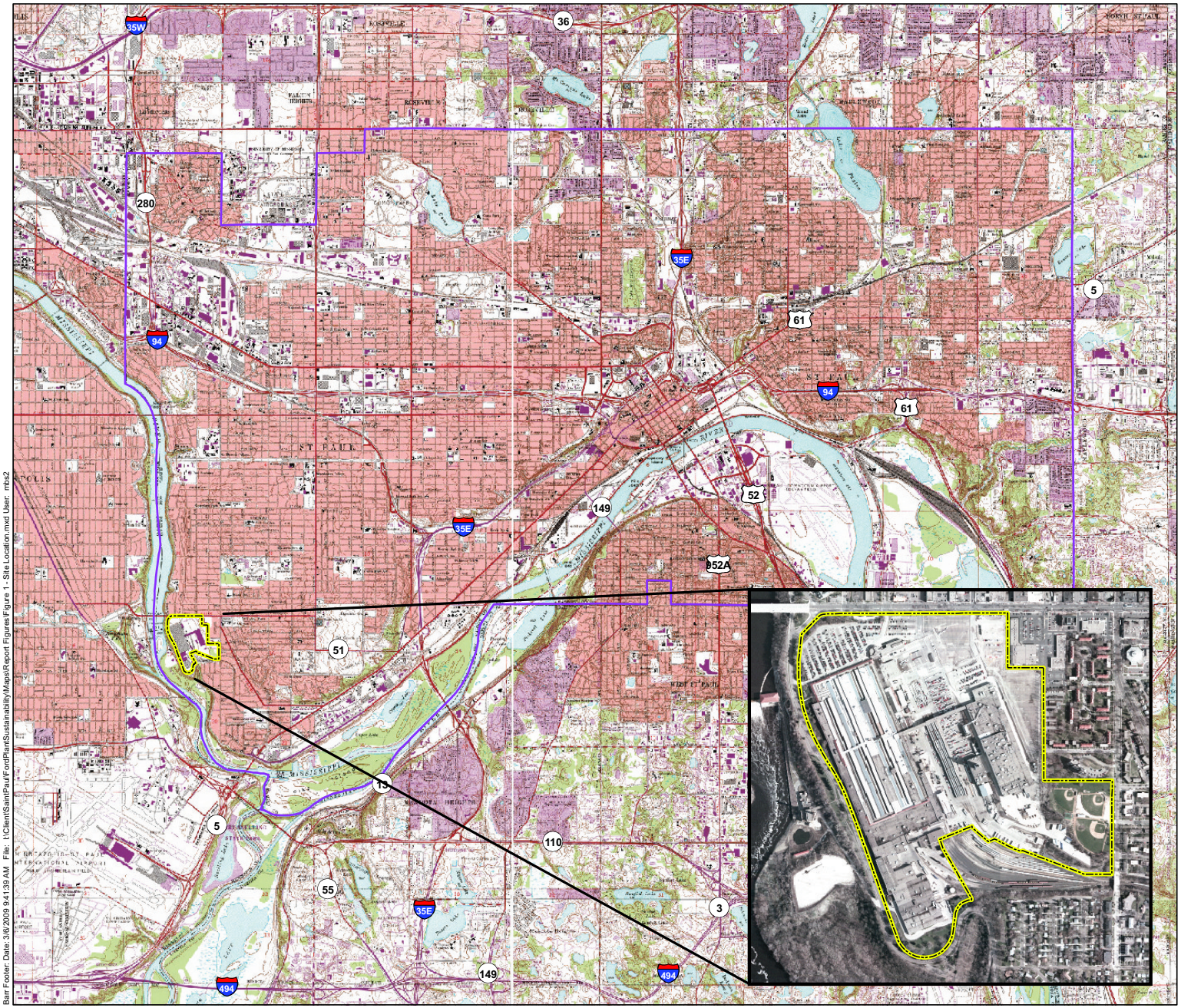
Figures



Ford Property Boundary

St. Paul Corporate Boundary

Sources:
USGS Digital Raster Graph
USGS 2008 Aerial Imagery

N

Miles
1 0 1 2

Kilometers
2 0 2

BARR

Figure 1

SITE LOCATION
Ford Plant Storm Water
Sustainability Report

City of St. Paul, MN

Barr Footer: Date: 3/6/2009 9:41:39 AM File: I:\Client\SaintPaul\FordPlant\Sustainability\Maps\Report Figures\Figure 1 - Site Location.mxd User: mbs2

Barr Footer: Date: 3/5/2009 11:34:15 AM File: I:\Client\SaintPaul\FordPlantSustainability\Maps\Report Figures\Figure 2 - Ford Plant Site Overview.mxd User: ndc

Building Footprints
Ford Property Boundary
Water Features

N

1 inch = 500 feet
Feet
500 0 500

Imagery is 2008 USGS on a hillshade

BARR

Figure 2

FORD PLANT OVERVIEW
Ford Plant Stormwater Sustainability Report

City of St. Paul, MN

Barr Footer: Date: 3/5/2009 12:58:27 PM File: I:\Client\SaintPaul\FordPlantSustainability\Maps\Report Figures\Figure 3 - Soil Boring and Monitoring Well Locations.mxd User: ndc

- Perched Groundwater Monitoring Well
- Platteville Monitoring Well
- St. Peter Monitoring Well
- Soil Boring
- Surface Soil Sample

Cross Section Name

- Cross Section A-A'
- Cross Section B-B'
- Building Footprints
- Ford Property Boundary
- Water Features

1 inch = 500 feet
Feet
500 0 500

Imagery is 2008 USGS on a hillshade.
Borings and monitoring conducted by ARCADIS

BARR

Figure 3
SOIL BORING AND MONITORING WELL LOCATIONS
Ford Plant Stormwater Sustainability Report

City of St. Paul, MN

Barr Footer: Date: 3/5/2009 11:48:09 AM File: I:\Client\SaintPaul\FordPlantSustainabilityMaps\Report Figures\Figure 4 - Impervious Surfaces - Existing Conditions.mxd User: ndc

- Building Footprints
- Ford Property Boundary
- Soo Line Parcels
- Existing Impervious on Ford and Soo Parcels
- Water Features

1 inch = 500 feet

Feet

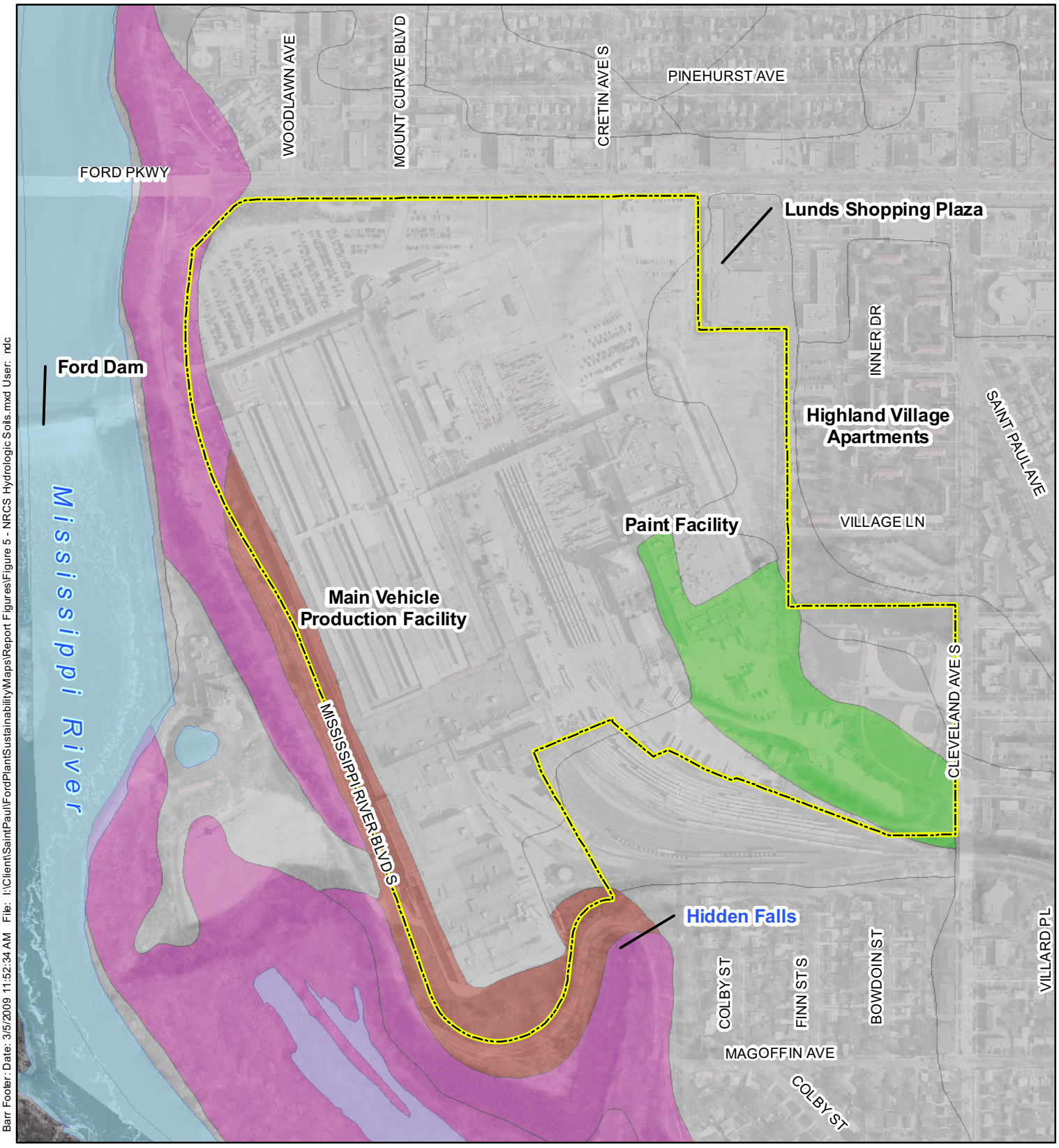
500 0 500

Imagery is 2008 USGS on a hillshade.

