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**MEMO**

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From:  
Micki M. Maki

Date:  
March 24, 2014

ARCADIS Project No.:  
B0064410.2014.01302

Subject:  
Outfall 002 and 005 Storm Sewer Bulkheading Work Plan  
Addendum No. 3 – Outfall 001 and 009 Storm Sewer Bulkheading Buick City Site,  
Flint, Michigan

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**Introduction**

This Addendum No. 3 to the Outfall 002 and 005 Storm Sewer Bulkheading Work Plan (the Work Plan) was prepared by ARCADIS on behalf of Revitalizing Auto Communities Environmental Response Trust (RACER) for the Buick City Site (Site) located in Flint, Michigan. The Work Plan was approved by the United States Environmental Protection Agency (U.S.EPA) on November 10, 2012. This Addendum No.3 to the Work Plan (Addendum) includes installing bulkheads and plugs at select locations along the Outfall 001 and 009 storm sewers in order to minimize or eliminate the Site's contribution to the outfalls. The activities included in this Addendum will be completed using the same approach presented in the approved Work Plan, except as noted below. The proposed bulkhead/plug locations for Outfalls 001 and 009 are presented on **Figures 1A** and **1B**. **Figure 2** presents the specification and abbreviations. The Bulkhead and Plug Sections, Details, and the Manhole Cap Details are presented on **Figures 3A, 3B, and 4**, respectively, as indicated in the original Work Plan.

**Manhole Locations Requiring Bulkheading**

Bulkheading activities at Outfalls 001 and 009 will consist of installing three (3) sewer plugs and one (1) bulkhead at the following locations as depicted on **Figures 1A** and **1B**.

- Upgradient inlet to MH 1-12 (sewer plug);
- Upgradient inlet to MH 1-13 (sewer plug);
- Upgradient inlet to MH 1-13-1 (sewer plug);
- Lateral Line leading to off-site MH 13-11-11 (bulkhead at the east side manhole).

### **Outfall 001 and 009 Storm Sewer Bulkheading Installation**

All activities associated with bulkheading along Outfalls 001 and 009 will be completed in accordance with the processes and procedures presented in the Work Plan, except as noted below.

#### Pipe Plugging Outfall 001

The lateral pipes entering the storm sewer mains as noted above will be plugged as indicated in the original Work Plan, with the addition of injecting a polyurethane grout around the circumference of the plug to help seal the contact surface between the new concrete and the sewer pipe as indicated on **Figures 3A and 3B**. Prior to installation of the plug at each location, the contractor will stop the water flow with a mechanical plug or will allow water to pass through the curing plug with a pass-through pipe. The concrete plugs will create a hydraulic seal upon completion.

#### Sewer Bulkheading Outfall 009

One bulkhead will be installed in the 30-inch line exiting the Site leading into manhole MH 13-11-11 (**Figure 1B**). The bulkhead will be installed as described in the original Work Plan, with the addition of injecting a polyurethane grout around the circumference of the bulkhead to help seal the contact surface between the new concrete and the sewer pipe as indicated in **Figures 3A and 3B**. Prior to installation of the bulkhead, the contractor will stop the water flow with a mechanical plug, or will allow water to pass through the curing bulkhead with a pass-through pipe.

#### Manhole Capping

Upgradient manhole grates located along each of the Outfall 001 laterals being bulkheaded or plugged shall be replaced with solid H-20 traffic rated covers in accordance with the Specification (**Attachment 1**) to prevent surface water drainage to the abandoned sewer system.

Upgradient manhole grates located along each of the Outfall 009 laterals being bulkheaded or plugged shall be capped in accordance with the original Work Plan to prevent surface water drainage to the abandoned sewer system (**Figure 4**).

**Next Steps**

Upon approval of this Addendum No. 3, ARCADIS will include this scope of work along with the upcoming bulkheading activities associated with Addendum No. 2 (slated to begin in early April 2014). Unit costs provided in the Addendum No. 2 subcontractor agreement will be used for the work described in Addendum No. 3.



**Attachment 1**

H-20 Traffic Rated Cover  
Specification

## **SPECIFICATION**

### SECTION 05500

#### METAL CASTINGS

##### PART 1 GENERAL

###### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions (if included), and Division 1 Specifications Sections, apply to this Section.

###### 1.2 SECTION INCLUDES

- A. Metal castings:
  - 1. Manhole frames and covers for casting or embedding into concrete.

##### PART 2 PRODUCTS

###### 2.1 MATERIALS - DUCTILE IRON

- A. Metal Castings: ASTM A48 or ASTM A536.
- B. Gaskets: Neoprene rubber.

###### 2.2 METAL CASTINGS

- A. Manhole Covers:
  - 1. Manufacturers: EJ Group Inc, Neenah Foundry, or as approved.
  - 2. Machined bearing surfaces, frame with 30 inch diameter clear opening or as indicated on the design drawings.
  - 3. Rated for H-20 traffic loading.
  - 4. Solid lid with neoprene gasket

##### PART 3 EXECUTION

###### 3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive Work and existing dimensions match design drawings.

###### 3.2 PREPARATION

- A. Supply items required to be cast or embedded into concrete with setting templates to appropriate sections.

###### 3.3 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Anchor items to structure using specified type for substrate and per manufacturer recommendations.
- C. Provide neoprene gasket between lid and framing.

