

MUNICIPAL SOLID WASTE PERMIT MAJOR AMENDMENT

PART III-ATTACHMENT D7 LINER QUALITY CONTROL PLAN



NAME OF PROJECT: Beck Landfill
MSW PERMIT APPLICATION NO.: 1848A
OWNER: Nido, LTD (CN603075011)
OPERATOR: Beck Landfill (RN102310968)
CITY, COUNTY: Schertz, Guadalupe County
Major Amendment: Revised March 2023

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Contents

30 TAC §§330.63(d)(4)(G), 330.331, 330.337, 330.339, 330.341

1 INTRODUCTION..... 3

1.1 Purpose..... 3

1.2 Definitions 3

1.3 Sequence of Construction Activities 4

2 LINER SYSTEM 5

2.1 Soil Liner..... 5

2.2 Construction Monitoring..... 5

3 EARTHWORK..... 7

3.1 General..... 7

3.2 Materials 7

3.3 Construction Below Groundwater..... 8

3.4 Excavation..... 8

3.5 Expansion of Perimeter Dike 8

4 COMPACTED SOIL LINER..... 10

4.1 General..... 10

4.2 Materials 10

4.3 Subgrade Preparation..... 10

4.4 Placement and Processing 11

4.5 Compaction..... 11

4.6 Protection 12

4.7 Tie in to Existing Liners..... 12

4.8 Testing and Verification 12

4.8.1 Preconstruction Testing..... 12

4.8.2 Construction Testing 13

4.8.3 Thickness Verification..... 14

5 PROTECTIVE COVER..... 15

5.1 General..... 15

5.2 Materials 15

5.3 Preparation 15

5.4 Placement..... 15

5.5 Testing and Verification 15



6.1 Reports 17
6.2 Soils and Liner Evaluation Report 17



1 INTRODUCTION

1.1 Purpose

This Liner Quality Control Plan (LQCP) has been prepared in accordance with 30 TAC §330.339 to establish procedures for the design, construction, testing, and documentation of the liner system for the landfill. Beck Landfill is a Type IV landfill and only accepts construction and demolition, and other inert wastes. The entire footprint of the landfill has been previously constructed utilizing an in-situ clay liner, so no additional liner construction is anticipated. However, if any liner construction becomes necessary in the future, it will be constructed in accordance with the provision in this section.

1.2 Definitions

Specific terms and acronyms that are used in this LQCP are defined below.

- ASTM- American Society for Testing and Material
- Construction Quality Assurance (CQA) - CQA is a planned system of activities that provides the owner and permitting agency assurance that the facility was constructed as specified in the design. CQA includes the observations, evaluations, and testing necessary to assess and document the quality of the constructed facility. CQA includes measures taken by the CQA organization to assess whether the work is in compliance with the plans, specifications, and permit requirements for a project
- Geotechnical Professional (GP) - The GP is the authorized representative of the operator who is responsible for all CQA activities for the project. The GP must be registered as a Professional Engineer in Texas. Experience and education should include geotechnical engineering, engineering geology, soil mechanics, geotechnical laboratory testing, construction quality assurance and quality control testing, and hydrogeology. The GP must also have competency and experience in certifying similar projects. The GP may also be known in applicable regulations and guidelines as the CQA engineer, resident project representative, geotechnical quality control/quality assurance professional (GQCP), or professional of record (POR).

- CQA Monitors - CQA monitors are representatives of the GP who work under direct supervision of the GP. The CQA monitor is responsible for quality assurance monitoring and performing on-site tests and observations. The CQA monitor must be NICET- certified at Level 2 for soils and geosynthetics, an engineering technician with a minimum of four years of directly related experience, or a graduate engineer or geologist with one year of directly related experience.
- Quality Assurance- Quality assurance is a planned program that is designed to assure that the work meets the requirements of the plans, specifications, and permit for a project. Quality assurance includes procedures, quality control activities, and documentation that are performed by the GP and CQA monitor.
- Quality Control - Quality control includes the activities that implement the quality assurance program. The GP, CQA monitor, and contractor will perform quality control.
- Seasonal High Water Table - The seasonal high water table is the highest measured water level within the construction area.
- SLER- Soil Liner Evaluation Report (only used if liner repairs are required)

1.3 Sequence of Construction Activities

All of the planned liner system for Beck Landfill has been previously constructed, this section only applies to an unforeseen situation where a portion of the liner needs to be repaired or re-constructed. Generally, construction of any new lined areas at Beck Landfill will proceed in the following sequence of activities:

- The area will be excavated to the proposed subgrade elevations.
- The subgrade elevations will be verified.
- The compacted soil liner will be constructed, tested, and verified in accordance with Section 4.
- The Soils Liner Evaluation Report will be submitted to the TCEQ.