BARR

Figure 4
IMPERVIOUS SURFACES
EXISTING CONDITIONS
Ford Plant Stormwater
Sustainability Report

City of St. Paul, MN



Barr Footer: Date: 3/5/2009 11:52:34 AM File: I:\Client\SaintPaul\FordPlantSustainabilityMaps\Report Figures\Figure 5 - NRCS Hydrologic Soils.mxd User: ndc

Hydrologic Soil Type - NRCS

- Unknown
- A - Soils having high infiltration rates
- B - Soils having moderate infiltration rates
- B/D - Soils acting like D soils when saturated
- D - Soils having very slow infiltration rates
- Ford Property Boundary
- Water Features

N

1 inch = 500 feet

Feet

500 0 500

Imagery is 2008 USGS on a hillshade.

BARR

Figure 5

NRCS HYDROLOGIC SOILS
Ford Plant Stormwater Sustainability Report

City of St. Paul, MN

Barr Footer: Date: 7/3/2009 11:47:59 AM File: I:\Client\SaintPaul\FordPlantSustainabilityMaps\Report Figures\Figure 6 - Soil Profile from ARCADIS Borings.mxd User: ndc

Soils from Borings

- Sand and Gravel
- Silt/Sand Mixture
- Clayey Sand/Gravel
- Clay/Organics
- Unknown
- Ford Property Boundary
- Water Features

1 inch = 500 feet

Feet

500 0 500

Imagery is 2008 USGS on a hillshade.
Soil Borings conducted by ARCADIS.
Soil type is predominant soil at 5' to 10' b.g.s

BARR

Figure 6
SOIL PROFILE FROM ARCADIS BORINGS
Ford Plant Stormwater Sustainability Report

City of St. Paul, MN

Barr Footer: Date: 3/5/2009 12:44:31 PM File: I:\Client\SaintPaul\FordPlantSustainability\Maps\Report Figures\Figure 7 - Depth to Bedrock.mxd User: ndc

N

1 inch = 500 feet

Feet

500 0 500

Depth to Bedrock (feet)

Ford Property Boundary

Water Features

Imagery is 2008 USGS on a hillshade.
Soil Borings conducted by ARCADIS.
Bedrock contours generalized from ARCADIS soil borings.

BARR

Figure 7

DEPTH TO BEDROCK
Ford Plant Stormwater Sustainability Report

City of St. Paul, MN

Barr Footer: Date: 4/2/2009 4:23:14 PM File: I:\Client\SaintPaul\FordPlantSustainability\Maps\Report Figures\Figure 8 - Groundwater Elevations by ARCADIS - limestone.mxd User: ndc

Groundwater Elevations (Platteville Limestone)

Ford Property Boundary

Water Features

1 inch = 500 feet

Feet

500 0 500

Imagery is 2008 USGS on a hillshade.
Soil Borings conducted by ARCADIS.
Groundwater contours created by ARCADIS

BARR

Figure 8
PLATTEVILLE LIMESTONE GROUNDWATER ELEVATIONS BY ARCADIS
Ford Plant Stormwater Sustainability Report
City of St. Paul, MN

Barr Footer: Date: 4/2/2009 4:23:31 PM File: I:\Client\SaintPaul\FordPlantSustainability\Maps\Report Figures\Figure 9 - Groundwater Elevations by ARCADIS - sandstone.mxd User: ndc

Groundwater Elevations (St. Peter Sandstone)

Ford Property Boundary

Water Features

1 inch = 500 feet

Feet

500 0 500

Imagery is 2008 USGS on a hillshade.
Soil Borings conducted by ARCADIS.
Groundwater contours created by ARCADIS

BARR

Figure 9
ST. PETER SANDSTONE GROUNDWATER ELEVATIONS BY ARCADIS
Ford Plant Stormwater Sustainability Report
City of St. Paul, MN

County Well Index (CWI)
Electric Features
Sanitary Manholes
Catch Basins
Storm Manholes
Electric Lines
Gas Lines
Sanitary Sewer
Storm Sewer
Building Footprints
Ford Property Boundary
Water Features

Imagery is 2008 USGS on a hillshade.

1 inch = 400 feet

Feet
400 0 400

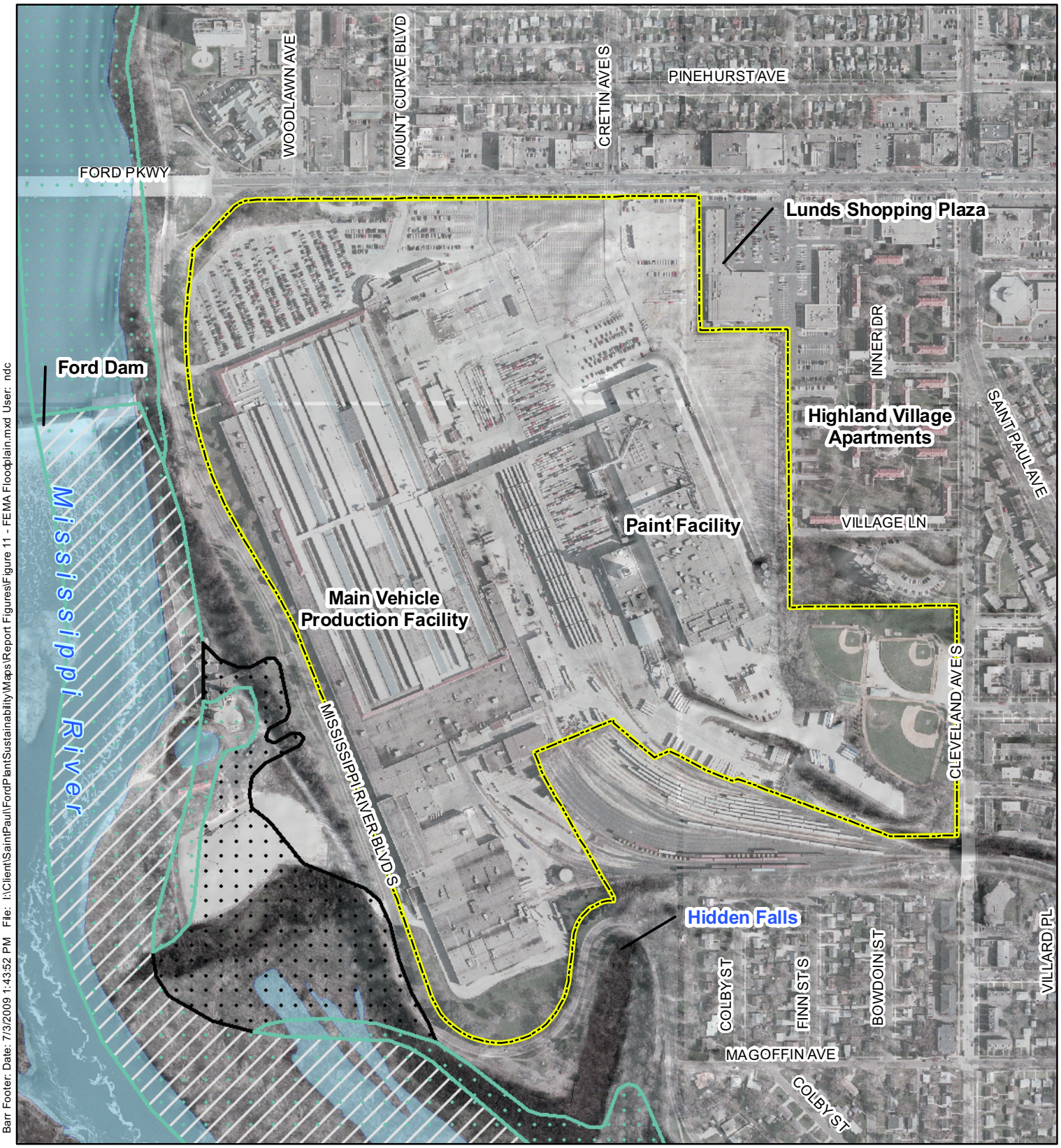
BARR

Figure 10

KNOWN UTILITY LOCATIONS
Ford Plant Stormwater Sustainability Report

City of St. Paul, MN

Barr Footer: Date: 3/5/2009 8:47:06 PM File: I:\Client\SaintPaul\FordPlantSustainability\Maps\Report Figures\Figure 10 - Known Utility Locations.mxd User: ndc



Barr Footer: Date: 7/3/2009 1:43:52 PM File: I:\Client\SaintPaul\FordPlantSustainability\Maps\Report Figures\Figure 11 - FEMA Floodplain.mxd User: ndc

Floodway

1% Annual Chance Floodplain

0.2% Annual Chance Floodplain

Ford Property Boundary

Water Features

N

1 inch = 500 feet

Feet

500 0 500

Imagery is 2008 USGS on a hillshade.

