ATTACHMENT 1

SAMPLE FORMS

Container Log

MDU ID#	TW Roll-off #	Waste Determination†	Date Determined‡	Disposal Method††	Manifest #‡‡	Shipped Date
HBH001	6516	Non-Hazardous	5/23/2005	On-Site		
HBH003	7405	Non-Hazardous	6/29/2005	On-Site		
HBH004	4752	Non-Hazardous	7/22/2005	On-Site		
HBH005	4753	Non-Hazardous	8/15/2005	On-Site		
HBH006	R1937	Non-Hazardous	8/30/2005	On-Site		
HBH007	R18036	Non-Hazardous	9/15/2005	On-Site		
HBH008		Non-Hazardous	10/4/2005	On-Site		
HBH009	R1916	Non-Hazardous	10/20/2005	On-Site		
HBH010	R20059	Non-Hazardous	11/3/2005	On-Site		
HBH011						
HBH012						
HBH013						
HBH014						
HBH015						
HBH016						
HBH017						
HBH018						
HBH019						
HBH020						

†— Choices are: Hazardous, Non-Hazardous, Beneficial Reuse, or State Exempt Waste.

‡—Choices are: On-Site Landfill, or Grassy Mtn.

††—This is the date that the analytical results are reviewed. If *Hazardous*, then disposal must occur within 90-days.

‡‡—If shipped off-site.

MCWANE DUCTILE - UTAH

LANDFILL INSPECTION AND MONITORING

Inspection/ Monitoring Activity	Frequency	Date Last Performed	Inspector's Initials	Comments
Access Road Condition and Maintenance	Daily During Operation			
Fence Inspection and Maintenance	Quarterly			
Waste Disposal Cell Development	Monthly (by Env. Mgr.)			
Drainage Channels Condition	Semi-Annual			

ATTACHMENT 2

PLAN OF OPERATION

3.0 *PLAN OF OPERATION*

The purpose of the Plan of Operation (Plan) is to provide an accurate description of the daily operations of the MDU Class IIIb Landfill while allowing for modifications that may be required to address minor operational changes.

3.1 *SCHEDULE OF CONSTRUCTION*

The Landfill is an existing Class IIIb landfill, and as such, has been receiving waste since prior to 1999. No construction is required to prepare the Landfill for receiving waste; therefore, a construction schedule has not been developed for this application and is not considered necessary.

3.2 *ON-SITE SOLID WASTE HANDLING PROCEDURES*

Daily operation of the Landfill is under the direction of the MDU Environmental Manager and his/her designated representatives.

Industrial process wastes are disposed within the active phase(s) of the landfill (currently Phases I and II). Sludge or wastes with high moisture content (no free liquid) are spread out and allowed to dry. Hot wastes, such as slag, are separated to allow for adequate cooling prior to placement and spreading at the landfill. All waste loads are recorded on the Waste Load Log, including estimated weight and volume for annual inventory tracking of waste placed at the landfill.

The landfill receives on-site industrial process wastes utilizing a berm and fill method. As a lift is completed, the next lift is constructed by excavating interior material and forming a three-sided berm around the perimeter of the cell. Waste is then placed within the berms comprising the cell. As each lift begins to reach the desired elevation, the next lift is constructed. This method of construction will continue throughout the permit term of the landfill. The landfill is currently disposing of waste as shown on Figure 4: Landfill Topographic Map.

As subsequent lifts are placed above the current lift, the side slope of the Landfill will be constructed with approximately 2:1 (horizontal: vertical) ratio in accordance with the slope stability analysis completed by ERM and accepted by the UDEQ as part of the prior Class IIIb Landfill Permit (UDEQ, 2009a). An access road sloping at an average 5% grade will

continue along the perimeter of the landfill. Approximately 9,000 cubic yards (12,600 tons) of waste annually will be disposed at the landfill until the design height of 70 feet is achieved for Phases 1/2. Additionally, about 4,500 cubic yards of slag will be placed in the Phase 3 footprint area to serve as inert buffer material in anticipation of placing other wastes in the Phase 3 areas when Phases 1/2 are complete. Figure 5 shows the current waste profiles and anticipated final grades for Landfill Phases 1/2.

3.3 *INSPECTIONS AND MAINTENANCE*

MDU personnel will inspect the Landfill facility to identify concerns with waste material erosion or other deterioration, operator errors, and discharges that may cause or lead to the release of wastes to the environment, or pose a threat to human health. Inspection personnel will keep an Inspection Log to include the date and time of the inspection, the printed name and handwritten signature of the inspector, a notation of observations made, and the date and nature of repairs or corrective actions. Copies of inspection logs will be kept at the MDU facility for at least three years from the date of inspection. The inspection schedule is provided below on Table 3-1. An example copy of the Landfill Inspection Log is provided in Attachment 2.

TABLE 3-1
INSPECTION AND MONITORING SCHEDULE

Inspection/ Monitoring Activity	Frequency
Access Road Condition and Maintenance	Daily During Operation as Needed
Fence Inspection and Maintenance	Quarterly
Waste Disposal Cell Development	During Daily Operation (Monthly by Environmental Manager)
Drainage Channels Condition	Semi-Annual
Post-Closure Final Cover Inspection	Semi-Annual

3.4 *CONTINGENCY PLAN*

This Contingency Plan is provided to minimize the hazards to human health and the environment in the event of a fire or explosion, or any unplanned sudden or non-sudden discharge to air, soil, or groundwater. The provisions of the Contingency Plan shall be carried out immediately when there is an emergency situation or release, which could threaten human health or the environment.

Emergency evacuation of the site will not be necessary given the nature of the waste materials stored at the site. The probability of fire, explosion, or toxic vapor generation from an emergency incident is remote.
The only possibility of a fire would exist in areas where hot slag is disposed within the active disposal area. The possibility of fire is minimized through proper disposal techniques, including separation of waste slag from combustible materials.

The primary means of fire control will be the exclusion or isolation of hot or burning loads. In the event that a fire occurs during operating hours, the burning material will be separated from other materials and covered with soil using on-site equipment. Small fires may be extinguished using a water truck, sprinklers, or fire extinguishers present in on-site vehicles. MDU currently has an on-site water truck and has installed sprinklers for dust control located along a portion of the landfill perimeter.

Upon notification of an on-site fire that is not controllable with on-site fire protection equipment, a long blast (greater than 30 seconds) on a vehicle horn will be sounded, and all employees will follow MDU's Employee Emergency Plan and the Fire Prevention Plan.

3.5 *FUGITIVE DUST*

Dust control is necessary at the landfill due to the types of wastes disposed, periodic landfill traffic, and the potential for wind dispersion. The MDU landfill currently utilizes two methods to minimize fugitive dust. Primary dust control is accomplished with a water truck. Periodically, the water truck wets down the existing access road and turn around area. Secondary dust control consists of a sprinkler system surrounding some of the perimeter of the landfill along the access road. As slopes are completed, MDU will perform partial closures as described in the Closure Plan section of this application to further minimize fugitive dust emissions. Dry wastes or soils producing dust will be wetted prior to

starting work each day, if necessary, and whenever fugitive dust emissions are visible.

3.6 *MAINTENANCE OF INSTALLED EQUIPMENT*

No equipment is installed at the landfill, so no maintenance schedule is provided here.

3.7 *PROCEDURES FOR EXCLUDING REGULATED WASTES*

All wastes disposed at the Landfill are generated through on-site sources. Therefore, MDU controls the wastes disposed on site and those transported off site. All municipal wastes, packing waste, waste oil, antifreeze, parts wash, etc., are transported off site for disposal. The purpose for the Class IIIb landfill is solely for disposal of non-hazardous, industrial wastes generated on site. By definition, a Class IIIb landfill can only dispose of non-hazardous industrial solid waste, or specific wastes that are exempt from hazardous waste regulations under Utah R315-2.4. Included within exempt wastes allowed are fly ash waste, bottom ash waste, slag waste and flue gas emission control waste, generated primarily from the combustion of coal or other fossil fuels. The Landfill is required to exclude regulated hazardous wastes containing PCBs.

The Landfill is currently used for disposal of seven primary waste streams from the MDU facility as listed below:

1. Desulfurization Slag
2. Baghouse Dropout (#2 Baghouse)
3. Spent Sand Cores
4. Construction & Demolition (C&D) Waste
5. Dry Cement Waste
6. Iron Slag
7. Miscellaneous Wastes (including variable sands, road sweeper dust, welding flux, and others)

The disposal operators are responsible for identification and prohibition of excluded wastes. All employees associated with the landfill are trained in techniques for spotting liquid wastes, drums, and wastes in sealed containers. Such wastes will not be disposed in the landfill, and a record of proper management of these non-landfill wastes will be recorded in the operating records. If such waste is discovered within the active area of the

landfill, it will be identified and segregated from the other wastes for alternative disposal.

Load inspections are carried out to verify that incoming waste loads are acceptable. Results of unacceptable load inspections will be documented on a Load Inspection Record.

MDU may direct inert wastes to areas of the facility requiring fill material. Only inert wastes will be used for fill.

