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Operations Supervisor
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Delta, UT 84624
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Millard County Solid Waste Division

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SW174

LuAnne Miller, Office Manager
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Div of Waste Management
and Radiation Control

MAY - 2 2018

DSHW-2018-003867

April 30, 2018

Scott T. Anderson, Director
Department of Environmental Quality
Division of Solid and Hazardous Waste
P.O. Box 144880
Salt Lake City, Utah 84114-4880

RE: Application for Renewal of Permit # 9712

Dear Mr. Anderson:

Please find enclosed Millard County Application for Renewal of Fillmore Class IVb Landfill Permit # 9712 which expires May 31, 2018. This Landfill is located approximately one mile northeast of Fillmore in Millard County.

I look forward to your response to the application. Please advise if further action or amendments to the application are needed. Thank you.

Sincerely,

LuAnne Miller

LuAnne Miller
Landfill Office Manager

lm

cc: John Higgins, Landfill Operations Supervisor
Wayne Jackson , Commission Chair

Div of Waste Management
and Radiation Control

MAY - 2 2018

APPLICATION FOR RENEWAL OF PERMIT # 9712 TO OPERATE A CLASS IVb MUNICIPAL SOLID WASTE FACILITY *at the* FILLMORE LANDFILL *Millard County, Utah*

Prepared by:
John Higgins
Landfill Operations Supervisor

LuAnne Miller
Landfill Office Manager

Millard County
71 South 200 West
Delta, Utah 84624
(435) 864-1400

April 2018

Appendices Prepared by
Vector Engineering, Inc.
1601 Fairview Avenue, Suite H
Carson City, Nevada 89701
(702) 883-7065
Project No. 945013.02
August 1997

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TR55 Results - Final Site Conditions ..... attached
FlowMaster - Final Site Conditions ..... attached

Utah Class IV and VI Landfill Permit Application Form

Part I General Information APPLICANT: PLEASE COMPLETE ALL SECTIONS.

I. Landfill Type	☐ Class IVa ☒ Class IVb ☐ Class VI	**II. Application Type**	☐ New Application ☐ Facility Expansion ☒ Renewal Application ☐ Modification

For Renewal Applications, Facility Expansion Applications and Modifications Enter Current Permit Number 9712R3

III. Facility Name and Location

Name of Facility: Fillmore Landfill

Site Address (street or directions to site): Approx .7 miles east of Highway 91, and northeast of Fillmore

County: Millard

City: Fillmore | Zip Code: 84631 | Telephone:

Township: 21 S | Range: 4 W | Section(s): 16 | Quarter/Quarter Section: SE | Quarter Section:

Main Gate Latitude: degrees 38 minutes 58 seconds 45 | Longitude: degrees 112 minutes 18 seconds 12

IV. Facility Owner(s) Information

Name of Facility Owner: Millard County

Address (mailing): 71 South 200 West, PO Box 854

City: Delta | State: UT | Zip Code: 84624 | Telephone: 435-864-1400

V. Facility Operator(s) Information

Name of Facility Operator: Millard County

Address (mailing): 71 South 200 West, PO Box 854

City: Delta | State: UT | Zip Code: 84624 | Telephone: 435-864-1400

VI. Property Owner(s) Information

Name of Property Owner: Fillmore City

Address (mailing): 75 West Center, PO Box 687

City: Fillmore | State: UT | Zip Code: 84624 | Telephone: 435-743-5233

VII. Contact Information

Owner Contact: John Higgins | Title: Landfill Operations Supervisor

Address (mailing): PO Box 854

City: Delta | State: UT | Zip Code: 84624 | Telephone: 435-864-2297

Email Address: jhiggins@co.millard.ut.us | Alternative Telephone (cell or other): 435-253-0820

Operator Contact: Same as Owner Contact info | Title:

Address (mailing):

City: | State: | Zip Code: | Telephone:

Email Address: | Alternative Telephone (cell or other):

Property Owner Contact: Michael D Holt | Title: Mayor

Address (mailing): 75 West Center, PO Box 687

City: Fillmore | State: UT | Zip Code: 84631 | Telephone: 435-743-5233

Email Address: recorder@fillmorecity.org | Alternative Telephone (cell or other):

Utah Class IV and VI Landfill Permit Application Form

Part I General Information (Continued)

VIII. Waste Types (check all that apply)

☐ Landfill will accept all wastes allowed in Class IV or VI landfills **Or** landfill will accept only the following wastes

Waste Type	Combined Disposal Unit	Monofill Unit
☒ Construction & Demolition	☐	☐
☐ Tires	☐	☐
☒ Yard Waste	☐	☐
☒ Animals	☐	☐
☒ Contaminated Soil	☐	☐
☐ Other _____	☐	☐

Note: Disposal of dead animals must be approved by the Director

IX. Facility Area

Facility Area	40	acres
Disposal Area	16	acres
Design Capacity		
Years	28	
Cubic Yards	185000	
Tons	22400	

X. Fee and Application Documents

Indicate Documents Attached To This Application ☐ Application Fee: Amount $

☒ Facility Map or Maps ☒ Facility Legal Description ☒ Plan of Operation ☒ Waste Description
☒ Ground Water Report ☒ Closure Design ☒ Cost Estimates ☒ Financial Assurance

Class VI Special Requirements
☐ Documents required by UCA 19-6-108(9) and (10)

I HEREBY CERTIFY THAT THIS INFORMATION AND ALL ATTACHED PAGES ARE CORRECT AND COMPLETE.

Signature of Authorized Owner Representative: John Higgins John Higgins Name typed or printed	Title: Landfill Operations Supervisor Address: 71 S 200 W, PO Box 854 Delta, UT 84624	Date: 11/26/18
Email Address: jhiggins@co.millard.ut.jus	Alternative Telephone (cell or other): 435-864-1400	
Signature of Authorized Land Owner Representative (if applicable): Michael D Holt Michael D Holt Name typed or printed	Title: Fillmore City Mayor Address: 75 W Center, PO Box 687 Fillmore, UT 84631	Date: 11/26/18
Email Address: recorder@fillmorecity.org	Alternative Telephone (cell or other): 435-743-5233	
Signature of Authorized Operator Representative (if applicable): John Higgins John Higgins Name typed or printed	Title: Landfill Operations Supervisor Address: 71 S 200 W, PO Box 854 Delta, UT 84624	Date: 11/26/18
Email Address: jhiggins@co.millard.ut.us	Alternative Telephone (cell or other): 435-864-1400	

PART I - GENERAL DATA

EXECUTIVE SUMMARY

The Fillmore Class IVb Landfill is located approximately .7 miles east of Highway 91, and northeast of Fillmore (550 North 500 East, Fillmore) in Millard County and serves the residents and businesses of east Millard County. The landfill is an existing Class IVb facility which must be in regulatory compliance with the Utah Solid Waste Permitting and Management Regulations (Utah Administrative Code R315-301-320) prior to April 1, 1995. Based on the information presented in this renewal application, Millard County requests that renewal of the Permit to Operate a Class IVb Landfill be granted by the Utah Department of Environmental Quality for the continued operation of the Fillmore Landfill.

Please refer to Millard County's application for renewal of a Permit to Operate a Class IVb municipal solid waste disposal facility at the Fillmore Landfill, which consists of a Plan of Operation, Closure and Post-Closure Plans, a Geohydrological Assessment, and Engineering Report. The application was prepared in accordance with R315-310 of the Utah Administrative Code, and the outline contained in the Application for a Permit to Operate a Class IVb Landfill provided by the Utah Department of Environmental Quality.

UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY

DIVISION OF SOLID AND HAZARDOUS WASTE

APPLICATION FOR A PERMIT RENEWAL TO OPERATE A CLASS IVb LANDFILL

1. **Name of Facility:** Fillmore Class IVb Landfill

2. **Site Location:** S ½ of the S ½ , of the Southeast 1/4 of Section 16, Township 21 South, Range 4 West, Salt Lake Base and Meridian, Millard County, Utah. (Lat. 38° 58' 45" N, Long. 112° 18' 12" W)

3. **Facility Owner:** Millard County

4. **Contact Person:**

John Higgins
Landfill Operations Supervisor

LuAnne Miller
Landfill Office Manager

71 South 200 West
Delta, Utah 84624
Phone: (435) 864-1400
Fax: (435) 864-1404
e-mail: lmiller@co.millard.ut.us

5. **Type of Facility:**

[ ] Class I Landfill
[ ] Class V Landfill
[x] Class IV Landfill

[ ] Initial Application
[x] Permit Renewal
Original Permit Number **9712**

6. **Property Ownership:**

[x] Fillmore City

7. Certification of Submitted Information:

Official: Wayne Jackson
Title: Chairman, Millard County Commission

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: Wayne Jackson
Wayne Jackson, Commission Chair

Date: 04-30-2018

SUBSCRIBED AND SWORN to before me this 30 day of April, 2018.

