 4 IR PUMP START/STOP	NOTE 2	-	-	DO	BPMD410
082	MCC	PCP	TANK NO. 4 IR PUMP SPEED	NOTE 2	-	3/4"	AI	BPSI410
-	PCP	MCC	TANK NO. 4 IR PUMP SPEED CONTROL	NOTE 2	-	-	AO	BPSC410
083	BP-PB410	MCC	TANK NO. 4 IR PUMP EMERGENCY PUSH BUTTON	NOTE 2	-	3/4"	DI	
084	BP-FI410	BP-FIT410	TANK NO. 4 IR PUMP FLOW	NOTE 2	-	3/4"	AI	
085	BP-FIT410	PCP	TANK NO. 4 IR PUMP FLOW	NOTE 2	-	3/4"	AI	BPFI410
086	MOISTURE	MCC	TANK NO. 4 IR PUMP MOISTURE SENSOR	NOTE 2	-	3/4"	DI	BPML 410
087	MCC	PCP	POST ANOXIC MIXER NO. 4 RUNNING	NOTE 2	-	3/4"	DI	BPMN420
-	MCC	PCP	POST ANOXIC MIXER NO. 4 OUT OF SERVICE	NOTE 2	-	-	DI	BPOOS420
-	MCC	PCP	POST ANOXIC MIXER NO. 4 FAIL	NOTE 2	-	-	DI	BPMF420
-	PCP	MCC	POST ANOXIC MIXER NO. 4 START/STOP	NOTE 2	-	-	DO	BPMD420
088	MIXER	LCP	POST ANOXIC MIXER TEMP AND MOISTURE	NOTE 2	-	3/4"	DI	
089	LCP	MCC	POST ANOXIC MIXER NO. 4 RUNNING	NOTE 2	-	3/4"	DI	
-	LCP	MCC	POST ANOXIC MIXER NO. 4 OUT OF SERVICE	NOTE 2	-	-	DI	
-	LCP	MCC	POST ANOXIC MIXER NO. 4 FAIL	NOTE 2	-	-	DI	
-	MCC	LCP	POST ANOXIC MIXER NO. 4 START/STOP	NOTE 2	-	-	DO	
090	BP-AE120	BP-AIT120	EFFLUENT NO3 CONCENTRATION	NOTE 1	NOTE 1	3/4"	AI	
091	BP-AIT120	PCP	EFFLUENT NO3 CONCENTRATION	2#16	TSP	3/4"	AI	BPAI120
092	LCP	PCP	PROCESS AREA H2S LEVEL	2#16	TSP	3/4"	AI	BPAI100
-	LCP	PCP	PROCESS AREA LEL LEVEL	2#16	TSP	-	AI	BPAI200
-	LCP	PCP	PROCESS AREA O2 LEVEL	2#16	TSP	-	AI	BPAI300
093	BP-AE100	LCP	PROCESS AREA H2S LEVEL	NOTE 1	NOTE 1	3/4"	AI	
094	BP-AE200	LCP	PROCESS AREA LEL LEVEL	NOTE 1	NOTE 1	3/4"	AI	
095	BP-AE300	LCP	PROCESS AREA O2 LEVEL	NOTE 1	NOTE 1	3/4"	AI	
096	LCP	BEACON	PROCESS AREA ALARM	2-#14	THWN	3/4"	DI	HAZARDOUS GAS ALARM
097	FS	PCP	VENTILATION FAIL	2-#14	THWN	3/4"	DI	BPFS100
098	FS	BEACON	VENTILATION FAIL	2-#14	THWN	3/4"	DI	HAZARDOUS GAS ALARM
099	LCP	PCP	UV1 SINGLE LAMP FAILURE	2-#14	THWN	1"	DI	UVLF100
-	LCP	PCP	UV1 POWER SUPPLY FAILURE	2-#14	THWN	-	DI	UVPF100

GENERAL SHEET NOTES:

1. CABLE TO BE PROVIDED BY MANUFACTURER. CONTRACTOR TO COORDINATE WITH MANUFACTURER FOR REQUIRED CABLE LENGTH.
2. CONTRACTOR SHALL PROVIDE SPARE CONDUIT FOR FUTURE INSTALLATION. SPARE CONDUIT SHALL INCLUDE PULL ROPES AND BE CAPPED AT BOTH ENDS.
3. SCHEDULE PROVIDED FOR I/O TO BE MODIFIED UNDER THIS PROJECT. NOT ALL THE I/O RELATED TO EACH PROCESS CONTROLLER IS SHOWN ON THE SCHEDULES.
4. CONTRACTOR SHALL REFER TO SPECIFICATION SECTION 17500 FOR COMPLETE I/O LIST.
5. THE SCHEDULES AS PROVIDED ARE COMPLEMENTARY TO THE P&ID AND ELECTRICAL DRAWINGS. CONTRACTOR SHALL REVIEW AND HAVE THOROUGH KNOWLEDGE OF THE SYSTEMS BEING RENOVATED. SHOULD DISCREPANCIES AMONG THE DOCUMENTS ARISE, IT SHOULD BE ASSUMED THAT THE MORE DURABLE (i.e., MORE EXPENSIVE), OPTION, AT THE SOLE DISCRETION OF THE ENGINEER, WAS PART OF THE BASE BID. CONTRACTOR SHALL INFORM THE ENGINEER IMMEDIATELY OF THE DISCREPANCIES.
6. ALL SIGNALS SHALL BE RUN IN 3/4" PVC COATED RIGID GALVANIZED STEEL CONDUIT UNLESS SIZE IS OTHERWISE NOTED.
7. TSP IS #18 TWISTED SHIELDED PAIR CABLE. ALL TSP SHALL BE RUN IN SEPARATE CONDUIT FROM DISCRETE SIGNALS.
8. MANUFACTURER SUPPLIED CABLE FROM INSTRUMENT TO CONTROL PANEL OR SIGNAL AMPLIFIER, CONDUIT BY CONTRACTOR SIZED PER MANUFACTURER'S REQUIREMENTS.
9. PROVIDE SURGE SUPPRESSION FOR ALL 4–20mA CIRCUITS.

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 20330 EXPIRATION DATE 01/29/2012.

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
INSTRUMENTATION AND CONTROLS
CABLE AND CONDUIT SCHEDULE

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

I-501

SHEET 127 OF 128

File: Q:\SMW\070662_Mystic\Harbour\WWTP\Tech\Proc\Vol_I\FY14~CADD\AS-BUILTS\INSTRUMENTATION\I-501 SCHEDULES.dwg
Jan 12, 2015 – 12:20:51pm

RUN NO.	FROM	TO	DESCRIPTION	WIRE NO. /SIZE	TYPE	CONDUIT /RACEWAY	SIGNAL TYPE	REMARKS
-	LCP	PCP	UV1 LOW UV TRANSMITTANCE	2-#14	THWN	-	DI	UVTL100
-	LCP	PCP	UV1 LOW UV INTENSITY	2-#14	THWN	-	DI	UVIL100
-	LCP	PCP	UV1 LAMP STATUS	2-#14	THWN	-	DI	UVLY100
-	LCP	PCP	UV1 OUT OF SERVICE	2-#14	THWN	-	DI	UVOOS100
-	LCP	PCP	UV1 LOW OPERATIONAL DOSE (FUTURE)	2-#14	THWN	-	DI	UVDL100
100	LCP	PCP	UV2 SINGLE LAMP FAILURE	2-#14	THWN	1"	DI	UVLF200
-	LCP	PCP	UV2 POWER SUPPLY FAILURE	2-#14	THWN	-	DI	UVPF200
-	LCP	PCP	UV2 LOW UV TRANSMITTANCE	2-#14	THWN	-	DI	UVTL200
-	LCP	PCP	UV2 LOW UV INTENSITY	2-#14	THWN	-	DI	UVIL200
-	LCP	PCP	UV2 LAMP STATUS	2-#14	THWN	-	DI	UVLY200
-	LCP	PCP	UV2 OUT OF SERVICE	2-#14	THWN	-	DI	UVOOS200
-	LCP	PCP	UV2 LOW OPERATIONAL DOSE (FUTURE)	2-#14	THWN	-	DI	UVDL200
101	UV-AE100	UV-AIT100	EFFLUENT TANK LEVEL	NOTE 1	NOTE 1	3/4"	AI	
102	UV-AIT100	PCP	EFFLUENT TANK LEVEL	2-#16	TSP	3/4"	AI	UVLI100
103	UV-FE100	UV-FIT100	PLANT EFFLUENT FLOW	NOTE 1	NOTE 1	3/4"		
104	UV-FIT100	PCP	PLANT EFFLUENT FLOW	2-#16	TSP	3/4"	AI	UVFI100
105	MCC	PCP	RAS PUMP NO. 1 IN AUTO	2-#14	THWN	1"	DI	RSMA100
-	MCC	PCP	RAS PUMP NO. 1 OUT OF SERVICE	2-#14	THWN	-	DI	RSOOS100
-	MCC	PCP	RAS PUMP NO. 1 RUNNING	2-#14	THWN	-	DI	RSMN100
-	MCC	PCP	RAS PUMP NO. 1 FAIL	2-#14	THWN	-	DI	RSMF100
	PCP	MCC	RAS PUMP NO. 1 START/STOP	2-#14	THWN	-	DO	RSMD100
106	VFD	PCP	RAS PUMP NO. 1 SPEED	2#16	TSP	3/4"	AI	RSSI100
-	PCP	VFD	RAS PUMP NO. 1 SPEED CONTROL	2#16	TSP	-	AO	RSSC100
107	RS-PB100	MCC	RAS PUMP NO. 1 EMERGENCY PUSH BUTTON	2-#14	THWN	3/4"	DI	RAS PUMP NO. 1 E-STOP
108	RS-AE100	RS-AIT100	RAS PUMP NO. 1 DISCHARGE PRESSURE	NOTE 1	NOTE 1	3/4"		
109	RS-AIT100	PCP	RAS PUMP NO. 1 DISCHARGE PRESSURE	2#16	TSP	3/4"	AI	RSPI100
110	MCC	PCP	RAS PUMP NO. 2 IN AUTO	2-#14	THWN	1"	DI	RSMA200
-	MCC	PCP	RAS PUMP NO. 2 OUT OF SERVICE	2-#14	THWN	-	DI	RSOOS200
-	MCC	PCP	RAS PUMP NO. 2 RUNNING	2-#14	THWN	-	DI	RSMN200
-	MCC	PCP	RAS PUMP NO. 2 FAIL	2-#14	THWN	-	DI	RSMF200
	PCP	MCC	RAS PUMP NO. 2 START/STOP	2-#14	THWN	-	DO	RSMD200
111	VFD	PCP	RAS PUMP NO. 2 SPEED	2#16	TSP	3/4"	AI	RSSI200
-	PCP	VFD	RAS PUMP NO. 2 SPEED CONTROL	2#16	TSP	-	AO	RSSC200
112	RS-PB200	MCC	RAS PUMP NO. 2 EMERGENCY PUSH BUTTON	2-#14	THWN	3/4"	DI	RAS PUMP NO. 2 E-STOP
113	RS-AE200	RS-AIT200	RAS PUMP NO. 2 DISCHARGE PRESSURE	NOTE 1	NOTE 1	3/4"		
114	RS-AIT200	PCP	RAS PUMP NO. 2 DISCHARGE PRESSURE	2#16	TSP	3/4"	AI	RSPI200
115	MCC	PCP	RAS PUMP NO. 3 IN AUTO	2-#14	THWN	1"	DI	RSMA300
-	MCC	PCP	RAS PUMP NO. 3 OUT OF SERVICE	2-#14	THWN	-	DI	RSOOS300
-	MCC	PCP	RAS PUMP NO. 3 RUNNING	2-#14	THWN	-	DI	RSMN300
-	MCC	PCP	RAS PUMP NO. 3 FAIL	2-#14	THWN	-	DI	RSMF300
	PCP	MCC	RAS PUMP NO. 3 START/STOP	2-#14	THWN	-	DO	RSMD300
116	VFD	PCP	RAS PUMP NO. 3 SPEED	2#16	TSP	3/4"	AI	RSSI300
-	PCP	VFD	RAS PUMP NO. 3 SPEED CONTROL	2#16	TSP	-	AO	RSSC300
117	RS-PB300	MCC	RAS PUMP NO. 3 EMERGENCY PUSH BUTTON	2-#14	THWN	3/4"	DI	RAS PUMP NO. 3 E-STOP
118	RS-AE300	RS-AIT300	RAS PUMP NO. 3 DISCHARGE PRESSURE	NOTE 1	NOTE 1	3/4"		
119	RS-AIT300	PCP	RAS PUMP NO. 3 DISCHARGE PRESSURE	2#16	TSP	3/4"	AI	RSPI300
120	MCC	PCP	RAS PUMP NO. 4 IN AUTO	NOTE 2	-	1"	DI	RSMA400
-	MCC	PCP	RAS PUMP NO. 4 OUT OF SERVICE	NOTE 2	-	-	DI	RSOOS400
-	MCC	PCP	RAS PUMP NO. 4 RUNNING	NOTE 2	-	-	DI	RSMN400
-	MCC	PCP	RAS PUMP NO. 4 FAIL	NOTE 2	-	-	DI	RSMF400
	PCP	MCC	RAS PUMP NO. 4 START/STOP	NOTE 2	-	-	DO	RSMD400
121	VFD	PCP	RAS PUMP NO. 4 SPEED	NOTE 2	-	3/4"	AI	RSSI400
-	PCP	VFD	RAS PUMP NO. 4 SPEED CONTROL	NOTE 2	-	-	AO	RSSC400
122	RS-PB400	MCC	RAS PUMP NO. 4 EMERGENCY PUSH BUTTON	NOTE 2	-	3/4"	DI	RAS PUMP NO. 4 E-STOP
123	RS-AE400	RS-AIT400	RAS PUMP NO. 4 DISCHARGE PRESSURE	NOTE 2	-	3/4"		
124	RS-AIT400	PCP	RAS PUMP NO. 4 DISCHARGE PRESSURE	NOTE 2	-	3/4"	AI	RSPI400
125	RS-FCV110	PCP	TANK NO. 1 RAS CONTROL VALVE % OPEN	2#16	TSP	3/4"	AI	RSZI110
-	PCP	RS-FCV110	TANK NO. 1 RAS CONTROL VALVE POSITION CONTROL	2#16	TSP	-	AO	RSZC110
126	RS-FCV110	PCP	TANK NO. 1 RAS CONTROL VALVE OPENED	2-#14	THWN	1"	DI	RSZD110
-	RS-FCV110	PCP	TANK NO. 1 RAS CONTROL VALVE CLOSED	2-#14	THWN	-	DI	RSZB110
-	RS-FCV110	PCP	TANK NO. 1 RAS CONTROL VALVE FAIL	2-#14	THWN	-	DI	RSZF110
-	RS-FCV110	PCP	TANK NO. 1 RAS CONROL VALVE IN AUTO	2-#14	THWN	-	DI	RSZA110
127	RS-AE110	RS-AIT110	TANK NO. 1 RAS FLOW	NOTE 1	NOTE 1	3/4"	AI	
128	RS-AIT110	PCP	TANK NO. 1 RAS FLOW	2#16	TSP	3/4"	AI	RSFI110
129	RS-FCV210	PCP	TANK NO. 2 RAS CONTROL VALVE % OPEN	2#16	TSP	3/4"	AI	RSZI210
-	PCP	RS-FCV210	TANK NO. 2 RAS CONTROL VALVE POSITION CONTROL	2#16	TSP	-	AO	RSZC210
130	RS-FCV210	PCP	TANK NO. 2 RAS CONTROL VALVE OPENED	2-#14	THWN	1"	DI	RSZD210
-	RS-FCV210	PCP	TANK NO. 2 RAS CONTROL VALVE CLOSED	2-#14	THWN	-	DI	RSZB210
-	RS-FCV210	PCP	TANK NO. 2 RAS CONTROL VALVE FAIL	2-#14	THWN	-	DI	RSZF210
-	RS-FCV210	PCP	TANK NO. 2 RAS CONROL VALVE IN AUTO	2-#14	THWN	-	DI	RSZA210
131	RS-AE210	RS-AIT210	TANK NO. 2 RAS FLOW	NOTE 1	NOTE 1	3/4"	AI	
132	RS-AIT210	PCP	TANK NO. 2 RAS FLOW	2#16	TSP	3/4"	AI	RSFI210
133	RS-FCV310	PCP	TANK NO. 3 RAS CONTROL VALVE % OPEN	2#16	TSP	3/4"	AI	RSZI310
-	PCP	RS-FCV310	TANK NO. 3 RAS CONTROL VALVE POSITION CONTROL	2#16	TSP	-	AO	RSZC310
134	RS-FCV310	PCP	TANK NO. 3 RAS CONTROL VALVE OPENED	2-#14	THWN	1"	DI	RSZD310
-	RS-FCV310	PCP	TANK NO. 3 RAS CONTROL VALVE CLOSED	2-#14	THWN	-	DI	RSZB310
-	RS-FCV310	PCP	TANK NO. 3 RAS CONTROL VALVE FAIL	2-#14	THWN	-	DI	RSZF310
-	RS-FCV310	PCP	TANK NO. 3 RAS CONROL VALVE IN AUTO	2-#14	THWN	-	DI	RSZA310
135	RS-AE310	RS-AIT310	TANK NO. 3 RAS FLOW	NOTE 1	NOTE 1	3/4"	AI	
136	RS-AIT310	PCP	TANK NO. 3 RAS FLOW	2#16	TSP	3/4"	AI	RSFI310
137	RS-FCV410	PCP	TANK NO. 4 RAS CONTROL VALVE % OPEN	NOTE 2	-	3/4"	AI	RSZI410
-	PCP	RS-FCV410	TANK NO. 4 RAS CONTROL VALVE POSITION CONTROL	NOTE 2	-	-	AO	RSZC410
138	RS-FCV410	PCP	TANK NO. 4 RAS CONTROL VALVE OPENED	NOTE 2	-	1"	DI	RSZD410
-	RS-FCV410	PCP	TANK NO. 4 RAS CONTROL VALVE CLOSED	NOTE 2	-	-	DI	RSZB410
-	RS-FCV410	PCP	TANK NO. 4 RAS CONTROL VALVE FAIL	NOTE 2	-	-	DI	RSZF410
-	RS-FCV410	PCP	TANK NO. 4 RAS CONROL VALVE IN AUTO	NOTE 2	-	-	DI	RSZA410
139	RS-AE410	RS-AIT410	TANK NO. 4 RAS FLOW	NOTE 2	-	3/4"	AI	
140	RS-AIT410	PCP	TANK NO. 4 RAS FLOW	NOTE 2	-	3/4"	AI	RSFI410
141	RS-FCV510	PCP	WAS CONTROL VALVE % OPEN	2#16	TSP	3/4"	AI	RSZI510
-	PCP	RS-FCV510	WAS CONTROL VALVE POSITION CONTROL	2#16	TSP	-	AO	RSZC510
142	RS-FCV510	PCP	WAS CONTROL VALVE OPENED	2-#14	THWN	1"	DI	RSZD510
-	RS-FCV510	PCP	WAS CONTROL VALVE CLOSED	2-#14	THWN	-	DI	RSZB510
-	RS-FCV510	PCP	WAS CONTROL VALVE FAIL	2-#14	THWN	-	DI	RSZF510
-	RS-FCV510	PCP	WAS CONRO. VALVE IN AUTO	2-#14	THWN	-	DI	RSZA510
143	RS-AE510	RS-AIT510	WAS FLOW	NOTE 1	NOTE 1	3/4"	AI	
144	RS-AIT510	PCP	WAS FLOW	2#16	TSP	3/4"	AI	RSFI510
145	LCP	PCP	BLOWER NO. 1 IN AUTO	2-#14	THWN	1"	DI	BLMA100
-	LCP	PCP	BLOWER NO. 1 OUT OF SERVICE	2-#14	THWN	-	DI	BLOOS100
-	LCP	PCP	BLOWER NO. 1 RUNNING	2-#14	THWN	-	DI	BLMN100
-	LCP	PCP	BLOWER NO. 1 FAIL	2-#14	THWN	-	DI	BLMF100
	PCP	LCP	BLOWER NO. 1 START/STOP	2-#14	THWN	-	DO	BLMD100
145A	BL-PIT100	PCP	BLOWER NO. 1 DISCHARGE PRESSURE	2#16	TSP	3/4"	AI	BLPI100
146	LCP	PCP	BLOWER NO. 1 SPEED	2#16	TSP	3/4"	AI	BLSI100

RUN NO.	FROM	TO	DESCRIPTION	WIRE NO. /SIZE	TYPE	CONDUIT /RACEWAY	SIGNAL TYPE	REMARKS
-	PCP	LCP	BLOWER NO. 1 SPEED CONTROL	2#16	TSP	-	AO	BLSC100
147	LCP	PCP	BLOWER NO. 2 IN AUTO	2-#14	THWN	1"	DI	BLMA200
-	LCP	PCP	BLOWER NO. 2 OUT OF SERVICE	2-#14	THWN	-	DI	BLOOS200
-	LCP	PCP	BLOWER NO. 2 RUNNING	2-#14	THWN	-	DI	BLMN200
-	LCP	PCP	BLOWER NO. 2 FAIL	2-#14	THWN	-	DI	BLMF200
	PCP	LCP	BLOWER NO. 2 START/STOP	2-#14	THWN	-	DO	BLMD200
147A	BL-PIT200	PCP	BLOWER NO. 2 DISCHARGE PRESSURE	2#16	TSP	3/4"	AI	BLPI200
148	LCP	PCP	BLOWER NO. 2 SPEED	2#16	TSP	3/4"	AI	BLSI200
-	PCP	LCP	BLOWER NO. 2 SPEED CONTROL	2#16	TSP	-	AO	BLSC200
149	LCP	PCP	BLOWER NO. 3 IN AUTO	2-#14	THWN	1"	DI	BLMA300
-	LCP	PCP	BLOWER NO. 3 OUT OF SERVICE	2-#14	THWN	-	DI	BLOOS300
-	LCP	PCP	BLOWER NO. 3 RUNNING	2-#14	THWN	-	DI	BLMN300
-	LCP	PCP	BLOWER NO. 3 FAIL	2-#14	THWN	-	DI	BLMF300
	PCP	LCP	BLOWER NO. 3 START/STOP	2-#14	THWN	-	DO	BLMD300
149A	BL-PIT300	PCP	BLOWER NO. 3 DISCHARGE PRESSURE	2#16	TSP	3/4"	AI	BLPI300
150	LCP	PCP	BLOWER NO. 3 SPEED	2#16	TSP	3/4"	AI	BLSI300
-	PCP	LCP	BLOWER NO. 3 SPEED CONTROL	2#16	TSP	-	AO	BLSC300
151A	BL-FE110	BL-FIT110	TANK NO. 1 AIR FLOW	NOTE 1	NOTE 1	3/4"	AI	
152A	BL-FIT110	PCP	TANK NO. 1 AIR FLOW	2#16	TSP	3/4"	AI	BLFI110
151B	BL-FE210	BL-FIT210	TANK NO. 2 AIR FLOW	NOTE 1	NOTE 1	3/4"	AI	
152B	BL-FIT210	PCP	TANK NO. 2 AIR FLOW	2#16	TSP	3/4"	AI	BLFI210
151C	BL-FE310	BL-FIT310	TANK NO. 3 AIR FLOW	NOTE 1	NOTE 1	3/4"	AI	
152C	BL-FIT310	PCP	TANK NO. 3 AIR FLOW	2#16	TSP	3/4"	AI	BLFI310
151D	BL-FE410	BL-FIT410	TANK NO. 4 AIR FLOW	NOTE 1	NOTE 1	3/4"	AI	
152D	BL-FIT410	PCP	TANK NO. 4 AIR FLOW	2#16	TSP	3/4"	AI	BLFI410
153	BL-FCV110	PCP	TANK NO. 1 AIR CONTROL VALVE % OPEN	2#16	TSP	3/4"	AI	BLZI110
-	PCP	BL-FCV110	TANK NO. 1 AIR CONTROL VALVE POSITION CONTROL	2#16	TSP	-	AO	BLZC110
154	BL-FCV110	PCP	TANK NO. 1 AIR CONTROL VALVE OPENED	2-#14	THWN	1"	DI	BLZD110
-	BL-FCV110	PCP	TANK NO. 1 AIR CONTROL VALVE CLOSED	2-#14	THWN	-	DI	BLZB110
-	BL-FCV110	PCP	TANK NO. 1 AIR CONTROL VALVE FAIL	2-#14	THWN	-	DI	BLZF110
-	BL-FCV110	PCP	TANK NO. 1 AIR CONROL VALVE IN AUTO	2-#14	THWN	-	DI	BLZA110
155	BL-FCV210	PCP	TANK NO. 2 AIR CONTROL VALVE % OPEN	2#16	TSP	3/4"	AI	BLZI210
-	PCP	BL-FCV210	TANK NO. 2 AIR CONTROL VALVE POSITION CONTROL	2#16	TSP	-	AO	BLZC210
156	BL-FCV210	PCP	TANK NO. 2 AIR CONTROL VALVE OPENED	2-#14	THWN	1"	DI	BLZD210
-	BL-FCV210	PCP	TANK NO. 2 AIR CONTROL VALVE CLOSED	2-#14	THWN	-	DI	BLZB210
-	BL-FCV210	PCP	TANK NO. 2 AIR CONTROL VALVE FAIL	2-#14	THWN	-	DI	BLZF210
-	BL-FCV210	PCP	TANK NO. 2 AIR CONROL VALVE IN AUTO	2-#14	THWN	-	DI	BLZA210
157	BL-FCV310	PCP	TANK NO. 3 AIR CONTROL VALVE % OPEN	2#16	TSP	3/4"	AI	BLZI310
-	PCP	BL-FCV310	TANK NO. 3 AIR CONTROL VALVE POSITION CONTROL	2#16	TSP	-	AO	BLZC310
158	BL-FCV310	PCP	TANK NO. 3 AIR CONTROL VALVE OPENED	2-#14	THWN	1"	DI	BLZD310
-	BL-FCV310	PCP	TANK NO. 3 AIR CONTROL VALVE CLOSED	2-#14	THWN	-	DI	BLZB310
-	BL-FCV310	PCP	TANK NO. 3 AIR CONTROL VALVE FAIL	2-#14	THWN	-	DI	BLZF310
-	BL-FCV310	PCP	TANK NO. 3 AIR CONROL VALVE IN AUTO	2-#14	THWN	-	DI	BLZA310
159	BL-FCV410	PCP	TANK NO. 4 AIR CONTROL VALVE % OPEN	NOTE 2	-	3/4"	AI	BLZI410
-	PCP	BL-FCV410	TANK NO. 4 AIR CONTROL VALVE POSITION CONTROL	NOTE 2	-	-	AO	BLZC410
160	BL-FCV410	PCP	TANK NO. 4 AIR CONTROL VALVE OPENED	NOTE 2	-	1"	DI	BLZD410
-	BL-FCV410	PCP	TANK NO. 4 AIR CONTROL VALVE CLOSED	NOTE 2	-	-	DI	BLZB410
-	BL-FCV410	PCP	TANK NO. 4 AIR CONTROL VALVE FAIL	NOTE 2	-	-	DI	BLZF410
-	BL-FCV410	PCP	TANK NO. 4 AIR CONROL VALVE IN AUTO	NOTE 2	-	-	DI	BLZA410
161	LCP	PCP	POLYMER BLENDING SYSTEM RUNNING	2-#14	THWN	1"	DI	CHMN300
-	LCP	PCP	POLYMER BLENDING SYSTEM FAIL	2-#14	THWN	-	DI	CHMF300
-	LCP	PCP	POLYMER BLENDING SYSTEM OUT OF SERVICE	2-#14	THWN	-	DI	CHOOS300
162	CH-LE100	CH-LIT100	SUPPLEMENTAL CARBON TANK NO. 1 LEVEL	NOTE 1	NOTE 1	3/4"	AI	
163	CH-LIT100	PCP	SUPPLEMENTAL CARBON TANK NO. 1 LEVEL	2#16	TSP	3/4"	AI	CHLI100
164	CH-LE200	CH-LIT200	SUPPLEMENTAL CARBON TANK NO. 2 LEVEL	NOTE 1	NOTE 1	3/4"	AI	
165	CH-LIT200	PCP	SUPPLEMENTAL CARBON TANK NO. 2 LEVEL	2#16	TSP	3/4"	AI	CHLI200
166	LCP	PCP	SUPPLEMENTAL CARBON PUMP NO. 1 IN AUTO	2-#14	THWN	1"	DI	CHMA100
-	LCP	PCP	SUPPLEMENTAL CARBON PUMP NO. 1 OUT OF SERVICE	2-#14	THWN	-	DI	CHOOS100
-	LCP	PCP	SUPPLEMENTAL CARBON PUMP NO. 1 RUNNING	2-#14	THWN	-	DI	CHMN100
-	LCP	PCP	SUPPLEMENTAL CARBON PUMP NO. 1 FAIL	2-#14	THWN	-	DI	CHMF100
-	PCP	LCP	SUPPLEMENTAL CARBON PUMP NO. 1 START/STOP	2-#14	THWN	-	DO	CHMD100
167	LCP	PCP	SUPPLEMENTAL CARBON PUMP NO. 1 SPEED	2#16	TSP	3/4"	AI	CHSI100
-	PCP	LCP	SUPPLEMENTAL CARBON PUMP NO. 1 SPEED CONTROL	2#16	TSP	-	AO	CHSC100
168	LCP	PCP	SUPPLEMENTAL CARBON PUMP NO. 2 IN AUTO	2-#14	THWN	1"	DI	CHMA200
-	LCP	PCP	SUPPLEMENTAL CARBON PUMP NO. 2 OUT OF SERVICE	2-#14	THWN	-	DI	CHOOS200
-	LCP	PCP	SUPPLEMENTAL CARBON PUMP NO. 2 RUNNING	2-#14	THWN	-	DI	CHMN200
-	LCP	PCP	SUPPLEMENTAL CARBON PUMP NO. 2 FAIL	2-#14	THWN	-	DI	CHMF200
-	PCP	LCP	SUPPLEMENTAL CARBON PUMP NO. 2 START/STOP	2-#14	THWN	-	DO	CHMD200
169	LCP	PCP	SUPPLEMENTAL CARBON PUMP NO. 2 SPEED	2#16	TSP	3/4"	AI	CHSI200
-	PCP	LCP	SUPPLEMENTAL CARBON PUMP NO. 2 SPEED CONTROL	2#16	TSP	-	AO	CHSC200
~~170~~	~~CH-FE100~~	~~CH-FIT100~~	~~SUPPLEMENTAL CARBON FLOW~~	~~NOTE 1~~	~~NOTE 1~~	~~3/4"~~	~~AI~~	~~CHFI100~~
~~171~~	~~CH-FIT100~~	~~PCP~~	~~SUPPLEMENTAL CARBON FLOW~~	~~2#16~~	~~TSP~~	~~3/4"~~	~~AI~~	
172	PCP	FILL PANEL	TANK NO. 1 LEVEL	2#16	TSP	3/4"	AO	
-	PCP	FILL PANEL	TANK NO. 2 LEVEL	2#16	TSP	-	AO	
173	CH-LIT100	FILL PANEL	TANK NO. 1 FULL	2-#14	THWN	3/4"	DI	
-	CH-LIT100	FILL PANEL	TANK NO. 1 OVERFILL	2-#14	THWN	-	DI	
174	CH-LIT200	FILL PANEL	TANK NO. 2 FULL	2-#14	THWN	3/4"	DI	
-	CH-LIT200	FILL PANEL	TANK NO. 2 OVERFILL	2-#14	THWN	-	DI	
175	CH-LS100	PCP	SUPPLEMENTAL CARBON CONTAINMENT FLOOD	2-#14	THWN	3/4"	DI	
176	LCP	PCP	GENERATOR RUNNING	2-#14	THWN	1"	DI	GEMN100
-	LCP	PCP	GENERATOR FAIL	2-#14	THWN	-	DI	GEMF100
-	LCP	PCP	GENERATOR NOT IN AUTO	2-#14	THWN	-	DI	GEMA100
-	LCP	PCP	GENERATOR LOW FUEL LEVEL	2-#14	THWN	-	DI	GEFL100
-	LCP	PCP	GENERATOR FUEL LEAK	2-#14	THWN	-	DI	GEFF100
-	LCP	PCP	GENERATOR LOW OIL ALARM	2-#14	THWN	-	DI	GEOL100
-	LCP	PCP	GENERATOR HIGH OIL TEMP ALARM	2-#14	THWN	-	DI	GEOH100
177	LCP	PCP	UTILITY WATER PUMP OUT OF SERVICE	2-#14	THWN	1"	DI	UWOOS100
-	LCP	PCP	UW PUMP NO. 1 IN AUTO	2-#14	THWN	-	DI	UWMA100
-	LCP	PCP	UW PUMP NO. 1 RUNNING	2-#14	THWN	-	DI	UWMN100
-	LCP	PCP	UW PUMP NO. 1 FAIL	2-#14	THWN	-	DI	UWMF100
-	LCP	PCP	UW PUMP NO. 2 IN AUTO	2-#14	THWN	-	DI	UWMA200
-	LCP	PCP	UW PUMP NO. 2 RUNNING	2-#14	THWN	-	DI	UWMN200
-	LCP	PCP	UW PUMP NO. 2 FAIL	2-#14	THWN	-	DI	UWMF200
-	PCP	LCP	~~UW PUMP START/STOP~~ NO. 2 START/STOP	2-#14	THWN	-	DO	UWMD200
178	UW-PIT100	PCP	UTILITY WATER PRESSURE	2#16	TSP	3/4"	AI	UWPI100
179	UW-PIT200	PCP	SCREEN ROOM WATER PRESSURE	2#16	TSP	3/4"	AI	UWPI200
–	PCP	LCP	UW PUMP NO. 1 START/STOP	2#14	THWN	–	DO	UWMD100

R * NO FLOW METER INSTALLED 1 PUMP PER TANK

R

R

GENERAL SHEET NOTES:

1. CABLE TO BE PROVIDED BY MANUFACTURER. CONTRACTOR TO COORDINATE WITH MANUFACTURER FOR REQUIRED CABLE LENGTH.
2. CONTRACTOR SHALL PROVIDE SPARE CONDUIT FOR FUTURE INSTALLATION. SPARE CONDUIT SHALL INCLUDE PULL ROPES AND BE CAPPED AT BOTH ENDS.
3. SCHEDULE PROVIDED FOR I/O TO BE MODIFIED UNDER THIS PROJECT. NOT ALL THE I/O RELATED TO EACH PROCESS CONTROLLER IS SHOWN ON THE SCHEDULES.
4. CONTRACTOR SHALL REFER TO SPECIFICATION SECTION 17500 FOR COMPLETE I/O LIST.
5. THE SCHEDULES AS PROVIDED ARE COMPLEMENTARY TO THE P&ID AND ELECTRICAL DRAWINGS. CONTRACTOR SHALL REVIEW AND HAVE THOROUGH KNOWLEDGE OF THE SYSTEMS BEING RENOVATED. SHOULD DISCREPANCIES AMONG THE DOCUMENTS ARISE, IT SHOULD BE ASSUMED THAT THE MORE DURABLE (i.e., MORE EXPENSIVE), OPTION, AT THE SOLE DISCRETION OF THE ENGINEER, WAS PART OF THE BASE BID. CONTRACTOR SHALL INFORM THE ENGINEER IMMEDIATELY OF THE DISCREPANCIES.
6. ALL SIGNALS SHALL BE RUN IN 3/4" PVC COATED RIGID GALVANIZED STEEL CONDUIT UNLESS SIZE IS OTHERWISE NOTED.
7. TSP IS #18 TWISTED SHIELDED PAIR CABLE. ALL TSP SHALL BE RUN IN SEPARATE CONDUIT FROM DISCRETE SIGNALS.
8. MANUFACTURER SUPPLIED CABLE FROM INSTRUMENT TO CONTROL PANEL OR SIGNAL AMPLIFIER, CONDUIT BY CONTRACTOR SIZED PER MANUFACTURER'S REQUIREMENTS.
9. PROVIDE SURGE SUPPRESSION FOR ALL 4–20mA CIRCUITS.

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 20330 EXPIRATION DATE 01/29/2012.

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
INSTRUMENTATION AND CONTROLS
CABLE AND CONDUIT SCHEDULE

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

I-502

SHEET 128 OF 128

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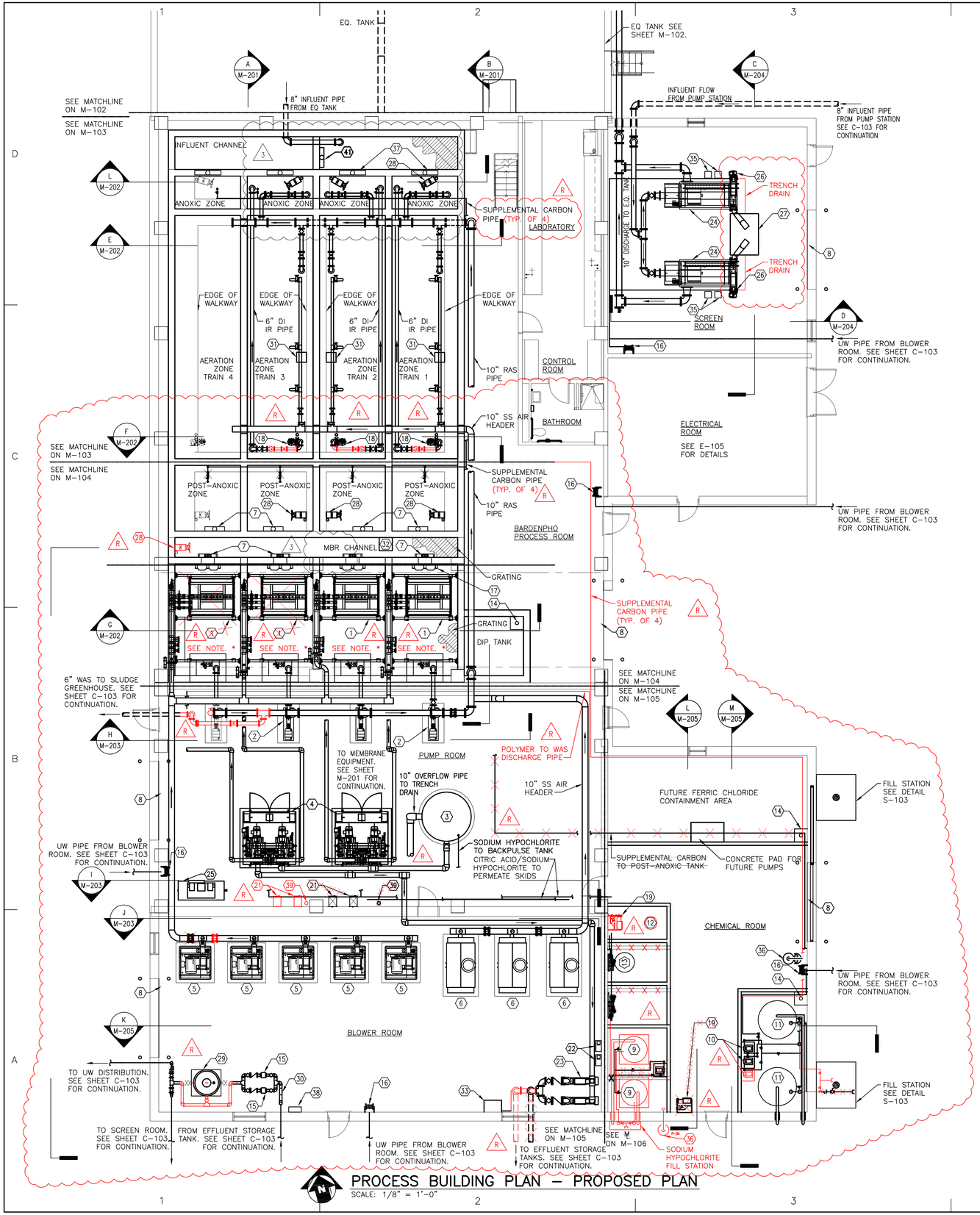

PROCESS BUILDING PLAN – PROPOSED PLAN

SCALE: 1/8" = 1'-0"

GENERAL SHEET NOTES:

1. EQUIPMENT ASSOCIATED WITH THE MEMBRANE UNITS HAS BEEN PRE-PURCHASED BY THE COUNTY AND WILL BE SUPPLIED BY GE. SEE SPECIFICATION SECTION 11900 FOR COMPLETE BILL OF MATERIALS. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETE INSTALLATION OF ALL PRE-PURCHASED EQUIPMENT INCLUDING BUT NOT LIMITED TO CONCRETE TANKS AND EQUIPMENT PADS, PROCESS PIPING, ELECTRICAL AND CONTROL WIRING, AND ALL ADDITIONAL APPURTANCES REQUIRED FOR A COMPLETE OPERABLE SYSTEM.
2. ALL PROCESS PIPING HAS NOT BEEN SHOWN ON THIS SHEET FOR CLARITY. REFER TO ENLARGED ROOM PLANS ON DRAWINGS M-102 THRU M-107 FOR ADDITIONAL DETAILS.
3. PIPING & EQUIPMENT LOCATED BENEATH TANK WALKWAYS HAS BEEN SHOWN FOR CLARITY. REFER TO M-200 SERIES DRAWINGS FOR MOUNTING HEIGHT OF PIPING AND EQUIPMENT WITHIN THE PROCESS TANKS.
4. DIFFUSER GRID IN AERATION TANKS NOT SHOWN FOR CLARITY. SEE DRAWING M-103 FOR DETAILS.
5. SEE STRUCTURAL & ARCHITECTURAL DRAWINGS FOR DETAILS OF TANK WALKWAYS, HANDRAILS AND GRATING.
6. WALL BASES AND DAVIT CRANES IN THE PROCESS ROOM FOR LIFTING PUMPS AND MIXERS OUT OF TANKS ARE NOT SHOWN FOR CLARITY.
7. ALL BELOW GRADE DUCTILE IRON PIPE AND FITTINGS SHALL BE MECHANICAL JOINT.
8. EQUIPMENT SHOWN GREYSCALE IS FOR FUTURE EXPANSION AND SHALL NOT BE SUPPLIED OR CONSTRUCTED UNDER THIS CONTRACT.
9. ALL PIPE PENETRATIONS BETWEEN PUMP ROOM & BARDENPHO PROCESS ROOM SHALL BE SEALED GAS TIGHT IN ACCORDANCE W/ DETAIL 3 ON M-401.

SHEET KEYNOTES:

1. MEMBRANE UNITS (SUPPLIED BY GE)
2. RAS PUMP
3. BACKPULSE TANK. SEE M-403 FOR DETAILS.
4. PERMEATE PUMP SKID (SUPPLIED BY GE)
5. MEMBRANE BLOWER (SUPPLIED BY GE)
6. AERATION BLOWER
7. 24"X24" SLUICE GATE.
8. 12'-0" ROLL-UP COILING DOOR. SEE ARCH. DWGS
9. ~~275~~ 375 GAL SODIUM HYPOCHLORITE ~~TOTE~~ TANK
10. CHEMICAL FEED PUMP
11. 500 GAL SUPPLEMENTAL CARBON TANK
12. POLYMER 55 GAL. DRUM
13. CITRIC ACID DAY TANK & PUMP SKID (SUPPLIED BY GE)
14. SUMP
15. UTILITY WATER PUMP
16. HOSE REEL
17. FRP BAFFLE. SEE M-401 FOR DETAILS
18. SUBMERSIBLE IR PUMP
19. POLYMER BLENDING UNIT
20. SODIUM HYPOCHLORITE ~~DAY TANK &~~ PUMP SKID (SUPPLIED BY GE)
21. AIR DRYER (SUPPLIED BY GE)
22. UV DISINFECTION CONTROL PANEL.
23. UV DISINFECTION EQUIPMENT
24. ROTARY DRUM SCREEN
25. AIR COMPRESSOR (SUPPLIED BY GE)
26. SCREENINGS COMPACTOR
27. 2 CUBIC YARD DUMPSTER
28. SUBMERSIBLE MIXER
29. HYDROPNEUMATIC BLADDER TANK
30. Y-STRAINER
31. DISSOLVED OXYGEN PROBE. SEE I-401 FOR DETAILS
32. NITRATE ANALYZER. SEE I-401 FOR DETAILS
33. COMPOSITE SAMPLER
34. WALL DAVIT CRANE BASE. SEE M-401 FOR DETAILS.
35. SCREEN/COMPACTOR PUSH BUTTON STATION. SEE E-105 FOR DETAILS
36. EMERGENCY SHOWER/EYE WASH. SEE H-103 FOR DETAILS.
37. 48"x24" SLUICE GATE
38. UTILITY WATER CONTROL PANEL
39. PRIMARY COALESCING FILTER W/INTEGRAL AUTO DRAIN (SUPPLIED BY GE)
40. ~~24"X24" SLIDE GATE~~
41. ~~36"X36" SLIDE GATE~~ 60"X60" STOP PLATE

R * MEMBRANE UNIT IN TRAIN 3 MOVED TO MEMBRANE TANK TRAIN 1. MEMBRANE UNIT IN TRAIN 4 MOVED TO MEMBRANE TANK TRAIN 2.

SCALE: 1/8"= 1'-0"

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

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CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

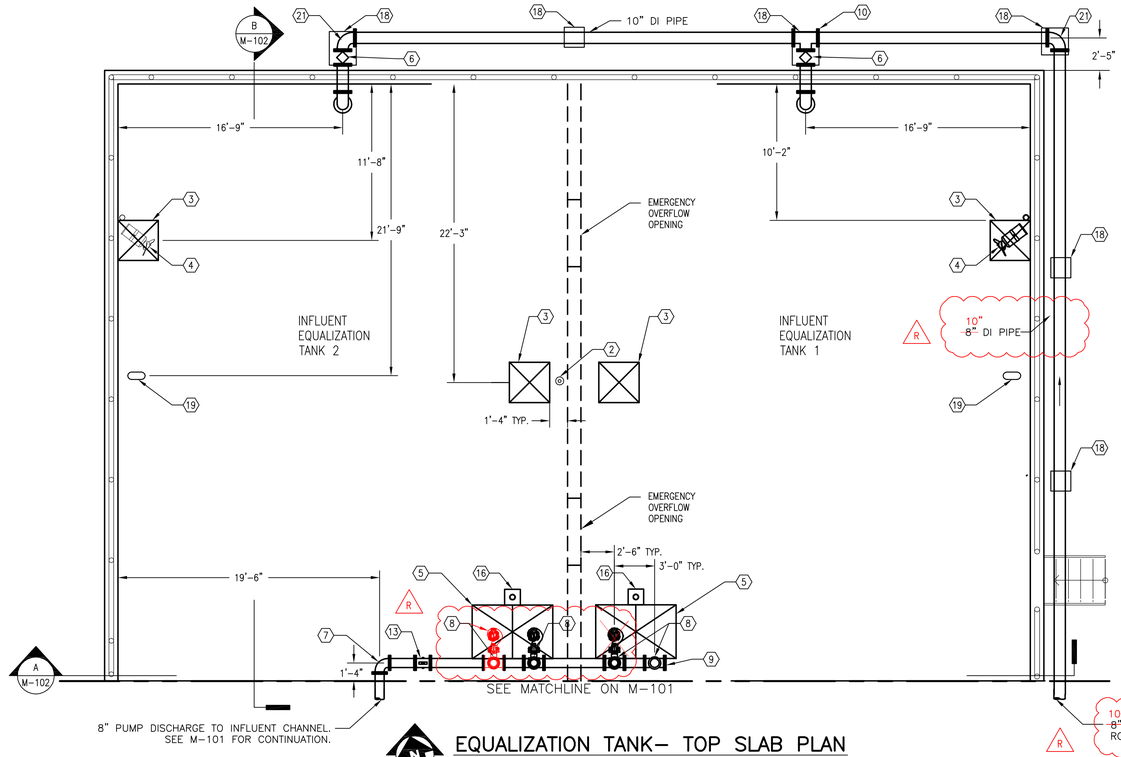
SHEET TITLE
PROCESS BUILDING PROPOSED PLAN

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	MAR. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
A	NOV. 2014	RECORD DRAWINGS

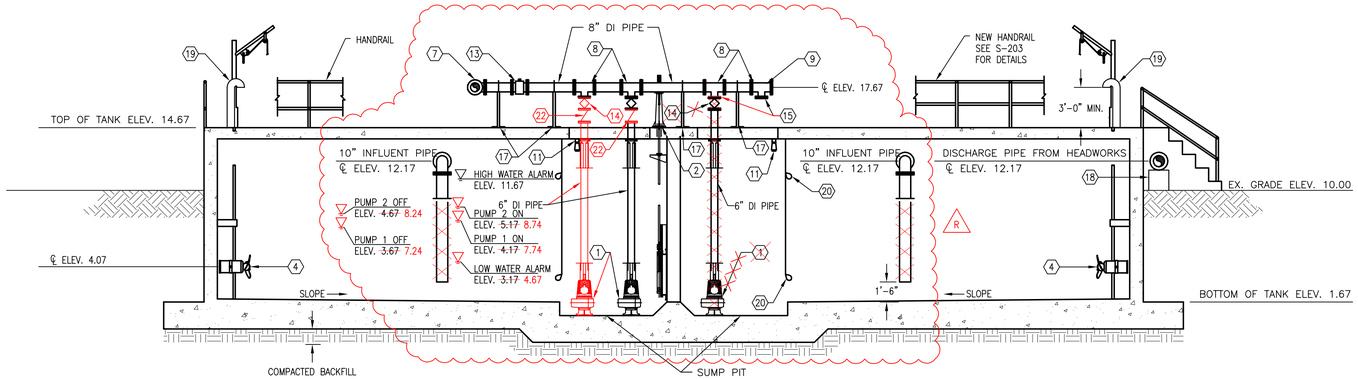
CONTRACT NO. #140-10-01
DATE: SEPTEMBER 2012
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-101

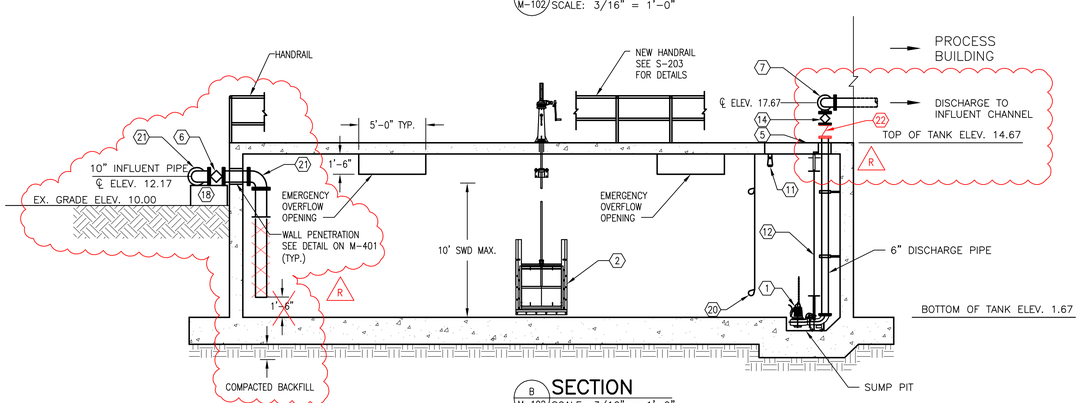
SHEET 62 OF 128



EQUALIZATION TANK– TOP SLAB PLAN
SCALE: 3/16" = 1'-0"



A M-102 SECTION
SCALE: 3/16" = 1'-0"



B M-102 SECTION
SCALE: 3/16" = 1'-0"

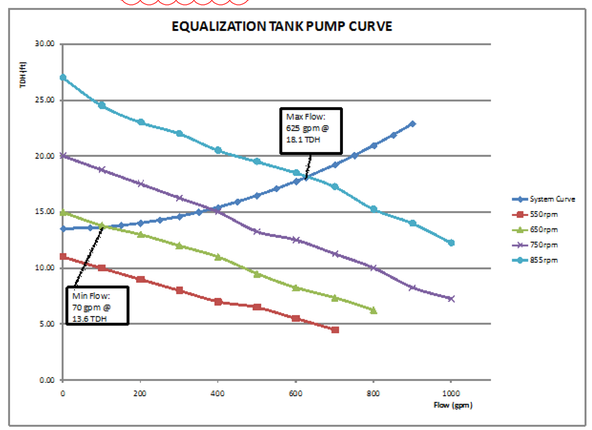
GENERAL SHEET NOTES:

1. ALL ABOVE GRADE PIPING SHALL BE INSULATED AND HEAT TRACED. SEE SPECIFICATION 11260 FOR DETAILS.
2. SEE DRAWING S–103 AND S–202 FOR EQUALIZATION TANK CONSTRUCTION.
3. COORDINATE ACCESS HATCH PLACEMENT AND HATCH OPENING WITH EQUIPMENT INSTALLATION AND REMOVAL. HATCH DOORS SHALL BE PLACED SUCH THAT OPEN DOOR DOES NOT OBSTRUCT JIB CRANE.
4. PEDESTAL BASE AND DAVIT CRANE FOR LIFTING PUMPS AND MIXERS OUT OF THE EQUALIZATION TANK ARE NOT SHOWN FOR CLARITY.