3.8 DISEASE VECTOR CONTROL

The types of wastes disposed at the landfill are primarily inert and therefore do not harbor disease vectors. The continued exclusion of specific types of solid wastes will be necessary to control disease vectors and the subsequent spread of disease. Special wastes, such as municipal solid waste, liquid wastes, and tires, which may directly carry disease or lead to the propagation of disease vectors, will be excluded from the landfill. Periodic load inspections and landfill inspections will identify these wastes and minimize the potential for disease vectors. Standing water is not typical at the landfill because of the porous nature of the waste materials and climate condition; however, if present it shall be allowed to drain from the landfill surface to the extent possible to preclude harboring of mosquito larvae.

3.9 ALTERNATIVE WASTE HANDLING OR DISPOSAL PLAN

The potential need for the facility to control or prevent unacceptable wastes is remote because it accepts only on-site materials. In the event the Landfill is unable to accept on-site industrial waste, it will be held on site until it can be disposed of in the landfill or transported to an appropriate off-site industrial waste landfill.

3.10 CLOSURE AND POST-CLOSURE PLANS

The Closure Plan for the MDU Landfill is provided as Section 5. The Post-Closure Plan is provided as Section 6.

3.11 *CLOSURE COST ESTIMATES AND FINANCIAL ASSURANCE*

Closure and post-closure cost estimates and financial assurance are provided as Section 7.

3.12 *GENERAL TRAINING AND SAFETY PLAN*

Each employee who works with solid waste at the MDU Class IIIb Landfill will be trained and have a working knowledge of basic maintenance and operational techniques necessary to operate and maintain the Landfill in a manner that does not endanger human health and safety or environmental quality. Training will be accomplished through on-the-job training and instructional sessions in house. Training will be provided by the Environmental Manager or a designated training representative. Initial training will be completed within three months of assignment. Thereafter, a review of basic waste management skills will be conducted annually.

3.12.1 *Training Schedule*

Introductory Training (half hour minimum) includes: Synopsis of solid waste regulations, Plan of Operation, record keeping, and transporter requirements.

Requirement: All personnel responsible for segregating, loading, hauling and disposing of identified Class III landfill waste streams

Method: Lecture / On-the-job training

Review: Annual

Policies and Procedures (half hour minimum) includes: Security, inspections, and emergency response.

Requirement: All Personnel directly responsible for operating the Class III landfill

Method: Lecture / On-the job training

Review: Annual

3.13 *INDUSTRIAL WASTE WATER TREATMENT REVIEW*

MDU does not operate an industrial wastewater treatment facility to pre-treat any potential runoff or leachate from the Landfill. The run-off from

exposed surfaces of the landfill is contained within the waste cell and typically percolates into the waste because of its porous nature. No leachate or other water seeps have been observed in association with the landfill. Therefore, the Landfill is not subject to review by the Division of Water Quality (DWQ) as required in Subsection R315-310-3(1)(i).

3.14 *RECORDKEEPING*

The MDU Landfill is required to maintain certain records for inspection by UDEQ or other authorized personnel. The required records are described in this section.

3.14.1 *Operating Records*

Load counts of waste being disposed at the Class IIIb Landfill are kept by each of the various operations (i.e. bag house, cement lining, cupola, etc.). Generally, the same quantity of waste is disposed on a daily basis. The quantities of wastes disposed on an annual basis are calculated in the annual report. The quantities are based on the annual tonnage of iron produced. See Attachment 2 for a sample Waste Load Log.

3.14.2 *Annual Report*

An annual report for the previous calendar year will be prepared and submitted by March 1 to the Executive Secretary of the Utah Solid Waste Board. The annual report will be prepared on forms provided by the UDEQ and contain all information requested on those forms.

3.14.3 *Closure and Post-Closure Plans*

Closure and Post-Closure Plans are provided as Sections 5 and 6, respectively. These plans will be kept on site and made available for inspection.

3.14.4 *Financial Assurance Plan*

The Financial Assurance Plan is provided as Section 7. It will be updated annually, and made available for inspection upon request.

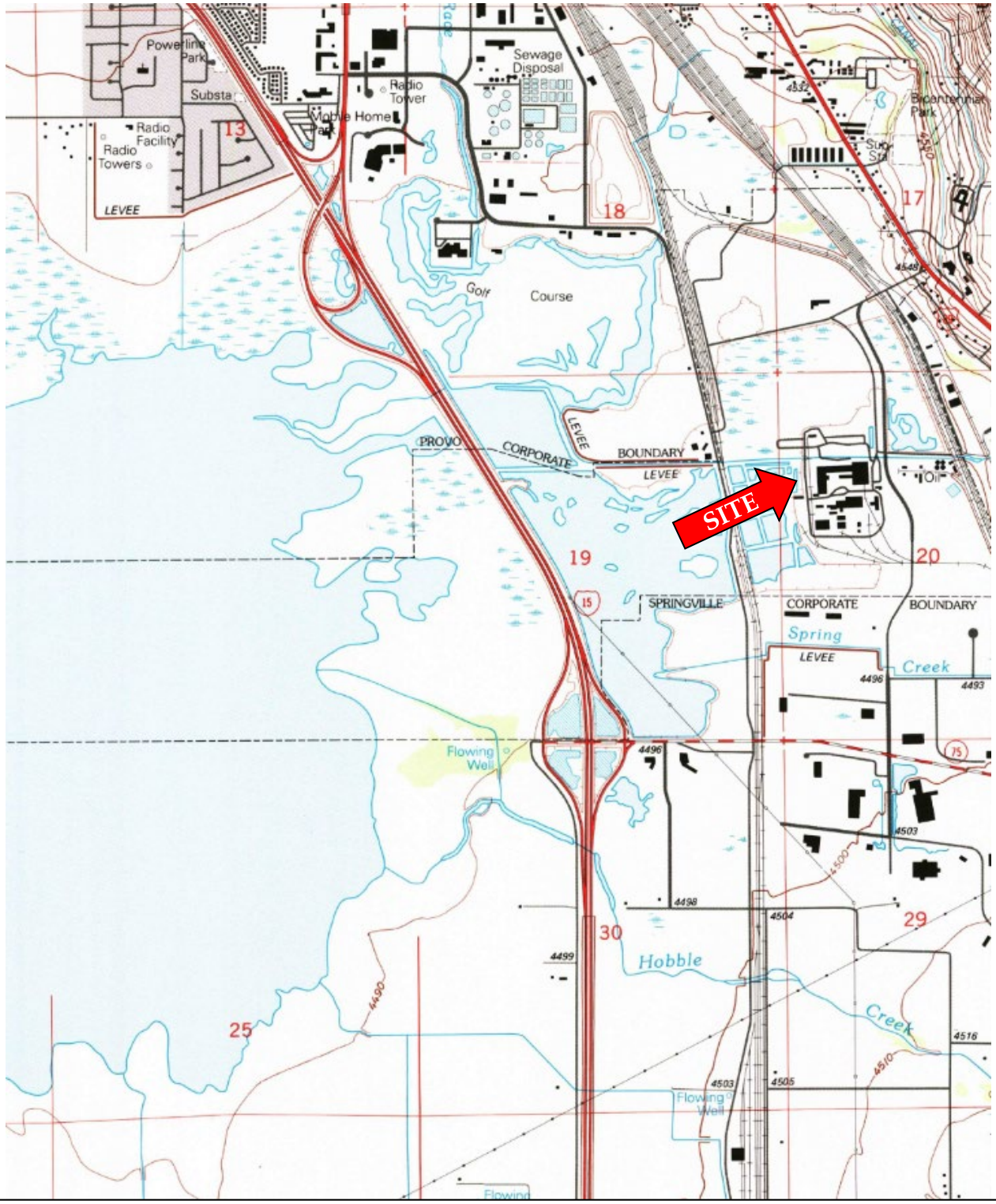
3.14.5 *Training Records*

Training documents will be kept for 5 years by MDU.