LuAnne F Miller

My Commission Expires 6/20/21

LuAnne F. Miller
Notary Public
State of Utah
My Commission Expires 06/20/2021
COMMISSION NUMBER 695214

PART II - GENERAL REPORT

1.0 FACILITY INFORMATION

The Fillmore Class IVb Landfill is an existing solid waste disposal facility, located in Millard County, Utah. The landfill currently serves the towns of Fillmore, Meadow, Kanosh, and Flowell, and accepts construction demolition waste, yard waste, inert waste and dead animals. This *Application for Renewal of a Permit to Operate a Class IV Disposal Facility* at the Fillmore Landfill has been prepared in accordance with applicable State of Utah solid waste regulations. This section will provide information regarding ownership, facility description and location, land use and zoning, waste stream characteristics, and facility administration. Figures depicting existing and planned site facilities are enclosed in Appendix 1 of this document.

1.1 Owner and Operator Information

The property on which the Fillmore Landfill is located is owned by the City of Fillmore, Utah. Millard County assumed daily operations of the facility in 1986 under an agreement with the City of Fillmore. Millard County leases the landfill property from the City of Fillmore; a copy of the lease agreement is included in Appendix 2 of this application. The name, address, and telephone number of the contact person at the City of Fillmore regarding site ownership is as follows:

Mayor Michael D. Holt
Fillmore City
75 West Center
PO Box 687
Fillmore, Utah 84631
Phone (435) 743-5233
Fax (435) 743-5195
e-mail: recorder@fillmorecity.org

Daily operations of the landfill are performed under the supervision of John Higgins, Landfill Operations Supervisor. LuAnne Miller, Landfill Office Manager, is responsible for

assisting with administration of Landfill operations. Mr. Higgins and Ms. Miller can be reached with the following addresses and telephone numbers:

John Higgins
Millard County Landfill
2250 S Highway 50
Delta, UT 84624
Phone: 435-864-2297
Email: jhiggins@co.millard.ut.us

LuAnne Miller
Millard County Offices
71 South 200 West
Delta, UT 84624
Phone: 435-864-1405
Fax: 435-864-1404
Email: lmiller@co.millard.ut.us

1.2 Site Location

The Fillmore Class IVb Landfill is located in the northeast sector of the City of Fillmore, approximately 0.7 miles east of Highway 91, in Millard County, Utah. The facility is located on 40 acres of land described in the public land survey as the S ½, S ½, SE 1/4, sec. 16, T21S, R4W, SLB&M. Entrance to the site is approximately located at latitude 38°58'45"N and longitude 112°18'12"W. The location of the City of Fillmore in relation to state and county borders is presented on Figure 1, Site Vicinity Map, included in Appendix 1. Figure 2, Site Location Map, delineates site property boundaries and facility location with respect to the City of Fillmore.

Pursuant to the provisions set forth in section $315-305-2 of the Utah Administrative Code (UAC), a Class IV landfill facility is not subject to the general location standards established for landfills as provided in section R315-302-1 of the UAC.

1.3 Land Use and Zoning

The landfill site is within County zoning boundaries designated as AG-20, Agricultural-20 acre. Use of the site for landfilling purposes is a pre-existing, non-conforming legal use for the AG-20 zoning classification. Surrounding land use is primarily for agricultural and open range purposes. The current Zoning Ordinance was adopted during the 2013 calendar year. Land within one-half mile of facility property boundaries to the north, south, east, and west is also designated with the AG-20 zoning classification. Zoning boundaries and classifications within three miles of the facility property boundaries are delineated in Figure 3, Fillmore Zoning Map, enclosed in Appendix 1.

1.4 Facility Description

The Fillmore Class IVb Landfill accepts construction and demolition waste for disposal along with wood and yard waste. In addition, scrap metals, are accepted and stockpiled adjacent to the site access road for salvage operations. Stockpiles and other existing site features, including topography, are identified on the enclosed Figure 4 (Appendix 1), Existing Facilities Plan. Discussion related to facility waste characteristics and disposal practices are presented in the enclosed Plan of Operation.

Waste placement at the landfill currently takes place at the westernmost portion of the site. Waste has historically been placed within the topographic boundaries of a northwester-trending ravine that crosses the western quarter of the site. A flat, elevated pad extending from the main road has been built up over time; waste accepted for disposal is compacted on the west-facing slope, resulting in a fill surface that progresses westward (Figure 4, Appendix 1). Soil cover is obtained from an on-site borrow source located east of the main access road. An upper access road provides a separate site entrance and access to the dead animal pit. This upper access road will provide site access for future disposal areas once facility operations are completed in the western portion of the site and are relocated to the east.

1.5 Waste Stream Characteristics

The Fillmore Class IVb Landfill provides waste disposal capacity for residents from the towns of Fillmore, Meadow, Kanosh, and Flowell. Pursuant to 2016 U.S. Bureau Intercensal Estimates, the approximate population of Fillmore, Meadow, Kanosh, Flowell and the surrounding area is 3272 people. Population growth projections developed by the State of Utah estimate an annual average growth rate of approximately 0.9 percent between 2015 and 2023.

Disposal rate estimates made in the *Millard County Solid Waste Management Plan* (Stansbury, 1993) predicted that the facility would receive approximately 480 tons per year. The current average tonnage received at the Fillmore Landfill is approximately 800 tons per year. Reports indicate that the site is receiving an average 5.22 tons per day.

The Fillmore Landfill will remain a Class IVb facility and will be operated in compliance with the regulations for a Class IVb waste landfill facility, as described in the enclosed Plan of Operation. Waste accepted for disposal at the site is comprised solely of inert waste, construction and demolition debris, wood and yard waste, and dead animals. Metals are also accepted at the site and temporarily stockpiled until arrangements for removal are made with a salvage contractor. Excluded wastes include, but are not limited to, household and commercial wastes, industrial wastes, liquids, sewage sludge, hazardous materials, contaminated soils, grease, and waste oils.

The volume of waste delivered by each incoming waste load is estimated by the site attendant prior to disposal. Although the incoming waste volume averages approximately eight cubic yards per day, much of the waste stream is comprised of wood and yard waste, white goods, dead animals, or other wastes that are either stockpiled for future recovery, removal, or other handling. As a result, it is estimated that approximately four cubic yards of waste is disposed in the working face on an average day.

1.6 County Recorder

In accordance with UAC R315-302-2(6), the location and nature of the landfill site will be recorded as part of the record of title with the County Recorder no later than 60 days after certification of closure. If required by local authorities, records may also include information regarding the dates of landfill operation, the amount of solid waste disposed at the site, and the location of disposal areas.

2.0 PLAN OF OPERATION

Millard County is submitting the following Plan of Operation for a Class IVb solid waste disposal facility at the Fillmore Landfill, as required by the general provisions for solid waste disposal defined in UAC R315-310-3 and R315-302-2(2). This Plan of Operation presents the general procedures for handling of various types of wastes which are either prohibited or accepted for disposal at the facility; the intended schedule of landfill construction, inspections and maintenance; fire control and contingency plans in the event of a fire or explosion; litter prevention; procedures for controlling disease vectors; general training and safety plan for site personnel; and, other information pertaining to the operation and maintenance of the facility. Information related to closure construction, post-closure maintenance care, and financial assurance is presented in Sections 4.0, 5.0 and 6.0, respectively, of this permit application.

2.1 Construction Schedule

The Fillmore Landfill utilizes the area fill method for solid waste disposal. As discussed in Section 1.4, above, waste placement at the landfill currently takes place at the westernmost portion of the site. Waste has historically been placed within the topographic boundaries of a northwest-trending ravine that crosses the western quarter of the site. A flat, elevated pad extending from the main road has been built up over time; waste accepted for disposal is compacted on the west-facing slope, resulting in a fill that progresses westward. Soil cover is obtained from an on-site borrow source located to the east of the main access road. An upper access road provides a separate site entrance and access to the dead animal disposal pit. Existing site condition, including the location of in-place waste and temporary stockpiles, is presented on Figure 4, Existing Facilities Plan (Appendix 1).

Once the current lift reaches its western limits, waste placement will commence against the eastern slope of the existing soil borrow area. Fill will then progress to the west and north with a 10-foot high lift over the top deck of the existing waste disposal area. Daily cover will be obtained by expanding the soil borrow area north of the existing pit. Following completion of the lift, another lift will then be constructed against the eastern slopes of the cell and progress in the same fashion as the previous until final grades are reached. The proposed final grades are

presented on Figure 5, Final Grading Plan (Appendix 1). The maintenance bench, access road, and drainage facilities will be constructed during the operational life of the facility as the appropriate grades are reached during fill progression.

When waste fill in the western portion of the site reaches the crest defined by the eastern fence line and upper access road, waste placement will then progress toward the east and north. Site operations will continue utilizing the area fill method of disposal. The existing upper access road will provide site access for future disposal areas once facility operations are completed in the western portion of the site and are relocated to the east. The eastern portion of the site will be completed in the same manner as that in the western portion, with a series of 10-foot high lifts that progress from the southwest toward the northeast. The low ridge located at the northeastern corner of the site will be excavated over time to provide additional disposal capacity and a source for cover soil. The limits of excavation are identified on Figure 4, Existing Facilities Plan, and Figure 6, Cross Section A-A' (Appendix 1).

