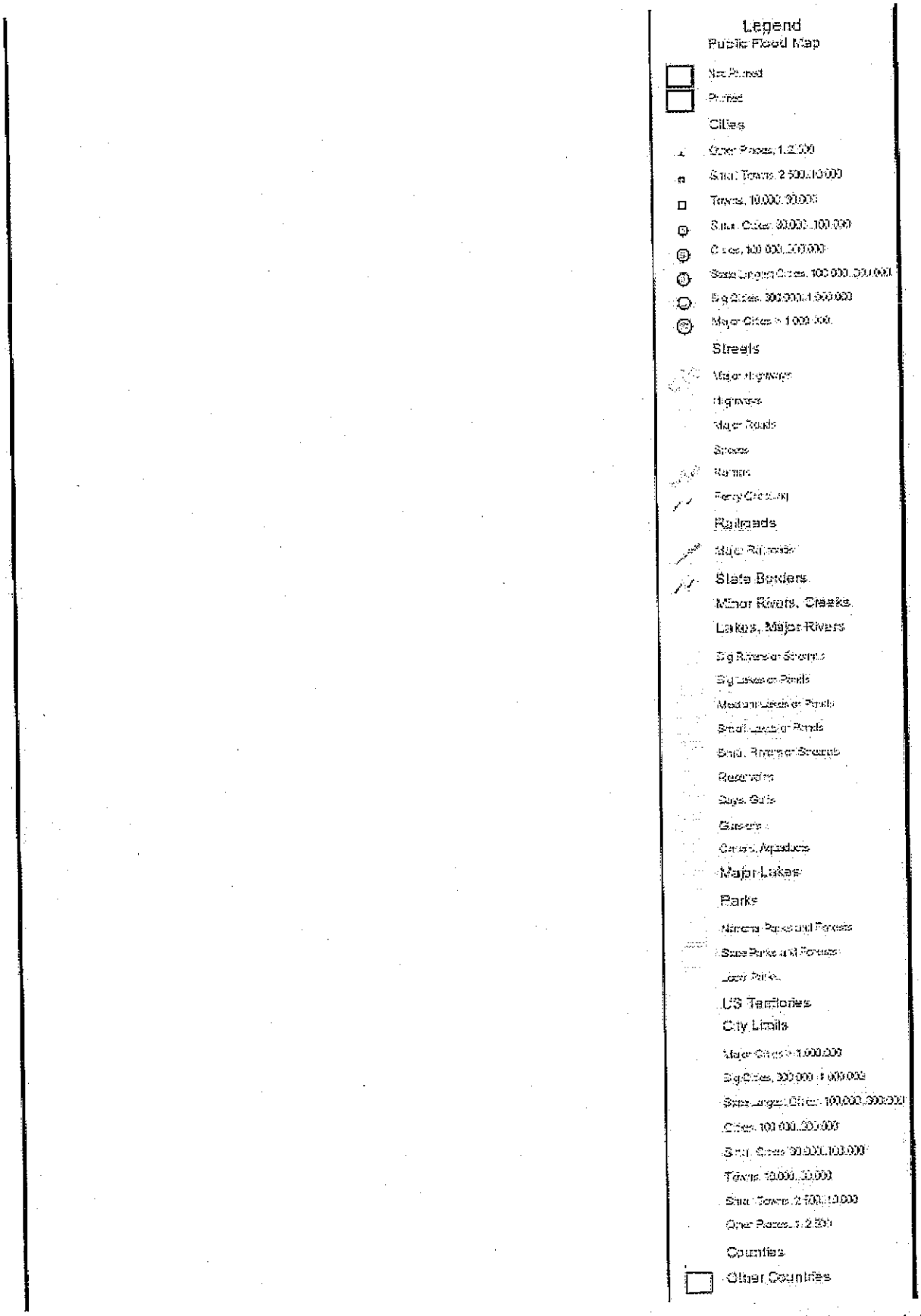

Legend
Public Flood Map
Not Printed
Printed
Cities
Other Places, 1-2,500
Small Towns, 2,500-10,000
Towns, 10,000-30,000
Small Cities, 30,000-100,000
Cities, 100,000-300,000
State Largest Cities, 100,000-300,000
Big Cities, 300,000-1,000,000
Major Cities > 1,000,000
Streets
Major Highways
Highways
Major Roads
Streets
Ramps
Ferry Crossing
Railroads
Major Railroads
State Borders
Minor Rivers, Creeks
Lakes, Major Rivers
Big Rivers or Streams
Big Lakes or Ponds
Medium Lakes or Ponds
Small Lakes or Ponds
Small Rivers or Streams
Reservoirs
Bays, Gulfs
Glaciers
Canals, Aqueducts
Major Lakes
Parks
National Parks and Forests
State Parks and Forests
Local Parks
US Territories
City Limits
Major Cities > 1,000,000
Big Cities, 300,000-1,000,000