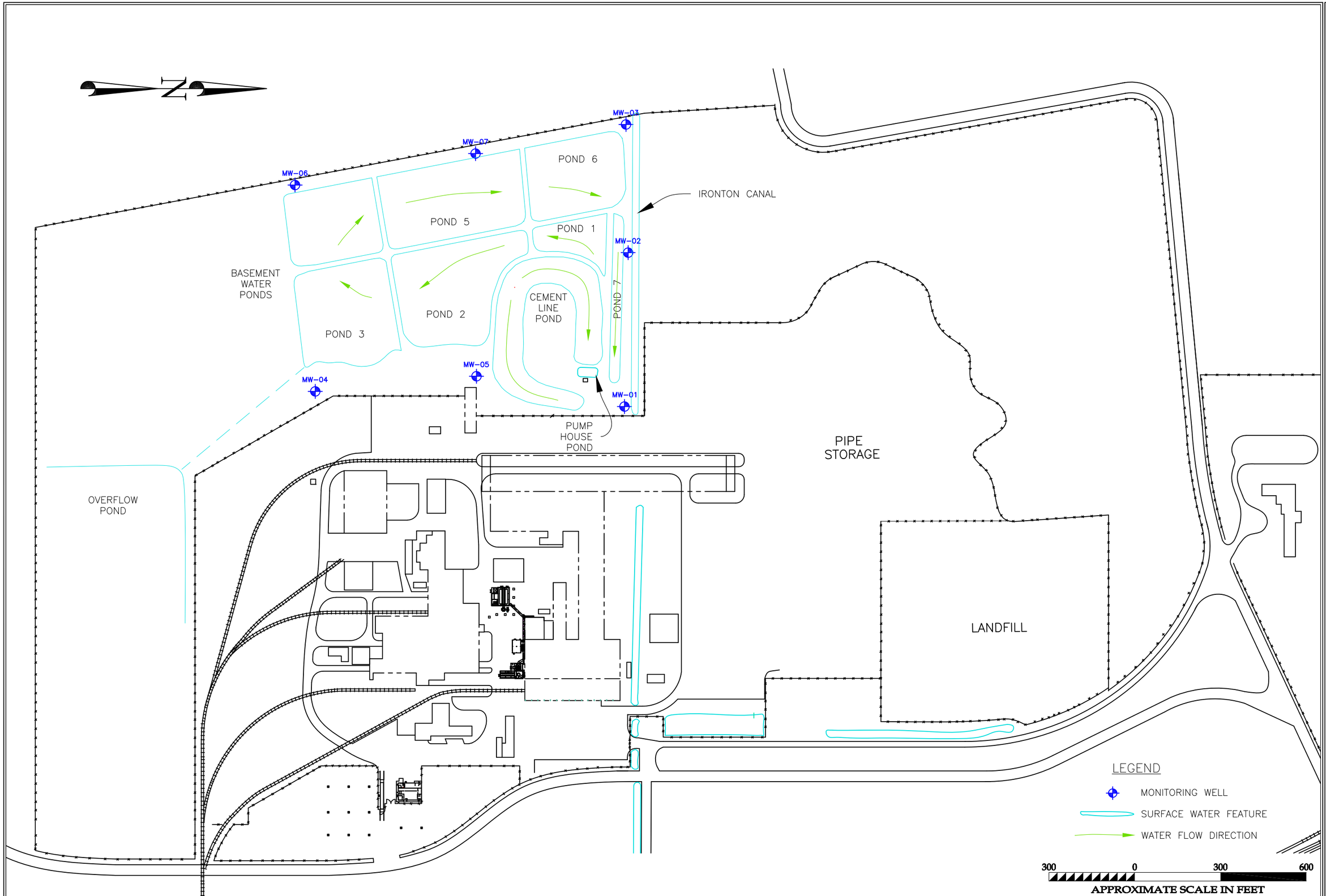
ATTACHMENT 3

LANDFILL DESIGN

Source: 2018 Google Earth Pro	**Environmental Resources Management** 136 E South Temple, Suite 2150 Salt Lake City, Utah 84111 (801) 204-4300	
Figure 1 **Aerial Photo July 2016** **McWane Ductile Utah**	Drawn By: GR Checked By: DW Date: 8/21/18	Scale = Not to Scale Project No. 0403140



Source: USGS Topo Map 1993	**Environmental Resources Management** 136 E South Temple, Suite 2150 Salt Lake City, Utah 84111 (801) 204-4300	
Figure 2 **Site Vicinity Map** **McWane Ductile Utah**	Drawn By: GR Checked By: SS Date: 8/7/20	Scale = 1:24 000 Project No. 0509446



REVISION	DESCRIPTION	DATE

Environmental Resources Management
136 E South Temple
Suite 2150
Salt Lake City, Utah 84111
(801) 204-4300
ERM