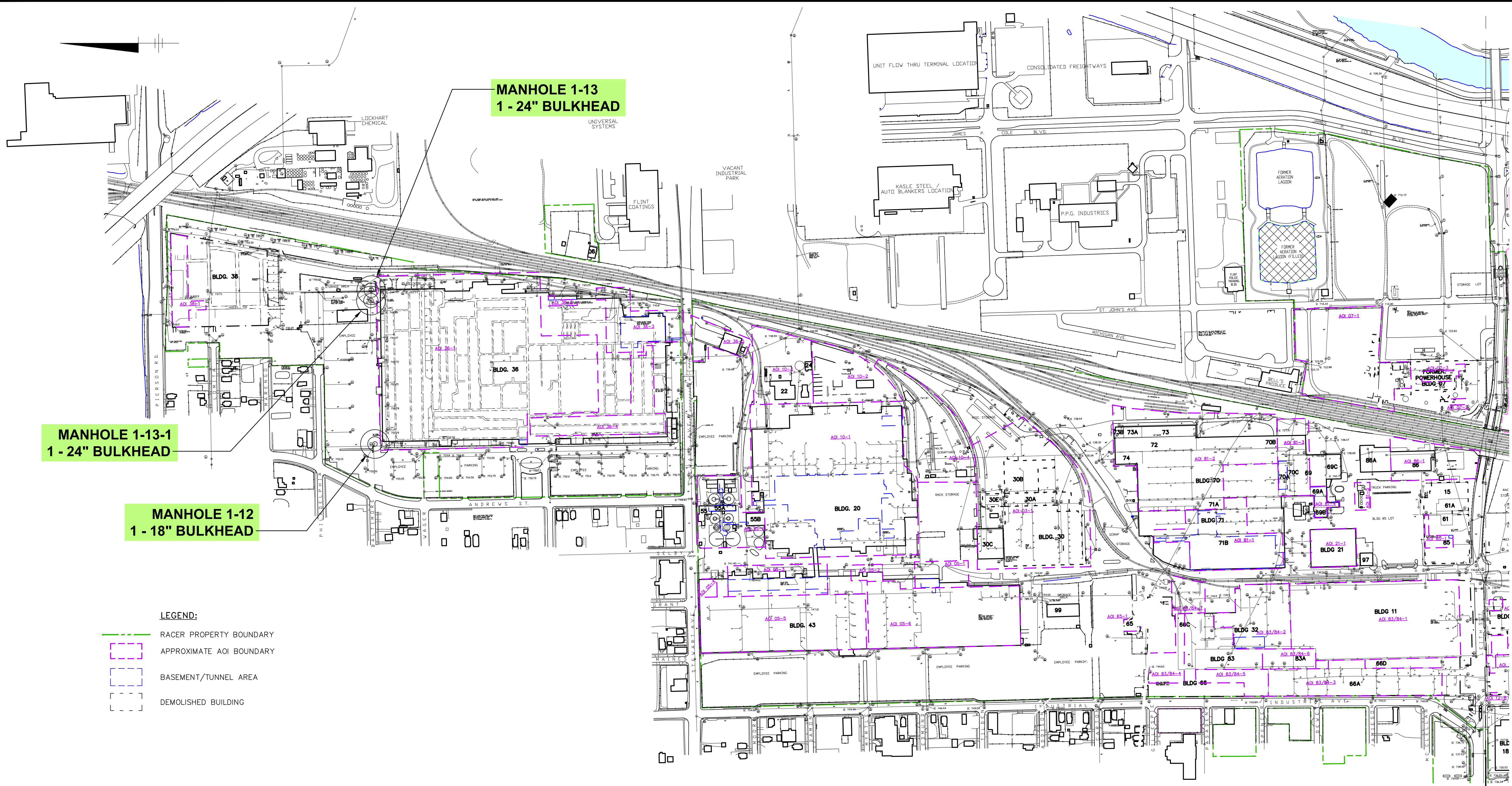
END OF SECTION



**Attachment 2**

Figures

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**LEGEND:**  
 --- RACER PROPERTY BOUNDARY  
 - - - APPROXIMATE AOI BOUNDARY  
 [ ] BASEMENT/TUNNEL AREA  
 [ ] DEMOLISHED BUILDING

NORTH END SOUTH END  
 0 250' 500'  
 APPROXIMATE SCALE IN FEET

**NOTE:**  
 1. BASE MAP INFORMATION FROM A SURVEY BY BMJ, INC. DATED APRIL 2001, AT A SCALE OF 1:100. AREAL IMAGE FROM ARCGIS 10 ONLINE MAPPING, ACCESSED 6/12/2013.  
 2. ALL LOCATIONS ARE APPROXIMATE.