Given the current waste disposal rate and growth projections discussed in Section 1.5 of this document, and assuming a waste-to-soil cover ratio of approximately 10:1, the remaining site life and construction schedule of individual disposal lifts can be calculated. The projected remaining volume in the current lift is approximately 27,000 cubic yard, which will require approximately 7 years to complete. Therefore, construction of the 10–foot lift over the current disposal area is expected to commence sometime in the year 2025. With an estimated 185,000 cubic yards available for disposal, the subsequent lift extending from the eastern edge of the existing soil borrow pit west over the top deck of the existing waste disposal area is expected to continue receiving waste until the year 2046. A table presenting the loading rate calculations is included in Appendix 3.

2.2 Hours of Operation

The hours for the Landfill are Monday, Friday, and Saturday 8:30 a.m. to 12:30 p.m. and 1:30 p.m. to 5:30 p.m.

The Landfill will be closed on all major holidays, including Christmas, New Year's Day, Thanksgiving and the day after, President's Day, Independence Day, Labor Day, Veteran's Day, Memorial Day, and Civil Rights Day. Signs will be posted at the entrance to the facility and will convey the hours of operation, owner and operator of the site, materials accepted and excluded, and fees charged.

2.3 Site Personnel and Equipment

UAC R305-303-5(2) requires at least one person on-site for landfills with a permitted capacity of less than 15,000 tons per year. The Fillmore Landfill will have one site attendant present during all hours of operation and one equipment operator, who will be on-site once a week, or as needed. The Landfill Operations Supervisor will periodically visit the site and will be available for consultation during operating hours. The Landfill Operations Supervisor is John Higgins, Supervisor of the Millard County Landfill. In the event of an emergency, Mr. Higgins should be notified. He can be reached at the following address and telephone numbers:

Millard County Class I Landfill 2250 S Highway 50 Delta, Utah 84624	Landfill: (435) 864-2297 Cell: (435) 253-0820

If Mr. Higgins is unavailable or if a situation requires further attention, the Sheriff's Office or the Fillmore Volunteer Fire Department should be notified by calling 911. Equipment currently utilized at the Fillmore Solid Waste Landfill includes a track dozer and a backhoe. If additional equipment is needed, it can be obtained from the Millard County Road Department or transported from the Millard County Landfill located in Delta, Utah.

2.4 Access Control

Pursuant to UAC R315-303-4(6a), and owner or operator shall provide fencing at the property or unit boundary, or use other artificial or natural barriers to impede unauthorized entry by the public and large animals. There is currently a lockable gate at the entry to the landfill. The landfill gate will be locked during all non-operating hours. An attendant will be on duty at the landfill during all operating hours. A perimeter fence has been installed along the full boundary of the disposal area, as delineated on the enclosed plan set (Appendix 1, Figure 4).

2.5 Waste Handling Procedures

Pursuant to UAC R315-302-2, the Plan of Operation provides for a description of on-site solid waste handling procedures during the active life of the facility. The waste accepted at the Fillmore Landfill is comprised of inert waste, construction and demolition debris, yard waste, and dead animals. Excluded wastes include, but are not limited to, industrial wastes, liquids, sewage sludge, hazardous materials, household and commercial wastes, contaminated soils, grease, and waste oils.

The quantity of incoming waste is visually estimated and recorded by landfill personnel stationed at the facility entrance. Daily logs of all incoming waste are maintained and will be entered into the operating record.

2.5.1 Construction and Demolition Debris

Construction and demolition (C&D) debris must be nonhazardous in order to be accepted; C&D debris includes items such as brick, rock, concrete, asphalt, and wall board. All C&D debris is deposited at the active disposal face and periodically compacted, separated, and covered with soil to prevent uncontrolled fires, rodent or vector harborage, and differential settlement.

2.5.2 Yard Waste

Yard waste is a general term used to refer to vegetative wastes, which may include cuttings from trees and brush, grass clippings, straw and hay, and waste from seasonal or special events. Grass clippings, leaves and similar wastes are disposed of with construction and demolition debris. Open burning of stockpiled tree limbs and woody yard waste will take place twice per year in accordance with Air Quality Rules Subsection R307-1-2.4((B)(5). Prior to any open burning, Millard County Solid Waste Department will obtain a permit from the Fillmore City Fire Department (Millard County Fire District) and the Millard County Sheriff's Office.

2.5.3 Dead Animals

Dead animals are deposited in a separate disposal area away from the active disposal face (Appendix 1, Figure 4). Dead animals are covered at the end of the operating day received with a minimum of six inches of soil. The location of the dead animal disposal trench is indicated at the landfill by a directional sign.

2.5.4 Tires

No tires are accepted at the Fillmore Class IVb Landfill effective March 10, 2003.

2.6 Prohibited Waste Exclusion Program

Wastes which are prohibited from disposal at the Fillmore Landfill include, but are not limited to, industrial wastes, liquids, sewage sludge, hazardous materials, household and commercial wastes, contaminated soils, grease trappings, and waste oils. Pursuant to UAC R315-303-5(7), and owner or operator shall not knowingly dispose, treat, store, otherwise handle hazardous waste or waste containing polychlorinated biphenyl (PCB). An owner or operator of a landfill shall include and implement as part of the plan of operation a plan that will inspect loads or take other steps, as approved by the Executive Secretary, which will prevent the disposal of hazardous waste or waste containing PCB's. These procedures include random load inspections, records of maintenance, training of facility personnel, handling procedures for hazardous and PCB wastes, and notification of the solid waste management authority.

2.6.1 Random Inspection of Incoming Loads

Each incoming load will be visually inspected by the landfill attendant to identify the nature of the waste intended for disposal and to estimate the total volume of the load. Incoming loads will be randomly selected for a more detailed inspection by the landfill attendant who will be trained and qualified to identify regulated hazardous waste or PCB waste. Selected loads will be discharged near the active disposal area, spread with a dozer, and inspected for free liquids and hazardous or PCB wastes. Loads which are suspected of containing a high liquid content will be tested on-site by Environmental Protection Agency (EPA) Method 9095, paint filter test. All on-site employees know how to conduct the paint filter test. Any loads failing the test will be rejected. When a load is suspected of containing unacceptable materials, a load inspection and decision determining whether the suspect material can be accepted for disposal may be made according to the following procedure:

- the waste will be unloaded in an area near, but not immediately adjacent to, the active face;
- the hauler will be required to wait until the content of the load is verified;
- the waste will be carefully spread for observation using a dozer or front end loader;
- containers with contents that are not easily identifiable, such as unmarked 55-gallon drums, will be separated if a visual inspection determines that movement will not cause the drum to rupture, and will be opened and inspected only by properly trained personnel, and;
- if the waste is determined to be acceptable, it may be transferred to the working face for disposal.

Tests for characteristics of hazardous wastes typically include TCLP (Toxicity Characteristic Leaching Procedure (US EPA) and tests for corrosiveness, flammability, and reactivity. Until proven otherwise, wastes that are suspected of being hazardous are handled and stored as a hazardous waste. If waste temporarily stored at the site is determined to be hazardous, and the origin of the waste is unknown, the operator will immediately contact the Fillmore Volunteer Fire Department, which will be responsible for the proper management of the waste. If the hazardous waste is to be transported from the facility, it must be stored at the landfill in accordance with requirements of a hazardous waste generator, manifested, transported

by a licensed transporter, and disposed of at a permitted treatment, storage, or disposal (TSD) facility.

2.6.2 Records of Inspection

Records of random load inspections will be maintained in the facility operating records and made available to Utah Department of Environmental Quality (UDEQ) upon request. The "Daily Activity Log" form, contained in Appendix 4, will be used to record information obtained during each inspection. Inspection records will include, but are not limited to the date and time waste loads were received and inspected, source or generator of the wastes, vehicle and driver identification, observations made by the inspector, description of rejected loads, and rationale for rejection.

2.6.3 Training of Facility Personnel

All facility personnel will be trained in the identification of containers and labels typically used for hazardous and PCB wastes. Training for hazardous material screening procedure will address hazardous waste handling, safety precautions, and record keeping requirements. Documentation of personnel training will be included with the operation records for the facility.

Safety/Training meetings are held on a monthly basis and solid waste inspectors attend SWANA (Solid Waste Association of North America) training courses as offered through the state organization.

2.6.4 Procedures for Handling Hazardous and PCB Waste

If primary load inspections reveal the presence of regulated quantities of hazardous or PCB wastes on incoming haul vehicles, the landfill attendant will refuse to accept the load and UDEQ will be notified. If regulated quantities of hazardous or PCB wastes are identified during secondary load checks, random inspections, or at any other time, and cannot be traced to the original hauler, the Fillmore Volunteer Fire Department will be notified. The Fillmore Volunteer Fire Department, acting as the first responder for hazardous materials, will implement their Hazardous Materials Response Plan. Any subsequent activities related to the waste load, including transportation, storage, and containment will be managed by the Fillmore Volunteer Fire Department. Landfill personnel will participate in these activities only as directed by the fire department. Following notification, it will be the responsibility of the fire department to ensure that the hazardous materials are handled, stored, or transported in accordance with applicable federal and state regulations.