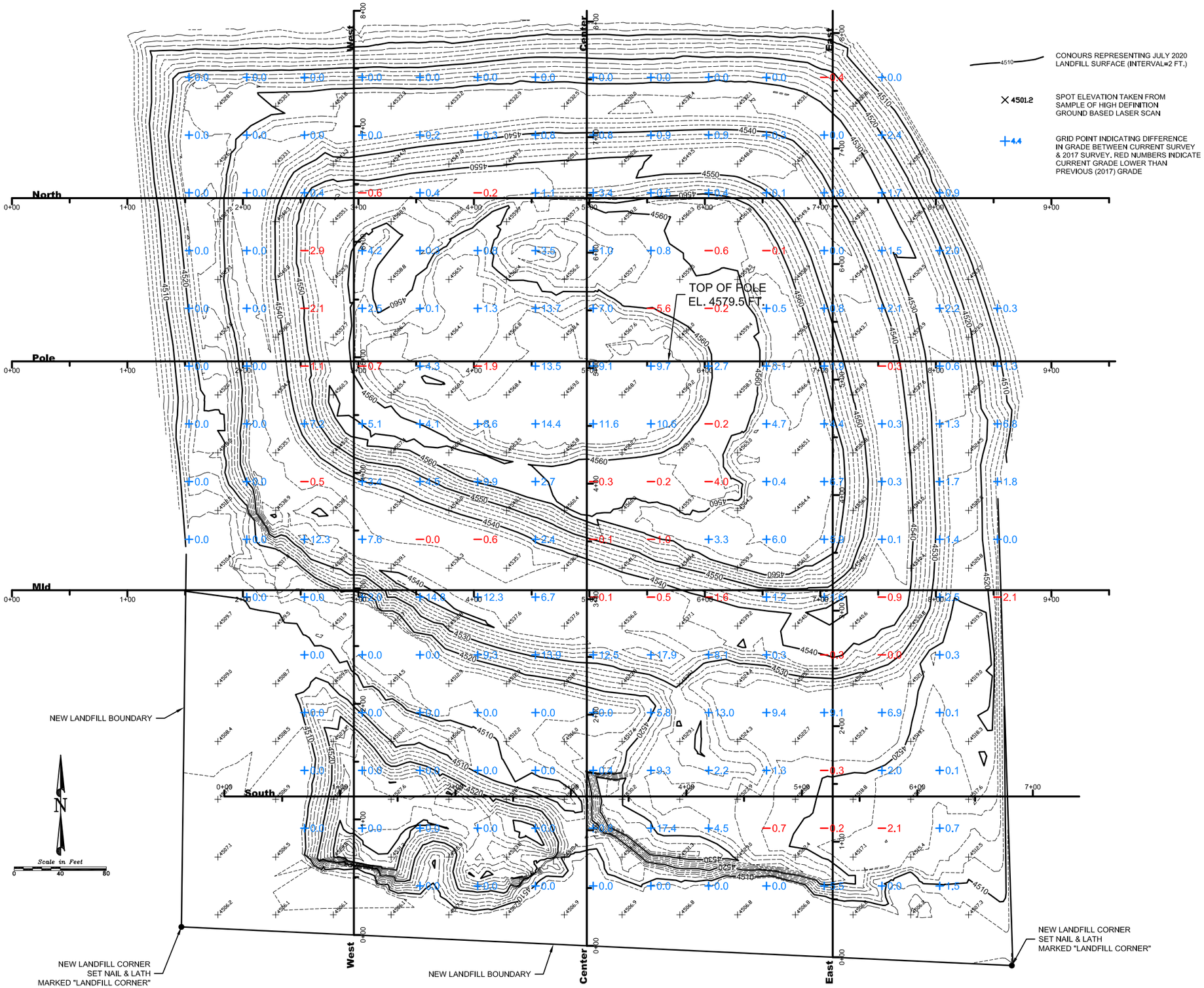
McWane Ductile
PROVO, UTAH

Facility Layout

GJR
GJR

DESIGNED
DRAWN
CHECKED
DATE
TIME

FIGURE 3



General Notes

No.	Revision/Issue	Date

ERM / McWAYNE DUCTILE

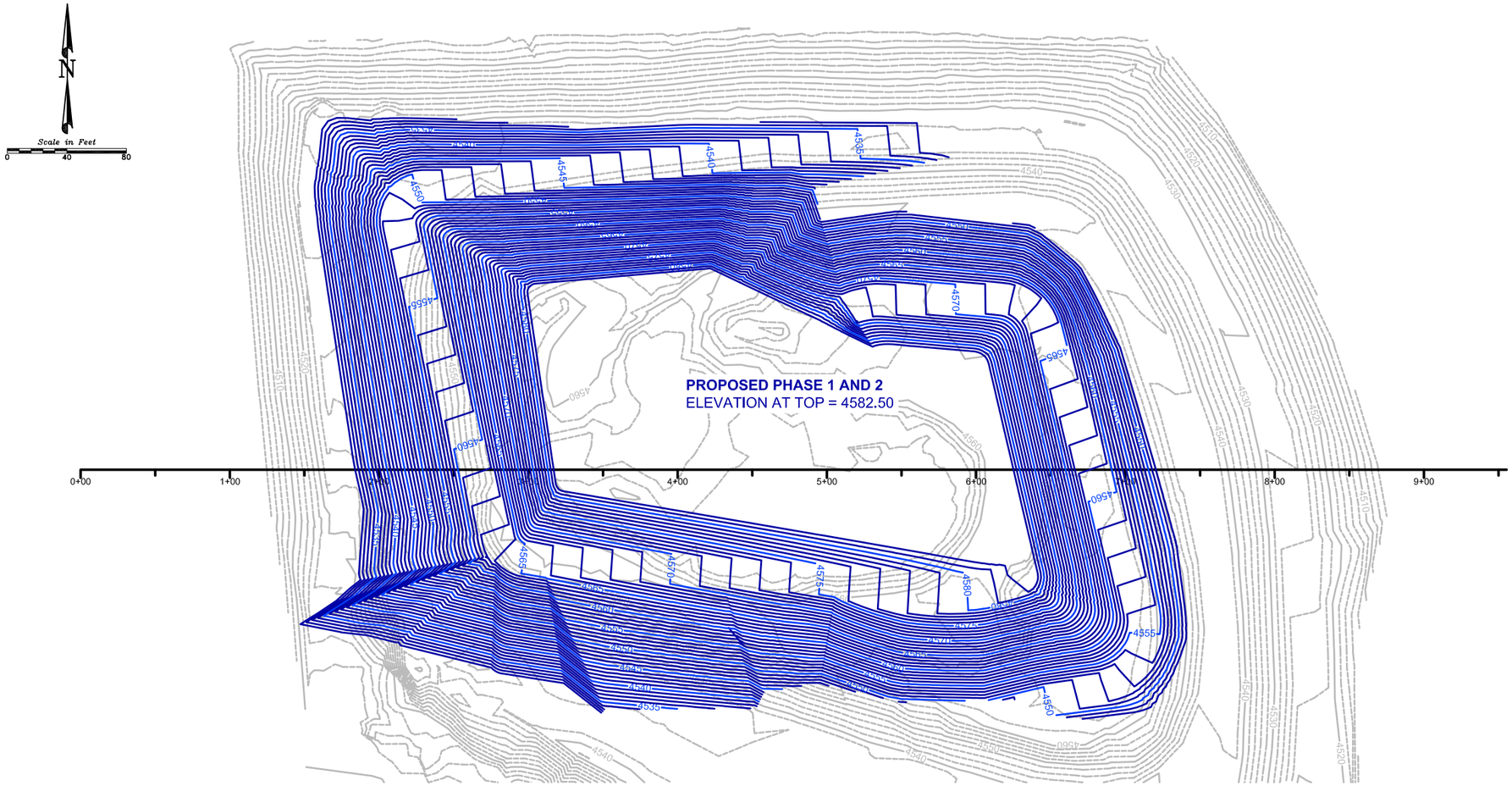
ANDERSON
ENGINEERING COMPANY, INC.
SARATOGA SPRINGS, UTAH 84054
(801) 972-6222
2053 N. HILLCREST RD.

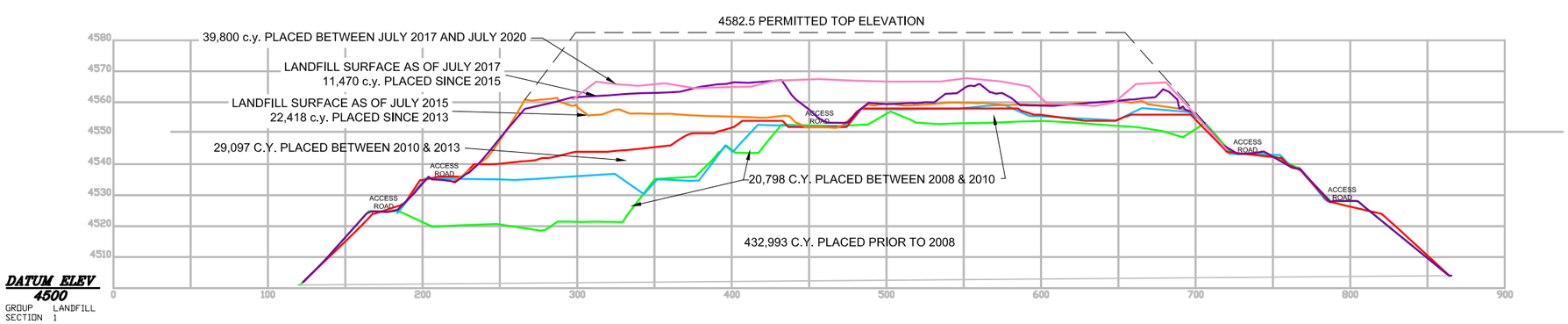
DRAWN BY: RKT
ENGINEER: XXX
APPROVED:
FILE: McWAYNE-2020.dwg

JULY 2020: ON-SITE INDUSTRIAL LANDFILL EXISTING CONDITIONS & QUANTITIES

Project	XX-XXX	Sheet
Date	30-AUG-2020	Fig 4
Scale	AS SHOWN	

THESE PLANS AND SPECIFICATIONS ARE THE PROPERTY OF ANDERSON ENGINEERING COMPANY, INC., 2053 N. HILLCREST RD., SARATOGA SPRINGS, UT 84045 AND SHALL NOT BE COPIED, REDUCED, OR REPRODUCED WITHOUT THEIR WRITTEN PERMISSION.





PHASE 1 & PHASE 2 LANDFILL

General Notes

No.	Revision/Issue	Date

ERM / McWAYNE DUCTILE

ANDERSON
ENGINEERING COMPANY, INC.
SARATOGA SPRINGS, UTAH 84054
(801) 972-6222
2053 N. HILLCREST RD.

DRAWN BY: RKT
ENGINEER: XXX
APPROVED:
FILE: McWAYNE-2020.dwg

LANDFILL FINAL TOPOGRAPHY AND CROSS SECITON

Project: XX-XXX
Date: 30-AUG-2020
Scale: AS SHOWN
Sheet: Fig 5

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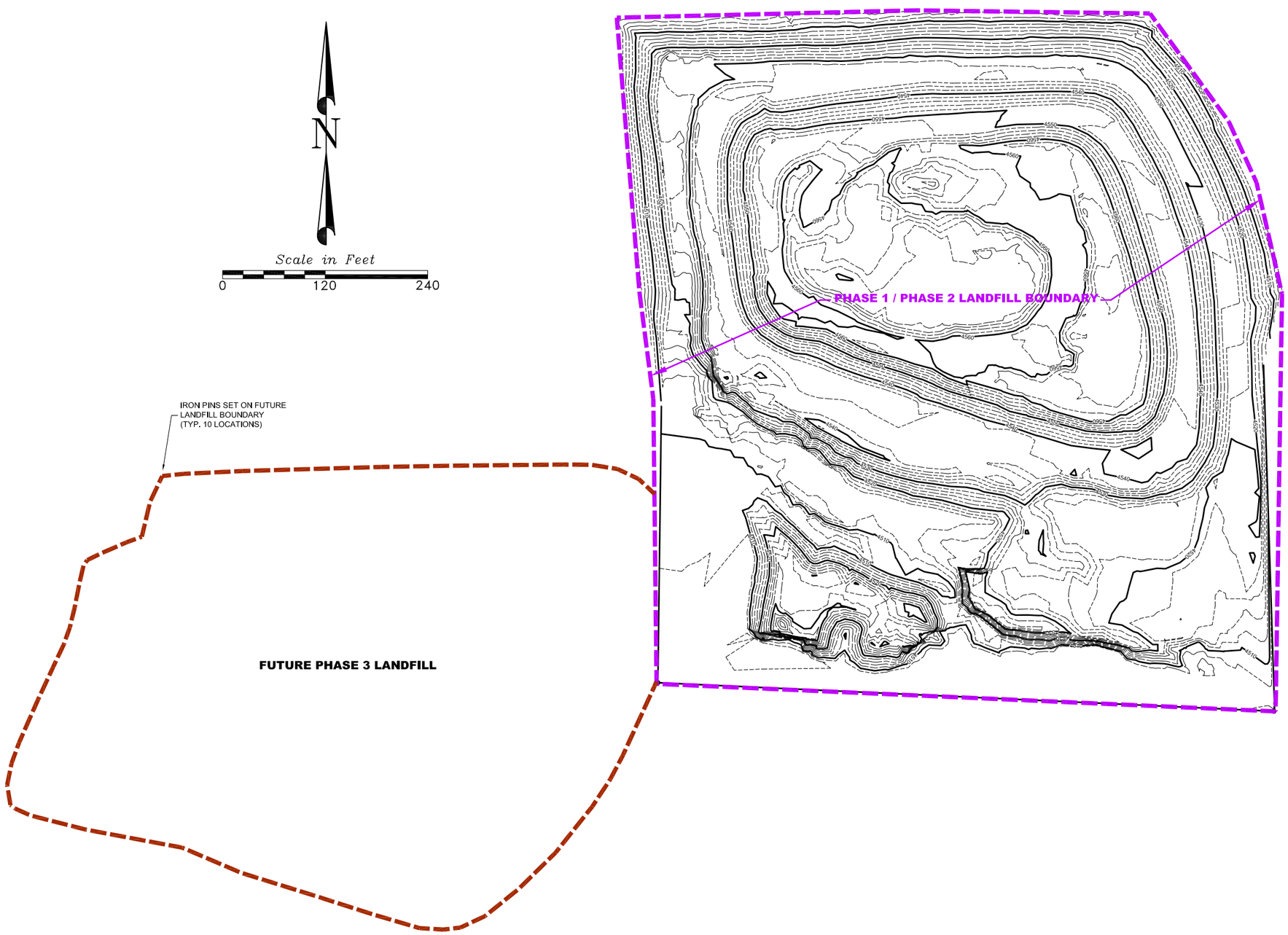

General Notes

No.	Revision/Issue	Date

ERM / McWAYNE DUCTILE

ANDERSON
ENGINEERING COMPANY, INC.
SARATOGA SPRINGS, UTAH 84054
(801) 872-8222
2053 N. HILLCREST RD.