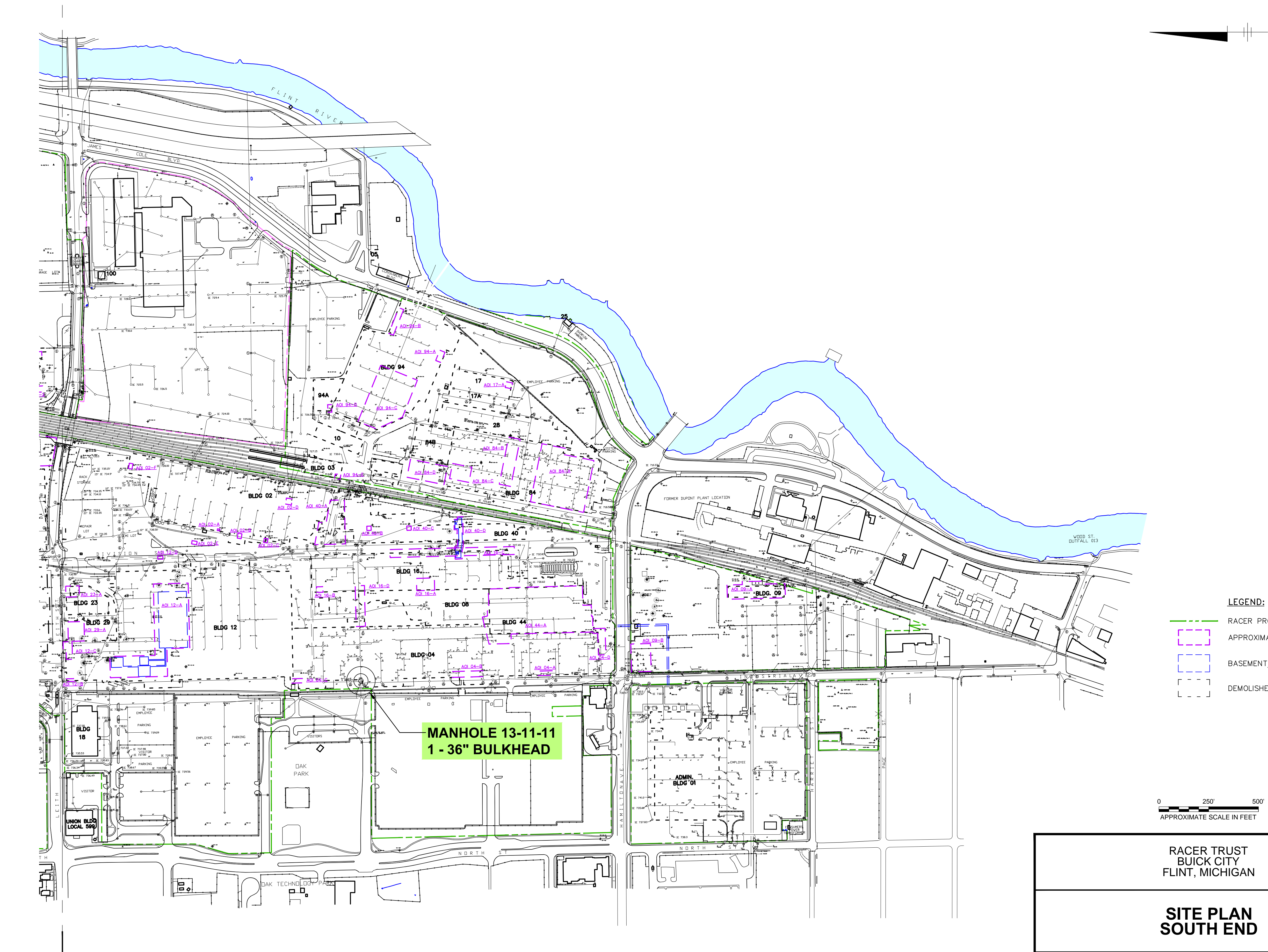
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**SITE PLAN  
 NORTH END**

FIGURE  
 1A

CITY: SYRACUSE DIV/GRP: 141 DB: A SANCHEZ LD: GMS PIC: C.S. PETERS PM: C. KIKER TM: C. KIKER LVR: ONL+OFF=REF:  
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IMAGES: PROJECTNAME: .....



NORTH END SOUTH END



- LEGEND:**
- RACER PROPERTY BOUNDARY
  - APPROXIMATE AOI BOUNDARY
  - BASEMENT/TUNNEL AREA
  - DEMOLISHED BUILDING

0 250' 500'  
 APPROXIMATE SCALE IN FEET

RACER TRUST  
 BUICK CITY  
 FLINT, MICHIGAN

---

**SITE PLAN  
 SOUTH END**

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FIGURE  
**1B**

**NOTE:**

1. BASE MAP INFORMATION FROM A SURVEY BY BMJ, INC. DATED APRIL 2001, AT A SCALE OF 1:100.. AREAL IMAGE FROM ARCGIS 10 ONLINE MAPPING, ACCESSED 6/12/2013.

**DESIGN AND CODE INFORMATION**

- ALL CONSTRUCTION SHALL CONFORM TO 2009 INTERNATIONAL BUILDING CODE, MICHIGAN EDITION.
- VERIFY EXISTING CONDITIONS AND DIMENSIONS AND NOTIFY ENGINEER OF ANY CONDITIONS WHICH DO NOT COMPLY WITH PLANS AND SPECIFICATIONS.
- SHOP DRAWINGS WILL NOT BE REVIEWED BY THE DESIGNER UNTIL AFTER THE GENERAL CONTRACTOR HAS THOROUGHLY REVIEWED THE SHOP DRAWINGS, VERIFIED EXISTING CONDITIONS, AND COORDINATED THE SHOP DRAWINGS WITH OTHER AFFECTED TRADES. SUBMIT FOUR COPIES OF REVIEWED DRAWINGS FOR ENGINEER'S REVIEW. ONLY THREE SETS OF MARKED UP SHOP DRAWINGS SHALL BE RETURNED BY THE DESIGNER. REPRODUCTION OF STRUCTURAL DRAWINGS FOR SHOP DRAWINGS IS NOT PERMITTED.
- DO NOT SCALE STRUCTURAL DRAWINGS.
- LIVE LOADS:**  
BULKHEAD DESIGN IS BASED ON 35ft HEAD.
- SPECIAL INSPECTIONS:**  
THIS WORK IS EXEMPT FROM SPECIAL INSPECTIONS BECAUSE "WORK IS OF MINOR NATURE" PER IBC 2009 SECTION 1704.1 EXCEPTION 1.