2 LINER SYSTEM

2.1 Soil Liner

As stated in Section 1.0, there is no anticipated construction of additional liner at the Beck landfill, because the entire footprint has previously been constructed with an in-situ soil liner. The in-situ liner has at least four feet of in-situ soil between the deposited waste and groundwater. The in-situ soil constitutes an in-situ liner and meets all the physical properties for a constructed liner as detailed in §330.339(c)(5). The In-situ liner was excavated to the depth necessary to ensure that it did not exhibit primary or secondary physical features such as jointing, fractures, bedding planes, solution cavities, root holes, desiccation shrinkage cracks etc., that have a coefficient of permeability greater than 1×10^{-7} cm/sec. Along the sidewalls a soil berm was constructed that has a slurry wall and/or clay core that penetrates a minimum of five feet into the unweathered shale layer. See Figures D-2 and D3.1 for details of the sidewall berm.

However, if an unforeseen condition requires the replacement of a portion of the liner system, the following provisions will be utilized. The optional soil liner, if required, will consist of 36 inches minimum of compacted clay with a maximum hydraulic conductivity of 1×10^{-7} cm/sec. The compacted clay liner will be overlain by a minimum of one foot of protective cover soil. A detail for the optional sidewall liner system is included on Figure D3.1.

An additional compacted soil berm is proposed to be constructed above the existing berm to provide protection and adequate freeboard from the 100-year floodplain. See Figure D-2 for the proposed dimensions of the soil berm.

2.2 Construction Monitoring

Continuous on-site monitoring is necessary to assure that the components of the liner system are constructed in accordance with this LQCP. In accordance with 30 TAC §330.339(a)(2), the CQA monitor shall provide on-site observation and field sampling and testing as required during the following construction activities:

- Subgrade preparation
- Compacted soil liner placement, processing, compaction, and testing
- Any work that could damage the installed components of the liner system

The GP will document and certify that the liner system was constructed in accordance with this LQCP. The GP shall make sufficient site visits to observe critical construction activities and to verify that the construction and quality assurance activities are performed in accordance with this LQCP.

All field sampling and testing, both during construction and after completion, shall be performed by a person acting in compliance with the provisions of the Texas Engineering Practice Act and other applicable state laws and regulations. The professional of record who signs the soil liner evaluation report or his representative will be on site during all liner construction. Quality control of construction and quality assurance of sampling and testing procedures will follow the latest technical guidelines of the executive director.

3 EARTHWORK

3.1 General

Earthwork activities and testing associated with liner construction will be documented in the SLER in accordance with Section 6.2.

3.2 Materials

The following material classifications will be encountered in excavations or will be required for landfill construction.

General Fill

General fill consists of soil that is free from debris, rubbish, solid waste, organic matter, and particles larger than four inches in diameter.

Compacted Soil Liner

Compacted soil liner materials consist of soil that is free from debris, rubbish, solid waste, organic matter, and meets the requirements of Section 4.2.

Operational and Intermediate Cover

Operational and intermediate cover materials consist of soil that has not been previously mixed with solid waste.

Topsoil

Topsoil consists of soil that is capable of sustaining vegetation and is free of debris, rubbish, and solid waste.

Unsuitable Materials

Unsuitable materials consist of any material that is determined by the GP to not be suitable for use as classified above.

3.3 Construction Below Groundwater

All cells have been excavated and no construction below the groundwater level was performed.

3.4 Excavation

A description of the materials that will be encountered in the excavations is provided in Attachment D5 -Geotechnical Design.

The slope stability analyses were performed for 3H:1V excavation and liner slopes, and 4H:1V final waste slopes. Any changes to the excavation plan, liner system, final cover system, or landfill completion plan will necessitate that the slope stability analyses be revised to reflect the changed conditions. Waste must be placed and properly compacted in horizontal lifts that are typically 20 feet thick. Temporary construction slopes should not be steeper than the final slopes and concentrated loadings such as heavy equipment and soil stockpiles will not be placed near the crest of slopes unless the permit is revised.

