Great Lakes Legacy Act

Tannery Bay/Wetland Sediment Remediation Dafter Sanitary Landfill - Preferred Disposal Cannelton Site, Sault Ste. Marie, Michigan

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BPAC Presentation - July 20, 2005

Presentation Agenda

- Tannery Bay/Wetland Remediation - Project Status Report
- Dafter Landfill Presentation
- Landfill Leachate/POTW Discharge
- Sediment Waste Characterization
- Summary

Tannery Bay/Wetland Remediation Project Status Report

- July 15, 2005 - Contractor Bids Received
- July 18-August 2, 2005 - Bid Evaluation Period
- August 3, 2005 - Bid Review/Award Meeting

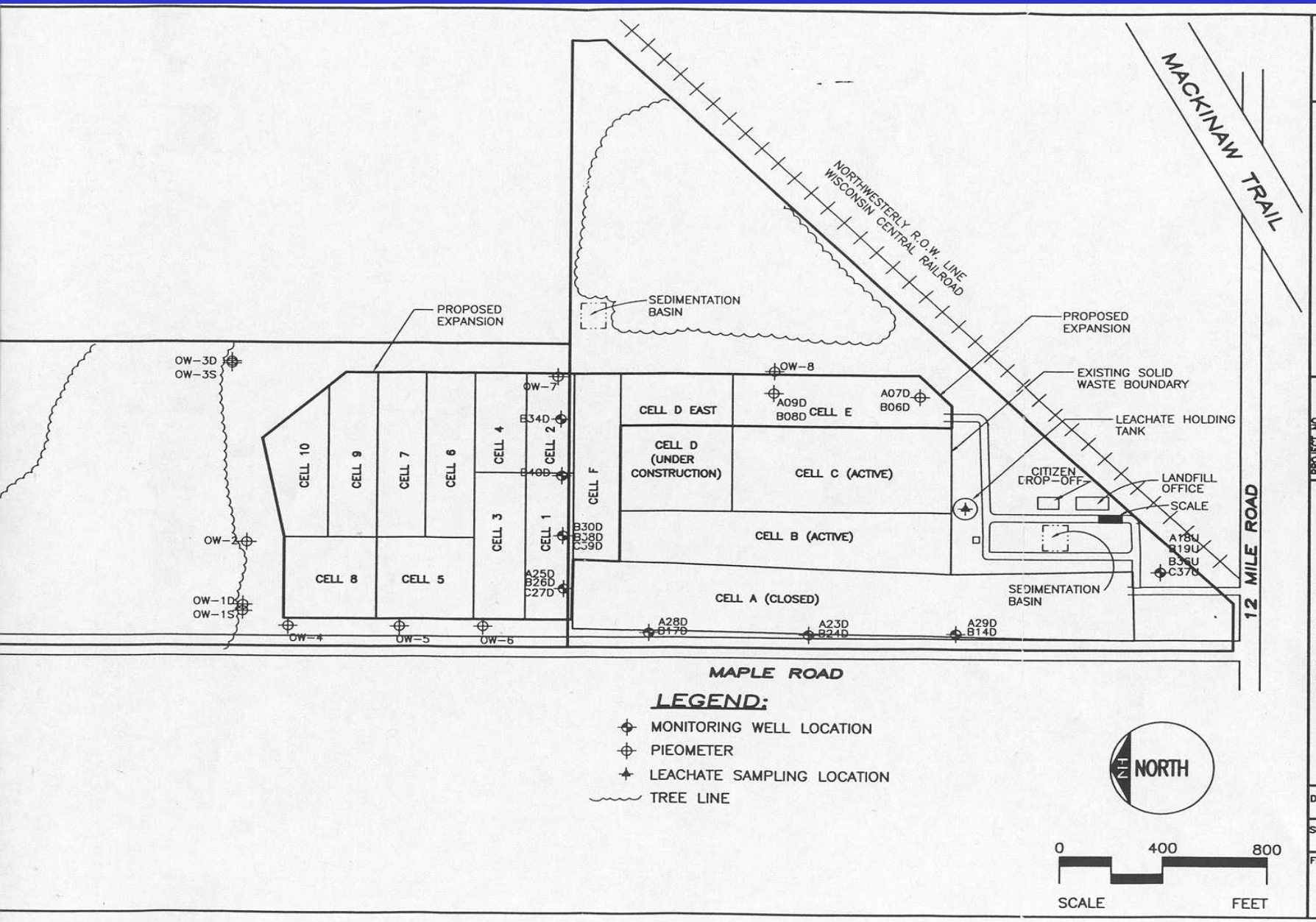
Tentative

- Mid August - Public/Project Meeting
- Late August - Contractor Mobilization
- September to November - Remedial Activities (dredging, dewatering, off-Site disposal)

Dafter Sanitary Landfill

- Situated in the west half of the SW corner of Section 33, Township 46 North, Dafter Landfill, Chippewa County
- Type II sanitary landfill in accordance with Part 115 Administrative Rules for the State of Michigan
- Obtained an Expansion Permit in 2004 for the development of an additional 40 acres (independent of Tannery Bay Remedial Action)

