Chambers, Danielle

From: Pardys, John-Eric
Sent: Monday, May 05, 2014 2:39 PM
To: Coffey, Lisa; Dave Favero; Tomka, Mike; Rousseau, Matthew
Cc: Project Email Filing
Subject: ~COR-007878~SMI - Southwest Plant LNAPL area presentation to MDEQ
Attachments: SMI LCSM Summary 050514UPDATED.pdf

Please find attached a final pdf version of the Southwest Plant LNAPL area presentation that we will present tomorrow to the MDEQ.

Should you have any questions, please do not hesitate to contact myself.

Thanks

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Southwest Plant LNAPL Area Status

RACER Malleable Iron Industrial Land

Review with MDEQ

May 6, 2014

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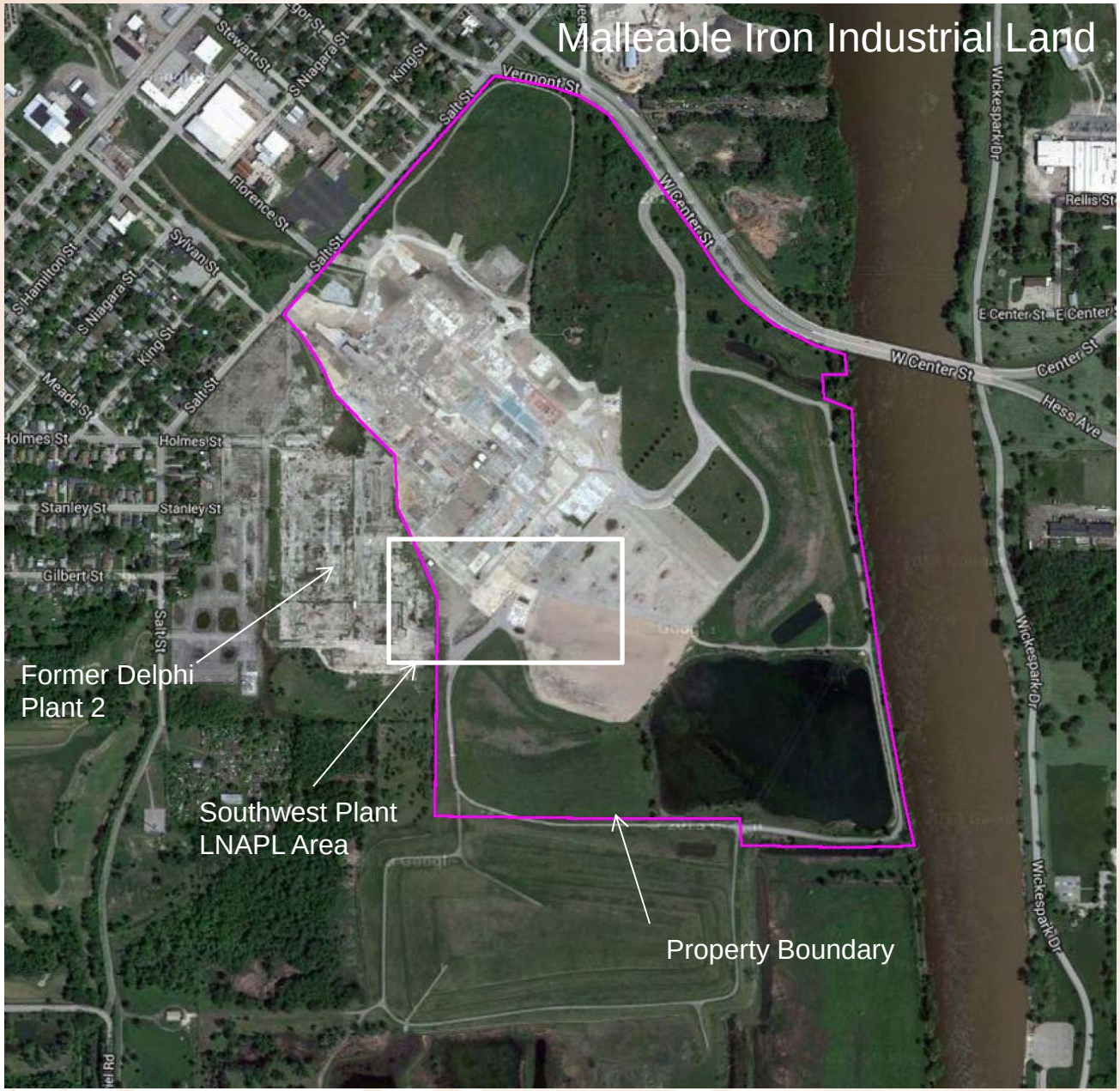
Worldwide Engineering, Environmental, Construction and IT Services

OUTLINE

1. Background
   - Malleable Iron Industrial Land
   - Southwest Plant LNAPL Area
2. Previous Characterization
3. Previous Remedial Activities
4. LNAPL Conceptual Site Model
5. LNAPL Remedial Decision Tree
6. Conclusions
7. Recommendations

Malleable Iron Industrial Land



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1. Background

Malleable Iron Industrial Land

- Approximate size of Site: 150 acres
- Approximate size of former Saginaw Malleable Iron (SMI) Plant : 1 million sq ft
- Historical manufacturing operations at SMI involved casting and heat treating of iron
- Historically, SMI used large volumes of quench and hydraulic oil
- SMI operated from 1907 to 2007
- Demolition of SMI was initiated in 2009 and was completed in December 2010

1. Background, cont'd

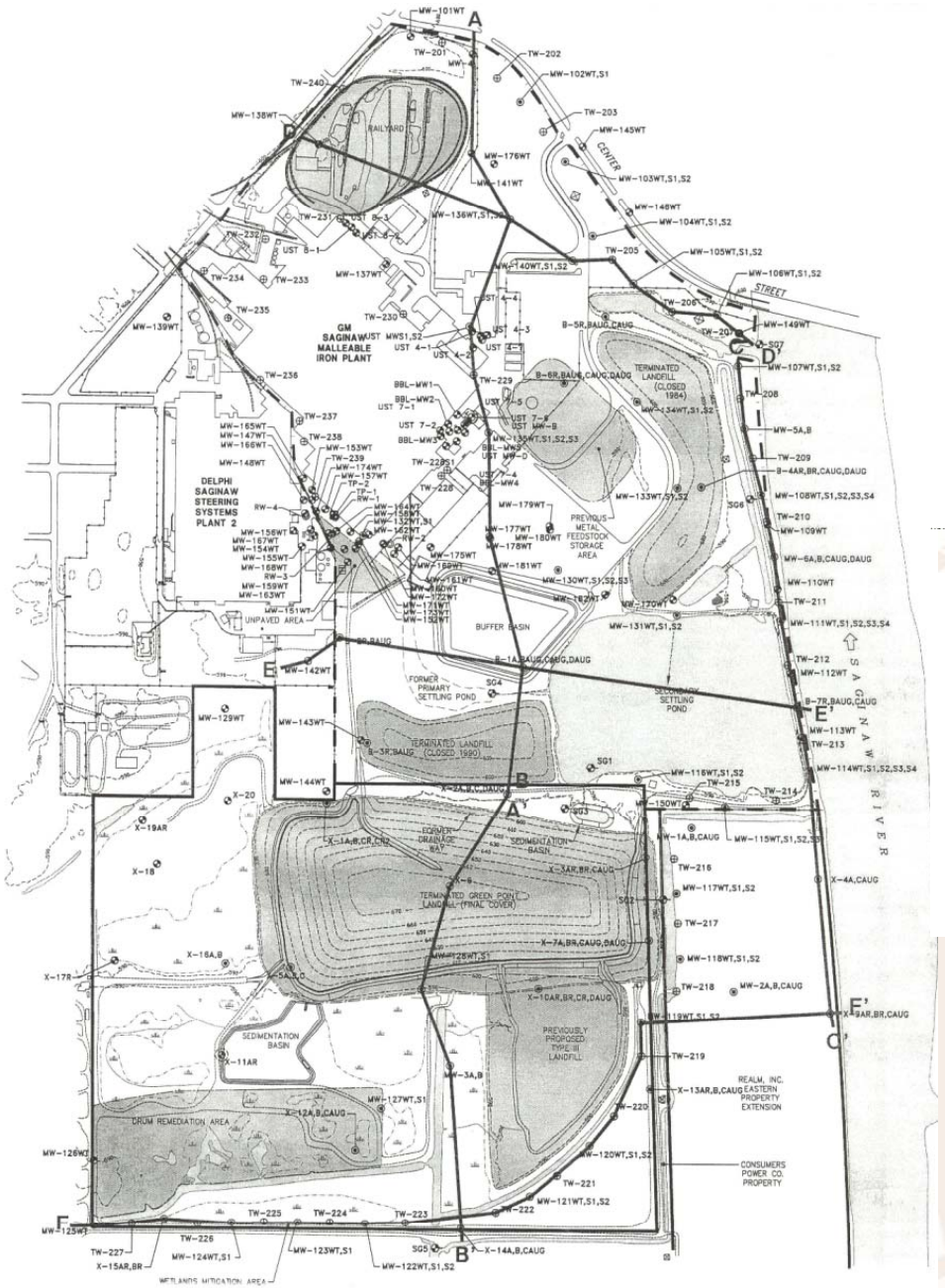
Malleable Iron Industrial Land

- Adjacent land uses include:
  - To the north is a residential area
  - To the south is the Greenpoint landfill (RACER property)
  - To the west is the former Delphi Plant 2 which historically cut and ground parts. Delphi Plant 2 was closed in 2001
  - Historically Delphi Plant 2 used large volumes of cutting and grinding oils
  - On-going activity at Delphi Plant 2 includes LNAPL extraction and groundwater treatment before discharge to the City sanitary sewer
  - To the east is the Saginaw River

