

Municipal Solid Waste Disposal

Overview

Nebraska's Integrated Solid Waste Management Act (Nebr. Rev. Statutes Chapter 13, Section 13-2001 to 2043) states in 13-2020 (County, municipality, or agency; provide or contract for disposal of solid waste; joint ownership of facility; governing body; powers and duties; rates and charges) that:

“Effective October 1, 1993, each county and municipality shall provide or contract for facilities and systems as necessary for the safe and sanitary disposal of solid waste generated within its solid waste jurisdictional area...”

In furtherance of this obligation the Lincoln Municipal Code (LMC) 8.32 (Solid Waste) states in 8.32.030 (Sanitary Landfill; Designated by Council) that:

“The City Council shall, by resolution, designate a place or places for the operation of a public sanitary landfill to be used for the disposal of solid waste, and other offensive or obnoxious substances.”

In carrying out this obligation LMC, Part 8.32.040 (Public Sanitary Landfills; Location; Type of Solid Waste Accepted for Disposal) states:

“Two public sanitary landfills are hereby designated for purposes of dumping and disposal of solid waste. One public sanitary landfill shall be located on 48th Street, approximately three-quarters of a mile north of Superior Street. The second public sanitary landfill shall be located at... 56th Street and Bluff Road.

LMC 8.32.070 stipulates that the designated public sanitary landfills in the County (Bluff Road Municipal Solid Waste (MSW) Landfill and North 48th Street Construction and Demolition Waste Landfill) are authorized for the citizens of the City, residents of the County, and for the disposal of solid waste generated within the County. Additionally, two related guiding principles were identified in the Lincoln-Lancaster County 2040 Comprehensive Plan (LPlan 2040). They are as follows:

- ◆ *“No out-of-county waste is accepted for landfill disposal. This policy reserves landfill capacity for city and county residents and allow administration of programs under existing authorities.*
- ◆ *The City policy of ... public ownership, operation and financing of disposal and selected integrated solid waste management services will continue during the planning period.”*

In planning for solid waste management facilities, it is important to reasonably and realistically project the potential quantity of waste expected to be managed or disposed of by the various systems, facilities and programs. Underestimating quantities of waste and/or overestimating recycling and diversion can adversely affect the predicted life of the landfill and require more frequent plan adjustments.

In the State of Nebraska there are 23 permitted municipal solid waste (MSW) landfills and 28 permitted construction and demolition waste landfills. Most of the MSW landfills charge higher disposal fees than the Bluff Road MSW Landfill. However, there are two privately owned and operated MSW landfills within 60 miles of the City's facilities (one in Milford, Nebraska in Seward County and one near David City, Nebraska in Butler County), which even though they have higher posted tipping fees are known to receive waste from the Planning Area. Table 1 summarizes the posted tipping fees at MSW landfills within approximately 60 miles of the Planning Area, as well as identifies the haul distances to these MSW landfills from Lincoln.

Table 1 – Regional Landfills (2012\$)

	Posted Tipping Fee (\$/ ton)		Distance from Lincoln (miles)	Operation /Ownership
	In County	Out of County		
Butler County Landfill	\$38.75	\$38.75	50	Private/Private
Milford Landfill	\$45.00	\$45.00	25	Private/Private
Bluff Road Landfill	\$21.00 ⁽²⁾	NA	-	Public/Public
York Area Landfill	\$38.00	\$38.00	50	Public/Public
Beatrice Landfill ⁽¹⁾	Avg. \$39.00	Varies	40	Public/Public
Pheasant Point Landfill	\$24.20	\$24.20	62	Private/Private
Sarpy County Landfill ⁽³⁾	\$24.85	\$31.52	47	Public/Public

Notes: (1) Beatrice charges vary based on cubic yard volume; average tip fee is estimated based on FY2010 revenues divided by tons.

(2) Tipping free is comprised of a \$14 per ton disposal fee and a \$7 per ton Occupation Tax.

(3) Site is scheduled to close in 2013 and is being replaced with a transfer station that will ship waste to a landfill outside of Sarpy County.