Site Plan & Well Location Map - Dafter Landfill



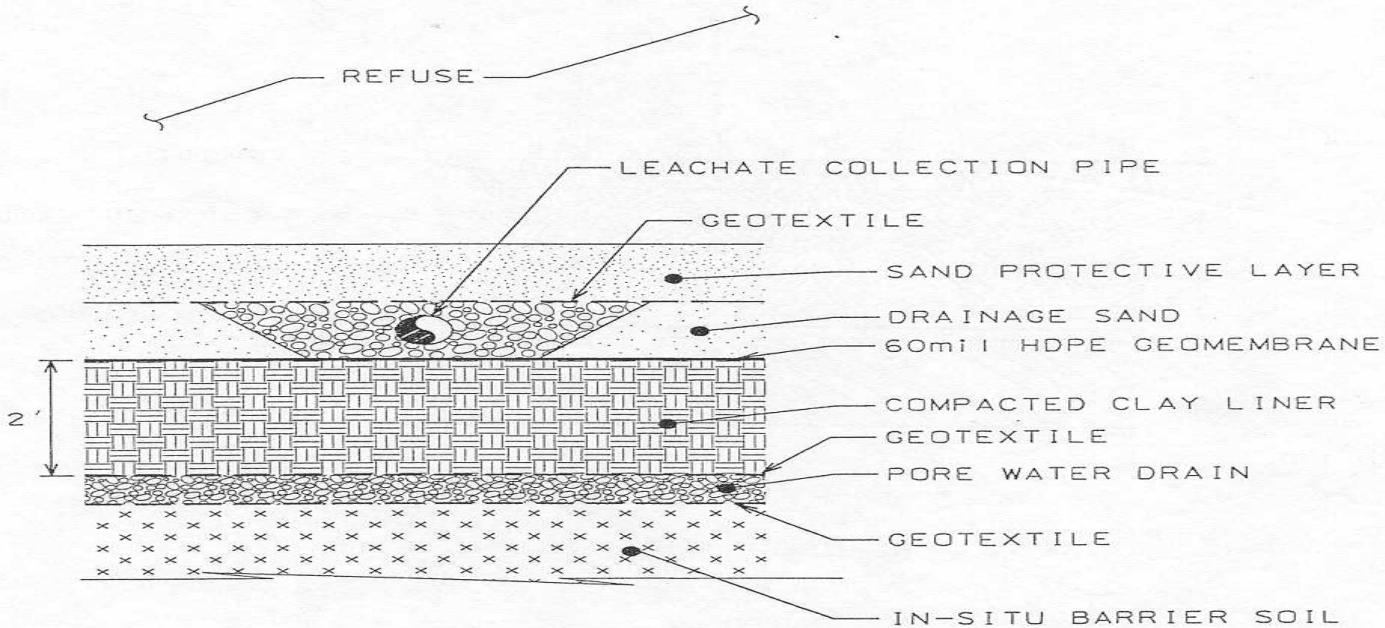
NTH Consultants, Ltd.
Professional Engineering & Environmental Services
Farmington Hills Detroit Exton Grand Rapids Lansing

