

**OPERATION AND MAINTENANCE PLAN  
LINDEN ROAD SITE  
FLINT TOWNSHIP, MICHIGAN**

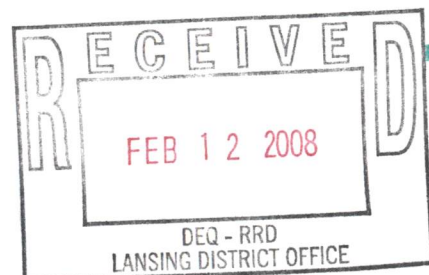
**Prepared For:**

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## **1.0 INTRODUCTION**

### **1.1 OBJECTIVE AND SCOPE**

The objective of this Operation and Maintenance (O&M) Plan is to describe the inspection and maintenance activities required to maintain the effectiveness of the Linden Road site soil cover system and its associated management systems for the duration of the post-closure operation period. The O&M Plan is intended to be used in conjunction with the Soil Cover Construction Plans and Specifications, which describes the construction activities related to this remedial action. General Motors Corporation (GMC) or a designated representative under the direct supervision of GM will conduct O&M activities. The records compiled through implementation of this O&M Plan will provide the Michigan Department of Environmental Quality (MDEQ) with sufficient documentation verifying the remedial action is functioning as designed and constructed, and will be an indicator as to the effectiveness of the remedial action.

### **1.2 SITE LOCATION AND DESCRIPTION**

The site is a 40-acre parcel in Flint Township, Genesee County, Michigan, and is located in Section 17 of Township 7 North and Range 6 East. The site is approximately 1.5 miles west of the City of Flint. The site is bounded by Linden Road on the east. The northern boundary of the site is approximately 114 mile south of Calkins Road, and the southern boundary is approximately 1/2 mile north of West Court Street. The western boundary of the site is approximately 1/4 mile east of Dye Road.

Based on current knowledge, the site has had three periods of land use during this century as: a source of mined gravel, a landfill, and an unused property. It was first used as a source of mined sand and gravel. The extent of the gravel excavation is uncertain. WESTON's review of an aerial photograph of the site taken in 1941 did not indicate any evidence of large excavations or traces of a filled excavation. For an undetermined number of years preceding 1931, a rubbish incinerator reportedly occupied part of the site. The Chevrolet Division of General Motors (GM) purchased the 40-acre property from several owners in 1931. GM used the site as a general refuse landfill from 1931 until-1969. The refuse reportedly consisted of construction debris, plaster, buffing and grinding wheels, buffing and grinding refuse, metallic chips, and other process wastes. Landfill operations ceased in 1969, and GM constructed a security fence around the site in July 1980. Since landfill activities ceased in 1969, the Linden Road property has been enclosed by a fence and monitored but has not been used for any beneficial purpose. A more detailed account of the site history is presented in the Remedial Action Plan for the Linden Road Site (WESTON, 1996).

### **1.3 REMEDIAL ACTION**

The remedial action for the site consists of excavation of waste materials that exceeded the designated removal criteria. The extent of the waste material began on the western edge of Linden Road and extended approximately 400 feet west of the centerline of Linden Road. The waste material was relocated onto the western portion of the site and 2.5-foot soil cover system was constructed over the waste materials to limit the potential for human contact during subsequent use of the facility.

#### **1.4 ELEMENTS OF THE O&M PLAN**

This O&M Plan has been prepared as a tool for use by GM or its designated representative to ensure the safe and effective implementation of the remedial action. The plan generally consists of the following elements:

- Description of main remedial components to include the final covers system and the stormwater management systems.
- Description of remedial action objectives and restoration specifications.
- Frequency of inspection and monitoring tasks.
- Identification of potential problems and corrective actions to be implemented by GM.
- Description of safety precautions and recommendations.
- Description of record-keeping and documentation requirements.