SHEET KEYNOTES:

1. SUBMERSIBLE INFLUENT PUMP (TYP. OF 2)
2. 24"x24" SLUICE GATE
3. 3'–0"x3'–0" ACCESS HATCH. (SEE DETAILS M–402)
4. SUBMERSIBLE MIXER WITH GUIDE RAIL (SEE DETAIL ON M–401)
5. 4'–0"x6'–0" ACCESS HATCH. (SEE DETAILS M–402)
6. 10" PLUG VALVE WITH HANDWHEEL ACTUATOR
7. 8" DI 90° BEND
8. 8"x6" DI TEE
9. 8" BLIND FLANGE
10. 10"x10" DI TEE
11. ULTRASONIC LEVEL SENSOR. SEE I–401 FOR DETAILS.
12. GUIDE RAIL
13. 8" FLOW METER
14. 6" PLUG VALVE
15. 6" BLIND FLANGE
16. PEDESTAL DAVIT CRANE BASE (SEE DETAIL ON M–401)
17. PIPE SUPPORT (SEE SPECIFICATION SECTION 11410.)
18. CONCRETE PIPE SUPPORT (SEE DETAIL ON S–301)
19. 6" STAINLESS STEEL VENTILATION PIPE WITH GOOSE NECK AND BIRD SCREEN. SEE CONNECTION DETAIL TO TANK TOP SLAB ON M–401
20. LEVEL FLOATS. SEE I–401 FOR DETAILS.
21. 10" D.I 90° BEND
22. 6" CHECK VALVE

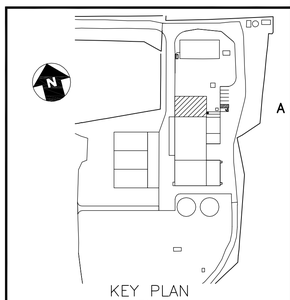
RECORD DRAWING SET JANUARY 2015



PUMP TYPE	NO. OF UNITS	DESIGN FLOW	TDH	POWER	BASIS OF DESIGN
VARIABLE SPEED SUBMERSIBLE	1 PER TANK, 2 TOTAL	PRIMARY DESIGN MIN. FLOW: 70 GPM MAX FLOW: 625 GPM	PRIMARY TDH 13.6ft – 18.1ft SECONDARY 6ft – 8.6ft	7.5 HP MAX	FAIRBANKS MORSE OR APPROVED EQUAL

PUMP OPERATING LEVELS	
HIGH ALARM	ELEV. 11.67
PUMP 1 ON	ELEV. ~~4.17~~ 7.74
PUMP 2 ON	ELEV. ~~5.17~~ 8.74
PUMP 1 OFF	ELEV. ~~3.67~~ 7.24
PUMP 2 OFF	ELEV. ~~4.67~~ 8.24
LOW LEVEL ALARM	ELEV. ~~3.17~~ 4.67

2' 0 2' 4' 6'
SCALE: 3/16"= 1'–0"



PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 20330 EXPIRATION DATE 01/29/2012.

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING
EQUALIZATION TANK
TOP SLAB PLAN AND SECTIONS

MARK	DATE	DESCRIPTION
A	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-102

SHEET 63 OF 128

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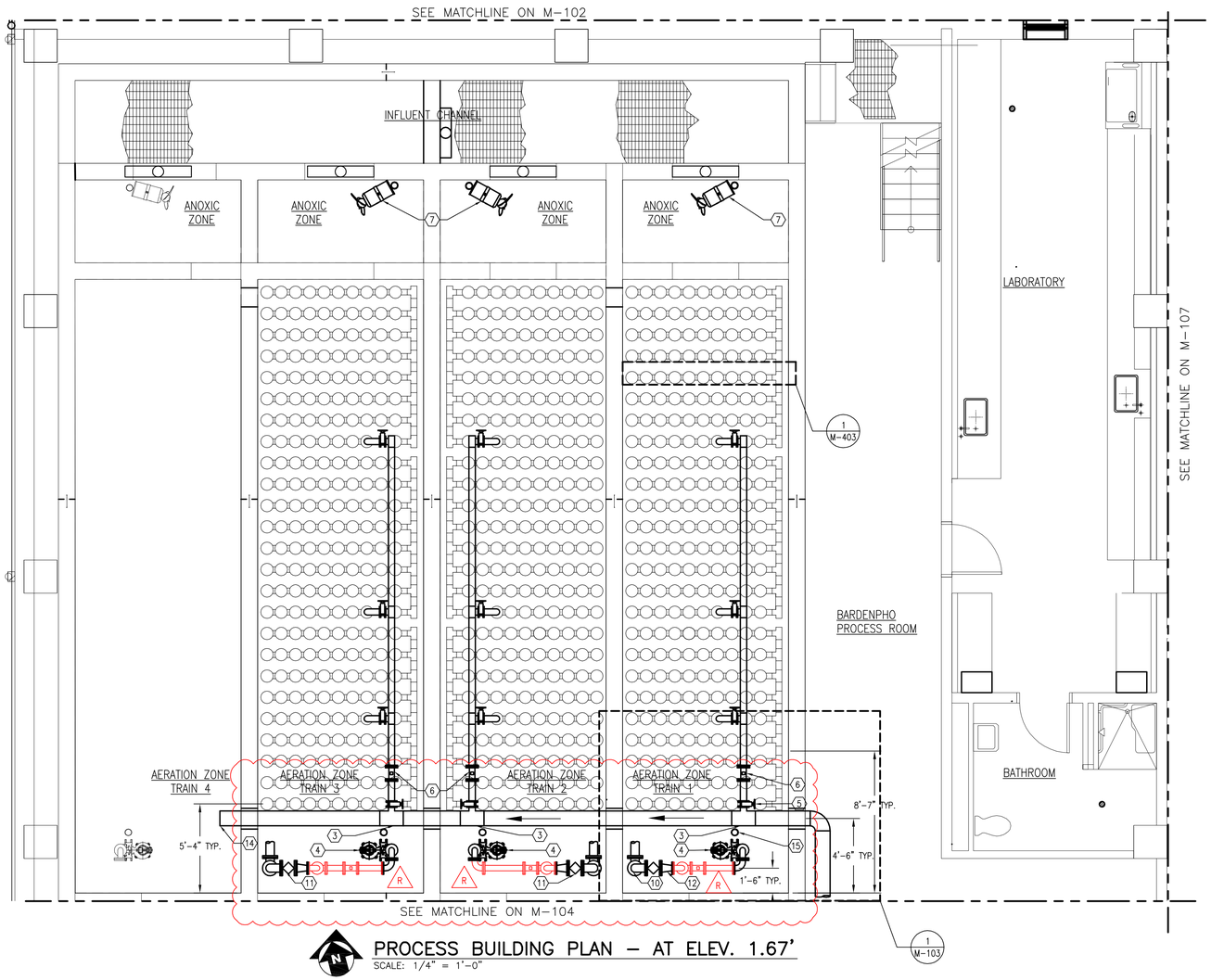
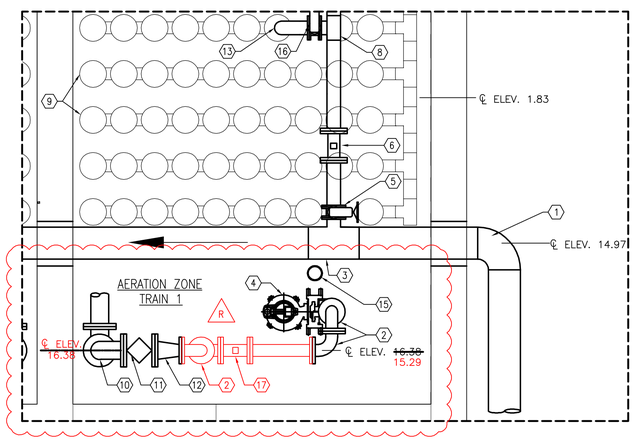


PROCESS BUILDING PLAN – AT ELEV. 1.67'

SCALE: 1/4" = 1'-0"



1 M-103 DIFFUSER LAYOUT DETAIL

SCALE: 1/2" = 1'-0"

GENERAL SHEET NOTES:

1. DIFFUSER LAYOUT SHOWN MAY VARY BY MANUFACTURER. REFER TO TABLE ON THIS SHEET FOR AERATION REQUIREMENTS.
2. DIFFUSER COUNT IS BASED UPON 9" MEMBRANE FINE BUBBLE DIFFUSERS. SEE SPECIFICATION SECTION 11375 FOR ADDITIONAL REQUIREMENTS.
3. ALL PROCESS PIPING HAS NOT BEEN SHOWN ON THIS SHEET FOR CLARITY. REFER TO ENLARGED ROOM PLANS ON DRAWINGS M-102 THRU M-107 FOR ADDITIONAL DETAILS.
4. SEE DIFFUSER MOUNTING DETAILS ON DRAWING M-403.
5. 6" DI PLUG VALVE INTERNAL RECYCLE DISCHARGE SHALL BE USED FOR THROTTLING APPLICATION TO ACHIEVE DESIGN POINTS INDICATED ON PUMP CURVE.
6. WALL MOUNTED BASE FOR DAVIT CRANE FOR LIFTING PUMPS AND MIXERS FROM PROCESS ROOM NOT SHOWN FOR CLARITY
7. EQUIPMENT SHOWN GREYSCALE IN TRAIN 4 ARE FOR FUTURE EXPANSION AND SHALL NOT BE SUPPLIED OR CONSTRUCTED UNDER THIS CONTRACT.

SHEET KEYNOTES:

1. 10" SS 90° BEND
2. 4" DI 90° BEND (TYP.)
3. 10"x4" SS TEE (TYP.)
4. SUBMERSIBLE IR PUMP (TYP.)
5. 4" MODULATING BUTTERFLY VALVE WITH ELECTRIC ACTUATOR (TYP.)
6. AIR FLOW METER (TYP.)
7. SUBMERSIBLE MIXER
8. 4"x4" SS TEE (TYP.)
9. 9"ø DIFFUSER DISC (TYP.)
10. 6" DI 90° VERTICAL BEND (TYP.)
11. 6" DI PLUG VALVE W/ ~~MANUAL~~ ACTUATOR
12. 6"X4" DI REDUCER
13. 4" SS 90° BEND
14. 10" SS END CAP
15. WALL DAVIT CRANE BASE. SEE DETAILS ON M-401
16. 4" BUTTERFLY VALVE W/ MANUAL ACTUATOR

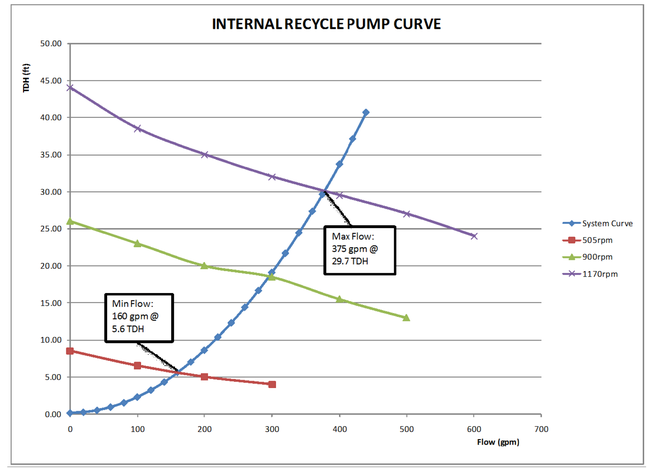
R 17 4" FLOW METER

TABLE: MINIMUM DIFFUSERS REQUIRED PER STAGE

ZONE	AIR REQUIRED – TOTAL 3 TRAINS (SCFM)	MINIMUM NUMBER DIFFUSERS PER TRAIN	MINIMUM NUMBER DIFFUSERS REQUIRED – TOTAL 3 TRAINS
AERATION	1510	250	750

TABLE: INTERNAL RECYCLE PUMP DESIGN

PUMP TYPE	NO. OF UNITS	FLOW	TDH	HP	BASIS OF DESIGN
VARIABLE SPEED SUBMERSIBLE	1 PER TRAIN, 3 TOTAL	375 GPM MAX. FLOW 160 GPM MIN. FLOW	29.7' MAX. 5.6 MIN.	5 MAX.	FAIRBANKS MORSE OR APPROVED EQUAL



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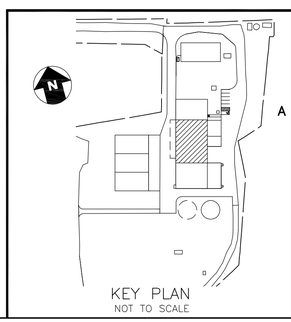
SCALE: 1/2"= 1'-0"

2' 0 2' 4'
SCALE: 1/4"= 1'-0"

RECORD DRAWING SET JANUARY 2015



WORCESTER COUNTY

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CONSULTANT
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Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING DIFFUSER LAYOUT PLAN

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-103

SHEET 64 OF 128

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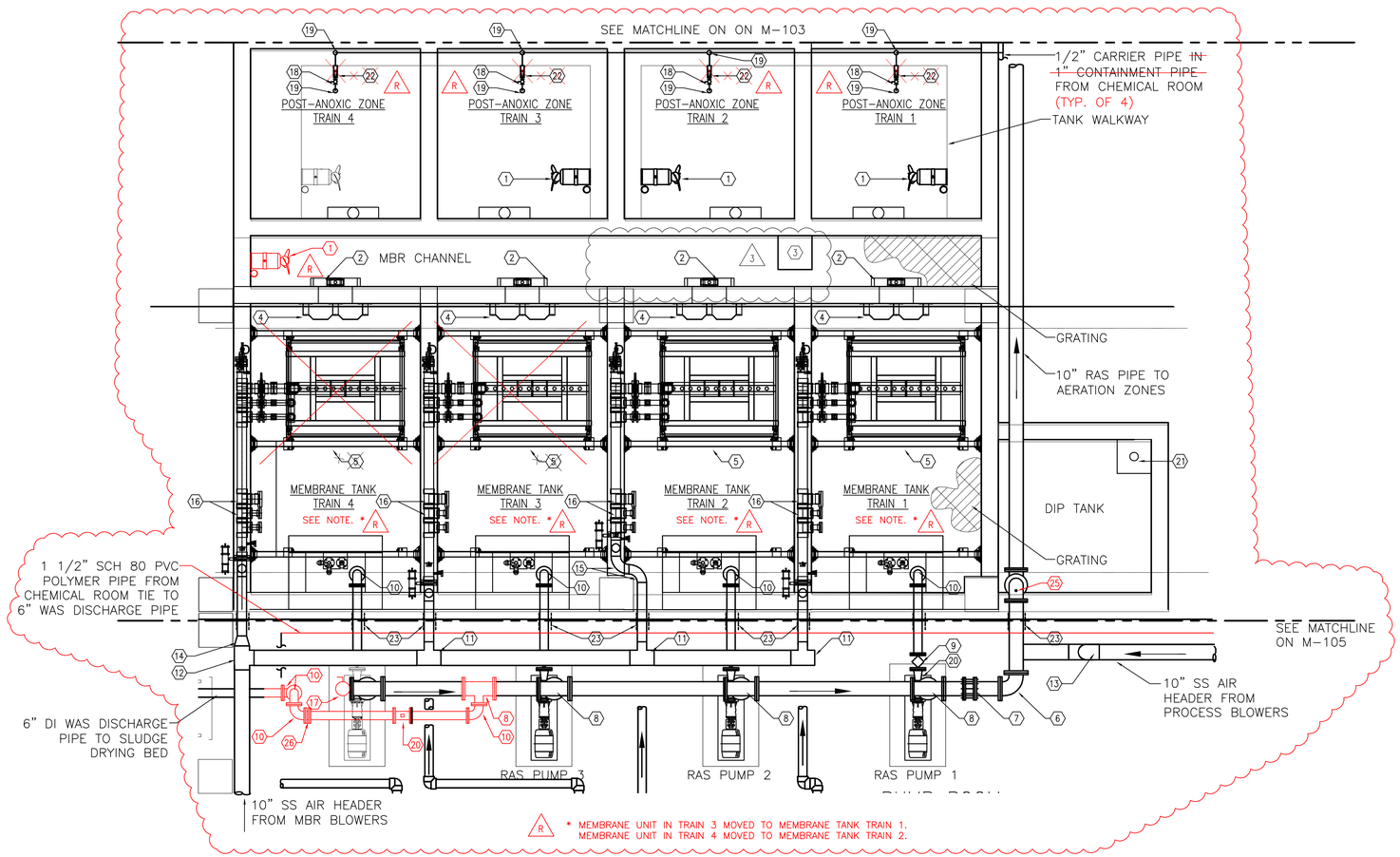


PLAN – BARDENPHO PROCESS ROOM POST-ANOXIC AND MEMBRANE TANKS

SCALE: 1/4" = 1'-0"

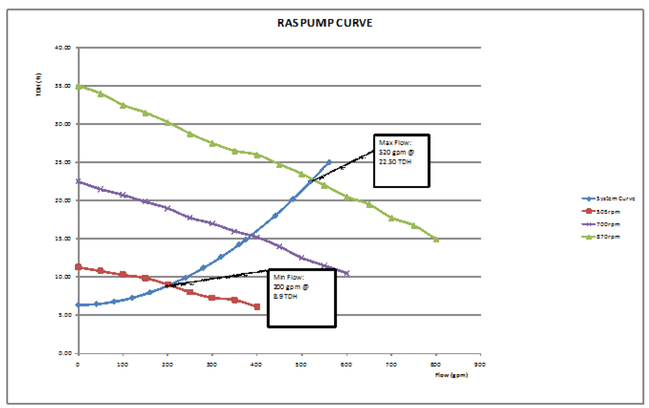
GENERAL SHEET NOTES:

1. EQUIPMENT ASSOCIATED WITH THE MEMBRANE UNITS HAS BEEN PRE-PURCHASED BY THE COUNTY AND WILL BE SUPPLIED BY GE. SEE SPECIFICATION SECTION 11900 FOR COMPLETE BILL OF MATERIALS. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETE INSTALLATION OF ALL PRE-PURCHASED EQUIPMENT INCLUDING BUT NOT LIMITED TO CONCRETE TANKS AND EQUIPMENT PADS, PROCESS PIPING, ELECTRICAL AND CONTROL WIRING, AND ALL ADDITIONAL APPURTANCES REQUIRED FOR A COMPLETE OPERABLE SYSTEM.
2. SEE SHEETS M-101 THRU M-107 FOR CONTINUATION OF PIPING NOT SHOWN ON THIS SHEET.
3. PIPE SUPPORTS ARE NOT SHOWN FOR CLARITY. PROVIDE PIPE SUPPORTS IN ACCORDANCE W/ SPECIFICATION SECTION 11410 & DETAILS ON S-301
4. SUPPLEMENTAL CARBON PIPE SHALL BE 1/2" PVC CARRIER PIPE IN 1" CONTAINMENT PIPE. CONTAINMENT PIPE SHALL BE PROVIDED FOR ALL AREAS OUTSIDE SUPPLEMENTAL CARBON CONTAINMENT AREA TO PROCESS TANKS. PIPING RUNNING INSIDE POST-ANOXIC ZONE TANKS DOES NOT REQUIRE CONTAINMENT PIPE.
5. COARSE BUBBLE DIFFUSERS IN DIP TANK NOT SHOWN IN PLAN FOR CLARITY.
6. WALL BASES AND DAVIT CRANE FOR LIFTING MIXERS NOT SHOWN FOR CLARITY.
7. EQUIPMENT SHOWN GREYSCALE ARE FOR FUTURE EXPANSION AND SHALL NOT BE SUPPLIED OR CONSTRUCTED UNDER THIS CONTRACT.

SHEET KEYNOTES:

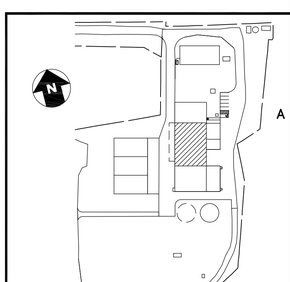
1. SUBMERSIBLE MIXER
2. 24"X24" SLUICE GATE
3. NITRATE ANALYZER. SEE I-401 FOR DETAILS
4. FRP BAFFLE. SEE M-404 FOR DETAILS
5. MEMBRANE UNIT
6. 10" DI 90° BEND
7. 10" EXPANSION COUPLING
8. 10"X6" DI TEE
9. 6" PLUG VALVE
10. 6" DI 90° BEND
11. 10"X6" SS TEE
12. 10"X6" SS TEE
13. 10" SS 90° BEND
14. 10"X6" SS REDUCER
15. 6" SS 90° BEND
16. 6"X6" SS TEE W/CAP
17. ~~1/2"X1/2" PVC TEE~~ FLUSH CONNECTION
18. 1/2" PVC BALL VALVE
19. 1/2" PVC 90° BEND
20. ~~6"X4" DI REDUCER~~ 6" FLOW METER
21. SUMP
22. ~~ROTAMETER~~
23. WALL PENETRATIONS. SEE DETAIL ON M-401
24. ~~24"x24" SLIDE GATE~~
25. AIR RELEASE VALVE
26. 6" EXPANSION COUPLING

TABLE: RETURN ACTIVATED SLUDGE PUMP DESIGN					
PUMP TYPE	NO. OF UNITS	FLOW	TDH	HP	BASIS OF DESIGN
VARIABLE SPEED CENTRIFUGAL	1 PER TRAIN, 3 TOTAL	520 GPM MAX. FLOW 200 GPM MIN. FLOW	22.5' MAX. 8.9' MIN.	7.5 MAX	FAIRBANKS MORSE OR APPROVED EQUAL



RECORD DRAWING SET JANUARY 2015

2' 0 2' 4'
SCALE: 1/4" = 1'-0"



WORCESTER COUNTY

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CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	MAR. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
A	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE: MYSTIC HARBOUR WWTP UPGRADE AND PLANT EXPANSION

SHEET TITLE: PLAN- BARDENPHO PROCESS ROOM POST-ANOXIC AND MEMBRANE TANKS

CONTRACT NO. #140-10-01
DATE: SEPTEMBER 2012
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-104

SHEET 65 OF 128

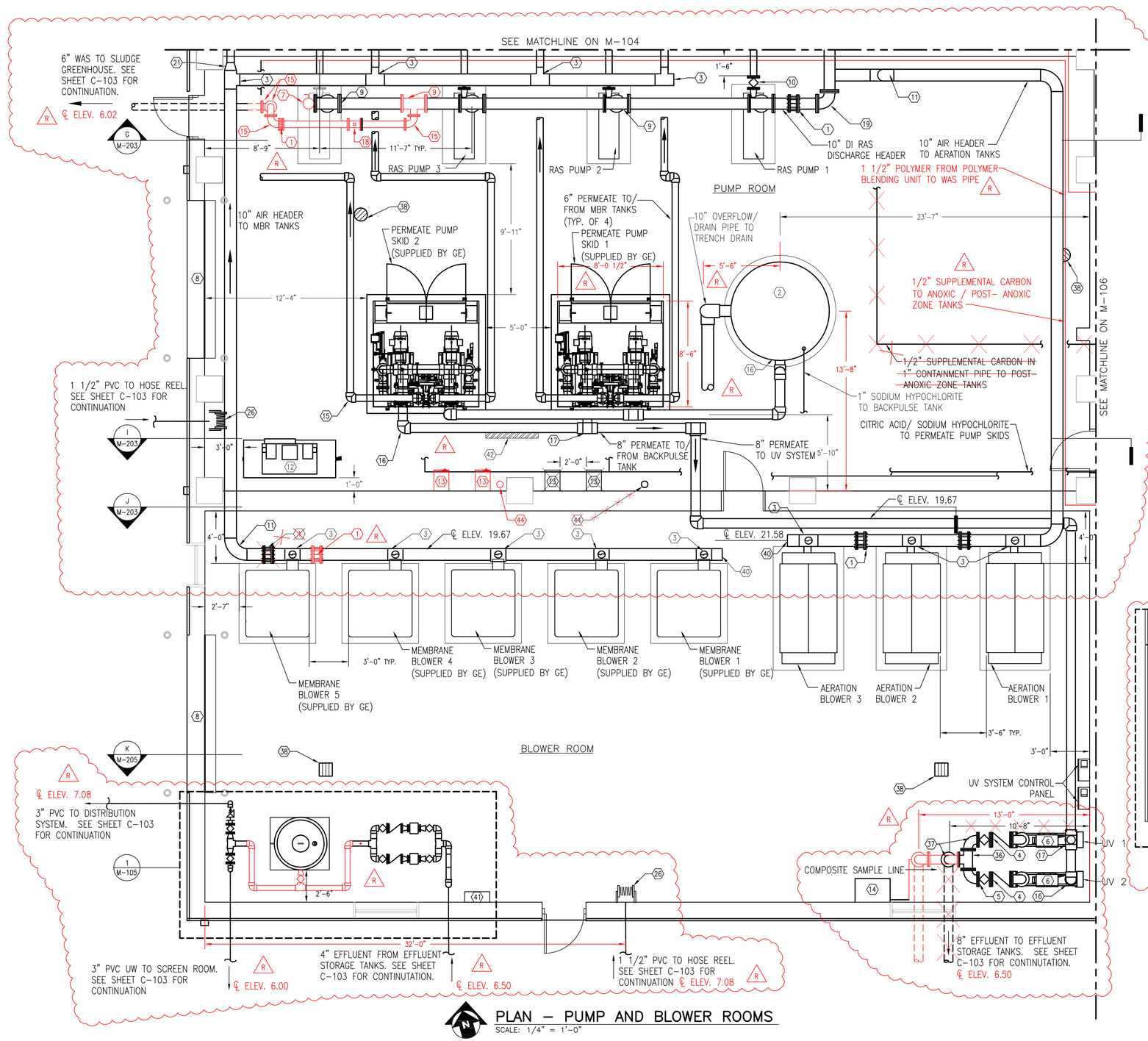
File: Q:\SMD\07062_MysticHarbourWWTPImprovProjCivil_EP\4-DADV\IS-BUILTS\MEP\HVAC\M-104 POST-ANOXIC AND MEMBRANE TANKS_PLAN DC.dwg
Jan 12, 2015 - 11:49:33am

GENERAL SHEET NOTES:

1. EQUIPMENT ASSOCIATED WITH THE MEMBRANE UNITS HAS BEEN PRE-PURCHASED BY THE COUNTY AND WILL BE SUPPLIED BY GE. SEE SPECIFICATION SECTION 11900 FOR COMPLETE BILL OF MATERIALS TO BE PROVIDED. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETE INSTALLATION OF ALL PRE-PURCHASED EQUIPMENT AS WELL AS SUPPLY AND INSTALLATION OF ANCILLARY ITEMS INCLUDING BUT NOT LIMITED TO CONCRETE TANKS AND EQUIPMENT PAD, PROCESS PIPING, ELECTRICAL AND CONTROL WIRING, AND ALL ADDITIONAL APPURTENANCES REQUIRED FOR A COMPLETE OPERABLE SYSTEM.
2. SEE GE DRAWINGS IN APPENDIX DRAWING SET FOR INFORMATION ON CONNECTING PIPING AND INSTALLATION OF PRE-PURCHASED EQUIPMENT.
3. BRIDGE CRANE FOR BLOWER REMOVAL IS NOT SHOWN FOR CLARITY. SEE DRAWINGS S-403 AND M-203 FOR DETAILS.
4. ALL PIPE PENETRATIONS BETWEEN PUMP ROOM & BARDENPHO PROCESS SHALL BE SEALED GAS TIGHT IN ACCORDANCE W/ DETAIL 3 ON M-401.
5. ALL PERMEATE SKID AND GE ASSOCIATED EQUIPMENT DRAIN PIPES SHALL DISCHARGE TO TRENCH DRAIN. SEE GE DRAWING P&ID-005

SHEET KEYNOTES:

1. EXPANSION COUPLING
2. BACKPULSE TANK. SEE M-403 FOR DETAILS
3. 10"x6" SS TEE (TYP.)
4. 8" CHECK VALVE
5. 8" PLUG VALVE
6. UV DISINFECTION EQUIPMENT
7. ~~BALL VALVE~~ FLUSH CONNECTION
8. 12'-0" ROLL-UP COILING DOOR
9. 10"x6" DI TEE (TYP.)
10. 6" DI PLUG VALVE (TYP.)
11. 10" SS 90° BEND
12. AIR COMPRESSOR (SUPPLIED BY GE)
13. AIR DRYER (SUPPLIED BY GE)
14. COMPOSITE SAMPLER
15. 6" SCH. 80 PVC 90° BEND (TYP.)
16. 8" SCH. 80 PVC 90° BEND (TYP.)
17. 8"X8" SCH. 80 PVC TEE (TYP.)
18. ~~10"X8" SS REDUCER~~ 6" FLOW METER
19. 10" DI 90° BEND
20. ~~8"X6" SS TEE (TYP.)~~
21. 4"x2" SCH. 80 PVC REDUCER
22. ~~1" PE TUNING INSIDE 1" PVC PIPE (TYP.)~~
23. UTILITY WATER PUMP
24. HYDROPNEUMATIC BLADDER TANK
25. Y STRAINER
26. HOSE REEL
27. 3" SCH. 80 PVC 90° BEND (TYP.)
28. PRESSURE REDUCING VALVE
29. 3" PLUG VALVE (NORMALLY OPEN)
30. 4"x3" SCH. 80 PVC REDUCER
31. 4"x4" SCH. 80 PVC TEE
32. 4" PLUG VALVE (NORMALLY CLOSED)
33. 4" SCH. 80 PVC 90° BEND
34. 4" PLUG VALVE (NORMALLY OPEN)
35. 4" CHECK VALVE
36. 8"x8" DI TEE
37. 8" DI 90° BEND
38. FLOOR DRAINS. SEE H-103 FOR DETAILS
39. ~~8" STAINLESS STEEL BLIND FLANGE~~
40. 10" STAINLESS STEEL BLIND FLANGE
41. UTILITY WATER CONTROL PANEL
42. TRENCH DRAIN.
43. 8" SCH. 80 PVC BLIND FLANGE
44. PRIMARY COALESCING FILTER W/INTEGRAL AUTO DRAIN (SUPPLIED BY GE)



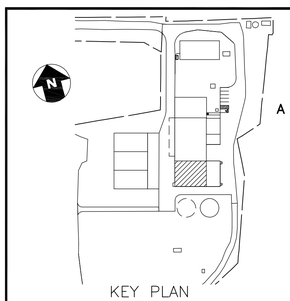
PLAN – PUMP AND BLOWER ROOMS
SCALE: 1/4" = 1'-0"

1 M-105 DETAIL– UTILITY WATER EQUIPMENT
SCALE: 3/8" = 1'-0"

SCALE: 3/8"= 1'-0"

SCALE: 1/4"= 1'-0"

RECORD DRAWING SET JANUARY 2015



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LICENSE NO. 20330
EXPIRATION DATE 01/29/2012.

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

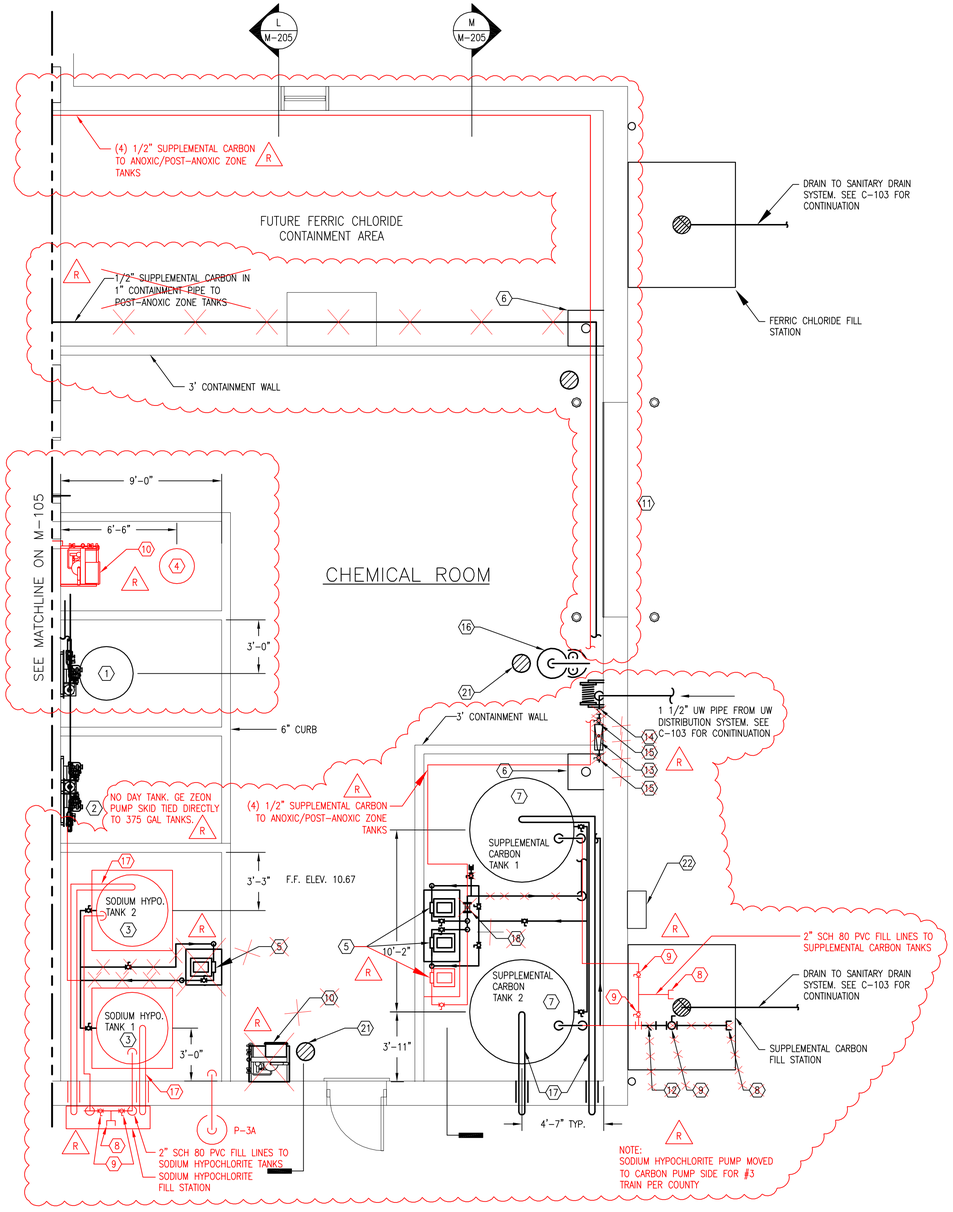
SHEET TITLE
PROCESS BUILDING
PUMP AND BLOWER ROOMS - PLAN

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-105

SHEET 66 OF 128



PLAN – CHEMICAL ROOM

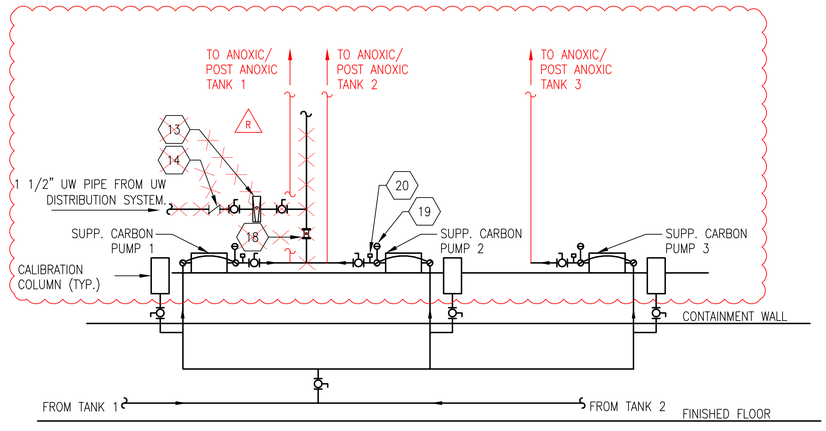
SCALE: 1/4" = 1'-0"

GENERAL SHEET NOTES:

1. POTABLE WATER SHALL BE SUPPLIED TO POLYMER BLENDING UNIT IN ACCORDANCE W/ MANUFACTURERS REQUIREMENTS AND SPECIFICATION SECTION 11500. SEE DRAWING H-102 FOR DETAILS.

SHEET KEYNOTES:

1. CITRIC ACID DAY TANK AND PUMP SKID (SUPPLIED BY GE)
2. SODIUM HYPOCHLORITE ~~DAY TANK AND~~ PUMP SKID (SUPPLIED BY GE)
3. 375 GAL SODIUM HYPOCHLORITE ~~TOTE~~ TANKS (R)
4. POLYMER – 55 GALLON DRUM
5. CHEMICAL FEED PUMP
6. SUMP
7. 500 GALLON SUPPLEMENTAL CARBON TANK
8. ~~2"~~ 4" QUICK CONNECT (R)
9. ~~2"~~ 4" BALL VALVE (R)
10. POLYMER BLENDING UNIT
11. 12'-0" ROLL-UP COILING DOOR
12. 4" WYE-STRAINER
13. ROTAMETER
14. ~~1/2" PVC CHECK VALVE~~ (R)
15. 1/2" PVC BALL VALVE
16. EMERGENCY SHOWER/EYE WASH STATION. SEE DETAIL ON H-402
17. 4" PVC TANK VENT
18. ~~MAGMETER~~ (R)
19. PULSATION DAMPNER
20. PRESSURE GAUGE. SEE M-401 FOR DETAILS.
21. FLOOR DRAIN. SEE H-103 FOR DETAILS.
22. FILL STATION ALARM PANEL.



CHEMICAL ROOM – SUPPLEMENTAL CARBON

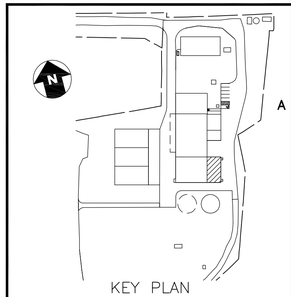
SCALE: NOT TO SCALE

(R) NOTE: EACH TANK (1-3) HAS ITS OWN CARBON PUMP TO ANOXIC/ POST-ANOXIC ZONES. TANK 4 PUMP NOT INSTALLED

2' 0 2' 4'

SCALE: 1/4"= 1'-0"

RECORD DRAWING SET JANUARY 2015



KEY PLAN
NOT TO SCALE

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PROJECT TITLE	MYSTIC HARBOUR WWTP UPGRADE AND PLANT EXPANSION
SHEET TITLE	PROCESS BUILDING CHEMICAL ROOM - PLAN

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-106

SHEET 67 OF 128

File: G:\SMD\07\0962_MysticHarbourWWTPImprProvExt_EP\1-CADD\XS-BUILT\MEP\MWOA\M-106 CHEMICAL ROOM_PLAN.dwg
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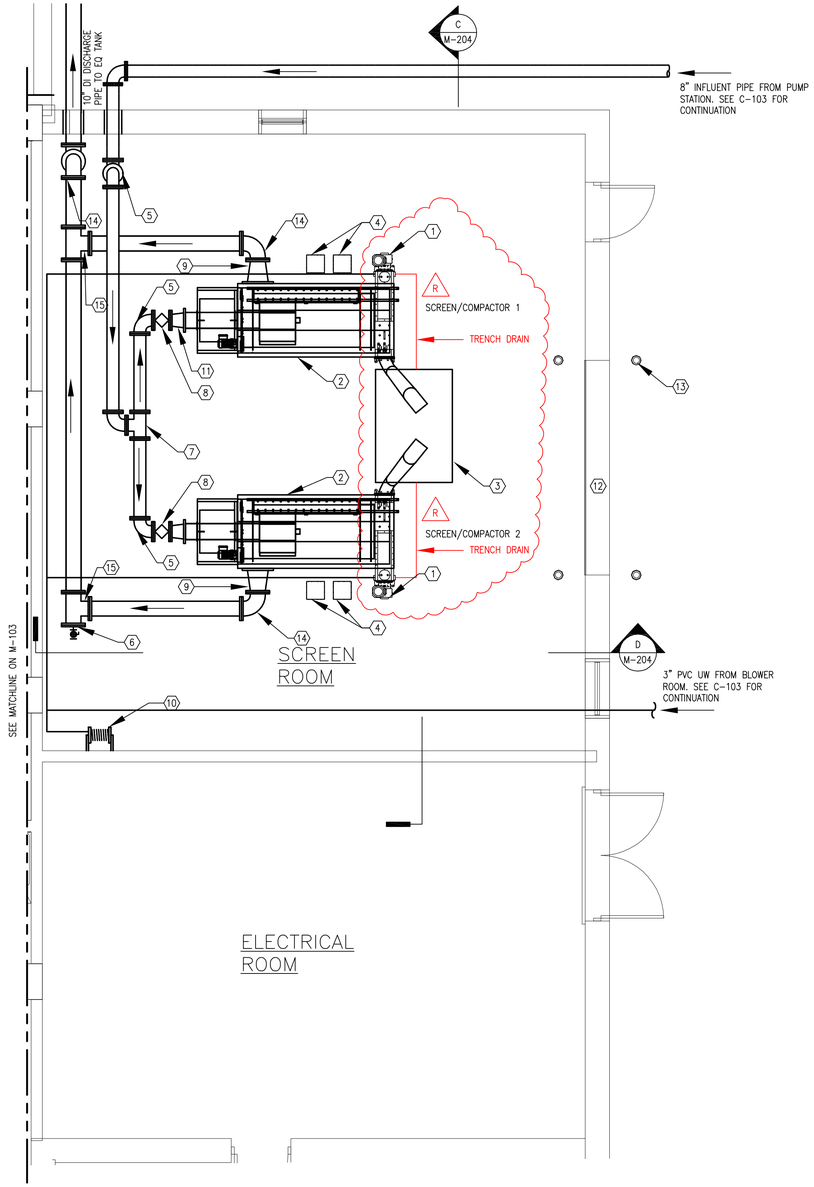


PLAN – SCREEN / ELECTRICAL ROOM
SCALE: 1/4" = 1'-0"

GENERAL SHEET NOTES:

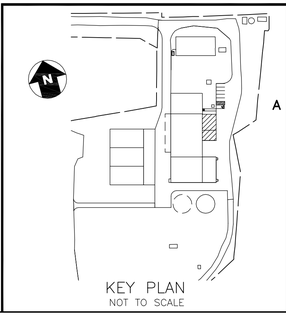
1. PIPE SUPPORTS ARE NOT SHOWN FOR CLARITY. SEE SPECIFICATION SECTION 11410 FOR REQUIREMENTS.
2. ALL BELOW GRADE DUCTILE IRON PIPE AND FITTINGS SHALL BE MECHANICAL JOINT.
3. TRENCH DRAINS NOT SHOWN FOR CLARITY. SEE S-DWGS FOR DETAILS.
4. SEE UTILITY WATER RISER DIAGRAM ON M-204

SHEET KEYNOTES:

1. SCREENINGS COMPACTOR
2. ROTARY DRUM SCREEN
3. 2 CUBIC YARD DUMPSTER
4. SCREEN/COMPACTOR PUSH BUTTON STATION. SEE E-105 FOR DETAILS
5. 8" DI 90° BEND
6. 10" BLIND FLANGE W/THREADED 1 1/2" PVC CONNECTION & BALL VALVE
7. 8"X8" DI TEE
8. 8" PLUG VALVE
9. 14"X10" DI REDUCER
10. HOSE REEL
11. 10"X8" DI REDUCER
12. 12'-0" ROLL-UP COILING DOOR
13. BOLLARDS (TYP.)
14. 10" DI 90° BEND
15. 10"X10" DI TEE

2' 0 2' 4'
SCALE: 1/4"= 1'-0"

RECORD DRAWING SET JANUARY 2015



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MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING
SCREEN ROOM AND ELECTICAL ROOM - PLAN

M-107

SHEET 68 OF 128

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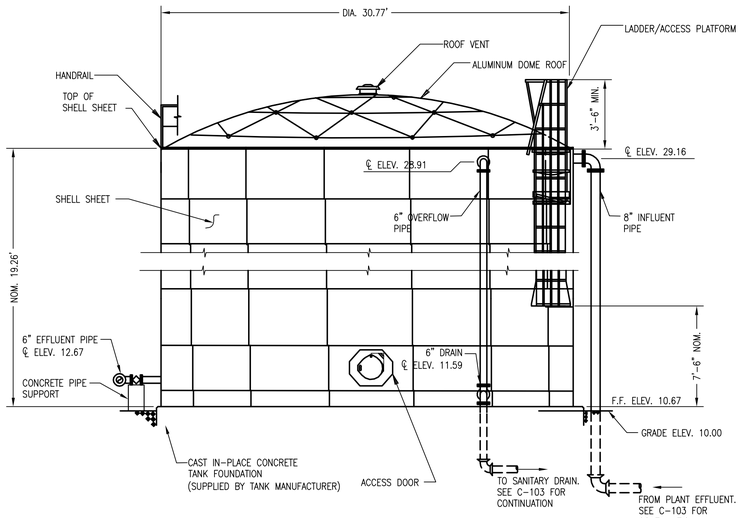
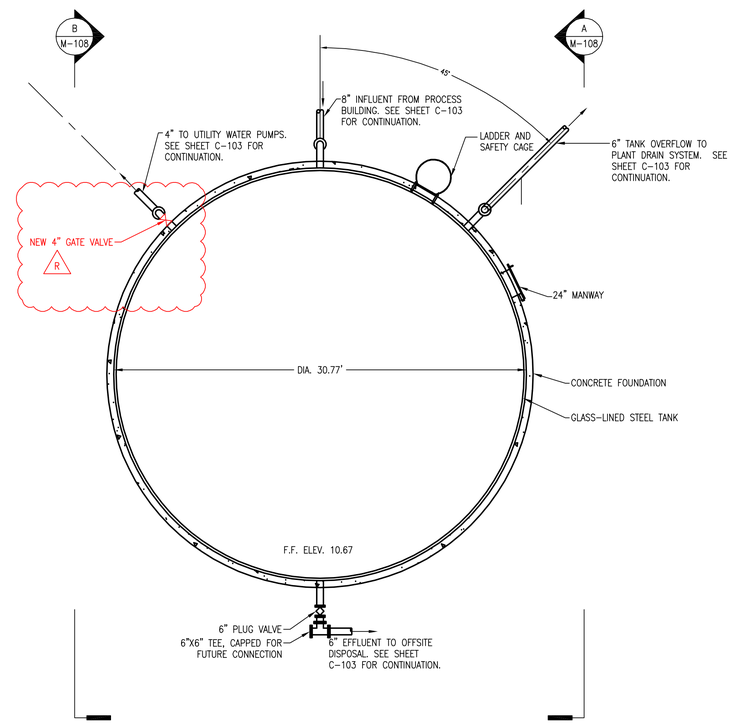
Jan 13, 2015 - 12:01:53pm

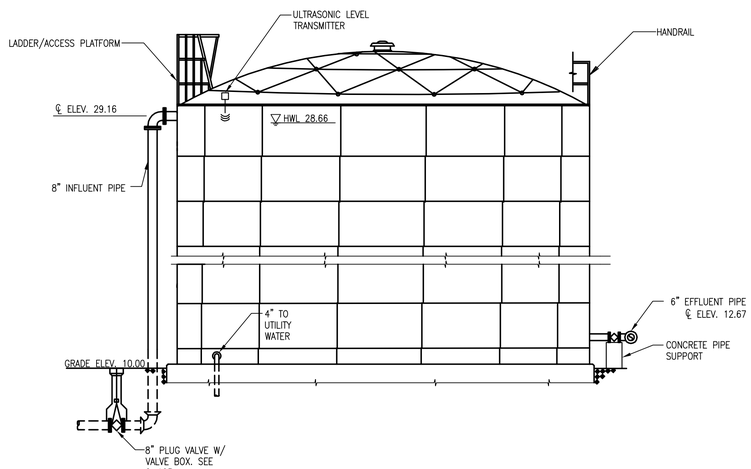
GENERAL SHEET NOTES:

1. EFFLUENT STORAGE TANK DESIGN IS BASED UPON AQUASTORE TANK MODEL 3119SSTT. 'OR EQUAL' TANKS SHALL BE APPROVED PER THE REQUIREMENTS OF SPECIFICATION SECTION 13380. CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING AND IMPLEMENTING ANY DESIGN CHANGES RESULTING FROM USE OF AN 'OR EQUAL' TANK TO ENGINEER FOR APPROVAL AT NO ADDITIONAL EXPENSE TO OWNER.
2. ALL ABOVE GRADE PIPING SHALL BE INSULATED AND HEAT TRACED. SEE SPECIFICATION SECTION 11260 FOR REQUIREMENTS.
3. TANK FOUNDATION SHALL BE SUPPLIED BY TANK MANUFACTURER. SEE SPECIFICATION SECTION 13380 FOR REQUIREMENTS.
4. TANK ULTRASONIC LEVEL TRANSMITTER SHALL BE LOCATED TO BE ACCESSIBLE FROM TANK LADDER/ACCESS PLATFORM.
5. HANDRAIL SHALL EXTEND AROUND ENTIRE TANK ROOF PERIMETER. NOT SHOWN FOR CLARITY.
6. ALL DUCTILE IRON PIPE FLANGED JOINT FITTINGS SHALL TRANSITION TO MECHANICAL JOINT BELOW GRADE.



