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June 26, 2000

Mr. ~~Jason Chan~~ *Spending White - Belton*
Project Manager
Minnesota Pollution Control Agency
Northern District
1601 Minnesota Drive
Brainerd, MN 56401

**RE: Remedial Investigation Report, MPCA Fact Sheet #3.24, Wayne's Oil Company, 230 Wells Street, Belgrade, MN, DAHL Project # 2497-5741
MPCA Leak # 10608**

Dear Mr. Chan:

On behalf of Mr. Wayne Maroschek, enclosed is the Remedial Investigation Report for the above referenced site. Please note that all fieldwork and data included in this report was completed/collected prior to May 2000, therefore, the report was completed per the applicable Fact Sheet #3.24 dated January 1997.

If you have any questions, please call me at (651) 490-3780.

Sincerely,

DAHL & Associates, Inc.

for *James Dietzmann*
James Dietzmann
Project Manager

Enclosures: MPCA Fact Sheet #3.24

Cc: Mr. Wayne Maroschek, Wayne's Oil



Tanks and Emergency Response Section
Minnesota Pollution Control Agency

Remedial Investigation Report Form

Fact Sheet #3.24

January 1997

This form must be completed for all sites in which a remedial investigation (RI) is conducted--this includes either a *Limited Site Investigation (LSI)* or a *full RI*. Completing this form will provide the MPCA with the minimum amount of information necessary for a *full RI*. Additional information should be included if deemed important for making a site cleanup decision. If the consultant has concluded that a *LSI* is applicable to this site, Section 6 and Section 7 may be deleted from this report.

Refer to Minnesota Pollution Control Agency (MPCA) fact sheet #3.1, "Leaking Underground Storage Tank Investigation and Cleanup Policy" for guidance for the overall objectives of an RI and other MPCA fact sheets regarding investigations.

When a tank has been excavated, refer to fact sheets #3.6, "Excavation of Petroleum Contaminated Soil" and #3.7, "Excavation Report Worksheet for Petroleum Release Sites" for reporting requirements.

If free product is discovered the initial reporting should be done in accordance with fact sheet #3.3 "Free Product: Evaluation and Recovery" and factsheet #3.4, "Free Product Recovery Report Worksheet."

Leak Number: LEAK00010608 Date: 6/20/00

Responsible Party: Wayne's Oil Company R.P. phone #: (320) 254-8815

Facility Name: Wayne's Standard Station

Facility Address: 230 Wells Street City: Belgrade

County: Stearns Zip Code: 56312

Location of site: LAT: 45° 27' 09" LONG: 95° 00' 16" Circle one: UTM/State

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TABLE OF CONTENTS

- SECTION 1: Emergency and High Priority Sites
- SECTION 2: Site and Release Information
- SECTION 3: Excavated Soil Information
- SECTION 4: Extent and Magnitude of Soil Contamination
- SECTION 5: Aquifer Characteristics/Ground Water Contamination Assessment
- SECTION 6: Extent and Magnitude of Ground Water Contamination
- SECTION 7: Evaluation of Natural Biodegradation
- SECTION 8: Well Receptor Information/Assessment
- SECTION 9: Surface Water Risk Assessment
- SECTION 10: Vapor Risk Assessment/Survey
- SECTION 11: Discussion Section
- SECTION 12: Conclusions and Recommendations
- SECTION 13: Required Figures
- SECTION 14: Appendices
- SECTION 15: Consultant (or other) Information

Section 1: Emergency and High Priority Sites

1. Is an existing drinking water well impacted? *NO*
2. Are there existing vapor impacts? *NO*
3. Is there an existing surface water impact as indicated by 1) a product sheen on the surface water or 2) a product sheen or volatile organic compounds in the part per million (ppm) range in ground water in a well located close to the surface water. *NO*
4. Has the release occurred in the last 30 days? *NO*
5. Has free product been detected at the site? *NO*
6. Is sand or gravel aquifer impacted which is tapped by water wells within or potentially within 500 feet from the edge of the plume or does impacted soil overlie a karsted limestone or fractured bedrock? If yes, explain: *NO*

If you answered *YES* to any of questions 1 through 6 above describe below the actions taken to date to reduce or eliminate the risk posed by the release.

During the UST excavation in August 1997, a sheen was identified on water that accumulated in the UST basin. Due to the presence of potentially impacted soil in contact with ground water, all excavated soil was return to the basin. DAHL completed an Excavation Report for Petroleum Release Sites (Fact Sheet 3.7) and subsequently performed a Limited Site Investigation (Appendix A).

Section 2: Site and Release Information

2.1 Describe the land use and pertinent geographic features within 1,000 feet of the site. The property is located within the town of Belgrade, MN (Figure 1a, Figure 1b). Structures in the immediate vicinity of the site are small businesses and residential properties. The general topography of the area has little to no slope.

Table 1.

Provide the following for all tanks that have been at the site:

Tank #	UST or AST	Capacity	Contents	Age	Status*	Condition
01	UST	10,000	gasoline	unknown	removed 8/1/97	minor rust, good condition
02	UST	6,000	gasoline	unknown	removed 8/1/97	minor rust, good condition
03	UST	4,000	diesel	unknown	removed 8/1/97	minor rust, good condition

*Indicate: *removed (date), abandoned in place (date), or currently used*

Notes:

2.2 Describe the status of the other components of the tank system(s), (i.e., piping and dispensers) for those tanks listed above.

One dispenser and three USTs were removed from the site. No product dispensing infrastructure was replaced (Figure 2a).

2.3 Identify and describe the source or suspected source(s) of the release.

The source of the release is unknown. The release was discovered during the tank excavation.

2.4 What was the volume of the release? (if known): **unknown** gallons

2.5 When did the release occur? (if known): **unknown**

Section 3: Excavated Soil Information

3.1 Was soil excavated for off-site treatment? **No**

If *YES* then complete the fact sheet #3.7 "Excavation Report Worksheet for Petroleum Release Sites" and include it as an appendix.

Date excavated: _____

Volume removed: _____ cubic yards

3.2 Indicate soil treatment type:

- land treatment
 thermal treatment
 composting/biopiling
 other (_____)

Name and location of treatment facility:

Section 4: Extent and Magnitude of Soil Contamination

4.1 Were soil borings conducted in or immediately adjacent to all likely source areas (e.g., underground storage tank basins, above ground storage tank areas, piping, dispensers, remote fill pipes, known spill areas)? **YES**

4.2 To adequately define the vertical extent of contamination soil borings should be completed at least five feet below the water table or ten feet below the deepest measurable (field screening and visual observation) contamination, whichever is deeper. Were all soil borings completed to the required depth? **NO**

4.3 To adequately evaluate site stratigraphy at least one boring should be completed 20 feet below the water table, unless a confining layer is present. Was this done? **YES**

If you answered *NO* to any of the three previous questions, explain why the borings were not conducted in the required locations or to the required depths (see fact sheet #3.19, "Soil and Ground Water Investigations Performed During Remedial Investigations" regarding exceptions and MPCA approval for depth of drilling):

Test borings TB-1, TB-3, TB-5 and TB-6 and monitoring well MW-1 were not completed at least 10 feet below the deepest measurable contamination (Table 2, Figure 2a). However, DAHL collected soil samples from the bottom of each of the above-mentioned borings. There were no contaminants detected above MPCA action levels in the soil samples.

4.4 Indicate the drilling method: hollow-stem auger
 sonic drilling
 push probes
 other (_____).

Note: contact MPCA staff hydro before use of flight augers)

Table 2.

Complete the following table indicating bag headspace results (in ppm) for soil samples from soil borings.

ASTM soil classification	Depth (ft)	Soil Boring								
		1	2	3	4	5	6	7	8	9

Notes: (type of PID/FID)

See Attached Table 2.

Table 3.

Indicate the laboratory analytical results for soil samples in mg/kg.

Well/Boring, Depth(ft)	Date Analyzed	Benzene	Toluene	Ethylbenzene	Xylene	GRO	DRO

Notes: (use less than symbols to show detection limits)

See Attached Table 3.

Table 4.

Indicate other notable contaminants (either petroleum or non-petroleum derived) detected in soil samples. Indicate contaminant and list in reported units mg/kg.

Well/Boring, Depth (ft)	Date Analyzed						

Notes:

There is no Table 4. No other notable contaminants detected in soil samples.

4.5 If any non-petroleum compounds were detected list them below and identify possible sources of these compounds.

Not Applicable.

4.6 Describe the vertical and horizontal extent and magnitude of soil contamination.

Petroleum hydrocarbon impacted soil appears to be limited to the northeast corner of the property, approximately 8-16' below ground surface (b.g.s.) (Table 2, Table 3, Figure 2a).

Benzene was detected at 2.6 mg/kg in a soil sample collected from the 12-16' interval of TB-1 and at 6.8 mg/kg from the 8-12' interval of TB-3. The Minnesota Soil Reference Value (SRV) for benzene is 1.5 mg/kg.

GRO was detected at 230 mg/kg in a soil sample collected from the 12-16' interval of TB-1, and at 540 mg/kg in a soil sample collected from the 8-12' interval of TB-3.

DRO was detected at 490 mg/kg in a soil sample collected from the 10-11' interval of TB-6.

Section 5: Aquifer Characteristics/Ground Water Contamination Assessment

5.1 Hydraulic conductivity is used to evaluate risk to present or potential ground water receptors. The level of potential risk determines the level of confidence required of the hydraulic conductivity values. Indicate average hydraulic conductivity and methods used for measurement and estimation.

Measurement

Methods of measuring aquifer parameters are *aquifer* and *permeameter* tests. Aquifer tests such as pumping and slug tests are necessary to evaluate parameters of the actual undisturbed aquifer material. Pumping tests evaluate the largest volume of aquifer material, providing the best measurement of *in situ* aquifer parameters. Slug tests provide *in situ* parameters representing a smaller portion of the aquifer. Permeameter tests are laboratory methods used for the evaluation of discrete samples collected from the aquifer. Permeameter tests require an adequate number of representative field samples, and, inherent sampling and analysis technique limitations must be considered when evaluating results.

Estimation

Methods of estimating hydraulic conductivity may involve grain size analysis or correlating a field description with a reference range of values. As with laboratory measurements, estimation methods require an adequate number of representative field samples. Use the most conservative value of a range when using estimates. If there is any question that sediments may be permeable enough to comprise a resource aquifer, confirm by conducting test(s).

Provide hydraulic conductivity values that support the level of investigation based on risk and remediation potential. Be sure to have tests and estimations performed and analyzed by personnel trained and/or experienced in hydrogeologic investigations. Improperly performed or analyzed tests may be returned as incomplete. Attach all supporting information for the determination in the Methodologies appendix:

10⁻³ to 10⁻⁵ cm/sec (typical hydraulic conductivity range for well-graded sand)

Indicate the measurement or estimation used:

- Pumping test analysis by _____ method(s).
 Slug tests by _____ method(s).
 Permeability tests by _____ method(s).
 Grain-size distribution approximations by _____ method(s).
 *Reference from Fetter, C.W.(1994), Applied Hydrogeology, 3rd Ed., Prentice-Hall, Inc., p.98

*provide author(s), year published, title, publisher and page(s).

5.2 Indicate the thickness of the aquifer. If the investigation does not provide enough information to determine the aquifer thickness, assume the aquifer is greater than 20 feet thick:

- less than 10 feet
 between 10 and 20 feet
 20 feet or greater

5.3 Describe in detail the geology underlying the site including confining layers, bedrock formations and the lateral extent of these formations:

The deepest soil borings on-site (TB-6) was completed to a depth of 32 feet b.g.s. (Table 2 and Appendix D). Soils on-site consist of poorly sorted sands from ground surface to at least 30 feet b.g.s. (Figure 6a, Figure 6b, Figure 6c). There appears to be a thin silt layer about two feet below grade on the west side of the property. The top eight feet of soil in the area of the former tank basin consist of fill material.

The nearest municipal water supply well is approximately 270 feet east of the site (Figure 1b and Appendix F). According to the geologic log for the well, the subsurface stratigraphy consists of a one-foot layer of soil and organic deposits underlain by layers of sand and sandy clay to approximately 40 feet b.g.s.. Below this is a clay layer from 43 to 58 feet. Following the clay layer is a mix of sandy clay with occasional silt and/or cobbles to 123 feet. From 123 to 135 feet is sand, followed by a clay layer from 135 to 139 feet.

Water level depth, ft										
----------------------------------	--	--	--	--	--	--	--	--	--	--

Notes:

See Attached Table 5

5.7 Is contaminated soil in contact with ground water?

YES

If *YES* or if ground water contamination appears likely then complete tables 6 and 7 below.

Table 6.

Indicate the laboratory analytical results for water samples collected from the borings, temporary wells or push probes.

Well/Boring Number	Date Analyzed	Depth	Benzene	Toluene	Ethylbenzene	Xylene	GRO	DRO

Notes:
See Attached Table 6

Table 7.

Indicate other notable contaminants (either petroleum or non-petroleum derived) detected in water samples collected from the borings, temporary wells or push probes. Indicate contaminant and report in units of ug/l (ppb).

Well/Boring Number	Date Analyzed						

Notes:
No other notable contaminants detected in water samples.

5.8 If any non-petroleum compounds were detected list them below and indicate whether they exceed the Health Risk Limits (HRLs). Also, identify possible sources of these compounds.

Not Applicable

5.9 If contaminated soil is not in contact with ground water, what is the distance separating the deepest contamination from the surface of the water table? Was this distance measured during site activities, referenced from geologic information, or estimated based on professional opinion during a site visit? NA Feet

5.10 Describe observations of any evidence of a fluctuating water table and a seasonal high water table (e.g., mottling). Also, from other sources of information describe the range of natural water table fluctuations in the area.

Water table elevation data from the three rounds of ground water data collected to date show approximately a two foot decrease in water table elevation from August 1999 to May 2000 (Figure 3d).

5.11 In your judgment, is there a sufficient distance separating the petroleum contaminated soil (or an impacted non-resource aquifer) from the underlying resource aquifer to prevent petroleum contamination of the resource aquifer? Please explain in detail. In your explanation consider the data and information of this section as well as the nature of the petroleum release (i.e., volume, when it occurred, petroleum product). **YES**

Monitoring wells were installed on-site in the area of the petroleum impacted soil (Figure 2b). According to the laboratory analysis of ground water samples collected from the on-site wells, there have not been any compounds detected above HRLs. The closest water supply well is approximately 270 feet from the impacted soil and is not directly down gradient of the site (Figure 1b). The well is 135 feet deep with casing to 123 feet b.g.s. and is screened from 123-135 feet b.g.s..

Additional Ground Water Investigation

Complete **Section 6 and Section 7** only if: 1) a resource aquifer has been impacted at or above Minnesota Department of Health HRLs, 2) a resource aquifer has been impacted below the HRLs, but the levels are likely to reach the HRLs, or 3) there is an insufficient distance separating the petroleum contaminated soil (or an impacted non-resource aquifer) from the underlying resource aquifer. Regardless of whether you are submitting a LSI or a full RI, all sections following Section 7 must be completed.

Section 6. Extent and Magnitude of Ground Water Contamination

Table 8.

Monitoring well construction.

Well Number	Unique Well Number	Date Installed	Relative Surface Elevation	Riser Height Above Grade	Bottom of Well (Elevation)	Screen Interval (Elev. - Elev.)

Notes: (location and elevation of benchmark)

See Attached Table 8

Table 9.

Water table summary.

Well Number	Date	Depth of Water from Top of Casing	Product Thickness	Depth of Water Below Grade	Relative Groundwater Elevation
MW-1					
MW-2					
MW-3					
MW-4					

Notes: (ground water above/below screen, etc.)

See Attached Table 9

6.1 Were any deep monitoring wells completed at the site? **NO**

If *YES*, which are deep wells?

Before a deep well is installed contact the MPCA project hydrologist for guidance on its necessity and placement. A deep monitoring well may be necessary if: 1) Contamination exist more than 10 feet below the water table or 2) the impacted aquifer is a resource aquifer or is hydraulically connected to a resource aquifer presently utilized by a water supply well located within 500 feet of the site.

Provide estimates of the following additional aquifer parameters:

Horizontal Gradient (dh/dl):	<u>1.5×10^{-3}</u>
Vertical Gradient (dv/dl):	<u> </u>
Porosity:	<u>35% estimated*</u>
Flow direction:	<u>southeast</u>
Hydraulic Conductivity (K):	<u>10^{-5} to 10^{-7}</u> m/s
Pore velocity:	<u>1.35 to 0.0135</u> meters/year

* referenced from: Fetter, C.W., 1994. Applied Hydrogeology, 3rd Edition; p. 86

Table 10.

All ground water monitoring data should be collected from a minimum of *two quarterly sampling events*.

Indicate the laboratory analytical results for water samples.

Well #	Date	Benzene	Toluene	Ethylbenzene	Xylene	MTBE	GRO	DRO
MW-1								
MW-2								
MW-3								
MW-4								

Notes: (e.g., free product, dry well, units etc.)

See Attached Table 10

Table 11.

Indicate other notable contaminants (either petroleum or non-petroleum derived) detected in water samples.

Well Number	Date Analyzed						

Notes: units

See Attached Table 11

6.2 If any non-petroleum compounds were detected list them below and indicate whether they exceed the HRLs. Also, identify possible sources of these compounds.

No non-petroleum related compounds were detected above HRLs. The source of the compounds is unknown.

6.3 Is there a clean or nearly clean (below HRLs) downgradient monitoring well **YES** located along the longitudinal axis of the contaminant plume?
(approximately 20 degrees plus or minus the axis)

6.4 Is there a worst case well completed through the source area of the release? **YES**

If you have answered *NO* to any of the above three questions, please explain why a well was not completed in the required location.

6.5 Provide an estimate of the longitudinal length of the dissolved 40 feet contaminant plume:

6.6 Describe the extent and magnitude of the ground water contamination:
Prior to the installation of monitoring wells on-site, ground water samples were collected from soil borings advanced on the property (Figure 2b, Table 6).

Benzene was detected above HRLs in three test borings (TB-1, TB-3 and TB-5). Ethyl benzene, toluene, and xylenes were detected above HRLs in one test boring (TB-1).

Monitoring well MW-1 was installed in the area of TB-1 (Figure 2b). There have not been any compounds detected above HRLs in MW-1 since its installation (Table 10 and Table 11). GRO was detected at 3.7 and 2.3 mg/l, DRO at 3.7 and 2.3 mg/l and ethyl benzene at 3.8 ug/l in samples collected from MW-1. Trace amounts of DRO also have been identified in ground water samples collected from MW-4

There have not been any compounds detected above HRLs in any of the other monitoring wells on-site (Table 10 and Table 11).

Section 7: Evaluation of Natural Attenuation

Table 12.

Complete the bio-activity data in the table below. Data should be from two quarterly rounds of sampling. Refer to the fact sheet #3.21, "Assessment of Natural Biodegradation at Petroleum Tank Release Sites," for acceptable methodologies and indicate the chosen method in the Methodologies appendix.

Monitoring Well	Temp. °C	pH	Dissolved oxygen (mg/l)	Nitrate (mg/l)	(Fe II) (mg/l)	(H ₂ S, HS ⁻) (mg/l)
MW-1						
MW-2						
MW-3						
MW-4						

Notes:

See Attached Table 12

7.1 Discuss the results of the bio-activity evaluation. Specifically, compare the concentrations of the inorganic parameters inside and outside the plume.

In general, subsurface conditions (temperature, pH, and D.O.) may be favorable for natural attenuation of petroleum hydrocarbons at the site (Table 12). Temperature and pH levels at the site are within the optimal range for biological activity.

7.2 In your judgment, is natural biodegradation occurring at this site? Please *YES NO*
Explain.

There is insufficient data to determine if natural biodegradation is occurring. However, conditions at the site appear favorable for biological activity.

Section 8: Well Receptor Information/Assessment

Include in the appendices of this report: 1) A list of addresses within 500 feet from the edge of the plume and confirmation of status of water supply from the city utility billing department; 2) well logs; and 3) map showing ½ mile radius, 500 foot radius, water supply wells, other potential petroleum sources, and addresses for properties within 500 feet.

Table 13.