#### **1.5 ROLES AND RESPONSIBILITIES**

Successful implementation of this O&M Plan will depend on a clear understanding of the roles and responsibilities of each member of the O&M team. The team is made of members responsible for implementing, operating, and overseeing the completion of the remedial action. The following list identifies the key personnel from each organization responsible for implementation of this remedial action:

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Title: Project Manager  
Org: General Motors Corporation  
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##### **MDEQ Project Manager**

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Org: Michigan Department of Environmental Quality  
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City: Lansing, Michigan 48909

Key personnel may change from time to time during the operation of this system. It is imperative that the site inspection personnel maintain an updated contact list in the event an emergency or other situation occurs that requires prompt action by one or more of the respective parties. The contact list will be reviewed and updated a minimum of once annually by the General Motors Project Manager.

## **1.6 HEALTH AND SAFETY**

Inspection and maintenance activities shall be conducted in accordance with a site-specific health and safety plan (HASP) to be prepared by the O&M contractor. The HASP shall be prepared in accordance with all State and federal regulations, including Occupational Health and Safety Administration (OSHA) construction safety standards and 29 Code of Federal Regulations (CFR) 1910 and 1926. The HASP shall include a task-by-task risk analysis using the available site data and incorporating each potential task to be conducted during site inspection and maintenance activities.

## **2.0 OPERATION AND MAINTENANCE ACTIVITIES**

### **2.1 SOIL COVER SYSTEM O&M**

The 2.5-foot final soil cover for the site consists of a 2-foot protective soil cover layer, and a 0.5-foot topsoil layer. The cover system has been designed in accordance with the Remedial Action Plan (RAP) prepared for the site. The objective of this inspection activity is to maintain the quality of the cover system to ensure the performance objectives dictated in the RAP are being met. The specific soil types and installation/restoration requirements are detailed in the construction specifications. Repair or reconstruction work will be completed in accordance with the construction specifications.

The final cover is intended to reduce the potential for human contact with the waste materials contained on the site. The final allows the surface to shed water to the perimeter stormwater management system, minimize the need for additional off-site fill, and to minimize the potential for erosion damage. The 0.5-foot topsoil layer is a highly organic layer that supports vigorous plant growth, which minimizes erosion damage from precipitation events, and maximizes evaporation and transpiration. During the inspection process, GM or its designated representative shall document the quality of the cover system and areas where the performance objectives are not being maintained.

#### **2.1.1 Soil Cover System O&M Inspection Requirements**

During the inspection process, GM will evaluate the quality of the vegetative cover across the site. A satisfactory area of vegetation shall be defined as an area of 10,000 square feet that has:

- No bare spots larger than 3 square feet.
- Not more than 10 percent of area with bare spots larger than 1 square foot.

Areas that show signs of erosion or sparse vegetation will be repaired within 60 days. The surface will be graded and/or filled to match the surrounding grade with topsoil material, as specified in the construction specifications. The area will be re-seeded and mulched in, accordance with the specifications. In areas prone to excessive pedestrian traffic, wood chips or gravel may be used to create walking paths in lieu of vegetative restoration.

The cover system will be inspected for areas of significant erosion or cracking in the cover system. Significant erosion or cracking is defined as a crack or gully 6 inches deep or loss of vegetation and multiple gullies/cracks 3 inches deep. Each layer of the final cover will be repaired in accordance with the initial construction specifications within 60 days. If significant erosion is discovered, the area will be over excavated and material will be placed and re-compacted to restore the damaged section. The cover soil and the topsoil shall be replaced immediately following completion of the soil cover system to minimize damage.

GM or its designated representative will inspect the final cover for signs of settlement or subsidence. Areas showing signs of potential ponding or continued settlement will be backfilled with protective cover soil and topsoil and will be seeded / mulched in accordance with the construction specifications. The final cover vegetated areas will be mowed at a minimum twice per year.

Damaged areas of the final cover will be documented to include method and scope of the repairs conducted. The locations and suppliers of materials will be included in the documentation.

## **2.2 STORMWATER MANAGEMENT SYSTEM O&M**

The stormwater management system is intended to control runoff; generated from precipitation events over the operating life of the site. The system consists of drainage channels directing runoff via culverts or other structures into the detention basin on the south side of the site with final discharge to the Genessee County Drain Commission Stormwater System.