PROJECT NO. 13-000289-01
SCALE: AS SHOWN
DRAWN BY: NAR
CHECKED BY: KLW

SITE PLAN AND WELL LOCATION MAP
DAFTER SANITARY LANDFILL
DAFTER, MICHIGAN

DATE: 03-16-01
SHEET 1 OF 1
FIGURE: 2

Base Liner - Dafter Sanitary Landfill



LANDFILL BASE LINER

SCALE IN FEET

0 1 2

RECEIVED

APR 27 2001

ENVIRONMENTAL QUALITY
LAND & WATER MGMT - PCU

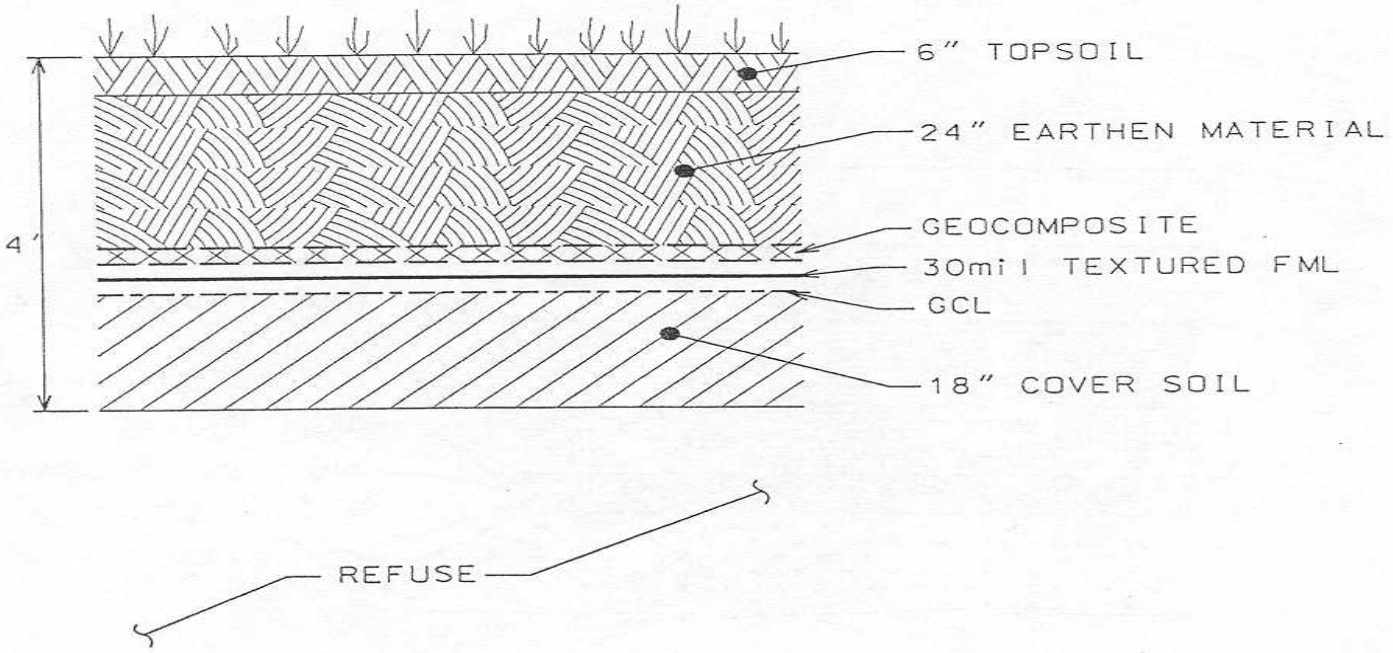
FILE: DFTRPETLOOP
DATE: 4/25/01 JWT

WASTE MANAGEMENT INC. - DAFTER LANDFILL

Wenck

APRIL 2001

Final Landfill Cap - Dafter Sanitary Landfill



FINAL LANDFILL CAP – ALTERNATIVE 1

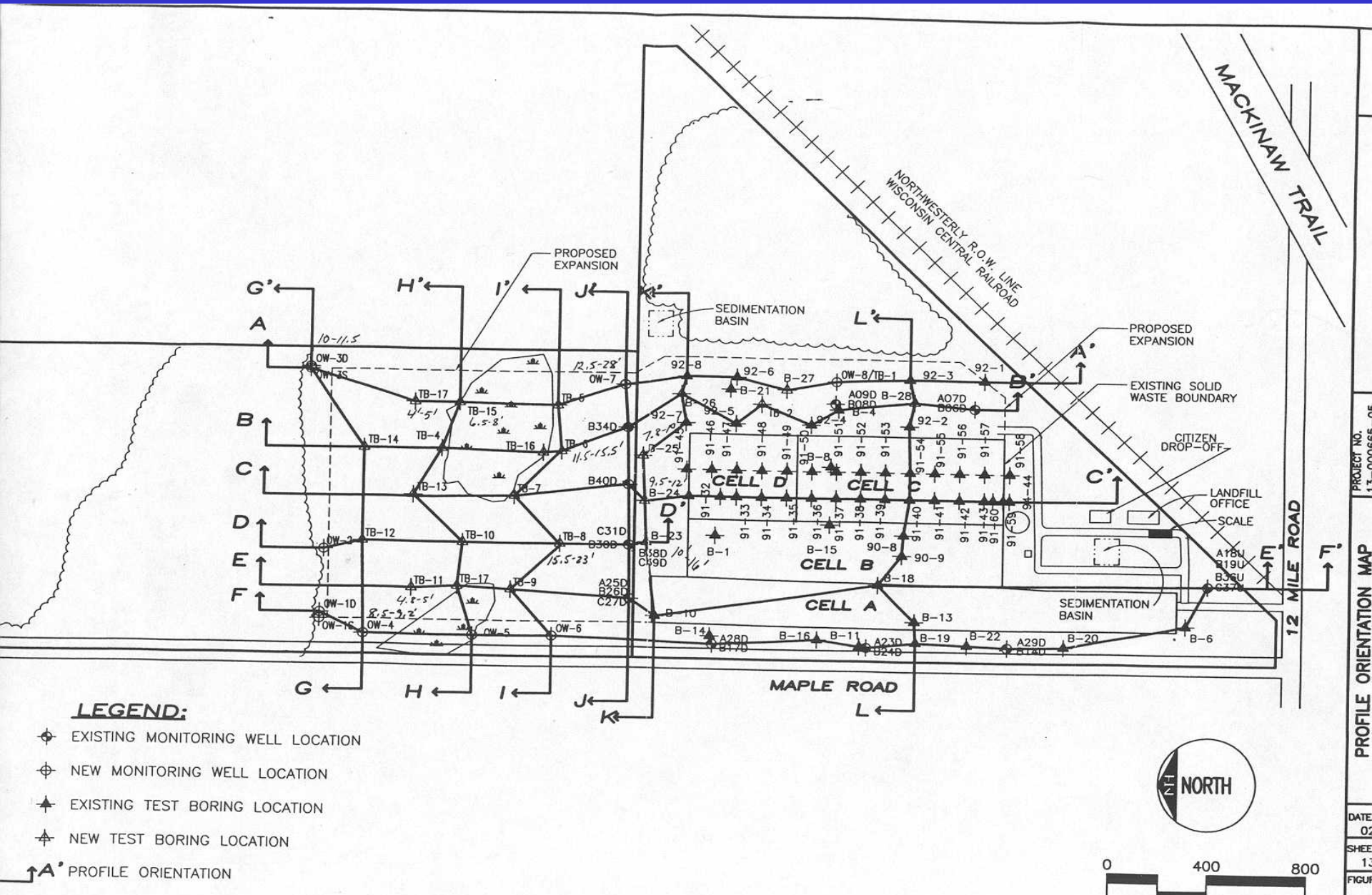
SCALE IN FEET

0 1 2

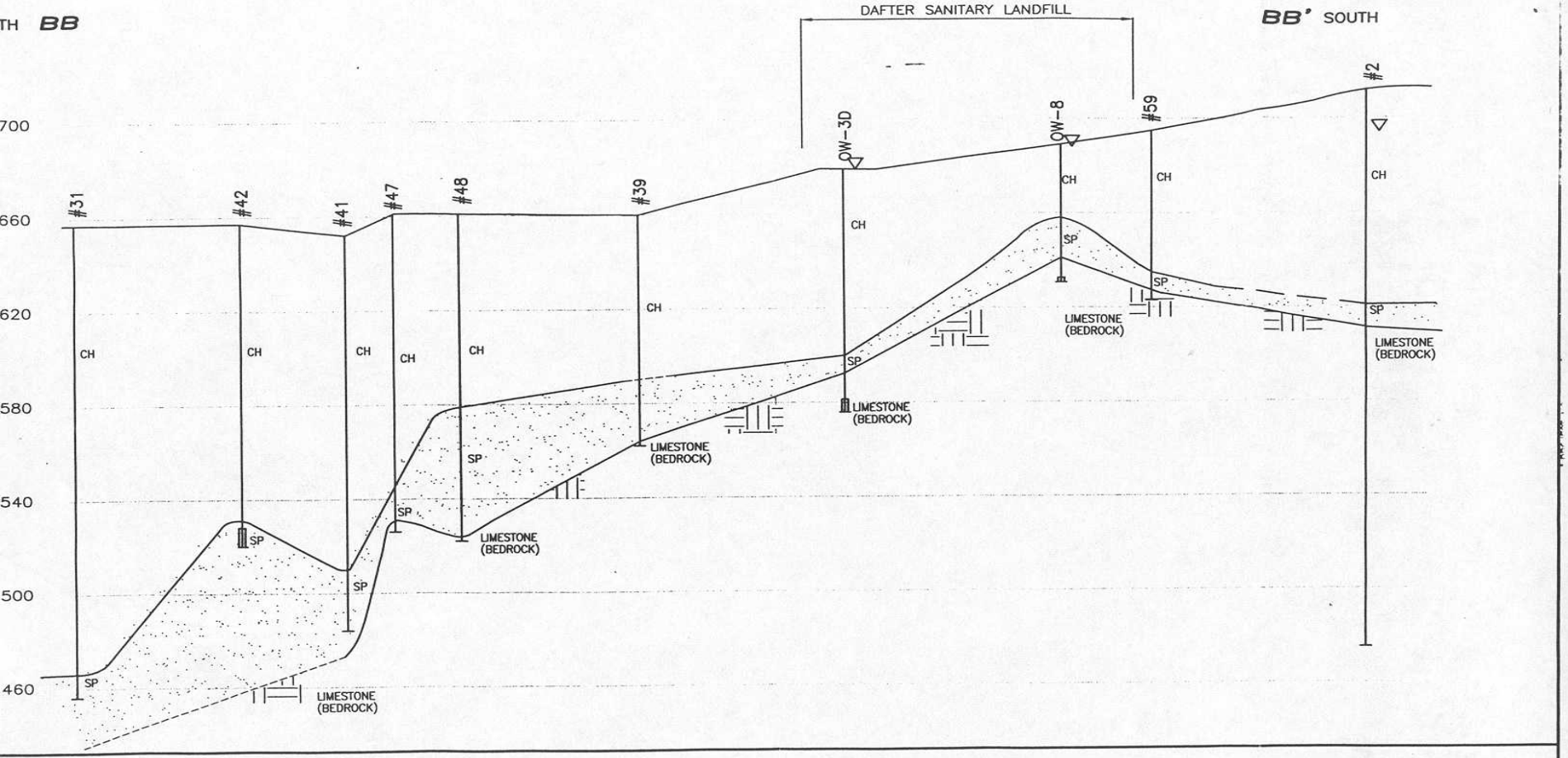
NATURE OF SOILS BENEATH THE LANDFILL DAFTER SANITARY LANDFILL

