## DRAWING INDEX

| DWG. N º | REV. N º | DATE | TITLE |
|---|---|---|---|
| **CIVIL / STRUCTURAL** | | | |
| CI-02 | 1 | 08/29/12 | INJECTION WELL SITE PLAN |
| CI-03 | 1 | 08/29/12 | INJECTION WELLS IW - 16, 17, 18, 19 |
| CI-04 | 1 | 08/29/12 | MISC. SECTIONS AND DETAILS SECTIONS AND DETAILS |
| CI-05 | 1 | 08/29/12 | INJECTION WELLS IW - 1 THROUGH IW-7, AND CH - 8 |
| CI-06 | 1 | 08/29/12 | INJECTION WELLS IW - 15, 20, 21, 22 |
| ST-01 | 1 | 08/29/12 | CONTROL BUILDING - GENERAL NOTES |
| ST-02 | 1 | 08/29/12 | CONTROL BUILDING - FLOOR PLAN |
| ST-03 | 1 | 08/29/12 | CONTROL BUILDING - ELEVATIONS |
| ST-04 | 1 | 08/29/12 | CONTROL BUILDING - SECTION AND DETAILS |
| ST-05 | 1 | 08/29/12 | CONTROL BUILDING - SCHEDULE & DETAILS |
| ST-06 | 1 | 08/29/12 | CONTROL BUILDING - FOUNDATION PLAN |
| ST-07 | 1 | 08/29/12 | CONTROL BUILDING - MISCELLANEOUS DETAILS |
| **ENGINEERING FLOW SHEETS** | | | |
| EF-00 | 1 | 08/29/12 | ENGINEERING FLOW SHEET - LEGEND |
| EF-01 S1 | 1 | 08/29/12 | ENGINEERING FLOW SHEET - PROCESS EQUIPMENT |
| EF-01 S2 | 1 | 08/29/12 | ENGINEERING FLOW SHEET - PROCESS EQUIPMENT |
| EF-02 | 1 | 08/29/12 | ENGINEERING FLOW SHEET - MIDDLE FENCE INJECTION WELLS |
| EF-03 | 1 | 08/29/12 | ENGINEERING FLOW SHEET - MIDDLE FENCE INJECTION WELLS |
| EF-04 | 1 | 08/29/12 | ENGINEERING FLOW SHEET - MIDDLE FENCE INJECTION WELLS |
| EF-05 | 1 | 08/29/12 | ENGINEERING FLOW SHEET - MIDDLE FENCE INJECTION WELLS |
| EF-06 | 1 | 08/29/12 | ENGINEERING FLOW SHEET - NORTH FENCE INJECTION WELLS |
| EF-07 | 1 | 08/29/12 | ENGINEERING FLOW SHEET - NORTH FENCE INJECTION WELLS |
| EF-08 | 1 | 08/29/12 | ENGINEERING FLOW SHEET - NORTH FENCE INJECTION WELLS |
| **MECHANICAL / PIPING** | | | |
| MP-01 | 1 | 08/29/12 | CONTROL BUILDING AND WELL - FIELD PIPING PLAN |
| MP-02 | 1 | 08/29/12 | CONTROL BUILDING - EQUIPMENT LAYOUT AT GRADE |
| MP-03 | 1 | 08/29/12 | CONTROL BUILDING - EQUIPMENT LAYOUT (UPPER) |
| MP-04 | 1 | 08/29/12 | CONTROL BUILDING - EQUIPMENT SECTIONS |
| MP-05 | 1 | 08/29/12 | WELL DETAILS |
| MP-06 | 1 | 08/29/12 | INJECTION WELLS IW-16, 17 ,18 & 19 - PLAN AND SECTIONS |
| MP-07 | 1 | 08/29/12 | INJECTION WELLS IW-15, 20 AND 22 - PLAN AND SECTIONS |
| MP-08 | 1 | 08/29/12 | LAVATORY PLUMBING |
| MP-09 | 1 | 08/29/12 | INJECTION WELL IW-08 - PLAN AND SECTIONS |
| MP-10 | 1 | 08/29/12 | INJECTION WELLS IW-01 THRU IW-07 - PLAN AND SECTIONS |
| MP-11 | | | REMOVED |
| MP-12 | 1 | 08/29/12 | LINE LIST |
| MP-13 | 1 | 08/29/12 | INJECTION WELLS IW-21A - PLAN AND SECTIONS |
| MP-14 | 1 | 08/29/12 | INJECTION WELLS IW-21 - PLAN AND SECTIONS |
| **ELECTRICAL / INSTRUMENTATION** (NOT INCLUDED - TO BE PROVIDED AT LATER DATE) | | | |
| E-01 | 1 | 08/29/12 | ELECTRICAL/INSTRUMENTATION SITE PLAN |
| E-02 | 1 | 08/29/12 | CONTROL BUILDING SINGLE LINE DIAGRAM |
| E-03 | 1 | 08/29/12 | CONTROL BUILDING - GROUNDING PLAN AND DETAILS |
| E-04 | 1 | 08/29/12 | CONTROL BUILDING - LIGHTING PLAN AND DETAILS |
| E-05 | 1 | 08/29/12 | CONTROL BUILDING - PANELBOARD SCHEDULES |
| E-06 | 1 | 08/29/12 | CONTROL BUILDING POWER PLAN |
| E-07 SHT. 1 | 1 | 08/29/12 | CONTROL BUILDING MOTOR SCHEMATIC DIAGRAMS |
| E-07 SHT. 2 | 1 | 08/29/12 | CONTROL BUILDING MOTOR SCHEMATIC DIAGRAMS |
| E-08 | 1 | 08/29/12 | CONTROL SYSTEM NETWORK ARCHITECTURE |
| E-09 | 1 | 08/29/12 | CONTROL BUILDING INSTRUMENTATION PLAN AND DETAILS |
| E-10 | 1 | 08/29/12 | MAIN PLC CONTROL PANEL ARRANGEMENT |
| E-11 SHT. 1 | 1 | 08/29/12 | MAIN PLC CONTROL PANEL WIRING DIAGRAM |
| E-11 SHT. 2 | 1 | 08/29/12 | MAIN PLC CONTROL PANEL ANALOG INPUT WIRING DIAGRAM |
| E-11 SHT. 3 | 1 | 08/29/12 | MAIN PLC CONTROL PANEL ANALOG OUTPUT WIRING DIAGRAM |
| E-11 SHT. 4 | 1 | 08/29/12 | MAIN PLC CONTROL PANEL DIGITAL INPUT WIRING DIAGRAM (1 OF 2) |
| E-11 SHT. 5 | 1 | 08/29/12 | MAIN PLC CONTROL PANEL DIGITAL INPUT WIRING DIAGRAM (2 OF 2) |
| E-11 SHT. 6 | 1 | 08/29/12 | MAIN PLC CONTROL PANEL DIGITAL OUTPUT WIRING DIAGRAM |
| E-12 | 1 | 08/29/12 | INJECTION WELLS PLAN, SECTION & DETAILS |
| E-13 | 1 | 08/29/12 | INJECTION WELLS HEAT TRACING PLAN, SECTION & DETAILS |
| E-14 | 1 | 08/29/12 | INJECTION WELLS TYPICAL ELECTRICAL WIRING DIAGRAM |
| E-15 | 1 | 08/29/12 | TYPICAL INJECTION WELL REMOTE I/O PANEL ARRANGEMENT |
| E-16 SHT. 1 | 1 | 08/29/12 | INJECTION WELL IW-1 REMOTE I/O PANEL WIRING DIAGRAM |
| E-16 SHT. 2 | 1 | 08/29/12 | INJECTION WELL IW-2 REMOTE I/O PANEL WIRING DIAGRAM |
| E-16 SHT. 3 | 1 | 08/29/12 | INJECTION WELL IW-3 REMOTE I/O PANEL WIRING DIAGRAM |
| E-16 SHT. 4 | 1 | 08/29/12 | INJECTION WELL IW-4 REMOTE I/O PANEL WIRING DIAGRAM |
| E-16 SHT. 5 | 1 | 08/29/12 | INJECTION WELL IW-5 REMOTE I/O PANEL WIRING DIAGRAM |
| E-16 SHT. 6 | 1 | 08/29/12 | INJECTION WELL IW-6 REMOTE I/O PANEL WIRING DIAGRAM |
| E-16 SHT. 7 | 1 | 08/29/12 | INJECTION WELL IW-7 REMOTE I/O PANEL WIRING DIAGRAM |
| E-16 SHT. 15 | 1 | 08/29/12 | INJECTION WELL IW-15 REMOTE I/O PANEL WIRING DIAGRAM |
| E-16 SHT. 16 | 1 | 08/29/12 | INJECTION WELL IW-16 REMOTE I/O PANEL WIRING DIAGRAM |
| E-16 SHT. 17 | 1 | 08/29/12 | INJECTION WELL IW-17 REMOTE I/O PANEL WIRING DIAGRAM |
| E-16 SHT. 18 | 1 | 08/29/12 | INJECTION WELL IW-18 REMOTE I/O PANEL WIRING DIAGRAM |
| E-16 SHT. 19 | 1 | 08/29/12 | INJECTION WELL IW-19 REMOTE I/O PANEL WIRING DIAGRAM |
| E-16 SHT. 20 | 1 | 08/29/12 | INJECTION WELL IW-20 REMOTE I/O PANEL WIRING DIAGRAM |
| E-16 SHT. 22 | 1 | 08/29/12 | INJECTION WELL IW-22 REMOTE I/O PANEL WIRING DIAGRAM |

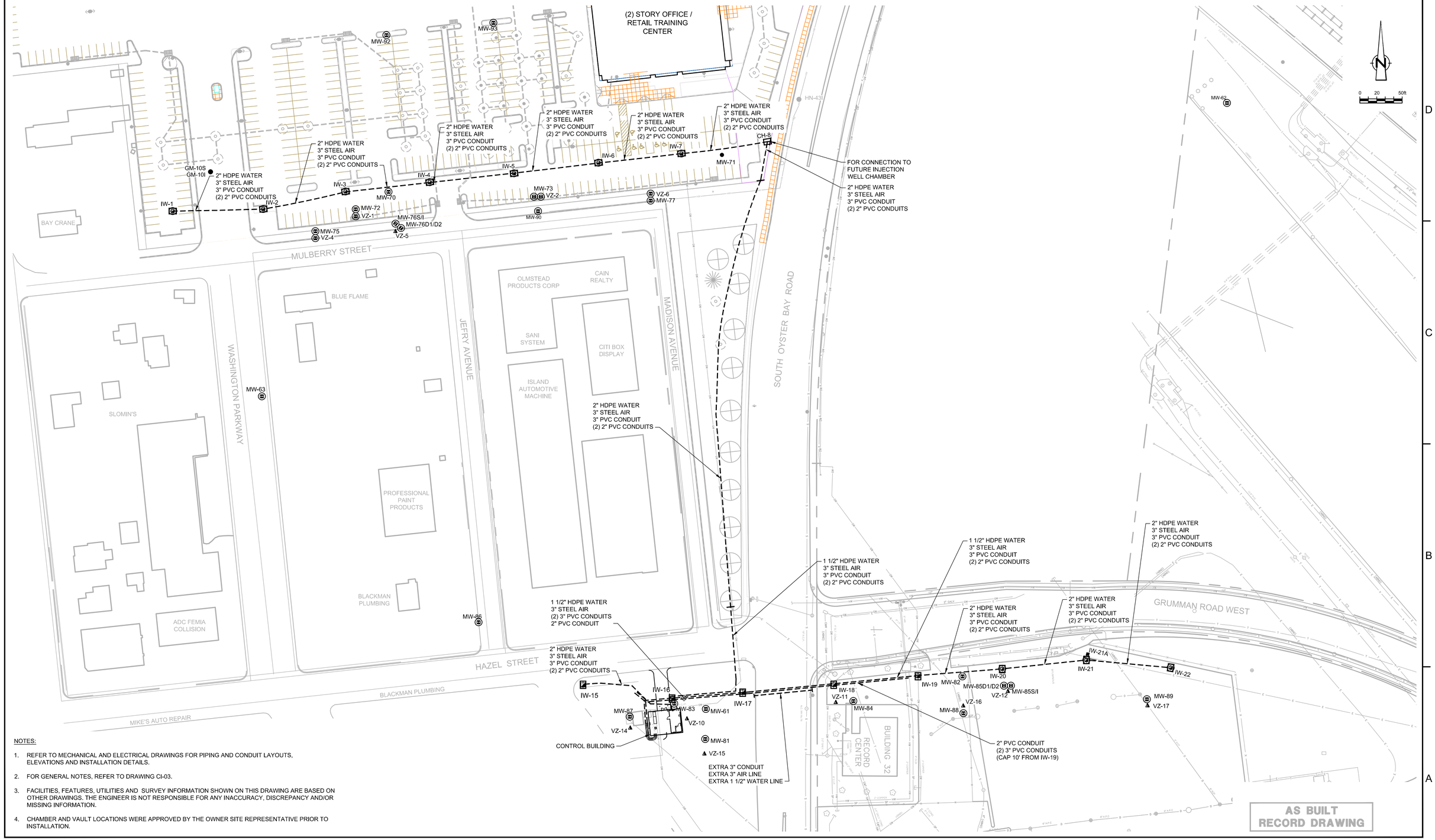
# HOOKER/RUCO SITE
# HICKSVILLE, NEW YORK

# BIOSPARGE
# TREATMENT SYSTEM
# MIDDLE AND NORTH INJECTION FENCE
# UNDERGROUND VAULTS

## AS BUILT

## 06883-00(056)

CRA Infrastructure & Engineering, Inc.




NOTES:

1. REFER TO MECHANICAL AND ELECTRICAL DRAWINGS FOR PIPING AND CONDUIT LAYOUTS, ELEVATIONS AND INSTALLATION DETAILS.
2. FOR GENERAL NOTES, REFER TO DRAWING CI-03.
3. FACILITIES, FEATURES, UTILITIES AND SURVEY INFORMATION SHOWN ON THIS DRAWING ARE BASED ON OTHER DRAWINGS. THE ENGINEER IS NOT RESPONSIBLE FOR ANY INACCURACY, DISCREPANCY AND/OR MISSING INFORMATION.
4. CHAMBER AND VAULT LOCATIONS WERE APPROVED BY THE OWNER SITE REPRESENTATIVE PRIOR TO INSTALLATION.

LEGEND

- FORCEMAIN AND CONDUIT ALIGNMENT
- IW-6 INJECTION WELL LOCATION
- MW-90 MONITORING WELL LOCATION
- MW-78 / VZ-7 MONITORING WELL NEST AND VADOSE ZONE MONITORING WELL NEST LOCATION
- CHAMBER

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | JA |



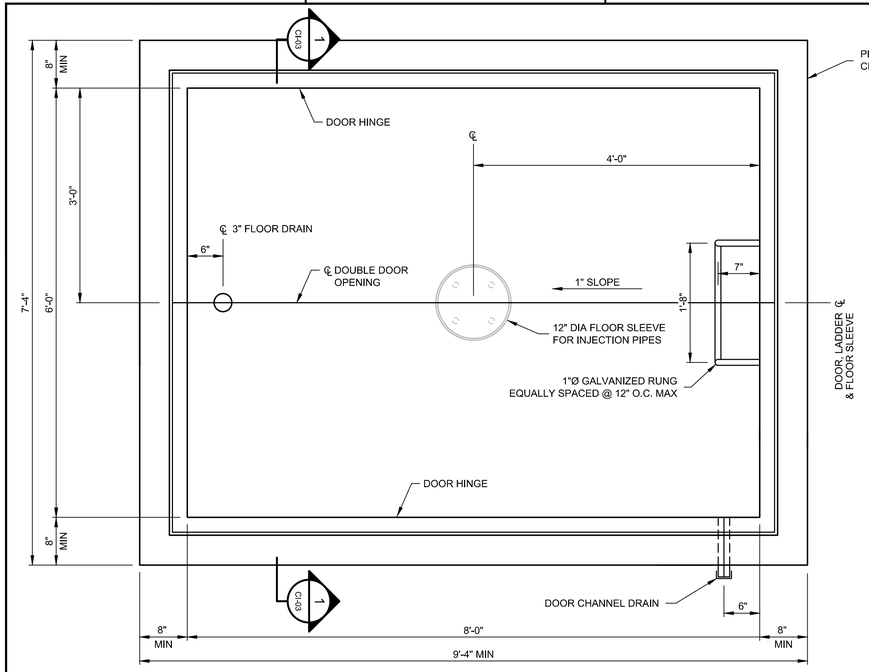
HOOKER/ RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

INJECTION WELL SITE PLAN

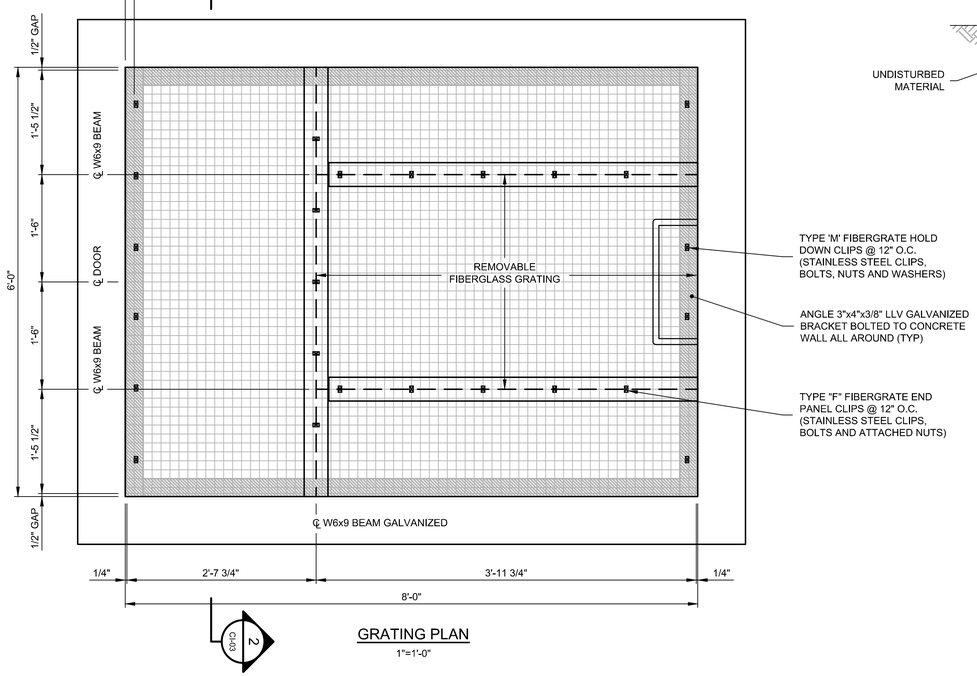
CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: SEPTEMBER 2003 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: J. WORRALL | Designed By: J. THORNTON | Drawn By: C. ROHRICH |
| Scale: AS NOTED | Project No: 06883-00 | Report No: 056 | Drawing No: CI-02 |



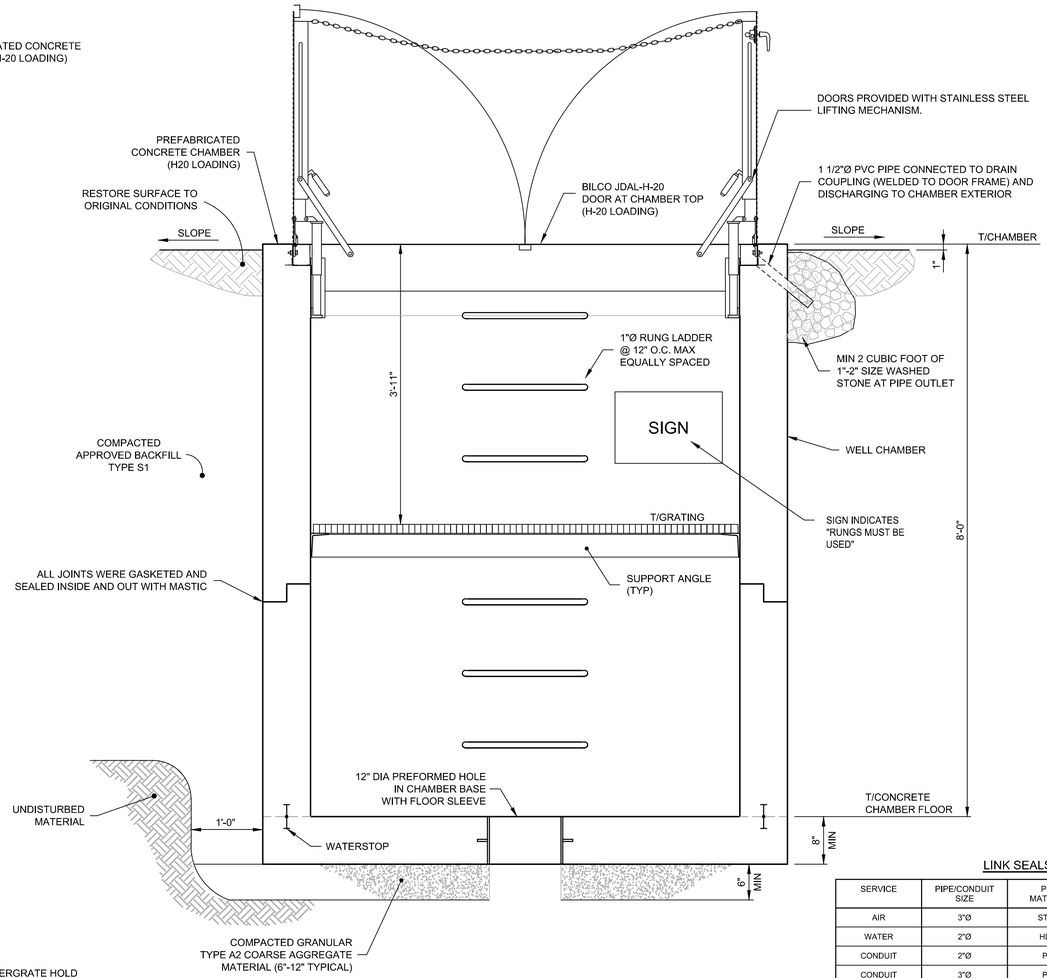

## INJECTION WELL CHAMBER PLAN

1"=1'-0"



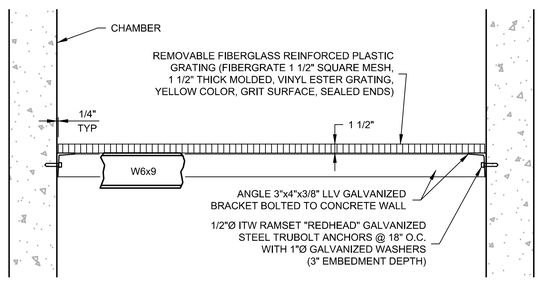

## GRATING PLAN

1"=1'-0"



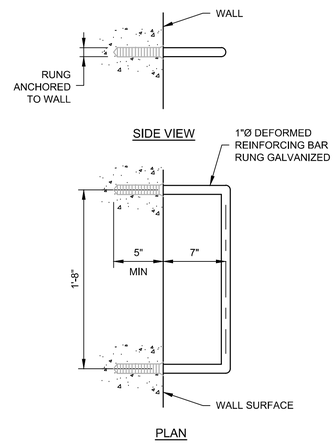

## SECTION 1

1"=1'-0"



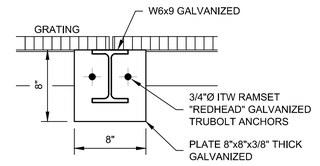

## SECTION 2

1"=1'-0"




## RUNG DETAIL

1 1/2"=1'-0"




## BEAM PLATE DETAIL

1 1/2"=1'-0"

### LINK SEALS AND WALL SLEEVES

| SERVICE | PIPE/CONDUIT SIZE | PIPE MATERIAL | CHAMBER WALL SLEEVE | CHAMBER LINK SEAL |
|---|---|---|---|---|
| AIR | 3"Ø | STEEL | WS-5-25-S | LS-300 (8 LINKS PER SEAL) |
| WATER | 2"Ø | HDPE | CS-4 | LS-300 (8 LINKS PER SEAL) |
| CONDUIT | 2"Ø | PVC | CS-4 | LS-300 (6 LINKS PER SEAL) |
| CONDUIT | 3"Ø | PVC | CS-5 | LS-300 (8 LINKS PER SEAL) |
| GROUND CABLE | " | " | WS-2-15-S | LS-200 (4 LINKS PER SEAL) |
| WELL | - | - | CS-12 | - |

### NOTES

1. FOR WELL CHAMBER ORIENTATION REFER TO MECHANICAL DRAWINGS.
2. LINK SEALS AND WALL SLEEVES BY THUNDERLINE CORPORATION.
3. WALL SLEEVE LENGTH TO BE THE SAME AS CHAMBER CONCRETE THICKNESS.
4. THUNDERLINE MODEL CS WALL SLEEVES ARE HDPE PLASTIC AND MODEL WS WALL SLEEVES SHALL BE GALVANIZED STEEL.
5. LOCATION OF 12" DIA SLEEVE IN CHAMBER FLOOR FOR INJECTION PIPES ARE IN ACCORDANCE WITH MECHANICAL DRAWINGS.
6. GRATING OPENINGS AND CUTOUTS FOR PIPING WERE FIELD LOCATED IN ACCORDANCE WITH MECHANICAL DRAWINGS.
7. LOWER 3'-0" SECTION OF CHAMBER WALLS AND BASE SLAB WAS CONSTRUCTED MONOLITHIC (SINGLE CONCRETE PLACEMENT) WITHOUT COLD JOINTS.
8. COMPACTION OF BACKFILL AROUND PIPING AND CONDUIT WAS PERFORMED CAREFULLY TO AVOID DISPLACEMENT OF PROTRUDING PIPE/CONDUIT AND TO PRESERVE SEAL AGAINST WATER INTRUSION.
9. FOR VAULT PENETRATIONS FOR PIPING SEE MECHANICAL DRAWINGS.

AS BUILT
RECORD DRAWING

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | JA |



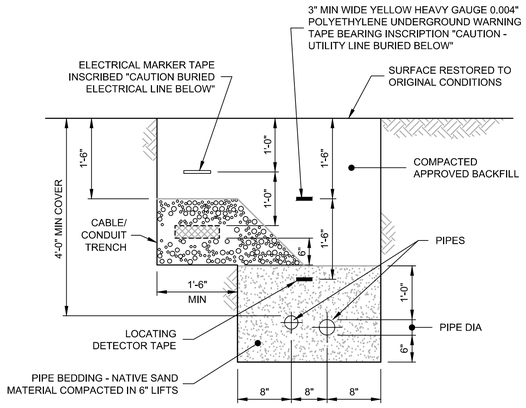
HOOKER/ RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

INJECTION WELLS
IW - 16, 17, 18, 19

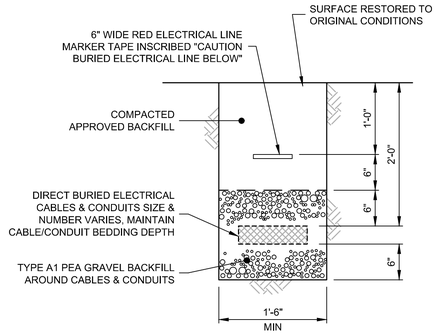
CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: SEPTEMBER 2003 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: J. WORRALL | Designed By: J. THORNTON | Drawn By: C. ROHRICH |
| Scale: AS NOTED | Project No: 06883-00 | Report No: 056 | Drawing No: CI-03 |



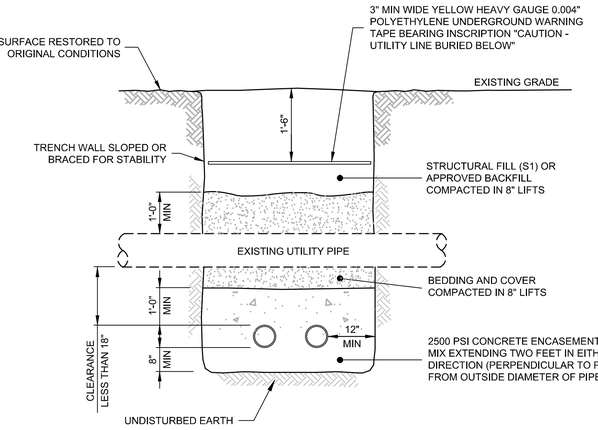

TYPICAL PIPE AND CABLE/CONDUIT TRENCH

NTS



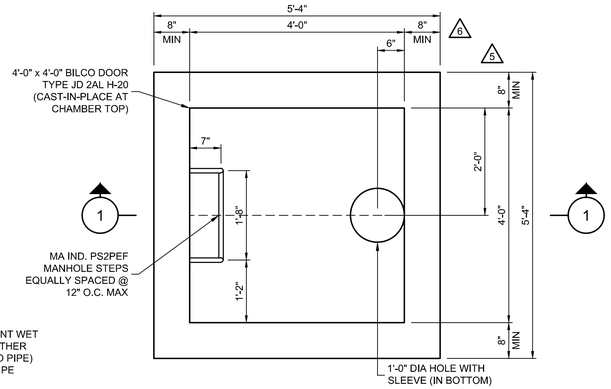

TYPICAL CABLE/CONDUIT TRENCH

NTS



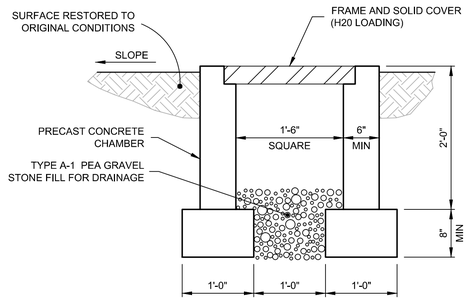

TYPICAL UTILITY PIPE CROSSING FORCEMAIN

NTS



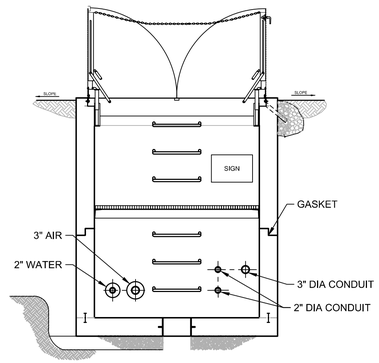

CONCRETE CHAMBER IW-21A

3/4"=1'-0"



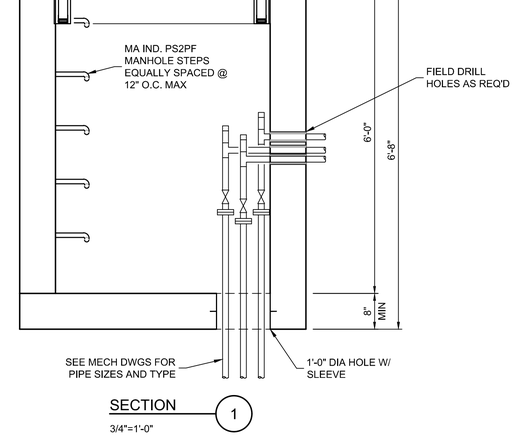

MONITORING WELL VAULT

1"=1'-0"




CONCRETE CHAMBER IW19 LOOKING SOUTH

NTS




SECTION 1

3/4"=1'-0"

NOTES

1. DESIGNED FOR H-20 LOADING

AS BUILT
RECORD DRAWING

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | JA |



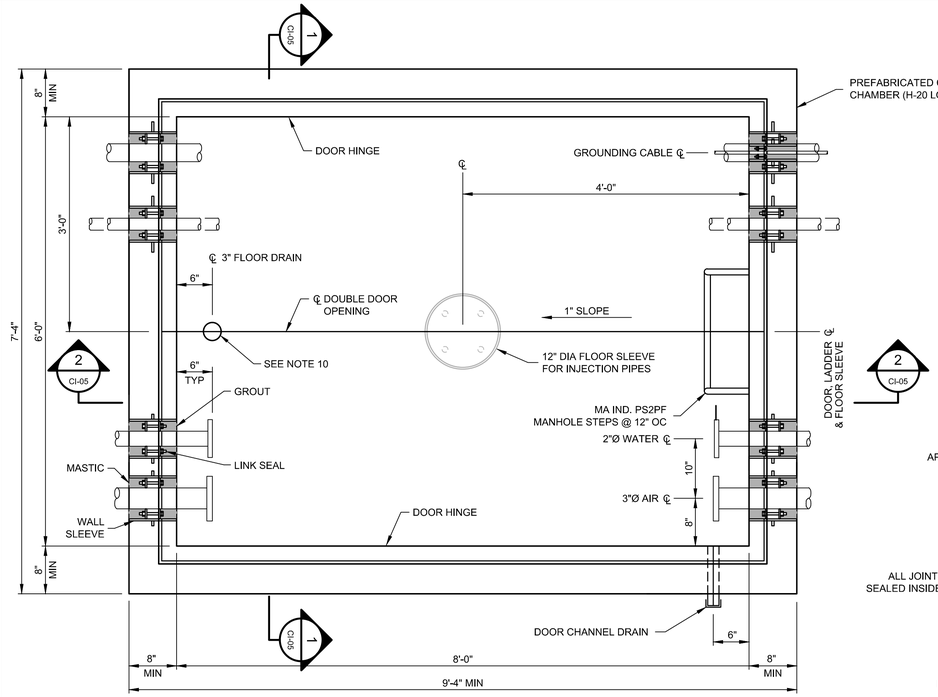
HOOKER/ RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

MISC. SECTIONS AND DETAILS

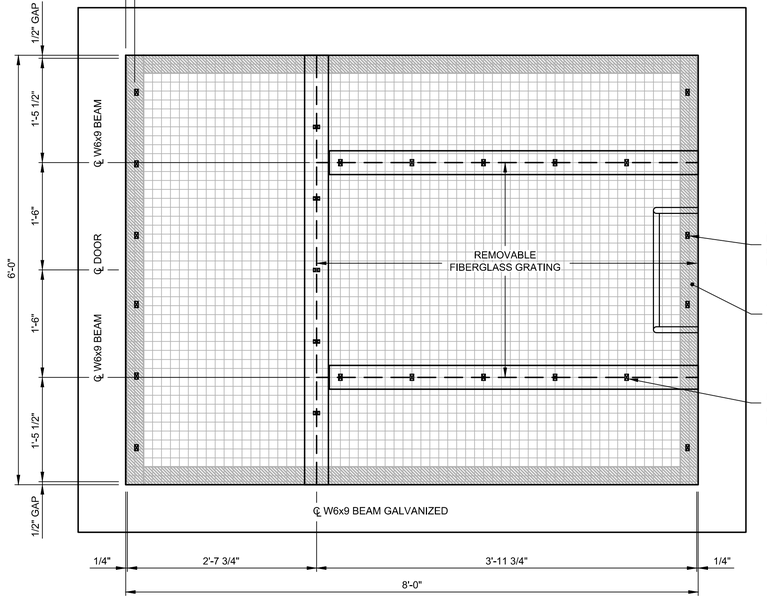
CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: SEPTEMBER 2003 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: J. WORRALL | Designed By: J. THORNTON | Drawn By: C. ROHRICH |
| Scale: AS NOTED | Project No: 06883-00 | Report No: 056 | Drawing No: CI-04 |




## WELL PLAN

1"=1'-0"