3.5 Expansion of Perimeter Dike

A compacted clay perimeter dike currently surrounds the entire landfill footprint. The top elevation of this dike is above the calculated 100 year floodplain and protects the landfill from wash-out of waste from the 100 year event. This landfill expansion application proposes to construct a second perimeter dike adjacent to the current one to provide a minimum of three feet of freeboard above the current 100 year flood event and to provide additional protection if the 100 year flood elevation were to rise in the future. The second perimeter dike will be 10 feet high and have 4:1 exterior slopes and 3:1 interior slopes. Figure D-2 in Attachment D shows the location and configuration of the proposed dike. The dike will be constructed of General Fill material.

The compacted soil subgrade below the dike and surface of each lift should be roughened prior to placement of the next lift of the dike. The dike material should be placed in maximum eight-inch loose lifts to produce compacted lift thickness of approximately six inches. The material should be processed to a maximum particle size of one inch or less before water is added.

If additional water is necessary to adjust the moisture content, it should be applied after initial processing, but prior to compaction. Water should be applied evenly across the lift and worked into the material. Water used for the dike compaction must not be contaminated by waste or any objectionable material.

The dike shall be compacted with a pad/tamping-foot or prong-foot roller. A footed roller is necessary to bond the lifts, to distribute the water, and to blend the soil matrix through kneading action. The compactor should make the required passes across the area being compacted to reach the required density. The material should be compacted to a minimum of 95 percent of the maximum dry density determined by standard Proctor (ASTM D 698) at a moisture content within 2% below or above optimum moisture. Areas with failing tests shall be reworked, re-compacted, and retested, and passing tests must be achieved before another lift is added.

4 COMPACTED SOIL LINER

4.1 General

The compacted soil liner component of the composite liner system consists of a 36-inch thick layer of compacted, relatively homogeneous, cohesive material. The CQA monitor shall provide continuous on-site observation during compacted soil liner placement, compaction, and testing in accordance with 30 TAC §330.339(a)(2). The GP shall make sufficient site visits during compacted soil liner construction to document the construction activities, testing, and thickness verification in the SLER, in accordance with Section 6.2.

4.2 Materials

Compacted soil liner material shall consist of soil that is free from debris, rubbish, frozen materials, foreign objects, and organic material. The required compacted soil liner material properties are summarized in Table D7-1.

Table D7-1
Beck Landfill
Compacted Soil Liner Material Properties

Test	Standard	Required Property
Plasticity Index	ASTM D 4318	15 or Greater
Liquid Limit	ASTM D 4318	30 or Greater
Percent Passing No. 200 Mesh Sieve	ASTM D 1140	30% or Greater
Percent Passing 1-inch Sieve	ASTM D 422	100%
Coefficient of Permeability	ASTM D 5084 or COE EM 1110-2-1906 Appendix VII	1×10^{-7} cm/sec or less

Preconstruction testing procedures and frequencies for compacted soil liner materials are listed in Section 4.8.1.

4.3 Subgrade Preparation

Prior to placing soil liner material, the subgrade should be proof-rolled with heavy, rubber-tired construction equipment to detect soft areas. The GP or CQA monitor must observe the proof-rolling operation. Soft areas should be undercut to firm material, then backfilled with compacted general fill.

The subgrade elevations shall be verified in accordance with the requirements of Section 4.8.3 prior to the placement of compacted soil liner.

4.4 Placement and Processing

The compacted soil subgrade and surface of each lift should be roughened prior to placement of the next lift of compacted soil liner. The soil liner material should be placed in maximum eight-inch loose lifts to produce compacted lift thickness of approximately six inches. The material should be processed to a maximum particle size of one inch or less before water is added. Rocks and clods less than one inch in diameter should not total more than 10 percent by weight. The surface of the top lift shall contain no material larger than 3/8 inch.

If additional water is necessary to adjust the moisture content, it should be applied after initial processing, but prior to compaction. Water should be applied evenly across the lift and worked into the material. Water used for the soil liner compaction must not be contaminated by waste or any objectionable material.