State Largest Cities, 100,000-300,000
Cities, 100,000-300,000
Small Cities, 30,000-100,000
Towns, 10,000-30,000
Small Towns, 2,500-10,000
Other Places, 1-2,500
Counties
Other Counties

National Ambient Air Quality Standards (NAAQS) Information
(from MDEQ website)

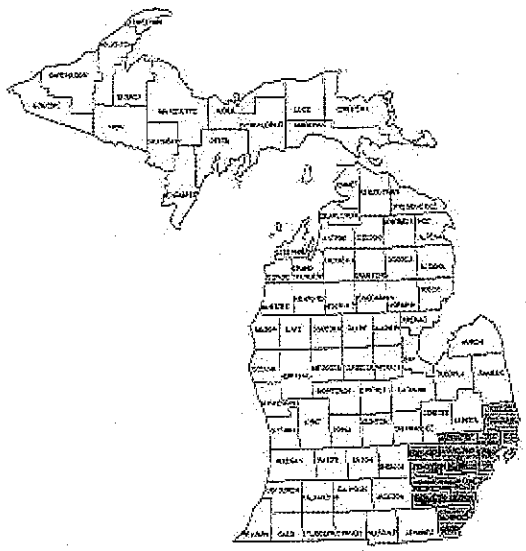
MICHIGAN NAAQS ATTAINMENT STATUS

Attainment Areas:
The entire State of Michigan is designated "Attainment" with the National Ambient Air Quality Standards (NAAQS) for:

- Carbon Monoxide [CO]
- Nitrogen Dioxide [NO_2]
- Sulfur Dioxide [SO_2]
- Particulate Matter Less Than 10 Microns [PM_{10}]
- Lead [Pb]

Nonattainment Areas:

- **84 ppb Ozone**
  Allegan County
  Note that Allegan County is impacted by overwhelming air emissions transport from locations outside of Michigan.