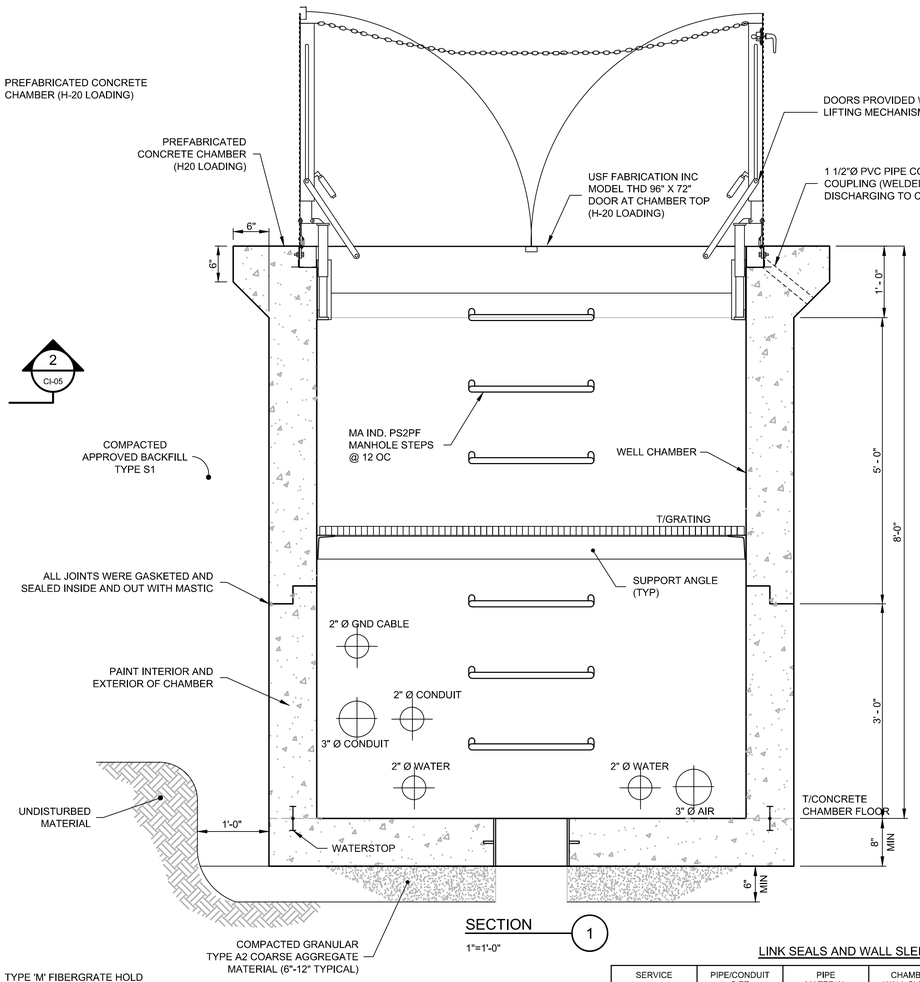

## GRATING PLAN

1"=1'-0"

TYPE 'M' FIBERGRATE HOLD DOWN CLIPS @ 12" O.C. (STAINLESS STEEL CLIPS, BOLTS, NUTS AND WASHERS)

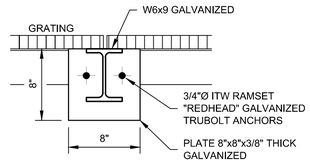
ANGLE 3"x4"x3/8" LLV GALVANIZED BRACKET BOLTED TO CONCRETE WALL ALL AROUND (TYP)

TYPE "F" FIBERGRATE END PANEL CLIPS @ 12" O.C. (STAINLESS STEEL CLIPS, BOLTS AND ATTACHED NUTS)



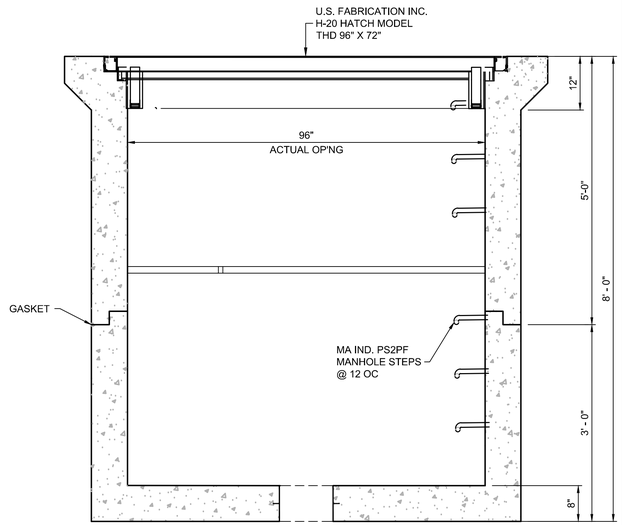

## SECTION 1

1"=1'-0"




## BEAM PLATE DETAIL

1 1/2"=1'-0"




## SECTION 2

3/4"=1'-0"

### LINK SEALS AND WALL SLEEVES

| SERVICE | PIPE/CONDUIT SIZE | PIPE MATERIAL | CHAMBER WALL SLEEVE | CHAMBER LINK SEAL |
|---|---|---|---|---|
| AIR | 3"Ø | STEEL | WS-5-25-S | LS-300 (8 LINKS PER SEAL) |
| WATER | 2"Ø | HDPE | CS-4 | LS-300 (8 LINKS PER SEAL) |
| CONDUIT | 2"Ø | PVC | CS-4 | LS-300 (6 LINKS PER SEAL) |
| CONDUIT | 3"Ø | PVC | CS-5 | LS-300 (8 LINKS PER SEAL) |
| GROUND CABLE | - | - | WS-2-15-S | LS-200 (4 LINKS PER SEAL) |
| WELL | - | - | CS-12 | - |

### NOTES

1. FOR WELL CHAMBER ORIENTATION REFER TO MECHANICAL DRAWINGS.
2. LINK SEALS AND WALL SLEEVES BY THUNDERLINE CORPORATION.
3. WALL SLEEVE LENGTH TO BE THE SAME AS CHAMBER CONCRETE THICKNESS.
4. THUNDERLINE MODEL CS WALL SLEEVES ARE HDPE PLASTIC AND MODEL WS WALL SLEEVES SHALL BE GALVANIZED STEEL.
5. LOCATION OF 12" DIA SLEEVE IN CHAMBER FLOOR FOR INJECTION PIPES ARE IN ACCORDANCE WITH MECHANICAL DRAWINGS.
6. GRATING OPENINGS AND CUTOUTS FOR PIPING WERE FIELD LOCATED IN ACCORDANCE WITH MECHANICAL DRAWINGS.
7. ALUMINUM CHAMBER DOOR IS FOR H20 LOADING AS MANUFACTURED BY USF FABRICATIONS.
8. LOWER 3'-0" SECTION OF CHAMBER WALLS AND BASE SLAB WAS CONSTRUCTED MONOLITHIC (SINGLE CONCRETE PLACEMENT) WITHOUT COLD JOINTS.
9. COMPACTION OF BACKFILL AROUND PIPING AND CONDUIT WAS PERFORMED CAREFULLY TO AVOID DISPLACEMENT OF PROTRUDING PIPE/CONDUIT AND TO PRESERVE SEAL AGAINST WATER INTRUSION.
10. ON IW-6 ONLY - DRAIN DRILLED TO 6" DIAMETER . HOLE EXTENDED TO 20 FT BELOW CHAMBER AND FILLED WITH PEA GRAVEL.

AS BUILT RECORD DRAWING

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | JA |



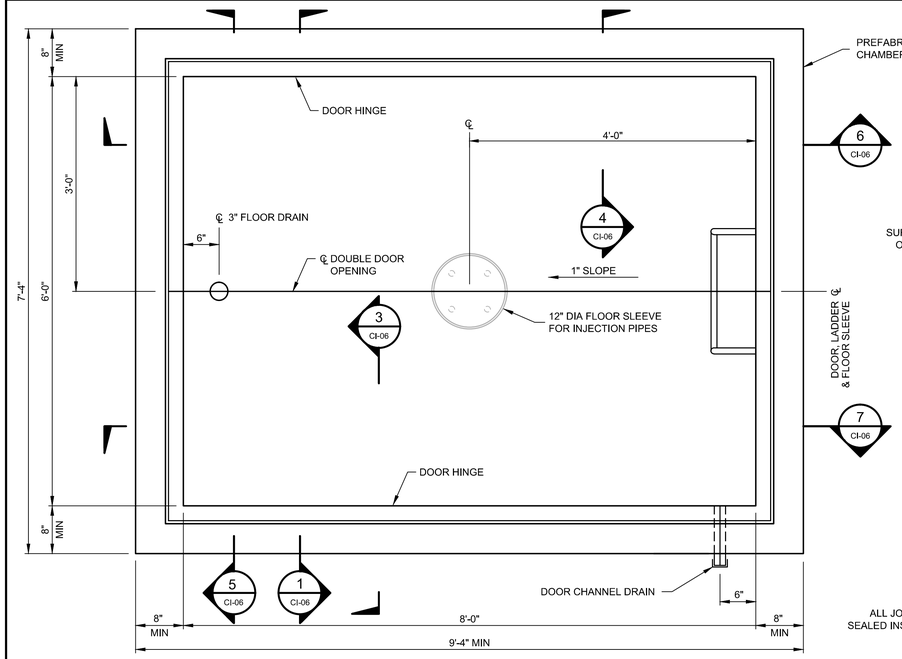
HOOKER/ RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

INJECTION WELLS
IW - 1 THROUGH IW-7, AND CH - 8

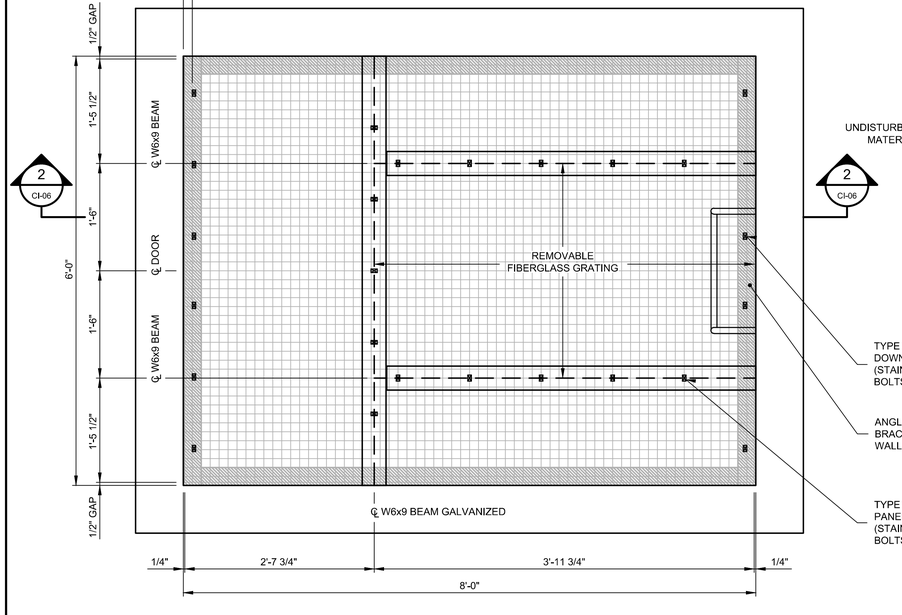
**CRA Infrastructure & Engineering, Inc.**

| Source Reference: | | | Date: SEPTEMBER 2003 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: J. WORRALL | Designed By: J. THORNTON | Drawn By: C. ROHRICH |
| Scale: AS NOTED | Project No: 06883-00 | Report No: 056 | Drawing No: CI-05 |



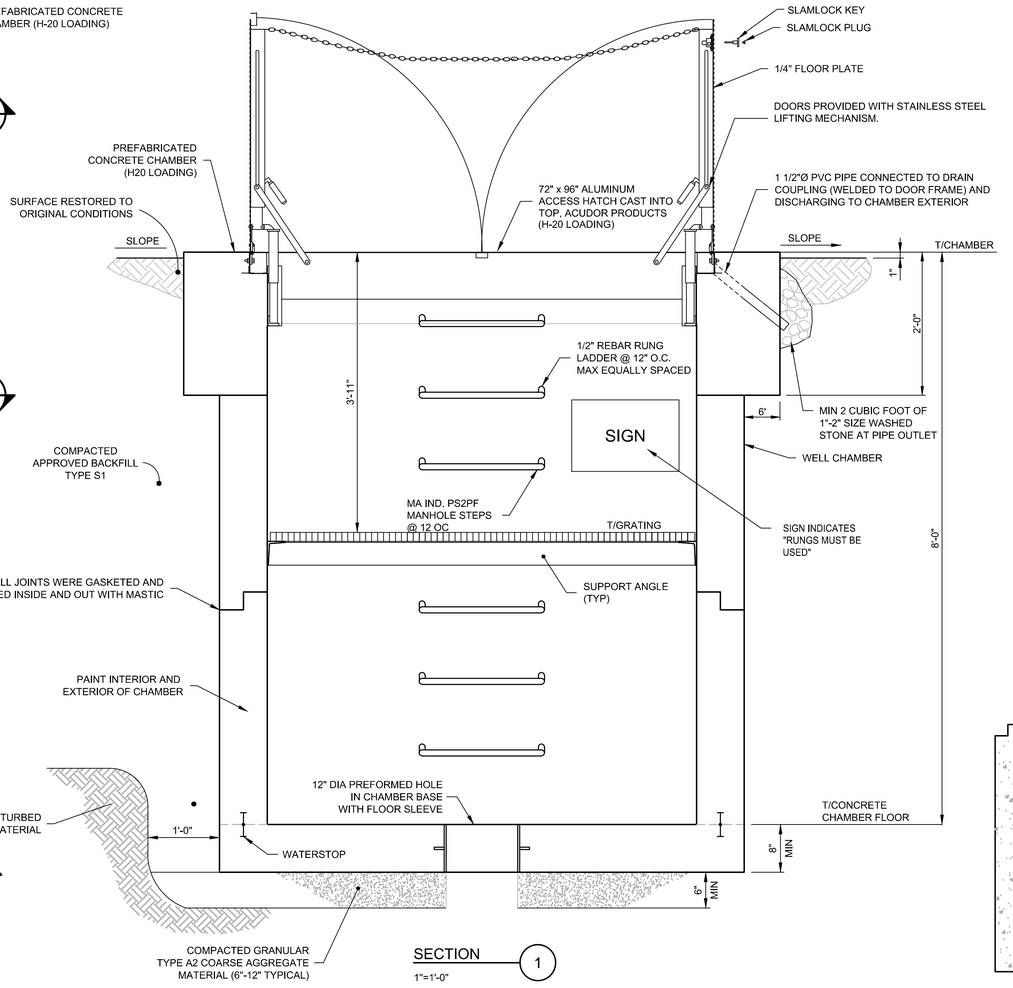

## WELL PLAN

1"=1'-0"




## GRATING PLAN

1"=1'-0"



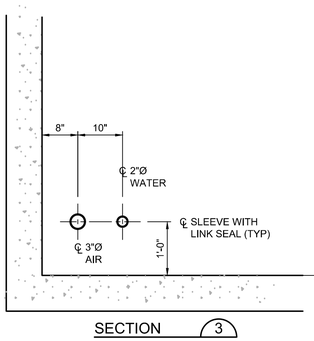

## SECTION 1

1"=1'-0"

TYPE 'M' FIBERGRATE HOLD DOWN CLIPS @ 12" O.C. (STAINLESS STEEL CLIPS, BOLTS, NUTS AND WASHERS)

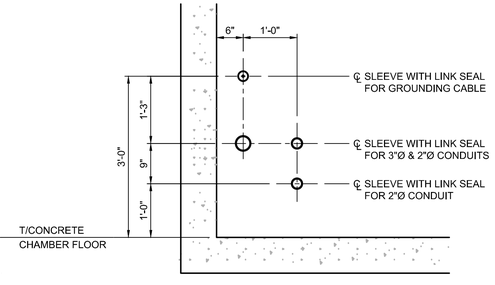
ANGLE 3"x4"x3/8" LLV GALVANIZED BRACKET BOLTED TO CONCRETE WALL ALL AROUND (TYP)

TYPE "F" FIBERGRATE END PANEL CLIPS @ 12" O.C. (STAINLESS STEEL CLIPS, BOLTS AND ATTACHED NUTS)




## SECTION 3

3/4"=1'-0"




## SECTION 4

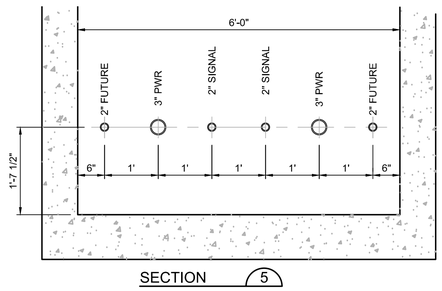
3/4"=1'-0"

### LINK SEALS AND WALL SLEEVES

| SERVICE | PIPE/CONDUIT SIZE | PIPE MATERIAL | CHAMBER WALL SLEEVE | CHAMBER LINK SEAL |
|---|---|---|---|---|
| AIR | 3"Ø | STEEL | WS-5-25-S | LS-300 (8 LINKS PER SEAL) |
| WATER | 2"Ø | HDPE | CS-4 | LS-300 (8 LINKS PER SEAL) |
| CONDUIT | 2"Ø | PVC | CS-4 | LS-300 (6 LINKS PER SEAL) |
| CONDUIT | 3"Ø | PVC | CS-5 | LS-300 (8 LINKS PER SEAL) |
| GROUND CABLE | - | - | WS-2-15-S | LS-200 (4 LINKS PER SEAL) |
| WELL | - | - | CS-12 | - |

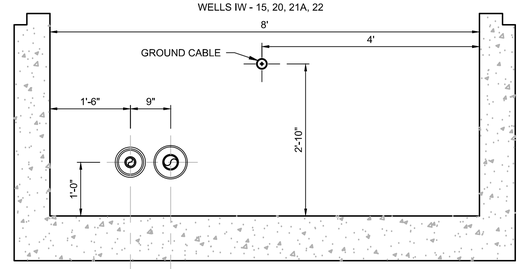
### NOTES

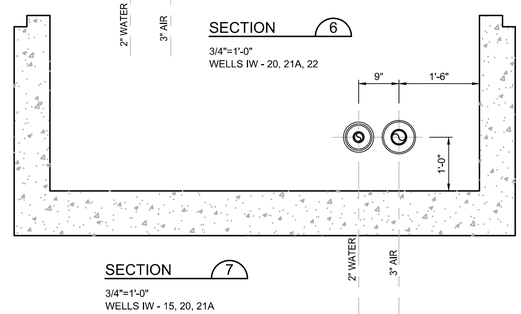
1. FOR WELL CHAMBER ORIENTATION REFER TO MECHANICAL DRAWINGS.
2. LINK SEALS AND WALL SLEEVES BY THUNDERLINE CORPORATION.
3. WALL SLEEVE LENGTHS ARE THE SAME AS CHAMBER CONCRETE THICKNESS.
4. THUNDERLINE MODEL CS WALL SLEEVES ARE HDPE PLASTIC AND MODEL WS WALL SLEEVES SHALL BE GALVANIZED STEEL.
5. LOCATION OF 12" DIA SLEEVE IN CHAMBER FLOOR FOR INJECTION PIPES ARE IN ACCORDANCE WITH MECHANICAL DRAWINGS.
6. GRATING OPENINGS AND CUTOUTS FOR PIPING WERE FIELD LOCATED IN ACCORDANCE WITH MECHANICAL DRAWINGS.
7. ALUMINUM CHAMBER DOOR IS FOR H20 LOADING AS MANUFACTURED BY ACUDOR PRODUCTS
8. COMPACTION OF BACKFILL AROUND PIPING AND CONDUIT WAS PERFORMED CAREFULLY TO AVOID DISPLACEMENT OF PROTRUDING PIPE/CONDUIT AND TO PRESERVE SEAL AGAINST WATER INTRUSION.




## SECTION 5

3/4"=1'-0"
WELLS IW - 15, 20, 21A, 22




## SECTION 6

3/4"=1'-0"
WELLS IW - 20, 21A, 22

## SECTION 7

3/4"=1'-0"
WELLS IW - 15, 20, 21A

AS BUILT
RECORD DRAWING

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | JA |



HOOKER/ RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

INJECTION WELLS
IW - 15, 20, 21, 22

CRA Infrastructure & Engineering, Inc.

| | | | |
|---|---|---|---|
| Source Reference: | | | Date: SEPTEMBER 2003 |
| Project Manager: J. KAY | Reviewed By: J. WORRALL | Designed By: J. THORNTON | Drawn By: C. ROHRICH |
| Scale: AS NOTED | Project No: 06883-00 | Report No: 056 | Drawing No: CI-06 |

06883-00(056)CI-BU006 AUG 22/2012

## GENERAL NOTES

1. THE CONTRACTOR SHALL NOT SCALE THE DRAWINGS TO ESTABLISH DIMENSIONS. ALL DIMENSIONS SHALL BE CHECKED ON-SITE PRIOR TO ASSEMBLY OR CONSTRUCTION OF ANY WORK.
2. THE STRUCTURE HAS BEEN DESIGNED FOR THE IN-SERVICE LOADS. THE METHODS, PROCEDURES AND SEQUENCES OF CONSTRUCTION TO BE USED ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. SUPPORTING FORMWORK FOR CONCRETE CONSTRUCTION SHALL NOT BE REMOVED BEFORE THE CONCRETE HAS GAINED SUFFICIENT STRENGTH TO SAFELY SUPPORT THE DEAD AND SUPERIMPOSED LOADS. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID OVERLOADS, AND MAINTAIN AND INSURE THE INTEGRITY OF THE STRUCTURE AT ALL STAGES OF CONSTRUCTION.
3. THE CONTRACTOR SHALL REFER TO MECHANICAL & ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR SIZE AND LOCATION OF SLEEVES, ANCHORS, INSERTS AND OPENINGS REQUIRED.
4. PRINCIPAL OPENINGS IN THE STRUCTURE ARE SHOWN ON THE DRAWINGS. SLEEVES AND OPENINGS NOT SHOWN ON STRUCTURAL DRAWINGS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
5. MATERIALS SPECIFIED ON THE DRAWINGS AND/OR IN THE SPECIFICATIONS SHALL BE USED UNLESS THE CONTRACTOR OBTAINS WRITTEN APPROVAL OF THE ENGINEER TO USE ALTERNATIVE MATERIALS. WHEN REQUESTING SUCH APPROVAL, THE CONTRACTOR SHALL PROVIDE ADEQUATE AND DETAILED MANUFACTURER'S LITERATURE AND TECHNICAL DATA FOR EACH MATERIAL PRIOR TO ITS POTENTIAL USE.

## CONCRETE NOTES

1. CONCRETE CONSTRUCTION SHALL CONFORM TO ACI 301, 305, 306, 308, 315, 318 AND 350R SPECIFICATIONS.
2. LATEST REVISION AND/OR VERSION OF ALL CODES AND REFERENCE STANDARDS SHALL BE FOLLOWED.
3. CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS. SLUMP SHALL BE 3 1/2 INCHES ± 1 INCH.
4. CONCRETE SHALL BE AIR ENTRAINED. CEMENT SHALL BE PORTLAND CEMENT CONFORMING TO ASTM C150, TYPE II WITH AIR-ENTRAINING ADMIXTURE CONFORMING TO ASTM C260. AIR CONTENT (% BY VOLUME) SHALL NOT BE LESS THAN 4% NOR GREATER THAN 6.5% AND SHALL DEPEND ON MAXIMUM SIZE AGGREGATE USED.
5. NO ADMIXTURE SHALL CONTAIN CALCIUM CHLORIDE BASED COMPOUNDS. FLYASH AND POZZOLAN CONTENT SHALL NOT EXCEED 20% BY WEIGHT OF CEMENT.
6. REINFORCING BARS SHALL CONFORM TO ASTM A615 GRADE 60 SPECIFICATIONS.
7. LAP SPLICES IN REINFORCING BARS SHALL BE A MINIMUM 38 TIMES BAR DIAMETERS. THE SPLICES SHALL NOT BE LESS THAN 18 INCHES.
8. CONCRETE PROTECTION FOR REINFORCING BARS (UNLESS OTHERWISE NOTED):
   A. FOOTINGS - 3 INCH BOTTOM AND SIDES, 2 INCH TOP
   B. GRADE BEAMS - 2 INCH BOTTOM AND SIDES, 1 1/2 INCH TOP (TO STIRRUPS)
   C. PIERS - 1 1/2 INCH (TO TIES)
   D. FORMED SLABS - 1 1/2 INCH TOP AND BOTTOM
   E. WALLS AND PADS - 2 INCH
   F. EXTERIOR SLABS ON FILL - 2 1/2 INCH BOTTOM, 2 INCH TOP
   G. INTERIOR SLABS ON FILL - 2 1/2 INCH BOTTOM, 1 1/2 INCH TOP
9. ANCHOR BOLTS SHALL BE CARBON STEEL CONFORMING TO ASTM A307 SPECIFICATIONS, WITH HEAVY HEX NUTS AND WASHERS. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED CONFORMING TO ASTM A123 AND A153 SPECIFICATIONS, AND SHALL BE ACCURATELY PLACED USING TEMPLATES.
10. NO CONSTRUCTION JOINT SHALL BE MADE UNLESS SHOWN ON DRAWINGS OR APPROVED IN WRITING BY THE ENGINEER.
11. GROUT IN DRILLED HOLES FOR ANCHOR BOLTS AND REINFORCING STEEL DOWELS, AND UNDER BASE PLATES SHALL BE NON-SHRINK NON-METALLIC "MASTERFLOW 713" OR "MASTERFLOW 928" BY DEGUSSA BUILDING SYSTEMS. MANUFACTURER'S INSTRUCTIONS CONCERNING HOLE SIZE, SURFACE PREPARATION AND INSTALLATION SHALL BE FOLLOWED.
12. EDGE TOOL TOP HORIZONTAL EDGES OF PIERS, EQUIPMENT (PUMP) PADS. OTHER EXPOSED EDGES SHALL HAVE 3/4 INCH CHAMFER.
13. RAMPS, PADS AND SLABS SHALL BE TROWEL FINISHED TO WITHIN 1/8 INCH OF ELEVATIONS SHOWN ON DRAWINGS. FOLLOWING TROWELLING, PROVIDE NON-SLIP MEDIUM BROOM FINISH.
14. PROVIDE CORNER BARS TO MATCH HORIZONTAL BARS AT ALL EXTERIOR CORNERS.
15. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A82 AND A185 SPECIFICATIONS.
16. PROVIDE MINIMUM OF 6 INCH MECHANICALLY COMPACTED CRUSHED STONE UNDER SLABS AND WHERE OTHERWISE NOTED ON DRAWINGS.
17. JOINT SEALANT SHALL BE ONE-COMPONENT POLYURETHANE "SIKAFLEX-1A" BY SIKA CHEMICAL CORPORATION.
18. WATERSTOPS SHALL BE 6 INCH FLAT RIBBED PVC WATERSTOPS R6-316 OR 4 INCH RIBBED CENTER BULB PVC WATERSTOPS RB4-316 BY VINYLEX CORPORATION. WATERSTOPS SHALL BE HEAT FUSED AT ALL JOINTS.
19. PERIMETER FOUNDATION WALL RIGID INSULATION SHALL BE STYROFOAM SQUARE EDGE BY DOW CHEMICAL COMPANY; AND LATEX MODIFIED CONCRETE FACING, TONGUE AND GROOVE FORMAT, WITH GALVANIZED CLIPS AND FASTENERS.
20. PRIOR TO CASTING CONCRETE PADS AND PIERS, BASE SLAB AND WALL SHALL BE ROUGHENED, CLEANED AND COATED WITH A CONCRETE BONDING AGENT. BONDING AGENT SHALL BE "CONCRESIVE LIQUID (LPL)" OR "CONCRESIVE PASTE (LPL)" BY DEGUSSA BUILDING SYSTEMS. MANUFACTURER'S INSTRUCTIONS CONCERNING SURFACE PREPARATION AND APPLICATION SHALL BE FOLLOWED.

## STRUCTURAL STEEL NOTES

1. FABRICATION, ERECTION AND WORKMANSHIP SHALL CONFORM TO THE DESIGN DRAWINGS, SCOPE OF WORK AND SPECIFICATIONS, AND SHALL BE IN ACCORDANCE WITH THE AISC SPECIFICATIONS.
2. LATEST REVISION AND/OR VERSION OF ALL CODES AND REFERENCE STANDARDS SHALL BE FOLLOWED.
3. STRUCTURAL STEEL SHALL CONFORM TO ASTM A36 SPECIFICATIONS. STRUCTURAL TUBING SHALL CONFORM TO ASTM A500 GRADE B WITH YIELD STRESS OF 46 KSI.
4. ALL DIMENSIONS SHALL BE FIELD CHECKED BEFORE FABRICATION MAY BEGIN.
5. WELDING SHALL BE IN ACCORDANCE WITH THE AWS STRUCTURAL WELDING CODE. WELDED CONNECTIONS SHALL BE MADE WITH E70XX ELECTRODES. ROOT PASS AND TACK WELDS SHALL BE MADE WITH E6010 ELECTRODES. FILLET WELDS ON STANDARD FRAMED BEAM CONNECTIONS MAY BE 3/16 INCH MINIMUM. ALL OTHER FILLET WELDS SHALL BE 1/4 INCH MINIMUM.
6. GUSSET PLATES AND CLIP ANGLES SHALL BE 5/16 INCH THICK MINIMUM (UNLESS OTHERWISE NOTED). GENERALLY, ONE-SIDED CONNECTIONS FOR BEAMS SHALL NOT BE USED.
7. SHOP CONNECTIONS MAY BE EITHER WELDED OR BOLTED. FIELD CONNECTIONS SHALL BE BOLTED (UNLESS OTHERWISE NOTED). CONNECTIONS FOR NEW STEEL FRAMING TO EXISTING STEEL SHALL HAVE ONE END OF MEMBER BOLTED TO ALLOW FOR ADJUSTMENTS. WELDED CONNECTIONS, FIELD AND SHOP, SHALL BE CONTINUOUS FULL PENETRATION SEAL WELDS.
8. FASTENERS SHALL BE HIGH STRENGTH ASTM A325-N, 3/4 INCH DIAMETER GALVANIZED BOLTS WITH ASTM A194 GRADE 2H OR A563 GRADE DH NUTS TAPPED OVERSIZE AFTER GALVANIZING AND THREADS LUBRICATED. HARDENED WASHERS SHALL BE PROVIDED UNDER ROTATING PART OF NUT AND BOLT ASSEMBLY. CONNECTIONS NOTED WITH A325-SC BOLTS SHALL BE SLIP CRITICAL PER AISC SPECIFICATIONS.
9. BOLT HOLES SHALL NOT BE LARGER THAN 1/16 INCH PLUS DIAMETER OF THE BOLT. A MINIMUM OF TWO BOLTS PER CONNECTION SHALL BE REQUIRED.
10. WHERE BRACING FORCES ARE NOT GIVEN, DESIGN CONNECTIONS AT EACH END FOR 50% OF MEMBER CAPACITY IN TENSION.
11. ALL STRUCTURAL STEEL FRAMES INCLUDING GIRTS, PURLINS, MISCELLANEOUS STEEL; DOOR/WINDOW/OPENING FRAMES, DOORS, COMBINATION LOUVER/DAMPER AND SHUTTERS SHALL BE PAINTED.
12. PAINT SHALL CONSIST OF ONE COAT PRIMER (6 MILS DFT) EPOXY BAR-RUST 235 AND ONE COAT FINISH (2 MILS DFT) ALIPHATIC URETHANE DEVTHANE 379 BY ICI DULUX-DEVOE COATINGS.

## FOUNDATION NOTES

1. FOUNDATION DESIGN IS BASED UPON A NET ALLOWABLE SOIL BEARING CAPACITY OF 3,000 POUNDS PER SQUARE FOOT FOR FOOTINGS BEARING ON APPROVED NATIVE SUBGRADE SOILS OR COMPACT STRUCTURAL GRANULAR FILL.
2. CONTRACTOR SHALL FIELD VERIFY THE FOUNDATION BEARING GRADE MATERIAL AND BEARING CAPACITY DURING CONSTRUCTION. FOUNDATIONS SHALL BE PLACED ON APPROVED BEARING GRADE.
3. NO FOOTING SHALL BEAR ON EXISTING FILL, SOFT/LOOSE, ORGANIC OR OTHER UNSUITABLE SOILS. IF ENCOUNTERED, THE EXISTING FILL AND UNSUITABLE SOILS AT THE FOOTING BEARING GRADE LEVEL SHALL BE REMOVED DOWN TO COMPETENT NATIVE SUBGRADE AND EXCAVATION BACKFILLED WITH COMPACTED STRUCTURAL GRANULAR FILL IN ACCORDANCE WITH THE SPECIFICATION.
4. EXISTING UNDERGROUND PIPING, REINFORCED CONCRETE STRUCTURES, UTILITIES, ELECTRICAL CABLES AND GROUNDING SYSTEMS NOT IDENTIFIED ON THE DRAWINGS MAY EXIST. WHEN UNCOVERED, THE CONTRACTOR MUST REPORT FINDINGS TO THE ENGINEER FOR IDENTIFICATION AND RECOMMENDED ACTION.
5. BACKFILL AROUND PIPES AND CABLES AS PER SPECIFICATIONS. NO PIPES OR CONDUITS SHALL BE PLACED IN FOOTINGS.
6. WHERE PIPES OR CONDUITS RUN PERPENDICULAR TO A FOOTING, STEP THE TOP OF THE FOOTING DOWN TO ALLOW PIPES OR CONDUITS TO RUN OVER TOP OF THE FOOTING. WHERE PIPES OR CONDUITS RUN PARALLEL TO A FOOTING, STEP BOTTOM OF FOOTING DOWN SO THAT A LINE DRAWN BETWEEN THE INVERT OF PIPE OR CONDUIT AND BOTTOM OF FOOTING SHALL NOT EXCEED 30 DEGREES ABOVE THE HORIZONTAL. NO PIPING OR CONDUIT SHALL BE ALLOWED TO PASS WITHIN A 30-DEGREE PLANE OF INFLUENCE BELOW AND AWAY FROM FOOTINGS.
7. MAXIMUM WALL FOOTING STEP SHALL BE 1'-0" VERTICAL SPACED NOT LESS THAN 2'-0" ON CENTER.
8. BUILDING FOUNDATIONS OVER EXISTING UTILITY LINES SHALL BEAR ONLY ON COMPACTED STRUCTURAL FILL PLACED AFTER REMOVAL OF ALL UNCONTROLLED FILL AND UNSUITABLE SOILS.

