DRAFT ENVIRONMENTAL ASSESSMENT

Proposed City of Billings Class II Landfill Expansion Project
Billings, MT
Solid Waste License Application

Prepared by

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Acronyms used in this document:

COB – City of Billings
SWMS – Solid Waste Management System
DEQ – Montana Department of Environmental Quality
SWP – Montana DEQ Solid Waste Program
SWS – Montana DEQ Solid Waste Section
MSW – Municipal Solid Waste
SpW – Special Waste
MCA – Montana Code Annotated
ARM – Administrative Rules of Montana
EA – Environmental Assessment
SWMA – Montana Solid Waste Management Act
FML – Flexible Membrane Liner
HDPE – High Density Polyethylene
CQA/CQC – Construction Quality Assurance/Construction Quality Control
LCRS – Leachate Collection and Removal System
LLDPE – Low Linear Density Polyethylene
RCRA – Resource Conservation and Recovery Act
MEPA – Montana Environmental Policy Act
IWMA – Integrated Waste Management Act

1 PURPOSE AND NEED FOR ACTION

1.1 SUMMARY

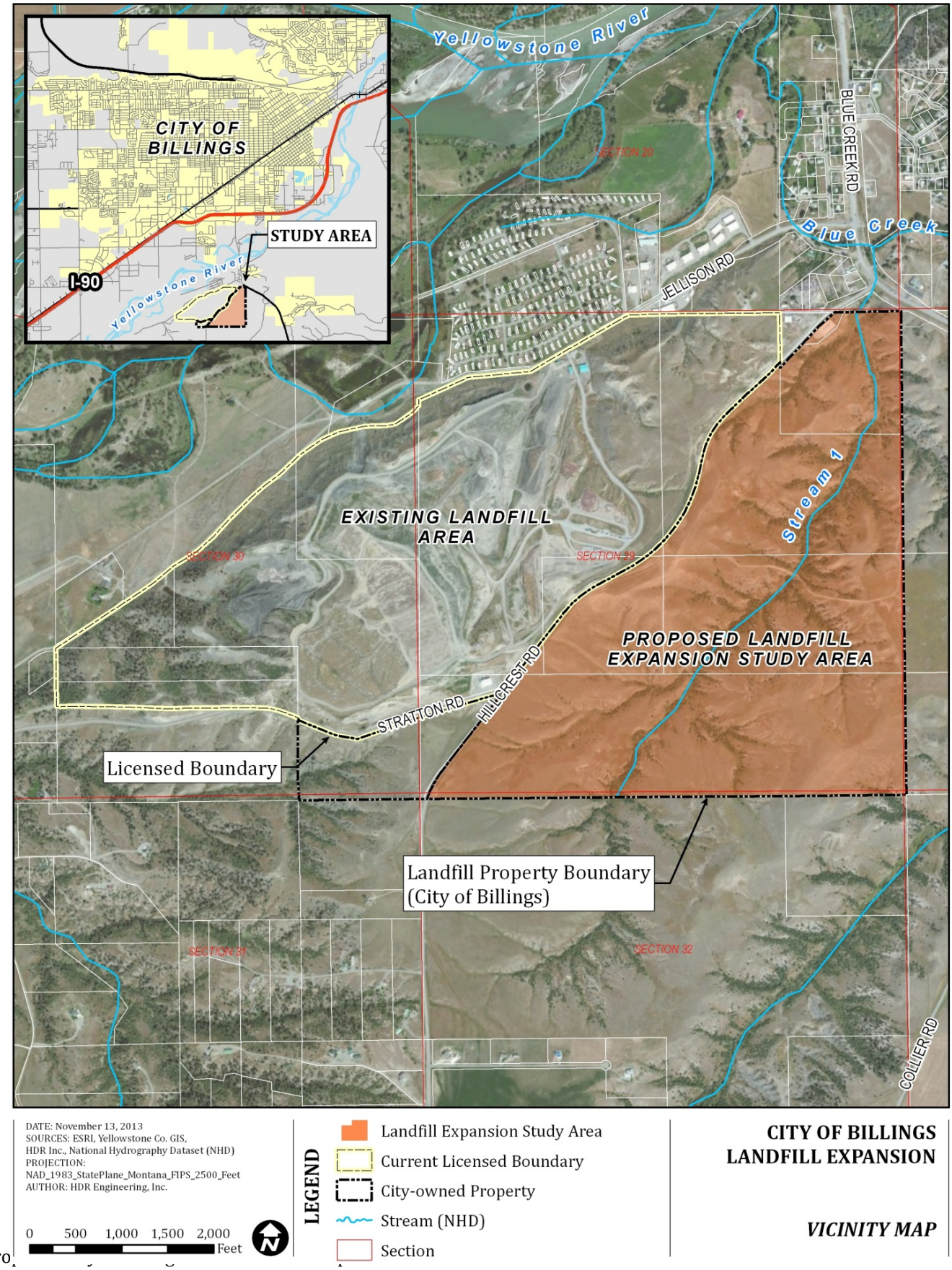
The City of Billings (COB) is currently licensed to operate a Class II Solid Waste Management System (SWMS) for the management of solid wastes. A Class II SWMS is a system that controls the storage, treatment, recycling, recovery, and/or disposal of Group II, III, and IV solid wastes. In Montana, wastes are grouped based upon their physical and chemical characteristics which determine the degree of care required in their handling and disposal, and the potential of the wastes to cause environmental degradation or public health hazards. Group II wastes include decomposable wastes and mixed solid wastes containing decomposable materials, but exclude regulated hazardous waste. Group III wastes include clean wood wastes and other clean non-water soluble or inert solids. This category includes, but is not limited to, brick, rock, dirt, concrete, unpainted and unglued wood materials, and tires. Group IV wastes include construction and demolition wastes and asphalt, but exclude regulated hazardous wastes. A Class II facility design requires the most stringent and protective features to ensure the protection of human health and the environment.

On April 27, 2015, the COB submitted a Solid Waste Management System (SWMS) license application to the Montana Department of Environmental Quality (DEQ) Solid Waste Program (SWP) for the expansion of their current facility license boundary. The proposed expansion will allow the City to continue operation of the COB Class II Landfill.

The proposed expansion area encompasses 350 acres of city-owned property. The project area is located south of the currently licensed and operating City of Billings Class II Landfill facility in portions of Section 29, Township 1 South, Range 26 East, Montana Principal Meridian (Figure 1.1). Of the 350 acres proposed for the expansion, the project will result in a disturbance total of 293 acres for landfill disposal units, storm water and leachate retention ponds, roads, and buildings during the entire life cycle of the facility. The landfill disposal units would disturb a total of 232 acres and the remaining 61 acres for the construction of the ponds, roads, buildings and ditches. The landfill disposal units will be partially closed when it reaches final grade and the maximum open area at any one point in time will be 119 acres.

The proposed expansion area will include four separate landfill units that will be developed in seven phases over the life of the facility; the four landfill units will consist of two Class II and two Class IV disposal units. This will expand the total COB Class II Landfill footprint by 232 acres, and will provide an additional capacity for the disposal of an estimated 12,101,100 tons (18,656,200 cubic yards) of Group II waste and 4,220,000 cubic yards of Group IV waste. The total on-site waste tonnage at closure is estimated to be 13,392,580 tons. Based upon the municipal solid waste density, the waste acceptance rate, and the projected growth rate in the Billings area, the proposed COB expansion will extend the life of the COB Class II Landfill by approximately 48 years.

Figure 1.1 – General Location of Proposed COB Class II Facility Expansion
(Source: Great West Engineering, Billings Landfill Expansion Application, 2015)



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Billings, Montana

The COB proposes to relocate the composting operations conducted along the southern boundary of the currently licensed and active COB Class II Landfill to the expansion area within three to five years. Compostable wastes would continue to be received and stockpiled at the current COB Class II Landfill; the COB would transport the compostable materials to the expansion area for management. Construction of new disposal units and associated appurtenances within the proposed expansion area is not expected to commence for another 20 to 25 years. Prior to the construction of future disposal units, COB would be required to submit updated construction documents that demonstrate compliance with existing regulations to DEQ for approval.

1.2 PURPOSE AND NEED

The Montana Integrated Waste Management Act (IWMA) establishes goals for waste reduction in the state through the development of an integrated approach to solid waste management. The IWMA's priority for solid waste management focuses first on source reduction, reuse, recycling, and composting. Landfill disposal and incineration are the final options for solid waste management that the IWMA identifies. While source reduction, reuse, recycling, and composting all play a role in solid waste management in Montana, most municipal waste is landfilled.

The Montana Solid Waste Management Act (SWMA) establishes the minimum requirements for the development of SWMS's. The SWMA is the result of long range planning efforts that were performed to ensure landfill capacity in the state exists to meet the state's growing population needs. The long range planning effort resulted in the regionalization and consolidation of solid waste facilities. The regulations developed in accordance with the authority provided by the SWMA establish the minimum requirements for the design, operation, financial assurance, closure, and post-closure care of SWMS's.

DEQ's evaluation of applications for the development of new solid waste management facilities or expansions of existing licensed facilities includes the development of an Environmental Assessment (EA) to identify the environmental effects of the proposed action. The EA is the mechanism that DEQ uses to: 1) Disclose whether a proposed site meets the minimum requirements for compliance with the current laws and rules; 2) Assist the public in understanding the state SWMS regulations as they pertain to licensing solid waste facilities; 3) Identify and discuss the potential environmental effects of the proposed site if it is approved and becomes operational; 4) Discuss actions taken by the applicant and the enforceable measures and conditions designed to mitigate the potential impacts identified by DEQ during the review of the application; 5) Seek public input to ensure DEQ has identified the substantive environmental impacts associated with the proposed landfill; and 6) Determine whether the landfill would create significant environmental impacts that would require the preparation of an Environmental Impact Statement.

The licensed disposal of solid wastes provides the best option to ensure facilities are properly designed and wastes are managed according to the regulations. There are currently 30 licensed Class II MSW landfills in Montana. The applicant's main

objective is to provide for the continued economical disposal of solid wastes for the City of Billings and residents of Yellowstone County that are currently managed at the licensed COB Class II Landfill facility.

In accordance with 75-1-102, MCA, the purpose of the Montana Environmental Policy Act (MEPA) is "to ensure that environmental attributes are fully considered by the legislature in enacting laws to fulfill constitutional obligations; and the public is informed of the anticipated impacts in Montana of potential state actions." An EA does not result in a certain decision, but rather serves to identify the potential effect of a state action within the confines of the existing regulations governing such proposed activities so that agencies make balanced decisions. MEPA does not provide regulatory authority beyond the authority explicitly provided in existing regulations. The final EA document will incorporate the responses to the comments received on the draft EA after the public comment period has ended.

1.3 PROJECT LOCATION AND STUDY AREA

The proposed landfill expansion area is located south of the current COB Class II landfill across Hillcrest Road, directly south of the intersection of Hillcrest Road and Highway 416 (Blue Creek Road) in Yellowstone County, Montana (Figure 1.2). The proposed landfill expansion area is located in Section 29, Township 1 South, Range 26 East, Montana Principal Meridian. The proposed landfill expansion property is owned by the COB. The site of the proposed expansion area is zoned agricultural property that is used occasionally for livestock grazing. There are no local restrictions that prohibit the location of the facility at the site the applicant selected. Adjacent land uses include residential, agricultural, light industrial, and recreational.

1.4 AUTHORIZING ACTION

DEQ's Solid Waste Section (SWS) is responsible for ensuring activities proposed under the Solid Waste Management Act, the Integrated Waste Management Act, the Septage Disposal Licensure Act, and the Motor Vehicle Disposal & Recycling Act are in compliance with current regulations. The SWS is a part of DEQ's Waste Management and Remediation Division, Waste and Underground Tank Management Bureau. The Solid Waste Management Act (75-10-201, MCA) and the Administrative Rules of Montana (ARM), Title 17, Chapter 50 provide the necessary authority for the SWS to license and regulate SWMS's in the state of Montana.

DEQ is also responsible for protecting air quality under the Montana Air Quality Act, and water quality and quantity under the Montana Water Quality Act. The options that DEQ has for decision-making upon completion of the EA are (1) denying the application if the proposed operation would violate SWMA, the Clean Air Act, or the Water Quality Act; (2) approving the application as submitted; (3) approving the application with agency mitigations; or (4) determining the need for further environmental analysis to disclose and analyze potentially significant environmental impacts. Table 1.1 provides a listing of agencies and their respective permit/authorizing responsibilities.

Figure 1.2 – Proposed COB Class II Facility Expansion Vicinity Map
(Source: Great West Engineering, Billings Landfill Expansion Application, 2015)

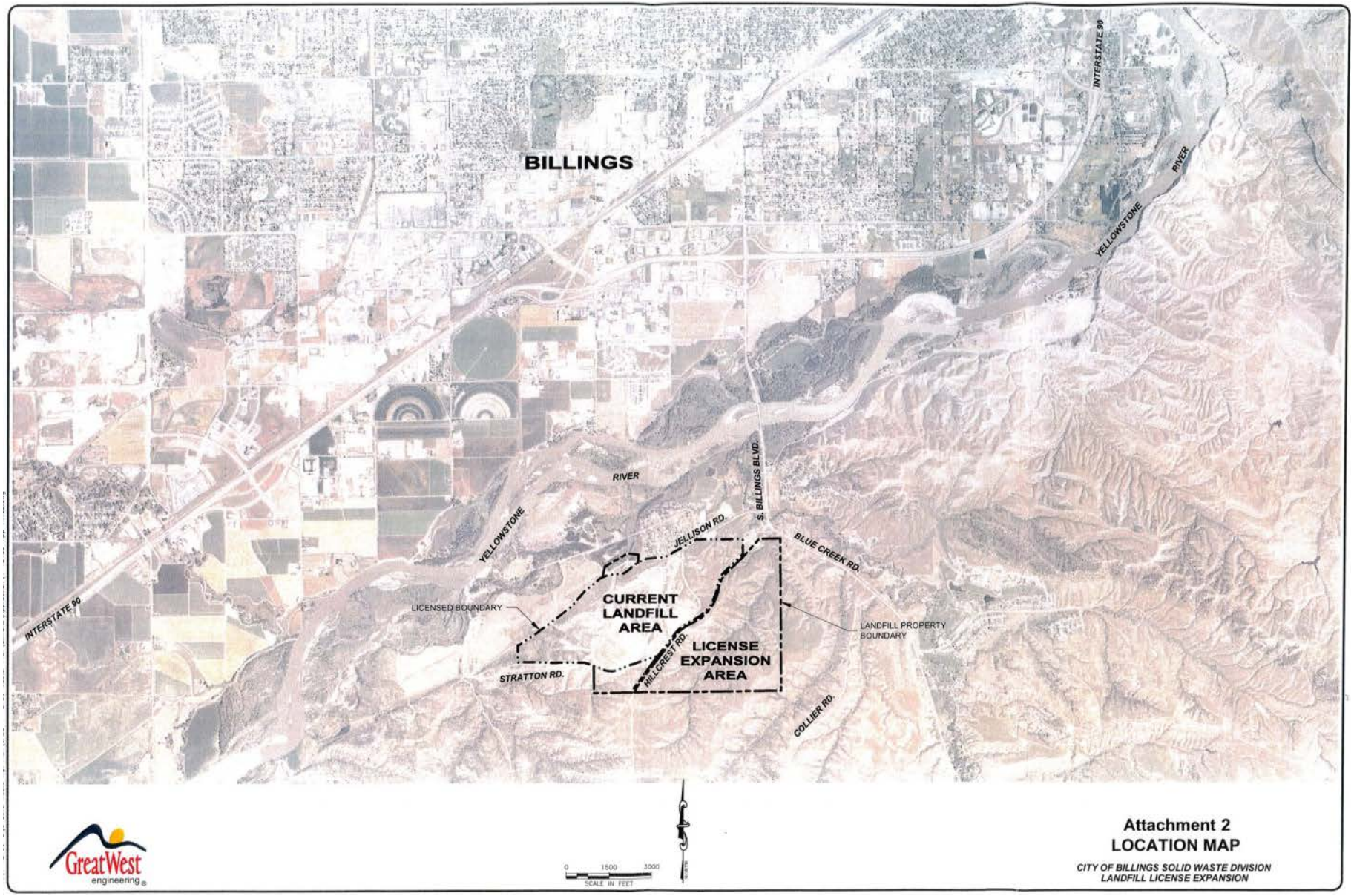


Table 1.1: Regulatory Responsibilities

ACTION	REGULATORY AGENCY
Solid Waste Management System License	DEQ – Waste and Underground Tank Management Bureau
Air Quality Permitting	DEQ – Air Quality Bureau
General Permit for Storm Water Discharge Associated with Industrial Activity	DEQ-Water Protection Bureau
Montana Pollutant Discharge Elimination System Permit (MPDES)	DEQ – Water Protection Bureau
SWMS License Validation by County Health Officer	Yellowstone County Health Officer
County Road Construction, Maintenance, and Land Use, Weed Plan Approval	Yellowstone County
Encroachment Permit for State Highway modifications	Montana Department of Transportation

DEQ's evaluation of the proposed COB Class II Landfill expansion application is based upon the current regulations and the site-specific characteristics of the location selected by the city as it relates to the proposed facility design and operation. The site location was selected by the applicant.

1.5 PUBLIC PARTICIPATION

DEQ is the lead agency and has prepared this draft EA to present the analysis of possible environmental consequences related to the proposal. This draft EA has been published for distribution to adjacent landowners and interested persons for review. Upon publication of this draft EA, a 45-day public comment period will commence. DEQ will hold a public meeting to accept public comments on this proposal on January 10, 2016, from 6:30 to 8:30 p.m. in the gymnasium at the Blue Creek School. Written comments received during the 45-day public comment period will be evaluated and DEQ will provide responses to substantive public comments in the final EA.

1.6 ISSUES AND CONCERNS

DEQ has identified potential issues and concerns related to the proposed action. The issues and concerns are discussed in Section 3.

2 DESCRIPTION OF ALTERNATIVES

2.1 INTRODUCTION

This chapter summarizes alternatives to the proposed plan including the No Action alternative required by MEPA. MEPA requires the evaluation of reasonable alternatives to the Proposed Action. Reasonable MEPA alternatives are those that are achievable under current technology and are economically feasible as determined solely by the economic viability for similar projects having similar conditions and physical locations and determined without regard to the economic strength of the specific project sponsor.

2.1.1 ALTERNATIVES CONSIDERED BUT DISMISSED

In addition to the action proposed as presented in the COB's application for expansion, the COB evaluated three other alternatives for site configuration. The evaluation of the alternatives was presented in the COB's November 2013 Solid Waste Alternatives Analysis document (Appendix A). The alternatives evaluation was based on soil balance, landfill waste capacity, capital costs, and costs/ton.

According to the evaluation, COB's Alternative 1 consisted of the construction of one large waste disposal unit designed to maximize the volume of waste in the disposal unit. This alternative would provide for the disposal of approximately 43,621,000 cubic yards of waste in a 214-acre landfill unit and would have a projected life of 123 years. This alternative requires the removal of the current central drainage that runs from the southwest towards the northeast on the site of the proposed expansion. COB would construct a perimeter drainage ditch adjacent to Hillcrest Road that would divert storm water run on entering the site and direct it towards the natural drainages in the southwest and the northeast portions of the site. The maximum depth of the waste unit would be 30 to 40 feet and, once filled, would rise 200 to 300 feet above current site elevations in the center of the proposed expansion area. The COB determined that Alternative 1 was impracticable due to the presence of large quantities of hard rock that would require excavation for construction of the landfill disposal unit and would require significant capital costs to construct the landfill unit and large perimeter storm water ditch.

COB's Alternative 2 consisted of a landfill design that overlaps the existing COB Class II Landfill. This alternative would provide for the disposal of approximately 50,482,100 cubic yards of waste in a 196-acre landfill unit and would have a projected life of 142 years. This alternative would require the removal of Hillcrest Road, but would capitalize on the volume of space available for landfilling by overlapping into the existing fill. . COB would either utilize and improve Collier Road or provide a new access off of Blue Creek Road for current users of Hillcrest Road. This alternative requires the removal of the current central drainage that runs from the southwest towards the northeast on the site of the proposed expansion. COB would construct a perimeter drainage ditch on the south and east side of the expansion property. Selection of this alternative would require COB's acquisition of additional property for

the replacement of Hillcrest Road. The COB determined that Alternative 2 was impracticable due to the presence of large quantities of hard rock that would require excavation and construction of the landfill unit and large perimeter storm water ditch. Selection of this alternative would maximize the capacity available for waste disposal, but would add significant capital costs to the project due to property acquisition, road reconstruction and hard rock excavation. This alternative would not meet the purpose and need and stated above in Section 1.2. Therefore, further evaluation of this alternative by COB was not conducted.