DRAWN BY: RKT
ENGINEER: XXX
APPROVED:
FILE: McWAYNE-2020.dwg

INDUSTRIAL LANDFILL BOUNDARIES

Project	Sheet
XX-XXX	Fig 6
Date: 30-AUG-2020	
Scale: AS SHOWN	

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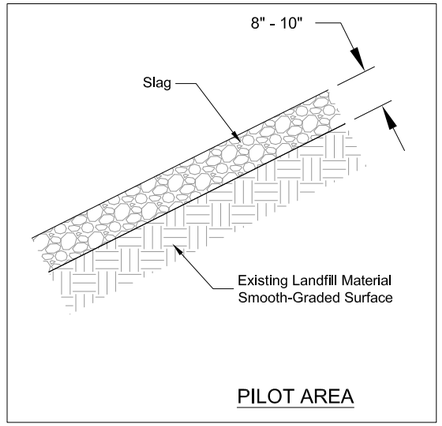
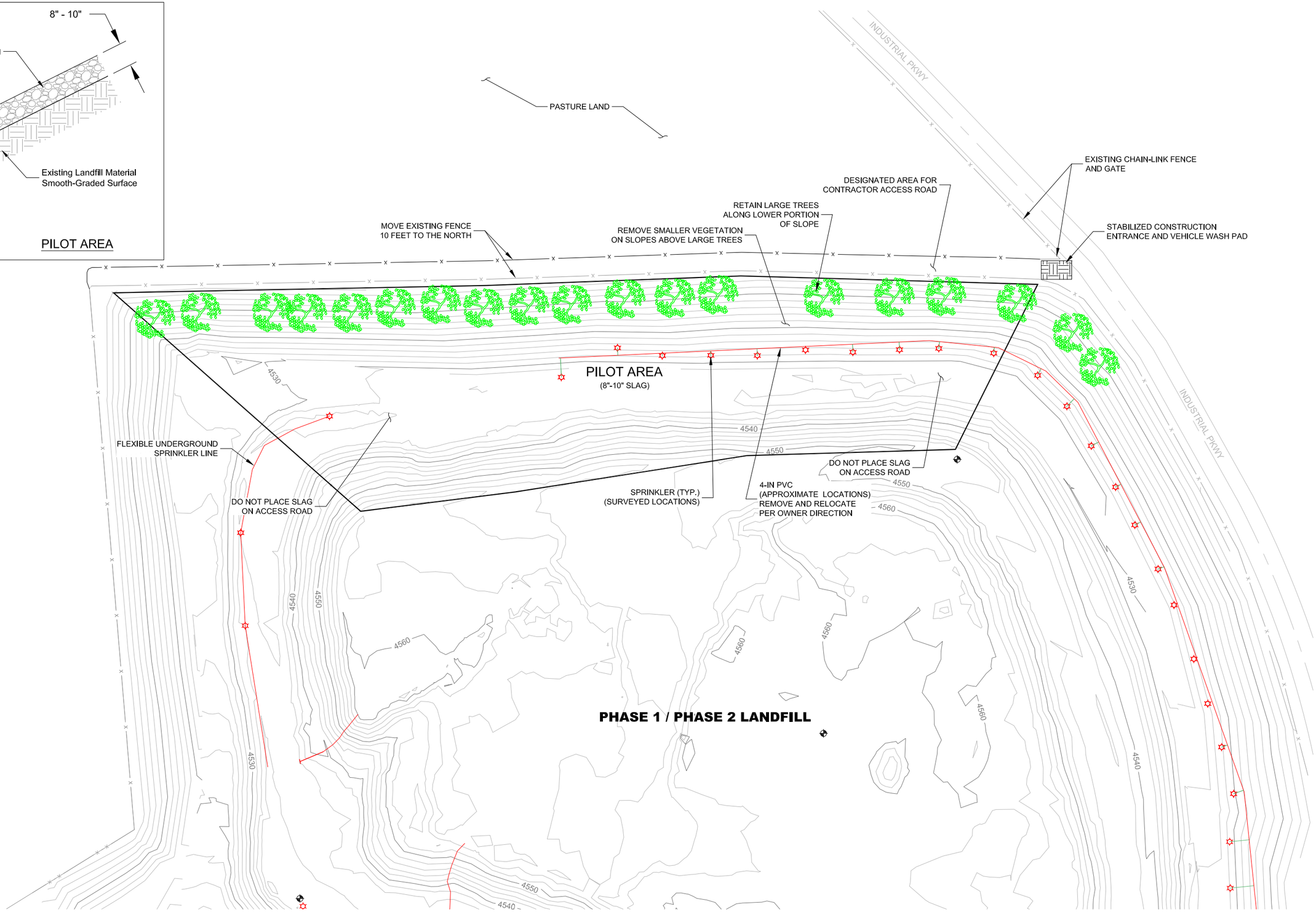




NOTES:
1. SEE DRAWING 2 FOR PILOT AREA DETAILS.

0 30
Approx. Scale (feet)

REVISION	DESCRIPTION	DATE

N W E S

Environmental Resources Management
136 E. South Temple
Suite 2150
Salt Lake City, Utah 84111
(801) 204-4300
ERM

MCWANE DUCTILE - UTAH FACILITY
2550 SOUTH INDUSTRIAL PARKWAY, PROVO, UTAH

PILOT LANDFILL CLOSURE PROGRAM
LANDFILL AREA MAP

DESIGNED	GJR	
DRAWN	GJR	
CHECKED		
DATE		8/4/20

DRAWING 7

ATTACHMENT 4

CLOSURE, POST-CLOSURE AND FINANCIAL ASSURACE

ERM

136 East South Temple
Suite 2150
Salt Lake City, UT 84111

Telephone: +1 801 204 4300
Fax: +1 801 595 8484

www.erm.com

22 October 2020

Joe Ozimek
Environmental Manager
McWane Ductile
2550 South Industrial Parkway
Provo, UT 84603
Joe.ozimek@mcwaneductile.com

Subject: McWane Ductile-Utah Closure, Post-Closure and Financial Assurance

Dear Joe,

ERM-West, Inc. (ERM) understands that McWane Ductile-Utah (MDU) is updating the Class IIIb landfill permit #0203 with the Utah Department of Environmental (UDEQ). The UDEQ has requested that MDU include the Life Cycle Evaluation (LFE) with this update.

As a part of the update to the permit, a survey was conducted by Anderson Engineering on July 7-8, 2020. The survey objectives included the following:

- Surface elevations to show landfill loading since the previous survey conducted in July 2017
- Establish revised boundaries for the extension of Phases 1 and 2 to the south
- Update the planned boundary of Phase 3

Following the survey, ERM calculated the area, volume, and life expectancy. These results are shown in the table below. A Landfill Capacity Evaluation was previously provided in the 2018 permit application. This has been updated based on the new design and the 2020 survey, which is provided as Attachment A.

Remaining area to close (Sq. Ft.)	457,000
Phases 1-2 Landfill Volume Remaining (Cu. Yd.)	372,000
Estimated Life Expectancy of Phases 1-2 (Years)	26
Approximate Year Life Expectancy is achieved	2047

Section 5.0 of the 2018 permit application (Closure Plan) has been updated and is provided as Attachment B.

ERM updated the Financial Assurance Cost Estimates based on the new survey and updated unit cost of slag cover provided by Crandall and the values listed in the table above. A 2017 Financial Assurance Cost Estimate was provided in the 2018 application. The updated Financial Assurance Cost Estimate is provided in Attachment C.

Figure 1 shows the final design of Phases 1 and 2 based on the new southern landfill boundary that has been overlaid on the July 2020 survey. Figure 2 shows the updated cross sections of Phases 1 and 2. Figure 3 shows the July 2020 survey data.