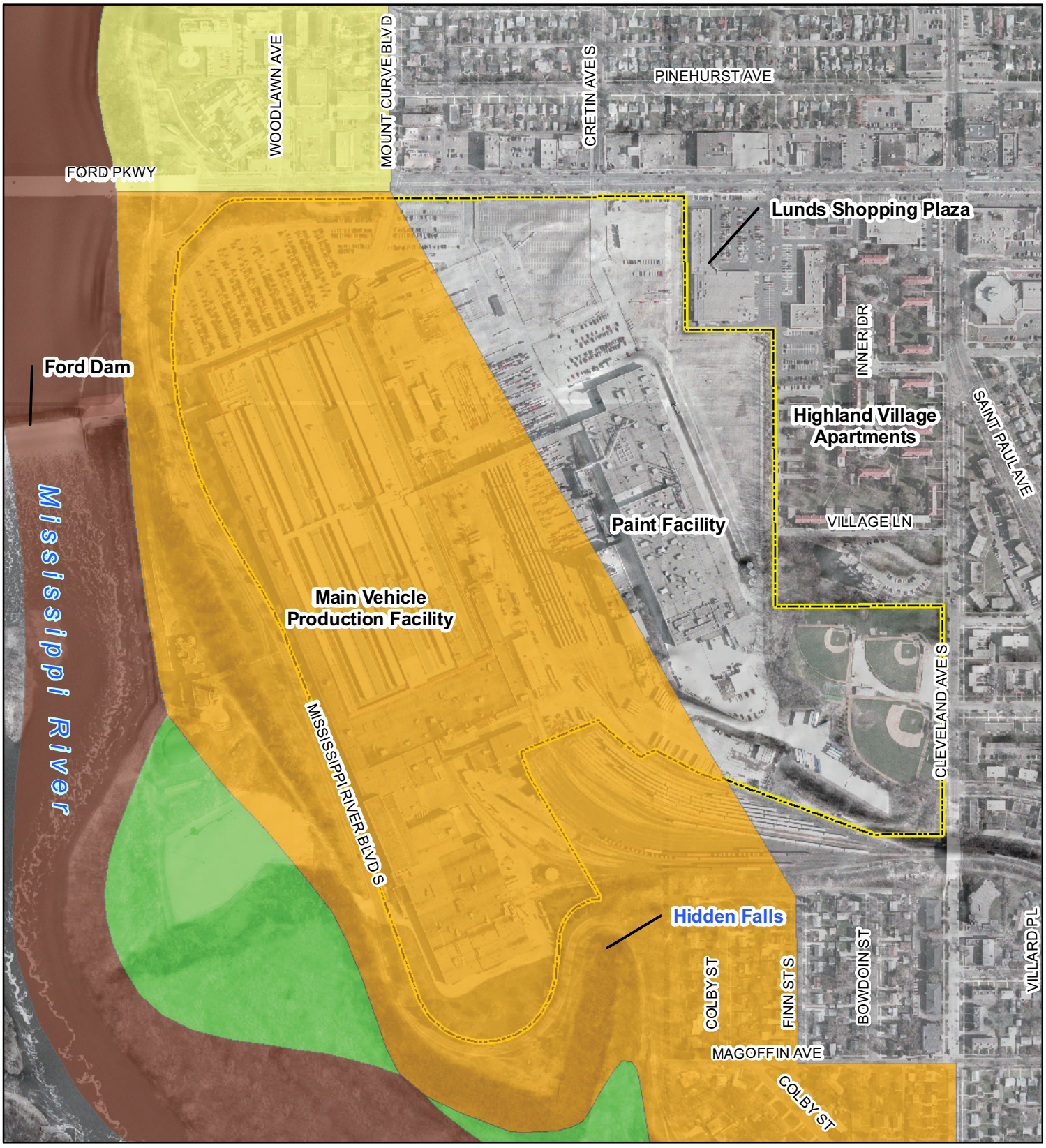
Floodplain boundaries from FEMA maps dated April 2, 2003.

BARR

Figure 11

FEMA FLOODPLAIN
Ford Plant Stormwater Sustainability Report

City of St. Paul, MN



Barr Footer: Date: 3/5/2009 4:40:37 PM File: I:\Client\SaintPaul\FordPlantSustainability\Maps\Report Figures\Figure 12 - River Corridor Overlay District.mxd User: ndc

River Corridor Overlay Zoning District

- RC-1 - Floodway District
- RC-2 - Flood Fringe District
- RC-3 - Urban Open District
- RC-4 - Urban Diversified Overlay District
- Ford Property Boundary

N

1 inch = 500 feet

Feet

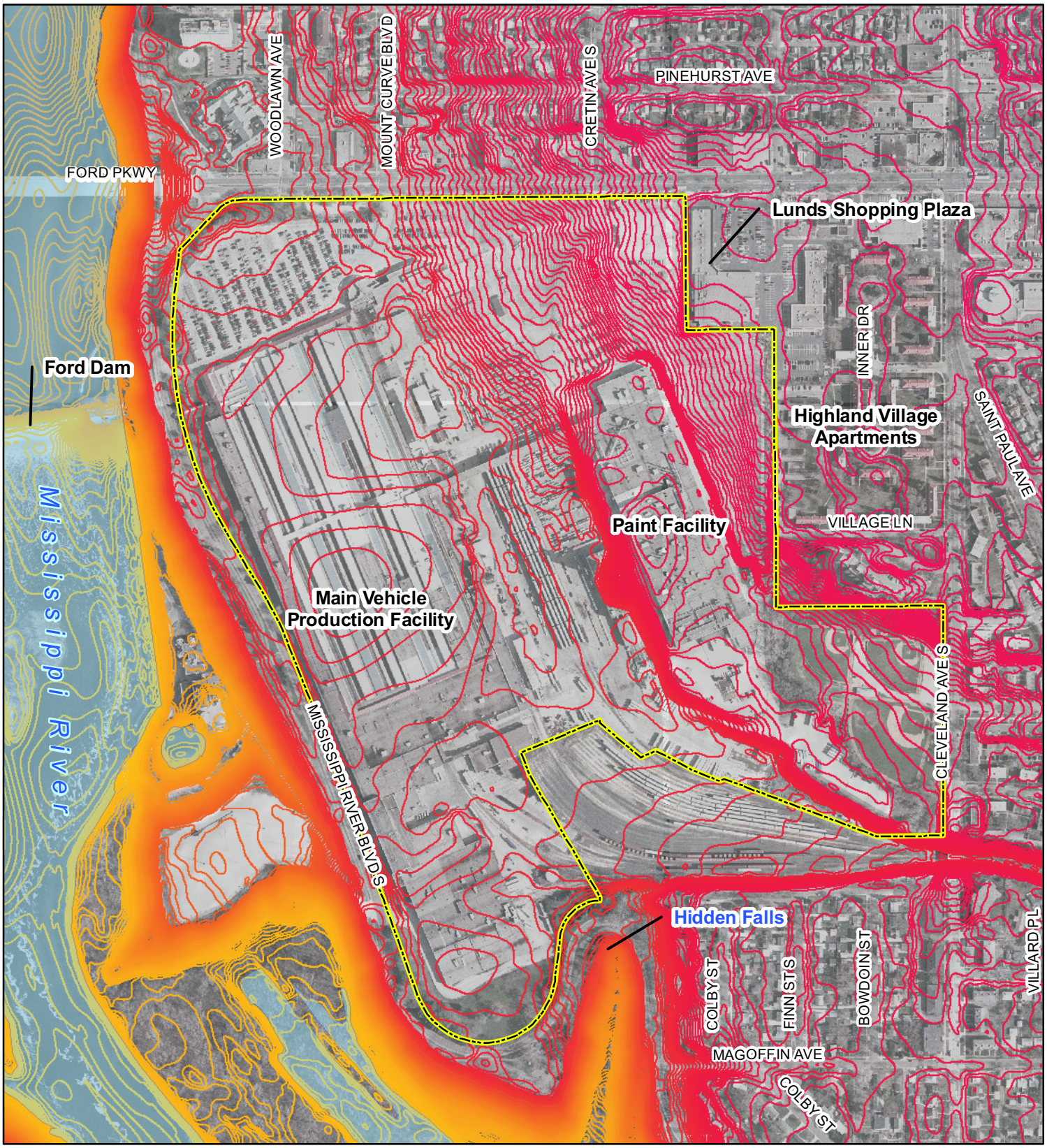
500 0 500

Imagery is 2008 USGS on a hillshade.

BARR

Figure 12
RIVER CORRIDOR OVERLAY ZONING DISTRICT
Ford Plant Stormwater Sustainability Report

City of St. Paul, MN



Barr Footer: Date: 3/5/2009 4:44:27 PM File: I:\Client\SaintPaul\FordPlantSustainability\Maps\Report Figures\Figure 13 - Topography.mxd User: ndc

N

1 inch = 500 feet

Feet
500 0 500

Imagery is 2008 USGS on a hillshade.
Contours are 1-foot (NAVD88).