COB's Alternative 3 consisted of a standalone facility. However, due to its configuration, the design resulted in a reduced capacity and lifespan, as compared to the other alternatives. Since there would be a reduced capacity and lifespan, this alternative would not meet the purpose and need as stated above in Section 1.2. Therefore, further evaluation of this alternative by COB was not conducted.

DEQ considered a modification of the proposed liner and final cover design as an alternative to the design proposed by the COB.

According to ARM 17.50.1204, two options exist for Class II landfill units: a prescriptive design that utilizes a composite liner and a leachate collection and removal system designed and constructed to maintain less than a 12-inch (30-cm) depth of leachate over the liner; or a design based upon liner performance that ensures that the concentration of ARM 17.50.1204 Table 1 constituents will not be exceeded at the relevant point of compliance in the uppermost aquifer. The list of Table 1 constituents is provided in Appendix B.

According to ARM 17.50.1403, two options exist for Class II landfill final cover systems. The first option is a prescriptive design that utilizes a liner equivalent to the base landfill liner that is covered by an 18-inch infiltration layer topped with an erosion layer that consists of at least six inches of topsoil. The second option is a design based upon performance that does not require the liner, but includes an infiltration layer equivalent to the prescriptive design and an erosion layer equivalent to six inches of topsoil.

DEQ considered the prescriptive design for both the landfill liner and final cover system as an alternative to the performance based liner and final cover system design submitted by the COB. The prescriptive liner design consists of two components: an upper 30-mil flexible membrane liner (FML) installed in direct contact with a lower two-foot barrier of compacted soil. The applicant proposes a liner design that consists of a 60-mil FML made of high-density polyethylene (HDPE) and re-compaction of the uppermost native subgrade material into an in-place six-inch barrier. The prescriptive final cover system consists of a 30-mil FML, covered by 18 inches of earthen material and six inches of topsoil.

DEQ's evaluation of the requirements for Class II liner and final cover system design, as discussed in sections 2.4.3 and 2.4.8, determined that the performance based design proposed by COB was equivalent to the prescriptive design. The current COB landfill has successfully implemented the performance based design since the facility

2008. To date, the alternative performance based liner and final cover design has functioned as designed; no releases to groundwater have been detected. Incorporation of the performance based liner and final cover design demonstration report into the proposed expansion application documents is justified because (i) all site investigations confirm that the geologic conditions beneath the expansion area correspond with the reported data, and (ii) the proposed liner is identical to the liner in the demonstration. Therefore, DEQ's alternative for the prescriptive design was dismissed from further evaluation.

2.2 DEQ ALTERNATIVE 1 - NO ACTION ALTERNATIVE

Under the No Action Alternative, the proposed landfill expansion would not be approved by DEQ and could not be built by the COB. The continued disposal of waste after closure of the existing landfill would have to occur at another approved landfill facility.

2.3 DEQ ALTERNATIVE 2 - PROPOSED ACTION

The Proposed Action is the expansion of the COB's currently licensed solid waste management system. The Proposed Action would consist of a landfill system as depicted on Figure 2.1 and as described below. Table 2.1 provides the information on the volume of earthen materials excavated along with the soil and waste balance budget. The proposed expansion will require the excavation of a total of 293 acres that includes 232 acres for the landfill disposal units and 61 acres for the construction of ponds, roads, buildings and ditches.

2.3.1 Landfill Features

The design features and layout of the proposed COB landfill expansion are depicted in Figure 2.1. The proposed landfill expansion design and operations will include construction of the following components: (i) the gatehouse and scale, (ii) landfill maintenance building, (iii) facility access road, (iv) controlled point of entry, (v) interior roads, (vi) waste disposal units, (vii) leachate collection, removal, and conveyance system, (viii) leachate ponds, (ix) alternative final cover system, and (x) storm water control system.

Two lined Class II landfill units would be developed in five phases (Phases 1 through 5); the first three phases of the Class II disposal unit will be located south of the central ravine that bisects the current proposed expansion area, and the last two phases will be located north of this central ravine. An interior road will be constructed along this central ravine. A continuous final cover will be constructed that will tie together phases one through three of the south disposal unit; another continuous final cover will constructed that will tie together phases four and five of the north disposal unit after filling over the liner has been completed. The construction of the disposal units will generally develop downslope on the western and eastern margins of the central coulee progressing from the southwest to the northeast.

2.3.2 Soils Excavation and Budget

The proposed expansion will require the excavation of 232 acres for the landfill disposal units, plus preparation for ponds, roads, and ditches after the excavation of the soil and rock from the coulee and slopes. Approximately 7,718,800 total cubic yards of excavated soil will be used for daily cover, final cover, liners, ponds, and other elements and will leave a net soil surplus of approximately 1,169,980 cubic yards. Table 2.1 provides the summary of the total soil volume available on site, as well as the fill and soil volumes required during each phase of construction and operation within the expansion area.

2.3.3 Landfill Liner Design

According to the Administrative Rules of Montana (ARM) 17.50.1204, a new Class II landfill unit must be designed to protect the uppermost aquifer from landfill contaminants. The regulations provide two design options to meet these requirements: (1) utilizing a composite liner and leachate collection and removal system that is designed and constructed to maintain less than a 30-cm depth of leachate over the liner; or (2) by submitting a design that ensures that the concentration of ARM 17.50.1204 Table 1 constituents will not be exceeded at the relevant point of compliance in the uppermost aquifer. The prescribed standard composite liner must be comprised of two components: an upper flexible synthetic membrane liner (FML) installed in direct contact with a lower two-foot barrier of compacted soil. The applicant proposes an alternative liner that consists of a 60-mil FML made of high-density polyethylene (HDPE), thereby matching the synthetic membrane standard and re-compaction of the uppermost native subgrade material into an in-place six-inch barrier that would substitute for the lower soil component, as depicted in Figures 2.2 and 2.3.

An alternative liner demonstration was previously approved by DEQ for compliance with the composite liner design requirements and the contaminant migration standards for the currently active, licensed Class II landfill. Incorporation of this previous demonstration report into the proposed expansion application documents is justified because (i) all site investigations confirm that the geologic conditions beneath the expansion area correspond with the reported data, and (ii) the proposed liner is identical to the liner in the demonstration.

HDPE is a very low permeability, flexible, synthetic membrane (geomembrane) that is widely used to contain or control liquid and gas migration in an engineered project, structure, or system. Also, HDPE pipe commonly conveys water or wastewater for many municipal systems. When properly installed and tested during landfill construction, HDPE geomembrane liners are highly impermeable barriers which prevent the contamination of soil and groundwater from chemicals in liquids that may be derived from the solid waste. The lower, compacted, in-place native component of the proposed composite liner will function as a secondary liner to enhance the primary upper geomembrane providing further protection by retarding seepage and landfill gas diffusion as noted.

Figure 2.1 – Proposed COB Class II Facility Expansion Area Features
(Source: Great West Engineering, Billings Landfill Expansion Application, 2015)

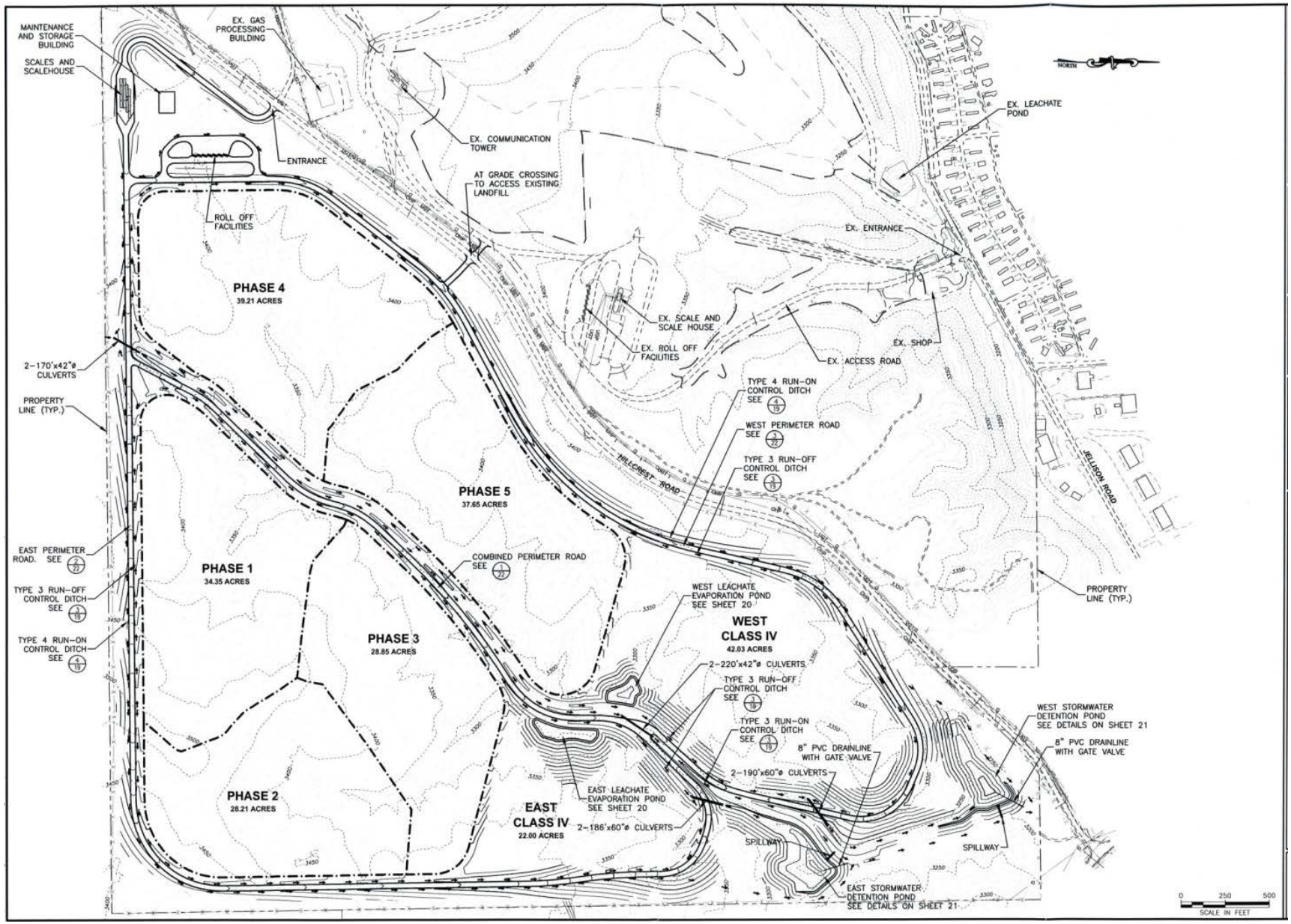


Table 2.1: Soil and Waste Balance Table

(Source: Great West Engineering, Billings Landfill Expansion Application, 2015)

Phase	Total Airspace (yds^3)	Waste Volume (yds^3)	Daily Cover (yds^3)	Final Cover (yds^3)	Total Soil Required (yds^3)	Total Fill Required for Construction (yds^3)	Total Excavation (yds^3)	Acres	Tonnage	Life (years)	Soil Balance (yds^3)
Roads, ponds, ditches						487,900	1,181,900	*61*		48	694,000
Phase 1	3,811,400	3,042,800	608,500	160,100	768,600	100,620	852,600	34.35	1,977,820	8	-16,620
Phase 2	3,514,800	2,818,100	563,300	133,100	696,700	12,000	795,500	28.21	1,831,800	7	86,800
Phase 3	6,296,800	4,973,000	994,500	329,300	1,323,800	5,000	887,700	28.85	3,232,400	13	-441,100
Phase 4	4,852,600	3,869,100	773,800	209,700	983,500	42,800	949,000	39.21	2,515,000	10	-77,300
Phase 5	5,078,800	3,953,200	790,600	335,000	1,125,600	14,700	986,100	37.55	2,569,600	10	-154,200
Total Class II	*23,554,400*	*18,656,200*						*168.17*	*12,126,620*	*48*	
West Class IV	3,626,000	2,985,200	298,500	342,300	640,800	0	1,356,200	42.03	895,560	26	715,400
East Class IV	1,581,600	1,234,800	123,500	223,300	346,800	0	709,800	22.00	370,400	11	363,000
Total Class IV	*5,207,600*	*4,220,000*						*64.03*	*1,265,960*	*37*	
TOTAL	*28,762,000*	*22,876,200*	*4,153,000*	*1,732,800*	*5,885,800*	*663,020*	*7,718,800*	*293.2*	*13,392,580*		*1,169,980*

Notes:

1. The site will retain the central drainage.
2. There will be two separate waste fill areas.
3. The average cut depth will be 20 feet.
4. The waste to soil ratio is 5:1 for Class II and 10:1 for Class IV.
5. The assumed waste density for Class II waste is 1,300 #/yd^3
6. The assumed waste density for Class IV waste is 600 #/yd^3.
7. The final fill slopes will be 3:1.
8. The top deck elevation is 3565.0 feet.
9. The life is based on 250,000 tons/yr for Class II.
10. The life is based on 35,000 tons/yr for Class IV.

Figure 2.2 depicts the applicant's proposed alternative base liner and leachate collection and removal system (LCRS) elements for the landfill floor. The anchor trench design is provided in Figure 2.3. The base liner elements consist of the following components, from top to bottom:

- LCRS gravel drainage layer
- Non-woven geotextile cushion
- Double-textured HDPE geomembrane (FML)
- Compacted uppermost native subgrade

Figure 2.2 – Base Liner Design Details

(Source: Great West Engineering, Billings Landfill Expansion Application, 2015)

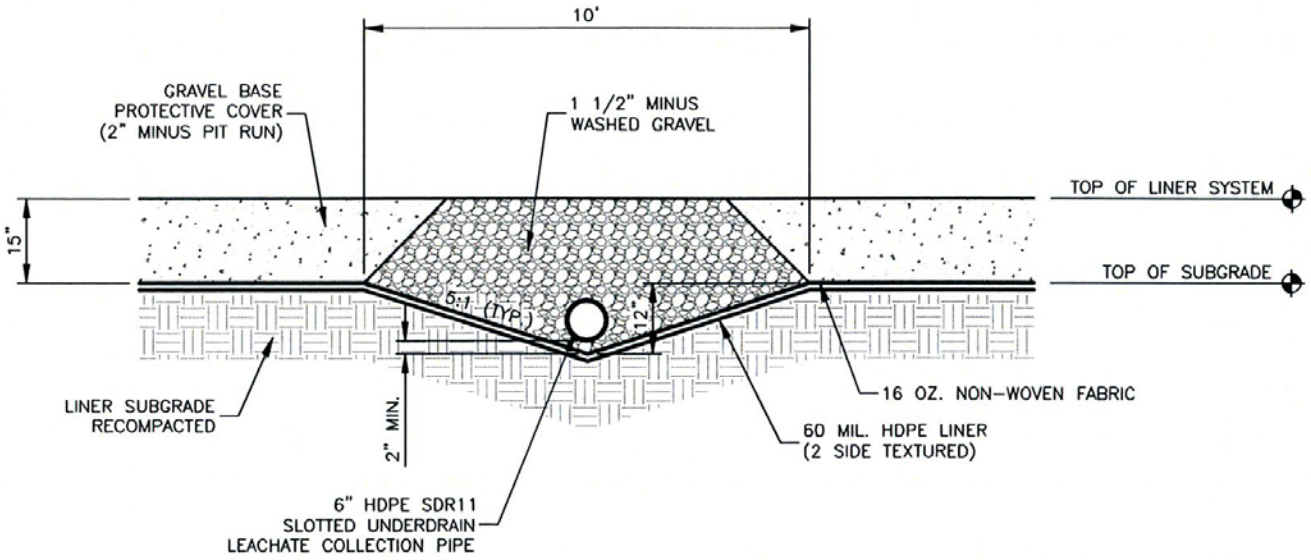
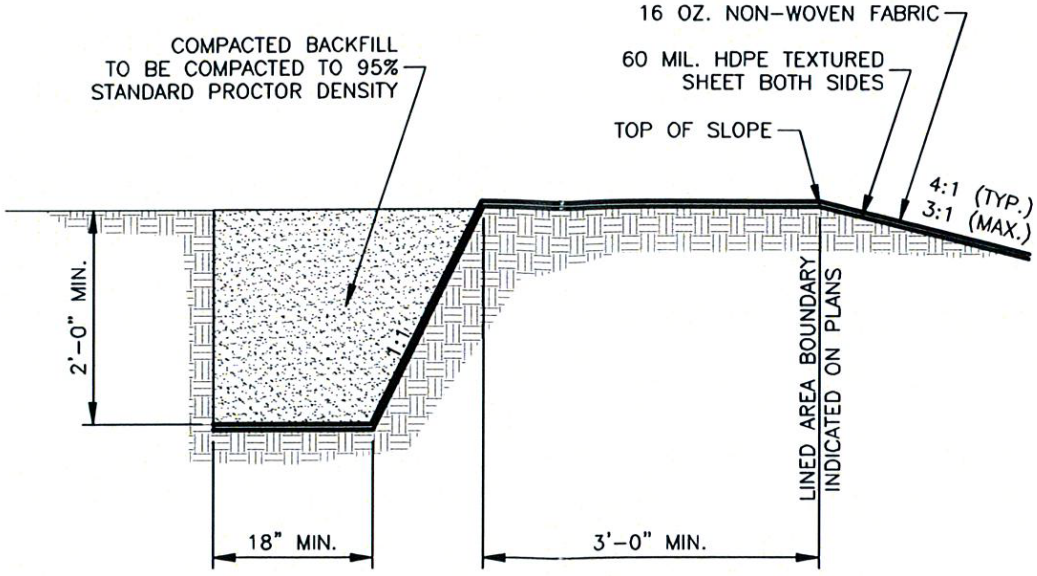


Figure 2.3 – Anchor Trench Details

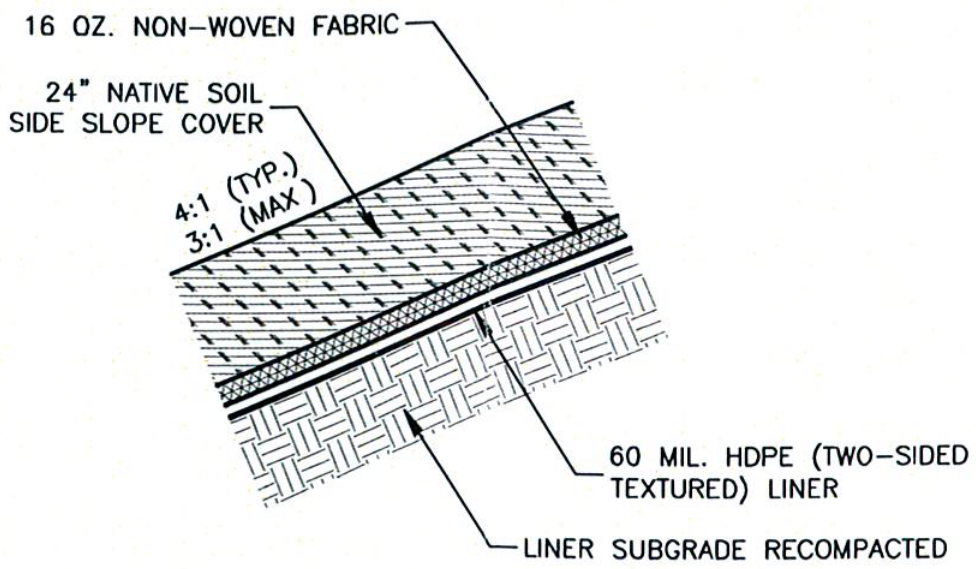
(Source: Great West Engineering, Billings Landfill Expansion Application, 2015)



As shown in Figure 2.4, the slope liner system and LCRS elements consist of the following components, from top to bottom:

- Protective cover soil
- Non-woven geotextile cushion
- HDPE geomembrane (FML)
- Compacted uppermost native subgrade.