A M-108 SECTION – EFFLUENT STORAGE TANK
SCALE: 3/16" = 1'-0"



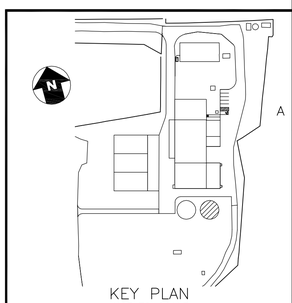


B M-108 SECTION – EFFLUENT STORAGE TANK
SCALE: 3/16" = 1'-0"

PLAN – EFFLUENT STORAGE TANK – ELEV. 10.67
SCALE: 3/16" = 1'-0"

2' 0 2' 4' 6'
SCALE: 3/16" = 1'-0"

RECORD DRAWING SET JANUARY 2015



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72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
EFFLUENT STORAGE TANK - PLAN AND SECTION

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-108

SHEET 69 OF 128

File: Q:\SMD\07062_MysticHarbour\WTPImpProv\Civil_ST\1-CAD\AS-BUILTS\MECHANICAL\M-108 EFFL TANK_PLAN.dwg
Jan 12, 2015 - 8:33:33am

PLAN – SLUDGE GREENHOUSE

SCALE: 1/8" = 1'-0"

GENERAL SHEET NOTES:

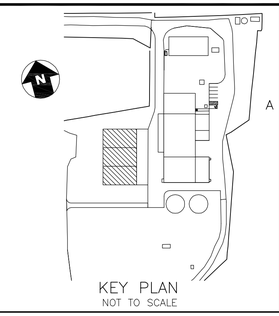
1. GREENHOUSE SUPERSTRUCTURE SHALL BE A PREFABRICATED STRUCTURE PROVIDED BY LUDY GREENHOUSE MANUFACTURING CORPORATION OR APPROVED EQUAL. SEE DRAWING S-201 FOR DETAILS.
2. SEE SHEET S-101 FOR GREENHOUSE FOUNDATION AND KNEEWALL DESIGN.
3. PERFORATED COLLECTION PIPE BENEATH PERMEABLE PAVEMENT SHOWN FOR CLARITY. SEE SECTIONS ON M-206 FOR ACTUAL PIPE LOCATION
4. ALL BELOW GRADE DUCTILE IRON PIPE AND FITTINGS SHALL BE MECHANICAL JOINT

SHEET KEYNOTES:

1. 6" DI PLUG VALVE W/ HANDWHEEL
2. 6" DI. 90° BEND
3. 6"x6" DI TEE
4. 2'-4" x 1'-0" CONCRETE SPLASH BLOCK. SEE M-206 FOR DETAILS
5. 6" SCH. 80 PVC WYE TO CLEANOUT. SEE C-402 FOR DETAILS
6. 6" SCH. 40 PERFORATED PVC TEE
7. CONCRETE SUPPORT. SEE S-101 FOR DETAILS
8. 10'-0" OVERHEAD COILING DOOR.
9. 6" SCH. 80 PVC 45° BEND
10. 6" DI. CAP
11. STOP PLATE. SEE SPECIFICATION SECTION 11200.

4' 0 4' 8'
SCALE: 1/8"= 1'-0"

RECORD DRAWING SET JANUARY 2015



WORCESTER COUNTY

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PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
SLUDGE GREENHOUSE
PROPOSED PLAN

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: SEPTEMBER 2012
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-109

SHEET 70 OF 128

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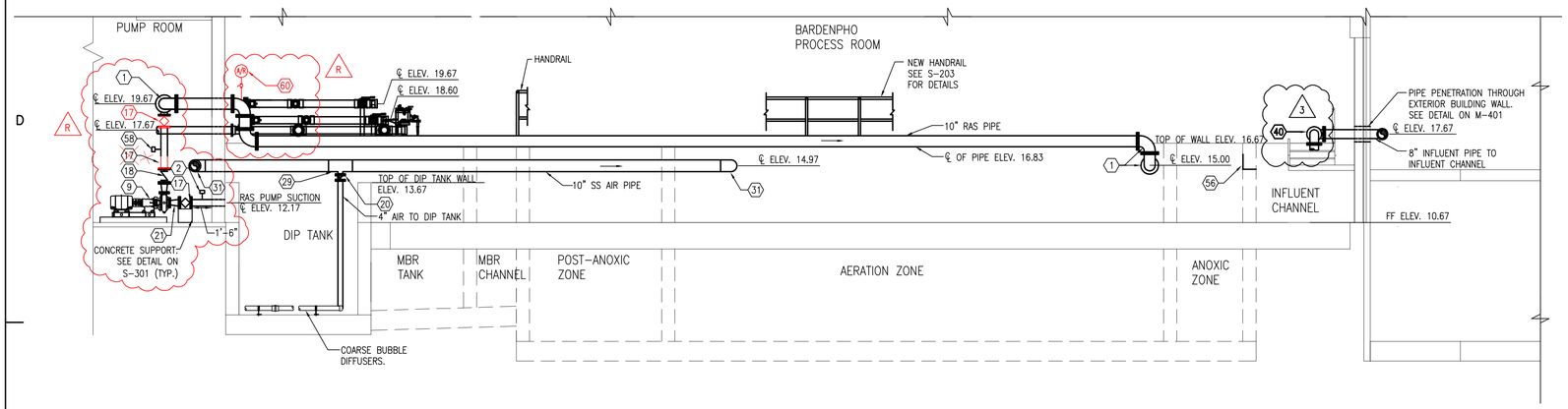


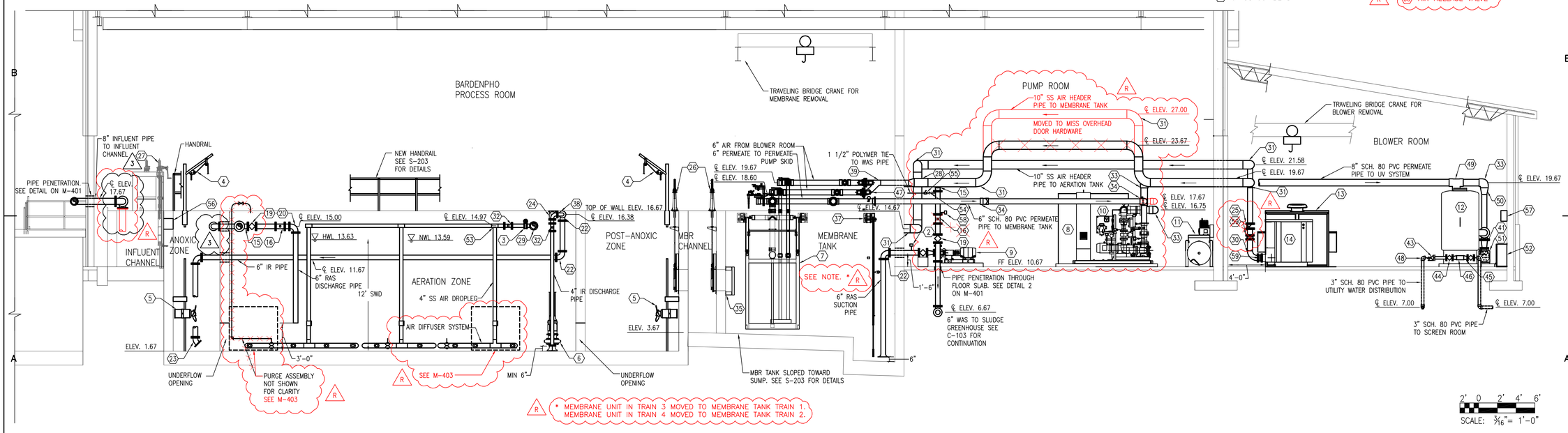
B M-101 SECTION – PROCESS TANK
SCALE: 3/16" = 1'-0"

GENERAL SHEET NOTES:

1. PIPE SUPPORTS ARE NOT SHOWN FOR CLARITY. SEE SPECIFICATIONS SECTION 11410. FOR REQUIREMENTS.
2. STAINLESS STEEL AIR PIPE SHALL BE WELDED EXCEPT WHERE FLANGE CONNECTIONS ARE REQ'D FOR CONNECTION TO VALVES, EXPANSION COUPLINGS ETC.
3. MOUNTING HEIGHT OF MIXERS TO BE DETERMINED BY MIXER MANUFACTURER.
4. ALL FLOWMETERS LOCATED WITHIN PROCESS TANK SHALL BE INSTALLED A MINIMUM OF 10" ABOVE HIGH WATER LEVEL (HWL) NOTED ON DRAWING.
5. ALL BELOW GRADE DUCTILE IRON PIPE AND FITTINGS SHALL BE MECHANICAL JOINT. ABOVE GRADE DI PIPING & FITTINGS MAY BE FLANGED OR GROOVED.

SHEET KEYNOTES:

1. 10" DI 90° BEND
2. PRESSURE GAUGE
3. 4" BUTTERFLY VALVE W/ ELECTRIC ACTUATOR
4. MIXER HOIST
5. MIXER
6. SUBMERSIBLE PUMP
7. MEMBRANE UNIT
8. BACKPULSE TANK
9. RAS PUMP
10. PERMEATE PUMP SKID (SUPPLIED BY GE)
11. AIR COMPRESSOR (SUPPLIED BY GE)
12. HYDROPNEUMATIC BLADDER TANK
13. AERATION BLOWER
14. MEMBRANE BLOWER (SUPPLIED BY GE)
15. 10"x6" DI TEE
16. 6" FLOWMETER
17. 6" PLUG VALVE W/ HAND WHEEL
18. 6" CHECK VALVE
19. 6" PLUG VALVE W/ ELECTRIC ACTUATOR
20. 4" BUTTERFLY VALVE.
21. 6"x4" DI REDUCER
22. 6" DI 90° BEND
23. 6" DI 45° BEND
24. PUMP GUIDE RAIL.
25. 6" BUTTERFLY VALVE
26. 24"X24" SLUICE GATE
27. 48"x24" SLIDE GATE
28. 10"x10" SS TEE
29. 10"x4" SS TEE
30. 6" SS 90° BEND
31. 10" SS 90° BEND
32. 4" FLOWMETER
33. 8" SCH. 80 PVC 90° BEND
34. 6" SCH. 80 PVC 90° BEND
35. FRP BAFFLE. SEE DETAILS ON M-404
36. 6" SCH. 80 PVC PIPE
37. LEVEL TRANSMITTER (SUPPLIED BY GE)
38. 4" DI 90° BEND
39. 6"X6" SS WYE
40. 8" DI 90° BEND
41. 8"x6" DI REDUCER
42. 10"x6" SS REDUCER
43. PRESSURE REDUCING VALVE
44. 3" PLUG VALVE
45. 4"X3" SCH. 80 PVC REDUCER
46. 4"X4" SCH. 80 PVC TEE
47. 6"X6" SS 45° BEND
48. 3" SCH. 80 PVC 90° BEND
49. 8"x8" SCH. 80 PVC REDUCER
50. 8"X6" SCH. 80 PVC REDUCER
51. UV SYSTEM (TYP. OF 2)
52. COMPOSITE SAMPLER
53. 4"x4" STAINLESS STEEL TEE
54. 1 1/2" CHECK VALVE
55. 1 1/2" BALL VALVE
56. WEIR V-NOTCH
57. UTILITY WATER CONTROL PANEL.
58. PRESSURE TRANSMITTER
59. EXPANSION COUPLING
60. AIR RELEASE VALVE



R * MEMBRANE UNIT IN TRAIN 3 MOVED TO MEMBRANE TANK TRAIN 1.
MEMBRANE UNIT IN TRAIN 4 MOVED TO MEMBRANE TANK TRAIN 2.

A M-101 SECTION – PROCESS TANKS
SCALE: 3/16" = 1'-0"

SCALE: 3/16" = 1'-0" (2' 0 2' 4' 6')

RECORD DRAWING SET JANUARY 2015

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 20330 EXPIRATION DATE 01/29/2012.

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	MAR. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
4	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING
PROPOSED SECTIONS

CONTRACT NO. #140-10-01
DATE: SEPTEMBER 2012
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-201

SHEET 71 OF 128

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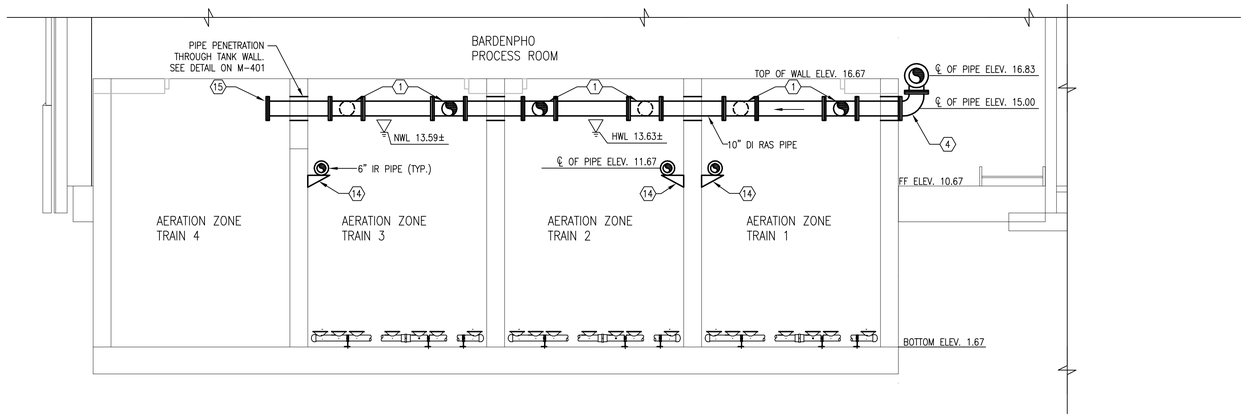
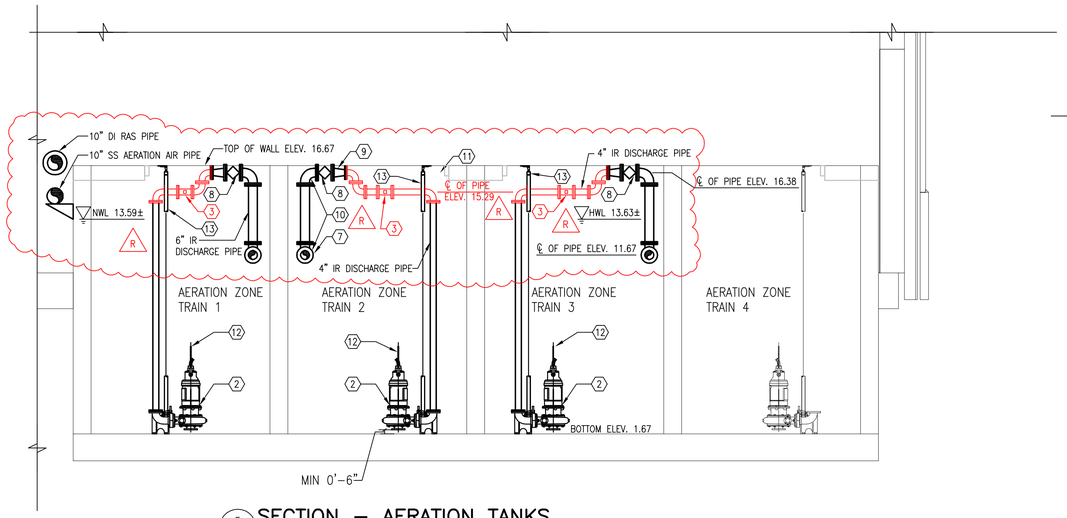
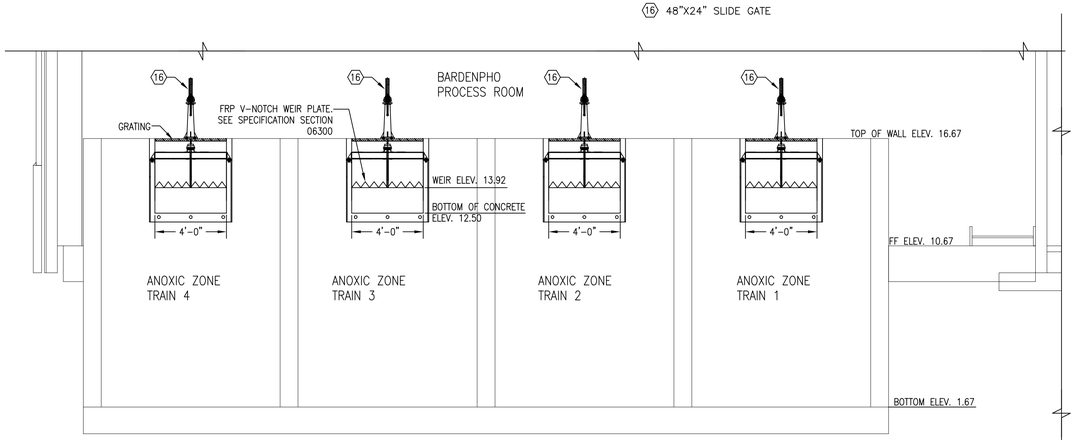


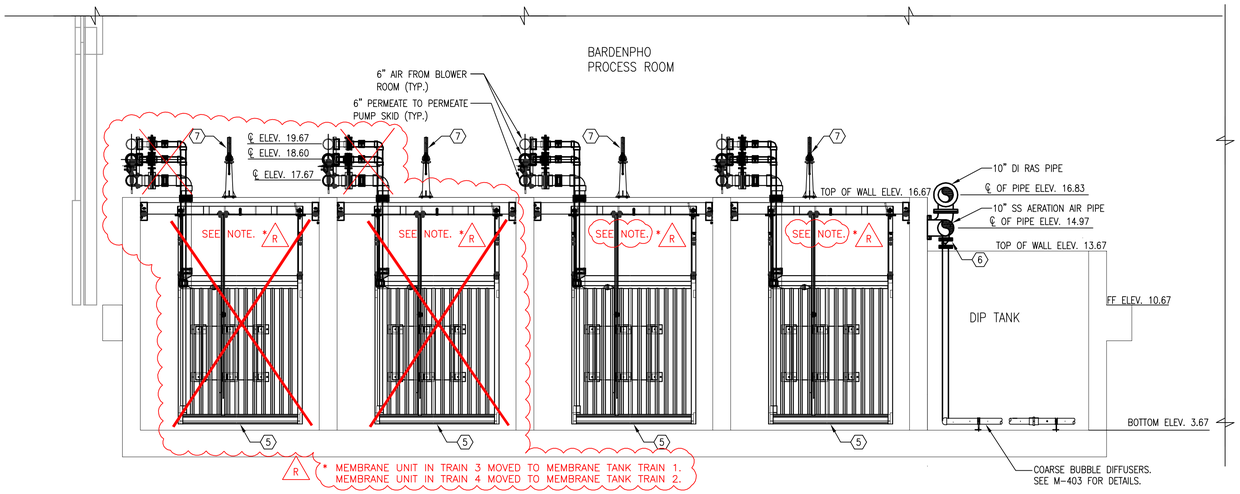
E M-101 SECTION – AERATION TANKS
SCALE: 1/4" = 1'-0"



F M-101 SECTION – AERATION TANKS
SCALE: 1/4" = 1'-0"



L M-101 SECTION – ANOXIC TANKS
SCALE: 1/4" = 1'-0"



G M-101 SECTION – MEMBRANE AND DIP TANK
SCALE: 1/4" = 1'-0"

GENERAL SHEET NOTES:

1. PIPE SUPPORTS ARE NOT SHOWN FOR CLARITY. SEE SPECIFICATION SECTION 11410 FOR REQUIREMENTS.
2. STAINLESS STEEL AIR PIPE SHALL BE WELDED EXCEPT WHERE FLANGE CONNECTIONS ARE REQ'D FOR CONNECTION TO VALVES, EXPANSION COUPLINGS ETC.
3. ALL FLOWMETERS LOCATED WITHIN PROCESS TANK SHALL BE INSTALLED A MINIMUM OF 10" ABOVE HIGH WATER LEVEL (HWL) NOTED ON DRAWING.
4. EQUIPMENT SHOWN IN GREYSCALE ARE FOR FUTURE EXPANSION AND SHALL NOT BE SUPPLIED OR CONSTRUCTED UNDER THIS CONTRACT.
5. MIXER IN ANOXIC TANKS NOT SHOWN FOR CLARITY.

SHEET KEYNOTES:

1. 10" X 6" DI TEE
2. IR PUMP
3. 4" FLOWMETER
4. 10" DI 90° BEND
5. MEMBRANE UNIT
6. 4" BUTTERFLY VALVE
7. 24"X24" SLUICE GATE
8. 6" PLUG VALVE W/ ELECTRIC ACTUATOR
9. 6"X4" DI REDUCER
10. 6" DI 90° BEND
11. 4" DI 90° BEND
12. LIFTING CHAIN
13. SLIDE RAIL
14. BRACKET PIPE SUPPORT
15. 10" DI BLIND FLANGE
16. 48"X24" SLIDE GATE

SCALE: 1/4"= 1'-0"

RECORD DRAWING SET JANUARY 2015

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LICENSE NO. 20330
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72 Loveton Circle Baltimore, Maryland 21152-0949

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3	SEPT. 2012	REVISION 3
4	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING
PROPOSED SECTIONS

CONTRACT NO. #140-10-01
DATE: SEPTEMBER 2012
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-202

SHEET 72 OF 128

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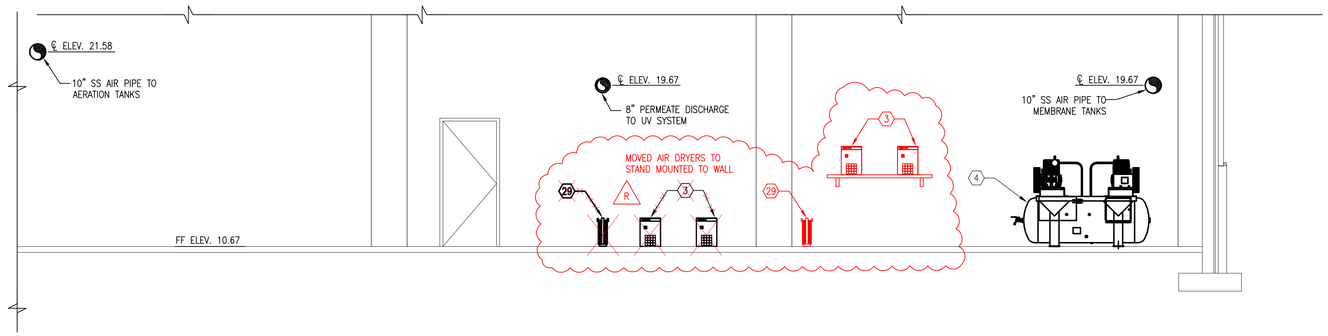
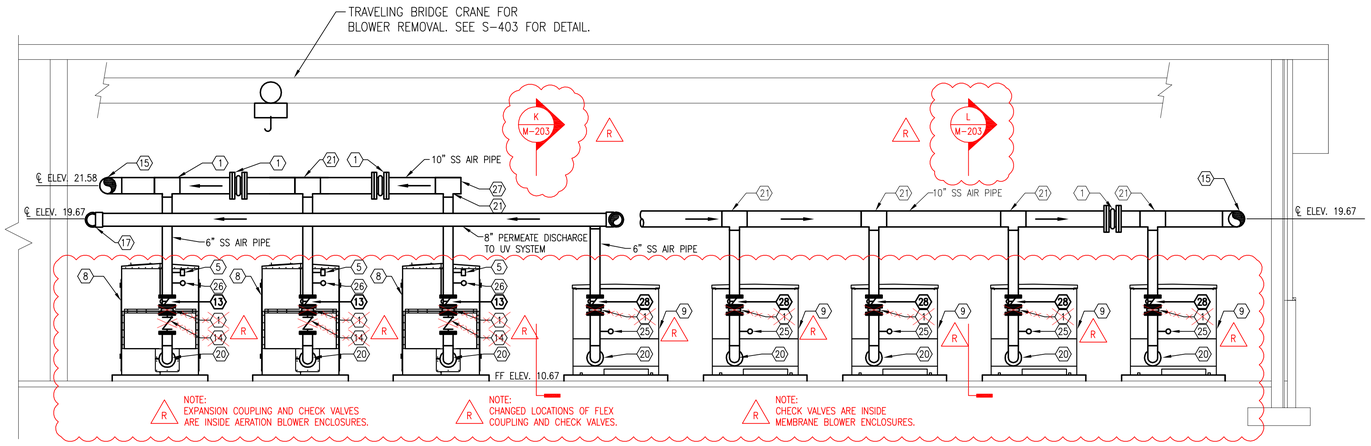
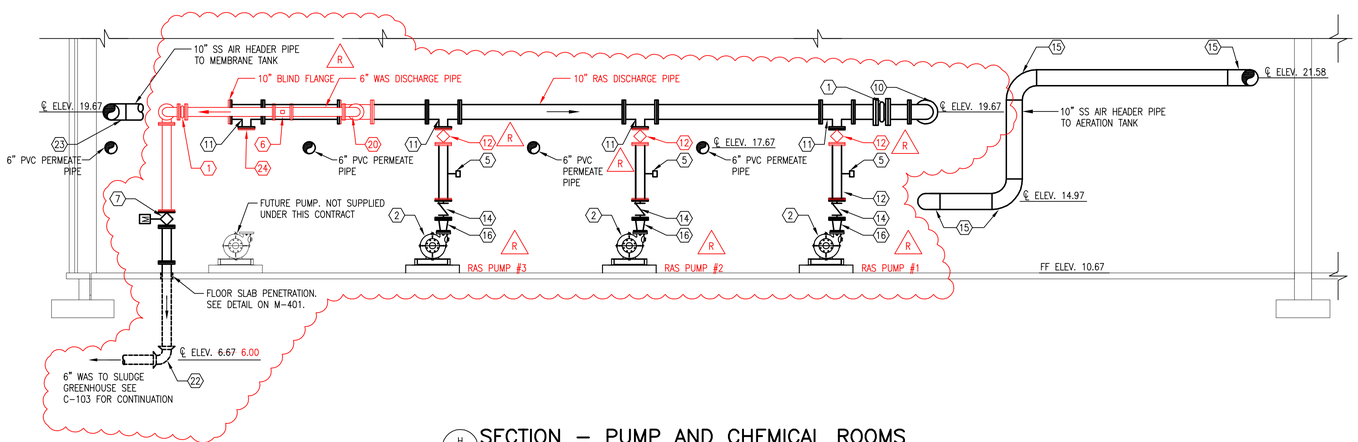


I M-101 SECTION – PUMP ROOM
SCALE: 1/4" = 1'-0"



J M-101 SECTION – BLOWER ROOM
SCALE: 1/4" = 1'-0"



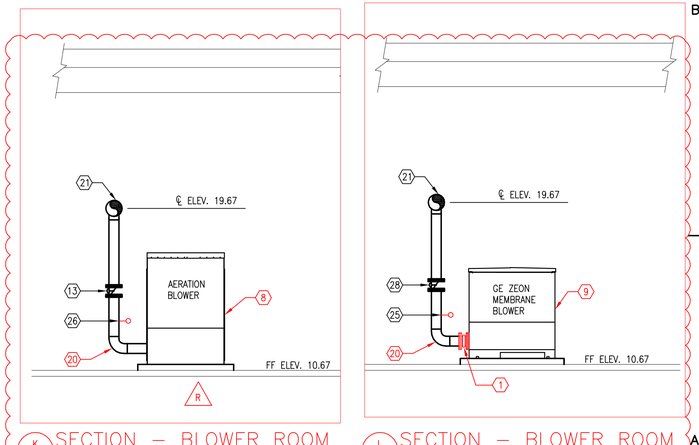
H M-101 SECTION – PUMP AND CHEMICAL ROOMS
SCALE: 1/4" = 1'-0"

GENERAL SHEET NOTES:

1. PIPE HANGERS ARE NOT SHOWN FOR CLARITY. SEE SPECIFICATION SECTION 11410 FOR PIPE HANGER REQUIREMENTS.
2. STAINLESS STEEL AIR PIPE SHALL BE WELDED EXCEPT WHERE FLANGE CONNECTIONS ARE REQ'D FOR CONNECTION TO VALVES, EXPANSION COUPLINGS ETC.
3. ALL BELOW GRADE DUCTILE IRON PIPE AND FITTINGS SHALL BE MECHANICAL JOINT.
4. ASSOCIATED GE EQUIPMENT PIPING HAS NOT BEEN SHOWN FOR CLARITY. SEE GE DWGS FOR DETAILS.

SHEET KEYNOTES:

1. EXPANSION COUPLING
2. RAS PUMP
3. AIR DRYER (SUPPLIED BY GE)
4. AIR COMPRESSOR (SUPPLIED BY GE)
5. PRESSURE TRANSMITTER
6. 6" FLOWMETER
7. 6" PLUG VALVE WITH ELECTRONIC ACTUATOR
8. AERATION BLOWER
9. MEMBRANE BLOWER (SUPPLIED BY GE)
10. 10" 90° BEND
11. 10"x6" DI TEE
12. 6" PLUG VALVE
13. 6" BUTTERFLY VALVE ~~W/ ELECTRIC ACTUATOR~~
14. 6" CHECK VALVE
15. 10" SS 90° BEND
16. ~~6"X4" DI REDUCER~~ 6"X3" DI REDUCER
17. 8" SCH. 80 PVC 90° BEND
18. ~~10"X8" SS REDUCER~~
19. ~~8"X6" SS TEE~~
20. 6" SS 90° BEND
21. 10"X6" SS TEE
22. 6" DI 90° BEND
23. 10"X10" SS TEE
24. 6" DI BLIND FLANGE
25. FLOW SWITCH. (SUPPLIED BY GE)
26. FLOW SWITCH
27. 10" SS ~~CAP~~ BLIND FLANGE
28. 6" BUTTERFLY VALVE (SUPPLIED BY GE)
29. PRIMARY COALESCING FILTER W/INTEGRAL AUTO-DRAIN (SUPPLIED BY GE)



K M-203 SECTION – BLOWER ROOM
SCALE: 1/4" = 1'-0"

L M-203 SECTION – BLOWER ROOM
SCALE: 1/4" = 1'-0"

SCALE: 1/4"= 1'-0"

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

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LICENSE NO. 20330
EXPIRATION DATE 01/29/2012

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

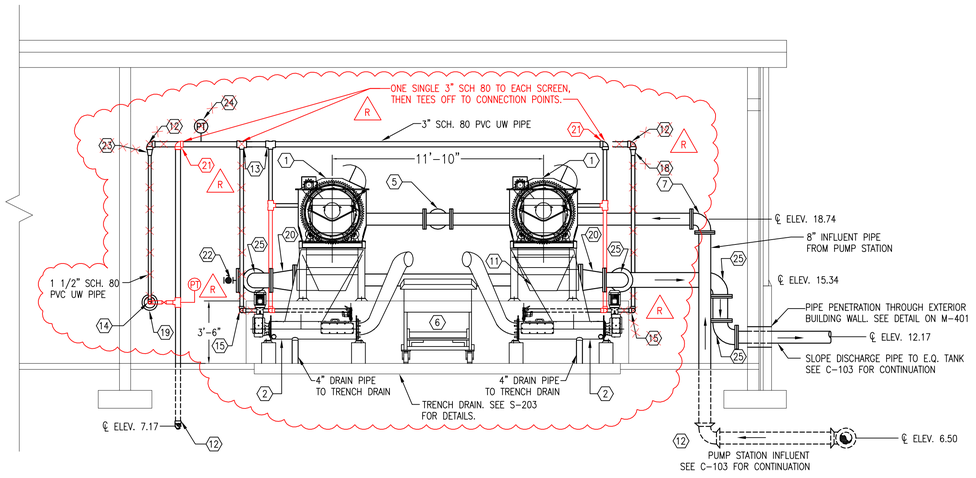
SHEET TITLE
PROCESS BUILDING
PROPOSED SECTIONS

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	NOV. 2014	RECORD DRAWINGS

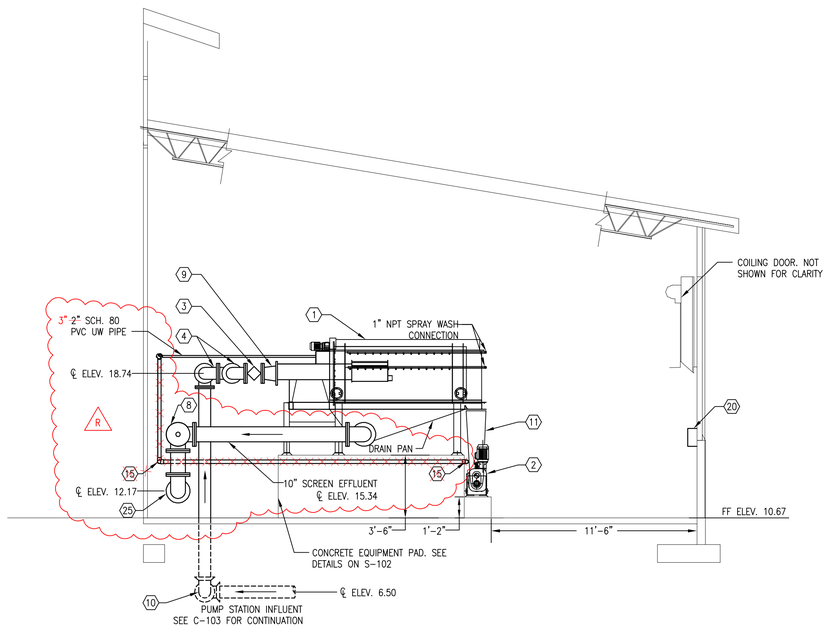
CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-203

SHEET 73 OF 128



C M-101 SECTION – SCREEN ROOM
SCALE: 1/4" = 1'-0"



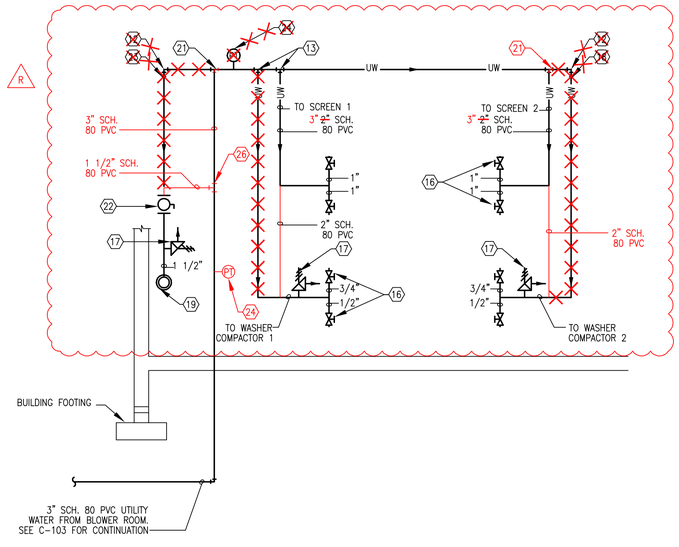
D M-101 SECTION – SCREEN ROOM
SCALE: 1/4" = 1'-0"

GENERAL SHEET NOTES:

1. PIPE SUPPORTS ARE NOT SHOWN FOR CLARITY. SEE SPECIFICATIONS SECTION 11410 FOR REQUIREMENTS.
2. SCREENS AND WASHER COMPACTORS DESIGN IS BASED UPON WESTECH DRUM SCREEN MODEL IM36L AND SCREW WASH MODEL SWP 20-60. 'OR EQUAL' SHALL BE APPROVED PER THE REQUIREMENTS OF SPECIFICATION SECTION 11100. SAME MANUFACTURER SHALL PROVIDE SCREEN AND WASHER COMPACTOR. CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING AND IMPLEMENTING ANY DESIGN CHANGES RESULTING FROM USE OF AN 'OR EQUAL' TO ENGINEER FOR APPROVAL AT NO ADDITIONAL EXPENSE TO OWNER.
3. ALL BELOW GRADE DUCTILE IRON PIPE AND FITTINGS SHALL BE MECHANICAL JOINT.
4. SEE DETAILS OF FLOOR SLAB PENETRATION ON SHEET M-401.
5. ABOVE GRADE PIPING SHALL BE FLANGED OR GROOVED PER THE REQUIREMENTS OF SPECIFICATION SECTION 11300.

SHEET KEYNOTES:

1. ROTARY DRUM SCREEN
2. SCREENINGS COMPACTOR
3. 8" PLUG VALVE
4. 8" DI 90° HORZ. BEND
5. 8"X8" DI TEE
6. 2 CU. YD DUMPSTER
7. 8" DI 90° BEND
8. 10" BLIND FLANGE W/ THREADED 1 1/2" PVC CONNECTION
9. 10'x8" DI REDUCER
10. 8" DI 90° MJ HORZ BEND
11. STAINLESS STEEL HOPPER
12. ~~3" SCH. 80 PVC 90° BEND~~ 3"x1"
13. ~~3"X2"~~ SCH. 80 PVC TEE
14. 1 1/2" SCH. 80 PVC 90° BEND
15. 2" SCH. 80 PVC 90° BEND
16. SOLENOID VALVE (SUPPLIED BY EQUIPMENT MANUFACTURER)
17. PRESSURE REDUCING VALVE
18. 3"X2" SCH. 80 PVC REDUCER
19. HOSE REEL
20. 14"X10" D.I. REDUCER
21. ~~3"X3"~~ 3" SCH. 80 PVC ~~TEE~~ 90° BEND
22. 1 1/2" BALL VALVE
23. 3"X1 1/2" SCH. 80 PVC REDUCER
24. PRESSURE TRANSMITTER
25. 10" DI 90° BEND
26. 3"X1 1/2" SCH. 80 PVC TEE



SCREEN ROOM UTILITY WATER LAYOUT
SCALE: NOT TO SCALE

SCALE: 1/4"= 1'-0"

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

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CONSULTANT
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Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING
SCREEN ROOM - PROPOSED SECTIONS

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	MAR. 2012	REVISION 2
3	SEPT. 2012	REVISION 3
4	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: SEPTEMBER 2012
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-204

SHEET 74 OF 128

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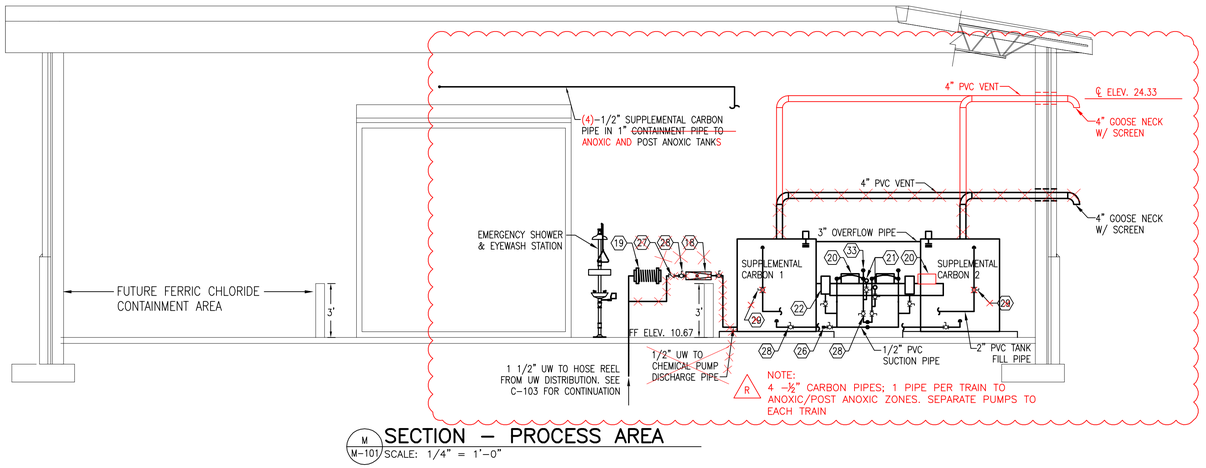
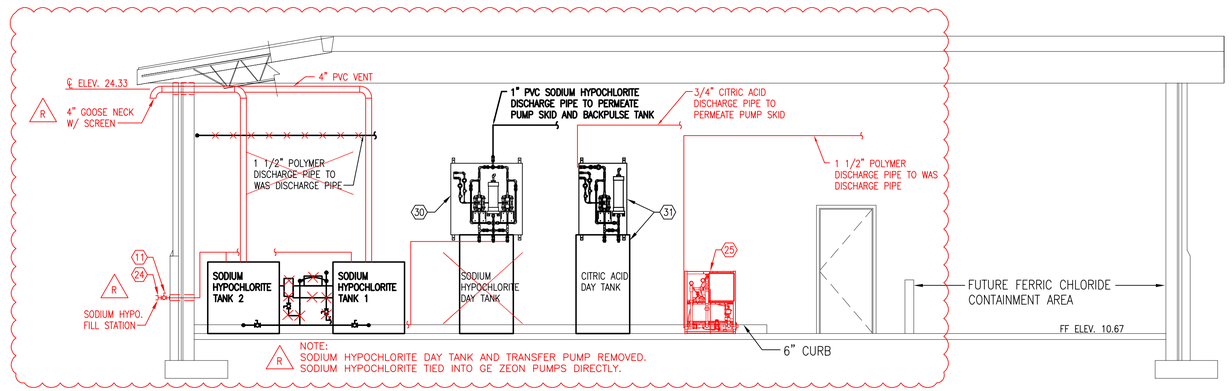
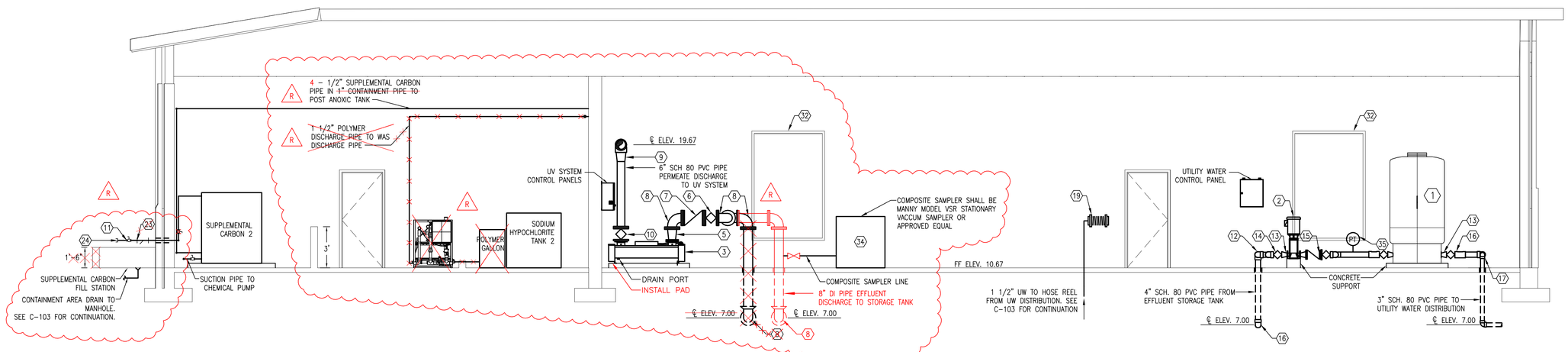


M M-101 SECTION – PROCESS AREA
SCALE: 1/4" = 1'-0"



L M-101 SECTION – PROCESS AREA
SCALE: 1/4" = 1'-0"



K M-101 SECTION – PROCESS TANKS
SCALE: 1/4" = 1'-0"

GENERAL SHEET NOTES:

1. PIPE SUPPORTS ARE NOT SHOWN FOR CLARITY. SEE SPECIFICATIONS SECTION 11410 FOR REQUIREMENTS.
2. ALL BELOW GRADE DUCTILE IRON PIPE AND FITTINGS SHALL BE MECHANICAL JOINT.
3. ASSOCIATED GE EQUIPMENT PIPES NOT SHOWN FOR CLARITY. SEE GE DWGS FOR DETAILS
4. SEE DETAIL OF FLOOR SLAB PENETRATION ON M-401.

SHEET KEYNOTES:

1. HYDROPNEUMATIC BLADDER TANK
2. UTILITY WATER PUMP (TYP. OF 2)
3. UV SYSTEM (TYP. OF 2)
4. 4" WYE STRAINER
5. 8"X6" DI REDUCER
6. 8" PLUG VALVE
7. 8" CHECK VALVE
8. 8" DI 90° BEND
9. 8"X6" SCH. 80 PVC REDUCER
10. 6" PLUG VALVE
11. ~~4"~~ 2" BALL VALVE (R)
12. 4" SCH. 80 PVC 90° BEND
13. 4"X2" SCH. 80 PVC REDUCER
14. 4" PLUG VALVE
15. 4" CHECK VALVE
16. 4" SCH. 80 PVC TEE
17. 3" SCH 80. PVC 90° BEND
18. ~~ROTAMETER~~ (R)
19. HOSE REEL
20. CHEMICAL PUMP
21. PRESSURE GAUGE
22. CALIBRATION COLUMN
23. ~~4" WYE STRAINER~~ (R)
24. ~~4"~~ 2" QUICK CONNECT (R)
25. POLYMER BLENDING UNIT
26. 1/2" QUICK CONNECT
27. ~~1/2" CHECK VALVE~~ (R)
28. ~~1/2" BALL VALVE~~ (R)
29. ~~2" BALL VALVE~~ (R)
30. SODIUM HYPOCHLORITE ~~DAY &~~ PUMP SKID (SUPPLIED BY GE)
31. CITRIC ACID DAY TANK & PUMP SKID SUPPLIED BY GE)
32. LOUVER
33. PULSATION DAMPNER
34. COMPOSITE SAMPLER
35. PRESSURE TRANSMITTER

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72 Loveton Circle Baltimore, Maryland 21152-0949

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1	DEC. 2011	REVISION 1
2	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

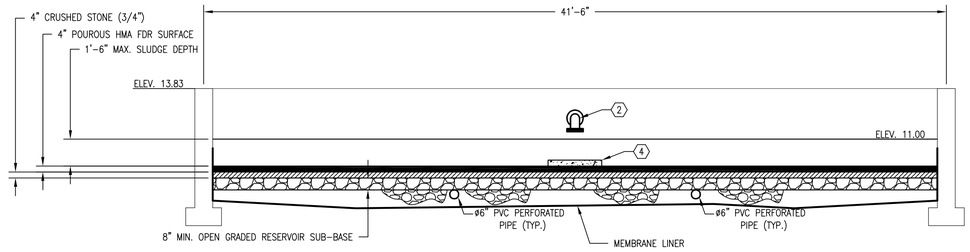
SHEET TITLE
PROCESS BUILDING
PROPOSED SECTIONS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

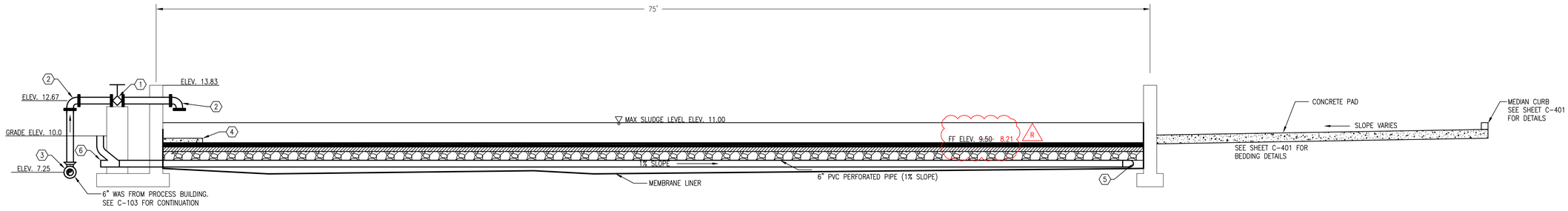
M-205

SHEET 75 OF 128

RECORD DRAWING SET
JANUARY 2015



A M-206 SECTION
SCALE: 1/4" = 1'-0"



B M-206 SECTION
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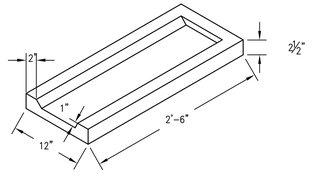

1 M-206 PRECAST CONCRETE SPLASHBLOCK
SCALE: 1/4" = 1'-0"

GENERAL SHEET NOTES:

1. GREENHOUSE SUPERSTRUCTURE SHALL BE A PREFABRICATED STRUCTURE PROVIDED BY LUDY GREENHOUSE MANUFACTURING CORPORATION OR APPROVED EQUAL. SEE DRAWING S-201 FOR DETAILS.
2. SEE SHEET S-101 FOR GREENHOUSE FOUNDATION AND KNEEWALL DESIGN.
3. DEPTH OF OPEN GRADED RESERVOIR SUB-BASE SHALL BE FROM THE BOTTOM OF THE CRUSHED STONE LAYER TO THE TOP OF THE PERFORATED PVC PIPE (8" MINIMUM DEPTH).
4. ALL BELOW GRADE DUCTILE IRON PIPE AND FITTINGS SHALL BE MECHANICAL JOINT.