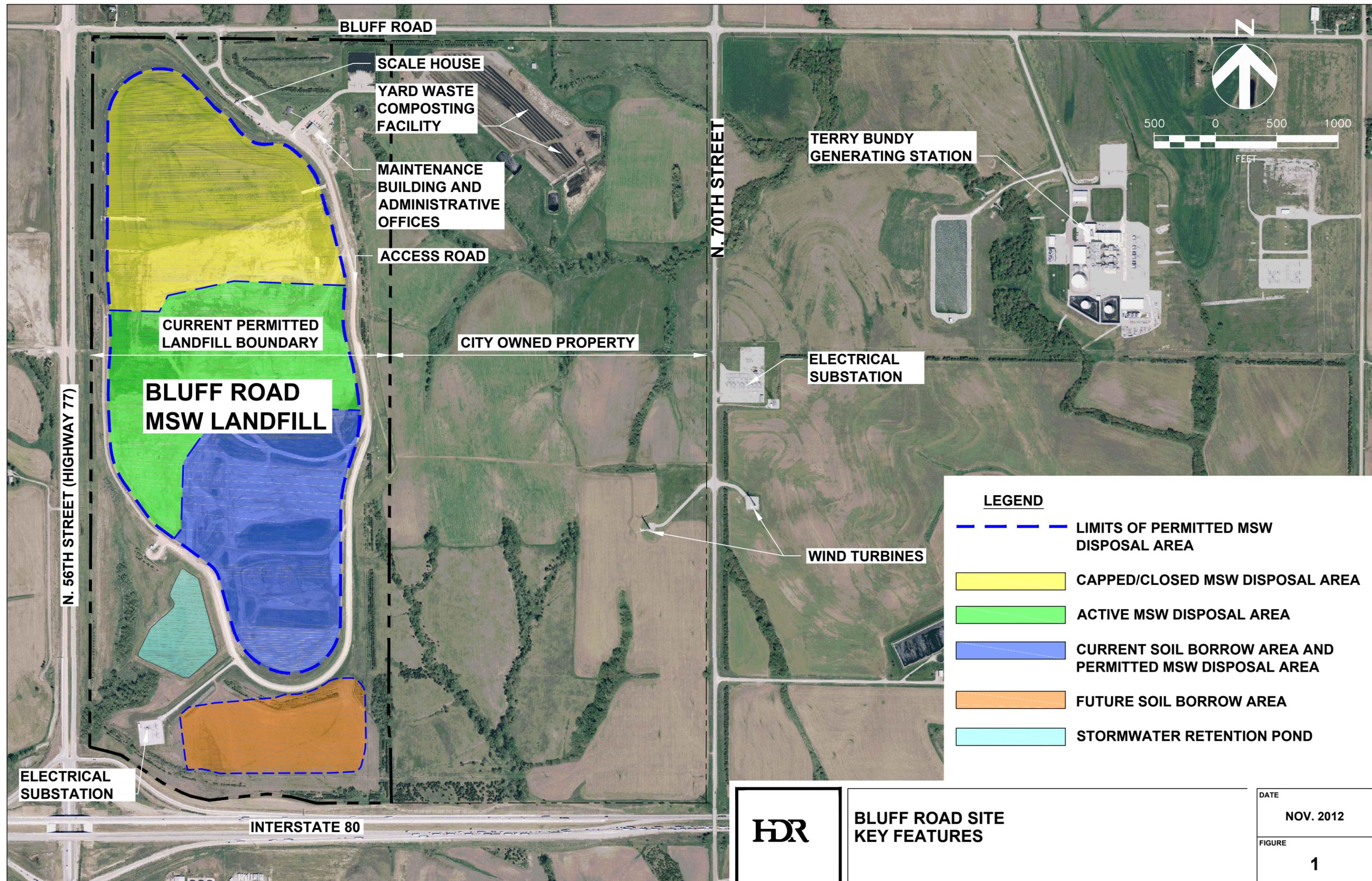
NA indicates not applicable.

Current Programs

The Bluff Road MSW Landfill, 6001 Bluff Road, currently operates in the western half of this approximately 1 square-mile property. The site is permitted by NDEQ as a Municipal Solid Waste Disposal Area. The Bluff Road MSW Landfill began operations in 1988 and only accepts solid waste generated from within Lancaster County. The site contains 350 acres, of which 171 acres are permitted as a disposal area (landfill). The permitted disposal area is currently projected to reach capacity in 2032. Figure 1 shows the overall location of the Bluff Road MSW Landfill and key facility features.

The Bluff Road MSW Landfill is the only permitted MSW landfill in Lancaster County. The landfill is used by waste/refuse haulers or customers hauling materials in large trucks and trailers. Construction and demolition (C&D) waste can be delivered to and disposed of at the Bluff Road MSW Landfill or the City's North 48th Street Construction and Demolition Waste Landfill. A portion of the waste generated in the City and County is exported to other landfills in the region.

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BLUFF ROAD MSW LANDFILL

CURRENT PERMITTED LANDFILL BOUNDARY

BLUFF ROAD

SCALE HOUSE

YARD WASTE COMPOSTING FACILITY

MAINTENANCE BUILDING AND ADMINISTRATIVE OFFICES

ACCESS ROAD

CITY OWNED PROPERTY

N. 70TH STREET

TERRY BUNDY GENERATING STATION

ELECTRICAL SUBSTATION

WIND TURBINES

N. 56TH STREET (HIGHWAY 77)

INTERSTATE 80

ELECTRICAL SUBSTATION

LEGEND

-  LIMITS OF PERMITTED MSW DISPOSAL AREA
-  CAPPED/CLOSED MSW DISPOSAL AREA
-  ACTIVE MSW DISPOSAL AREA
-  CURRENT SOIL BORROW AREA AND PERMITTED MSW DISPOSAL AREA
-  FUTURE SOIL BORROW AREA
-  STORMWATER RETENTION POND



BLUFF ROAD SITE KEY FEATURES

DATE	NOV. 2012
FIGURE	1

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Facilities on the Bluff Road site include the weigh scale, scale house, the maintenance facility and administrative offices, a training building, as well as a leachate load-out facility and a landfill gas (LFG) blower and flare facility. The weigh scale located adjacent to the scale house is used to determine the weight of inbound wastes and a commercial software program calculates fees for billing to the customer.