- Classified as “CH” soil under Unified Soil Classification System
- CH soil is a fat clay (i.e., consistency of play dough)
- Clay thickness ranges from 10 to 80 feet

Geology Profile/Orientation Map - Dafter Sanitary Landfill



Regional Geologic Profile (North -South) - Dafter Landfill



LEGEND:

▽ STATIC WATER LEVEL

] WELL SCREEN INTERVAL

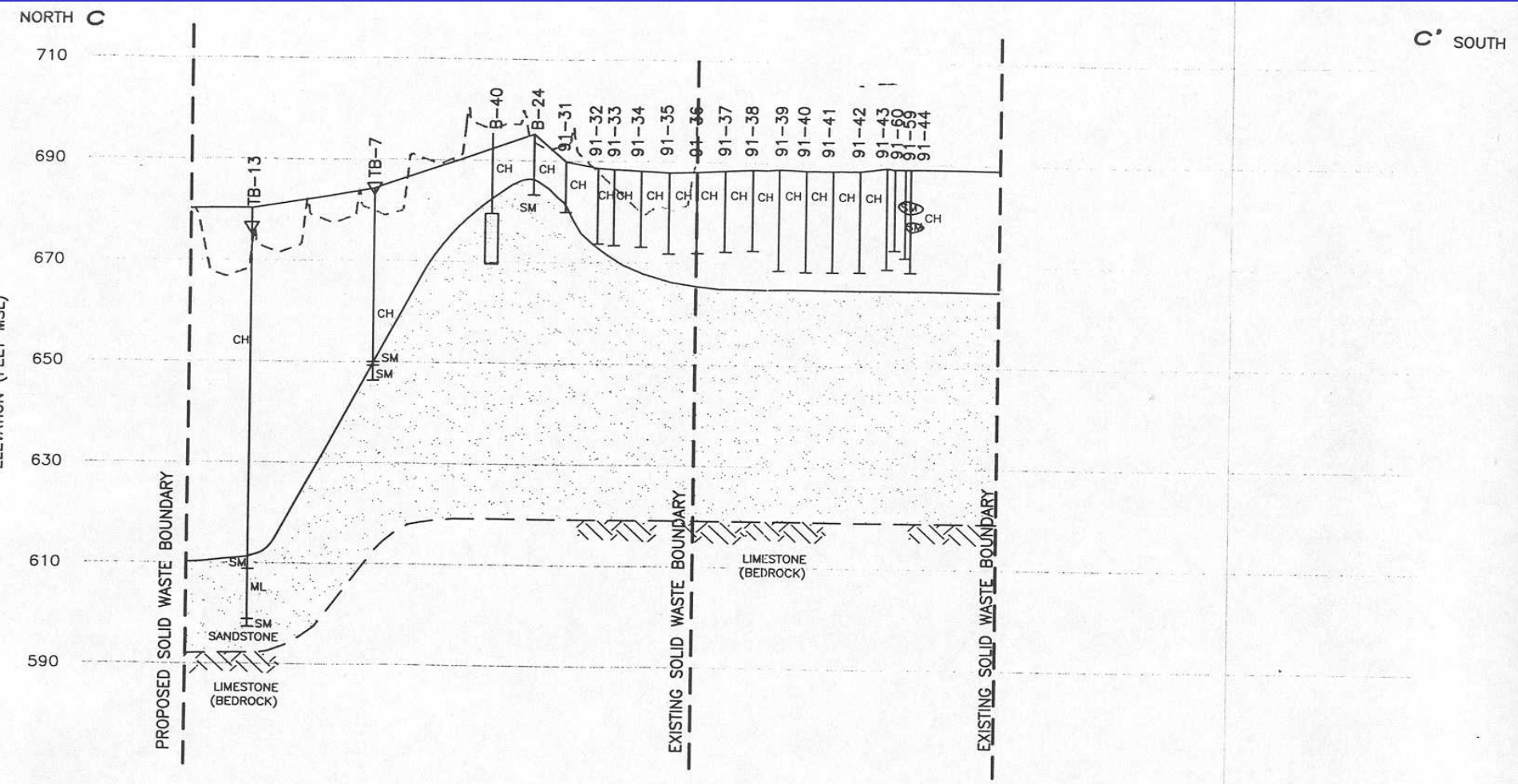
NOTES:

1. PROFILE IS GENERALIZED. SOIL CONTACTS BETWEEN BORINGS ARE INFERRED. FOR ACTUAL CONDITIONS REFER TO ORIGINAL TEST BORING LOGS.
2. SURFACE ELEVATIONS ARE REFERENCED TO MEAN SEA LEVEL.
3. SOIL DATA FROM WELLS #62 AND #68 DOES NOT FIT WITH THE REGIONAL PROFILE. BORINGS INFORMATION WAS USED TO DEPICT THE TOP OF BEDROCK ELEVATION.