**GENERAL NOTES:**

- EPOXY ADHESIVE FOR DOWELS:  
  
MANUFACTURERS:  
HILTI CORPORATION, HIT-RE 500 SD.  
OR AS APPROVED.  
  
A. INJECTABLE TWO-COMPONENT EPOXY ADHESIVE.  
  
B. DEFORMED REINFORCING BAR.  
  
C. ADHESIVE ANCHORAGE SYSTEM SHALL BE SEISMIC QUALIFIED PER IBC 2009.  
  
D. ADHESIVE ANCHORAGE SYSTEM SHALL MEET REQUIREMENTS OF ASTM C881-90, TYPE N, GRADE 2 AND 3, CLASS A, B, C EXCEPT GEL TIMES.
- BONDING AGENT: 3 COMPONENT, SOLVENT FREE WATER-BASED EPOXY RESIN WITH PORTLAND CEMENT, SIKA CORP., SIKA ARMATEC 110 EPOCEM, OR AS APPROVED.
- NON-SHRINK GROUT: PRE-MIXED COMPOUND CONSISTING OF NON-METALLIC AGGREGATE, CEMENT, WATER-REDUCING AND PLASTICIZING AGENTS; CAPABLE OF DEVELOPING A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI IN 28 DAYS; BASF MASTERFLOW 713 PLUS, OR AS APPROVED.
- PREFORMED PLASTIC ADHESIVE WATERSTOP (PPAWS): FEDERAL SPECIFICATION SS-SS-210A; SINGLE-COMPONENT, SELF-SEALING PLASTIC ADHESIVE TYPE, EXTRUDED ROPE FORM BETWEEN TWO PROTECTIVE SILICONE TREATED PAPERS, 1 INCH SQUARE CROSS SECTION, 1 INCH LAP SPLICE, FURNISH WITH PRIMER; SYNKO-FLEX PRODUCTS SYNKO-FLEX, OR AS APPROVED.
- FORM MATERIALS**  
  
FORMS FOR FINISH CONCRETE: PLYWOOD, METAL, METAL-FRAMED PLYWOOD FACED, OR OTHER ACCEPTABLE PANEL-TYPE MATERIALS, TO PROVIDE CONTINUOUS, STRAIGHT, SMOOTH SURFACES. FURNISH IN LARGEST PRACTICABLE SIZES TO MINIMIZE NUMBER OF FORM MARKS. SEAL FORM TIE HOLES TO WATERTIGHT CONDITION.
- FIELD QUALITY CONTROL**  
  
TESTS OF CONCRETE SLUMP, AIR CONTENT AND STRENGTH WILL BE MADE AT THE DIRECTION OF ENGINEER. SAMPLES FOR STRENGTH SHOULD BE TAKEN AS NEAR AS PRACTICAL TO THE POINT OF PLACEMENT INTO THE FORMWORK OR AT A LOCATION WHICH CLOSELY MATCHES THE HANDLING CONDITIONS WHEN THE CONCRETE IS PLACED IN THE FORMS. PRIOR TO THE ADDITION OF A MID OR HIGH RANGE WATER REDUCER, A SLUMP TEST MAY BE MADE FROM A SAMPLE TAKEN FROM THE VERY FIRST CONCRETE OUT OF THE LOAD.

**REINFORCED CONCRETE**

- ALL CONCRETE WORK SHALL CONFORM TO THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318-05).
- REINFORCING STEEL SHALL BE DEFORMED BARS ASTM A-615 (GRADE 60).
- THE COMPRESSIVE STRENGTH AT 28 DAYS OF ALL CAST IN PLACE CONCRETE SHALL BE 4000 PSI. MINIMUM
- LAP SPLICES FOR REINFORCING BARS SHALL BE CLASS B IN ACCORDANCE WITH ACI 318-05, UNLESS NOTED OTHERWISE.
- CLEAR CONCRETE COVER FOR REINFORCING STEEL:  
WALLS 2"  
SLAB ON GRADE 2" TOP STEEL  
3" BOTTOM CAST AGAINST GROUND  
FOOTINGS 2" TOP & FORMED EDGES  
3" CAST AGAINST GROUND
- CONCRETE MATERIALS AND ADMIXTURES**  
CEMENT: ASTM C150, TYPE I NORMAL PORTLAND TYPE.  
  
FINE AND COARSE AGGREGATES: ASTM C33 (NORMAL WEIGHT AGGREGATE); MATERIALS CONTAINING DELETERIOUS SUBSTANCES (SPALLING CAUSING) ARE NOT ACCEPTABLE.  
  
WATER: CLEAN AND NOT DETRIMENTAL TO CONCRETE.