## ARCHITECTURAL NOTES

1. BUILDING SHALL CONSIST OF PRE-ENGINEERED METAL, CLEAR SINGLE SPAN RIGID FRAME WITH STRAIGHT COLUMNS (NON-TAPERED) AND GABLED ROOF BEAMS.
2. ROOF SHALL HAVE A 2:12 PITCH.
3. ROOF PANELS SHALL BE 24 GAUGE STANDING SEAM STEEL.
4. EXTERIOR WALL PANELS SHALL BE 26 GAUGE.
5. INTERIOR WALL LINER PANELS SHALL BE 28 GAUGE (STANDARD HEIGHT 8'-3").
6. BOTTOM OF STEEL BASE PLATE TO BE AT EL. 100'-7".
7. BUILDING SHALL HAVE A 6" HIGH CURB AND 1" GROUT UNDER STEEL BASE PLATES.
8. CUTOUTS AND HOLES IN WALL AND ROOF PANELS SHALL BE COMPLETELY SEALED BY MECHANICAL/ELECTRICAL CONTRACTORS WITH FIRE STOP AND WEATHER PROOF MATERIALS AFTER PIPE/DUCT/CABLE INSTALLATIONS.
9. PAINT FOR CONTROL ROOM GYPSUM BOARD WALL SHALL CONSIST OF ONE COAT PRIMER (1 MIL DFT) ULTRA-HIDE PVA (1030) AND ONE COAT FINISH (2 MILS DFT) ULTRA-HIDE LATEX ENAMEL (1416) BY ICI PAINT STORES.
10. FIRE EXTINGUISHERS:
    CONTROL ROOM - (2 NOS) CLASS C TYPE,
    OTHER AREAS - (1 NO) CLASS ABC TYPE.
11. BASED ON USE, BUILDING IS NOT INTENDED TO BE "ACCESSIBLE" PER CODE.

## PRECAST CONCRETE NOTES

1. CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGHT OF 5,000 PSI AT 28 DAYS.
2. AIR ENTRAINED CONCRETE:
   A. CONCRETE SHALL BE AIR ENTRAINED
   B. CEMENT SHALL BE PORTLAND CEMENT CONFORMING TO ASTM C150, TYPE II WITH AIR ENTRAINING ADMIXTURE CONFORMING TO ASTM C260. AIR CONTENT (% BY VOLUME) SHALL NOT BE LESS THAN 5% NOR GREATER THAN 7%.
3. REINFORCING BARS SHALL CONFORM TO ASTM A615 GRADE 60 SPECIFICATIONS.
4. LAP SPLICES IN REINFORCING SHALL BE IN ACCORDANCE WITH ACI 318 SPECIFICATIONS. LAP SPLICES SHALL NOT BE LESS THAN 18 INCHES.
5. CONCRETE PROTECTION FOR REINFORCING BARS SHALL BE INDUSTRY OR DOT STANDARDS, UNLESS NOTED OTHERWISE.
6. DESIGN LOADING TO MEET AASHTO HS-20-44 WITH 30% IMPACT. FOR HYDROSTATIC PRESSURE AND UPLIFT FORCES, WATER TABLE SHALL BE CONSIDERED AT THE GROUND SURFACE.
7. LIFTING HOLES IN PRECAST UNITS TO BE FILLED WITH CONCRETE REPAIR MATERIAL IN ACCORDANCE WITH NYSDOT 701-04 SPECIFICATION.

## PERMIT NOTE

CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FROM CITY AND STATE AGENCIES FOR UTILITIES AND ROAD PAVEMENT INCLUDING RIGH-OF-WAY WORK.

AS BUILT
RECORD DRAWING

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | ZM |

Approved



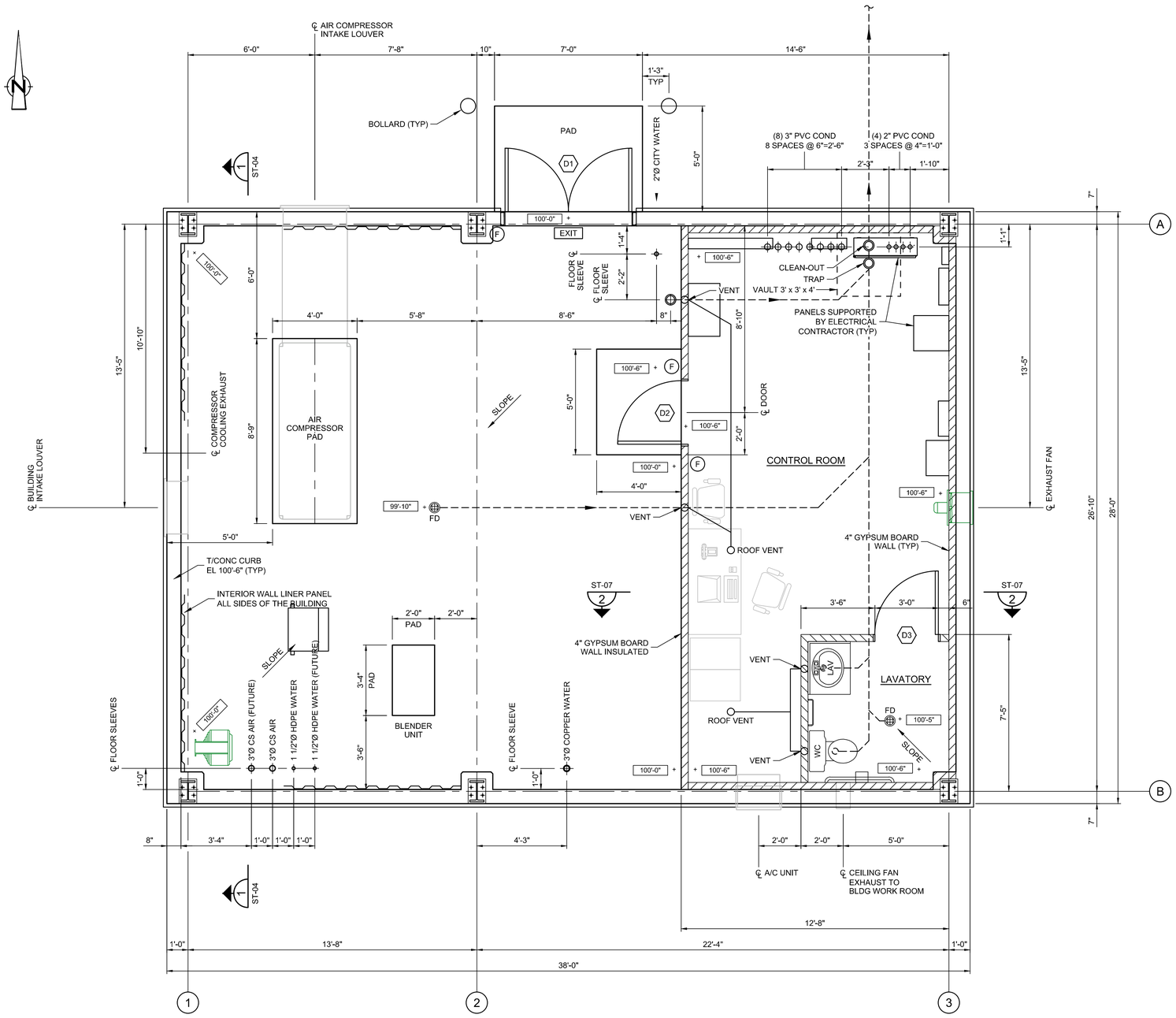
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

CONTROL BUILDING
GENERAL NOTES

CRA Infrastructure & Engineering, Inc.

| | | | |
|---|---|---|---|
| Source Reference: | | | Date: AUGUST 2012 |
| Project Manager: JK | Reviewed By: JGRW | Designed By: SKM | Drawn By: ZM |
| Scale: NONE | Project No: 06883-00 | Report No: 056 | Drawing No: ST-01 |




FLOOR PLAN

3/8" = 1'-0"

## BUILDING CODE DATA

| | |
|---|---|
| CODE: | BUILDING CODE OF NEW YORK STATE |
| LOCATION: | TOWN OF OYSTER BAY, NASSAU COUNTY, NEW YORK |
| BUILDING DIMENSIONS: | 28'-0" x 38'-0" ONE STORY |
| BUILDING HEIGHT: | 14'-6" NOMINAL EAVE - ABOVE FLOOR |
| BUILDING AREA: | 1,064 SQUARE FEET (TABLE 503) |
| OCCUPANCY CLASS: | USE GROUP F-2 FACTORY INDUSTRIAL (SECTION 306.3) |
| CONSTRUCTION: | NON-COMBUSTIBLE TYPE 2B (SECTION 602.2, TABLE 601) |
| OCCUPANT LOAD: | ACTUAL - NONE; TABLE - 10 PERSONS (SECTION 1003.2.2.2) |
| BUILDING TYPE: | PRE-ENGINEERED METAL, STRUCTURAL STEEL RIGID FRAMED |
| BUILDING INSULATION: | WALLS - R19, ROOF - R30 |
| FIRE SEPARATION DISTANCE: | GREATER THAN 30 FEET |
| FIRE RESISTANCE RATING: | EXTERIOR WALL - 0 HR (TABLES 601 & 602) |
| FIRE SEPARATION ASSEMBLIES: | NOT REQUIRED (TABLE 302.3.3) |

## STRUCTURAL LOADS (NON-FACTORED)

| | |
|---|---|
| 1. DEAD LOAD | STRUCTURAL, NONSTRUCTURAL, EQUIPMENT, PIPE, CABLE |
| 2. FLOOR LIVE LOAD | |
| UNIFORMLY DISTRIBUTED LOAD | 125 POUNDS PER SQUARE FOOT |
| CONCENTRATED LOAD | 2,000 POUNDS (ON 2 1/2 FT x 2 1/2 FT SQUARE AREA) |
| 3. ROOF LIVE LOAD | |
| 0 - 200 SQUARE FEET TRIBUTARY AREA | 20 POUNDS PER SQUARE FOOT |
| 201 - 600 SQUARE FEET TRIBUTARY AREA | 16 POUNDS PER SQUARE FOOT |
| OVER 600 SQUARE FEET TRIBUTARY AREA | 12 POUNDS PER SQUARE FOOT |
| CONCENTRATED LOAD | 200 POUNDS (ON AREA OF ONE SQUARE INCH) |
| 4. ROOF SNOW LOAD | |
| GROUND SNOW LOAD | 45 POUNDS PER SQUARE FOOT (FIGURE 1608.2) |
| SNOW EXPOSURE FACTOR | 0.9 (TABLE 1608.3.1) |
| SNOW LOAD IMPORTANCE FACTOR | 1.0 (SECTION 1604.5) |
| 5. WIND LOAD | |
| BASIC WIND SPEED (3-SECOND GUST) | 120 MILES PER HOUR (FIGURE 1609) |
| EXPOSURE CATEGORY | C (SECTION 1609.4) |
| WIND LOAD IMPORTANCE FACTOR | 1.0 (SECTION 1604.5) |
| 6. EARTHQUAKE LOAD | |
| SEISMIC USE GROUP | GROUP I (SECTION 1616.2) |
| SEISMIC IMPORTANCE FACTOR | 1.0 (SECTION 1604.5) |
| SITE CLASS | D (SECTION 1615.1.1) |
| 7. SPECIAL LOADS | |
| COLLATERAL IMPOSED CEILING LOAD | 10 POUNDS PER SQUARE FOOT |
| PIPE/CABLE & EQUIPMENT LOADS | REFER DRAWINGS |
| FLOOD LOAD | NONE |
| UNIT HEATER | 250 POUNDS EACH |
| AIR CONDITIONER | 500 POUNDS |
| 8. DEFLECTION LIMITATION | |
| EXTERIOR WALL AND ROOF SYSTEMS | NOT TO EXCEED 1/240 OF SPAN OF STRUCTURAL MEMBER |
| 9. FOUNDATION | |
| NET ALLOWABLE SOIL BEARING PRESSURE | 3,000 POUNDS PER SQUARE FOOT |
| MODULUS OF SUBGRADE REACTION | 200 KIPS PER CUBIC FOOT |

## LEGEND

| | |
|---|---|
| + 100'-0" | ELEVATION FEET AMSL |
| EXIT | EXIT SIGN INSTALLED ABOVE DOOR |
| F | FIRE EXTINGUISHER |
| D1 | DOOR |
| | DIRECTION OF FLOOR SLOPE |
| | UNIT HEATER |
| | WALL INTERIOR PANEL |
| | GYPSUM BOARD WALL (FIRE-RATED) |
| FD | FLOOR DRAIN |

AS BUILT RECORD DRAWING

## NOTES

1. ELECTRICAL CONTRACTOR SHALL INSTALL CONDUITS IN CONTROL ROOM FLOOR SLAB AREA PRIOR TO SLAB CONSTRUCTION.
2. CONTRACTOR SHALL INSTALL FLOOR SLEEVES FOR PIPING PRIOR TO SLAB CONSTRUCTION.
3. REFER MECHANICAL DRAWINGS FOR PLUMBING.
4. FLOOR DRAIN SHALL BE FD-2330-PV3 HEAVY DUTY WITH SEDIMENT BASKET BY ZURN (TEL. (716) 665-1131, WWW.ZURN.COM).

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | ZM |

Approved



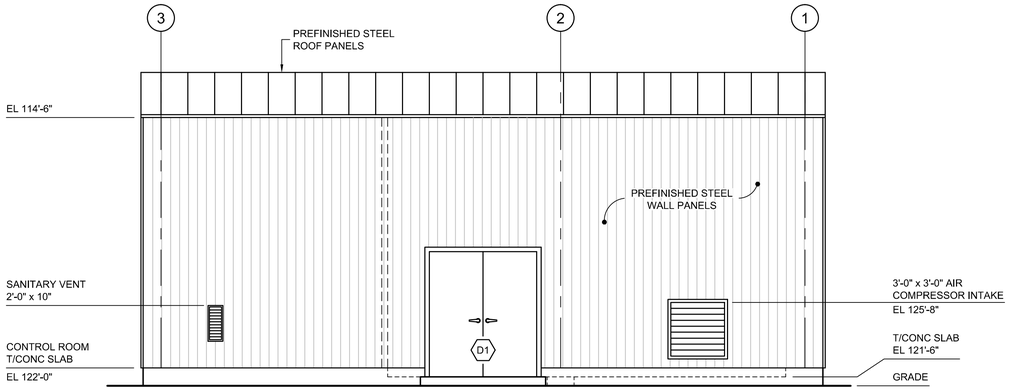
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

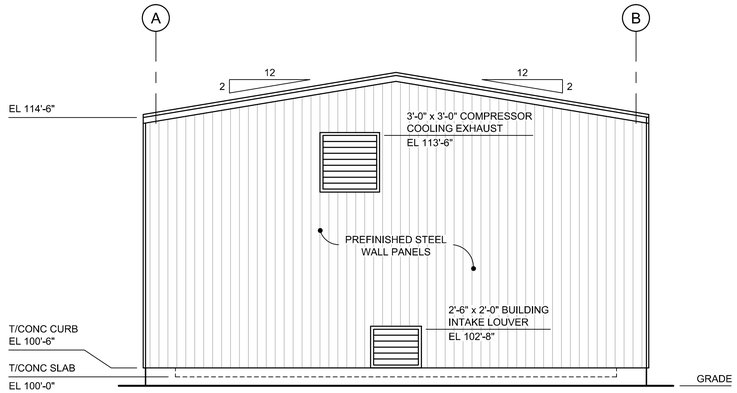
CONTROL BUILDING
FLOOR PLAN

CRA Infrastructure & Engineering, Inc.

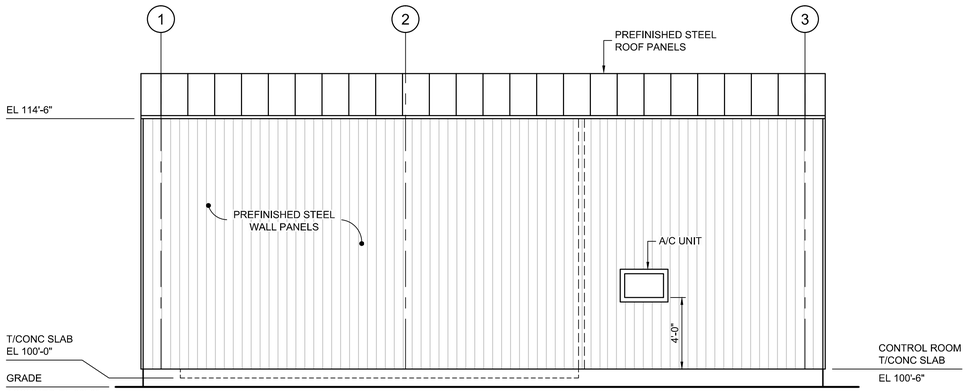
| | | | |
|---|---|---|---|
| Source Reference: | | | Date: AUGUST 2012 |
| Project Manager: JK | Reviewed By: JGRW | Designed By: SKM | Drawn By: ZM |
| Scale: 3/8"=1'-0" | Project No: 06883-00 | Report No: 056 | Drawing No: ST-02 |



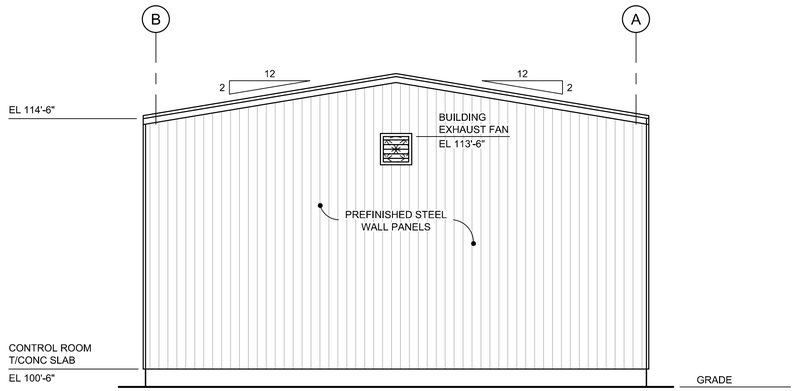

NORTH ELEVATION




WEST ELEVATION




SOUTH ELEVATION




EAST ELEVATION

CONTRACTOR SHALL PROVIDE BUILDING EXTERIOR ELEVATION OF 114'-6" AND INTERIOR CLEARANCE AT PRIMARY RIGID FRAME OF MINIMUM 12'-8" ABOVE FLOOR SLAB EL 100'-0", WHICHEVER RESULTS IN GREATER BUILDING HEIGHT

AS BUILT
RECORD DRAWING

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | ZM |

Approved



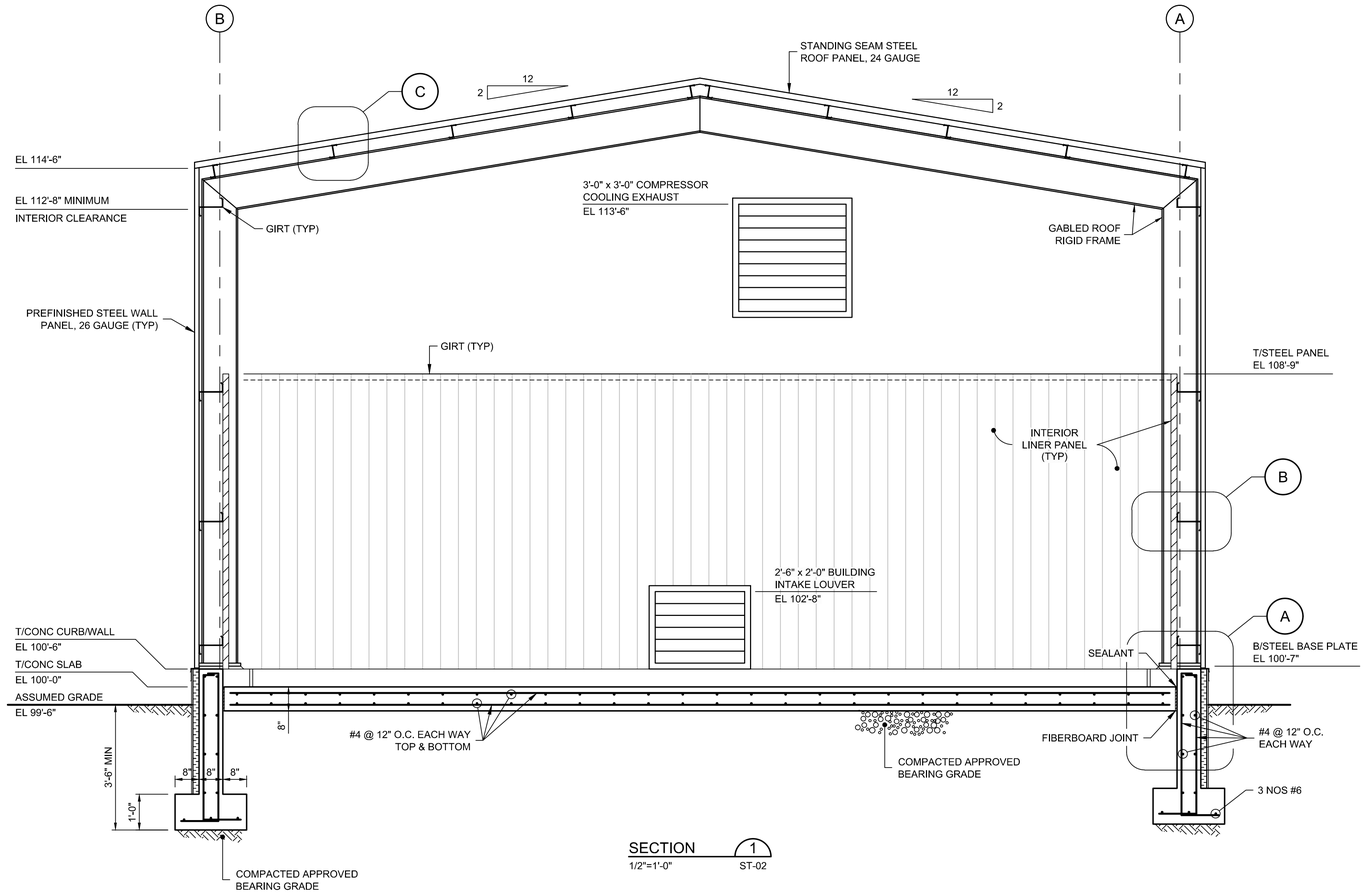
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

CONTROL BUILDING
ELEVATIONS

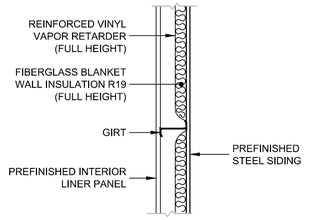
CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: AUGUST 2012 |
|---|---|---|---|
| Project Manager: JK | Reviewed By: JGRW | Designed By: SKM | Drawn By: ZM |
| Scale: 1/4"-1'-0" | Project No: 06883-00 | Report No: 056 | Drawing No: ST-03 |

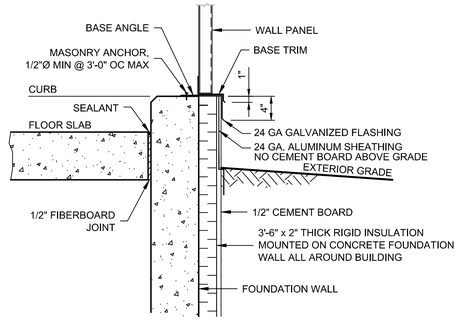



SECTION 1
1/2"=1'-0" ST-02

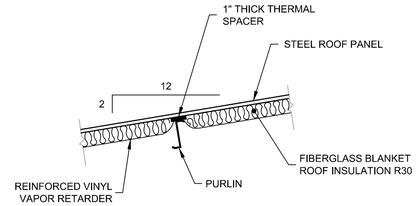
CONTRACTOR SHALL PROVIDE BUILDING EXTERIOR ELEVATION OF 114'-6" AND INTERIOR CLEARANCE AT PRIMARY RIGID FRAME OF MINIMUM 12'-8" ABOVE FLOOR SLAB EL 100'-0", WHICHEVER RESULTS IN GREATER BUILDING HEIGHT



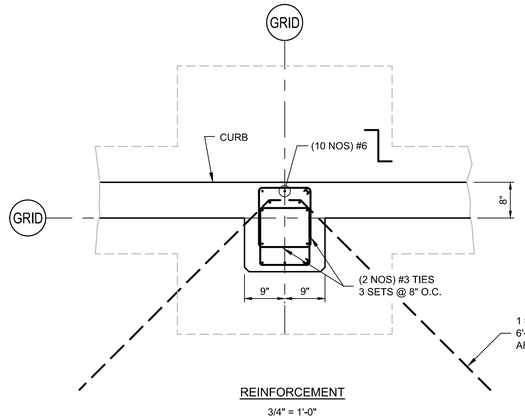

WALL INSULATION B
NTS



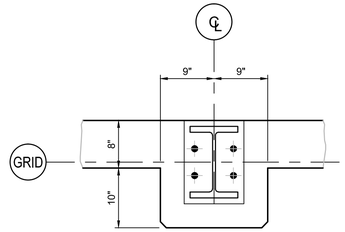

WALL BASE A
NTS




ROOF INSULATION C
NTS




REINFORCEMENT
3/4" = 1'-0"




INSET GIRT
1" = 1'-0"

BUILDING COLUMN PIERS - TYPICAL

AS BUILT
RECORD DRAWING

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | ZM |

Approved



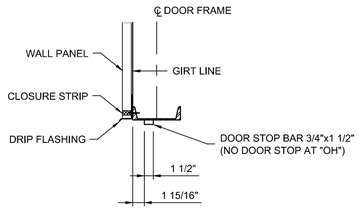
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

CONTROL BUILDING
SECTION AND DETAILS

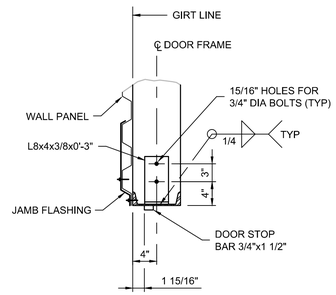
CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: AUGUST 2012 |
|---|---|---|---|
| Project Manager: JK | Reviewed By: JGRW | Designed By: SKM | Drawn By: ZM |
| Scale: AS NOTED | Project No: 06883-00 | Report No: 056 | Drawing No: ST-04 |



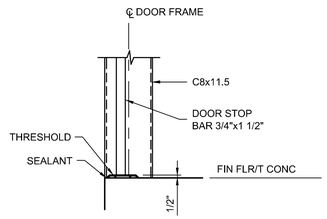

HEAD H-1

1"=1'-0"




JAMB J-1

1"=1'-0"



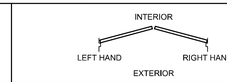

SILL S-1

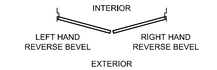
1"=1'-0"

## DOOR & HARDWARE SCHEDULE

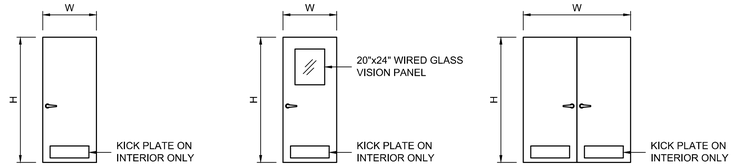
ABBREVIATIONS:

| | | | |
|---|---|---|---|
| EN | ALUMINUM ENAMEL | SFT | 1/4" SAFETY GLASS - STEEL WIRED |
| FRP | FIBERGLASS REINFORCED PLASTIC | SS | STAINLESS STEEL |
| GHM | GALVANIZED HOLLOW METAL | STL | STRUCTURAL STEEL |
| RBR | RUBBER | | |




| DOOR | | | | | | | | | | | | FRAME | | | | HARDWARE | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | DOOR OPENING | | | | | | | | | | | | | | | | |
| DOOR MARK | TYPE | DOOR HAND | FIRE RATING LABELED | EXTERIOR | INTERIOR | THERMAL INSUL. | WIDTH "W" | HEIGHT "H" | THICKNESS | MATERIAL | GLAZING | MATERIAL | HEAD DETAIL | JAMB DETAIL | SILL DETAIL | CLOSER | DOOR STOP | HINGES | KICK PLATE | PANIC SET | THRESHOLD | WEATHERSTRIP | REMARKS |
| D1 | "C" | RHRB LHRB | - | X | | R14.97 | 6'-0" | 7'-0" | 1 3/4" | GHM | - | STL | H-1 | J-1 | S-1 | X | X | 6 | X | X | A | X | LHRB DOOR - DEAD BOLT T & B, RHRB DOOR - LATCHES & EXIT DEVICE |
| D2 | "B" | RHRB | 3/4 HR | | X | R2.44 | 3'-0" | 7'-0" | 1 3/4" | GHM | SFT | STL | - | - | - | X | X | 3 | X | X | B | X | |
| D3 | "A" | RHRB | - | | X | - | 3'-0" | 7'-0" | 1 3/4" | GHM | - | STL | - | - | - | X | - | 3 | X | - | - | - | INTERIOR LATCH |




DOOR TYPES

1/4" = 1'-0"

## DOOR AND HARDWARE NOTE

ALL DOORS AND HARDWARE SHALL BE AS SPECIFIED OR APPROVED EQUAL, AND SHALL CONFORM TO CODE REQUIREMENTS FOR ACCESSIBILITY.

### DOORS

1. EXTERIOR DOORS SHALL BE "IMPERIAL" BY CECO DOOR PRODUCTS, 16 GAUGE, POLYURETHANE CORE, GALVANIZED AND PAINTED.
2. INTERIOR DOORS SHALL BE "REGENT" BY CECO DOOR PRODUCTS, 18 GAUGE, HONEYCOMB CORE, GALVANIZED AND PAINTED.

## HARDWARE (MANUFACTURER'S STANDARD)

1. CLOSER: 1250 SERIES ALUMINUM ENAMEL (EN) - "SARGENT".
2. DOOR STOP: TRI BASE FLOOR STOP #259F-US26D - "HAGER".
3. HINGES: FULL MORTISE STAINLESS STEEL 32D, 4 1/2"x4 1/2"x0.134 GAUGE, #BB1191 - "HAGER".
4. KICK PLATE: STAINLESS STEEL 32D, 16 GAUGE, 8"x26", #220S - "HAGER".
5. PANIC SET:
   A. EXIT DEVICE: #12-9913-ETF, US 32D FIRE RATED - "SARGENT"; EXTERIOR DOOR BY BUTLER.
   B. PUSH PLATE: STAINLESS STEEL 32D, 3"x12", #30S - "HAGER".
   C. PULL PLATE: STAINLESS STEEL 32D, 3"x12", #32G - "HAGER".
   D. LOCKS: MORTISE - "SARGENT".
6. THRESHOLD:
   A. SKID RESISTANT ABRASIVE CAST ALUMINUM HEAVY DUTY, 4" WIDE, #624S - "HAGER".
   B. NON-SLIP ABRASIVE ALUMINUM SADDLE, 4" WIDE, #410S - "HAGER".
7. WEATHERSTRIP AND DOOR BOTTOM:
   A. WEATHERSTRIP JAMB & HEAD #870S-N - "HAGER".
   B. DOOR BOTTOM #774S-V - "HAGER".

AS BUILT
RECORD DRAWING

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | ZM |

Approved



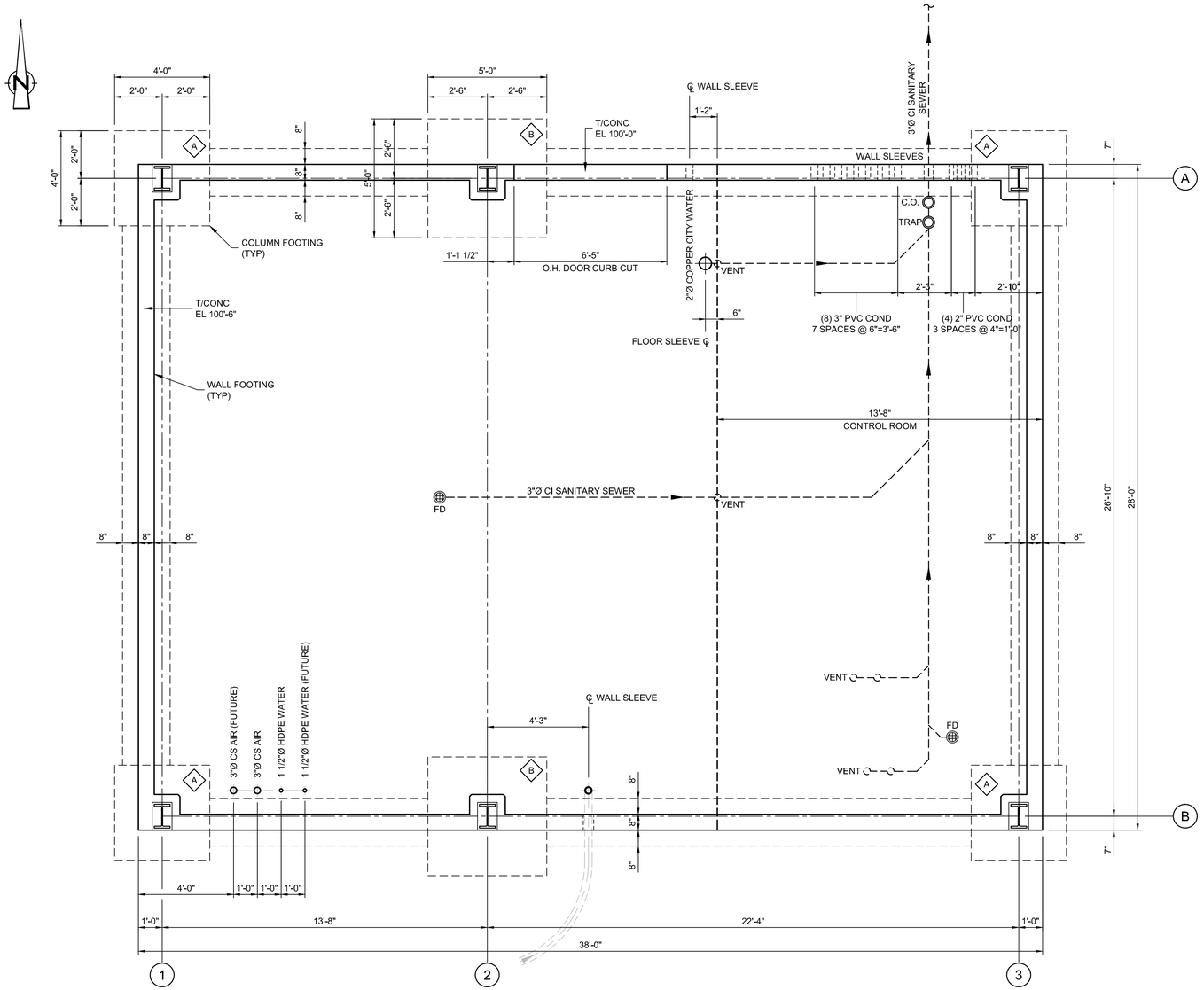
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

CONTROL BUILDING
SCHEDULE & DETAILS

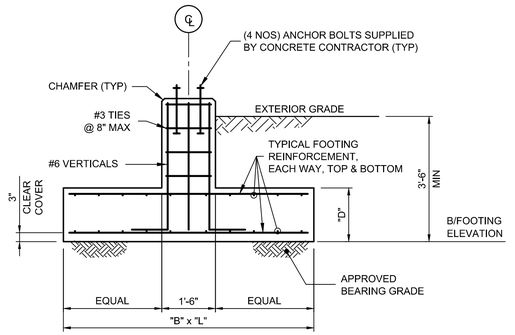
CRA Infrastructure & Engineering, Inc.

| | | | |
|---|---|---|---|
| Source Reference: | | | Date: AUGUST 2012 |
| Project Manager: JK | Reviewed By: JGRW | Designed By: SKM | Drawn By: ZM |
| Scale: AS NOTED | Project No: 06883-00 | Report No: 056 | Drawing No: ST-05 |



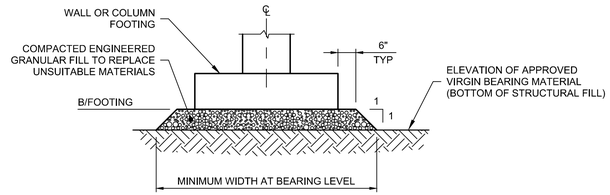

## FOUNDATION PLAN

3/8" = 1'-0"



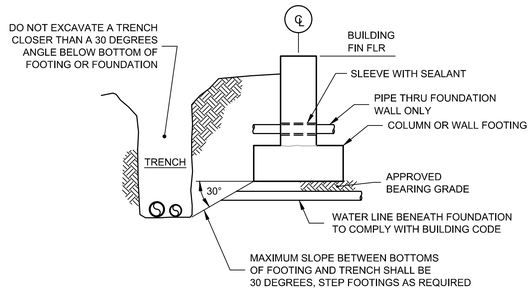

## COLUMN FOOTING DETAIL

NTS




## FILL BENEATH FOUNDATION

NTS




## TRENCH NEAR FOOTING

NTS

| COLUMN FOOTING SCHEDULE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| FOOTING MARK | DIMENSIONS | | | REINFORCEMENT | | | | NOTES |
| | "B" (EAST-WEST) | "L" (NORTH-SOUTH) | "D" | BOTTOM (EAST-WEST) | BOTTOM (NORTH-SOUTH) | TOP (EAST-WEST) | TOP (NORTH-SOUTH) | |
| A | 4'-0" | 4'-0" | 1'-6" | 7 #7 | 7 #7 | 5 #3 | 5 #3 | - |
| B | 5'-0" | 5'-0" | 1'-6" | 7 #7 | 7 #7 | 5 #3 | 5 #3 | - |

## NOTES

1. FOOTING SIZES AND DETAILS SHOWN ON VARIOUS DRAWINGS ARE BASED ON BUTLER MANUFACTURING COMPANY INFORMATION PROVIDED TO CRAIE.
2. FOOTING SIZES, DETAILS AND DESIGN SHALL BE VERIFIED/MODIFIED BASED ON ACTUAL PRE-ENGINEERED BUILDING LOADS PROVIDED BY MANUFACTURER PRIOR TO ORDERING MATERIALS FOR CONSTRUCTION.
3. FOR ANCHOR BOLT AND BUILDING COLUMN LAYOUT DETAILS REFER TO DRAWINGS BY PRE-ENGINEERED BUILDING MANUFACTURER.
4. BUILDING COLUMN FOUNDATION ANCHORS LAYOUT, NUMBER, TYPE, DIAMETER, LENGTH, EMBEDMENT DEPTH, AND OTHER DETAILS SHALL BE BASED ON BUILDING MANUFACTURER'S REQUIREMENTS AND LOADINGS. THE ANCHORS SHALL BE INSTALLED PER ITS MANUFACTURER'S RECOMMENDATIONS.
5. CONTINUE WALL HORIZONTAL AND VERTICAL REINFORCEMENTS INTO COLUMN PIERS AND FOUNDATIONS, RESPECTIVELY.
6. PROVIDE TYPICAL PIER REINFORCEMENTS FOR ALL BUILDING COLUMNS.