The 171 acres of permitted disposal area has an air space capacity of over 25.2 million cubic yards (CY) (excluding the liner system and final cover). Based on projections in the permit renewal documents (the current permit expires in May 2013), the remaining air space capacity is approximately 12.5 million CY (excluding final soil cover).

Generation and Diversion

From the standpoint of the USEPA's solid waste management hierarchy landfill disposal and treatment systems are the least preferred management system. The USEPA's data suggests that nationally 54 percent of MSW is landfilled with 34 percent being recovered (via recycling and composting) and the remaining approximately 12 percent managed by combustion with energy recovery [referred to as "Waste Conversion Technologies" in a separate technical paper] (USEPA *Municipal Solid Waste in the United States: 2010 Facts and Figures*, December 2011). The data indicates municipal solid waste landfills are the most common form of waste management. Table 2 provides a summary of historical tonnages of solid waste disposed of by landfilling.

Table 2 – Historical Quantities Disposed from Planning Area (Tons)

FY	MSW Landfilled at Bluff Road MSW Landfill (1)(2)	MSW Exported	Total MSW Generated in the Planning Area that is Landfilled
88-89	278,338	-	278,338
89-90	289,604	-	289,604
90-91	296,897	-	296,897
91-92	280,449	-	280,449
92-93	258,828	-	258,828
93-94	265,414	-	265,414
94-95	257,957	-	257,957
95-96	265,196	-	265,196
96-97	284,536	-	284,536
97-98	275,512	-	275,512
98-99	286,322	-	286,322
99-00	289,542	-	289,542
00-01	278,351	15,330	293,681
01-02	265,027	32,854	297,881
02-03	275,049	27,092	302,141
03-04	282,263	29,477	311,740
04-05	280,105	29,888	309,993

05-06	285,253	36,515	321,768
06-07	288,102	31,618	319,720
07-08	288,298	22,165	310,463
08-09	261,910	16,397	278,307
09-10	272,443	15,880	288,323
10-11	287,211	17,709	304,920

Notes:

- (1) Solid Waste is defined in LMC and includes garbage, refuse, commercial and industrial waste, demolition debris, building refuse, including those designated as Special Waste. MSW tons also include tonnages received from the North 48th Street Transfer Station.
- (2) Biosolids were disposed of at the Bluff Road Landfill for the first 4 years of landfill operation. After fiscal year 92-93, biosolids were diverted from landfill disposal via a land application program.

The Bluff Road MSW Landfill has accepted for disposal an average of 279,500 tons per year of solid waste over the last five years; based on 365 days per year, this is the equivalent of 764 tons per day.

Forecasts of future waste quantities sent to disposal were developed as part of the Needs Assessment using the unit waste generation rates and the LPlan 2040 projected population growth rates. These forecasts represent the waste quantities baseline expected to be generated and disposed from the Planning Area under the status quo. There are three major factors that have the potential to significantly influence the estimates of local disposal capacity needed:

- ◆ Regulatory changes related to management of biosolids and coal combustion residues (CCR)
- ◆ Changes in waste export quantities or imports
- ◆ Changes in diversion practices

Changes in recycling or diversion rates can also affect future disposal needs. The current management practices for diversion of CCR and biosolids are being evaluated by USEPA. Changes to regulations regarding biosolids have the potential to require this material to be directed to a disposal site rather than land application. If all the biosolids from the Planning Area were directed to the Bluff Road MSW Landfill starting in 2013, it would represent an increase of 11 percent in projected disposal quantities at this landfill. Disposing of biosolids in the Bluff Road MSW Landfill would theoretically decrease the overall life of the landfill by approximately 2 years.

Currently, CCR materials are largely recycled with only a small portion disposed of in a dedicated landfill (monofill). While regulatory changes may reduce the quantities that can be diverted, it is not currently projected that CCR materials will be directed to the Bluff Road MSW Landfill; as such, changes in regulation may reduce diversion rates but are not anticipated to affect the remaining MSW landfill capacity in the Planning Area.

Waste exports represent approximately 5 percent of the MSW generated in the Planning Area that might otherwise be sent to the Bluff Road MSW Landfill. If waste exports were to cease, the increase in disposal tonnage would reduce the life of the landfill by approximately 1 year.