Complete the following table for all water supply wells located within 500 feet of the edge of the plume and any municipal or industrial wells found within ½ mile.

Unique Well #	Ground Elevation	Total Depth (ft)	Base of Casing (ft)	Static Elevation	Aquifer	Use	Owner	Distance & Direction from site

Notes:

See Attached Table 13

8.1 Is municipal water available in the area?

YES

8.2 Were all property owners within 500 feet of the nearest edge of the contaminant plume successfully contacted to determine if water wells are present? If No, please explain. **YES**

DAHL did not receive responses from all of the residents contacted (Appendix G). All residents that responded stated that they were connected to municipal water supply. DAHL contacted officials from Belgrade who stated that the area surrounding the site is connected to municipal water.

8.3 Discuss the results of the ground water receptor survey and any analytical results from sampling conducted at nearby water wells. Comment on the risks to water supply wells identified within 500 feet from the edge of the plume as well as the risk posed by or to any municipal or industrial wells found within ½ mile. Specifically indicate whether water supply wells identified utilize the impacted aquifer. (Note: an impacted aquifer separated from another aquifer by a clay lens is not considered a separate aquifer.)

There have been no compounds detected above MPCA HRLs in the ground water samples collected from the monitoring wells at the site. There are two municipal wells (Well #3 and Well #1) located within 400 feet of the site (Figure 1b). The well screens are set at 123 to 135 feet and 160 to 200 feet b.g.s. respectively (Appendix F). Given this information, there is a minimal risk of impact to the water supply wells.

8.4 Are there any plans for ground water development in the impacted aquifer within 1/2 mile of the site, or one mile down gradient of the site if the aquifer is fractured? Please give the name, title and telephone number of the person that was contacted for this information. **NO**

Corinne Bahe, Clerk Treasurer for the City of Belgrade Telephone: (320) 254-8220

Section 9: Surface Water Risk Assessment

9.1 Are there any surface waters or wetlands located within ¼ mile of the site? **NO**

If YES, indicate its name: _____

9.2 If surface water is present downgradient of the site, is there a clean down gradient soil boring or monitoring well located between the site and the surface water? **N/A**

If *NO*, we assume that contamination discharges to surface water. Therefore, complete the following information:

Name of receiving water:	_____
Plume width, (W):	_____ feet
Plume thickness, (H):	_____ feet
Hydraulic conductivity, (K):	_____ gal/day/ft ²
Horizontal gradient, (dh/dl):	_____ (unitless)
Discharge, (Q) = $H*W*K*(dh/dl)/1440$	_____ gal/min

If *YES*, identify them and indicate the distance to these features and discuss the contamination risk potential.

Section 10: Vapor Risk Assessment/Survey

10.1 Is there a history of vapor impacts in the vicinity of the site ? *NO*

If *YES*, describe:

10.2 Is there any indication that free product or highly contaminated ground water may be traveling offsite within the utility corridors? If *YES*, have they been investigated with borings or push probes? *NO*

10.3 Discuss the potential for vapor migration/accumulation near the site. In your discussion consider: Soil types, product type, presence and distribution of free product or high concentrations of dissolved product. Also, compare the depth of contamination with the location of underground utility lines, location and depth of storm and sanitary sewers and location of nearby basements.

Soils on site consist of poorly sorted sands from ground surface to at least 30 feet b.g.s. The top eight feet of soil in the area of the former tank basin consist of sandy fill material.

Free product has not been detected on-site. Impacted soil was identified in the areas of TB-1 and TB-3 (Figure 2a and Table 3). Benzene was detected at 2.6 mg/kg in a soil sample collected from the 12-16' interval of TB-1 and at 6.8 mg/kg from the 8-12' interval of TB-3. The Minnesota Soil Reference Value (SRV) for benzene is 1.5 mg/kg. GRO was detected at 230 mg/kg in a soil sample collected from the 12-16' interval of TB-1 and at 540 mg/kg in a soil sample collected from the 8-12' interval of TB-3.

An underground storm sewer and water utility are located immediately down gradient of TB-1 and TB-3 (Figure 5). The depth to storm sewer ranges from two to four feet b.g.s.. The depth to the water line is estimated to be between seven to eight feet b.g.s.. The depth of soil impacts on-site appears to be below nearby utility receptors.

If the vapor risk assessment indicated a risk of vapor impacts to buildings or utilities, complete the following table with vapor monitoring data collected. Location numbers should be mapped on an accompanying figure of the surveyed area.

Table 14.

Location #	Date	PID reading (ppm)	Percent of the LEL

Notes:

See attached Table 14.

10.4 Describe and interpret the results of the vapor survey.

DAHL monitored the storm sewer adjacent to the site for percent oxygen, the lower explosive limits, and organic vapors. Percent oxygen readings were consistently 20.9%, LEL readings were consistently 0, and PID readings were consistently within background levels (Table 14).

Section 11: Discussion

11.1 Discuss the risks associated with the remaining soil contamination?

Soil contamination appears to be limited to the northeast corner of the property, approximately 8-16' b.g.s. (Table 2 and Table 3).

Benzene was detected at 2.6 mg/kg in a soil sample collected from the 12-16' interval of TB-1 and at 6.8 mg/kg from the 8-12' interval of TB-3. GRO was detected at 230 mg/kg in a soil sample collected from the 12-16' interval of TB-1, and at 540 mg/kg in a soil sample collected from the 8-12' interval of TB-3. DRO was detected at 490 mg/kg in a soil sample collected from the 10-11' interval of TB-6.

The petroleum impacted soil on-site does not appear to be a risk to the surrounding environment. According to the data collected from the site, adjacent utilities have not been impacted and impact to local ground water is minimal (Table 10, Table 11 and Table 14).

11.2 Discuss the risks associated with the impacted ground water?

Prior to the installation of monitoring wells on-site, ground water samples were collected from soil borings advanced on the property (Figure 2a and Table 6).

Benzene was detected above HRLs in three test borings (TB-1 [370 ug/l], TB-3 [24 ug/l] and TB-5 [17 ug/l]). Ethyl benzene, toluene, and xylenes were detected above HRLs in one test boring (TB-1).

Monitoring well MW-1 was installed in the area of TB-1 (Figure 2a). There have not been any compounds detected above HRLs in MW-1 since its installation. There have not been any compounds detected above HRLs in any of the monitoring wells installed on-site (Table 10 and Table 11).

Based on the ground water data collected from the monitoring wells, ground water impacts are minimal. The nearest water supply wells are not directly down gradient of the property. Therefore the risk of impacting drinking water is minimal.

11.3 Discuss other concerns not mentioned above: None

Section 12: Conclusions and Recommendations

Recommendation for site: site closure
 additional vapor monitoring
 additional ground water monitoring
 active cleanup

The recommendation above should be based on fact sheet #3.1, "Leaking Underground Storage Tank Investigation and Cleanup Policy." Describe below how you applied the policy to support your recommendation.

The site appears to be congruous with a "Low Risk Resource Aquifer Scenario." Impacted soil on-site has not impacted nearby utilities and has not significantly impacted ground water. There are low levels of contaminants in the ground water, all are below HRLs. The contaminant levels in the ground water appear to be stable, and conditions in the subsurface appear favorable for natural attenuation. The aquifer is not considered a resource aquifer. Therefore, on behalf of Wayne's Oil, DAHL recommends this site for closure.

Please note that all field activities and data included in this report were completed prior to the effective date of the new MPCA fact sheets (effective May 2000). Therefore this report was prepared in accordance with the fact sheets that were in effect prior to May 2000.

If additional monitoring is recommended, indicate the proposed monitoring schedule and frequency:

If active cleanup is proposed, then MPCA staff will review this RI report at a higher than normal priority to determine if active cleanup is required. We will respond with either a request for proposal for additional monitoring or a Corrective Action Design report. Please indicate below what cleanup technology you are considering at this time.

Section 13: Required Figures

Indicate attached figures:

- Figure 1, 1a:* Site location map (*approximate scale is not acceptable*) and a large scale site map show all potential receptors within 300 feet of the site. The large scale site map should show those properties with basements and wells.
- Figure 2, 2a, 2b, etc.:* One or more site map showing: structures; all past and present petroleum storage tanks, piping, and dispensers; extent of soil excavation; boring and well locations (including any drinking water wells on site); horizontal extent of soil contamination; horizontal extent of ground water contamination; and location of end points for all geologic cross sections.
- Figure 3, 3a:* Ground water gradient contour maps (for sites with monitoring wells).
- Figure 4* Well receptor survey map showing 1/2 mile radius, 500 foot radius, water supply wells, other potential sources of contamination.
- Figure 5:* Vapor survey map showing utilities and buildings with basements and monitoring locations (if a survey was required).
- Figure 6:* Geologic cross sections.

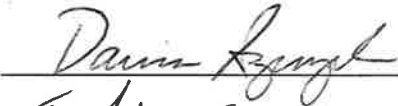


Section 14: Appendices

Indicate attached appendices.

- Appendix A* Excavation Report Worksheet for Petroleum Release Sites.
- Appendix B* Laboratory Analytical Reports for Soil and Ground Water.
- Appendix C* Methodologies and Procedures, Including Field Screening of Soil, Other Field Analyses, Soil Boring, Soil Sampling, Well Installation, and Water Sampling.
- Appendix D* Geologic Logs for Each Well or Boring, Including Well As-Built on Log.
- Appendix E* Well Construction Diagrams and Copies of the Minnesota Department of Health Well Record.
- Appendix F* Copies of Water Supply Well Logs With Legible Unique Numbers.
- Appendix G* A List of Addresses Within 500 Feet From the Edge of the Plume and Confirmation of Status of Water Supply From the City Utility Billing department.

Section 15: Consultant (or other) Information

By signing this document, I/we acknowledge that we are submitting this document on behalf of and as agents of the responsible person or volunteer for this leaksite. Information was obtained from a variety of sources including the responsible person or volunteer, public records, published maps, and local and state agencies, and DAHL accepts no liability for the accuracy of the information obtained from these sources. In addition, I/we acknowledge on behalf of the responsible person or volunteer for this leaksite that if this document is determined to contain an intentionally misstated or false material statement, representation, or certification, or if material information is knowingly omitted, the responsible person or volunteer may be found to be in violation of Minn. Stat. § 115.075 (1994) or Minn. Rules 7000.0300 (Duty of Candor), and that the responsible person or volunteer may be liable for civil penalties.

Name and Title:	Signature:	Date signed:
Darius Szewczak, Staff Scientist		6 / 23 / 00
James Dietzmann, Project Manager	 for James Dietzmann	6 / 23 / 00
Mike Watson, Project Director		6 / 23 / 00
_____	_____	____/____/____

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TABLE 2
HEADSPACE RESULTS
Wayne's Belgrade (24975741)

Depth (ft.)	Soil Boring				
	MW-1	MW-2	MW-3	MW-4	TB-6
1'-2'	2	ND	ND	ND	ND
2'-4'	ND	ND	ND	ND	ND
4'-6'	ND	ND	ND	ND	10
6'-8'	150	ND	ND	ND	140
8'-10'	NR	ND	ND	ND	200
10'-12'	68	ND	ND	ND	300
12'-14'	12	ND	ND	ND	ND
14'-16'	ND	ND*	ND*	ND*	30
16'-18'	27*				ND
18'-20'					ND
20'-22'					14
22'-24'	measurements collected with				ND
24'-32'	MiniRae PID				ND*

Depth	TB-1	TB-2	TB-3	TB-4	TB-5
0'-4'	NA	NA	NA	NA	NA
4'-8'	NA	ND	ND	ND	NA
8'-12'	40	ND	1,000+	ND	ND
12'-16'	1,000+	ND*	ND*	ND	5
16'-20'	18				ND*
20'-24'	ND*				

Explanation: NA= Not Analyzed
ND= Not Detected values expressed in parts per million (ppm)
NR= No Recovery unless noted otherwise
*= End of Boring

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TABLE 3
SOIL LABORATORY ANALYTICAL DATA
Wayne's Belgrade (24975741)

Sampling Location	SAMPLE DEPTH	DATE	benzene	ebenzene	toluene	xylene (total)	GRO	DRO
MW-1	6-8'	07/13/99	<0.025	0.03	<0.025	0.11	7.4	18
	16-18'	07/13/99	<0.025	<0.025	<0.025	<0.05	<2.9	<4.0
MW-2	6-8'	07/13/99	<0.025	<0.025	<0.025	<0.05	<2.7	<3.9
	14-16'	07/13/99	<0.025	<0.025	<0.025	<0.05	<2.9	<4.0
MW-3	6-8'	07/14/99	<0.025	<0.025	<0.025	<0.05	<2.9	<3.9
	14-16'	07/14/99	<0.025	<0.025	<0.025	<0.05	<2.9	<3.9
MW-4	6-8'	07/14/99	<0.025	<0.025	<0.025	<0.05	<2.9	<3.8
	14-16'	07/14/99	<0.025	<0.025	<0.025	<0.05	<3.0	<4.1
TB-6	10-11'	07/13/99	<0.05	0.087	<0.05	0.39	72.0	490
	30-32'	07/13/99	<0.025	<0.025	<0.025	<0.05	<3.0	<4.3
TB-1	12-16'	05/26/98	2.60	4.00	6.60	23	230	NA
	16-20'	05/26/98	0.077	0.13	0.23	0.79	6.40	NA
TB-2	8-12'	05/26/98	<0.005	<0.005	<0.005	<0.005	<0.25	NA
	12-16'	05/26/98	<0.005	<0.005	<0.005	<0.005	<0.25	NA
TB-3	8-12'	05/26/98	6.80	NQ	NQ	NQ	540	NA
	12-16'	05/26/98	<0.005	<0.005	<0.005	<0.005	<0.25	NA
TB-4	12-16'	05/26/98	<0.005	<0.005	<0.005	<0.005	<0.25	NA
TB-5	8-12'	05/26/98	0.007	0.006	0.011	0.016	0.56	NA
	16-20'	05/26/98	<0.005	<0.005	<0.005	<0.005	<0.25	NA

Explanation: values expressed in mg/kg unless specified otherwise

ebenzene= ethylbenzene

DRO= Diesel Range Organics

GRO= Gasoline Range Organics

NA= Not Analyzed

NE= Not Established

MTBE= Methyl tert butyl ether

NQ= Not Quantified

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There is no Table 4

TABLE 5
SOIL BORING WATER LEVELS
 Wayne's Belgrade (24975741)

	Soil Boring									
	TB-1	TB-2	TB-3	TB-4	TB-5	TB-6	MW-1	MW-2	MW-3	MW-4
Water Level	8	8	8	8	8	7	7.5	7	5.5	7

Explanation: water level measured in feet below ground surface

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TABLE 6
GROUNDWATER LABORATORY ANALYTICAL DATA
 Wayne's Belgrade (24975741)

TEST BORING #	DATE	benzene	ebenzene	toluene	xylenes (total)	GRO (mg/l)	DRO (mg/l)
TB-1	05/26/98	370	2,100	4,700	12,000	34	8.9
TB-2	05/26/98	<1.0	<1.0	<1.0	<1.0	<0.1	<0.1
TB-3	05/26/98	24	8.2	4.7	17	750	2.2
TB-4	05/26/98	<1.0	<1.0	<1.0	<1.0	<0.1	<0.1
TB-5	05/26/98	17	8.4	14	9.5	1.1	0.4
HRL		10	700	1,000	10,000	NE	NE

Explanation: values expressed in ug/l unless specified otherwise

ebenzene= ethylbenzene
 DRO= Diesel Range Organics
 GRO= Gasoline Range Organics
 ug/l= micrograms per liter
 mg/l= milligrams per liter

NE= Not Established
 HRL = Health Risk Limit
Bold Values= concentration above HRL

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TABLE 8
MONITORING WELL CONSTRUCTION

Wayne's Belgrade (24975741)

WELL #	UNIQUE WELL #	DATE INSTALLED	RELATIVE SURFACE ELEVATION	RISER HEIGHT ABOVE GRADE	BOTTOM OF WELL (ELEVATION)	SCREEN INTERVAL (ELV.-ELV.)
MW-1	628993	07/13/99	96.75	0	81.75	91.75'-81.75'
MW-2	628994	07/13/99	97.56	2	82.56	92.56'-82.56'
MW-3	628995	07/14/99	95.95	0	81.45	91.45'-81.45'
MW-4	628992	07/14/99	96.93	0	81.93	91.93'-81.93'

Notes: All values expressed in feet, surveyed to the nearest 0.01 foot from a benchmark given an arbitrary elevation of 100.00 feet.

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TABLE 9
WATER TABLE SUMMARY
 Wayne's Belgrade (24975741)

WELL #	DATE	CASING ELEVATION*	DEPTH OF WATER FROM TOP OF CASING*	PRODUCT THICKNESS	DEPTH OF WATER BELOW GRADE	RELATIVE GROUND WATER ELEVATION*
MW-1	08/17/99	96.55	6.97	ND	6.97	89.58
	10/21/99		7.80	ND	7.8	88.75
	05/25/00		8.57	ND	8.57	87.98
MW-2	08/17/99	99.19	9.46	ND	7.46	89.73
	10/21/99		10.32	ND	8.32	88.87
	05/25/00		11.12	ND	9.12	88.07
MW-3	08/17/99	95.71	6.03	ND	6.03	89.68
	10/21/99		6.85	ND	6.85	88.86
	05/25/00		7.63	ND	7.63	88.08
MW-4	08/17/99	96.70	7.22	ND	7.22	89.48
	10/21/99		8.03	ND	8.03	88.67
	05/25/00		8.79	ND	8.79	87.91

Notes: *All values expressed in feet, surveyed to the nearest 0.01 foot
 from a benchmark given an arbitrary elevation of 100.00 feet.
 ND= Not Detected

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TABLE 10
GROUNDWATER LABORATORY ANALYTICAL DATA
 Wayne's Belgrade (24975741)

WELL #	DATE	benzene	ebenzene	toluene	xylenes (total)	MTBE	GRO (mg/l)	DRO (mg/l)
MW-1	08/17/99	<2.5	<2.5	<2.5	<5.5	<2.5	3.7	3.7
	10/21/99	<2.0	3.8	<2.0	<6.0	4.0	2.3	2.3
	05/25/00	<2.5	3.9	<2.5	<7.9	22.0	2.6	1.2
MW-2	08/17/99	<1.0	<1.0	<1.0	<2.0	<1.0	<0.05	<0.1
	10/21/99	<1.0	<1.0	<1.0	<3.0	<1.0	<0.05	<0.1
	05/25/00	<1.0	<1.0	<1.0	<3.0	<1.0	<0.05	<0.1
MW-3	08/17/99	<1.0	<1.0	<1.0	<2.0	<1.0	<0.05	<0.1
	10/21/99	<1.0	<1.0	<1.0	<3.0	<1.0	<0.05	<0.1
	05/25/00	<1.0	<1.0	<1.0	<3.0	<1.0	<0.05	<0.1
MW-4	08/17/99	<1.0	<1.0	<1.0	<1.0	<1.0	<0.05	0.19
	10/21/99	<1.0	<1.0	<1.0	<3.0	<1.0	<0.05	0.18
	05/25/00	<1.0	<1.0	<1.0	<3.0	<1.0	<0.05	<0.1
HRL	10	700	1,000	10,000	NE	NE	NE	NE

Explanation: values expressed in ug/l unless specified otherwise

ebenzene= ethylbenzene
 DRO= Diesel Range Organics
 GRO= Gasoline Range Organics
 NA= Not Analyzed
 NE= Not Established

HRL= Health Risk Limit
Bold Values= concentration above HRL

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TABLE 11
GROUNDWATER LABORATORY ANALYTICAL DATA
(Other Notable Contaminants)
 Wayne's Belgrade (24975741)