SCALE:
HORIZONTAL: 1"=1000'
VERTICAL: 1"=40'

Regional Geologic Profile

Generalized Geologic Cross Section - Dafter Landfill



LEGEND:

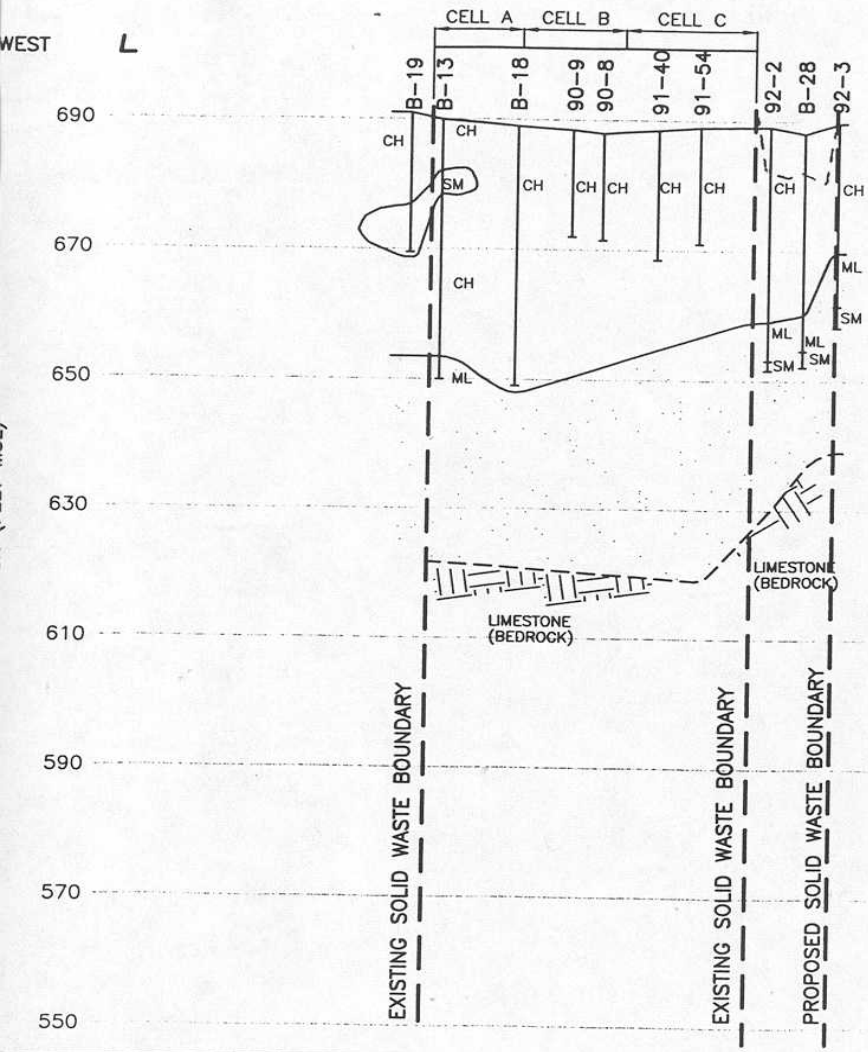
- WELL SCREEN INTERVAL
- POTENTIOMETRIC SURFACE
- PROPOSED LANDFILL SUBGRADES

NOTES:

1. PROFILE IS GENERALIZED. SOIL CONTACTS BETWEEN BORINGS ARE INFERRED. FOR ACTUAL CONDITIONS REFER TO ORIGINAL TEST BORING LOGS.
2. SURFACE ELEVATIONS ARE REFERENCED TO MEAN SEAL LEVEL.

SCALE:
HORIZONTAL: 1"=400'
VERTICAL: 1"=20'

Generalized Geologic Cross Section - Dafter Landfill



LEGEND:

WELL SCREEN INTERVAL

POTENTIOMETRIC SURFACE

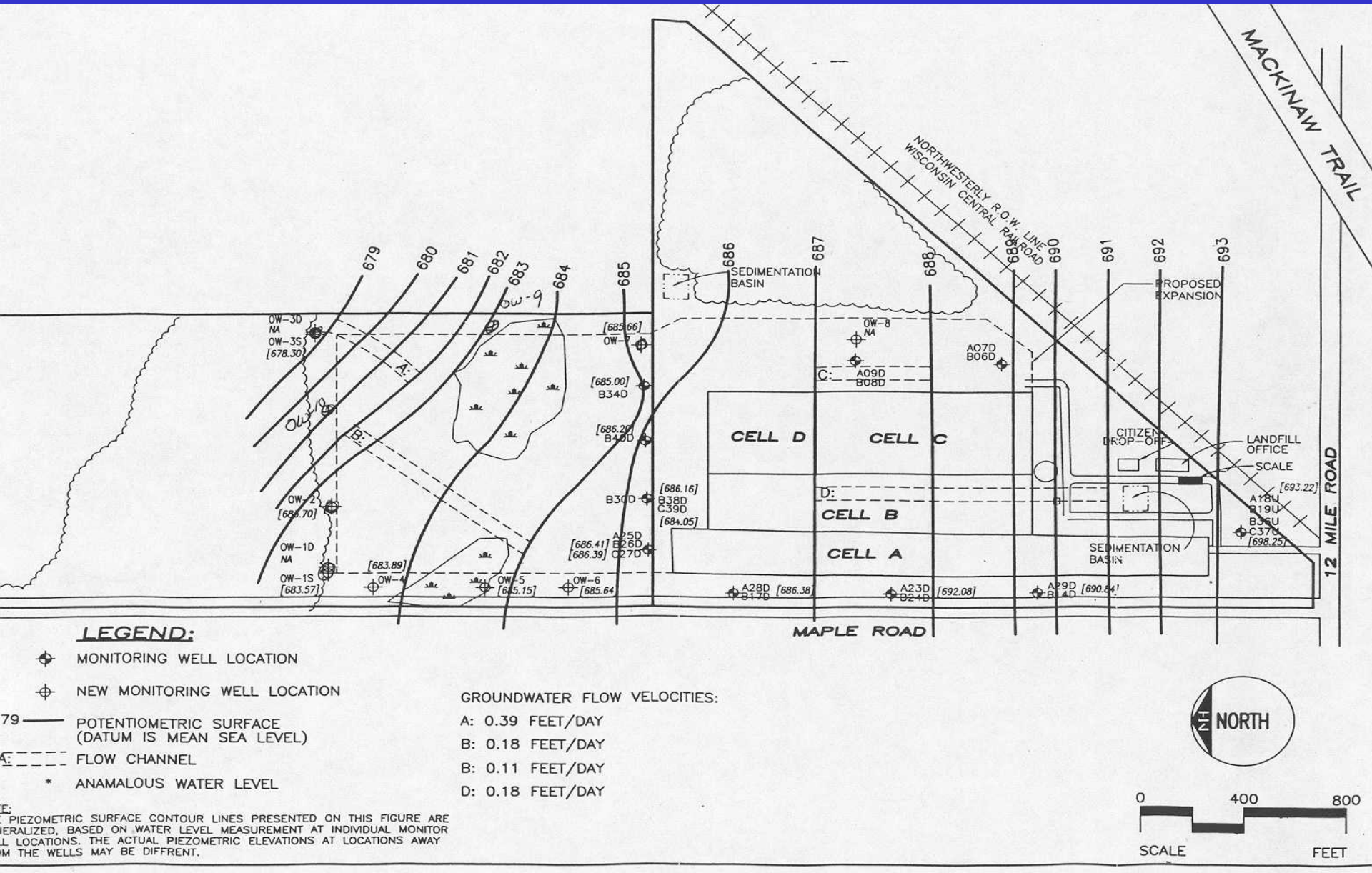
PROPOSED LANDFILL SUBGRADES

NOTES:

1. PROFILE IS GENERALIZED. SOIL CONTACTS BETWEEN BORINGS ARE INFERRED. FOR ACTUAL CONDITIONS REFER TO ORIGINAL TEST BORING LOGS.
2. SURFACE ELEVATIONS ARE REFERENCED TO MEAN SEA LEVEL.

SCALE:
HORIZONTAL: 1"=400'
VERTICAL: 1"=20'

Hydrogeology/Groundwater Contour Map - Dafter Sanitary Landfill



LEGEND:

- MONITORING WELL LOCATION
- NEW MONITORING WELL LOCATION
- 679 —— POTENTIOMETRIC SURFACE (DATUM IS MEAN SEA LEVEL)
- A: - - - - FLOW CHANNEL
- * ANAMALOUS WATER LEVEL

GROUNDWATER FLOW VELOCITIES:

A: 0.39 FEET/DAY

B: 0.18 FEET/DAY

B: 0.11 FEET/DAY

D: 0.18 FEET/DAY

E:
PIEZOMETRIC SURFACE CONTOUR LINES PRESENTED ON THIS FIGURE ARE IERALIZED, BASED ON WATER LEVEL MEASUREMENT AT INDIVIDUAL MONITOR L LOCATIONS. THE ACTUAL PIEZOMETRIC ELEVATIONS AT LOCATIONS AWAY M THE WELLS MAY BE DIFFRENT.

NORTH

0 400 800

SCALE FEET

Groundwater and Surface Water Dafter Sanitary Landfill

- Groundwater flow is to the north.
- Groundwater is sampled/reported quarterly.
- MDEQ inspects the landfill quarterly.
- MDEQ also conducts split (independent) sampling annually.
- No evidence of groundwater or surface water contamination from landfill activities.

Groundwater Monitoring
Dafter Landfill

			MDEQ SAMPLING DATA 04-05			
	MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY					
	WASTE AND HAZARDOUS MATERIALS DIVISION					
FACILITY:	Dafter Landfill	YEAR:	04	STAFF: C.SMITH		ug/l unless noted
	PARAMETER	201 LIMIT	WELL B36U	WELL B40D		
			bold=over 201			
	Arsenic	50	1.9	<1		
	Boron	500	31	27		
	Cadmium	5	<1	<1		
	Copper	1400	<1	<1		
	Chromium	100	<1	<1		
	Iron	300	100	<20		
	Manganese	860	37	30		
	Antimony	6	<1	<1		
	Lead	4	<1	<1		

Surface Water Monitoring - Dafter Sanitary Landfill

			SELECTED PARAMETERS FROM			
			WAISKA RIVER SAMPLES June 2004			
			MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY			
			WASTE AND HAZARDOUS MATERIALS DIVISION			
FACILITY:	Dafter Landfill	YEAR:	2004	STAFF:	C. SMITH	ug/l unless noted
SAMPLE LOCATION	PARAMETER	LOCATION (U,D,S)	STAT & 201 LIMIT	Jun-04 bold=over 201		
R01U	Arsenic	U	50	<1		
	Cadmium		190000	<0.2		
	Chromium		120	2.3		
	Copper		790	2.4		
	Iron mg/l		N/A	1.1		
	Manganese		3600	63		
	Nickel		2600	3.3		
	Lead		190	<1		
RO2D	Arsenic	D	50	<1		
	Cadmium		190000	<0.2		
	Chromium		120	1.4		
	Copper		790	1.3		
	Iron mg/l		N/A	0.47		
	Manganese		3600	48		
	Nickel		2600	3.9		
	Lead		190	<1		
R03D	Arsenic	D	50	1.2		
	Cadmium		190000	<0.2		
	Chromium		120	2.7		
	Copper		790	2.1		
	Iron mg/l		N/A	3.2		
	Manganese		3600	88		
	Nickel		2600	3.0		
	Lead		190	<1		

Leachate Monitoring
Dafter Sanitary Landfill

- Leachate from the leachate collection system is extracted from the landfill.
- Approximately 16,000 gallons of leachate is transferred daily to the POTW for treatment.
- Leachate is analyzed quarterly.