As part of the planning process, the City may examine options to accept waste from outside Lancaster County for disposal; if this were to occur, there may be benefits to the City, but the increase in disposal quantities would reduce the overall life of the landfill(s).

A separate technical paper discusses construction and demolition waste disposal. The North 48th Street Construction and Demolition Waste Landfill is projected to reach capacity in 2030. The quantities of C&D wastes currently delivered to the North 48th Street Construction and Demolition Waste Landfill are equivalent to approximately 20 to 30 percent of the solid waste disposed in the Bluff Road MSW Landfill. If the North 48th Street Construction and Demolition Waste Landfill were to close and the C&D waste were to be directed to the Bluff Road MSW Landfill, it would negatively affect the life of the Bluff Road MSW Landfill.

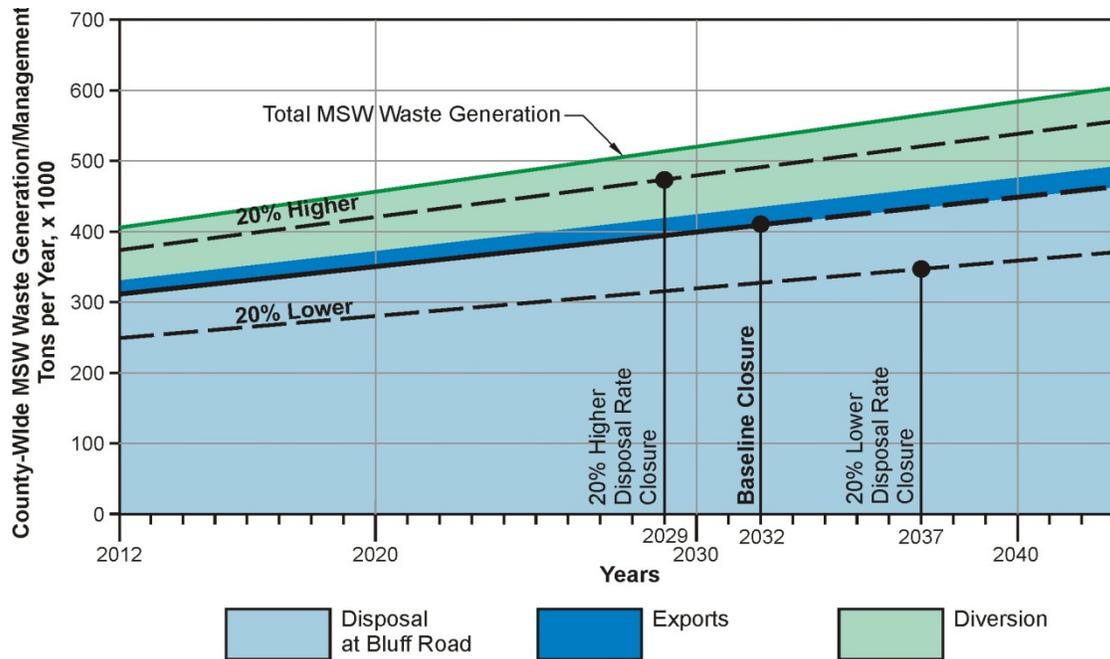
As further discussed in the Needs Assessment and technical paper on Yard Waste, approximately 3 percent of the material currently disposed of at the Bluff Road MSW Landfill was estimated to be yard waste. However, approximately 8 percent of the total MSW generation in the Planning Area is yard waste (which includes wood wastes). Of the total yard waste and wood waste collected in the Planning Area, two-thirds is currently estimated to be managed by composting and chipping (through the City's composting operation). If all of the yard waste and wood waste materials collected in the County were directed to the Bluff Road MSW Landfill starting in 2013, it would decrease the overall life of the landfill by approximately 1 year.

While it is possible to examine a wide range of factors that might affect variations in waste generation (i.e., changes in projections for population and employment growth) or improvements in waste reduction and recycling, the results of any such assumptions are still only assumed values. As such, in the Needs Assessment the baseline estimates for landfilled waste at the Bluff Road MSW Landfill have been shown with an upper and lower range of plus or minus 20 percent. The upper range may reflect one or more of the following considerations: 1) higher than projected employment, 2) higher than projected increases in population, 3) lower than projected exports, 4) imports, 5) disposal of biosolids, or 6) disposal of increased quantities of yard waste. The lower range may reflect one or more of the following considerations: 1) lower than projected employment, 2) lower than projected increases in population, 3) increased diversions, or 4) increased waste exports. If technologies such as waste combustion (e.g., waste-to-energy (WTE) or conversion technologies) are employed, they have the potential to reduce the volume of the waste requiring landfilling substantially. While not all waste would typically be managed by a WTE facility, for typical MSW, the combustion process can be expected to reduce the volume of the combusted fraction by 90 percent. The benefits of WTE and other waste conversion technologies are discussed in a separate technical paper on Waste Conversion Technologies. Depending on when such a system would be assumed to be placed in service, it could substantially increase the life of the MSW landfill or delay the siting of a new facility.