### **2.2.1 Stormwater Control O&M Inspection Requirements**

GM or its designated representative shall inspect each component of the stormwater control system during the inspection period. The drainage channels will be inspected for excessive erosion damage or lack of suitable vegetation. Erosion gullies will be backfilled, seeded, and mulched. Catch basins and culverts will be inspected for debris and sediment build up. Sediment in catch basin sumps will be removed to restore the sump volume to full capacity. Sticks and debris will be removed from culverts as necessary to restore flow capacity. Each culvert will be inspected for damage or erosion at the end sections. Riprap will be replaced as necessary, and any debris will be removed to maintain a free-flowing condition.

## **2.3 GENERAL SITE MAINTENANCE**

### **2.3.1 Security Fence O&M Inspection Requirements**

Chain link fencing is provided around the perimeter of the site to further limit potential public contact with waste materials under the final cover. In addition, the fencing provides protection of the soil cover system as a whole. Post and cable fencing has been provided along all gravel access roads and parking areas. This fencing will keep vehicle traffic on established roadway surfaces limiting the potential for damage to the vegetative cover. Excessive vehicle or recreational use without the appropriate maintenance can contribute to erosion or limited vegetation.

GM or its designated representative shall inspect the fence for serviceability and for signs of tampering. The chain link fence fabric shall be securely attached to each post and end rail. The end posts shall be solidly installed in concrete pads with the necessary support posts and top rails detailed in the specifications. Any damaged or missing material shall be replaced with new material meeting the requirements of the specification. Any signage located along the fence limit or attached to the fence fabric will be inspected. Any damaged or unreadable signs will be replaced.

### **2.3.2 Access Road and Parking Area O&M Inspection Requirements**

A gravel access road and parking area has been constructed in the central portion of the site. During the post closure period, this road will serve as the primary access to the recreational site. GM or its designated representative will inspect and maintain the access road to allow access to the site to conduct inspection and maintenance operations as well as to provide safe travel for park visitors.

## **2.4 GROUNDWATER MONITORING**

GM will conduct post-construction groundwater monitoring to assess the effectiveness of the soil cover system and to confirm results of previous groundwater sampling at the site. The groundwater monitoring program has the following objectives:

- Establish a baseline for site groundwater quality immediately after the placement of the soil cover system.
- Monitor the quality of groundwater in the shallow water-bearing zone.

Monitoring has occurred annually for five years after completion of Phase 2 activities. This monitoring period ended in 2005; however, the MDEQ indicated that additional monitoring was required. Going forward it is anticipated that three additional quarterly sampling events will be required. The sampling program will be completed in 2008. Groundwater samples will be collected from up to 13 monitoring wells. The groundwater samples will be analyzed for organics. GM will repair or replace wells that are damaged or are no longer suitable for long-term sampling in accordance with the O&M Plan.

GM or its representative will forward to MDEQ a copy of the groundwater monitoring results within one month of receiving complete analytical results from the laboratory following every sampling event. Any significant change to groundwater quality will be noted in these submittals. Any modifications to the monitoring program will be implemented after consultations with the MDEQ.

## **3.0 DOCUMENTATION**

This section describes the record-keeping that will be used to document the O&M activities performed during the post-construction period. This documentation will be the ongoing record of effectiveness of the work completed. All documentation completed as part of this project will be presented as part of a post-closure certification report to be prepared at the completion of the O&M period. The following subsections describe the specific records that will be maintained.

### **3.1 PERIODIC INSPECTION REPORT**

GM or an appointed representative will prepare a report that will serve as a chronological record of periodic maintenance and inspection activities. At a minimum, the report will contain:

- Date, project name, location, and other identification (as necessary).
- Weather conditions.
- Construction activities and incidents that occurred during working and nonworking hours.
- Descriptions of inspections and observations conducted by GM or its designated representative.
- Description and quantity of materials received, including vendor certification documents (if applicable).
- Description of restoration work completed and/or deficiencies identified with corrective actions taken.

In addition to the written narrative of construction, repair, and inspection activities, observation check sheets will be provided as an appendix to the inspection report.

