Final Report

Asotin County Regional Landfill

Asotin County, Washington

Long-Term Solid Waste Disposal Strategic Plan

CH2MHILL

April 2010

Contents

CHAPTER 1

Introduction

1.1 Purpose and Objectives

This report summarizes solid waste management options for Asotin County, Washington. The study evaluates long-term solid waste disposal/management options beyond the life of the current permitted landfill providing at least another 20 years of waste capacity (that is, to at least 2053). This report presents the first phase of the study. Subsequent phases will be needed to further develop the preferred option(s) and establish an action plan for implementation.

This report contains the following key elements:

- **Chapter 2: Waste Projection and Life Cycle Analysis**—This chapter presents an update of the waste forecasts and associated life cycle for the permitted landfill and landfill capacity for the planning horizon.
- **Chapter 3: Identify and Evaluate Solid Waste Disposal Alternatives**—This chapter presents the evaluation process for developing and screening alternative solid waste disposal options.
- **Chapter 4: Cost Evaluations**—This chapter presents the cost evaluations for the three top ranking alternatives based on the outcome of the screening processes.
- **Chapter 5: Summary and Recommendations**—This chapter provides a summary of the overall alternatives evaluation and provides recommendations for the next step of the evaluation.

This report was prepared by CH2M HILL working closely with Asotin County. County input and participation has been essential in development and identification of long-term waste disposal/waste management alternatives.

1.2 Limitations

CH2M HILL has used generally accepted professional consulting principles and practices in the development of alternative landfill options, and economic evaluations presented in this report. In some cases (where noted in the report), cost estimates are based on bid proposals that were provided by other parties for contract services as part of other nearby, similar type projects. No other warranty, express or implied, is made. The services were performed consistent with the agreement with Asotin County. This report is solely for the use and information of Asotin County and its constituents. Any reliance by an outside third party is at such party's risk.

Cost estimates were prepared in this report and are rough order-of-magnitude (ROM) in 2010 dollars (2010$), and are considered Class 5 estimates as defined by the American Association of Cost Engineering (AACE). Class 5 estimates have a typical accuracy of

-50 percent to +100 percent. The cost estimates shown have been prepared for guidance in project evaluation and implementation from the information available at the time of the estimate. Actual construction and engineering services costs will depend on competitive market conditions, actual labor and material costs, actual site conditions, productivity, project scope, final design and schedule, and other factors. As a result, the final project costs will vary from the estimates presented. Because of this, project feasibility and funding needs must be carefully reviewed prior to making specific financial decisions to help ensure proper project evaluation and adequate funding. It should be recognized that material prices are highly subject to variation as a result of shortages resulting from natural disasters, the economy, etc. Certain construction material commodities continue to increase or escalate in material pricing and are subject to market volatility.

1.3 Background

Asotin County operates a regional municipal solid waste (MSW) landfill facility [Asotin County Regional Landfill (ACRL)] located just outside of the City of Clarkston, Washington. The ACRL provides affordable regional solid waste disposal services for three counties (Asotin and Garfield Counties in Washington, and Nez Perce County in Idaho) and four Cities (Clarkston, Asotin, and Pomeroy in Washington, and Lewiston in Idaho).

The original ("old") landfill was first permitted in 1972 by the Department of Natural Resources (DNR). The parcel of land on which that landfill resides was first leased from the DNR, but was subsequently purchased and is now owned by Asotin County[1].

The landfill currently consists of three modern lateral cells (Cells A-C), located east of the old landfill area. Cell A was constructed in 1993, with waste filling beginning in May of that year. Cells B and C were constructed in 1998, with waste filling commencing in the fall of that year. The general waste filling plan is to continue to fill Cells B and C concurrently up to the interim closure elevation of Cell A (elevation 1,240 feet), and then fill all three cells together up to an elevation of 1,270 feet. At that time, a fourth cell (Cell D) will be constructed and filled up to an elevation of 1,270 feet to match Cells A-C. Finally, all four cells will be filled simultaneously to the final closure elevation of 1,350 feet.

The ACRL is permitted under the requirements of WAC 173-351, *Criteria for Municipal Solid Waste Landfills*, and operates in compliance with WAC 173-351-200.

[1] Asotin County currently owns one, one-mile square section of land around the landfill.

CHAPTER 2

Waste Projections and Life Cycle Analysis

This chapter provides an overview of the current waste tonnage trends and future waste projections for purposes of this long-term planning. This plan looks out approximately 20 years beyond the closure of the permitted landfill for waste management alternatives. Combined with the projected life cycle of existing facilities (Year 2033), this study represents an overall planning horizon of approximately 50 years into the future, which is a reasonable long-term planning horizon for 'forward-thinking' solid waste systems such as Asotin County.

2.1 Projected Waste Stream Growth

The projected waste stream growth estimates the increase in annual refuse, expressed as a percent of the previous year's annual refuse in-coming tonnage quantities. Table 2-1 presents the annual incoming waste tonnages from 1994 (first full year of waste disposal in Cell A) through 2009 and the associated annual waste stream growth rates.

TABLE 2-1
Annual Waste Tonnage Data
Asotin County

Year	In-coming MSW (tons)	MSW Annual Growth Rate (%)
1994	37,180	----
1995	36,412	-2.07
1996	36,582	0.47
1997	37,523	2.57
1998	38,365	2.24
1999	36,648	-4.48
2000	38,107	3.98
2001	38,400	0.77
2002	39,935	4.00
2003	40,824	2.23
2004	41,735	2.23
2005	43,625	4.53
2006	47,048	7.85
2007	48,787	3.70
2008	48,686	-0.21
2009	47,068	-3.32
Average MSW Growth Rate (1995 – 2009) – last 15 years =		1.6%
Average MSW Growth Rate (2005 – 2009) – last 5 years =		2.5%
Average MSW Growth Rate (2007 – 2009) – last 3 years =		0.1%
Average MSW Growth Rate – Peak Years (2001 – 2007) =		4.1%

*1994 was the first full year of waste disposal in the modern landfill (Cell A). Waste filling began in May 1993.

Annual growth at the ACRL has ranged from -4.5 percent (1998 to 1999) to as high as 7.9 percent (2005 to 2006). The average annual growth rate from 1995 through 2009 was 1.6 percent. The growth and health of the economy from 2001 through 2007 resulted in an average annual waste growth rate of 4.1 percent. Exhibit 2-1 illustrates this data graphically.

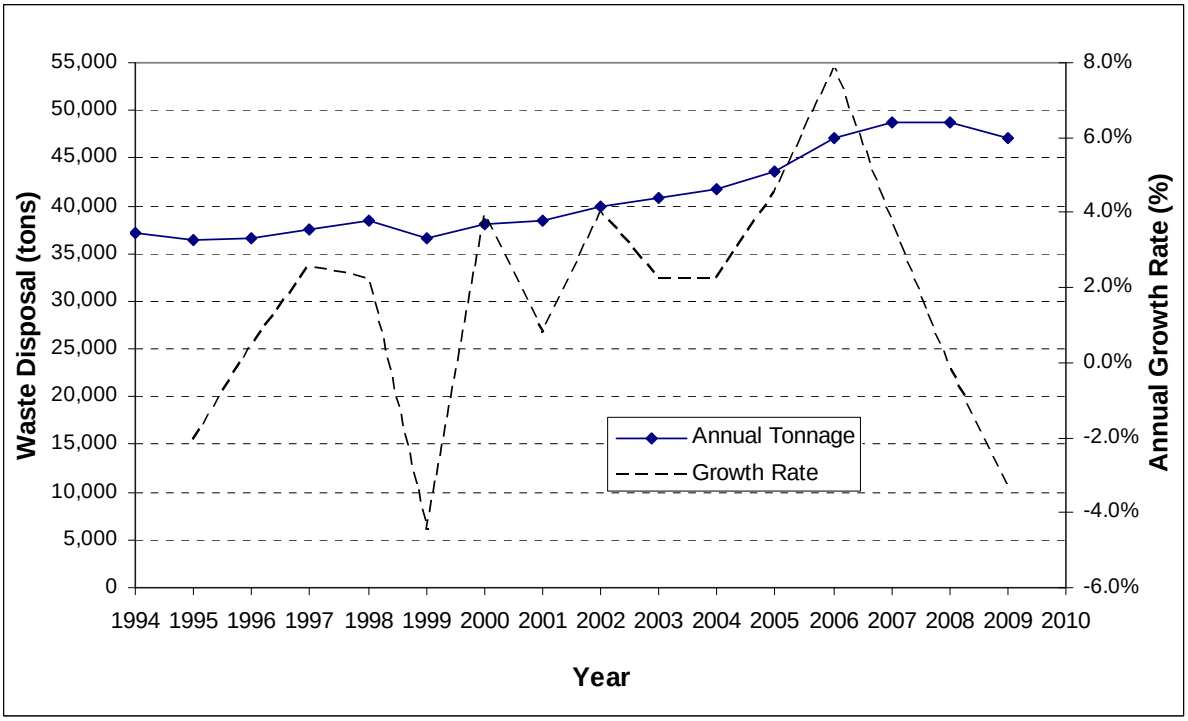


EXHIBIT 2-1
Asotin County Waste Stream Growth (1994 through 2009)

It is assumed for this long-term strategic plan that Asotin County will continue to provide affordable solid waste disposal services for the region, and that the long-term, sustained waste tonnage annual growth rate is 2 percent. For the last 15 years (1995 to 2009), the growth rates have varied depending on the health of the local market and economy. It is assumed that these trends of high and low growths will continue into the future but that the overall average growth rate will be on the order of 2 percent per year.

This plan only provides a "snap-shot" of the waste tonnages and landfill life at the time this plan was written, and therefore, it is very important to note that waste trends should continue to be tracked and incorporated into the County's planning tools and forecasts for long-term strategic outlooks.

2.2 Life Cycle Analysis

The last official life cycle update for the ACRL was conducted in 2007 (CH2M HILL, August 2007). At that time, the annual waste growth rate was around 4 percent and the forecast for future growth remained optimistic. As discussed in Section 2.1, however, a 2 percent rate appears to be more reflective of sustained growth over the long term. Therefore, the 2 percent growth rate is used in this life cycle update for strategic long-term waste planning.

It should be noted that this life cycle evaluation is based on several estimates and approximations that are identified in this section. As such, the evaluation should be used as a general planning tool that needs to be routinely updated and re-evaluated as annual refuse disposal data and waste volumes (survey data) become available for the landfill.

The general filling plan for the current permitted cells (Cells A-D) is assumed as follows:

- Stage 1: Currently, Cell A is in sub-interim closure at elevation 1240 ft with active filling occurring in Cells B and C[2]. Continue filling Cells B and C together to elevation 1240 ft to match the fill elevation of adjacent Cell A. As of April 16, 2007, Cells B and C had approximately 218,000 cy remaining before the elevation of the two cells match Cell A.
- Stage 2: Once reaching the 1240 ft sub-interim closure elevation in Cells B and C, fill all three cells (Cells A-C) together to elevation 1270 ft for interim closure[3]. Prior to reaching this 1270-foot interim closure elevation, begin final design/permitting and construction of lateral expansion Cell D.
- Stage 3: Fill Cell D to the 1270-ft interim closure elevation to match Cells A-C.
- Stage 4: Fill all four cells together up to the final closure elevation of approximately 1350 ft.

This section presents the life cycle analysis for the permitted Cells A-D. The key input parameters for this update are discussed in the following subsections.

2.2.1 Refuse Effective Density

The effective density measures the weight of refuse that can be placed in a unit volume of airspace within the landfill. The effective density takes into account the volume lost through daily and interim cover, and the volume gained through settlement and waste decomposition during the active life of the landfill. This density ratio is termed "effective" because it gives the landfill operator an understanding of how much waste has been placed in a given volume (airspace), even though other materials are present within the same volume.

The effective density was established for the ACRL using landfill volume estimates obtained from surveys of the site through 2007, and the known tonnages of refuse placed into the landfill at those times. The effective density from the inception of Cell A in 1993 until the October 2004 survey (last landfill survey before April 2007) averaged 1,028 lb/cy. The effective density from 1993 until the most recent April 2007 survey averaged 1,042 lb/cy. From October 2004 to April 2007, the effective density increased to 1,098 lb/cy. The density of the landfill material is expected to continue to incrementally increase as the overall waste ages, due to consolidation under its own weight and biological decomposition of the organic fraction of the waste. As a result, a step increase of effective density is used for the life cycle

[2] Recently a small area on the southwest corner of Cell A was opened for public tipping, to provide separation from commercial haulers and waste transfer trucks. The other tipping operations occur in Cells B/C.

[3] The airspace capacity assumes an interim closure of Stage 2 at approximate elevation 1273 ft with a bench grade slope to drain non-contact stormwater off the landfill.

update. A density of 1,050 lb/cy is used from the landfill inception in 1993 through 1997, 1,150 lb/cy for 2008 through 2020, and 1,250 lb/cy from 2021 through closure of the landfill[4].

2.2.2 Airspace

Table 2 presents the airspace volumes projected to be available for development of the ACRL through Cell D. This is the total volume between the top of the bottom lining system and the underside of the final cover, and includes all of the volume consumed by waste, daily cover, and interim cover.

TABLE 2-2
Fill Sequencing and Airspace Availability – Permitted Cells A-D
Asotin County

Fill Development Stage	Depth of Fill (feet) [a]	Airspace (cy)	Cumulative Airspace (cy)
In-place waste as of April 2007 [b]	~60	---	1,066,000
Est. In-place waste through 2008 [c]	~65	---	1,211,000
Stage 1: Fill Cells B&C to Elev. 1240-ft (finish Stage 1 filling)	70	73,000	1,284,000
Stage 2: Fill Cells A-C to Elev. 1270-ft	100	675,000	1,959,000
Stage 3: Construct Cell D and Fill Cell D to Elev. 1270-ft	100	1,019,000	2,978,000
Stage 4: Fill Cells A-D to final closure Elev. 1350-ft	180	848,000	3,826,000

[a] Depth of fill over the cell floor with an approximate center floor elevation of 1170 feet.
[b] Includes total waste in place in Cells A–C as of April 16, 2007 (last landfill survey).
[c] Estimate of airspace utilized as of December 31, 2008.