The results of these variations from the baseline are shown graphically in Figure 2. Figure 2 is intended to further illustrate the effects of uncertainties on the overall life of the City's Bluff Road MSW Landfill. The baselines and banding are also intended to be used to as a basis of

evaluation for future diversion options and to illustrate how future programs may affect disposal capacity (existing or required).

Figure 2 - Waste Generation and Management Baseline



Program (Facility/System) Options

A municipal solid waste landfill is basically a facility designed to store or entomb materials discarded by society. While considered least preferred on the USEPA management hierarchy it is often the lowest cost per ton option to manage the solid waste that is not otherwise diverted from disposal by source reduction, recycling, composting or other resource recovery alternatives. Among the principal concerns with landfills is that the waste placed in these facilities is a heterogeneous mix of organic and inorganic materials that may, to varying degrees, be chemically or biologically active and as such, if not properly managed represent a risk to human health and the environment (short- and long-term). The USEPA states “Modern landfills are well-engineered facilities that are located, designed, operated, and monitored to ensure compliance with federal regulations. Solid waste landfills must be designed to protect the environment from contaminants which may be present in the solid waste stream. The landfill siting plan—which prevents the siting of landfills in environmentally-sensitive areas—as well as on-site environmental monitoring systems—which monitor for any sign of groundwater contamination and for landfill gas—provide additional safeguards. In addition, many new landfills collect potentially harmful landfill gas emissions and convert the gas into energy.” (reference: <http://www.epa.gov/osw/nonhaz/municipal/landfill.htm>, retrieved 10/10/2012) Municipal solid waste landfills must comply with the federal regulations in 40 CFR Part 258 (Subtitle D of the Resource Conservation and Recovery Act (RCRA)), and in Nebraska must comply with the Nebraska Department of Environmental Quality (NDEQ) Title 132 – Integrated Solid Waste Management Regulations. Federal and state standards address such matters as:

- ◆ Location restrictions.
- ◆ Liners requirements.
- ◆ Leachate collection and removal systems. Leachate is the liquid that comes in contact with solid waste.
- ◆ Operating practices.
- ◆ Groundwater monitoring requirements.
- ◆ Closure and post-closure care requirements.
- ◆ Corrective action provisions.
- ◆ Financial assurance.

These standards were established in the early 1990s and have served as the basis for modern landfills and facility permitting for more than two decades.

For purposes of this technical paper landfills are addressed as a necessary facility (solid waste management option) to deal with the waste materials not otherwise diverted or recovered. As such, options are discussed in terms of providing secure long-term waste disposal capacity, via landfilling, when the existing permitted Bluff Road MSW Landfill facility reaches capacity and there remains solid waste that requires disposal.

Because of the real and perceived issues associated with MSW landfills, it is often quite costly and difficult to establish (site/permit) a new MSW landfill. Siting a new landfill often involves a mix of social, political, environmental, regulatory, technical and economic considerations and can take many years; some efforts to site new landfills (or expand existing sites) across the U.S. have been unsuccessful and contribute to a continuing trend toward fewer landfills in the U.S.

Well before the City's Bluff Road MSW Landfill reaches capacity it will be necessary to identify a suitable disposal site for landfilling waste generated in the Planning Area. The basic options for long-term capacity include the following:

- ◆ New City MSW landfill
- ◆ New Private MSW landfill
 - In the County
 - Outside the County

While the City may be able to own or participate in a regional disposal facility outside Lancaster County, this options is not evaluated in this technical paper. While it is also possible to find and secure such capacity in remote locations it is generally anticipated that such an option would result in higher costs to residents, businesses, industries, and institutions within the City and County; this assumption of higher costs is based on added transportation costs and higher disposal costs (see Table 1, which shows that landfills in proximity to Lincoln have higher disposal rates).

As noted above, one of the LPlan 2040 guiding principles related to solid waste is:

“The City policy of ... public ownership, operation and financing of disposal ... will continue during the planning period.”

LPlan 2040 also identifies that:

“planning for expansion of the Bluff Road Landfill on City owned property just east of the existing site is anticipated...The expansion into this additional landfill area has not been permitted by the State of Nebraska Department of Environmental Quality.”

One of the LPlan 2040 “Strategies for Solid Waste Management” is to:

“Discourage future urban acreage developments in the area around the Bluff Road landfill and LES power generating operations, which are located between N. 56th and N. 84th Streets. Acreage development could impact the current and future landfill and LES operations.”

Figure 1 shows the location of the land east of the current Bluff Road MSW Landfill. Unless these policies, guiding principles and strategies change a new City owned and operated MSW landfill has been determined to be the option of choice. As such, the remainder of this technical paper focuses on issues that will need to be addressed to secure the existing land east of the current Bluff Road MSW Landfill for future use.