In the event that PCB wastes are identified on-site, the Fillmore Volunteer Fire Department or Millard County Regional Landfill personnel will temporarily store and ensure disposal of the waste as required by 40 CFR Part 761, while completing the following activities:

- an EPA PCB identification number will be obtained;
- the PCB waste will be properly stored until transport;
- the containers will be properly marked with the words "Caution: Contains PCB's," and;
- the container will be manifested for shipment to a permitted disposal facility

If waste is transported off-site by a hazardous waste disposal company, a provisional or one-time U.S. EPA identification number will be obtained, the waste will be packaged according to applicable Department of Transportation regulations, and the container will be properly transported and manifested to its point of destination. Proper chain of custody and manifest documents will be obtained from the hazardous materials disposal facility in order to maintain compliance with all applicable federal and state regulations.

2.6.5 Notification of the Solid Waste Management Authority

The landfill operator will notify UDEQ within 24 hours if suspected hazardous materials or PCB wastes are discovered at the landfill. A record of notification will be submitted to UDEQ which identifies the date and time of discovery, type of material (if possible without analytical testing), probable hauler, an estimate of the quantity of material, and actions proposed for the removal of the material from the area of discovery. The record of notification will be entered into the operating record maintained at the facility.

2.7 Environmental Monitoring Systems

UAC R315-303-4 and R315-305-2 state that owners or operators of a Class IV solid waste landfill must design, construct, and maintain run-on and run-off structures to control the peak discharge from a 24-hour, 25-year storm event. Drainage areas and run-off patterns at the site through final closure, details of the structures used for run-on and run-off control, and engineering design calculations used to determine flow volume and appropriate sizes of drainage structures are contained in the Engineering Report for the Fillmore Landfill. The report is included in this *Application for Renewal of a Permit to Operate* the site, and is maintained in the operating record for the landfill.

Construction of the surface water control devices described in the Engineering Report, in conjunction with dry waste management practices, daily cover, and compaction of solid wastes, and the application of daily and interim cover, increases the protection of waters of the State from a discharge of pollutants or contaminants during landfill operation. The surface water control devices and operational practices will be modified if it is determined that discharges from the site contain pollutants or contaminants which may degrade waters of the State.

2.8 Nuisance Control

The Fillmore Landfill will be operated in a manner which does not create odors, unsightliness, or other nuisances. The working face will be kept as narrow as possible while remaining consistent with safe and efficient equipment operation. Bulky waste material will not be used for the final surface of side slopes. During construction of each disposal cell, waste will

be spread into layers not exceeding two feet in thickness, and compacted (if possible) with appropriately-sized equipment. The equipment will make a minimum of two passes over each waste layer.

Pursuant to UAC R315-303-5(4), a minimum of six inches of compacted earthen material will be used to cover the solid waste at a frequency which is sufficient to prevent the uncontrolled migration of fires. However, six inches of cover material will be spread over the exposed waste surface no less than once per week. If necessary, waste will be covered more frequently to control disease vectors, fires, odors, and litter. If a fill surface other than a final fill surface is not expected to receive waste for a period of time in excess of 90 days, an intermediate cover will be placed on that surface. Intermediate cover will be a layer of native soil with a minimum thickness of 12 inches. The integrity of daily and intermediate cover will be maintained until filling is resumed or final cover is constructed. Routine visual inspections of the cover material will be made, and all erosion surfaces, cracks, and depressions will be repaired as soon as is practicable. Both daily and intermediate cover will be uniformly graded to promote drainage of surface water. All slopes will have a grade of not less than three percent.

2.8.1 Vector Control Program

Pursuant to UAC R315-303-5(4), appropriate control and prevention of disease vectors at the Fillmore Landfill will be used for the protection of public health and safety. Control and prevention are accomplished using techniques appropriate for the protection of public health and safety and the environment. Compaction and grading of waste at the active face prevents vector harborage in the waste mass. A minimum of six inches of cover material is applied to the working face at least once each week. This waste management practice assures minimum exposure of wastes to potential disease vectors by reducing available entry space, food sources, and nesting locations. Rodent populations may be controlled by the use of poisons, smoke devices, or sonar techniques, if necessary.

Insect breeding areas, which may develop in areas of stagnant water or putrescible wastes, will be addressed as discovered. The presence of standing water at the facility will be minimized through the uniform grading of fill surfaces and the installation of a drainage control system. The accumulation of fluids in the waste mass will be minimized by the restriction of liquid wastes accepted at the landfill. Putrescible wastes, such as dead animals, are placed in a separate disposal area and covered immediately upon disposal, thereby limiting the likelihood of disease transmission. If insect infestations occur in spite of these measures, approved insecticidal sprays or other methods may be employed.

2.8.2 Erosion and Dust Control

Completed portions of the landfill will be configured and maintained as described in the closure and post-closure plans contained in Sections 4.0 and 5.0 of this *Application for Renewal of a Permit to Operate* the site. Construction of a graded and compacted final cover, and subsequent revegetation, will help prevent erosion, surface deterioration, and fugitive dust generation. A water truck will be available on an as-needed basis to apply water to site roads and disturbed surfaces on the landfill property to control fugitive dust emissions.

2.8.3 Litter Control Program

Litter control measures will be implemented at the Fillmore Landfill in order to prevent scattering of lightweight debris. The primary control measure will include compaction and covering of waste. If necessary, portable litter fences will be placed downwind and within 100 feet of active disposal areas. Litter collection will be performed on an as-needed basis by landfill personnel or contracted day laborers.

2.8.4 Scavenging/Salvaging

Scavenging and salvaging at the Fillmore Landfill are prohibited in all areas of the facility. This provision is enforced through the use of access control measures, perimeter fencing, and employee diligence.

2.9 Site Inspections

The landfill attendant will conduct daily site inspections for litter, scattered paper, and other lightweight debris. All recovered waste is returned to the active fill area for proper disposal. Quarterly site inspections will be performed and will include a visual inspection of drainage control systems, fill surfaces, perimeter fencing, and site equipment and structures. Quarterly inspection reports will be entered into the operating record for the facility. A copy of the quarterly inspection form is included in Appendix 4.

2.10 Contingency Plans

UAC R315-302-2(d, f, j) requires the development of contingency plans to be implemented in the event of an emergency at the site. These plans must include an organized, coordinated, and technically and financially feasible course of action for response to fire or explosion, releases of toxic or hazardous material, landfill gas, failure of run-off containment system, and equipment breakdown. In addition, an alternative waste handling or disposal system must be developed in case the facility becomes unable to accept waste because of an emergency. The contingency plan for each of these occurrences is described below.

A general emergency operations plan has been developed for Millard County. In addition, the County Sheriff maintains a hazardous materials' response plan. It is anticipated that one of these plans will be invoked by County personnel if the severity of an event at the landfill facility requires the participation of an emergency response team.

A cellular phone will be maintained at the landfill gatehouse and will enable contact with the appropriate outside services in case of an emergency. In the event of an injury and depending on the severity of an injury, workers may either treat themselves, call the Fillmore Volunteer Fire Department, or summon an ambulance. The injured worker is given discretion regarding whom to call and at what point. First aid kits will be maintained in the gatehouse and in all County landfill vehicles. The Landfill Operations Supervisor or the Landfill Office Manager will be notified in the event of more severe injuries, and will ensure availability of appropriate medical care. If an emergency-response team is called to the site, site personnel will complete an incident report form and record the date, time, type of injury, actions taken,

response time of the emergency management service, and the time at which the individual was evacuated from the site.

2.10.1 Equipment Breakdown

In the event of equipment breakdowns which cannot be repaired by the County Landfill Department, a commercial repair facility will be contacted. Backup equipment will be provided by the Road Department or the Delta Landfill within 24 hours if necessary; therefore, 24 hours is considered to be the maximum anticipated down time due to equipment failure. Additionally, auxiliary equipment may be leased from a private contractor as required, or borrowed from other County departments.

2.10.2 Fire or Explosion

On-site personnel are prepared to provide immediate fire suppression in the event of a waste or structure fire. Fire extinguishers are mounted on all site equipment and County vehicles. In the event of a fire at the active face or within the waste mass, stockpiled cover soils will be used to cover the burning or smoldering area. Water will not be applied to the active face unless absolutely necessary. In the event of an uncontrolled fire or a fire that cannot be managed by on-site personnel, the Fillmore Volunteer Fire Department will be contacted. The Fire Department is located in central Fillmore, approximately two miles from the landfill; estimated response time is approximately 10 minutes. On arrival at the facility, the Fire Department will assume responsibility for continued fire abatement activities.