1. Background, cont'd

Malleable Iron Industrial Land

- Site Geology:
  - Overburden at the Site is approximately 86 feet thick and is comprised generally of (in descending order): fill materials, glaciolacustrine silts and clays, a sand unit which becomes coarser with depth, glaciolacustrine silty clay, and glacial till
  - The Site lies over bedrock units in the central part of the Michigan basin, the shallowest of which consists of Pennsylvanian age bedrock of the Grand River and Saginaw Formations
- Site Hydrogeology
  - Shallow groundwater at the Site exists in an unconfined condition and the depth to groundwater varies from 2 to 10 feet bgs
  - The bedrock aquifer is confined by a the continuous lower silty clay
  - Groundwater flow is controlled on a regional scale by the Saginaw River, which acts as a discharge point for overburden groundwater



LEGEND

- GM SAGINAW MALLEABLE IRON PLANT PROPERTY LINE (APPROX.)
- REALM, INC. PROPERTY LINE (APPROX.)
- UNPAVED ROAD
- GROUND SURFACE ELEVATION CONTOUR (10 FT INTERVAL)
- FENCE LINE
- SWAMPY AREA
- MW-4 — MONITORING WELL
- MW-102WT,S1 — MONITORING WELL CLUSTER
- TW-203 — TEMPORARY MONITORING WELL
- SG5 — STAFF GAUGE
- TP-2 — PIEZOMETER
- RW-4 — RECOVERY WELL
- X-11AR — ABANDONED MONITORING WELL
- A—A' — CROSS SECTION LOCATION

NOTES:

1. THIS PHOTOGRAMMETRIC BASE MAP FOR THE GM SAGINAW MALLEABLE IRON PLANT AND DELPHI SAGINAW STEERING SYSTEMS PLANT 2 PROPERTIES WAS PREPARED BY LOCKWOOD MAPPING, INC. OF ROCHESTER, NEW YORK. AERIAL PHOTOGRAPHY WAS CONDUCTED ON 11/11/94. ORIGINAL LOCKWOOD MAP WAS AT A SCALE OF 1"=100' AND WAS INTERPRETED FOR TWO-FOOT CONTOURS.
2. SAMPLING LOCATIONS SURVEYED BY ATWELL-HICKS, INC. UTICA, MICHIGAN, FILE NO. M1014SU2, FILE DATE 3/22/96, REVISED 8/8/96, OR SPICER GROUP.
3. VERTICAL DATUM REFERENCED TO NGVD OF 1929, HORIZONTAL DATUM REFERENCED TO MICHIGAN SPC-NAD 1983.
4. BASE MAP HAS BEEN MODIFIED TO INCORPORATE BUFFER BASIN, SEDIMENTATION BASINS, WETLANDS MITIGATION AREA, AND GREEN POINT LANDFILL (GPL) FINAL COVER FROM THE FINAL ENGINEERING DESIGN REPORT PREPARED BY BBL FOR THE GPL, DATED JANUARY 1998.
5. PROPERTY BOUNDARY FOR REALM, INC, DIGITIZED FROM SPICER GROUP DRAWING NO. A-21854-1, DATED 3/27/98.

Cross Section Locations

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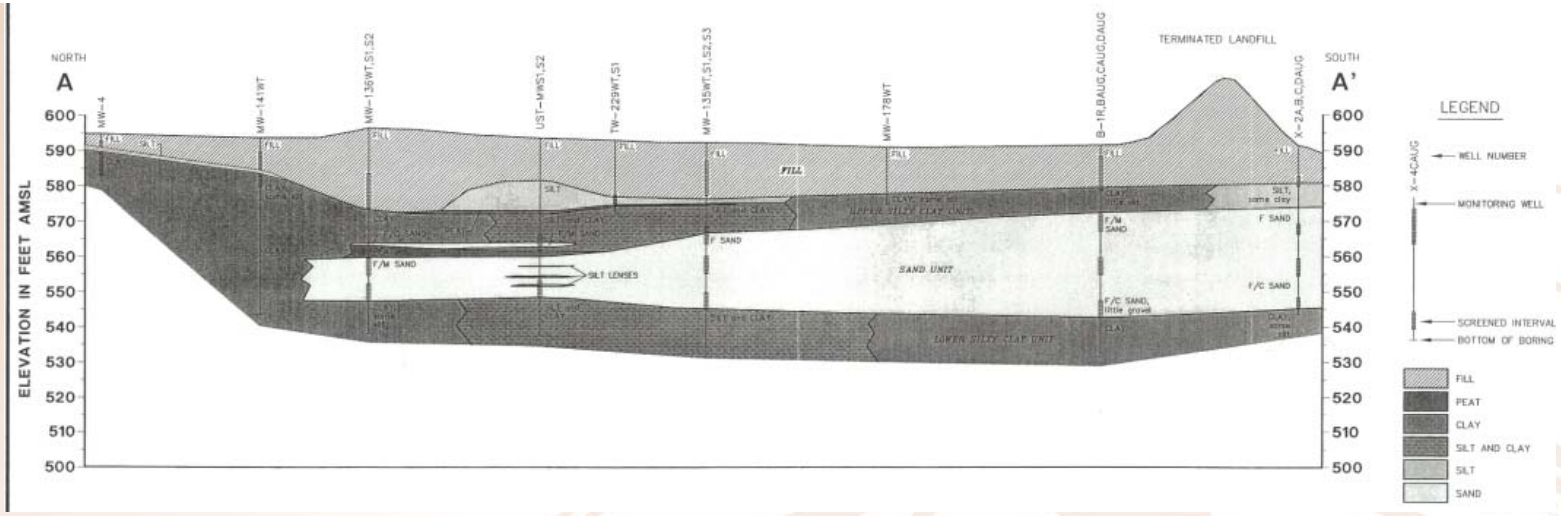
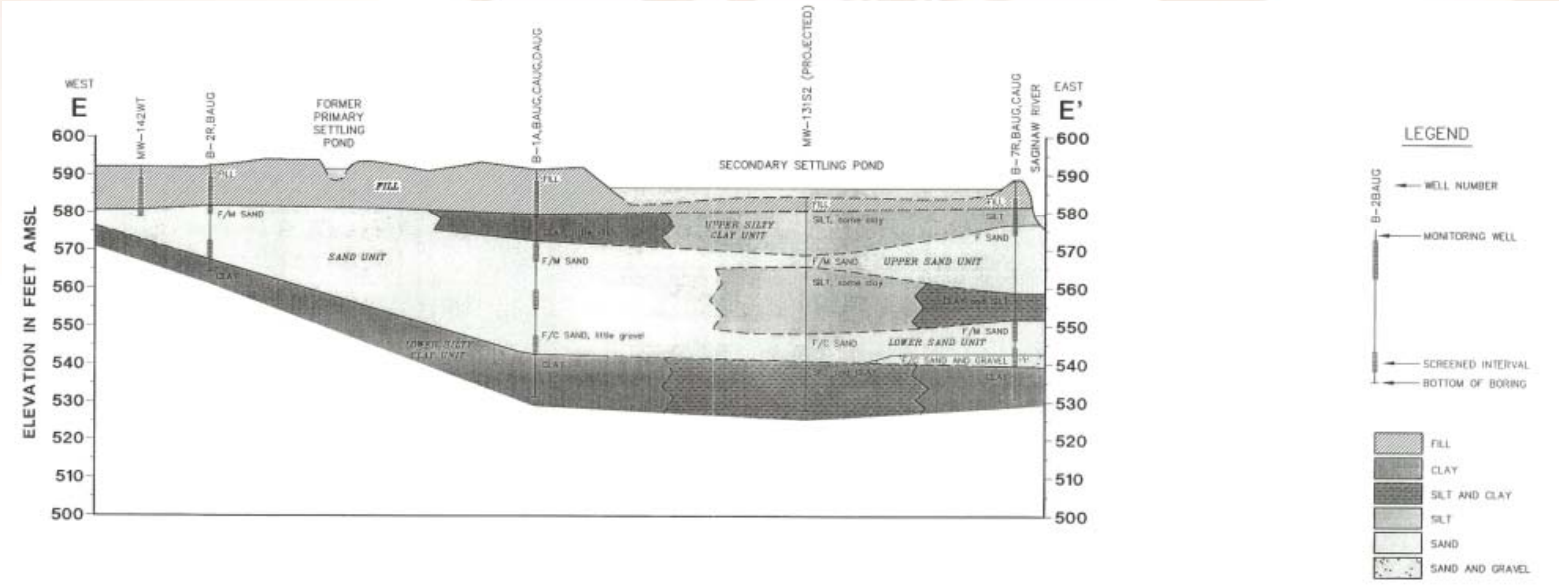