AIR ENTRAINMENT: ASTM C260; MASTER BUILDERS (BASF CONSTRUCTION CHEMICALS) MICRO-AIR, OR AS APPROVED.  
  
CHEMICAL: ASTM C494 TYPE A - WATER-REDUCING, TYPE B RETARDING, TYPE D - WATER-REDUCING AND RETARDING, TYPE F - WATER-REDUCING, HIGH RANGE, TYPE G - WATER-REDUCING, HIGH RANGE AND RETARDING; CONTAINING NO CHLORIDES; MASTER BUILDERS (BASF CONSTRUCTION CHEMICALS), W.R. GRACE, OR AS APPROVED.

FLY ASH: ASTM C618 CLASS F OR C; LOSS ON IGNITION LESS THAN 3 PERCENT.

MEMBRANE CURING COMPOUND: ASTM C309, TYPE I-D, CLASS B, CLEAR WITH FUGITIVE DYE WHICH DISAPPEARS APPROXIMATELY 24 HOURS AFTER EXPOSURE TO SUNLIGHT; SPRAY-CURE SAFE CURE CLEAR, EUCLID CHEMICAL COMPANY KUREZ DR, OR AS APPROVED. WET CURING CONCRETE MAY BE SUBSTITUTED FOR CURING COMPOUND.

- CONCRETE MIX**  
CONCRETE PROPORTIONS: COMPLY WITH ACI 301, 4.2.

PROVIDE CONCRETE TO THE FOLLOWING CRITERIA:  
COMPRESSIVE STRENGTH (7 DAY): 3,200 PSI.  
COMPRESSIVE STRENGTH (28 DAY): 4,000 PSI.  
WATER/CEMENT RATIO (MAXIMUM): 0.42 BY WEIGHT.  
AIR ENTRAINMENT: NOT APPLICABLE.  
FLY ASH CONTENT: MAXIMUM 25 PERCENT OF CEMENT CONTENT.  
SLUMP (MAXIMUM): 3 INCHES (DUE TO WATER).  
MID OR HIGH RANGE WATER REDUCER:  
ADD AT SITE TO INCREASE SLUMP TO 7 INCHES ±1 INCHES.

**ABBREVIATIONS**

ABANDONED	ABAND
ASPHALT	ASPH
BACK OF CURB	BC
BASE LINE	BL
BASEMENT	BSMT
BEARING	BRG
BENCH MARK	BM
BOTTOM	BOT
CAST IRON	CI
CATCH BASIN	CB
CENTER LINE	CL
CENTER TO CENTER	C/C
CLEANOUT	CO
CLEAR	CLR
CONCRETE	CONC
CONTROL DENSITY FILL	CDF
CORRUGATED METAL PIPE	CMP
CROSS SECTION	X SECT
CURB INLET	CI
DEMOLITION	DEMO
DETAIL DET	DET
DIAMETER	DIA
DRAIN	DR
DROP MANHOLE	DMH
DUCTILE IRON	DI
EASEMENT	ESMT
EDGE OF PAVEMENT	EP
ELECTRIC (AL)	ELEC
ELEVATION	EL
ENGINEER	ENGR
EXISTING	EX, EXIST
FORCE MAIN	FM
GRAD (E) (ING)	GR
GROUND	GND
HEADWALL	HDWL
HORIZONTAL	HORIZ
INSIDE DIAMETER	ID
INVERT	INV
IRON PIPE	IP
LINEAR	LIN
LINEAR FOOT	LF
MANHOLE	MH
MAXIMUM	MAX
MECHANICAL JOINT	MJ
MINIMUM	MIN
MONUMENT	MON
NUMBER	#, NO
PK NAIL	PK
POUNDS PER SQUARE INCH	PPSI
PREFORMED PLASTIC	
ADHERED WATER STOP	PPAWS
PRESTRESSED CONCRETE	PS CONC
PROPERTY LINE	PL
QUANTITY	QTY
REINFORCE (D) (ING) (MENT)	REINF
REINFORCED CONCRETE	RCONC
REINFORCED CONCRETE PIPE	RCP
RIGHT OF WAY	ROW
SANITARY	SAN
SEWER	SWR
SQUARE FOOT	SQ FT
SQUARE YARD	SQ YD
STATION	STA
STONE	STN
STORM	STM
TELEPHONE	TELE
TEST BOING-XX (E.G. TB-1)	TB-XX
TO BE REMOVED	TBR
THICKNESS	THK
TYPICAL	TYP
UNDERGROUND	UND
UNLESS OTHERWISE NOTED	UON
VALVE BOX	VB
VERTICAL	VERT
WATER MAIN	WM