2.10.3 Environmental Releases

The Fillmore Volunteer Fire Department will be called immediately and will act as the first response team in the event of hazardous or toxic material discharges at the Fillmore Landfill. On arrival at the facility, the fire department will assume responsibility for subsequent activities related to the safe handling of the discharged material. Landfill personnel will not handle hazardous material spills, except under the direct supervision of the Fire Department or the emergency management team. The landfill attendant will ensure the safe evacuation of all

employees and the public. Advanced planning of emergency exit routes is the responsibility of the operator. All employees will be regularly appraised of established primary and secondary exit routes.

2.10.4 Facility Shutdown

In the unlikely event of an emergency which requires the short term closure of the landfill, several options are available. Waste haulers may be temporarily diverted to the Fillmore collection site or the Millard County Landfill, located six miles east of Delta, Utah. Additional 40-cubic yard debris boxes may be acquired to accept additional waste volumes at waste collection points within the service area. In the event that the landfill is unable to accept waste for an extended period of time, long-hauling the waste to the Millard County Landfill or another waste disposal facility will be implemented.

2.11 Personnel Training

Personnel will receive training in landfill operations at regularly scheduled safety meetings. Training of landfill personnel will be a continuing process including landfill operations, basic first aid, and safety training. Basic safety and first aid training will be conducted on an annual basis. At least one employee with CPR and first aid training will be available during all operating hours. Waste inspectors attend SWANA training courses as offered through the state organization.

2.12 Record Keeping

The operation of the Fillmore Landfill is considered to be approved by UDEQ upon issuance of a permit to operate. The following information will be recorded and maintained in the operating record for the Fillmore Landfill, at the gate house and/or the Millard County Offices in Delta:

- records of inspections, training of personnel, and procedures for notifications to UDEQ relating to hazardous waste required by UAC R315-303-5;
- plans for closure and post-closure and any monitoring, testing or analytical data required by UAC R315-302-3 and R315-302-2 and,

- documentation of cost estimates and financial assurance required by UAC R315-309-2(2).

Because leachate collection and ground water monitoring systems are neither installed nor planned for installation at the Fillmore Landfill, documentation related to these systems will not be kept. The records of documentation related to the plans for closure and post-closure are included in this *Application for Renewal of a Permit to Operate,* and therefore have been included in the operating record. The records of inspections, personnel training, and hazardous waste notifications, as well as any monitoring required during closure or post-closure activities, will be entered into the operating record as the information is developed. UDEQ will be notified when new documentation has been placed in or added to the operating record. All information will be made available to UDEQ upon request. Reports of the quantity of solid waste received at the Fillmore Landfill will be submitted to UDEQ on an annual basis on forms supplied by UDEQ.

PART III - TECHNICAL DATA

3.0 ENGINEERING REPORT

The engineering report has been prepared in accordance with R315-310-4(2)© of the Utah Administrative Code (UAC).

3.1 Maps, Drawings and Specifications

All maps and drawings are included in Appendix 1 of this permit application. Figures 1 and 2 illustrate the location of the landfill in relation to state and county boundaries and the City of Fillmore. Figure 3 depicts the zoning of the landfill property and the surrounding land. Figure 4 illustrates the existing facilities and topography of the site. Figure 4A illustrates current topography. Base topography for Figures 4, 5, 8, and 9 was digitized from the U.S. Geological Survey Fillmore, Utah 7.5 Minute Quadrangle (1961) Plate 1. Figure 5 presents the proposed final grading plan for the landfill, which Figure 6 depicts a cross section along a line running from north to south across the landfill property. The location of the cross section is indicated on Figure 5. Figure 7 presents specific details of existing and proposed facilities. Figures 8 and 9 illustrate the off-site and on-site drainage sub-areas used to calculate run-on and run-off flows and design the drainage control system. There are no structures within one-quarter mile of the facility. The closest weather station for which prevailing wind information is available is near Delta, Utah. According to the Utah State Climatologist's Office, the prevailing winds in the Delta area blow from the northwest to the southeast (personal communication, D. Jensen).

3.2 Design and Location of Run-Off and Run-On Control System

The run-off control systems proposed for the Fillmore Class IV Landfill, illustrated on Figures 5A and 5B (Appendix 5, Figures & Charts), have been designed to control and redirect the flow resulting from a 25-year, 24-hour storm event during the post-closure period. During the operating life, the application of soil cover to exposed waste surfaces will minimize the volume of contact water generated during precipitation events. Temporary berms will be

constructed around the active disposal area to contain run-off flows which may come in contact with waste during disposal operations.

Run-off controls during the active life of the facility will include the gradual construction of exterior and interior perimeter drainage along the perimeter of the waste footprint and along the maintenance bench. Temporary diversion berms will be constructed when necessary up-slope from the active disposal area. These will redirect potential run-on flows that are generated off-site and up-slope from the active disposal area. As a result of the combination of these run-on control features, the amount of water entering or affecting the active disposal area will be limited to direct precipitation. Based on the favorable climate of the area and relatively low calculated flow velocities, all drainage channels will be grass-lined.

The United States Department of Agriculture Soil Conservation Service (SCS) TR-55 methodology was used to calculate peak flood hydro graphs (USDA, 1986) for each of the drainage areas delineated on Figures 8 and 9. Rainfall intensity data used in the TR-55 method was derived from the Precipitation Frequency Atlas of the United States - Volume VI - Utah (NOAA, 1973). The 25-year, 24-hour storm depth used was 2.6 inches, while a two-year storm depth of 1.4 inches was used.

Hydrologic soil groups within the drainage areas were identified by a representative of the U.S. Department of Agriculture Natural Resource Conservation Service (personal communication, V. Parslow). The 40-acre site contains two soil groups identified as the Borvant and Pahvant complexes. Both soils are classified as hydrologic soil group D. The cover type was selected as pasture, grassland, or range with good coverage. The cover type and hydrologic soil group classifications were used to select the appropriate runoff curve number from Table 2-2c of TR-55 (USDA, 1986) As such, the existing site conditions were given a runoff curve number of 80. Since the site closure plan calls for the revegetation of all disturbed areas with native vegetation, the same curve number was used in the drainage analyses for both on and off site drainage areas.

Manning's values for drainage surfaces were derived from Merritt (1983). All unlined earthen drainage were given a Manning's value of 0.035, appropriate for grass-lined channels. The only culvert used in the conceptual design was given a Manning's value of 0.024 for corrugated metal storm drains, based on information presented in Table 21-11 from Merritt (1983). Drainage channels and the culvert were sized using the FlowMaster I computer program (Haestad, 1990). The resulting flow depths and velocities in each channel and culvert, as determined by the Flow-Master analysis, are summarized in the attached Table 5-2 (Appendix 5). All drainage channels which collect and control on-site run-off were conservatively sized as 12- or 18-inch deep v-ditches with 3:1 side slopes, or as 12-inch deep drainage swales with 10:1 side slopes. The drainage diversion channel along the southern property boundary which diverts off-site run-on away from the facility footprint was conservatively designed as an 18-inch deep trapezoidal channel with 2:1 side slopes and a 24-inch wide base. TR-55 calculations predict a maximum flow of 46 cubic feet per second (cfs) in any particular channel which could impact the final cover of the facility. A series of data sheets from the FlowMaster analysis is attached to provide detailed information on the flow depth and velocity in each drainage channel at the calculated discharge and given slope grades included in the facility design. The culvert and channel designations refer to the labeling system presented on Figures 8 and 9 (Appendix 1).

Culvert 1 (C1, Figure 9, Appendix 1) concentrates flows collected from the Drainage Areas 3A and 3B and routes them under the maintenance bench and down the western landfill slope into a natural drainage off-site to the northwest. This culvert was designed as an 18-inch diameter corrugated metal pipe with a drop inlet on the upstream end and a t-section at the downstream end. The culvert was conservatively sized to handle the predicted flow of four cubic feet per second. Predicted peak flows, water depths, and design depths in each channel and culvert are summarized in Tables 5-1 and 5-2 (Appendix 5).

3.3 Closure and Post-Closure Design, Construction and Maintenance

A detailed discussion of closure and post-closure design, construction, and maintenance is included in Sections 4.0 and 5.0 of this application. Because of its remote location, the post-

closure land use of the property is likely to be open range. However, the perimeter fence will remain in place until the completion of the post-closure care period.

3.4 Facility Zoning Status

The landfill site is within County zoning boundaries designated as AG-20, Agricultural-20 acre. Use of the site for landfilling purposes is a pre-existing, non-conforming legal use for the AG-20 zoning classification. Surrounding land use is primarily for agricultural and open range purposes. The current Zoning Ordinance was adopted during the 2013 calendar year. Land within one-half mile of facility property boundaries to the north, south, east, and west is also designated with the AG-20 zoning classification. Zoning boundaries and classifications within three miles of the facility property boundaries are delineated in Figure 3, Fillmore Zoning Map, enclosed in Appendix 1.