WELL #	DATE	isopropyl benzene	p-isopropyl toluene	naphthalene	n-propyl benzene	1,2,4-trimethyl benzene	1,3,5-trimethyl benzene	s-butyl benzene	n-butyl benzene
MW-1	08/17/99 10/21/99	3.6 NA	11 NA	3 NA	32 NA	200 NA	150 NA	15 NA	58 NA
MW-2	08/17/99 10/21/99	<1.0 NA	<1.0 NA	<1.0 NA	<1.0 NA	<1.0 NA	<1.0 NA	<1.0 NA	<1.0 NA
MW-3	08/17/99 10/21/99	<1.0 NA	<1.0 NA	<1.0 NA	<1.0 NA	<1.0 NA	<1.0 NA	<1.0 NA	<1.0 NA
MW-4	08/17/99 10/21/99	<1.0 NA	<5.0 NA	<1.0 NA	<1.0 NA	<1.0 NA	<1.0 NA	<1.0 NA	<1.0 NA
HRL		NE	NE	300	NE	NE	NE	NE	NE

Explanation: values expressed in ug/l unless specified otherwise

HRL= Health Risk Limit

NE= Not Established

Bold Values= concentration above HRL

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TABLE 12
FIELD ANALYTICAL CHEMICAL DATA
 Wayne's Belgrade (24975741)

WELL #	DATE	Temp °C	pH	Dissolved		Nitrate (mg/l)	Fe II (mg/l)	S ²⁻ (mg/l)	Conductivity (umhos)	Eh (mV)
				oxygen (mg/L)						
MW-1	08/17/99	15.5	7.15	1.10	1.0	3.0	ND	1,650	-11.1	
	10/27/99	15.6	7.55	NA	3.0	2.0	ND	1,773	-7.6	
	05/25/00	9.6	6.27	1.10	1.0	7.0	ND	690	13.6	
MW-2	08/17/99	16.4	7.21	0.70	5.0	1.0	ND	1,100	-21.2	
	10/27/99	15.0	7.52	NA	5.0	4.0	ND	1,182	-5	
	05/25/00	13.0	6.63	1.10	1.5	4.0	ND	640	-2.6	
MW-3	08/17/99	16.6	7.13	0.30	4.0	0.8	ND	750	-16.8	
	10/27/99	16.7	7.60	NA	5.0	0.4	ND	591	-13.4	
	05/25/00	9.8	6.43	1.30	0.8	1.0	ND	720	3	
MW-4	08/17/99	14.2	7.19	0.30	2.5	0.8	ND	983	-27.5	
	10/27/99	13.9	7.45	NA	5.0	ND	ND	1,182	-8.5	
	05/25/00	11.9	6.61	1.10	0.4	0.4	ND	680	-4.7	

Notes: ND= Not Detected
 NA= Not Analyzed

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TABLE 13
WATER SUPPLY WELLS

Wayne's (24975741)

WELL	UNIQUE WELL #	TOTAL DEPTH (ft.)	BASE OF CASING (ft.)	STATIC ELEVATION	AQUIFER	USE	OWNER	DISTANCE AND DIRECTION FROM SITE
Belgrade 3	496508	135.00	123.00	18.20	Quaternary	municipal drinking water	Belgrade	270 ft. east
Belgrade 1	241377	200.00	160.00	15.00	Quaternary	municipal drinking water	Belgrade	340 ft. east
Belgrade 2	215129	49.00	48.00	14.00	Quaternary	municipal drinking water	Belgrade	1,700 ft. SSE

Notes:

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TABLE 14
VAPOR RISK ASSESSMENT
 Wayne's Belgrade (24975741)

LOCATION	DATE	PID reading (ppm)	% O ₂	Percent of the LEL	LOCATION	DATE	PID reading (ppm)	% O ₂	Percent of the LEL	
ST-1 bottom (2.5 ft.)	05/25/00	0.1	20.9	0	ST-6 bottom (4 ft.)	05/25/00	0.1	20.9	0	
middle		0.1	20.9	0	middle		0.1	20.9	0	
top		0.1	20.9	0	top		0.1	20.9	0	
ST-2 bottom (2 ft.)	05/25/00	0.2	20.9	0	ST-7 bottom (4 ft.)	05/25/00	0.3	20.9	0	
middle		0.3	20.9	0	middle		0.3	20.9	0	
top		0.3	20.9	0	top		0.2	20.9	0	
ST-3 bottom (2.5 ft.)	05/25/00	0.3	20.9	0	ST-8 bottom (3.5 ft.)	05/25/00	0.2	20.9	0	
middle		0.3	20.9	0	middle		0.2	20.9	0	
top		0.3	20.9	0	top		0.3	20.9	0	
ST-4 bottom (3 ft.)	05/25/00	0.3	20.9	0	S-1 bottom (4 ft.)	05/25/00	0.2	20.9	0	
middle		0.3	20.9	0	middle		0.2	20.9	0	
top		0.2	20.9	0	top		0.2	20.9	0	
ST-5 bottom (3 ft.)	05/25/00	0.2	20.9	0	S-2	PID malfunction				
middle		0.2	20.9	0	S-3		PID malfunction			
top		0.2	20.9	0						

Explanation: PID background 0.0 to 0.4 ppm
 ppm= parts per million

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PROJECT SITE LOCATION

NORTH



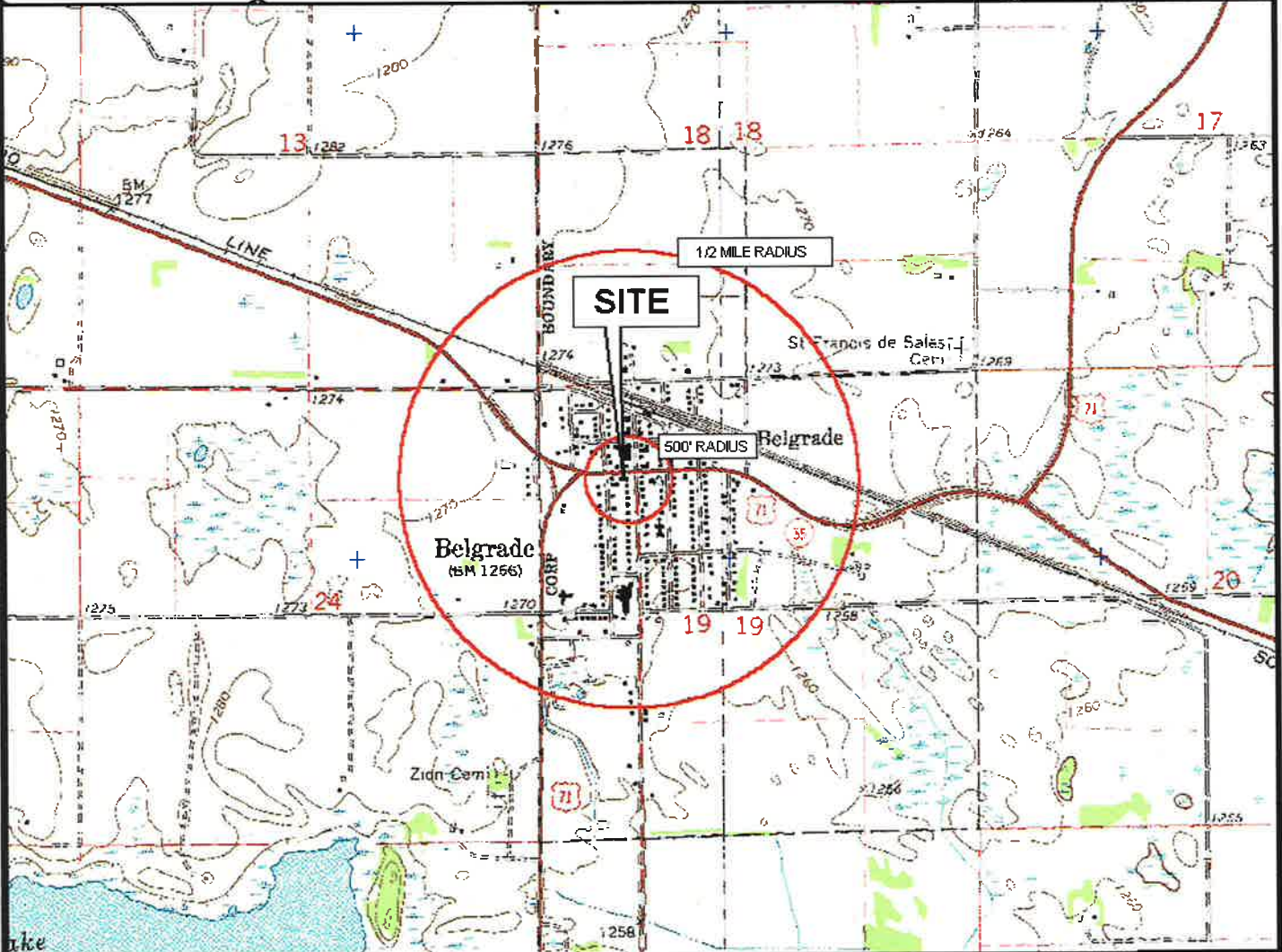
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LONG. W. 95° 00' 16"

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R. 34W
SEC. 19

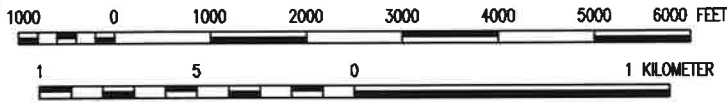
U.S.G.S. STANDARD NAME
BELGRADE, MINN.



QUADRANGLE LOCATION



SCALE 1:24000



CONTOUR INTERVAL 10 FEET

Heavy duty Light duty
Medium duty Unimproved dirt

Interstate Route U.S. Route State Route

BASED ON U.S.G.S. 7.5 MINUTE SERIES (TOPOGRAPHIC) MAP

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LOCATION MAP

WAYNE'S BELGRADE
239 WELLS STREET
BELGRADE, MINNESOTA

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STD NO. P:\5000\5741\Drafting\

DATE DRAWN	05/08/00	DRAWN BY	D. Reeder	APPR. BY	
PLOT DATE	06/22/00	PROJECT NUMBER	24975741	FIGURE NUMBER	1a

AutoCAD FILE NAME	5741-01A	PLOT SCALE	1" = 2000'
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DRAWING NUMBER	A-01-A
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EXPLANATION

NOTE :
 This drawing (including property lines, structures, and locations of buried utilities) is not exact. For precise locations, consult a registered land surveyor and appropriate utility company.
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**SURROUNDING AREA
 MAP**

WAYNE'S BELGRADE
 239 WELLS STREET
 BELGRADE, MINNESOTA

DATE DRAWN	06 / 15 / 00
DRAWN BY	<i>S. Reeder</i>
APPROVED BY	
DRAWING NUMBER	B- 01 - B
PROJECT NUMBER	24975741
FIGURE NUMBER	1k

PLOT DATE 06/22/00

AutoCAD FILE NAME 5741-01B

PLOT SCALE 1" = 100'

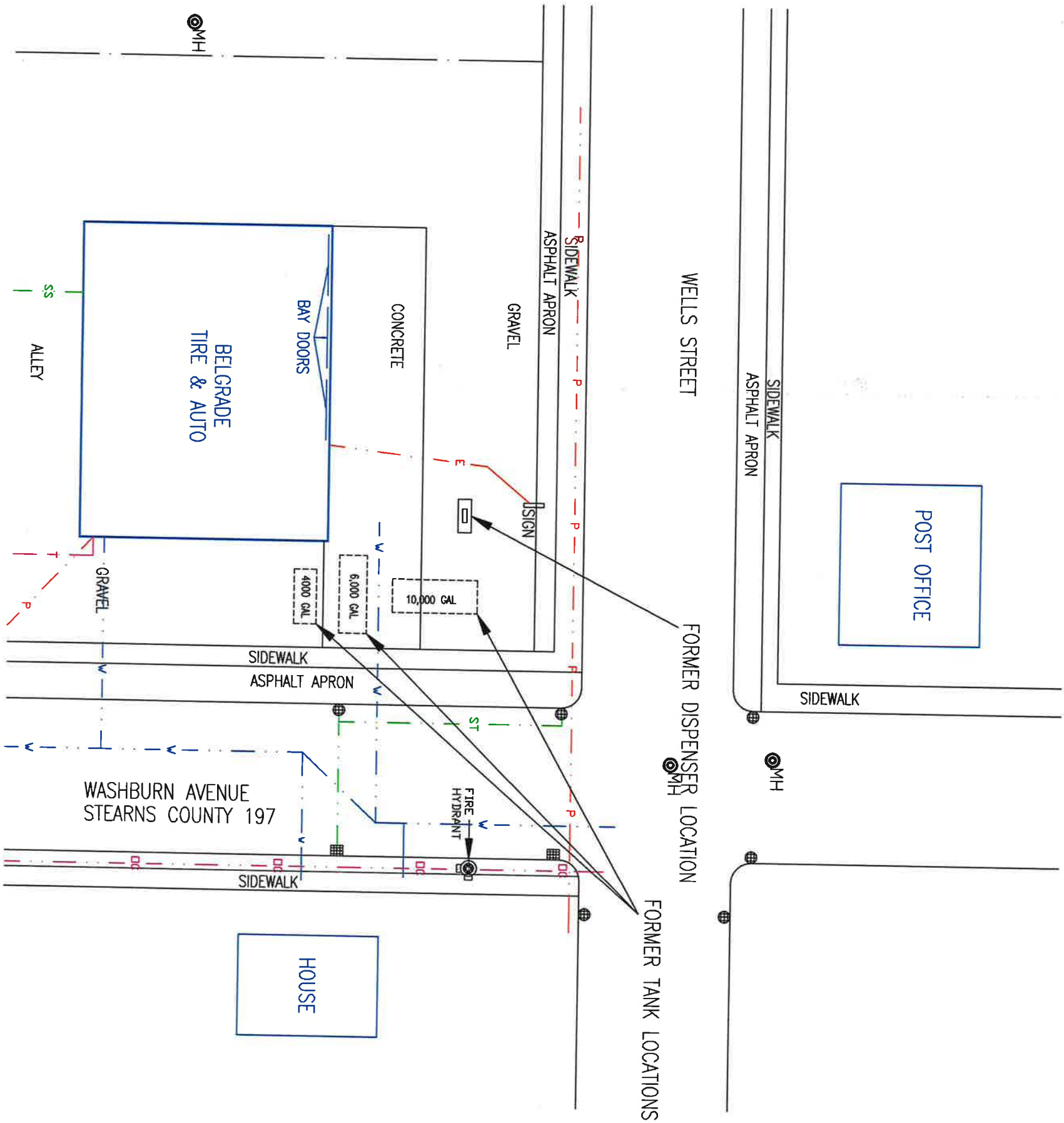
EXPLANATION



NOTE:
 This drawing (including property lines, structures, and locations of buried utilities) is not exact. For precise locations, consult a registered land surveyor and appropriate utility company.

- ⊙ MH MANHOLE
- ⊞ CATCH BASINS

- P — OVERHEAD POWER
- E — UNDERGROUND ELECTRIC
- T — TELEPHONE LINE
- ST — STORM SEWER
- SS — SANITARY SEWER
- V — WATER
- DC — OVERHEAD CABLE TV



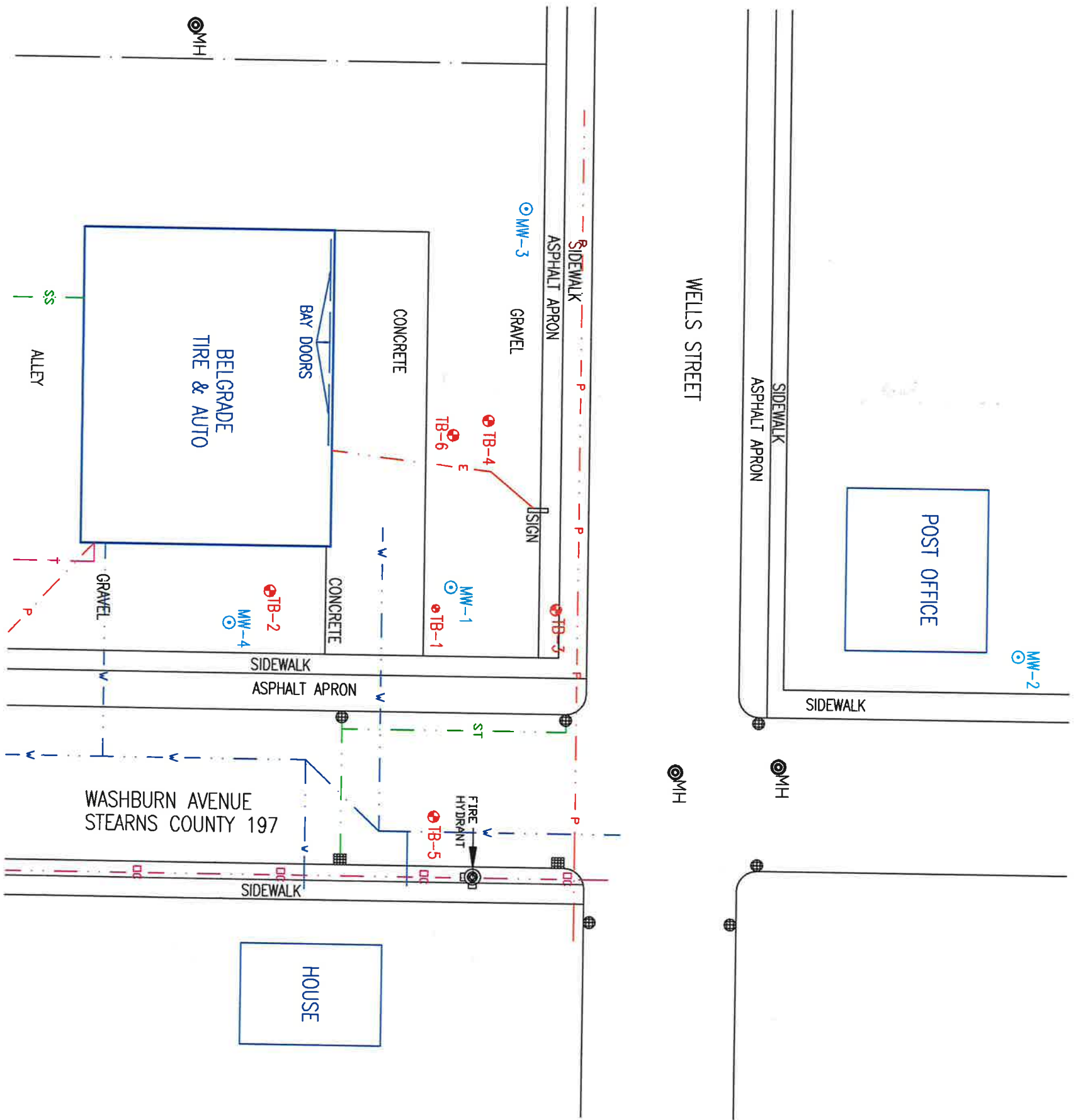
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DRAWN BY	D. Reeder
REVISION DATE	
DRAWING NUMBER	B-09-A
PROJECT NUMBER	24975741
FIGURE NUMBER	2a

FORMER TANK LOCATION MAP
WAYNE'S BELGRADE
 239 WELLS STREET
 BELGRADE, MINNESOTA

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EXPLANATION

NOTE:
This drawing (including property lines, structures, and locations of buried utilities) is not exact. For precise locations, consult a registered land surveyor and appropriate utility company.