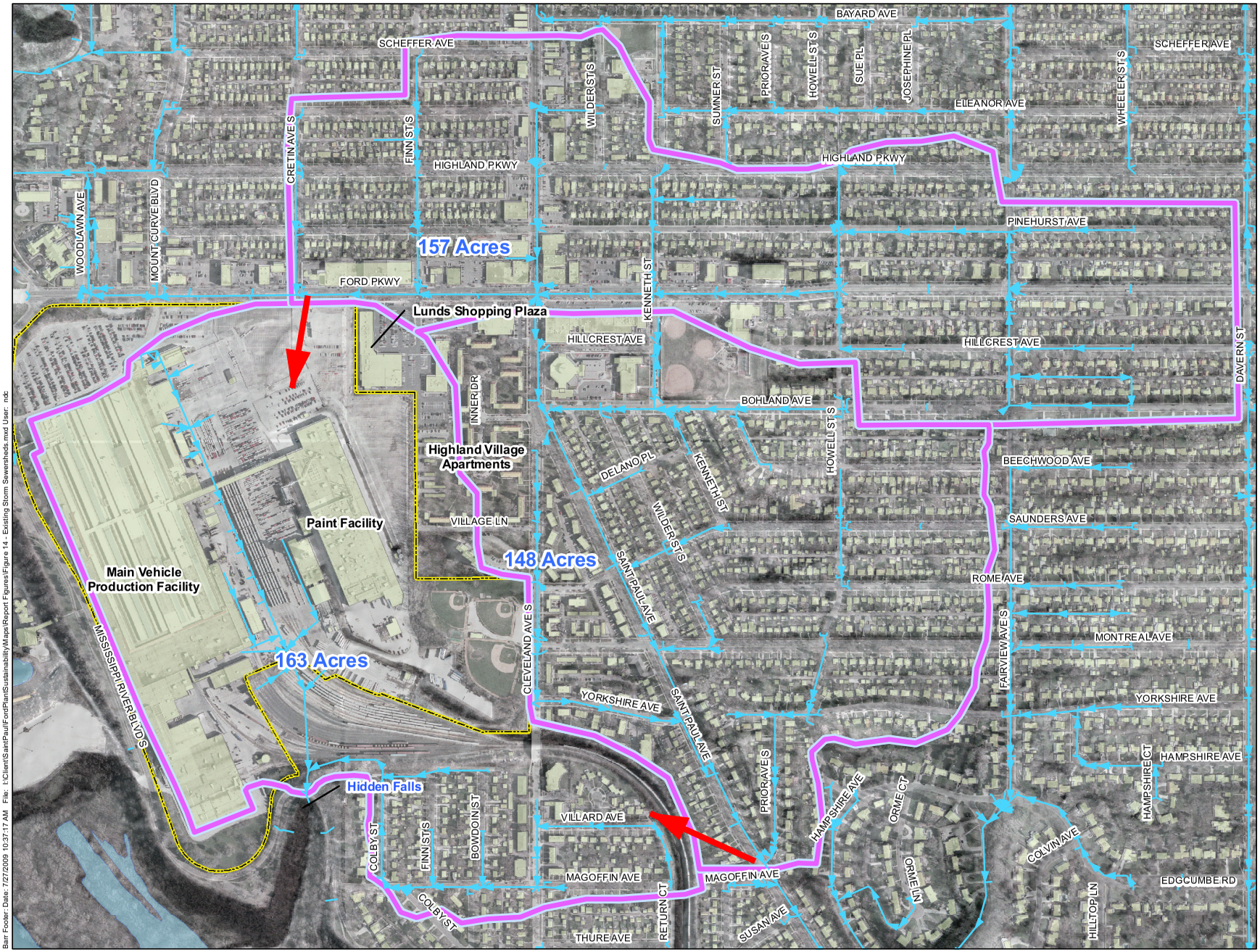
Contours (1ft) - NAVD88
Ford Property Boundary
Water Features

BARR

Figure 13

TOPOGRAPHY
Ford Plant Stormwater Sustainability Report

City of St. Paul, MN



Low Flow Diversions
Existing Storm Sewer
Storm Sewersheds
Building Footprints
Ford Property Boundary
Water Features

Imagery is 2008 USGS on a hillshade.
Low flow diversions are from adjoining storm sewersheds.

1 inch = 500 feet

Feet
500 0 500

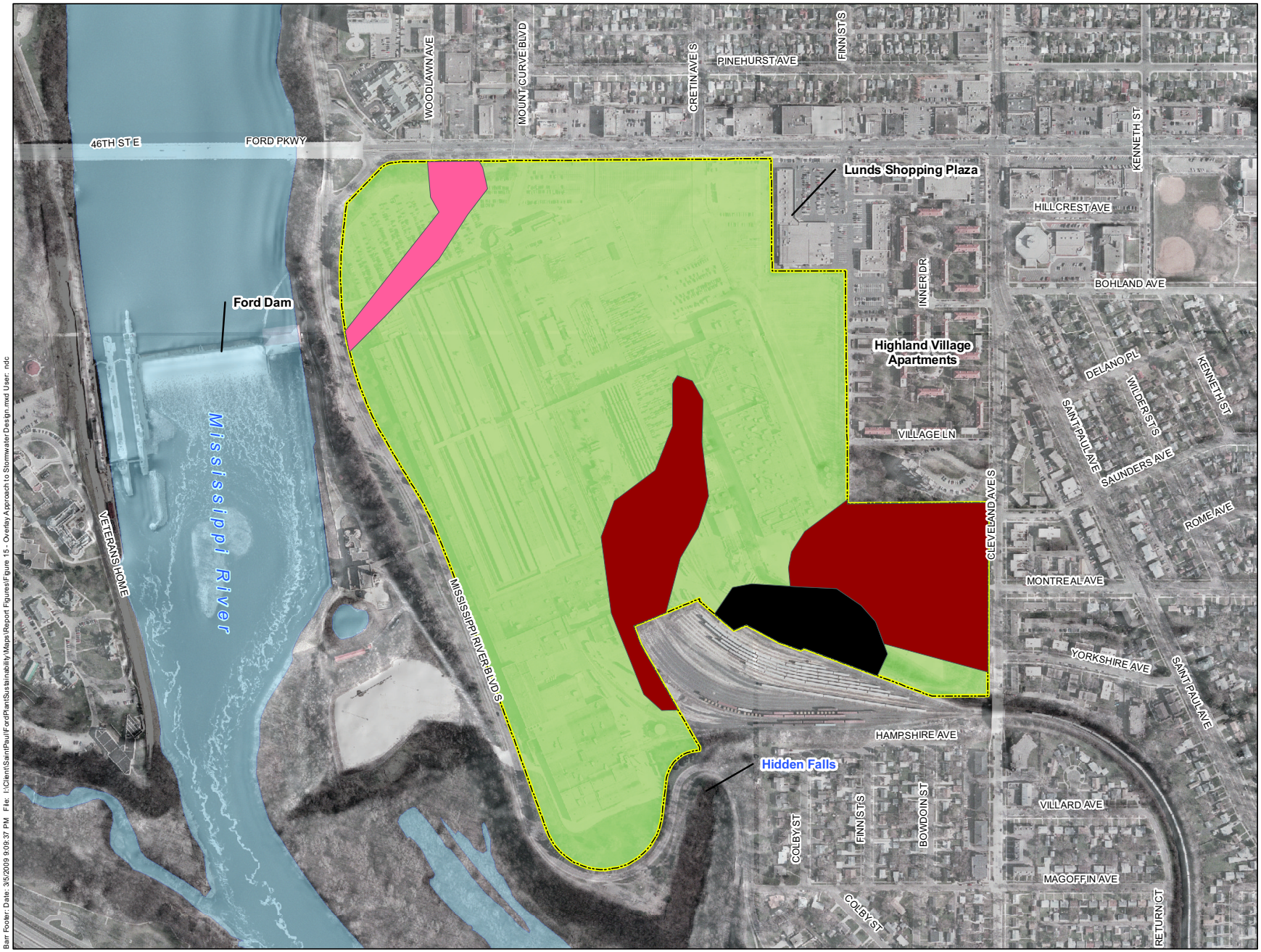
BARR

Figure 14

EXISTING STORM SEWERSHEDS
Ford Plant Stormwater Sustainability Report

City of St. Paul, MN

CONCEPTUAL



Utility Conflicts
Impermeable Soils
Shallow Bedrock
Areas of Potential Infiltration
Ford Property Boundary
Water Features

Imagery is 2008 USGS on a hillshade.
Areas in green could be suitable for infiltration but require further investigation.