4.5 Compaction

The soil liner shall be compacted with a pad/tamping-foot or prong-foot roller. A footed roller is necessary to bond the lifts, to distribute the water, and to blend the soil matrix through kneading action. Soil liner shall not be compacted with a bulldozer, rubber-tired roller, flat-wheel roller, scraper, truck, or any track equipment unless it is used to pull a footed roller. The lift thickness shall be controlled to achieve penetration into the top of the previously compacted lift; therefore, the lift thickness should not be greater than the pad or prong length. Cleaning devices on the roller must be in place and maintained to prevent the prongs or pad feet from becoming clogged to the point that they cannot achieve full penetration. The minimum weight of the compactor shall be 1,500 lbs/ft of drum length.

The compactor should make the required passes across the area being compacted to reach the required density. A pass is defined as one pass of the compactor, front and rear drums. The material should be compacted to a minimum of 95 percent of the maximum dry density determined by standard Proctor (ASTM D 698) at a moisture content at or above optimum

moisture. Areas with failing tests shall be reworked, re-compacted, and retested, and passing tests must be achieved before another lift is added.

After a lift is compacted, it must be watered to prevent drying and excessive desiccation until the next lift can be placed. If desiccation occurs, the GP must determine if the lift can be rehydrated by surface application of water or if the lift must be scarified, watered, and re-compacted. Following compaction and fine grading of the final lift, the surface of the compacted soil liner shall be smooth drum rolled.

4.6 Protection

The completed compacted soil liner must be protected from drying, excessive desiccation, rutting, erosion, and ponded water until waste is placed. Areas that undergo excessive desiccation or damage shall be reworked, re-compacted, and retested as directed by the GP.

4.7 Tie in to Existing Liners

The edge of existing compacted soil liners shall be cut back on either a slope or steps to prevent the formation of a vertical joint. The slope will be a maximum of 3:1 and the steps will be three feet wide by one foot thick.

4.8 Testing and Verification

4.8.1 Preconstruction Testing

Table D7-2 lists the minimum testing required for material proposed for use as soil liner.

**Table D7-2-Beck Landfill
Compacted Soil Liner Material Preconstruction Tests**

Test	Standard	Frequency
Plasticity Index	ASTM D 4318	1 per material type
Liquid Limit	ASTM D 4318	1 per material type
Percent Passing No. 200 Mesh Sieve	ASTM D 1140	1 per material type
Percent Passing 1-inch Sieve	ASTM D 0422	1 per material type
Standard Proctor Test	ASTM D 698	1 per material type
Coefficient of Permeability	ASTM D 5084 or COE EM 1110-2-1906 Appendix VII	1 per moisture/density relationship
Unified Soil Classification	ASTM 2487	1 per material type

After the moisture density relationship has been determined for a material type, a soil sample should be remolded to about 95 percent of the maximum dry density at the optimum moisture content. This sample will be tested to determine if the soil can be compacted to achieve the required coefficient of permeability. Either falling head or constant head laboratory permeability tests may be performed to determine the coefficient of permeability. The permeant fluid for testing must be tap water or 0.005N calcium sulfate solution. Distilled or deionized water shall not be used as the permeant fluid.

4.8.2 Construction Testing

All quality control testing will be performed during construction of the liner, except for testing that is required after individual lifts are constructed. Table D7-3 lists the minimum testing required for material used as compacted soil liner.

Table D7-3
Beck Landfill
Compacted Soil Liner Material Construction Tests

Test	Standard	Frequency
Field Density	ASTM D 2922	1/8,000 ft ² per 6" parallel lift; one per 100 lineal ft per 12" sidewall horizontal lift
Plasticity Index	ASTM D 4318	One per 100,000 ft ² per 6" parallel lift; one per 2,000 lineal ft per 12" sidewall horizontal lift
Liquid Limit	ASTM D 4318	
Percent Passing No. 200 Mesh Sieve	ASTM D 1140	
Percent Passing 1-inch Sieve	ASTM D 422	
Percent Passing 1-inch Sieve	ASTM D 0422	
Coefficient of Permeability	ASTM D 5084 or COE EM 1110-2-1906 Appendix VII	
Thickness	Surveyor	1/5,000 SF

The Atterberg limits of the in-place compacted soil liner must be compared to the Atterberg limits of the Proctor curve sample to assure that the Proctor curve represents the in-place material. Any variance of more than 10 points between the liquid limit or plasticity index of the in-place soil and those of the Proctor curve sample will require that a new Proctor curve be developed. Permeability testing will be performed as described in Section 4.8.1 and all test data will be reported. Areas with failing permeability tests shall be reworked, re-compacted, and retested, and passing tests must be achieved before another lift is added.