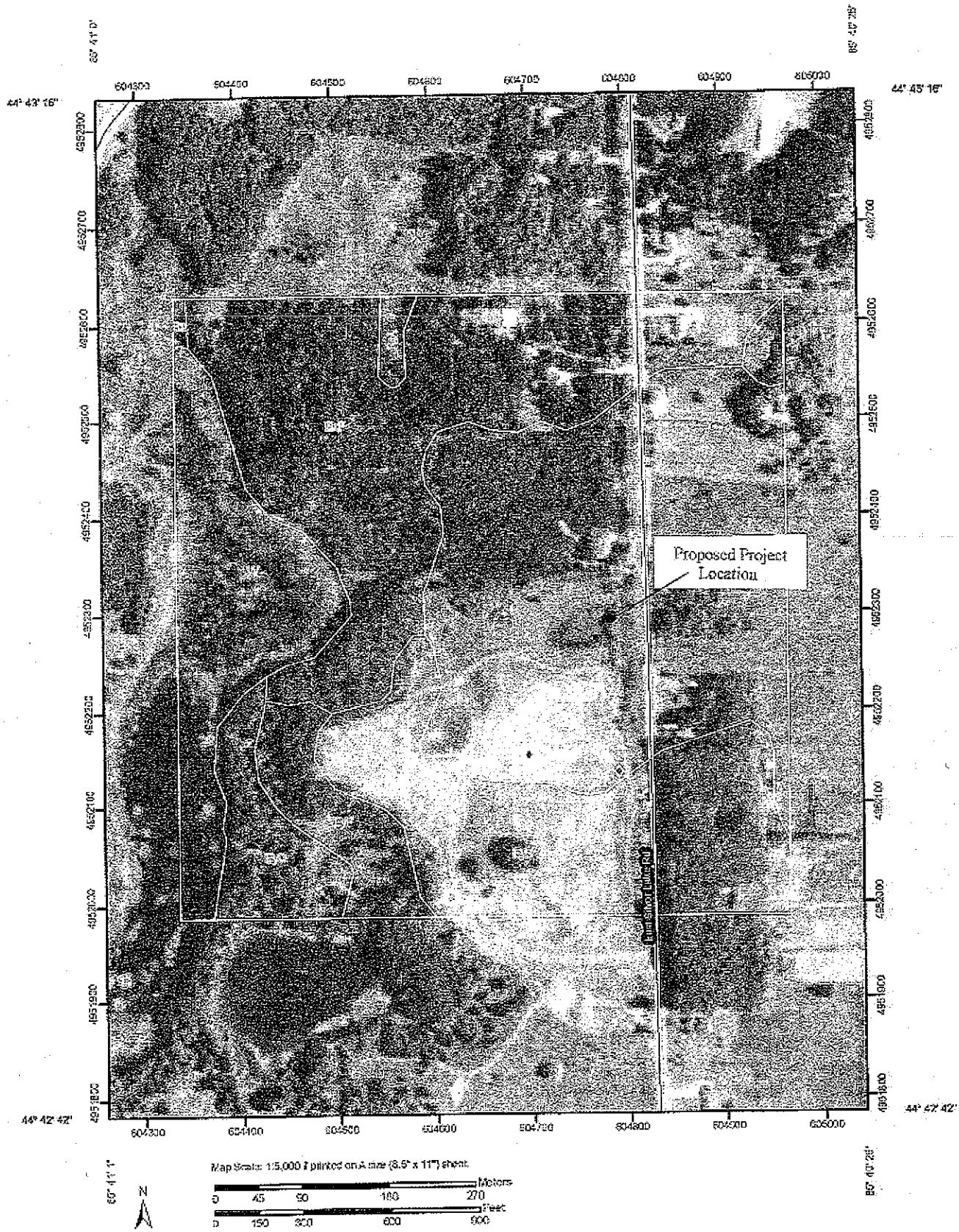
- **Annual and 24-hour $PM_{2.5}$ (fine particles)**
  Detroit Metropolitan Area
  - Livingston
  - Macomb
  - Monroe
  - Oakland
  - St. Clair
  - Washtenaw
  - Wayne

  Note that thirteen SE Michigan monitors demonstrate compliance. Only one Wayne County monitor located in an area heavily impacted by highway and industrial emissions does not yet meet the PM2.5 standards.

DEQ

October 2009

Soil Survey Information
(from USDA website)


Proposed Project Location
44° 43' 16"
44° 42' 42"
85° 41' 0"
85° 40' 28"
Map Scale: 1:5,000 if printed on A size (8.5" x 11") sheet.
Meters
0 45 90 180 270
Feet
0 150 300 600 900
N

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features

- Gully
- Short Steep Slope
- Other

Political Features

- Cities

Water Features

- Oceans
- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:5,000 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Grand Traverse County, Michigan
Survey Area Data: Version 5, Jun 17, 2009