SHEET KEYNOTES:

1. 6" DI PLUG VALVE W/ HANDWHEEL
2. 6" DI. 90° BEND
3. 6"x6" DI TEE
4. 2'-4" x 1'-0" PRECAST CONCRETE SPLASH BLOCK. SEE DETAIL ON M-206
5. 6" SCH. 80 PVC 90° TEE
6. 6" DIA. SCH. 80 PVC WYE TO CLEANOUT. SEE DETAILS ON C-402

2' 0 2' 4'
SCALE: 1/4"= 1'-0"

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

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Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
SLUDGE GREENHOUSE
PROPOSED SECTIONS

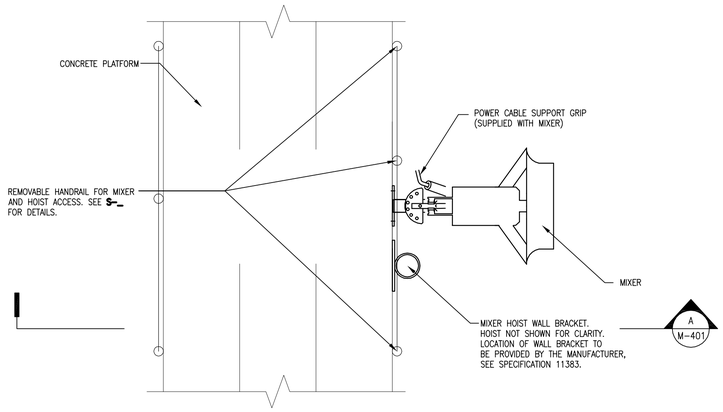
MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-206

SHEET 76 OF 128

File: Q:\SHARED\2006Z_Mystic\Harbour\WWTP\mod\Prod\sd_LEV1-CADD\AS-BUILTS\MECHANICAL\M-206 SLUDGE GREENHOUSE_SECTIONS.dwg
Jan 12, 2015 - 8:19:58am



1 M-401 TYPICAL MIXER – PARTIAL PLAN
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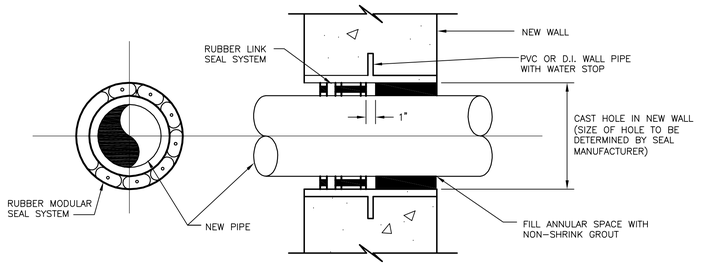

2 M-401 PIPE PENETRATION NEW WALL OR SLAB – DETAIL
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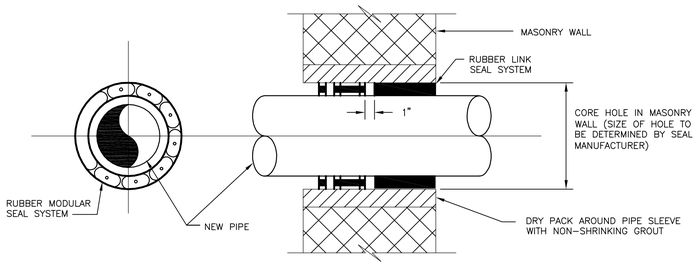
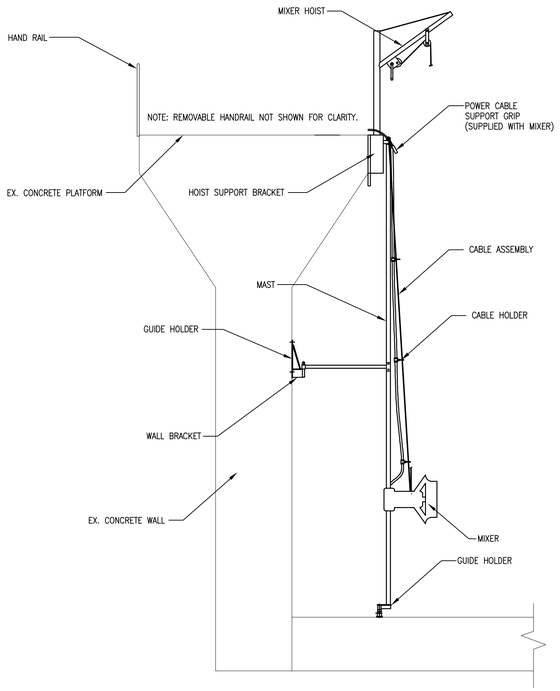
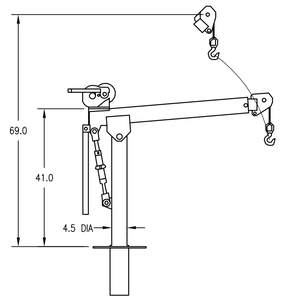


3 M-401 PIPE PENETRATION THROUGH INTERIOR MASONRY WALL – DETAIL
SCALE: NOT TO SCALE

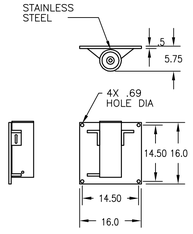


A M-401 TYPICAL MIXER – SECTION
SCALE: NOT TO SCALE

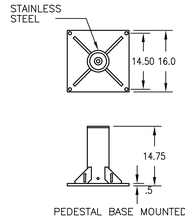
MIXER SCHEDULE			
LOCATION	SIZE	QUANTITY	MIXER TYPE
ANOXIC ZONE	3 HP MAX.	1 PER TRAIN, 3 TOTAL	SUBMERSIBLE
POST-ANOXIC ZONE	5 HP MAX.	1 PER TANK, 3 TOTAL	SUBMERSIBLE
EQ TANK	5 HP MAX.	2 TOTAL	SUBMERSIBLE



NOTE:
1. SEE SPECIFICATION 11801



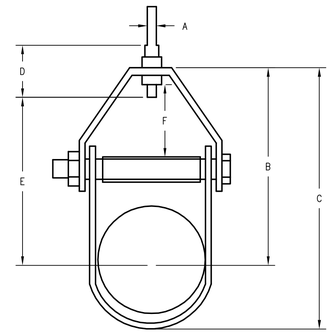
WALL BASE MOUNTED



PEDESTAL BASE MOUNTED

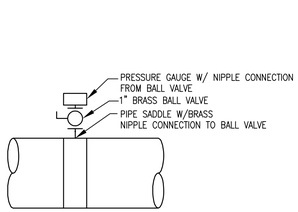
5 M-401 LIFTING DAVIT DETAIL
SCALE: NOT TO SCALE

LIFTING DAVIT SCHEDULE		
LOCATION	BASE PLATE TYPE	QUANTITY
EQ TANK MIXERS	PEDESTAL MOUNT	1 PER TRAIN, 2 TOTAL
EQ TANK PUMPS	PEDESTAL MOUNT	1 PER TRAIN, 2 TOTAL
ANOXIC TANK MIXERS	WALL MOUNT	1 PER TRAIN, 3 TOTAL
POST-ANOXIC TANK MIXERS	WALL MOUNT	1 PER TRAIN, 3 TOTAL
AERATION TANK IR PUMPS	WALL MOUNT	1 PER TRAIN, 3 TOTAL

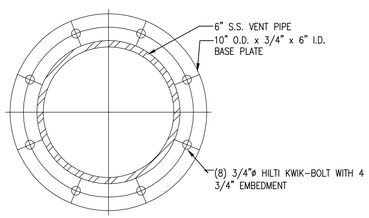


PIPE SIZE	A	B	C	D	E	F
10"	7/8"	10 1/4"	15 7/8"	3 1/2"	8 11/16"	2 1/4"
8"	3/4"	8 5/8"	13 1/4"	3 1/2"	7 3/16"	2 1/8"
6"	3/4"	7 1/16"	10 5/8"	3"	5 13/16"	2"
4"	5/8"	5 13/16"	8 5/16"	2 1/2"	4 5/8"	2"

4 M-401 PIPE HANGER DETAIL
SCALE: NOT TO SCALE



6 M-401 PRESSURE GAUGE – DETAIL
SCALE: NOT TO SCALE



7 M-401 GOOSE NECK TOP SLAB CONNECTOR – DETAIL
SCALE: NOT TO SCALE

RECORD DRAWING SET JANUARY 2015

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 20330
EXPIRATION DATE 01/29/2013.

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON®
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
MECHANICAL DETAILS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-401

SHEET 77 OF 128

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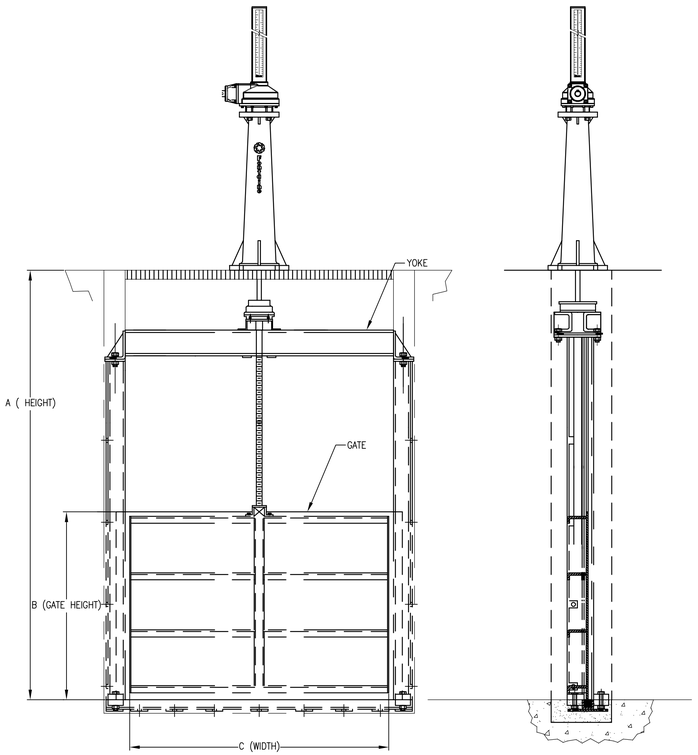
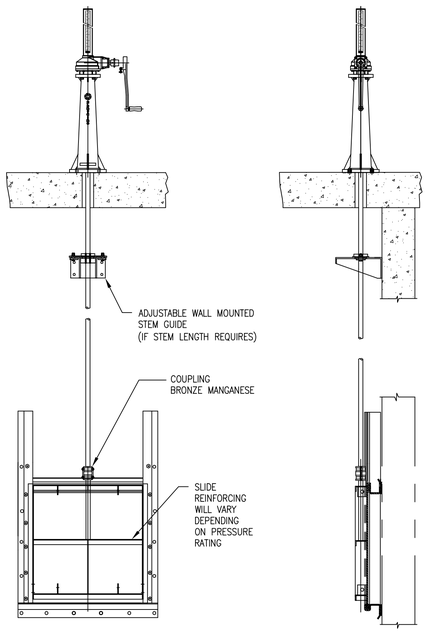


1 M-402 SCALE: 1" = 1'-0"

SLIDE GATE – DETAIL (TYP.)



2 M-402 SCALE: 1" = 1'-0"

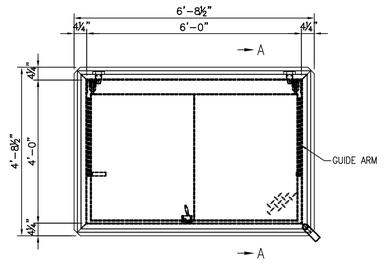
SLUICE GATE – DETAIL (TYP.)

SLIDE GATE SCHEDULE			
LOCATION	SIZE	QUANTITY	ACTUATOR TYPE
INFLUENT CHANNEL	48"WX24"H	4	HAND CRANK

SLUICE GATE SCHEDULE			
LOCATION	SIZE	QUANTITY	ACTUATOR TYPE
EQ TANK	24"Wx24"H	1	HAND CRANK
POST–ANOXIC ZONE (TRAINS 1–4)	24"Wx24"H	4	HAND CRANK
MBR TANK	24"Wx24"H	4	HAND CRANK

R

STOP PLATE SCHEDULE			
LOCATION	SIZE	QUANTITY	ACTUATOR TYPE
INFLUENT CHANNEL	60"WX60"H	1	LIFT HOLE

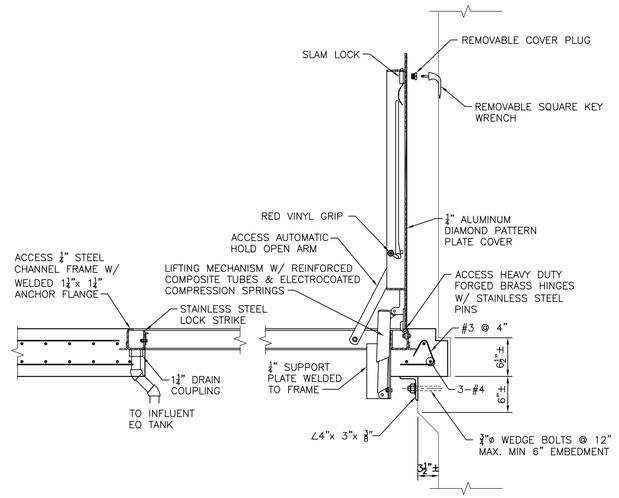


3 M-402 SCALE: 1/2" = 1'-0"

ACCESS HATCH DOUBLE DOOR– PLAN

NOTES: ACCESS HATCH SHALL BE BILCO COMPANY TYPE JD–AL OR APPROVED EQUAL.

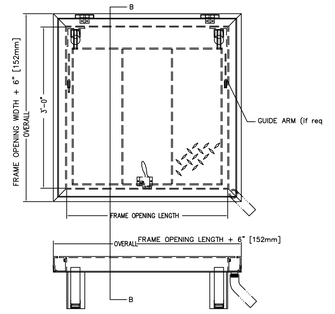
1. DOOR LEAF(S): ¼" MINIMUM ALUMINUM DIAMOND PLATE REINFORCED TO WITHSTAND A LIVE LOAD OF 300 PSF AND REINFORCED TO WITHSTAND 18,000 LBS CONCENTRATED LOADING AT THE CENTER OF THE DOOR.
2. CHANNEL FRAME: ¼" ALUMINUM WITH ANCHOR FLANGE AROUND PERIMETER.
3. DOOR(S): EQUIP WITH HEAVY FORGE BRASS HINGES, STAINLESS STEEL PINS, SPRING OPERATORS AND AUTOMATIC HOLD OPEN ARM WITH RELEASE HANDLE.
4. LOCK: SNAP LOCK WITH REMOVABLE HANDLE.
5. DRAINAGE COUPLING; LOCATE 1½" DRAINAGE COUPLING IN THE CORNER OF THE CHANNEL FRAME.
6. HARDWARE: STAINLESS STEEL.
7. FALL PROTECTION GRATING: FIBERGLASS MOLDED DESIGNED TO SUPPORT 300PSF LOAD. SAFETY YELLOW COLOR. INCLUDE TORSION ROD LIFT ASSISTANCE, HOLD OPEN ARM TO LOCK GRATING PANEL IN 90° POSITION, AND RELEASE HANDLE WITH GRATING PANEL. ALL HARDWARE ASSOCIATED WITH GRATING PANEL SHALL BE 316 STAINLESS STEEL.



A M-402 SCALE: 1" = 1'-0"

ACCESS HATCH DOUBLE DOOR – SECTION

ACCESS HATCH DIMENSIONS					
TYPE	LOCATION	QUANTITY	LENGTH	WIDTH	LOAD RATING
DOUBLE DOOR	EQ TANK 1	1	72"	48"	300 PSF
DOUBLE DOOR	EQ TANK 2	1	72"	48"	300 PSF
SINGLE DOOR	EQ TANK 1	1	36"	36"	300 PSF
SINGLE DOOR	EQ TANK 2	1	36"	36"	300 PSF
SINGLE DOOR	EQ TANK 1	1	36"	36"	300 PSF
SINGLE DOOR	EQ TANK 2	1	36"	36"	300 PSF

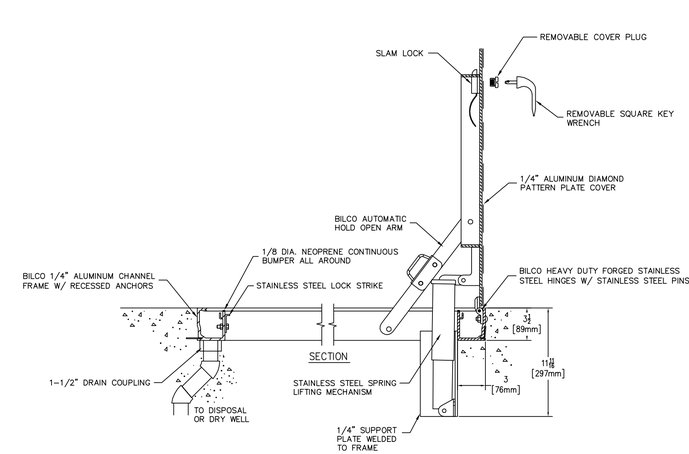


4 M-402 SCALE: 1-1/2" = 1'-0"

ACCESS HATCH SINGLE DOOR– PLAN

NOTES: ACCESS HATCH SHALL BE BILCO COMPANY TYPE J–AL OR APPROVED EQUAL.

1. DOOR LEAF(S): ¼" MINIMUM ALUMINUM DIAMOND PLATE REINFORCED TO WITHSTAND A LIVE LOAD OF 300 PSF AND REINFORCED TO WITHSTAND 18,000 LBS CONCENTRATED LOADING AT THE CENTER OF THE DOOR.
2. CHANNEL FRAME: ¼" ALUMINUM WITH ANCHOR FLANGE AROUND PERIMETER.
3. DOOR(S): EQUIP WITH HEAVY FORGE BRASS HINGES, STAINLESS STEEL PINS, SPRING OPERATORS AND AUTOMATIC HOLD OPEN ARM WITH RELEASE HANDLE.
4. LOCK: SNAP LOCK WITH REMOVABLE HANDLE.
5. DRAINAGE COUPLING; LOCATE 1½" DRAINAGE COUPLING IN THE CORNER OF THE CHANNEL FRAME.
6. HARDWARE: STAINLESS STEEL.
7. FALL PROTECTION GRATING: FIBERGLASS MOLDED DESIGNED TO SUPPORT 300PSF LOAD. SAFETY YELLOW COLOR. INCLUDE TORSION ROD LIFT ASSISTANCE, HOLD OPEN ARM TO LOCK GRATING PANEL IN 90° POSITION, AND RELEASE HANDLE WITH GRATING PANEL. ALL HARDWARE ASSOCIATED WITH GRATING PANEL SHALL BE 316 STAINLESS STEEL.



B M-402 SCALE: NOT TO SCALE

ACCESS HATCH SINGLE DOOR – SECTION

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 20330 EXPIRATION DATE 01/29/2012.

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE: MYSTIC HARBOUR WWTP UPGRADE AND PLANT EXPANSION

SHEET TITLE: MECHANICAL DETAILS

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-402

SHEET 78 OF 128

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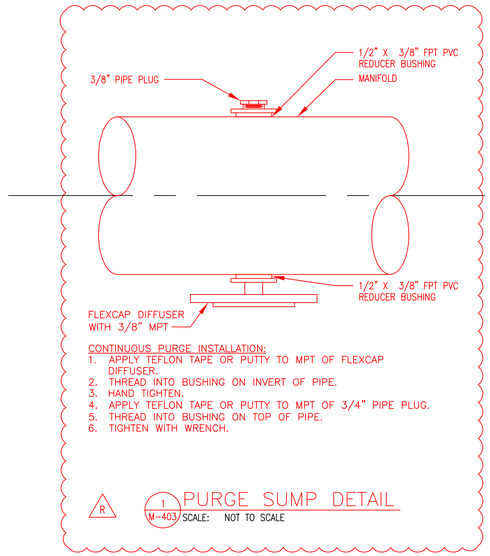

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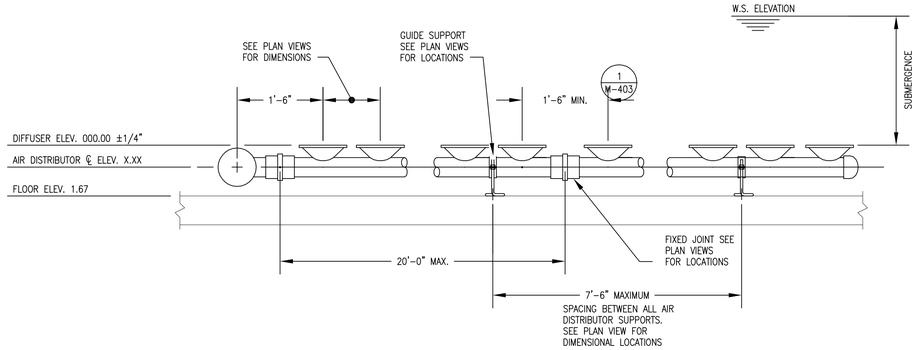
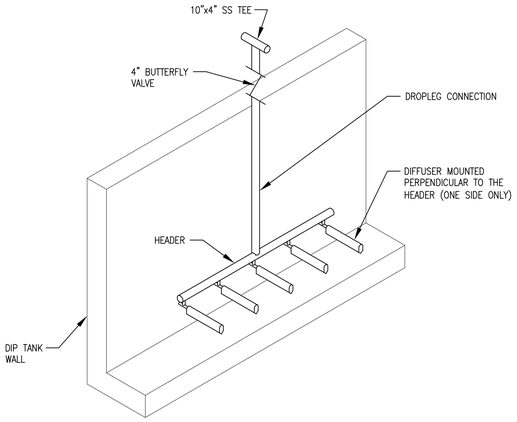
1 M-403 PURGE SUMP DETAIL
SCALE: NOT TO SCALE



1 M-103 FINE BUBBLE AIR DISTRIBUTOR DETAIL
SCALE: NOT TO SCALE



3 M-403 COARSE BUBBLE AIR DISTRIBUTOR DETAIL
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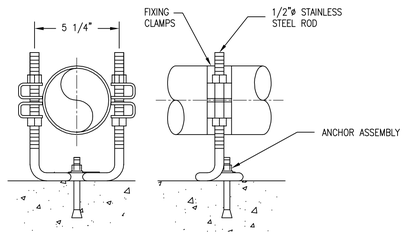
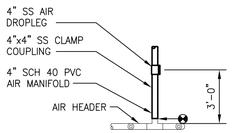
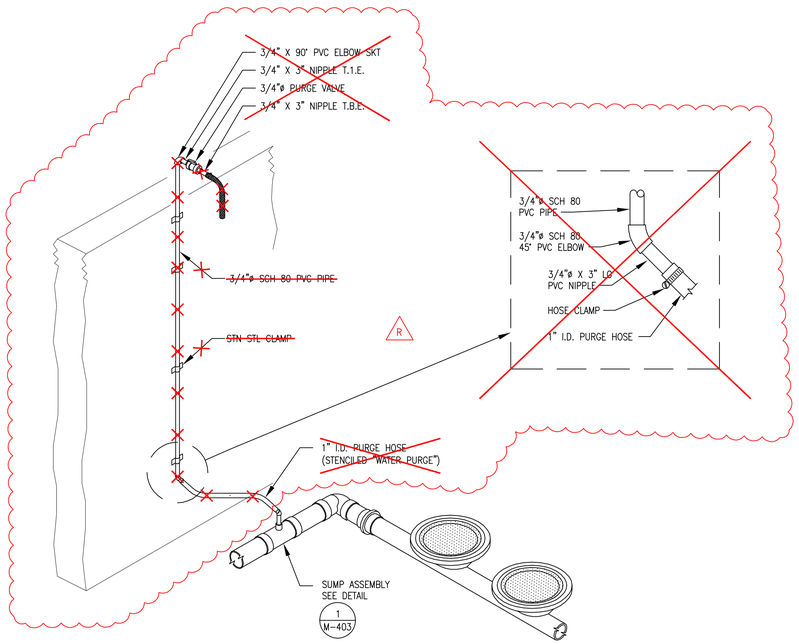


2 M-403 ANCHOR SUPPORT DETAIL
SCALE: NOT TO SCALE



NOTE: FLOW OPENING NOT SHOWN FOR CLARITY. DETAIL IS BASED ON DETAIL PROVIDED BY SANITAIRE.

1 M-201 SS TO PVC CONNECTION DETAIL
SCALE: 1/4" = 1'-0"



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2 M-201 PURGE SUMP ASSEMBLY DETAIL
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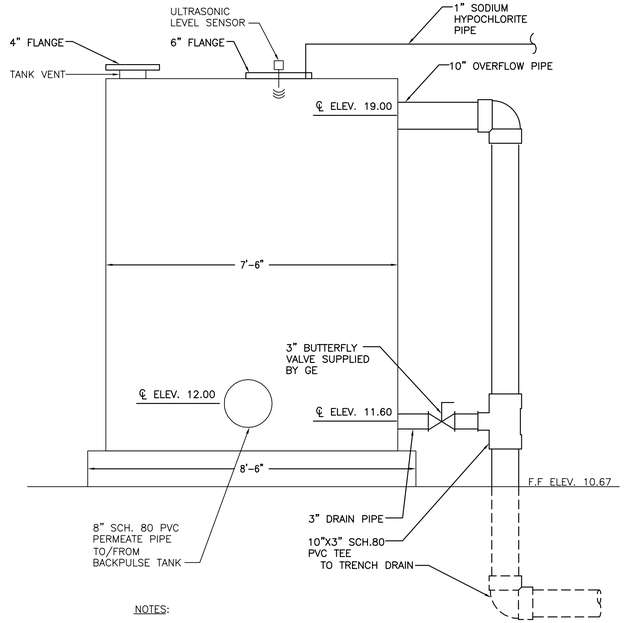

NOTES:

1. PROVIDE 2500 GALLON HIGH DENSITY LINEAR POLYETHYLENE (HDLPE) TANK.
2. COORDINATE TANK OPENINGS FOR GE PROVIDED LEVEL SENSOR WITH TANK MANUFACTURER.
3. ALL FITTINGS SHALL BE GASKETED BULKHEAD FITTINGS.
4. TANK SHALL BE 90" DIA X 107" HEIGHT
5. HDLPE TANK SHALL BE COMPATIBLE FOR USE WITH SODIUM HYPOCHLORITE
6. TANKS SHALL BE SYNDER VERTICAL BULK STORAGE TANK OR APPROVED EQUAL.

4 M-403 BACKPULSE TANK
SCALE: NOT TO SCALE

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

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LICENSE NO. 20330
EXPIRATION DATE 01/29/2012.

CONSULTANT
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72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	DEC. 2011	REVISION 1
2	NOV. 2014	RECORD DRAWINGS

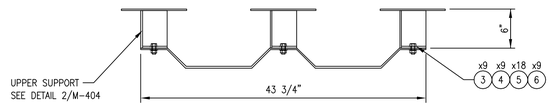
PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
MECHANICAL DETAILS

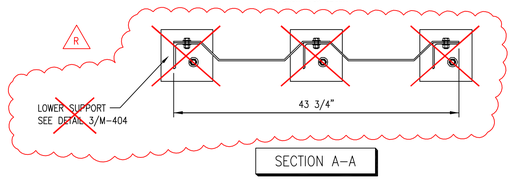
CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-403

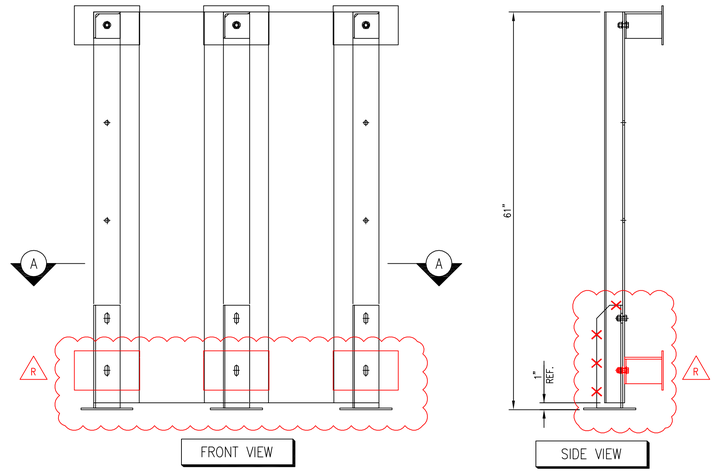
SHEET 79 OF 128



PLAN VIEW



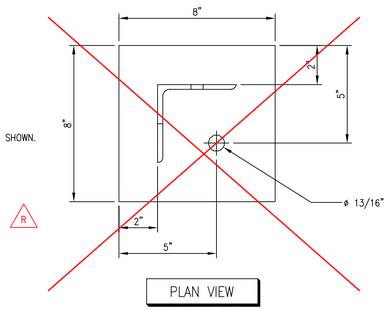
SECTION A-A



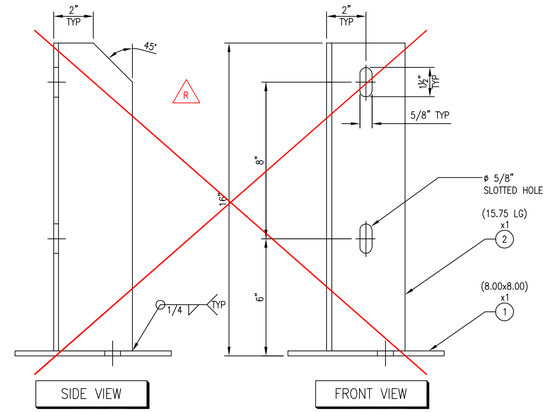
FRONT VIEW SIDE VIEW

1 M-404 BAFFLE PLATE ASSEMBLY
SCALE: NOT TO SCALE

QUANTITY REQUIRED: 3 (THREE) AS SHOWN.



PLAN VIEW

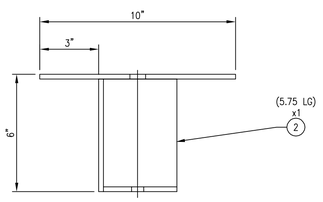


SIDE VIEW FRONT VIEW

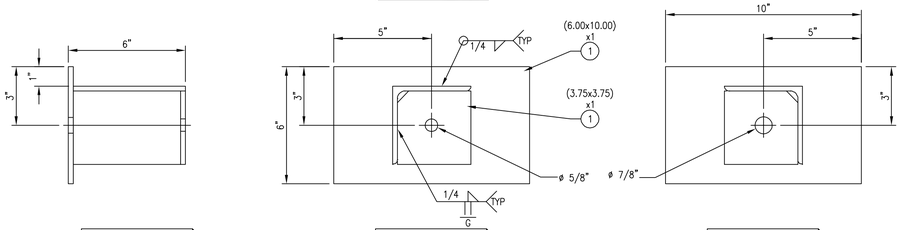
3 M-404 LOWER SUPPORT DETAIL
SCALE: NOT TO SCALE

R

QUANTITY REQUIRED: 6 (SIX) AS SHOWN.



PLAN VIEW



SIDE VIEW FRONT VIEW BACK VIEW

2 M-404 UPPER SUPPORT DETAIL
SCALE: NOT TO SCALE

NOTES:

1. QUANTITY REQUIRED: (1) ONE AS SHOWN
2. ALL WELDS TO BE CONTINUOUS U.N.O.
3. ALL PLATES TO BE STITCH WELDED 2"-8" U.N.O.
4. ALL WELDS TO BE FREE OF SCALE & FOREIGN PARTICLES.
5. REMOVE ALL WELD SPATTER.
6. BREAK ALL BURRS & SHARP EDGES.
7. ALL OPEN MEMBERS TO BE CAPPED.
8. ROUND ALL CORNERS 1/4" RADIUS.
9. ALL WELDS TO CONFORM TO WELDING SPECIFICATION CSA W59-1989.
10. ALL FINISHED SURFACES (INCLUDING WELDS) TO BE MILL FINISH ON STAINLESS STEEL.
11. ALL DIMENSIONS IN BRACKETS ARE FOR MATERIAL TAKE-OFF ONLY.
12. FINISH I.A.W. ASTM A380-96 (STANDARD PRACTICE FOR CLEANING, DESCALING AND PASSIVATING OF STAINLESS STEEL PARTS, EQUIPMENT AND SYSTEMS).

R 13. NO LOWER SUPPORTS. BAFFLE IS MOUNTED 4'-0" ABOVE FLOOR.

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

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3	SEPT. 2012	REVISION 3
R	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
MECHANICAL DETAILS

CONTRACT NO. #140-10-01
DATE: SEPTEMBER 2012
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-404

SHEET 80 OF 128

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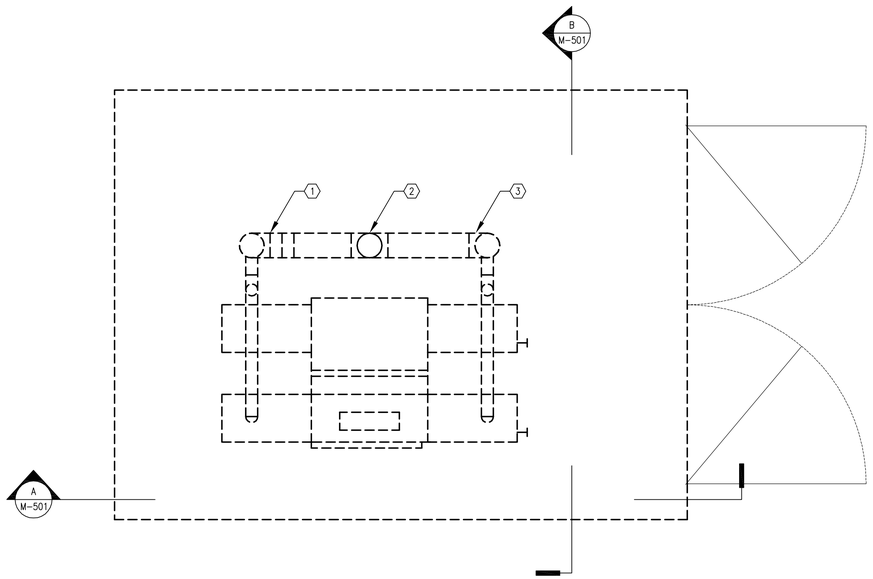
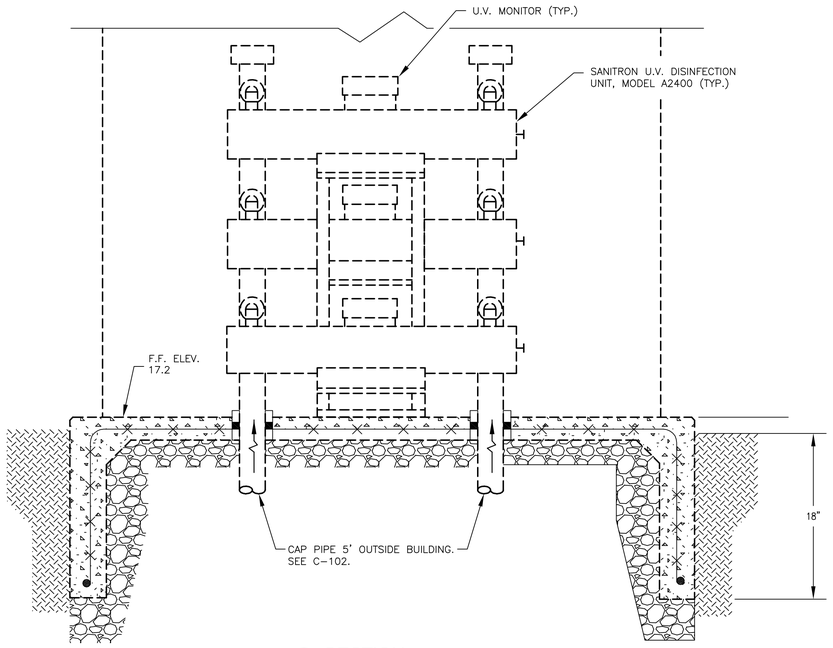
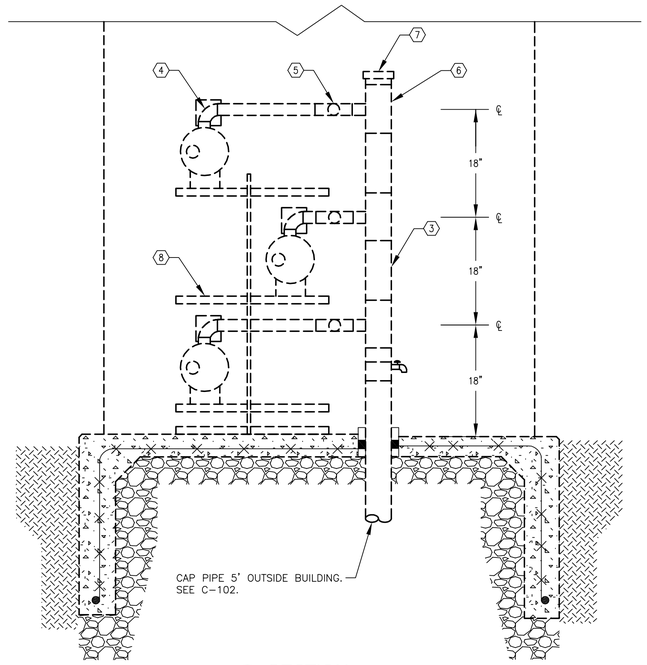


UV BUILDING DEMOLITION PLAN
SCALE: 1/8" = 1'-0"



A M-501 SECTION SCALE: NOT TO SCALE



B M-501 SECTION SCALE: NOT TO SCALE

GENERAL SHEET NOTES:

1. EXISTING UV EQUIPMENT SHALL NOT BE DEMOLISHED UNTIL NEW UV SYSTEM IS INSTALLED AND ONLINE. CONTRACTOR SHALL NOTIFY WORCESTER COUNTY A MINIMUM OF 1 WEEK PRIOR TO DEMOLISHING EXISTING UV SYSTEM.
2. CONTRACTOR IS RESPONSIBLE FOR COMPLETE DEMOLITION OF EXISTING UV SYSTEM INCLUDING BUT NOT LIMITED TO ALL EQUIPMENT, PIPING, INSTRUMENTATION, CONTROL PANELS, AND ELECTRICAL CONNECTIONS. ALL ELECTRIC AND CONTROL WIRING SHALL BE DEMOLISHED BACK TO THE NEAREST PANEL UNLESS OTHERWISE NOTED. SEE SHEET E-102 FOR ELECTRICAL DEMOLITION.
3. CONTRACTOR IS RESPONSIBLE FOR DISPOSAL OF ALL DEMOLISHED MATERIAL IN ACCORDANCE WITH APPLICABLE REGULATIONS.
4. DRAWINGS ARE NOT GUARANTEED TO SHOW LOCATIONS OF EQUIPMENT, PIPING, CONTROLS, AND ELECTRICAL CONNECTIONS TO BE DEMOLISHED. CONTRACTOR IS RESPONSIBLE FOR SCHEDULING SITE VISIT WITH WORCHESTER COUNTY PRIOR TO BIDDING TO DETERMINE FULL SCOPE OF DEMOLITION.
5. DEMOLISH EXISTING BUILDING AND BUILDING FOUNDATION. BACKFILL WITH SUITABLE COMPACTED MATERIAL AS IS REQUIRED TO MATCH PROPOSED GRADING.

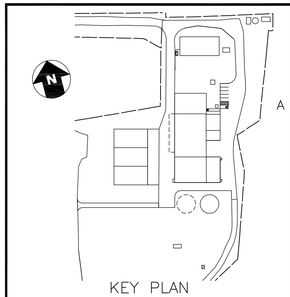
SHEET KEYNOTES:

1. PRESSURE GAUGE AND DIAPHRAGM SEAL (CLOSE COUPLED – MOUNTED ON PIPING)
2. 4" DIA. BALL VALVE
3. 4"x4" TEE
4. 2" DIA. 90° BEND (THD. BY SOLVENT WELD), TYP.
5. 2" DIA. BALL VALVE (TRUE UNION), TYP.
6. 4"x2" TEE, TYP.
7. 4" DIA. END CAP
8. MANUFACTURER'S STAND

LEGEND:

– – – – – = DEMOLISH

RECORD DRAWING SET
JANUARY 2015



KEY PLAN
NOT TO SCALE

WORCESTER COUNTY

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 20330
EXPIRATION DATE 01/29/2012.

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
UV BUILDING DEMOLITION PLAN AND SECTIONS

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-501

SHEET 81 OF 128

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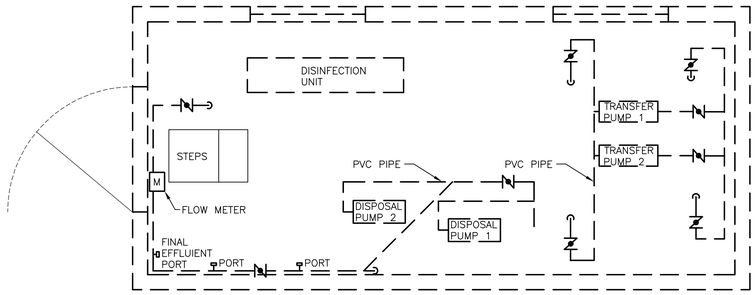
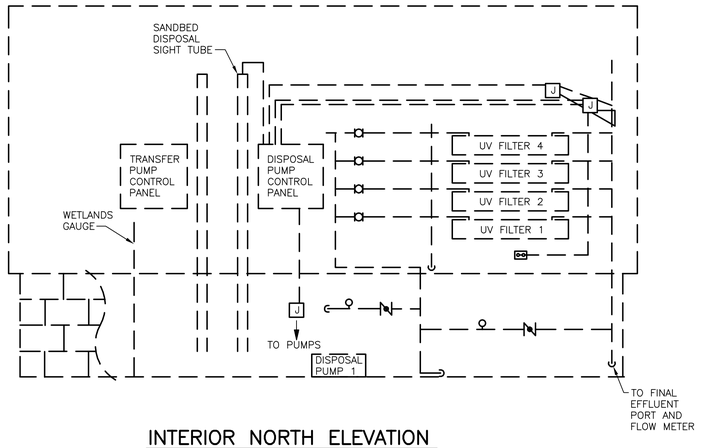


PUMPING STATION DEMOLITION PLAN

SCALE: NOT TO SCALE



INTERIOR NORTH ELEVATION

SCALE: NOT TO SCALE

GENERAL SHEET NOTES:

1. EXISTING UV AND PUMPING EQUIPMENT SHALL NOT BE DEMOLISHED UNTIL NEW PROCESS SYSTEM IS INSTALLED AND ONLINE. CONTRACTOR SHALL NOTIFY WORCESTER COUNTY A MINIMUM OF 1 WEEK PRIOR TO DEMOLISHING EXISTING UV AND PUMPING SYSTEM.
2. CONTRACTOR IS RESPONSIBLE FOR COMPLETE DEMOLITION OF EXISTING UV SYSTEM AND PUMPING SYSTEM INCLUDING BUT NOT LIMITED TO ALL EQUIPMENT, PIPING, INSTRUMENTATION, CONTROL PANELS, AND ELECTRICAL CONNECTIONS. ALL ELECTRIC AND CONTROL WIRING SHALL BE DEMOLISHED BACK TO THE NEAREST PANEL UNLESS OTHERWISE NOTED. SEE SHEET E-102 FOR ELECTRICAL DEMOLITION.
3. CONTRACTOR IS RESPONSIBLE FOR DISPOSAL OF ALL DEMOLISHED MATERIAL IN ACCORDANCE WITH APPLICABLE REGULATIONS.
4. DRAWINGS ARE NOT GUARANTEED TO SHOW LOCATIONS OF ALL EQUIPMENT, PIPING, CONTROLS, AND ELECTRICAL CONNECTIONS TO BE DEMOLISHED. CONTRACTOR IS RESPONSIBLE FOR SCHEDULING SITE VISIT WITH WORCHESTER COUNTY PRIOR TO BIDDING TO DETERMINE FULL SCOPE OF DEMOLITION.
5. DEMOLISH EXISTING BUILDING AND BUILDING FOUNDATION. BACKFILL WITH SUITABLE COMPACTED MATERIAL AS IS REQUIRED TO MATCH PROPOSED GRADING.

LEGEND:

— — — = DEMOLISH

PROFESSIONAL CERTIFICATION.
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
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PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PUMP STATION DEMOLITION PLAN AND INTERIOR NORTH ELEVATION

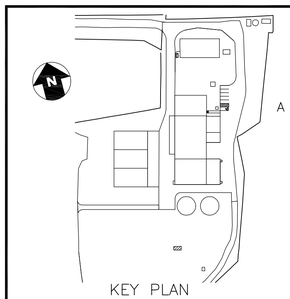
MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

M-502

SHEET 82 OF 128

RECORD DRAWING SET JANUARY 2015



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GENERAL NOTES

GENERAL

THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE BUILDING IS FULLY COMPLETED. IT IS SOLELY THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE ERECTION PROCEDURES AND SEQUENCE, AND TO ENSURE THE STABILITY OF THE BUILDING AND ITS COMPONENT PARTS, AND THE ADEQUACY OF TEMPORARY OR INCOMPLETE CONNECTIONS, DURING ERECTION. THIS INCLUDES THE ADDITION OF ANY SHORING, SHEETING, TEMPORARY GUYS, BRACING OR TIEDDOWNS THAT MIGHT BE NECESSARY. SUCH MATERIAL IS NOT SHOWN ON THE DRAWINGS. IF APPLIED, THEY SHALL BE REMOVED AS CONDITIONS PERMIT AND SHALL REMAIN THE CONTRACTOR'S PROPERTY. THE ENGINEER HAS NO EXPERTISE IN, AND TAKES NO RESPONSIBILITY FOR, CONSTRUCTION MEANS AND METHODS OR JOB SITE SAFETY DURING CONSTRUCTION. PROCESSING AND/OR APPROVING SUBMITTALS MADE BY THE CONTRACTOR WHICH MAY CONTAIN INFORMATION RELATED TO CONSTRUCTION METHODS OR SAFETY ISSUES, OR PARTICIPATION IN MEETINGS WHERE SUCH ISSUES MIGHT BE DISCUSSED, SHALL NOT BE CONSTRUED AS VOLUNTARY ASSUMPTION BY THE ENGINEER OR ANY RESPONSIBILITY FOR SAFETY PROCEDURES. IT IS SOLELY THE RESPONSIBILITY OF EACH CONTRACTOR TO FOLLOW ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASE OF CONSTRUCTION. THE ENGINEER IS NOT ENGAGED IN, AND DOESN'T SUPERVISE CONSTRUCTION.

UTILITIES

1. CONTRACTOR IS TO VERIFY LOCATIONS OF ALL UNDERGROUND UTILITIES PRIOR TO PERFORMING ANY SUBSURFACE OR EXCAVATION WORK.
2. PROTECTION: PROTECT EXISTING UTILITIES TO REMAIN DURING EXCAVATION, AND CUTTING AND PATCHING, TO PREVENT DAMAGE.
3. TAKE ALL PRECAUTIONS NECESSARY TO AVOID CUTTING EXISTING PIPE, CONDUIT OR DUCTWORK SERVING THE BUILDING, UNTIL PROVISIONS HAVE BEEN MADE TO BYPASS THEM. PROVIDE TEMPORARY SERVICES DURING INTERRUPTIONS TO EXISTING UTILITIES, AS ACCEPTABLE TO OWNER.
4. DAMAGES: PROMPTLY REPAIR DAMAGES CAUSED TO ADJACENT FACILITIES BY DEMOLITION WORK AT NO COST TO OWNER.
5. DISPOSAL OF DEMOLISHED MATERIALS: REMOVE DEBRIS, RUBBISH AND OTHER MATERIALS RESULTING FROM EXCAVATION/DEMOLITION OPERATIONS FROM BUILDING SITE. TRANSPORT AND LEGALLY DISPOSE OF MATERIALS OFF SITE.
6. IF UNANTICIPATED MECHANICAL, ELECTRICAL OR STRUCTURAL ELEMENTS WHICH CONFLICT WITH THE INTENDED FUNCTION OR DESIGN ARE ENCOUNTERED, INVESTIGATE AND MEASURE BOTH NATURE AND EXTENT OF THE CONFLICT. SUBMIT REPORT TO OWNER'S REPRESENTATIVE IN WRITTEN, ACCURATE DETAIL. PENDING RECEIPT OF DIRECTIVE FROM OWNERS' REPRESENTATIVE, REARRANGE SCHEDULE AS NECESSARY TO CONTINUE OVERALL JOB PROGRESS WITHOUT DELAY.

DEMOLITION

1. PROTECTION: PROTECT EXISTING CONSTRUCTION TO REMAIN DURING REMOVAL, CUTTING AND PATCHING TO PREVENT DAMAGE.
2. CUTTING: CUT EXISTING CONSTRUCTION USING METHODS LEAST LIKELY TO DAMAGE ELEMENTS TO BE RETAINED OR ADJOINING CONSTRUCTION. IN GENERAL, WHERE CUTTING IS REQUIRED, USE HAND OR SMALL POWER TOOLS DESIGNED FOR SAWING OR GRINDING, NOT HAMMERING AND CHOPPING. CUT HOLES AND SLOTS NEATLY TO SIZE REQUIRED WITH MINIMUM DISTURBANCE OF ADJACENT SURFACES. TEMPORARILY COVER OPENINGS WHEN NOT IN USE. CUT THROUGH CONCRETE AND MASONRY USING A CUTTING MACHINE SUCH AS CARBORUNDUM SAW OR DIAMOND CORE DRILL.
3. CUT-OFF PIPE OR CONDUIT IN WALLS OR PARTITIONS TO BE REMOVED, RELOCATED OR ABANDONED. CUT-OFF PIPE OR CONDUIT IN WALLS OR PARTITIONS TO BE REMOVED. CAP VALUE OR PLUG AND SEAL THE REMAINING PORTION OF PIPE OR CONDUIT TO PREVENT ENTRANCE OF MOISTURE OR OTHER FOREIGN MATTER AFTER BY-PASSING AND CUTTING. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL UTILITIES THAT ARE INVOLVED IN THE DEMOLITION ACTIVITIES AND COORDINATE THEIR REMOVAL OR RELOCATION WITH THE OWNERS REPRESENTATIVE. WORK AT NO COST TO OWNER.
4. DAMAGES: PROMPTLY REPAIR DAMAGES CAUSED TO ADJACENT FACILITIES BY DEMOLITION WORK AT NO COST TO OWNER.
5. DISPOSAL OF DEMOLISHED MATERIALS: REMOVE DEBRIS, RUBBISH AND OTHER MATERIALS RESULTING FROM EXCAVATION AND/OR DEMOLITION OPERATIONS FROM THE BUILDING SITE. TRANSPORT AND LEGALLY DISPOSE OF MATERIALS OFF SITE.

CONTROLLED FILL AND BACKFILL:

SAMPLES OF ALL MATERIALS THAT THE CONTRACTOR PROPOSES TO USE FOR COMPACTED FILL SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER AND STRUCTURAL ENGINEER. COMPACTED FILL SHALL CONSIST OF LOCAL MATERIAL FREE OF DELETERIOUS MATTER AND CLASSIFIED CL, SC, GC, GM, OR SM PER ASTM D-2487. THE CONTROL OF THE MOISTURE FOR PLACING THE FILL WILL BE BASED ON THE RESULTS OF COMPACTION TESTS PER ASTM D-1557. ALL COMPACTED FILL SHALL HAVE A DENSITY OF AT LEAST 95% FOR COHESIONLESS SOILS AND 90% FOR COHESIVE SOILS OF THE MODIFIED PROCTOR MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-698. PRIOR TO PLACEMENT OF ANY FILLS, THE SITE SHALL BE STRIPPED OF ALL TOPSOIL, VEGETATION, ROCKS, AND ORGANIC MATERIALS AND THE EXPOSED SUBGRADE SHALL BE COMPACTED IN PLACE TO A CONFIRMED DENSITY OF 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY. FILL MATERIAL SHALL BE PLACED IN LOOSE LIFTS NOT EXCEEDING 8" IN THICKNESS AND SHALL BE MIXED, SPREAD AND PLACED IN SUCH A WAY AS TO PRODUCE A UNIFORM THICKNESS OF MATERIAL AFTER PLACING. EACH LAYER OF FILL SHALL BE COMPACTED WITH A MINIMUM OF 6 COMPLETE PASSES ON ALL PORTIONS OF THE SURFACE OF EACH LIFT OF FILL BY RUBBER-TIRED ROLLERS, SHEEPS-FOOT ROLLERS OR OTHER MECHANICAL EQUIPMENT APPROVED BY THE GEOTECHNICAL ENGINEER AND THE STRUCTURAL ENGINEER. COMPACTED FILL PLACED WITHIN 4 FEET OF STRUCTURES AND PIPES SHOULD BE PLACED IN HORIZONTAL LIFTS NOT TO EXCEED 4 INCHES THICKNESS AND COMPACTED WITH HAND TAMPERS OR LIGHT COMPACTION EQUIPMENT TO THE SAME STANDARD. HEAVY COMPACTION EQUIPMENT SHOULD NOT BE ALLOWED WITHIN 4 FEET OF STRUCTURES UNLESS A MINIMUM 2 FEET DEPTH OF FILL COVERS THE STRUCTURES. WHENEVER IN PLACE DENSITIES ARE FOUND BELOW ACCEPTABLE LIMITS, ADDITIONAL ROLLING TO PRODUCE THE SPECIFIED DENSITIES SHALL BE REQUIRED. THE CONTRACTOR SHALL TAKE ALL MEASURES REQUIRED TO PROVIDE FOR FREE DRAINAGE OF THE SITE AND TO PREVENT PONDING OF WATER. SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED AT ALL TIMES. PLACING OF FILL CONTAINING ORGANIC MATTER; PLACING OF FILL WITH MOISTURE CONTENT TOO HIGH OR TOO LOW FOR PROPER COMPACTION; PLACING OF FILL WHEN FREE WATER IS STANDING ON THE EXISTING FILL SURFACE; PLACING OF FILL IN A FROZEN CONDITION OR ON TOP OF FROZEN MATTER WILL NOT BE PERMITTED. THE SOILS ENGINEER SHALL SUPERVISE THE PLACING OF THE COMPACTED FILL AND ALL THE MATERIAL AND EQUIPMENT USED FOR THIS PURPOSE AND SHALL MAKE SUCH SOILS TESTS AS MAY BE REQUIRED FOR THE COMPLETION OF THE WORK PERFORMING AT LEAST 6 IN PLACE DENSITY TESTS DURING EACH EIGHT HOUR SHIFT.