1 inch = 400 feet

Feet
400 0 400

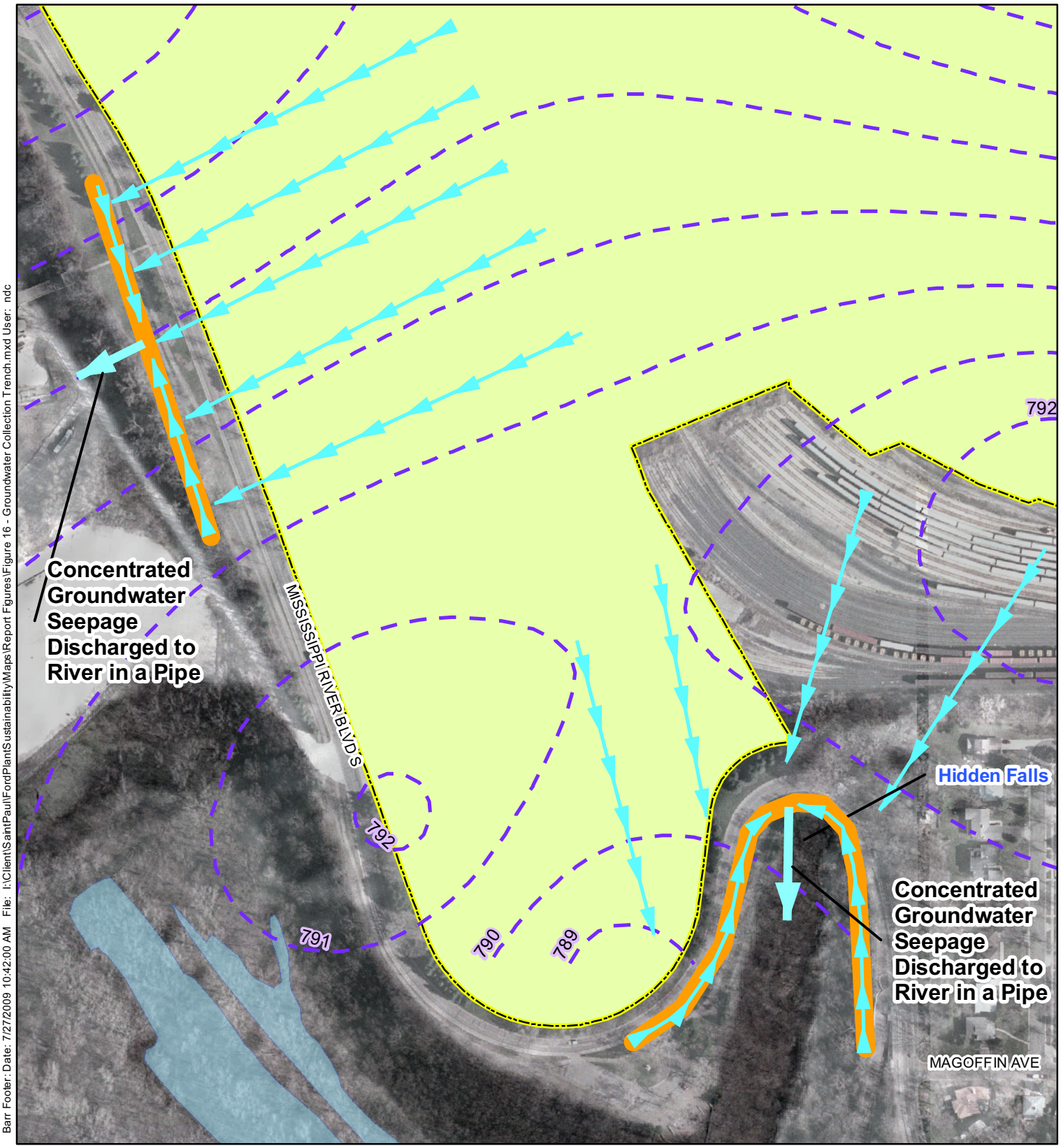
BARR

Figure 15

OVERLAY APPROACH TO STORMWATER DESIGN
Ford Plant Stormwater Sustainability Report

City of St. Paul, MN

CONCEPTUAL



Barr Footer: Date: 7/27/2009 10:42:00 AM File: I:\Client\SaintPaul\FordPlantSustainabilityMaps\Report Figures\Figure 16 - Groundwater Collection Trench.mxd User: ndc

Collector Pipe to River

Groundwater Collection Trench

Possible Groundwater Path

Groundwater Elevations (Platteville Limestone)

Ford Property Boundary

Ford Property Boundary

N

1 inch = 250 feet

Feet

250 0 250

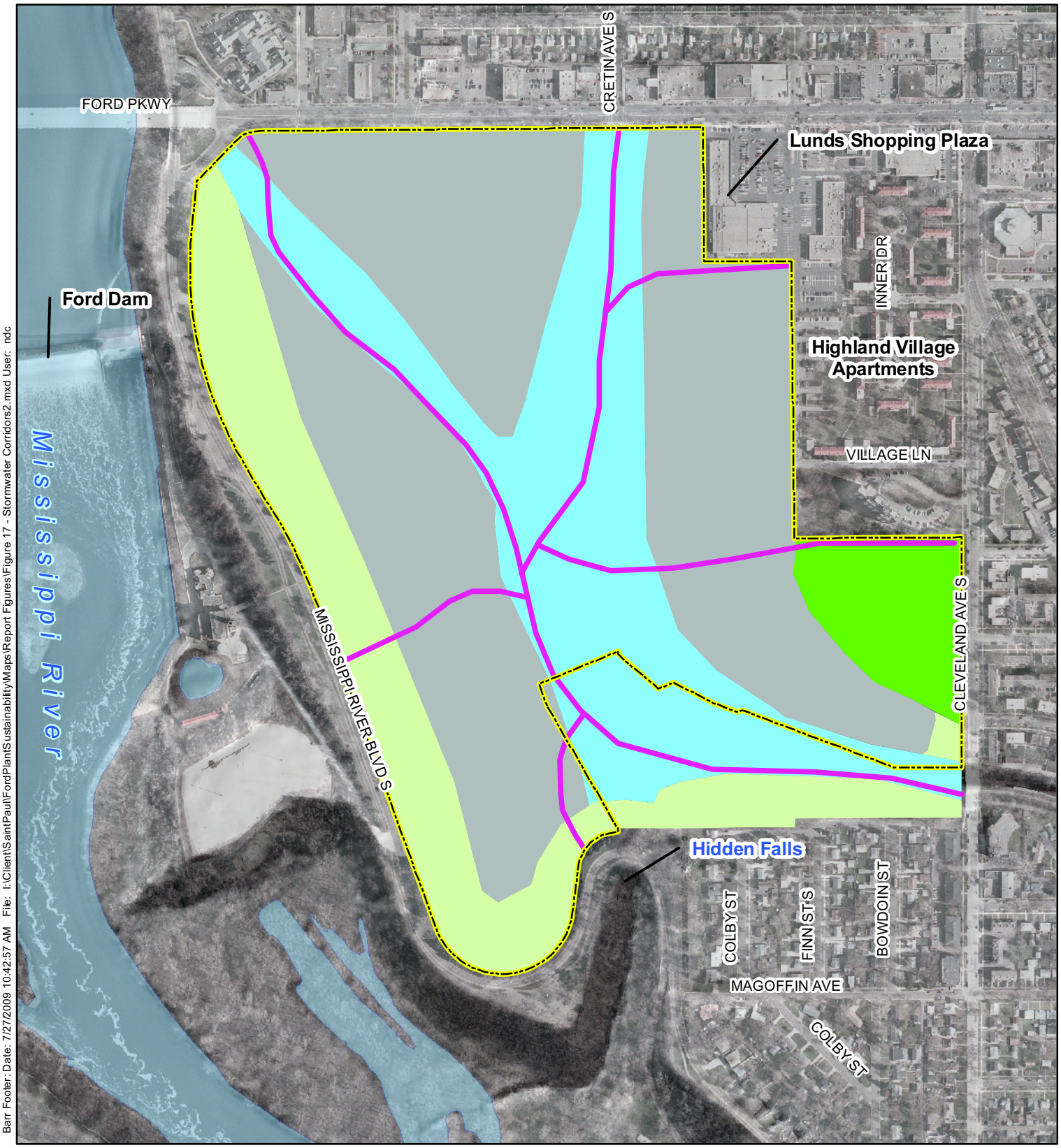
BARR

Figure 16
GROUNDWATER COLLECTION TRENCH
Ford Plant Stormwater Sustainability Report

City of St. Paul, MN

CONCEPTUAL

Imagery is 2008 USGS on a hillshade.



Barr Footer: Date: 7/27/2009 10:42:57 AM File: I:\Client\SaintPaul\FordPlantSustainabilityMaps\Report Figures\Figure 17 - Stormwater Corridors2.mxd User: ndc

Pedestrian Corridors

Potential Landuse

- Native Plantings and Grasses
- Recreation
- Residential/Commercial
- Stormwater Treatment Corridor
- Ford Property Boundary