Options Evaluation

The issues that will need to be addressed in undertaking the development of a new MSW landfill (including on land adjacent to the existing site) in the future may include:

- ◆ Siting/location restrictions
- ◆ Permitting requirements and restrictions
- ◆ Infrastructure requirements
- ◆ Cost of services and funding mechanism
- ◆ Implementation schedule

One significant challenge that exists with future landfill construction and operations is the uncertainty of public policy and the always controversial process of siting a new solid waste management facility (e.g., landfill, waste-to-energy, composting, processing) or expanding a current solid waste disposal site. To protect the City’s investment in the City owned land east of the existing landfill and ensure solid waste management and disposal capacity for the Planning Area beyond 2040 (the planning period), the City will likely need to consider the following proactive measures:

- Ensure that current and future land-use plans and regulations identify landfilling and solid waste management as acceptable uses or designate the use of the land currently owned by the City for such purposes.
- Pursue including “solid waste landfilling” and “solid waste processing and management” as specifically defined and approved uses in the zoning regulations.
- Obtain all zoning and land-use approvals available or necessary to allow construction and ensure the future use of this land east of the existing Bluff Road MSW Landfill as a landfill or solid waste management site (landfill, solid waste processing, or solid waste management systems and facilities).

- Obtain the local land-use (siting) approval, if necessary, to allow for permitting of the City owned land east of the existing Bluff Road MSW Landfill as a solid waste facility (landfill or solid waste processing and management).
- Once such land-use approval is obtained, consider incorporating the City owned land east of the existing Bluff Road MSW Landfill into the next solid waste permit renewal or as a permit modification.
- Evaluate options in land-use plans and zoning rules to prevent conflicting development near the landfill boundary. One such option may be the establishment by code or ordinance of a buffer area (setback distance) for residential and commercial development around the perimeter of the current City owned land/landfill. Such a code change or ordinance establishing setbacks would need to be structured to prevent encroachment on designated City solid waste management property by residential and commercial development for some distance (e.g., 1 mile). Effective land-use/planning designations would minimize both the likelihood of off-site nuisance issues and future pressure to increase performance standards, both of which would help control long-term costs of solid waste facilities operations.
- Acquire land adjacent to the currently permitted disposal area and City owned land, especially on the north side, to ensure that no other conflicting development can occur on these lands.

At this time, the City's operations at the Bluff Road site is not considered a significant nuisance to neighbors.

If residential and commercial development is allowed to encroach on the City's existing and future solid waste facilities, the neighbors' expectations, complaints, and opposition to expansion will likely increase, and nuisance conditions that are considered to be managed in an acceptable manner by today's standards may not be tolerated in the future (e.g., the standard performance expectation will likely increase (that is, get more stringent)). As waste quantities to be managed increase (baseline projections) and the physical size of the existing Bluff Road MSW Landfill increases, the City could be further challenged to meet these higher expectations. Several methods or options can be employed to reduce potential future nuisance concerns and meet higher expectations; however, most of these will result in higher costs of operations.

Siting/location restrictions: The existing Bluff Road MSW Landfill and City owned land east of the landfill are currently zoned in a manner which allows their use for buildings or premises owned by any governmental entity, including local, county, state, federal governmental units and their subdivisions, and in some form of public use. Land to the north of these City owned parcels is generally zoned Agriculture. A review of City and County zoning regulations identifies a Waste Management and Extractive Services Use Group, which includes landfills as one potential special use (permit required).

Consistent with NDEQ Title 132 regulations, the City will need to demonstrate that any future landfill site meets certain regulatory "location restrictions". These restrictions are intended to ensure that landfills are built in suitable geological areas away from seismic faults, wetlands, flood plains, or other restricted areas. Given the proximity to the existing Bluff Road MSW Landfill it is generally anticipated that the land to the east would satisfy

these requirements; however, specific investigations and analysis will ultimately be required as part of the permitting process.

Permitting: Both state and local regulations govern the siting, construction and operations of a MSW disposal site. NDEQ regulations relative to siting, design, construction and operations are quite specific and detailed. The Bluff Road MSW Landfill currently complies with these NDEQ Title 132 and related regulations; any future municipal solid waste disposal site will require subsequent NDEQ approval and involve public notice and potentially a public hearing before such approval is granted.

Infrastructure requirements: Essential infrastructure associated with a landfill is currently present at the Bluff Road MSW Landfill. Development of a new landfill to the east of the existing Bluff Road MSW Landfill will require added infrastructure including additional roadway construction, electrical power, and likely a new water source. Additional infrastructure will also be necessary for storm water management, leachate handling and management, and landfill gas management. While these all have associated costs, none of these are consider barriers and are typically part of a new landfill development.