- ⊙ MH MANHOLE
- ⊙ TB- TEST BORING
- ⊙ MW- MONITORING WELL
- ⊙ CATCH BASINS

- P OVERHEAD POWER
- E UNDERGROUND ELECTRIC
- T TELEPHONE LINE
- ST STORM SEWER
- SS SANITARY SEWER
- W WATER
- DC OVERHEAD CABLE TV



MONITORING WELL AND TEST BORING LOCATIONS
WAYNE'S BELGRADE
 239 WELLS STREET
 BELGRADE, MINNESOTA

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DATE DRAWN	07/26/99
DRAWN BY	S. Roeder
REVISION DATE	
DRAWING NUMBER	B-07-B
PROJECT NUMBER	24975741
FIGURE NUMBER	2b

PLOT DATE 06/22/00

AutoCAD FILE NAME 5741-07B

PLOT SCALE 1" = 30'

DAHL STD NO. P:\5000\5741\Drafting\

MW-3	07/14/99	TB-6	07/13/99
DEPTH	6-8'	DEPTH	10-11'
B	<0.025	B	<0.05
E	<0.025	E	0.087
T	<0.025	T	<0.05
X	<0.05	X	0.39
GRO	<2.9	GRO	72
DRO	<3.9	DRO	490
MW-3	07/14/99	TB-4	05/26/98
DEPTH	14-16'	DEPTH	12-16'
B	<0.025	B	<0.005
E	<0.025	E	<0.005
T	<0.025	T	<0.005
X	<0.05	X	<0.005
GRO	<2.9	GRO	<0.25
DRO	<3.9	DRO	NA

MW-2	07/13/99	TB-3	05/26/98
DEPTH	6-8'	DEPTH	8-12'
B	<0.025	B	6.80
E	<0.025	E	NO
T	<0.025	T	NO
X	<0.05	X	NO
GRO	<2.7	GRO	540
DRO	<3.9	DRO	NA

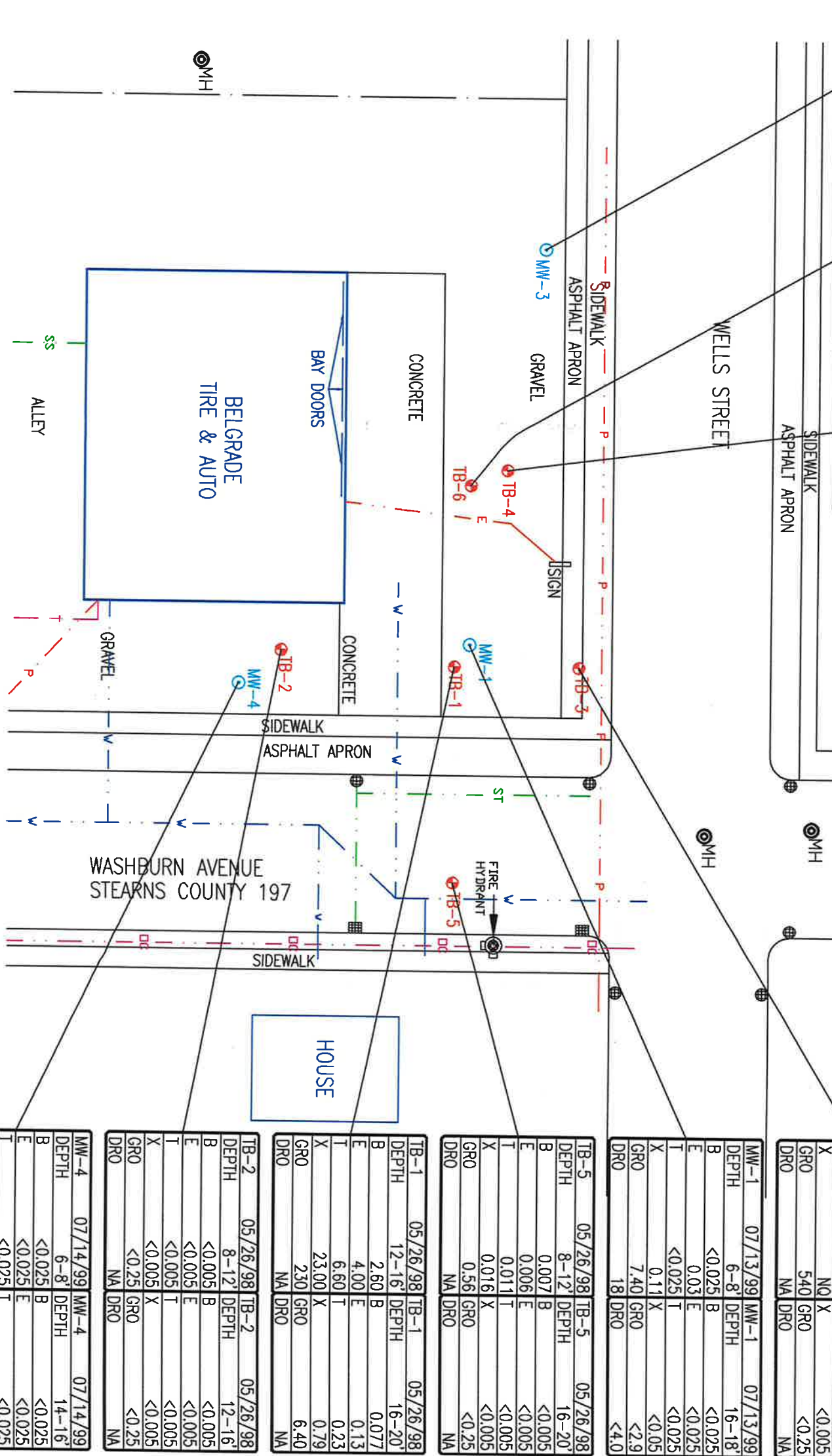
MW-1	07/13/99	TB-5	05/26/98
DEPTH	6-8'	DEPTH	8-12'
B	<0.025	B	0.007
E	0.03	E	<0.005
T	<0.025	T	<0.005
X	0.11	X	0.016
GRO	7.40	GRO	0.56
DRO	18	DRO	NA

MW-2	07/13/99	TB-2	05/26/98
DEPTH	6-8'	DEPTH	8-12'
B	<0.025	B	<0.005
E	<0.025	E	<0.005
T	<0.025	T	<0.005
X	<0.05	X	<0.005
GRO	<2.9	GRO	<0.25
DRO	<4.0	DRO	NA

MW-3	07/14/99	TB-1	05/26/98
DEPTH	6-8'	DEPTH	12-16'
B	<0.025	B	<0.005
E	<0.025	E	<0.005
T	<0.025	T	<0.005
X	<0.05	X	<0.005
GRO	<2.9	GRO	<0.25
DRO	<3.8	DRO	NA

MW-4	07/14/99	TB-1	05/26/98
DEPTH	6-8'	DEPTH	12-16'
B	<0.025	B	2.60
E	<0.025	E	4.00
T	<0.025	T	6.60
X	<0.05	X	23.00
GRO	<2.9	GRO	230
DRO	<3.8	DRO	NA

MW-4	07/14/99	TB-2	05/26/98
DEPTH	6-8'	DEPTH	8-12'
B	<0.025	B	<0.005
E	<0.025	E	<0.005
T	<0.025	T	<0.005
X	<0.05	X	<0.005
GRO	<2.9	GRO	<0.25
DRO	<4.1	DRO	NA



EXPLANATION

- NOTE:**
 This drawing (including property lines, structures, and locations of buried utilities) is not exact. For precise locations, consult a registered land surveyor and appropriate utility company.
- ⊕ MH MANHOLE
 - ⊞ CATCH BASINS
 - ⊕ TB- TEST BORING
 - ⊖ MW- MONITORING WELL
 - P — OVERHEAD POWER
 - E — UNDERGROUND ELECTRIC
 - T — TELEPHONE LINE
 - ST — STORM SEWER
 - SS — SANITARY SEWER
 - W — WATER
 - DC — OVERHEAD CABLE TV
 - B — BENZENE
 - E — ETHYL BENZENE
 - T — TOLUENE
 - X — XYLENES
 - GRO — GASOLENE RANGE ORGANICS
 - DRO — DIESEL RANGE ORGANICS
 - NA — NOT ANALYZED
 - NO — NOT QUANTIFIED
 - VALUES EXPRESSED IN mg/kg

SCALE:
 0 15' 30'

SOIL ANALYTICAL DATA
WAYNE'S BELGRADE
 239 WELLS STREET
 BELGRADE, MINNESOTA



Offices: Lino Lakes, MN - Bettendorf, IA - Ann Arbor, MI
 Fort Worth, TX - Charlotte, NC

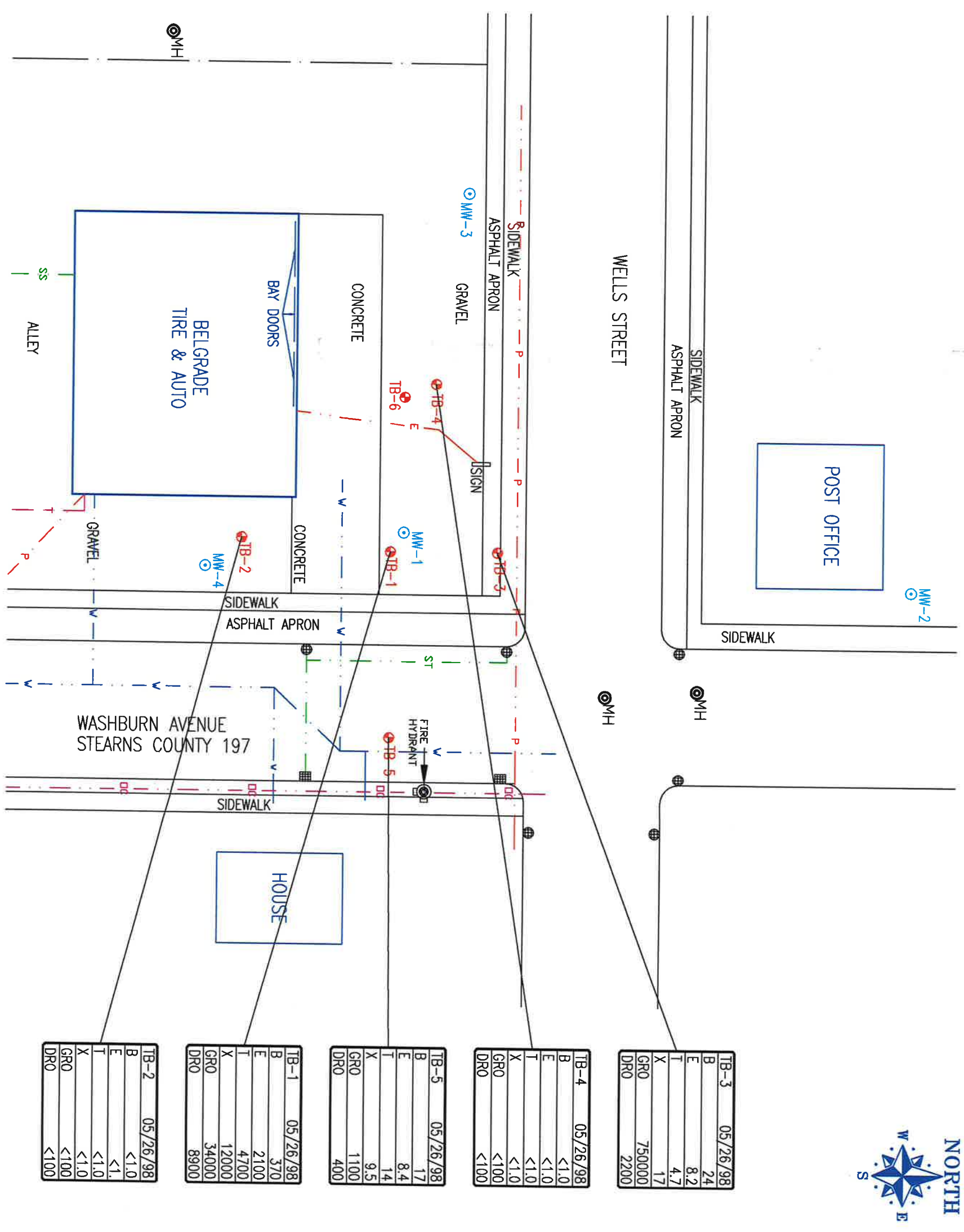
DATE DRAWN	06 / 14 / 00
DRAWN BY	D. Reeder
REVISION	
DATE	
DRAWING NUMBER	B- 18-A
PROJECT NUMBER	24975741
FIGURE NUMBER	2C

PLT DATE 06/22/00

AutoCAD FILE NAME 5741-18A

PLT SCALE 1" = 30'

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TB-3		05/26/98
B	24	
E	8.2	
T	4.7	
X	17	
GRO	750000	
DRO	2200	

TB-4		05/26/98
B	<1.0	
E	<1.0	
T	<1.0	
X	<1.0	
GRO	<100	
DRO	<100	

TB-5		05/26/98
B	17	
E	8.4	
T	14	
X	9.5	
GRO	1100	
DRO	400	

TB-1		05/26/98
B	370	
E	2100	
T	4700	
X	12000	
GRO	34000	
DRO	8900	

TB-2		05/26/98
B	<1.0	
E	<1.0	
T	<1.0	
X	<1.0	
GRO	<100	
DRO	<100	

EXPLANATION

NOTE:
 This drawing (including property lines, structures, and locations of buried utilities) is not exact. For precise locations, consult a registered land surveyor and appropriate utility company.

- ⊙ MH MANHOLE
- ⊕ CATCH BASINS
- ⊕ TB- TEST BORING
- ⊙ MW- MONITORING WELL

- P OVERHEAD POWER
- E UNDERGROUND ELECTRIC
- T TELEPHONE LINE
- ST STORM SEWER
- SS SANITARY SEWER
- W WATER
- DC OVERHEAD CABLE TV

- B BENZENE
- E ETHYLBENZENE
- T TOLUENE
- X XYLENES
- GRO GASOLENE RANGE ORGANICS
- DRO DIESEL RANGE ORGANICS
- NA NOT ANALYZED
- NO NOT QUANTIFIED
- VALUES EXPRESSED IN ug/L



GROUNDWATER LABORATORY
ANAYLTICAL DATA-05/26/98
WAYNE'S BELGRADE
 239 WELLS STREET
 BELGRADE, MINNESOTA



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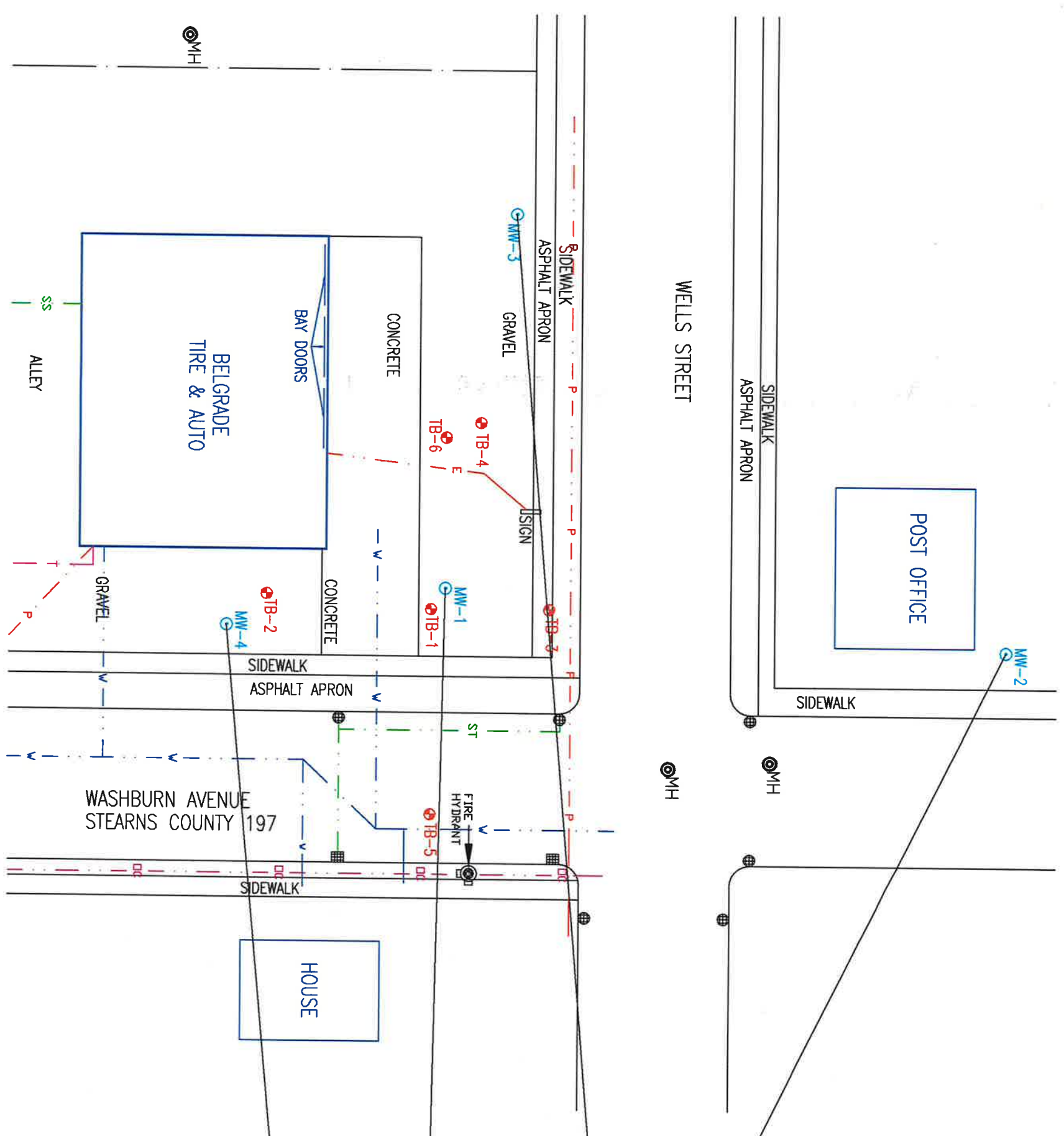
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 STD NO: P:\5000\5741\Drafting\

DATE DRAWN	06/14/00
DRAWN BY	S. Reader
REVISION DATE	
DRAWING NUMBER	B-18-B
PROJECT NUMBER	24975741
FIGURE NUMBER	2d

PLOT DATE 06/22/00

AutoCAD FILE NAME 5741-18B

PLOT SCALE 1" = 30'



MW-2 05/25/00	
B	<1.0
E	<1.0
T	<1.0
X	<3.0
MTBE	<1.0
GRO	<50
DRO	<100
MW-3 05/25/00	
B	<1.0
E	<1.0
T	<1.0
X	<3.0
MTBE	<1.0
GRO	<50
DRO	<100
MW-1 05/25/00	
B	<2.5
E	3.9
T	<2.5
X	<7.9
MTBE	22.0
GRO	2600
DRO	1200
MW-4 05/25/00	
B	<1.0
E	<1.0
T	<1.0
X	<3.0
MTBE	<1.0
GRO	<50
DRO	<100

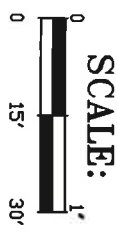
EXPLANATION

NOTE:

This drawing (including property lines, structures, and locations of buried utilities) is not exact. For precise locations, consult a registered land surveyor and appropriate utility company.