2.2.3 Summary

Table 2-3 presents the fill staging and life cycle analysis update for the ACRL.

TABLE 2-3
Fill Staging and Life Cycle—Cells A-D and Beyond
Asotin County

Year End	Waste Landfilled (tons)[(a)]	Est. Annual Vol. (cy)	Est. Cumulative Vol. (cy)	Fill Stage	Landfill Construction/Closure Schedule & Comments
1993 [(b)]	29,925	57,000	57,000	Stage 1	Constructed Cell A; Started Filling Cell A
1994	37,180	70,819	127,819		
1995	36,412	69,356	197,175		
1996	36,582	69,680	266,855		
1997	37,523	71,472	338,328		
1998	38,365	73,076	411,404		Constructed Cells B&C
1999	36,648	69,806	481,210		Cell A interim closure; Began filling Cells B&C together
2000	38,107	72,585	553,794		Continue filling Cells B&C to elev. 1240 ft (1,284,000)
2001	38,400	73,143	626,937		

[4] The effective density calculation indirectly accounts for airspace volume that is generated with settlement resulting from both waste decomposition and consolidation. Thus, the effective density should continue to increase in the coming years with good waste placement and compaction and limited soil cover.

TABLE 2-3
Fill Staging and Life Cycle—Cells A-D and Beyond
Asotin County

Year End	Waste Landfilled (tons)[a]	Est. Annual Vol. (cy)	Est. Cumulative Vol. (cy)	Fill Stage	Landfill Construction/Closure Schedule & Comments
2002	39,935	76,067	703,004		
2003	40,824	77,760	780,764		
2004	41,735	79,495	860,259		
2005	43,625	83,095	943,354		
2006	47,048	89,615	1,032,970		
2007	48,787	92,928	1,125,897		
2008	48,687	84,673	1,210,570		
2009	47,068	81,857	1,292,428	Stage 2	Reach elev. 1240 in Cells B&C (1,284,000 cy);
2010	48,009	83,495	1,375,922		Fill Cells A-C to interim closure elev. 1270 ft (1,959,000 cy)
2011	48,970	85,164	1,461,087		
2012	49,949	86,868	1,547,954		
2013	50,948	88,605	1,636,559		
2014	51,967	90,377	1,726,937		
2015	53,006	92,185	1,819,121		Design Cell D & permitting
2016	54,066	94,028	1,913,150		Construct Cell D
2017	55,148	95,909	2,009,059	Stage 3	Reach interim closure elev. 1270 ft in Cells A-C (1,959,000 cy)
2018	56,251	97,827	2,106,886		Fill Cell D to interim closure elev. 1270 ft (2,978,000 cy)
2019	57,376	99,784	2,206,669		
2020	58,523	101,779	2,308,449		
2021	59,694	95,510	2,403,959		
2022	60,887	97,420	2,501,379		
2023	62,105	99,368	2,600,747		
2024	63,347	101,356	2,702,103		
2025	64,614	103,383	2,805,486		
2026	65,907	105,451	2,910,936		
2027	67,225	107,560	3,018,496	Stage 4	Reach interim closure elev. 1270 ft in Cell D (2,978,000 cy)
2028	68,569	109,711	3,128,206		Fill all four cells together to final closure (3,826,000 cy)
2029	69,941	111,905	3,240,111		
2030	71,339	114,143	3,354,254		
2031	72,766	116,426	3,470,680		
2032	74,221	118,754	3,589,434		Final closure design & permitting
2033	75,706	121,129	3,710,564	Final Closure[c]	Final Landfill Closure (3,826,000 cy)
2034	77,220	123,552	3,834,116		Implement a Waste Disposal Alternative (20-yr planning horizon)
2035	78,764	126,023	3,960,139		
2036	80,340	128,544	4,088,683		
2037	81,947	131,114	4,219,797		
2038	83,585	133,737	4,353,534		
2039	85,257	136,411	4,489,945		
2040	86,962	139,140	4,629,085		
2041	88,702	141,922	4,771,007		
2042	90,476	144,761	4,915,768		
2043	92,285	147,656	5,063,425		
2044	94,131	150,609	5,214,034		
2045	96,013	153,621	5,367,655		
2046	97,934	156,694	5,524,349		

TABLE 2-3
Fill Staging and Life Cycle—Cells A-D and Beyond
Asotin County

Year End	Waste Landfilled (tons)[a]	Est. Annual Vol. (cy)	Est. Cumulative Vol. (cy)	Fill Stage	Landfill Construction/Closure Schedule & Comments
2047	99,892	159,828	5,684,177		
2048	101,890	163,024	5,847,201		
2049	103,928	166,285	6,013,486		
2050	106,007	169,611	6,183,097		
2051	108,127	173,003	6,356,099		
2052	110,289	176,463	6,532,562		
2053	112,495	179,992	6,712,554		**Additional Capacity Needed ~3,123,000 cy or ~1,952,000 tons[d]**

[a] Assumes a 2 percent annual growth rate from 2009 and on through the planning period.

[b] Cell A, the first of the new modern landfill cells, was opened in 1993 for waste filling. The 1993 tonnage represents a partial incoming tonnage for that year for the amount of waste that was disposed in Cell A.

[c] This life cycle update predicts a minor amount of airspace remaining at the end of year 2033, which may allow the landfill to stay open into the first part of 2034; however, as a conservative measure, it is assumed that the ACRL will close in 2033.

[d] Assumes a long-term effective waste density of 1250 lb/cy.

Table 2-4 below provides a summary of the Cell A-D stage development and closure timelines for the ACRL.

TABLE 2-4
ACRL Development Timeline Summary
Asotin County

Activity	Date (No Later Than)
Stage 1/Continued Filling	Ongoing
Complete Stage 1/Start Stage 2	2009
Cell D Development:	
Permit & Design	2015
Construct	2016
Complete Stage 2 Fill/Begin Stage 3 Filling	2017
Complete Stage 3/Begin Stage 4	2027
Complete Stage 4	2033
Final Closure System Installation:	
Permit & Design	2032
Construct	2033
Implement Long-Term Disposal Alternative	
Permit & Design	2031
Construct	2032

The previous 2007 life cycle update estimated the construction of Cell D to occur in 2015, with design and permitting completed by no later than 2014. This update, however, pushes this timeline out by one year, which is based on the longer term waste growth rate of 2 percent, and the effective in-place refuse density remaining at 1,050 lb/cy through 2007

with then step-wise increases to 1,150 lb/cy in 2008 through 2020 and then 1,250 lb/cy from 2021 through final closure.

This update life cycle and future waste projections analysis indicates that the long-term planning horizon will require approximately 3.1 million cubic yards of additional airspace beyond the full build-out of the current permitted landfill cells (Cells A-D). This is about 80 percent of the total capacity of the current permitted landfill (3.8 million cubic yards).

CHAPTER 3

Identify and Evaluate Long-Term Solid Waste Disposal Alternatives

Long-term disposal alternatives were identified for this study, a screening process was conducted to pare down viable alternatives to a final set of four (retaining Alternative 1 as a basis of comparison), and are further evaluated by cost estimating (Chapter 4).

3.1 Selection of Alternatives for Evaluation

A list of long-term solid waste disposal alternatives was developed with the County. The following seven alternatives were evaluated:

Alternative 1. Near-Term Transfer Station Conversion—Converting the ACRL to a transfer station when the permitted landfill is closed (Cells A-D), and long hauling/waste disposal to a regional repository (Figure 1). This alternative considers transportation by either long-haul trucking from the proposed transfer station at the ACRL, or a combination of trucking and barging to a regional repository (Finley Buttes Landfill in Boardman, Oregon); the combination of truck and barge transportation would require intermodal trailers to be loaded at the transfer station and be moved by truck to the Port of Lewiston where they would be loaded onto barges; typically this would require several days to a week of loading time to fill the barge with enough containers for shipment; barges would then haul the waste containers to the Port of Morrow container yard in Boardman where they would be off-loaded by crane and hauled by trucks approximately 15 miles to the Finley Buttes Landfill. As a basis of comparison, this alternative is carried through the screening and subsequent cost estimating exercise of this report to evaluate how the other alternatives measure up to this "*basis of comparison*" alternative.

Alternative 2. New Landfill Cells—This option includes developing a future lateral landfill Cell E in the general shape of a "hockey stick," and retaining all of the entrance facilities and support infrastructure plus one of the following new landfill developments (Figure 2):

- **2a. New North Landfill Cell Development**—Developing a new landfill cell on the northwest corner of the County's property within Section 36 (Figure 2a). This concept provides approximately 1.8 million cy of airspace in Cell E plus 3.9 million cy of airspace in the north cell for a total of 5.7 million cy (>3.3 million cy). ***With the likelihood of the County selling this section of the property to the Port for an industrial park development, this alternative was not carried any further through the screening process.***
- **2b. New Landfill Located on Other Property**—Developing a new landfill cell on a new piece of property within the county that would provide the minimum airspace needed for waste disposal through the planning horizon. The selection criteria for locating a completely new landfill facility in the county, included: (a) keeping the site within 5 miles of the urban boundary, (b) locating the site where residential development is sparse now and would be anticipated to be sparse in the future, and (c) locating the site where road improvements would be reasonable and feasible. The site that was chosen

was an area off of Silcott Road where it intersects the east side of Section 33, and is west to northwest of the ACRL. This proposed area is shown in Figure 2b.

- **2c. New Landfill Cell in Canyon Area—**Developing a new landfill cell in a natural depression (canyon area) on the north side of 6th Avenue on existing county-owned property. The team looked at the potential of filling in the natural depression on the north side of the property to satisfy waste disposal through the planning horizon (Figure 3c). The canyon fill option was determined to not be viable. The natural depression would provide only 1.1 million cy of airspace plus 1.8 million cy of airspace in Cell E for a total of 2.9 million cy, which is less than the planning horizon need of 3.1 million cy. ***This in consideration of the close proximity to neighbors on this side of the property resulted in the team deciding not to evaluate this option any further.***

Alternative 3. New Contiguous Landfill Expansion Cells—This option includes developing future lateral landfill cells (Cells E and F) plus one of the following:

- **3a. New Entrance Facilities and 6th Avenue Realignment—**Developing new contiguous Cells E and F in phases, demolishing existing facilities and infrastructure in phases, constructing all new entrance facilities on the north side of 6th Avenue, and realigning 6th Avenue.
- **3b. New Entrance Facilities and Underpass beneath 6th Avenue—**Developing new contiguous Cells E and F in phases, demolishing existing facilities and infrastructure in phases, constructing all new entrance facilities on the north side of 6th Avenue, constructing an underpass beneath 6th Avenue.
- **3c. New Entrance Facilities Near Closed (Old) C&D Landfill Area—**Developing new contiguous Cells E and F (smaller Cells E and F compared to Alternatives 3a and 3b), and building all new entrance facilities over the closed C&D landfill area.

Table 3-1 summarizes the additional airspace and waste tonnage capacity that would be gained by implementing one of the identified long-term waste disposal alternatives.

TABLE 3-1
Alternative Airspace Estimates
Asotin County Long-Term Disposal Strategic Plan

	Description	Additional Airspace (cubic yards)	Additional Waste Capacity (tons)[a]
Alternative 1. Near-Term Transfer Station Conversion:			
1	Transfer Station Conversion	NA	NA
Alternative 2. New Landfill Cells:			
2a	Cell E + North Cell	5,700,000	3,562,500
2b	Cell E + New Landfill Located on Other Property	>5,000,000	>3,125,000
2c	Cell E + Canyon Fill	2,900,000	1,812,500
Alternative 3. New Contiguous Landfill Expansion Cells:			
3a	Cells E/F, Relocate Entrance Facilities, & Realign 6th Ave	4,500,000	2,812,000
3b	Cells E/F, Relocate Entrance Facilities, & 6th Ave Underpass	4,500,000	2,812,000
3c	Smaller Cells E/F, Relocate Entrance Facilities Near Closed C&D Landfill	3,900,000	2,437,500

[a] Assumes a long-term effective waste density of 1250 lb/cy.

Each of the alternatives provides more than enough waste management capacity beyond the 20-year planning horizon (minimum of approximately 3,123,000 cy, or 1,952,000 tons), except for Alternative 2c.

During this strategic planning exercise, other strategic waste management technologies were noted to exist outside of landfilling, which may include:

- **Thermal (Waste to Energy)**—Thermal technologies operate at high temperatures (and high reaction rates) and are typically used to generate electricity as the primary byproduct. Examples include thermal conversion technologies whereby the carbon-based portion of the waste feedstock is converted synthetic gas ("syn gas") which is used to produce electricity, chemical or green fuels. Examples of this technology are incineration, pyrolysis/gasification, and plasma-arc gasification.
- **Biological/Chemical**—These technologies operate at lower temperatures (and lower reaction rates) than thermal technologies. They can accept feedstock with high moisture levels, but require biodegradable materials. Some technologies involve the synthesis of products using chemical processing carried out in multiple stages. Byproducts can vary, which include: electricity, compost and chemicals. Examples of this technology are anaerobic digestion and aerobic digestion/composting.
- **Physical**—This type of technology involves altering the physical characteristics of the waste feedstock by separating, shredding, and/or drying. The resulting material is referred to as refuse-derived fuel (RDF). It may also be densified or pelletized into homogeneous fuel pellets and transported and combusted as a supplementary fuel in utility boilers.