AS BUILT
RECORD DRAWING

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | ZM |

Approved



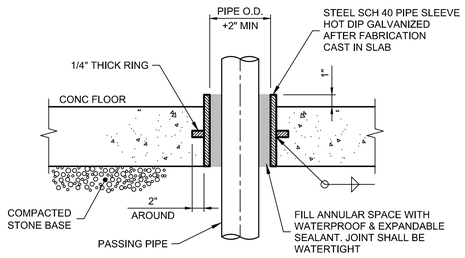
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

CONTROL BUILDING
FOUNDATION PLAN

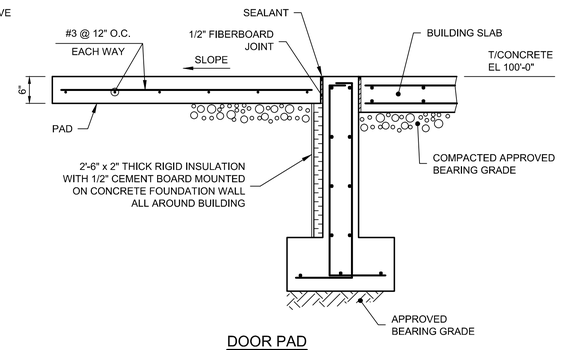
CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: AUGUST 2012 |
|---|---|---|---|
| Project Manager: JK | Reviewed By: JGRW | Designed By: SKM | Drawn By: ZM |
| Scale: 3/8" = 1'-0" | Project No: 06883-00 | Report No: 056 | Drawing No: ST-06 |



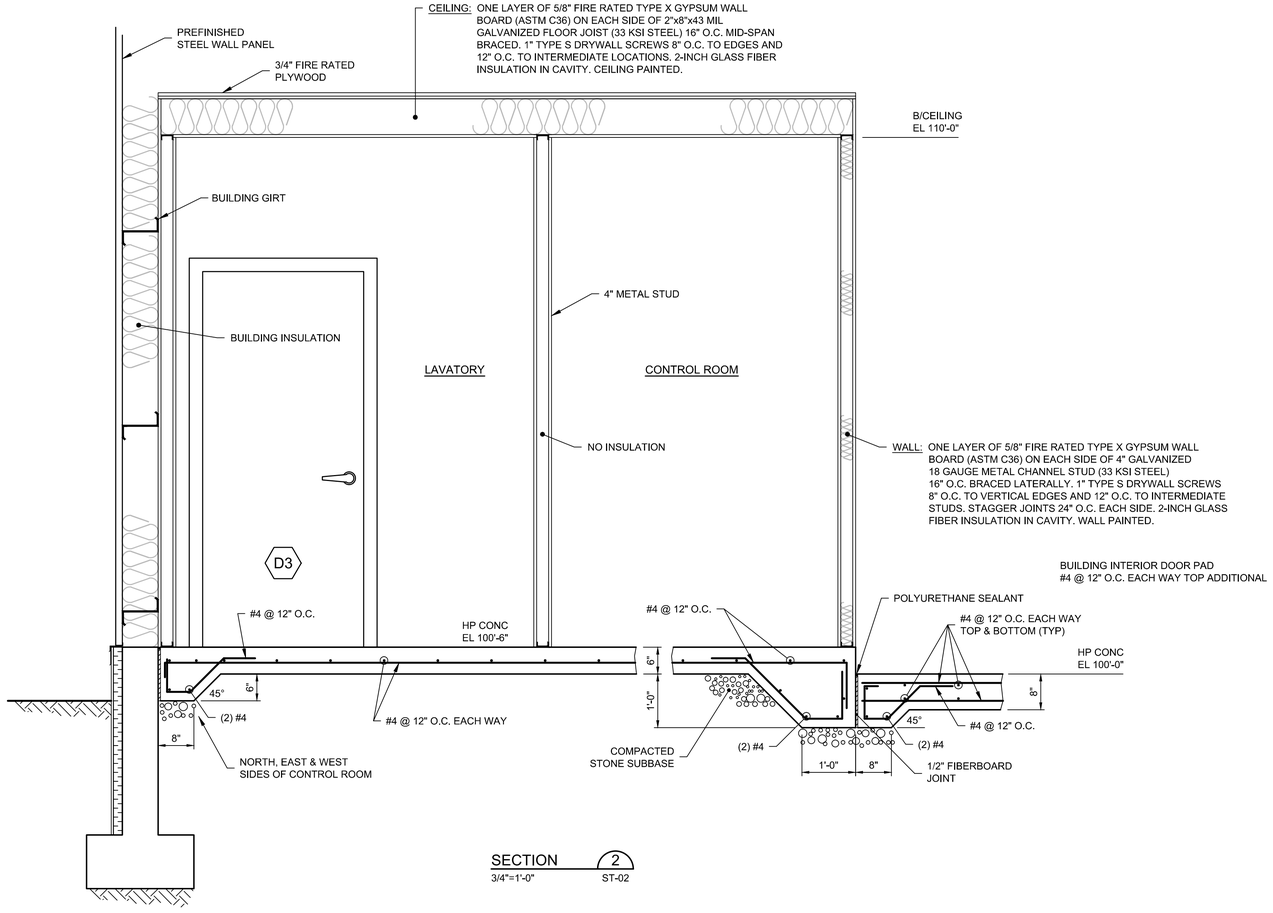

PIPE FLOOR SLEEVE

NTS




DOOR PAD

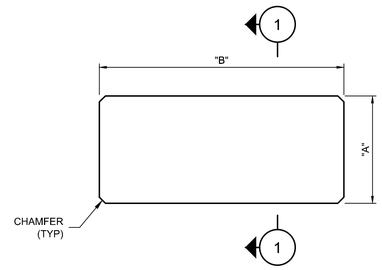
3/4"=1'-0"




SECTION 2

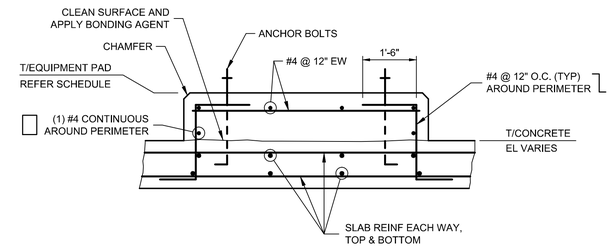
3/4"=1'-0" ST-02

| EQUIPMENT PAD SCHEDULE | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EQUIP No | DESCRIPTION | TYPE | A | B | C | D | E | F | G | H | T/PAD EL | ANCHOR BOLTS | REMARKS |
| - | AIR COMPRESSOR | - | 4'-0" | 8'-9" | - | - | - | - | - | - | 100'-8" | HILTI | - |
| - | SUPPLEMENT BLENDING UNIT | - | 2'-0" | 3'-4" | - | - | - | - | - | - | 100'-8" | HILTI | - |
| | | | | | | | | | | | | | |




EQUIPMENT PAD

(FOR ORIENTATION REFER PLAN)

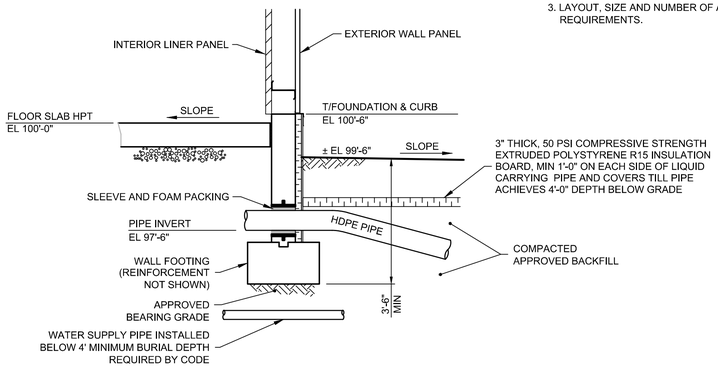



SECTION 1

NTS

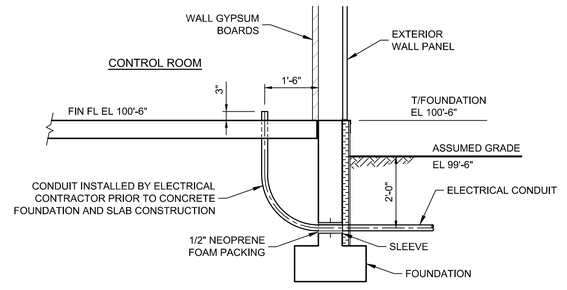
NOTES

1. HILTI ANCHOR BOLTS SHALL CONSIST OF HVA ANCHORING SYSTEM (HVU ADHESIVE AND HAS STAINLESS STEEL ROD) WITH SPECIFIED BOLT DIAMETER AND MINIMUM CONCRETE EMBEDMENT.
2. HILTI ANCHORS SHALL BE SUPPLIED AND INSTALLED BY MECHANICAL CONTRACTOR.
3. LAYOUT, SIZE AND NUMBER OF ANCHORS SHALL BE AS PER MECHANICAL REQUIREMENTS.




PIPE CROSSING FOUNDATION

1/2" = 1'-0"




ELECTRICAL CONDUIT SLEEVE

1/2" = 1'-0"

AS BUILT
RECORD DRAWING

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | ZM |

Approved

WARNING: ALTERING THIS DOCUMENT IS IN VIOLATION OF THE NEW YORK STATE EDUCATION LAW EXCEPTING AS PROVIDED IN SECTION 7209, PART 2 OF THE LAW.

HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

CONTROL BUILDING
MISCELLANEOUS DETAILS

CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: AUGUST 2012 |
|---|---|---|---|
| Project Manager: JK | Reviewed By: JGRW | Designed By: SKM | Drawn By: ZM |
| Scale: AS NOTED | Project No: 06883-00 | Report No: 056 | Drawing No: ST-07 |

06883-00(056)ST-BU007 AUG 22/2012

## PROCESS / INSTRUMENT LINES

- MAIN PROCESS LINE
- SECONDARY PROCESS LINE
- UNDEFINED SIGNAL
- PNEUMATIC SIGNAL
- ELECTRICAL SIGNAL
- CAPILLARY TUBE, FILLED SYSTEM
- ELECTROMAGNETIC OR SONIC SIGNAL (GUIDED)
- ELECTROMAGNETIC OR SONIC SIGNAL (NOT GUIDED)
- INTERNAL SYSTEM LINK
- HYDRAULIC SIGNAL
- MECHANICAL LINK
- ELECTRICAL BINARY SIGNAL
- OFF PAGE CONNECTOR (TO / FROM SHEET No.)
- HARDWIRED INTERLOCK LOGIC (-1,2,3...IS OPTIONAL REFERENCE TO INTERLOCK DETAIL DESCRIPTION)

## VALVE SYMBOLS

- BA- " — BALL VALVE
- BU- " — BUTTERFLY VALVE
- CH- " — CHECK VALVE
- GA- " — GATE VALVE
- GL- " — GLOBE VALVE
- THREE WAY VALVE (FAIL OPEN TO PATH A-C)
- FOUR WAY VALVE (FAIL OPEN TO PATH A-C AND B-D)
- DAMPER OR LOUVER

## GENERAL INSTRUMENT SYMBOLS

- LOCALLY MOUNTED INSTRUMENTS
- PRIMARY PANEL MOUNTED INSTRUMENTS
- AUXILARY PANEL MOUNTED INSTRUMENTS WHERE x = PANEL No. WHEN MORE THAN ONE PANEL IS PRESENT
- BEHIND BOARD MOUNTED INSTRUMENTS
- INSTRUMENTS SHARING COMMON HOUSING
- IN LINE INSTRUMENTS AS INDENTIFIED
- SIGNAL CONVERTER (INPUT/OUTPUT)
  - * E - VOLTAGE, I - CURRENT
  - P - PNEUMATIC, B - BINARY (MODBUS, R5232...)
- PILOT LIGHT
  - A = AMBER, B = BLUE, C = CLEAR
  - G = GREEN, R = RED
  - W = WHITE, Y = YELLOW

## DISTRIBUTED CONTROL / SHARED DISPLAY INSTRUMENTS

- INDICATOR/CONTROLLER/RECORDER OR ALARM POINTS - USUALLY USED TO INDICATE VIDEO DISPLAY (DCS OR HMI CONFIGURATIONS) * NORMALLY ACCESSIBLE TO OPERATOR
- NORMALLY BLIND OPERATION * NOT NORMALLY ACCESSIBLE TO OPERATOR
- DISTRIBUTED CONTROL INTERCONNECTING LOGIC CONTROLLER OR PLC WITH BINARY OR SEQUENTIAL LOGIC FUNCTIONS. * NORMALLY ACCESSIBLE TO OPERATOR
- NORMALLY BLIND OPERATION * NOT NORMALLY ACCESSIBLE TO OPERATOR

- INTERLOCK LOGIC IN CONTROLLER OR PLC WHERE: - 1,2,3.....IS OPTIONAL REFERENCE TO INTERLOCK DETAIL DESCRIPTION - x = PLC No. WHEN MORE THAN ONE PLC IS PRESENT IN THE SYSTEM

## MISCELLANEOUS SYMBOLS

- REDUCER
- FLEXIBLE PIPE
- EXPANSION JOINT
- BLIND FLANGE
- HOSE CONNECTION
- SCREWED CAP, CLEANOUT
- Y-LINE STRAINER
- SPECIFICATION CHANGE
- FUNNEL DRAIN
- STATIC MIXER
- FILTER/REGULATOR/LUBRICATOR
- ANNUNCIATOR HORN
- FILTER/REGULATOR
- EQUIPMENT INSULATED WITH X" OF INSULATION
- RESET FOR LATCH-TYPE ACTUATOR
- OPEN VENT TO ATMOSPHERE
- INLINE BLANK
- RESTRICTION ORIFICE
- AIR EJECTOR
- TRAP
- PULSATION DAMPER
- BLOCK & BLEED ASSEMBLY
- TIE POINT TO EXISTING SYSTEM
- DRAIN (FLOOR, SEWER, ETC.)
- FLOW STRAIGHTENING VANE
- SPECIALITY PART
- AIR VENT, AUTOMATIC

## SELF-ACTUATED REGULATORS, VALVES, AND OTHER DEVICES

- RUPTURE DISC FOR PRESSURE RELIEF
- RUPTURE DISC FOR VACUUM RELIEF
- PRESSURE RELIEF VALVE
- VACUUM RELIEF VALVE
- PRESSURE REDUCING REGULATOR (SELF CONTAINED)
- BACKPRESSURE REGULATOR (SELF CONTAINED)
- LEVEL REGULATOR WITH MECHANICAL LINKAGE

- CONSERVATION VENT
- FLAME ARRESTOR

## PRIMARY ELEMENT SYMBOLS

- VARIABLE AREA FLOWMETER
- DIAPHRAM SEAL WITH PRESSURE LEAD LINE
- DIAPHRAM SEAL (LINE-MOUNTED)
- TEMPERATURE ELEMENT WITH THERMOWELL (OPTIONAL ELEMENT DESCRIPTION RTD, TYPE K...)
- FLOW SIGHT GLASS (LG - LEVEL SIGHT GLASS, SG - GENERAL SIGHT GLASS)
- LEVEL DEVICE, FLOAT TYPE

## ACTUATOR SYMBOLS

- DIAPHRAM ACTUATOR
- CYLINDER ACTUATOR
- ROTARY MOTOR ACTUATOR
- SOLENOID ACTUATOR
- HAND ACTUATOR OR HANDWHEEL
- AIR ACTUATED VALVE W/POSITIONER
  - OPTIONAL:
  - D - DIRECT ACTING POSITIONER
  - R - REVERSE ACTING POSITIONER
- VALVE FAIL SYMBOLS
  - FO - FAIL OPEN
  - FC - FAIL CLOSED
  - FL - FAIL LOCKED (LAST POSITION)
  - FI - FAIL INDETERMINATE
- LIMIT SWITCH ACTIVATED WHEN VALVE CLOSED (ZSH ACTIVATED WHEN VALVE OPEN)

## ABBREVIATIONS:

### POWER SUPPLY OR PURGE FLUID TYPES

- AS - AIR SUPPLY
  - IA - INSTRUMENT AIR
  - PA - PLANT AIR
- ES - ELECTRICAL SUPPLY
- GS - GAS SUPPLY
- HS - HYDRAULIC SUPPLY
- NS - NITROGEN SUPPLY
- SS - STEAM SUPPLY
- WS - WATER SUPPLY

THE SUPPLY LEVEL MAY BE ADDED TO THE INSTRUMENT SUPPLY LINE, E.G., AG-100, A 100-PSI AIR SUPPLY; ES-24DC, A 24-VOLT DIRECT CURRENT POWER SUPPLY.

### INSTRUMENTS:

- HOA - HAND/OFF/AUTO
- LOR - LOCAL/OFF/REMOTE
- OPN - OPEN
- CLS - CLOSE
- SP - SETPOINT

## INSTRUMENT / PROCESS LINES DESIGNATIONS

| | |
|---|---|
| 000 | UNDERGROUND INSTRUMENTS |
| 100 | PROCESS INSTRUMENTS |
| 200 | VENDOR SUPPLIED INSTRUMENTS |
| 300 | UTILITY INSTRUMENTS |
| 0000 | UNDERGROUND LINES |
| 1000 | PROCESS LINES |
| 2000 | VENDOR SUPPLIED LINES |
| 3000 | UTILITY LINES |
| CS | CARBON STEEL PIPE |
| CSVD | CARBON STEEL VENT DUCT (12 GAUGE) |
| DVW | DRAIN VENT WASTE PIPE |
| HDPE | HIGH DENSITY POLYETHYLENE PIPE |
| KYA | KYNAR |
| PDE | CPVC, SOLID |
| PVC | POLYVINYL CHLORIDE PIPE SCHEDULE 40 |
| PVE | POLYVINYL CHLORIDE PIPE SCHEDULE 80 |
| PPL | POLYPROPYLENE LINED/LINED DUCTILE PIPE |
| SS | STAINLESS STEEL |
| TFD | TEFLON |
| B | BARE |
| I | INSULATED |
| J | JACKETED AND INSULATED |
| TE | ELECTRICALLY TRACED AND INSULATED |

## TYPICAL ISA LETTER COMBINATIONS

| First-Letters | Initiating or Measured Variable | Controllers: Recording | Controllers: Indicating | Controllers: Blind | Controllers: Self-Actuated Control Valves | Readout Devices: Recording | Readout Devices: Indicating | Switches and Alarm Devices *: High ** | Switches and Alarm Devices *: Low | Switches and Alarm Devices *: Comb | Transmitters: Recording | Transmitters: Indicating | Transmitters: Blind | Solenoids, Relays, Computing Devices | Primary Element | Test Point | Well or Probe | Viewing Device, Glass | Safety Device | Final Element |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | Analysis | ARC | AIC | AC | | AR | AI | ASH | ASL | ASHL | ART | AIT | AT | AY | AE | AP | AW | | | AV |
| B | Burner/Combustion | BRC | BIC | BC | | BR | BI | BSH | BSL | BSHL | BRT | BIT | BT | BY | BE | | BW | BG | | BZ |
| C | User's Choice | | | | | | | | | | | | | | | | | | | |
| D | User's Choice | | | | | | | | | | | | | | | | | | | |
| E | Voltage | ERC | EIC | EC | | ER | EI | ESH | ESL | ESHL | ERT | EIT | ET | EY | EE | | | | | EZ |
| F | Flow Rate | FRC | FIC | FC | FCV, FICV | FR | FI | FSH | FSL | FSHL | FRT | FIT | FT | FY | FE | FP | | FG | | FV |
| FQ | Flow Quantity | FQRC | FQIC | | | FQR | FQI | FQSH | FQSL | | | FQIT | FQT | FQY | FQE | | | | | FQV |
| FF | Flow Ratio | FFRC | FFIC | FFC | | FFR | FFI | FFSH | FFSL | | | | | | FE | | | | | FFV |
| G | User's Choice | | | | | | | | | | | | | | | | | | | |
| H | Hand | | HIC | HC | | | | | | HS | | | | | | | | | | HV |
| I | Current | IRC | IIC | | | IR | II | ISH | ISL | ISHL | IRT | IIT | IT | IY | IE | | | | | IZ |
| J | Power | JRC | JIC | | | JR | JI | JSH | JSL | JSHL | JRT | JIT | JT | JY | JE | | | | | JV |
| K | Time | KRC | KIC | KC | KCV | KR | KI | KSH | KSL | KSHL | KRT | KIT | KT | KY | KE | | | | | KV |
| L | Level | LRC | LIC | LC | LCV | LR | LI | LSH | LSL | LSHL | LRT | LIT | LT | LY | LE | | LW | LG | | LV |
| M | User's Choice | | | | | | | | | | | | | | | | | | | |
| N | User's Choice | | | | | | | | | | | | | | | | | | | |
| O | User's Choice | | | | | | | | | | | | | | | | | | | |
| P | Pressure/Vacuum | PRC | PIC | PC | PCV | PR | PI | PSH | PSL | PSHL | PRT | PIT | PT | PY | PE | PP | | | PSV, PSE | PV |
| PD | Pressure, Differential | PDRC | PDIC | PDC | PDCV | PDR | PDI | PDSH | PDSL | | PDRT | PDIT | PDT | PDY | PE | PP | | | | PDV |
| Q | Quantity | QRC | QIC | | | QR | QI | QSH | QSL | QSHL | QRT | QIT | QT | QY | QE | | | | | QZ |
| R | Radiation | RRC | RIC | RC | | RR | RI | RSH | RSL | RSHL | RRT | RIT | RT | RY | RE | | RW | | | RZ |
| S | Speed/Frequency | SRC | SIC | SC | SCV | SR | SI | SSH | SSL | SSHL | SRT | SIT | ST | SY | SE | | | | | SV |
| T | Temperature | TRC | TIC | TC | TCV | TR | TI | TSH | TSL | TSHL | TRT | TIT | TT | TY | TE | TP | TW | | TSE | TV |
| TD | Temperature, Differential | TDRC | TDIC | TDC | TDCV | TDR | TDI | TDSH | TDSL | | TDRT | TDIT | TDT | TDY | TE | TP | TW | | | TDV |
| U | Multivariable | | | | | UR | UI | | | | | | | UY | | | | | | UV |
| V | Vibration/Machinery Analysis | | | | | VR | VI | VSH | VSL | VSHL | VRT | VIT | VT | VY | VE | | | | | VZ |
| W | Weight/Force | WRC | WIC | WC | WCV | WR | WI | WSH | WSL | WSHL | WRT | WIT | WT | WY | WE | | | | | WZ |
| WD | Weight/Force, Differential | WDRC | WDIC | WDC | WDCV | WDR | WDI | WDSH | WDSL | | WDRT | WDIT | WDT | WDY | WE | | | | | WDZ |
| X | Unclassified | | | | | | | | | | | | | | | | | | | |
| Y | Event/State/Presence | | YIC | YC | | YR | YI | YSH | YSL | | | | YT | YY | YE | | | | | YZ |
| Z | Position/Dimension | ZRC | ZIC | ZC | ZCV | ZR | ZI | ZSH | ZSL | ZSHL | ZRT | ZIT | ZT | ZY | ZE | | | | | ZV |
| ZD | Gauging/Deviation | ZDRC | ZDIC | ZDC | ZDCV | ZDR | ZDI | ZDSH | ZDSL | | ZDRT | ZDIT | ZDT | ZDY | ZDE | | | | | ZDV |

Note: This table is not all-inclusive.

* A, alarm, the annunciating device, may be used in the same fashion as S, switch, the actuating device.

** The letters H and L may be omitted in the undefined case.

Other Possible Combinations:

- FO (Restriction Orifice)
- FRK, HIK (Control Stations)
- LLH (Level Light High)
- LCH (Level Control High)
- KQI (Running Time Indicator)
- HMS (Hand Momentary Switch)
- LCL (Level Control Low)

## IDENTIFICATION LETTERS

| | FIRST-LETTER: MEASURED OR INITIATING VARIABLE | FIRST-LETTER: MODIFIER | SUCCEEDING-LETTERS: READOUT OR PASSIVE FUNCTION | SUCCEEDING-LETTERS: OUTPUT FUNCTION | SUCCEEDING-LETTERS: MODIFIER |
|---|---|---|---|---|---|
| A | Analysis | | Alarm | | |
| B | Burner/Combustion | | User's Choice | User's Choice | User's Choice |
| C | User's Choice | | | Control | |
| D | User's Choice | Differential | | | |
| E | Voltage | | Sensor (Primary Element) | | |
| F | Flow Rate | Ratio (Fraction) | | | |
| G | User's Choice | | Glass, Viewing Device | | |
| H | Hand | | | | High |
| I | Current (Electrical) | | Indicate | | |
| J | Power | Scan | | | |
| K | Time, Time Schedule | Time Rate of Change | | Control Station | |
| L | Level | | Light | | Low |
| M | User's Choice | Momentary | | | Middle, Intermediate |
| N | User's Choice | | User's Choice | User's Choice | User's Choice |
| O | User's Choice | | Orifice, Restriction | | |
| P | Pressure, Vacuum | | Point (Test) Connection | | |
| Q | Quantity | Integrate, Totalize | | | |
| R | Radiation | | Record | | |
| S | Speed, Frequency | Safety | | Switch | |
| T | Temperature | | | Transmit | |
| U | Multivariable | | Multifunction | Multifunction | Multifunction |
| V | Vibration, Machinery Analysis | | | 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, Unclassified Final Control Element | |

AS BUILT RECORD DRAWING

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |

Approved

HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

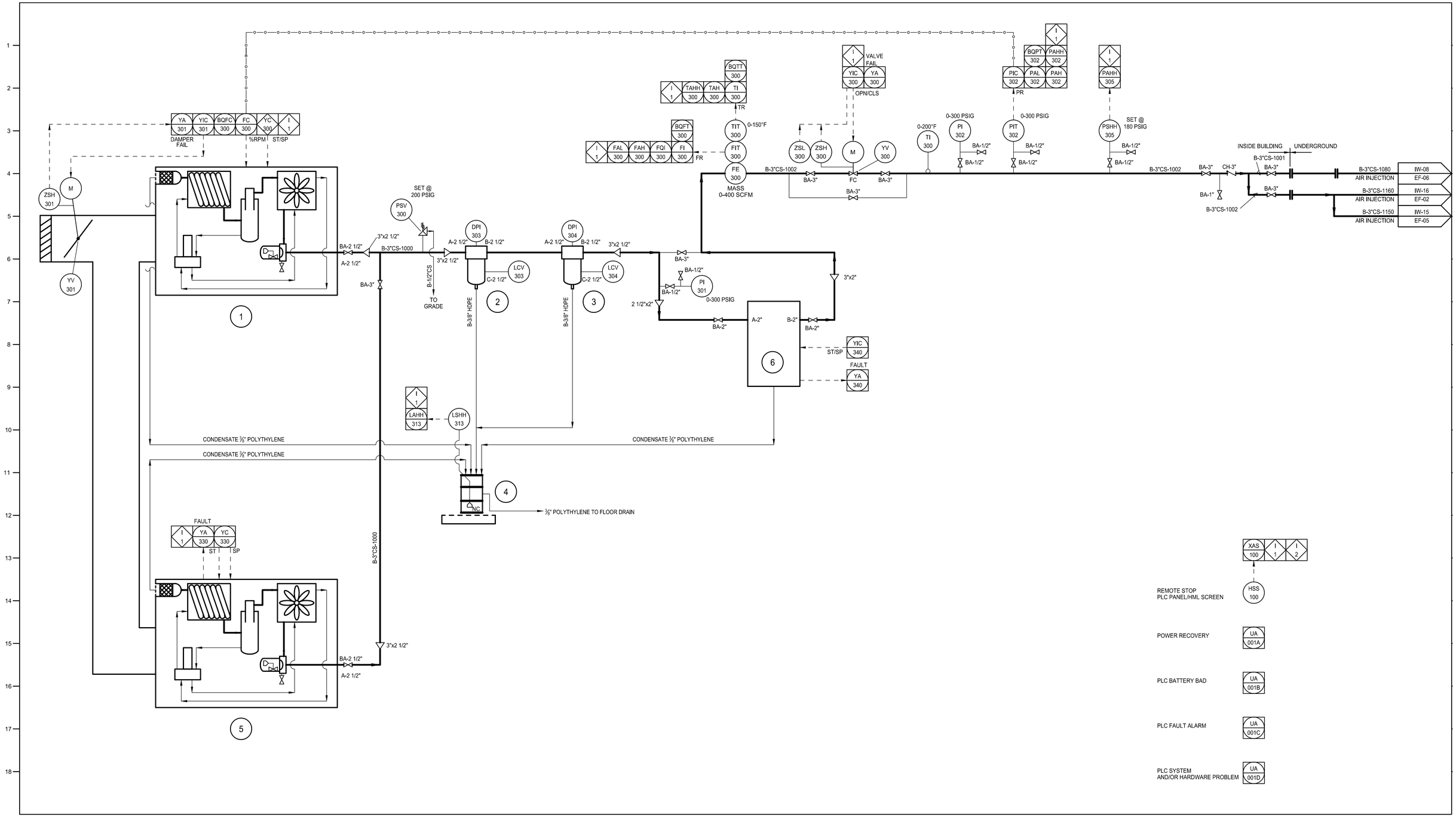
BIOSPAGE TREATMENT SYSTEM

ENGINEERING FLOW SHEET LEGEND

CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: 7-23-03 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: | Drawn By: B.A. BEEBE |
| Scale: | Project No: 06883-00 | Report No: 056 | Drawing No: EF-00 |

06883-00(056)EF-BU000 SEP 26/2012




| PLANT ID. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NAME | PRIMARY COMPRESSOR | MOISTURE/OIL SEPARATOR W/ AUTO DRAIN PREFILTER | MOISTURE/OIL SEPARATOR W/ AUTO DRAIN POLISHING FILTER | MOISTURE/OIL SEPARATOR DRUM W/ CONTAINMENT | AUXILIARY COMPRESSOR | COMPRESSED AIR DRYER | | | | | | |
| DESCRIPTION: MATERIAL | | | | | | | | | | | | |
| SIZE | | 2 1/2" | 2 1/2" | | | | | | | | | |
| CAPACITY | 337 SCFM | 551 SCFM | 551 SCFM | 55 GALLON | 100 SCFM @ 175 PSI | 300 SCFM | | | | | | |
| TEMP/PRESS | 175 PSI | 150°F/232 PSIG | 150°F/232 PSIG | | 200 PSI | 230 PSIG | | | | | | |
| HP/V/RPM | 100/460/2700 | | | | 30/460/1765 | 460/3/60 | | | | | | |
| WEIGHT | 3967 POUNDS | 15 POUNDS | 15 POUNDS | | 1292 POUNDS | 735 POUNDS | | | | | | |
| MANUFACTURE | ATLAS-COPCO | | | | INGERSOLL-RAND | INGERSOLL-RAND | | | | | | |
| MODEL | GA-75VSD | DD-260 | PD-260 | | UP6-30 | NVC300A | | | | | | |
| VENDOR | GLAUBER | ATLAS COPCO | ATLAS COPCO | | INGERSOLL-RAND | INGERSOLL-RAND | | | | | | |