- ⊙ MH MANHOLE
- ⊕ CATCH BASINS
- ⊕ TB- TEST BORING
- ⊕ MW- MONITORING WELL
- P — OVERHEAD POWER
- E — UNDERGROUND ELECTRIC
- T — TELEPHONE LINE
- ST — STORM SEWER
- SS — SANITARY SEWER
- W — WATER
- DC — OVERHEAD CABLE TV

- B BENZENE
- E ETHYLBENZENE
- T TOLUENE
- X XYLENES
- MTBE METHYL-TERT-BUTYL-ETHER
- GRO GASOLENE RANGE ORGANICS
- DRO DIESEL RANGE ORGANICS
- NA NOT ANALYZED
- NQ NOT QUANTIFIED
- VALUES EXPRESSED IN ug/L



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GROUNDWATER LABORATORY
ANAYLTICAL DATA-05/25/00
WAYNE'S BELGRADE
239 WELLS STREET
BELGRADE, MINNESOTA

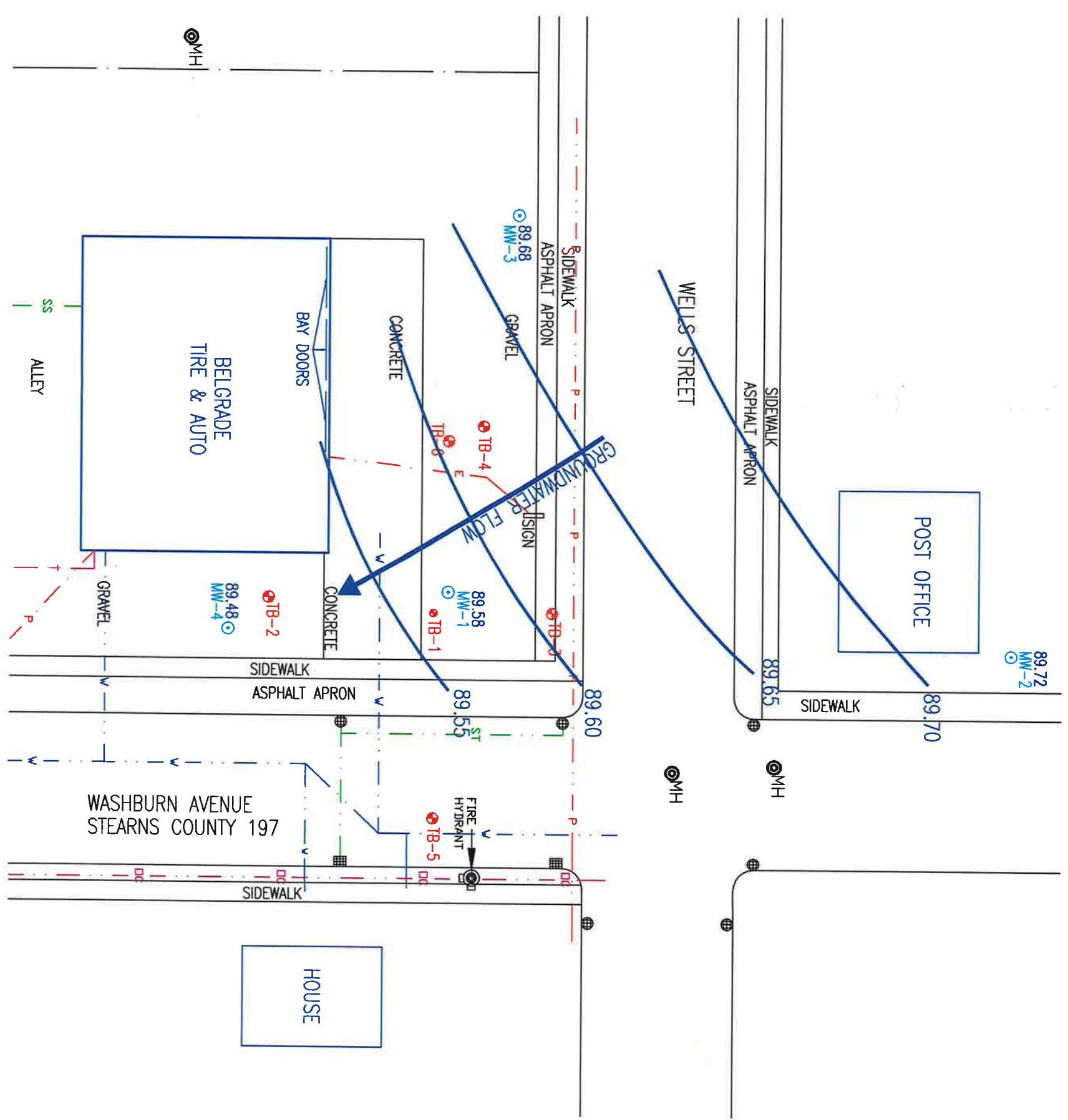
PLOT DATE 06/22/00

AutoCAD FILE NAME 5741-18E

PLOT SCALE 1" = 30'

DAHL STD NO. P:\5000\5741\Drafting\

DATE DRAWN	06/15/00
DRAWN BY	D. Reardon
REVISION DATE	
DRAWING NUMBER	B-18-E
PROJECT NUMBER	24975741
FIGURE NUMBER	29



EXPLANATION

NOTE :

This drawing (including property lines, structures, and locations of buried utilities) is not exact. For precise locations, consult a registered land surveyor and appropriate utility company.

- ⊙ MH MANHOLE
- ⊕ CATCH BASINS
- ⊕ TB- TEST BORING
- ⊙ MW- MONITORING WELL

- P OVERHEAD POWER
- E UNDERGROUND ELECTRIC
- T TELEPHONE LINE
- ST STORM SEWER
- SS SANITARY SEWER
- V WATER
- DC OVERHEAD CABLE TV

GROUNDWATER GRADIENT DATA:
 * BASED ON DATA COLLECTED ON 08/17/99
 AVERAGE GRADIENT=1.5 x 10⁻³



GROUNDWATER GRADIENT
08/17/99
WAYNE'S BELGRADE
 239 WELLS STREET
 BELGRADE, MINNESOTA



Offices: Lino Lakes, MN - Bettendorf, IA - Ann Arbor, MI
 Fort Worth, TX - Charlotte, NC

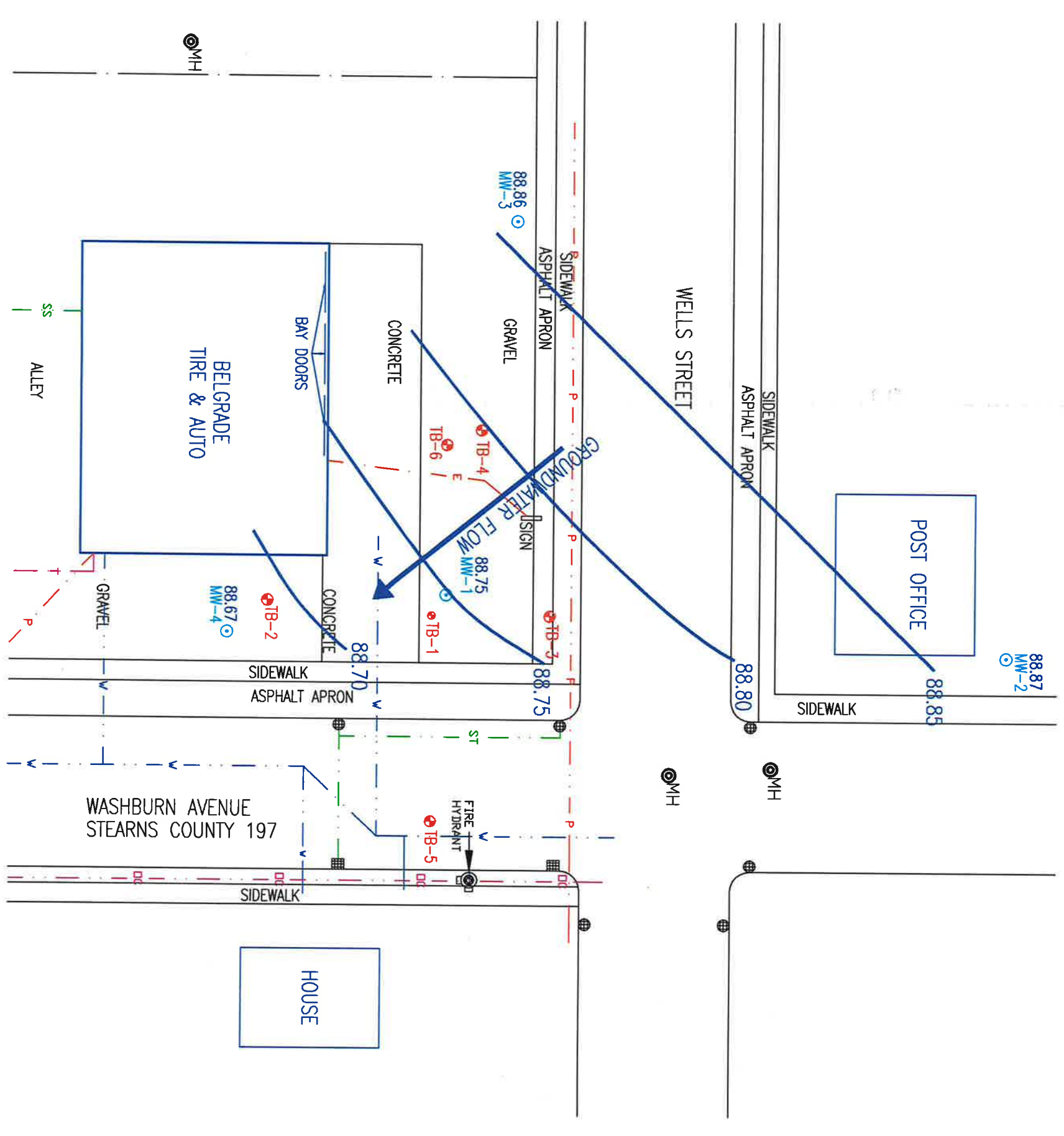
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 STD No: P:\5000\5741\Drafting\

PLOT DATE 06/22/00

AutoCAD FILE NAME 5741-15A

PLOT SCALE 1" = 30'

DATE DRAWN	05/09/00
DRAWN BY	D. Roeder
REVISION DATE	
DRAWING NUMBER	B- 15-A
PROJECT NUMBER	24975741
FIGURE NUMBER	3a



EXPLANATION

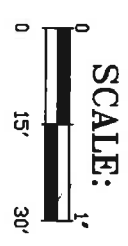
NOTE :

This drawing (including property lines, structures, and locations of buried utilities) is not exact. For precise locations, consult a registered land surveyor and appropriate utility company.

- ⊙ MH MANHOLE
- ⊙ MW- MONITORING WELL
- ⊕ TB- TEST BORING
- ⊕ MW- MONITORING WELL

- P OVERHEAD POWER
- E UNDERGROUND ELECTRIC
- T TELEPHONE LINE
- ST STORM SEWER
- SS SANITARY SEWER
- V WATER
- DC OVERHEAD CABLE TV

GROUNDWATER GRADIENT DATA:
 * BASED ON DATA COLLECTED ON 10/27/99
 AVERAGE GRADIENT=1.5 x 10⁻³



GROUNDWATER GRADIENT
10/27/99
WAYNE'S BELGRADE
 239 WELLS STREET
 BELGRADE, MINNESOTA

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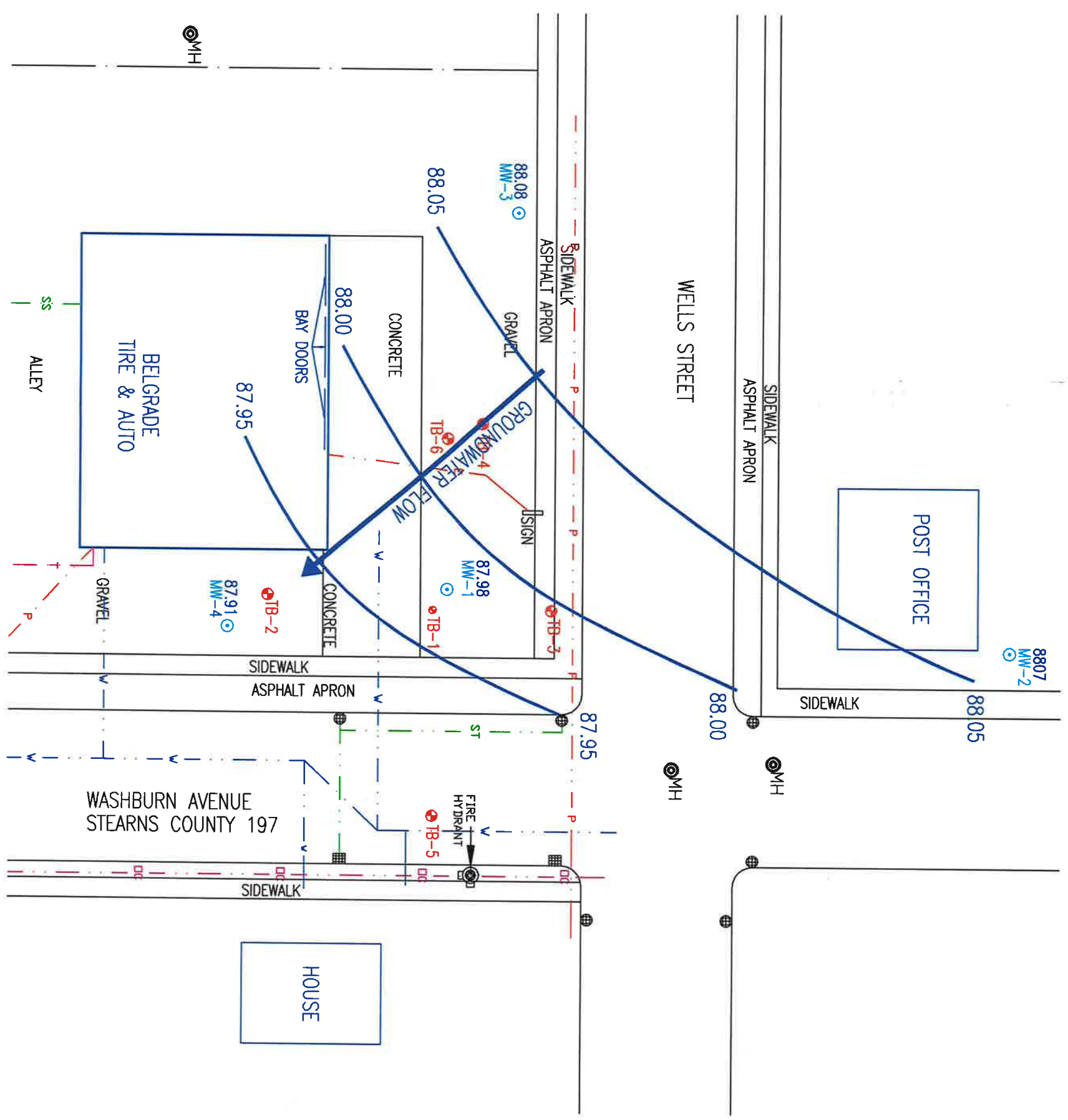
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PLOT DATE 06/22/00

AutoCAD FILE NAME 5741-15B

PLOT SCALE 1" = 30'

DATE DRAWN	05/09/00
DRAWN BY	J. Reeder
REVISION DATE	
DRAWING NUMBER	B- 15-B
PROJECT NUMBER	24975741
FIGURE NUMBER	3b



EXPLANATION

NOTE:

This drawing (including property lines, structures, and locations of buried utilities) is not exact. For precise locations, consult a registered land surveyor and appropriate utility company.

- ⊙ MH MANHOLE
- ⊞ CATCH BASINS
- ⊕ TB- TEST BORING
- ⊖ MW- MONITORING WELL

- P OVERHEAD POWER
- E UNDERGROUND ELECTRIC
- T TELEPHONE LINE
- ST STORM SEWER
- SS SANITARY SEWER
- W WATER
- DC OVERHEAD CABLE TV

GROUNDWATER GRADIENT DATA:
 * BASED ON DATA COLLECTED ON 05/25/2000
 AVERAGE GRADIENT=1.4 x 10⁻³



GROUNDWATER GRADIENT
05/25/2000
WAYNE'S BELGRADE
 239 WELLS STREET
 BELGRADE, MINNESOTA



Offices: Lino Lakes, MN - Bettendorf, IA - Ann Arbor, MI
 Fort Worth, TX - Charlotte, NC

DAHL
 STD NO: P:\5000\5741\Drafting\

PLOT DATE 06/22/00

AutoCAD FILE NAME 5741-15C

PLOT SCALE 1" = 30'

DATE DRAWN	06/14/00
DRAWN BY	D. Reeder
REVISION DATE	
DRAWING NUMBER	B- 15-C
PROJECT NUMBER	24975741
FIGURE NUMBER	3C

Ground Water Elevation vs. Time
Wayne's Belgrade
(24975741)