3.5 Relationship to Solid Waste Management Plan

All municipal waste within Millard County is currently routed to the Millard County Landfill near Delta, Utah. The Fillmore Class IV Landfill is an integral component of the Millard County Solid Waste Management Plan in that it provides a central location within Millard County for the disposal of Class IVb waste. As a result, a large portion of the waste generated in Millard County is diverted from the Millard County Landfill to the Fillmore Class IVb Landfill, where it can be landfilled more economically and efficiently.

3.6 Compliance with R315-305

Section R315-305 of the Utah Administrative Code defines general and operating requirements for the operation of a Class IVb landfill in the State of Utah. This section describes how the Fillmore Class IVb Landfill satisfies those requirements.

- As described above, the Fillmore Class IVb Landfill is not subject to the location restrictions defined in Section R315-302-1.
- With the submittal and subsequent approval of this *Application for Renewal of a Permit to Operate a Class IVb Disposal Facility at the Fillmore Landfill, Fillmore, Utah,* Millard County will obtain a permit to operate in accordance with R315-305-2(2).

- As described in Section 3.2, the Fillmore Class IVb Landfill has been designed to collect and control the run-on and run-off resulting from a 25-year, 24-hours storm event as per Section R315-305-2(3).
- As required by Section R315-305-2(4) and described in the Plan of Operation, the landfill attendant will record estimates of the incoming volumes and types of waste disposed of at the site.
- Millard County will comply with UAC R315-302-2(6) as described in Section 1.6 of this report regarding notations to the deed to the landfill property.
- The operation of the Fillmore Class IVb Landfill meets with the requirements for operation, established by R315-305-3, as described by the Plan of Operation in Section 2.0 of this permit application.
- The landfill will be closed in accordance with the Closure Plan described in Section 4.0 of this application.

4.0 CLOSURE PLAN

This Closure Plan has been prepared for the Fillmore Class IVb Landfill in accordance with UAC R315-302-3. Closure of the landfill will be performed in accordance with this plan, and in such a manner as to:

- minimize the need for further maintenance;
- minimize or eliminate threats to human health and the environment from post-closure escape of solid waste constituents, leachate, landfill gases, contaminated run-off or waste decomposition products to the ground, ground water surface water, or the atmosphere; and,
- adequately prepare the facility for the post-closure period.

This plan and any future alterations or amendments to this plan will be maintained with the operations plan for the facility at the Millard County Offices in Delta, Utah.

4.1 Closure Construction

The final cover will be constructed in accordance with UAC R315-305-5(5)(b)(ii). The final cover will consist of two feet of compacted native soil. Of these two feet, the upper six inches will be topsoil or other suitable soil which is capable of sustaining native plant growth. The final cover will be revegetated with native plants and grasses according to a plan developed or recommended by a representative of the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) representative, and graded to prevent ponding and minimize infiltration of run-off waters.

Based on the vertical and lateral expansion design presented in the drawing set in Appendix 1, Millard County will perform final cover placement at the end of the active life of the landfill. Closure activities will be initiated when the development of the site reaches the final design height illustrated on attached Figure 5 (Appendix 1). As a result, the size of the area to be closed will encompass only the 0.4 acres located inside the fenced area along with the 0.25 acres outside the fence which is being used for dead animal disposal. There will be a 16-acre limit of final cover placement. All equipment which will not be used on-site during the post-closure period will be removed. Structures at the site which remain after the final receipt of waste, and which will not be an integral part of post-closure site maintenance, will be removed from the site. Any soil contamination remaining after the final receipt of waste will be removed, treated, or disposed of according to applicable regulation. Following the final receipt of waste, any remaining stockpiles of recyclable or other stored materials will be removed from the site.

Rough contouring will be performed throughout the life of the site during daily operation. Following the general site cleanup described above, final contouring will be performed using waste and native soils to establish a suitable foundation for final cover construction. The site will be surveyed to establish base elevations for closure cap construction. After final grading of the foundation layer, the final cover layer will be constructed. Following the placement and compaction of a minimum of two feet of native soil, the landfill will again be surveyed to verify the final thickness of the final cover layer. As described above, the upper six inches of the final cover layer will be comprised of topsoil or a comparable soil which is capable of sustaining native plant growth. Following placement of the final cover, the top several inches of soil will

be scarified and then seeded or hydroseeded with a seed/fertilizer mixture designed or recommended by a representative of the Natural Resources Conservation Service (NRCS).

Drainage channels have been designed and will be constructed to accommodate the flow from a 25-year, 24-hour storm event. Much of the drainage system construction will be accomplished throughout the active life of the facility. Any drainage system construction which remains after the final receipt of waste, such as along the maintenance bench on the west slope of the waste mass, will be completed following the installation of the final cover described above. Interior and exterior perimeter drainage or drainage diversions will be constructed as defined in Section 3.2 and illustrated on Figure 5 (Appendix 1). The drainage will assist in maintaining the integrity of the final cover and preventing a washout of waste due to uncontrolled run-off during precipitation events.

4.2 Closure Schedule

At least 60 days before the projected final receipt of waste, Millard County will notify the Executive Secretary of the intent to close the Fillmore Class IVb Landfill and implement the closure plan. Within thirty days after the final receipt of waste, Millard County will implement the approved closure plan. The closure activities described in this plan will be completed within 180 days of initiation. Following the completion of closure activities, Millard County will submit to the Executive Secretary a set of as-built drawings of final closure construction.

4.3 Site Capacity

The area-fill method of disposal is utilized at the Fillmore Class IVb Landfill. Current operating plans are to continue filling in the northwest corner of the site until the area reaches the level of the existing waste mass to the east. Filling will then commence against the east wall of the current soil borrow pit and continue north and west as the borrow pit is expanded to the northern limit of waste placement. This second waste lift will be approximately 10 feet thick and will be completed from the eastern wall of the existing borrow pit to the extreme western waste slope. The life of the entire site is expected to be considerably more than 50 years. As a result, a rough volume estimation was done for the completion of the existing waste lift to the

northwestern corner and the subsequent lift from the eastern wall of the soil borrow pit to the western waste boundary. In order to estimate the expected life of these two lifts, the following assumptions were made:

- total incoming waste volume is estimated at 8 cy per day;
- 50% of the incoming waste is diverted from disposal through burning or recycling;
- total landfilled waste is estimated at approximately 8.6 cy per day, 156 days per year;
- remaining volume of the existing waste lift is 26,100 cy;
- disposal volume of second lift is approximately 185,000 cy (1,000'L x 500' W x 10' D);
- waste to soil ratio is approximately 10:1; and,
- average annual growth projections for Millard County are estimated at 0.75% (Stansbury, 1993).

Loading rate calculations based on these assumptions are included in Appendix 3. Twelve-year growth projections for the county were obtained from the Millard County Solid Waste Management Plan (Stansbury, 1993) and applied into the future. The calculations indicate that the remaining portion of the existing waste lift will provide approximately 26,100 cubic yards of waste disposal lasting into the year 2025. The subsequent 10-foot lift extending from the east wall of the existing borrow pit to the western waste slope will provide an additional disposal volume of approximately 185,000 cubic yards and waste disposal into the year 2046. Based on this data, it is reasonable to predict a conservative site life of well over 50 years.

4.4 Final Inspection

Following the completion of closure activities, a final report will be prepared and entered into the operating record of the facility. The report will summarize laboratory and field test data which support the conformance of the final cover installation and closure activities with the Utah solid waste regulations and the approved Closure Plan. The report will also include as-built construction drawings. The Executive Secretary will be notified of the completion of closure activities and arrangements will be made for a final inspection by UDEQ. Following final approval by UDEQ, the post-closure maintenance plan will be initiated pursuant to the approved Post-Closure Plan, outlined in Section 5.0 of this permit application.

4.5 Closure Construction Cost Estimate

The closure cost estimate, detailed in Table 4.1 (See Tables), has been prepared by Sunrise Engineering, 25 East 500 North, Fillmore, Utah 84631, Telephone: (435) 743-6151, Licensed Professional Engineer Zane W. Pentz, No. 186879. It is estimated that the site will be closed in halves, with the largest area requiring closure at any time constituting 16 acres. The cost estimate is based on the assumption that an outside contractor will perform the construction tasks and has been prepared using reasonable estimates of unit costs based on 2018 dollars. Millard County has established a trust fund account with the State of Utah Treasurer's Office. The trust fund will provide financial assurance for closure construction and post-closure maintenance at the Fillmore Class IVb Landfill.

5.0 POST-CLOSURE PLAN

The Post-Closure Plan has been developed in accordance with UAC R315-302-3. Post-closure care and maintenance of the Fillmore Class IVb Landfill will be performed in accordance with this plan, which provides for continued facility maintenance. The design of the Fillmore Class IVb Landfill does not include a gas monitoring, ground water monitoring or leachate collection system; therefore, the post-closure plan does not include provisions for gas or ground water monitoring. The office listed below may be contacted during the post-closure period regarding issues which concern the landfill property:

Millard County Offices
71 South 200 West
Post Office Box 854
Delta, Utah 84624
(435) 864-1400

5.1 Monitoring of Environmental Systems

This permit application is submitted without provisions for ground water monitoring, surface water monitoring, or leachate collection or treatment systems. Exclusion of these items is based on the classification of the landfill as a Class IVb waste disposal facility.