Although these technologies are available in some form or fashion in today's market, they tend to be unsuitable for smaller communities such as Asotin County (and its regional waste partners). Many of the technologies are still in their infancy of development and some have not been implemented on a full-scale commercial level. Although incineration has been available for a long time, it was not considered a viable alternative for the County due to its high investment and operating costs (on the order of $125 per ton or more), general negative public perception and intensive permitting requirements, and its liability/risk to the County being the primary factors of concern.

3.2 Screening and Selection Process

The five alternatives that were not immediately dismissed as viable options were carried forward into the screening and selection process by the project team[5]. Factors of primary importance were developed and considered in the evaluation and comparison process of the alternatives and included:

- **Level of Service**—Considered the anticipated service level (materials received and processed/disposed, and convenience) to the public.
- **Impact on Cost (Economics)**—Compared perceived relative costs of the alternatives, including operational, administrative, and capital costs.

[5] Project team members included Joel Ristau/Asotin County Public Works Director/County Engineer, Steve Becker/ACRL Solid Waste Supervisor, and CH2M HILL key team staff members (Jay Dehner and Travis Pyle).

- **Liability/Risk**—Considered risk of for future environmental issues and associated risks/liabilities of continuing to operate and own a county landfill/facility.
- **Public Perception (and Social Attitudes/Expectations)**—Considered social attitudes, public expectations and public perception of the identified alternatives (for example, neighbors perceptions/reactions to new landfill cells at the existing facility)
- **Environmental Impacts**—Identified environmental considerations that might influence viability of the options.
- **Regulatory Compliance and Permitting**—Considered current and anticipated future regulations to determine what impacts they may have on alternative selection.
- **County Land Use Compatibility**—Considered if the alternative would be generally compatible with the County's land use plan.

The alternatives were ranked by the project team between 1 to 5, with 5 being the most beneficial or advantageous, 3 meaning neutral impacts, and 1 having the most disadvantages or worst impacts. Each of these screening criteria was then assigned a weighting factor by the team between 1 and 7, with 7 having the highest weight or influence and 1 having the least weight or influence. Table 3-2 presents the weighting factors that were assigned to the screening criteria.

TABLE 3-2
Screening Criteria Weighting Factors
Asotin County Long-Term Disposal Strategic Plan

Weighting Factor	Ranking Criteria
7	Level of Service
6	Impact on Cost
5	Liability/Risk
4	Public Perception
3	Environmental Impacts
2	Regulatory Compliance and Permitting
1	County Land Use Compatibility

In consideration of the alternatives and development of the ranking values, the project team developed an alternative comparison summary table (Table 3-3). Table 3-4 presents the compiled average rankings by the project team.

TABLE 3-3

Alternative Comparison Summary

Asotin County Long-Term Disposal Strategic Plan

Alternative	I. Level of Service	II. Impact on Costs	III. Liability/Risk	IV. Public Perception	V. Environmental Impacts	VI. Regulatory Compliance and Permitting	VII. County Land Use Compatibility	Comments
1. Near-Term Transfer Station Conversion								
1. Convert ACRL to a Transfer Station [a]	Neutral change in level of service is anticipated; Customers should see no change with service under normal operating circumstances.	Moderate capital costs - while retaining much of the existing infrastructure with little to no improvements, there would be a large investment cost for the transfer building; High operating costs - equivalent cost to operating a landfill but would require additional costs for long-haul and regional landfill tipping fee. Overall anticipated to be highest cost to citizens due to combination of capital costs for station upgrades and long-haul contract.	Neutral level to slight increase in liability and risk; waste being transported to a regional landfill to share in liability with all other disposers has an increased level of risk but needs to be considered in the context of potential reduced risk of not increasing the onsite facility footprint with no landfill expansion (reduced potential of contamination to sole-source aquifer.)	Neutral to worst case in public perception; the ACRL will remain as a solid waste management facility in terms of collecting waste from the customers. However, this alternative has the potentially highest cost increase (potentially increasing tipping fees by 3 times) which has an overall negative impact on public perception.	Neutral to good environmental impacts; historical groundwater contamination caused by the old, closed landfill remains. However, waste is being managed elsewhere and no landfill expansion over the sole-source aquifer; offset by trucking environmental impacts.	Neutral to better than neutral change with regulatory compliance and permitting; a new permit will need to be acquired to cover the new transfer station but should be a relatively quick and easy permit to secure since there is a pre-existing landfill on the premises; elimination of active landfill permit; No CUP anticipated to be required.	Neutral since there would be no change in property use with onsite development.	Any of the other options presented herein may be converted eventually to a transfer station with similar type of impacts; this option doesn't defer costs like the others; overall an expensive option with increased liability and risk. Liability and risk is about the same level as other alternatives, just different risk areas.
2. New Landfill Cells								
2b. New Cell Located on Other Property	Scored as neutral to slightly reduced level of service; probably could maintain current LOS with possibility of slight decline with pushing the landfill farther out	Higher cost impacts than alt 3 series due to acquisition, permitting, and development of a new offsite property, but less expensive than the long-term costs of alt 1.	Greater impacts (compared to alt 3 series) due to expanded footprint over new areas of aquifer.	Poor public perception due to higher costs, offsite development of landfill space. Will likely result in a high level of public involvement and scrutiny.	Greater impacts due to offsite development and landfilling; longer waste haul from population centers.	Greater impacts due to acquisition, permitting, and development of offsite properties.	Greater impacts due to offsite property development.	Considered most expensive landfilling alternative as new land would need to be purchased and all new infrastructure built. Leachate management in this more remote location would likely require design and operation of leachate pond systems.
3. New Contiguous Landfill Expansion Cells								
3a. Across the Road Support Facilities /Realign 6th Ave	Level of service expected to increase slightly with better entrance facilities to support long term demand and queuing load; efficient truck movement across 6th Ave without interfering with vehicle traffic.	High capital costs for re-locating all support and entrance facilities across 6th Ave and realigning 6th Ave; neutral change in operating costs. Will need to consider road level of service needs, road speed and siting requirements for a realignment of 6th Ave. Could be an expensive alternative with a large road realignment opposed to alt 3b with installing just an underpass beneath 6th Ave.	Neutral change in liability and risk.	Generally neutral change in public perception; possibility of some public outcry with the support and entrance facilities being re-located closer to the northeast neighbors and the complete realignment of 6th Ave; the ACRL will remain a solid waste management facility.	Neutral environmental impacts; historical groundwater contamination caused by the old, closed landfill remains; new modern cells expected to not increase environmental impacts.	Slight increase level in regulatory compliance and permitting; will need to update the solid waste permit documents to capture changes to the landfill footprint; CUP required. Also likely large permit involvement in realigning 6th Ave. New facilities across road will also likely trigger SEPA.	Will likely require CUP and SEPA for property development on the north side of 6th Ave.	Realignment of 6th Ave should consider a wider sweep over to its connection with Evans Road, providing more room for future infrastructure and transfer building development; future transfer station to make use of direct north haul out of facility onto Evans Road without interfering with customer/self-haul traffic; doesn't require removal and realignment of sewer/leachate line in 6th Ave.
3b. Across the Road Support Facilities /Underpass beneath 6th Ave	Level of service expected to increase slightly with better entrance facilities to support long term demand and queuing load; partial constraints with truck movement from north to south side of facility for waste disposal.	High capital costs for re-locating all support and entrance facilities across 6th Ave and realigning 6th Ave; neutral change in operating costs. Potentially high capital related to installing a new underpass under 6th Ave; triggering the potential change in the leachate/sewer system as well.	Neutral change in liability and risk.	Generally neutral change in public perception; possibility of some public outcry with the support and entrance facilities being re-located closer to the northeast neighbors; the ACRL will remain a solid waste management facility.	Neutral environmental impacts; historical groundwater contamination caused by the old, closed landfill remains; new modern cells expected to not increase environmental impacts.	Slight increase level in regulatory compliance and permitting; will need to update the solid waste permit documents to capture changes to the landfill footprint; CUP required. Permit for a new underpass beneath 6th Ave (may be less arduous of a permitting process compared to alt 3a). New facilities across road will also likely trigger SEPA.	Will likely require CUP and SEPA for property development on the north side of 6th Ave.	Requires the construction of an underpass beneath 6th Avenue; likely relocation of sewer line system; possibly cheaper than 6th Ave realignment under Option 3a; future layout constraints with transfer building.
3c. Partial Cell F Development /Support Facilities on Old C&D Landfill	The level of service will generally stay unchanged (neutral); however, this option provides less overall airspace for landfill development in future Cell F; also land constraints exist with the ball fields to the east and the landfill and property lines to the south and west, and 6th Ave to the north.	High capital costs for re-locating all support and entrance facilities on old C&D landfill; more expensive than locating across 6th avenue with additional design costs for placing structures over old landfill and likely more geotech/foundation costs for building over old landfill area; neutral change in operating costs.	Neutral to a small increase in liability and risk.	Slight decrease in public perception related to the support and entrance facilities with the ball fields as immediate neighbors; the noise and potential odor of the facilities directly across from them could cause some public outcry.	Slightly more environmental impacts; with building over an old landfill and opening up any historical contamination with placing new waste handling facilities over this area; careful consideration of segregating any residual contamination from any new potential contamination.	Neutral change with regulatory compliance and permitting with consideration of any residual contamination in the area of the old C&D Landfill; will need to update the solid waste permit documents to capture changes to the landfill footprint; CUP likely not required since expansion is staying in existing facility impact area.	Neutral since there would be no change in property use with onsite development.	Use of the old C&D Landfill footprint for relocated entrance and support facilities makes a lot of sense; however, there is a high likelihood of increased engineering and construction costs related to geotechnical concerns for foundational support of this infrastructure; the close location to the public ball fields/park on the east side also makes this option less appealing; slightly smaller airspace increase compared to Options 3a and 3b.

[a] Advantages and disadvantages for Alternative 1 assume waste transport by long-haul trucking to a regional repository, and not the combination of trucking and barging of waste. Therefore, the potential liability/risk and environmental impacts for the combination of trucking and barging of the waste are not truly described.

There is inherently more environmental risk in barging waste on navigable water such as the Snake and Columbia Rivers compared to trucking of waste.

TABLE 3-4
Summary of Compiled Average Project Team Rankings
Asotin County Long-Term Disposal Strategic Plan

Alternative Comparison [a]	Screening Criteria (weighting factor)							
	I. Level of Service (7)	II. Impact on Cost (6) [b]	III. Liability/Risk (5)	IV. Public Perception (4)	V. Environmental Impacts (3)	VI. Regulatory Compliance and Permitting (2)	VII. County Land Use Compatibility (1)	SUM
Alternative 1. Near-Term Transfer Station Conversion								
1. Transfer Station Conversion[c]	19.25	10.50	13.75	7.00	10.50	7.50	3.50	72.00
Alternative 2. New Landfill Cells	(Future Landfill Cell E + Sub-Option)							
2b. New Landfill Location on Other Prop.	17.50	9.00	11.25	8.00	6.00	4.50	2.25	58.50
Alternative 3. Maximize ACRL Landfill Expansion	(Future Landfill Cells E/F + Sub-Option)							
3a. New Entrance Facilities & 6th Ave Realignment	26.25	13.50	16.25	12.00	9.00	5.50	2.75	85.25
3b. New Entrance Facilities & Underpass Beneath 6th Ave	24.50	12.00	15.00	12.00	9.75	6.00	2.75	82.00
3c. New Entrance Facilities Near Closed C&D Landfill	22.75	18.00	15.00	9.00	8.25	6.50	3.00	82.50

[a] Alternatives ranked on the basis of 1 to 5, with 5 being the most beneficial or advantageous, 3 being neutral impacts, and 1 the most disadvantageous or worst impacts. Table values reflect average ranking by the screening team; Weighting Factors 1 to 7 are noted next to the Screening Criteria in parentheses, with 7 being the most weight or influence and 1 being the least weight or influence.

[b] Cost impacts are perceived relative costs. Costs that are provided in Chapter 4 were not developed at the time the screening was conducted.

[C] This ranking is for transfer station conversion assuming waste transport by long-haul trucking to a regional repository, and not the combination of trucking and barging of waste. Therefore, the potential liability/risk and environmental impacts for the combination of trucking and barging of the waste are not truly reflected in this scoring for Alternative 1. There is inherently more environmental risk in barging waste on navigable water such as the Snake and Columbia Rivers compared to trucking of waste, and therefore, the team would have ranked this option much lower in these categories resulting in an overall lower score for Alternative 1.

Although the individual rankings varied by project team member, the over-all rankings were generally consistent with options under Alternative 3 having the highest rankings, and Alternative 2b having the lowest ranking. By comparison, Alternative 1 ranked almost exactly in the middle of these two alternatives (for long-haul trucking). The highest overall

ranked alternative was development of a future contiguous expansion Cells E and F, new entrance facilities north of 6th Avenue, and realignment of 6th Avenue (Alternative 3a) with an overall average score of 85.25. Development of new entrance facilities over the closed C&D landfill and contiguous expansion of the landfill into a smaller version of Cells E and F (Alternative 3c) ranked second with a score of 82.50, while development of new entrance facilities on the north side of 6th Avenue with an access underpass beneath 6th Avenue and expansion into contiguous Cells E and F (Alternative 3b) ranked third with a score of 82.00. Because the scores were so close for these top three alternatives, it was decided that ranking the alternatives into categories of first, second and third place should be deferred until the cost analysis (presented in Chapter 4) was completed to provide more insight on a preferred option that should be pursued by the County for long-term waste disposal.