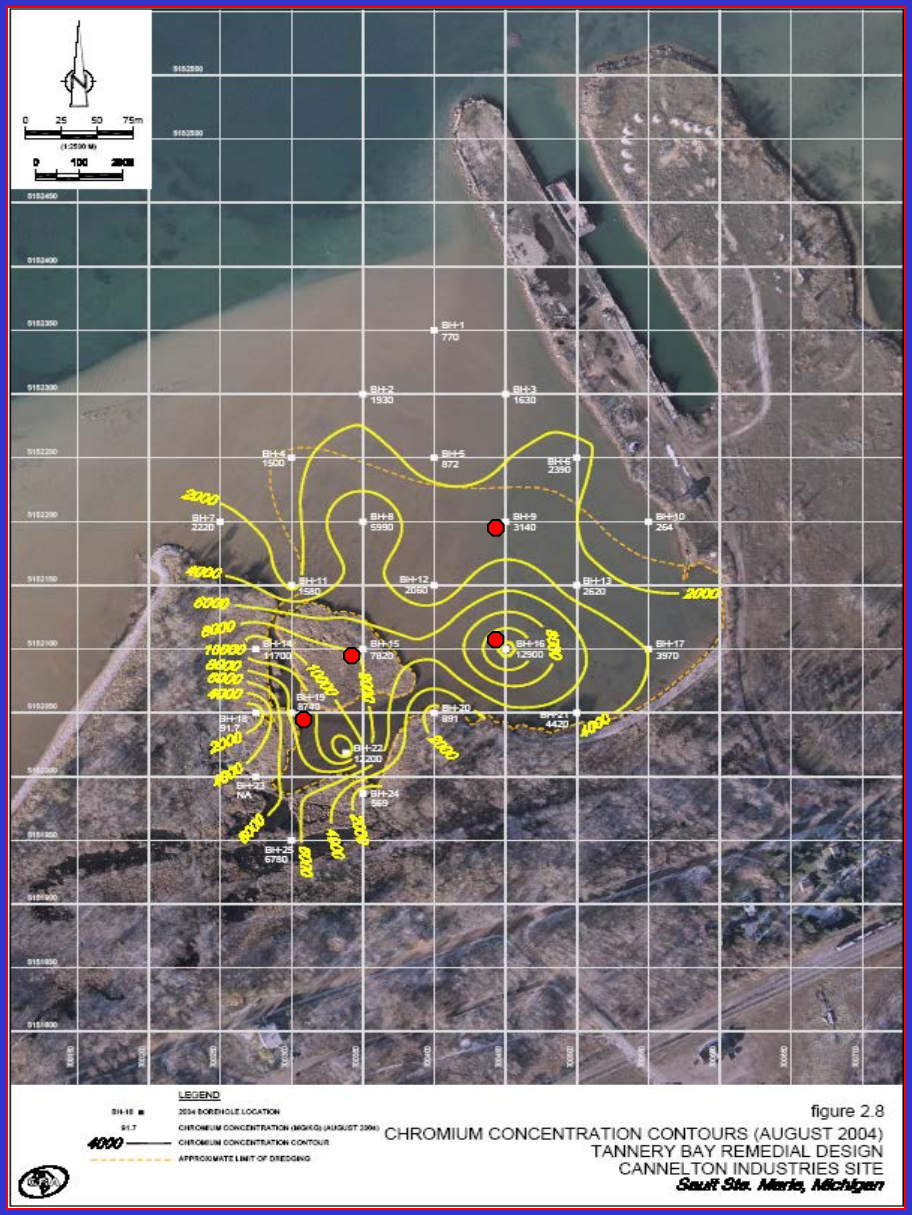
Leachate Monitoring
Dafter Sanitary Landfill

			SELECTED PARAMETERS FROM			
			LEACHATE SAMPLE Oct-04			
		MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY				
		WASTE AND HAZARDOUS MATERIALS DIVISION				
FACILITY:	Dafter Landfill	YEAR:	2004	STAFF:	C. SMITH	ug/l unless noted
SAMPLE	PARAMETER	Oct-04				
LEACHATE	Arsenic	56				
	Cadmium	2				
	Hex Chromium	<10				
	Chromium	250				
	Mercury	<0.2				
	Lead	3.7				