DESIGN CODES AND SPECIFICATIONS:

1. 2006 INTERNATIONAL BUILDING CODE (IBC)
2. AMERICAN CONCRETE INSTITUTE (ACI)
3. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

DESIGN DATA:

f'c = 5,000 PSI (FOOTINGS)
f'c = 3,000 PSI GROUT FOR MASONRY CONSTRUCTION
f'c = 5,000 PSI (SLAB ON GRADE)
f'c = 4,000 PSI (SLAB ON METAL DECK).
fy = 60,000 PSI (CONCRETE REINFORCING)
Fy = 36'000 PSI/50,000 PSI

DESIGN LIVE LOADS:

FLOOR LIVE LOAD

SLAB ON GRADE = UP TO 100 PSF
CORRIDORS/STAIRS = 100 PSF
PUBLIC AREAS = 100 PSF
STORAGE = 125 PSF

ROOF LIVE LOAD IBC 2006

ROOF LIVE LOAD = 30 PSF

ROOF SNOW LOAD ASCE 7-02

1. GROUND SNOW LOAD PG = 25 PSF
2. SNOW EXPOSURE FACTOR Ce = 1.0
3. SNOW LOAD IMPORTANCE FACTOR I = 1.1
4. THERMAL FACTOR Ct = 1.0
5. FLAT-ROOF SNOW LOAD Pf = 19.3 PSF

DEAD LOADS

PARTITIONS = 10 PSF
METAL FLOOR DECK AND SLAB = 40 PSF
STRUCTURE = 6 PSF
CEILING AND MECH. = 8 PSF

EARTHQUAKE LOAD IBC-2003

1. SEISMIC USE GROUP = III, IE = 1.25
2. Ss = 0.11g , S1 = 0.0449
3. SITE CLASS = D
4. SDS = 0.117, SDI = 0.070
5. SEISMIC DESIGN CATEGORY B
6. ORDINARY REINFORCED MASONRY SHEAR WALLS
7. DESIGN BASE SHEAR = 20K
8. Cs =0.049
9. RESPONSE MODIFICATION FACTOR R = 3.0
10. EQUIVALENT LATERAL FORCE DESIGN METHOD

WIND LOAD ASCE 7-02

1. BASIC WIND SPEED = 120 MPH
2. BUILDING CATEGORY = III
3. IMPORTANCE FACTOR = 1.15
4. WIND EXPOSURE = C
5. GUST FACTOR: G = 0.85
6. INTERNAL PRESSURE COEFFICIENT = ± 0.18
7. COMPONENTS AND CLADDING = SEE WIND TABLE AND DIAGRAM (S-104)
8. WIND TOPOGRAPHIC FACTOR (Kzt) = 1.0
9. COMPONENT AND CLADDING:

ROOF	SURFACE PRESSURE (psf)		
AREA	10 SF	50 SF	100 SF
NEGATIVE ZONE 1	-39.5 PSF	-36.9 PSF	-35.8 PSF
NEGATIVE ZONE 2	-68.7 PSF	-56.0 PSF	-50.5 PSF
NEGATIVE ZONE 3	-101.6 PSF	-86.3 PSF	-79.7 PSF
POSITIVE ALL ZONES	+24.9 PSF	+19.8 PSF	17.6 PSF
OVERHANG ZONE 2	-80.4 PSF	-80.4 PSF	-80.4 PSF
OVERHANG ZONE 2	-135.3 PSF	-104.6 PSF	-91.4 PSF

FOUNDATION:

1. ALL FOUNDATIONS SHALL BEAR ON 6" OF #57 STONE OVER UNDISTURBED SOIL WITH ALLOWABLE BEARING CAPACITY SPECIFIED.
2. CONCRETE SHALL NOT BE POURED ON FROZEN GROUND.
3. PROVIDE SHEETING AS REQUIRED TO SUPPORT LATERAL LOADS DURING EXCAVATION. SEE GEOTECHNICAL REPORT FOR SOIL PROPERTIES.
4. FILL ALL VOIDS AND REPLACE DISTURBED SOIL WITH LEAN CONCRETE.

FOUNDATIONS-SPREAD FOOTINGS:

BOTTOM OF ALL FOOTINGS SHALL BE A MINIMUM OF 2'-0" BELOW ORIGINAL GRADE OR PLACED IN APPROVED COMPACTED FILL. BOTTOM OF ALL EXTERIOR FOOTINGS SHALL BE A MINIMUM OF 2'-6" BELOW FINISHED GRADE. A SOIL BEARING CAPACITY AS INDICATED BELOW WAS USED IN THE FOUNDATION DESIGN, AND MUST BE FIELD VERIFIED BY A REGISTERED GEOTECHNICAL ENGINEER. IF SOIL OF THIS BEARING CAPACITY IS NOT ENCOUNTERED AT THE ELEVATIONS INDICATED ON THE CONTRACT DRAWINGS, FOOTINGS SHALL BE LOWERED OR INCREASED IN SIZE AS DIRECTED BY THE STRUCTURAL ENGINEER. ELEVATIONS SHOWN ON PLAN ARE TO THE BOTTOM OF THE FOOTINGS.

BEARING CAPACITY:

PROCESS BUILDING: 5,500 PSF
EQUALIZATION TANK: 3,500 PSF
GREEN HOUSE: 3,000 PSF

MODULUS OF SUBGRADE REACTION (K)
FOR SLAB-ON-GRADE: 125 PSI

GEOTECHNICAL REPORT:

A GEOTECHNICAL INVESTIGATION AND REPORT DATED MARCH 31, 2010 HAS BEEN PREPARED BY T.L.B. ASSOCIATES, INC. AND SHALL BE CONSIDERED PART OF THE PROJECT DOCUMENTS. IF DIFFERENCES IN REQUIREMENTS BETWEEN THE GEOTECHNICAL REPORT AND THESE DRAWINGS EXIST, THE MORE STRINGENT REQUIREMENT SHALL APPLY.

SHOP DRAWINGS:

SHOP DRAWINGS FOR ALL STRUCTURAL ELEMENTS SHOWN ON THE CONTRACT DOCUMENTS MUST BE SUBMITTED BY GENERAL CONTRACTOR AND REVIEWED BY THE ENGINEER. ALL CONTRACTOR MODIFICATIONS (INCLUDING PRODUCTS SUBMISSION) MUST BE IDENTIFIED IN WRITING AS A PROPOSED "AS EQUAL" CHANGES AT TIME OF SUBMISSION. IF A CONTRACTOR OR OWNER FAILS TO SUBMIT THE SHOP DRAWINGS OR FAILS TO FOLLOW THE ABOVE "AS EQUAL" PROCEDURE, JMT WILL NOT BE RESPONSIBLE FOR THE STRUCTURAL CERTIFICATION AND DESIGN OF THE PROJECT. SHOP DRAWINGS ARE REVIEWED BY THE ENGINEER AS A CONVENIENCE TO THE CONTRACTOR AND ARE NOT A CONTRACT DOCUMENT.

INSPECTION:

ALL WORK SPECIFIED HEREIN SHALL BE INSPECTED IN ACCORDANCE WITH THE BUILDING CODE AND ALL LOCAL ORDINANCES. THE CONTRACTOR SHALL HIRE AN EXPERIENCED QUALIFIED INSPECTOR TO PERFORM ALL REQUIRED INSPECTION WORK. INSPECTION SHALL CONSIST OF, BUT NOT BE LIMITED TO, VISUAL OBSERVATIONS OF MATERIALS, EQUIPMENT OR CONSTRUCTION WORK FOR THE PURPOSE OF ASCERTAINING THAT THE WORK IS IN SUBSTANTIAL CONFORMANCE WITH THE CONTRACT DOCUMENTS AND WITH THE DESIGN INTENT. THE ENGINEER WILL NOT PERFORM THE REQUIRED INSPECTION AS PART OF THIS PRESENT CONTRACT WITH THE ARCHITECT/OWNER. UNDER THIS PRESENT CONTRACT, THE ENGINEER MAY VISIT THE SITE TO ASCERTAIN GENERAL CONFORMANCE TO THE CONTRACT DOCUMENTS. HOWEVER, SUCH VISITS SHALL NOT BE RELIED UPON BY OTHERS AS ACCEPTANCE OF THE WORK, NOR SHOULD IT BE CONSTRUED TO RELIEVE THE CONTRACTOR IN ANY WAY FROM HIS OBLIGATIONS AND RESPONSIBILITIES UNDER THE CONSTRUCTION CONTRACT. HOWEVER, IF DESIRED, JMT CONSULTANTS, INC. MAY BE HIRED UNDER A SEPARATE CONTRACT TO PERFORM THIS INSPECTION WORK.

OWNERSHIP OF DOCUMENTS:

THE CONTRACTOR ACKNOWLEDGES THESE PLANS AND SPECIFICATIONS PREPARED BY JMT, AS INSTRUMENTS OF PROFESSIONAL SERVICE. NEVERTHELESS, THE PLANS AND SPECIFICATIONS PREPARED UNDER THIS AGREEMENT SHALL REMAIN THE PROPERTY OF JMT. UPON COMPLETION OF THE WORK. THE CONTRACTOR AGREES TO HOLD HARMLESS AND INDEMNIFY AGAINST ALL DAMAGES, CLAIMS, AND LOSSES, INCLUDING DEFENSE COSTS, ARISING OUT OF ANY REUSE OF THE PLANS AND SPECIFICATIONS WITHOUT THE WRITTEN AUTHORIZATION OF JMT.

STAINLESS STEEL:

1. FABRICATE AND ERECT STEEL IN ACCORDANCE WITH THE LATEST EDITION OF THE AISC MANUAL OF STEEL CONSTRUCTION
2. WELDING SHALL BE COMPATIBLE WITH STAINLESS STEEL. ALL WELDERS SHALL BE CERTIFIED IN ACCORDANCE WITH AWS D1.6.
3. SUBMIT COMPLETE ERECTION AND DETAILED SHOP DRAWINGS OF ALL STRUCTURAL STEEL TO THE ENGINEER FOR REVIEW. MARK ALL ITEMS OF STRUCTURAL STEEL, SHOWING SIZES, LENGTHS, LOCATIONS, AND ASTM DESIGNATIONS.
4. WHERE IDENTIFIED STEEL SHALL BE STAINLESS STEEL MEETING ASTM A276, TYPE 304.

REINFORCING STEEL:

REINFORCING STEEL SHALL BE DEFORMED BARS IN ACCORDANCE WITH ASTM A-615, GRADE 60. BENDS ARE TO BE FABRICATED AS PER DETAILS. PLACE MAIN REINFORCING STEEL SO AS TO PROVIDE 3" MINIMUM COVER FOR FOUNDATIONS POURED ON EARTH, AND 2" FOR ALL REBAR IN EXPOSED CONCRETE (EXCEPT AS OTHERWISE DETAILED). ALL WALL STEEL SHALL HAVE A MINIMUM EXTENSION INTO THE SUPPORTS IN ACCORDANCE WITH THE LATEST ADDITION OF THE ACI CODE, PROVIDE ACCESSORIES AND BAR SUPPORTS IN ACCORDANCE WITH THE MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES (ACI 315). ALL REINFORCING SHALL BE EPOXY-COATED CONFORMING TO ASTM A-775 FOR BARS AND ASTM A-884 FOR WELDED WIRE FABRIC. DAMAGED AND CUT EPOXY- COATING SHALL BE REPAIRED WITH PATCHING MATERIAL CONFORMING TO ASTM A-775. EPOXY- COATED REINFORCING BARS SHALL REST ON COATED WIRE BAR SUPPORTS MADE OF DILLECTIC MATERIAL FOR A MINIMUM DISTANCE OF 2 INCHES FROM POINT OF CONTACT WITH EPOXY-COATED REBARS. EPOXY-COATED REINFORCING BARS SHALL BE FASTENED WITH NYLON-, EPOXY-, OR PLASTIC- COATED TIE WIRE.

STRUCTURAL STEEL:

1. STRUCTURAL STEEL PLATES, ANGLES, CHANNELS, BARS, AND ROLLED S, M, AND HP SHAPES SHALL CONFORM TO ASTM A-36.
2. ROLLED WIDE FLANGE SHAPES SHALL CONFORM TO ASTM A-992, GRADE 50.
3. STRUCTURAL STEEL TUBULAR SHAPES SHALL CONFORM TO ASTM A-500, GRADE B (FY=46KSI)
4. AND STRUCTURAL STEEL PIPES SHAPES SHALL CONFORM TO ASTM A-53, TYPES E OR S, GRADE B (FY=35KSI). ANCHOR BOLTS SHALL CONFORM TO ASTM F1554, GRADE 36.

ALL CONNECTIONS WITH SLOTTED AND OVERSIZE HOLES SHALL HAVE SLIP CRITICAL CONNECTIONS. ALL OTHER CONNECTIONS MAY BE BEARING TYPE CONNECTIONS. ALL BOLTS SHALL CONFORM TO ASTM A-325. WELDS SHALL CONFORM TO ALL THE PROVISIONS OF THE STRUCTURAL WELDING CODE, AWS D1.1-77 OF THE AMERICAN WELDING SOCIETY EXCEPT SECTIONS 2.3, 2.4, 2.5, 8.13.1.2 AND 9. HEADED STUD TYPE SHEAR CONNECTORS SHALL BE COLD FINISHED CARBON STEEL COMPLYING WITH ASTM A-108, GRADE 1015 OR 1020, WITH DIMENSIONS COMPLYING WITH AISC SPECIFICATIONS. NO OPENINGS IN BEAMS OTHER THAN SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE PERMITTED WITHOUT WRITTEN APPROVAL FROM THE STRUCTURAL ENGINEER.

ALUMINUM:

ALL ALUMINUM SHALL BE 6060-T6, UNLESS NOTED OTHERWISE.

WALLS	SURFACE PRESSURE (psf)		
AREA	10 SF	100 SF	500 SF
NEGATIVE ZONE 4	-46.8 PSF	-40.3 PSF	-35.8 PSF
NEGATIVE ZONE 5	-57.8 PSF	-44.9 PSF	-35.8 PSF
POSITIVE ZONE 4 & 5	+43.1 PSF	+36.7 PSF	-32.2 PSF

METAL DECK:

ALL METAL DECKING SHALL BE DESIGNED, FABRICATED, AND ERECTED PER THE "SPECIFICATION OF THE STEEL DECK INSTITUTE"-LATEST EDITION, EXCEPT AS NOTED HEREIN. STEEL DECK AND ALL ACCESSORIES SHALL BE FORMED OF ZINC COATED STEEL SHEETS CONFORMING TO ASTM A-446, GRADE "A" FOR GALVANIZED DECK UNITS. GALVANIZED UNITS SHALL CONFORM TO ASTM 525, COATING CLASS G-60 FOR INTERIOR FLOOR DECK AND CLASS G-90 FOR EXTERIOR FLOOR DECK AND ALL ROOF DECK. ALL UNITS SHALL SPAN CONTINUOUS OVER A MINIMUM OF 3 SUPPORTS. ALL METAL DECK UNITS SHALL BE WELDED TO THE STEEL FRAMING AT 12" o/c. MAXIMUM UNLESS SPECIFIED AT A CLOSER SPACING BY THE MANUFACTURER. METAL DECK AND/OR SLABFORM WITH A THICKNESS LESS THAN 22 GAUGE SHALL BE WELDED WITH WELDING WASHERS. ALL SIDE LAPS SHALL BE CONNECTED USING SHEET METAL SCREWS OR WELDS AT 24" o/c. MAXIMUM. ALL WELDS AND BURNED AREAS SHALL BE THOROUGHLY CLEANED AND PAINTED WITH A GALVANIZED REPAIR PAINT.

CONCRETE:

ALL CONCRETE WORK SHALL CONFORM TO ALL THE PROVISIONS OF THE "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS" (ACI 301), CODE REQUREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES (ACI 350), AND TO THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318-02). ALL STRUCTURAL CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 5,000 PSI UNLESS NOTED OTHERWISE. ADDITIONALLY, THE CONCRETE SHALL CONFORM TO ALL THE PROVISIONS OF "RECOMMENDED PRACTICE FOR HOT WEATHER CONCRETING" (ACI 305-R82) AND "RECOMMENDED PRACTICE FOR COLD WEATHER CONCRETING" (ACI 306-R83). ALL FORMWORK SHALL BE IN ACCORDANCE WITH THE AMERICAN CONCRETE INSTITUTE "FORMWORK FOR CONCRETE" SPECIAL PUBLICATION NO. 4 AND ACI'S "STANDARD RECOMMENDED PRACTICE FOR CONCRETE FORMWORK" (ACI-347-LATEST EDITION). ALL CONCRETE EXPOSED TO THE WEATHER SHALL HAVE AN AIR ENTRAINMENT OF 6% ± 1%. NO ADMIXTURES CONTAINING CALCIUM CHLORIDE SHALL BE PERMITTED. THE MAXIMUM SLUMP OF ALL CONCRETE SHALL BE 4". FLOOR SLABS SHALL BE FINISHED TO A MINIMUM FLATNESS F- NUMBER Ff = 20 AND A MINIMUM LEVELNESS F-NUMBER F1 = 17 IN ANY DIRECTION. ALL CONCRETE SHALL BE CURED WITH LIQUID SEALING COMPOUND CONFORMING TO ASTM C-309, TYPE I AND FEDERAL SPECIFICATION TT-C-00800 OR OTHER APPROVED METHOD WHICH IS COMPATIBLE WITH FLOORING ADHESIVES AND OTHER SURFACE TREATMENTS. ALL CONCRETE LEFT EXPOSED AT THE COMPLETION OF THE PROJECT SHALL BE TREATED WITH A CLEAR, PENETRATING ACRYLIC BASE POLYMER CAPABLE OF PREVENTING INFILTRATION OF WATER BORNE CHLORIDES SUCH AS CONSPEC #1 BY CONSPEC MARKETING & MANUFACTURING COMPANY OR APPROVED EQUAL. LOADS GREATER THAN THE DESIGN LIVE LOADS SHALL NOT BE PLACED ON THE STRUCTURE. A CONCRETE STRUCTURE MAY NOT SUPPORT ITS DESIGN LIVE LOAD FOR 28 DAYS. CONTRACTOR SHALL SUPPORT ADJACENT STRUCTURES, UTILITIES, AND EXCAVATIONS AS REQUIRED FOR COMPLETION OF WORK. ONE SET OF COMPRESSIVE TEST CYLINDERS FOR EACH 100 CUBIC YARDS POURED, BUT NOT LESS THAN ONE SET FOR EACH DAY'S POUR AND EACH CLASS OF CONCRETE, ALONG WITH SLUMP TESTS SHALL BE PERFORMED BY A TESTING LABORATORY APPROVED BY THE STRUCTURAL ENGINEER.

MASONRY:

SOLID MASONRY SHALL BE GRADE N1 IN ACCORDANCE WITH ASTM C-145 AND MAY BE 75% SOLID UNLESS OTHERWISE NOTED. HOLLOW MASONRY UNITS SHALL BE GRADE N1 CONFORMING TO ASTM C-90. MASONRY UNITS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI BASED ON THE NET CROSS SECTIONAL AREA OF THE INDIVIDUAL BLOCK UNITS. ALL MORTAR SHALL BE TYPE "S" CONFORMING TO ASTM C-270 WITH MINIMUM COMPRESSIVE STRENGTH OF 1800 PSI AT 28 DAYS. PROVIDE A MINIMUM OF 3 COURSES OF SOLID BRICK OR ONE COURSE OF 100% SOLID BLOCK UNDER WALL BEARING ENDS OF ALL JOISTS AND SLABS, THE FULL WIDTH OF THE WALL, UNLESS NOTED. IN BEARING WALLS, PROVIDE SOLID BRICK OR 100% BLOCK EXTENDING 8" BEYOND WALL OPENINGS THE FULL WALL THICKNESS DOWN TO THE FLOOR, UNLESS NOTED. ALL PORTIONS OF MASONRY WALLS HAVING A HORIZONTAL CROSS SECTION OF 4 SQ. FT. OR LESS SHALL BE OF SOLID MASONRY DOWN TO FOOTINGS. PROVIDE HORIZONTAL MASONRY REINFORCING (DUR-O-WALL OR EQUAL) AT 16" O.C. IN ALL MASONRY WALLS UNLESS NOTED. ALL BRICK VENEER SHALL HAVE MASONRY CONTROL JOINTS AT 40'-0" ON CENTER MAXIMUM. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS. ALL MORTAR JOINTS IN MASONRY WALLS (HORIZONTAL AND VERTICAL) SHALL BE FILLED 100% WITH MORTAR. USE BUCKETS TO MEASURE MATERIALS FOR MIXING MORTAR.

ABBREVIATIONS

@ At
AB: Anchor Bolt; Asbestos Board
ABV: Above
ACF: Architectural Concrete Finish
ACI: American Concrete Institute
ADD: Addendum; Addition
ADDL: Additional
ADH: Adhesive
AF: Above the Floor
AFF: Above Finished Floor
AGG: Aggregate
AISC: American Institute of Steel Construction
ALUM: Aluminum
ALS: Acrylic Latex Sealant
AN: Anode
ANCH: Anchor, Anchorage
APPD: Approved
APPROX: Approximate
APRVD: Approved
ARCH: Architect, Architectural
ASPH: Asphalt
ASSY: Assembly
ASTM: American Society for Testing Materials
AVG: Average
AWS: American Welding Society

BAF: Baffle
BEL: Below
BET: Between
BETW: Between
BEV: Bevel
BHD: Bulkhead
BIT: Bituminous
BLDG: Building
BLK: Block
BM: Beam, Bench Mark
BOT: Bottom
BP: Base Plate
BPL: Bearing Plate
BRDG: Bridge, Bridging
BRG: Bearing
BRK: Brick
BUR: Built-up Roof
BVL: Bevelled

C/C: Center to Center
CAD: Cadmium, Computer-Aided Drafting
CAIS: Caisson

CCW: Counter Clockwise
C.I.: Cast Iron
CIR: Circle, Circular,
CIRC: Circumference
CJ: Control Joint
CL: Centerline,
CLR: Clear
CLR OPG: Clear Opening
CMP: Corrugated Metal Pipe
CMU: Concrete Masonry Unit
CNTR: Center, Counter
CO: Company, Cleanout,
CO & DP: Cleanout & Deck Plate
COEF: Coefficient
COL: Column
CONC: Concrete
CONST: Construction
CONSTR: Construction
CONT: Continuous, Continue, Control
CONTR: Contractor
CTR: Center, Counter

DEM: Demolish
DEMO: Demolition
DET: Detail
DIAG: Diagonal
DIA: Diameter
DIM: Dimension
DL: Dead Load
DMH: Drop Manhole
DN: Down
DR: Drain
DT: Drain Tile
DVTL: Dovetail
DWG: Drawing
DS: Downspout

E TO E: End to End
EA: Each
EB: Expansion Bolt
EE: Each End
EF: Each Face
EIFS: Exterior Insulation and Finish System
EJ: Expansion Joint
EL: Elevation
ELB: Elbow
ELEC: Electrical
ELECT: Electrical
ELEV: Elevator, Elevation
ENG: Engineer
ENGR: Engineer
EQ: Equal
EQUIP: Equipment
EW: Each Way
EX: Existing
EXCAV: Excavate
EXP: Expansion, Exposed
EXT: Exterior

FBRK: Fire Brick
FD: Floor drain
FDN: Foundation
FF: Far Face, Finished Floor
FFE: Finished Floor Elevation
FFL: Finished Floor Line
FHY: Fire Hydrant
FIL: Fillet
FIN: Finish, finished
FLG: Flooring
FOC: Face of Concrete
FOS: Face of Studs
FPRF: Fireproof
FRG: Forged
FRM: Frame
FRPF: Fireproof
FRT: Fire Retardant
FS: Full Size, Far Side
FSCW: Flush Solid Core Wood
FT: Foot, Feet, Fully Tempered
FTG: Footing

GA: Gauge, Gage
GALV: Galvanized
GC: General Contractor
GD: Guard, Grade
GEN: General, Generator
GRND: Ground
GRTG: Grating
GVL: Gravel
GYP: Gypsum

HGT: Height
HOR: Horizontal
HT: Height
HVAC: Heating, Ventilating & Air Conditioning
HVY: Heavy

ID: Inside Diameter
INFO: Information
INT: Interior, Internal

JST: Joist
JT: Joint

KIP: Kilopound (1000 pounds)
KO: Knockout
KP: Kickplate

L: Angle, Left, Length
LAD: Ladder
LAT: Lateral
LB: Pound (weight)
LL: Live Load
LMS: Limestone
LN: Length
LNDG: Landing
LNTL: Lintel
LOC: Locate
LOCS: Locations
LVR: Louver
LW: Light Weight
LWC: Light Weight Concrete

M: Bending Moment
MAINT: Maintenance
MAN; Manual
MAS: Masonry
MAT: Material
MATL: Material
MAX: Maximum
ME: Mechanical Engineer
MECH: Mechanical
MEMB: Membrane
MET: Metal
MEZZ: Mezzanine
MFD: Manufactured, Metal Floor Deck
MFG: Manufacturer, Manufacturing
MFR: Manufacture, Manufacturer
MH: Manhole
MIN: Minimum
MISC: Miscellaneous
MM: Millimeter
MMB: Membrane
MO: Masonry Opening
MOD: Module
MONO: Monolithic
MOV: Movable
MRD: Metal Roof Deck
MT: Mount, Mounted
MTD: Mounted
MTL: Metal

N: North,
NF: Near Face
NI: Nickel
NS: Near Side
NTS: Not To Scale

O TO O: Out to Out
OBS: Obscure
OC: On Center
OD: Outside Diameter
OF: Outside Face
OH: Overhead
OHD: Overhead Door
OPNG: Opening
OPP: Opposite
OVFL: Overflow
OW: Open Waste

P SL: Pipe Sleeve
PAF: Powder Actuated Fasteners
PAR: Parallel
PC: Precast Concrete
PCF: Pounds per cubic foot
PCPL: Portland Cement Plaster
PE: Professional Engineer
PED: Pedestal
PERIM: Perimeter
PERP: Perpendicular
PFN: Prefinished
PJF: Preformed Joint Filler
PKG: Parking
PKWY: Parkway
PL: Plate, Plan, Property Line
PLBG: Plumbing
PLF: Pounds Per Lineal Foot
PLTF: Platform
PLWD: Plywood

PNT: Paint
PRC: Precast
PRE: Prefinished
PREFAB: Prefabricated
PRES: Pressure
PRF: Preformed
PRI: Primary
PSC: Prestressed Concrete
PSF: Pounds per square foot
PSI: Pounds per square inch
PT: Pressure Treated
PTC: Post-Tensioned Concrete
PVG: Paving
PVMT: Pavement
PVT: Private

QUAL: Quality
QTR: Quarter
QTY: Quantity

RAD: Radius
RCP: Reinforced Concrete Pipe
RD: Roof Drain, Round
REBAR: Reinforcing Bar
REFL: Reflected, Reflector
REINF: Reinforcement, or Reinforce
REM: Remove, Removable
REQD: Required
RET: Retaining
REV: Revise, Revision
RF: Roof
RFG: Roofing
RGH: Rough
RGH OPNG:Rough Opening

SSCFT: Structural Clay Facing Tile
SCHED: Schedule
SE: Structural Engineer
SEAL: Sealant
SECT: Section
SHTH: Sheathing
SHTHG: Sheathing
SIM: Similar
SJS: Silicone Joint Sealant
SLOT: Slotted
SLV: Sleeve
SPECS: Specifications
SQ: Square
SS: Stainless Steel
SSD: Sub-soil Drain
SSGS: Silicone Structural Glazing Sealant
ST: Straight
STA: Station
STD: Standard
STIFF: Stiffener
STL: Steel
STR: Structural
SUR: Surface
SUSP: Suspended, Suspend

TC: Top of Curb
TD: Trench Drain
THK: Thick, Thickness
THRU: Through
TP: Top of Pavement
T.O. SLAB: Top of Slab
T.O.S: Top of Steel

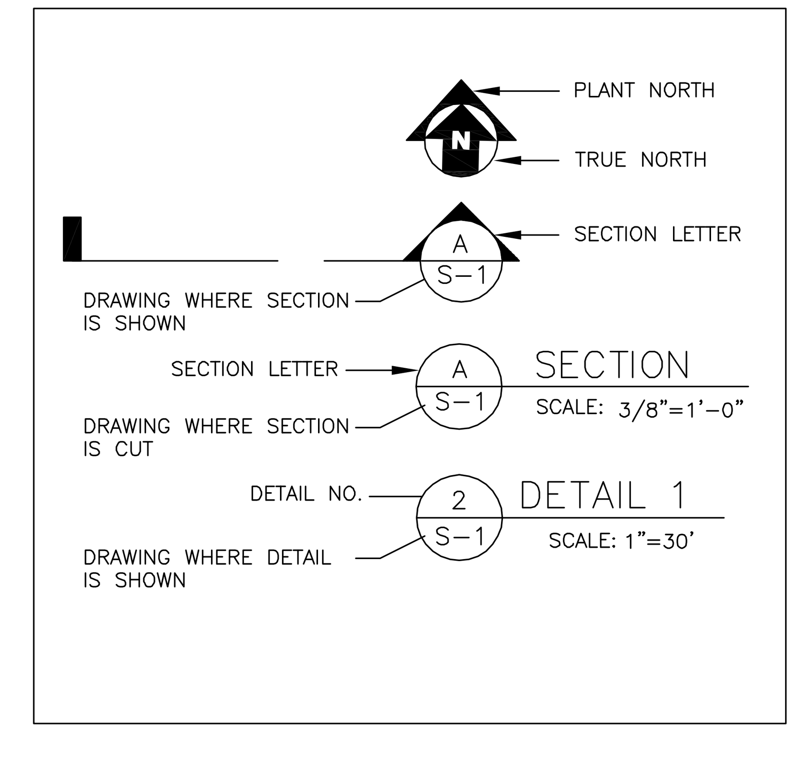
UNEXC: Unexcavated
UNFIN: Unfinished
UNO: Unless Noted Otherwise
USS: United States Standard
UT: Utility

VB: Vapor Barrier
VBC: Vinyl Base (Coved)
VERT: Vertical
VEST: Vestibule
VF: Vinyl Fabric
VIF: Verify In the Field
VNR: Veneer
VP: Vent Pipe

W/: With
W/O: Without
WM: Wire Mesh
WP: Working Point
WPR: Waterproofing
WT: Weight
WWF: Welded Wire Fabric

XH: Extra Heavy
XS: Extra Strong
XXS: Double Extra Strong

LEGEND



RECORD DRAWING SET
JANUARY 2015

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND,
LICENSE NO. 16596
EXPIRATION DATE 2011-08-14

11-22-2010

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

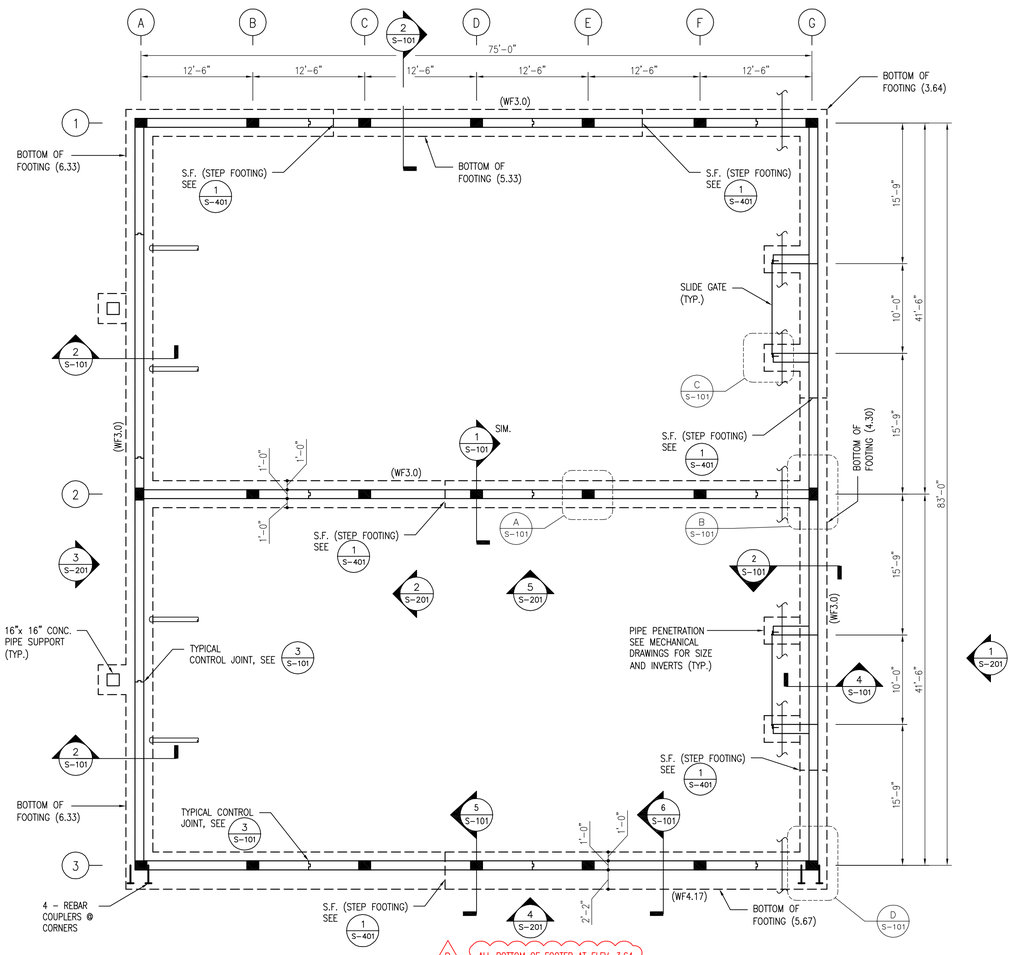
PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
STRUCTURAL GENERAL NOTES

MARK	DATE	DESCRIPTION
R	NOV. 2014	RECORD DRAWINGS

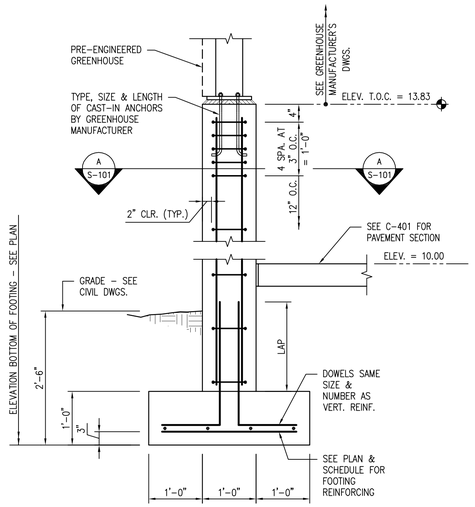
CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

S-001



SLUDGE GREENHOUSE – FOUNDATION PLAN

SCALE: 1/8" = 1'-0"



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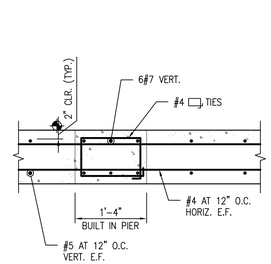
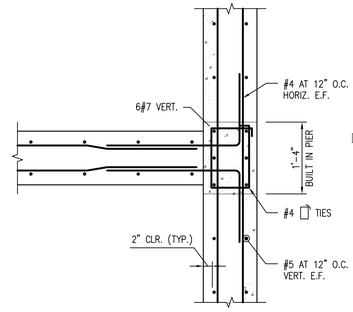


A PIER PLAN

S-101 SCALE: NTS



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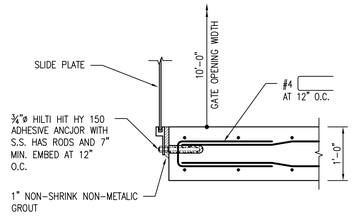

C SLIDE GATE ATTACHMENT

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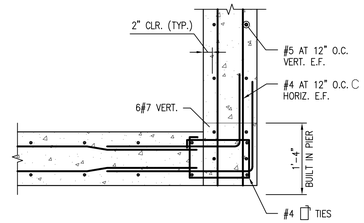

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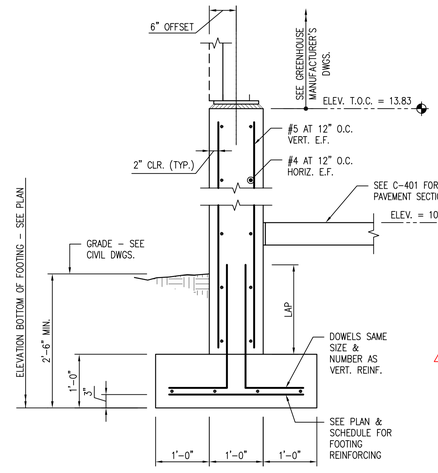

2 WALL SECTION (WF3.0)

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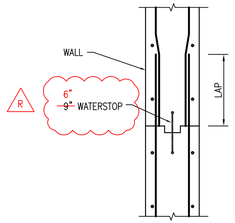

3 CONTROL JOINT IN WALLS

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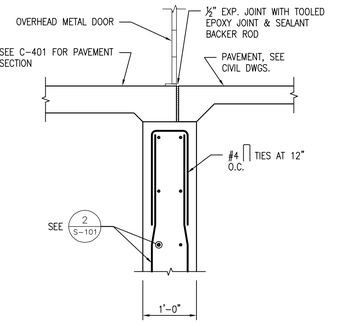

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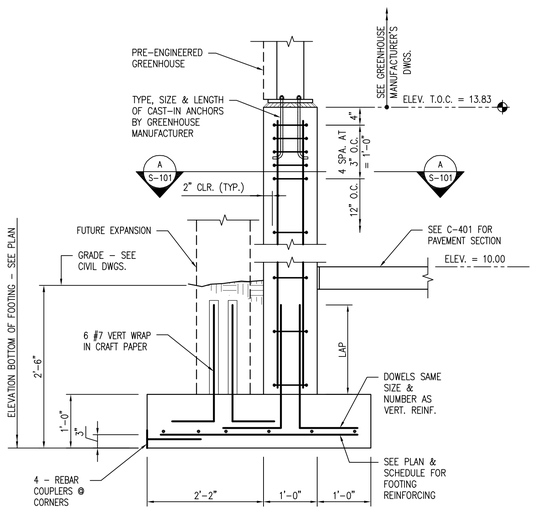

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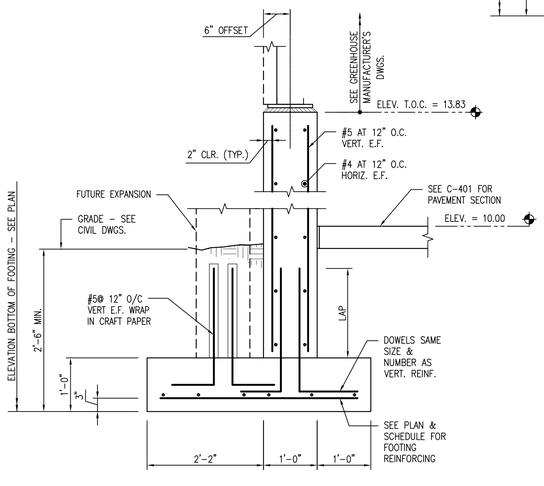
S-101 SCALE: NTS



6 WALL SECTION (WF4.17)

S-101 SCALE: NTS

GENERAL SHEET NOTES:

1. GREENHOUSE SUPERSTRUCTURE SHALL BE A PREFABRICATED GREENHOUSE STRUCTURE.
2. SEE DRAWING C-401 FOR SLAB SECTIONS.
3. SEE MECHANICAL DRAWINGS FOR UNDER DRAIN.
4. A BEARING CAPACITY OF 3,000 PSF WAS USED IN THE DESIGN OF THE FOUNDATION AND SHALL BE VERIFIED IN THE FIELD BY A REGISTERED PROFESSIONAL GEOTECHNICAL ENGINEER. IF THIS BEARING CAPACITY IS NOT REACHED AT THE ELEVATIONS INDICATED THE FOUNDATIONS SHALL BE LOWERED OR INCREASED IN SIZE AS DIRECTED BY THE ENGINEER.

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

STATE OF MARYLAND – ENGINEER – KEVIN M. SMITH – 22040 – PROFESSIONAL ENGINEER
11-22-2040

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 16596
EXPIRATION DATE 2011-06-14

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
SLUDGE GREENHOUSE - FOUNDATION PLAN AND DETAILS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

S-101

SHEET 43 OF 128

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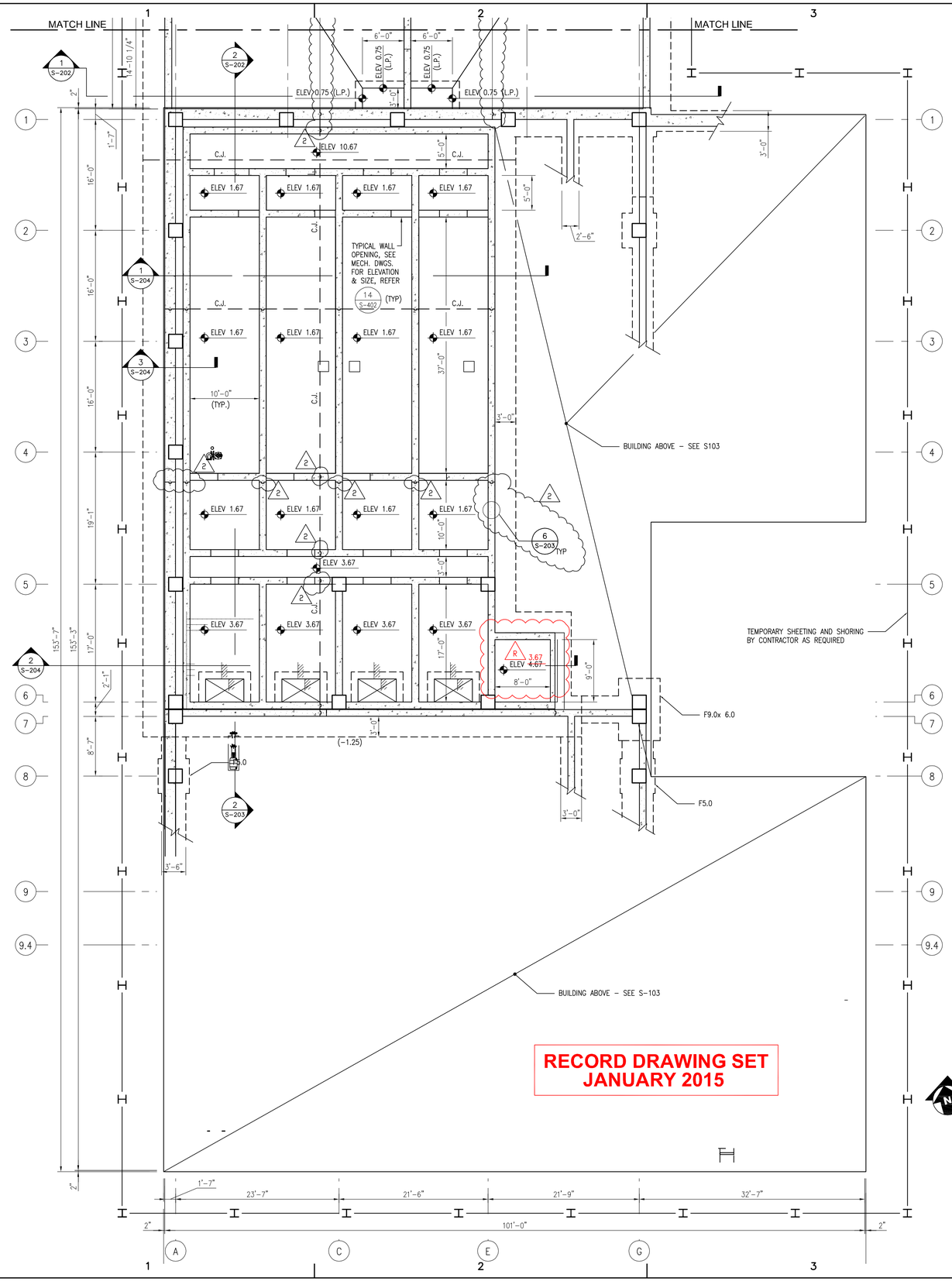
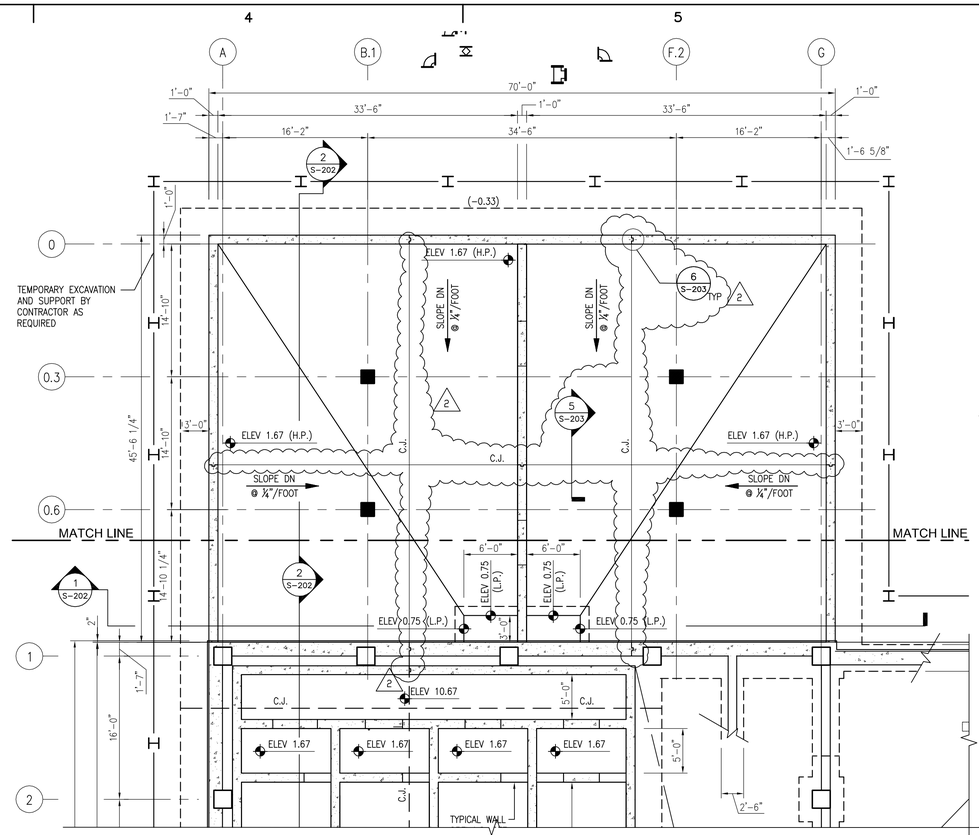
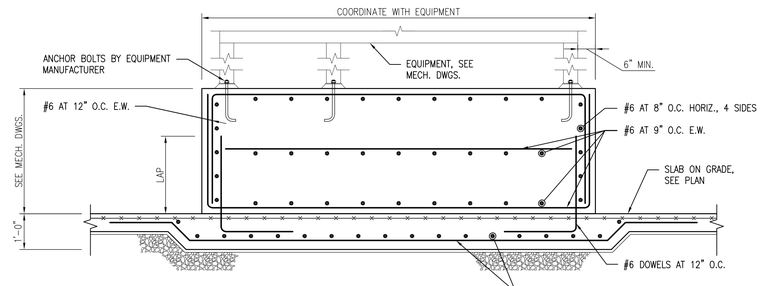




EQUALIZATION TANK FOUNDATION WALL PLAN

SCALE: 1/8" = 1'-0"

1. THE FOUNDATIONS HAVE BEEN DESIGNED FOR AN ALLOWABLE BEARING CAPACITY OF 3,500 POUNDS PER SQUARE FOOT. THE BEARING CAPACITY SHALL BE FIELD VERIFIED DURING CONSTRUCTION BY A REGISTERED PROFESSIONAL GEOTECHNICAL ENGINEER IN THE STATE OF MARYLAND PRIOR TO THE PLACEMENT OF THE FOUNDATIONS.
2. ELEVATIONS NOTED ON PLAN ARE TO THE BOTTOM OF THE FOUNDATIONS UNLESS NOTED OTHERWISE.
3. SEE PLAN FOR ELEVATION TOP OF CONCRETE MAT SHOWN ◆ ELEV.
4. CONCRETE FOR TWO WAY REINFORCED MAT SHALL HAVE A 28-DAY COMPRESSIVE STRENGTH (f'c) OF 5,000 PSI.
5. SEE SPECIFICATION SECTION 02260 FOR TEMPORARY EXCAVATION SUPPORT AND PROTECTION REQUIREMENTS.