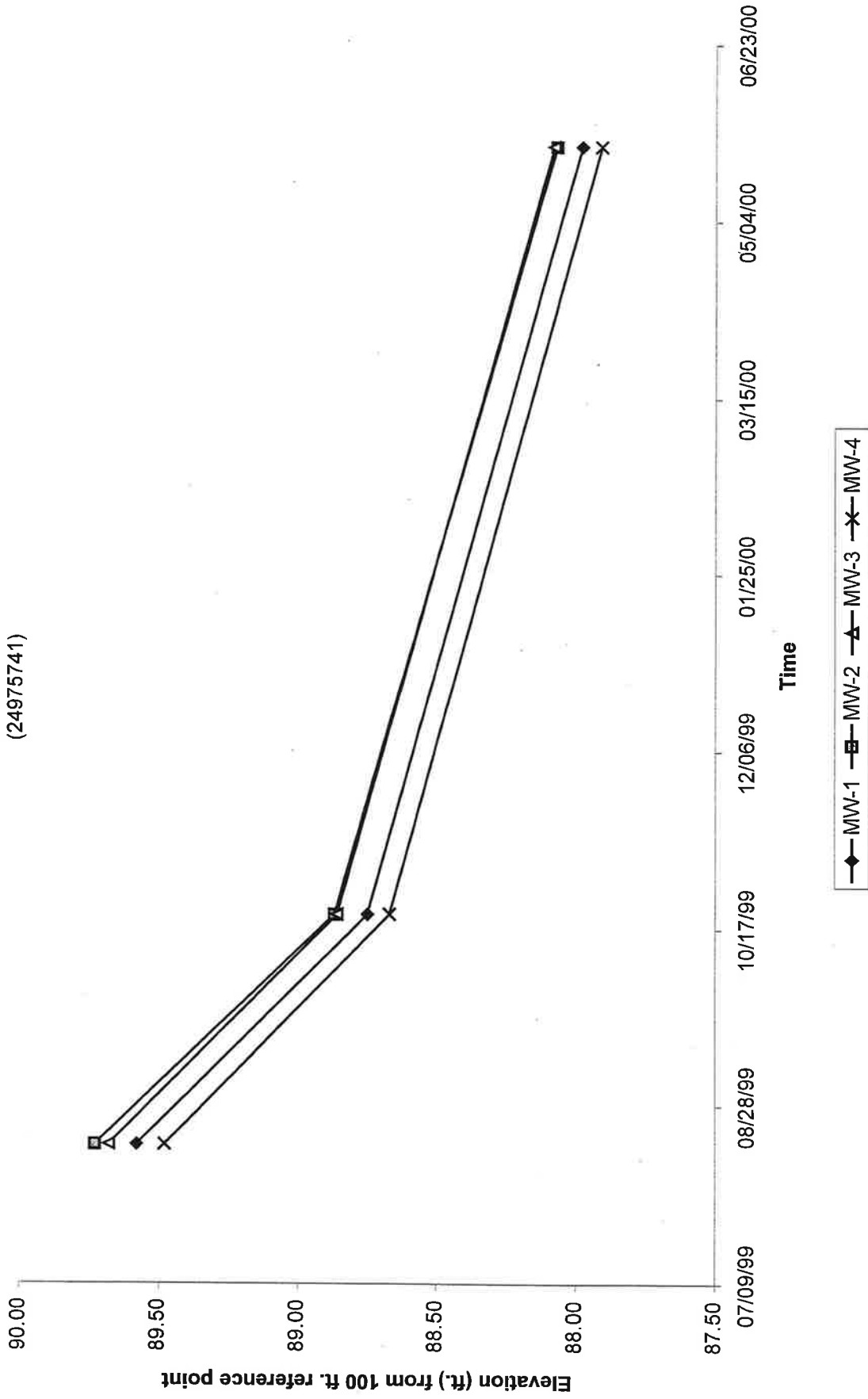


Figure 3d

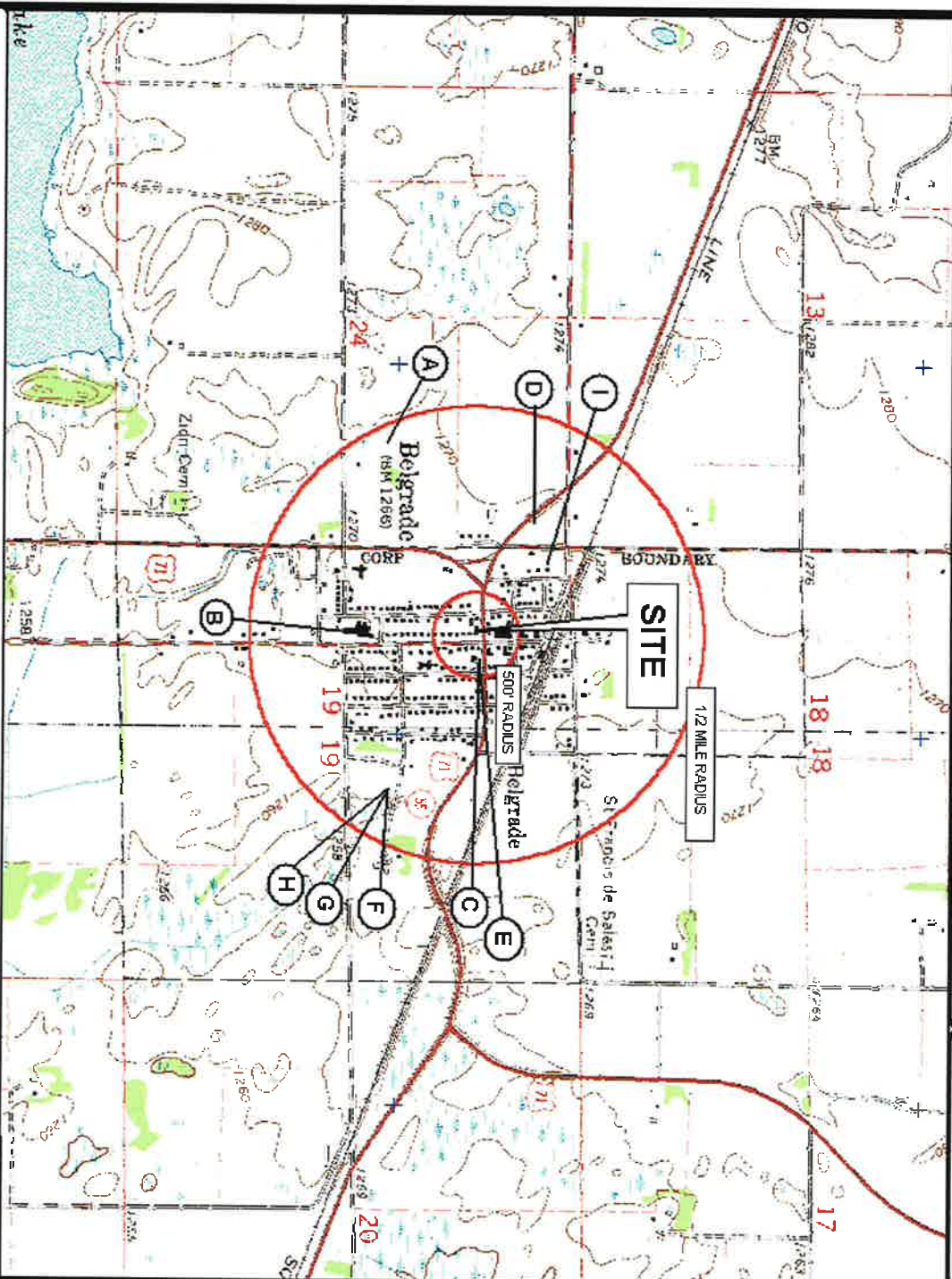
PROJECT SITE LOCATION



LAT. N. 45°27'09"
 LONG. W. 95°00'16"
 T. 123N
 R. 34W
 SEC. 19

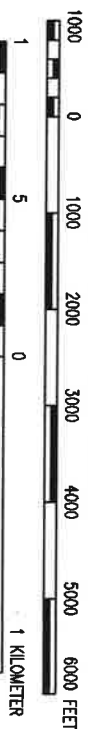
U.S.G.S. STANDARD NAME
 BELGRADE, MINN.

QUADRANGLE LOCATION

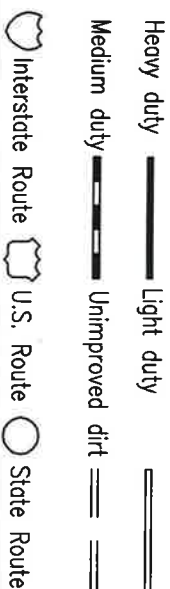


UNIQUE WELL #	UNIQUE WELL #
A 135401	F 510072
B 215139	G 510073
C 241377	H 510074
D 360848	I 536827
E 496508	

SCALE 1:24000



CONTOUR INTERVAL 10 FEET



BASED ON U.S.G.S. 7.5 MINUTE SERIES (TOPOGRAPHIC) MAP

PROPERTIES WITHIN THE 500' RADIUS



WELL RECEPTOR SURVEY

WAYNE'S BELGRADE
 239 WELLS STREET
 BELGRADE, MINNESOTA

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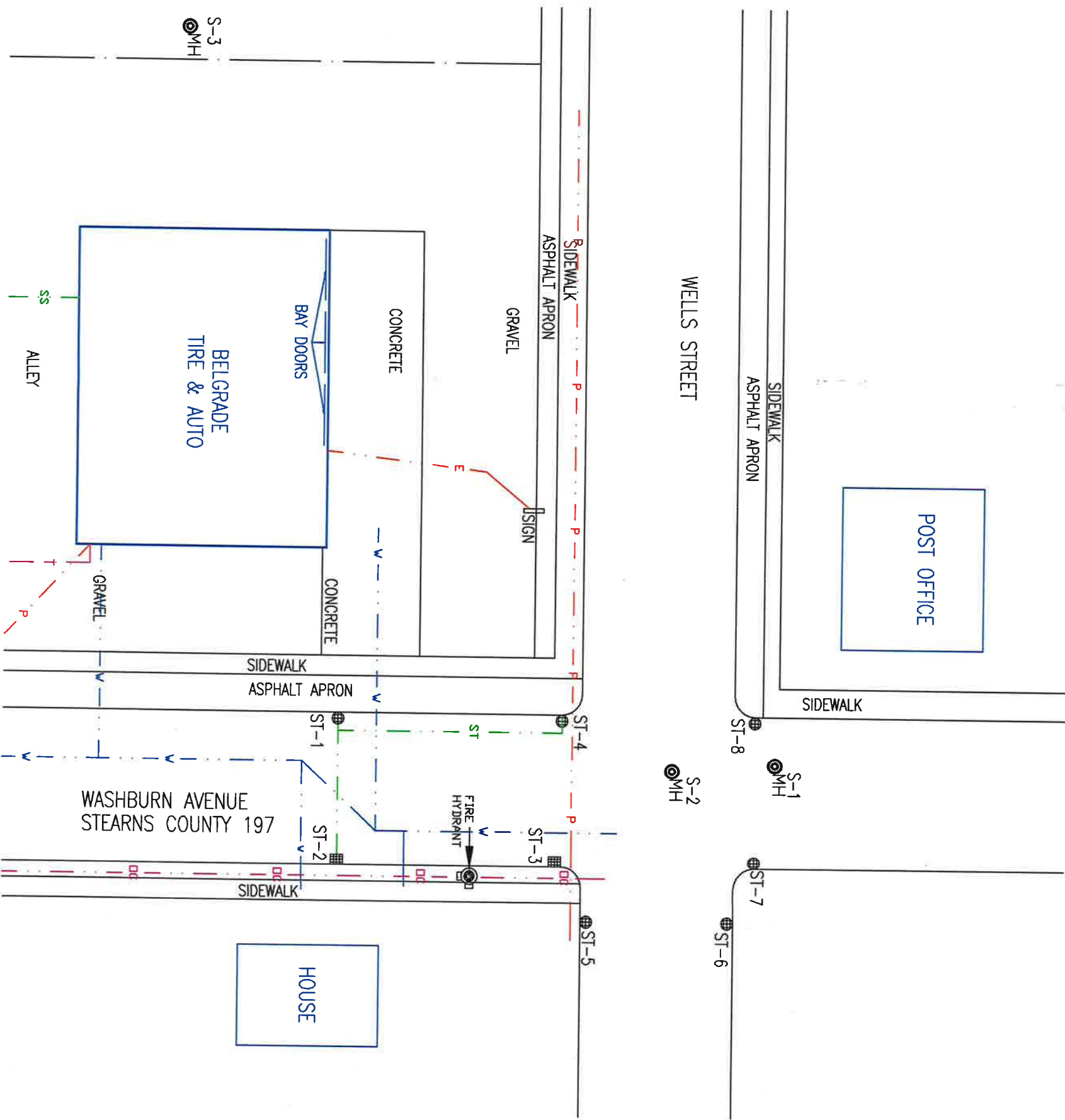
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 STD NO: P:\5000\5741\Drafting\

DATE 06/16/00
 PLOT DATE 06/22/00

AutoCAD
 FILE NAME 5741-02A

PLOT SCALE 1"=2000'

DATE DRAWN	06/16/00
DRAWN BY	J. Reeder
REVISION DATE	
DRAWING NUMBER	B-02-A
PROJECT NUMBER	24975741
FIGURE NUMBER	4



EXPLANATION

NOTE:
 This drawing (including property lines, structures, and locations of buried utilities) is not exact. For precise locations, consult a registered land surveyor and appropriate utility company.

- ⊙ MH MANHOLE
- ⊕ CATCH BASINS
- S-ST- VAPOR SAMPLE LOCATION

- P OVERHEAD POWER
- E UNDERGROUND ELECTRIC
- T TELEPHONE LINE
- ST STORM SEWER
- SS SANITARY SEWER
- W WATER
- DC OVERHEAD CABLE TV



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**VAPOR SURVEY
 MAP**
WAYNE'S BELGRADE
 239 WELLS STREET
 BELGRADE, MINNESOTA

DATE DRAWN 06/14/00

DRAWN BY D. Reardon

REVISION DATE

DRAWING NUMBER B- 19-A

PROJECT NUMBER 24975741

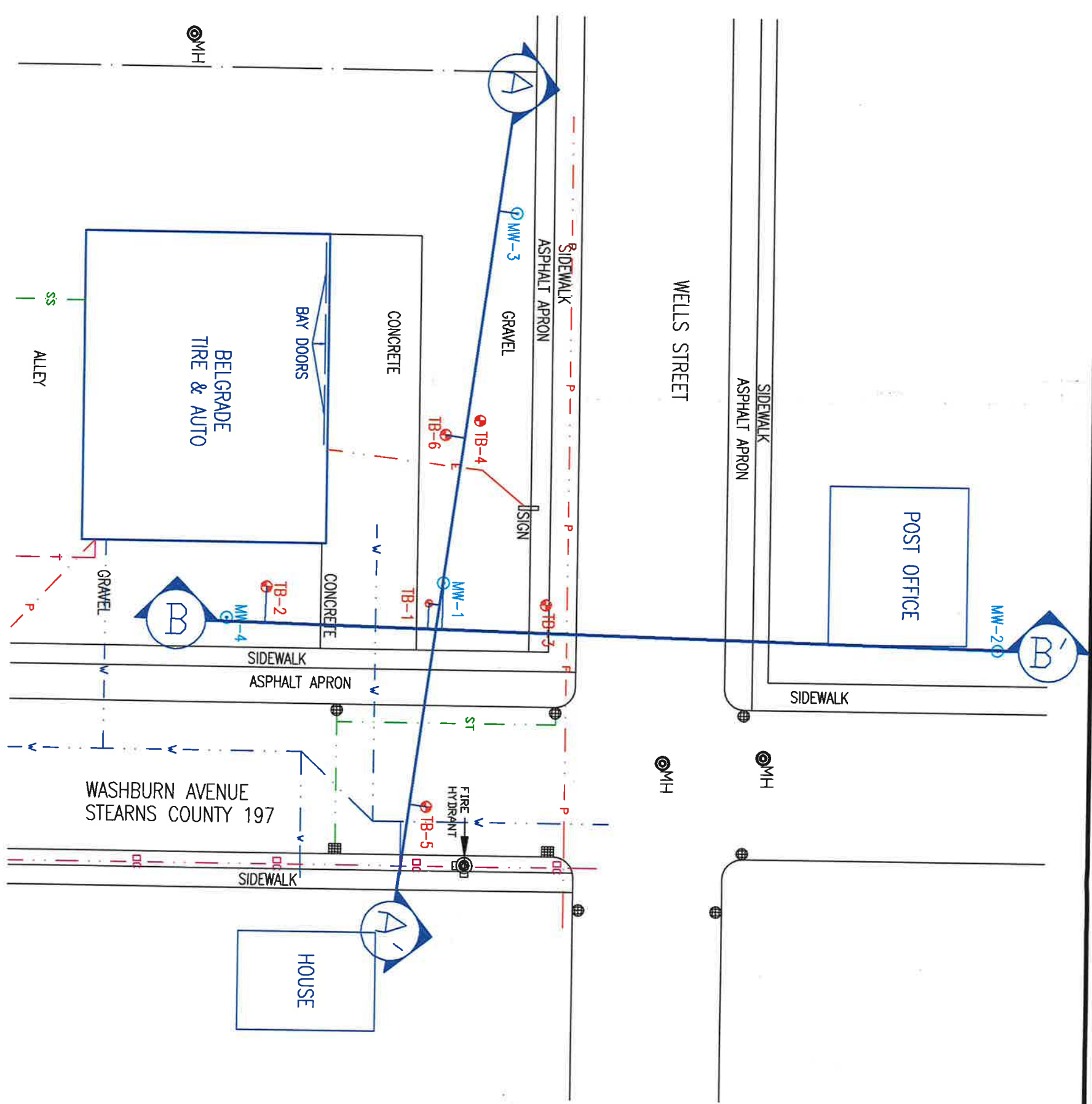
FIGURE NUMBER 5

PLOT DATE 06/22/00

AutoCAD FILE NAME 5741-19A

PLOT SCALE 1" = 30'

DAHL STD NO: P:\5000\5741\Drafting\



EXPLANATION

NOTE 1
 This drawing (including property lines, structures, and locations of buried utilities) is not exact. For precise locations, consult a registered land surveyor and appropriate utility company.

- MANHOLE
- CATCH BASINS
- TEST BORING
- MONITORING WELL

- OVERHEAD POWER
- UNDERGROUND ELECTRIC
- TELEPHONE LINE
- STORM SEWER
- SANITARY SEWER
- WATER
- OVERHEAD CABLE TV



**CROSS SECTION
 LOCATION MAP
 WAYNE'S BELGRADE
 239 WELLS STREET
 BELGRADE, MINNESOTA**

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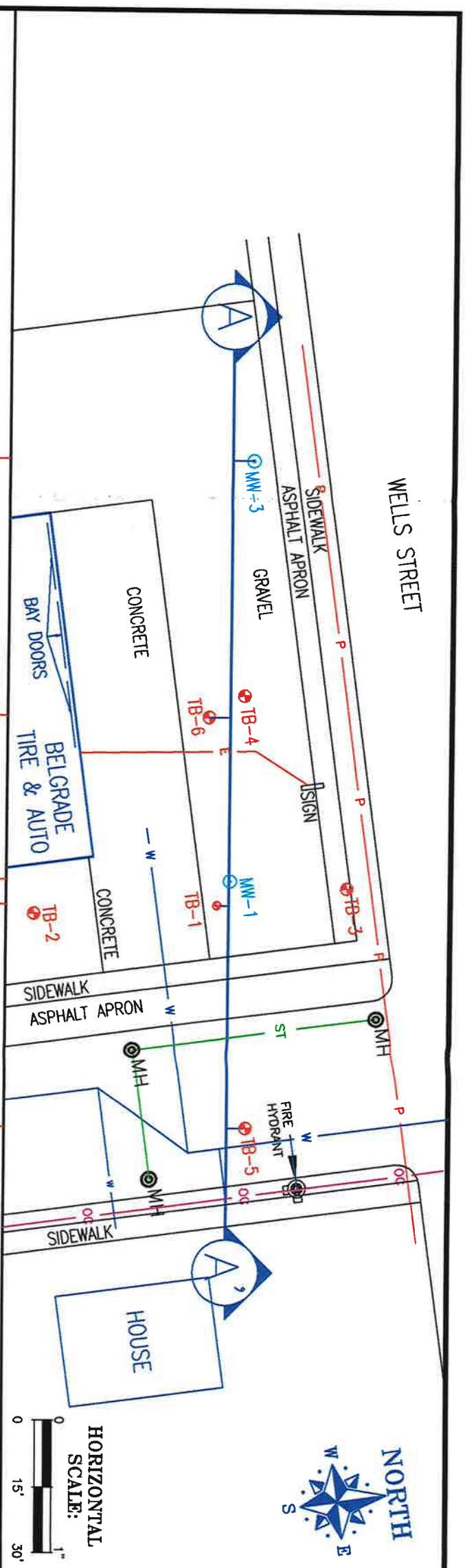
DATE DRAWN	05/08/00
DRAWN BY	D. Reeder
REVISION DATE	
DRAWING NUMBER	B- 11-A
PROJECT NUMBER	24975741
FIGURE NUMBER	6a

PLOT DATE 06/22/00

AutoCAD FILE NAME 5741-11A

PLOT SCALE 1" = 30'

DAHL STD NO: P:\5000\5741\Drafting\



EXPLANATION

NOTE:
 This drawing (including property lines, structures, and locations of buried utilities) is not exact. For precise locations, consult an appropriate land surveyor and/or appropriate utility company.

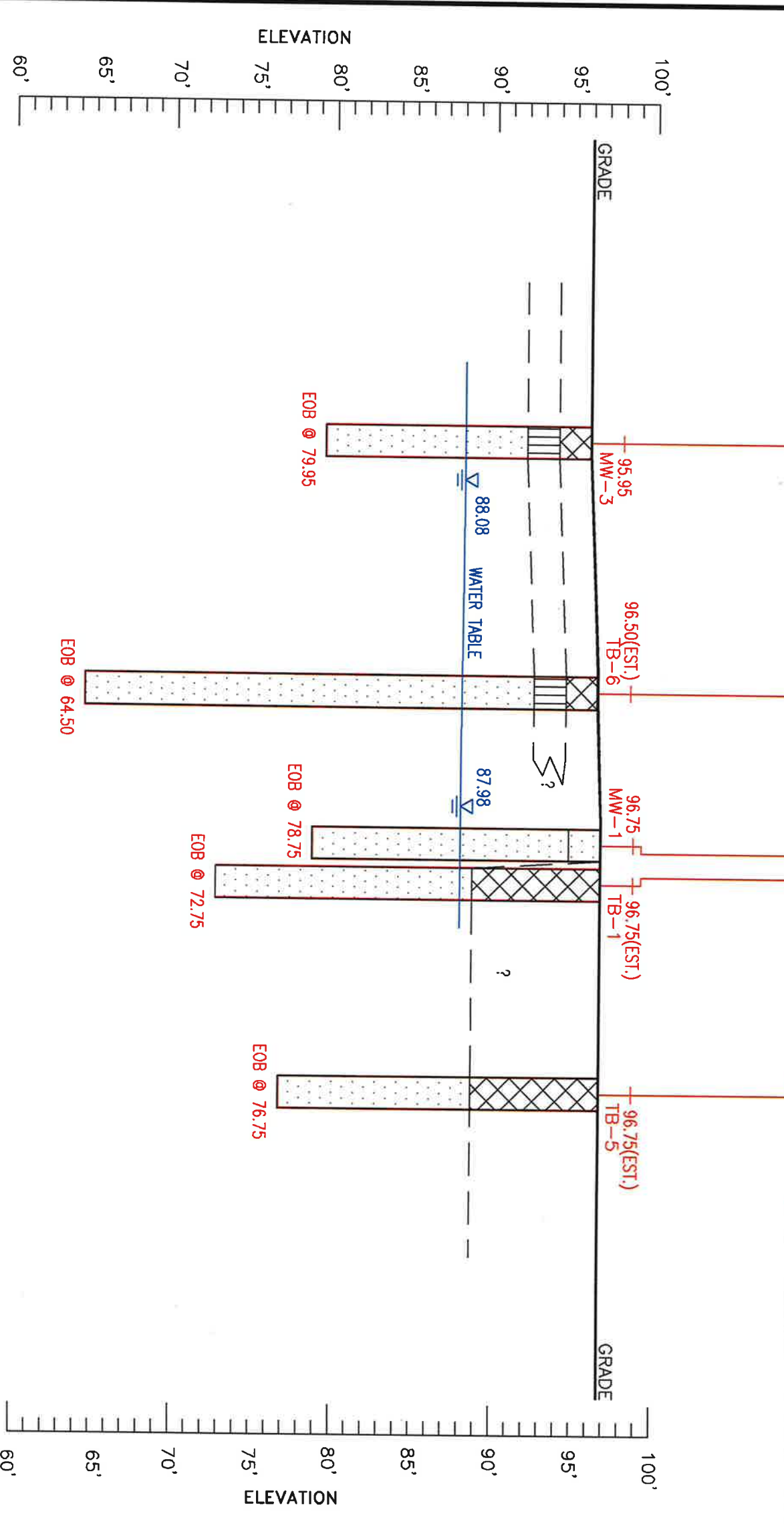
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LEGEND:
 TB- TEST BORING
 WATER LEVEL
 FILL MAKE VISUAL INSPECTION
 ML INORGANIC SILT & SANDY SILTS
 SW WELL GRADED SAND, SW LITTLE FINES