Cross Section A-A’



Cross Section E-E’

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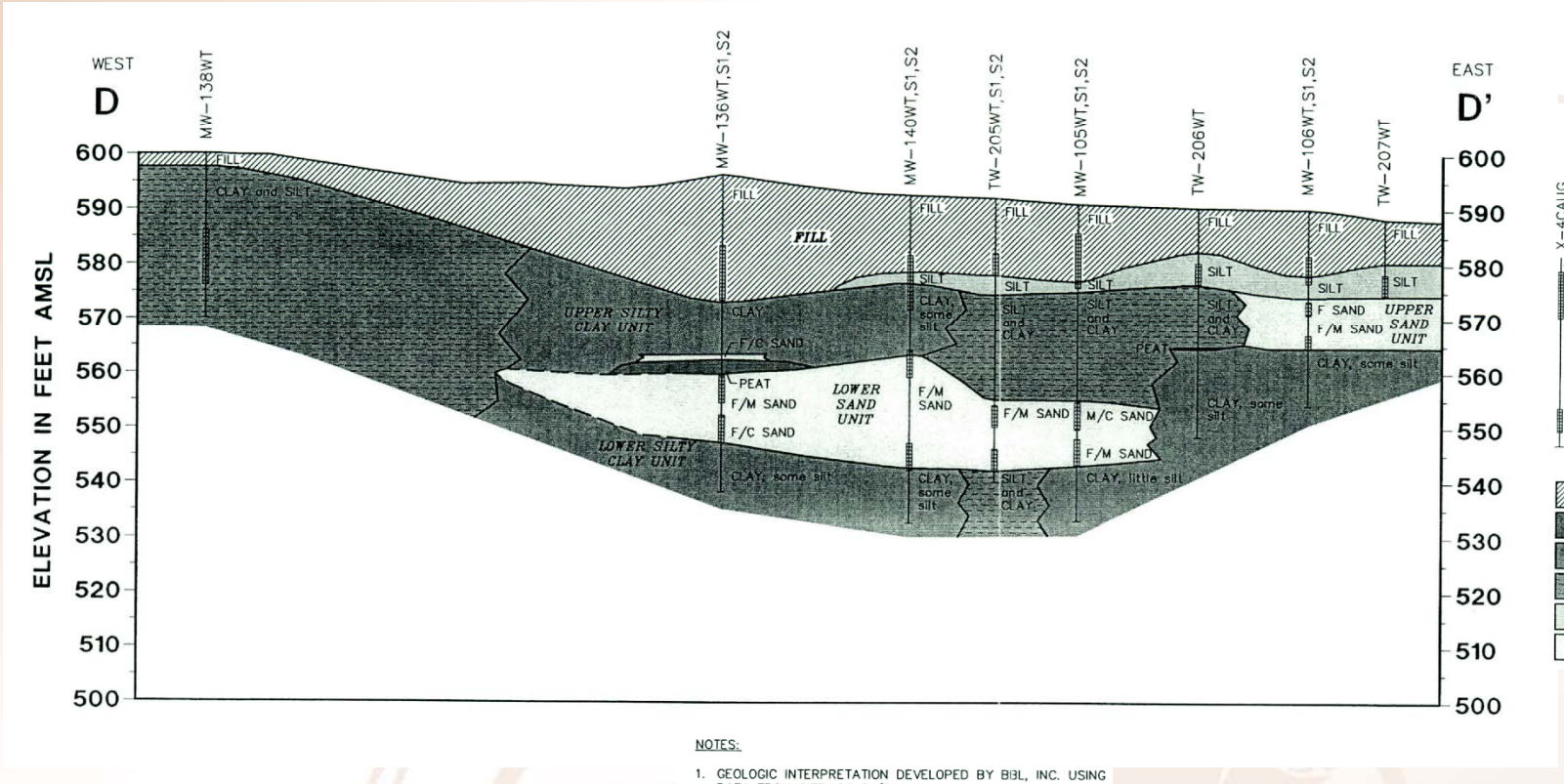
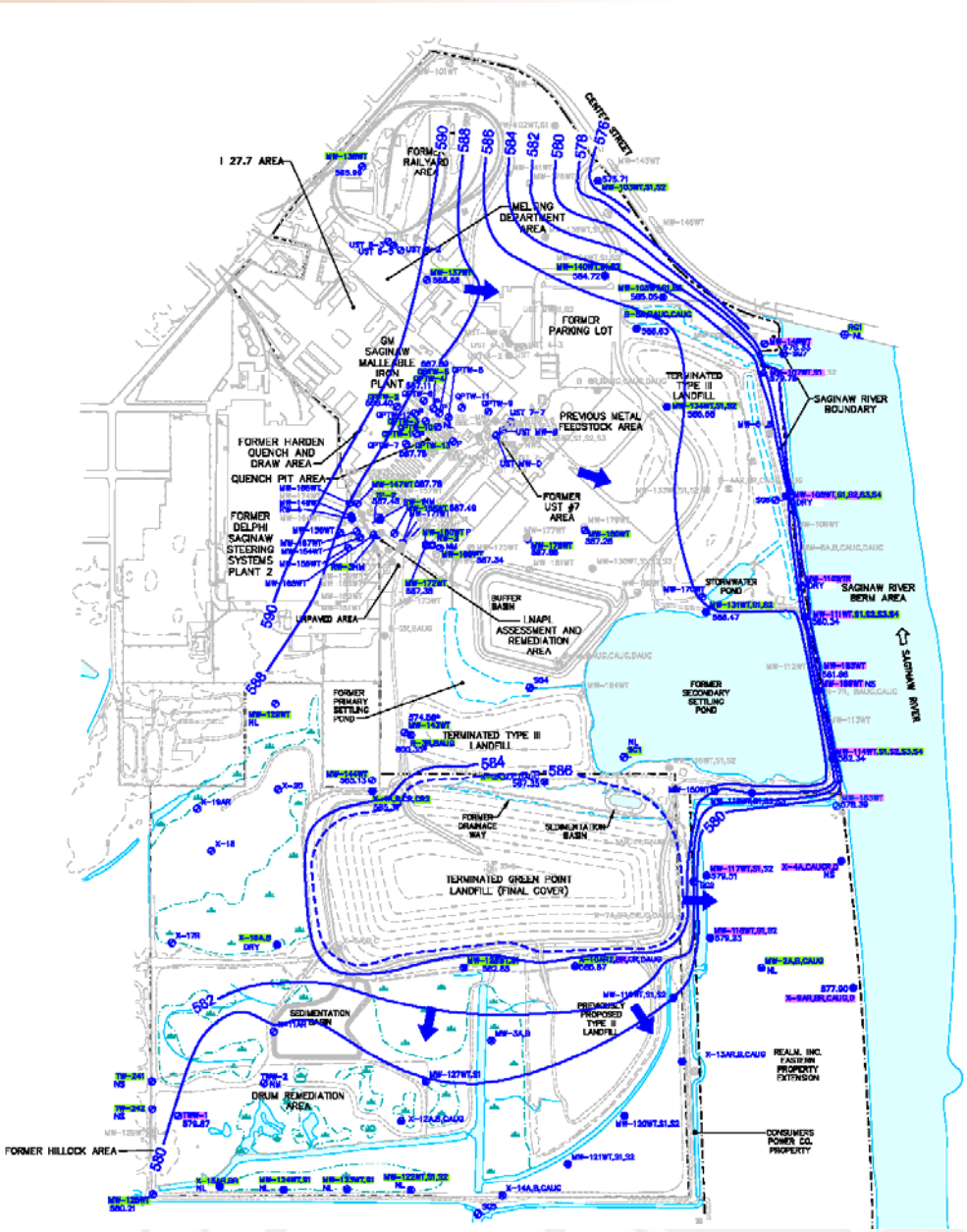
RACER



NOTES:

1. GEOLOGIC INTERPRETATION DEVELOPED BY BBL, INC. USING DATA FROM SITEWIDE RI/FS.
2. ALL ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL (AMSL) RELATIVE TO NGVD OF 1929.
3. F, M, C = FINE, MEDIUM, COARSE.