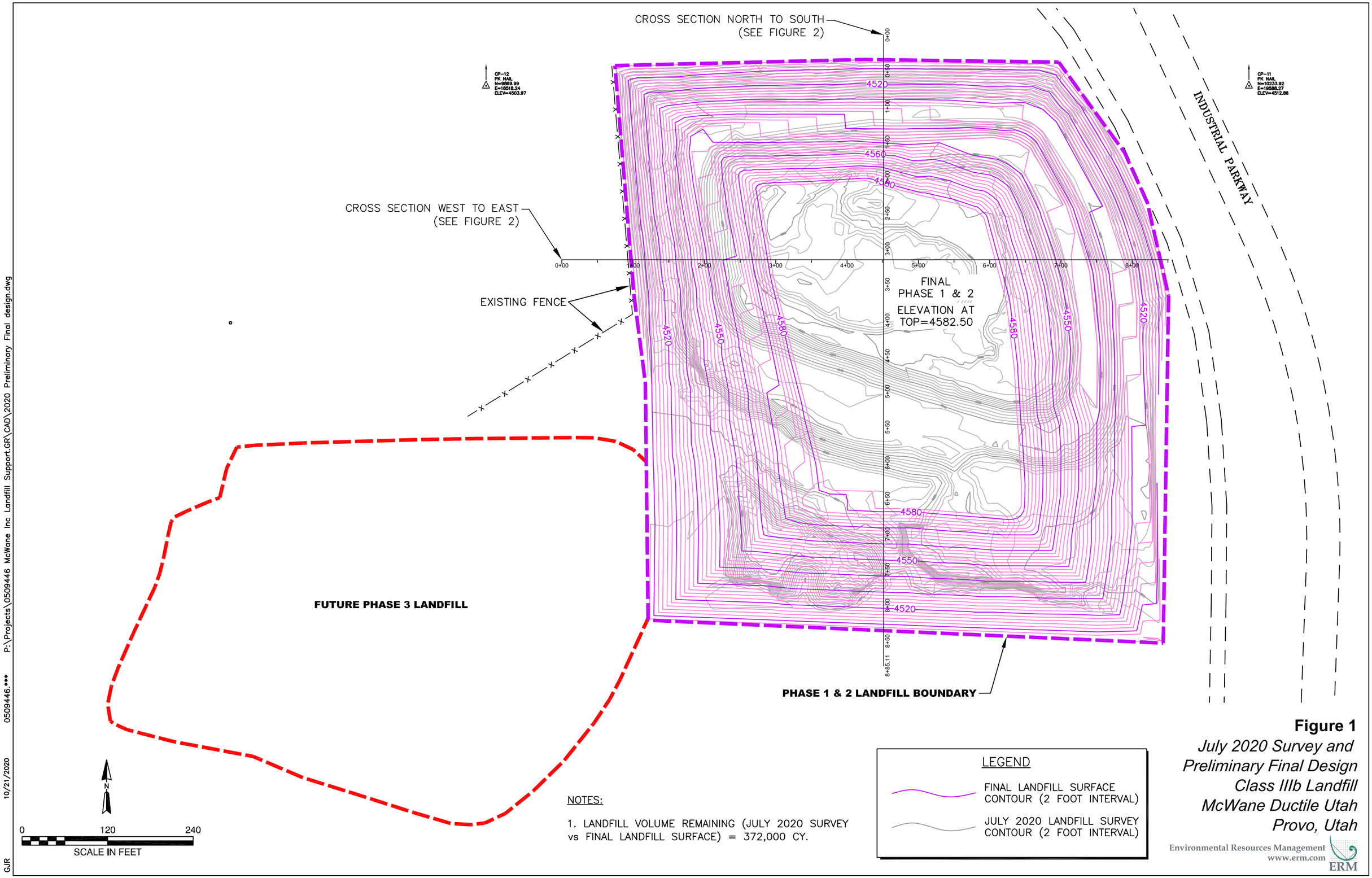
Please contact me if you have any questions.

Sincerely,

Suzy Smith

Suzy Smith, P.E,
Senior Consultant

FIGURES



NOTES:

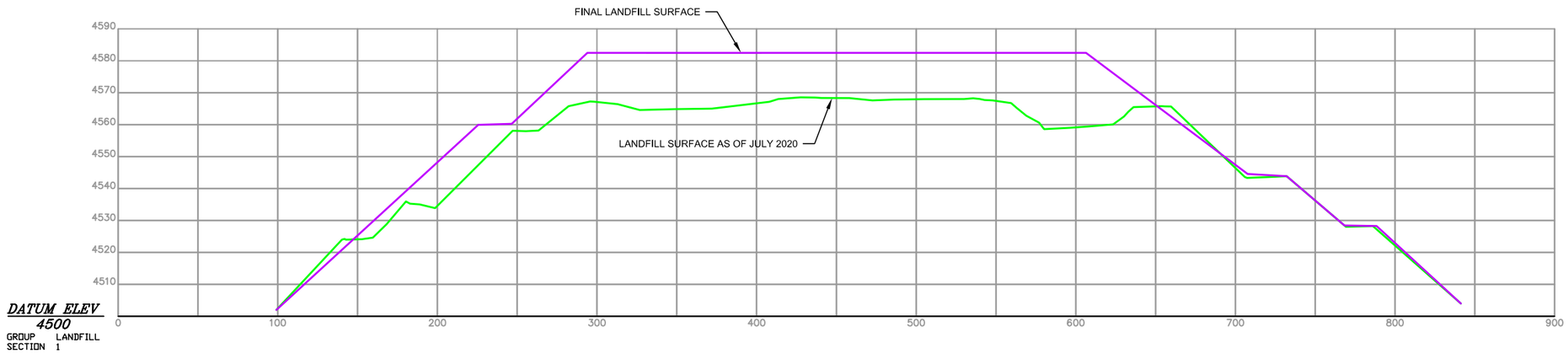
1. LANDFILL VOLUME REMAINING (JULY 2020 SURVEY vs FINAL LANDFILL SURFACE) = 372,000 CY.

Figure 1

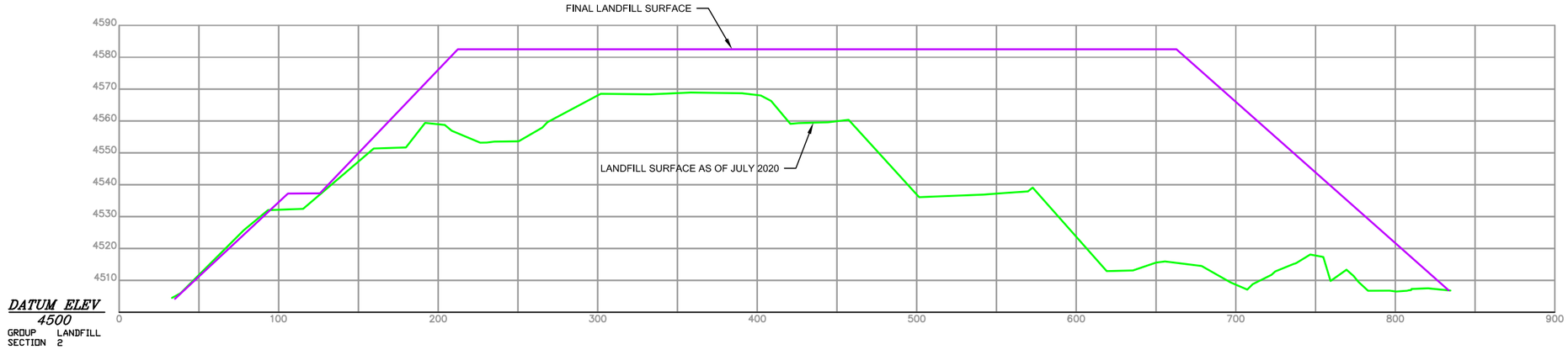
July 2020 Survey and Preliminary Final Design
Class IIIb Landfill
McWane Ductile Utah
Provo, Utah

Environmental Resources Management
www.erm.com
ERM

P:\Projects\0509446 McWane Inc Landfill Support.GR\CAD\2020 Preliminary Final design.dwg
0509446.***
10/21/2020
GJR



CROSS SECTION WEST TO EAST



CROSS SECTION NORTH TO SOUTH

PROFILE KEY

FINAL LANDFILL SU

LANDFILL SURFACI

N

0 80 160

HORIZONTAL SCALE IN FEET

Figure 2

Cross Sections

Class IIIb Landfill

McWane Ductile Utah

Provo, Utah

Environmental Resources Management
www.erm.com
ERM

P:\Projects\0509446 McWane Inc Landfill Support.GR\CAD\2020 Preliminary Final design.dwg