Figure 3-1 shows the Periodic Inspection Report Form to be used by GM in documenting inspection and maintenance activities.

### **3.2 PROJECT PHOTOGRAPHS**

The site inspector will take photographs of all work placed to augment periodic inspection reports and to assist in documenting work deficiencies before and after corrective actions are taken. All photographs taken by the site inspector must be recorded on a photograph documentation log that will include, at a minimum, the following information:

- A unique identifying number for cross referencing and document control.
- Date, time, location, and current weather conditions at the time the photograph was taken.
- Purpose of intent of the photograph.
- Signature of the photographer.

### **3.3 RECORD DRAWINGS**

GM will maintain a complete set of design drawings, including formal modifications and field changes. The inspector will record any deviations from the plans and specifications and will document the reason for the deviation. The drawings should document any changes made to the completed work, to include actual lines and grades, survey data showing locations of restored work, locations of testing, and elevations of each particular component repaired. At the completion of the O&M period, the information will be used to update the record drawings for use in the post-closure certification report.

### **3.4 STORAGE AND DISPOSITION OF RECORDS**

During post-closure activities, GM will be responsible for maintaining a complete set of plans, specifications, design drawings, analytical data, and inspection reports. These documents will be used to record all changes or modifications to the project as of completion of construction. GM shall transfer all changes to the record documents following each maintenance activity at the site. GM will retain the periodic inspection reports, including all analytical data and evaluations.

The documents will be maintained in accordance with GM's March 20, 2003 approved document control methods. As documents are updated from time to time, to ensure that the most recent version is in use, version control is implemented. Each document contains a version number and the creation date. In addition, changes made to a document are annotated using italics as the font for the affected text, and a bar in the page margin where revisions occur in the document; this annotation will be removed when the next version of the document is published. Therefore, the most recent changes to the document will be readily visible to the reader.

Figure 3-1

**Operation and Maintenance Periodic Inspection Report  
Linden Road Site  
Flint Township, Michigan**

Inspector \_\_\_\_\_  
 Company \_\_\_\_\_  
 Project \_\_\_\_\_  
 Location \_\_\_\_\_  
 Date/Time \_\_\_\_\_  
 Project No. \_\_\_\_\_

Weather	Clear	P. Cloudy	Cloudy	Fog
Temperature	High	____ F°	---	---
Wind	Calm	Medium	High	---
Precipitation (circle)	Rain	Light	Moderate	Heavy
	Snow	Light	Moderate	Heavy

Type of Inspection    Routine        Special   

Persons/Equipment Present: \_\_\_\_\_

General Description of Site Conditions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Specific Inspection Items	Potential Problem Areas	Status*	Notes
Perimeter Security Fencing	Missing barbed wire, torn fabric.		
Entrance Gate and Locking Mechanism	Lock broken/missing, mechanism inoperative.		
Monitoring Wells and Wellhead Covers	Signs of tampering, casing damaged, lock missing.		
Final Cover Vegetation	Bare spots, stressed vegetation, deep rooted vegetation.		
Final Cover Slope (explain below)	Gullies, cracking, subsidence, ponding.		
Evidence of Burrowing Animals	Damage to final cover, evidence of waste.		
Stormwater Drainage Channels	Gullies, erosion, debris, culvert blocked.		
Access Road	Ponding, rutting, erosion.		

\* (1) Acceptable—No Maintenance Required.    (2) Not Acceptable—Identify Required Maintenance.

Summary of Deficiencies and/or Corrective Actions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Signature of Inspector \_\_\_\_\_  
 Date \_\_\_\_\_

**Table 4-1**

**Operation and Maintenance Schedule  
Linden Road Site  
Flint Township, MI**

	<b>Operation and Maintenance Activity</b>			
<b>Year</b>	<b>Soil Cover Inspection/ Maintenance (Frequency)</b>	<b>Access Control Inspection/ Maintenance (Frequency)</b>	<b>Drainage System Maintenance (Frequency)</b>	<b>Reporting (Frequency)</b>
2008-2032	Bi-annual	Bi-annual	Bi-annual	Bi-annual