Therefore, the final four alternatives that were retained for further, more detailed evaluations included (not in any particular order):

- Alternative 1a. Near-Term Transfer Station Conversion (retained as a basis of comparison)
- Alternative 3a. New Cells E/F, New Entrance Facilities, and 6th Ave. Realignment
- Alternative 3b. New Cells E/F, New Entrance Facilities and Underpass Beneath 6th Ave.
- Alternative 3c. New Cells E/F (smaller version than Alternatives 3a and 3b) and New Entrance Facilities Near Closed (Old) C&D Landfill Area

These four alternatives were further evaluated by developing rough order-of-magnitude (ROM) cost estimates based on concept designs (Chapter 4) to assist the team in narrowing them down to a preferred option. Up to this point, only perceived, relative costs were considered by the team in ranking the alternatives.

CHAPTER 4

Cost Evaluations

The cost opinions provided in this report are considered rough order-of-magnitude (ROM) cost estimates in 2010 dollars (2010$), and are considered Class 5 estimates as defined by the American Association of Cost Engineering (AACE). Class 5 estimates have a typical accuracy of -50 percent to +100 percent. These cost opinions have been prepared for general project guidance based on conceptual design of the top four ranking alternatives as presented in Chapter 3. Price information for other similar size solid waste facilities projects in the Inland Northwest were used in the cost estimates.

4.1 Cost Estimate Assumptions

The following key assumptions were made in the preparation of the cost opinions:

4.1.1 All Alternatives Assumptions

- 6 percent of the total construction costs allocated for bonds and insurance premiums, mobilization, demobilization, and contract closeout.
- 4 percent of the construction costs allocated for construction facilities, temporary controls, and safety related construction items.
- 30 percent of the construction cost estimate for contingency to account for potential scope changes that are presently unforeseen at this time (and level of design).
- 20 percent of the construction cost estimate for engineering services (permitting, design and CM support services).
- 2 percent annual inflation rate.

4.1.2 Alternative 1 Assumptions

- Operations costs for the transfer station facility of $30 per ton (2010$).
- Truck haul modeling tool (see Appendix) estimates the cost to long-haul waste from the ACRL to the Finley Buttes Landfill in Boardman, Oregon. This assumes a private contract hauler at $37 per ton (2010$); model assumes 8 transfer trucks and 18 transfer trailers in the fleet; tonnage hauled based on 2034 annual tonnage projection.
- The tipping fee at the regional waste repository (Finley Buttes Landfill) is based on a proposal received by the City of Lewiston by a major waste management company in 2006 for a 7 year minimum service contract (2007 – 2013) at a rate of $20 per ton. At an annual inflation rate of 2 percent per year (from 2007 to 2010), the estimated tipping fee is $21 per ton (2010$); Waste transport by a combination of truck and barge is also based on the 2006 proposal with a proposed rate of $45.50 per ton, which equates to approximately $48 per ton (2010$).

- Retain the shop building, MRW facility, recycling area, and self-haul tipping areas without any modifications or extra expenditures.
- Retrofits to the existing administration building/scalehouse and adding a second scale – $300,000 (2010$).
- Other site improvements and utilities to support the transfer station development – $50,000 (2010$); road improvements, expansions, etc. – $150,000 (2010$).
- Transfer building to be a pre-engineered metal building – 40,000 sf building with two push pits (loading chutes) at a cost of $130/sf; building size is based on approximate 110,000 tons per year (300 ton per day with a peaking factor of 2.0, or approximately 600 ton per day) through the planning horizon (2053); building to be designed to accommodate a third push pit and loading bay beyond planning horizon.

4.1.3 Alternative 3 Assumptions

- Operations costs for the landfill facility operation of $35 per ton; closure costs of $180,000 per acre; post-closure care costs of $180,000 per year for the first 10 years and $150,000 per year for the last 20 years (30 years total post-closure care).
- Earthwork (general excavation and embankment fill) for the expansion cells (Cells E and F) will be performed by the construction contractor; the County may choose to self-perform this work as a cost savings measure as they are currently doing for Cell D.
- Bottom liner system for Cells E and F consist of the same composite liner that was installed for Cells B and C (and anticipated for Cell D), which is comprised of (from bottom to top): 12-inch foundation layer (processed native soil prepared through rotovation), a geosynthetic clay liner (GCL), and a 60-mil HDPE geomembrane.
- Leachate collection system over the bottom liner consists of an 18-inch thick layer of drain sand with strip drains, leachate collector pipes (wrapped with gravel and geotextile), in-cell leachate collection sump with vertical pipe boot penetration, and gravity drainage through a double-containment pipe to the existing leachate pump station.
- Access roads around the perimeter of the landfill cells and lined stormwater ditches along the inside edge (landfill side) of the perimeter roads.
- Two 80-foot long typical entrance platform scales serviced by a single scalehouse (slab-on-grade, stick-framed) on the order of 12 feet by 20 feet (240 square feet).
- Shop building to be a pre-engineered metal building with a maintenance shop section and an area for administrative support (offices, conference room, kitchen, and locker rooms); assumed building size of 5,000 square feet at $160/sf.
- Moderate Risk Waste (MRW) facility to be a pre-engineered metal building (enclosed); assumed building size of 1,500 square feet at $200/sf.
- 6th Avenue road realignment cost of $750,000 per 1/2 mile, per estimate provided by the County (Alternative 3a); estimated road length for 6th Avenue realignment of 2,000 feet.

- Underpass beneath 6th Avenue project cost allowance of $750,000 (Alternative 3b).

Table 4-1 provides a summary of the estimated capital investment costs for the four alternatives. The costing detail worksheets are provided in Appendix.

TABLE 4-1
Summary of Alternatives – Rough Order of Magnitude Capital Cost Estimates (2010$)
Asotin County Long-Term Disposal Strategic Plan

Alternative	Description	Cell E	Cell F	Infrastructure & Support Facilities	Total
1	Near-Term Transfer Station Conversion (retained as a basis of comparison)	----	----	$10,352,000	**$10,352,000**
3a	New Cells E/F, Entrance Facilities, & 6th Ave Realignment	$4,454,000	$3,034,000	$4,322,000	**$11,810,000**
3b	New Cells E/F, Entrance Facilities, & 6th Ave Underpass	$4,454,000	$3,034,000	$4,722,000	**$12,210,000**
3c	New Cells E/F & Entrance Facilities Near Closed C&D LF	$3,839,000	$2,852,000	$3,360,000	**$10,051,000**

Table 4-2 summarizes each of the four alternatives, accounting for capital investment costs, annual operations, and long-term closure and post-closure care commitments, and loss of airspace (revenue), where applicable.

To arrive at a tipping fee (that is, cost per ton) for each of the alternatives, a *Levelized Tip Fee*[6] methodology is used which allows for direct comparisons of options (that is, discounted costs divided by discounted tons). The costs and tons are discounted back to present worth (2010$) using a *Real Interest Rate*[7] of 3 percent.

[6] *Levelized Rates* (or in this case, *Levelized Tipping Fees*) are used as standard of practice in the energy industry where one is making direct comparisons between energy technologies in terms of cost per power unit. The Solid Waste Industry has adopted a similar approach when comparing solid waste management alternatives to "levelize" or normalize the alternatives over the long-term.

[7] It is assumed for this simplified evaluation in arriving at cost comparisons that the rate of inflation is consistent among all cost items. As such, it is acceptable to apply a *Real Interest Rate* for discounting costs. *Real Interest Rates* account for the rate of inflation in evaluating the time value of money. Therefore, when calculating a present value cost (2010$) using a *Real Interest Rate,* in the standard sense of discounting costs, no rates of inflations are added to the costs.

TABLE 4-2
Summary of Alternatives – Rough Order of Magnitude Tipping Fees (2010$)
Asotin County Long-Term Disposal Strategic Plan

Alternative	Description	Levelized Tip Fee ($/ton)	Comments
1	Near-Term Transfer Station Conversion – Truck Long Haul	$99.20	The combination truck and barge haul option under Alternative 1 was estimated to have a *Levelized Tip Fee* of $110.20 per ton. Timeframe of service is through 2061 to match the service period for Alternatives 3a and 3b.
3a	New Cells E/F, Entrance Facilities, & 6th Ave Realignment	$56.82	Alternatives 3a and 3b provide an estimated 4.5 million cy of airspace which is equivalent to approximately 2.8 million tons @ 1250 lb/cy, providing waste management through 2061.
3b	New Cells E/F, Entrance Facilities, & 6th Ave Underpass	$57.25	See comments above for Alternative 3a.
3c	New Cells E/F & Entrance Facilities Near Closed C&D LF	$57.00	Alternative 3c provides an estimated 3.9 million cy of airspace which is equivalent to approximately 2.4 million tons @ 1250 lb/cy, providing waste management through 2058. Development of a transfer station with long haul trucking is assumed to occur in 2059 to 2061 to match the same period as Alternatives 3a and 3b. Includes an estimate loss of revenue of $1,875,000 (assumes $5/ton revenue) compared to the other alternatives.

4.2 Cost Estimate Results Summary

Alternative 3a appears to be the least expensive option based on these ROM cost estimates, while Alternative 1 is the most expensive. It is apparent that Alternative 1 (the basis of comparison option) is more expensive than the other three alternatives. It is important to note, however, that the level of accuracy (error margin) associated with ROM cost estimating is large enough that the true cost savings of any one of the three options under Alternative 3, if any, cannot truly be realized at this level of design and evaluation.

CHAPTER 5

Summary and Recommendations

5.1 Summary

A list of seven long-term solid waste disposal/management alternatives was developed with the County. Two of the seven options were immediately discounted as viable alternatives as a result of conflict in obligated land use (Alternative 2a) or not enough airspace capacity to fulfill the long-term planning horizon needs (Alternative 2c). The other five alternatives were carried forward into the screening process by ranking them weighted scale basis using the seven selection criteria, which included level of service, impact on cost (perceived), liability/risk, public perception, environmental impacts, regulatory compliance, and county land use compatibility.

Based on evaluation of alternatives, the four final alternatives that best fit the selection criteria were:

- Alternative 1a. Near-Term Transfer Station Conversion (retained as a basis of comparison) (Score 72.00)
- Alternative 3a. New Cells E/F, New Entrance Facilities, and 6th Avenue Realignment (Score 85.25)
- Alternative 3b. New Cells E/F, New Entrance Facilities, and Underpass Beneath 6th Avenue (Score 82.00)
- Alternative 3c. New Cells E/F (smaller version than Alternatives 3a and 3b) and New Entrance Facilities over Closed (Old) C&D Landfill Area (Score 82.50)

From an engineering, technical standpoint any of these four options would provide the needed long-term waste disposal capacity and flexibility for the County.

Rough-order-of-magnitude (ROM) cost opinions were then prepared for each of the four options. Although the costs for each of the options were relatively close in terms of the *Levelized Tip Fee*, Alternative 3a was estimated to be the least expensive, followed by Alternative 3b and then by Alternative 3c, and finally Alternative 1 being the most expensive. It is apparent that Alternative 1 would be the most expensive alternative when compared to the other three alternatives; however, the level of cost savings between any of the three options under Alternative 3 can not be truly realized at this level of cost estimating.

Alternative 3c would require new entrance facilities (infrastructure and support facilities) to be built between the proposed east boundary of Cell F and the old C&D Landfill waste limits; this would, in turn, constrain the development of Alternative 3c to those areas not potentially over waste fill zones and any future developments such as a transfer building. Another longer-term consideration is the transition of the ACRL into a transfer station beyond the planning horizon. At some point in the future, the landfill will run out of

airspace and another option such as waste transfer and long-haul transport may become more desirable. Alternatives 3a and 3b are adjacent to open space of county-owned land that could easily serve as an expansion area for a transfer building. On the other hand, Alternative 3c would be relatively crowded and would make construction of a future transfer building more difficult, unless the lease for the neighboring ballpark was turned back over to the County and this land was available for use; this, however, conflicts with the county's current land use model.

The major cost difference between Alternatives 3a and 3b is the new road versus the allowance for the underpass cost beneath 6th Avenue. The underpass is estimated to cost about $250,000 more than realignment of 6th Avenue. At this level of cost estimating, however, it is really difficult to identify which alternative would end up being the least expensive between the two. Not including the cost impact ranking in the screening process, Alternative 3a would rank the highest (Score 71.75), followed by Alternative 3b (Score 70.00), and then last by Alternative 3c (Score 64.50). The development of Alternative 3a versus Alternative 3b might eventually come down to consideration of the more intangible influences, such as input from the neighbors and the community on what they would prefer, construction safety/complexity and operational safety both from the standpoint of the landfill and 6th Avenue traffic, long-term maintenance costs, county engineering preferences, etc.

Another consideration in planning for these future landfill alternatives is the demolition and development staging of infrastructure and support facilities. The conceptual layout for Cell E, for example, shows all of the entrance facilities removed except for the MRW facility, and even then, the access and use of the MRW facility is likely restricted making it unusable at that time. Subsequent design evaluations may consider the costs-benefits of developing partial landfill cells and trying to keep existing infrastructure and support facilities intact as long as possible, whereby deferring capital investment expenditures. For this evaluation, however, the expansions are assumed to occur in their full configuration essentially requiring all existing facilities to be removed and replaced at the time of development.

5.2 Recommendations

Based on the conceptual design and cost opinions, the following recommendations should be considered by Asotin County in moving towards the decision of a preferred alternative and its development and implementation.

- Secure long-term contracting with its main waste partners (City of Lewiston and City of Clarkston) to get commitments on service contracts for waste disposal thereby securing waste tonnage and revenues for long-term waste planning.
- Dismiss Alternative 3c as a preferred option given the long-term development area constraints for the alternative itself and future expansions and retrofits (for example, a transfer building).
- Continue evaluating Alternatives 3a and 3b to determine which of the two is the preferred option; as previously noted, the primary difference between the two is access

related to 6th Avenue (Alternative 3a includes realigning 6th Avenue, while Alternative 3b requires an underpass beneath 6th Avenue).