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |

AS BUILT
RECORD DRAWING

HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

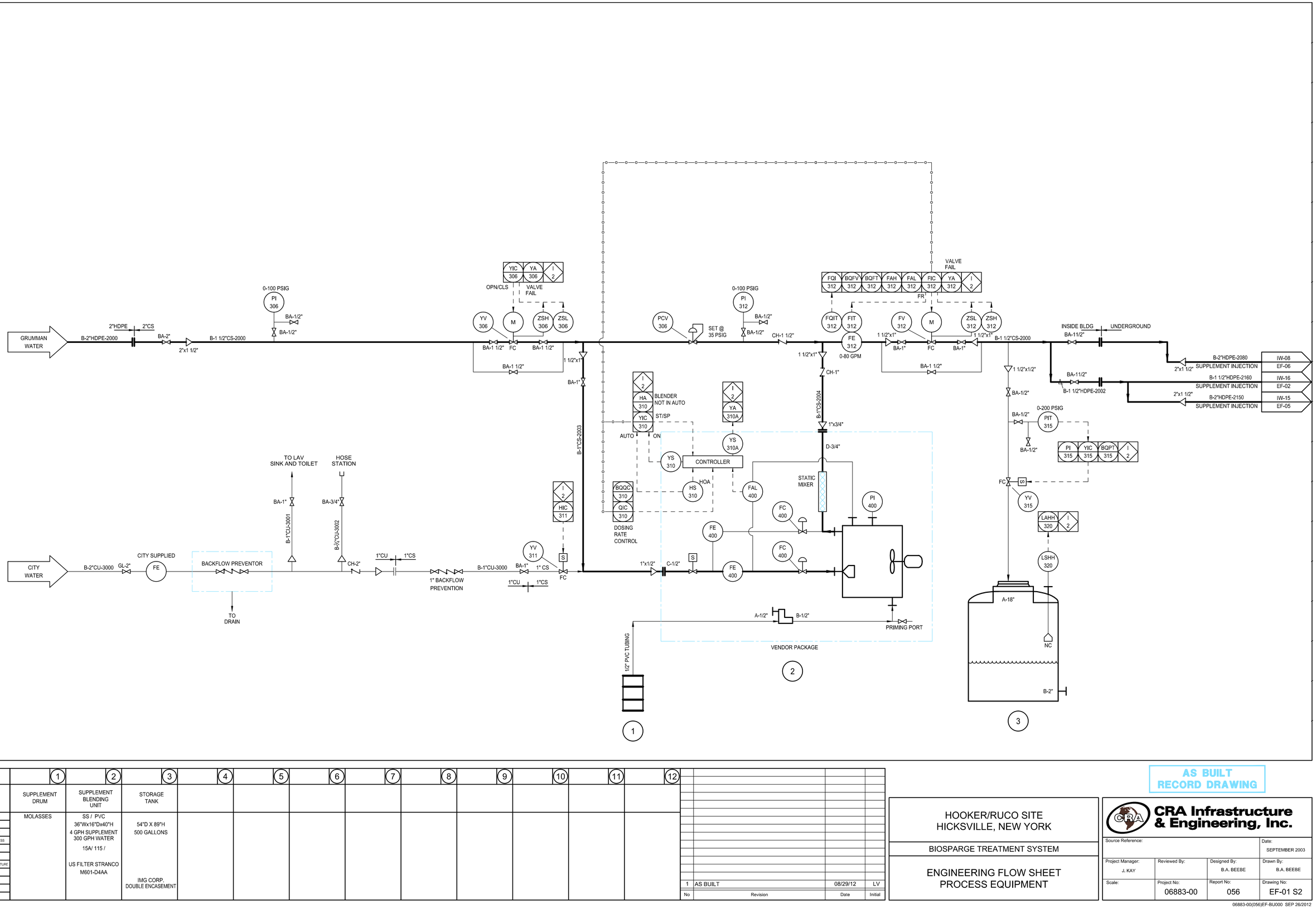
BIOSPARGE TREATMENT SYSTEM

ENGINEERING FLOW SHEET
PROCESS EQUIPMENT

CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: MARCH 2010 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: T. PESTKA | Drawn By: L. VAN NOTE |
| Scale: | Project No: 06883-00 | Report No: 056 | Drawing No: EF-01 S1 |

06883-00(056)EF-BU000 SEP 26/2012




| PLANT ID. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NAME | SUPPLEMENT DRUM | SUPPLEMENT BLENDING UNIT | STORAGE TANK | | | | | | | | | |
| DESCRIPTION: MATERIAL | MOLASSES | SS / PVC | | | | | | | | | | |
| SIZE | | 36"Wx16"Dx40"H | 54"D X 89"H | | | | | | | | | |
| CAPACITY | | 4 GPH SUPPLEMENT 300 GPH WATER | 500 GALLONS | | | | | | | | | |
| TEMP/PRESS | | | | | | | | | | | | |
| HP/V/RPM | | 15A/ 115 / | | | | | | | | | | |
| WEIGHT | | | | | | | | | | | | |
| MANUFACTURE | | US FILTER STRANCO | | | | | | | | | | |
| MODEL | | M601-D4AA | | | | | | | | | | |
| VENDOR | | | IMG CORP. DOUBLE ENCASEMENT | | | | | | | | | |

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |

AS BUILT
RECORD DRAWING

HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

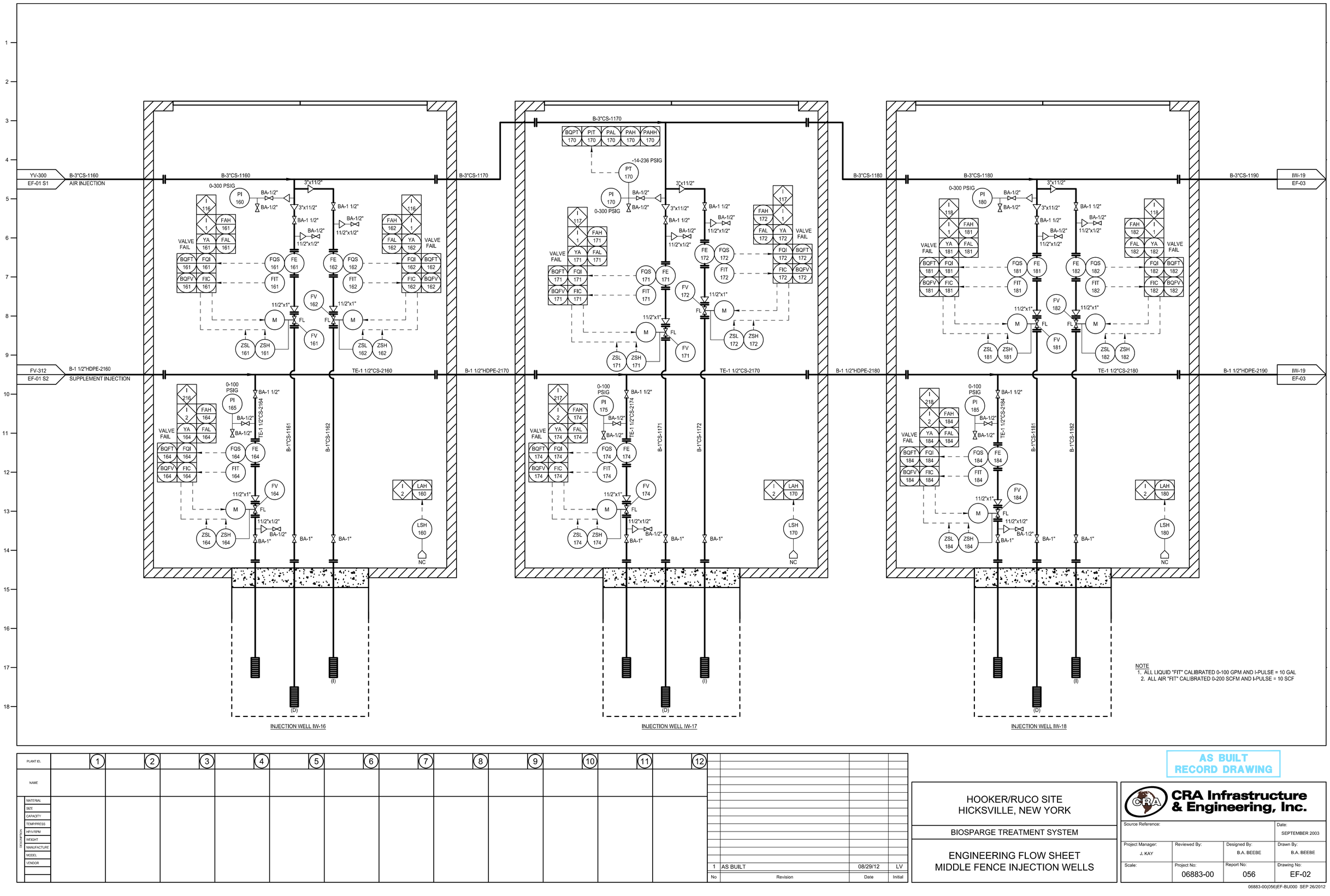
BIOSPARGE TREATMENT SYSTEM

ENGINEERING FLOW SHEET
PROCESS EQUIPMENT

CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: SEPTEMBER 2003 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: B.A. BEEBE | Drawn By: B.A. BEEBE |
| Scale: | Project No: 06883-00 | Report No: 056 | Drawing No: EF-01 S2 |

06883-00(056)EF-BU000 SEP 26/2012




NOTE
1. ALL LIQUID "FIT" CALIBRATED 0-100 GPM AND I-PULSE = 10 GAL
2. ALL AIR "FIT" CALIBRATED 0-200 SCFM AND I-PULSE = 10 SCF

| PLANT ID. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NAME | | | | | | | | | | | | |
| DESCRIPTION: MATERIAL | | | | | | | | | | | | |
| SIZE | | | | | | | | | | | | |
| CAPACITY | | | | | | | | | | | | |
| TEMP/PRESS | | | | | | | | | | | | |
| HP/V/RPM | | | | | | | | | | | | |
| WEIGHT | | | | | | | | | | | | |
| MANUFACTURE | | | | | | | | | | | | |
| MODEL | | | | | | | | | | | | |
| VENDOR | | | | | | | | | | | | |

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |

AS BUILT
RECORD DRAWING

HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

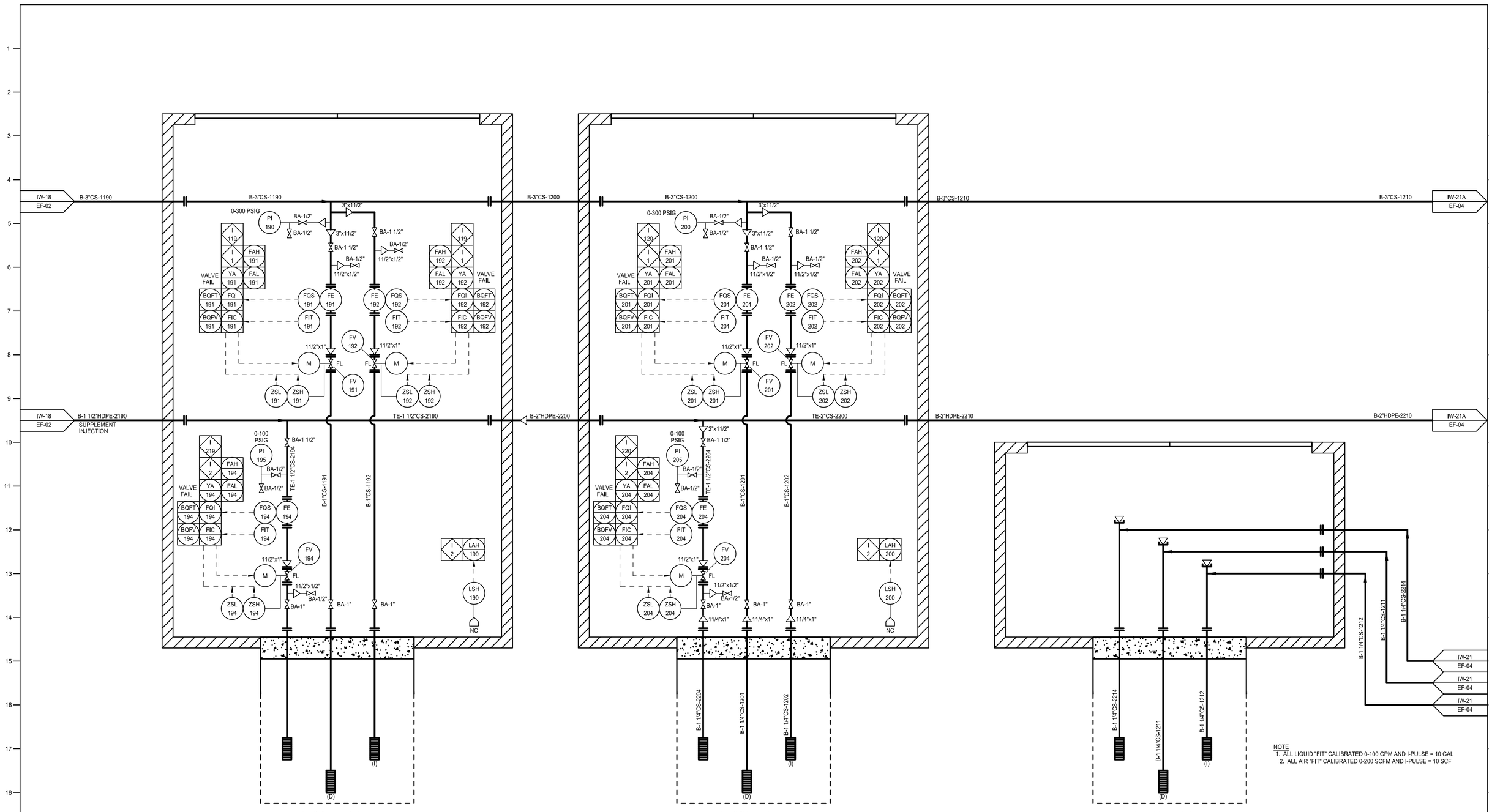
BIOSPARGE TREATMENT SYSTEM

ENGINEERING FLOW SHEET
MIDDLE FENCE INJECTION WELLS

CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: SEPTEMBER 2003 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: B.A. BEEBE | Drawn By: B.A. BEEBE |
| Scale: | Project No: 06883-00 | Report No: 056 | Drawing No: EF-02 |

06883-00(056)EF-BU000 SEP 26/2012




NOTE
1. ALL LIQUID "FIT" CALIBRATED 0-100 GPM AND I-PULSE = 10 GAL
2. ALL AIR "FIT" CALIBRATED 0-200 SCFM AND I-PULSE = 10 SCF

| PLANT ID. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NAME | | | | | | | | | | | | |
| DESCRIPTION: MATERIAL | | | | | | | | | | | | |
| SIZE | | | | | | | | | | | | |
| CAPACITY | | | | | | | | | | | | |
| TEMP/PRESS | | | | | | | | | | | | |
| HP/V/RPM | | | | | | | | | | | | |
| WEIGHT | | | | | | | | | | | | |
| MANUFACTURE | | | | | | | | | | | | |
| MODEL | | | | | | | | | | | | |
| VENDOR | | | | | | | | | | | | |

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |

AS BUILT
RECORD DRAWING

HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

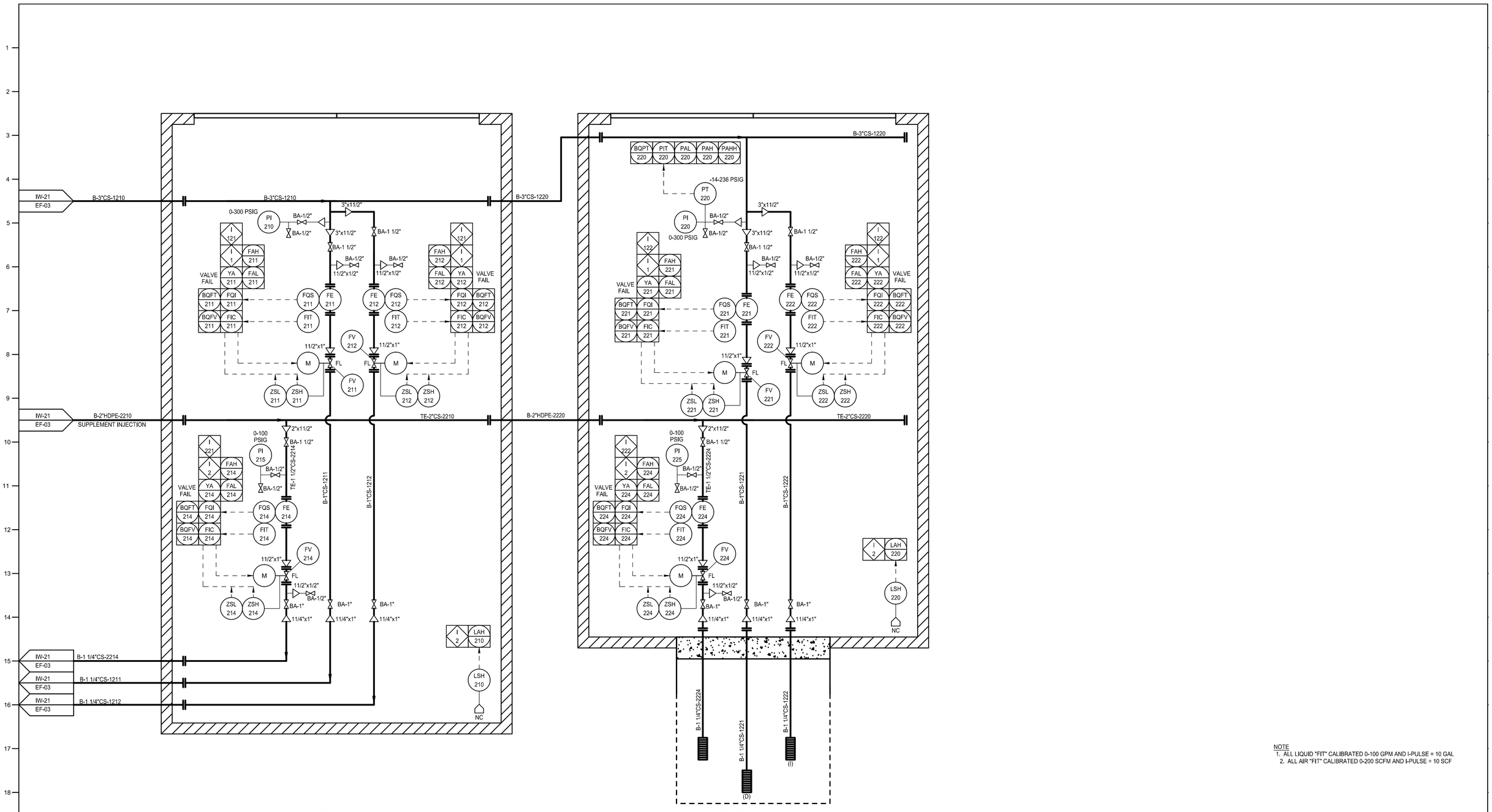
BIOSPARGE TREATMENT SYSTEM

ENGINEERING FLOW SHEET
MIDDLE FENCE INJECTION WELLS

CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: SEPTEMBER 2003 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: B.A. BEEBE | Drawn By: B.A. BEEBE |
| Scale: | Project No: 06883-00 | Report No: 056 | Drawing No: EF-03 |

06883-00(056)EF-BU000 SEP 26/2012




INJECTION WELL IW-21

INJECTION WELL IW-22

NOTE
1. ALL LIQUID "FIT" CALIBRATED 0-100 GPM AND I-PULSE = 10 GAL
2. ALL AIR "FIT" CALIBRATED 0-200 SCFM AND I-PULSE = 10 SCF

| PLANT ID. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NAME | | | | | | | | | | | | |
| DESCRIPTION: MATERIAL | | | | | | | | | | | | |
| SIZE | | | | | | | | | | | | |
| CAPACITY | | | | | | | | | | | | |
| TEMP/PRESS | | | | | | | | | | | | |
| HP/VRPM | | | | | | | | | | | | |
| WEIGHT | | | | | | | | | | | | |
| MANUFACTURE | | | | | | | | | | | | |
| MODEL | | | | | | | | | | | | |
| VENDOR | | | | | | | | | | | | |

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |

AS BUILT
RECORD DRAWING

HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

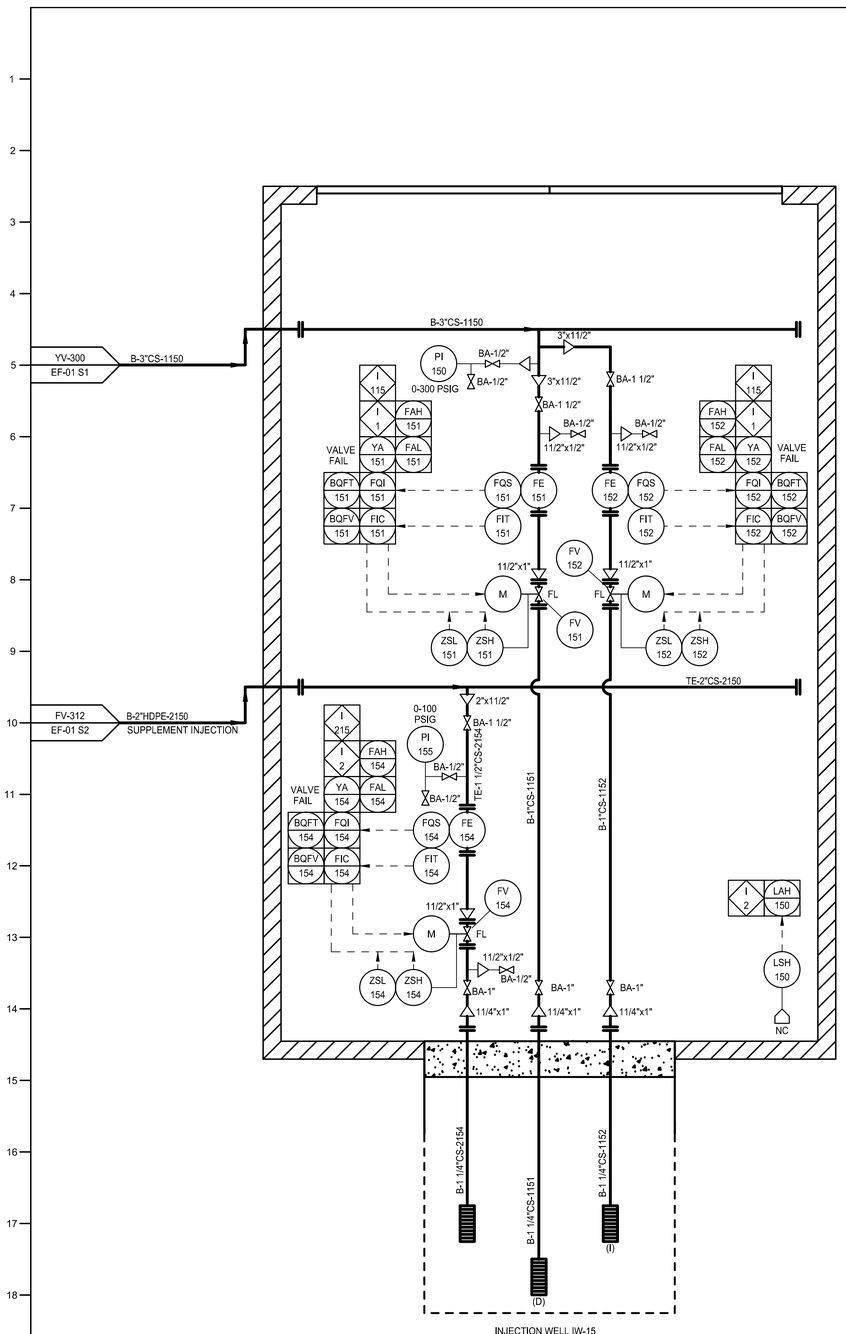
BIOSPARGE TREATMENT SYSTEM

ENGINEERING FLOW SHEET
MIDDLE FENCE INJECTION WELLS

CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: SEPTEMBER 2003 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: B.A. BEEBE | Drawn By: B.A. BEEBE |
| Scale: | Project No: 06883-00 | Report No: 056 | Drawing No: EF-04 |

06883-00(056)EF-BU000 SEP 26/2012




INJECTION WELL IW-15

1. ALL LIQUID "FIT" CALIBRATED 0-100 GPM AND I-PULSE = 10 GAL
2. ALL AIR "FIT" CALIBRATED 0-200 SCFM AND I-PULSE = 10 SCF

| PLANT ID. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NAME | | | | | | | | | | | | |
| DESCRIPTION: MATERIAL | | | | | | | | | | | | |
| SIZE | | | | | | | | | | | | |
| CAPACITY | | | | | | | | | | | | |
| TEMP/PRESS | | | | | | | | | | | | |
| HP/V/RPM | | | | | | | | | | | | |
| WEIGHT | | | | | | | | | | | | |
| MANUFACTURE | | | | | | | | | | | | |
| MODEL | | | | | | | | | | | | |
| VENDOR | | | | | | | | | | | | |

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |

AS BUILT
RECORD DRAWING

HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

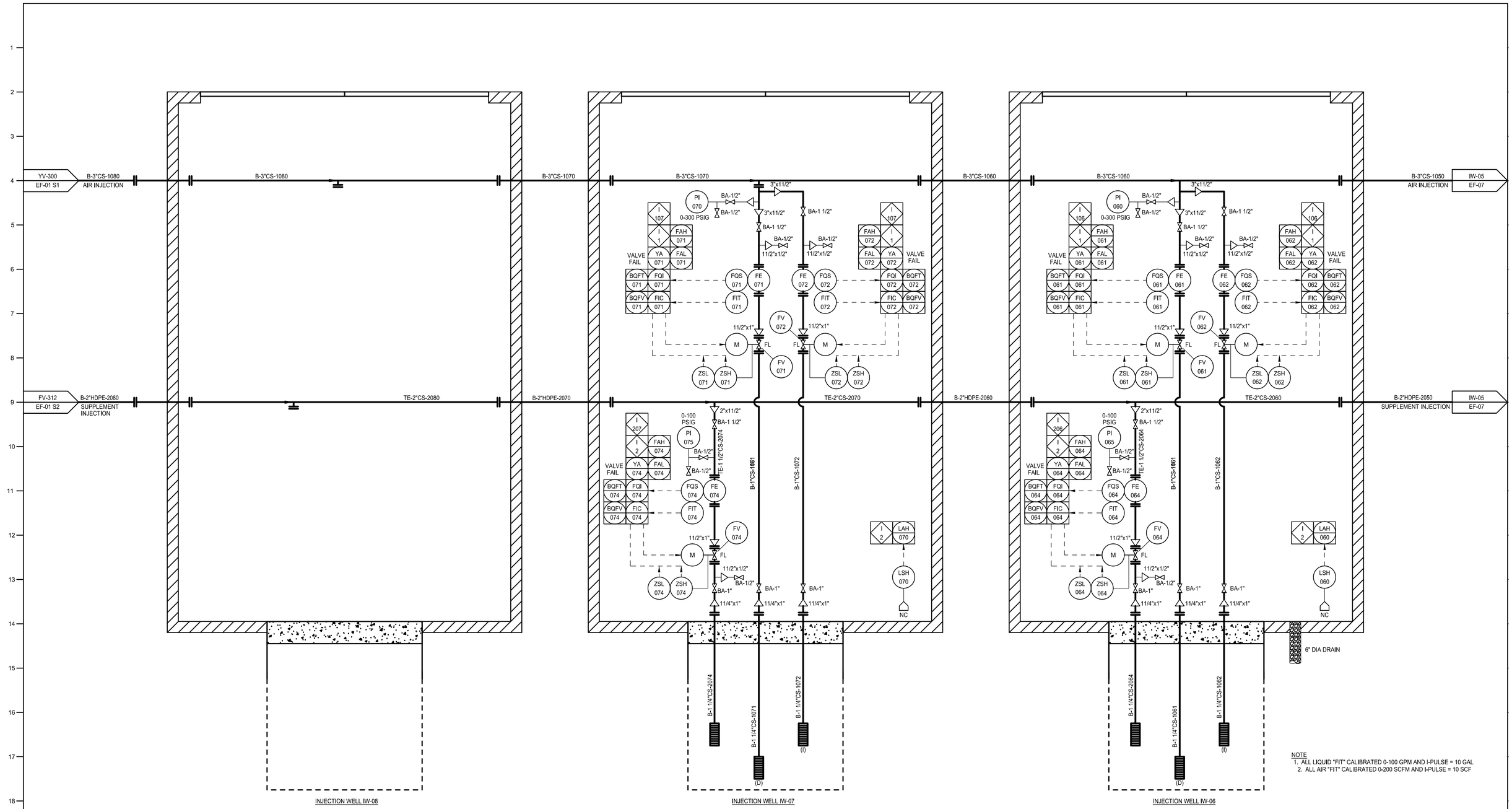
BIOSPARGE TREATMENT SYSTEM

ENGINEERING FLOW SHEET
MIDDLE FENCE INJECTION WELLS

CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: SEPTEMBER 2003 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: B.A. BEEBE | Drawn By: B.A. BEEBE |
| Scale: | Project No: 06883-00 | Report No: 056 | Drawing No: EF-05 |

06883-00(056)EF-BU000 SEP 26/2012




NOTE
1. ALL LIQUID "FIT" CALIBRATED 0-100 GPM AND I-PULSE = 10 GAL
2. ALL AIR "FIT" CALIBRATED 0-200 SCFM AND I-PULSE = 10 SCF

| PLANT ID. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NAME | | | | | | | | | | | | |
| DESCRIPTION: MATERIAL | | | | | | | | | | | | |
| SIZE | | | | | | | | | | | | |
| CAPACITY | | | | | | | | | | | | |
| TEMP/PRESS | | | | | | | | | | | | |
| HP/VP/RPM | | | | | | | | | | | | |
| WEIGHT | | | | | | | | | | | | |
| MANUFACTURE | | | | | | | | | | | | |
| MODEL | | | | | | | | | | | | |
| VENDOR | | | | | | | | | | | | |

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |

AS BUILT
RECORD DRAWING

HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

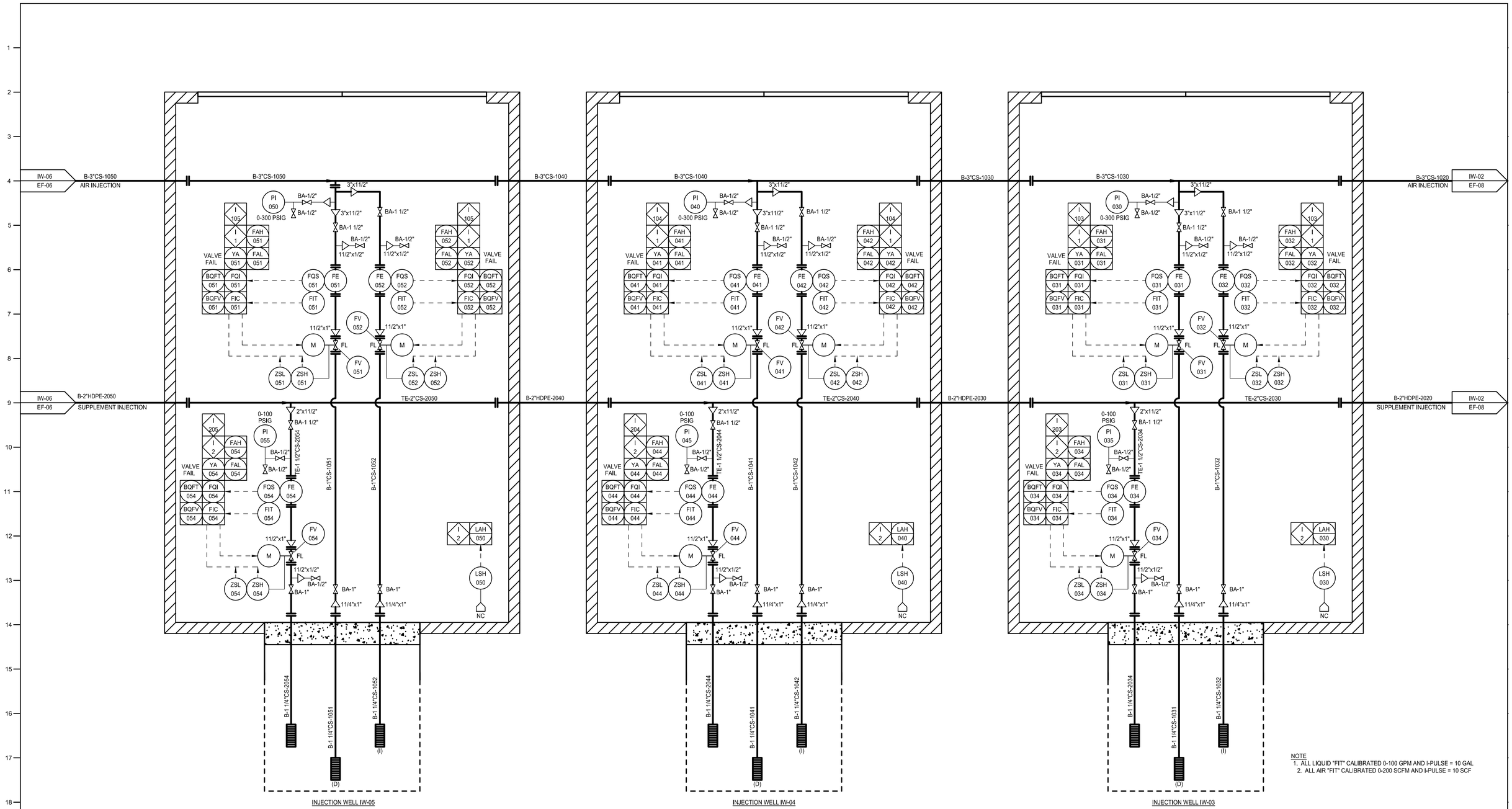
BIOSPARGE TREATMENT SYSTEM

ENGINEERING FLOW SHEET
NORTH FENCE INJECTION WELLS

CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: SEPTEMBER 2003 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: B.A. BEEBE | Drawn By: B.A. BEEBE |
| Scale: | Project No: 06883-00 | Report No: 056 | Drawing No: EF-06 |

06883-00(056)EF-BU000 SEP 26/2012




INJECTION WELL IW-05

INJECTION WELL IW-04

INJECTION WELL IW-03

NOTE
1. ALL LIQUID "FIT" CALIBRATED 0-100 GPM AND I-PULSE = 10 GAL
2. ALL AIR "FIT" CALIBRATED 0-200 SCFM AND I-PULSE = 10 SCF

| PLANT ID. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NAME | | | | | | | | | | | | |
| DESCRIPTION: MATERIAL | | | | | | | | | | | | |
| SIZE | | | | | | | | | | | | |
| CAPACITY | | | | | | | | | | | | |
| TEMP/PRESS | | | | | | | | | | | | |
| HP/VRPM | | | | | | | | | | | | |
| WEIGHT | | | | | | | | | | | | |
| MANUFACTURE | | | | | | | | | | | | |
| MODEL | | | | | | | | | | | | |
| VENDOR | | | | | | | | | | | | |