Figure 2.4 – Slope Liner Design Details
(Source: Great West Engineering, Billings Landfill Expansion Application, 2015)



2.3.4 Landfill Unit Construction

The proposed liner system described above will be installed during construction of the east and west landfill units according to DEQ's approval and the manufacturer's guidelines for each component. Each component of the liner system will be tested for conformance with the design based on the DEQ-approved Construction Quality Assurance and Construction Quality Control (CQA/CQC) Plan.

The proposed landfill expansion is comprised of two separate Class II landfill units and two separate Class IV units, each of the pairs separated by the central road as shown in Figure 2.1. As illustrated by the Phase 1 plans (Figure 2.5), the complex base grades in each phase will be built following local bedrock topography maintaining at least a two-percent minimum slope on the liner towards a network of lateral leachate collection pipes. These laterals mostly connect to headers that slope towards the leachate mains that follow the central road. Some laterals will connect along gradient directly to the mains. The liner slopes will vary in degree

and aspect, but will not exceed 4:1 (Horizontal:Vertical) slopes; such variations are caused by hardness of bedrock at depth. The maximum waste fill thickness will be approximately 200 feet. Maximum utilization of the designed landfill capacity will provide for the minimum disposal of 12,101,100 tons (18,656,200 cubic yards) of Group II waste when the daily and final cover soil volume is subtracted from the total fill volume (Table 2.1).

Excavation of the native soils to a depth of 25 feet below the existing natural grade within the landfill footprint will remove a total 7,718,800 cubic yards of soil that will be used for daily, intermediate, and final covers. During construction, the lower soil component of the Class II liner will be compacted in one six-inch lift. The native subgrade will be wetted, compacted, and tested to ensure that it meets the compaction specifications; the complete compacted surface of the six-inch soil barrier layer will be rolled and inspected for adequate smoothness before the HDPE geomembrane liner is installed. The geomembrane liner will then be placed in direct and uniform contact with the compacted soil layer with a three- to six-inch overlap on each unrolled panel that will be heat fusion welded along each edge to form a double seam. Located along the steeper eastern flank of the disposal area (Figure 2.1), the Class IV units will be excavated to base grade in shallow bedrock and will provide for the disposal of 4,220,00 cubic yards of Group IV waste.

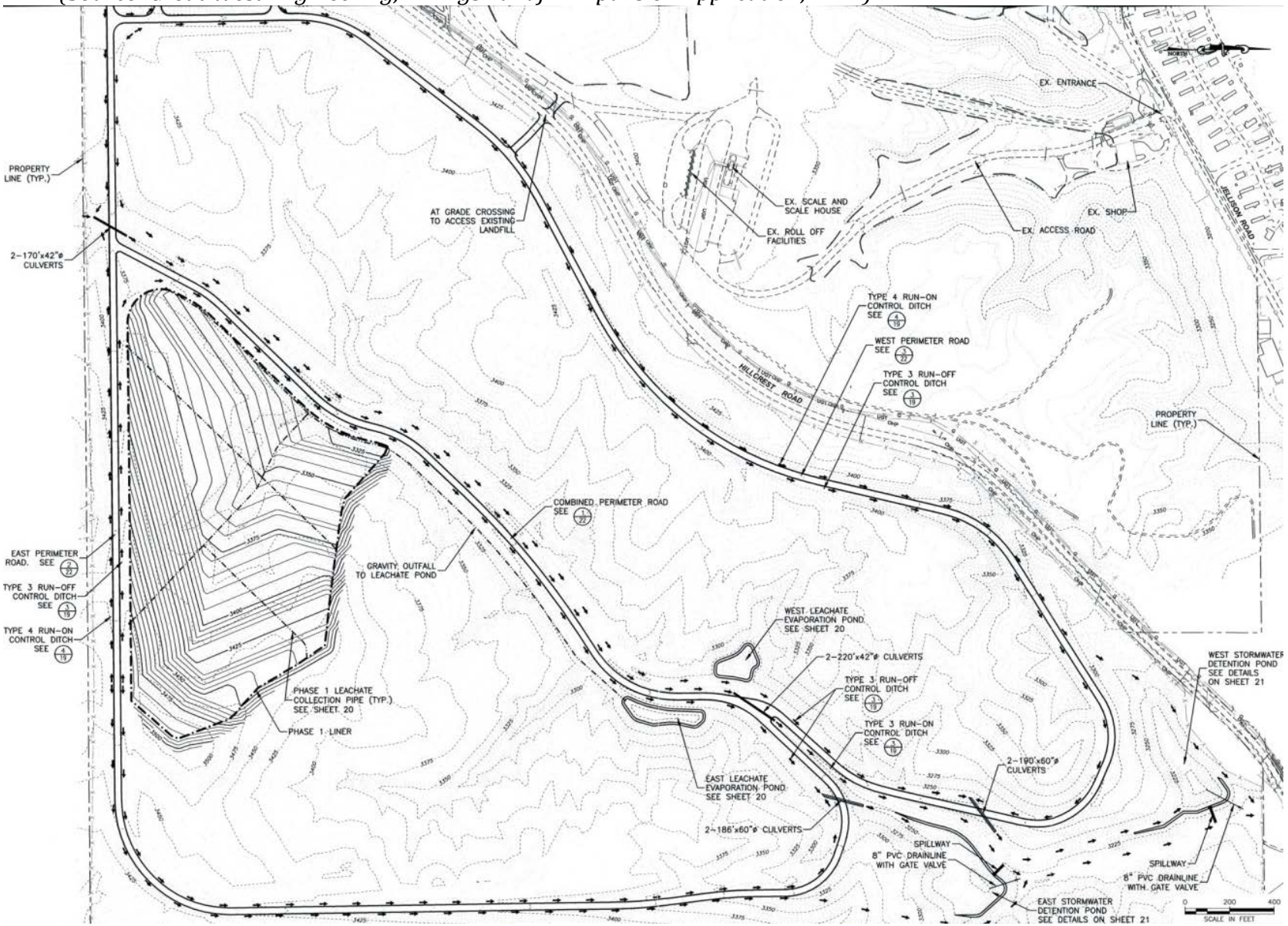
2.3.5 Leachate Collection and Removal System (LCRS) and Leachate Pond Construction

An LCRS and leachate pond will be installed for the east and west Class II landfill units according to all DEQ-approved design plans and CQA/CQC requirements during each phase of construction. All leachate will be collected over the lined base of each Class II landfill unit within the granular drainage layer and will flow into a network of perforated HDPE leachate collection pipes bedded in gravel (*e.g.* Phase 1, Figure 2.5). Numerical models of leachate generation indicate that leachate levels will remain less than 12 inches over the liner as required over a range of rainfall intensity beyond normal averages.

The LCRS design will provide two configurations to account for the difference in base and slope liner stability. For each waste disposal unit base, the granular leachate collection layer and lateral leachate collection pipe trenches will be constructed with at least two-percent slope following changes in grade to convey leachate from the outer edge of the floor towards a central perforated leachate collection header. In the south landfill unit, a leachate divide separates the Phase 1 and Phase 2 pipe networks, but Phase 3 parallels those prior slopes toward the toe. The headers connect downslope from each phase to a single leachate collection main that follows the toe of each unit flanking the central road along the axis of the expansion area.

Figure 2.5 – Phase 1 Design Plan

(Source: Great West Engineering, Billings Landfill Expansion Application, 2015)



The LCRS elements placed over the liner at the base of each unit will consist of the following components from top to bottom (Figure 2.6):

- Leachate collection gravel layer
- Outer coarse gravel filter (trench)
- Inner perforated leachate collection pipe (trench)
- Non-woven geotextile cushion.

On the side slopes of the waste disposal units, the LCRS will consist of a geotextile cushion over the textured geomembrane. Leachate from the side slopes will percolate through the protective cover soil to be carried downslope by gravity drainage through the nonwoven geotextile and lateral collection pipes into the base LCRS network and headers. Each lateral collection pipe will be joined to a solid riser pipe that is extended to the surface on the uphill side-slope berms to allow for cleanout access.

All leachate will be directed to the leachate pond via gravity flow through an external buried, double-walled HDPE leachate conveyance pipe. The temporary liner penetrations installed during Phase 1, 2, and 4 operations (Figure 2.7) will be replaced by permanent penetrations at the toe of Phases 3 and 5 where the main pipes exit the collection sump and connect to the buried conveyance pipes for the east and west Class II landfill units (Figure 2.5). These double-walled HDPE (8-inch carrier pipe inside a 16-inch outer sleeve) leachate conveyance pipes will transport leachate by gravity along both sides of the central road and discharge into the east and west leachate ponds via dissipation manholes.

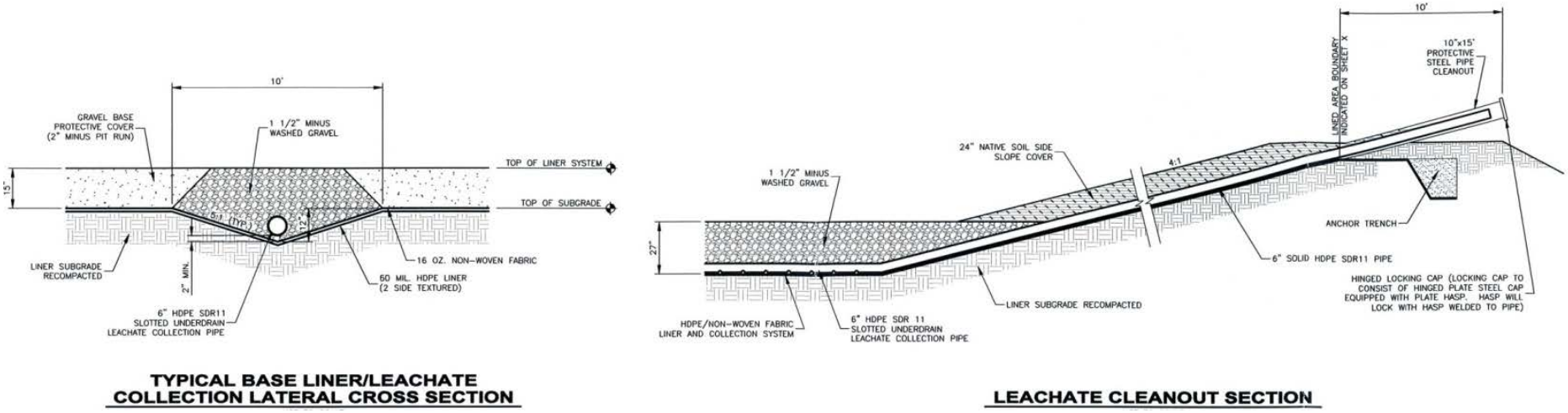
Leachate will be managed largely by evaporation from the leachate pond, but may be applied over the lined active waste disposal areas (areas that are not under final or intermediate cover) for dust control, if needed. This management allows the pond to be emptied faster to assure that there is sufficient capacity available at all times.

Separate leachate ponds will be constructed for each of the east and west Class II landfill units with double composite liner components from top to bottom as follows (Figure 2.8):

- Primary HDPE geomembrane (FML)
- Geonet composite
- Slotted HDPE collector and riser pipe (monitors leakage)
- Geonet composite rub sheet
- Secondary HDPE geomembrane (FML)
- Geosynthetic Clay Liner (GCL), doubled below monitoring sump
- Compacted subgrade.

Each pond bottom will slope 1% toward the detection sump with maximum 3:1 (Horizontal:Vertical) side slopes. The double composite liners for the leachate ponds will be installed in a manner equivalent to the landfill base liner according to all DEQ-approved design plans and CQA/CQC requirements.

Figure 2.6 – Leachate Collection and Removal System Design Detail
(Source: Great West Engineering, Billings Landfill Expansion Application, 2015)



2.3.6 Scale House and Equipment Building

The new gatehouse, scales, maintenance building, and roll-off zee-wall will be accessed by the controlled entrance built off Hillcrest Road, located across from the existing methane gas processing facility near the northwest corner of the proposed expansion area.

2.3.7 Soil Stockpiles

The soil removed as each waste disposal unit is excavated for construction will either be stockpiled in the Class IV unit areas, or will be placed on top of fill in available active or closed landfill cells. Stockpiled soil can be utilized for daily or intermediate cover operations when needed, or placed for use during phased closure of any waste management area that has reached final grade.

2.3.8 Final Closure

The landfill final cover will be constructed in phases. Each unit will be partially closed when it reaches final grade in a progression that follows the sequence of construction (Table 2.1). The maximum open area at any one point in time will be 119 acres. The overall barrier performance characteristics for the composite final cover must at least match that of the base composite liner system, as discussed in Liner Design, Section 1.5.1. Once the outer portions of each phase have been filled to final grade, those areas will be closed. The intermediate soil cover over each of the east and west units will be tied together and capped as a single, mounded disposal unit by a continuous final cover (Figure 2.9). Both Class IV units will be covered in the same manner using the same type of final cover.

The COB proposes to utilize a performance based Alternative Final Cover (AFC) system for closure of all four landfill units in the proposed expansion area, matching the AFC closures for the currently licensed active COB Class II Landfill facility. The AFC demonstration was previously approved by DEQ for compliance with the AFC design requirements and the standards for infiltration reduction, erosion, and revegetation at the currently licensed facility. Incorporation of this previous AFC demonstration report into the proposed COB expansion application documents is adequately justified given the proposed base liner properties and performance as shown by the alternative liner demonstration (Appendix C).

The proposed AFC is designed to provide an engineered soil-plant system that will attain similar water-balance equilibrium as that reached in the surrounding natural soil ecosystem. Consequently, optimal vegetative growth is supported by natural storage of yearly precipitation in the soil cover for the timely release to the plants and evaporation during the growth season. Numerical models based on testing of site soils predict that the proposed AFC performance will approach an upper limit of 1 mm/year (0.05 inch/year) average annual drainage through the cover. Such percolation rates fall within the range required for equivalence to the base liner.

Figure 2.7 – Leachate Collection and Removal System Design During Phased Expansions
(Source: Great West Engineering, Billings Landfill Expansion Application, 2015)

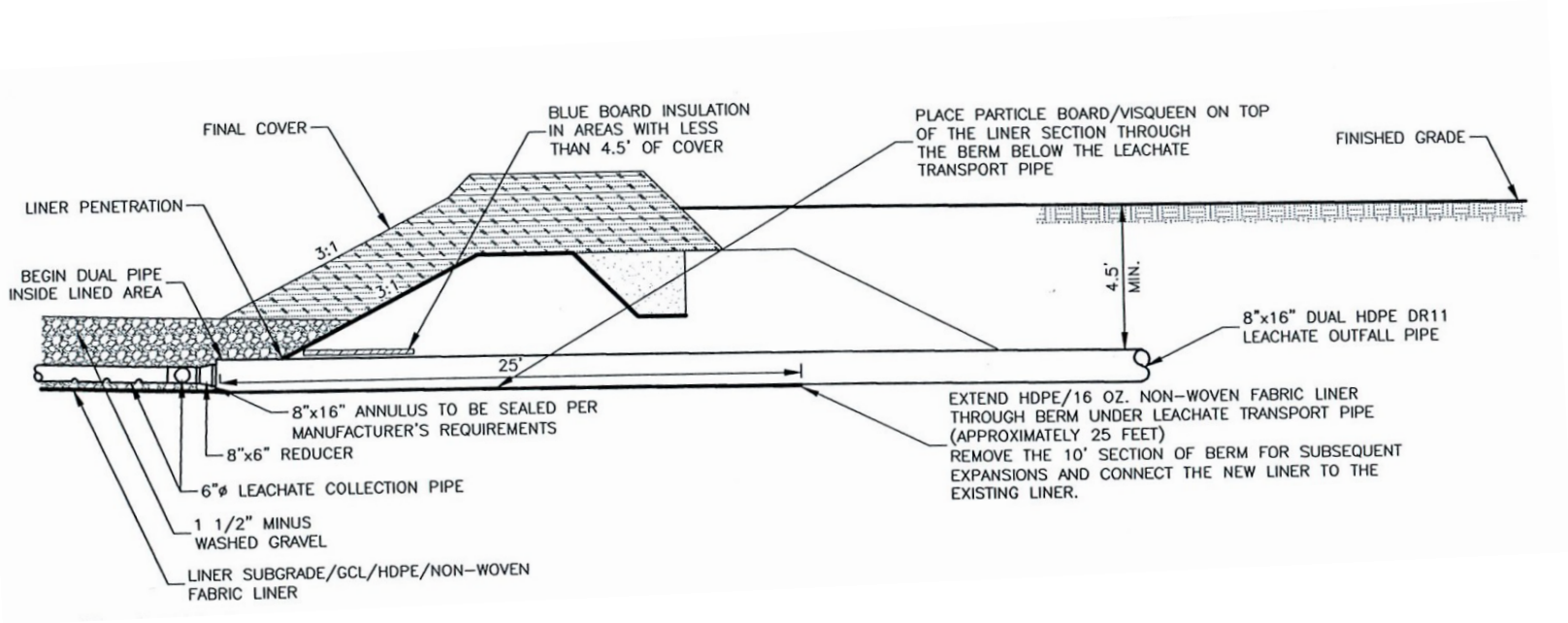


Figure 2.8 – Leachate Pond Design Detail
(Source: Great West Engineering, Billings Landfill Expansion Application, 2015)

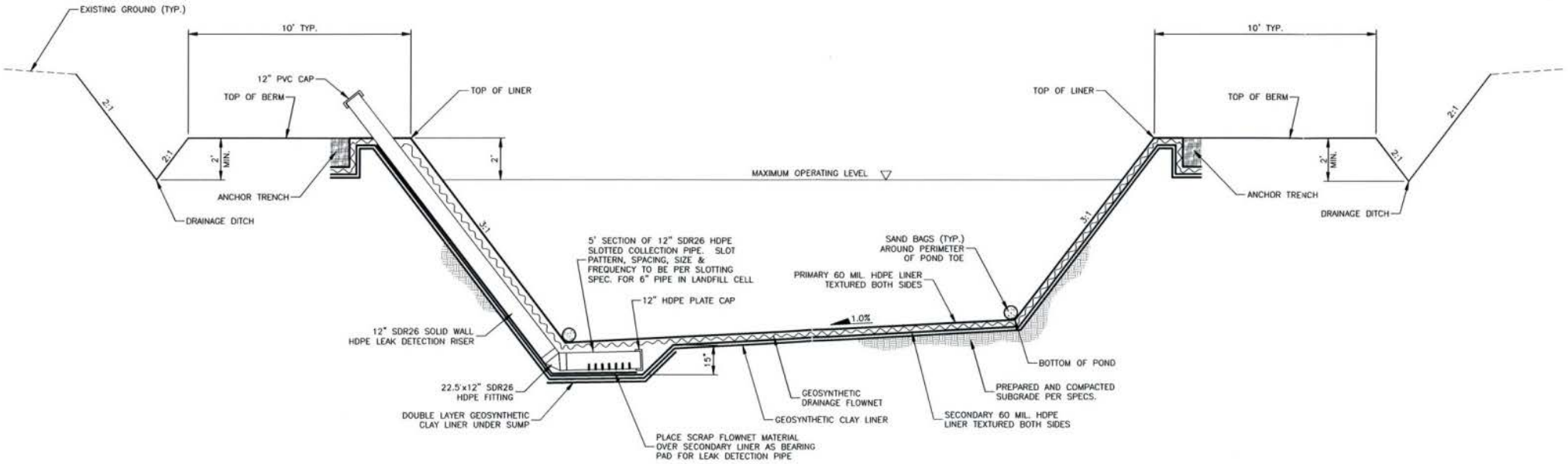
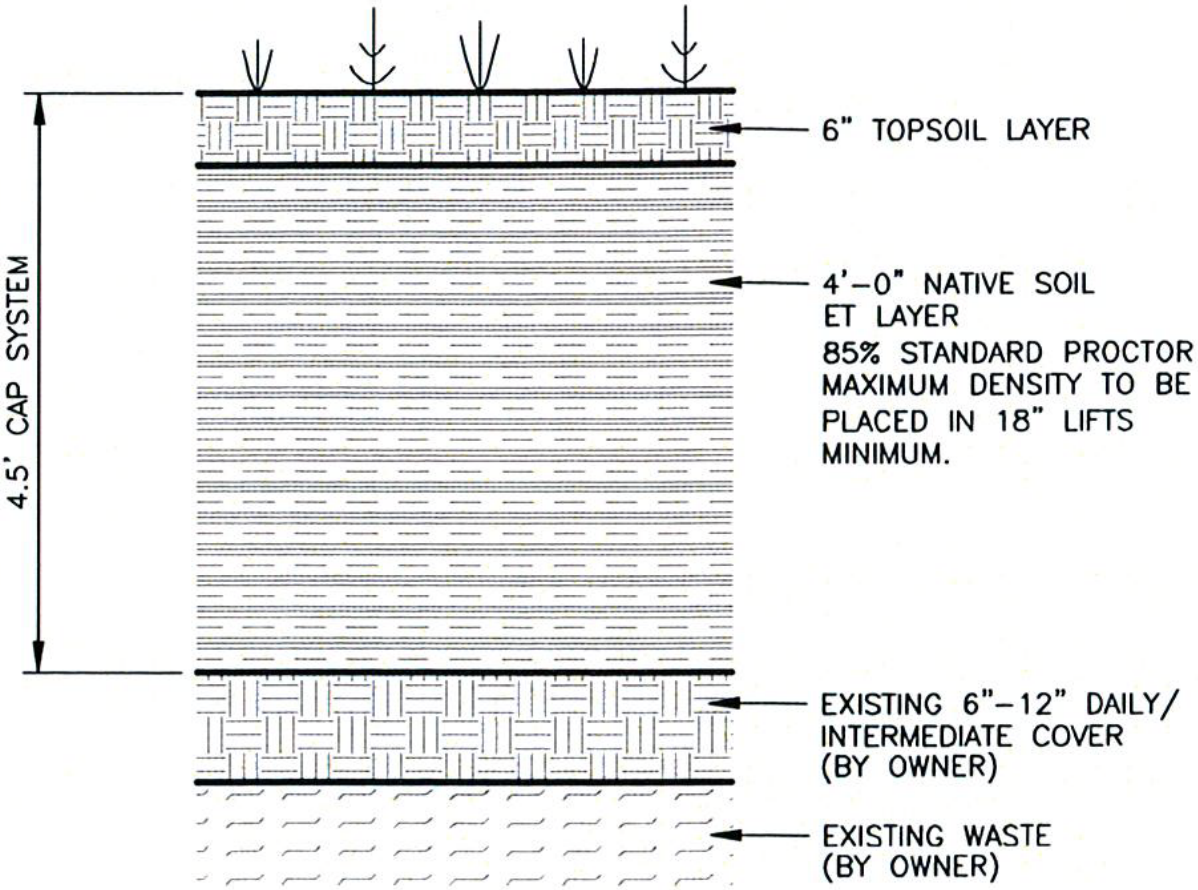