Cost of services and funding mechanism: For purposes of this technical paper it was assumed that continued City ownership and operations of the MSW landfill will remain cost competitive with other disposal facilities in the region (currently the lowest published tipping fee). The cost of funding long-term site development is assumed to be a continued part of the City's capital improvement program and would continue to be paid for by the tipping fees assessed for use of the landfill. In the past the City has used a revenue bond to fund capital improvements at the Bluff Road MSW Landfill; it is assumed this option will remain viable in the future. Revenue bonds imply the repayment of bonds will be from revenues generated from landfill tipping fees as opposed to general obligation bonds which are generally repaid from tax levies.

Implementation Schedule: From a national perspective the timeframe associated with siting and permitting a new municipal solid waste landfill is often 5 to 10 years and not all such efforts are successful. For this reason providing long-term capacity via the City owned land adjacent to the existing Bluff Road MSW Landfill is important to securing system capacity through 2040 and beyond. Proactive measures associated with zoning, permitting and buffer areas are considered important to meeting the guiding principles associated with the LPlan 2040 and Solid Waste Plan 2040.

Options Evaluation

Consistent with the evaluation criteria developed for use in the Solid Waste Plan 2040, municipal solid waste disposal options have been evaluated based on the following considerations:

- **Waste Reduction/Diversion:** Landfilling is used to manage the municipal solid waste not otherwise diverted from disposal. As such, landfills are not a waste reduction or diversion program. While increased exportation of MSW would extend the life of the existing Bluff Road MSW Landfill it will not reduce the amount of waste generated that requires disposal in a landfill.

- **Technical Requirements:** The current baseline projections for MSW disposal indicate that the existing Bluff Road MSW Landfill will reach capacity in approximately 2032 and as such additional disposal capacity will be required before the end of the planning period. Landfills provide a high degree of flexibility in accommodating changes in waste volumes and composition. The technology utilized for modern landfills is considered reliable and has been deemed protective of the environment by the USEPA. The issues, concerns and uncertainty often discussed in association with a landfill is what risks the site may pose beyond the required 30-year monitoring and maintenance period after site closure.
- **Environmental Impacts:** Landfills are currently considered a necessity in the solid waste management system to protect human health and the environment. MSW landfills are designed and monitored to ensure protection of groundwater. As organic waste decomposes in a landfill it produces air emissions that may include criteria pollutants and greenhouse gases (principally, methane and carbon dioxide (CO₂)). Air emissions (principally particulate (dust) and CO₂) also result from facility operations and vehicles that use the landfill. An active landfill gas collection system can capture and destroy a significant portion of the methane and can also be used to generate electricity and offset emissions from other sources. The City currently has a contract with Lincoln Electric System (LES) to use the majority of the landfill gas collected at the Bluff Road MSW Landfill to generate electricity. Also, because not all waste placed in a landfill degrades, landfills also serve to sequester carbon (help reduce a portion of the greenhouse gas generation) that might otherwise result in air emissions. Monitoring of surface water and groundwater is a routine part of landfill operations and permit compliance requirements. Such monitoring is used to demonstrate that constructed and operational controls are performing properly. As discussed under a separate technical paper on Household Hazardous & Conditionally Exempt Small Quantity Generator (Small Business) Hazardous Waste, state and federal law allows limited amounts of hazardous or toxic substances to be managed through landfill disposal. The Special Waste Permit program, household hazardous waste collection events, and conditionally exempt small quantity generator program administered by the Lincoln-Lancaster County Health Department serves to further limit and reduce the toxicity of the waste currently disposed of in the Bluff Road MSW Landfill.
- **Economic Impacts:** The initial construction, ongoing expansion and capping of completed areas of the Bluff Road MSW Landfill require significant capital expenditures. These are typically paid for from the tipping fee charged to site users. Residents and business pay landfill costs through their refuse collection fees. The City establishes landfill tipping fees based the necessity for capital and operating expenditures. The City has also used a revenue bond, repaid from tipping fees, to fund capital improvements. The tipping fee at the Bluff Road MSW Landfill is currently \$21 per ton of which approximately \$14 is used for landfill design, construction, operations and related expenses. The City collects \$7 per ton from refuse haulers as an Occupation Tax. If the overall quantities of municipal solid waste sent to landfill disposal (in the County or exported) decreases the revenue generated by the Occupation Tax will also decrease (assuming the rate remains unchanged); significant reductions in Occupation Tax revenues will result in less funds available to subsidize/incentivize other non-disposal or waste diversion programs. Landfills are not considered a tool for economic development; however low cost disposal can be a consideration in attracting new businesses.