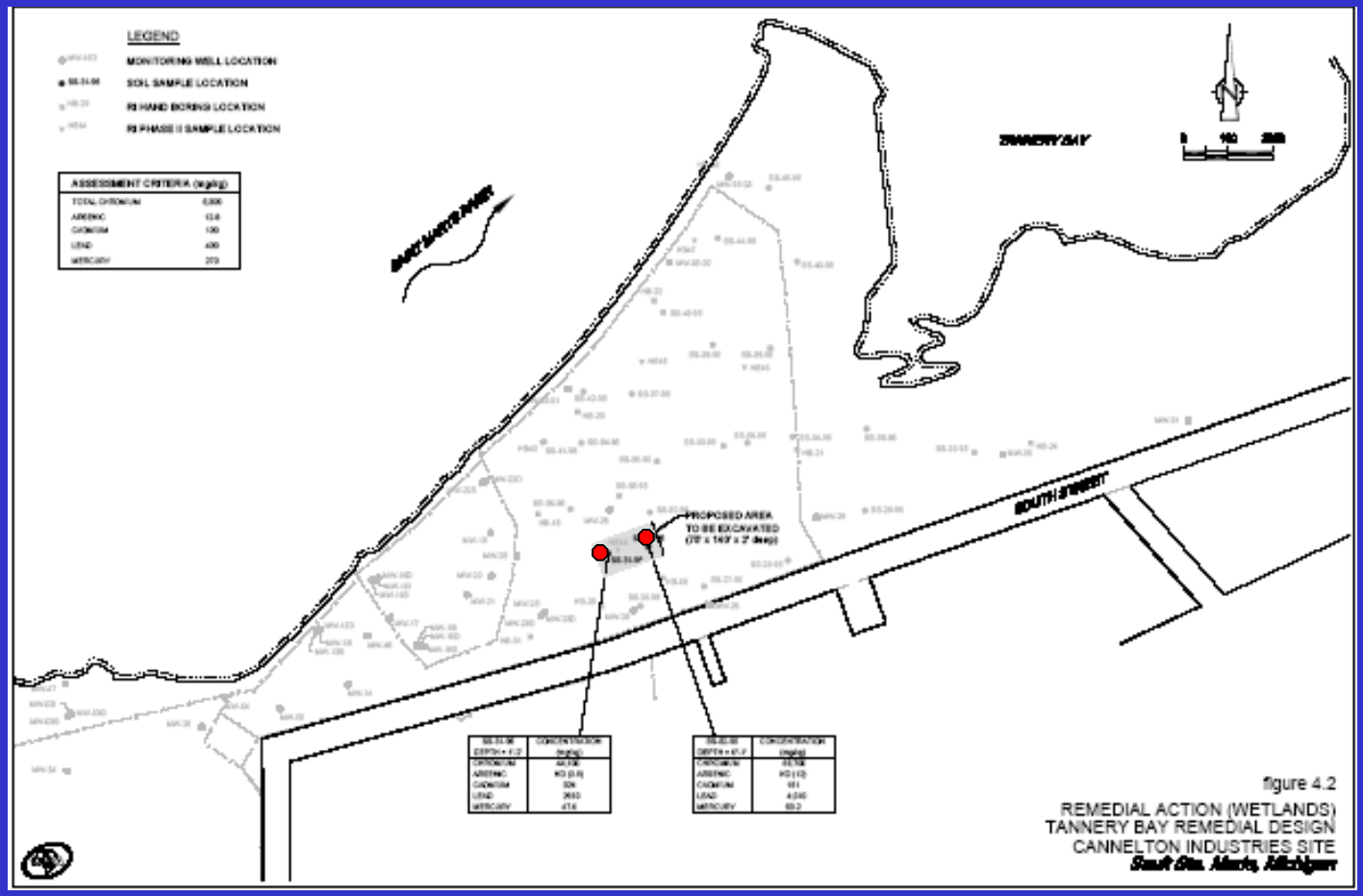
POTW Effluent Quality

Sample I.D.	001A (ug/L)	
Parameter *Sample Date*	5/15/2003 - 5/16/2003	11/5/2003 - 11/6/2003
Arsenic	<1	<1
Cadmium	<.2	<.2
Chromium	1.3	2
Hexavalent Chromium	<5	<5
Lead	1.4	1.9
Mercury	9.1 to 12 ng/L	

Waste Characterization –Tannery Bay



Waste Characterization –Wetlands



Sediment Waste Characterization

			Tannery Bay				*Wetlands*	
Sample Location:			***BH9***	***BH15***	***BH16***	***BH19***	***SS31-95***	***SS52-95***
Sample ID:			***RB-023***	***RB-017A***	***RB-006B***	***RB-014A***		
Sample Date:			***8/13/2004***	***8/13/2004***	***8/11/2004***	***8/12/2004***	***6/8/2005***	***6/8/2005***
Parameters	***Units***	1999 Performance Soil Standard						
Total Metals (1)								
Arsenic	mg/kg	100	3.8	6.2	5.0	7.6	ND	ND
Cadmium	mg/kg	2,300	2.0	4.7 J	5.3	8.8	160	118
Chromium Total	mg/kg	1,000,000	3140	7820	12900 J	8740 J	33500	30000
Lead	mg/kg	1,500	32.6	107	131	102	614	1250
Mercury	mg/kg	1,400	0.54	2.0	0.94	1.0	1.1	1.1
Sample Location:			***BH9***	***BH15***	***BH16***	***BH19***	***SS31-95***	***SS52-95***
Sample ID:			***SM-001***	***SM-003***	***SM-002***	***SM-004***	***SM-005***	***SM-006***
Sample Date:			***6/8/2005***	***6/8/2005***	***6/8/2005***	***6/8/2005***	***6/8/2005***	***6/8/2005***
		TCLP Hazardous Criteria a						
Metals - Leachate								
Arsenic	mg/L	5	0.019	0.0055	0.019	0.010	ND (0.50)	0.014
Cadmium	mg/L	1	0.0073	0.0026	0.0067	0.022	0.042	0.00033
Chromium Total	mg/L	5	0.53	0.17	0.72	0.96	0.52	0.073
Lead	mg/L	5	0.031	0.0087	0.027	0.019	0.22	0.011
Mercury	mg/L	0.2	ND (0.0020)	ND (0.0020)	ND (0.0020)	ND (0.0020)	0.000046	ND (0.0020)
General Chemistry								
Total Organic Carbon (TOC)	mg/kg	-	26	68	19	99	94	280
Total Solids	%	-	75.6	46.5	68.8	22.3	24.2	20.7

Wood Waste Characterization

Sample Location:			*NW Corner*	*SE Corner*	*SW Corner*	*BH8*	*BH15*	*BH16*	*BH20*	*BH22*
Sample ID:			*RB-030*	*RB-032*	*RB-031*	*SM-008*	*SM-010*	*SM-007*	*SM-011*	*SM-009*
Sample Depth:			*-*	*-*	*-*	*-*	*-*	*-*	*-*	*-*
Sample Date:			*8/13/2004*	*8/13/2004*	*8/13/2004*	*6/8/2005*	*6/8/2005*	*6/8/2005*	*6/8/2005*	*6/8/2005*
Parameters	*Units*	1999 Performance Soil Standard								
Total Metals										
Arsenic	mg/kg	100	2.5	7.7	ND	10.4	1.8	2.5	0.75	1.8
Cadmium	mg/kg	2,300	0.39	0.58 B	0.22 B	1.1	0.10	0.15	0.060	.31
Chromium Total	mg/kg	1,000,000	156	478	125	197	58.6	80.9	7	139
Lead	mg/kg	1,500	ND	ND	ND	3.4	1.1	1.4	0.16	2.1
Mercury	mg/kg	1,400	ND	ND	ND	0.041	0.015	ND (0.26)	ND (0.13)	0.030
Metals - Leachate (TCLP)										
Arsenic	mg/L	5	-	-	-	0.0031	0.0030	0.0040	0.0040	0.0050
Cadmium	mg/L	1	-	-	-	0.00061	0.00086	0.00099	0.0011	0.0011
Chromium Total	mg/L	5	-	-	-	0.0089	0.027	0.028	0.0093	0.015
Lead	mg/L	5	-	-	-	0.0017	0.0020	0.0059	0.0022	0.0024
Mercury	mg/L	0.2	-	-	-	ND (0.0020)	0.000054	0.000046	0.000030	0.000061
General Chemistry										
Total Solids	%	-	-	-	-	27.2	65.9	31.2	62.5	28.0

Conclusion/Summary

- Dafter landfill is a licensed Type II Sanitary Landfill.
- Groundwater/surface water monitoring do not identify any impacts as a result of the Dafter Landfill.
- The leachate from the landfill is shipped to, and effectively treated by, the SSM Wastewater Treatment Plant.
- 1999 (and 2005) RA waste are both classified as non-hazardous waste.
- 2005 waste is destined for the same or adjacent cell within the Dafter Landfill (Cell C or D) as waste disposed of in 1999.
- Dafter Landfill is the selected landfill for the 2005 Tannery Bay/Wetland Sediment Remedial Action