Cross Section D-D'



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4. PROPERTY BOUNDARY FOR REALM, INC. DIGITIZED FROM SPICER GROUP DRAWING NO. A-21854-1, DATED 3/27/98.
5. BASE MAP INFORMATION SOUTH OF MAIN REALM, INC. PROPERTY LINE FROM AIR-LAND SURVEYS, INC. PHOTO DATE 11/90, MAPPING DATE 10/91.
6. CONTOURS HAVE BEEN INFERRED IN THE AREA OF THE LANDFILL BASED ON HISTORICAL DATA.

* ELEVATIONS AT MW-143WT AND B-3R WERE NOT USED FOR CONTOURING.
* MONITORING WELLS RW-1, RW-2 AND RW-3 NOT MEASURED BECAUSE THE VAULTS WERE FLOODED.

LEGEND:

- GM SAGINAW MALLEABLE IRON PLANT PROPERTY LINE (APPROX.)
- REALM, INC. PROPERTY LINE (APPROX.)
- UNPAVED ROAD
- GROUND SURFACE ELEVATION CONTOUR (10 FT INTERVAL)
- FENCE LINE
- SWAMPY AREA
- MW-123WT — MONITORING WELL
- MW-3A,B,CAUG — MONITORING WELL CLUSTER
- SG-525 — STAFF GAUGE
- TP-1 — PIEZOMETER
- RW-1 — RECOVERY WELL
- X-8 — ABANDONED MONITORING WELL
- X-5A,B,C — ABANDONED MONITORING WELL CLUSTER
- RG1 — RIVER GAUGE
- MW-152WT — WELL NOT FOUND
- 580.93 — GROUNDWATER ELEVATION (FEET AMSL)
- NS — NOT SURVEYED
- NL — NOT LOCATED
- NM — NOT MEASURED
- P — PRODUCT MEASURED IN WELL
- DRY — MONITORING WELL DRY AT TIME OF GAUGING
- 582 — GROUNDWATER ELEVATION CONTOUR LINE (FEET AMSL), DASHED WHERE INFERRED
- GROUNDWATER FLOW DIRECTION

RAP (7/31/08) MONITORING PROGRAM; REVISED 12/08

- SAMPLING AND GROUNDWATER ELEVATION MEASUREMENT LOCATION
- LNAPL AND/OR GROUNDWATER ELEVATION MEASUREMENT LOCATION

Water Elevation Contour Map Sept. 23, 2013

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1. Background, cont'd

Malleable Iron Industrial Land

- The Remedial Investigation (RI) was completed between December 1994 and August 2000 in accordance with the MDEQ approved Work Plan and the additional phases of RI activities
- The RI report was submitted to the MDEQ on November 27, 2000 and approved on July 5, 2001

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1. Background, cont'd

Malleable Iron Industrial Land

- A Feasibility Study, including Human Health Evaluation Report (HHE) and Ecological Risk Assessment (ERA) Report, was completed and submitted in July of 2003 and approved by in a letter dated November 18, 2003
  - The HHE evaluated groundwater contact, industrial groundwater volatilization to indoor air inhalation, flammability and explosivity screening, water solubility screening, soil direct contact, and industrial drinking water protection exposure pathways in the Southwest Plant LNAPL area and determined that evaluation of remedial alternatives, other than deed restrictions, are not required

1. Background, cont'd

Malleable Iron Industrial Land

- Environmental Indicator (EI) CA 750 – Migration of contaminated groundwater under control was approved by US EPA on September 15, 2006
  - The EI CA 750 identified that monitoring for the stability of two plumes (free phase plume and VOC/PCB dissolved plume), that were being captured at the time by a pump and treat system in the Southwest Plant LNAPL area, would continue

- EI CA 725 – Current Human Exposures Under Control was approved by US EPA on September 27, 2007

1. Background, cont'd

Malleable Iron Industrial Land

- A Remedial Action Plan (RAP) was initially submitted on July 30, 2008, was modified on December 31, 2008, and approved with conditions on February 27, 2009. A revised RAP was submitted on May 29, 2009

- The approved RAP included a monitoring program and continued Operation and Maintenance of the groundwater and LNAPL extraction and treatment system for the Southwest Plant LNAPL area

1. Background, cont'd

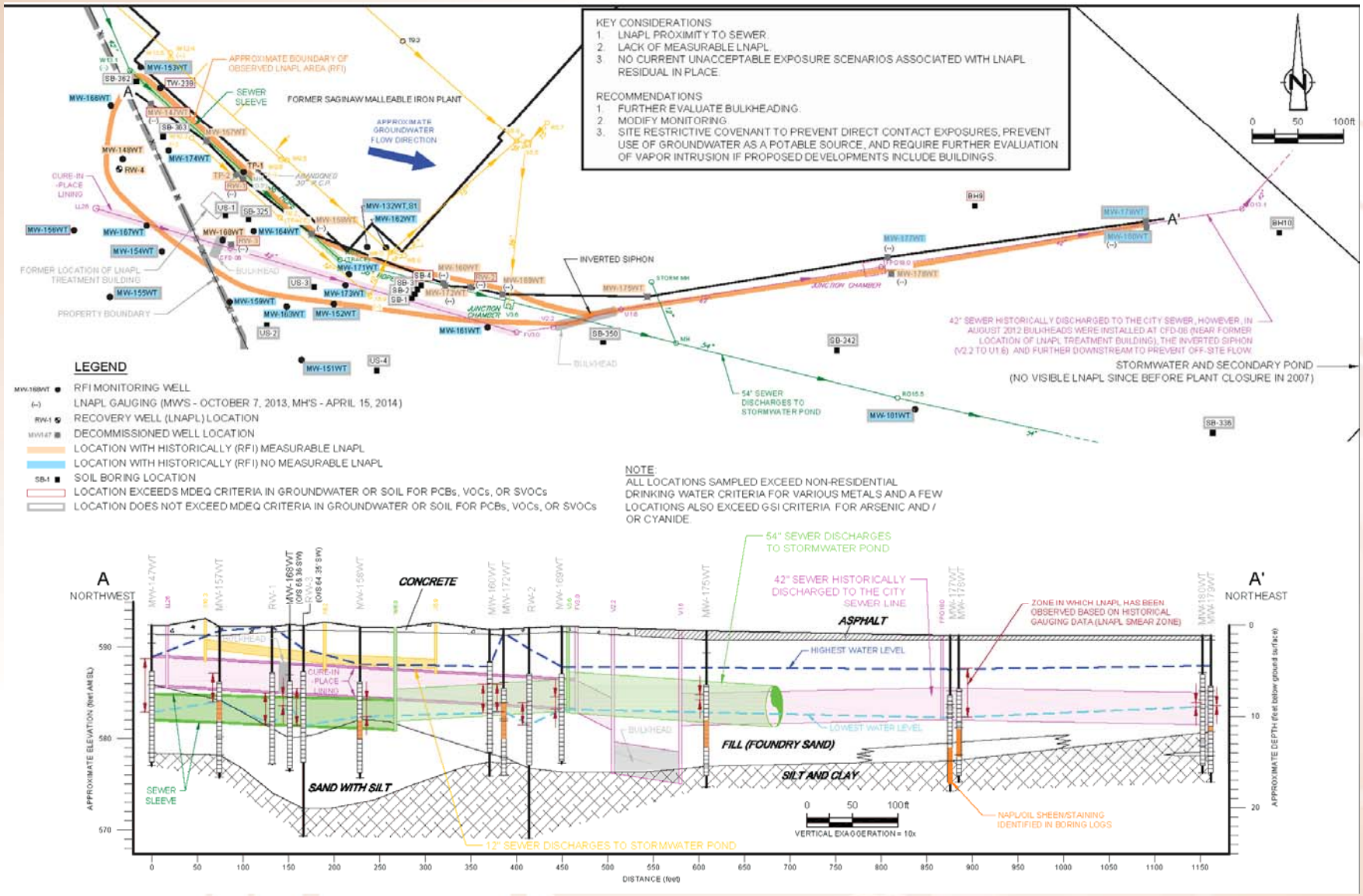
Southwest Plant LNAPL Area

- LNAPL was first observed in monitoring wells in the southwest corner of the Plant during the RI in March 1995
- Subsequent investigations were completed between June 1995 and August 1996 to determine the extent of LNAPL impacts and to provide additional data for design of a LNAPL and groundwater recovery and treatment system (completed in September 1997)
- LNAPL fingerprint analyses (January 2005) demonstrated source contribution from the Delphi property

1. Background, cont'd

Southwest Plant LNAPL Area

- The storm sewer system intersects groundwater table
  - Since demolition, the groundwater surface has risen (rebounded) in the area of the former Plant
- Two large storm sewers pass through the LNAPL area. The bedding for the two sewers were investigated for potential preferential pathways
- The magenta colored sewer on the following figure historically discharged to the City sewer system further downstream at Outfall CFD-02 in the northeast portion of the property (several bulkheads have been installed)
- The green colored sewer on the following figure discharges to the stormwater pond



LNAPL Area Plan and Profile

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2. Previous Characterization at Southwest Plant LNAPL Area