- **Implementation Viability:** Implementing new landfills in the Planning Area or elsewhere can be difficult and complex. Siting a new landfill often involves a mix of social, political, environmental, regulatory, technical and economic considerations and can take many years; some efforts to site new landfills across the U.S. have been unsuccessful and have contributed to a continuing trend toward fewer landfills in the U.S. Locally, proactive efforts in designating land for solid waste management and associated land-use planning and zoning can aid in siting new disposal capacity. While the City has currently adopted a policy of “public ownership, operation and financing of disposal and selected integrated solid waste management services” during the planning period, it may still require significant efforts to successfully develop and permit additional disposal capacity during this planning period. The City currently owns land that appears suitable for use as a future landfill but additional approvals will be required before it can be firmly established as a usable site. Such approval will require approval by the NDEQ as well as local approvals. From a national perspective the timeframe associated with siting and permitting a new sanitary landfill is often 5 to 10 years. As such implementation efforts will need to begin well in advance of the projected closure of the current Bluff Road MSW Landfill.

Relationship to Guiding Principles and Goals

As it relates to the Guiding Principles and Goals of the Solid Waste Plan 2040, maintaining the availability of a local MSW landfill would be applicable as further noted below:

- **Emphasize the waste management hierarchy:** while landfilling may be considered a lesser preferred option on the waste management hierarchy it nonetheless is recognized as an option where reduction, reuse, and recycle (composting) do not eliminate all municipal solid wastes from disposal. As noted in the USEPA website, “an integrated waste management system considers fluctuating recycling markets, energy potential, and long-term landfill cost and capacity to make a waste management strategy that is sustainable.... What is economically preferable one year is not always environmentally preferable in the long run. However, by following the hierarchy of environmental preference, communities can ensure their economic decisions regarding MSW management are environmentally sound as well...community decisions are based both on environmental and economic factors.”
- **Encourage public/private partnerships:** Currently the City’s role in providing a MSW disposal site is based on fulfillment of state law and LMC as well as LPlan 2040 which states “*The City policy of privately owned and operated collection of refuse and recyclables coupled with public ownership, operation and financing of disposal ... will continue during the planning period.*”
- **Ensure system capacity:** Additional MSW disposal capacity is anticipated to be required before the end of the planning period. As such, a strategy to establish and ensure additional disposal capacity for municipal solid wastes will likely need to be component of the Solid Waste Plan 2040. The capacity that would be created within the City owned property east of the current Bluff Road MSW Landfill has not been estimated; however, it is reasonable to assume that under the baseline projections of waste generation and disposal needs that this site would provide disposal capacity beyond the end of the planning period.
- **Engage the community:** Public education to engage the community will be important to sustaining existing diversion programs and to implement alternatives to land disposal

of municipal solid wastes (e.g., source reduction, recycling, composting). Additionally, any effort to modify the current permit for the Bluff Road MSW Landfill or to develop a new disposal site will create additional opportunities for public comment. In terms of obtaining added landfill capacity an informed public will be important to understanding why approval of such a facility is necessary.

- **Embrace sustainable principles:** While resource recovery, reuse, waste minimization and waste diversion from landfills are often key aspects of sustainability programs, for waste that is not otherwise diverted, or does not provide a viable resource recovery option, landfills can serve to protect the environment and minimize social impacts. Low cost disposal for waste can also have economic benefits. Recycling and energy recovery would be management alternatives of a higher priority, but may need to be balanced with economic and environmental factors.

Summary

Until such time as waste is eliminated landfills will be a necessary part of an integrated solid waste management strategy. State law and City policies and regulations make the City responsible for ownership, operation and financing of disposal facilities during the planning period.

Baseline estimates of waste generation and disposal, even under the scenario of a 20 percent decrease in disposal rates, suggests that the existing Bluff Road MSW Landfill will reach capacity prior to 2040 (the end of the planning period). Consistent with the Guiding Principle of the Solid Waste Plan 2040 to ensure system capacity it is anticipated that the Solid Waste Plan 2040 will need to include action items related to the establishment of additional MSW disposal capacity. One option identified as anticipated in the LPlan 2040 is to plan “for expansion of the Bluff Road Landfill on City owned property just east of the existing site...The expansion into this additional landfill area has not been permitted by the State of Nebraska Department of Environmental Quality.” A proactive program, including the following options may be of significant value in securing such land for future solid waste management uses:

- Ensure that current and future land-use plans and regulations identify landfilling and solid waste management as acceptable uses or designate the use of the land currently owned by the City for such purposes.
- Pursue including “solid waste landfilling” and “solid waste processing and management” as specifically defined and approved uses in the zoning regulations.
- Obtain all zoning and land-use approvals necessary to allow construction
- Evaluate options in land-use plans and zoning rules to prevent conflicting development near the landfill boundary.
- Acquire land adjacent to the currently permitted disposal area and City owned land, especially on the north side, to ensure that no other conflicting development can occur on these lands.

The capacity that would be created within the City owned property east of the current Bluff Road MSW Landfill has not been estimated; however, it is reasonable to assume that under the baseline projections of waste generation and disposal needs that this site would provide added disposal capacity beyond the end of the planning period.