CONCEPTUAL

N

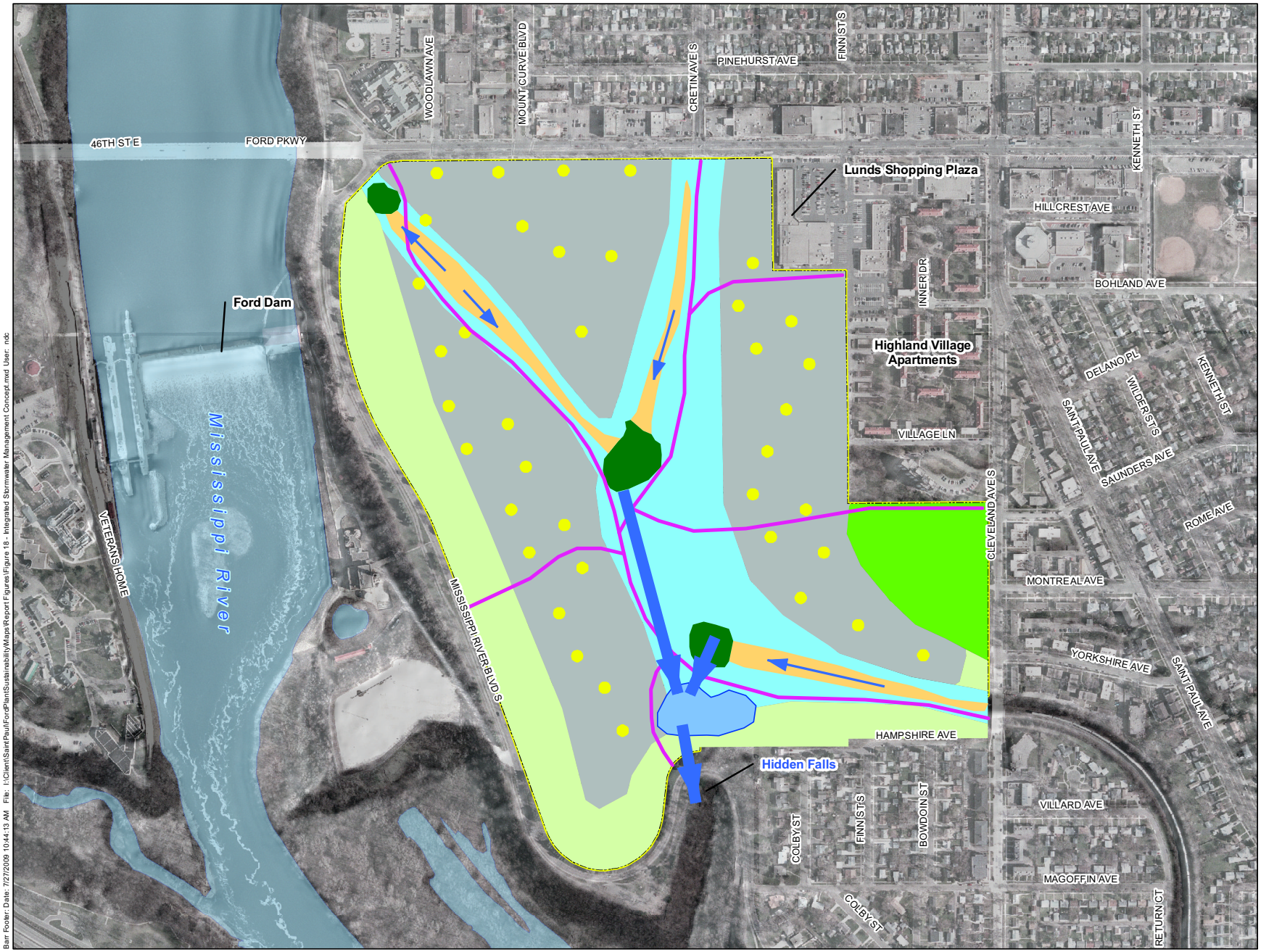
1 inch = 500 feet
Feet
500 0 500

Imagery is 2008 USGS on a hillshade.
*Eventual stormwater system configuration will depend on the overall redevelopment plan for the site

BARR

Figure 17
CONCEPTUAL STORMWATER CORRIDORS*
Ford Plant Stormwater Sustainability Report

City of St. Paul, MN



Imagery is 2008 USGS on a hillshade.

1 inch = 400 feet

Feet
400 0 400

BARR

Figure 18

INTEGRATED STORMWATER MANAGEMENT CONCEPT*

Ford Plant Stormwater Sustainability Report

City of St. Paul, MN

*Eventual stormwater system configuration will depend on overall redevelopment plan for the site.

CONCEPTUAL

Barr Footer: Date: 7/27/2009 10:44:29 AM File: I:\Client\SaintPaul\FordPlantSustainabilityMaps\Report Figures\Figure 19 - Proposed Stormwater Monitoring Locations.mxd User: ndc

Proposed Stormwater Monitoring Locations

Existing Storm Sewer

Storm Sewersheds

Ford Property Boundary

Water Features

CONCEPTUAL

N

1 inch = 650 feet

Feet

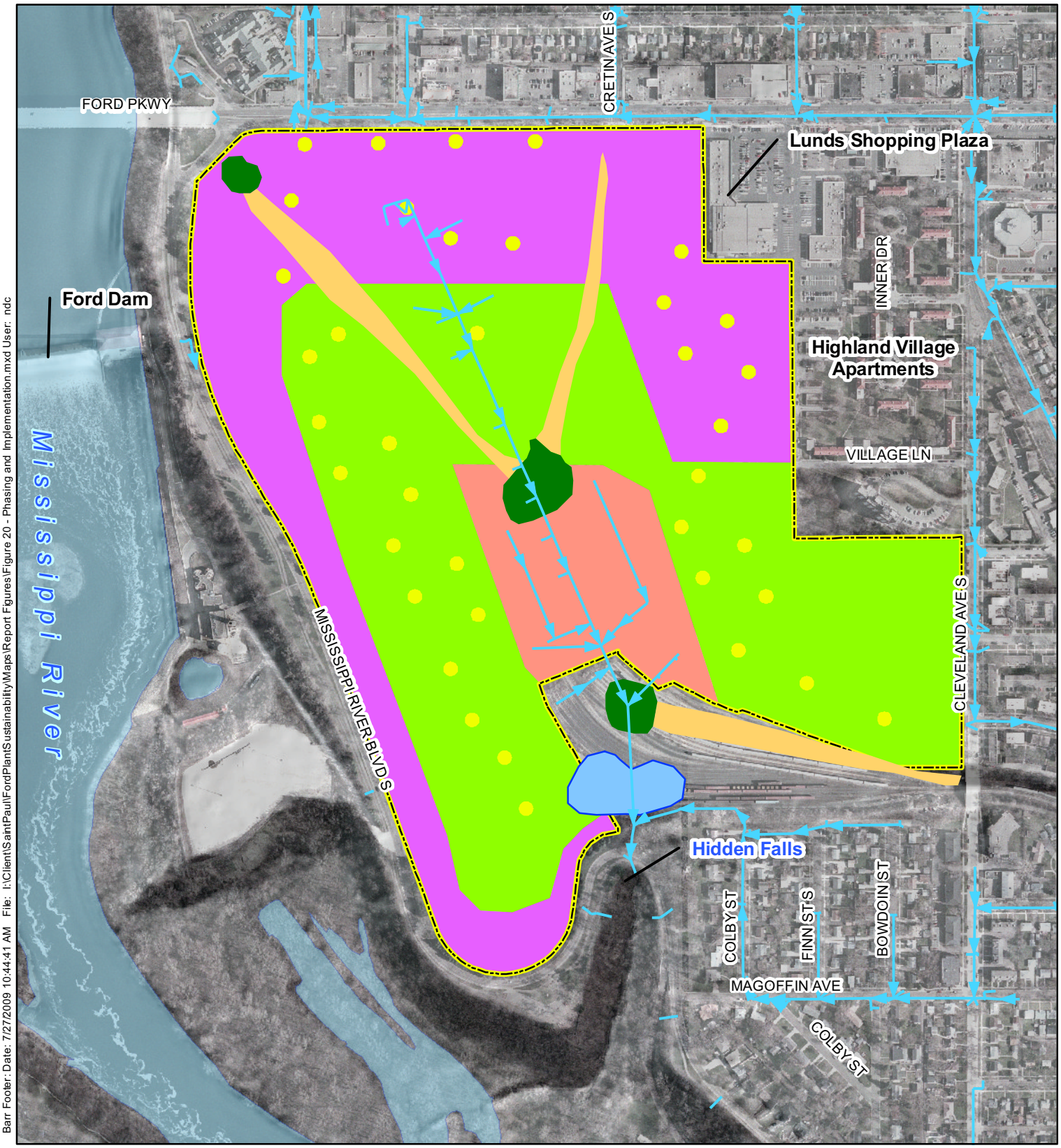
650 0 650

Imagery is 2008 USGS on a hillshade.

BARR

Figure 19
PROPOSED STORMWATER MONITORING LOCATIONS
Ford Plant Stormwater Sustainability Report

City of St. Paul, MN



Barr Footer: Date: 7/27/2009 10:44:41 AM File: I:\Client\SaintPaul\FordPlantSustainabilityMaps\Report Figures\Figure 20 - Phasing and Implementation.mxd User: ndc

- Existing Storm Sewer
- Rainwater Garden
- Regional Infiltration Basin
- Vegetated Swales
- Stormwater Pond/Wetland
- Ford Property Boundary

Phasing

- 1 - Upstream and Native Plantings
- 2 - Middle of Site and Railroad
- 3 - Downstream and End of Line BMPs

1 inch = 500 feet

CONCEPTUAL

Feet

500 0 500

Imagery is 2008 USGS on a hillshade.
This figure assumes that the Canadian Pacific Railway property will be combined with the Ford Plant. If this is not the case, BMPs can shift slightly.