- Southwest Plant LNAPL Area Investigation included:
  - 33 monitoring wells (including wells in sewer bedding)
  - 12 soil borings
  - 4 recovery wells
  - LNAPL, soil, and groundwater sampling
- Concentrations of PCBs detected in the Southwest Plant LNAPL Area during the RI were:
  - Non-detect to 9,600 ppm in LNAPL
  - Non-detect to 41 ppm in soil
  - No PCBs were found in filtered groundwater samples
- LNAPL in the Southwest Plant Area was characterized as an amber colored, light, viscous, multi-component mixture of petroleum based oils, containing PCBs

2. Previous Characterization at Southwest Plant LNAPL Area, cont'd

- The sewers at the Site have been investigated extensively since 1996
  - 326 manhole surveys were completed at the Former SMI Plant and 84 were completed at Delphi Plant 2 (prior to Delphi separation from GM)
  - More than 3,000 ft of sewers at the Former SMI Plant were evaluated using a combination of video inspections, visual observations, and dye testing
  - This resulted in a comprehensive sewer map that was developed for the Site including the Southwest Plant LNAPL Area
- Potential sources of LNAPL are the historical waste management activities at the Former SMI Plant and the adjacent Delphi Plant 2 facility

3. Previous Remedial Activities at Southwest Plant LNAPL Area

- September 1995: Manual LNAPL recovery initiated from wells (bailing)
- April 1996: Repair of sewer that discharges to the stormwater pond
  - Various sections of the sewer (42" ø concrete) that discharges to the stormwater pond, upstream of manhole W13.1 to manhole W6.8, were replaced to prevent LNAPL from entering the sewer
  - The two ends of a truncated 30" ø sewer line which was previously abandoned was also located while completing the 42" ø sewer repair
  - Approximately 4,300 gallons of LNAPL was removed from the 30" ø abandoned sewer line and an additional 700 gallons of LNAPL was removed from the excavation
  - A recovery well (RW-1) was installed in the backfill of the 30" ø abandoned sewer excavation to allow for ongoing LNAPL recovery

3. Previous Remedial Activities at Southwest Plant LNAPL Area, cont'd

- June 1996: Additional sewer repairs
  - Approximately 600 ft of cure-in-place lining was installed in the 42" Ø sewer line that discharges to the City between the Delphi Plant 2 diversion chamber and the inverted siphon (manhole V2.2 and manhole U1.6)
  - Three additional recovery wells (RW-2, RW-3, and RW-4) were installed
- September 1997: Initiated operation of LNAPL and Groundwater Recovery and Treatment System:
  - Four recovery wells
  - An oil/water separator
  - A hydrogen peroxide system to control iron bacteria
  - Bag filters
  - GAC treatment

3. Previous Remedial Activities at Southwest Plant LNAPL Area, cont'd

- July 1998: PCB impacted soil excavation
  - PCB impacted soil (as high as 41 ppm) was excavated from a 40'x10' area from grade to a depth of 1 ft, south of the Southwest Plant LNAPL Area
  - Confirmation samples were collected from the sidewalls and base of the excavation. The results confirmed that soils containing PCBs above industrial direct contact values were removed
- August 1998: Sewer Sleeve installation
  - Approximately 300 ft of 36" ø HDPE pipe was installed between manhole W13.1 and W6.8 within the 42" ø sewer line that discharges to stormwater pond
- Mid 1990's to 2000: As a result of PCB detections at Outfall CFD-02, more than 2,500 ft of sewers at the Former SMI Plant were cleaned by jetting and bucketing

3. Previous Remedial Activities at Southwest Plant LNAPL Area, cont'd

- August 2000: Stormwater Pond Improvements
  - Oily material found on the stormwater pond in 1998
  - PCBs were detected in the oily material and from sediment samples located adjacent to the active storm sewer discharge line that goes through the LNAPL impacted area, however Industrial Direct Contact values for soil were not exceeded
  - No PCBs were detected in surface water
  - As a result of the supplemental investigation sediments were stabilized using lime and fly ash and the Stormwater Pond was lined in August 2000 as documented in the RI report

3. Previous Remedial Activities at Southwest Plant LNAPL Area, cont'd

- October 1998 to 2007: Stormwater Pond Inspections/Maintenance
  - Inspections of the stormwater pond were conducted weekly for the presence of LNAPL
  - Oil absorbent booms and containment booms were replaced, as necessary
  - LNAPL was occasionally skimmed off the stormwater pond
  - Inspections and maintenance of the stormwater pond ceased in 2007 when the plant was closed

3. Previous Remedial Activities at Southwest Plant LNAPL Area, cont'd

- 1997 to 2007: O&M of LNAPL and Groundwater Recovery and Treatment System
  - May 2001: the scavenger pump in RW-1 was switched to a skimmer pump, and RW-2, RW-3, and RW-4 continued to operate with scavenger pumps
  - October 2001: RW-4 was disconnected from the system and wells located on the Delphi Plant 2 property were excluded from gauging, due to Delphi no longer being owned by GM
  - 1997 to 2007: 3,700 gallons of LNAPL recovered
  - December 2007: Operation of the LNAPL and groundwater recovery and treatment system ceased when power to the system was turned off, as a result of SMI closure activities
  - Periodic monitoring of LNAPL thicknesses and manual LNAPL removal (bailing) in area wells was completed during the operation of the system

3. Previous Remedial Activities at Southwest Plant LNAPL Area, cont'd

- 2007 to Present: Post-LNAPL and Groundwater Recovery System Operation
  - 2007 to October 2013: Since stopping the LNAPL and groundwater recovery system (automated), passive recovery and monitoring has occurred periodically
  - July to August 2010: conducted a study to determine the effectiveness of passive recovery utilizing absorbent socks. MDEQ approved use of passive recovery using absorbent socks instead of re-starting the automated system in an email date October 2010
  - Measurable LNAPL (generally less than 0.1 ft present at four MWs)
  - Late 2010: the water table rose above the top of a number of monitoring well screens due to groundwater rebound
  - April 2012: last measurable LNAPL reading
  - October 2013: last LNAPL readings taken (no measureable LNAPL)
  - 2007 to present: no LNAPL observed in the stormwater pond

3. Previous Remedial Activities at Southwest Plant LNAPL Area, cont'd

- August 2011: Bulkheads installed in sewer that discharges to City sewer
  - Flow directed to the City sewer from the 42" Ø sewer was blocked with bulkheads at the inverted siphon (manhole V2.2 to manhole U1.6, at CFD-06, and further downstream where the 42" Ø sewer connects to the City 60" Ø sewer
- April 2014: Manhole inspections
  - Nine manholes were inspected for the presence of LNAPL in the Southwest Plant LNAPL area
  - A LNAPL thickness of 3.5" was measured in one inactive manhole located on the 30" abandoned sewer, trace LNAPL was identified in two manholes (X8.2 and W6.8)
  - There was no LNAPL present in manholes upstream of the manholes that identified the presence of LNAPL
  - No LNAPL was observed downgradient of the Southwest Plant LNAPL area in the stormwater pond

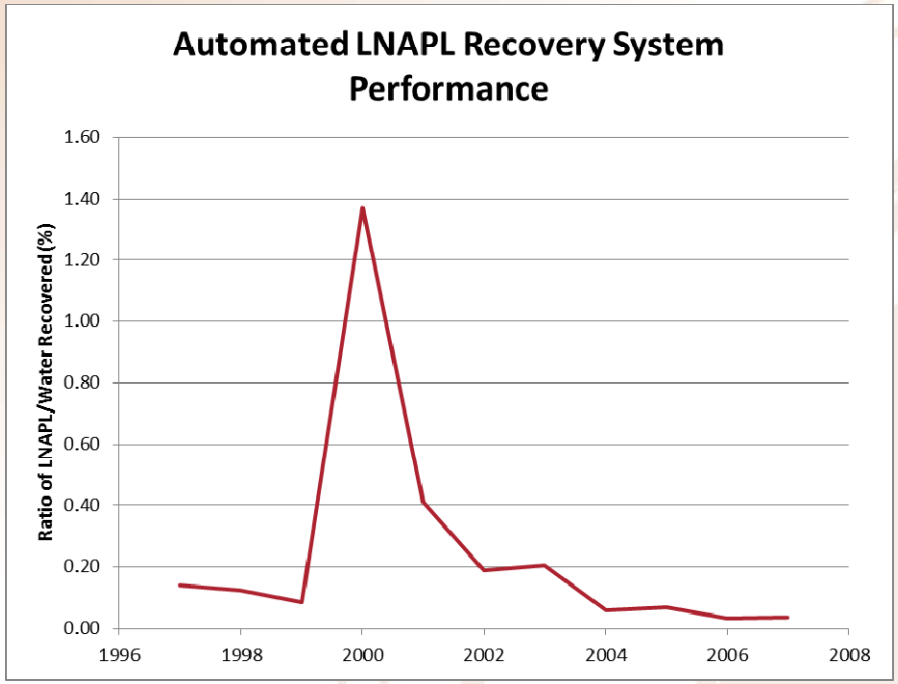
4. LNAPL Conceptual Site Model (LCSM)