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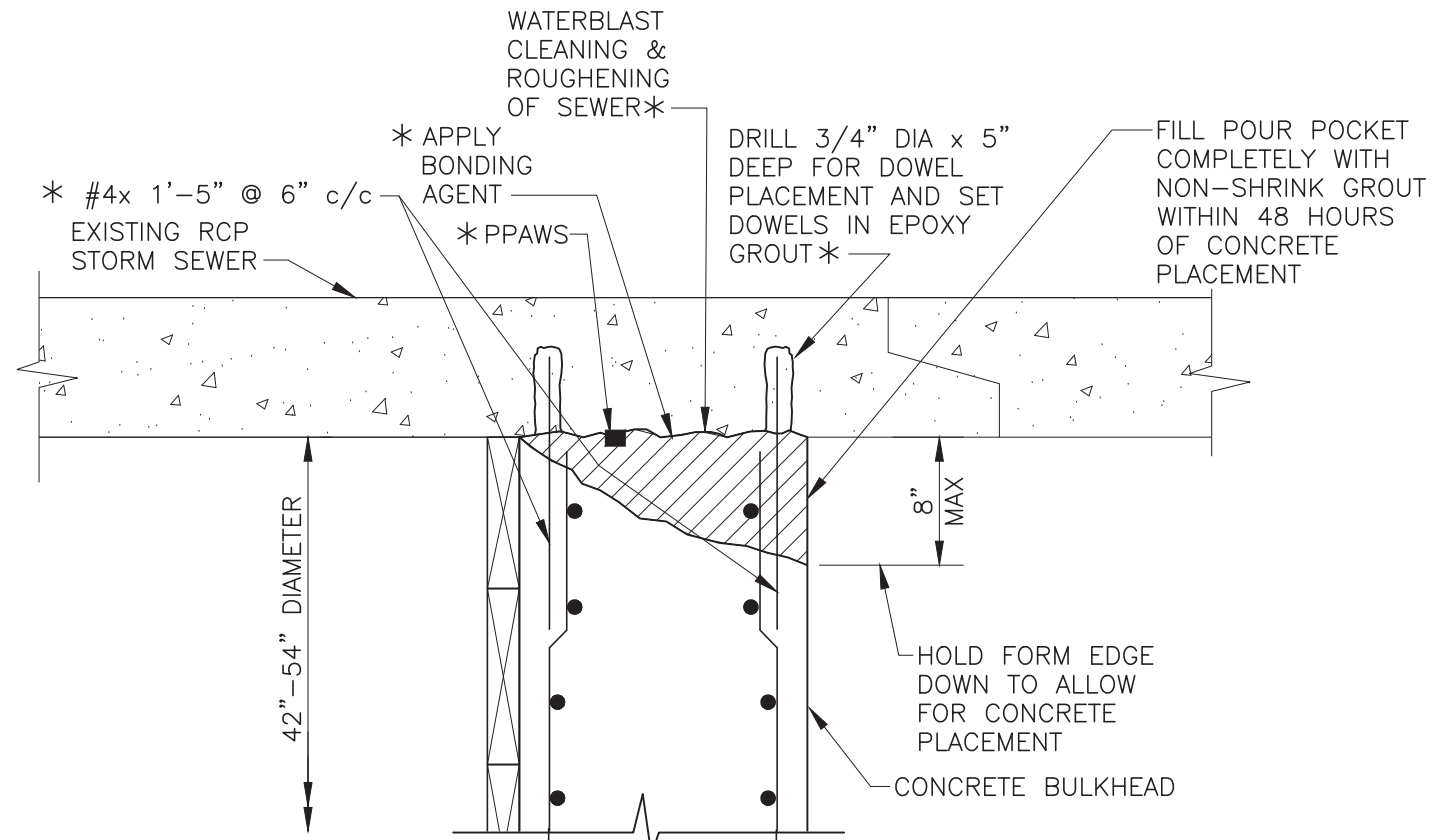
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