Figure 2.9 – Alternative Final Cover Design Profile
(Source: Great West Engineering, Billings Landfill Expansion Application, 2015)



The monolithic AFC profile (Figure 2.9) for the proposed expansion area landfill will consist of the following field-tested components, from top to bottom:

- Healthy stand of select native local vegetation
- Minimum 6-inch thick topsoil layer
- Minimum 48-inch thick storage layer of select tested and approved soil.

The daily or intermediate covered waste will provide the base for the final cover system. This surface will be prepared smooth and firm. The 48-in monolithic, evapotranspiration (ET) layer will be constructed in one or two continuous lifts compacted to a maximum of 85% standard proctor. The permeability of the ET layer will be verified by a combination of field and laboratory testing. The top layer will consist of six inches of loose topsoil and will be fertilized and seeded in accordance with the recommendations described in the AFC Demonstration and Vegetation Plan. The AFC will be installed according to all methods and testing based on conformance with the DEQ approved Closure Plan specifications and CQA/CQC requirements.

Both west and east Class-II landfill units will reach a final elevation of 3565 feet above mean sea level and relief will not exceed 265 feet above the lowest surrounding grade in the central coulee (Figure 2.10). The final cover top deck will not exceed 3-5% slope and will attain maximum side slopes not to exceed a 3:1 grade. Side slope ditches for storm water control will be constructed to intercept runoff at 50-feet vertical intervals and route flow at approximately 5% percent into grouted downchutes that discharge to the perimeter rip-rap ditches adjacent to the central road.

2.3.9 Operation and Maintenance Plan

The COB Landfill facility will continue to operate as a licensed Class II SWMS and follow a DEQ-approved Operation and Maintenance (O&M) Plan. The facility O&M Plan will be updated at least every five years, and as necessary prior to commencing operations in the proposed expansion area and as on-site conditions change. The facility must comply with applicable requirements of the SWMA and associated administrative rules, including the payment of fees and submittal of an annual application for renewal. Failure to operate the facility according to these requirements could result in enforcement actions, license revocation, or denial of an application for renewal.

2.3.10 Personnel

The proposed expansion area will continue to be operated by COB employees. Site personnel will inspect incoming loads, review incoming waste load records, operate landfill equipment, and apply the necessary soil cover.

2.3.11 Operating Hours

The current City of Billings landfill is open Monday through Saturday from 8:00 a.m. to 5:30 p.m. From May through October, the facility is also open on Sunday from noon to 5:00 p.m. The facility is closed on New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, and Christmas Day.

2.3.12 Access Control

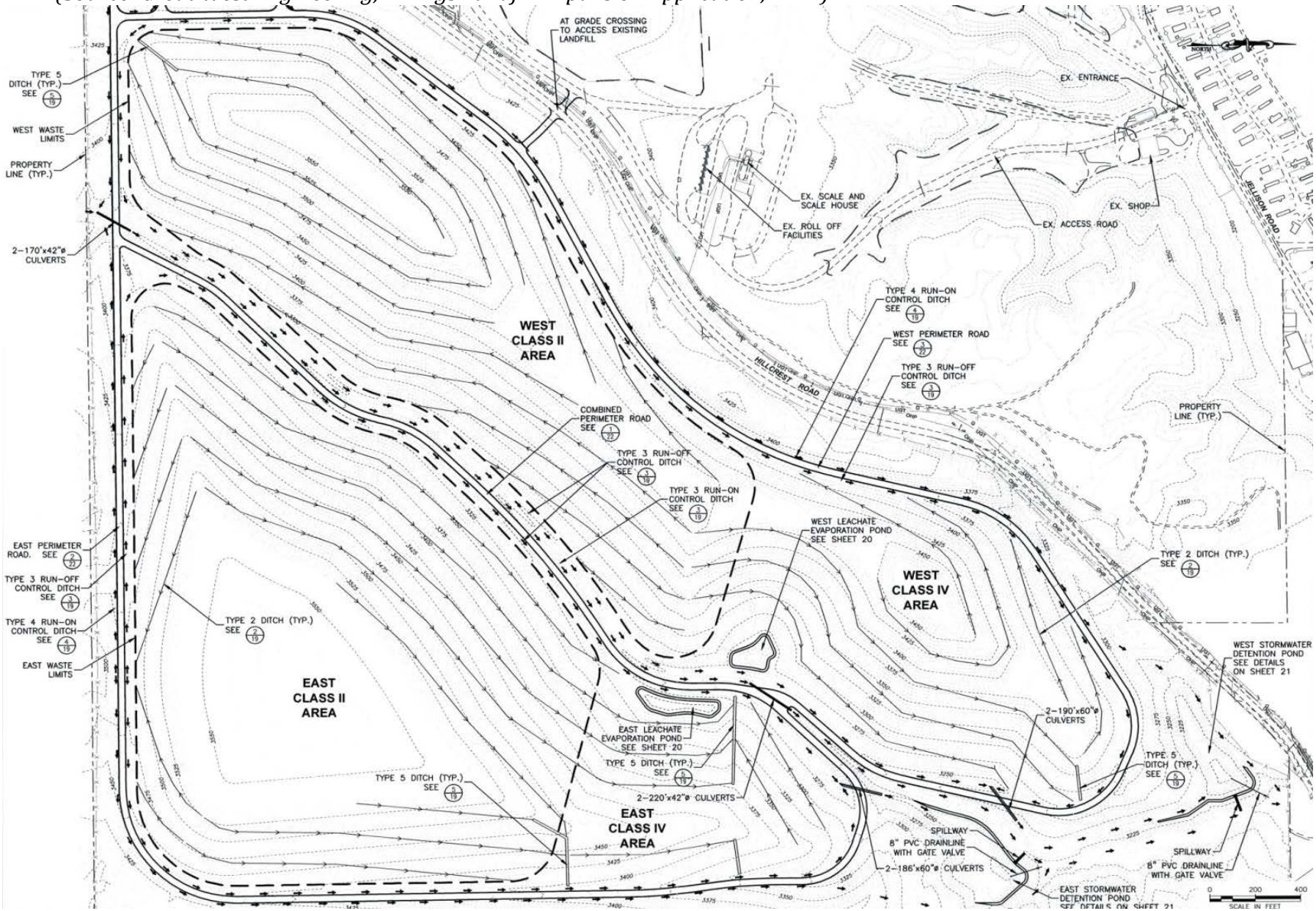
Planned access to the landfill expansion will be provided by Hillcrest Road from South Billings Boulevard. Access into the facility will be controlled through a lockable entrance gate and perimeter fence around the landfill facility. All landfill users will enter the expansion area through the main facility gate. Scale house personnel will continue to control all access through this existing landfill entrance.

2.3.13 Acceptable Wastes

The proposed expansion area will be licensed as a Class II SWMS and continue to accept Group II, III, and IV wastes, as is the current practice at the existing COB Class II Landfill facility. Group II wastes include decomposable wastes and mixed solid wastes containing decomposable materials, but exclude regulated hazardous waste. Group III wastes include wood wastes and other clean non-water soluble or inert solids. This category includes, but is not limited to, brick, rock, dirt, concrete, unpainted and unglued wood materials, and tires. Group IV wastes include construction and demolition wastes and asphalt, but exclude regulated hazardous wastes.

Figure 2.10 – Landfill Final Grading Design

(Source: Great West Engineering, Billings Landfill Expansion Application, 2015)



2.3.14 Waste Screening and Prohibited Wastes

The landfill staff would perform random load inspections to assure landfill compliance with regulations prohibiting the disposal of regulated hazardous waste and polychlorinated-biphenyls (PCB) in solid waste landfills. The landfill operator will monitor each load of incoming wastes at the scale house. Waste screening procedures, including random and targeted load inspections, would continue to be implemented to prevent prohibited wastes from entering the COB Class II Landfill Facility. If unacceptable wastes are discovered at the scale house, the facility would reject the load and instruct the customer to dispose of it at an appropriate facility. Any unacceptable waste discovered by the equipment operators at the working face would be segregated in the waste disposal unit for handling and disposal by a qualified consultant. The facility operator would notify DEQ's Solid Waste Program within 24-hours when prohibited wastes are discovered at the facility or when incoming loads are rejected during the on-site waste screening activities.

The following prohibited wastes would not be accepted for disposal at the COB Class II Landfill Facility: regulated quantities of hazardous waste; listed hazardous wastes; explosives; regulated quantities of polychlorinated biphenyls (PCBs); bulk liquids; highly flammable or volatile substances; septic tank pumpings; and infectious waste as defined by 75-10-1003, MCA.

If questionable wastes that do not fall into the above categories are discovered during operations, these wastes would not be incorporated into the active disposal areas but would be placed outside the area of daily operation for further evaluation. Temporarily stored wastes would be segregated from other wastes in the landfill and protected from wind and water dispersion and leaching as may be appropriate for the type of waste. The hauler responsible for the waste would be determined and would be asked to identify the source of the waste. The waste will then either be removed from the site by the hauler, or the characteristics of the waste identified by the generator to confirm that the waste is acceptable. If the hauler cannot be identified, the COB would have the waste characterized by a private laboratory. In the event that the waste is determined to be prohibited, handling and disposal would be in accordance with the requirements of the appropriate regulatory authorities. The COB would notify DEQ within 24-hours of discovery that prohibited waste has been delivered to the landfill.

2.3.15 Landfill Equipment

Equipment to be used at the landfill during operations includes:

- Dozers;
- Loaders;
- Compactors;
- Graders;
- Water Truck;
- Vacuum Truck;
- Excavator; and
- Roll-off Trucks.

The facility also has an assortment of pick-up trucks, dump trucks, and a welding/service truck that will be available for site operations.

The following equipment will be used during landfill construction:

- Dozers;
- Loaders;
- Rollers;
- Graders;
- Water Truck;
- Scrapers; and
- Excavators.

2.3.16 Daily Landfill Operations

The scale operator will continue to be the first point of contact for vehicles entering the landfill and will direct vehicles to the appropriate waste management areas based upon the type of material being disposed. Trained landfill personnel will continue to maintain control over the area used for discharging wastes. Shipments of special waste with unique disposal requirements, such as friable asbestos or dead animals, would also be directed to their respective disposal areas. Since wastes will be brought to the landfill in a variety of vehicles, the scale operator will direct the individual haulers to areas of the working face apart from the larger commercial vehicles or to roll-off containers located near the scale. Large household appliances and metals will continue to be unloaded at a separate drop-box container.

As refuse is being unloaded at the containers or working face, landfill staff will inspect the loads for recyclable or prohibited materials. Unacceptable waste identified by landfill staff will continue to be separated for proper treatment and disposal, or rejected and returned to the customer. As appropriate, customers with recyclable or salvageable materials will continue to be directed to a licensed off-site recycling facility**.**

2.3.17 Severe Weather Operations

All-season roads will be constructed by re-compacting the subgrade materials within the facility boundary to ensure that facility operations are not hindered during inclement weather. Asphalt may also be used to construct permanent roads in areas that will be used during the life of the facility. The location of the public drop-off area may be adjusted as necessary during muddy conditions. During windy weather, the operators will utilize temporary litter fences that can be moved to strategic areas of the landfill to catch blowing litter. The working face may also be moved to lower elevations, or operations may be shut down temporarily during extremely windy conditions.

2.3.18 Litter Control

Wastes will continue to be compacted and covered as required in the active waste disposal unit as soon as possible after deposition to reduce the possibility of blowing litter. Whenever possible, the active working face will be oriented to the downwind side of prevailing winds and kept to the smallest practical area to minimize exposure and help reduce blowing litter. Landfill personnel will continue to regularly patrol the landfill perimeter and pick up litter blown from the working face on a daily basis. Additionally,

portable litter fences may be placed downwind of the working face. Litter caught on the fences is removed daily, or as necessary. All loads require tarps placed over open truck loads.

2.3.19 Dust Control

The operator is required to control dust on the interior facility roads. Water will be applied as a dust suppressant on an as-needed basis using a water truck. Application of water as a dust suppressant will not cause runoff, erosion, or water/waste interaction. The water will be applied to the road any time the operator observes dust beginning to circulate into the air more than about three feet, where visibility of the drivers could be obstructed. In windy conditions, the operator shall be prepared to implement dust control measures to prevent dust generation. If the operator is unable to control dust generation, the site manager may temporarily halt operations to mitigate dust generation.

To minimize dust generation in the lined active waste disposal units, the facility may use leachate generated from the waste unit as a dust suppressant within the unit. Leachate will only be applied within the active waste disposal unit as-needed to achieve the desired results.

2.3.20 Leachate Control

According to the solid waste regulations, moisture that contacts waste is considered leachate. Leachate generated from the landfill disposal units will be managed by evaporation. The COB will construct two separate leachate evaporation ponds, a 1.5-acre East Leachate Pond and a 1.0-acre West Leachate Pond. Both leachate evaporation ponds will be constructed with at least two-feet of freeboard. The evaporation pond design will provide a maximum capacity sized for variations based on historic annual precipitation models and the peak flows experienced at the active landfill. The leachate ponds have no outlet and leachate may not be released from the leachate pond or landfill units, although leachate may be recirculated over the active Class II landfill unit for land application or infiltration over the composite liner . Solid waste regulations prohibit more than 12 inches of leachate over the liner. Leachate collected in the ponds will be monitored and recorded regularly in the facility operating record.

2.3.21 Storm Water Control

Storm water is water that originates during precipitation events and snow and ice melt. Storm water can soak into the ground, be held on the surface to evaporate, or run off towards downstream surface water bodies. Two storm water ponds will be constructed to retain storm water for sediment control. During routing, this storm water runoff will be managed using standard best management practices (BMP's). Storm water BMP's are control measures used to manage changes in the quality and quantity of storm water runoff. BMP's are designed to reduce the volume, peak flows, and/or quality of storm water through evaporation, infiltration, detention, and filtration. BMP's, including erosion control mats, screens, wattles, or berms, ditches, and ponds will be constructed according to the facility Storm Water Pollution Prevention Plan (SWPPP).

Perimeter ditches will surround the facility to intercept natural runoff from outside the facility, prevent it from flowing onto the site, and route it away from the facility into adjacent natural drainages. Perimeter rip-rap ditches will also be constructed to convey

runoff from areas on the interior side of the facility perimeter road, but outside the waste disposal units, toward a central ditch to the ponds. The central ditch will be constructed in the current drainage (Stream 1 – Section 3.4.2) that flows 1.5 miles north-northeast through the proposed area. The ditches are designed to carry the maximum 25-year 24-hour storm flow volume as required (3.25-inches/day) to control site erosion during large storm events. The pond inlets and outlets will be constructed with riprap plunge pools to further minimize erosion impacts. The 127-acre west drainage basin drains into the 2.5-acre west storm water pond. The west storm water pond is designed to hold 9.1 million gallons (28 acre-feet); the discharge calculated from a 25-year, 24-hour storm event for the area captured by the west basin is 22.7 acre-feet, or 7.4 million gallons. The 123-acre east drainage basin drains into the 3-acre east storm water pond. The east storm water pond is designed to hold 7.2 million gallons (22 acre-feet); the discharge calculated from a 25-year, 24-hour storm event for the area captured by the east basin is 21.5 acre-feet, or 7.0 million gallons.

Effective erosion control BMP's, such as revegetation, may allow clean runoff from some areas to also be routed to the central coulee and naturally discharged offsite. The existing general storm water industrial discharge permit issued by the DEQ Water Protection Bureau for the current Class II Landfill facility will be extended prior to operations in the proposed expansion area. The COB will also acquire the necessary storm water construction permits prior to any landfill unit construction/expansion activities.

The BMP's, including the establishment and maintenance of vegetation on closed areas as well as on the soil stockpiles, will be implemented as necessary. Areas receiving final cover would be contoured for positive drainage so that surface runoff would be routed away from the active disposal area. Runoff from fully re-vegetated and closed areas of the landfill final cover may discharge naturally off-site.

2.3.22 Contingency Planning

The O&M Plan for the active COB Class II Landfill facility has current contingency plans for unusual situations beyond typical screening procedures. The expanded facility will follow similar updated detailed response plans for fire protection and notifications during emergencies. Presently, all emergency operations will be managed under the Incident Command System with one designated Incident Commander. Initial response will be the responsibility of the Landfill Supervisor or any landfill employees present as the mechanism to get the most appropriate emergency response personnel to the site as soon as possible. The Solid Waste Superintendent will assume the lead role in coordinating all contingency plans beyond the initial response phase. In the absence of the Solid Waste Superintendent, the Landfill supervisor and Environmental Compliance Coordinator, in that order, will assume the role of Incident Commander unless replaced by a more appropriate person. The O&M Plan is reviewed at least every five years and as part of the review, the contingency plan will be updated as necessary for DEQ review and approval.

2.3.23 Financial Assurance

In accordance with ARM 17.50.540, all Class II landfills must provide and maintain a Financial Assurance (FA) mechanism to cover costs associated with facility closure and post-closure care. FA ensures that work associated with facility closure and post-closure

care is completed in the event the operator cannot or will not do so on his own accord. Financial assurance is already required for the active COB Class II Landfill facility.

The amount of FA required is based upon the proposed maximum costs associated with third-party closure of the maximum exposed landfill area and the performance of post-closure care activities. If the proposed facility expansion is approved, the current total cost estimate for FA is $7,059,470 and includes projected closure costs of $5,798,870 and $1,260,600 for the 30-year post-closure care period.