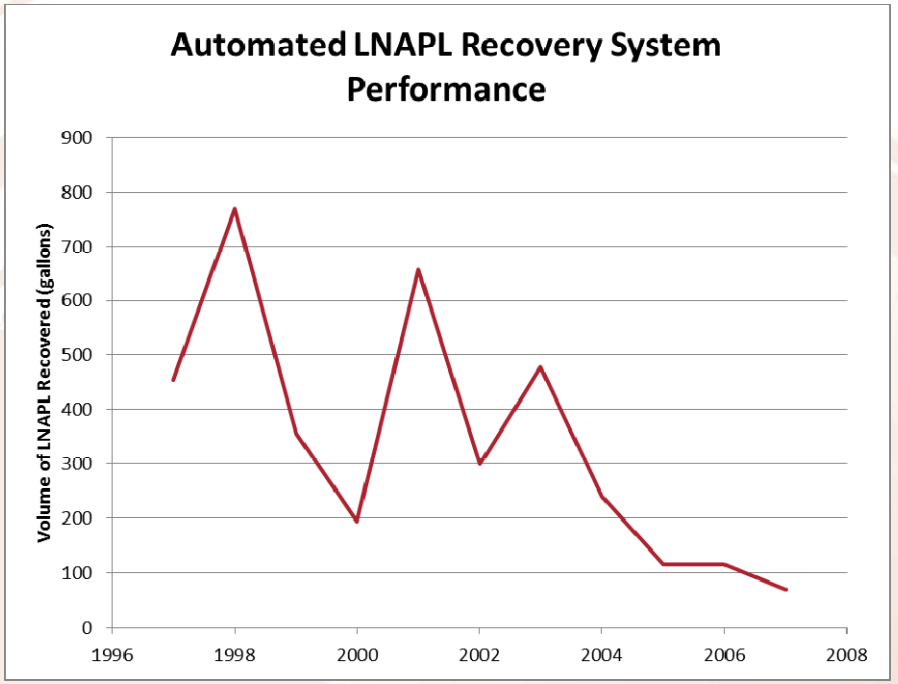
Release History

- Potential sources of LNAPL are the historical waste management activities at the Former SMI Plant and the adjacent Delphi Plant 2 facility
  - Former SMI Plant closed in 2007
  - Former Delphi Plant 2 was closed in 2001

Remedial History

- Recovery of LNAPL has been performed by various methods since 1995
  - Automated recovery system efficiency decreased significantly prior to water table submerging screens post-demolition (ratio of LNAPL recovered/water recovered decreased from high of 0.01 in 2000 to 0.0004 in 2006 and 2007)





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4. LCSM, Cont'd

Land Use

- Residual LNAPL within the confines of former heavy industrial site with future land use restricted to non-residential

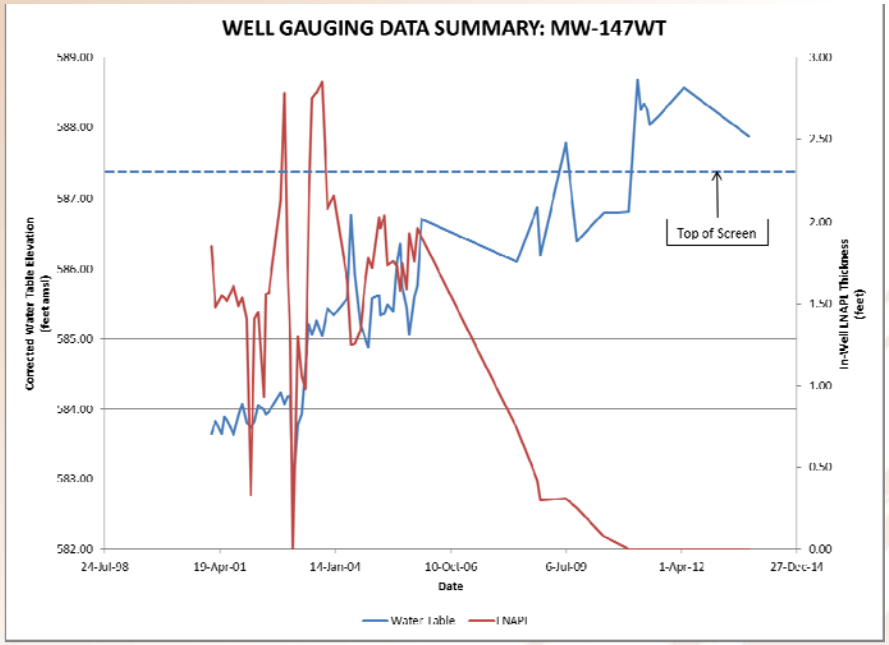
LNAPL Properties

- Amber colored, light, viscous, multi-component mixture of primarily petroleum based oils resembling motor oils
- Historical LNAPL results indicate the presence of PCBs

4. LCSM, Cont'd

LNAPL Spatial Distribution

- Vertical impacts 4-14 ft bgs
- Extent of potentially mobile/recoverable LNAPL historically delineated by MWs
  - Limited measurable LNAPL detected mid-2010
  - Trace LNAPL thicknesses or no LNAPL detected prior to post-demo water table rise (submerging screens)
  - No measurable LNAPL in monitoring wells since April 2012 (including wells where screens are not submerged currently)
- Residual LNAPL impacts expected to extend from up-gradient Delphi property (from historical sources)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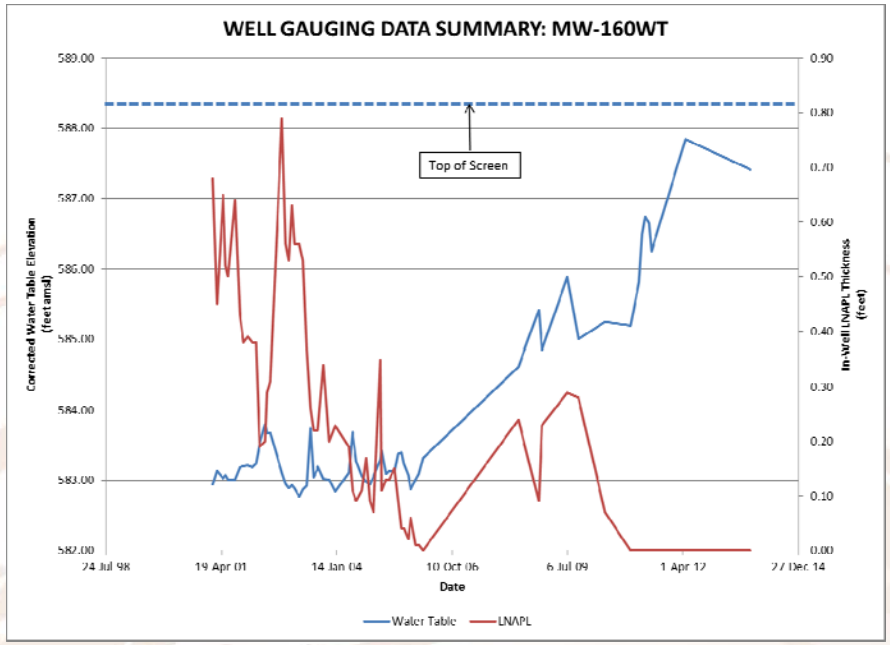
In-Well LNAPL Thickness (feet)
Top of Screen
Date
Water Table
LNAPL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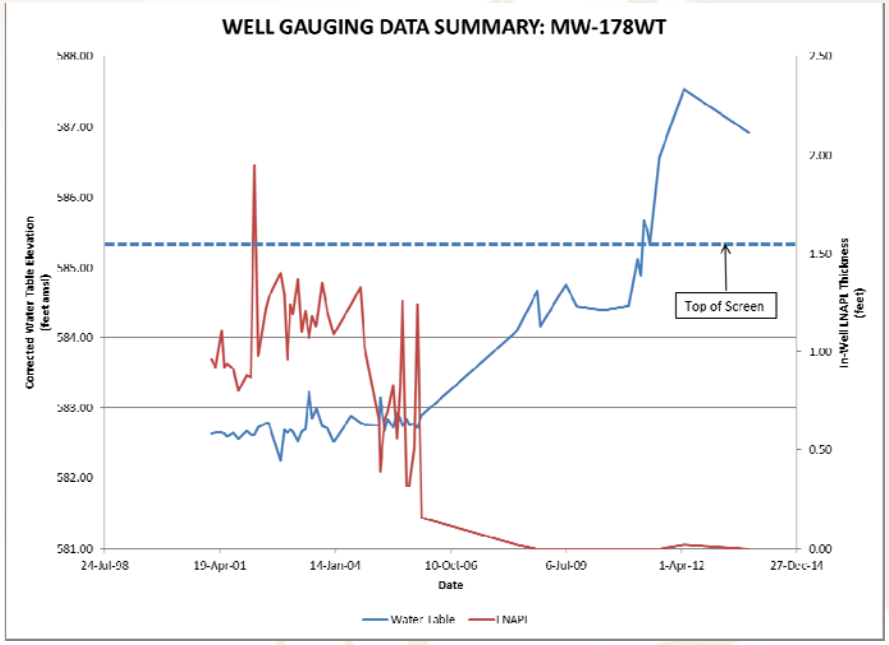
In-Well LNAPL Thickness (feet)
Top of Screen
Date
Water Table
LNAPL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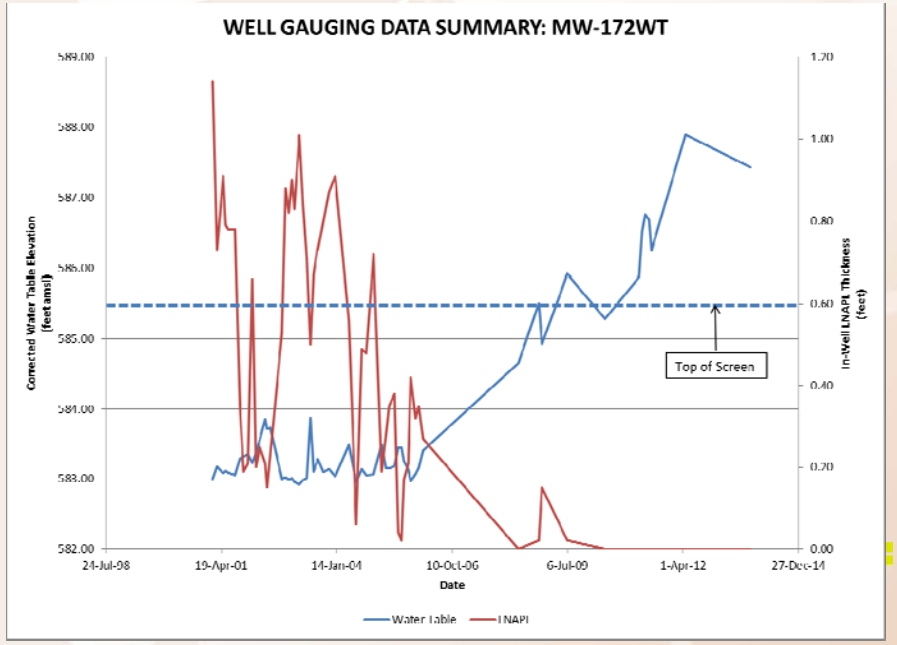
Top of Screen
Date
Water Table
LNAPL