BARR

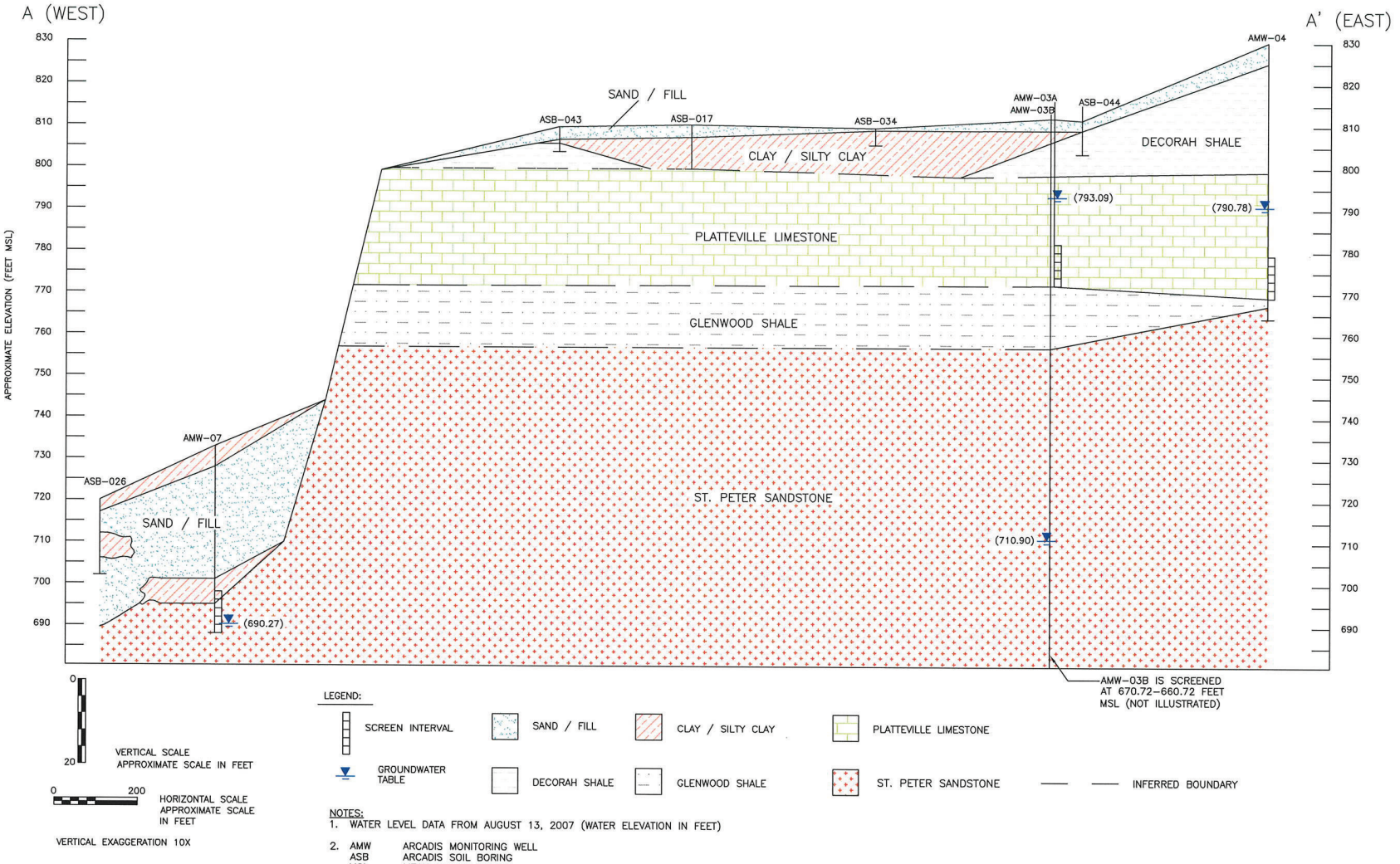
Figure 20
PHASING AND IMPLEMENTATION
Ford Plant Stormwater Sustainability Report

City of St. Paul, MN

Appendices

Appendix A

Soil and Bedrock Cross Sections by ARCADIS



NOTES:
1. WATER LEVEL DATA FROM AUGUST 13, 2007 (WATER ELEVATION IN FEET)
2. AMW ARCADIS MONITORING WELL
   ASB ARCADIS SOIL BORING
   MSL MEAN SEA LEVEL

Project Manager	E. CARMAN
Assistant Project Manager	B. ZINDA
Drawn	R. DORN
Checked	A. FISKNESS

FORD MOTOR COMPANY

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
1	—	—	—	—	—	—

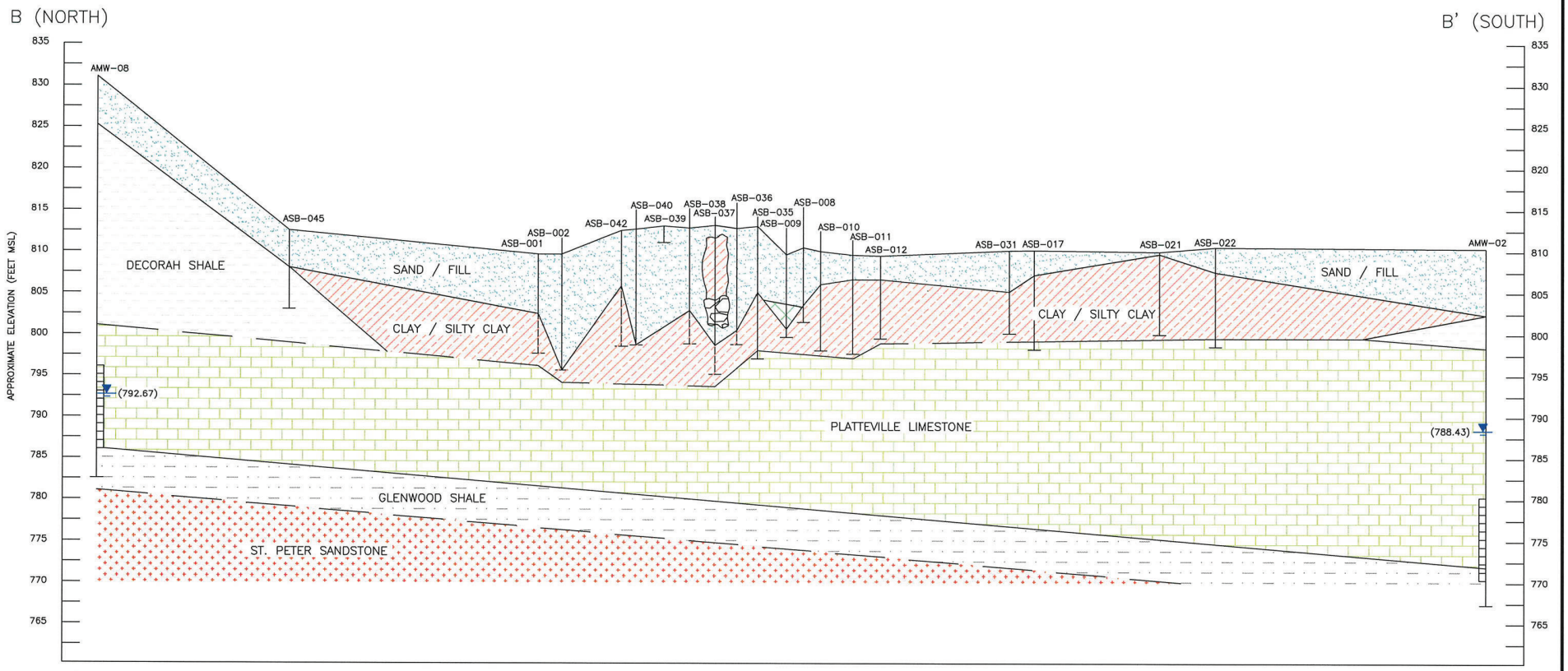
SCALE VERIFICATION
THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING.
USE TO VERIFY FIGURE REPRODUCTION SCALE

ARCADIS
430 First Avenue North, Suite 720
Minneapolis, Minnesota 55401
Ph: 612.339.9434 Fx: 612.336.4538
www.arcadis-us.com

CROSS SECTION A-A' (West-East)

TWIN CITIES ASSEMBLY PLANT
ST. PAUL, MINNESOTA

Project Number	MN000593.0003
Date	11-OCT-07
Figure	6



0
20
VERTICAL SCALE
APPROXIMATE SCALE IN FEET

0 200
HORIZONTAL SCALE
APPROXIMATE SCALE
IN FEET

VERTICAL EXAGGERATION 10X

LEGEND:

- SCREEN INTERVAL
- GROUNDWATER TABLE
- SAND / FILL
- DECORAH SHALE
- CLAY / SILTY CLAY
- GLENWOOD SHALE
- PLATTEVILLE LIMESTONE
- ST. PETER SANDSTONE
- SILT
- GRAVEL
- INFERRED BOUNDARY

NOTES:
1. WATER LEVEL DATA FROM AUGUST 13, 2007 (WATER ELEVATION IN FEET)
2. AMW ARCADIS MONITORING WELL
   ASB ARCADIS SOIL BORING
   MSL MEAN SEA LEVEL

Project Manager	E. CARMAN
Assistant Project Manager	B. ZINDA
Drawn	R. DORN
Checked	A. FISKNESS

FORD MOTOR COMPANY

REV	DATE	DES	REVISION DESCRIPTION	CADD	CHK	RVW
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Minneapolis, Minnesota 55401
Ph: 612.339.9434 Fx: 612.336.4538
www.arcadis-us.com