  - Additional design and more refined cost estimates targeting the main difference in infrastructure (new road versus underpass) could affect the decision making process for the preferred alternative. The need for additional design, however, should be carefully considered and weighed against some of the more intangible influences that might lead the County towards developing one alternative over the other.
  - Consider more of the intangible influences such as input from the neighbors and the community on what they would prefer, construction safety/complexity and operational safety both from the standpoint of the landfill and 6th Avenue traffic, long-term maintenance costs, county engineering preferences, etc.

- Begin follow-on design engineering and permitting activities for the development of the proposed lateral expansion cells (Cells E and F) and support infrastructure:
  - Conduct additional subsurface investigations (borings and test pits) in the proposed development areas
  - Refine the layout for the lateral expansion cells and civil model
  - Update the site water balance model and evaluate the size of the existing leachate collection system and pump station to handle additional leachate flows from the expansion cells
  - Evaluate staging development options considering partial cell developments to possibly hold out on use of existing structures as long as possible before they are required to be demolished whereby deferring costs
  - Conduct stability evaluations of the landfill (global/veneer stability and settlement) to check waste fill staging plans for stability as well as overall stability of the landfill.
- Once the preferred alternative is selected, develop it to a preliminary level of design (30 percent level) for more refined layouts, cost estimating, and to include in any upcoming permitting applications. This may include evaluating sub-options such as partial cell developments
- Incorporate preliminary costs (and development timing) into the economic model to see how it impacts the financials for funding
- Amend the current permit (Engineering Design Report, Closure and Post-Closure Plan, etc. with Conditional Use Permit planning) sooner than later as the permitting tends to become more arduous as time passes due to the potential for more residential development in the area, more stringent regulations, and other constraints and restrictions that could make permitting more difficult. In case of developing either Alternative 3a or 3b, a Conditional Use Permit is assumed to be needed, requiring the development of permit application package generally including the permit, SEPA Checklist, and landfill master development plan.

Figures

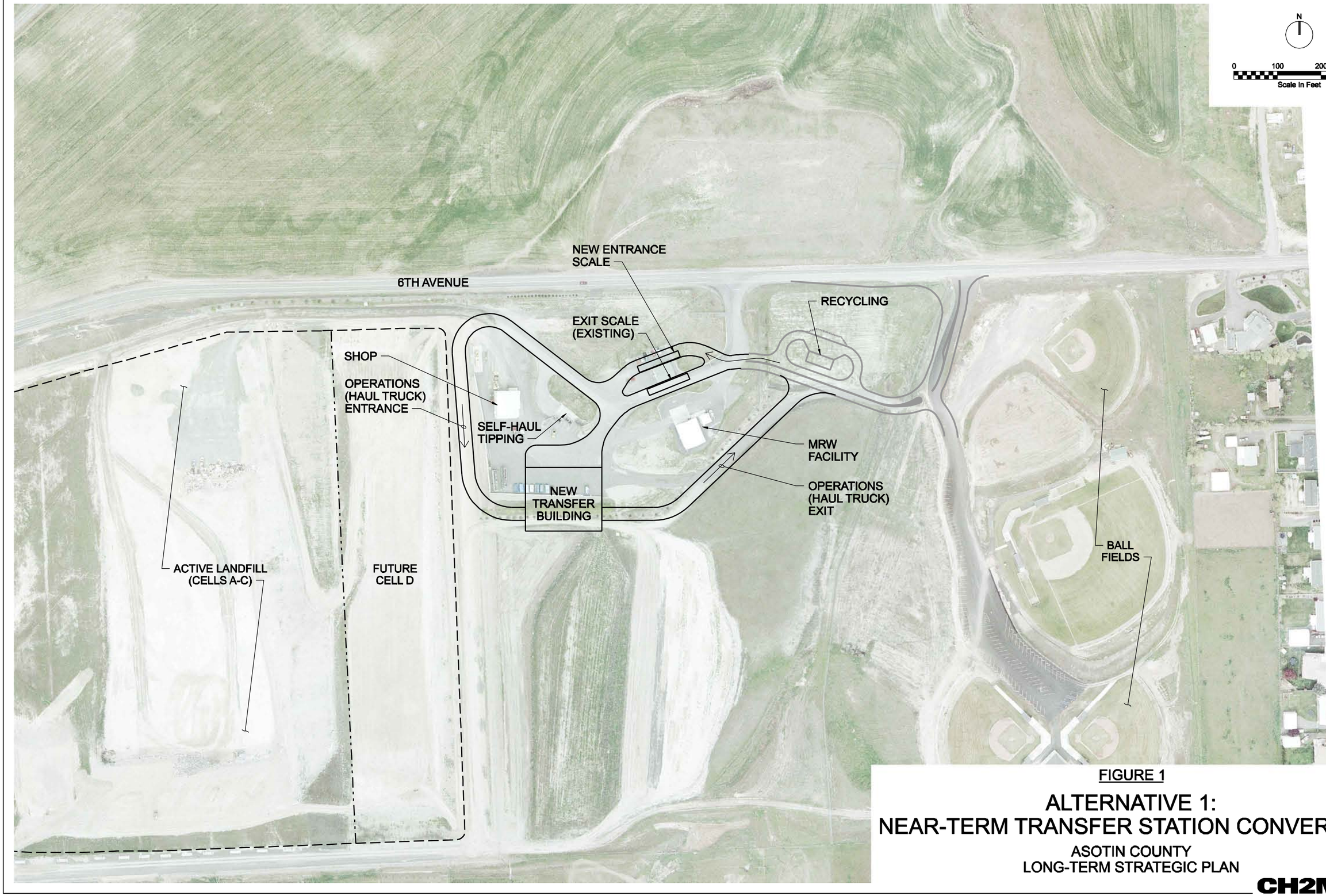


FIGURE 1

ALTERNATIVE 1: NEAR-TERM TRANSFER STATION CONVERSION

ASOTIN COUNTY
LONG-TERM STRATEGIC PLAN

CH2MHILL

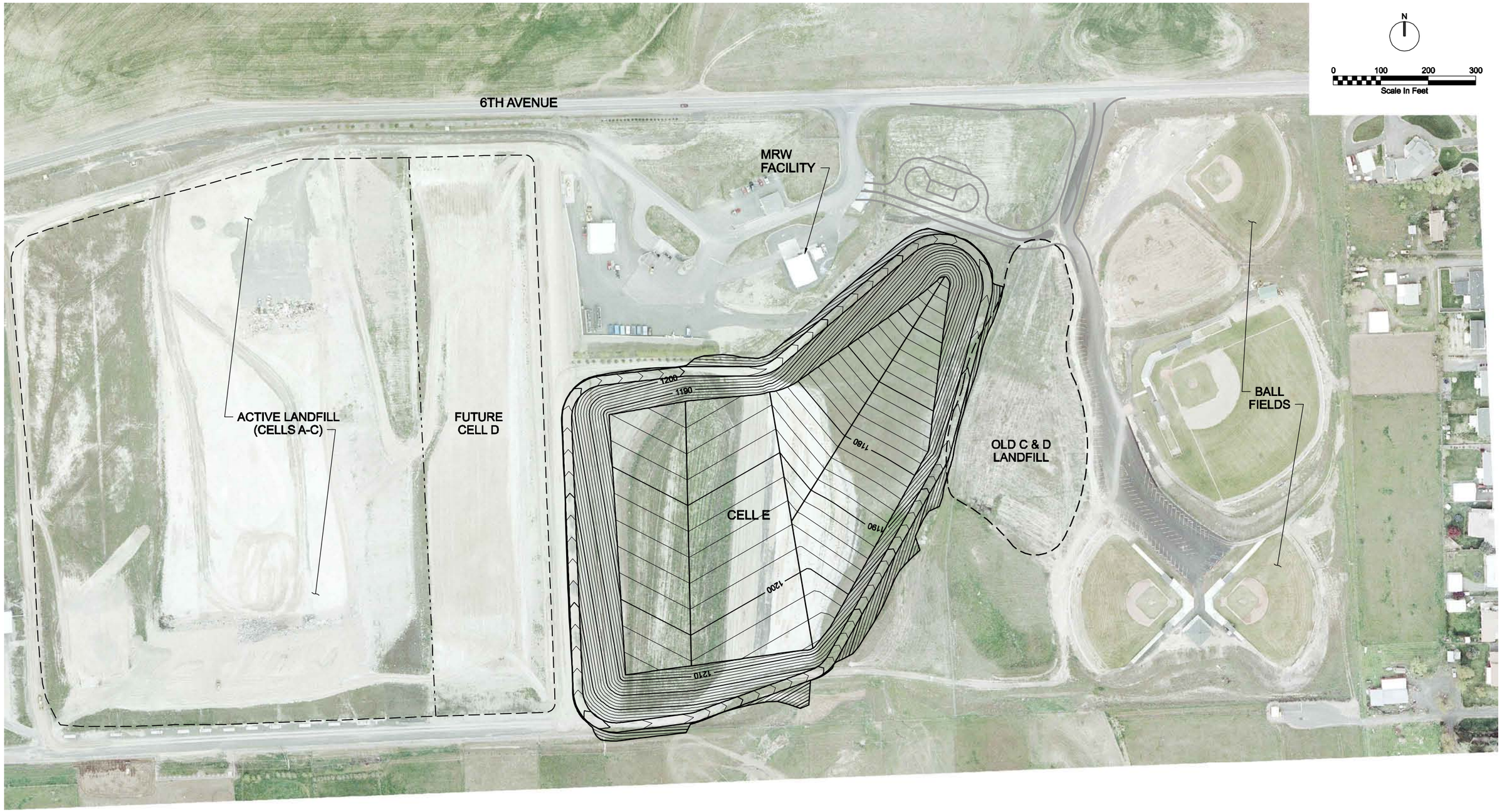
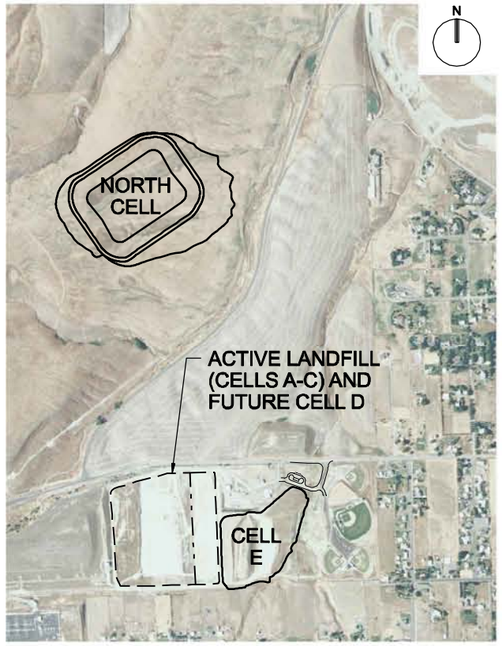