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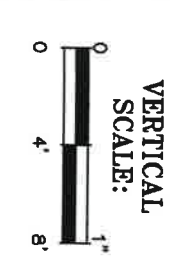
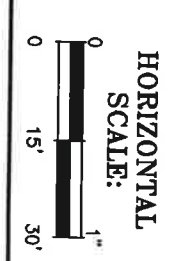
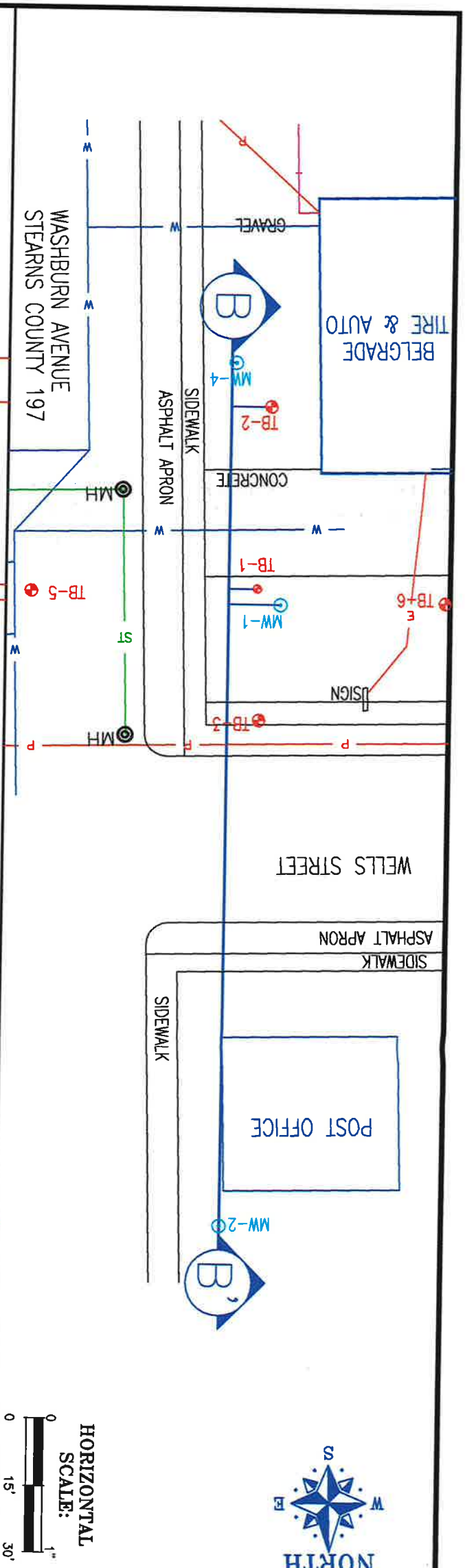


VERTICAL SCALE:
 0 4' 8'

CROSS SECTION A - A'
WAYNE'S BELGRADE
 239 WELLS STREET
 BELGRADE, MINNESOTA

DATE	05/08/00
DRAWN BY	J. Reader
APPROVED BY	
DRAWING NUMBER	B-10-A
PROJECT NUMBER	24975741
FIGURE NUMBER	6b

PLOT DATE 06/22/00 AutoCAD FILE NAME 5741-10A PLOT SCALE 1"=8'



EXPLANATION

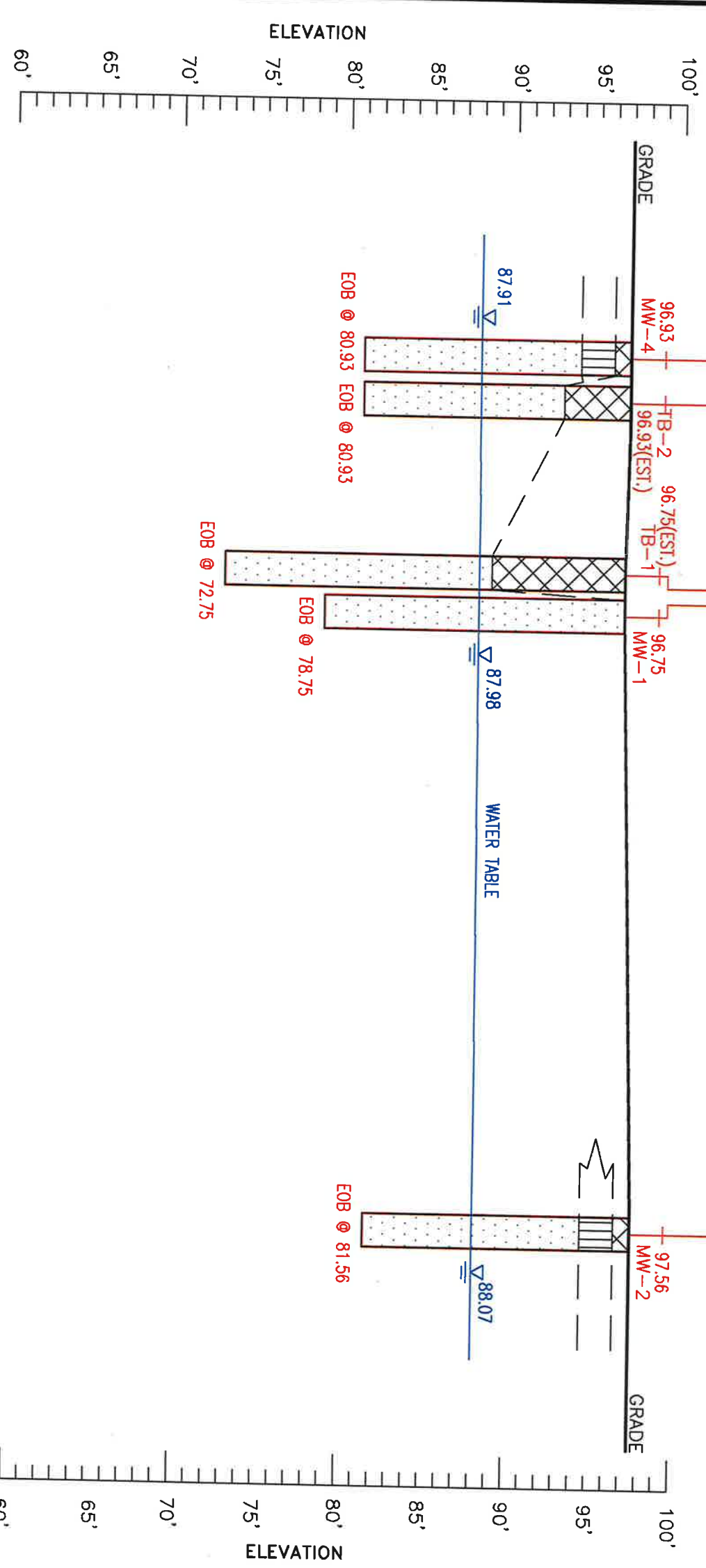
NOTE:
 This drawing (including property lines, structures, and locations of buried utilities) is not exact. For precise locations, consult a registered land surveyor and appropriate utility company.

THIS DESIGN AND DRAWING CONTAINS CONFIDENTIAL INFORMATION AND INTELLECTUAL PROPERTY AND THE USER AGREES NOT TO REPRODUCE, IMITATE OR DISCLOSE TO OTHERS IN WHOLE OR PART FOR ANY OTHER PURPOSES OTHER THAN SPECIFICALLY PERMITTED IN WRITING BY DAHL & ASSOCIATES, INC.

TB- TEST BORING
WATER LEVEL

EXPLANATION

FILL MAKE VISUAL INSPECTION
 ML INORGANIC SILT & ML SANDY SILTS
 SW WELL GRADED SAND, SW LITTLE FINES



CROSS SECTION B - B'

WAYNE'S BELGRADE

239 WELLS STREET
 BELGRADE, MINNESOTA

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DAHL
 STD No: P:\5000\5741\Drafting\

DATE DRAWN	05/08/00
DRAWN BY	D. Reader
APPROVED BY	
DRAWING NUMBER	B-10-B
PROJECT NUMBER	24975741
FIGURE NUMBER	6c

PLOT DATE 06/22/00

AutoCAD FILE NAME 5741-10B

PLOT SCALE 1"=8'

E. What was the volume of the release? (if known): Unknown gallons

F. When did the release occur? (if known): Unknown

G. Describe source of on-site drinking water.

The building on the property is supplied with municipal drinking water.

PART IV: EXCAVATION INFORMATION

A. Dimensions of excavation:

Length 45 feet Width 23 feet Depth 11 feet

B. Original tank backfill material (sand, gravel, etc.): sand

C. Native soil type (clay, sand, etc.): sand

D. Quantity of contaminated soil removed for treatment (cubic yards):

NA

[Note: If more than 150 cubic yards removed, please attach copy of written approval from MPCA.]

E. Were new tanks installed at the site? (yes/no) If yes, how much soil was excavated to accommodate the installation of the new tanks?

NA

F. Was ground water encountered or a suspected perched water layer or was there evidence of a seasonally high ground water table (i.e. mottling)? (yes/no) At what depth? 8 feet

G. If ground water was not encountered during the excavation, what is the expected depth of ground water? NA

PART VII: SUMMARY

Briefly summarize evidence indicating whether additional investigation is necessary at the site, as discussed in parts VI and VII of "Excavation of Petroleum Contaminated Soil" (fact sheet #3.6). If no further action is recommended, the MPCA staff will review this report following notification of soil treatment.

Three underground storage tanks (USTs) and one dispenser, located on Wayne's Standard Station property in Belgrade, Minnesota, were removed on August 1, 1997. UST #1 and UST #2 both contained gasoline, and had storage capacities of 10,000 gallons and 6,000 gallons, respectively. UST #3 had a capacity of 4,000 gallons, and was used for the storage of diesel fuel.

Soil samples collected from below UST #1 and UST #2 were submitted for laboratory analysis of GRO, MTBE and BETX. The highest level of petroleum compounds detected by laboratory analysis of the soil samples was 940 ppm GRO, 120 ppm xylene, 0.41 ppm toluene and 20 ppm ethyl benzene. Benzene was not detected at concentrations exceeding the method detection limit.

A soil sample collected from below UST #3 and submitted for laboratory analysis of DRO and BETX revealed a DRO concentration of 520 ppm, ethyl benzene concentration of 1.1 ppm and xylene concentration of 6.2 ppm.

A soil sample collected from below the dispenser island and submitted for laboratory analysis of GRO, MTBE, and DRO revealed concentrations of 130 ppm, 0.054 ppm, and 510 ppm, respectively. BTEX analysis of a soil sample collected from beneath the dispenser indicated a benzene concentration of 0.063 ppm benzene, 0.270 ppm ethyl benzene, 170 ppm toluene, and a total xylene concentration of 0.920 ppm.

Based on the above-referenced laboratory results, petroleum hydrocarbon impacts appear to be most concentrated in the vicinity of UST #3 and in the area of the dispenser island.

A DAHL geologist observed groundwater in the UST basin at a depth of 8 feet below grade. A sheen was noted on the groundwater. Approximately 30 yards of soil with organic vapor concentrations greater than the MPCA action level was encountered during the excavation and removed from the basin.

Due to the presence of potentially impacted soil in contact with groundwater and the presence of a sheen on groundwater encountered in the basin, all excavated soil was returned to the UST basin. This delineation decision was made in accordance with guidance provided by MPCA Fact Sheet # 3.6, "Excavation of Petroleum Impacted Soil."

As groundwater in the excavation basin was observed in contact with petroleum impacted soil, DAHL, in accordance with parts VI and VII of MPCA fact sheet #3.6, recommends the initiation of a Limited Site Investigation.

TABLE 2

SOIL SAMPLE LABORATORY ANALYTICAL RESULTS
Waynes Standard (24975719)

DATE	Sample Number	Benzene	Ethyl Benzene	Toluene	Total Xylenes	GRO	MTBE	TPHFO/DRO
08/01/97	B-1	<0.025	<0.025	<0.025	0.029	<2.8	<0.025	NA
	B-2	<0.05	<0.05	<0.05	1.5	150	<0.05	NA
	B-4	<0.2	1.1	<0.2	6.2	NA	NA	520
	B-5	<0.2	20	0.41	120	940	3.6	NA
	B-6	0.063	0.27	0.17	0.92	130	0.054	510

Explanation:

All values are expressed in parts-per-million

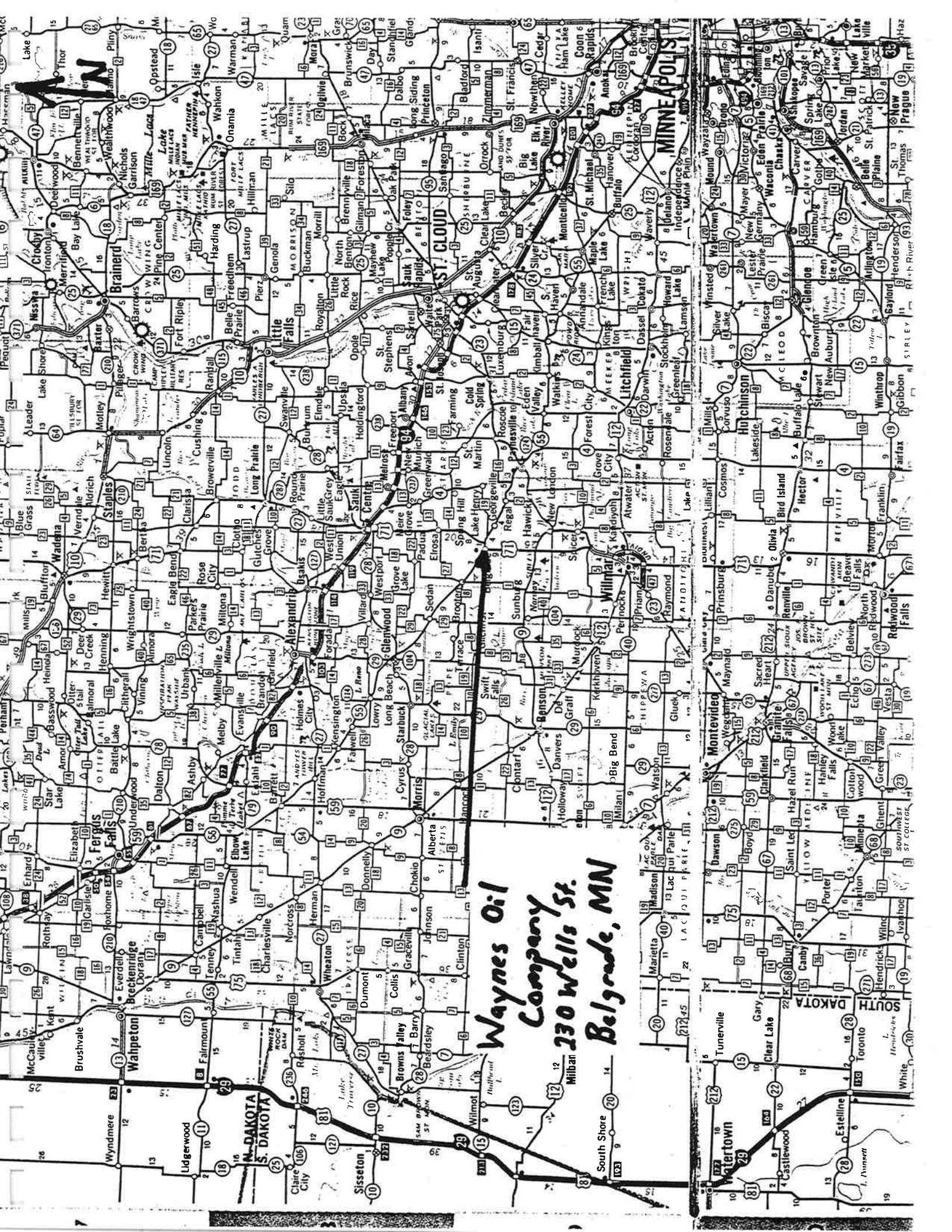
NA = Not Analyzed

GRO = Gasoline Range Organics

DRO = Diesel Range Organics

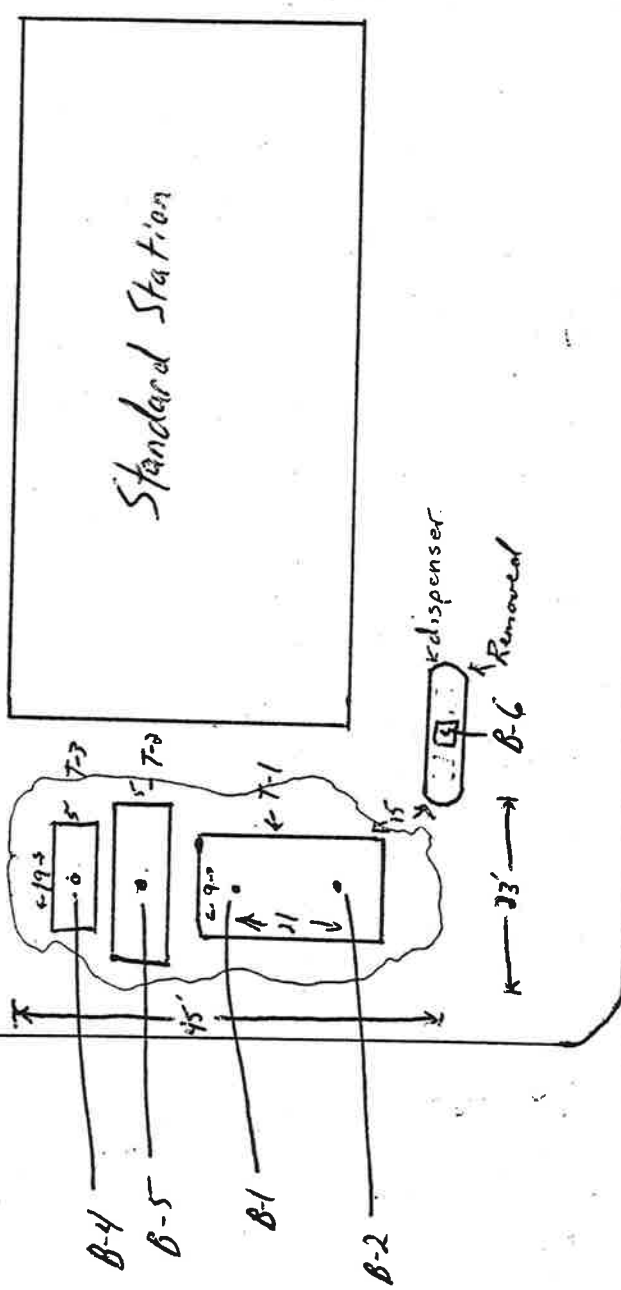
MTBE = Methyl - tert - butyl - ether

DAHL



**Waynes Oil
Company
230 Wells St.
Belgrade, MN**

T-1
 T-2 6,000 gal gas
 T-3 4,000 gal diesel



Standard Station
 230 Wells Street
 Belgrade, MN 56312

LABORATORY RESULTS

Client: Dahl & Associates Date(s) Analyzed: 5/26/98
 Project Name: MATRIX Project #: 98096
 Project Location: Belgrade, MN

ANALYTE	FQL ug/L ¹	TB-1 10-12'	TB-2 10-14'	TB-3 8-12'	TB-4 8-12'	TB-5 8-12'
Benzene ¹	<1.0 ¹	370	<1.0	24	<1.0	17
Toluene	<1.0	4,700	<1.0	4.7	<1.0	14
Ethyl Benzene	<1.0	2,100	<1.0	8.2	<1.0	8.4
Xylenes	<1.0	12,000	<1.0	17	<1.0	9.5
TPH as GRO ⁴	<100.0	34,000	<100.0	750	<100.0	1,100
TPH as Fuel Oil	<250.0	<6200	<250.0	<250.0	<250.0	<250.0
1,4-Bromoflourobenzene ⁵	% rec	90%	89%	84%	84%	94%

- 1 - Water sample results reported in micrograms per liter (ug/L).
 2 - <1.0 represents less than the method practical quantitation limit.
 3 - Analyte results quantified in accordance with US EPA Method 8020 modified.
 4 - TPH as GRO results quantified in accordance with the WDNR Modified GRO Method.
 5 - Surrogate standard added to confirm retention time and concentration accuracy.
 6 - * - Not quantifiable due to sample interference.
 J Estimated Value
 B Compound found in blank

LABORATORY RESULTS

Client: Dahl & Associates

Date(s) Analyzed: 5/26/98

Project Name:

MATRIX Project #: 98096

Project Location: Belgrade, MN

Client Project #:

ANALYTE	PQL mg/kg ¹	TB-1 12-16'	TB-1 16-20'	TB-2 8-12'	TB-2 12-16'	TB-3 8-12'	TB-3 12-16'	TB-4 12-16'	TB-5 8-12'	TB-5 16-20'
Benzene ²	<0.005 ²	2.6	0.077	<0.005	<0.005	6.8	<0.005	<0.005	0.007	<0.005
Toluene	<0.005	6.6	0.23	<0.005	<0.005	*6	<0.005	<0.005	0.011	<0.005
Ethyl Benzene	<0.005	4.0	0.13	<0.005	<0.005	*6	<0.005	<0.005	0.006	<0.005
Xylenes	<0.005	23	0.79	<0.005	<0.005	*6	<0.005	<0.005	0.016	<0.005
TPH as GRO ³	<0.25	230	6.4	<0.25	<0.25	540	<0.25	<0.25	0.56	<0.25
TPH as Fuel Oil	<0.25	<50	<0.62	<0.25	<0.25	<25	<0.25	<0.25	<0.25	<0.25
1,4-Bromofluorobenzene ⁴	% rec	*6	138%	89%	93%	*6	87%	83%	107%	87%

1 -Soil sample results reported in milligrams per kilogram (mg/kg).