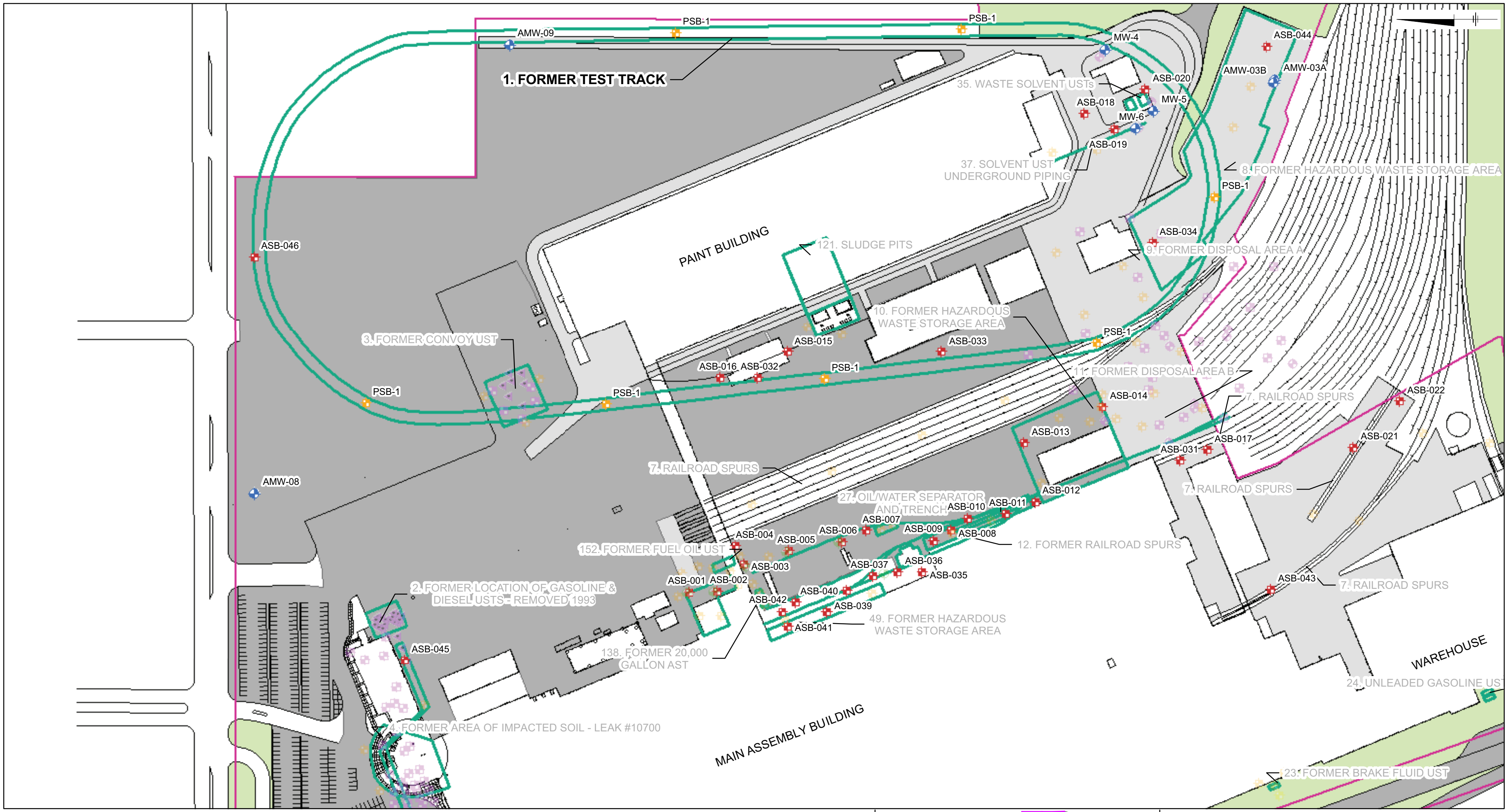
CROSS SECTION B-B' (North-South)

TWIN CITIES ASSEMBLY PLANT
ST. PAUL, MINNESOTA

Project Number	MN000593.0003
Date	12-OCT-07
Figure	7

Appendix B

Proposed Supplemental Phase II Soil Borings and Monitoring Wells by ARCADIS



LEGEND:

Proposed Locations
- Monitoring Well
- Soil Boring

Completed Locations
- Monitoring Well
- Soil Boring

Historic Locations
- Monitoring Well
- Soil Boring
- Surface Soil Sample

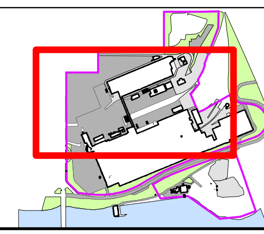
- Feature
- Ford Property Boundary
- Roads
- Rail
- Buildings
- Asphalt
- Concrete
- Grass
- Mississippi River

0 200 400 Feet

1 inch equals 200 feet

NOTES:

AMW	ARCADIS Monitoring Well
ASB	ARCADIS Soil Boring
PSB	Proposed Soil Boring



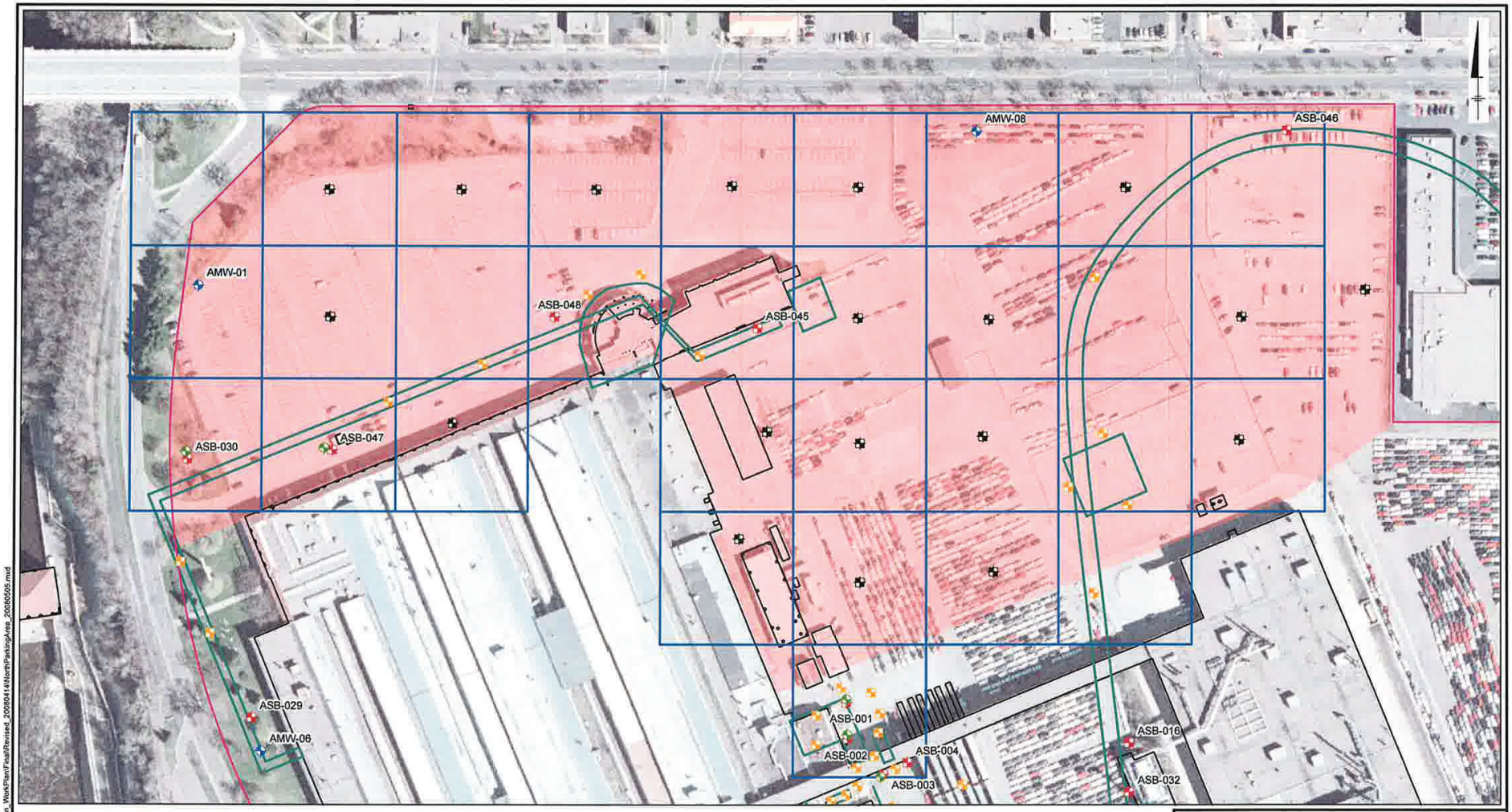
Twin Cities Assembly Plant
Ford Motor Company
St. Paul, Minnesota

Feature 1 - Former Test Track
Proposed Soil and Groundwater Sampling Locations
Supplemental Exterior Phase II Investigation

ARCADIS

FIGURE
2

CITY: Minneapolis, MN DB: MGress PM: BZinda
Project: MN000593
G:\GIS\Projects\Ford Ranger\ArcMap\Delineation_WorkPlan\Final\Revised_20080414\Feature_1_20080414.mxd - 4/28/2008 @ 9:40:56 AM



LEGEND:

Supplemental Phase II - Exterior Proposed Locations
- Monitoring Well
- Soil Boring
- Additional Borings for Main Parking Area

Initial Phase II - Exterior Completed Locations
- Monitoring Well
- Soil Boring
- Ford Property Boundary

- 1 - Acre Grid
- Feature
- Buildings
- North Parking Area

NOTES:

1. Imagery Source:
United States Geological Survey
High Resolution Orthoimagery for the
Minneapolis-St. Paul, Minnesota Urban Area

0 150 300 450 Feet

1 inch equals 150 feet

Twin Cities Assembly Plant
Ford Motor Company
St. Paul, Minnesota

North Parking Area
Proposed Soil and Groundwater Sampling Locations
Supplemental Exterior Phase II Investigation

ARCADIS

FIGURE 1

CITY: Minneapolis, MN DB: MGress PM: Bryan Zinda
Project MN000503
G:\GIS\Projects\Ford Ranger\ArcMap\Delineation_Work\Final\Revised_20080414\NorthParkingArea_20080505.mxd

Appendix C

Ford Plant Sustainable Stormwater GIS and Planning Database by Barr (on DVD)

Appendix D

Metropolitan Council Minnesota Urban Small Sites BMP Manual by Barr (on CD)