WELL GAUGING DATA SUMMARY: MW-172WT
Corrected Water Table Elevation (feet amsl)
In-Well LNAPL Thickness (feet)
Top of Screen
Date
Water Table
LNAPL

4. LCSM, Cont'd

LNAPL Mobility and Recoverability

- Only trace amounts of LNAPL observed recently and prior to water table submerging screens
  - de minimis mobility/recoverability condition
  - Post-demolition water table rise would have significantly smeared and further immobilized/submerged the limited mobile LNAPL observed prior
  - Mobility/recoverability also de minimis at neighboring Delphi site
- Active recovery completed until 2007 when the Plant was shut down
  - Recovery efficiency diminished prior to post-demolition water table rise
- MDEQ agreed passive recovery was appropriate in an email dated October 2010, which requested a Work Plan be prepared for passive recovery

4. LCSM, Cont'd

LNAPL Stability

- LNAPL stable based on:
  1. Time since possible release
  2. Historical LNAPL recovery performance
  3. Diminishing mobility/recoverability trend before post-demolition water table rise
  4. Significant post-demolition water table rise (further immobilization)
  5. De minimis mobility/recoverability of potential source zone(s) at neighboring Delphi property

4. LCSM, Cont'd

Potential Exposures

- The results for groundwater samples collected during the RI from the Southwest Plant LNAPL Area exceed current generic State of Michigan criteria for various metals, PCBs, SVOCs, and VOCs for GSI, Non-Residential Drinking Water, and Vapor Intrusion
- Groundwater and soil data from the RI was also evaluated in the HHE (BBL, 2003) and concluded that there are no foreseen exposure pathways following implementation of restrictive covenant

4. LCSM, Cont'd

Potential Exposures cont'd

- Exposures that exceed current State of Michigan Criteria will be addressed as identified below:
  - Drinking Water Pathway
    - This pathway is incomplete since the Site is serviced by municipal water supply
    - Use of groundwater as a potable source will be prohibited by the Restrictive Covenant
  - Vapor Intrusion Pathway
    - This pathway is not currently complete as there are no buildings
    - Will include RRD template language for VI restriction for possible future redevelopment in Restrictive Covenant

4. LCSM, Cont'd

Potential Exposures (cont'd)

- GSI Pathway
  - Any remaining LNAPL is stable and is a significant distance from the Saginaw River (~1,000 ft)
  - Sewers routed through the LNAPL area discharge to the stormwater pond which empties into the former Secondary Settling Pond. Groundwater sampled between the former Secondary Settling Pond and the Saginaw River has indicated constituent concentrations below applicable criteria and/or within acceptable concentrations established through the Site mixing zone
  - Quarterly monitoring of the three manholes with observed LNAPL, the stormwater pond, and the Secondary Settling pond is recommended to confirm NAPL is not migrating downstream. LNAPL, if present, will be recovered. Once there are four consecutive rounds of no measurable LNAPL, monitoring of the manholes will cease.

4. LCSM, Cont'd

Potential Exposures (cont'd)

- Direct Contact
  - Not currently a relevant pathway as NAPL is located at least 4 ft bgs, however, there is a potential pathway in the future should the area be excavated for redevelopment or other purposes
  - A restrictive covenant will be placed on the Southwest Plant LNAPL Area that identifies that caution is required and proper precautions should be in place while excavating or conducting other work in the area, and that requires maintaining 2 ft of cover over the area following any work and to properly manage any impacted material encountered while performing the work

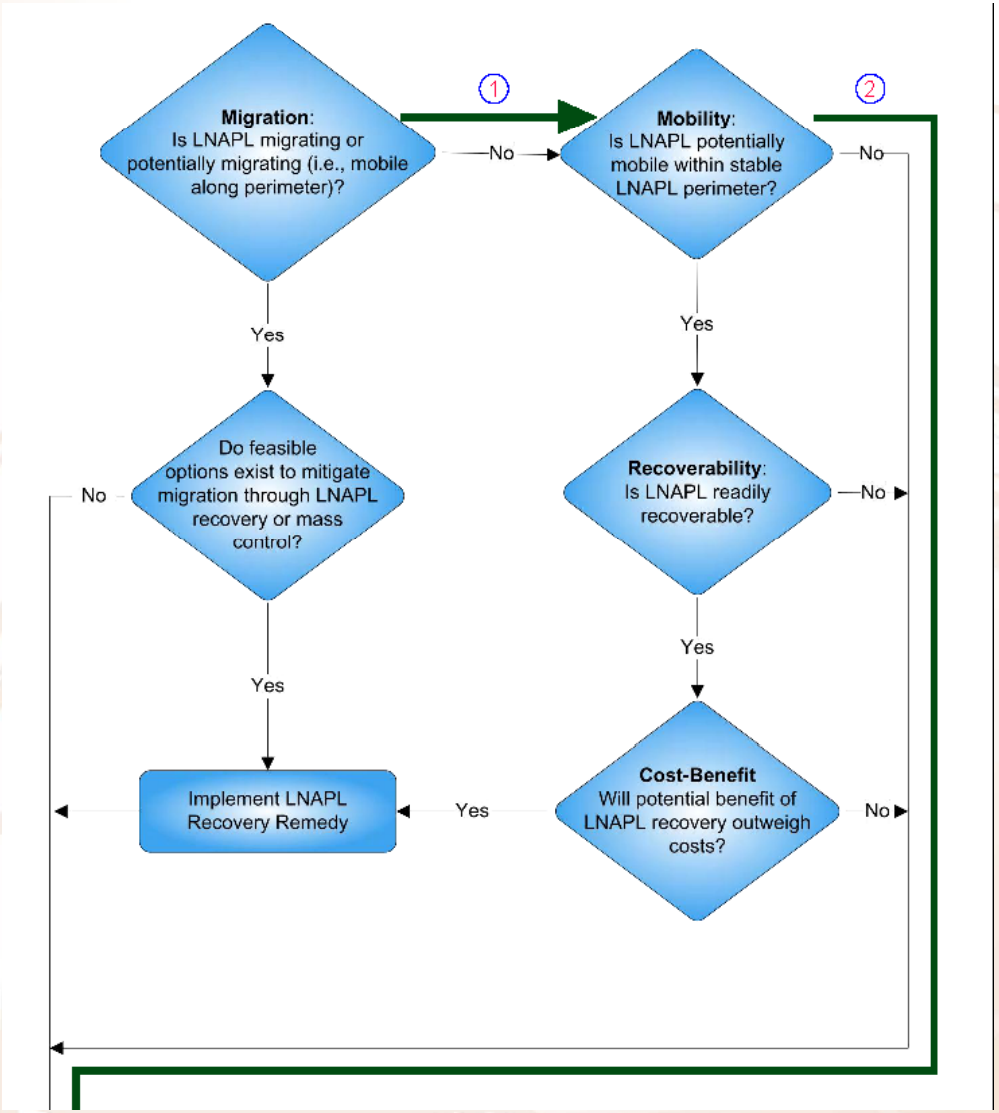
5. LNAPL Remedial Decision Tree

- Risk-based LNAPL management decision-making process developed in conjunction with MDEQ
  - Implemented at RACER sites across Michigan
  - Strategies based on realistic assessment of risk and potential benefit of engineered remedies
  - The process can be implemented at any point in the life of a project to determine an appropriate risk-based LNAPL management strategy (e.g., determine whether to start, stop or continue LNAPL recovery if already implemented)