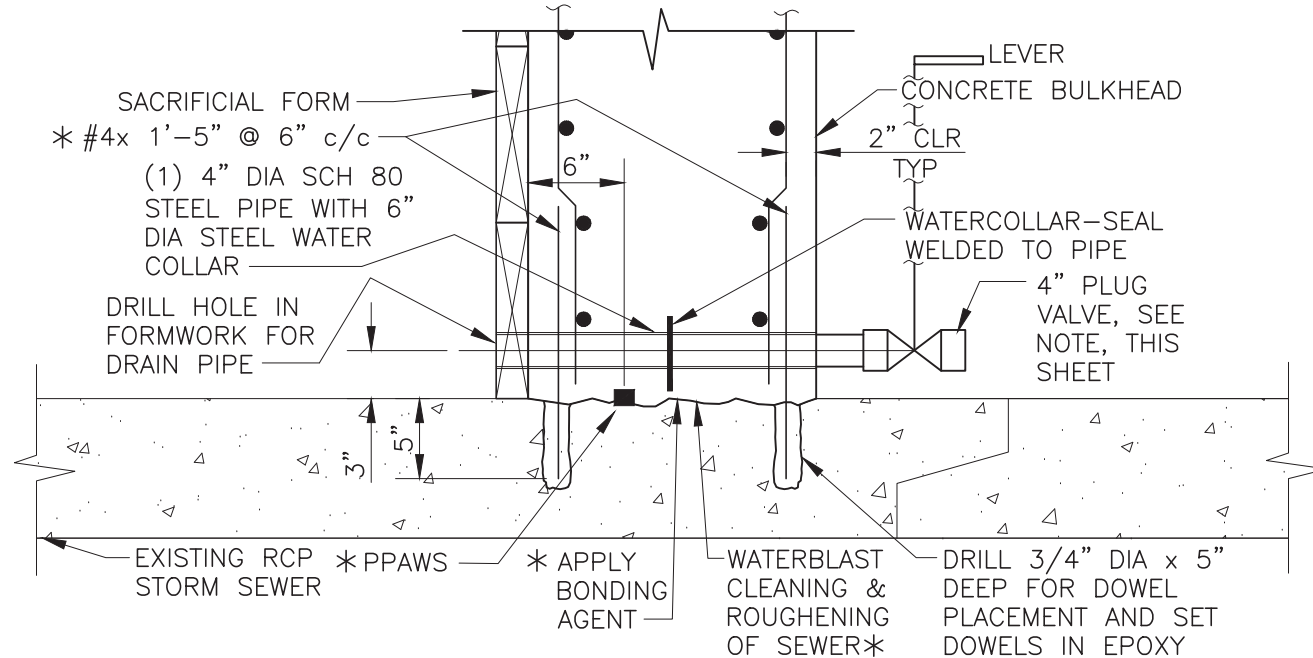
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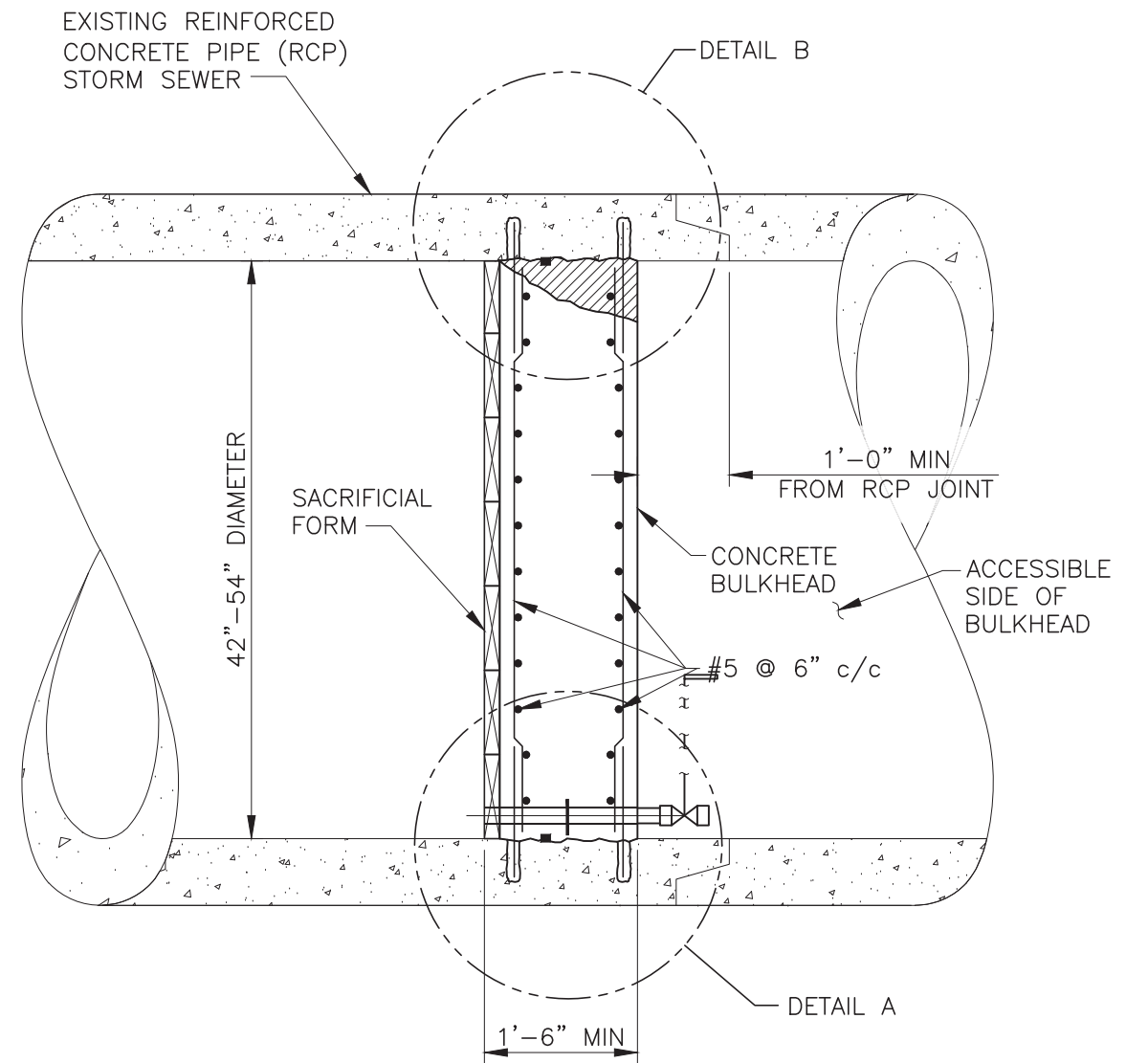
**DETAIL B**