1 S-102 EQUIPMENT PAD
SCALE: NOT TO SCALE

PROCESS BUILDING – FOUNDATION & TANK LEVEL PLAN

SCALE: 1/8" = 1'-0"

PROCESS BUILDING – FOUNDATION & TANK LEVEL PLAN

1. THE FOUNDATIONS HAVE BEEN DESIGNED FOR AN ALLOWABLE BEARING CAPACITY OF 5,500 POUNDS PER SQUARE FOOT. THE BEARING CAPACITY SHALL BE FIELD VERIFIED DURING CONSTRUCTION BY A REGISTERED PROFESSIONAL GEOTECHNICAL ENGINEER IN THE STATE OF MARYLAND PRIOR TO THE PLACEMENT OF THE FOUNDATIONS.
2. ELEVATIONS NOTED ON PLAN ARE TO THE BOTTOM OF THE FOUNDATIONS UNLESS NOTED OTHERWISE.
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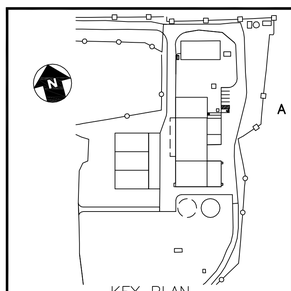

WORCESTER COUNTY

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11-22-240

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
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72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING - FOUNDATION & TANK LEVEL PLAN

MARK	DATE	DESCRIPTION
1	FEB. 2011	ADDENDUM 2
2	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: NTB
CH'D. BY: JB

S-102

SHEET 44 OF 128

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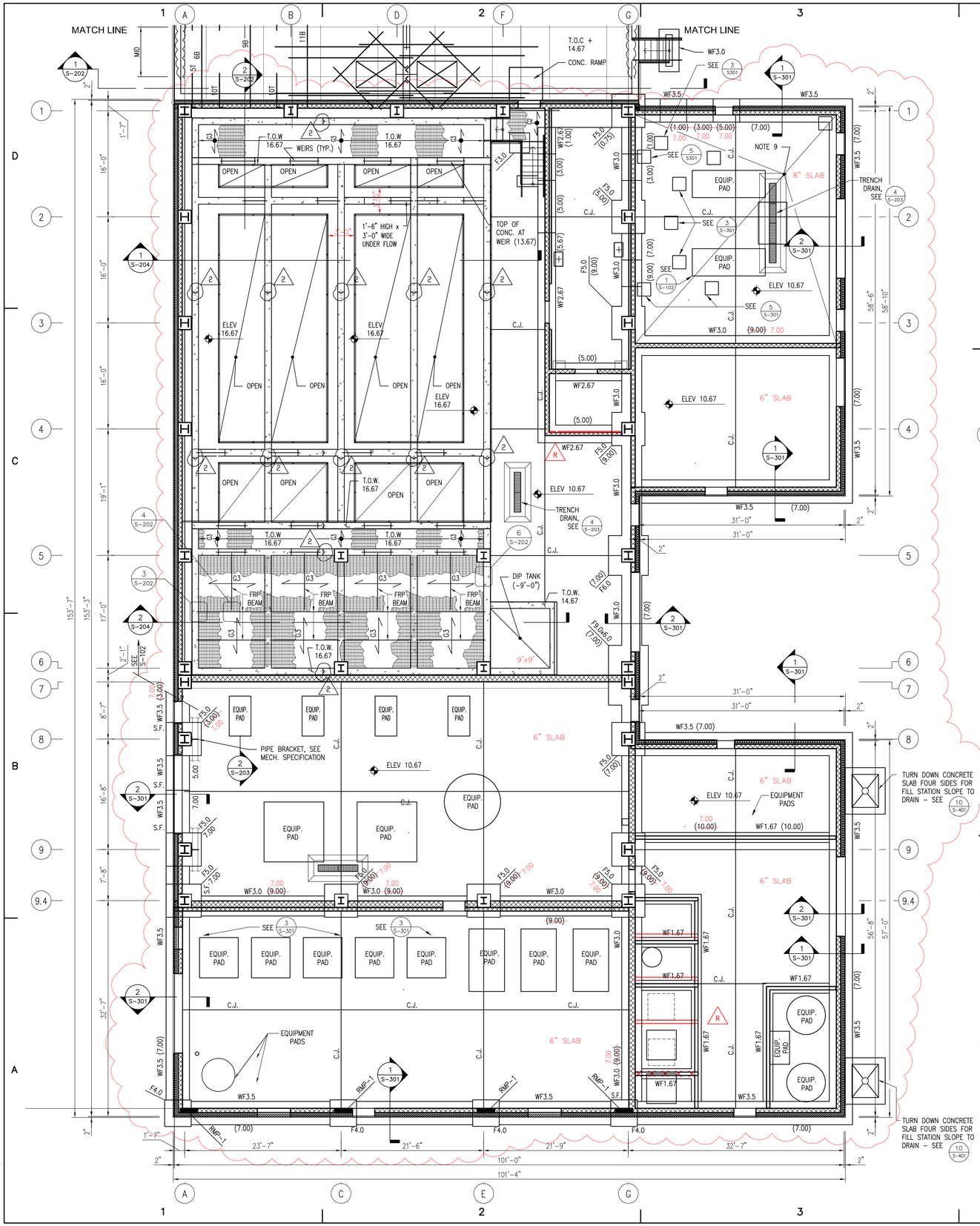
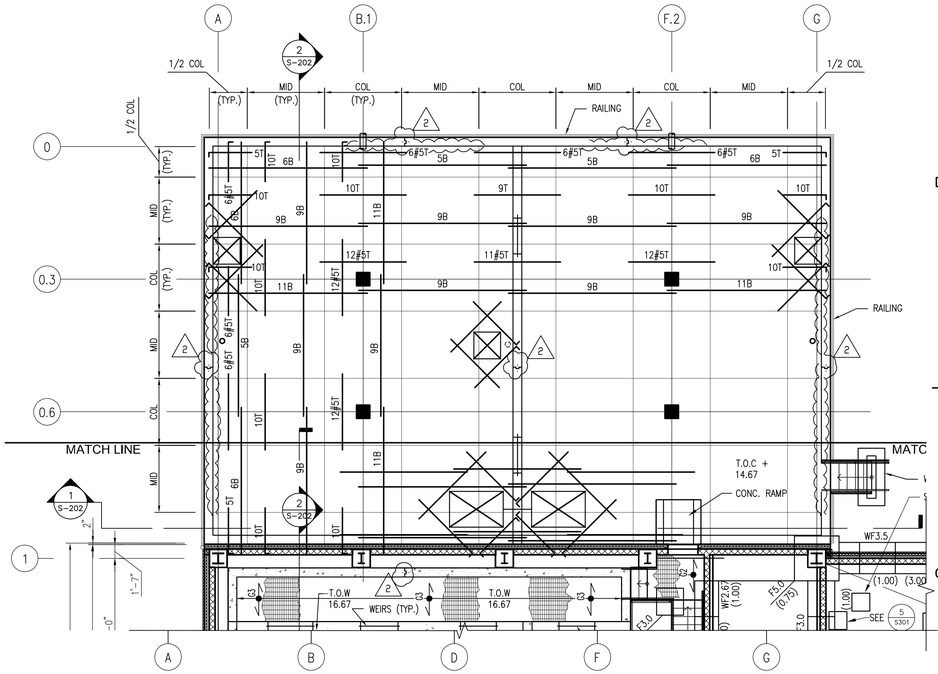




EQUALIZATION TANK SLAB PLAN

SCALE: 1/8" = 1'-0"

EQUALIZATION TANK CONCRETE SLAB NOTES

1. STRUCTURAL SLAB SHALL BE 10-INCH THICK TWO-WAY CONCRETE FLAT PLATE REINFORCED WITH QUANTITY OF BARS TOP(T) AND BOTTOM (B) AS SHOWN IN COLUMN AND MIDDLE STRIPS.
2. ALL REINFORCING BARS TO BE #4 UNLESS NOTED OTHERWISE.
3. LIVE LOAD = 125 PSF.
4. ELEVATION TOP OF PLATE IS 14.67'.
5. CONCRETE FLAT PLATE 28-DAY COMPRESSIVE STRENGTH (fc') TO BE 5,000 PSI.
6. ALL REINFORCING BARS TO BE EPOXY COATED.
7. FOR REINFORCING NOT SHOWN, PROVIDE FOR REINFORCING BARS SHOWN FOR TYPICAL ½ COLUMN, COLUMN, & MID STRIPS.
8. SEE S-403 FOR BAR PLACEMENT AND BAR LENGTH.

FOOTING SCHEDULE

MARK	SIZE	REINFORCING	REMARKS
WF2.67	2'-8" WIDE x 12" THICK x CONTINUOUS	4#4 L.W. WITH #4 TIE BARS @ 12" O.C.	BARS @ BOTTOM
WF3.0	3'-0" WIDE x 12" THICK x CONTINUOUS	4#4 L.W. WITH #4 TIE BARS @ 12" O.C.	BARS @ BOTTOM
WF3.5	3'-6" WIDE x 12" THICK x CONTINUOUS	4#4 L.W. WITH #4 TIE BARS @ 12" O.C.	BARS @ BOTTOM
F3.0	3'-0"x 3'-0"x 12" THICK	3#4 E.W. BOTTOM	–
F4.0	4'-0"x 4'-0"x 12" THICK	4#5 E.W. BOTTOM	–
F5.0	5'-0"x 5'-0"x 12" THICK	5#5 E.W. BOTTOM	–
F6.0	6'-0"x 6'-0"x 14" THICK	7#5 E.W. BOTTOM	–
F9.0x6.0	9'-0"x 6'-0"x 14" THICK	11#5 S.W. BOTTOM 7#5 L.W. BOTTOM 7#5 L.W. TOP WITH #4 TIE BARS @ 12" O.C.	–
WF1.67	1'-8" WIDEx 12" THICK x CONTINUOUS	3#4 L.W. WITH #4 TIE BARS @ 12" O.C.	BARS @ BOTTOM

PROCESS BUILDING – FIRST FLOOR & FOUNDATION PLAN

SCALE: 1/8" = 1'-0"

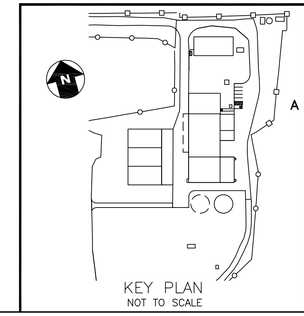
PROCESS BUILDING FIRST FLOOR AND FOUNDATION PLAN

1. STRUCTURAL SLAB SHALL BE 6-INCH NORMAL WEIGHT CONCRETE WITH A 28-DAY COMPRESSIVE STRENGTH (f'c) OF 5,000 PSI, REINFORCED WITH 6"x 6"– W2.9XW2.9 WELDED WIRE FABRIC, OVER A 10 MIL VAPOR BARRIER, OVER 5-INCH MINIMUM POROUS STONE FILL, OVER A COMPACTED SUB-GRADE (U.N.O.).
2. LIVE LOAD = 125 PSF.
3. COORDINATE SIZE AND LOCATION OF EQUIPMENT PADS AND PIPE SUPPORTS WITH MECHANICAL EQUIPMENT PIPING LAYOUT. SEE MECHANICAL DRAWINGS FOR EXACT LOCATION AND SIZE.
4. THE FOUNDATIONS HAVE BEEN DESIGNED FOR AN ALLOWABLE BEARING CAPACITY OF 5,500 POUNDS PER SQUARE FOOT. THE BEARING CAPACITY SHALL BE VERIFIED DURING CONSTRUCTION BY A REGISTERED PROFESSIONAL GEOTECHNICAL ENGINEER IN THE STATE OF MARYLAND PRIOR TO PLACEMENT OF THE FOUNDATIONS.
5. FOOTING ELEVATIONS NOTED ON PLAN ARE TO THE BOTTOM OF THE FOUNDATIONS UNLESS NOTED OTHERWISE.
6. SEE PLAN FOR ELEVATION TOP OF SLAB.
7. ELEVATION BOTTOM OF FOUNDATION IS SHOWN ON PLAN THUS: (7.00).
8. FRP BEAMS TO BE 10"x 10"x ½" WIDE FLANGE BEAMS.
9. STRUCTURAL SLAB SHALL BE 8-INCH NORMAL WEIGHT CONCRETE WITH A 28-DAY COMPRESSIVE STRENGTH (f'c) OF 5,000 PSI, REINFORCED WITH 2 LAYERS OF 6"x 6" – W4.0/W4.0 WELDED WIRE FABRIC, OVER A 10 MIL VAPOR BARRIER, OVER 5-INCH MINIMUM POROUS STONE FILL, OVER A COMPACTED SUB-GRADE (U.N.O.).

REINFORCED MASONRY PIER SCHEDULE (RMP)

MARK	SIZE	REINFORCING	TYPE	REMARKS
RMP-1	8x32	4#6 E.F.		#3 TIES AT 8" O/C

RECORD DRAWING SET JANUARY 2015



WORCESTER COUNTY

STATE OF MARYLAND — JAMES E. BUNTING — 21708 — REGISTERED PROFESSIONAL ENGINEER
11-22-2010

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 16596
EXPIRATION DATE 2011-06-14

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING - FIRST FLOOR & FOUNDATION PLAN

MARK	DATE	DESCRIPTION
1	FEB. 2011	ADDENDUM 2
2	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: NTB
CH'D. BY: JB

S-103

SHEET 45 OF 128

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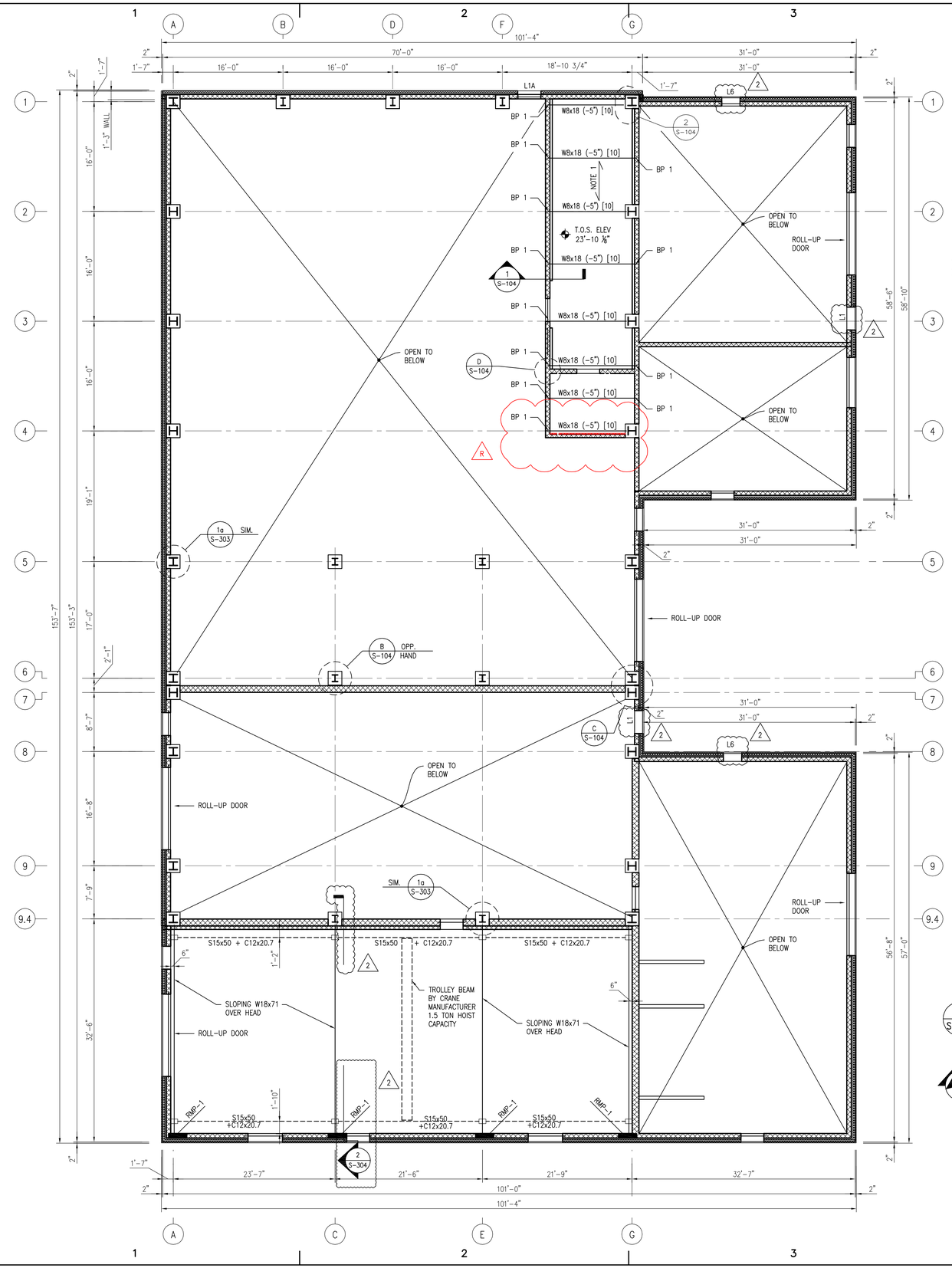
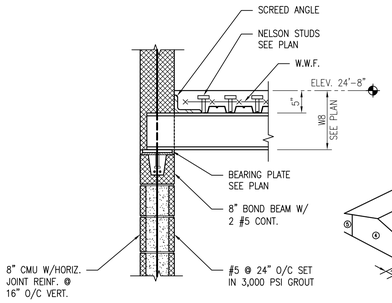
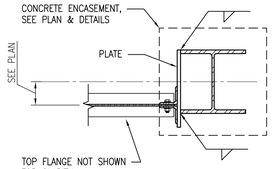
JANUARY 2015

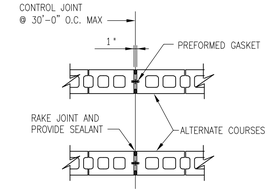




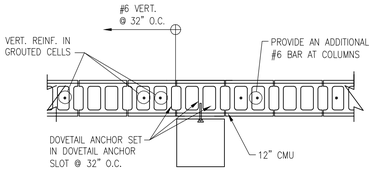
1 S–104 **WALL DETAIL**
SCALE: 3/4" = 1'–0"



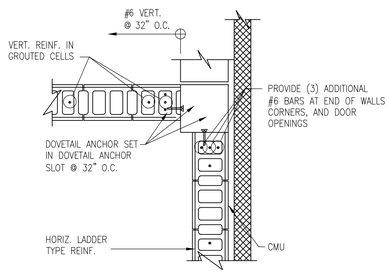
2 S–104 **ECCENTRIC BEAM TO COL CONNECTION**
SCALE: 3/4" = 1'–0"



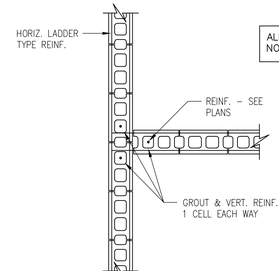
A S–104 **PLAN – MASONRY CONTROL JOINT**
SCALE: 1/2" = 1'–0"



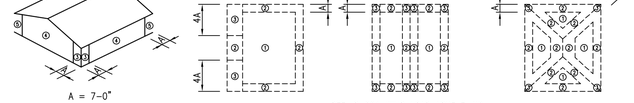
B S–104 **PLAN – MASONRY DETAIL AT COLUMN**
SCALE: 1/2" = 1'–0"



C S–104 **PLAN – MASONRY DETAIL AT CORNER COLUMN**
SCALE: 1/2" = 1'–0"



D S–104 **PLAN – MASONRY DETAIL AT INTERIOR CORNER**
SCALE: 1/2" = 1'–0"



REF. S–001 WIND LOAD ASCE 7–02

COMPONENTS AND CLADDING WIND DIAGRAMS
SCALE: NOT TO SCALE

REINFORCED MASONRY PIER SCHEDULE (RMP)

MARK	SIZE	REINFORCING	TYPE	REMARKS
RMP–1	12x24	4#7 E.F.		#3 TIES AT 8" O/C
RMP–2	8x32	4#6 E.F.		#3 TIES AT 8" O/C

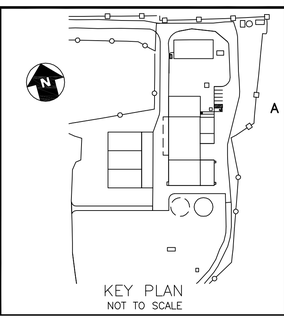
BEARING PLATE SCHEDULE

MARK	SIZE (BxTxN)	REMARKS
BP–1	6"x 3/4"x 1'–0"	SEE 6 S–402
BP–2	7"x 1 ½" x 1'–4"	SEE 2 S–304 6 S–402

PROCESS BUILDING – TROLLEY BEAM AND CEILING FRAMING PLAN
SCALE: 1/8" = 1'–0"

PROCESS BUILDING – 2nd FLOOR FRAMING PLAN

1. STRUCTURAL SLAB SHALL BE 3 ½ – INCH NORMAL WEIGHT CONCRETE WITH A 28–DAY COMPRESSIVE STRENGTH (f'c) OF 4,000 PSI, OVER ½ – INCH X 20 GAGE GALVANIZED COMPOSITE METAL FLOOR DECK (TOTAL THICKNESS TO BE 5–INCHES). CONCRETE SLAB TOP BE REINFORCED WITH 6"x 6"W2.0/W2.0 WELDED WIRE FABRIC. FLOOR DECK TO BE CONTINUOUS A MINIMUM OF 3 SPANS.
2. ELEVATION TOP OF SLAB AS NOTED ON PLAN.
3. LIVE LOAD: 125 PSF
4. STEEL BEAMS NOTED ON PLAN THUS W00x00 (–5") [10] ARE COMPOSITE STEEL BEAMS WITH THE NUMBER IN PARENTHESIS (–5") INDICATING THE ELEVATION TO THE TOP OF THE BEAM REFERENCED FROM FINISHED FLOOR, AND THE NUMBER IN BRACKETS INDICATING THE NUMBER OF ¾" DIAMETER x 3 ½" NELSON STUDS RESISTANCE WELDED THRU THE DECK TO THE TOP FLANGE OF THE STEEL BEAM.
5. SEE S–106 FOR LINTEL SCHEDULE INDICATING SIZE AND TYPE. SEE ARCHITECTURAL SECTIONS, DETAILS, AND SCHEDULES FOR LOCATIONS OF LINTELS.



PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 16596
EXPIRATION DATE 2011–06–14

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON®
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152–0949

MARK	DATE	DESCRIPTION
1	FEB. 2011	ADDENDUM 2
2	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING - TROLLEY BEAM & CEILING FRAMING PLAN

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: NTB
CH'D. BY: JB

S-104

SHEET 46 OF 128

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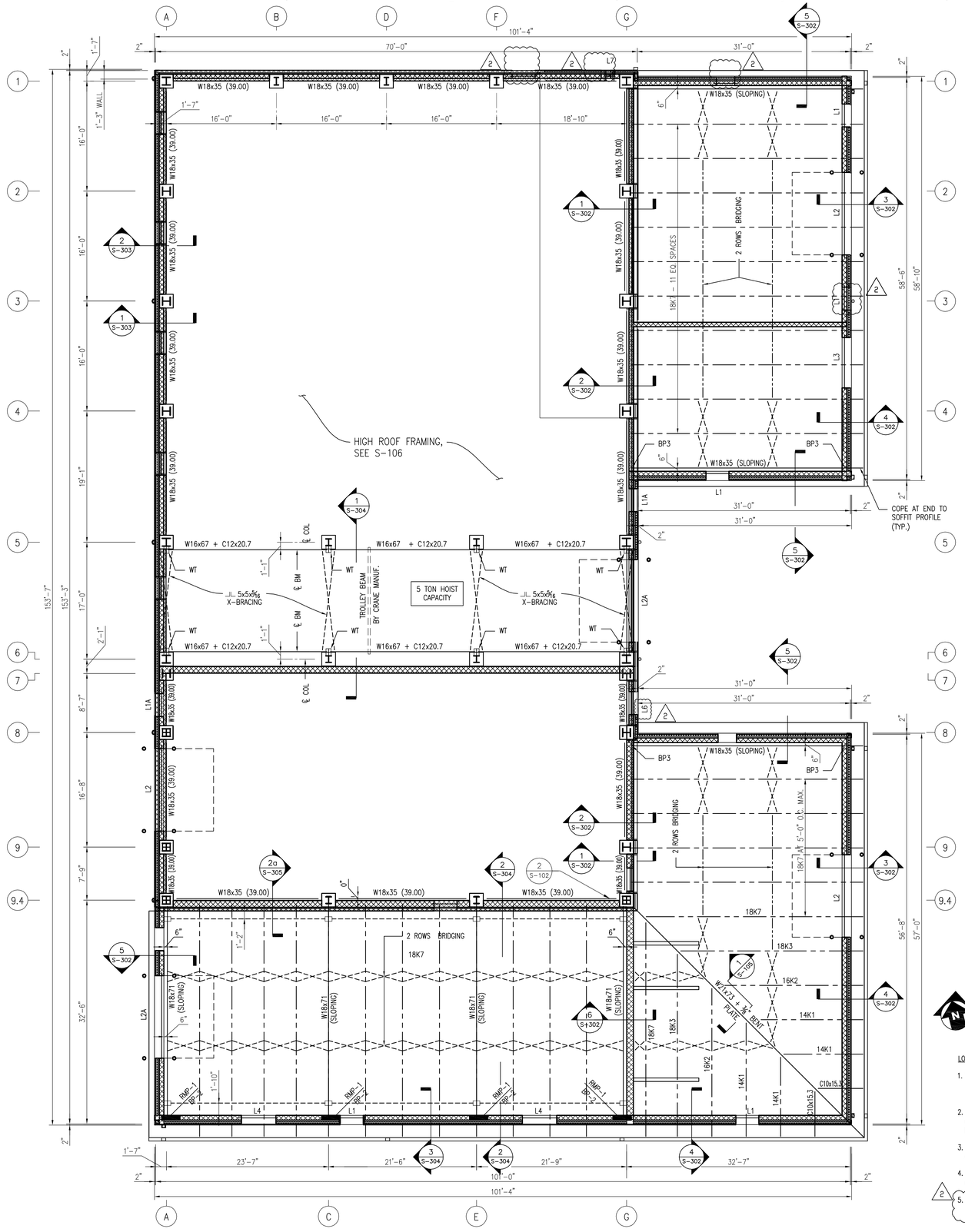
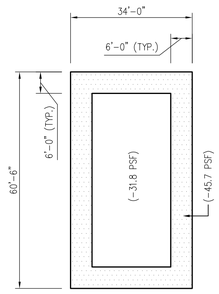
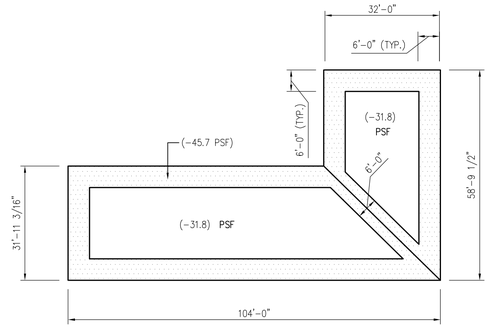




ROOF DECK AND JOIST UPLIFT PRESSURE DIAGRAM
SCALE: NTS



ROOF DECK AND JOIST UPLIFT RESSURE DIAGRAM
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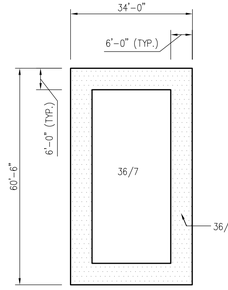

ROOF DECK ATTACHMENT PATTERN DIAGRAM
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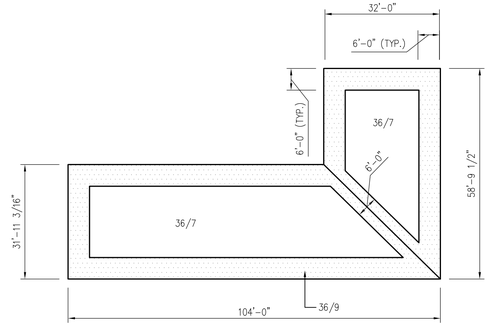

ROOF DECK ATTACHMENT PATTERN DIAGRAM
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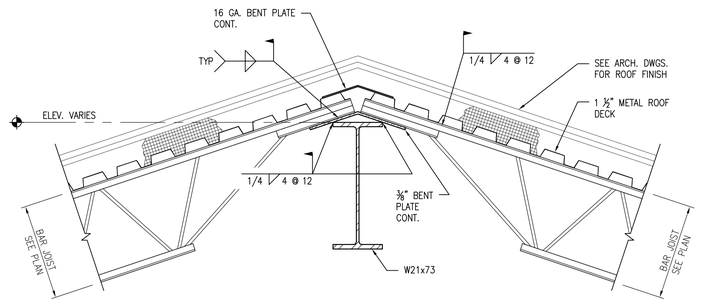


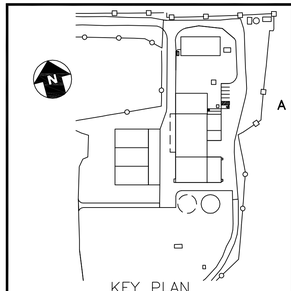
1/S-105 TRUSS CONNECTION AT W21 BEAM
SCALE: 1" = 1'-0"

PROCESS BUILDING – LOW ROOF & HOIST FRAMING PLAN
SCALE: 1/8" = 1'-0"

LOW ROOF FRAMING NOTES:

1. THE STRUCTURE HAS BEEN DESIGNED FOR THE FOLLOWING ROOF LOADS:
   a. LIVE LOAD = 30 PSF
   b. ROOF SNOW LOAD (Pf) = 17.5 PSF
2. THE STRUCTURAL ROOF DECK SHALL BE 1 ½-INCH BY 20 GAGE TYPE B GALVANIZED METAL ROOF DECK (I min. = 0.213 IN4. CONTINUOUS A MINIMUM OF 3-SPANS OVER THE SUPPORTS.
3. SEE SECTIONS AND DETAILS FOR ELEVATION TOP OF STRUCTURAL STEEL AND WORKING POINTS.
4. ELEVATION OF STRUCTURAL STEEL IS SHOWN ON PLAN THUS W00x00 (39.00)
2 5. SEE S-106 FOR LINTEL SCHEDULE INDICATING SIZE AND TYPE. SEE ARCHITECTURAL SECTIONS, DETAILS, AND SCHEDULES FOR LOCATIONS OF LINTELS.

RECORD DRAWING SET JANUARY 2015



WORCESTER COUNTY

STATE OF MARYLAND — ENGINEER — JOSEPH M. THOMPSON — 21552 — PROFESSIONAL

11-22-2010

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 16596
EXPIRATION DATE 2011-06-14

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON®
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	FEB. 2011	ADDENDUM 2
2	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
PROCESS BUILDING - LOW ROOF & HOIST FRAMING PLAN

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: NTB
CH'D. BY: JB

S-105

SHEET 47 OF 128

File: Q:\SMD\07060_Mystic\Harbour\WWTP\Feed\Proc\st_FLT\4-CADD\AS-BUILTS\ARCHITECTURAL & STRUCTURAL\Mystic Harbour Waste Water Treatment Plt2\105 A002 - PROCESS BLDG-LOW.dwg
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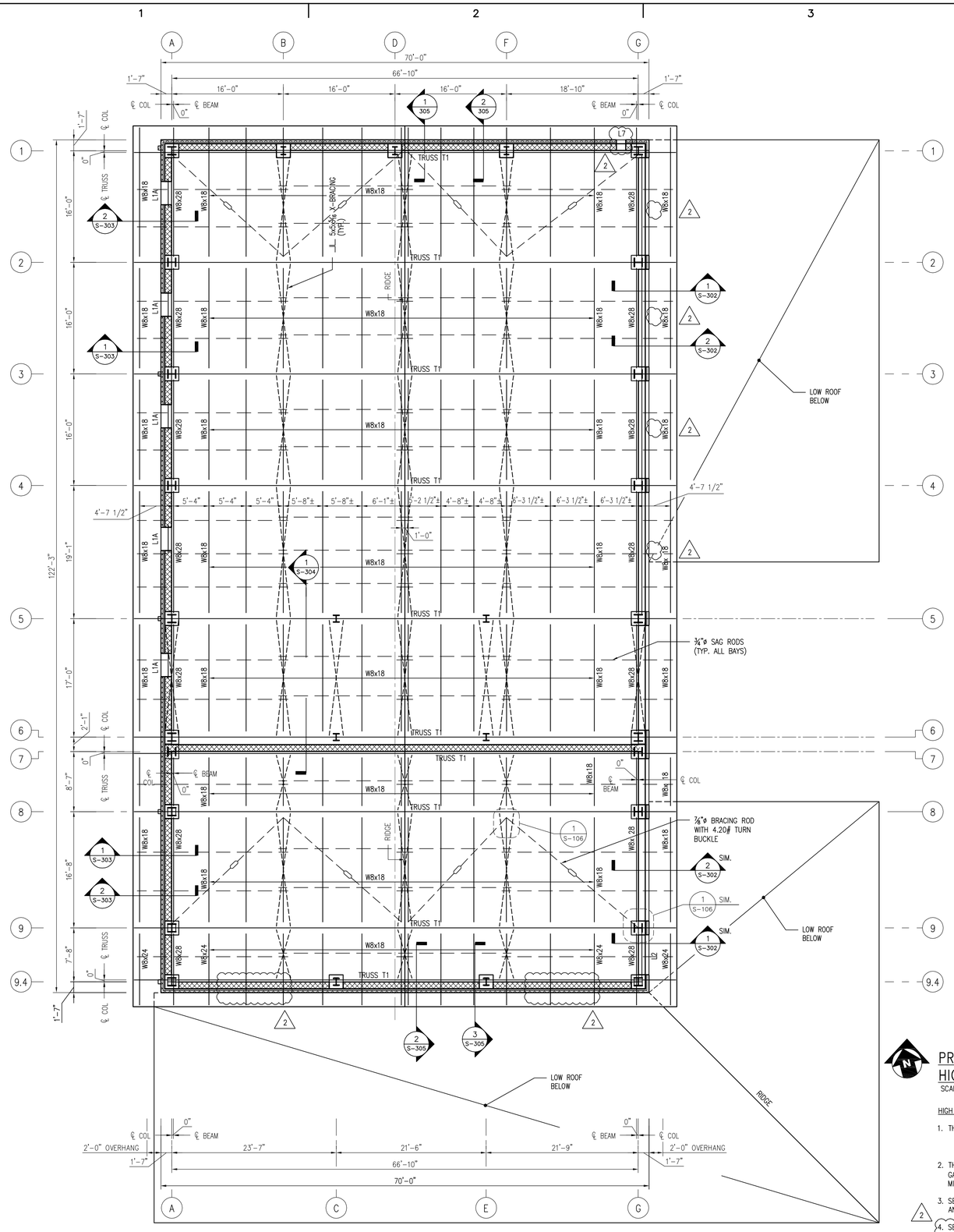

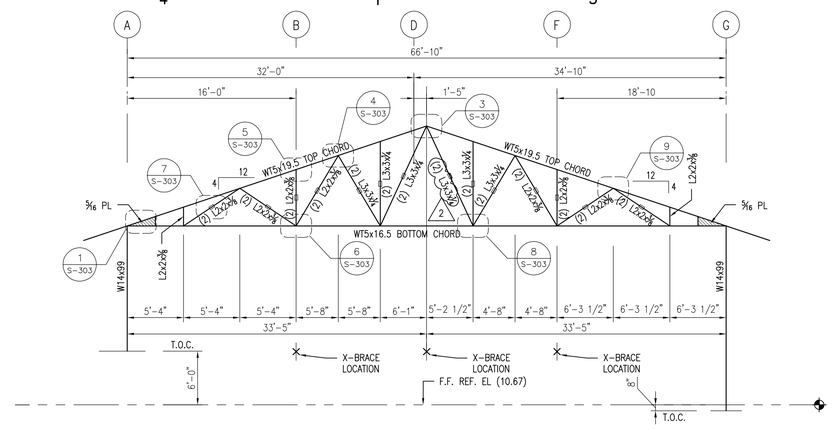

TRUSS PROFILE T1
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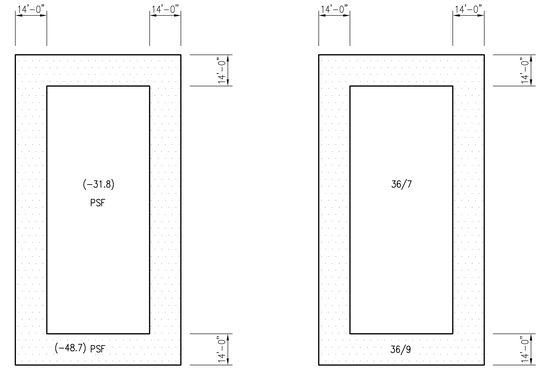
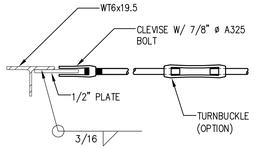


ROOF DECK UPLIFT PRESSURE DIAGRAM
SCALE: NTS

ROOF DECK ATTACHMENT PATTERN DIAGRAM
SCALE: NTS



1 S-106 CLEVIS & TURNBUCKLE
SCALE: NOT TO SCALE

PROCESS BUILDING - HIGH ROOF FRAMING PLAN
SCALE: 1/8" = 1'-0"

HIGH ROOF FRAMING NOTES:

1. THE STRUCTURE HAS BEEN DESIGNED FOR THE FOLLOWING ROOF LOADS:
   a. LIVE LOAD = 30 PSF
   b. ROOF SNOW LOAD (Pf) = 17.5 PSF
2. THE STRUCTURAL ROOF DECK SHALL BE 1 ½-INCH BY 20 GAGE TYPE B GALVANIZED METAL ROOF DECK (I min. = 0.213 IN4. CONTINUOUS A MINIMUM OF 3-SPANS OVER THE SUPPORTS.
3. SEE SECTIONS AND DETAILS FOR ELEVATION TOP OF STRUCUTRAL STEEL AND WORKING POINTS.
4. SEE S-106 FOR LINTEL SCHEDULE INDICATING SIZE AND TYPE. SEE ARCHITECTURAL SECTIONS, DETAILS, AND SCHEDULES FOR LOCATIONS OF LINTELS.

LINTEL SCHEDULE

MARK	MEMBER	TYPE	REMARKS
L1	(2)–4x8 PRECAST REINFORCED WITH 1#5 TOP AND BOTTOM AND #2 TIES AT 8" O/C+ (1) 4X16 PRECAST W/ 1#5 TOP AND BOTTOM AND #2 TIES @ 8" O/C		PROVIDE 8" MINIMUM BEARING AT EACH END
L1A	(3)–4x8 PRECAST REINFORCED WITH 1#5 TOP AND BOTTOM AND #2 TIES AT 8" O/C + (1) 4X16 PRECAST W/ 1#5 TOP AND BOTTOM AND #2 TIES @ 16" O/C		PROVIDE 8" MINIMUM BEARING AT EACH END
L2	HSS 16"x8"x⅜" W/ ¾"ø x0'–6" HEADED STUDS @ 24" O/C AND ⅜"x1'–2" PL CONT W/ CONT BAR. PLUS 4"X16" PRECAST W/ 1#5 TOP AND BOTTOM AND #2 TIES @ 8" O/C	3/16 3@12 3/16 3@12	PROVIDE 16" MINIMUM BEARING AT EACH END ON RAMP (U.N.O.) TYP WELDING ALL LINTEL
L2A	HSS 16"x12"x⅜" W/ ¾"ø x0'–6" HEADED STUDS @ 24" O/C AND ⅜"x1'–6" PL CONT W/ CONT BAR. PLUS 4"X16" PRECAST W/ 1#5 TOP AND BOTTOM AND #2 TIES @ 8" O/C		PROVIDE 16" MINIMUM BEARING AT EACH END ON RAMP (U.N.O.)
L3	HSS 8"x8"x⅜" W/ ¾"ø x0'–6" HEADED STUDS @ 24" O/C AND ⅜"x1'–2" PL CONT W/ CONT BAR. PLUS 4"X16" PRECAST W/ 1#5 TOP AND BOTTOM AND #2 TIES @ 8" O/C		PROVIDE 8" MINIMUM BEARING AT EACH END
L4	HSS 8"x8"x⅜" W/ ¾"ø x0'–6" HEADED STUDS 24" O/C AND ⅜"x1'–2" PL CONT		PROVIDE 8" MINIMUM BEARING AT EACH END
L5	HSS 12"x8"x⅜" AND 3/8"x 1'–2" PL CONT.+BAR 4"x6" PRECAST W/ 1#5 TOP AND BOTTOM AND #2 TIES @ 8" O/C		16" HSS BEARING AT EACH END TO RAMP. PROVIDE 8" MINIMUM BEARING AT EACH END
L6	3 – 4"x3 ½"x⅜" ANGLES (LLV)		PROVIDE 8" MINIMUM BEARING AT EACH END
L7	4 – 4"x3 ½"x⅜" ANGLES (LLV)		PROVIDE 8" MINIMUM BEARING AT EACH END

* PROVIDE #4 BAR WITH 2" HOOK AT EACH BEARING. FILL CMU BLOCKS DIRECTLY UNDER STEEL BEARING PLATE WITH GROUT THE ENTIRE HEIGHT OF WALL

RECORD DRAWING SET JANUARY 2015

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 16596
EXPIRATION DATE 2011-08-15

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	FEB. 2011	ADDENDUM 2
2	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

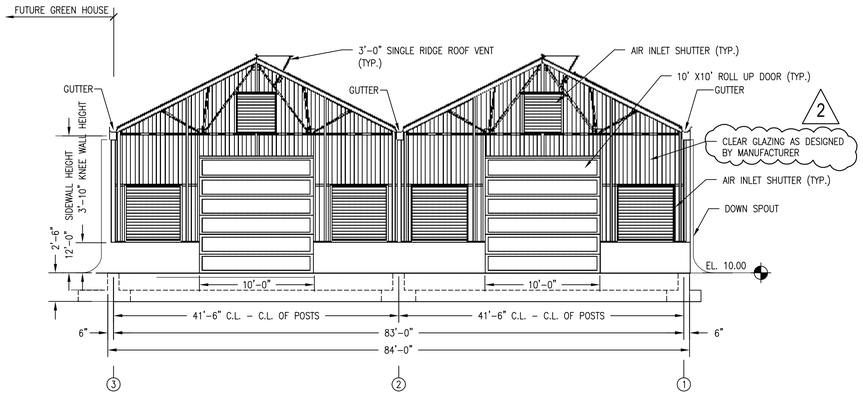
SHEET TITLE
PROCESS BUILDING - HIGH ROOF FRAMING PLAN

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: NTB
CH'D. BY: JB

S-106

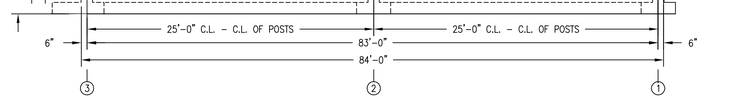
SHEET 48 OF 128

File: Q:\SMV\127066\2_Mystic\Harbour\WWTP\Invest\Proc\Civil_STY\1-CADD\AS-BUILTS\ARCHITECTURAL & STRUCTURAL\Mystic Harbour Waste Water Treatment Proc\106 ADD1 - PROCESS BLDG - HIGH ROOF FRAMING.dwg
Jan 16, 2015 - 2:07:42pm

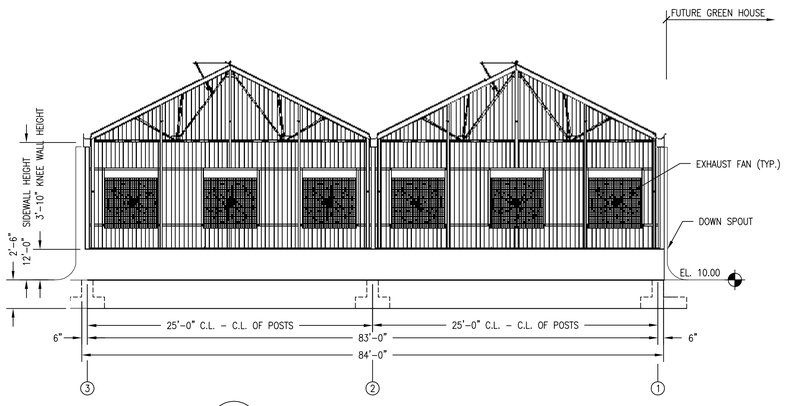


1 S-101 ELEVATION – COLUMN LINE G
SCALE: NOT TO SCALE

R KNEE WALLS NEXT TO THE OVERHEAD DOORS CUT DOWN TO THE SILL ELEVATION.



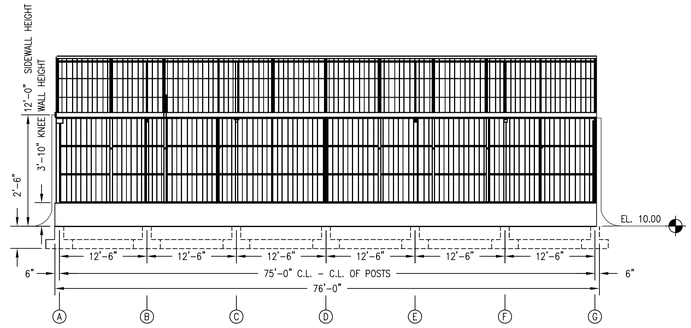
2 S-101 CROSS SECTION ELEVATION
SCALE: NOT TO SCALE



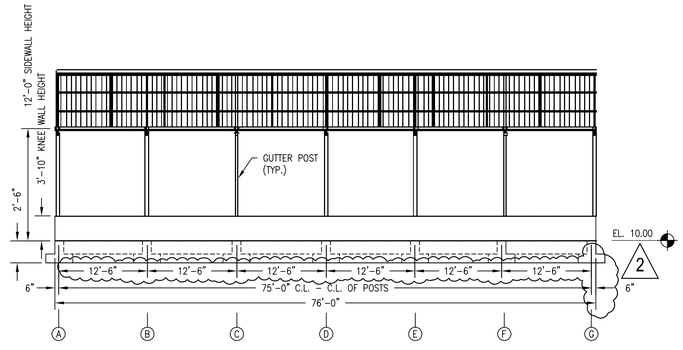
3 S-101 ELEVATION – COLUMN LINE A
SCALE: NOT TO SCALE

GENERAL SHEET NOTES:

1. GREENHOUSE SUPERSTRUCTURE SHALL BE A PREFABRICATED STRUCTURE. BASIS OF DESIGN FOR GREENHOUSE SUPERSTRUCTURE IS LUDY GREENHOUSE. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DESIGN MODIFICATIONS REQUIRED BY USING AN "OR EQUAL" MANUFACTURER.