The existing COB Class II Landfill FA mechanism is a trust fund. The regulations require that the trust fund be funded prior to the initial placement of waste in the proposed expansion area. DEQ will be the fund beneficiary and control all release of money from the trust fund. The minimum annual payment required to cover the cost of closure and post-closure care is based upon the size of the projected largest open area of the landfill units. The projected largest open area is 119 acres. The FA cost based upon this is currently estimated to be $178,864 accumulated over the first 38 years (Phases 1-4). A payment of $26,263 would be required annually thereafter based on projected 10-year remaining life until closure. The regulations require all Class II facilities to update the FA cost estimates, including adjustments for inflation, and payments to the approved FA mechanism on an annual basis to ensure that the approved FA mechanism is adequately funded.

2.3.24 Post-Closure Care

The Post-Closure Plan identifies the inspection, maintenance, and monitoring activities to be completed during the 30-year post-closure care period, and identifies the frequency for conducting these activities. The final proposed use of the facility is rangeland.

According to the Post-Closure Plan, detailed inspections of the closed landfill facility will be conducted yearly during the post-closure care period and will include:

- Evaluation of the final cover for settlement, erosion and quality of vegetation;
- Inspection of leachate collection, monitoring, and evaporation systems for damage or degradation;
- Inspection of drainage control facilities (berms, ditches, catch basins, piping, manholes, outlets and ponds) for erosion, damage, blockage or accumulation of sediment;
- Condition and functionality of groundwater and methane monitoring wells,
- General site conditions (gates, locks, fencing, survey monuments, etc.); and
- Evaluation of the FA.

The leachate collection pipes will also be cleaned as necessary. If damage or degradation to the final cover, drainage control facilities, monitoring systems or general site features is noted, maintenance will be completed by the owner on a timely basis. Such maintenance activities will be described in the Post-Closure Plan, will follow manufacturer's specifications as necessary, and meet all approved CQA/CQC procedures. The nature of the maintenance completed will be noted on the inspection form, which will be added to the operating record.

A report describing the inspections, conditions observed, corrective actions, maintenance activities, monitoring activities performed, and annual FA adjustments needed in connection with the closed facility will be submitted to DEQ annually and entered into the operating record. Routine groundwater or methane monitoring will be performed by the owner during the post-closure care period in accordance with the DEQ-approved Groundwater or Methane Monitoring Plans.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES BY RESOURCE

3.1 INTRODUCTION

Section 3 describes resources that could be affected by the Proposed Action and discusses the environmental consequences of the Proposed Action and the No Active Alternative.

3.2 LOCATION DESCRIPTION AND STUDY AREA

The project location and associated study area for the Proposed Action include all lands and resources in the proposed Project Area, plus those additional areas identified by technical disciplines as "resource analysis areas" that are beyond the Project Area. Resource analysis areas are identified for each technical discipline.

3.3 TERRESTRIAL AND AQUATIC LIFE AND HABITATS

3.3.1 ANALYSIS AREA AND METHODS

The analysis area for wildlife and aquatic life is the proposed COB Class II Landfill facility expansion site. The analysis methods included DEQ's research of the Natural Resource Heritage Program database to determine the presence of threatened, listed, and/or endangered plant and animal species. DEQ also reviewed the United States Geological Survey topographic maps to determine existing water resources in the area.

3.3.2 AFFECTED ENVIRONMENT

The proposed landfill expansion area is located in an upland plain that is dissected by a secondary drainage that flows to Blue Creek. Blue Creek is a tributary of the Yellowstone River. The expansion area is currently used intermittently for livestock grazing.

The tract is currently dominated by various grasses, sage, and cacti that may be used as forage by local deer and antelope populations. Large areas of similar vegetation are found adjacent to the proposed expansion area. The landscape is not unique and does not contain any specially designated or unique wildlife habitat features.

Wetland and stream delineations were conducted within the area of the proposed expansion. (Appendix D). During the investigation, 14 wetlands, occupying a total of approximately 2.41 acres, were identified. These wetlands were distinguished from the abutting uplands by the presence of wetland indicators, including hydric soils (soils that are saturated, flooded or ponded long enough during the growing season to create anaerobic conditions), and hydrophytic vegetation (plants that grow in the water, or areas deficient in oxygen due to excess water).

The proposed expansion area is located in the Blue Creek Watershed. There are 22 unnamed first-order intermittent streams that discharge into a large second-order intermittent stream (where 2 or more first-order streams join). These 22 unnamed intermittent streams do not carry water year round, but only exhibit seasonal flow when runoff exceeds the rate of infiltration. The large second-order intermittent stream identified as Stream 1 is located in the center of the

proposed expansion area. Seasonal flow occurs in Stream 1 when runoff exceeds the rate of infiltration. Stream 1 starts just south of the proposed area and runs 1.5 miles north-northeast through the proposed area. Discharges from Stream 1 flow into Blue Creek through the culverts constructed under Blue Creek Road. During springtime weather events, it is expected that this area would generate low-gradient riffles. However, the resulting shallow, coarse-bedded intermittent streams with slow flows, but high turbulence, do not provide fish habitat.

3.3.3 ENVIRONMENTAL CONSEQUENCES

3.3.3.1 No Action Alternative

Under this alternative, because the site would not be developed, there would be no additional impacts to terrestrial and aquatic life and habitats.

3.3.3.2 Proposed Action

The primary impact anticipated due to the construction and operation of the landfill within the expansion area will be the displacement of terrestrial and avian species that may currently occupy the site. The COB application for expansion was received before January 1, 2016. Therefore, compliance with the Sage Grouse Executive Order is not required. However, DEQ consulted maps of sage grouse habitat available from the Montana Sage Grouse Conservation Program to determine whether or not sage grouse habitat is present in the proposed expansion area. The result of the habitat map review indicated that sage grouse habitat is not present in the proposed expansion area. A search of the Montana Natural Heritage Program database indicated that there are no threatened or endangered terrestrial or avian species in Township 1 South, Range 26 East. The displacement of other wildlife habitat from construction and operation of the facility may alter the movement of local wildlife. Current populations of deer and antelope that may inhabit portions of the proposed expansion area site will move to other areas of similar habitat. Not all disposal areas within the proposed expansion area will be open at any one time; a maximum of 119 acres of landfill units would be open at any one time. This would leave undisturbed areas available for grazing and bedding. Once the current COB landfill reaches capacity, the disposal units would be closed, capped, and revegetated. Existing wildlife would likely migrate away from disturbances in the proposed expansion area and move into the closed landfill where interactions with humans, vehicles, and heavy equipment would be minimal. Therefore, the impacts from landfill construction and operation on wildlife habitat will be minor due to the abundance of surrounding similar habitats in the vicinity to accommodate any terrestrial or avian species that may be forced to relocate.

Construction of landfill units and associated features of the proposed expansion area will impact the existing wetlands identified on site. The wetlands and bodies of water that would be affected by the expansion have direct contact to Blue Creek, which flows into the Yellowstone River. The United States Army Corps of Engineers (USACE) has elected the Yellowstone River as Traditional Navigable Water, or TNW. Thus, all impacted wetlands and bodies of water are subject to jurisdiction under Section 404 of the Clean Water Act. COB must also obtain a 401 certification from DEQ's Water Quality Bureau prior to any construction activity. The USACE is accountable for Section 404 determinations. The COB must obtain a 404 permit from the USACE prior to any wetland disturbance.

The proposed landfill expansion would impact 2.41 acres of wetland from the construction of the landfill units and storm water control ditches. Although the wetlands identified on site exhibited the primary indicators of wetland hydrology, not all contained standing water during the wetland delineation study. With the disturbance of these wetlands, the construction of mitigated wetlands is required. Wetland mitigation must occur prior to construction. The minimum wetland mitigation requirement would be a 1:1 ratio to achieve 2.41 acres of wetland, or 2.41 mitigation credits. However, mitigation could require at least a 2:1 ratio, depending on project timing and whether or not mitigation wetlands are likely to provide the same or better quality of habitat. Actual mitigation requirements will be determined prior to 404 permitting in a Wetland Mitigation Plan. Additional mitigation credits will be required if mitigation is not completed before construction.

The wetland delineation report identified other potentially jurisdictional waterbodies, including Stream 1, a seasonal tributary to Blue Creek, and several intermittent tributaries to Stream 1. As discussed in Section 2.3.21, the central ditch will be constructed in Stream 1 to divert storm water runoff in the facility to one of two storm water detention ponds. The construction of the proposed expansion will be considered one project, so all impacted wetlands and jurisdictional water bodies would require mitigation even if construction is completed in phases and only disturbs a portion of the waterbodies at any given time.

A number of options currently exist for compensatory wetland and stream mitigation. While the options and agency preferences may change in the coming years, the following list encompasses the primary options available:

- Buy into existing wetland mitigation bank
- Pay into in-lieu fee program prior to anticipated impacts
- Pay into in-lieu fee program at time of permitting and anticipated impacts
- Create mitigation bank for City of Billings prior to anticipated impacts on existing City property or purchased property to have mitigation wetlands in place before permitting and anticipated impacts to minimize required credits
- Create mitigation bank for City of Billings at time of permitting and create additional wetland to fulfill additional required credits because mitigation follows impact
- Contract off-site wetland creation and/or restoration before anticipated impact or additional acreage after impact
- Create wetland on-site at downstream end of intermittent stream/run-on ditch in lower-lying areas for partial mitigation, combined with one of the above strategies to fulfill any remaining mitigation credit requirements

Mitigation must be completed or contracting for off-site wetland creation or restoration must be in place before anticipated impacts occur. If off-site mitigation is selected, mitigation may occur in a different watershed. The 404 permit will specify the wetland mitigation requirements.

3.4 HYDROLOGY

3.4.1 ANALYSIS AREA AND METHODS

The analysis area for hydrology is the proposed COB Class II Landfill facility expansion site and downstream area. Some discussion of regional geology, based upon published reports, is also provided herein. The analysis methods for hydrology included reviewing on-site drilling information, publications of the Montana Bureau of Mines and Geology, and published topographic maps of the area.

3.4.2 AFFECTED ENVIRONMENT

3.4.2.1 Surface Water

The proposed COB Class II expansion site is located approximately 0.8 miles south of the Yellowstone River, the main drainage mapped on the United States Geological Survey (USGS) Billings East MT 1:24,000 quadrangle. Generally, surface water drains from the surrounding upland areas to the north and east via several seasonal first order drainages to large seasonal second order drainage to Blue Creek and into the Yellowstone River.

As part of the proposed expansion project, COB's consulting engineers conducted a wetland and stream delineation study in October 2012. The investigation was conducted using methods described in the Corps of Engineers Wetland Delineation Manual, as updated by the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region. The field investigation identified 14 wetlands with a cumulative area of 2.41 acres in the study area. The proposed expansion area also contains 22 unnamed first-order streams that discharge into a large second-order stream (where 2 or more first-order streams join). The large second-order intermittent stream, identified as Stream 1, runs through the center of the proposed expansion area. Stream 1 starts just south of the proposed area and runs 1.5 miles north-northeast through the proposed area, and discharges into Blue Creek through the culverts constructed under Blue Creek Road. In the week prior to the October 2012 stream delineation investigation, Billings had 1.5 inches of rain and temperatures were generally in the normal range for early October. None of the intermittent streams, including Stream 1, contained surface water flow in any part of the channel during the October 2012 field investigation. Due to the intermittent nature of these drainages identified within the proposed expansion area, none of these drainages contribute a large amount of flow to Blue Creek.

3.4.2.2 Ground Water

The distribution and physical properties of the underlying geologic units affect the availability, movement, and quality of ground water. The proposed expansion site is located within The Yellowstone River valley which lies between the sandstone cliffs to the north and rolling hills underlain by a thick sequence of shale to the south. The cliffs are locally known as the "Rims" and are composed of the Eagle Sandstone and the Telegraph Creek Formation, both are Cretaceous in age. The sandstone formations dip gently to the north and are not present in the valley beneath the river. Within the Yellowstone River valley, the Yellowstone River has cut down into a thick sequence of Cretaceous aged shale. The shale sequence is on the order of 2,000 feet thick and is widely exposed in the hills south of Billings, as evidenced in the proposed landfill expansion area hydrogeological and soils investigation.

The two geological units within the proposed landfill expansion property are the Belle Fourche unit and the Quaternary-aged (Pleistocene) deposit. The Belle Fourche shale underlies the entire site, exposed either at the surface or near the surface, and consists of a fine-grained sedimentary rock of upper Cretaceous age. The unit is thinly-laminated, dark bluish-gray, and consists almost entirely of silt- and clay-sized particles. The Quaternary-aged (Pleistocene) deposit consists of silt, sand and gravel that underlie the center of the easternmost part of the expansion area property; it is expressed as a flat, non-eroded prairie and is obvious on the land east of the expansion area property. Several faults were identified in the proposed expansion area. None of the faults are active and the proposed landfill expansion area does not lie within any seismic impact zone.

Within the Yellowstone River valley, ground water generally occurs in gravel deposits ranging from 0 to 30 feet thick and lying beneath these terraces. Saturated thickness beneath the terraces is approximately 15 feet and the individual terraces do not appear to be hydraulically connected. There is up to 100 feet of silty clay or clayey sand above the saturated gravel units that acts as a confining layer in some areas.

Ground water in the proposed expansion area was encountered in at least two of the four deeper borings and monitoring wells were established at these two locations (B8 and B16). In general, the lower depths of the weathered Belle Fourche shale, perhaps as deep as 45 feet below ground surface, appear capable of transmitting small quantities of groundwater. Ground water also migrates on top of thicker bentonite beds. Due to the lack of consistency in the occurrence of ground water, the generally shallow depths at which it was conclusively detected and apparently low yields of the water-bearing formations, the hydrogeological regime appears to consist of locally recharged perched aquifers. Conditions documented during the hydrogeological and soils study support the assertion that groundwater is not contiguous, is locally recharged, and occurs as isolated, perched water-bearing zones. These are the same conditions that are dominant at the existing landfill, which is immediately adjacent to the proposed expansion area.

Locations of nearby ground water wells, including public water supply wells, within one-mile of the proposed expansion area boundary were identified by a search of the Montana Bureau of Mines and Geology's (MBMG) Groundwater Information Center (GWIC) database. The GWIC database lists 46 water-supply wells within a one-mile radius of the proposed expansion area. Because the GWIC database locates wells by section, all wells in the section containing the proposed expansion area were included in this analysis. Table 3.1 summarizes the well information by section. The data used to create this table are collected from well drillers' records and are not verified for accuracy. The wells identified by GWIC nearest to the proposed expansion site are greater than 20 feet deep and have static water levels greater than 7 feet below ground surface. Most of those wells are concentrated within the southeast quarter of Section 20, Township 1 South, Range 26 East. All but four of the wells are set in alluvial aquifers related to Blue Creek or the Yellowstone River. The remaining four wells appear to penetrate aquifers within the Mowry shale. The Mowry shale underlies the Belle Fourche formation found at the landfill

Table 3.1: Nearby Well Information

(Source: Montana Bureau of Mines and Geology, GWIC database)

Gwic Id	Twn	Rng	Sec	Q Sec	Type	Total Depth	Static water level	Yield	Date	Use
179454	01S	26E	19	DADA	WELL	19	10	17.5	12/22/1999	PUBLIC
179455	01S	26E	19	DADA	WELL	20	10	75	12/23/1999	PUBLIC
94160	01S	26E	19	DD	WELL	30	10		8/12/1977	DOMESTIC
94161	01S	26E	19	DD	WELL	30	10		8/12/1977	DOMESTIC
144866	01S	26E	20		WELL	22	12	20	6/20/1988	DOMESTIC
94163	01S	26E	20		WELL	32	7	20	10/9/1967	DOMESTIC
94164	01S	26E	20		WELL	29	13	20	4/20/1978	DOMESTIC
94165	01S	26E	20		WELL	35	14	10	11/28/1977	DOMESTIC
94166	01S	26E	20		WELL	35	14	10	11/29/1977	DOMESTIC
199219	01S	26E	20		WELL	29	18.5	50	8/6/2002	DOMESTIC
94170	01S	26E	20	D	WELL	32	12	10	3/28/1968	DOMESTIC
94171	01S	26E	20	D	WELL	29	14	25	12/16/1974	DOMESTIC
94172	01S	26E	20	D	WELL	32	15	20	12/16/1974	DOMESTIC
94173	01S	26E	20	D	WELL	36	16	8	9/28/1977	DOMESTIC
94174	01S	26E	20	D	WELL	34	15	8	11/7/1979	DOMESTIC
94181	01S	26E	20	D	WELL	35	25	15	1/1/1954	DOMESTIC
143913	01S	26E	20	D	WELL	31	11	20	10/3/1989	DOMESTIC
94176	01S	26E	20	DA	WELL	30	18		5/10/1962	DOMESTIC
94177	01S	26E	20	DA	WELL	33	8	12	9/12/1963	DOMESTIC
280024	01S	26E	20	DA	WELL	29	13	8	8/21/2014	DOMESTIC
280024	01S	26E	20	DA	WELL	29	13	8	8/21/2014	DOMESTIC
94178	01S	26E	20	DAA	WELL	29	15	30	11/14/1969	DOMESTIC
94162	01S	26E	20	DACA	WELL	36	19	8	10/16/1976	DOMESTIC
144867	01S	26E	20	DACB	WELL	29	16	24	10/15/1990	DOMESTIC
94179	01S	26E	20	DD	WELL	35	7	15	6/19/1978	DOMESTIC
94180	01S	26E	20	DD	WELL	32	14	20	10/15/1986	UNKNOWN
143914	01S	26E	20	DD	WELL	27	9	20	6/23/1989	DOMESTIC
187038	01S	26E	20	DD	WELL	33	13.8	33	5/15/2000	IRRIGATION
184287	01S	26E	20	DDB	WELL	110	31	2.5	8/8/2000	DOMESTIC
705319	01S	26E	20	DDDA	WELL	22			7/1/1978	DOMESTIC
270054	01S	26E	21	DB	WELL	15			8/14/2012	MONITORING
94189	01S	26E	28		WELL	55	14	25	8/25/1975	DOMESTIC
94191	01S	26E	28	ABBD	WELL	30	10	5	11/26/1984	DOMESTIC
181372	01S	26E	28	ACDB	WELL					
6978	01S	26E	28	ACDB	WELL	25	12.7			DOMESTIC
143915	01S	26E	28	BA	WELL	45	11	1.5	8/5/1991	DOMESTIC
94192	01S	26E	28	BA	WELL	25	18	20	1/1/1895	DOMESTIC
218551	01S	26E	28	BAA	WELL	20	0		11/6/2003	TEST WELL
705320	01S	26E	28	BACD	WELL	40				DOMESTIC
160975	01S	26E	28	DCC	WELL	65	24	6	8/27/1996	DOMESTIC
94190	01S	26E	28		WELL	35	7	28	7/12/1977	DOMESTIC

Gwic Id	Twn	Rng	Sec	Q Sec	Type	Total Depth	Static water level	Yield	Date	Use
230197	01S	26E	30	DB	WELL	35			9/29/2006	DOMESTIC
94193	01S	26E	31	BB	WELL	1,291.00			1/1/1961	STOCK
176733	01S	26E	33	DDC	WELL	245	75	0.5	8/9/1999	
94197	01S	26E	33	DDDA	WELL	32	9	20	7/12/1982	UNUSED
162939	01S	26E	33	BDD	WELL	50	28	30	2/28/1997	IRRIGATION

3.4.3 ENVIRONMENTAL CONSEQUENCES

3.4.3.1 No Action Alternative

Under this alternative, because the site would not be developed, there would be no additional impacts to site surface water or ground water.

3.4.3.2 Proposed Action

3.4.3.2.1 Surface Water

Surface water at the proposed site consists of the natural flow of water discharged when the excess water generated by rain or snowfall, melting of accumulated snow, or seepage from groundwater springs flows freely over the land surface into the intermittent drainages.

Surface water flow may occur over bare rock or ice, when the soil is saturated and ponding capacity is exceeded, when precipitation falls more quickly than the soil can absorb it, or more typically when a combination of all these conditions exists. Storm water runoff can cause erosion and may transport sediments some distance from their source depending upon the intensity of the runoff, vegetative cover, soil characteristics, and topography.