2-<0.005 represents less than the method practical quantitation limit.

3 -Analyte results quantified in accordance with US EPA Method 8020 modified.

4 -Surrogate standard added to confirm retention time and concentration accuracy.

5 -TPH as GRO results quantified in accordance with the WDNR Modified GRO Method.

6 - * - Not quantifiable due to sample interference.

Estimated value

B Compound found in blank

LABORATORY RESULTS

Client: Dahl & Associates
Project Name:
Project Location: Belgrade, MN

Date Analyzed: 5/26/98
Matrix Project #: 98096
Client Project #:

QUALITY ASSURANCE/ QUALITY CONTROL DATA

ANALYTE	MATRIX SPIKE	MATRIX SPIKE DUPLICATE	RELATIVE PERCENT DIFFERENCE
	% RECOVERY	% RECOVERY	
Methyl Tert Butyl Ether	95	98	3.1
Benzene	96	97	1.0
Toluene	96	97	1.0
Ethyl Benzene	97	96	1.0
Xylenes	97	97	0.0
1,3,5-Trimethylbenzene	100	98	2.0
1,2,4-Trimethylbenzene	99	98	1.0
TPH as GRO	112	100	11.3
TPH as Fuel Oil	93	117	22.9

DAHL & ASSOCIATES, INC.

Geologic Report: SOIL BORING LOG

Page 1 of 1

Project Name: WAYNES BELGRADE
 Job Number: 2497-5783

HOLE ID: TB-1
 Geologist: J-RYAN

DATE: 5/26/98
 Driller/Co.: MATRIX

Depth (feet)	Sample		Description of Material General	USCS	PID/FID (ppm)	Blow Counts	H2O
	#	Type					
0-8	1	GP	Sand basin	FILL			
8-12	2	GP	Medium-coarse sand, very moist, petroleum odor	SP	40		
*12-16	3	GP	Medium coarse sand, very moist, petroleum odor	SP	1,000+		
16-20	4	GP	Medium coarse sand, brown, wet	SP	18		
*20-24	5	GP	Same soil, wet	SP	ND		
			EOB at 24'				
			GW analyzed BTEX,TPH-FO				
			Soil 12-16', 20-24' for BTEX,TPH-FO				

DRILLING SUMMARY

Drill/Method: GEOPROBE
 Time Start:
 Time Complete:
 Total Time:
 Drilling Rate:

PID/FID INFORMATION

Make: FID
 Model:
 Unit ID:
 ppm Span Gas:
 Time of Calibration:

ELEVATION DATA

Surveyed:
 Surface Elevation:
WATER LEVEL:
 Water level indicated on log: *
 Depth of oxidation on log: ox

DAHL & ASSOCIATES, INC.

Geologic Report: SOIL BORING LOG

Page 1 of 1

Project Name: WAYNES BELGRADE
Job Number: 2497-5783

HOLE ID: TB-2
Geologist: J-RYAN

DATE: 5/26/98
Driller/Co.: MATRIX

Depth (feet)	Sample		Description of Material General	USCS	PID/FID (ppm)	Blow Counts	H2O
	#	type					
0-4	1	GP	Dark brown sandy fill				
4-8	2	GP	Brown, medium coarse sand, moist	SP	0		
*8-12	3	GP	Brown, medium coarse sand with some gravel, wet,	SP	0		
*12-16	4	GP	Same soil, wet	SP	0		
			EOB at 16'				
			GW collected for BTEX, THFO				
			Soil collected 8-12', 12-16 for BTEX, THFO, TPH, Gas				
			Collected DRO duplicate				

DRILLING SUMMARY

Drill/Method: GEOPROBE
Time Start:
Time Complete:
Total Time:
Drilling Rate:

PID/FID INFORMATION

Make: FID
Model:
Unit ID:
ppm Span Gas:
Time of Calibration:

ELEVATION DATA

Surveyed:
Surface Elevation:
WATER LEVEL:
Water level indicated on log: *
Depth of oxidation on log: ox

DAHL & ASSOCIATES, INC.

Geologic Report: SOIL BORING LOG

Page 1 of 1

Project Name: WAYNE'S BELGRADE

HOLE ID: TB-3

DATE: 5/26/98

Job Number: 2497-5783

Geologist: J-RYAN

Driller/Co.: MATRIX

Depth (feet)	Sample		Description of Material General	USCS	PID/FID (ppm)	Blow Counts	H2O
	#	Type					
0-4	1	GP	Sand fill	FILL			
4-8	2	GP	Brown medium coarse sand, moist	SP	0		
*8-12	3	GP	Brown medium coarse sand, some black discoloration at 10-11', strong petroleum odor, wet at 8'	SP	1,000+		
*12-16	4	GP	Brown medium coarse sand, wet	SP	0		
			EOB at 16'				
			GW collected for BTEX, TPH, GAS and FO				
			Soil collected at 8-12', 12-16' for BTEX, TPH, GAS, FO				

DRILLING SUMMARY

Drill/Method: GEOPROBE
 Time Start:
 Time Complete:
 Total Time:
 Drilling Rate:

PID/FID INFORMATION

Make: FID
 Model:
 Unit ID:
 ppm Span Gas:
 Time of Calibration:

ELEVATION DATA

Surveyed:
 Surface Elevation:
WATER LEVEL:
 Water level indicated on log: *
 Depth of oxidation on log: ox

DAHL & ASSOCIATES, INC.

Geologic Report: SOIL BORING LOG

Page 1 of 1

Project Name: WAYNE'S BELGRADE
Job Number: 2497-5783

HOLE ID: TB-5
Geologist: J-RYAN

DATE: 5/26/98
Driller/Co.: MATRIX

Depth (feet)	Sample		Description of Material General	USCS	PID/FID (ppm)	Blow Counts	H2O
	#	Type					
0-4	1	GP	Brown fill	FILL			
*8-12	2	GP	Brown medium coarse sand, wet, slightly petroleum odor	SP	0		
12-16	3	GP	Same soil, wet	SP	5		
*16-20	4	GP	Same soil, wet	SP	ND		
			EOB at 20'				
			GW collected for BTEX, TPH-GAS, FO				
			Soil collected at 8-12', 16-20 for BTEX, TPH-GAS, FO				

DRILLING SUMMARY

Drill/Method: GEOPROBE
Time Start:
Time Complete:
Total Time:
Drilling Rate:

PID/FID INFORMATION

Make: FID
Model:
Unit ID:
ppm Span Gas:
Time of Calibration:

ELEVATION DATA

Surveyed:
Surface Elevation:
WATER LEVEL:
Water level indicated on log: *
Depth of oxidation on log: ox

DAHL & ASSOCIATES, INC.

Geologic Report: SOIL BORING LOG

Page 1 of 1

Project Name: WAYNE'S BELGRADE
Job Number: 2497-5783

HOLE ID: TB-4
Geologist: J-RYAN

DATE: 5/26/98
Driller/Co.: MATRIX

Depth (feet)	Sample		Description of Material General	USCS	PID/FID (ppm)	Blow Counts	H2O
	#	Type					
0-4	1	GP	Sand fill	FILL			
4-8	2	GP	Brown, medium coarse sand, moist	SP	0		
*8-12	2	GP	Same soil, wet at 8'	SP	0		
12-16	3	GP	Same soil, wet	SP	0		
			GW collected for BTEX, TPH-Gas and F.O. Soil collected at 8-12' for BTEX, TPH-GAS and F.O.				

DRILLING SUMMARY

Drill/Method: GEOPROBE
Time Start:
Time Complete:
Total Time:
Drilling Rate:

PID/FID INFORMATION

Make: FID
Model:
Unit ID:
ppm Span Gas:
Time of Calibration:

ELEVATION DATA

Surveyed:
Surface Elevation:
WATER LEVEL:
Water level indicated on log: *
Depth of oxidation on log: ox

DAHL & ASSOCIATES, INC.

Geologic Report: SOIL BORING LOG

Page 1 of 1

Project Name: WAYNE'S OIL

HOLE ID: TB-6

DATE: 7/13/99

Job Number: 2947-5741

Geologist: T-BECKER

Driller/Co.: BOART

Depth (feet)	Sample		Description of Material General	USCS	PID/FID (ppm)	Blow Counts	H2O
	#						
0			Brown, gravely sand, fill	SP	1		
2			Black, sandy silt, trace gravel, trace organics, trace clay	ML	0		
3			Gray, sandy silt, trace gravel,, trace clay	ML	0		
4			Brown, fine to coarse sand with silt, trace gravel,	SP	10		
5			subqangular to round, poorly sorted				
6			Dark brown, fine to medium silty sand, trace gravel, slight petroleum odor wet, 6" recovery	SM	140		*
8			Brown and dark brown, fine to coarse sand, trace gravel, trace silt, black sand in tip, strong petroleum odor,	SP	200		
10							
10	3	SS	Gray and gray-brown, fine to coarse sand with gravel	SP	300		
11			Brown, fine to coarse sand with gravel, mostly carbonates	SP	65		
12			Brown and light brown, fine to coarse gravely sand, poorly sorted, mostly carbonates	GP	0		
15							
14			Brown, fine to coarse gravely sand, trace cobble, poorly sorted, rounded	GP	30		
16			Brown, fine to coarse sand with gravel, poorly sorted, round	SP	0		
18			Same soil				
20							
19			Brown, very fine to fine occasionally medium sand, well sorted	SW	0		
20			Brown, fine to coarse sand, trace gravel, 1' recovery	SP	0		
22			Brown, fine to coarse sand, trace gravel, subround to round, poorly sorted	SP	14		
25							

DRILLING SUMMARY

Drill/Method: HSA-8"
 Time Start: 12:35
 Time Complete: 15:00
 Total Time: 2:25
 Drilling Rate: -

PID/FID INFORMATION

Make: RAE Instrumens
 Model: MINI RAE
 Unit ID: #11
 ppm Span Gas: 100 ppm Isobut.
 Time of: 9:30

ELEVATION DATA

Surveyed:
 Surface Elevation:
WATER LEVEL: 7'
 Water level indicated on log:
 *

DAHL & ASSOCIATES, INC.

Geologic Report: SOIL BORING LOG

Page 2 of 2

Project Name: WAYNE'S OIL
Job Number: 2497-5741

HOLE ID: TB-6
Geologist: T-BECKER

DATE: 7/13/99
Driller/Co.: BOART

Depth (feet)	Sample #	Description of Material		USCS	PID/FID (ppm)	Blow Counts	H2O
		General					
25							
24			Gray-brown, fine to medium occasional coarse sand, trace gravel, fair sorted, round, tight	SP-SW	0		
26			Gray, very fine to fine occasional medium sand, well sorted, tight	SW	0		
28			No recovery, sample washed out	-	-		
30	4	SS	Gray, fine to coarse sand with gravel, trace weathered limestone fragments	SP	0		
			EOB at 32'				
35							
40							
45							
50							

DRILLING SUMMARY

Drill/Method: HSA-8"
Time Start: 12:35
Time Complete: 15:00
Total Time: 2:25
Drilling Rate: -

PID/FID INFORMATION

Make: RAE Instruments
Model: MINI RAE
Unit ID: #11
ppm Span Gas: 100 ppm Isobut.
Time of: 9:30

ELEVATION DATA

Surveyed:
Surface Elevation:
WATER LEVEL: 7'
Water level indicated on log:
*

DAHL & ASSOCIATES, INC.

Geologic Report: SOIL BORING LOG

Page 1 of 1

Project Name: WAYNE'S OIL
Job Number: 24945741

HOLE ID: MW-1
Geologist: T-BECKER

DATE: 7/13/99
Driller/Co.: BOART

Depth (feet)	Sample #	Description of Material General	USCS	PID/FID (ppm)	Blow Counts	H2O
0		Brown, gravely sand, fill	SP	-		
2		Brown and dark brown, fine to coarse sand with gravel, trace silt, poorly sorted	SP	0		
4		Gray-brown, fine to coarse sand, trace gravel, subangular to round, poorly sorted, moist	SP	0		
6	1	SS Brown-gray, fine to coarse sand, poorly sorted, slight petroleum odor	SP	150		
8		No recovery				*
10		Gray, fine to coarse gravely sand, trace cobble, wet-1' recovery	SP	68		
12		Same soil, slight petroleum odor,	SP	12		
13		Brown, fine to coarse sand, trace gravel, fair sorted	SP	12		
14		Same soil, gravel lens at 15.5' mostly carbonates	SP	0		
16	2	SS Brown fine to coarse sand trace gravel, poorly sorted, round	SP	27		
17		Brown, very fine to fine sand occasionally medium, well sorted	SP	27		
20		EOB at 18'				
25		Screen set from 5 to 15'				

DRILLING SUMMARY

Drill/Method: HSA-8"
Time Start: 9:40
Time Complete: 10:15
Total Time: 35 min
Drilling Rate: -

PID/FID INFORMATION

Make: RAE Instruments
Model: MINI RAE
Unit ID: #11
ppm Span Gas: 100 ppm Isobut.
Time of: 9:30

ELEVATION DATA

Surveyed:
Surface Elevation:
WATER LEVEL: 7.5'
Water level indicated on log:
*

DAHL & ASSOCIATES, INC.

Geologic Report: SOIL BORING LOG

Page 1 of 1

Project Name: WAYNE'S OIL

HOLE ID: MW-2

DATE: 7/13/99

Job Number: 2497-5741

Geologist: T-BECKER

Driller/Co.: BOART

Depth (feet)	Sample		Description of Material General	USCS	PID/FID (ppm)	Blow Counts	H2O
	#						
0			Dark brown and brown, fine to medium gravely sand, fill	SP	-		
1			Black and dark brown, sandy silt, trace organics, trace gravel	ML	-		
2			Same soil				
3			Brown and red brown, fine to coarse sand, trace gravel, trace cobble, poorly sorted	SP	0		
4			Brown and light brown, fine to coarse gravely sand, trace Fe stain	GP	0		
6	5	SS	Brown, fine to coarse sand with gravel, Wet at 7'	SP	0		*
7			No recovery	-	-		
10			Brown fine to medium occasional coarse sand, trace gravel, round fair sorted	SP-SW	0		
12			Same soil, gravel lens at 12.8'-13.2',	SP	0		
14	6	SS	Same soil	SP	0		
15			EOB 16'				
20			Screen set from 5'-15'				
25							

DRILLING SUMMARY

Drill/Method: HSA-8'
 Time Start: 16:30
 Time Complete: 17:00
 Total Time: 0.30
 Drilling Rate: -

PID/FID INFORMATION

Make: RAE Instruments
 Model: MINI RAE
 Unit ID: #11
 ppm Span Gas: 100 ppm Isobut
 Time of: 9:30

ELEVATION DATA

Surveyed:
 Surface Elevation:
WATER LEVEL: 7'
 Water level indicated on log:
 *

DAHL & ASSOCIATES, INC.

Geologic Report: SOIL BORING LOG

Page 1 of 1

Project Name: WAYNES OIL

HOLE ID: MW-3

DATE: 7/14/99

Job Number: 2497-5741

Geologist: T-BECKER

Driller/Co.: BOART

Depth (feet)	Sample		Description of Material General	USCS	PID/FID (ppm)	Blow Counts	H2O
	#						
0			Brown, gravely sand, fill	SP	-		
2			Black to gray, sandy silt, trace gravel	ML	0		
4			Brown, fine to medium occasional coarse sand, trace gravel, moist	SP	0		
5.5			Brown, fine to coarse sand with gravel wet	SP	0		
6	7	SS	Same soil, silty in part	SP	0		
8			Brown fine to coarse gravely sand, poorly sorted, round	GP	0		
10			Same soil	GP	0		
12			Brown, fine to coarse sand with gravel, poorly sorted, round	SP	0		
14	8	SS	Same soil	SP	0		
15			EOB 16'				
20			Screen set from 4.5-14.5				
25							

DRILLING SUMMARY

Drill/Method: HSA-8"
 Time Start: 7:30
 Time Complete: 8:00
 Total Time: .30
 Drilling Rate: -

PID/FID INFORMATION

Make: RAE Instruments
 Model: MINI RAE
 Unit ID: #11
 ppm Span Gas: 100 ppm Isobut.
 Time of: 7:20

ELEVATION DATA

Surveyed:
 Surface Elevation:
WATER LEVEL: 5.5'
 Water level indicated on log:
 *

DAHL & ASSOCIATES, INC.

Geologic Report: SOIL BORING LOG

Page 1 of 1

Project Name: WAYNE'S OIL

HOLE ID: MW-4

DATE: 7/14/99

Job Number: 24975741

Geologist: T-BECKER

Driller/Co.: BOART

Depth (feet)	Sample		Description of Material		USCS	PID/FID (ppm)	Blow Counts	H2O
	#		General					
0				Brown, gravely sand, fill	GP	-		
1				Black, sandy silt	ML	0		
2				Black, sandy silt, trace gravel, trace organics	ML	0		
3				Brown and Red brown, fine to coarse sand with gravel	SP	0		
4				Brown, fine to coarse sand with gravel, poorly sorted,	SP	0		
5				round				
6	9	SS		Red brown to light brown, fine to coarse sand, trace	SP	0		
				gravel, poorly sorted, round, wet at 7'				
8				Brown, fine to coarse sand, trace gravel	SP	0		*
10				Brown and gray brown, fine to coarse gravely sand,	GP	0		
				poorly sorted round				
12				Same soil	GP	0		
13				Light gray brown, very fine to fine sand, well sorted	SW	0		
14				Same soil, trace gravel	SW	0		
15	10	SS		Brown, sandy gravel	SP	0		
				EOB 16'				
				Screen set from 5'-15'				
20								
25								

DRILLING SUMMARY

Drill/Method: HSA-8"
 Time Start: 8:45
 Time Complete: 9:15
 Total Time: .30
 Drilling Rate: -

PID/FID INFORMATION

Make: RAE Instruments
 Model: MINI RAE
 Unit ID: #11
 ppm Span Gas: 100 ppm Isobut.
 Time of: 7:20

ELEVATION DATA

Surveyed:
 Surface Elevation:
WATER LEVEL: 7'
 Water level indicated on log:
 *