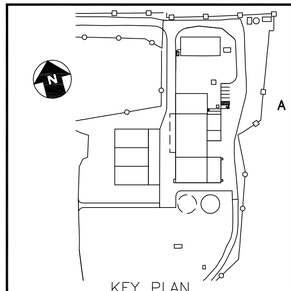


4 S-101 ELEVATION – COLUMN LINE 3
SCALE: NOT TO SCALE



5 S-101 CROSS SECTION ELEVATION
SCALE: NOT TO SCALE

RECORD DRAWING SET
JANUARY 2015



KEY PLAN
NOT TO SCALE

WORCESTER COUNTY

STATE OF MARYLAND — ENGINEER — JOHN BRUCE — 16596 — PROFESSIONAL ENGINEER
11-22-2010

PROFESSIONAL CERTIFICATION.
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 16596
EXPIRATION DATE 2011-08-14

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
SLUDGE GREENHOUSE - ELEVATION & SECTIONS

MARK	DATE	DESCRIPTION
1	FEB. 2011	ADDENDUM 2
2	NOV. 2014	RECORD DRAWINGS

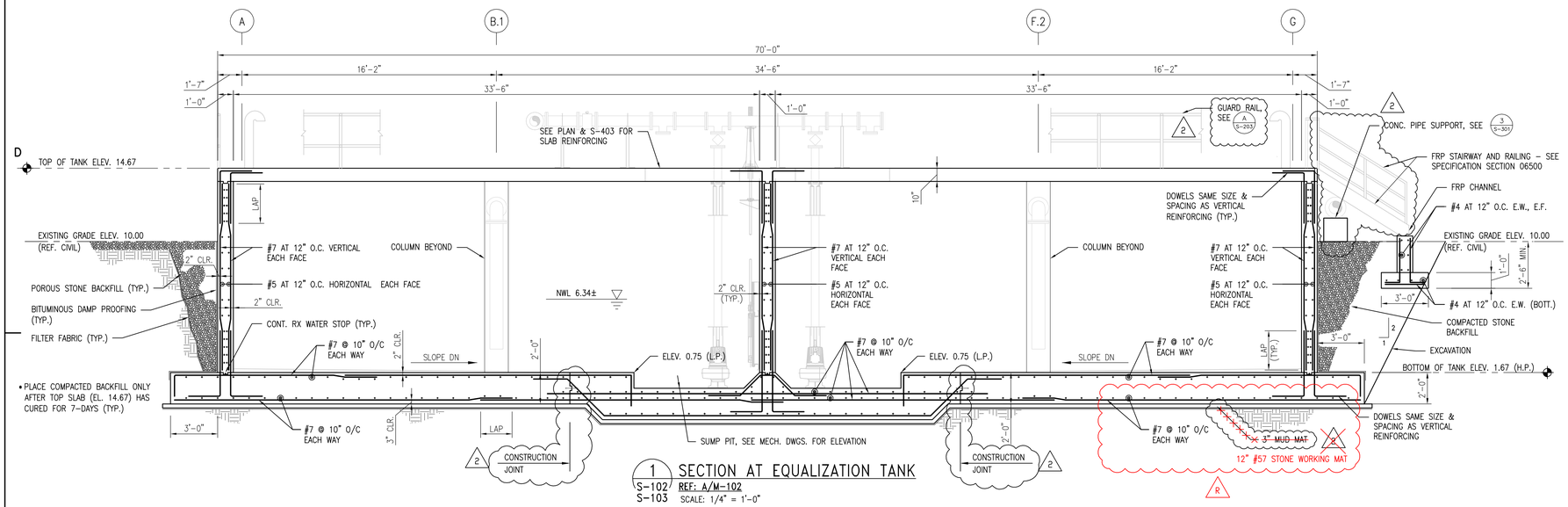
CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: NTB
CH'D. BY: JB

S-201

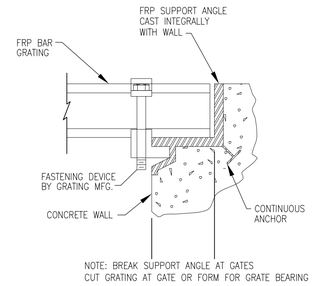
SHEET 49 OF 128

File: G:\MW\07062_Mysticharbour\WWTP\new\Proj\Cad_LEVL4-CADD\AS-BUILTS\ARCHITECTURAL & STRUCTURAL\Mystic Harbour Waste Water Treatment Proj\S-201 SLUDGE GREENHOUSE ELEVATIONS & SECTIONS.dwg
Jan 16, 2015 - 3:09:19pm

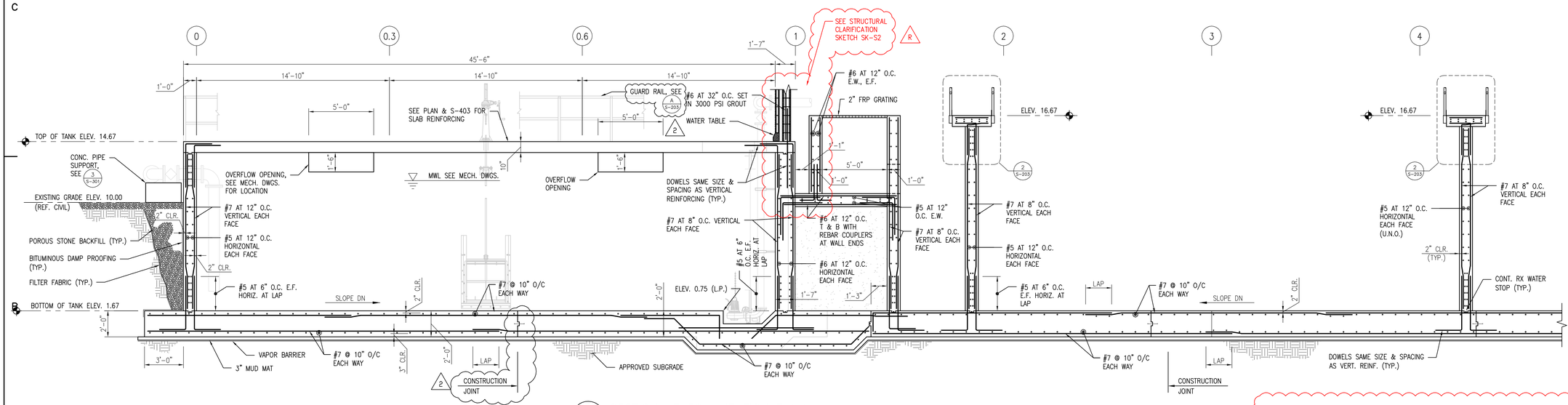
RECORD DRAWING SET
JANUARY 2015



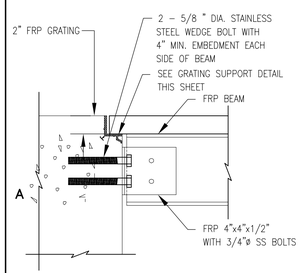
1 SECTION AT EQUALIZATION TANK
S-102 / S-103 REF: A/M-102
SCALE: 1/4" = 1'-0"



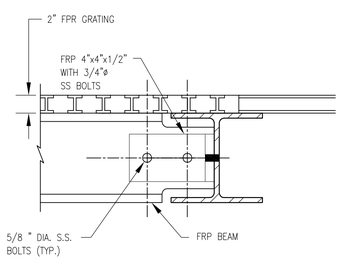
7 GRATING SUPPORT DETAIL
S-202 SCALE: 3" = 1'-0"



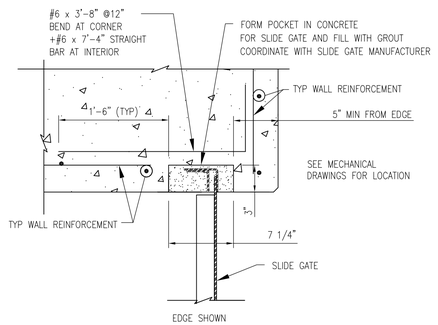
2 SECTION AT EQUALIZATION TANK
S-102 / S-103 REF: B/M-102
SCALE: 1/4" = 1'-0"



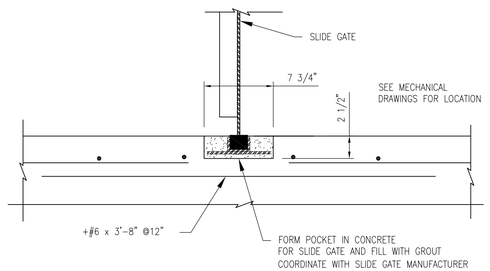
3 FRP BEAM @ CONCRETE WALL
S-202 SCALE: NOT TO SCALE



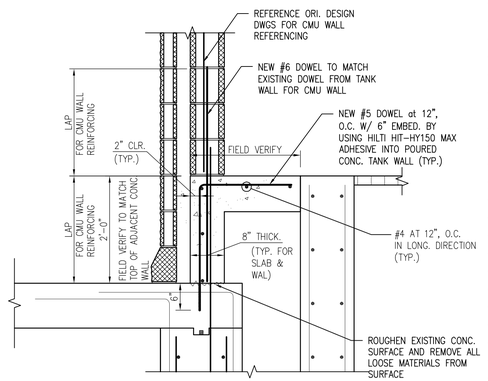
4 FRP BEAM DETAIL
S-202 SCALE: 1 1/2" = 1'-0"



5 JAMB DETAIL AT SLIDE GATE IN CONCRETE
S-202 SCALE: 1 1/2" = 1'-0"



6 SILL DETAIL AT SLIDE GATE IN CONCRETE
S-202 SCALE: 1 1/2" = 1'-0"



1 8" ENCLOSURE SLAB
SK-S2 SCALE: NOT TO SCALE

CONSULTANT
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72 Loveton Circle Baltimore, Maryland 21152-0949

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LICENSE NO. 16596
EXPIRATION DATE 2011-06-14

11-22-2010

PROJECT TITLE: MYSTIC HARBOUR WWTP UPGRADE AND PLANT EXPANSION

SHEET TITLE: **EQUALIZATION TANK - SECTIONS**

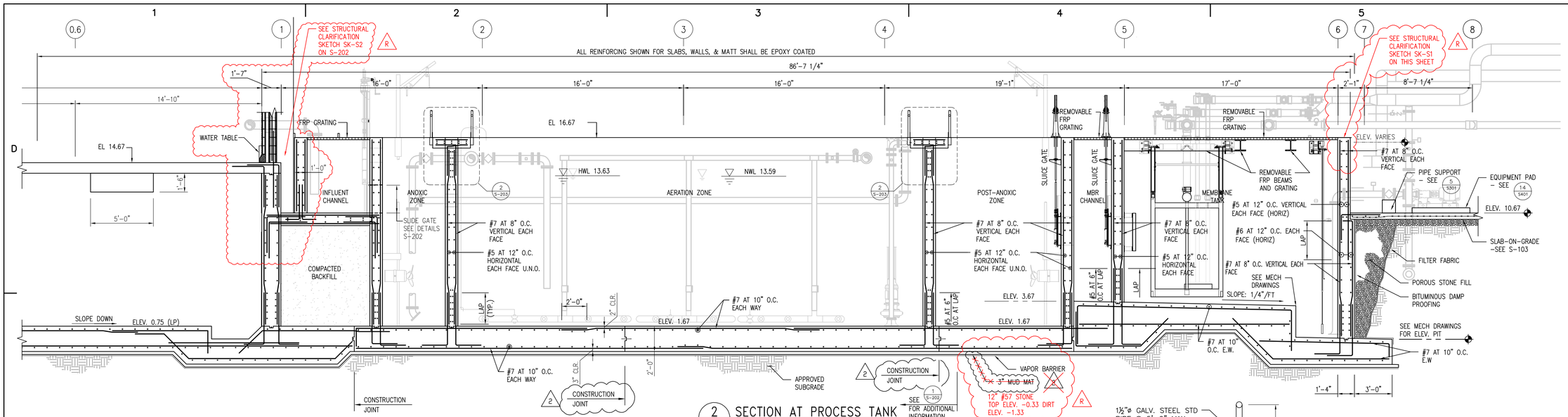
MARK	DATE	DESCRIPTION
2	FEB. 2011	ADDENDUM 2
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: NTB
CH'D. BY: JB

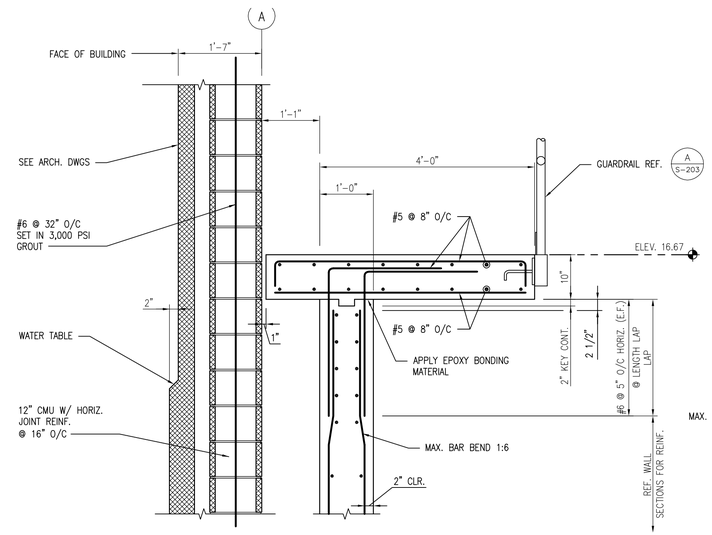
S-202

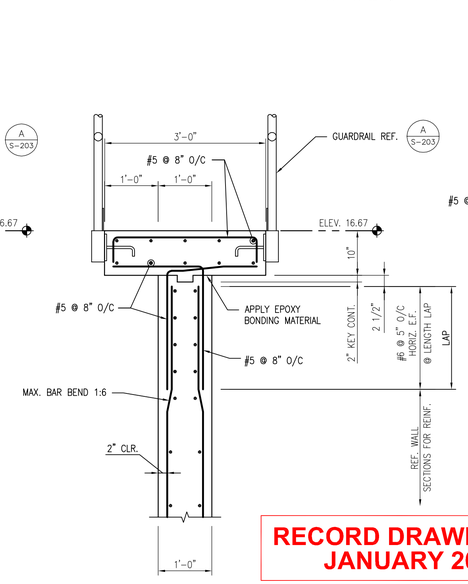
SHEET 50 OF 128

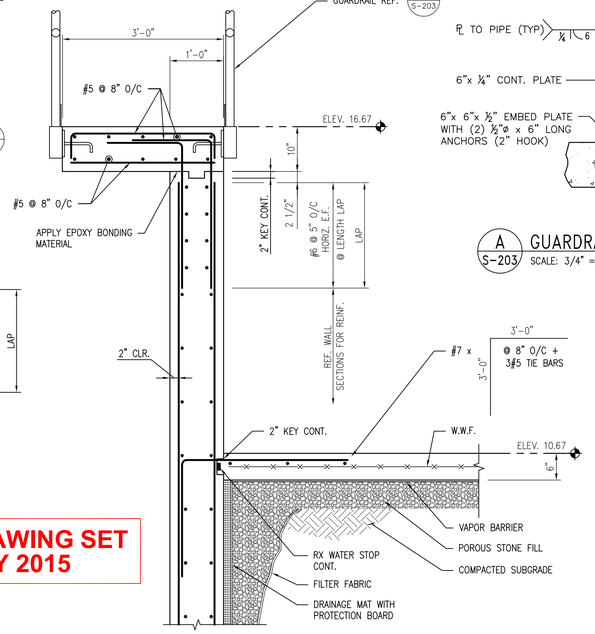
File: Q:\SMO\270562_MysticHarbourWWTPImpProvExpn_EPV\+CADD\AS-BUILTS\ARCHITECTURAL & STRUCTURAL\Mystic Harbour Waste Water Treatment Pls\2202 ADD2 - EQUALIZATION TANK SECTIONS.dwg
Jan 16, 2015 - 2:36:19pm



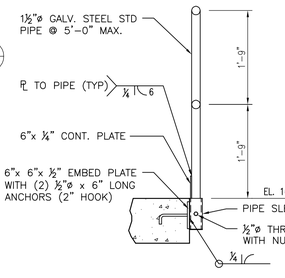
2 SECTION AT PROCESS TANK
S-102 S-103 REF: A/M-201
SCALE: 1/4" = 1'-0"

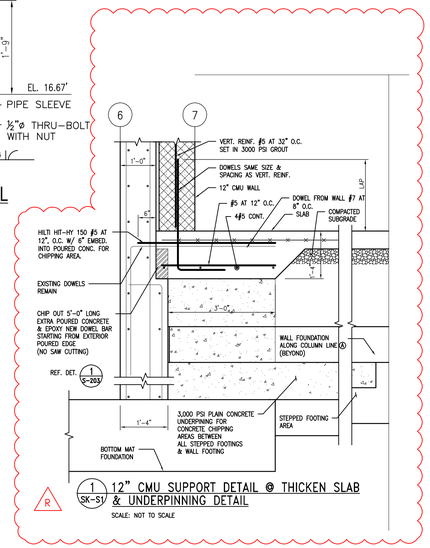




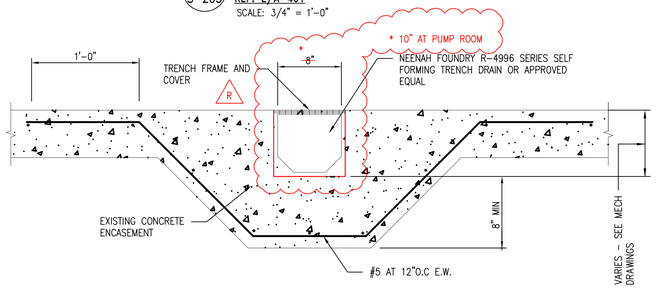


A GUARDRAIL DETAIL
S-203 SCALE: 3/4" = 1'-0"





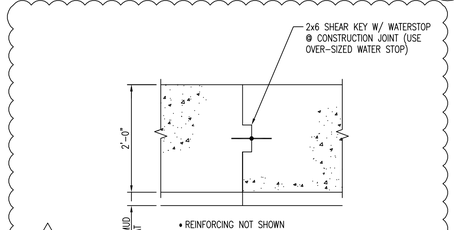
1 12" CMU SUPPORT DETAIL @ THICKEN SLAB & UNDERPINNING DETAIL
SK-S1
SCALE: NOT TO SCALE



1 WALKWAY SECTION
S-203 REF: E/A-401
SCALE: 3/4" = 1'-0"

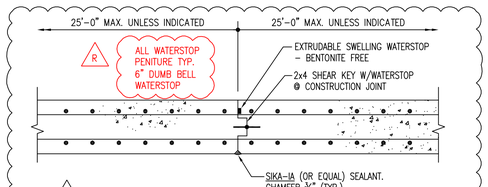
4 TRENCH DRAIN DETAIL
S-203 SCALE: NOT TO SCALE

2 WALKWAY SECTION
S-203 REF: E/A-401
SCALE: 3/4" = 1'-0"

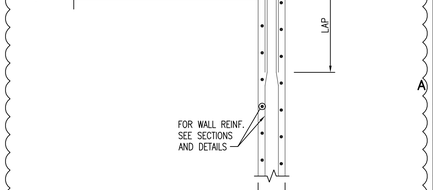


5 TYPICAL MAT CONTROL JOINT – SECTION
S-203 SCALE: 3/4" = 1'-0"

3 WALKWAY SECTION
S-203 REF: E/A-401
SCALE: 3/4" = 1'-0"



6 TYPICAL WALL CONSTRUCTION JOINT PLAN
S-203 SCALE: 3/4" = 1'-0"



7 CORNER REINFORCEMENT DETAIL
S-203 SCALE: 3/8"= 1'-0"

RECORD DRAWING SET JANUARY 2015

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON®
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

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LICENSE NO. 16596
EXPIRATION DATE 2011-06-14

MARK	DATE	DESCRIPTION
1	FEB. 2011	ADDENDUM 2
2	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

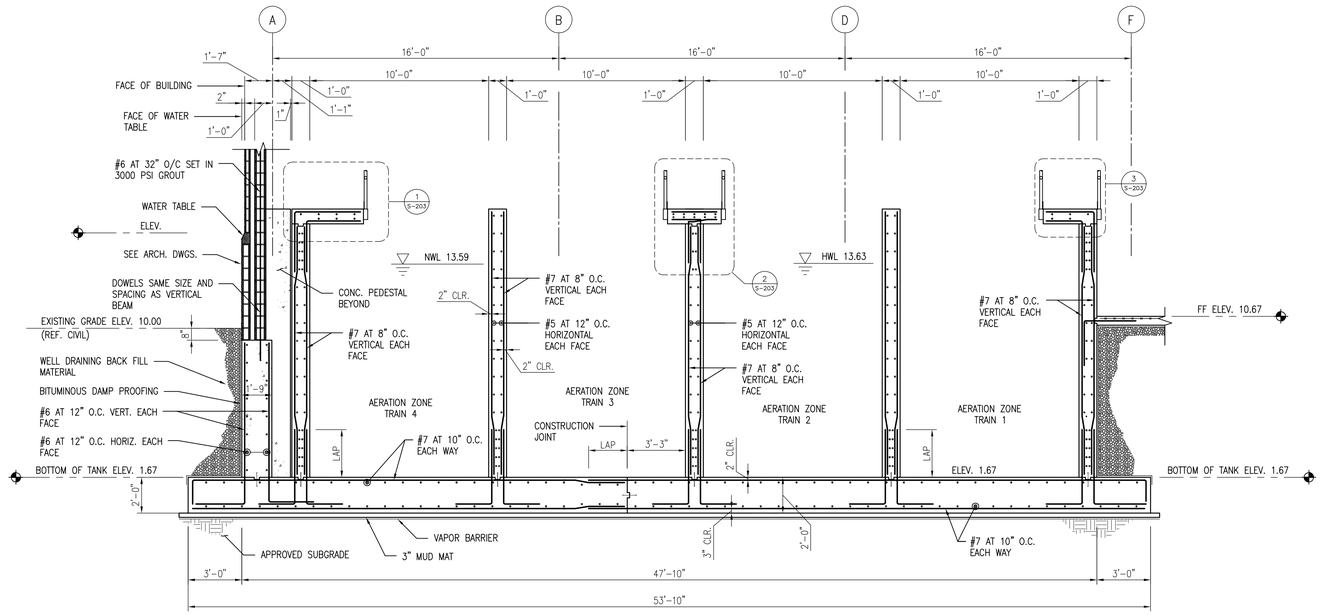
SHEET TITLE
PROCESS TANK - SECTIONS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: NTB
CH'D. BY: JB

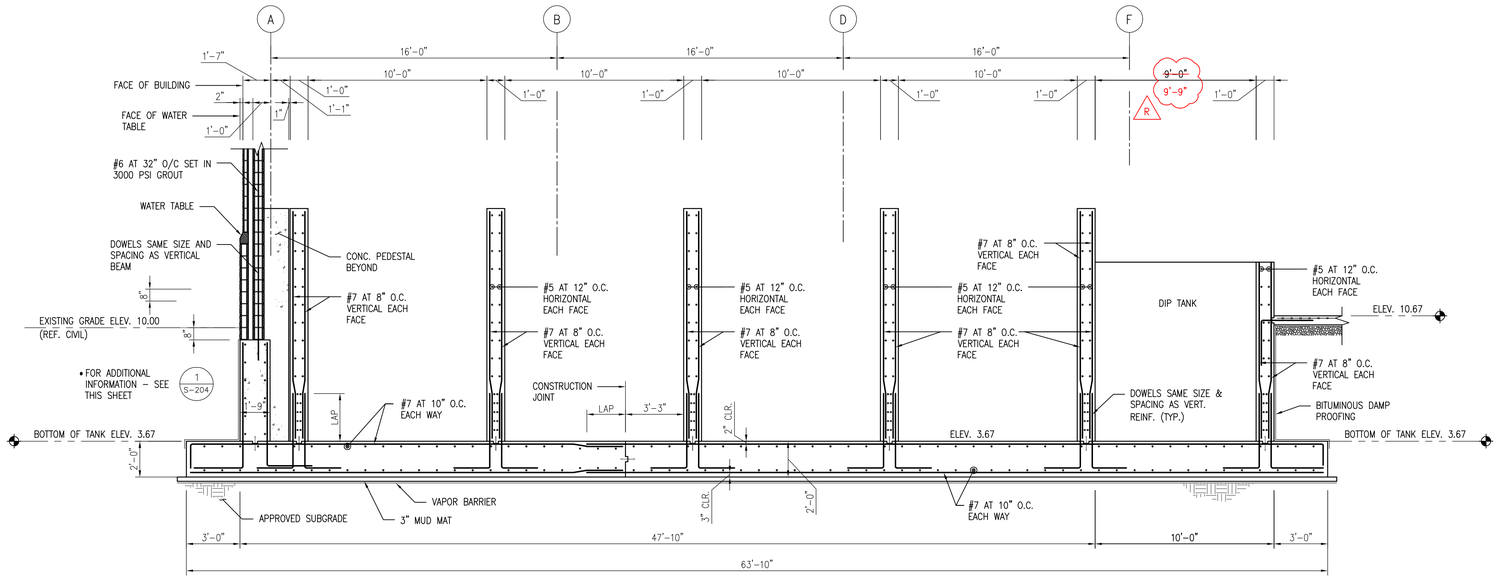
S-203

SHEET 51 OF 128

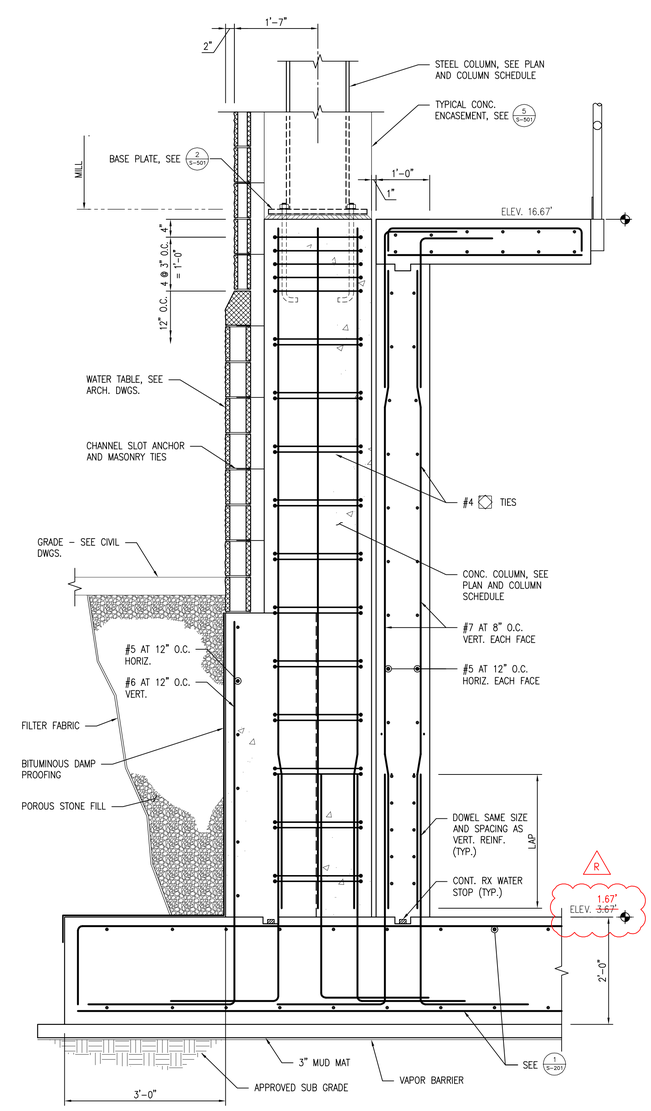
File: G:\MKY\07062_MysticHarbor-WWTP\revPrvsCivil_LFY\4-CADD\AS-BUILTS\ARCHITECTURAL & STRUCTURAL\Mystic Harbour Waste Water Treatment Proj\S-203 ADD2 - PROCESS TANK SECTIONS.dwg
Jan 16, 2015 - 2:55:13pm



1 SECTION AT AERATION TANK
S-102 / S-103 REF: E/M-202
SCALE: 1/4" = 1'-0"



2 SECTION AT MEMBRANE & DIP TANK
S-102 / S-103 REF: E/M-202
SCALE: 1/4" = 1'-0"



3 DETAIL
S-102 REF: 2/S-204
SCALE: 3/4" = 1'-0"

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LICENSE NO. 16596
EXPIRATION DATE 2011-08-14

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
AERATION TANK - SECTIONS

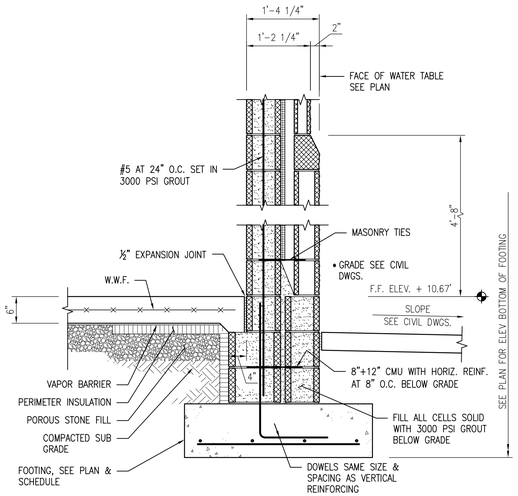
MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

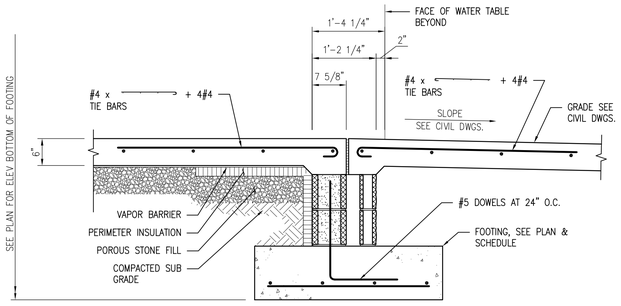
S-204

SHEET 52 OF 128

RECORD DRAWING SET JANUARY 2015

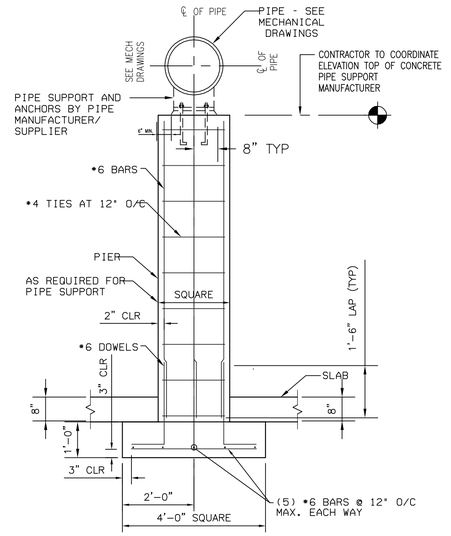


1 S-301 SECTION AT TYP. EXTERIOR WALL
REF: F/A-401
SCALE: 3/4" = 1'-0"

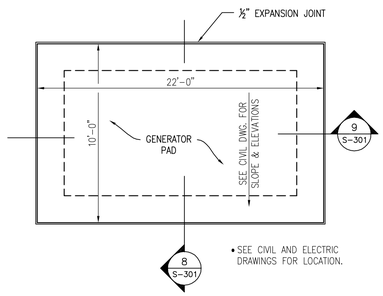


2 S-301 SECTION AT COILING DOOR OPENING – FOOTING
REF: E/A-401
SCALE: 3/4" = 1'-0"

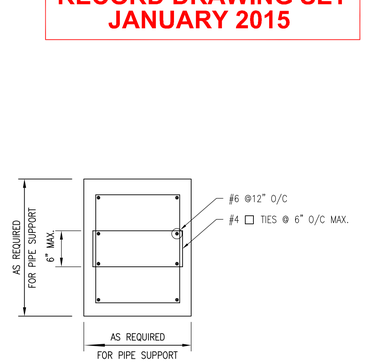
RECORD DRAWING SET JANUARY 2015



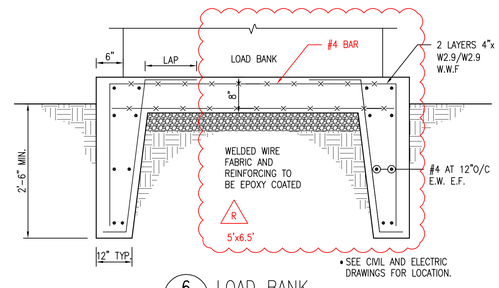
3 S-301 CONCRETE PIPE SUPPORT
SCALE: NOT TO SCALE



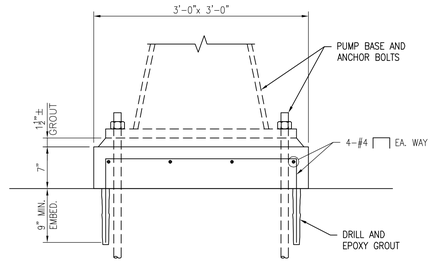
4 S-301 SITE GENERATOR PAD PLAN
SCALE: NOT TO SCALE



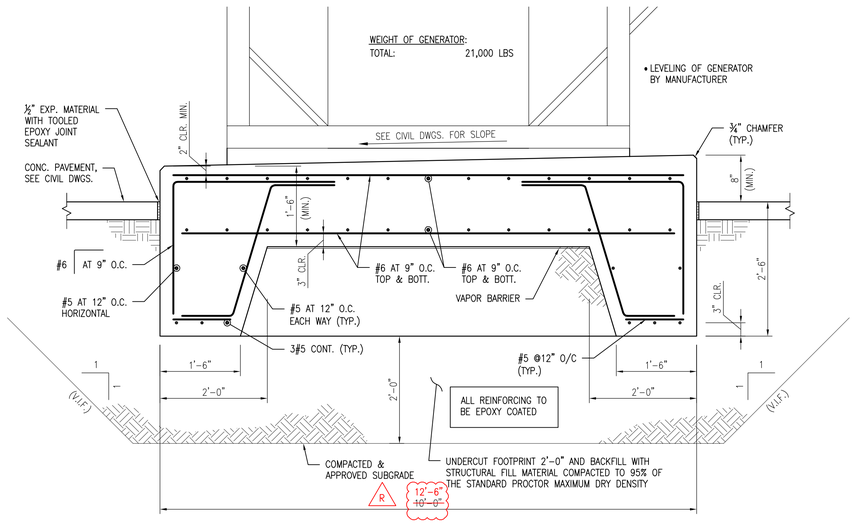
A S-301 SECTION
SCALE: NOT TO SCALE



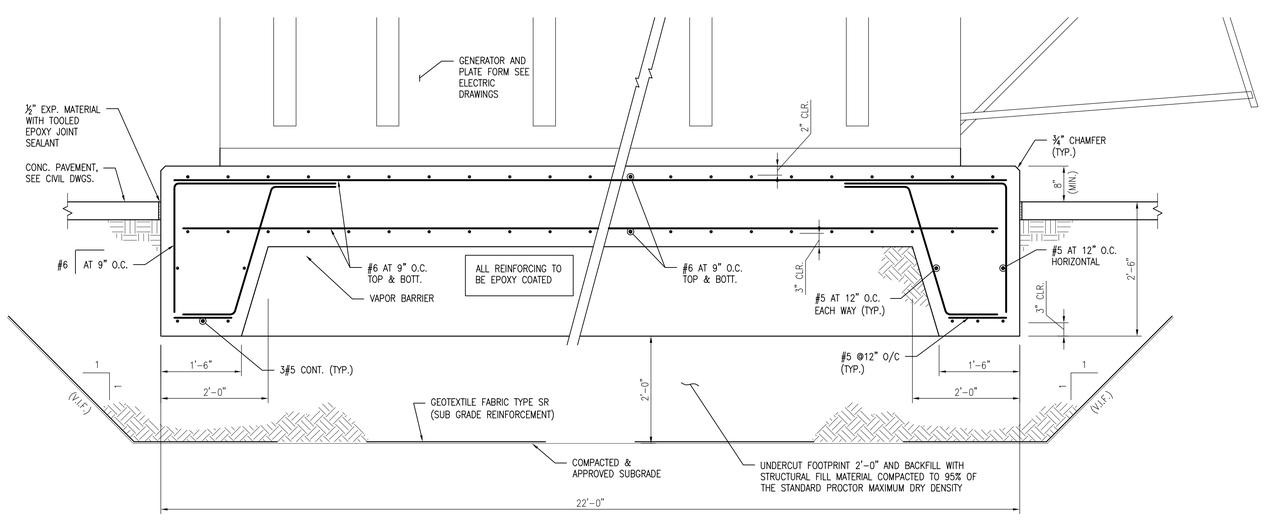
6 S-301 LOAD BANK
SCALE: NOT TO SCALE



7 S-301 EQUIPMENT PAD – PUMP BASE
SCALE: NOT TO SCALE



8 S-301 GENERATOR CONCRETE PAD
SCALE: 3/4" = 1'-0"



9 S-301 GENERATOR CONCRETE PAD
SCALE: 3/4" = 1'-0"

WORCESTER COUNTY

STATE OF MARYLAND — ENGINEER — PROFESSIONAL
11- 22-2015

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 16596
EXPIRATION DATE 2011-08-14

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

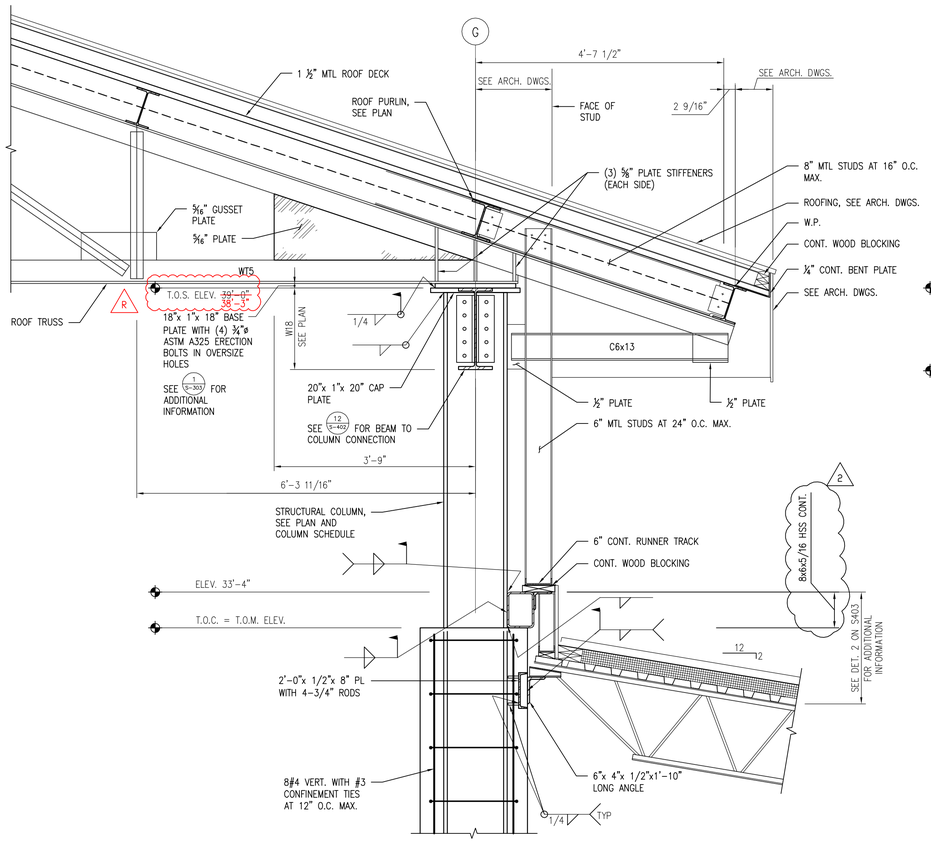
SHEET TITLE
WALL AND ROOF SECTIONS AND DETAILS

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

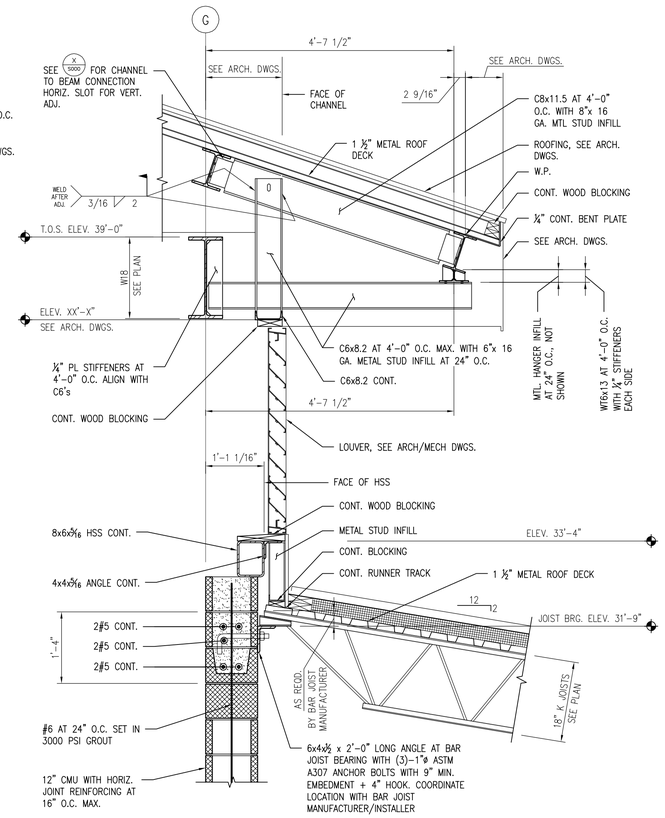
CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

S-301

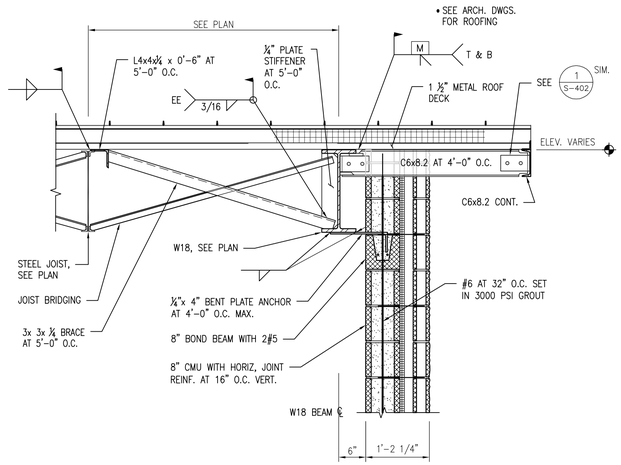
SHEET 53 OF 128



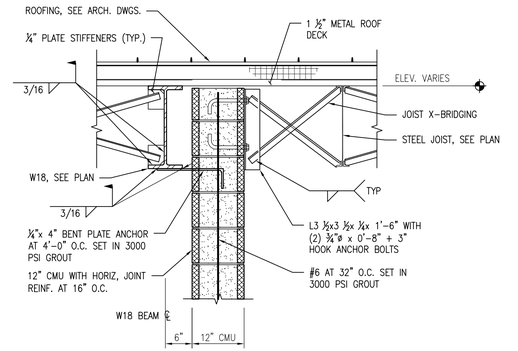
1 SECTION AT COLUMN
S-106 REF: D/A-401
SCALE: 3/4" = 1'-0"



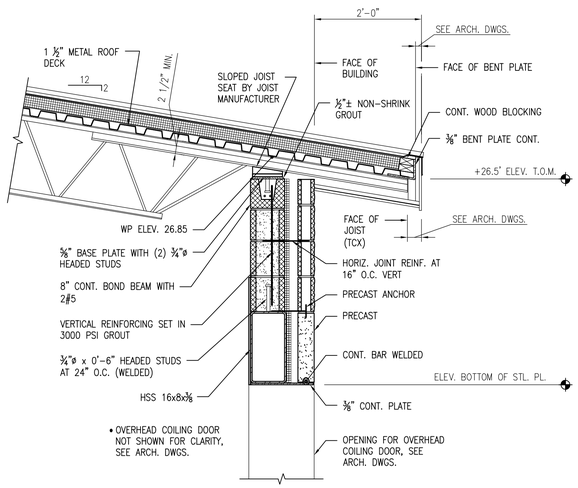
2 SECTION AT EVE
S-106 REF: D/A-401
SCALE: 3/4" = 1'-0"



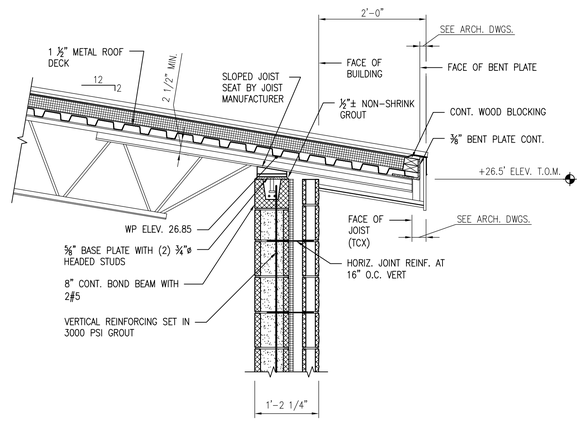
5 SECTION AT TYP. EXTERIOR WALL
S-105 REF: 8/A-403
SCALE: 3/4" = 1'-0"



6 SECTION AT SEPARATION WALL
S-105 SCALE: 3/4" = 1'-0"



3 SECTION
S-105 REF: E/A-401
SCALE: 3/4" = 1'-0"



4 SECTION AT TYP. EXTERIOR WALL
S-105 REF: E/A-401
SCALE: 3/4" = 1'-0"

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY
STATE OF MARYLAND
JOHN BRUCE
No. 21552
PROFESSIONAL ENGINEER
11-22-2940
PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 16596
EXPIRATION DATE 2011-08-14
CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
WALL AND ROOF SECTIONS AND DETAILS

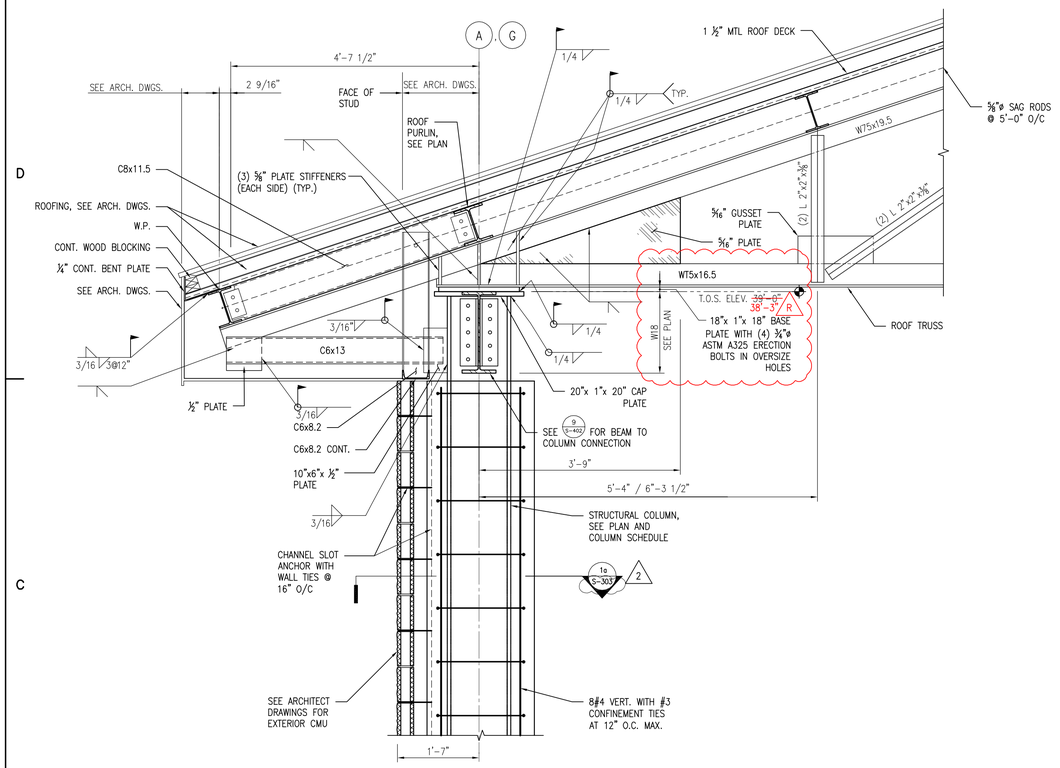
MARK	DATE	DESCRIPTION
2	FEB. 2011	ADDENDUM 2
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: NTB
CH'D. BY: JB

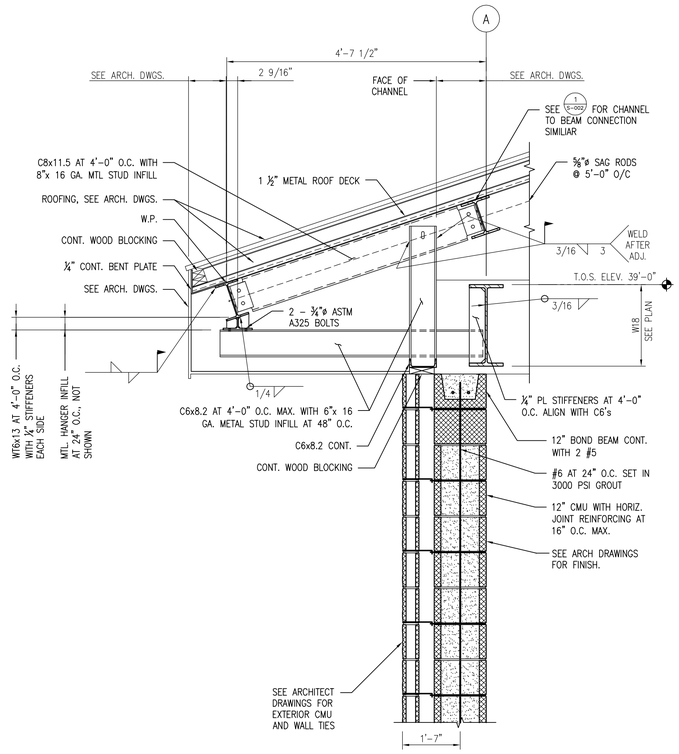
S-302

SHEET 54 OF 128

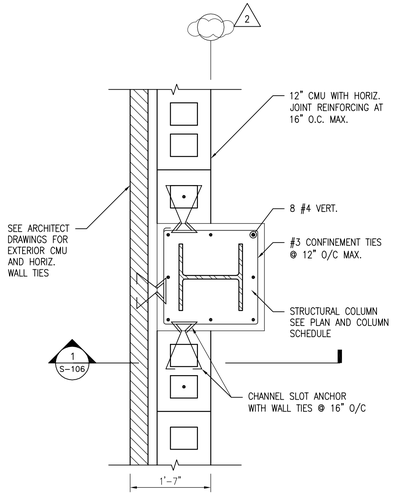
File: Q:\1Mdt\07\0902_Mystic\Harbour\WWTP\Hwd\Proc\Eval_EFL\1-CADD\AS-BUILTS\ARCHITECTURAL & STRUCTURAL\Mystic Harbour Waste Water Treatment Proc\S-302 WALL SECTION.dwg
Jan 16, 2015 - 3:57:09pm



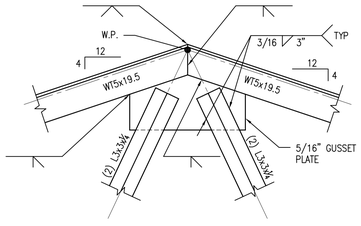
1 SECTION AT COLUMN
S-106 REF: D/A-401
S-105 SCALE: 3/4" = 1'-0"



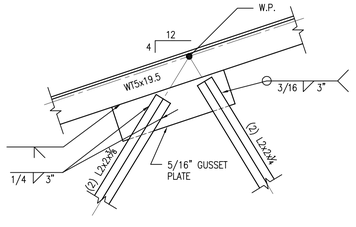
2 SECTION AT EVE
S-106 REF: D/A-401
S-105 SCALE: 3/4" = 1'-0"



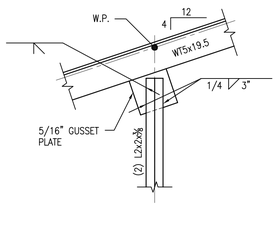
1a SECTION AT COLUMN
S-106 REF: D/A-401
S-104 SCALE: 3/4" = 1'-0"
S-303
2



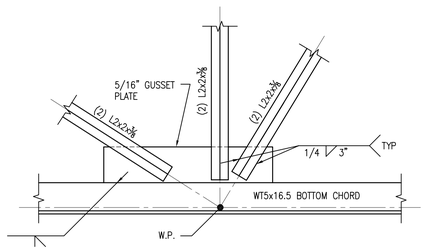
3 TRUSS JOINT
S-106 SCALE: 1" = 1'-0"



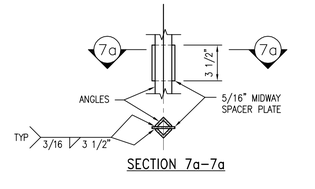
4 TRUSS JOINT
S-106 SCALE: 1" = 1'-0"



5 TRUSS JOINT
S-106 SCALE: 1" = 1'-0"

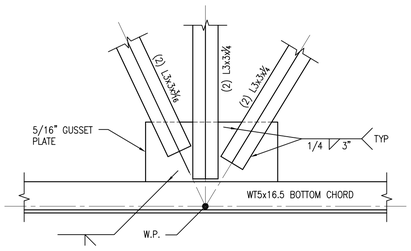


6 TRUSS JOINT
S-106 SCALE: 1" = 1'-0"

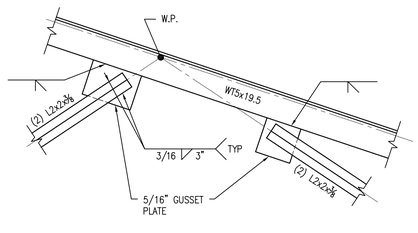


SECTION 7a–7a

7 TYP. MIDWAY SPACER DETAIL
S-106 SCALE: 1" = 1'-0"



8 TRUSS JOINT
S-106 SCALE: 1" = 1'-0"



9 TRUSS JOINT
S-106 SCALE: 1" = 1'-0"

RECORD DRAWING SET JANUARY 2015

WORCESTER COUNTY ENGINEERING

STATE OF MARYLAND — JOSEPH BERTRAM — No. 22290 — PROFESSIONAL ENGINEER
11-22-2013

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 16596
EXPIRATION DATE 2011-08-14

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON®
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
WALL AND ROOF SECTIONS AND DETAILS

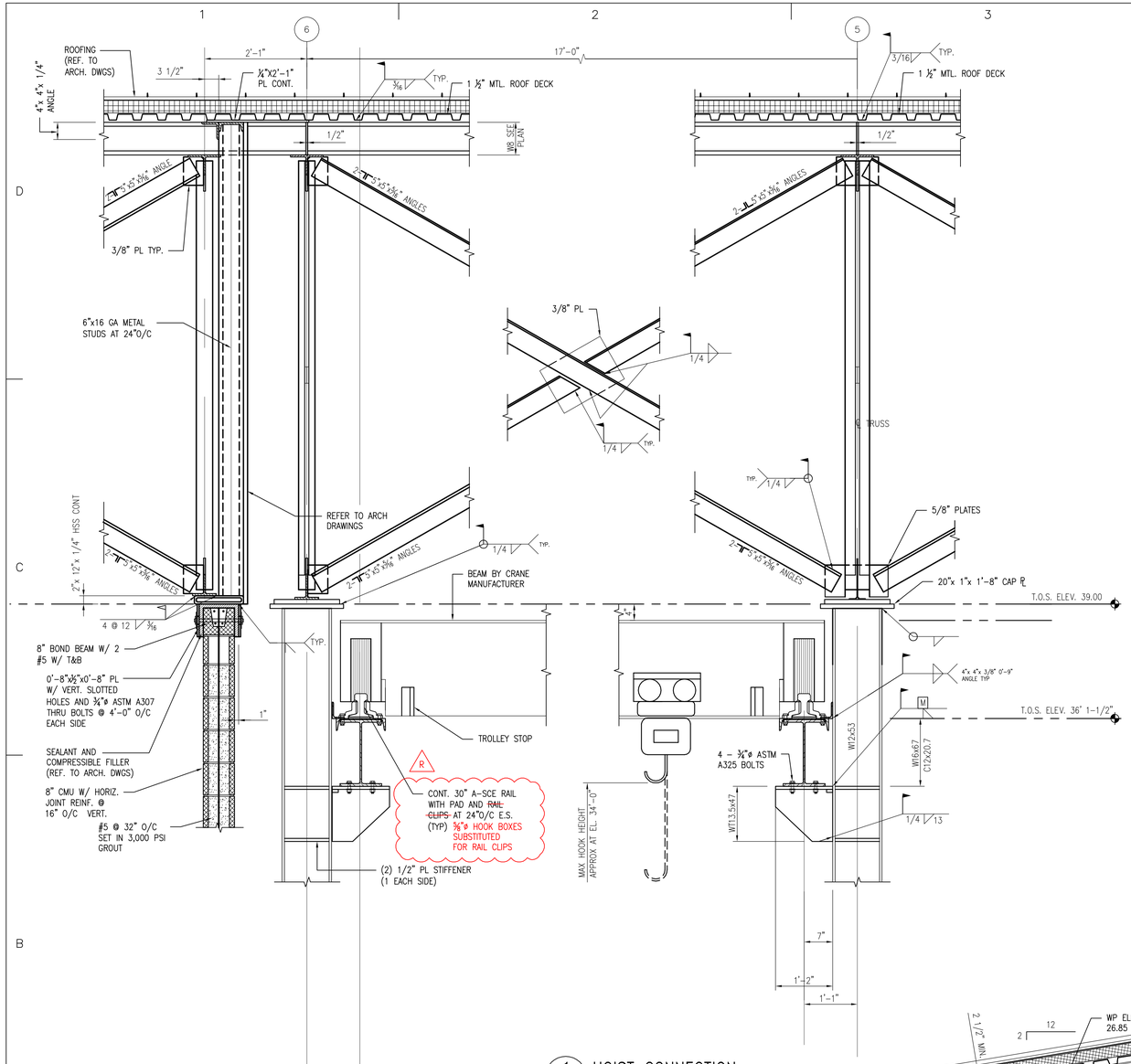
MARK	DATE	DESCRIPTION
1	FEB. 2011	ADDENDUM 2
2	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: NTB
CH'D. BY: JB