The current regulations require licensed solid waste management systems to control storm water runoff. As discussed in the facility design section, the overall design of the proposed COB Class II Landfill facility includes the construction of two perimeter ditches and a central ditch and berms that will keep storm water run-on that originates upgradient from entering any waste disposal area. Construction of the landfill disposal units will result in the removal of the first-order drainages identified on site. The central ditch will be constructed in the current second-order intermittent drainage (Stream 1 – Section 3.4.2) that runs 1.5 miles north-northeast through the proposed area. Perimeter ditches will surround the facility to intercept natural runoff from outside the facility, prevent it from flowing onto the site, and route it away from the facility into adjacent natural drainages. Perimeter rip-rap ditches will also be constructed to convey runoff from areas on the interior side of the facility perimeter road, but outside the waste disposal units, toward a central ditch to the ponds. The interior perimeter ditches are designed to carry the maximum 25-year 24-hour storm flow volume as required (3.25-inches/day) to control site erosion during large storm events. Storm water flow in the interior perimeter ditches will be conveyed to one of two storm water detention ponds. The detention ponds are designed to settle the solid particles in the storm water and retain at a minimum the total volume of water from the 25-year, 24-hour storm event in accordance with State and Federal requirements. The pond inlets and outlets will be constructed with riprap plunge pools to further minimize erosion impacts. The 127-acre west drainage basin drains into the 2.5-acre west storm water pond. The pond is designed to hold 9.1

million gallons (28 acre-feet); the discharge calculated from a 25-year, 24-hour storm event for the area captured by the west basin is 22.7 acre-feet, or 7.4 million gallons. The 123-acre east basin drains into the 3-acre east storm water pond. The east storm water pond is designed to hold 7.2 million gallons (22 acre-feet); the discharge calculated from a 25-year, 24-hour storm event for the area captured by the east basin is 21.5 acre-feet, or 7.0 million gallons.

The COB will operate and maintain the detention ponds and ditches in accordance with the SWPPP and General Industrial MPDES Permit throughout the life of the facility. As required by the regulations, the storm water retention pond is designed at a minimum to contain a surge of storm water generated from a 25-year, 24-hour rainfall with adequate freeboard on pond inlets and berms. Any necessary discharges from the ponds would be routed to the natural drainage that flows to Blue Creek. If a discharge occurs, the discharge permit requires that the storm water be sampled for total suspended solids and iron to ensure that the waters that are released do not deposit sediment downstream.

The COB landfill staff will be responsible for maintenance of all on-site drainage structures and ditches. Maintenance will include the implementation of Best Management Practices (BMPs) to control erosion and sediment transport.

Construction of landfill units and associated features of the proposed expansion area will remove the 2.41 acres of existing wetlands identified on site. The wetlands and bodies of water that would be affected by the expansion currently have direct contact to Blue Creek, which flows into the Yellowstone River. The United States Army Corps of Engineers (USACE) has elected the Yellowstone River as Traditional Navigable Water, or TNW. Thus, all impacted wetlands and bodies of water are subject to jurisdiction under Section 404 of the Clean Water Act. COB must also obtain a 401 certification from DEQ's Water Quality Bureau prior to any construction activity. The USACE is accountable for Section 404 determinations. The COB must obtain a 404 permit from the USACE prior to any wetland disturbance.

With the disturbance of these wetlands, the construction of mitigated wetlands is required. Wetland mitigation must occur prior to construction. The minimum wetland mitigation requirement would be a 1:1 ratio to achieve 2.41 acres of wetland, or 2.41 mitigation credits. However, mitigation could require at least a 2:1 ratio, depending on project timing and whether or not mitigation wetlands are likely to provide the same or better quality of habitat. Actual mitigation requirements will be determined prior to 404 permitting in a Wetland Mitigation Plan. Additional mitigation credits will be required if mitigation is not completed before construction.

The wetland delineation report identified other potentially jurisdictional waterbodies, including Stream 1, a seasonal tributary to Blue Creek, and several intermittent tributaries to Stream 1. As discussed in Section 2.3.21, the central ditch will be constructed in Stream 1 to divert storm water runoff in the facility to one of two storm water detention ponds. The construction of the proposed expansion will be considered one project, so all impacted wetlands and jurisdictional water bodies would require mitigation even if construction is completed in phases and only disturbs a portion of the waterbodies at any given time.

A number of options currently exist for compensatory wetland and stream mitigation. While the options and agency preferences may change in the coming years, the following list encompasses the primary options available:

- Buy into existing wetland mitigation bank
- Pay into in-lieu fee program prior to anticipated impacts
- Pay into in-lieu fee program at time of permitting and anticipated impacts
- Create mitigation bank for City of Billings prior to anticipated impacts on existing City property or purchased property to have mitigation wetlands in place before permitting and anticipated impacts to minimize required credits
- Create mitigation bank for City of Billings at time of permitting and create additional wetland to fulfill additional required credits because mitigation follows impact
- Contract off-site wetland creation and/or restoration before anticipated impact or additional acreage after impact
- Create wetland on-site at downstream end of intermittent stream/run-on ditch in lower-lying areas for partial mitigation, combined with one of the above strategies to fulfill any remaining mitigation credit requirements

Mitigation must be completed, or contracting for off-site wetland creation or restoration must be in place, before anticipated impacts occur. If off-site mitigation is selected, mitigation may occur in a different watershed. The 404 permit will specify the wetland mitigation requirements.

Due to the small size of the watershed in the proposed expansion area, the low precipitation the area receives, the effectiveness of the perimeter ditches, and the proposed storm water controls including the storm water ponds, the impacts to surface water from the construction and operation of the facility are expected to be minor. The controlled release of storm water from the storm water detention pond would not contain the suspended sediments that is currently contained in runoff that occurs presently during heavy precipitation or snowmelt events.

3.4.3.2.2 Ground Water-No Migration Determination

The hydrogeological and soils investigations were conducted during March and April of 2013 and then again during September 2014. The 2013 field work consisted of the drilling and excavation of 10 exploratory borings and 17 test pits. During September 2014, an additional 21 test borings and 40 test excavations were completed. Of the 31 test borings, 28 terminated in the Belle Fourche shale, ranging in depth from 17 to 300 feet below ground surface (bgs). The 57 test pits were excavated to a depth of approximately 12 feet bgs. Figure 3.1 provides a map of the location of soil borings and test pits.

The subsurface profile in the exploratory borings generally consisted of a thin layer of topsoil overlying interbedded layers of alluvial clay, sand, and gravel which extended to depths ranging from approximately 0.5 to 50.5 feet bgs.

The profile encountered in the test pits generally consisted of a thin layer of topsoil overlying interbedded layers of alluvial clay, sand, and gravel which extended to depths ranging from approximately 1.5 feet bgs to beyond the excavated depth of approximately 12 feet bgs. The Belle Fourche shale bedrock was encountered below the alluvial soil deposits and extended beyond the maximum depth of the test pits in 42 of the 57 test pits.

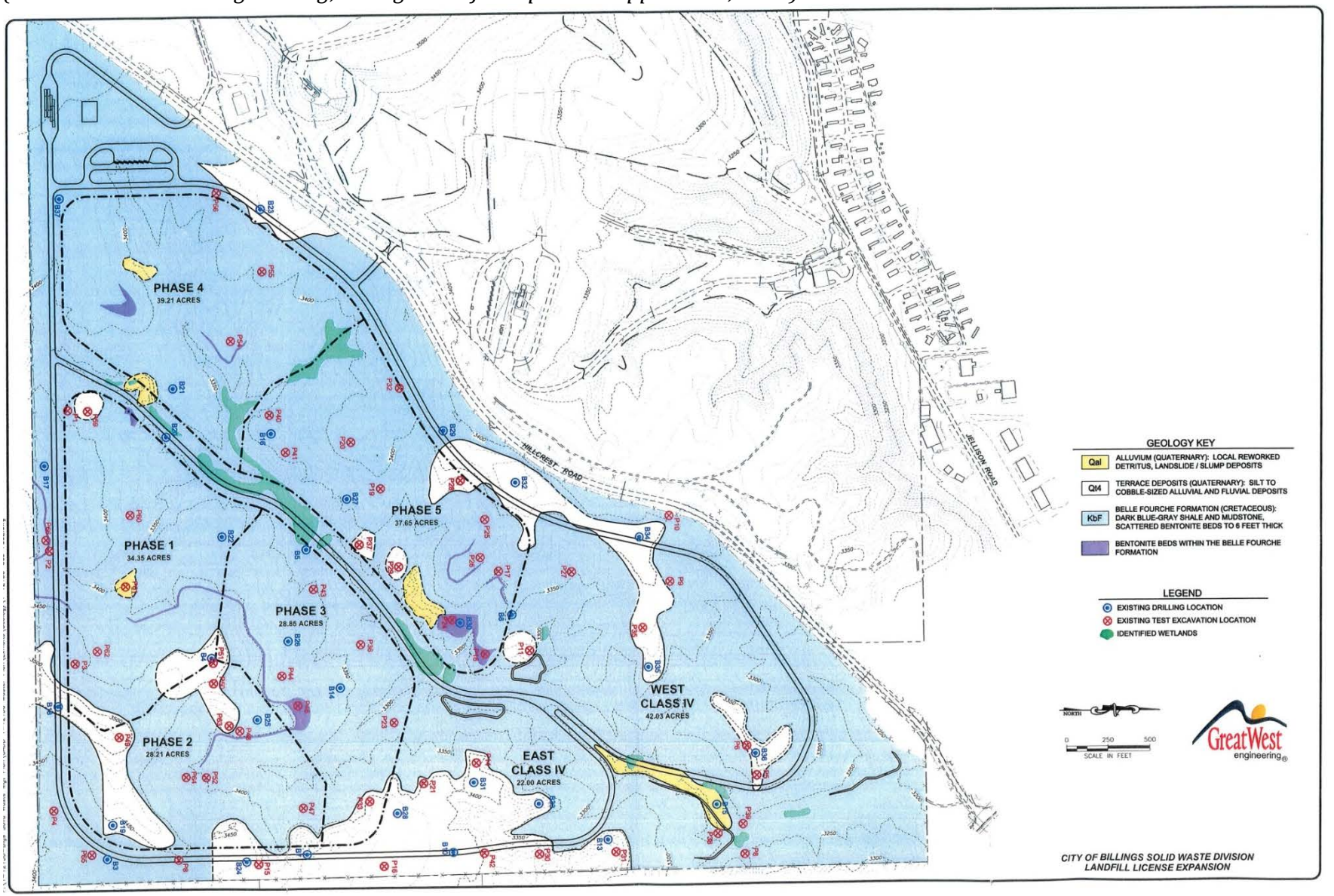
The Belle Fourche shale in the area is reported to be at least 350 to 400 feet thick, and is documented in a well log to be from 1,200 to 1,300 feet thick in one well located approximately 1.5 miles to the west of the expansion area. The shallowest groundwater proximal to the proposed expansion area is at the current COB Class II Landfill, where previous investigations suggest that the groundwater is locally recharged within discontinuous zones of the Belle Fourche, the overlying Greenhorn shale and a Quaternary-aged landslide. Groundwater was not encountered in any of the drilled borings at the time of the field investigation, other than in minimal quantities in isolated zones. Two of the borings drilled during the site investigation (B8 and B16) were completed as monitoring wells at depths of 48 feet and 55 feet bgs, respectively. Since construction, these two wells have been monitored for water levels. Groundwater will not be intercepted in the areas excavated for construction of the disposal units. In addition, slug tests have been performed to determine the hydraulic conductivity properties. The results of the slug test conducted on well BRLX-B8 indicated a hydraulic conductivity of 35 feet per day; while the slug test performed on well BRLX-B16 indicated indicate a hydraulic conductivity of 0.07 feet per day. These conflicting results demonstrate the lack of a laterally continuous aquifer at the site. The result from well BRLX-8 indicates a possible, localized infiltration to that well, which may be a response from fractures in the clay rich bedrock.

The water level monitoring has indicated very limited quantities of groundwater. The slug tests recharge rates validate the absence of a viable aquifer. To further determine the source and response of groundwater recharge to the aquifer, a pressure transducer was installed in the monitoring well completed in boring B-8 (MW-BRLX-B-8). Transducers are used to measure and log static water level data to record changes in water levels in wells over longer periods of time. The overall conclusion based upon the transducer data collected from November 2015 to August 2016 was that there no direct connection between precipitation events and ground water recharge of the localized aquifer. Several significant precipitation events that occurred during this time period did not result in an increase in water levels, confirming that precipitation is not a source of recharge.

Another indication of the lack of recharge in the area from precipitation is radiocarbon dating analysis performed in 1997. Three samples were collected from monitoring wells located at the existing COB landfill monitoring network for Carbon-14 (C-14) dating. The results of the C-14 dating, after dilution factors were applied, indicated that groundwater ages in the area ranged from present to 2,700 years before present (BP) in monitoring well DH-M-1; a mid-range of 2,400 to 6,700 years BP in monitoring well DH-18; and from 18,700 to 23,000 years BP at monitoring well DH-16.

The overall conclusion from the investigation is that the property and surrounding upland areas do not present an identifiable connecting groundwater system that would allow for the placement of either background wells or downgradient wells. These conditions also exist to the immediate south and west of the expansion area and are apparent by the fact that homes built in this area do not have wells, but have cisterns and potable water is hauled in due to the lack of available groundwater. Therefore, developing a groundwater monitoring network and plan will be impractical for the facility.

Figure 3.1 – Location of Site Characterization Test Pits and Borings
(Source: Great West Engineering, Billings Landfill Expansion Application, 2015)



The speed of movement of leachate migration and landfill gas diffusion within the shale located beneath the adjacent Phase V of the existing landfill was calculated using the POLLUTE version 7.11 model software. The model has a 15-year history, and functions on the integration of data to develop rates of flow and contaminant concentrations based on diffusion. The model assumes, as a conservative input, that there is no liner and that there is no attenuation, both of which are not the circumstance at the proposed expansion area. The minimum possible estimate from the model output of migration time of the leachate and landfill gas to the uppermost aquifer was 150 years. This estimate is well beyond the expected life of the expansion plus the required 30-year post closure period.

No continuous uppermost aquifer was found upon drilling to 300-ft maximum depth below ground surface during site investigations. Any leachate seepage would not reach this depth for 2900 years (or probably longer) after potential release into the natural subsurface shales. Additionally, the attenuating natural subgrade also meets the standards for landfill gas diffusion (*e.g.* any vinyl chloride component) to depths likely not more than 25 feet for a period of at least 100 years after closure.

The log for the well located approximately 1.5 miles west of the expansion area, drilled to a depth below the Belle Fourche (1,291 feet bgs), reports the well is under artesian pressure. An artesian aquifer is a confined aquifer that contains ground water under positive pressure. When a well is completed in a confined aquifer, the water level in the well rises above the height of the surrounding water table until it reaches hydrostatic equilibrium. Considering that leachate and landfill gas would have to first migrate through the HDPE liner and 300 feet of the very low permeability shale, the leachate would then have to overcome artesian pressure of the deep aquifer, a phenomena which is very unlikely. The most likely estimate for migration to the deep aquifer is at least several hundred years for the vertical seepage of fluid or gas through a minimum 300-foot thick section of consolidated Belle Fourche shale.

Finally, the combination the 60-mil HDPE liner and the alternative 6-inch barrier of re-compacted native (in-place) subgrade for the lower soil component, along with the highly impermeable Belle Fourche shale will provide an exceptional barrier to the potential migration of leachate. This will also, in all probability, prevent the lateral and vertical migration of contaminants to points of potential impact for a period well beyond the active and post-closure period of the proposed facility. The extreme length of the most probable migration times for leachate exceeds the estimated life of the facility and the 30-year post closure care period. Additionally, the landfill design consists of the composite liner designed to impede the flow of liquids. The clay component of the liner system has a hydraulic conductivity of not more than 1.0×10^{-7} cm/sec, meaning that any liquids passing through the clay liner would pass through at a rate of 0.0000001 cm/sec or 0.10346 inches per year. Therefore, wells in the area will not be impacted by construction and operation of the proposed landfill expansion.

The DEQ has found that the COB has adequately demonstrated that there is no potential for migration of constituents indicative of landfill contamination to the uppermost aquifer during the proposed 48-year operational life and 30-year post-closure period of the proposed landfill expansion area.

3.5 GEOLOGY AND SOILS

3.5.1 ANALYSIS AREA AND METHODS

The analysis area for geology is the proposed COB Class II Landfill facility expansion site. Some discussion of regional geology, based upon published reports, is also provided herein. The analysis methods for geology included reviewing on-site drilling information, publications of the Montana Bureau of Mines and Geology, the U.S. Geological Survey, and the U.S. Department of Agriculture's Natural Resource Conservation Service, along with their associated geology and soil maps and drawings.

3.5.2 AFFECTED ENVIRONMENT

The proposed expansion is located within the Yellowstone River valley which lies between the sandstone cliffs to the north and rolling hills underlain by a thick sequence of shale to the south. The cliffs are locally known as the "Rims" and are composed of the Eagle Sandstone and the Telegraph Creek Formation, both are Cretaceous in age. The sandstone formations dip gently to the north and are not present in the valley beneath the river.

Within the Yellowstone River valley, the Yellowstone River has cut down into a thick sequence of Cretaceous aged shale. The shale sequence is on the order of 2,000 feet thick and is widely exposed in the hills south of Billings, as evidenced in the proposed landfill expansion area hydrogeological and soils investigation. Two geological units are exposed within the proposed landfill expansion property: The Belle Fourche unit and the Quaternary-aged (Pleistocene) deposit. The Belle Fourche shale underlies the entire site, either at the surface or near the surface. The unit is a fine-grained sedimentary rock of upper Cretaceous age. The unit is thinly-laminated, dark bluish-gray, and consists almost entirely of silt- and clay-sized particles. As discussed above, the Belle Fourche shale in the area is reported to be at least 350 to 400 feet thick, and is documented in a well log to be from 1,200 to 1,300 feet thick in one well located approximately 1.5 miles to the west of the expansion area. The Quaternary-aged (Pleistocene) deposit consists of silt, sand and gravel that underlie the center of the easternmost part of the expansion area property; it is expressed as a flat, non-eroded prairie and is obvious on the land east of the expansion area property.

The predominant soil type at the proposed COB expansion are the Lismas Clay (map unit "Ln"), 15 to 35 percent slopes (Figure 3.2). These soils are characterized as shallow, well-drained, moderately steep clay soils on upland, with a low to moderately high capacity to transmit water. The secondary soil types are the Pierre-Lismas clays (map unit "Pl"), moderately steep clay soils and well-drained soil, with a low capacity to transmit water. A typical profile from top to bottom show the Lismas clay soils consist of 0 to 2 inches of clay, 2 to 10 inches of clay, and 10 to 60 inches bedrock. A typical profile of the Pierre-Lismas clays, from top to bottom, consists of 0 to 31 inches of clay and 31 to 60 inches of bedrock.

The minor soil types are Maginnis channery clay loam (Map unit "Mc"), which is classified as well drained with a low capacity to transmit water, and the Danvers silty clay loam (Map unit "Da") which is classified as well drained with a high capacity to transmit water. A typical profile from top to bottom shows the Maginnis channery clay loam consists of 0 to 10 inches of clay loam and 10 to 60 inches of bedrock. A typical profile from top to bottom of Danvers silty clay loam consists of 0 to 6 inches of silty clay loam, 6 to 13 inches of silty clay, and 13 to 60 inches of clay loam.

The subsurface cores collected during the site investigation were submitted for laboratory testing to measure the average vertical hydraulic conductivity, moisture content, grain size distribution and critical water contents (shrinkage, plastic limit and liquid limit). Laboratory test results indicate that the soils above the Belle Fourche shale generally contain a small percentage of fine gravel with some limited areas containing cobble size alluvial and fluvial deposits. The sand fraction ranged from 3.99% to 46.6%, and the silt and clay fractions ranged from 21.3% to 65.7%. The measured hydraulic conductivities provided by the laboratory analysis of the soil borings ranged from 2.21×10^{-9} cm/sec to 5.31×10^{-9} cm/sec. This range is typical for clays and silts.

The result of the hydrogeological and soils investigation was generally consistent with published technical studies of the region.

3.5.1 ENVIRONMENTAL CONSEQUENCES

3.5.1.1 No Action Alternative

Under this alternative, because the site would not be developed, there would be no additional impacts to site geology and soils.