5.2 Maintenance Activities

Following closure of the Fillmore Class IVb Landfill, the final cover and drainage systems will be inspected at least annually by personnel from Millard County. The final cover and drainage system will be examined for the effects of erosion, subsidence, settlement, or other events which may compromise the integrity of the final cover or the effectiveness of the drainage system. Necessary repairs will be completed as soon as is practicable following each inspection in order to maintain the effectiveness of the drainage system and restore the integrity of the final cover. The site perimeter fence will also be inspected during annual inspections.

5.3 Post-Closure Schedule

Post-closure activities will be initiated immediately following the completion of the closure activities described in Section 4.0 of this application. Post-closure activities will continue for a period of thirty years or a period established by the Executive Secretary. If post-closure monitoring activities indicate that the site has stabilized and does not pose a threat to human health or the environment, Millard County may petition the Executive Secretary for a decrease in the length of the post-closure monitoring period.

Upon completion of post-closure monitoring activities as determined by the Executive Secretary, Millard County will submit to the Executive Secretary a certification, signed by a County representative, which states why post-closure activities are no longer necessary. Following final approval by the Executive Secretary, post-closure monitoring activities will be discontinued.

5.4 Record Modifications

Within 60 days after the completion of all closure activities, plats and a statement of fact concerning the location of any disposal site shall be recorded as part of the record of title with the County Recorder. The notation will serve to notify any potential purchaser of the property that the land has been used as a landfill, and that its use may be restricted by local land use or zoning regulations. Millard County will notify the Executive Secretary that the deed notation has been recorded.

5.5 Post-Closure Cost Estimate

The post-closure cost estimate, detailed in Table 5.1 (See Tables) has been prepared utilizing Appendix G of the Utah State Solid Waste Permitting and Management Rules. Some of the assumptions used to derive the cost estimate included annual inspection of the integrity of the final cover and general site condition and hiring a third-party to perform the inspections. The cost estimate for annual post-closure care is presented in detail in Table 5.1, and is based on 2018 dollars. A ten percent contingency has been built into the cost estimate. Millard County has established a trust fund account with the State of Utah Treasurer's Office. The trust fund will provide financial assurance for closure construction and post-closure maintenance at the Fillmore Class IVb Landfill.

6.0 FINANCIAL ASSURANCE

The current Closure Cost Estimate with inflation is:	$20,241.00
The current Post Closure Cost Estimate with inflation is:	$98,074.00
Total:	$118,315.00

The *PTIF Financial Assurance* trust fund account # 2528 is in place with a current balance of $125,205.99.

7.0 REFERENCES

Brough, R.C., Jones, D.L. and Stevens, D.J., 1987, Utah Comprehensive Weather Almanac: Publisher's Press, Salt Lake City, Utah.

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TABLES

TABLES

Table 4.1

Project: **MILLARD COUNTY**
FILLMORE CLASS IV LANDFILL

SUNRISE ENGINEERING

CLOSURE COST ESTIMATE

Date: April 5, 2018

MILLARD COUNTY FILLMORE CLASS IV LANDFILL CLOSURE COST ESTIMATE

Based on Oklahoma Department of Environmental Quality 2010 Worksheet for Calculating Closure and Post-closure Cost Estimates table H.2 as Provided in the Utah Division of Solid and Hazardous Waste Solid Waste Management Program, Preparation of Solid Waste Facility Closure and Post Closure Cost Estimates Guidance.

	Task/Service	Quantity	Units	Multiplier[a]	Unit Cost[b]	Subtotal	SOURCE	NOTES
1.0	PRELIMINARY SITE WORK							
a	Conduct Site Evaluation	1	Lump sum	1	$ 1,800.00	$ 1,800	a.	
b	Disposal of Final Wastes	N/A						
	Average Daily Flow	N/A	tons/day		$ -	$ -		
	Disposal Cost	N/A	tons/day	5	$ -	$ -		
c	Remove Temporary Buildings	1	Lump sum	1	$ 1,695.00	$ 1,695	a.	
d	Remove Equipment	1	Lump sum	1	$ 2,260.00	$ 2,260	a.	
e	Repair/Replace Perimeter Fencing	0	linear feet	0.25	$ 3.16	$ -	a.	
f	Clean Leachate Lines	N/A	Lump sum	1	$ 1,460.44	$ -	a.	
2.0	Monitoring Equipment							
a	Rework/Replace Monitoring Well(s)	N/A	VLF	0.25	$ 67.81	$ -		no monitoring equipment is installed per the original permit application,
b	Plug Abandoned Monitoring Well(s)	N/A	VLF	0.25	$ 27.14	$ -		
c	Rework/Replace Methane Probe(s)	N/A	VLF	0.25	$ 58.55	$ -		
d	Plug Abandoned Methane Probe(s)	N/A	VLF	0.25	$ 21.40	$ -		
e	Rework/Replace Remediation and/or Gas Control Equipment	N/A	Lump sum	0.05	$ -	$ -	a.	
3.0	CONSTRUCTION							
a	Complete Site Grading to Include On- and Off- Site Borrow Areas	0.4	acres	1	$ 2,680.00	$ 1,072	a.	
b	Construct Final Cap							
	Compacted On-Site Clay Cap or	1,987	cubic yards	1	3.50	$ 6,955	a.	
	Compacted Off-Site Clay Cap or	N/A	cubic yards	1	7.45	$ -		On-site material is used
	Install Geosynthetic Clay Liner Cap	N/A	square feet	1	0.47	$ -		On-site material is used
c	Contract Landfill Gas Venting Layer	N/A						not included in landfill
	Place Sand or	N/A	acres	1	34,183.10	$ -		not included in landfill
	Install Net and Geotextile	N/A	square feet	1	0.33	$ -		not included in landfill
d	Install Passive Landfill Gas Vents	N/A	acres	1	818.98	$ -		not included in landfill
e	Install Flexible Membrane Line	N/A	square feet	1	0.36	$ -		not included in landfill
f	Drainage Layer	N/A						not included due to exemption
	Place Sand or	N/A	acres	1	34,183.10	$ -		
	Install Net and Geonet	N/A	square feet	1	0.33	$ -		
g	Place On-site Topsoil	400	cubic yards	1	3.25	$ 1,300	a.	based on 6" layer over 7.6 acres
	Place Off-site Topsoil	N/A	cubic yards	1	15.78	$ -		
h	Establish vegetative cover, including on- and off-site borrow areas	0.4	acres	1	632.00	$ 253	a.	
4	Drainage/erosion control							
a	Construct Terraces	N/A	linear feet	1	8.26	$ -		
b	Construct Letdown Channels	N/A	linear feet	1	7.77	$ -		
c	Clean Perimeter Drainage Ditches	0	linear feet	0.5	6.30	$ -	a.	
5	Tasks Not Identified	N/A						
6	Subtotal					$ 15,334		
7	Administrative Services	1	Lump sum	0.10	15,334.30	$ 1,533	a.	
8	Technical and Professional Services	1	Lump sum	0.12	15,334.30	$ 1,840	a.	
9	Closure Contingency	1	Lump sum	0.10	15,334.30	$ 1,533	a.	
10		**TOTAL CLOSURE COST ESTIMATE**				**$ 20,241**		

a. Oklahoma Department of Environmental Quality as Provided in the Utah Division of Solid and Hazardous Waste Solid Waste Management Program, Preparation of Solid Waste Facility Closure and Post Closure Cost Estimates Guidance.

In providing opinions of probable construction cost, the Client understands that the Engineer has no control over costs or the price of labor, equipment or materials, or over the Contractor's method of pricing, and that the opinion of probable construction cost provided herein is made on the basis of the Engineer's qualifications and experience. The Engineer makes no warranty, expressed or implied, as to the accuracy of such opinions compared to bid or actual costs.

Table 5.1

Project: **MILLARD COUNTY**
FILLMORE CLASS IV LANDFILL

SUNRISE ENGINEERING

POST CLOSURE COST ESTIMATE

Date: April 5, 2018

MILLARD COUNTY FILLMORE CLASS IV LANDFILL POST-CLOSURE COST ESTIMATE

Based on Oklahoma Department of Environmental Quality 2010 Worksheet for Calculating Closure and Post-closure Cost Estimates table I.1 as Provided in the Utah Division of Solid and Hazardous Waste Solid Waste Management Program, Preparation of Solid Waste Facility Closure and Post Closure Cost Estimates Guidance.