0509446.*** 10/21/2020 GJR

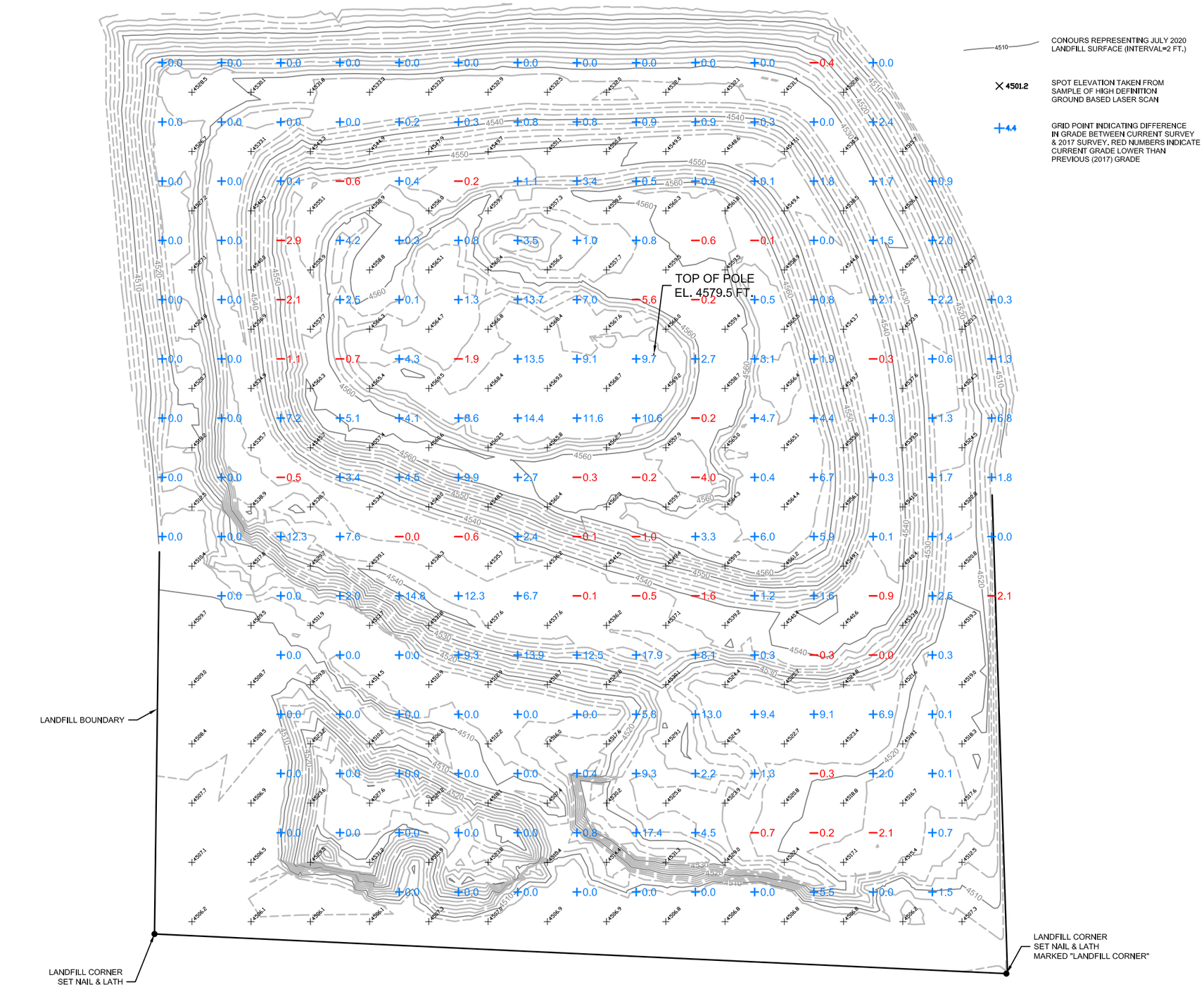


Figure 3
July 2020 Survey Data
Class IIIb Landfill
McWane Ductile Utah
Provo, Utah

Environmental Resources Management
www.erm.com
ERM

GJR 10/21/2020 0509446.*** P:\Projects\0509446 McWane Inc Landfill Support.GR\Survey – July 2020\2020-07-08 McWayne Landfill.dwg

ATTACHMENT A LANDFILL CAPACITY EVALUATION

Phase 1 & 2 Remaining Capacity and Estimated Date of Completion (Final Top Elevation = 4582.5)			
Date of Survey or Operation Period	**Calculated Material Placed (CY)**	**Estimated Volume Remaining (CY)[3]**	**Estimated Volume Remaining (Tons)[4]**
7/9/2020[1]		372,000	386,508
	Total Waste Placed to Date Will be updated at EOY 2020		
Phase 1 & 2 Completion [2]	**Estimated Years to Complete from 7/9/2020** 26.6	**Date** 2047	

Notes:

1. Based on an updated survey completed by Anderson Engineering Company, Inc. The total estimated capacity of Phases 1 and 2 is 600,500 CY.

2. Assumes placement of 14,000 CY of waste per year on Phases 1 & 2.

3. Recalculation of estimated volume remaining is based on extentions of Phases 1 & 2 to the south.

4. Site specific load conversions based on weighted density from landfill tracking data collected in 2015 and 2017.

ATTACHMENT B CLOSURE PLAN

5. CLOSURE PLAN

Final closure activities will be implemented upon complete filling of each disposal cell, except where future cells may abut one another. Some advanced closure work may be performed on completed slopes/surfaces when feasible. Closure of the landfill is designed to minimize the need for maintenance, minimize the potential effects of the landfill on the surrounding environment, and prepare the facility for the post-closure period.

5.1 CLOSURE SCHEDULE

The Class IIIb Landfill will be closed in phases as slopes and surface grading are completed on portions of the landfill that reach their proposed design heights. The sides of completed phases/cells will be graded and covered with slag set aside by the facility for cover material. During 2017, McWane Ductile Utah (MDU) performed partial closure of the north slope of Cells 1 and 2 as part of a pilot closure program to assess the effectiveness of the UDEQ approved alternative slag cover described below. The next phase of closure is currently anticipated after the Phase 1 and 2 cells are completed in approximately year 2047.

5.2 FINAL COVER AND GRADING

The MDU Class IIIb Landfill will be covered with slag material generated at the MDU facility. The slag will be placed after the waste has been contoured to the grades outlined in the engineering closure plan. The cover of the landfill will be constructed with approximately 2H:1V side slopes and a minimum 2% top slope.

This closure design is based on the set of alternatives for the slopes and cover that was approved by the UDEQ for the MDU Landfill during the prior renewal dated April 2, 2009, which was valid until March 31, 2019. An updated approval date is a part of the permit update and will be updated once the permit is finalized. The details of these alternatives are presented below.

5.2.1 EXEMPTION FROM FINAL COVER SLOPE

The existing final cover on the side slope of the existing landfill is approximately 2H:1V. Current Solid Waste Permitting and Management Rules, R315-303-3(4)(a)(i)(B) defines the maximum side slope as 33% except where construction integrity and integrity of erosion control can be demonstrated for a steeper slope. MDU has submitted a slope stability analysis for both static and seismic conditions that can be anticipated at the landfill. Both conditions have been analyzed along the lines of steepest slope (Approximately 1.5H:1V) using the soil conditions of the landfill. Based on calculations using the Simplified Bishop Method of Slices, the factor of safety was approximately 2.2 at the minimum. The pseudo-static safety factor for the critical failure surface on the north slope was greater than 1.0. These safety factors indicate that the steeper slopes will still maintain a stable landfill in both static and pseudo static conditions.

5.2.2 EXEMPTION FROM FINAL COVER MATERIAL

The proposed final cover material for this industrial landfill is slag material. Current Solid Waste Permitting and Management Rules, R315-303-3(4)(c)(ii) allows for an alternative final cover material providing that the alternative material provides equivalent protection from wind and water erosion as achieved by the standard final cover. The proposed use of iron slag on side slopes fulfills this requirement and has been approved by the Executive Secretary of the Solid and Hazardous Waste Control Board in the letter to PSCIPCO [now MDU] dated November 10, 2008.

The completed pilot closure program consisted of placement of 8 inches of slag on the north side of Phases 1 and 2 from the base of the landfill (i.e., toe of slope) up the slope approximately 130 feet, where waste placement was considered complete. The completed north slope is roughly 600 feet wide as designed (horizontally from west to east). The north slope comprises roughly 20 percent of the entire closure of Phases 1 and 2. The pilot area is identified on Figure 7 of this permit renewal application.

5.3 VOLUME CAPACITY

Based on the survey conducted in 2020, the total remaining volume capacity of the landfill area (Phases 1 and 2) is approximately 372,000 cubic yards (cy) based on a final elevation of 70 feet above grade. At an estimated waste generation rate of 14,000 cubic yards per year of waste, the life of the landfill is projected to be 26 years, which will be achieved in approximately year 2047. Attachment A shows the landfill capacity and estimated completion date for landfill Phases 1 and 2. The previous history and projections were a part of the 2018 permit application, however, with the extension of Phases 1 and 2 to the south, this has been updated.

Slag material is currently being placed as UDEQ-approved, inert base material on the current southern footprint of phase 1 and 2. MDU generates approximately 4,500 cubic yards of slag per year and this material is being placed to provide a 10-foot-thick inert buffer above the water table in this area.

5.4 COST ESTIMATE

The financial assurance cost estimate for the final closure and post-closure care of the Class IIIb Landfill are presented in Attachment C. The original description in Section 7 of the 2018 permit application still applies. These cost estimates are based on a worst case (largest area) requiring closure based on the open area of the landfill, minus the portion of the landfill closed under the 2017 pilot program. The closure activities are assumed to be administered by third-party entities and assumes MDU will not self-perform this work using its own equipment.

5.5 FINAL INSPECTION

The landfill operator will notify the Executive Secretary of its intent to implement the closure plan in whole or in part, 60 days prior to the projected final receipt of waste at the facility. The landfill will commence implementation of the closure plan within 30 days following receipt of the final volume of waste, or when the final elevation is attained for the current cell(s). Closure activities will be completed within 180 days of their commencement.

A final inspection of the landfill site will be performed at the termination of the landfill activities. The final inspection will determine if the landfill meets all the closure requirements outlined in the permit and closure plan. Inspection requirements of the closure plan will include: long-term operation of run-on and run-off controls (as appropriate), maintenance of proper final grade on the landfill to promote run-off, and control of access at the site (fencing).

Within 90 days of completion of closure activities, MDU will submit a certified document to the Executive Secretary, indicating that the facility has been closed in accordance with the approved closure plan. This document will include facility or closure plan sheets and record drawings.

5.6 RECORDING

Within 60 days following certification of closure, MDU will submit to the Utah County Recorder a plat and statement of fact concerning the location of the landfill. The Recorder will be instructed to include this information as part of the record of title. MDU will provide proof to the Executive Secretary that the record of title has been filed.