1" = 1'-0"



**DETAIL A**

1" = 1'-0"



**TYPICAL BULKHEAD SECTION**

1/2" = 1'-0"

**NOTES:**  
 DRAIN PIPE IS TO BE USED TO ALLOW FLOW TO WEEP UNTIL CONCRETE BULKHEAD HAS ACHIEVED FULL STRENGTH. PROVIDE 4" RESILIENT SEAT PLUG VALVE EQUAL TO USABUEBOOK.COM ME-26421. PROVIDE LEVER OPERATOR EXTENSION TO 6" BELOW MANHOLE COVER.

\* FULL CIRCUMFERENCE OF BULKHEAD.

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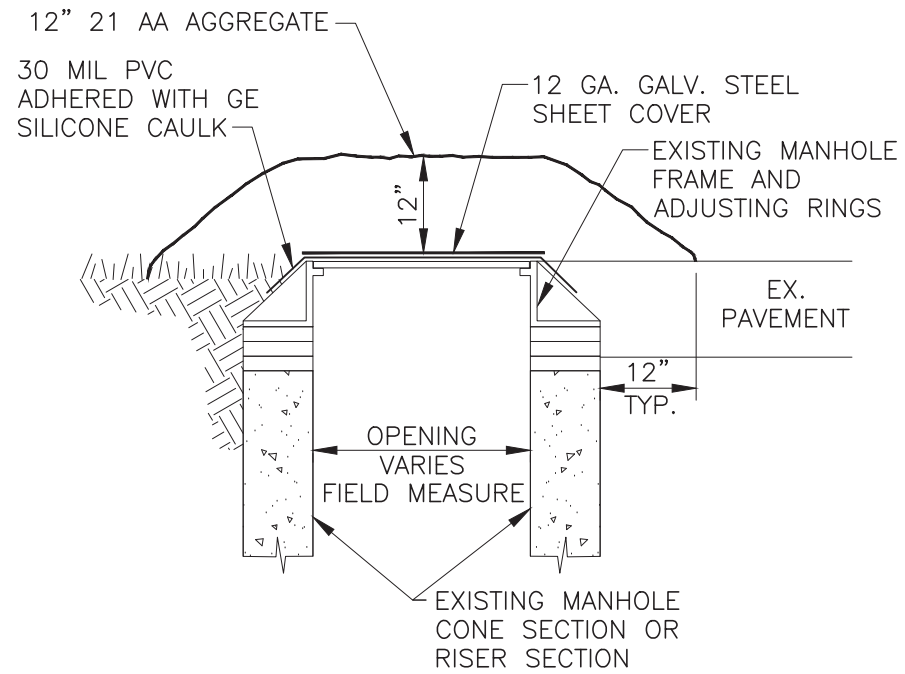
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PROJECT MANAGER MICKI MAKI	DEPARTMENT MANAGER -	LEAD DESIGN PROF. ELC	CHECKED ELC
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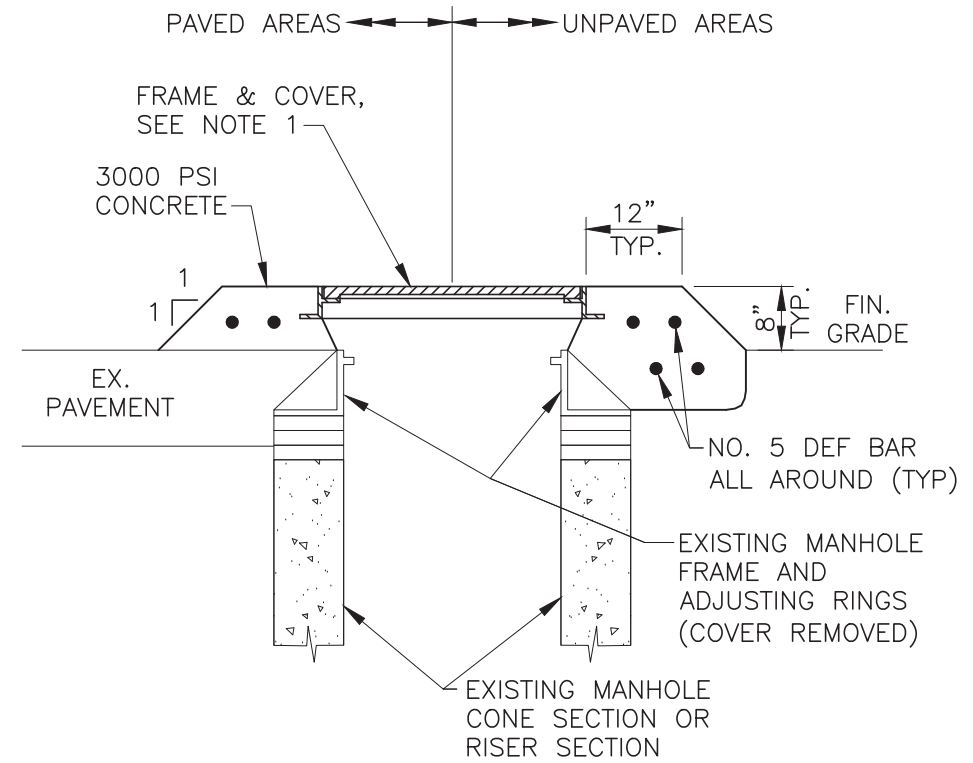


**PROPOSED**

1/2" = 1'-0"

**MANHOLE CAP DETAIL "A"**

NOTE 1:  
EAST JORDAN IRON WORKS CAST IRON  
FRAME W/ COMPOSITE COVER, 32" OPENING,  
COM 1480 ASY



**PROPOSED**

1/2" = 1'-0"

**MANHOLE CAP DETAIL "B"**

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							SHEET TITLE		TASK/PHASE NUMBER	DRAWN BY
							MANHOLE CAP DETAILS		01301	JAM
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