3.5.1.2 Proposed Action

The site would be excavated to accommodate the proposed landfill disposal units. Additionally, general site grading would be necessary to facilitate the storm water control features. Excavation of the existing ground to a maximum depth of 25 feet below natural grade to establish the landfill footprints for the MSW and Class IV would yield 7,718,800 cubic yards of loose soil and rocky subsurface material. These materials would be used to (i) provide subgrade fill to establish base elevations for the landfill units, and (ii) construct the compacted soil component of the landfill, final cover, and leachate pond liners.

The weathered, bentonitic marine shale found beneath the base of all areas within the proposed expansion planned for the landfill excavation provides a good in-situ source of cohesive, clay-rich, natural liner material that will be scarified and re-compacted in place to form a six-inch soil barrier. As demonstrated for saturated flow, this native material will meet the maximum allowable standard by restricting the gravity seepage rate to less than 0.10346 inches per year as required. The proposed lower soil barrier will enhance existing subgrade conditions that combine to control any potential leachate migration. Testing of samples obtained from the native subsurface formation also yield a consistently lower seepage rate than required in the Administrative Rules (1×10^{-7} cm/sec). No continuous uppermost aquifer was found upon drilling to 300-ft maximum depth below ground surface during site investigations. Any such seepage would not reach this depth for 2900 years (or probably longer) after potential release into the natural subsurface shales. Additionally, the attenuating natural subgrade also meets the standards for landfill gas diffusion (*e.g.* any vinyl chloride component) to depths likely not more than 25 feet for a period of at least 100 years after closure.

Figure 3.2: Map of the soil types in the expansion area
(Source: U.S. Department of Agriculture, Natural Resources Conservation Service)

SOIL KEY

Ln: Lismas Clay
Pl: Pierre-Lismas clays
Mc: Maginnis channery clay loam

Construction and operation of the facility would result in the disturbance of 293-acres for the entire life of the facility. The native soil and subgrade materials would be stockpiled on site and used to construct vegetated berms, landfill liner components, landfill cover, and in on-site road construction.

Any impacts to geology and soils are anticipated to be minor due to some rock exposure by the landfill cut after removal of soils and placement in cover stockpiles. All long-term soil stockpiles would be seeded to prevent wind or water erosion and airborne dust. The rocky soils and bedrock layers are not good substrate for agriculture. Because these soils are well drained, construction and operation of the proposed facility would not result in soil erosion or the substantial loss of viable topsoil through appropriate placement of berms, ditches, and other previously identified storm water BMPs minimizing erosion (see Section 2.3.2.1). Additionally, the landfill design consists of the composite liner designed to impede the flow of liquids. The clay component of the liner system has a hydraulic conductivity of not more than $1.0x10^{-7}$ cm/sec, meaning that any liquids passing through the clay liner would pass through at a rate of 0.0000001 cm/sec or 0.10346 inches per year.

3.6 VEGETATION

3.6.1 ANALYSIS AREA AND METHODS

The analysis area at the proposed COB Class II Expansion Landfill site is identified as Big Sagebrush Steppe and Great Plains Mixedgrass Prairie at the proposed COB Class II Landfill site. The analysis method for vegetation consisted of published reports from the Montana natural Heritage Program, the U.S. EPA, and Yellowstone County.

3.6.2 AFFECTED ENVIRONMENT

The more common species occupying this area include Wyoming big sagebrush, western wheatgrass, thickspike wheatgrass, green needlegrass, blue grama, and needle and thread. In grazing areas, the predominant species include Kentucky bluegrass, smooth brome, and Japanese brome. Along Stream 1, there are areas identified as Great Plains Ponderosa Pine Woodland and Savanna, Great Plains Wooded Draw and Ravine, and Great Plains Riparian. Vegetation in these areas include ponderosa pine uphill from drainages, Rocky Mountain juniper in valleys and ravines, and both narrowleaf cottonwood and Plains cottonwood in the floodplains.

3.6.3 ENVIRONMENTAL CONSEQUENCES

A search of the Montana Natural Heritage Program website revealed that there are no records of plant species of concern in the area surrounding the proposed COB Class II Landfill expansion site. During facility construction, vegetation would be removed from areas of the site for establishing the proposed landfill disposal units, roads, buildings, and storm water control features. Some soils removed during excavation of each landfill unit may be stockpiled in the area of the subsequent unit and would be used as-needed for daily, intermediate, or final soil cover. Ground disturbance activities could increase the potential for noxious weeds on the facility. COB would be required to obtain and implement a County-approved noxious weed plan during all stages of the project.

The existing vegetation at the location of the proposed expansion is not unique or limited, considering the extensive amount of similar land around the proposed expansion area. Further, at final closure, the final cap will be fully revegetated with native plant species. To ensure vegetative success, the upper six inches of the final cover must be comprised of a top soil capable of supporting vegetation. In addition, the seed mix used for revegetation must be approved by the Natural Resource Conservation Service (NRCS) to ensure the vegetation is adapted to the local climate.

3.7 AIR QUALITY

3.7.1 ANALYSIS AREA AND METHODS

The analysis area for air quality is the site of the proposed COB Class II Landfill expansion. The analysis methods for air quality included a review of the application documents for projected incoming waste volumes and DEQ's knowledge of other Major Class II Landfill facilities.

3.7.2 AFFECTED ENVIRONMENT

At the present time, the active COB landfill is adjacent to the proposed expansion site. Landfill operational activities resulting in the generation of windblown dust associated with the continued landfill operations will continue to vary depending upon the time of year, demand for services, and maintenance needs of the facility. The landfill access road and all long-term interior facility roads will be paved.

3.7.1 ENVIRONMENTAL CONSEQUENCES

3.7.1.1 No Action Alternative

Under this alternative, because the site would not be developed, there would be no additional impacts to existing air quality.

3.7.1.2 Proposed Action

Air quality concerns related to landfills are frequently associated with fugitive dust emissions from landfill traffic, construction activities, and day-to-day facility operations. Air quality concerns also include the generation of methane and non-methane organic compounds resulting from waste decomposition.

Traffic to the proposed facility should not result in an increase in the levels of airborne dust because Hillcrest Road will be paved. Traffic within the proposed expansion area due to continued landfill operations would cause an increase in the levels of airborne dust during the dry months of the year, but those levels would be similar to the dust levels at the current COB landfill. Further, the access roads and long-term interior facility roads will be paved, just as they are at the current COB landfill. Dust control measures on the interior roads, such as applying a dust palliative or water, would lessen the impact of airborne dust generated as a result of landfill operations.

Construction of new landfill cells would cause an increase in internal landfill traffic which would result in an increase in airborne dust during the period of excavation and construction. Since the construction periods would be short in relation to the operating life of the facility, these effects would be minor. If dust from construction becomes a problem, dust control measures, such as wetting the surface before working on it, must be initiated as required for large earthwork activities, such as road construction.

Fugitive dusts generated from disposal activities would be mitigated by adequate dust control measures on the interior roads and applying a dust palliative or water to the waste materials before disposal. The excavation and placement of cover material could increase the amount of dust in the air. If it becomes a problem, the cover material must be wetted prior to its placement so that the net effect would be minor. All long-term soil stockpiles would be seeded to prevent wind or water erosion and airborne dust.

Odors related to landfilling activities will be controlled by the application of daily soil cover. Wind dispersion in the area will also alleviate odors resulting from the placement of wastes in the working face prior to the application of soil cover,

The wastes proposed for disposal at the site will generate methane and non-methane organic compounds. As each phase of the MSW landfill unit is developed, a series of landfill gas monitoring wells will be installed to surround the waste disposal unit footprint at locations and depths approved by DEQ prior to construction of each waste unit. Methane levels will be monitored on a quarterly basis to ensure the concentration of methane gas generated by the facility does not exceed 25-percent of the lower explosive limit (LEL) for methane in facility structures, and the LEL for methane is not exceeded at the facility property boundary. Any exceedance of these specified levels of methane in the soil will be immediately reported to the DEQ followed by the submittal of a landfill gas remediation plan for DEQ approval.

As each discrete phase of the MSW landfill unit is closed, an active methane gas control system will be installed. The active gas system will include vertical gas vents and a gas venting layer. Vertical gas vents will be installed at a rate of approximately one per acre to provide relief of pressure that is generated by the degradation of waste after closure. The gas venting layer will be installed at the base of the final cover system. The landfill unit final covers and methane control systems would be installed according to the manufacturer's guidelines for each component, with all elements tested for conformance with the DEQ approved Closure Plan and Methane Control System specifications and CQA/CQC requirements. Based on the total design capacity of the MSW landfill unit, an active methane gas removal and flare system would be developed; or the existing system would be expanded to accommodate the additional methane produced by the expansion. The methane control system would be installed according to the manufacturer's guidelines for each component, with all elements tested for conformance with the DEQ-approved Methane Control System specifications and CQA/CQC requirements.

The landfill gas generated as the MSW decomposes will be controlled by the Methane Control System; fugitive dusts will be controlled by the application of water as a dust palliative and vegetation of long-term soil stockpiles. Therefore, construction and operation of the facility will have a minor impact on air quality in the area.

3.8 INDUSTRIAL, COMMERCIAL, AND AGRICULTURAL ACTIVITIES

3.8.1 ANALYSIS AREA AND METHODS

The analysis area for industrial, commercial, and agricultural activities is the site of the proposed COB Class II Landfill expansion site. The analysis methods for these activities included several site visits to determine current land use.

3.8.2 AFFECTED ENVIRONMENT

At the present time, the property proposed for the COB Class II Landfill expansion site encompasses approximately 350 acres. The parcel is currently used intermittently for livestock grazing, which provides some nominal income to the COB. There are no other known commercial or industrial uses of the property.

3.8.3 ENVIRONMENTAL CONSEQUENCES

3.8.3.1 No Action Alternative

Under this alternative, because the site would not be developed as a solid waste management facility, there would be no additional impacts to existing land use activities.

3.8.3.2 Proposed Alternative

Construction and operation of the proposed COB Class II Landfill expansion facility will cause an increase in the industrial activity of the area due to the need for contractors and associated materials, machinery, and machinery repairs. Once construction activities are complete, industrial activities in the area will be similar to those currently experienced at the currently licensed and active COB Class II Landfill. There were no other commercial activities identified at the site of the proposed COB Class II Landfill expansion. The current agricultural activity in the area occurs primarily along the Yellowstone River. Because the proposal will remove 350 acres of land from livestock grazing activities, there will be an impact to agricultural activities. However, upon closure, the proposed post-closure use is restricted. Livestock grazing activities could be resumed once the facility has been closed and the site has been revegetated. The final cover of the landfill units will be seeded with an NRCS-approved seed mix adapted to the local area climate and could provide a better quality and healthier stand of grasses due in part to the requirement for the placement of six inches of topsoil material.

3.9 TRAFFIC AND UTILITIES

3.9.1 ANALYSIS AREA AND METHODS

The analysis area for traffic and utilities includes the site of the proposed COB Class II Landfill expansion as well as the intersection of Blue Creek Road and Hillcrest Road, and Hillcrest Road as it approaches the entrance to the proposed facility. The analysis methods for these activities included a site reconnaissance to identify potential traffic impacts, issues with existing utilities, and necessary road and utility improvements, research conducted by the COB and their engineering consultants, and communications between the COB, their engineering consultants, and the Montana Department of Transportation (MDT).

3.9.2 AFFECTED ENVIRONMENT

At the present time, the property proposed for the COB Class II Landfill expansion site encompasses approximately 350-acre parcel owned by the applicant. The affected environment for traffic and utilities includes the junction of Blue Creek Road and Hillcrest Road as well as Hillcrest Road itself. South Billings Boulevard converts to Blue Creek Road as it crosses the Yellowstone River. This road accommodates vehicles accessing the landfill, as well as residential and agricultural properties located south of Interstate-90.

3.9.3 ENVIRONMENTAL CONSEQUENCES

3.9.3.1 No Action Alternative

Under this alternative, because the site would not be developed as a solid waste management facility, there would be no additional impacts to existing land use activities. The 350-acre parcel is currently used intermittently for livestock grazing. There are no other known commercial or industrial uses of the property. As a result, traffic accessing the facility varies depending upon the maintenance needs and the need to access livestock grazing on site.

3.9.3.2 Proposed Alternative

Currently, the landfill is accessed via Jellison Road from Blue Creek Road. Presently, vehicles travel south on Blue Creek Road, then turn west utilizing the dedicated right turn lane onto Jellison Road. The existing entrance to the current COB Class II Landfill is approximately 0.7 miles down Jellison Road to the south. Changes in access to the COB Class II Landfill expansion area will require modifications to existing roads and utilities. During the construction phases, there may be a slight increase in traffic on the roads leading to the landfill as a result of approximately 15 construction workers and the mobilization/demobilization of equipment for facility construction activities. The mobilization and demobilization of equipment will take approximately five days total for both activities.

Traffic and Road Modifications

Hillcrest Road is located between the existing COB Class II Landfill and the proposed expansion area. Construction and operation of the proposed COB Class II Landfill expansion would require changes to the route to the landfill. The COB has proposed the use of Hillcrest Road to access the expansion area. During development of the proposed landfill expansion application, the COB considered three separate road improvement alternatives (Appendix E). These alternatives consisted of:

1. Reconstructing Hillcrest Road;
2. Rerouting Hillcrest Road to the perimeter of the expansion area; and,
3. Rerouting Hillcrest Road to Collier Road.

Field and topographical map reconnaissance surveys were conducted to determine potential alternate routes to accommodate expansion of the landfill south across Hillcrest Road while still providing acceptable levels of service. Hillcrest Road is a County collector road that serves residential and ranching properties to the south of Blue Creek Road. An electrical substation, overhead power, buried telephone lines, gas mains, and a commercial property are located along Hillcrest Road. Existing curve data and the roadway function were used to determine a design

speed of 45 mph. This design speed is used for all roadway alternatives. For the purpose of the expansion application, the reconstruction of Hillcrest Road was presented as the COB's preferred alternative that meets the project goal of maintaining a cost-effective method of solid waste management and providing safe access to all site users.

The Montana Department of Transportation (MDT) maintains records of average annual daily traffic on state roadways; data for South Billings Boulevard (Blue Creek Road) 1.5 miles south of the Yellowstone River Bridge located approximately one mile west-northwest of the proposed Facility's approach. According to the MDT data, the annual average daily traffic (AADT) observed in 2011 along Blue Creek Road was 4,850 vehicles.

The COB's consulting engineers conducted a peak hour traffic analysis at the intersection of Blue Creek Road and Jellison Road. Vehicles were counted on Wednesday morning, October 17, 2012, from 7:30 am to 9:30 am. The counting time was selected on previous traffic counts and intended to capture the time when the intersection saw the highest traffic impact. The analysis found that the eastbound movement operates at Level of Service (LOS) B, while the other intersection movements operate at a LOS A. LOS A means that the delay per vehicle is less than or equal to 10 seconds and there is little or no delay to street traffic; LOS B means that the delay per vehicle is between 10 and 15 seconds and traffic experiences short delays. Based on the recent LOS analysis, the COB and their consulting engineers determined that routing to the proposed expansion area via Hillcrest Road will not significantly impact these intersections. The level of traffic on a newly reconstructed Hillcrest Road would increase as a result of the expansion, but the goal of the road reconstruction efforts is to accommodate the increased traffic. The redesign of Hillcrest Road and modifications to Blue Creek Road will be subject to review and approval by MDT and Yellowstone County. Blue Creek Road is an On-system Urban Route. As a result, any work done on the roadway is under the jurisdiction of the Montana Transportation Commission. COB would obtain all necessary permits prior to commencing any modifications to either road. Since this activity would not take place for at least 20 years, COB has not yet applied for these modifications.

The COB's preferred alternative will maintain the existing horizontal alignment, but will improve the typical section to include two foot shoulders as well as improving the cut/fill slopes to meet existing County Road standards. Approximately 1100 feet of Blue Creek Road will be reconstructed to meet minimum MDT requirements for the intersection sight distance and includes the construction of an approach landing along Hillcrest Road that will result in an approximate ten foot cut adjacent to the substation. This cut creates the need for a retaining wall separating the lowered Hillcrest Road from the electric substation to minimize impacts. Utility relocation will be required.

According to the COB's consulting engineers, the current right turn lane found at the intersection of Blue Creek and Jellison does not appear to be warranted based on traffic count data alone, but is likely there due to accident data. During the COB's field reconnaissance efforts, a crash occurred as a result of a north turning vehicle on Jellison unable to see north on Blue Creek due to the presence of a large commercial vehicle. Therefore, the COB's consulting engineers recommended a dedicated right turn lane from Blue Creek Road to Hillcrest Road and a signalized intersection on Hillcrest Road at the access point to the expansion area.

Since modifications to Hillcrest Road are not expected to occur for 20-25 years, all plans for road reconstruction will first be approved by MDT and Yellowstone County as required prior to construction.

Utility Modifications

Existing utilities located in the landfill expansion area must be relocated and will affect the overall cost of the landfill expansion project. An overhead power line owned by NorthWestern Energy and an underground gas line owned by Montana-Dakota Utilities Company will need to be realigned. These lines will be redirected south from Hillcrest Road to run along the southern, then eastern boundary of the proposed project area. An underground telephone line that runs adjacent to Hillcrest Road may also need to relocated. Figures 3.3 and 3.4 provide the proposed locations of the utility realignments. Construction efforts necessary to relocate utility lines will be conducted prior to shutting the lines off for reconnection. The relocation of these lines may affect surrounding residents for a short time period while the utility companies connect the new utility lines where they are realigned to the existing lines.

3.10 VISUALS

3.10.1 ANALYSIS AREA AND METHODS

The analysis area for visuals is the site of the proposed COB Class II Landfill expansion and Hillcrest Road as it approaches the entrance to the proposed facility. The analysis methods for these activities included a site reconnaissance to identify potential visual impacts.

3.10.2 AFFECTED ENVIRONMENT

At the present time, the property proposed for the COB Class II Landfill expansion site encompasses approximately 350-acre parcel owned by the applicant. There are no local restrictions that prohibit the location of the facility at the site the applicant selected. The affected environment includes the site of the proposed expansion as well as Hillcrest Road.