FIGURE 2

ALTERNATIVE 2: FUTURE LANDFILL CELL E

ASOTIN COUNTY
LONG-TERM STRATEGIC PLAN

CH2MHILL



KEY MAP

0 800 1600 2400
Scale In Feet

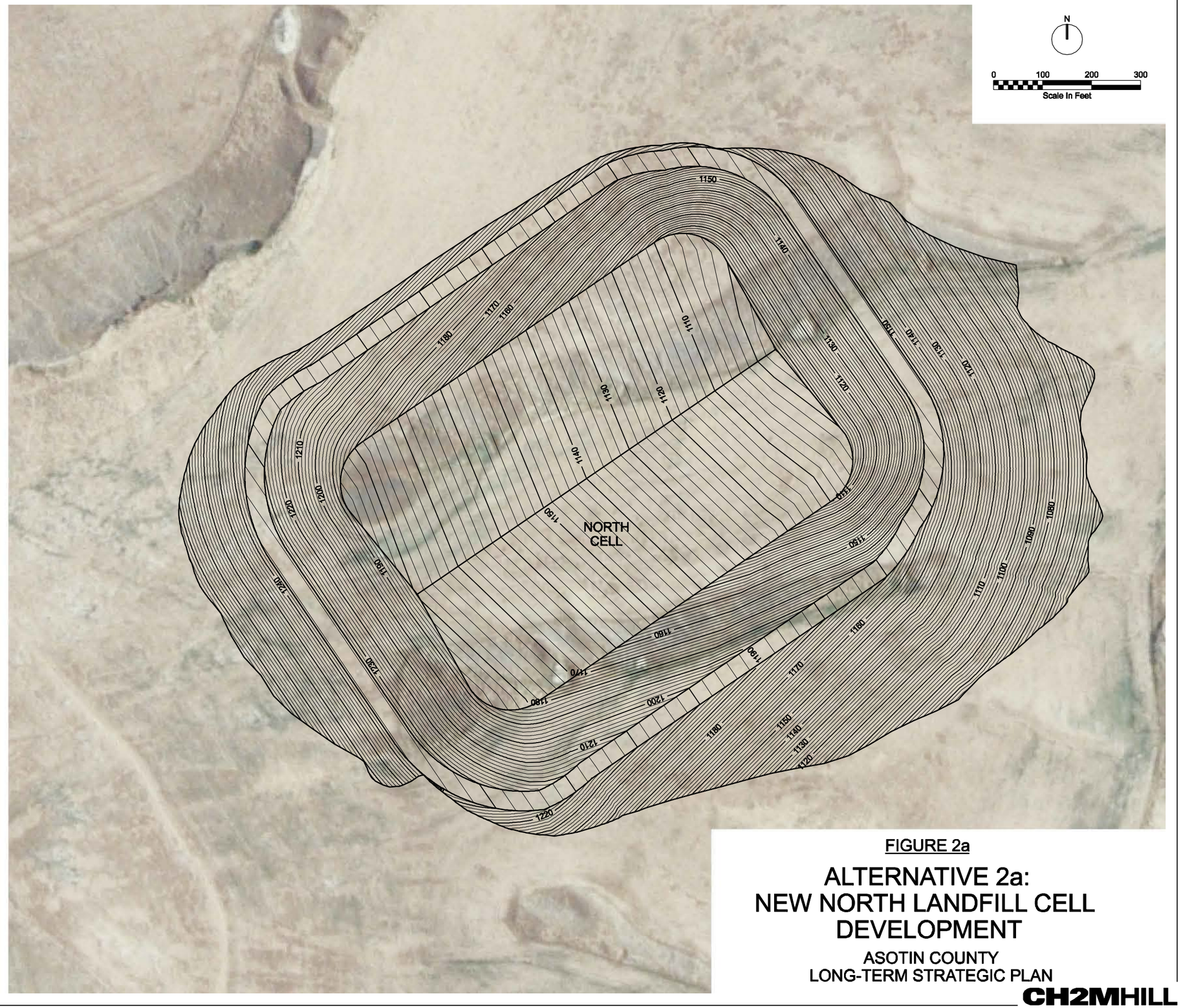


FIGURE 2a

ALTERNATIVE 2a: NEW NORTH LANDFILL CELL DEVELOPMENT

ASOTIN COUNTY
LONG-TERM STRATEGIC PLAN

CH2MHILL

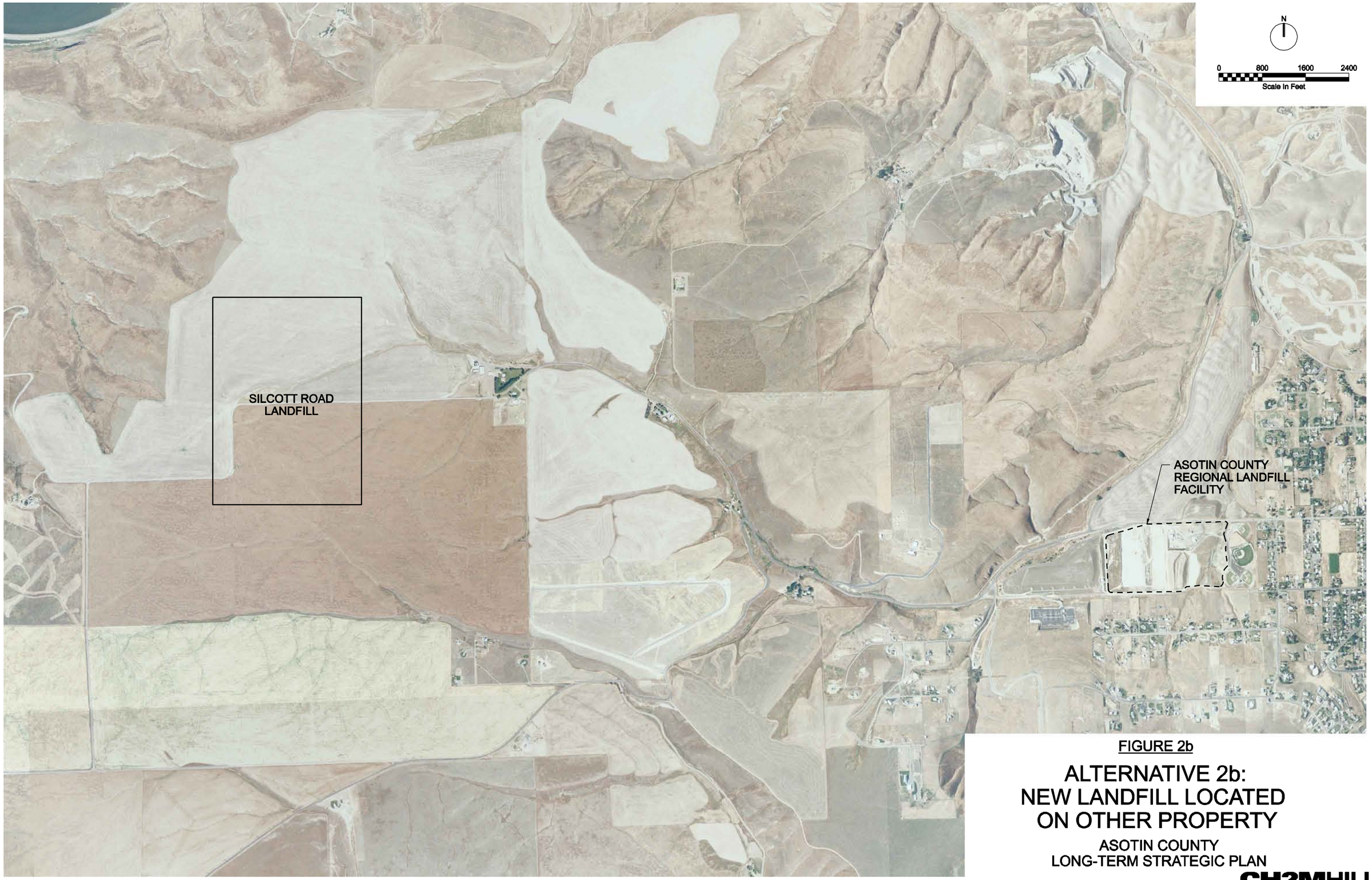
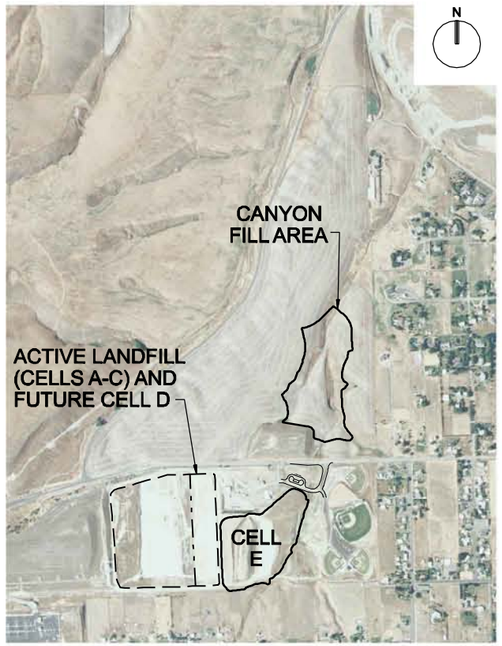