Date(s) aerial images were photographed: 6/20/2005

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Grand Traverse County, Michigan (MI055)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ExF	Emmet gravelly sandy loam, 25 to 45 percent slopes	26.2	26.2%
EyB	Emmet sandy loam, 2 to 6 percent slopes	18.0	18.0%
EyC	Emmet sandy loam, 6 to 12 percent slopes	4.4	4.4%
EyD	Emmet sandy loam, 12 to 18 percent slopes	34.2	34.2%
EyF	Emmet sandy loam, 25 to 45 percent slopes	4.3	4.3%
RcA	Richter loams, 0 to 2 percent slopes, overwash	0.6	0.6%
Ro	Roscommon mucky loamy sand	0.2	0.2%
UnD	Ubly-Nester complex, 12 to 18 percent slopes	0.7	0.7%
W	Water	11.5	11.5%
Totals for Area of Interest		100.1	100.0%

Soil Boring Logs

Client: Advantage Design
Project: G.T. Metro Fire Department, G09-125
Location: Garfield Twp., MI

Boring Log Of: SB-2
Date Drilled: 21 August 2009
Drilling Contractor: Shepler

Std. Penetration Resistance (N)	Recovery	Sample Method	Depth (feet)	Soil Type	Soil Description	Comments
					Surface Conditions: Grass	
					SAND; fine to medium grained; trace clay, gravel, and silt, dark brown to black (topsoil)	Soil Boring Advanced using an:
6,7,7,6	13"	SS			SAND; fine grained, trace to some gravel, light brown	Ingersoll Rand A300 drill rig and 3 1/4" inside diameter continuous flight hollow stem auger
4,5,6,7	15"	SS	5			
					- grading to gravely	
6,7,7,11	13"	SS			CLAY; with some sand, trace gravel, light brown, moist	
7,12, 7,12	16"	SS	10			Pocket Penetrometer (tsf) 3.0 @ 9.0-9.5' bgl 2.0 @ 14.5-16.0'
4,7,8,7	23"	SS	15		SAND; fine grained, trace clay and gravel, light brown, moist	
					CLAY; with some sand and gravel, light brown, moist	
2,3,5,6	8"	SS			SAND; fine to medium grained, trace to some gravel, tan, moist	
			20		EOB @ 20' bgl	
			25			
			30			Soil classifications based upon observation of soil from the auger flights and split spoon samples

Well Construction / Boring Data

Top of Casing : N/A
Ground Elev.: 909.3'
Casing: N/A
Screen: N/A
Screen Setting: N/A

Water Encountered: None
Date: 21 August 2009
Development Method: N/A
Logging Method: Split Spoon

Driller: ES
Helper: RS
Logged By: JJ

Otwell Mawby, P.C.
309 E. Front Street
Traverse City, MI 49684
231-946-5200
Fax 231-946-5216

Client: Advantage Design
Project: G.T. Metro Fire Department, G09-125
Location: Garfield Twp., MI

Boring Log Of: SB-3
Date Drilled: 21 August 2009
Drilling Contractor: Shepler
Page 1 of 1

Std. Penetration Resistance (N)	Recovery	Sample Method	Sample Type/Interval	Depth (feet)	Soil Type	Soil Description		Comments
						Surface Conditions: Grass		
						SAND; fine to medium grained; trace clay, gravel, and silt, dark brown to black (topsoil)		Soil Boring Advanced using an:
2,4,5,5	16"	SS				SAND; fine grained, trace clay and gravel, light brown		Ingersoll Rand A300 drill rig and 3 1/4" inside diameter continuous flight hollow stem auger
2,2,3,2	9"	SS		5				
Hammer Push/ 6, 3,5,9	12"	SS				- grading to some gravel		
						- grading to gravely		
3,9,9,9	14"	SS		10				
7,7,5,5	17"	SS						
				15		- grading to trace gravel		
3,4,5,6	16"	SS						
						- grading to moist		
				20		EOB @ 20' bgl		
				25				
				30				Soil classifications based upon observation of soil from the auger flights and split spoon samples

Top of Casing : N/A
Ground Elev.: ~897.0
Casing: N/A
Screen: N/A
Screen Setting: N/A

Well Construction / Boring Data
Water Encountered: None
Date: 21 August 2009
Development Method: N/A
Logging Method: Split Spoon

Driller: ES
Helper: RS
Logged By: JJ

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