4.8.3 Thickness Verification

The as-built thickness of the compacted soil liner shall be determined by standard survey methods. Prior to the placement of liner material, the subgrade elevations will be determined at a minimum rate of one survey point per 5,000 sf of lined area. After the compacted soil liner is completed, the top of the liner elevations will be determined at the same locations as the subgrade elevations.

5 PROTECTIVE COVER

5.1 General

The protective cover component of the liner system will consist of a 12-inch- thick layer of soil placed over the compacted clay layer after completion of all required soil testing and verification. The clay liner construction shall be completed prior to initiation of protective cover placement. The CQA monitor shall provide continuous on-site observation during protective cover placement to assure that protective cover placement does not damage underlying soil liners. The GP shall make sufficient site visits during protective cover placement to document the construction activities, testing, and thickness verification.

5.2 Materials

Protective cover material shall consist of soil that is free from debris, rubbish, frozen materials, foreign objects, and organic material.

5.3 Preparation

Prior to placing the protective cover material, the top of compacted soil liner elevations shall be verified.

5.4 Placement

The protective cover shall be placed in a manner that minimizes the potential to damage the underlying soil liner. Hauling equipment shall be restricted to haul roads of sufficient thickness to protect the underlying liner. The protective cover shall be dumped from the haul road and spread by low ground pressure equipment. On sidewalls, protective cover shall be placed from the bottom to the top, not across or down.

5.5 Testing and Verification

The as-built thickness of the protective cover shall be determined by standard survey methods. Prior to the placement of protective cover, the top of compacted soil liner elevations will be determined at a minimum rate of 1 survey point per 5,000 sf of lined area. After the protective

cover is completed, the top of the protective cover elevations will be determined at the same locations as the top of compacted soil liner elevations.

6 DOCUMENTATION

6.1 Reports

Each report shall be submitted in triplicate to the Municipal Solid Waste Division and shall be prepared in accordance with the methods and procedures contained in this LQCP. The evaluated area should not be used for the receipt of solid waste until acceptance is received from the executive director. The executive director may respond to the permittee either verbally or in writing within 14 days from the date on which the Soils and Liner Evaluation Report is date-stamped by the Municipal Solid Waste Division. Verbal acceptance may be obtained from the executive director, which will be followed by written concurrence. If no response, either written or verbal, is received within 14 days, the SLER shall be considered accepted and the owner or operator may continue facility construction or operations. Each report must be signed and, where applicable, sealed by the individual performing the evaluation and countersigned by the site operator or his authorized representative.

Markers will be placed to identify all disposal areas for which a SLER has been submitted and accepted by the executive director. These markers shall be located so that they are not destroyed during operations.

The surface of a liner should be covered with a layer of solid waste within a period of six months to mitigate the effects of surface erosion and rutting due to traffic. Liner surfaces not covered with waste within six months shall be checked by the SLER evaluator, who shall then submit a letter report on his findings to the executive director. Any required repairs shall be performed properly. A new SLER shall be submitted on the new construction for all liners that need repair due to damage.

6.2 Soils and Liner Evaluation Report

After construction of the compacted soil liner, the GP will submit a SLER to the TCEQ on behalf of the owner. No area may be used for the receipt of solid waste until the TCEQ has accepted the SLER or 14 days from the date of receipt of the SLER by the TCEQ, if the executive director has not provided a verbal or written response.

Preparation and submission of the SLER shall be in accordance with TCEQ MSWR. The purpose of the SLER is to document that the construction methods and test procedures are consistent with this LQCP, the TCEQ MSWR, and the project specifications.

At a minimum, the SLER will contain the following:

- A summary of all construction activities
- A summary of all laboratory and field test results
- Sampling and testing location drawings
- A description of significant construction problems and the resolution of these problems
- Record drawings
- A statement of compliance with the LQCP
- The seal and signature of the GP and assistant GP, if applicable, in accordance with the Texas Engineering Practice Act