FIGURE 2b

ALTERNATIVE 2b: NEW LANDFILL LOCATED ON OTHER PROPERTY

ASOTIN COUNTY
LONG-TERM STRATEGIC PLAN

CH2MHILL



KEY MAP

0 800 1600 2400
Scale In Feet

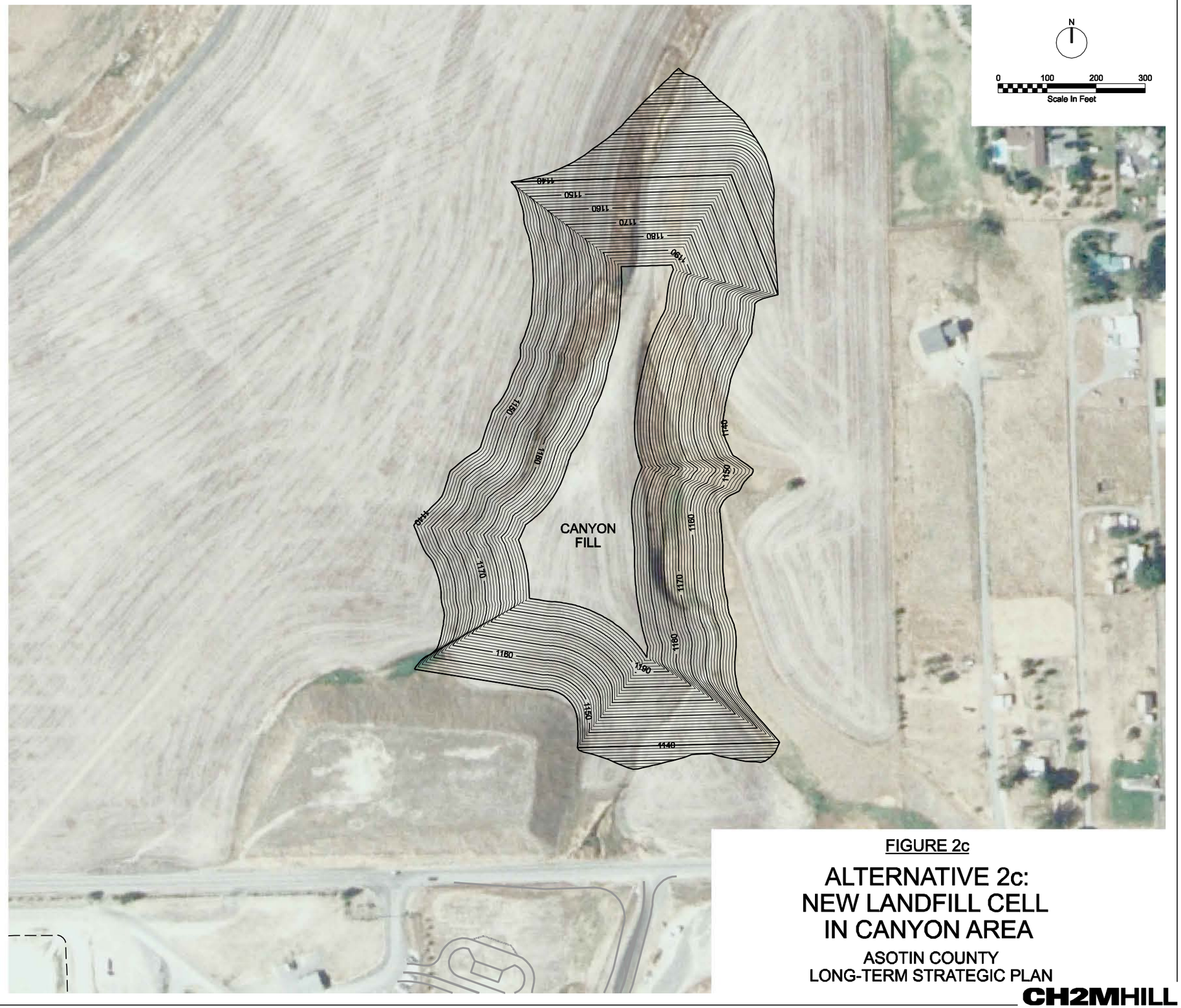


FIGURE 2c

ALTERNATIVE 2c: NEW LANDFILL CELL IN CANYON AREA

ASOTIN COUNTY
LONG-TERM STRATEGIC PLAN

CH2MHILL

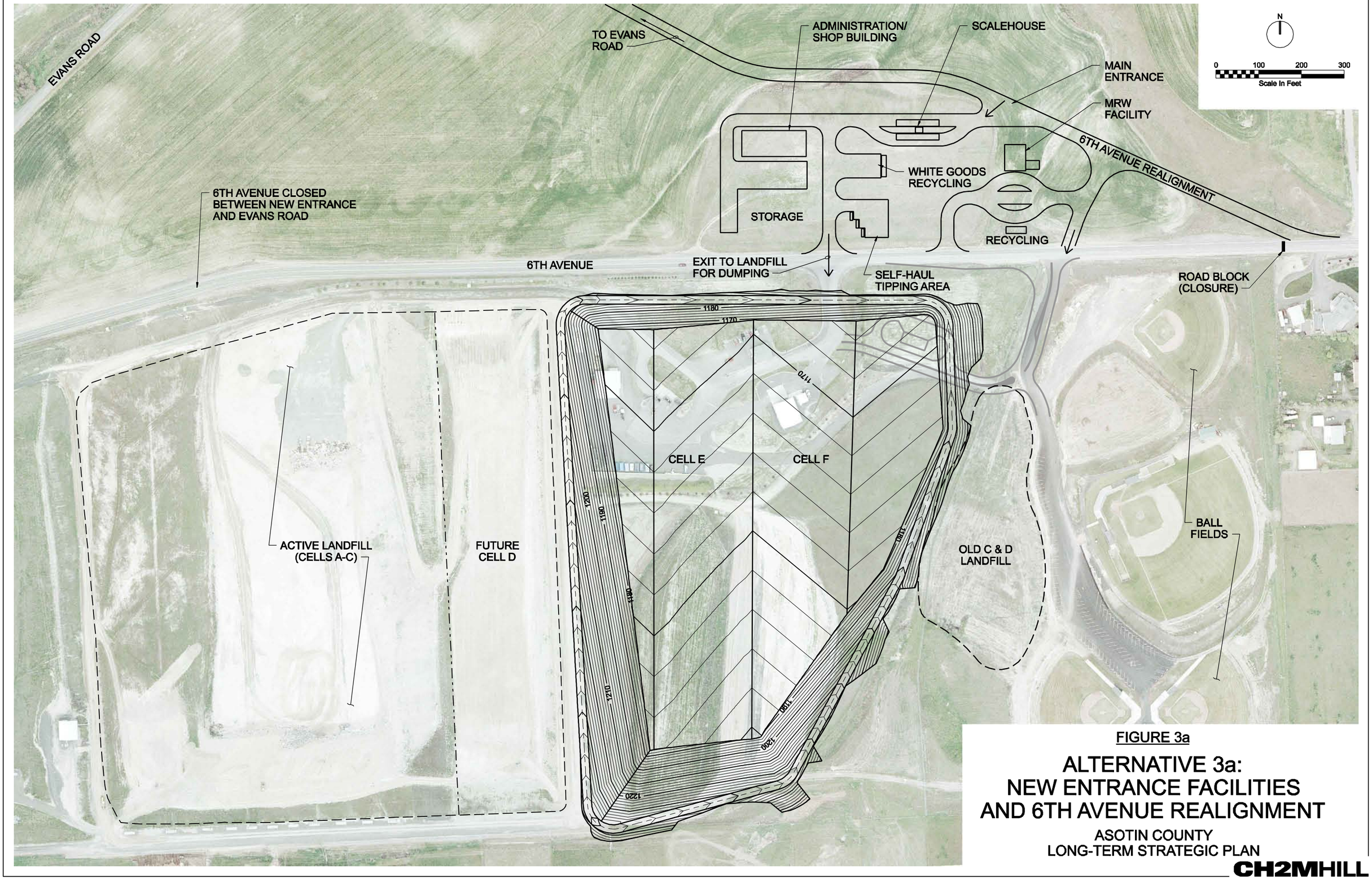


FIGURE 3a

ALTERNATIVE 3a: NEW ENTRANCE FACILITIES AND 6TH AVENUE REALIGNMENT

ASOTIN COUNTY
LONG-TERM STRATEGIC PLAN

CH2MHILL

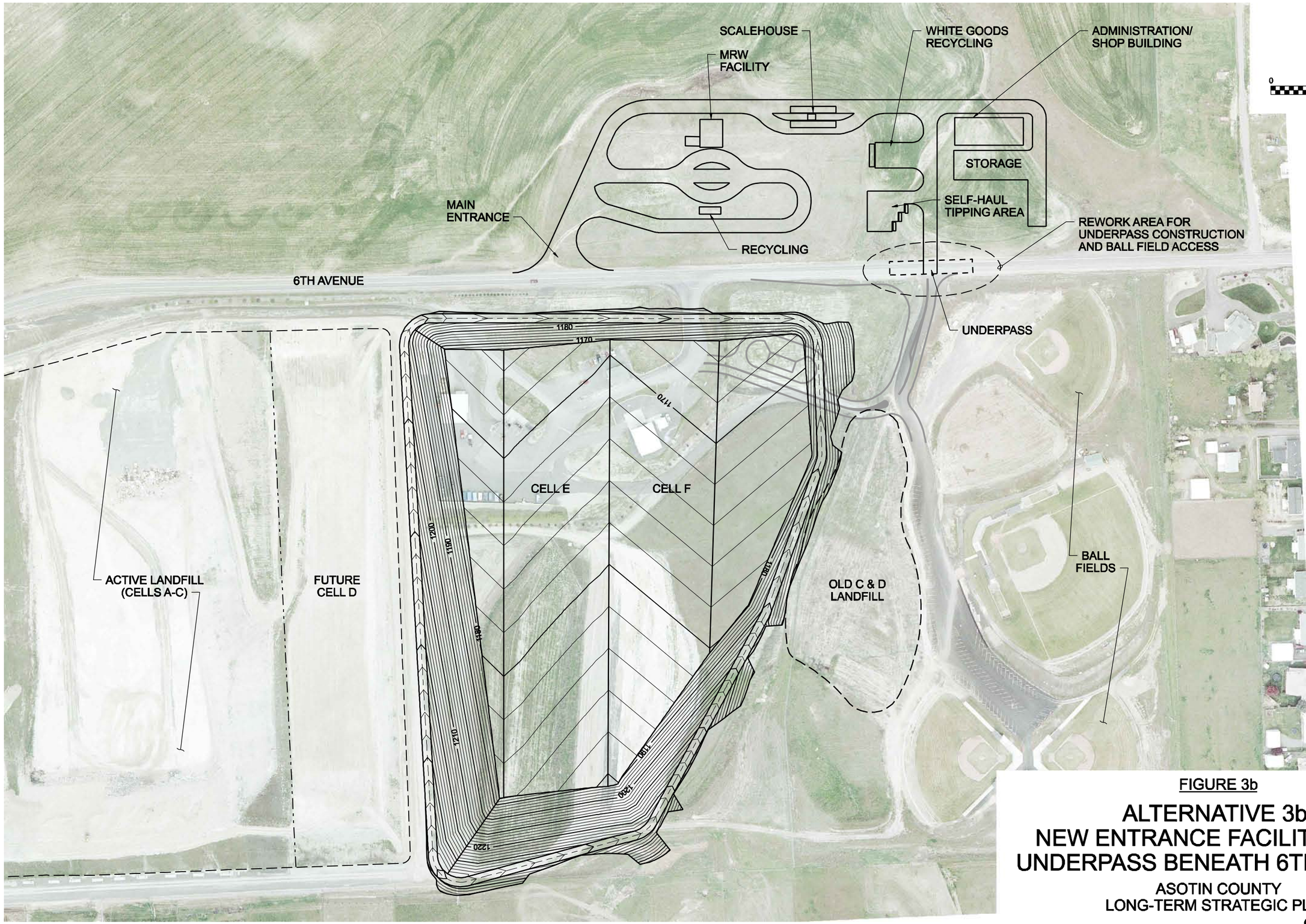


FIGURE 3b

ALTERNATIVE 3b: NEW ENTRANCE FACILITIES AND UNDERPASS BENEATH 6TH AVENUE

ASOTIN COUNTY
LONG-TERM STRATEGIC PLAN

CH2MHILL

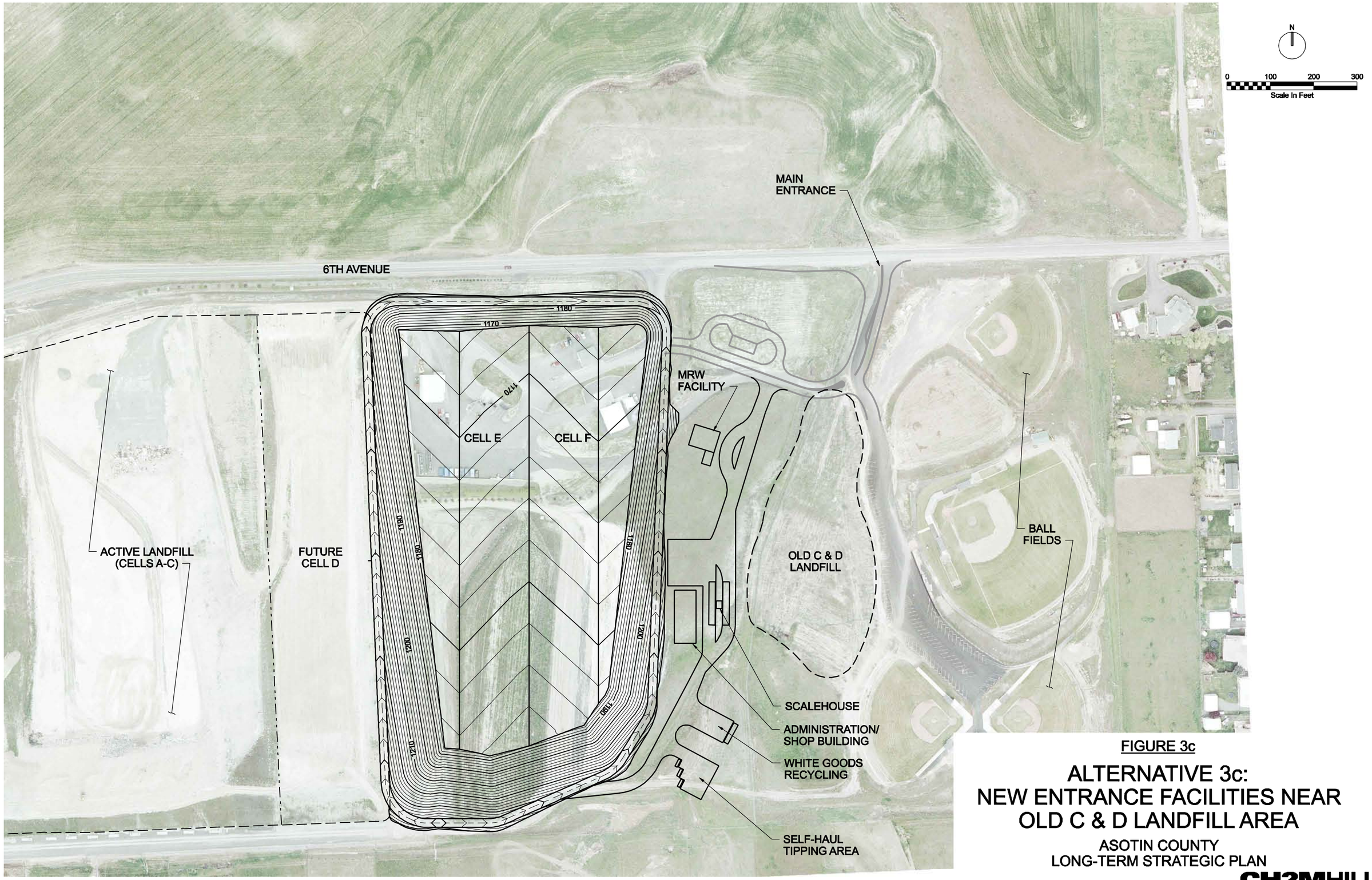


FIGURE 3c

ALTERNATIVE 3c: NEW ENTRANCE FACILITIES NEAR OLD C & D LANDFILL AREA

ASOTIN COUNTY
LONG-TERM STRATEGIC PLAN

CH2MHILL

Appendix

Costing Detail Worksheets

CH2M HILL

Asotin County Regional Landfill
Alternative 1

Date: January 2010
Prepared By: Travis Pyle, P.E.
Checked by: Jay Dehner, P.E.

Engineer's Rough Order-of-Magnitude (ROM) Cost Estimate[a]

Item No.	Description	Estimated Quantity	Unit	Unit Price	Extended Bid Unit Price
1	Bonds, Insurance Premiums, Mobilization, Demobilization and Contract Closeout	1	LS	$ 342,000	$ 342,000
2	Construction Facilities, Temporary Controls, and Safety	1	LS	$ 228,000	$ 228,000
3	Transfer Building	40,000	SF	$ 130	$ 5,200,000
4	Site Improvements/Utilities	1	LS	$ 50,000	$ 50,000
5	Facility Access Roads	1	LS	$ 150,000	$ 150,000
6	Admin Retrofits/New Scale	1	LS	$ 300,000	$ 300,000
Construction Subtotal					**$ 6,270,000**
Contingency[b]		30%			$ 1,881,000
Construction Total (rounded)					**$ 8,151,000**
Design/Permitting and CM		20%			$ 1,630,200
Sales Tax (Construction Only)		7%			$ 570,570
PROJECT TOTAL (rounded)					**$ 10,352,000**

Notes:
(a) This order-of-magnitude cost estimate is in January 2010 dollars and does not include escalation, financing or O&M costs. This cost opinion has been prepared for project guidance based on conceptual level design. Actual costs of the project will depend on competitive market conditions, actual labor and material costs, actual site conditions, productivity, project scope, final design and schedule, and other factors. As a result, the actual project costs will vary from those presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
(b) Contingency is for scope changes that are presently unforeseen.

CH2M HILL

Asotin County Regional Landfill
Alternatives 3a and 3b
Cell E Development

Date: January 2010
Prepared By: Travis Pyle, P.E.
Checked by: Jay Dehner, P.E.

Engineer's Rough Order-of-Magnitude (ROM) Cost Estimate[a]

Cell E Liner "True" Area (acres) = 11.3

Item No.	Description	Estimated Quantity	Unit	Unit Price	Extended Bid Unit Price
1	Bonds, Insurance Premiums, Mobilization, Demobilization and Contract Closeout	1	LS	$ 147,000	$ 147,000
2	Construction Facilities, Temporary Controls, and Safety	1	LS	$ 98,000	$ 98,000
3	Excavation	479,000	CY	$ 2.00	$ 958,000
4	Embankment Fill	1,700	CY	$ 3.50	$ 5,950
5	Subgrade Preparation	54,700	SY	$ 1.00	$ 54,700
6	Foundation Layer	18,200	CY	$ 8.00	$ 145,600
7	Bottom Liner System (HDPE GM & GCL)	54,700	SY	$ 10.00	$ 547,000
8	Anchor Trench	2,000	LF	$ 5.50	$ 11,000
9	Temporary Liner Termination	1,150	LF	$ 10.00	$ 11,500
10	Drain Sand (w/ strip drains)	27,300	CY	$ 20.00	$ 546,000
11	Leachate Collector	1,000	LF	$ 15.00	$ 15,000
12	Leachate Collector Pipe Cleanout	2	EA	$ 5,000.00	$ 10,000
13	Dual Containment Leachate Discharge Pipe	400	LF	$ 115.00	$ 46,000
14	Leachate Discharge Pipe Cleanout	1	LS	$ 8,000.00	$ 8,000
15	Leachate Sump w/ Vertical Pipe Penetration	1	LS	$ 25,000	$ 25,000
16	Perimeter Stormwater Lined Ditch	2,000	LF	$ 20.00	$ 40,000
17	Perimeter Road Grading and Surfacing	1,600	TON	$ 18.00	$ 28,800
Construction Subtotal					**$ 2,697,550**
Contingency[b]		30%			$ 809,265
Construction Total (rounded)					**$ 3,507,000**
Design/Permitting and CM		20%			$ 701,400
Sales Tax (Construction Only)		7%			$ 245,490
PROJECT TOTAL (rounded)					**$ 4,454,000**
Cost Per Acre - Construction Only		11.3	Acres		$310,354
Cost Per Acre - Total w/ Engineering		11.3	Acres		$394,159

Notes:

(a) This order-of-magnitude cost estimate is in January 2010 dollars and does not include escalation, financing or O&M costs. This cost opinion has been prepared for project guidance based on conceptual level design. Actual costs of the project will depend on competitive market conditions, actual labor and material costs, actual site conditions, productivity, project scope, final design and schedule, and other factors. As a result, the actual project costs will vary from those presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.

(b) Contingency is for scope changes that are presently unforeseen.

CH2M HILL

Asotin County Regional Landfill
Alternatives 3a and 3b
Cell F Development

Date: January 2010
Prepared By: Travis Pyle, P.E.
Checked by: Jay Dehner, P.E.