3.10.3 ENVIRONMENTAL CONSEQUENCES

3.10.3.1 No Action Alternative

Under this alternative, because the site would not be developed as a solid waste management facility, there would be no additional impacts to the visual landscape

3.10.3.2 Proposed Alternative

The proposed COB Class II Landfill facility expansion area is located within a 350-acre parcel owned and controlled by the applicant, and is located immediately southeast of the existing COB Class II Landfill facility. The site location was selected by the applicant. The proposed expansion area site extends from just south of the intersection of Hillcrest Road and Montana State Highway 416 (Blue Creek Road) south approximately one-mile to the Section 29 boundary line. The facility will be visible from Hillcrest and Stratton Roads, but the visual impacts should be limited to passing traffic or cyclists passing the facility. The COB plans to begin planting trees and shrubs along the northern boundary of the proposed facility that parallels Hillcrest Road within the next few years. As these trees and shrubs grow, they will serve as a visual barrier to traffic along

Figure 3.3 – Gas Line Realignment Plan
(Source: Great West Engineering, Billings Landfill Expansion Application, March 2015)

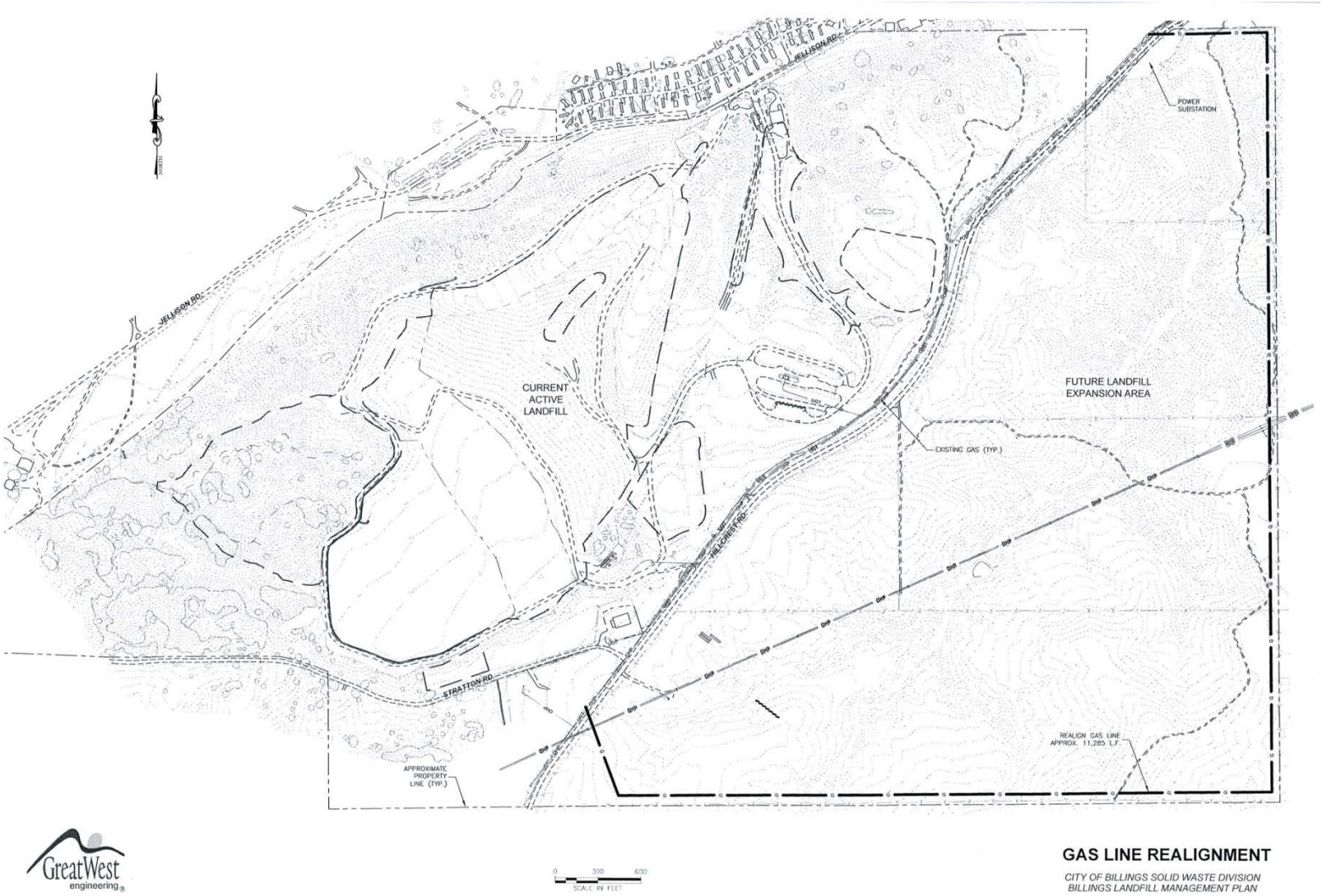
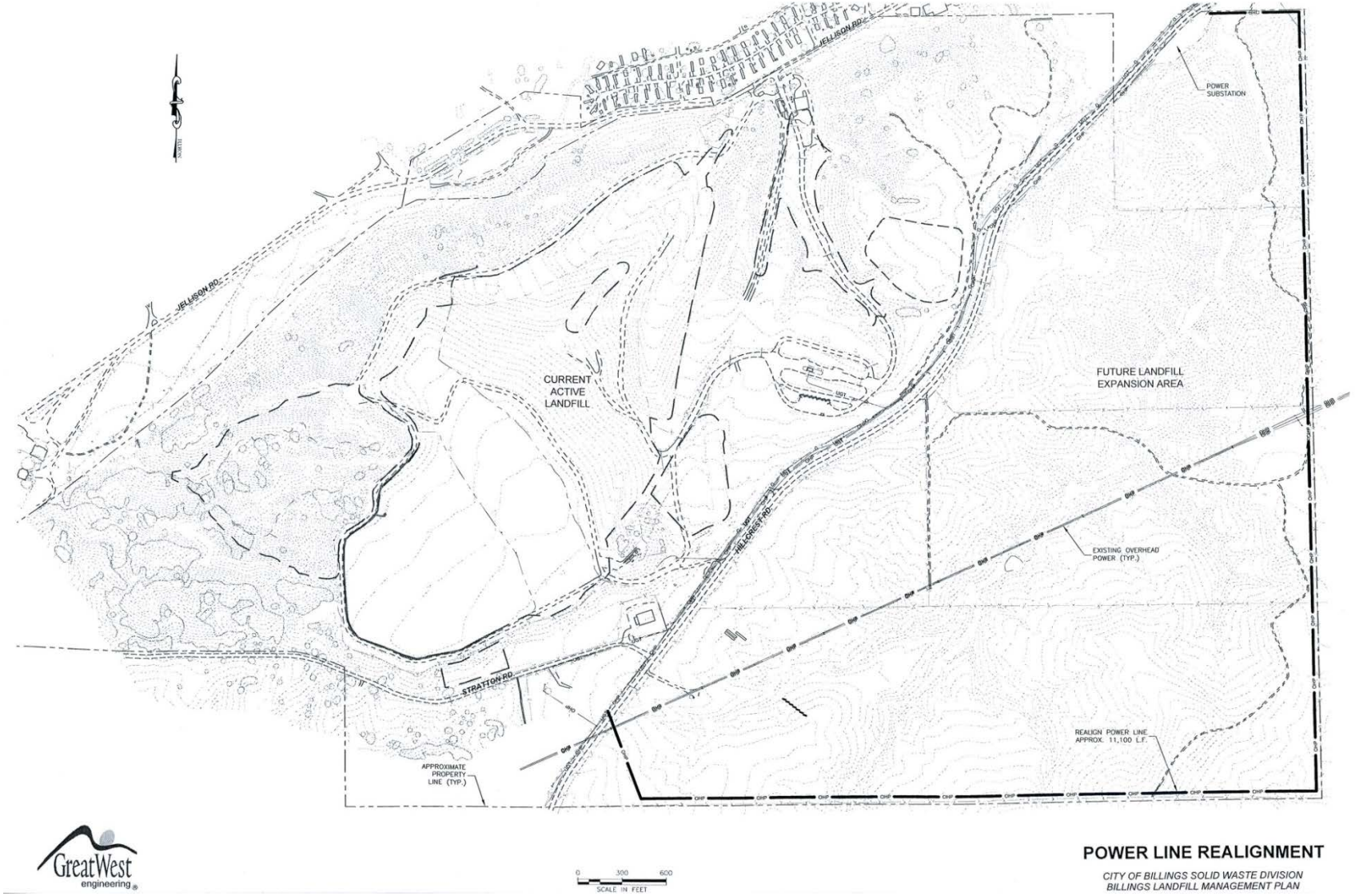


Figure 3.4 – Power Line Realignment Plan

(Source: Great West Engineering, Billings Landfill Expansion Application, March 2015)



Hillcrest Road. Presently, the active COB Class II Landfill is visible along Hillcrest Road and from the Yellowstone River. Although landfill features and activities may be partially visible through the trees and shrubs, the expansion area will be less visible to traffic along Hillcrest Road because the expansion area is shielded by higher topography next to the road.

The landscape affected by the current proposal is not locally or regionally unique, but is typical of the overall landscape in the area. The proposed expansion area is adjacent to the existing COB Class II landfill, and is currently used for livestock grazing that has impacted existing vegetation, especially in those areas that have been more heavily grazed. The dominant color of the land is tawny brown, except for the few months in late spring and early summer when there is enough moisture and plant growth to cover the land in varying shades of green.

Construction and operation of the facility would change the immediate area from grazing land to a landfill. As areas of the expansion are closed, capped, and revegetated, the visual landscape will change to manmade hills as those operations are completed. This change would occur within the licensed boundary over the projected life of the facility. Therefore, the impact of the construction, operation, and closure of the proposed expansion area would be similar to how the existing facility will look upon closure.

3.11 NOISE

3.11.1 ANALYSIS AREA AND METHODS

The analysis area is the site of the proposed COB Class II Landfill expansion. The analysis methods included a site reconnaissance and inspections of the currently active COB Class II Landfill facility.

3.11.2 AFFECTED ENVIRONMENT

At the present time, the property proposed for the COB Class II Landfill expansion site encompasses approximately 350-acre parcel owned by the applicant. The affected environment includes the proposed landfill site as well as adjacent properties.

3.11.3 ENVIRONMENTAL CONSEQUENCES

3.11.3.1 No Action Alternative

Under this alternative, because the site would not be developed as a solid waste management facility, there would be no additional impacts to noise in the area.

3.11.3.2 Proposed Alternative

Landfill generated noise resulting from the equipment operation associated with disposal activities would not be expected to increase as a result of the continued operation of the landfill in the proposed expansion area. Daily landfilling operations in the proposed expansion area will not fully commence until the current COB Class II Landfill has reached capacity. Noise levels from activities in the expansion area once landfilling activities have moved from the closed area will be similar to noise from current activities. There may be an increase in noise generated from

construction activities. However, that activity would be temporary. Therefore, the impact of the construction, operation, and closure of the proposed expansion area on noise in the area would be similar to the existing landfill.

3.12 DEMANDS FOR GOVERNMENT SERVICES

3.12.1 ANALYSIS AREA AND METHODS

The analysis area is the site of the proposed COB Class II Landfill expansion. The analysis methods included research regarding city infrastructure and state services.

3.12.2 AFFECTED ENVIRONMENT

At the present time, the property proposed for the COB Class II Landfill expansion site encompasses approximately 350-acre parcel owned by the applicant. The undeveloped site is not yet subject to inspections performed by DEQ's SWS. Current Class II Landfill personnel occasionally drive through the parcel to ensure fences and gates are in good working order.

3.12.3 ENVIRONMENTAL CONSEQUENCES

3.12.3.1 No Action Alternative

Under this alternative, because the site would not be developed as a solid waste management facility, there would be no additional impacts to the demands for government services.

3.12.3.2 Proposed Alternative

DEQ's SWS will perform inspections of the site both during and after construction, a typical routine activity for all proposed and licensed facilities. The Yellowstone County Environmental Health Department may also conduct inspections of the site during and after construction.

Ongoing city services and equipment operations and maintenance required for the proposed facility will be no different than what is currently required for the active COB landfill.

During the construction phases, there may be a slight increase in traffic on the roads leading to the landfill. This will result in a minor impact to roadway infrastructure and traffic enforcement. Road crews and contractors will be responsible for making the necessary modifications to both the state highway and Hillcrest Road once the applicant receives a permit from the Montana Department of Transportation and Yellowstone County to modify the facility approaches off of Montana State Highway 416 and Hillcrest Road. This is not expected to occur for 20-25 years. However, the additional traffic associated with highway reconstruction will be short-term relative to the operational life of the facility.

Once the facility is operational, DEQ's SWS will be responsible for performing inspections and providing compliance assistance. The County and State road department maintenance crews may be required to perform additional road maintenance after any necessary improvements have been made.

The Yellowstone County Sanitarian, the Montana Department of Transportation's (MDT) Motor Carrier Services Division, and DEQ's Solid Waste Section and Enforcement Division may be called

upon to respond to complaints and spills on County roads and State highways. Spills of any size may be reported to the Yellowstone County Sanitarian. Spills that exceed 25 gallons must be reported to DEQ's Spill Hotline. The clean-up of spills that occur during transportation will be overseen by the Yellowstone County Sanitarian and/or DEQ's Enforcement Division, and must be completed in accordance with the state and/or federal requirements. Individual haulers and hauling contractors are fully responsible for expenses and proper clean-up related to accidental spills caused from hauling materials to and from the facility.

3.13 CULTURAL UNIQUENESS AND DIVERSITY

3.13.1 ANALYSIS AREA AND METHODS

The analysis area is the site of the proposed COB Class II Landfill expansion. The analysis methods included research conducted by the State Historic Preservation Office (SHPO).

3.13.2 AFFECTED ENVIRONMENT

At the present time, the property proposed for the COB Class II Landfill expansion site encompasses approximately 350-acre parcel owned by the applicant. The undeveloped site is used currently for intermittent cattle grazing.

3.13.3 ENVIRONMENTAL CONSEQUENCES

3.13.3.1 No Action Alternative

Under this alternative, because the site would not be developed as a solid waste management facility, there would be no additional impacts to the cultural uniqueness and diversity within the project area.

3.13.3.2 Proposed Alternative

SHPO conducted a cultural resource file search for Section 29, Township 1 South, Range 26 East. The results of the file search indicated there have been no previously recorded sites within the area. Based upon previous ground disturbances in Section 29 associated with the currently licensed active COB Class II Landfill, agricultural activities, and residential development in the area, SHPO determined that there is a low likelihood that cultural properties will be impacted.

COB consultants conducted a cultural resource inventory of the expansion area to identify and provide preliminary National Register of Historic Places eligibility evaluations of sites located within the proposed expansion area (Appendix F). The cultural resource inventory identified one site and one isolated find. However, neither demonstrated the potential to be listed on the National Register of Historic Places.

3.14 PROPERTY VALUES

3.14.1 ANALYSIS AREA AND METHODS

The analysis area is the site of the proposed COB Class II Landfill expansion and most residential and vacant lots surrounding the area. The analysis method consisted of DEQ's research of the Montana State Library's (MSL) cadastral database for property tax assessment information.

3.14.2 AFFECTED ENVIRONMENT

At the present time, the property proposed for the COB Class II Landfill expansion site encompasses approximately 350-acre parcel owned by the applicant. There are residential subdivisions located near the current and proposed facility.

3.14.3 ENVIRONMENTAL CONSEQUENCES

3.14.3.1 No Action Alternative

Under this alternative, because the site would not be developed as a solid waste management facility, there would be no impacts.

3.14.3.2 Proposed Alternative

DEQ conducted a search of the MSL's database to determine assessed property values for the past three years. According to the MSL records, values of existing developed residential property within a mile of the proposed landfill have increased an average of 14.56% from 2014 to 2016.

The current COB Class II Landfill has not impacted property values in the area. The landfill has been operating since the late 1950's, before the majority of the residential parcels in the areas were developed. Therefore, the relocation of the landfill from the current location to the expansion area is not anticipated to impact property values.

3.15 SOCIOECONOMIC

3.15.1 ANALYSIS AREA AND METHODS

The analysis area for the proposed landfill is located south of the current COB Class II landfill across Hillcrest Road, directly south of the intersection of Hillcrest Road and Highway 416 (Blue Creek Road) in Yellowstone County, Montana. Data were collected from the COB's application, landfill staff, and engineering consultant.

3.15.2 AFFECTED ENVIRONMENT

At the present time, the COB landfill manages wastes generated by residents in the City of Billings, Yellowstone County, Stillwater County, and Worland, Wyoming. The existing operations at the COB landfill provide employment for 15 people in Yellowstone County.

3.15.3 ENVIRONMENTAL CONSEQUENCES

3.15.3.1 No Action Alternative

Under this alternative, because the site would not be developed as a solid waste management facility, existing landfill staff and contractors would be forced to find similar employment elsewhere once the existing landfill is closed; this would likely result in the relocation of landfill staff to other communities for employment.

In addition, current landfill users would be forced to obtain waste disposal services elsewhere. The nearest licensed Class II landfill is located in Hardin, approximately 54 miles south of Billings. Transportation of solid wastes currently managed at the COB landfill would result in an increase in costs to site users, not only for transportation fees, but also landfill tipping fees since the City of Hardin landfill would need to add additional landfill staff to manage the increased incoming waste volumes. The remaining capacity of the Hardin landfill is approximately 336,000 tons. If the Hardin facility were to have to handle the additional waste coming from the COB landfill, it could cause the City of Hardin landfill to close in one year. The City of Hardin could submit an application to expand their landfill for this increased volume of waste. Transportation would also result in an increase in vehicle emissions from users transporting their wastes to the Hardin landfill.

3.15.3.2 Proposed Alternative

During the construction phases of the landfill expansion, especially during the initial startup of the expansion area operations, there would be a minor increase in local employment due to the additional need for contractors, site operators, and associated support. Landfill construction activities would employ approximately 15 additional people as construction workers for about six months. However, because this would occur only during the construction of landfill features, the impact of these activities on employment are of short duration compared to the life of the landfill. Operations would move from the current landfill to the expansion area once the site features have been constructed; existing landfill staff would move at the same time. The long-term employment requirements will be similar to existing employment at the current COB Class II landfill.

3.16 CUMULATIVE EFFECTS

Cumulative impacts are the collective impacts on the human environment when considered in conjunction with other past, present, and future actions by location and generic type. Cumulative impact analysis under MEPA requires an agency to consider all past and present state and non-state action. Related future actions must also be considered when these actions are under concurrent consideration by any state agency through pre-impact statement studies, separate impact statement evaluation, or permit process procedures. Cumulative impact analyses help to determine whether an action would result in significant impacts when added to other activities.

According to MDT, Blue Creek Road is an On-system Urban Route. As a result, any work done on the roadway is under the jurisdiction of the Montana Transportation Commission. There is a high likelihood that there could be pavement preservation projects along the roadway, including a chip seal or a mill and overlay. There could also be maintenance work on the bridge deck for the

bridge over the Yellowstone River. One project, scheduled for 2026, is the addition of a right-turn lane at the intersection of Blue Creek Road and Hillcrest Road. However, the timing of the project could change if issues arise with right-of-way or funding.

The City of Billings-Yellowstone County Planning Department indicated that a new commercial development is proposed for property on the east side of Blue Creek Road, just northeast of the intersection of Jellison Road and Blue Creek Road. However, this project has not moved forward for full development review. Therefore, no additional details are available. However, once completed, this may increase traffic on Blue Creek Road.

By the time construction activities commence in the proposed expansion area, the existing COB landfill will be in the final stages of landfilling and preparing for final facility closure construction. The proposed COB Class II Landfill expansion area is adjacent to the existing COB Class II Landfill. Historic land uses of the area south of the Billings area include both commercial and non-commercial activities. Commercial uses include livestock grazing, hay, and wheat production, several types of businesses from trucking to energy recovery. Non-commercial uses include wildlife habitat, watershed, and residential sites. Landfilling activities would simply move from the currently licensed COB Class II Landfill to the proposed expansion area once the current landfill reaches capacity. As population grows, there may be an increase in demands on the landfill from the expanding population. However, the proposed expansion is designed to accommodate the additional anticipated demands.

3.17 UNAVOIDABLE ADVERSE EFFECTS

Residual impacts from the Proposed Action would include the loss of developed soil from approximately 293 acres of the 350-acre site for use on roads, cover soils, and for the construction of berms and other landfill features. However, topsoil would be placed as part of the cap construction during final closure of the facility. The topsoil will be reseeded with native vegetation. Some sediment control structures would remain and the capped landfill units would appear as man-made features across the landscape. Post-closure land use would be restricted to animal grazing. No structures that require the placement of footings or foundations are allowed over the closed landfill units. Any disturbance of the closed landfill final cover for construction of any structure would have to be approved in advance by DEQ.

Plant communities dominated by native plants would be replaced by reclaimed plant communities on the property. Noxious weeds would increase from the soil disturbance, but weeds would be treated to ensure revegetation by native local grasses occurs as required by the county weed control program. The disturbed areas would be reclaimed, reseeded, revegetated, and a program implemented to inventory and treat noxious weeds would be implemented.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 A listing and appropriate evaluation of mitigation, stipulations and other controls enforceable by the agency or another government agency:

The proposed licensure of the COB Class II Landfill expansion facility will meet the requirements of the Montana Solid Waste Management Act and administrative rules regulating solid waste disposal. Adherence to the Solid Waste, Water Quality, and Air Quality regulations and the approved facility Operation and Maintenance Plan will mitigate the potential for harmful releases and impacts to human health and the environment by the proposed facility.

4.2 Recommendation:

DEQ has preliminarily determined that there are no significant impacts from this project that would require the preparation of an Environmental Impact Statement. DEQ will distribute the Draft EA to adjacent landowners and interested persons for 45 days to satisfy the public notification and participation requirements of MEPA. Substantive comments received during the 45-day public participation period in response to the Draft EA will be considered in preparation of the Final EA. DEQ will make a final determination on the need for an EIS in that document.

4.3 Other groups or agencies contacted or contributing to this EA:

Montana Natural Heritage Program
State of Montana Historic Preservation Office
Great West Engineering
HRD Engineering, Inc.
Ethnoscience, Inc.
Tetra Tech
U.S. Geological Survey
Montana Bureau of Mines and Geology
U.S. Department of Agriculture - Natural Resource Conservation Service
Montana Department of Transportation
City of Billings-Yellowstone County Planning Department

4.4 Authors:

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Montana DEQ, Solid Waste Section

Date: December 16, 2016

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