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |

AS BUILT
RECORD DRAWING

HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

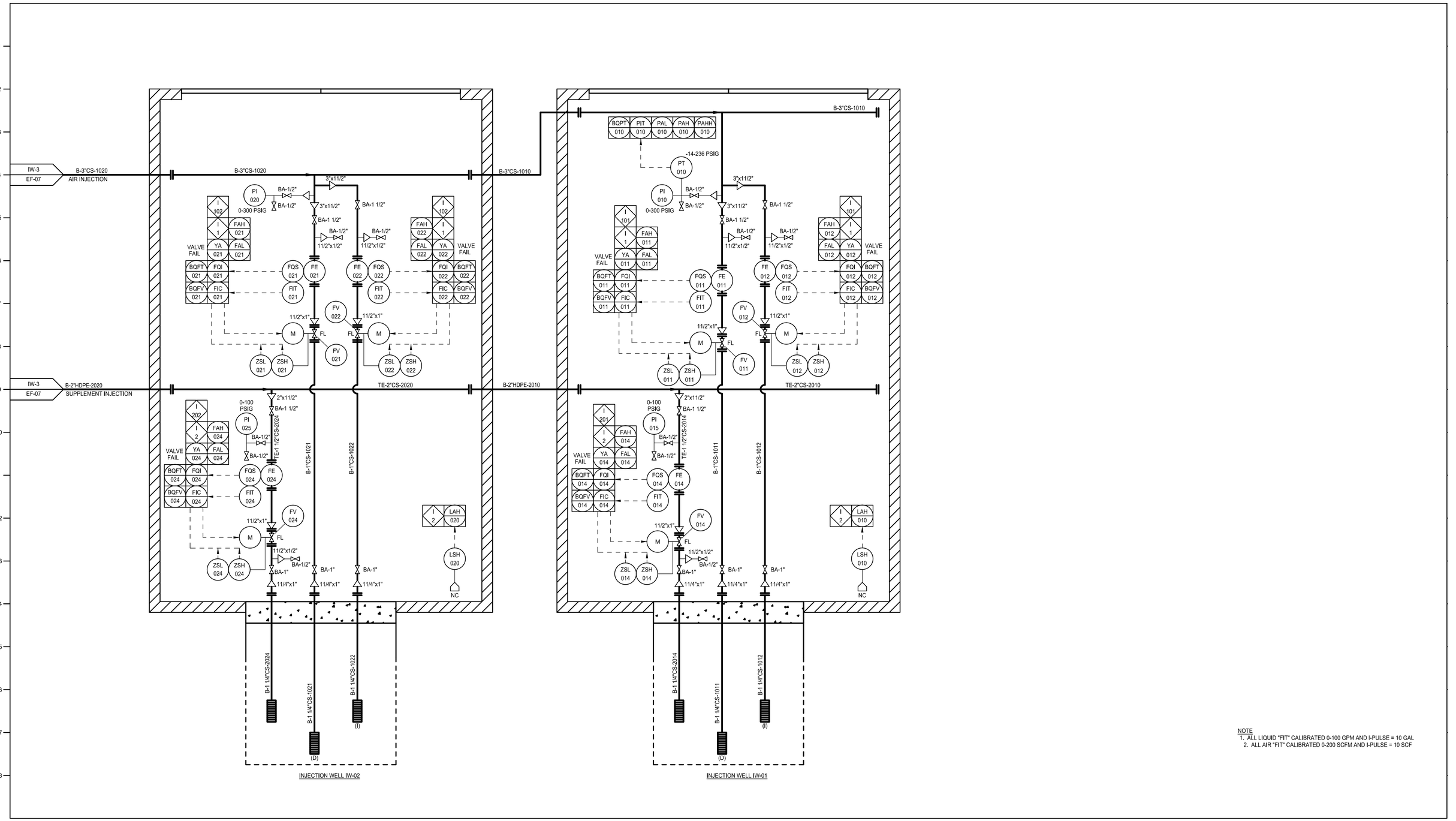
BIOSPARGE TREATMENT SYSTEM

ENGINEERING FLOW SHEET
NORTH FENCE INJECTION WELLS

CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: SEPTEMBER 2003 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: B.A. BEEBE | Drawn By: B.A. BEEBE |
| Scale: | Project No: 06883-00 | Report No: 056 | Drawing No: EF-07 |

06883-00(056)EF-BU000 SEP 26/2012




NOTE
1. ALL LIQUID "FIT" CALIBRATED 0-100 GPM AND I-PULSE = 10 GAL
2. ALL AIR "FIT" CALIBRATED 0-200 SCFM AND I-PULSE = 10 SCF

| PLANT ID. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NAME | | | | | | | | | | | | |
| DESCRIPTION: MATERIAL | | | | | | | | | | | | |
| SIZE | | | | | | | | | | | | |
| CAPACITY | | | | | | | | | | | | |
| TEMP/PRESS | | | | | | | | | | | | |
| HP/VRPM | | | | | | | | | | | | |
| WEIGHT | | | | | | | | | | | | |
| MANUFACTURE | | | | | | | | | | | | |
| MODEL | | | | | | | | | | | | |
| VENDOR | | | | | | | | | | | | |

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |

AS BUILT
RECORD DRAWING

HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

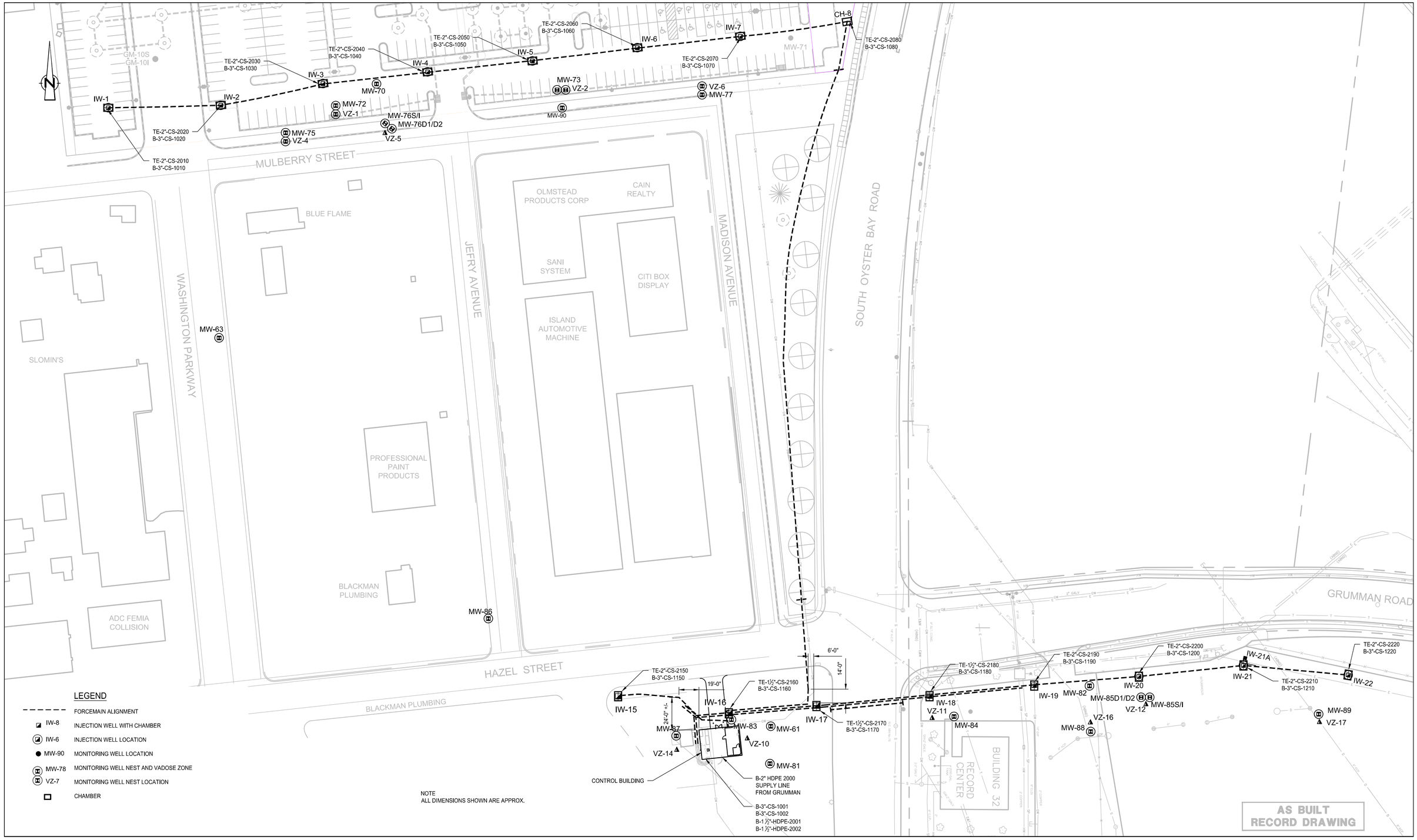
BIOSPARGE TREATMENT SYSTEM

ENGINEERING FLOW SHEET
NORTH FENCE INJECTION WELLS

CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: SEPTEMBER 2003 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: B.A. BEEBE | Drawn By: B.A. BEEBE |
| Scale: | Project No: 06883-00 | Report No: 056 | Drawing No: EF-08 |

06883-00(056)EF-BU000 SEP 26/2012




LEGEND

- FORCEMAIN ALIGNMENT
- IW-8 — INJECTION WELL WITH CHAMBER
- IW-6 — INJECTION WELL LOCATION
- MW-90 — MONITORING WELL LOCATION
- MW-78 — MONITORING WELL NEST AND VADOSE ZONE
- VZ-7 — MONITORING WELL NEST LOCATION
- CHAMBER

NOTE
ALL DIMENSIONS SHOWN ARE APPROX.

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |



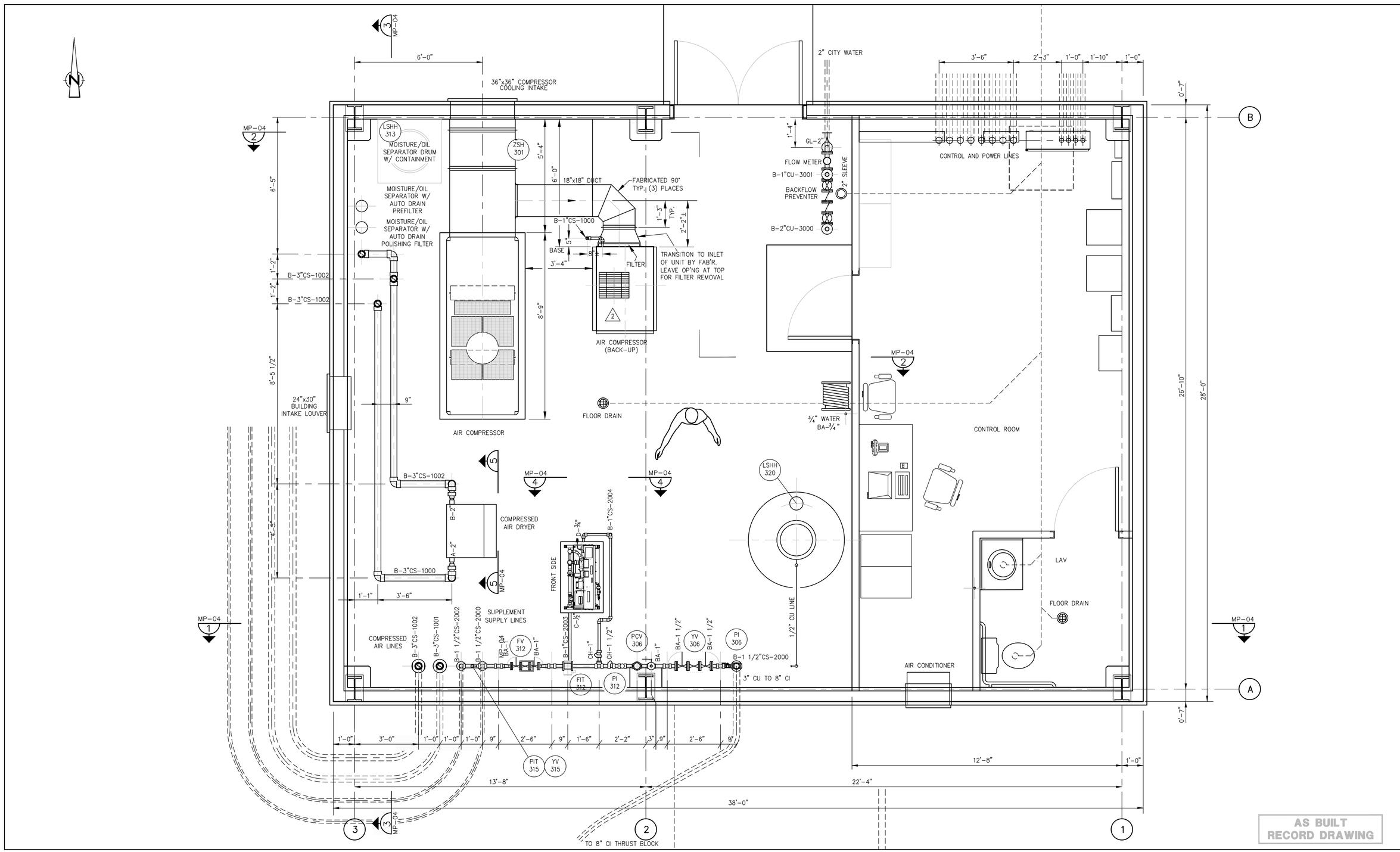
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

# CONTROL BUILDING AND WELL FIELD PIPING PLAN

CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: OCTOBER 2010 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: | Drawn By: L. VAN NOTE |
| Scale: 1" = 40' | Project No: 06883-00 | Report No: 056 | Drawing No: MP-01 |




AS BUILT
RECORD DRAWING

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |



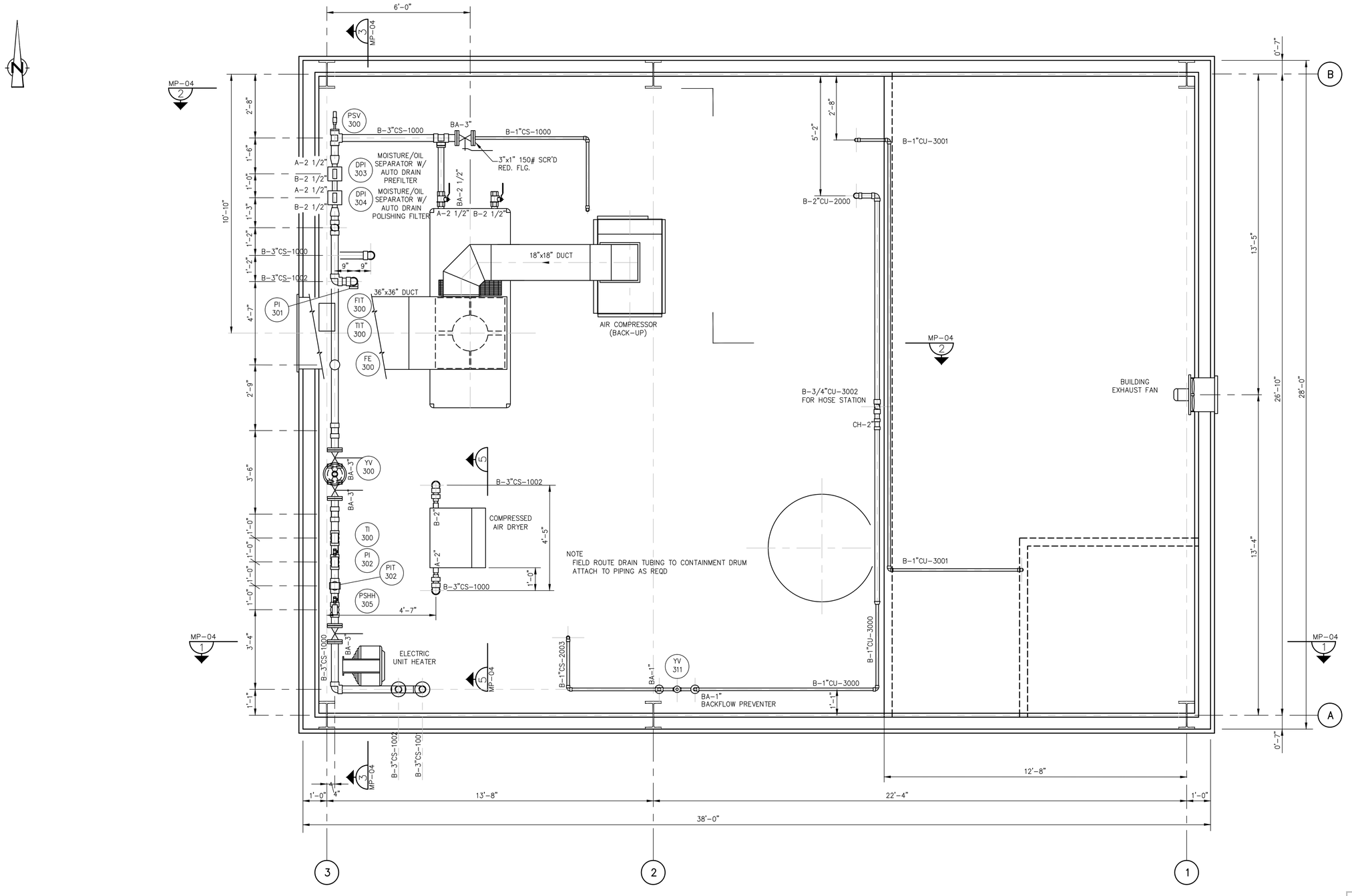
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

# CONTROL BUILDING EQUIPMENT LAYOUT AT GRADE

CRA

| Source Reference: | | | Date: 7-23-03 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: B. A. BEEBE | Drawn By: B. A. BEEBE |
| Scale: 1/2" = 1'-0" | Project No: 06883-00 | Report No: 056 | Drawing No: MP-02 |




AS BUILT
RECORD DRAWING

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |



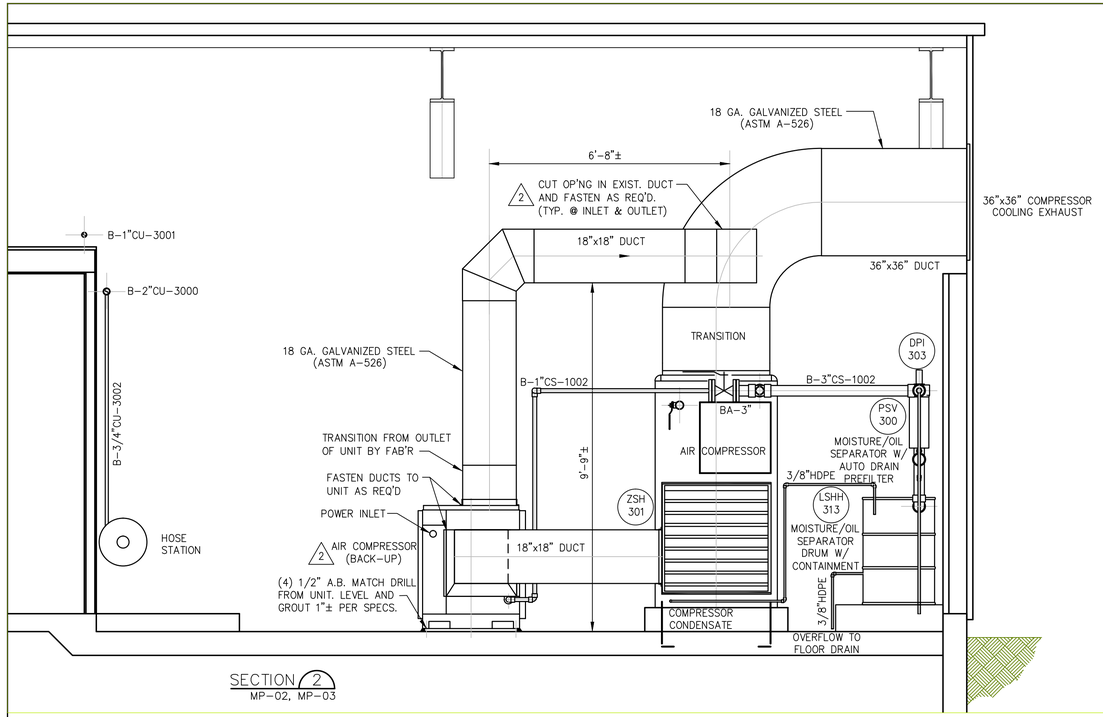
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

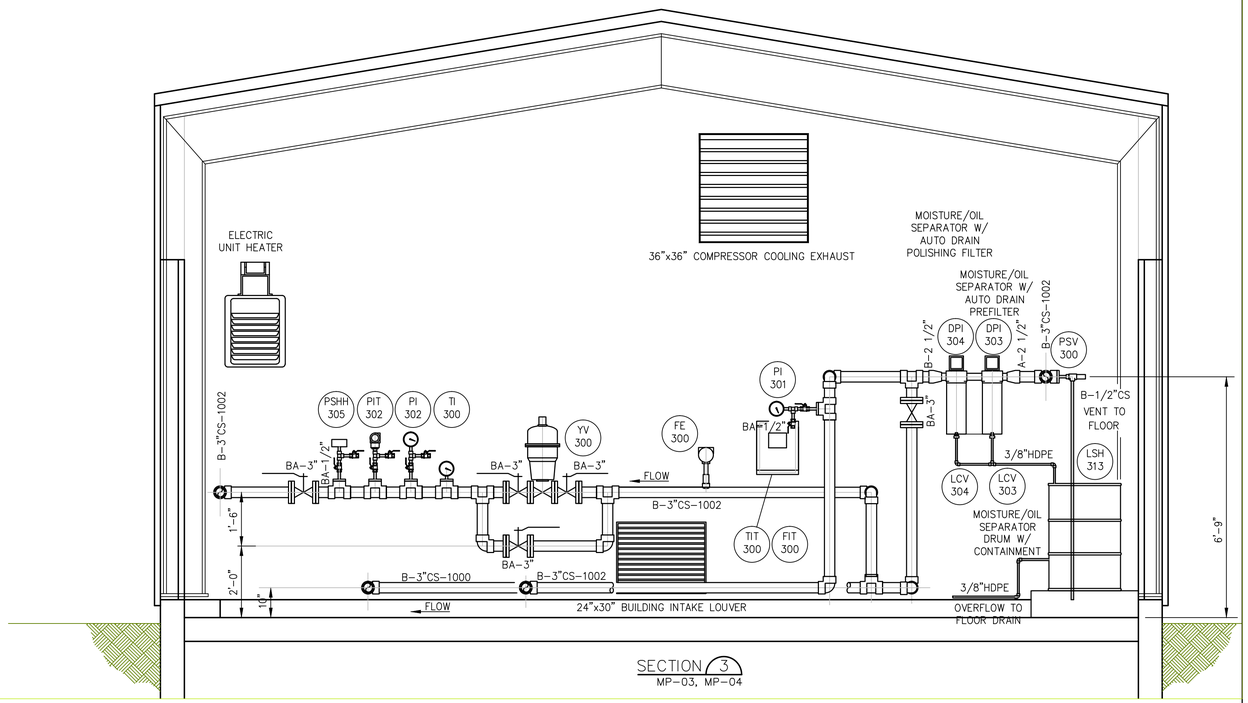
# CONTROL BUILDING EQUIPMENT LAYOUT (UPPER)

CRA Infrastructure & Engineering, Inc.

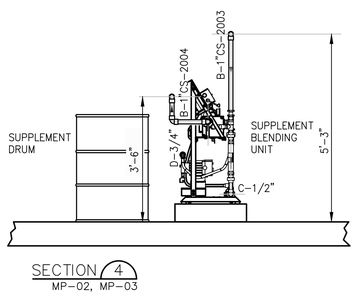
| Source Reference: | | | Date: 7-23-03 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: B. A. BEEBE | Drawn By: B. A. BEEBE |
| Scale: 1/2" = 1'-0" | Project No: 06883-00 | Report No: 056 | Drawing No: MP-03 |



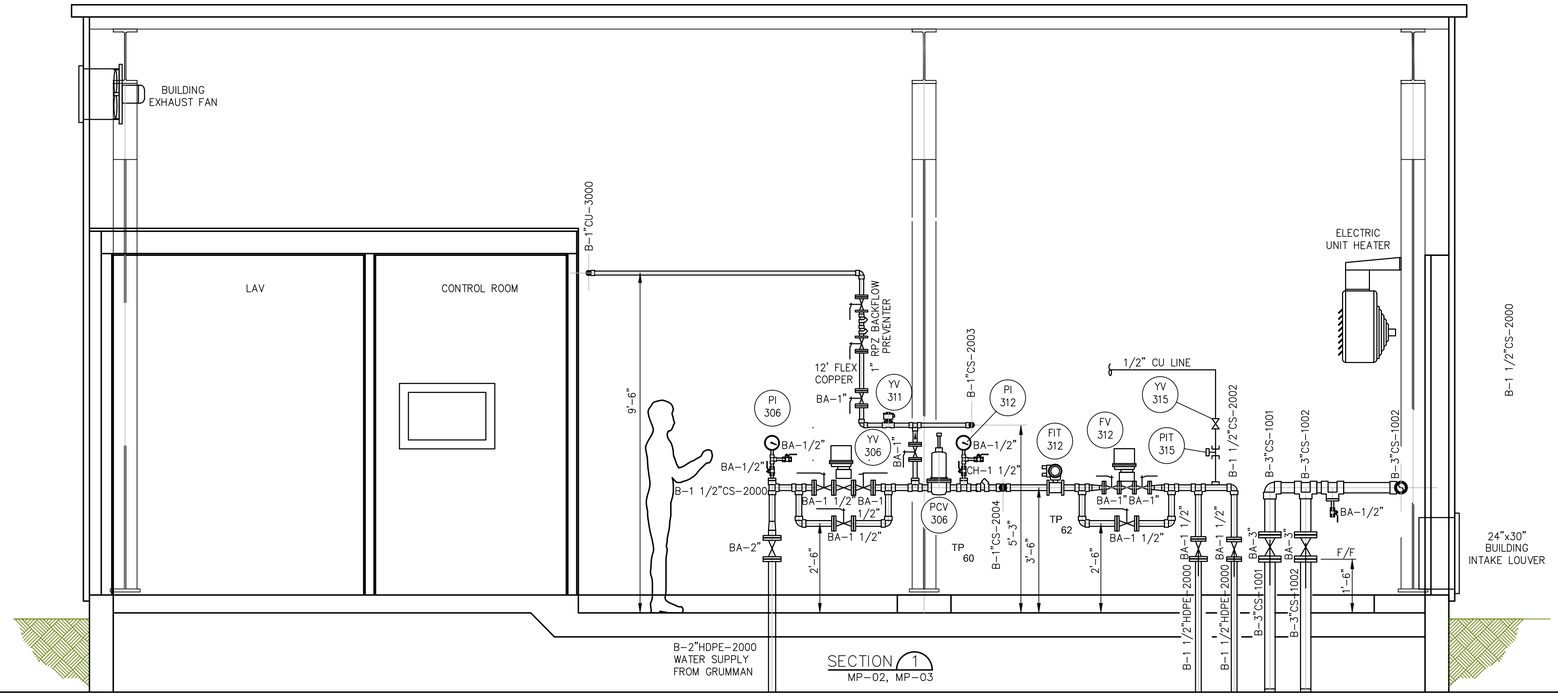

SECTION 2
MP-02, MP-03



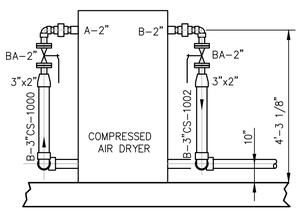

SECTION 3
MP-03, MP-04




SECTION 4
MP-02, MP-03




SECTION 1
MP-02, MP-03




SECTION 5
MP-02, MP-03

AS BUILT
RECORD DRAWING

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |



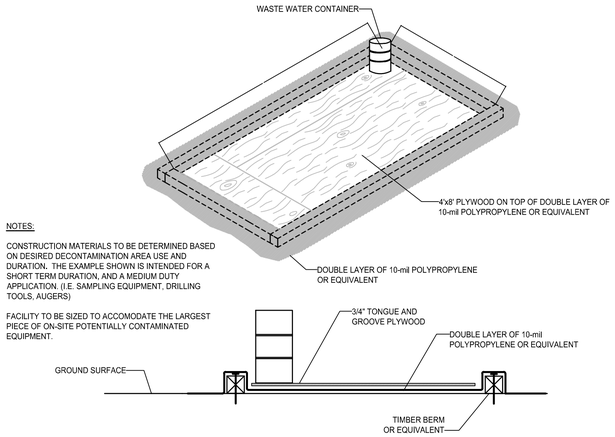
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

# CONTROL BUILDING EQUIPMENT SECTIONS

CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: 7-23-03 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: B. A. BEEBE | Drawn By: B. A. BEEBE |
| Scale: 1/2" = 1'-0" | Project No: 06883-00 | Report No: 056 | Drawing No: MP-04 |

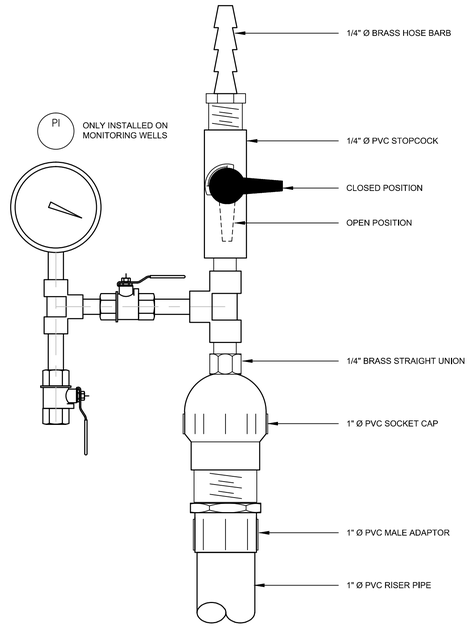



NOTES:

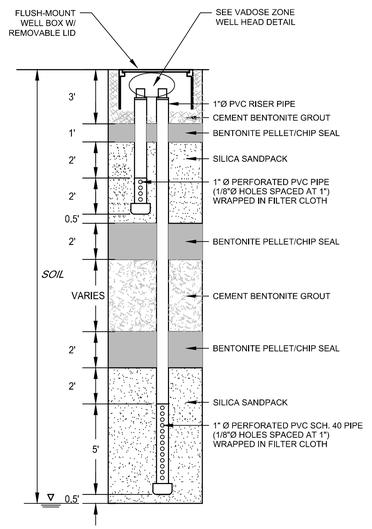
CONSTRUCTION MATERIALS TO BE DETERMINED BASED ON DESIRED DECONTAMINATION AREA USE AND DURATION. THE EXAMPLE SHOWN IS INTENDED FOR A SHORT TERM DURATION, AND A MEDIUM DUTY APPLICATION. (I.E. SAMPLING EQUIPMENT, DRILLING TOOLS, AUGERS)

FACILITY TO BE SIZED TO ACCOMODATE THE LARGEST PIECE OF ON-SITE POTENTIALLY CONTAMINATED EQUIPMENT.