Engineer's Rough Order-of-Magnitude (ROM) Cost Estimate[a]

Cell F Liner "True" Area (acres) = 8.5

Item No.	Description	Estimated Quantity	Unit	Unit Price	Extended Bid Unit Price
1	Bonds, Insurance Premiums, Mobilization, Demobilization and Contract Closeout	1	LS	$ 100,000	$ 100,000
2	Construction Facilities, Temporary Controls, and Safety	1	LS	$ 67,000	$ 67,000
3	Excavation	243,000	CY	$ 2.00	$ 486,000
4	Embankment Fill	9,800	CY	$ 3.50	$ 34,300
5	Subgrade Preparation	41,100	SY	$ 1.00	$ 41,100
6	Foundation Layer	13,700	CY	$ 8.00	$ 109,600
7	Bottom Liner System (HDPE GM & GCL)	41,100	SY	$ 10.00	$ 411,000
8	Anchor Trench	2,000	LF	$ 5.50	$ 11,000
9	Temporary Liner Termination	1,150	LF	$ 10.00	$ 11,500
10	Drain Sand (w/ strip drains)	20,600	CY	$ 20.00	$ 412,000
11	Leachate Collector	650	LF	$ 15.00	$ 9,750
12	Leachate Collector Pipe Cleanout	2	EA	$ 5,000.00	$ 10,000
13	Dual Containment Leachate Discharge Pipe	400	LF	$ 115.00	$ 46,000
14	Leachate Discharge Pipe Cleanout	1	LS	$ 8,000.00	$ 8,000
15	Leachate Sump w/ Vertical Pipe Penetration	1	LS	$ 25,000	$ 25,000
16	Perimeter Stormwater Lined Ditch	1,600	LF	$ 20.00	$ 32,000
17	Perimeter Road Grading and Surfacing	1,300	TON	$ 18.00	$ 23,400
Construction Subtotal					**$ 1,837,650**
Contingency[b]		30%			$ 551,295
Construction Total (rounded)					**$ 2,389,000**
Design/Permitting and CM		20%			$ 477,800
Sales Tax (Construction Only)		7%			$ 167,230
PROJECT TOTAL (rounded)					**$ 3,034,000**
Cost Per Acre - Construction Only		8.5	Acres		$281,059
Cost Per Acre - Total w/ Engineering		8.5	Acres		$356,941

Notes:

(a) This order-of-magnitude cost estimate is in January 2010 dollars and does not include escalation, financing or O&M costs. This cost opinion has been prepared for project guidance based on conceptual level design. Actual costs of the project will depend on competitive market conditions, actual labor and material costs, actual site conditions, productivity, project scope, final design and schedule, and other factors. As a result, the actual project costs will vary from those presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.

(b) Contingency is for scope changes that are presently unforeseen.

CH2M HILL

Asotin County Regional Landfill
Alternative 3a - Infrastructure & Support Facilities

Date: January 2010
Prepared By: Travis Pyle, P.E.
Checked by: Jay Dehner, P.E.

Engineer's Rough Order-of-Magnitude (ROM) Cost Estimate[a]

Item No.	Description	Estimated Quantity	Unit	Unit Price	Extended Bid Unit Price
1	Bonds, Insurance Premiums, Mobilization, Demobilization and Contract Closeout	1	LS	$ 143,000	$ 143,000
2	Construction Facilities, Temporary Controls, and Safety	1	LS	$ 95,000	$ 95,000
3	6th Avenue Re-Alignment	1	LS	$ 530,000	$ 530,000
4	Site Improvements/Utilities	1	LS	$ 200,000	$ 200,000
5	Facility Access Roads	1	LS	$ 150,000	$ 150,000
6	Scales/Scalehouse	1	LS	$ 400,000	$ 400,000
7	Shop/Administration Building	5,000	SF	$ 160	$ 800,000
8	MRW Facility	1,500	SF	$ 200	$ 300,000
Construction Subtotal					**$ 2,618,000**
Contingency[b]		30%			$ 785,400
Construction Total (rounded)					**$ 3,403,000**
Design/Permitting and CM		20%			$ 680,600
Sales Tax (Construction Only)		7%			$ 238,210
PROJECT TOTAL (rounded)					**$ 4,322,000**

Notes:
(a) This order-of-magnitude cost estimate is in January 2010 dollars and does not include escalation, financing or O&M costs. This cost opinion has been prepared for project guidance based on conceptual level design. Actual costs of the project will depend on competitive market conditions, actual labor and material costs, actual site conditions, productivity, project scope, final design and schedule, and other factors. As a result, the actual project costs will vary from those presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
(b) Contingency is for scope changes that are presently unforeseen.

CH2M HILL

Asotin County Regional Landfill
Alternative 3b - Infrastructure & Support Facilities

Date: January 2010
Prepared By: Travis Pyle, P.E.
Checked by: Jay Dehner, P.E.

Engineer's Rough Order-of-Magnitude (ROM) Cost Estimate[a]

Item No.	Description	Estimated Quantity	Unit	Unit Price	Extended Bid Unit Price
1	Bonds, Insurance Premiums, Mobilization, Demobilization and Contract Closeout	1	LS	$ 156,000	$ 156,000
2	Construction Facilities, Temporary Controls, and Safety	1	LS	$ 104,000	$ 104,000
3	6th Avenue Underpass	1	LS	$ 750,000	$ 750,000
4	Site Improvements/Utilities	1	LS	$ 200,000	$ 200,000
5	Facility Access Roads	1	LS	$ 150,000	$ 150,000
6	Scales/Scalehouse	1	LS	$ 400,000	$ 400,000
7	Shop/Administration Building	5,000	SF	$ 160	$ 800,000
8	MRW Facility	1,500	SF	$ 200	$ 300,000
Construction Subtotal					**$ 2,860,000**
Contingency[b]		30%			$ 858,000
Construction Total (rounded)					**$ 3,718,000**
Design/Permitting and CM		20%			$ 743,600
Sales Tax (Construction Only)		7%			$ 260,260
PROJECT TOTAL (rounded)					**$ 4,722,000**

Notes:
(a) This order-of-magnitude cost estimate is in January 2010 dollars and does not include escalation, financing or O&M costs. This cost opinion has been prepared for project guidance based on conceptual level design. Actual costs of the project will depend on competitive market conditions, actual labor and material costs, actual site conditions, productivity, project scope, final design and schedule, and other factors. As a result, the actual project costs will vary from those presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
(b) Contingency is for scope changes that are presently unforeseen.

CH2M HILL

Asotin County Regional Landfill
Alternative 3c
Cell E Development

Date: January 2010
Prepared By: Travis Pyle, P.E.
Checked by: Jay Dehner, P.E.

Engineer's Rough Order-of-Magnitude (ROM) Cost Estimate[a]

Cell E Liner "True" Area (acres) = 9.3

Item No.	Description	Estimated Quantity	Unit	Unit Price	Extended Bid Unit Price
1	Bonds, Insurance Premiums, Mobilization, Demobilization and Contract Closeout	1	LS	$ 127,000	$ 127,000
2	Construction Facilities, Temporary Controls, and Safety	1	LS	$ 85,000	$ 85,000
3	Excavation	428,000	CY	$ 2.00	$ 856,000
4	Embankment Fill	1,950	CY	$ 3.50	$ 6,825
5	Subgrade Preparation	45,000	SY	$ 1.00	$ 45,000
6	Foundation Layer	15,000	CY	$ 8.00	$ 120,000
7	Bottom Liner System (HDPE GM & GCL)	45,000	SY	$ 10.00	$ 450,000
8	Anchor Trench	2,000	LF	$ 5.50	$ 11,000
9	Temporary Liner Termination	1,150	LF	$ 10.00	$ 11,500
10	Drain Sand (w/ strip drains)	22,500	CY	$ 20.00	$ 450,000
11	Leachate Collector	1,000	LF	$ 15.00	$ 15,000
12	Leachate Collector Pipe Cleanout	2	EA	$ 5,000.00	$ 10,000
13	Dual Containment Leachate Discharge Pipe	400	LF	$ 115.00	$ 46,000
14	Leachate Discharge Pipe Cleanout	1	LS	$ 8,000.00	$ 8,000
15	Leachate Sump w/ Vertical Pipe Penetration	1	LS	$ 25,000	$ 25,000
16	Perimeter Stormwater Lined Ditch	1,700	LF	$ 20.00	$ 34,000
17	Perimeter Road Grading and Surfacing	1,400	TON	$ 18.00	$ 25,200
Construction Subtotal					**$ 2,325,525**
Contingency[b]		30%			$ 697,658
Construction Total (rounded)					**$ 3,023,000**
Design/Permitting and CM		20%			$ 604,600
Sales Tax (Construction Only)		7%			$ 211,610
PROJECT TOTAL (rounded)					**$ 3,839,000**
Cost Per Acre - Construction Only		9.3	Acres		$325,054
Cost Per Acre - Total w/ Engineering		9.3	Acres		$412,796

Notes:

(a) This order-of-magnitude cost estimate is in January 2010 dollars and does not include escalation, financing or O&M costs. This cost opinion has been prepared for project guidance based on conceptual level design. Actual costs of the project will depend on competitive market conditions, actual labor and material costs, actual site conditions, productivity, project scope, final design and schedule, and other factors. As a result, the actual project costs will vary from those presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.

(b) Contingency is for scope changes that are presently unforeseen.

CH2M HILL

Asotin County Regional Landfill
Alternative 3c
Cell F Development

Date: January 2010
Prepared By: Travis Pyle, P.E.
Checked by: Jay Dehner, P.E.

Engineer's Rough Order-of-Magnitude (ROM) Cost Estimate[a]

Cell F Liner "True" Area (acres) = 7.2

Item No.	Description	Estimated Quantity	Unit	Unit Price	Extended Bid Unit Price
1	Bonds, Insurance Premiums, Mobilization, Demobilization and Contract Closeout	1	LS	$ 94,000	$ 94,000
2	Construction Facilities, Temporary Controls, and Safety	1	LS	$ 63,000	$ 63,000
3	Excavation	285,000	CY	$ 2.00	$ 570,000
4	Embankment Fill	2,100	CY	$ 3.50	$ 7,350
5	Subgrade Preparation	34,800	SY	$ 1.00	$ 34,800
6	Foundation Layer	11,600	CY	$ 8.00	$ 92,800
7	Bottom Liner System (HDPE GM & GCL)	34,800	SY	$ 10.00	$ 348,000
8	Anchor Trench	2,000	LF	$ 5.50	$ 11,000
9	Temporary Liner Termination	1,150	LF	$ 10.00	$ 11,500
10	Drain Sand (w/ strip drains)	17,400	CY	$ 20.00	$ 348,000
11	Leachate Collector	450	LF	$ 15.00	$ 6,750
12	Leachate Collector Pipe Cleanout	2	EA	$ 5,000.00	$ 10,000
13	Dual Containment Leachate Discharge Pipe	400	LF	$ 115.00	$ 46,000
14	Leachate Discharge Pipe Cleanout	1	LS	$ 8,000.00	$ 8,000
15	Leachate Sump w/ Vertical Pipe Penetration	1	LS	$ 25,000	$ 25,000
16	Perimeter Stormwater Lined Ditch	1,500	LF	$ 20.00	$ 30,000
17	Perimeter Road Grading and Surfacing	1,200	TON	$ 18.00	$ 21,600
Construction Subtotal					**$ 1,727,800**
Contingency[b]		30%			$ 518,340
Construction Total (rounded)					**$ 2,246,000**
Design/Permitting and CM		20%			$ 449,200
Sales Tax (Construction Only)		7%			$ 157,220
PROJECT TOTAL (rounded)					**$ 2,852,000**
Cost Per Acre - Construction Only		7.2	Acres		$311,944
Cost Per Acre - Total w/ Engineering		7.2	Acres		$396,111

Notes:

(a) This order-of-magnitude cost estimate is in January 2010 dollars and does not include escalation, financing or O&M costs. This cost opinion has been prepared for project guidance based on conceptual level design. Actual costs of the project will depend on competitive market conditions, actual labor and material costs, actual site conditions, productivity, project scope, final design and schedule, and other factors. As a result, the actual project costs will vary from those presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.

(b) Contingency is for scope changes that are presently unforeseen.

CH2M HILL

Asotin County Regional Landfill
Alternative 3c - Infrastructure & Support Facilities

Date: January 2010
Prepared By: Travis Pyle, P.E.
Checked by: Jay Dehner, P.E.

Engineer's Rough Order-of-Magnitude (ROM) Cost Estimate[a]

Item No.	Description	Estimated Quantity	Unit	Unit Price	Extended Bid Unit Price
1	Bonds, Insurance Premiums, Mobilization, Demobilization and Contract Closeout	1	LS	$ 111,000	$ 111,000
2	Construction Facilities, Temporary Controls, and Safety	1	LS	$ 74,000	$ 74,000
3	Site Improvements/Utilities	1	LS	$ 200,000	$ 200,000
4	Facility Access Roads	1	LS	$ 150,000	$ 150,000
5	Scales/Scalehouse	1	LS	$ 400,000	$ 400,000
6	Shop/Administration Building	5,000	SF	$ 160	$ 800,000
7	MRW Facility	1,500	SF	$ 200	$ 300,000
Construction Subtotal					**$ 2,035,000**
Contingency[b]		30%			$ 610,500
Construction Total (rounded)					**$ 2,646,000**
Design/Permitting and CM		20%			$ 529,200
Sales Tax (Construction Only)		7%			$ 185,220
PROJECT TOTAL (rounded)					**$ 3,360,000**

Notes:
(a) This order-of-magnitude cost estimate is in January 2010 dollars and does not include escalation, financing or O&M costs. This cost opinion has been prepared for project guidance based on conceptual level design. Actual costs of the project will depend on competitive market conditions, actual labor and material costs, actual site conditions, productivity, project scope, final design and schedule, and other factors. As a result, the actual project costs will vary from those presented above. Because of these factors, funding needs must be carefully reviewed prior to making specific financial decisions or establishing final budgets.
(b) Contingency is for scope changes that are presently unforeseen.