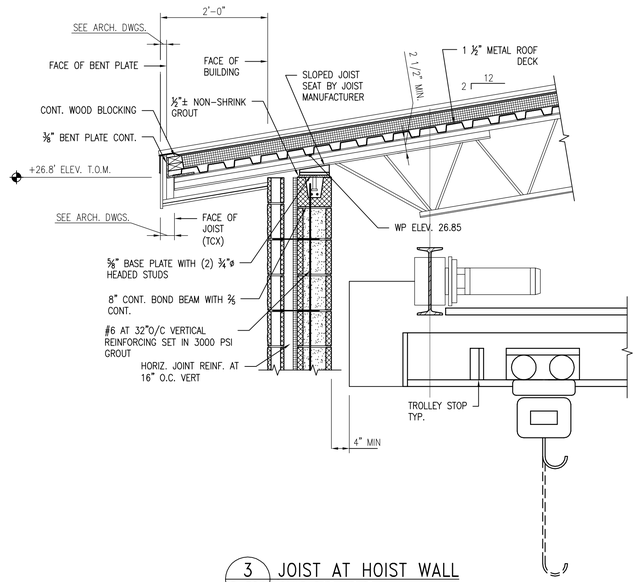
S-303

SHEET 55 OF 128

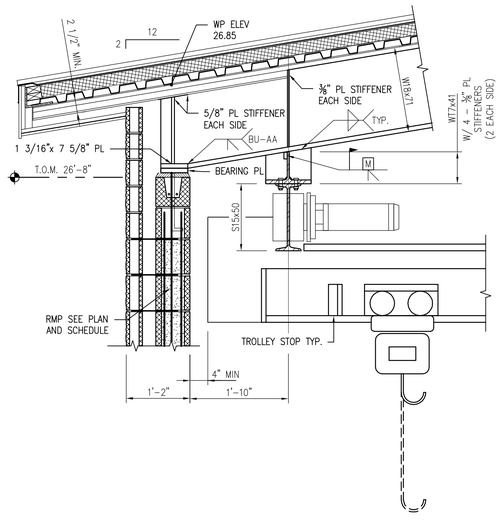
File: Q:\SHARED\70992_MysticHarbour\WWTP\revitProv\st_LFLY-CA001(AS-BUILTS)ARCHITECTURAL & STRUCTURAL\Mystic Harbour Waste Water Treatment Proj\S-303 WALL SECTIONS.dwg
Jan 16, 2015 - 3:56:59pm



1 HOIST CONNECTION
S-104 REF: E/A-401
SCALE: 3/4" = 1'-0"

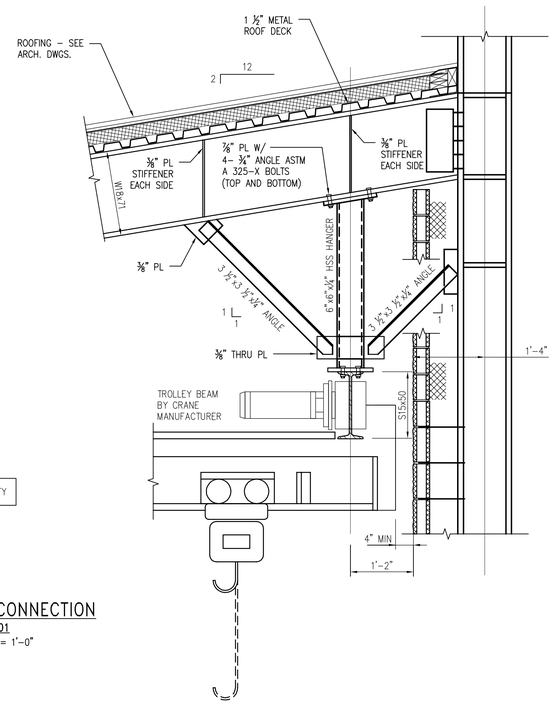


3 JOIST AT HOIST WALL
S-304 SCALE: 3/4" = 1'-0"



2 HOIST CONNECTION
S-104 REF: E/A-401
SCALE: 3/4" = 1'-0"

1.5 TON CAPACITY



RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY

STATE OF MARYLAND — ENGINEER — PROFESSIONAL ENGINEER
11- 22-2-90

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 19586
EXPIRATION DATE 2011-08-14

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152 0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

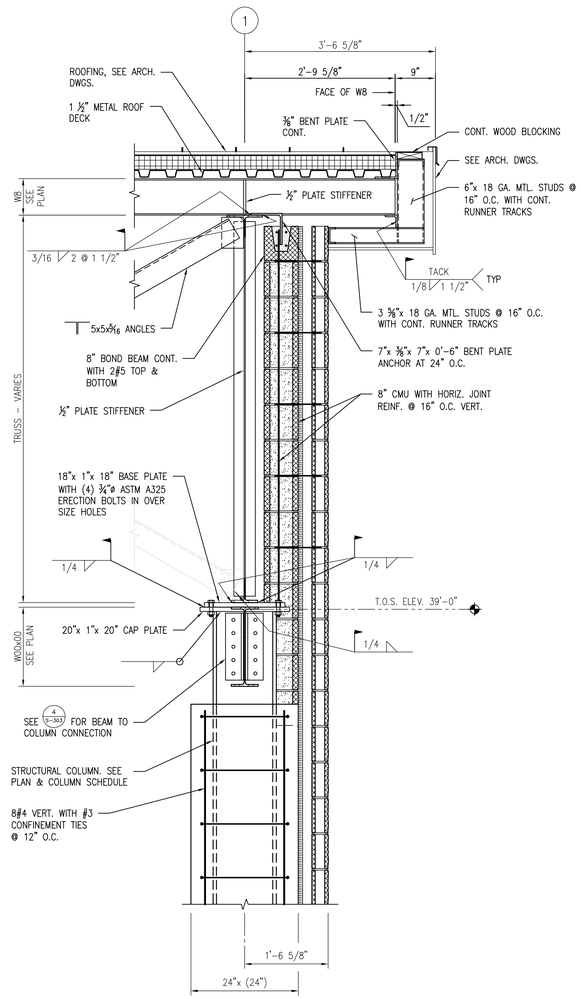
SHEET TITLE
TROLLEY BEAM SECTIONS AND DETAILS

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

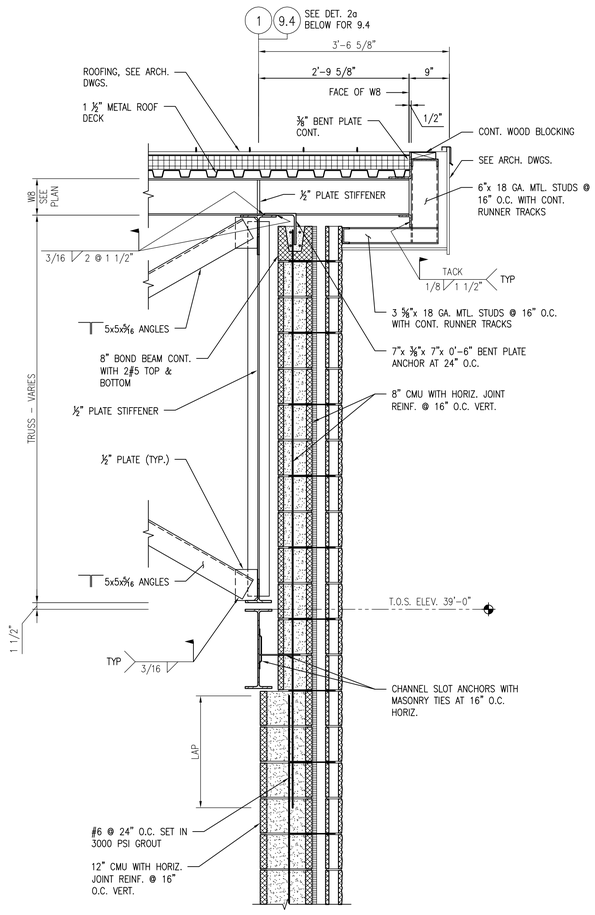
CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

S-304

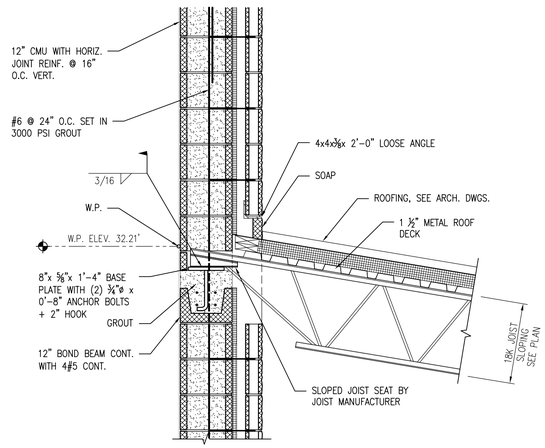
SHEET 56 OF 128



1 ROOF GABLE
S-106 SCALE: 3/4" = 1'-0"

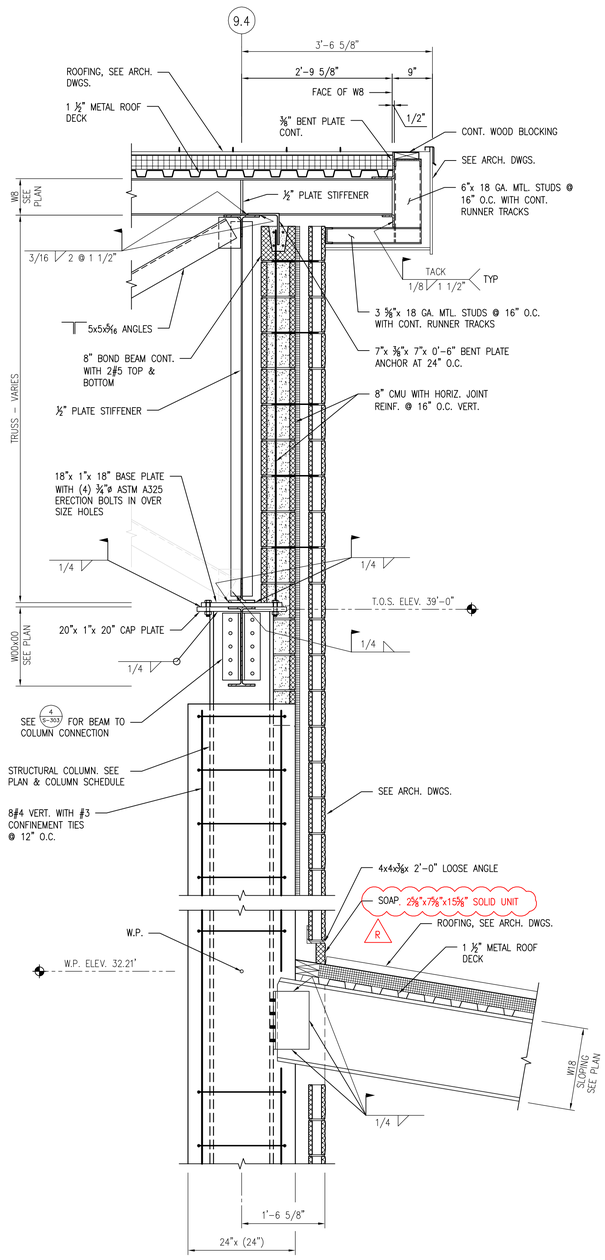


2 ROOF GABLE
S-106 SCALE: 3/4" = 1'-0"



HOIST NOT SHOWN

2a ROOF GABLE
S-105 SCALE: 3/4" = 1'-0"



3 ROOF GABLE
S-106 SCALE: 3/4" = 1'-0"

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 16596
EXPIRATION DATE 2011-08-14

11- 22-2040

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

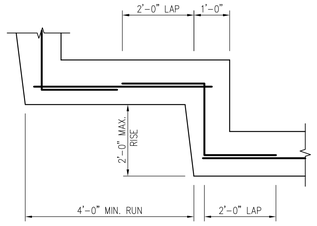
SHEET TITLE
WALL AND ROOF SECTIONS AND DETAILS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

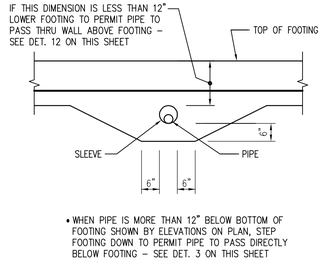
S-305

SHEET 57 OF 128

RECORD DRAWING SET JANUARY 2015

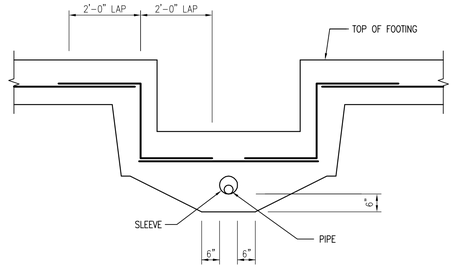


1 TYP. STEPPED FOOTING
S-401 SCALE: NTS



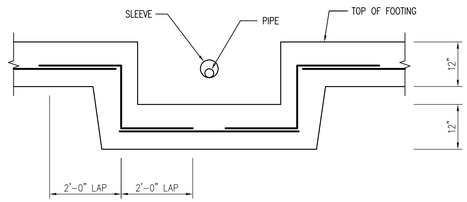
• WHEN PIPE IS MORE THAN 12" BELOW BOTTOM OF FOOTING SHOWN BY ELEVATIONS ON PLAN, STEP FOOTING DOWN TO PERMIT PIPE TO PASS DIRECTLY BELOW FOOTING – SEE DET. 3 ON THIS SHEET

2 TYP. PIPE THRU FOOTING
S-401 SCALE: NTS



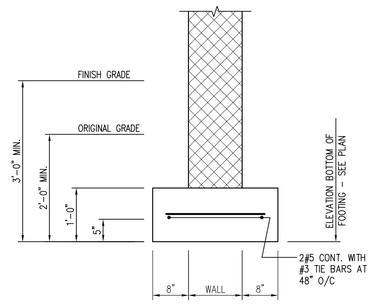
• STEP FOOTING DOWN AS REQUIRED IN ACCORDANCE WITH DET. 1 ON THIS SHEET

3 TYP. FOOTING STEPPED DOWN AT PIPE PENETRATION
S-401 SCALE: NTS

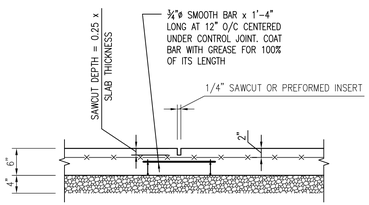


• STEP FOOTING DOWN AS REQUIRED IN ACCORDANCE WITH DET. 1 ON THIS SHEET

4 TYP. FOOTING STEPPED DOWN AT PIPE
S-401 SCALE: NTS

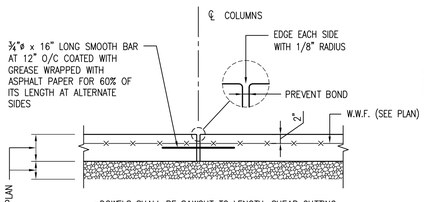


5 TYP. MASONRY WALL FOOTING
S-401 SCALE: NTS



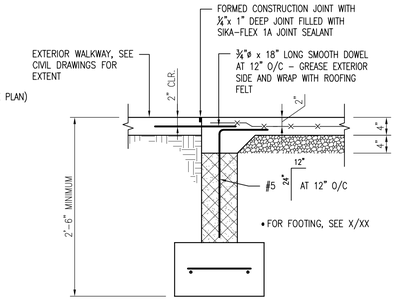
- PROVIDE DOWEL BASKET TO ENSURE ALL DOWELS ARE INSTALLED LEVEL AND PARALLEL
- TERMINATE MESH AT CONTROL JOINTS
- ALL SAWCUTS SHALL BE MADE WITHIN 8 HOURS OF POURING SLAB
- FILL WITH JOINT SEALANT

6 TYP. CONTROL JOINT
S-401 SCALE: NTS

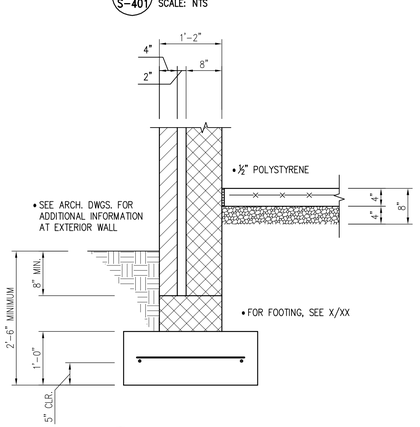


- DOWELS SHALL BE SAWCUT TO LENGTH, SHEAR CUTTING OF DOWELS SHALL NOT BE PERMITTED
- BUTT–TYPE CONSTRUCTION JOINT
- CONSTRUCTION JOINT TO OCCUR AT END AND SIDES OF POUR ONLY
- CONTROL JOINT MAY BE USED IN LIEU OF CONSTRUCTION JOINT AT COLUMN CENTERLINES INSIDE CONTINUOUS POURS
- FILL WITH JOINT SEALANT

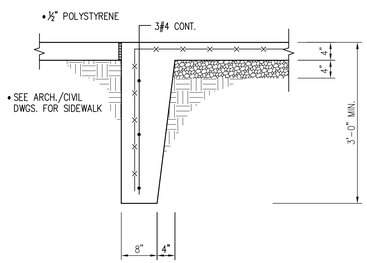
7 TYP. CONSTRUCTION JOINT
S-401 SCALE: NTS



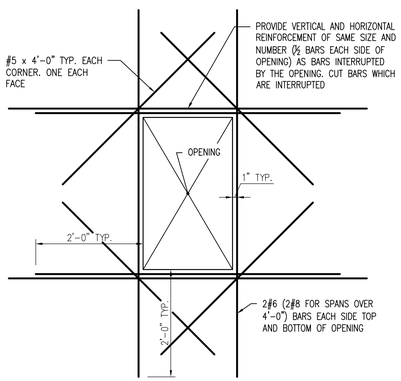
8 EXTERIOR WALL AT DOORWAYS
S-401 SCALE: NTS



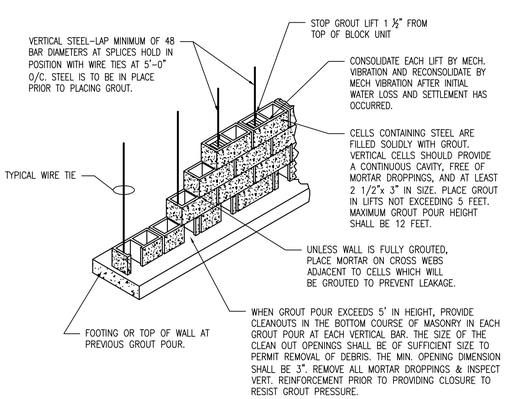
9 EXTERIOR WALL
S-401 SCALE: NTS



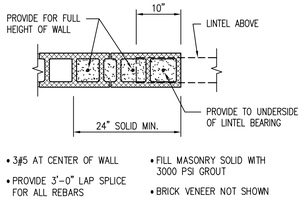
10 TYP. EXTERIOR TURN DOWN SLAB
S-401 SCALE: NTS



11 TYP. OPENING IN CONCRETE WALL
S-401 SCALE: NTS

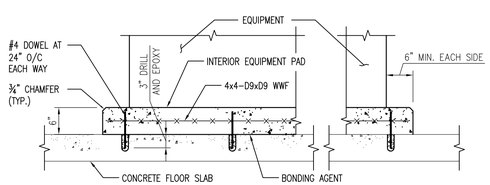


12 TYP. REINFORCED MASONRY CONSTRUCTION
S-401 SCALE: NTS

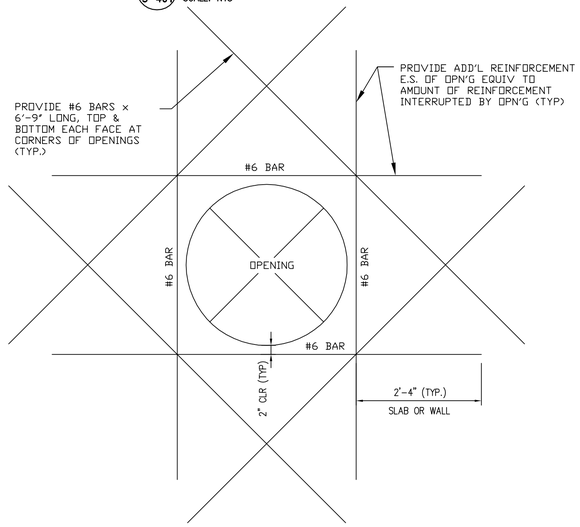


- 3#5 AT CENTER OF WALL
- PROVIDE 3'–0" LAP SPLICE FOR ALL REBARS
- FILL MASONRY SOLID WITH 3000 PSI GROUT
- BRICK VENEER NOT SHOWN

13 TYP. MASONRY JAMB DETAIL
S-1 SCALE: NTS



14 TYP. INTERIOR EQUIPMENT PAD
S-401 SCALE: 3/4" = 1'–0"



15 TYPICAL REINFORCING AT PIPE PENETRATION OPENING
S-401 SCALE: 3/4" = 1'–0"

RECORD DRAWING SET
JANUARY 2015

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 16596
EXPIRATION DATE 2011-06-14

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

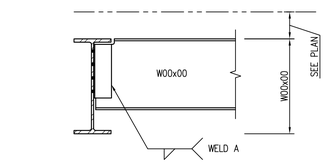
SHEET TITLE
TYPICAL DETAILS

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

S-401

SHEET 58 OF 128



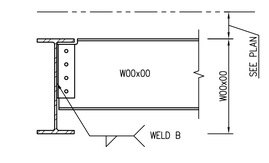
NOTES:

1. USE PRINCIPLE DETAIL EXCEPT WITH THE APPROVAL OF STRUCTURAL ENGINEER.
2. CLIP ANGLE ON BEAM WEB AT ROOF ONLY.

- FRAMED BEAMED CONNECTIONS TABLE 10-1 THRU 10-11 (LRFD 3RD ED.)
- ¾"ø FIELD BOLTS (ASTM A-325)
- SHOP WELDS - E70XX ELECTRODES

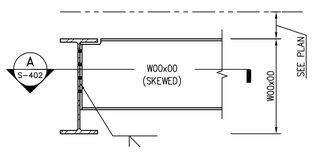
1 BEAM TO BEAM CONNECTIONS
S-402 SCALE: 3/4" = 1'-0"

PRINCIPLE DETAIL



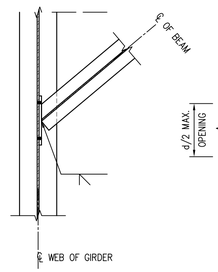
- ONE SIDE FRAMED BEAM CONNECTIONS
- ¾"ø FIELD BOLTS (ASTM A-325)
- SHOP WELDS - E70XX ELECTRODES

2 BEAM TO BEAM CONNECTIONS
S-402 SCALE: 3/4" = 1'-0"

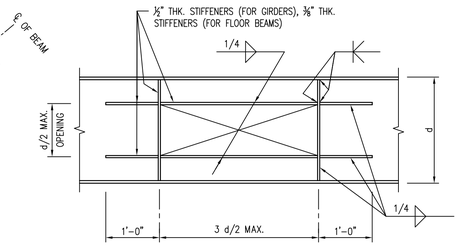


- END SHEAR PLATE CONNECTION - TABLE IX (A.I.S.C.)
- ¾"ø FIELD BOLTS (ASTM A-325 - SC)
- SHOP WELDS - E70XX ELECTRODES

3 BEAM TO BEAM CONNECTIONS
S-402 SCALE: 3/4" = 1'-0"

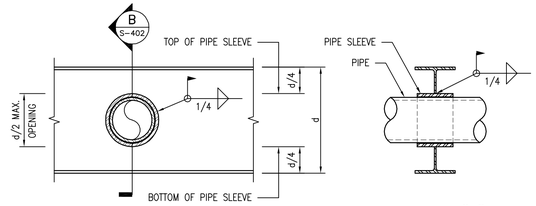


VIEW "A"



- OPENING SHALL BE EQUALLY SPACED BETWEEN STEEL BEAMS OR JOISTS.
- END OF STIFFENER SHALL CLEAR STEEL BEAMS OR JOISTS BY MIN. AND CLEAR COLUMNS BY 30" MINIMUM.
- PROVIDE SLOTS IN BEAMS FOR PIPES, DUCTS, AND OTHER SIMILAR MECHANICAL WORK.
- PIPE SLEEVES MAY BE USED WITH THE APPROVAL OF THE ENGINEER.
- SEE ARCHITECTURAL AND MECHANICAL DRAWINGS FOR SIZE AND LOCATION OF OPENING.

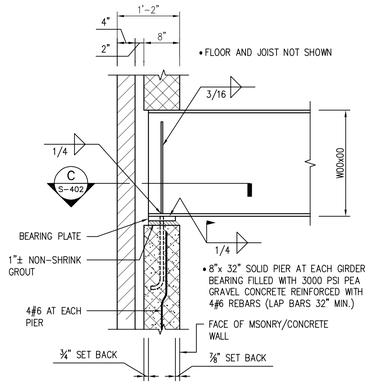
4 TYPICAL DETAIL FOR SLOTS IN BEAMS
S-402 SCALE: 3/4" = 1'-0"



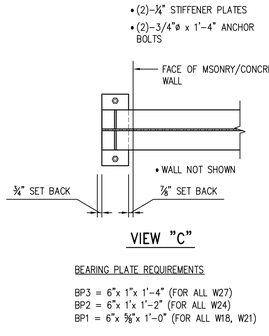
SECTION "B"

- PIPE SLEEVES SHALL CLEAR ALL BEAM AND BEAM TO COLUMN CONNECTIONS BY 30" MIN.
- PIPE SLEEVES SHALL BE MADE OF STEEL CONFORMING TO ASTM A-53, TYPES E OR S, GRADE B (f_y = 35 KSI)
- PIPE SLEEVES SHALL BE SPACED NO CLOSER THAN 2'-0" O/C.
- IF INSIDE DIAMETER OF PIPE SLEEVE EXCEEDS d/3, USE TYPICAL DETAIL FOR SLOTS IN BEAMS

5 TYPICAL DETAIL FOR SLOTS IN BEAMS
S-402 SCALE: 3/4" = 1'-0"



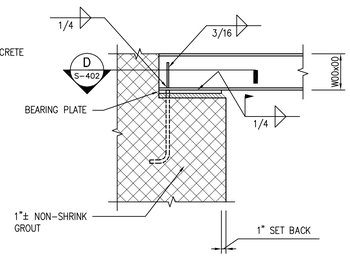
6 TYPICAL BEAM BEARING
S-402 SCALE: 3/4" = 1'-0"



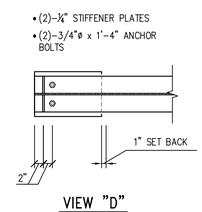
VIEW "C"

BEARING PLATE REQUIREMENTS

BP3 = 6"x 1"x 1'-4" (FOR ALL W27)
BP2 = 6"x 1"x 1'-2" (FOR ALL W24)
BP1 = 6"x ⅝"x 1'-0" (FOR ALL W18, W21)



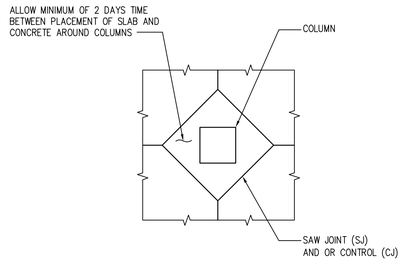
7 TYPICAL LINTEL BEARING
S-402 SCALE: 3/4" = 1'-0"



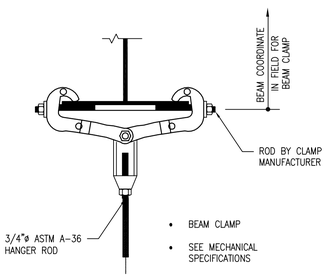
VIEW "D"

BEARING PLATE REQUIREMENTS

BP4 = 11"x ⅝"x 0'-7 ¾" (FOR L?)
BP5 = 1'-3"x ¾"x 0'-10" (FOR L?)
BP6 = 1'-3"x 1"x 0'-10" (FOR L?)

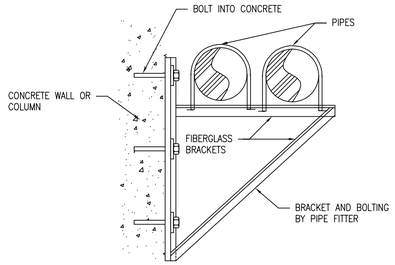


8 TYPICAL ISOLATION JOINT DETAIL
S-402 SCALE: NONE

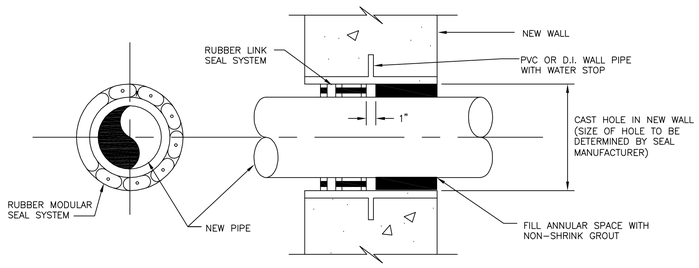


- BEAM CLAMP
- SEE MECHANICAL SPECIFICATIONS

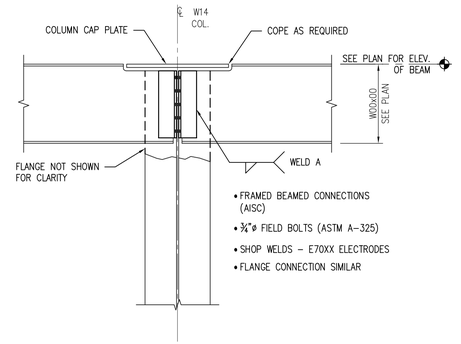
9 HANGER
S-402 SCALE: NOT TO SCALE



10 PIPE BRACKET SUPPORT DETAIL
S-402 SCALE: NOT TO SCALE

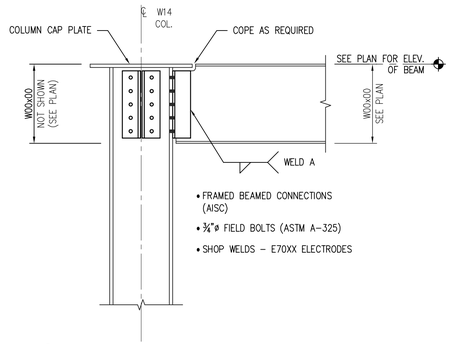


11 PIPE PENETRATION THROUGH NEW WALL - DETAIL
S-402 SCALE: NOT TO SCALE



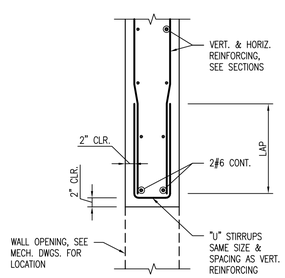
- FRAMED BEAMED CONNECTIONS (AISC)
- ¾"ø FIELD BOLTS (ASTM A-325)
- SHOP WELDS - E70XX ELECTRODES
- FLANGE CONNECTION SIMILAR

12 BEAM TO COLUMN CONNECTION
S-402 SCALE: ¾" = 1'-0"

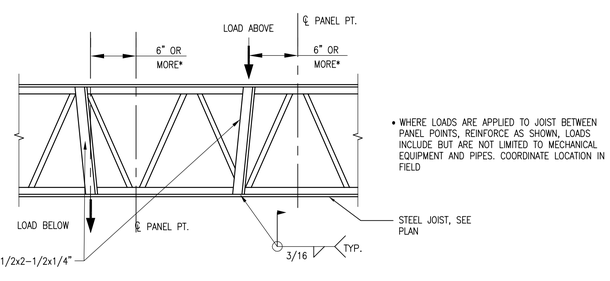


- FRAMED BEAMED CONNECTIONS (AISC)
- ¾"ø FIELD BOLTS (ASTM A-325)
- SHOP WELDS - E70XX ELECTRODES

13 BEAM TO COLUMN CONNECTION
S-402 SCALE: ¾" = 1'-0"



14 TYP. OPENING IN WALL
S-402 SCALE: NOT TO SCALE



- WHERE LOADS ARE APPLIED TO JOIST BETWEEN PANEL POINTS, REINFORCE AS SHOWN, LOADS INCLUDE BUT ARE NOT LIMITED TO MECHANICAL EQUIPMENT AND PIPES. COORDINATE LOCATION IN FIELD

15 TYPICAL JOIST REINFORCEMENT DETAIL
S-402 SCALE: NOT TO SCALE

RECORD DRAWING SET
JANUARY 2015

WORCESTER COUNTY ENGINEERING

STATE OF MARYLAND — KEVIN M. SMITH — 21652 — PROFESSIONAL ENGINEER
11-22-2010

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16596, EXPIRATION DATE 2011-08-14

CONSULTANT

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

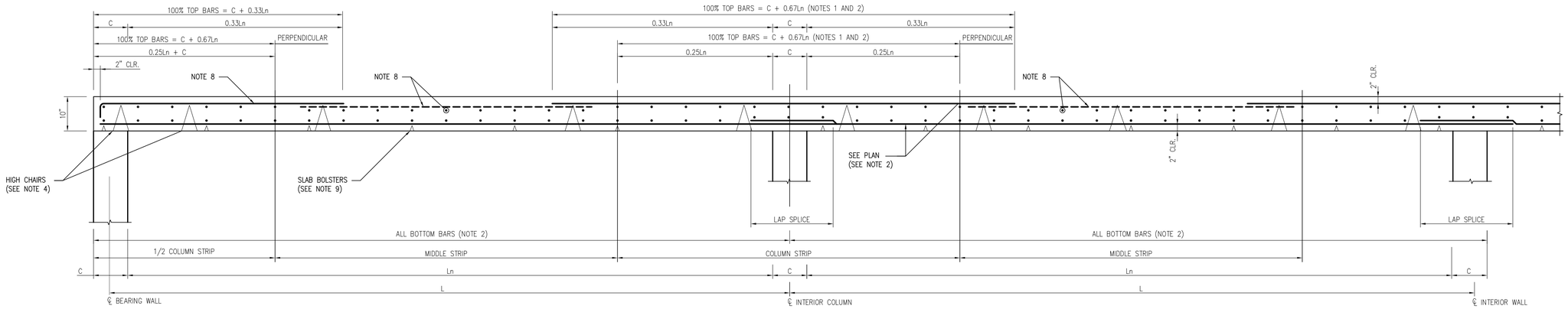
PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
TYPICAL DETAILS

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

S-402

SHEET 59 OF 128



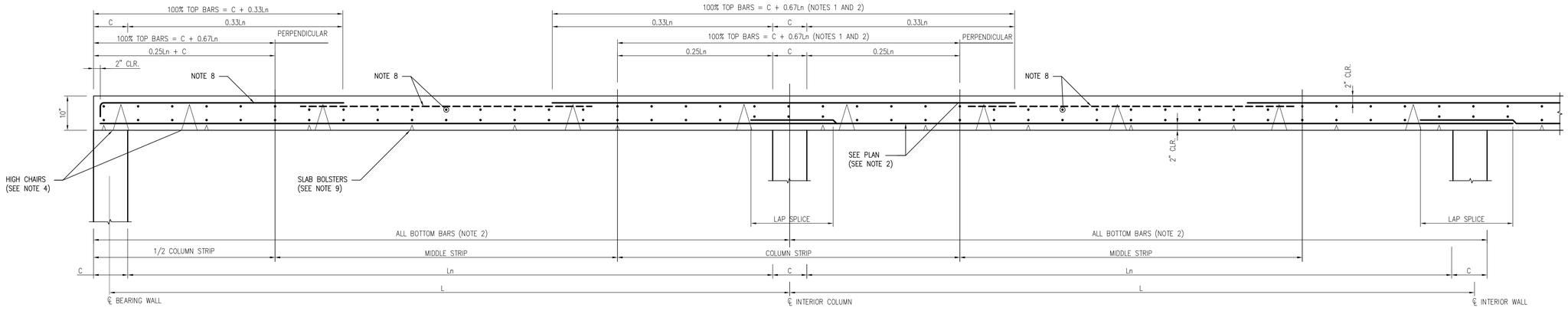
1 S-403 TYPICAL BAR LENGTHS IN COLUMN STRIP OF FLAT PLATE

SCALE: NOT TO SCALE

- SEE NOTE 1 thru 9
- COLUMNS BARS AND DOWELS TO PLATE NOT SHOWN

NOTES:

1. AT THE INTERIOR SUPPORTS "L" AND "Ln" ARE THE LONGER OF THE ADJACENT SPANS.
2. SEE PLAN FOR SIZE AND NUMBER OF BARS IN COLUMN AND MIDDLE STRIPS AND FOR WIDTH OF STRIPS.
3. TOP BARS SHALL BE SUPPORTED ON INDIVIDUAL HIGH CHAIRS @ 4'–0" ON CENTER WITH #5 SUPPORT BARS AT 5'–0" ON CENTER.
4. PLACEMENT SCHEDULE:
   TOP REINFORCEMENT. NORTH–SOUTH / EAST–WEST BARS FIRST; EAST–WEST / NORTH–SOUTH BARS SECOND
5. BOTTOM REINFORCEMENT: EAST–WEST / NORTH–SOUTH BARS FIRST; NORTH–SOUTH / EAST–WEST BARS SECOND
6. BARS SHALL BE SPACED UNIFORMLY ACROSS EACH COLUMN AND MIDDLE STRIP EXCEPT FOR THE TOP BARS AT THE COLUMN PERIPHERY.
7. ALL REINFORCING ACCESSORIES SHALL BE EPOXY COATED AN HAVE PLASTIC TIPS.
8. #5 AT 12" TEMP BARS (NOT SHOWN ON PLAN)
9. BOTTOM BARS SHALL BE SUPPORTED ON CONTINUOUS BOLSTERS AT 3'–0" ON CENTER.



2 S-403 TYPICAL BAR LENGTHS IN MIDDLE STRIP OF FLAT PLATE

SCALE: NOT TO SCALE

- SEE NOTE 1 thru 9
- COLUMNS BARS AND DOWELS TO PLATE NOT SHOWN

RECORD DRAWING SET JANUARY 2015

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16596, EXPIRATION DATE 2011-08-14

11-22-2010

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON ®
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
TYPICAL EQUALIZATION SLAB DETAILS

MARK	DATE	DESCRIPTION
1	NOV. 2014	RECORD DRAWINGS

CONTRACT NO. #140–10–01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

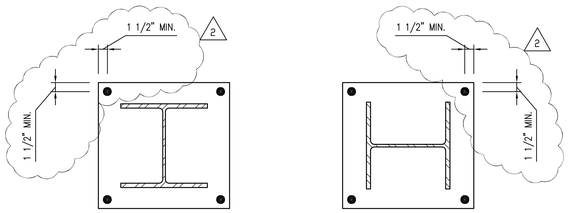
S-403

SHEET 60 OF 128

COLUMN SCHEDULE

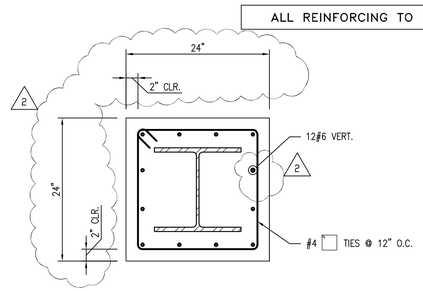
MARK / LEVEL	A-1	A-2 A-3 A-4	A-5	A-6	A-7	A-8	A-9	A-9.4	B-1	C-5	C-6	C-9.4	D-1	E-5	E-6	E-9.4	F-1	G-1	G-2 G-3 G-4	G-5	G-6	G-7	G-8	G-9	G-9.4	0.3-B.1 0.3-F.2	0.6-B.1 0.6-F.2
HIGH ROOF (39.00)	7K	14K	16K	9K	4K	12K	10K	18K	10K	13K	13K	10K	10K	13K	13K	10K	10K	9K	18K	20K	10K	5K	14K	22K	13K		
LOW ROOF (26.67)	W14x90 (CE) 7K	W14x90 (CE) 14K	W14x90 (CE) 16K	W14x90 (CE) 9K	W14x90 (CE) 4K	W14x90 (CE) 12K	W14x90 (CE) 10K	W14x90 (CE) 18K	W14x48 (CE) 10K	W12x53 13K	W12x53 13K	W14x48 (CE) 10K	W14x48 (CE) 10K	W12x53 13K	W12x53 13K	W14x48 (CE) 10K	W14x48 (CE) 10K	W14x99 (CE) 9K	W14x99 (CE) 18K	W14x99 (CE) 20K	W14x99 (CE) 10K	W14x99 (CE) 5K	W14x99 (CE) 14K	W14x99 (CE) 22K	W14x99 (CE) 13K		
(16.67)	7K	14K	16K	9K	4K	12K	10K	18K	10K	13K	13K	10K	10K	13K	13K	10K	10K	9K	18K	20K	10K	5K	14K	22K	13K		
GROUND	7K	14K	18K	11K	6K	14K	12K	20K	10K	14K	14K	10K	10K	13K	13K	10K	10K	9K	18K	20K	10K	5K	14K	22K	13K		
LEVEL (10.67)	24"x 24"	24"x 24"	24"x 24"	24"x 24"	24"x 24"	24"x 24"	24"x 24"	24"x 24"	24"x 24"	24"x 24"	24"x 24"	10K	24"x 24"	24"x 24"	24"x 24"	24"x 24"	24"x 24"	24"x 24"	21K	23K	13K	8K	17K	25K	16K	18"x 18" WITH 4#10 VERT. & #4 TIES @ 12" O.C.	18"x 18" WITH 4#10 VERT. & #4 TIES @ 12" O.C. 10" VARIES
TANK (SEE LEVEL SECTIONS)	19K	26K	28K	21K	16K	24K	22K	30K	11K	24K	24K	7K	10K	2K	13K	10K	7K	17K	26K	28K	18K	13K	22K	30K	19K		
BASE PL TYPE	a	b	a	a	b	a	a	a	a	a	a	a	a	a	a	a	a	a	b	a	a	b	a	a	a	–	–
BASE PLATE	22"x22"x1"	22"x22"x1"	22"x22"x1"	22"x22"x1"	22"x22"x1"	22"x22"x1"	22"x22"x1"	22"x22"x1"	22"x22"x1"	20"x18"x1"	20"x18"x1"	22"x22"x1"	22"x22"x1"	20"x18"x1"	20"x18"x1"	22"x22"x1"	22"x22"x1"	22"x22"x1"	22"x22"x1"	22"x22"x1"	22"x22"x1"	22"x22"x1"	22"x22"x1"	22"x22"x1"	22"x22"x1"	–	–
LEVEL PLATE	22"x22"x1/4"	22"x22"x1/4"	22"x22"x1/4"	22"x22"x1/4"	22"x22"x1/4"	22"x22"x1/4"	22"x22"x1/4"	22"x22"x1/4"	22"x22"x1/4"	20"x18"x1/4"	20"x18"x1/4"	22"x22"x1/4"	22"x22"x1/4"	20"x18"x1/4"	20"x18"x1/4"	22"x22"x1/4"	22"x22"x1/4"	22"x22"x1/4"	22"x22"x1/4"	22"x22"x1/4"	22"x22"x1/4"	22"x22"x1/4"	22"x22"x1/4"	22"x22"x1/4"	22"x22"x1/4"	–	–
ELEV. TOP OF LEVEL PL	16.77	16.77	16.77	16.77	16.77	10.10	10.10	10.10	16.77	16.77	16.77	10.10	16.77	16.77	16.77	10.10	16.77	16.77	10.10	10.10	10.10	10.10	10.10	10.10	10.10	–	–
ANCHOR BOLTS	(4) 1"ø AB1	(4) 1"ø AB1	(4) 1"ø AB1	(4) 1"ø AB1	(4) 1"ø AB1	(4) 1"ø AB1	(4) 1"ø AB1	(4) 1"ø AB1	(4) 1"ø AB1	(4) 1 1/2"ø AB2	(4) 1 1/2"ø AB2	(4) 1"ø AB1	(4) 1"ø AB1	(4) 1"ø AB2	(4) 1"ø AB2	(4) 1"ø AB1	(4) 1"ø AB1	(4) 1"ø AB1	(4) 1"ø AB1	(4) 1"ø AB1	(4) 1"ø AB1	(4) 1"ø AB1	(4) 1"ø AB1	(4) 1"ø AB1	(4) 1"ø AB1	–	–
FOUNDATION						5'-0"x5'-0" x12"	5'-0"x5'-0" x12"	5'-0"x5'-0" x12"				5'-0"x5'-0" x12"				5'-0"x5'-0" x12"			5'-0"x5'-0" x12"	6'-0"x6'-0" x14"	9'-0"x6'-0" x14" 11#5 SW (BOT) 7#5 LW (T) 7#5 LW (W) #4 TIE BARS AT 12"O/C	9'-0"x6'-0" x14" 11#5 SW (BOT) 7#5 LW (T) 7#5 LW (W) #4 TIE BARS AT 12"O/C	5'-0"x5'-0" x12"	5'-0"x5'-0" x12"	5'-0"x5'-0" x12"		
REINF. E.W.	MAT	MAT	MAT	MAT	MAT	5#5 EW	5#5 EW	5#5 EW	MAT	MAT	MAT	5#5 EW	MAT	MAT	MAT	5#5 EW	MAT	MAT	5#5 EW	7#5 EW			5#5 EW	5#5 EW	5#5 EW	MAT	MAT

ALL REINFORCING TO BE EPOXY COATED



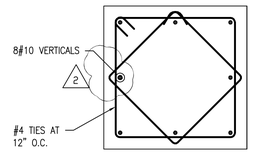
TYPE "a" • SEE PLAN FOR ORIENTATION TYPE "b"

4 S-501 BASE PLATE TYPES
SCALE: N.T.S.

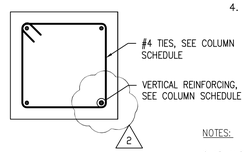


SHOWN ON COLUMN SCHEDULE AS (CE)

5 S-501 TYPICAL CONCRETE COLUMN ENCASEMENT (CE)
SCALE: N.T.S.



24"x 24"



18"x 18"

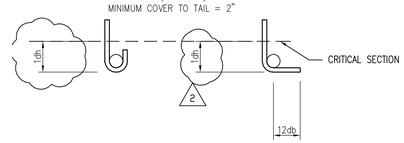
6 S-501 TYPICAL CONCRETE COLUMN/PEDESTAL
SCALE: N.T.S.

NOTES:

SLAB AND WALL: 6" MINIMUM REBAR SPACING
BEAM: MINIMUM CLEAR SPACING BETWEEN BARS = db (BAR DIAMETER)
MINIMUM CONCRETE COVER = 2.0" CLEAR

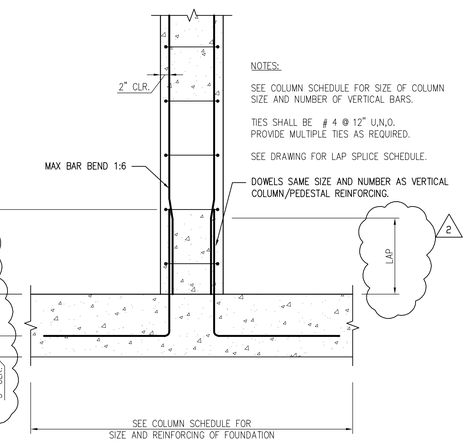
TOP BAR: TOP BAR FOR SLAB AND BEAM SHALL BE DEFINED AS REINFORCED SO PLACED THAT MORE THAN 12" OF CONCRETE IS CAST BELOW THE SPLICE.

STANDARD HOOKS: SIDE COVER MORE THAN 2.5"
END COVER (90° HOOK) MORE THAN 2"
MINIMUM COVER TO TAIL = 2"

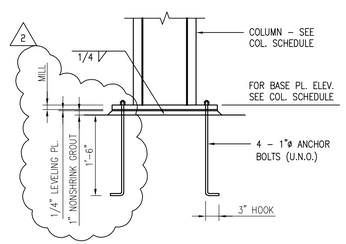


STANDARD 180° AND 90° END HOOKS

STANDARD HOOK LENGTH

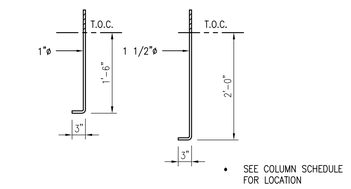


1 S-501 TYPICAL FOUNDATION AND TIED COLUMN DETAIL
SCALE: NONE



2 S-501 TYPICAL BASE PLATE DETAIL
SCALE: NONE

RECORD DRAWING SET JANUARY 2015



3 S-501 ANCHOR BOLT DIAGRAMS
SCALE: NONE

LAP SPLICE SCHEDULE (f'c = 5,000 PSI – WWTP)									
BAR SIZE	SLAB AND WALL		BEAM		STANDARD 90° HOOK		STANDARD 180° HOOK		D
	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	1dh	12db	1dh	4db	FINISHED BEND DIAMETER
#3	20"	29"	25"	38"	8"	5"	8"	2"	2 1/4"
#4	26"	39"	34"	50"	11"	6"	11"	2"	3"
#5	32"	48"	42"	63"	13"	8"	13"	3"	3 1/4"
#6	39"	58"	50"	75"	16"	9"	16"	3"	4 1/2"
#7	56"	84"	73"	109"	18"	11"	18"	4"	5 1/4"
#8	64"	96"	83"	125"	21"	12"	21"	4"	6"
#9	72"	108"	94"	140"	23"	14"	23"	5"	9 1/2"
#10	80"	120"	104"	156"	26"	16"	26"	5"	10 3/4"
#11	88"	132"	114"	171"	29"	17"	29"	6"	12"

NOTES:

1. SEE PLAN FOR COLUMN LOCATIONS.
2. ALL CONCRETE FOR CONCRETE COLUMNS TO HAVE A 28 DAY COMPRESSIVE STRENGTH (f'c) OF 5,000 PSI.
3. ALL CONCRETE FOR CONCRETE ENCASEMENT TO HAVE A 20 DAY COMPRESSIVE STRENGTH OF 5,000 PSI.
4. PROVIDE CORROSION INHIBITING ADMIXTURE AT TYPICAL CONRETE COLUMN ENCASEMENT (CE)

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.
LICENSE NO. 16596
EXPIRATION DATE 2011-08-14

CONSULTANT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®
72 Loveton Circle Baltimore, Maryland 21152-0949

PROJECT TITLE
MYSTIC HARBOUR WWTP
UPGRADE AND PLANT EXPANSION

SHEET TITLE
COLUMN SCHEDULE AND DETAILS

MARK	DESCRIPTION	DATE
1	RECORD DRAWINGS	NOV. 2014

CONTRACT NO. #140-10-01
DATE: MAY 2011
SCALE: AS SHOWN
DWN. BY: BMH
CH'D. BY: KMS

S-501

SHEET 61 OF 128