## TYPICAL DECONTAMINATION AREA (MEDIUM DUTY)

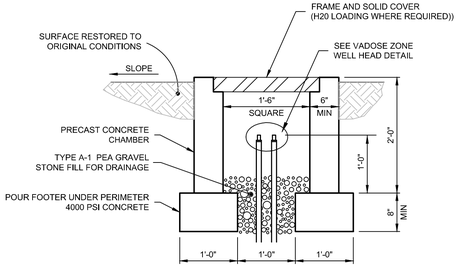



## VADOSE ZONE WELL HEAD DETAIL

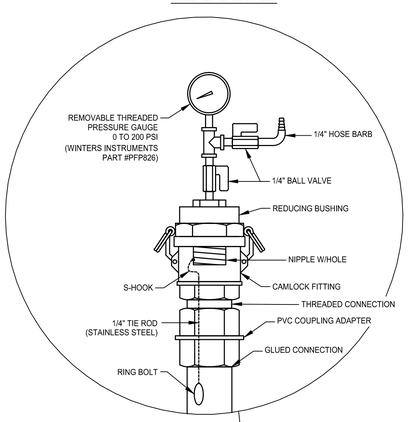



## TYPICAL VADOSE ZONE MONITORING WELL DETAIL

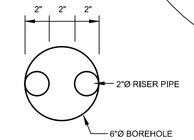
NOT TO SCALE




## VADOSE ZONE MONITORING WELL VAULT




## GROUNDWATER MONITORING WELL HEAD DETAIL




## SPACER DETAIL

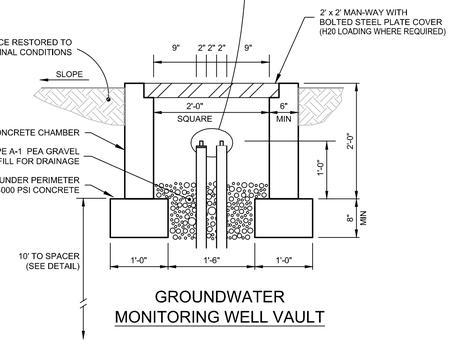



## TYPICAL GROUNDWATER MONITORING WELL DETAIL

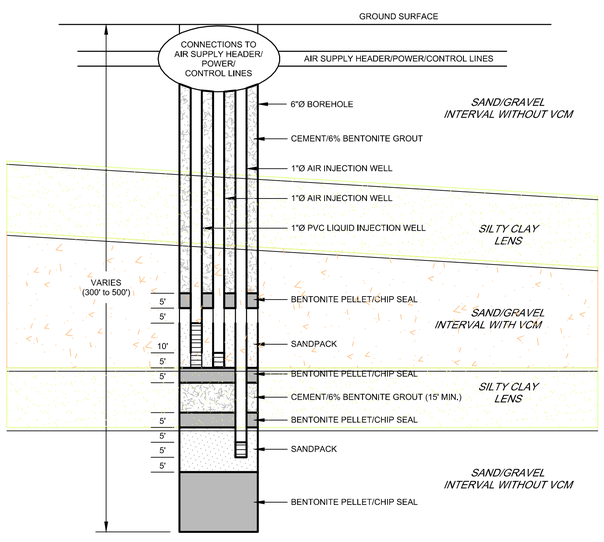
NOT TO SCALE

NOTES:

1. WELLS EXTEND TO DEPTH RANGING FROM 250' TO 450'
2. NUMBER OF MONITORED INTERVALS DETERMINED IN THE FIELD

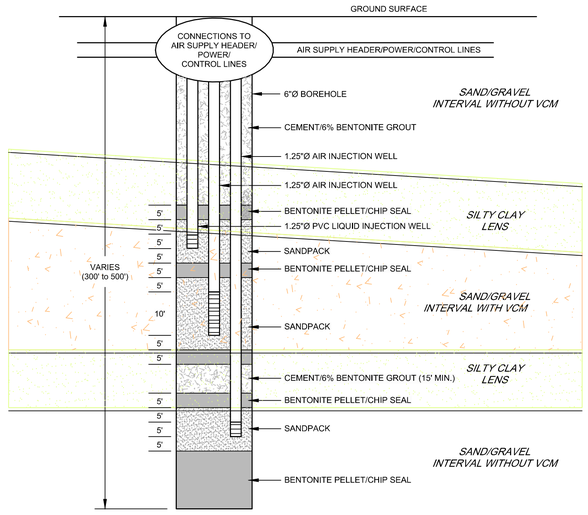



## GROUNDWATER MONITORING WELL VAULT




## TYPICAL INJECTION WELL DETAIL (IW-16, 17, 18 AND 19)

NOT TO SCALE




## TYPICAL INJECTION WELL DETAIL (IW-1 THRU 7, 15, 20 THRU 22)

NOT TO SCALE

AS BUILT
RECORD DRAWING

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |



HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

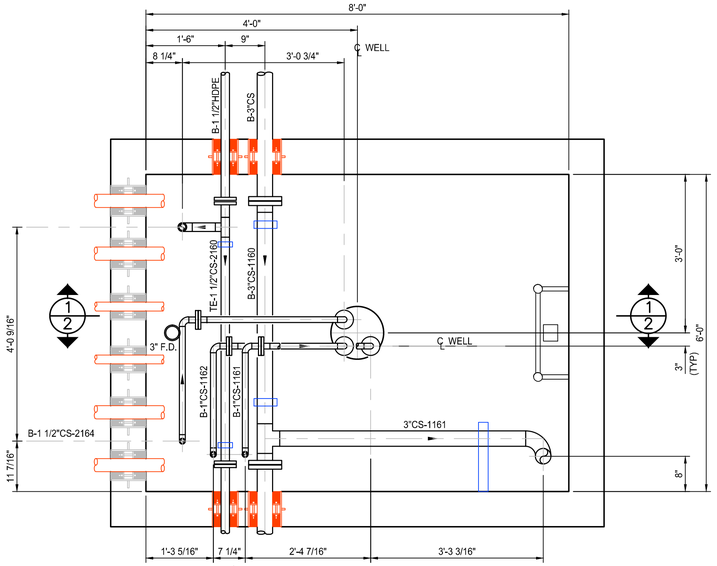
BIOSPARGE TREATMENT SYSTEM

WELL DETAILS

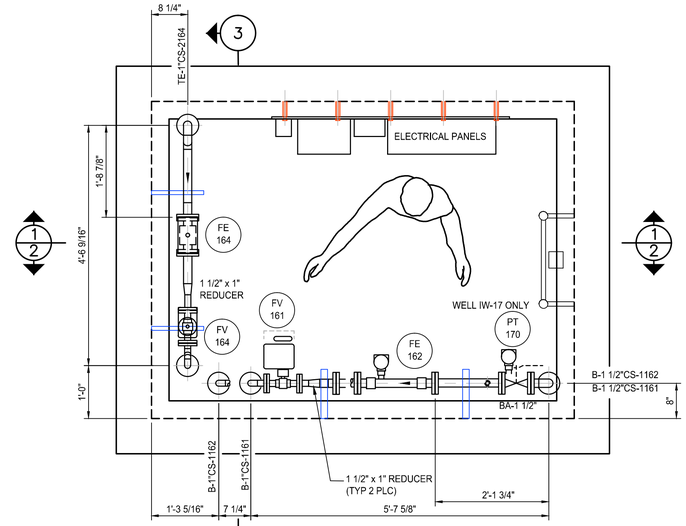
CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: AUGUST 2012 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: | Drawn By: |
| Scale: NONE | Project No: 06883-00 | Report No: 056 | Drawing No: MP-05 |

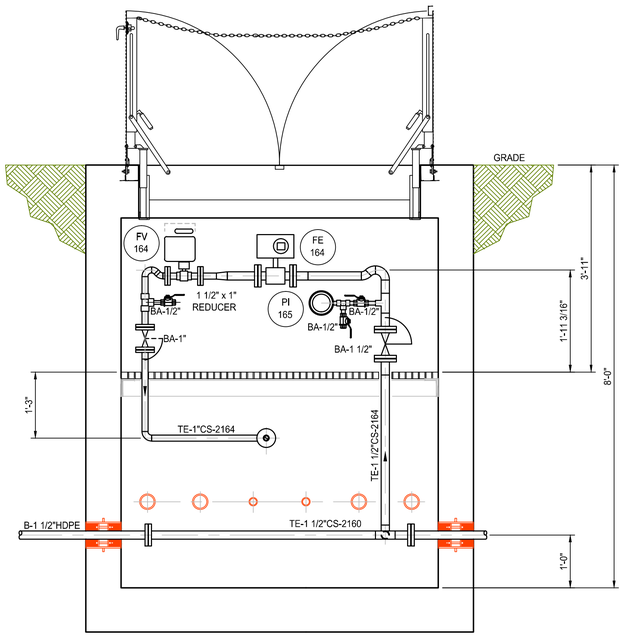
| WELL NUMBER | LINE NUMBER | INSTRUMENT NUMBER | | | | | "TIE POINT" NUMBER |
|---|---|---|---|---|---|---|---|
| | | PI | PT | FE | FV | FE | |
| IW-16 | TE-1 1/2"CS-2160 | | | | | | TP-4, TP-56 |
| | B-3"-CS-1160 | 160 | | | | | TP-6, TP-8 |
| | TE-1 1/2"CS-2164 | 165 | | 164 | 164 | | TP-5 |
| | B-1 1/2"CS-1161 | | | | 161 | 161 | TP-7 |
| | B-1 1/2"CS-1162 | | | | 162 | 162 | TP-9 |
| IW-17 | TE-1 1/2"CS-2170 | | | | | | TP-10, TP-57 |
| | B-3"-CS-1170 | 170 | | | | | TP-12, TP-14 |
| | TE-1 1/2"CS-2174 | 175 | | 174 | 174 | | TP-11 |
| | B-1 1/2"CS-1171 | | 170 | | 171 | 171 | TP-13 |
| | B-1 1/2"CS-1172 | | | | 172 | 172 | TP-15 |
| IW-18 | TE-1 1/2"CS-2180 | | | | | | TP-16,TP-58 |
| | B-3"-CS-1180 | 180 | | | | | TP-18,TP-20 |
| | TE-1 1/2"CS-2184 | 185 | | 184 | 184 | | TP-17 |
| | B-1 1/2"CS-1181 | | | | 181 | 181 | TP-19 |
| | B-1 1/2"CS-1182 | | | | 182 | 182 | TP-21 |
| IW-19 | TE-1 1/2"CS-2190 | | | | | | TP-22 |
| | B-3"-CS-1190 | 190 | | | | | TP-24 |
| | TE-1 1/2"CS-2194 | 195 | | 194 | 194 | | TP-23 |
| | B-1 1/2"CS-1191 | | | | 191 | 191 | TP-25 |
| | B-1 1/2"CS-1192 | | | | 192 | 192 | TP-27 |



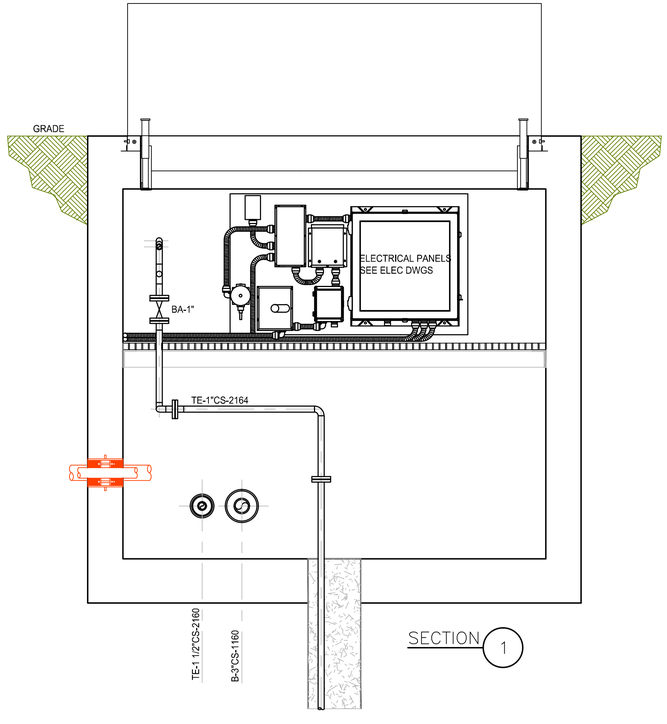

3 PLAN BELOW THE GRATING



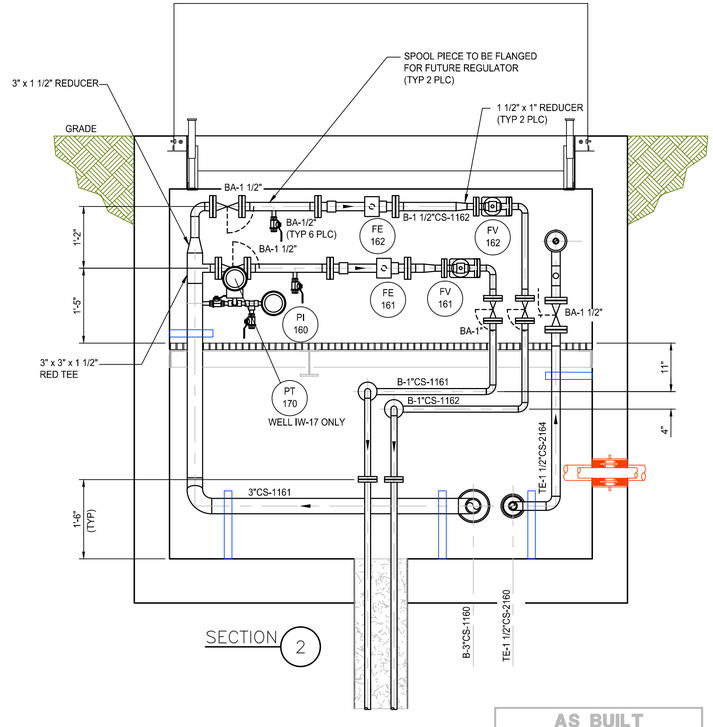

3 PLAN ABOVE THE GRATING




SECTION 3




SECTION 1




SECTION 2

AS BUILT
RECORD DRAWING

NOTES:

1. THE VAULT SHOWN ABOVE IS FOR WELL IW-16. ALL VAULTS WERE PIPED AS PER THIS TYPICAL DRAWING. INSTRUMENT AND LINE NUMBERS FOR THE OTHER VAULTS MAY BE FOUND ON TABLE.
2. WELLS IW-01 THRU IW-07 ARE LOCATED NORTH OF THE CONTROL BUILDING. THESE VAULTS ARE POSITIONED WITH THE WELL LOCATED ON THE NORTH SIDE OF THE VAULT.
3. WELLS IW-15 THRU IW-22 ARE LOCATED JUST NORTH OF THE CONTROL BUILDING. THESE VAULTS ARE POSITIONED WITH THE WELL LOCATED ON THE SOUTH SIDE OF THE VAULT.
4. ALL AIR, LIQUID, CONTROL, AND ELECTRICAL LINES PASS THRU THE VAULTS, EXCEPT IW-1, IW-8, IW-15, AND IW-22. CONTRACTOR PLUGGED ANY ADDITIONAL HOLES IN THESE VAULTS.
5. WATER FLOW METER FE-XX4 CONFIGURED FOR REVERSE FLOW AND INSTALLED BACKWARD.

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |



HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

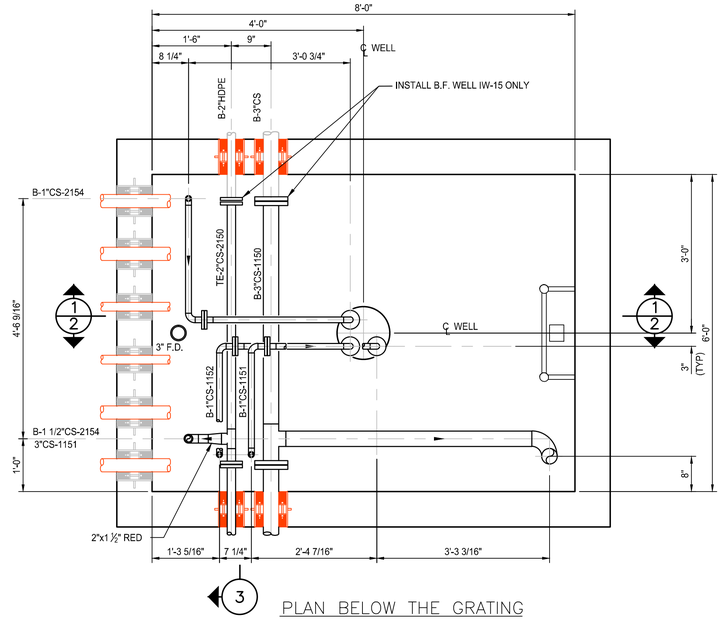
BIOSPARGE TREATMENT SYSTEM

INJECTION WELLS IW-16, 17, 18 & 19
PLAN AND SECTIONS

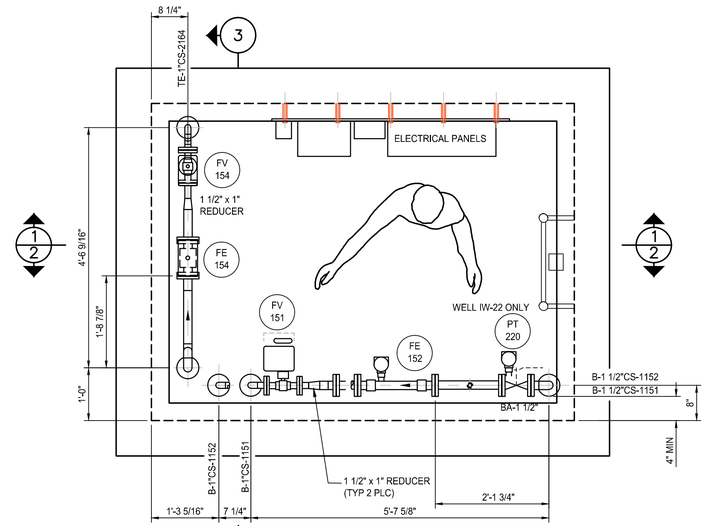
CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: |
|---|---|---|---|
| | | | 7-23-03 |
| Project Manager: J. KAY | Reviewed By: | Designed By: B. A. BEEBE | Drawn By: B. A. BEEBE |
| Scale: NONE | Project No: 06883-00 | Report No: 056 | Drawing No: MP-06 |

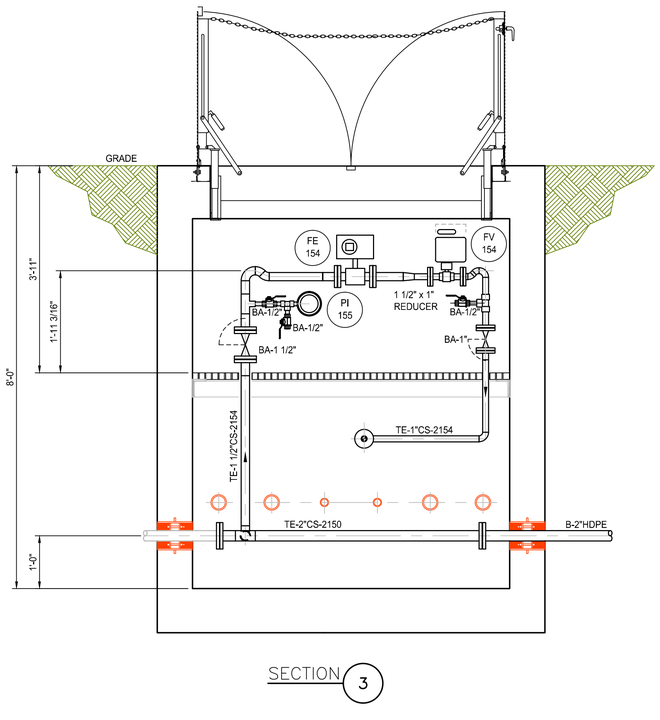
| WELL NUMBER | LINE NUMBER | INSTRUMENT NUMBER | | | | |
|---|---|---|---|---|---|---|
| | | PI | PT | FE | FV | FE |
| IW-15 | TE-2"CS-2150 | | | | | |
| | B-3"CS-1150 | 150 | | | | |
| | TE-1 1/2"CS-2154 | 155 | | 154 | 154 | |
| | B-1 1/2"CS-1151 | | | | 151 | 151 |
| | B-1 1/2"CS-1152 | | | | 152 | 152 |
| IW-20 | TE-2"CS-2200 | | | | | |
| | B-3"CS-1200 | 200 | | | | |
| | TE-1 1/2"CS-2204 | 205 | | 204 | 204 | |
| | B-1 1/2"CS-1201 | | | | 201 | 201 |
| | B-1 1/2"CS-1202 | | | | 202 | 202 |
| IW-22 | TE-2"CS-2210 | | | | | |
| | B-3"CS-1220 | 220 | | | | |
| | TE-1 1/2"CS-2224 | 225 | | 224 | 224 | |
| | B-1 1/2"CS-1221 | | 220 | | 221 | 221 |
| | B-1 1/2"CS-1222 | | | | 222 | 222 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |



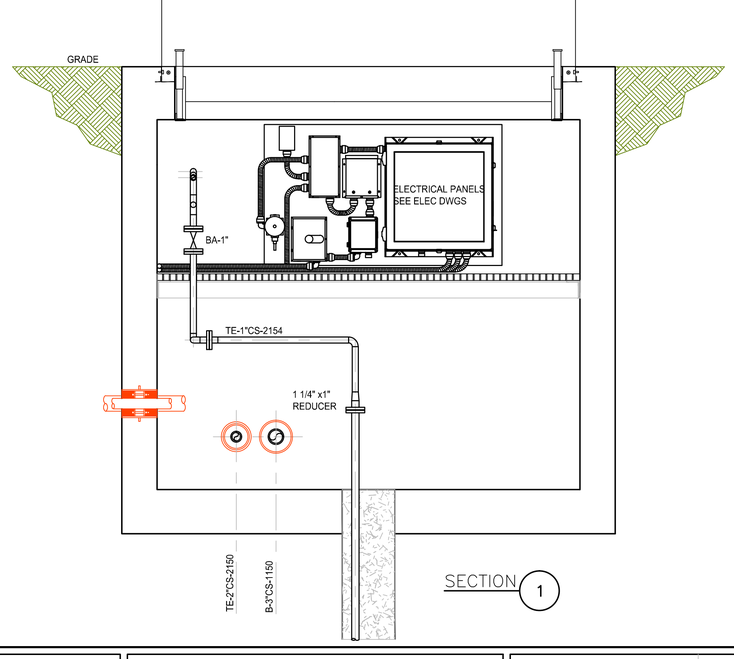

PLAN BELOW THE GRATING



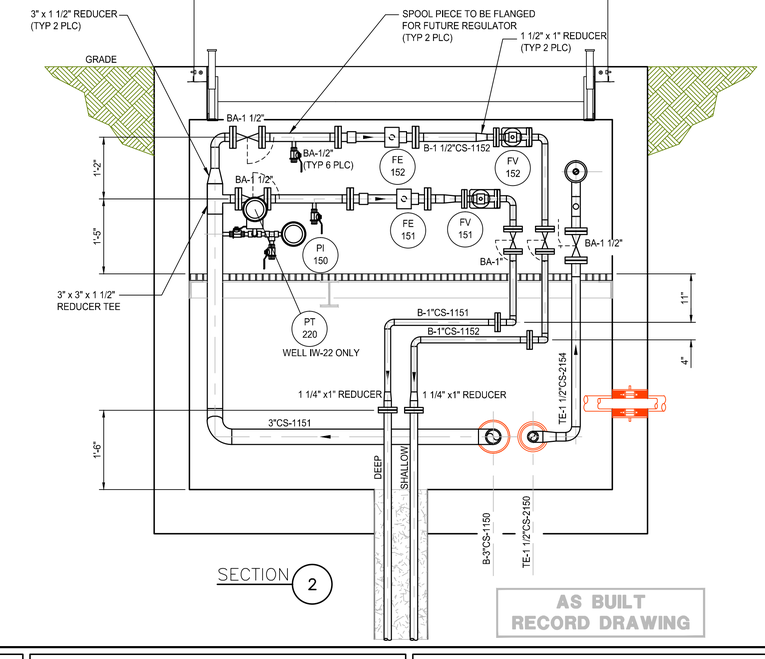

PLAN ABOVE THE GRATING




SECTION 3




SECTION 1




SECTION 2

AS BUILT
RECORD DRAWING

NOTES:

1. THE VAULT SHOWN ABOVE IS FOR WELL IW-15. ALL VAULTS WERE PIPED AS PER THIS TYPICAL DRAWING. INSTRUMENT AND LINE NUMBERS FOR THE OTHER VAULTS MAY BE FOUND ON TABLE.
2. WELLS IW-01 THRU IW-07 ARE LOCATED NORTH OF THE CONTROL BUILDING. THESE VAULTS ARE POSITIONED WITH THE WELL LOCATED ON THE NORTH SIDE OF THE VAULT.
3. WELLS IW-15 THRU IW-22 ARE LOCATED JUST NORTH OF THE CONTROL BUILDING. THESE VAULTS ARE POSITIONED WITH THE WELL LOCATED ON THE SOUTH SIDE OF THE VAULT.
4. ALL AIR, LIQUID, CONTROL, AND ELECTRICAL LINES PASS THRU THE VAULTS, EXCEPT IW-1, IW-8, IW-15, AND IW-22. CONTRACTOR PLUGGED ANY ADDITIONAL HOLES IN THESE VAULTS.

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |



HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

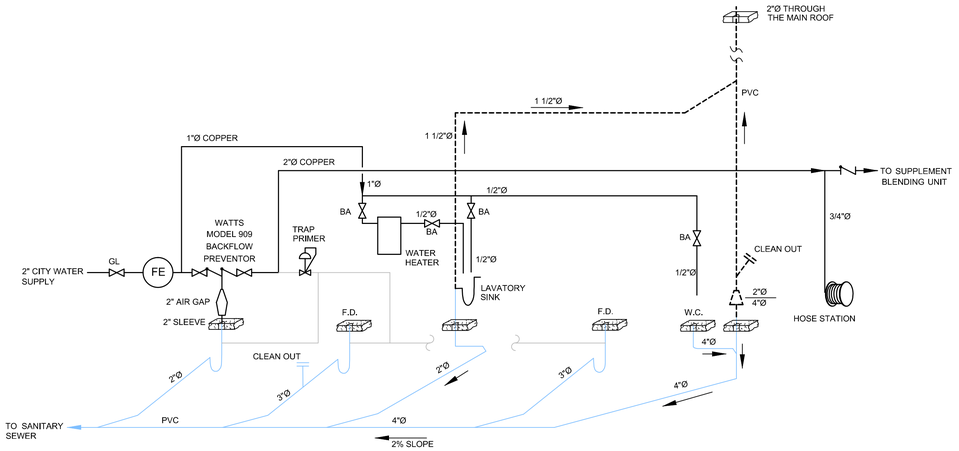
BIOSPARGE TREATMENT SYSTEM

# INJECTION WELLS IW-15, 20 AND 22 PLAN AND SECTIONS

CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: 7-23-03 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: B. A. BEEBE | Drawn By: B. A. BEEBE |
| Scale: NONE | Project No: 06883-00 | Report No: 055 | Drawing No: MP-07 |

06883-00(056)MP-BU007 SEP 26/2012




GENERAL PLUMBING NOTES:

1. ALL WORKS MUST COMPLY WITH NEW YORK PLUMBING CODE.
2. REFER TO WRITTEN SPECIFICATIONS FOR SPECS ON FIXTURES, PIPING MATERIALS, INSTALLATIONS, ETC., UNLESS INDICATED OTHERWISE.
3. THESE PLANS MAKE NO ATTEMPT TO SHOW ALL ITEMS REQUIRED FOR COMPLETE INSTALLATION. ALL FIXTURES MUST BE ROUGHED IN AND INSTALLED IN STRICT ACCORDANCE WITH MFG'S SHOP DWGS AND INSTALLATION PROCEDURES. CONTRACTOR MUST FURNISH AND INSTALL ALL ITEMS, FITTINGS, AND MISCELLANEOUS HARDWARE NEEDED FOR PLUMBING-CODE COMPLIANCE AND COMPLETE OPERATIONAL SERVICE AND MAINTENANCE.

## LAVATORY PLUMBING

NOT TO SCALE

AS BUILT
RECORD DRAWING

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |



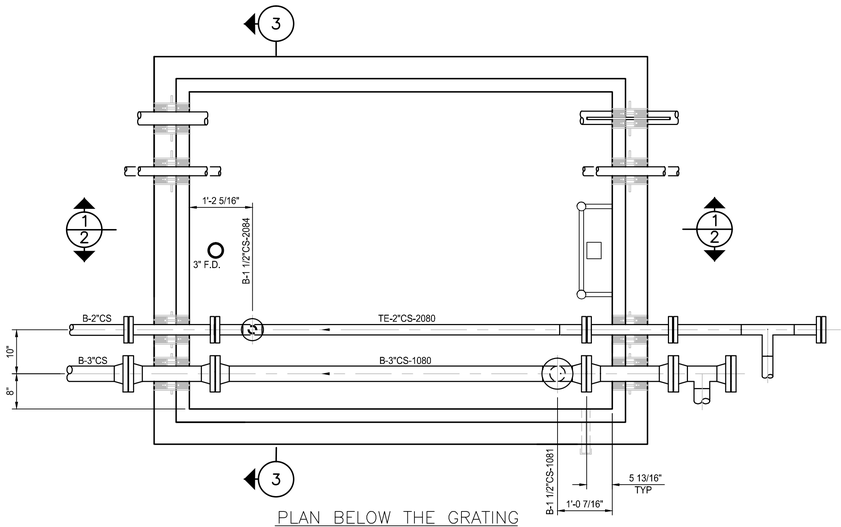
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

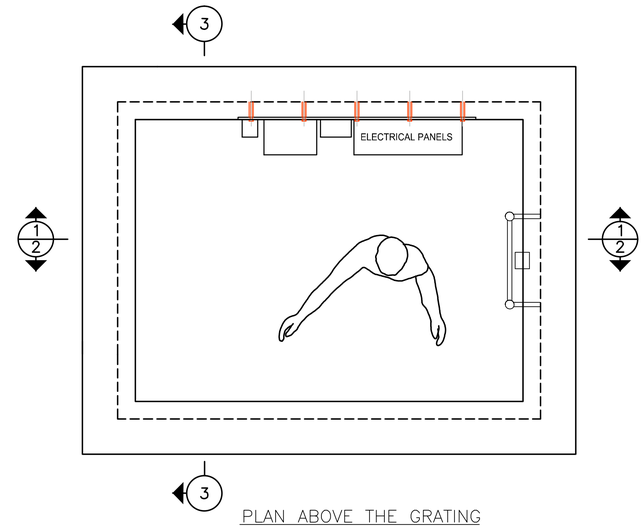
LAVATORY PLUMBING

CRA Infrastructure & Engineering, Inc.

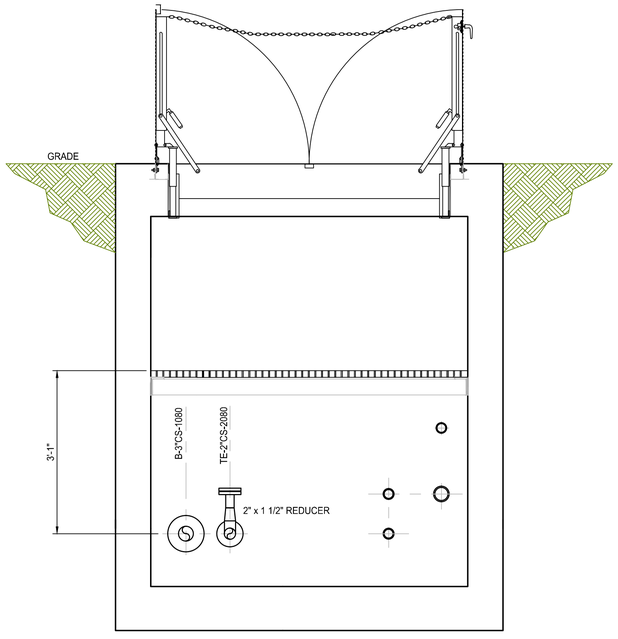
| Source Reference: | | | Date: AUGUST 2012 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: | Drawn By: |
| Scale: NONE | Project No: 06883-00 | Report No: 056 | Drawing No: MP-08 |



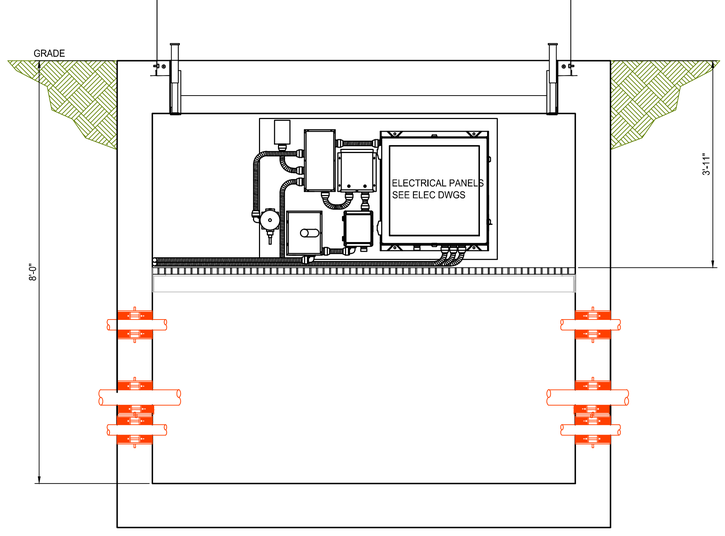

PLAN BELOW THE GRATING



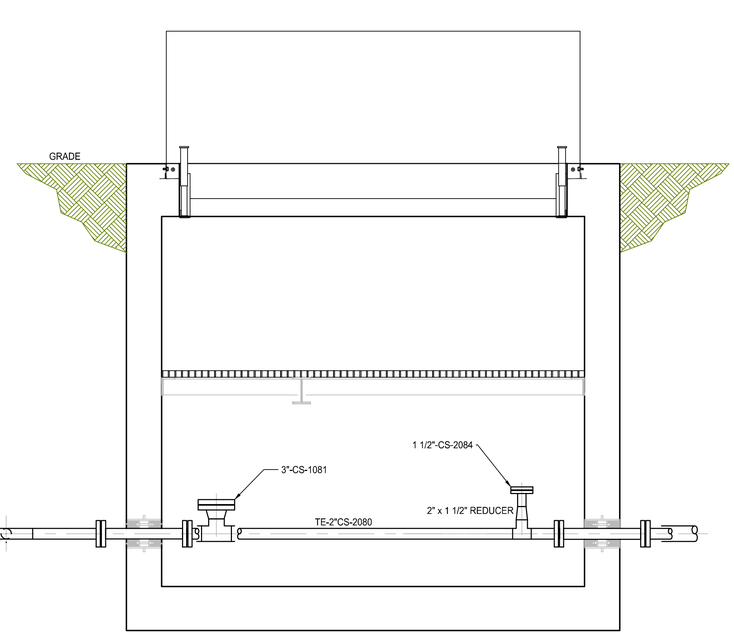

PLAN ABOVE THE GRATING




SECTION 3




SECTION 1




SECTION 2

AS BUILT
RECORD DRAWING

NOTES:

1. WELLS IW-01 THRU IW-07 ARE LOCATED NORTH OF THE CONTROL BUILDING. THESE VAULTS ARE POSITIONED WITH THE WELL LOCATED ON THE NORTH SIDE OF THE VAULT.
2. WELLS IW-15 THRU IW-22 ARE LOCATED JUST NORTH OF THE CONTROL BUILDING. THESE VAULTS ARE POSITIONED WITH THE WELL LOCATED ON THE SOUTH SIDE OF THE VAULT.
3. ALL AIR, LIQUID, CONTROL, AND ELECTRICAL LINES PASS THRU THE VAULTS, EXCEPT IW-1, IW-8, IW-15, AND IW-22. CONTRACTOR PLUGGED ANY ADDITIONAL HOLES IN THESE VAULTS.