ATTACHMENT C FINANCIAL ASSURANCE COST ESTIMATE

2020 Closure Expenditures

$	**699,193.44**	**Closure Cost Estimate (2020)**
	$46,830.06	Crandall Excavating Costs to perform closure east face middle and top section (invoice dated 7/8/2020)
	$22,143.38	ERM Costs to perform third party oversight and inspections January 2020 through September 2020
$	**630,220.00**	**Balance of Closure Cost Estimate (2020)**
	$217,815.17	**Balance of Post-Closure Cost Estimate (2020)**
$	**848,035.17**	**Financial Assurance Amount to Provide to DEQ as part of 2020 Landfill Annual Report. The 2021 inflation factor is not accounted for in this calculation.**

Updated closure costs are based on updated Phases 1 and 2 designs and a survey conducted in July of 2020.

2020 Updated Worksheet for Calculating Closure and Post-closure Cost Estimates

Site data necessary to calculate estimates of closure and post-closure costs come from site conditions, plans and McWane/ERM experience.

Closure Cost Estimate

Facility Name: McWane Ductile Utah (MDU)

Permit Number: 0203, PSCIPCO Class IIIB landfill

	Task/Service	Quantity	Units	Multiplier	Unit Cost	Subtotal	
1	**Preliminary Site Work**						
a	Conduct Site Evaluation	1	Lump sum	acres	Included	Included	
b	Dispose Final Wastes					N/A	
c	Remove Temporary Building(s)					N/A	No temp bldgs at landfill site
d	Remove Equipment					N/A	No equipment stationed at landfill
e	Repair/Replace Perimeter Fencing	2,640	linear feet	1	$3.30	$8,712.00	ERM estimate (update w/Crandall input)
f	Clean Leachate Line(s)					N/A	No Leachate Lines
2	**Monitoring Equipment**						
a	Rework/Replace Monitoring Well(s)					N/A	Have no wells
b	Plug Abandoned Monitoring Well(s)					N/A	Have no wells
c	Rework/Replace Methane Probe(s)					N/A	Have no wells
d	Plug Abandoned Methane Probe(s)					N/A	Have no wells
e	Rework/Replace Remediation and/or Gas Control Equipment					N/A	Have no wells
3	**Construction**						
a	Complete Site Grading over landfill surface (Phases 1 and 2)	7	acres	Included	Included	Included	
b	Construct Final Cap						
c	Install 8-10" Slag Cover	457,000	square feet	1	$1.14	$520,980.00	Unit price of $1.14/square foot from Crandall Construction (includes grading). Square footage based on remaining surface area to close as of July 2020 survey
d	Install Geosynthetic Clay Liner Cap					N/A	Removed based on top cover evaluation of options after Pilot Closure Program in 2017

2020 Updated Worksheet for Calculating Closure and Post-closure Cost Estimates

Site data necessary to calculate estimates of closure and post-closure costs come from site conditions, plans and McWane/ERM experience.

Closure Cost Estimate

Facility Name: McWane Ductile Utah (MDU)

Permit Number: 0203, PSCIPCO Class IIIB landfill

	Task/Service	Quantity	Units	Multiplier	Unit Cost	Subtotal	
e	Add additional 8-10" Slag over GCL					N/A	Removed based on top cover evaluation of options after Pilot Closure Program in 2017
f	Construct Landfill Gas Venting Layer					N/A	
g	Place Sand or					N/A	
h	Install Net and Geotextile					N/A	
i	Install Passive Landfill Gas Vents					N/A	
j	Install Flexible Membrane Liner					N/A	
k	Drainage Layer					N/A	
l	Place Sand or					N/A	
m	Install Net and Geonet					N/A	
n	Place On-site Topsoil					N/A	
o	Place Off-site Topsoil					N/A	
p	Establish vegetative cover, including on- and off-site borrow areas					N/A	
4	**Drainage/erosion control**						
a	Construct Terraces					N/A	Built during landfill operation
b	Construct Letdown Channels					N/A	Precipitation infiltrates into course waste
c	Add Perimeter Drainage Ditches					N/A	Precipitation infiltrates into course waste
5	**Tasks Not Identified**						
6	**Subtotal**					**$529,692.00**	
7	**Administrative (Agency) Services**	1	lump sum	0.1	$529,692.00	$52,969.20	Multiplier from "Preparation of Solid Waste Facility Closure and Post-Closure Cost Estimates Guidance" from the UDEQ.
8	**Technical and Professional Services**	1	lump sum	0.12	$529,692.00	$63,563.04	Multiplier from "Preparation of Solid Waste Facility Closure and Post-Closure Cost Estimates Guidance" from the UDEQ.

2020 Updated Worksheet for Calculating Closure and Post-closure Cost Estimates

Site data necessary to calculate estimates of closure and post-closure costs come from site conditions, plans and McWane/ERM experience.

Closure Cost Estimate

Facility Name: McWane Ductile Utah (MDU)

Permit Number: 0203, PSCIPCO Class IIIB landfill

	Task/Service	Quantity	Units	Multiplier	Unit Cost	Subtotal	
9	**Closure Contingency**	1	lump sum	0.1	$529,692.00	$52,969.20	Multiplier from "Preparation of Solid Waste Facility Closure and Post-Closure Cost Estimates Guidance" from the UDEQ.
10	**Total Final Closure**					**$699,193.44**	

2020 Updated Worksheet for Calculating Closure and Post-closure Cost Estimates

Site data necessary to calculate estimates of closure and post-closure costs come from site conditions, plans and McWane/ERM experience.

Post-Closure Cost Estimate

Facility Name: McWane Ductile Utah (MDU)

Permit Number: 0203, PSCIPCO Class IIIB landfill

	Task/Service	Quantity	Units	Multiplier	Unit Cost[a]	Subtotal	
1	**Site maintenance**						
a	Site Inspections	4	per year	30	$620.00	$74,400.00	
b	General Maintenance					Included	Included with slag cover maintenance
c	Remediation and/or Gas Control Equipment					N/A	Not installed
2	**Monitoring equipment**						
a	Rework/Replace Monitoring Well(s)					N/A	None Installed and currently not required
b	Plug Abandoned Monitoring Well(s)					N/A	None Installed and currently not required
c	Final Plugging of Monitoring Wells					N/A	None Installed and currently not required
d	Rework/Replace Methane Probe(s)					N/A	None Installed and currently not required
e	Plug Abandoned Methane Probe(s)					N/A	None Installed and currently not required
f	Final Plugging of Methane Probes					N/A	None Installed and currently not required
g	Final Plugging of Piezometer(s)					N/A	
3	**Sampling and analysis**						
a	Groundwater Monitoring Wells					N/A	None Installed and currently not required
b	Methane Gas Probes					N/A	None Installed and currently not required
c	Surface Water Monitoring Points					N/A	Currently not required
d	Leachate					N/A	None Installed and currently not required
4	**Final cover maintenance**						

2020 Updated Worksheet for Calculating Closure and Post-closure Cost Estimates

Site data necessary to calculate estimates of closure and post-closure costs come from site conditions, plans and McWane/ERM experience.

Post-Closure Cost Estimate

Facility Name: McWane Ductile Utah (MDU)

Permit Number: 0203, PSCIPCO Class IIIB landfill

		Task/Service	Quantity	Units	Multiplier	Unit Cost[a]	Subtotal	
	a	Mow and Fertilize Vegetative Cover					N/A	
	b	Repair Erosion, Settlement, and Subsidence for Slag Cover	600,500	square feet	0.005	$1.14		600,500 Square Feet based on all sides and top of landfill (Phases I/II)
				30 Year	30		$102,685.50	Assumes 0.5% of landfill requires repairs on annual basis
	c	Repair Erosion, Settlement, and Subsidence for Off-site Soils					N/A	
	d	Reseed Vegetative Cover					N/A	
5		**Leachate management**						
	a	Clean Leachate Line(s)						None Installed and currently not required
	b	Maintain Leachate Collection System and Equipment					N/A	None Installed and currently not required None Installed and currently not required
	c	Collect, Treat, Transport, and Dispose of Leachate					N/A	None Installed and currently not required
6		**Tasks not identified (Contingency)**						
7		**Subtotal**					**$177,085.50**	
8		**Administrative (Agency) Services**	1	lump sum	0.06	$177,085.50	$10,625.13	Multiplier from "Preparation of Solid Waste Facility Closure and Post-Closure Cost Estimates Guidance" from the UDEQ.
9		**Technical and Professional Services**	1	lump sum	0.07	$177,085.50	$12,395.99	Multiplier from "Preparation of Solid Waste Facility Closure and Post-Closure Cost Estimates Guidance" from the UDEQ.
10		**Post-closure Contingency**	1	lump sum	0.1	$177,085.50	$17,708.55	Multiplier from "Preparation of Solid Waste Facility Closure and Post-Closure Cost Estimates Guidance" from the UDEQ.
11		**Total Post-closure**					**$217,815.17**	

[a] Unit price for quarterly site inspections based on ERM Pilot Closure Plan; cost per event based on 4 hours at $110/hour, 0.5 hour at $254, 10% direct costs.