- Consistent with draft MDEQ Petroleum NAPL Policy

LNAPL Saturation Concerns
(mobility and migration issues)

- Potential for LNAPL to spread and create new or increased risk (migration toward surface water, property boundary, underground utilities)
- Aesthetic/Nuisance issues



(1) AGE, LNAPL WELL OBSERVATIONS SINCE 2000 INDICATE A STABLE LNAPL BODY.

(2) NO MEASURABLE LNAPL IN WELLS, SHEEN OBSERVED (DE MINIMIS MOBILITY CONDITION, INSUFFICIENT LNAPL PRESENT TO EVALUATE TRANSMISSIVITY)

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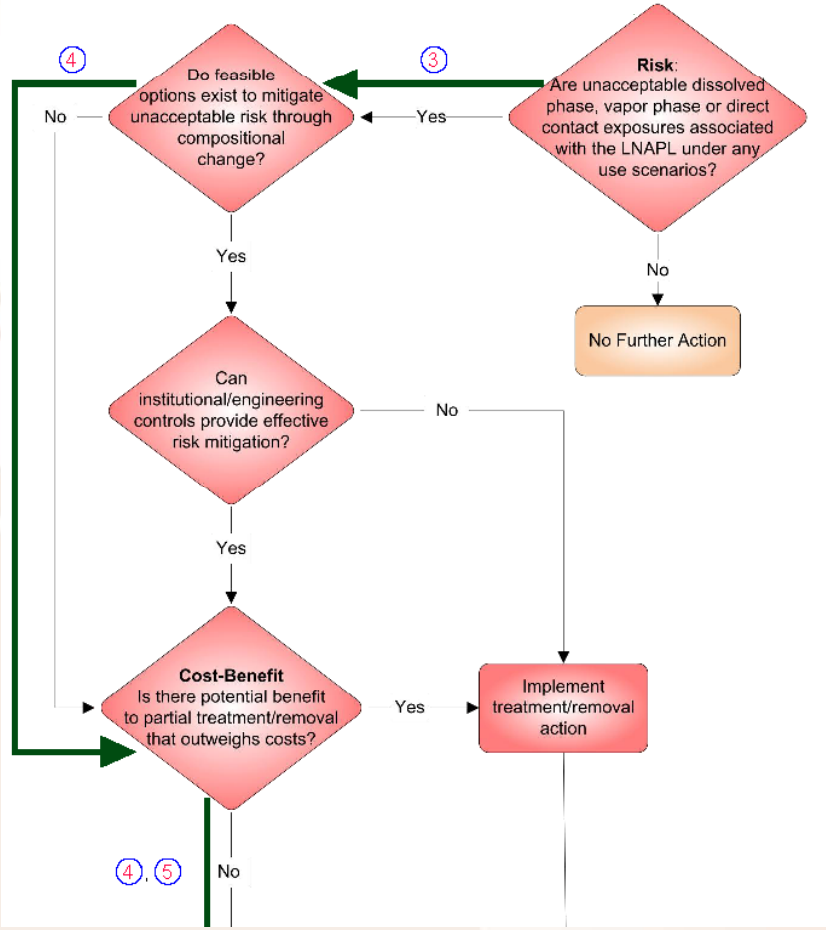
RACER

LNAPL Compositional Concerns (potential exposure/risk issues):

- Explosive hazards (vapor accumulation in confined spaces/ utilities, open excavations)
- Dissolved-phase concentrations (migration toward surface water bodies or groundwater supply wells)
- Vapor-phase concentrations (vapor intrusion/Long-term exposure risk)
- Direct contact or ingestion



(3) NO CURRENT RISK DUE TO LNAPL PRESENCE
DIRECT CONTACT REMAINS A POTENTIAL
FUTURE CONCERN IN THE EVENT OF SUBSURFACE EXCAVATION.

(4) COMPOSITIONAL CHANGE WILL NOT MITIGATE POTENTIAL EXPOSURE TO LNAPL IN THE EVENT OF EXCAVATION.

(5) RESTRICTIVE COVENANT WILL PROVIDE EFFECTIVE MITIGATION AND WILL BE THE MOST SUSTAINABLE APPROACH.

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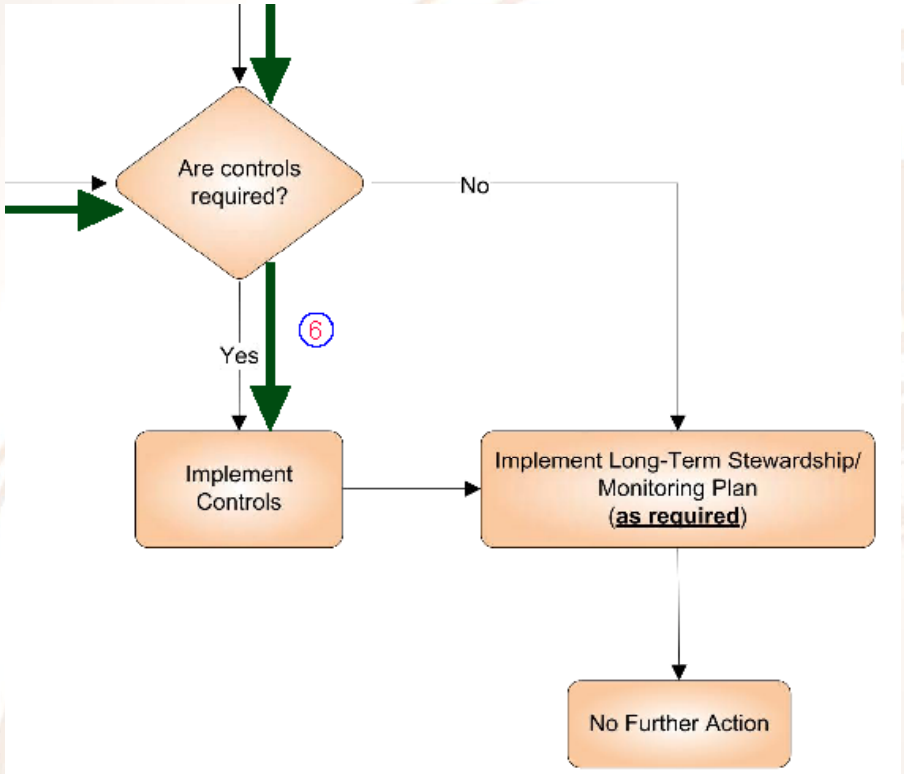

6 RESTRICTIVE COVENANT PROPOSED.

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6. Conclusions

- LNAPL is a viscous, non-volatile motor oil range fuel type
- LNAPL is effectively immobile, unrecoverable and stable/non-migrating overall in the bulk of the soil matrix
- LNAPL has the potential to migrate in the sewers, however, due to the current state of the water table (significantly above the sewers), it is unlikely LNAPL will migrate to the stormwater pond. In addition, LNAPL has not been observed in the stormwater pond since before 2007
- No current unacceptable exposure scenarios associated with the LNAPL in place
- Proposed Site restrictive covenant will prevent any potential future exposures

7. Recommendations

- Implement restrictive covenant
  - Prevent direct contact exposures
  - Prevent use of Site groundwater as a potable source
  - Require further evaluation of vapor intrusion pathway should future development include buildings in vicinity

- Further evaluate bulkheading sewers between Southwest Plant LNAPL area and the stormwater pond

7. Recommendations

- Modify monitoring
  - Discontinue monitoring of remaining wells for LNAPL with water levels above the screen
  - Quarterly monitoring of the three manholes with observed LNAPL, the stormwater pond, and the Secondary Settling pond to confirm NAPL is not migrating downstream. LNAPL, if present, will be recovered. Once there are four consecutive rounds of no measurable LNAPL, monitoring of the manholes will cease.
  - Monitor sewer manholes for the presence of LNAPL in the Southwest Plant LNAPL area