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |



HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

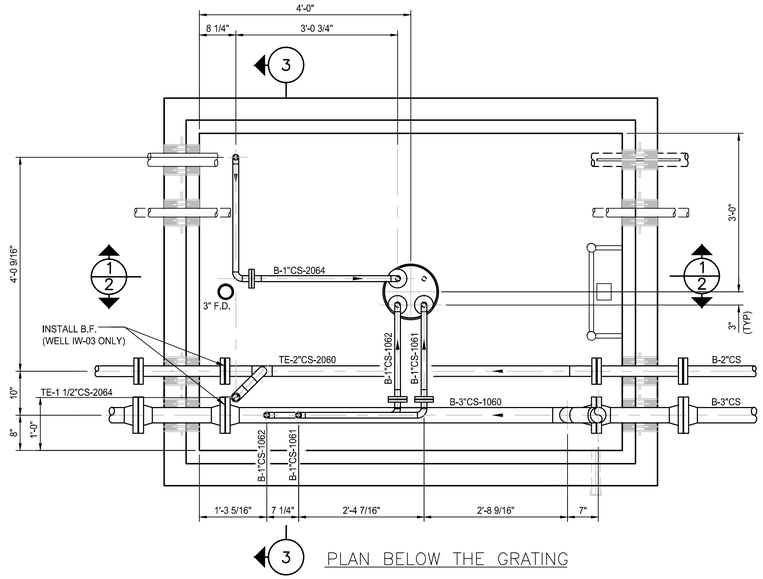
BIOSPARGE TREATMENT SYSTEM

INJECTION WELL IW-08
PLAN AND SECTIONS

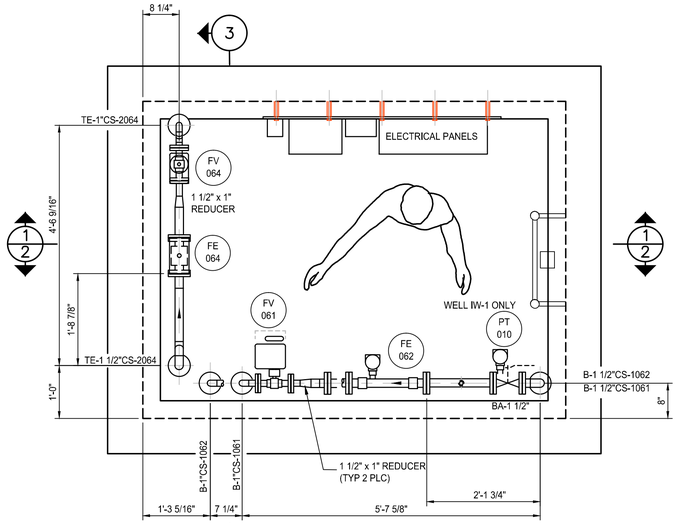
CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: 7-23-03 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: B. A. BEEBE | Drawn By: B. A. BEEBE |
| Scale: NONE | Project No: 06883-00 | Report No: 056 | Drawing No: MP-09 |

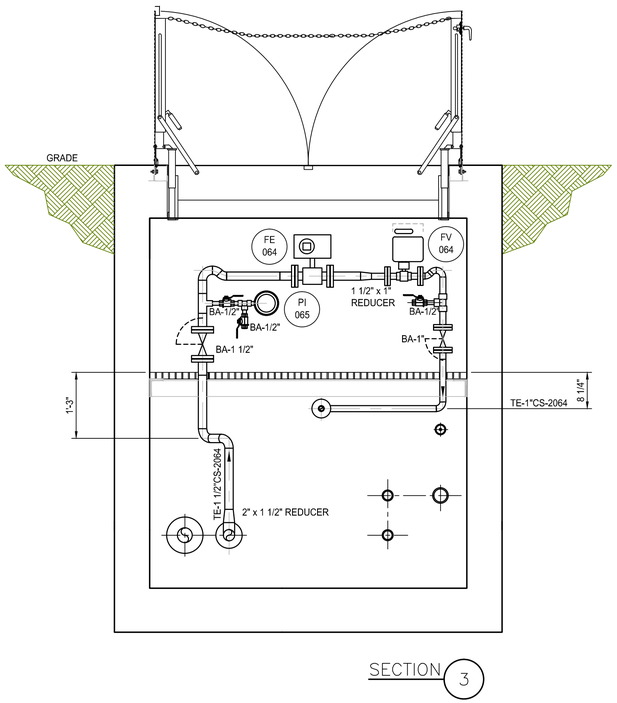
| WELL NUMBER | LINE NUMBER | INSTRUMENT NUMBER | | | | | "TIE POINT" NUMBER |
|---|---|---|---|---|---|---|---|
| | | PI | PT | FE | FV | FE | |
| IW-01 | TE-2"CS-2010 | | | | | | TP-72 |
| | B-3"CS-1010 | 010 | | | | | TP-71 |
| | TE-1 1/2"CS-2014 | 015 | | 014 | 014 | | |
| | B-1 1/2"CS-1011 | | 010 | | 011 | 011 | |
| | B-1 1/2"CS-1012 | | | | 012 | 012 | TP-67,TP-69 |
| IW-02 | TE-2"CS-2020 | | | | | | TP-69,TP-70 |
| | B-3"CS-1020 | 020 | | | | | |
| | TE-1 1/2"CS-2024 | 025 | | 024 | 024 | | |
| | B-1 1/2"CS-1021 | | | | 021 | 021 | |
| | B-1 1/2"CS-1022 | | | | 022 | 022 | |
| IW-03 | TE-2"CS-2030 | | | | | | TP-64,TP-66 |
| | B-3"CS-1030 | 030 | | | | | TP-63,TP-65 |
| | TE-1 1/2"CS-2034 | 035 | | 034 | 034 | | |
| | B-1 1/2"CS-1031 | | | | 031 | 031 | |
| | B-1 1/2"CS-1032 | | | | 032 | 032 | |
| IW-04 | TE-2"CS-2040 | | | | | | TP-45,TP-47 |
| | B-3"CS-1040 | 040 | | | | | TP-44,TP-46 |
| | TE-1 1/2"CS-2044 | 045 | | 044 | 044 | | |
| | B-1 1/2"CS-1041 | | | | 041 | 041 | |
| | B-1 1/2"CS-1042 | | | | 042 | 042 | |
| IW-05 | TE-2"CS-2050 | | | | | | TP-41,TP-43 |
| | B-3"CS-1050 | 050 | | | | | TP-40, TP-42 |
| | TE-1 1/2"CS-2054 | 055 | | 054 | 054 | | |
| | B-1 1/2"CS-1051 | | | | 051 | 051 | |
| | B-1 1/2"CS-1052 | | | | 052 | 052 | |
| IW-06 | TE-2"CS-2060 | | | | | | TP-37,TP-39 |
| | B-3"CS-1060 | 060 | | | | | TP-36,TP-38 |
| | TE-1 1/2"CS-2064 | 065 | | 064 | 064 | | |
| | B-1 1/2"CS-1061 | | | | 061 | 061 | |
| | B-1 1/2"CS-1062 | | | | 062 | 062 | |
| IW-07 | TE-2"CS-2070 | | | | | | TP-33,TP-35 |
| | B-3"CS-1070 | 070 | | | | | TP-32,TP-34 |
| | TE-1 1/2"CS-2074 | 075 | | 074 | 074 | | |
| | B-1 1/2"CS-1071 | | | | 071 | 071 | |
| | B-1 1/2"CS-1072 | | | | 072 | 072 | |



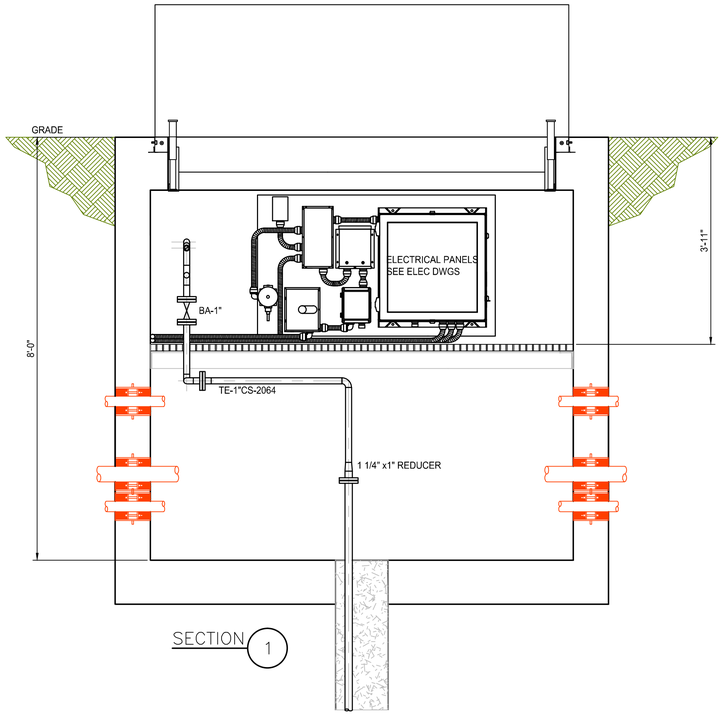

PLAN BELOW THE GRATING



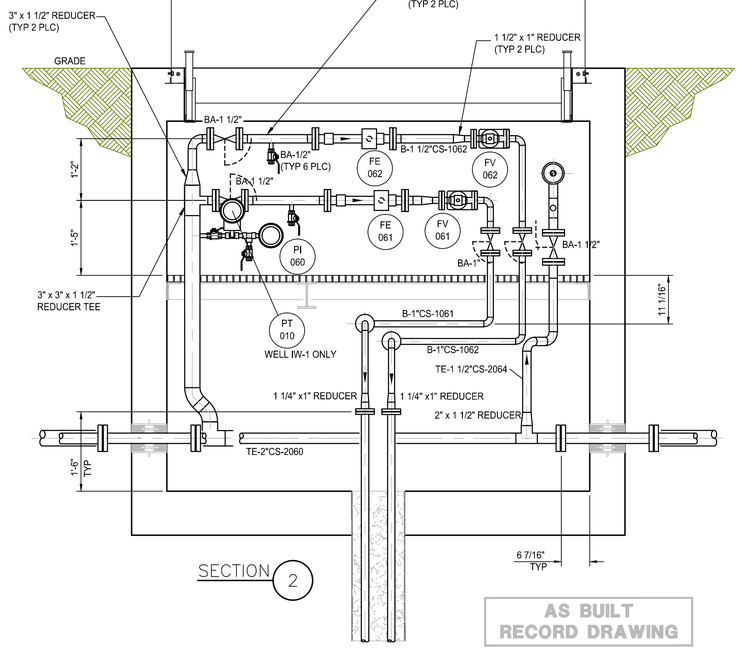

PLAN ABOVE THE GRATING




SECTION 3




SECTION 1




SECTION 2

AS BUILT
RECORD DRAWING

NOTES:
1. THE VAULT SHOWN ABOVE IS FOR WELL IW-06. ALL VAULTS WERE PIPED AS PER THIS TYPICAL DRAWING. INSTRUMENT AND LINE NUMBERS FOR THE OTHER VAULTS MAY BE FOUND ON TABLE.
2. WELLS IW-01 THRU IW-07 ARE LOCATED NORTH OF THE CONTROL BUILDING. THESE VAULTS ARE POSITIONED WITH THE WELL LOCATED ON THE NORTH SIDE OF THE VAULT.
3. WELLS IW-15 THRU IW-22 ARE LOCATED JUST NORTH OF THE CONTROL BUILDING. THESE VAULTS ARE POSITIONED WITH THE WELL LOCATED ON THE SOUTH SIDE OF THE VAULT.
4. ALL AIR, LIQUID, CONTROL, AND ELECTRICAL LINES PASS THRU THE VAULTS, EXCEPT IW-1, IW-8, IW-15, AND IW-22. CONTRACTOR PLUGGED ANY ADDITIONAL HOLES IN THESE VAULTS.

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |



HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

INJECTION WELLS IW-01 THRU IW-07
PLANS AND SECTIONS

| Source Reference: | | | Date: 7-23-03 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: B. A. BEEBE | Drawn By: B. A. BEEBE |
| Scale: NONE | Project No: 06883-00 | Report No: 056 | Drawing No: MP-10 |

| REV | SIZE & LINE No. | DESCRIPTION (TO & FROM) | PIPING DRAWING | P & ID DRAWING | DATE COMPLETED | TRACED | | INSULATION | | | TIE POINT No. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | STEAM | ELECTRICAL | THK | SPEC | JACKET | | |
| | 3"CS-1000 | PRIMARY AIR COMPR TO COMPR AIR DRYER | MP-02, 03 & 04 | EF-01 S1 | | N | N | N | N | N | | INSIDE BLDG |
| | 3"CS-1001 | 3"CS-1002 TO 3"CS-1080 | MP-01 | EF-01 S1 | | N | N | N | N | N | | NORTH, UNDERGROUND |
| | 3"CS-1002 | COMPR AIR DRYER TO 3"CS-1160 | MP-02, 03 & 04 | EF-01 S1 | | N | N | N | N | N | | INSIDE BLDG |
| | 3"CS-1010 | 3"CS-1020 (IW-02) TO END | MP-01, 10 | EF-08 | | N | N | N | N | N | | IW-01 |
| | 3"CS-1011 | 3"CS-1010 TO WELL | MP-10 | EF-08 | | N | N | N | N | N | | IW-01 |
| | 3"CS-1012 | 3"CS-1011 TO WELL | MP-10 | EF-08 | | N | N | N | N | N | | IW-01 |
| | 3"CS-1020 | 3"CS-1030 (IW-03) TO 3"CS-1010 (IW-01) | MP-01, 10 | EF-08 | | N | N | N | N | N | | IW-02 |
| | 3"CS-1021 | 3"CS-1020 TO WELL | MP-10 | EF-08 | | N | N | N | N | N | | IW-02 |
| | 3"CS-1022 | 3"CS-1021 TO WELL | MP-10 | EF-08 | | N | N | N | N | N | | IW-02 |
| | 3"CS-1030 | 3"CS-1040 (IW-04) TO 3"CS-1020 (IW-02) | MP-01, 10 | EF-07 | | N | N | N | N | N | | IW-03 |
| | 3"CS-1031 | 3"CS-1030 TO WELL | MP-10 | EF-07 | | N | N | N | N | N | | IW-03 |
| | 3"CS-1032 | 3"CS-1031 TO WELL | MP-10 | EF-07 | | N | N | N | N | N | | IW-03 |
| | 3"CS-1040 | 3"CS-1050 (IW-05) TO 3"CS-1030 (IW-03) | MP-01, 10 | EF-07 | | N | N | N | N | N | | IW-04 |
| | 3"CS-1041 | 3"CS-1040 TO WELL | MP-10 | EF-07 | | N | N | N | N | N | | IW-04 |
| | 3"CS-1042 | 3"CS-1041 TO WELL | MP-10 | EF-07 | | N | N | N | N | N | | IW-04 |
| | 3"-CS-1050 | 3"CS-1060 (IW-06) TO 3"CS-1040 (IW-04) | MP-01, 10 | EF-07 | | N | N | N | N | N | | IW-05 |
| | 3"CS-1051 | 3"CS-1050 TO WELL | MP-10 | EF-07 | | N | N | N | N | N | | IW-05 |
| | 3"CS-1052 | 3"CS-1051 TO WELL | MP-10 | EF-07 | | N | N | N | N | N | | IW-05 |
| | 3"-CS-1060 | 3"CS-1070 (IW-07) TO 3"CS-1050 (IW-05) | MP-01, 10 | EF-06 | | N | N | N | N | N | | IW-06 |
| | 3"-CS-1061 | 3"CS-1060 TO WELL | MP-10 | EF-06 | | N | N | N | N | N | | IW-06 |
| | 3"-CS-1062 | 3"CS-1061 TO WELL | MP-10 | EF-06 | | N | N | N | N | N | | IW-06 |
| | 3"-CS-1070 | 3"CS-1080 (IW-08) TO 3"CS-1060 (IW-06) | MP-01, 10 | EF-06 | | N | N | N | N | N | | IW-07 |
| | 3"CS-1071 | 3"CS-1070 TO WELL | MP-10 | EF-06 | | N | N | N | N | N | | IW-07 |
| | 3"CS-1072 | 3"CS-1071 TO WELL | MP-10 | EF-06 | | N | N | N | N | N | | IW-07 |
| | 3"-CS-1080 | 3"CS-1001 TO 3"CS-1070 | MP-01, 09 | EF-06 | | N | N | N | N | N | | IW-08 |

| REV | SIZE & LINE No. | DESCRIPTION (TO & FROM) | PIPING DRAWING | P & ID DRAWING | DATE COMPLETED | TRACED | | INSULATION | | | TIE POINT No. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | STEAM | ELECTRICAL | THK | SPEC | JACKET | | |
| | 1 1/2"CS-2000 | WATER SUPPLY TO 2"HDPE-2080 | MP-02, 04 | EF-01 S2 | | N | N | N | N | N | | INSIDE BLDG |
| | 1"CS-2004 | 1 1/2"CS-2000 TO SUPPLEMENT BLENDING UNIT | MP-02, 04 | EF-01 S2 | | N | N | N | N | N | | INSIDE BLDG |
| | 2"CS-2010 | 2"HDPE-2030 (IW-03) TO END | MP-01, 10 | EF-08 | | | Y | | | | | IW-01 |
| | 1 1/2"CS-2014 | 2"HDPE-2010 TO WELL | MP-10 | EF-08 | | | Y | | | | | IW-01 |
| | 2"CS-2020 | 2"HDPE-2030 (IW-03) TO 2"HDPE-2010 (IW-01) | MP-01, 10 | EF-08 | | | Y | | | | | IW-02 |
| | 1 1/2"CS-2024 | 2"HDPE-2020 TO WELL | MP-10 | EF-08 | | | Y | | | | | IW-02 |
| | 2"CS-2030 | 2"HDPE-2040 (IW-04) TO 2"HDPE-2020 (IW-02) | MP-01, 10 | EF-07 | | | Y | | | | | IW-03 |
| | 1 1/2"CS-2034 | 2"HDPE-2030 TO WELL | MP-10 | EF-07 | | | Y | | | | | IW-03 |
| | 2"CS-2040 | 2"HDPE-2050 (IW-05) TO 2"HDPE-2030 (IW-03) | MP-01, 10 | EF-07 | | | Y | | | | | IW-04 |
| | 1 1/2"CS-2044 | 2"HDPE-2040 TO WELL | MP-10 | EF-07 | | | Y | | | | | IW-04 |
| | 2"CS-2050 | 2"HDPE-2060 (IW-06) TO 2"HDPE-2040 (IW-04) | MP-01, 10 | EF-07 | | | Y | | | | | IW-05 |
| | 1 1/2"CS-2054 | 2"HDPE-2050 TO WELL | MP-10 | EF-07 | | | Y | | | | | IW-05 |
| | 2"CS-2060 | 2"HDPE-2070 (IW-07) TO 2"HDPE-2050 (IW-05) | MP-01, 10 | EF-06 | | | Y | | | | | IW-06 |
| | 1 1/2"CS-2064 | 2"HDPE-2060 TO WELL | MP-10 | EF-06 | | | Y | | | | | IW-06 |
| | 2"CS-2070 | 2"HDPE-2080 (IW-08) TO 2"HDPE-2060 (IW-06) | MP-01, 10 | EF-06 | | | Y | | | | | IW-07 |
| | 1 1/2"CS-2074 | 2"HDPE-2070 TO WELL | MP-10 | EF-06 | | | Y | | | | | IW-07 |
| | 2"HDPE-2080 | 1 1/2"CS-2000 TO 2"HDPE-2070 (IW-07) | MP-01, 09 | EF-06 | | | Y | | | | | IW-08 |

| REV | SIZE & LINE No. | DESCRIPTION (TO & FROM) | PIPING DRAWING | P & ID DRAWING | DATE COMPLETED | TRACED | | INSULATION | | | TIE POINT No. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | STEAM | ELECTRICAL | THK | SPEC | JACKET | | |
| | 3"CS-1150 | 3"CS-1060 TO 3"CS-1140 (IW-15) | MP-01, 06 | EF-01 S1, 05 | | N | N | N | N | N | | IN TRENCH |
| | 3"CS-1151 | 3"CS-1150 TO WELL | MP-07 | EF-05 | | N | N | N | N | N | | IW-15 |
| | 3"CS-1152 | 3"CS-1151 TO WELL | MP-07 | EF-05 | | N | N | N | N | N | | IW-15 |
| | 3"CS-1160 | 3"CS-1002 TO 3"CS-1170 (IW-17) | MP-01, 06 | EF-01 S1, 02 | | N | N | N | N | N | | IW-16 |
| | 3"CS-1161 | 3"CS-1160 TO WELL | MP-06 | EF-02 | | N | N | N | N | N | | IW-16 |
| | 3"CS-1162 | 3"CS-1161 TO WELL | MP-06 | EF-02 | | N | N | N | N | N | | IW-16 |
| | 3"-CS-1170 | 3"CS-1160 (IW-16) TO 3"CS-1180 (IW-18) | MP-01, 06 | EF-01 S1, 02 | | N | N | N | N | N | | IW-17 |
| | 3"-CS-1171 | 3"CS-1170 TO WELL | MP-06 | EF-02 | | N | N | N | N | N | | IW-17 |
| | 3"-CS-1172 | 3"CS-1171 TO WELL | MP-06 | EF-02 | | N | N | N | N | N | | IW-17 |
| | 3"-CS-1180 | 3"CS-1170 (IW-17) TO 3"CS-1190 (IW-19) | MP-01, 06 | EF-01 S1, 02 | | N | N | N | N | N | | IW-18 |
| | 3"-CS-1181 | 3"CS-1180 TO WELL | MP-06 | EF-02 | | N | N | N | N | N | | IW-18 |
| | 3"-CS-1182 | 3"CS-1181 TO WELL | MP-06 | EF-02 | | N | N | N | N | N | | IW-18 |
| | 3"-CS-1190 | 3"CS-1180 (IW-18) TO 3"CS-1200 (IW-20) | MP-01, 06 | EF-03 | | N | N | N | N | N | | IW-19 |
| | 3"-CS-1191 | 3"CS-1190 TO WELL | MP-06 | EF-03 | | N | N | N | N | N | | IW-19 |
| | 3"-CS-1192 | 3"CS-1191 TO WELL | MP-06 | EF-03 | | N | N | N | N | N | | IW-19 |
| | 3"-CS-1200 | 3"CS-1190 (IW-19) TO 3"CS-1210 (IW-21) | MP-01, 07 | EF-03 | | N | N | N | N | N | | IW-20 |
| | 3"-CS-1201 | 3"CS-1200 TO WELL | MP-07 | EF-03 | | N | N | N | N | N | | IW-20 |
| | 3"-CS-1202 | 3"CS-1201 TO WELL | MP-07 | EF-03 | | N | N | N | N | N | | IW-20 |
| | 3"-CS-1210 | 3"CS-1200 (IW-20) TO 3"CS-1220 (IW-22) | MP-01, 07 | EF-03 | | N | N | N | N | N | | IW-21 |
| | 3"-CS-1211 | 3"CS-1210 TO WELL | MP-07 | EF-03 | | N | N | N | N | N | | IW-21 |
| | 3"-CS-1212 | 3"CS-1211 TO WELL | MP-07 | EF-03 | | N | N | N | N | N | | IW-21 |
| | 3"-CS-1220 | 3"CS-1210 (IW-21) TO END | MP-01, 07 | EF-04 | | N | N | N | N | N | | IW-22 |
| | 3"-CS-1221 | 3"CS-1220 TO WELL | MP-07 | EF-04 | | N | N | N | N | N | | IW-22 |
| | 3"-CS-1222 | 3"CS-1221 TO WELL | MP-07 | EF-04 | | N | N | N | N | N | | IW-22 |

| REV | SIZE & LINE No. | DESCRIPTION (TO & FROM) | PIPING DRAWING | P & ID DRAWING | DATE COMPLETED | TRACED | | INSULATION | | | TIE POINT No. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | STEAM | ELECTRICAL | THK | SPEC | JACKET | | |
| | 2"HDPE-2150 | 1 1/2"HDPE-2160 TO 2"HDPE-2140 | MP-01, 07 | EF-01 S2, 05 | | | Y | | | | | IN TRENCH |
| | 1"CS-2154 | 1 1/2"CS-2150 TO WELL | MP-07 | EF-05 | | | Y | | | | | IW-15 |
| | 1 1/2"HDPE-2160 | 1 1/2"HDPE-2002 TO 1 1/2"HDPE-2170 (IW-17) | MP-01, 06 | EF-01 S1, 02 | | | Y | | | | | IW-16 |
| | 1 1/2"CS-2164 | 1 1/2"CS-2160 TO WELL | MP-06 | EF-02 | | | Y | | | | | IW-16 |
| | 1 1/2"HDPE-2170 | 1 1/2"HDPE-2160 (IW-16) TO 1 1/2"HDPE2180 (IW-18) | MP-01, 06 | EF-02 | | | Y | | | | | IW-17 |
| | 1 1/2"CS-2174 | 1 1/2"CS-2170 TO WELL | MP-06 | EF-02 | | | Y | | | | | IW-17 |
| | 1 1/2"HDPE-2180 | 1 1/2"HDPE-2170 (IW-17) TO 1 1/2"HDPE2190 (IW-19) | MP-01, 06 | EF-02 | | | Y | | | | | IW-18 |
| | 1 1/2"CS-2184 | 1 1/2"CS-2180 TO WELL | MP-06 | EF-02 | | | Y | | | | | IW-18 |
| | 1 1/2"HDPE-2190 | 1 1/2"HDPE-2180 (IW-18) TO 1 1/2"HDPE2200 (IW-20) | MP-01, 06 | EF-03 | | | Y | | | | | IW-19 |
| | 1 1/2"CS-2194 | 2"CS-2190 TO WELL | MP-06 | EF-03 | | | Y | | | | | IW-19 |
| | 1 1/2"HDPE-2200 | 2"HDPE-2190 (IW-19) TO 2"HDPE2210 (IW-21) | MP-01, 07 | EF-03 | | | Y | | | | | IW-20 |
| | 1 1/2"CS-2204 | 2"CS-2200 TO WELL | MP-07 | EF-03 | | | Y | | | | | IW-20 |
| | 2"HDPE-2210 | 2"HDPE-2200 (IW-20) TO 2"HDPE2220 (IW-22) | MP-01, 07 | EF-03 | | | Y | | | | | IW-21 |
| | 1 1/2"CS-2214 | 2"CS-2210 TO WELL | MP-07 | EF-03 | | | Y | | | | | IW-21 |
| | 2"HDPE-2220 | 1 1/2"HDPE-2210 (IW-21) TO END | MP-01, 07 | EF-04 | | | Y | | | | | IW-22 |
| | 1 1/2"CS-2224 | 2"CS-2220 TO WELL | MP-07 | EF-04 | | | Y | | | | | IW-22 |

AS BUILT
RECORD DRAWING

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |



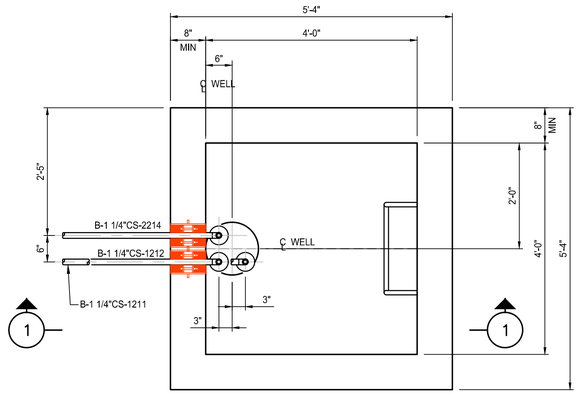
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

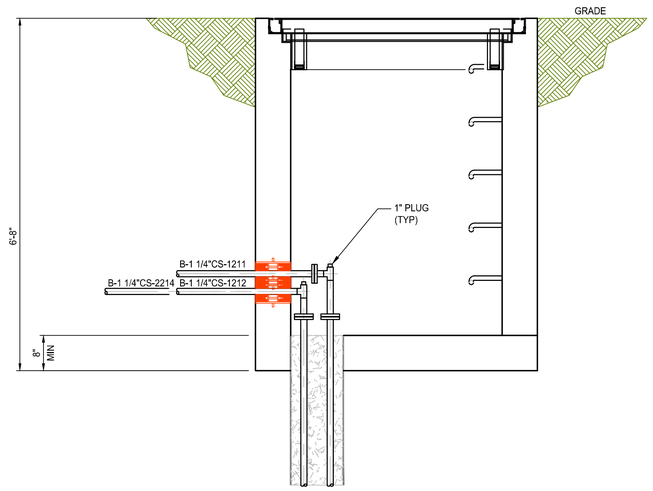
LINE LIST

CRA Infrastructure & Engineering, Inc.

| | | | |
|---|---|---|---|
| Source Reference: | | | Date: SEPTEMBER 2003 |
| Project Manager: J. KAY | Reviewed By: | Designed By: B. A. BEEBE | Drawn By: B. A. BEEBE |
| Scale: NONE | Project No: 06883-00 | Report No: 056 | Drawing No: MP-12 |




PLAN VIEW




SECTION 1

AS BUILT
RECORD DRAWING

NOTES:

1. WELLS IW-01 THRU IW-07 ARE LOCATED NORTH OF THE CONTROL BUILDING. THESE VAULTS ARE POSITIONED WITH THE WELL LOCATED ON THE NORTH SIDE OF THE VAULT.
2. WELLS IW-15 THRU IW-22 ARE LOCATED JUST NORTH OF THE CONTROL BUILDING. THESE VAULTS ARE POSITIONED WITH THE WELL LOCATED ON THE SOUTH SIDE OF THE VAULT.
3. ALL AIR, LIQUID, CONTROL, AND ELECTRICAL LINES PASS THRU THE VAULTS, EXCEPT IW-1, IW-8, IW-15, AND IW-22. CONTRACTOR PLUGGED ANY ADDITIONAL HOLES IN THESE VAULTS.

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |



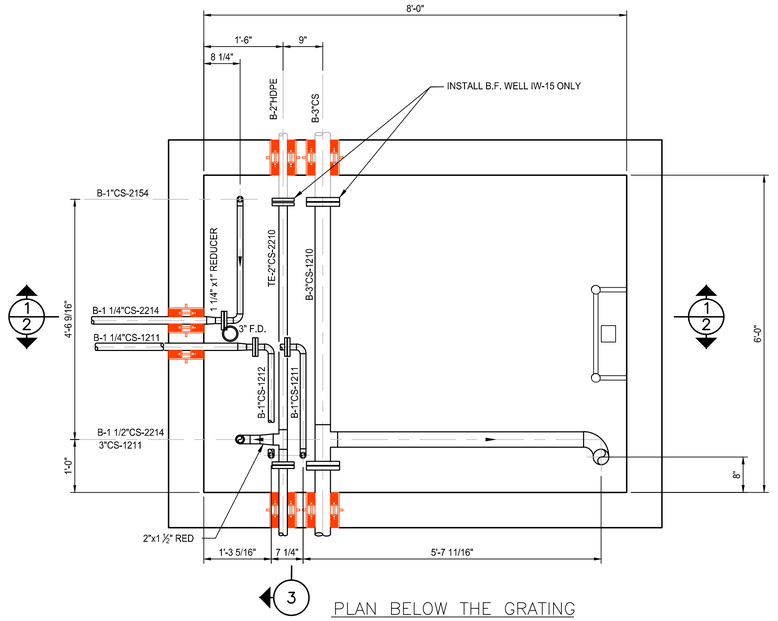
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

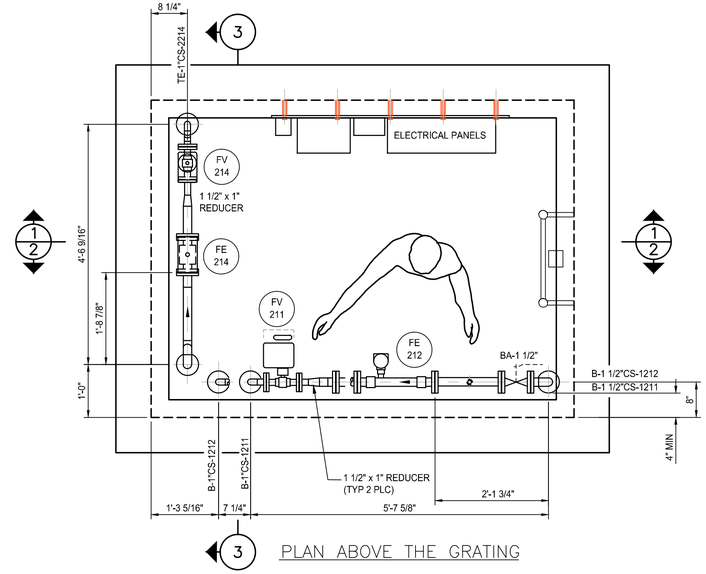
INJECTION WELLS IW-21A
PLAN AND SECTIONS

CRA Infrastructure & Engineering, Inc.

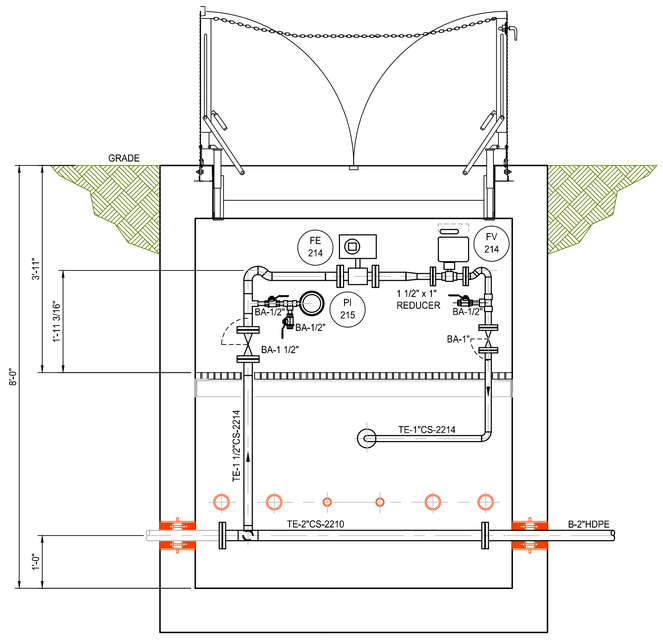
| Source Reference: | | | Date: 7-23-03 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: B. A. BEEBE | Drawn By: B. A. BEEBE |
| Scale: NONE | Project No: 06883-00 | Report No: 056 | Drawing No: MP-13 |



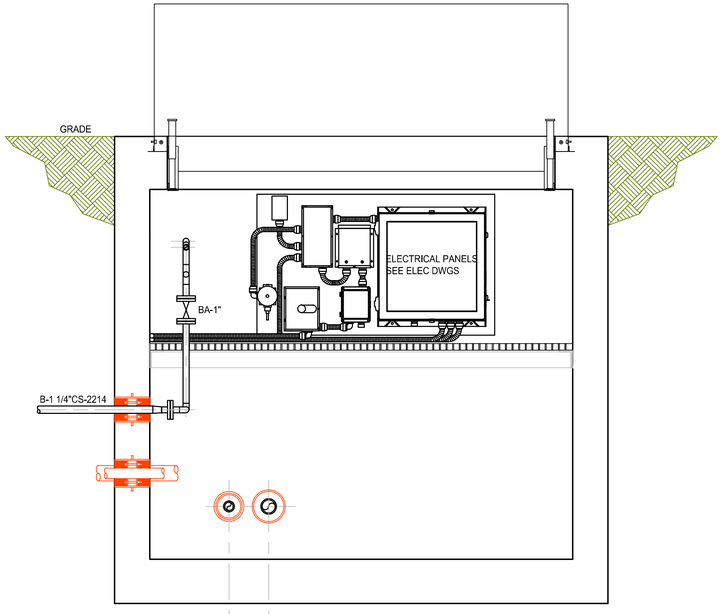

PLAN BELOW THE GRATING



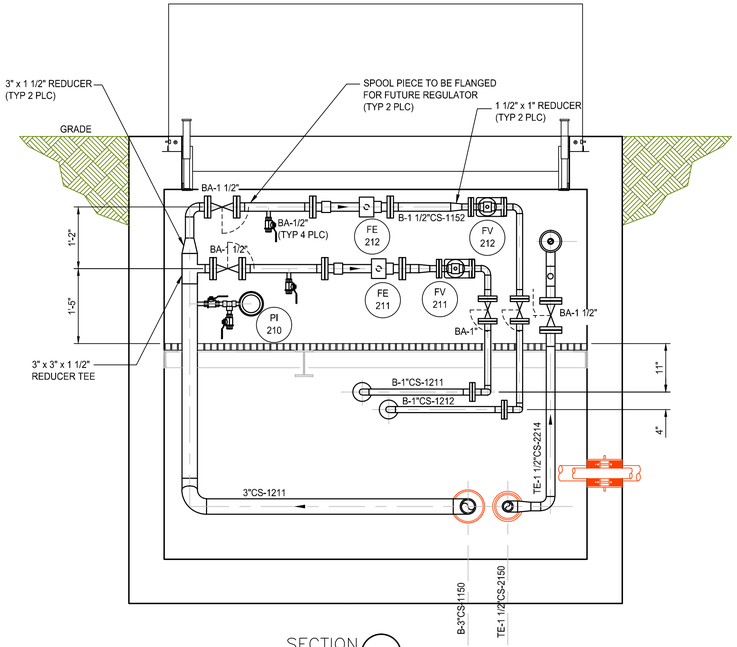

PLAN ABOVE THE GRATING




SECTION 3




SECTION 1




SECTION 2

AS BUILT
RECORD DRAWING

NOTES:

1. WELLS IW-01 THRU IW-07 ARE LOCATED NORTH OF THE CONTROL BUILDING. THESE VAULTS ARE POSITIONED WITH THE WELL LOCATED ON THE NORTH SIDE OF THE VAULT.
2. WELLS IW-15 THRU IW-22 ARE LOCATED JUST NORTH OF THE CONTROL BUILDING. THESE VAULTS ARE POSITIONED WITH THE WELL LOCATED ON THE SOUTH SIDE OF THE VAULT.
3. ALL AIR, LIQUID, CONTROL, AND ELECTRICAL LINES PASS THRU THE VAULTS, EXCEPT IW-1, IW-8, IW-15, AND IW-22. CONTRACTOR PLUGGED ANY ADDITIONAL HOLES IN THESE VAULTS.

SCALE VERIFICATION: THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

| No | Revision | Date | Initial |
|---|---|---|---|
| 1 | AS BUILT | 08/29/12 | LV |



HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

BIOSPARGE TREATMENT SYSTEM

INJECTION WELLS IW-21
PLAN AND SECTIONS

CRA Infrastructure & Engineering, Inc.

| Source Reference: | | | Date: 7-23-03 |
|---|---|---|---|
| Project Manager: J. KAY | Reviewed By: | Designed By: B. A. BEEBE | Drawn By: B. A. BEEBE |
| Scale: NONE | Project No: 06883-00 | Report No: 056 | Drawing No: MP-14 |