	Task/Service	Quantity	Units	Multiplier[a]	COST/UNIT[b]	TOTAL COST	SOURCE	NOTES
1.0	Site Maintenance							
a	Site Inspections	2	Per Year	30	$ 528.00	$ 31,680	a.	
	Site Inspections	N/A	Per Year	8	$ 662.81	$ -	a.	
b	General Maintenance	1	Per Year	30	$ 1,568.00	$ 47,040	a.	
	General Maintenance	N/A	Per Year	8	$ 1,568.00	$ -	a.	
c	Remediation and/or Gas Control Equipment	N/A	Lump sum	0.3	$ -	$ -	a.	
2.0	Monitoring Equipment							
a	Rework/Replace Monitoring Well(s)	N/A	VLF	0.25	$ 68.24	$ -	a.	
b	Plug Abandoned Monitoring Well(s)	N/A	VLF	0.25	$ 27.14	$ -	a.	
c	Final Plugging of Monitoring Well(s)	N/A	VLF	1	$ 27.14	$ -	a.	
d	Rework/Replace Methane Probe(s)	N/A	VLF	0.25	$ 58.55	$ -	a.	
e	Plug Abandoned Methane Probe(s)	N/A	VLF	0.25	$ 21.40	$ -	a.	
f	Final Plugging of Methane Probe(s)	N/A	VLF	1	$ 21.40	$ -	a.	
g	Final Plugging of Piezometer(s)	N/A	VLF	1	$ 21.40	$ -	a.	
3.0	Sampling and Analysis							
a	Groundwater Monitoring Wells	N/A	wells	60	$ 632.48	$ -	a.	
	Groundwater Monitoring Wells	N/A	wells	16	$ 156.11	$ -	a.	
b	Methane Gas Probes	N/A	probes	60	$ 41.04	$ -	a.	
c	Surface Water Monitoring Points	N/A	points	60	$ 76.32	$ -	a.	
d	Leachate	N/A	sample	60	$ 122.82	$ -	a.	
4.0	Final Cover Maintenance							
a	Mow and Fertilize Vegetative Cover	0.4	acres	0	$ 194.05	$ -	a.	
a	Mow and Fertilize Vegetative Cover	N/A	acres	8	$ 194.05	$ -	a.	
b	Repair Erosion, Settlement, and Subsidence for On-site Soils	0.4	acres	30	68.52	$ 822	a.	
b	Repair Erosion, Settlement, and Subsidence for On-site Soils	N/A	acres	8	2.81	$ -	a.	
	Repair Erosion, Settlement, and Subsidence for Off Site Soils	N/A	acres	30	16.82	$ -	a.	
	Repair Erosion, Settlement, and Subsidence for Off Site Soils	N/A	acres	8	16.82	$ -	a.	
c	Reseed Vegetative Cover	0.4	acres	0.5	964.32	$ 193	a.	
5.0	Leachate Management							
a	Clean Leachate Line(s)	N/A	Per Year	30	$ 1,504.09	$ -	a.	
b	Maintain Leachate Collection System and Equipment	N/A	Per Year	30	2,336.66	$ -	a.	
c	Collect, Treat, Transport, and Dispose of Leachate	N/A	gal/yr	30	0.30	$ -	a.	
6	Tasks Not Identified	N/A						
7	Subtotal					$ 79,735	a.	
8	Administrative Services	1	Lump sum	0.06	79,735.10	$ 4,784	a.	
9	Technical and Professional Services	1	Lump sum	0.07	79,735.10	$ 5,581	a.	
10	Post-Closure Contingency	1	Lump sum	0.10	79,735.10	$ 7,974	a.	
11		**TOTAL POST CLOSURE COST ESTIMATE**				**$ 98,074**	**a.**	

a. Oklahoma Department of Environmental Quality as Provided in the Utah Division of Solid and Hazardous Waste Solid Waste Management Program, Preparation of Solid Waste Facility Closure and Post Closure Cost Estimates Guidance.

In providing opinions of probable construction cost, the Client understands that the Engineer has no control over costs or the price of labor, equipment or materials, or over the Contractor's method of pricing, and that the opinion of probable construction cost provided herein is made on the basis of the Engineer's qualifications and experience. The Engineer makes no warranty, expressed or implied, as to the accuracy of such opinions compared to bid or actual costs.

Table 6.1

STATEMENT OF ACCOUNT

PTIF

UTAH PUBLIC TREASURERS' INVESTMENT FUND

David Damschen, Utah State Treasurer, Fund Manager
PO Box 142315
350 N State Street, Suite 180
Salt Lake City, Utah 84114-2315
Local Call (801) 538-1042 Toll Free (800) 395-7665
www.treasurer.utah.gov

ESC-MILLARD CO LANDFILL FILLMORE
SHERI DEARDEN
50 S MAIN
FILLMORE UT 84631

Account	**Account Period**
2528	December 01, 2017 through December 31, 2017

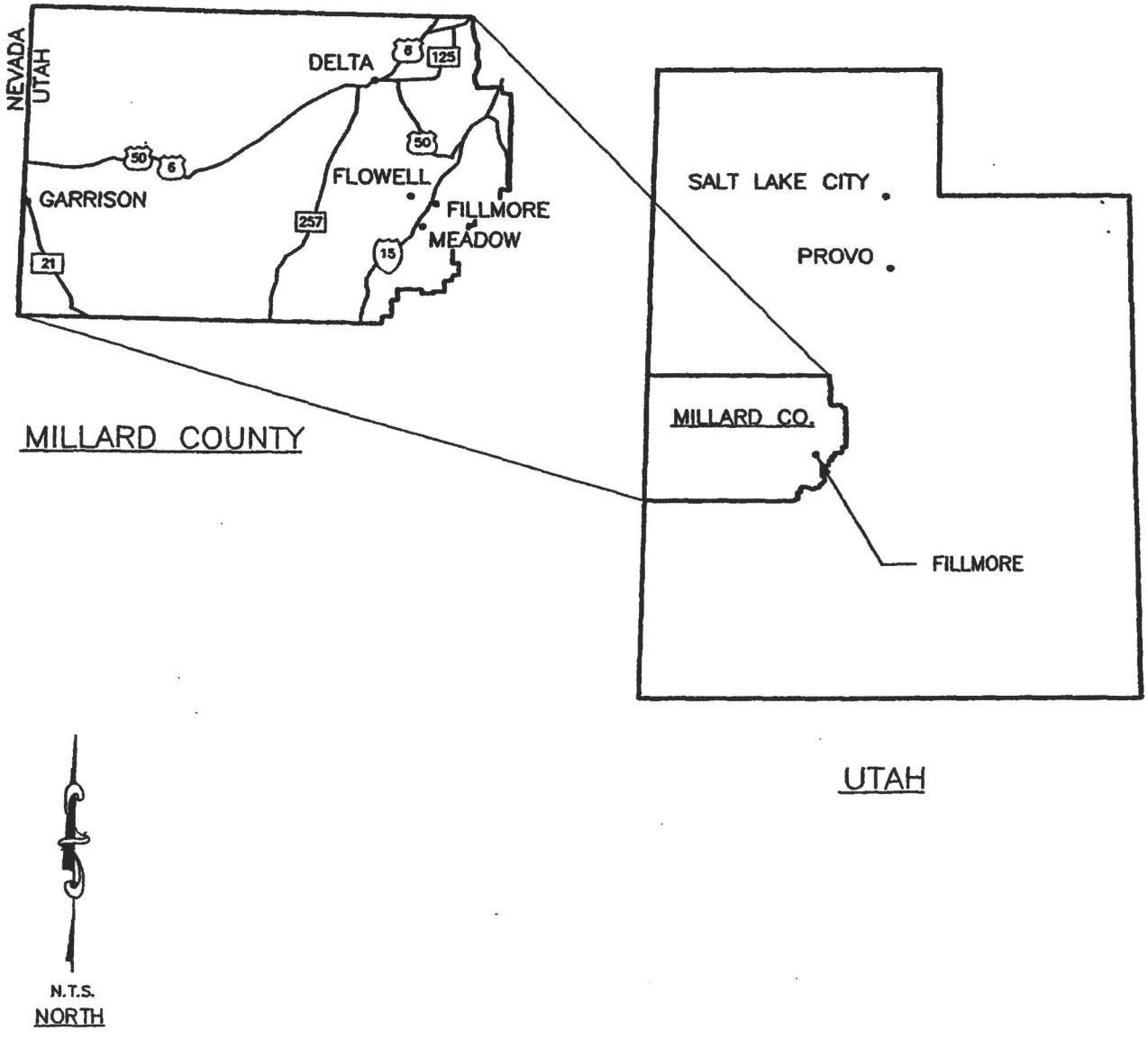
Summary

Beginning Balance	$ 125,032.47	Average Daily Balance	$ 125,032.47
Deposits	$ 173.52	Interest Earned	$ 173.52
Withdrawals	$ 0.00	360 Day Rate	1.6116
Ending Balance	$ 125,205.99	365 Day Rate	1.6340

Date	**Activity**	**Deposits**	**Withdrawals**	**Balance**
12/01/2017	FORWARD BALANCE	$ 0.00	$ 0.00	$ 125,032.47
12/31/2017	REINVESTMENT	$ 173.52	$ 0.00	$ 125,205.99
12/31/2017	ENDING BALANCE	$ 0.00	$ 0.00	$ 125,205.99

APPENDIX 1

Conceptual Design Drawings



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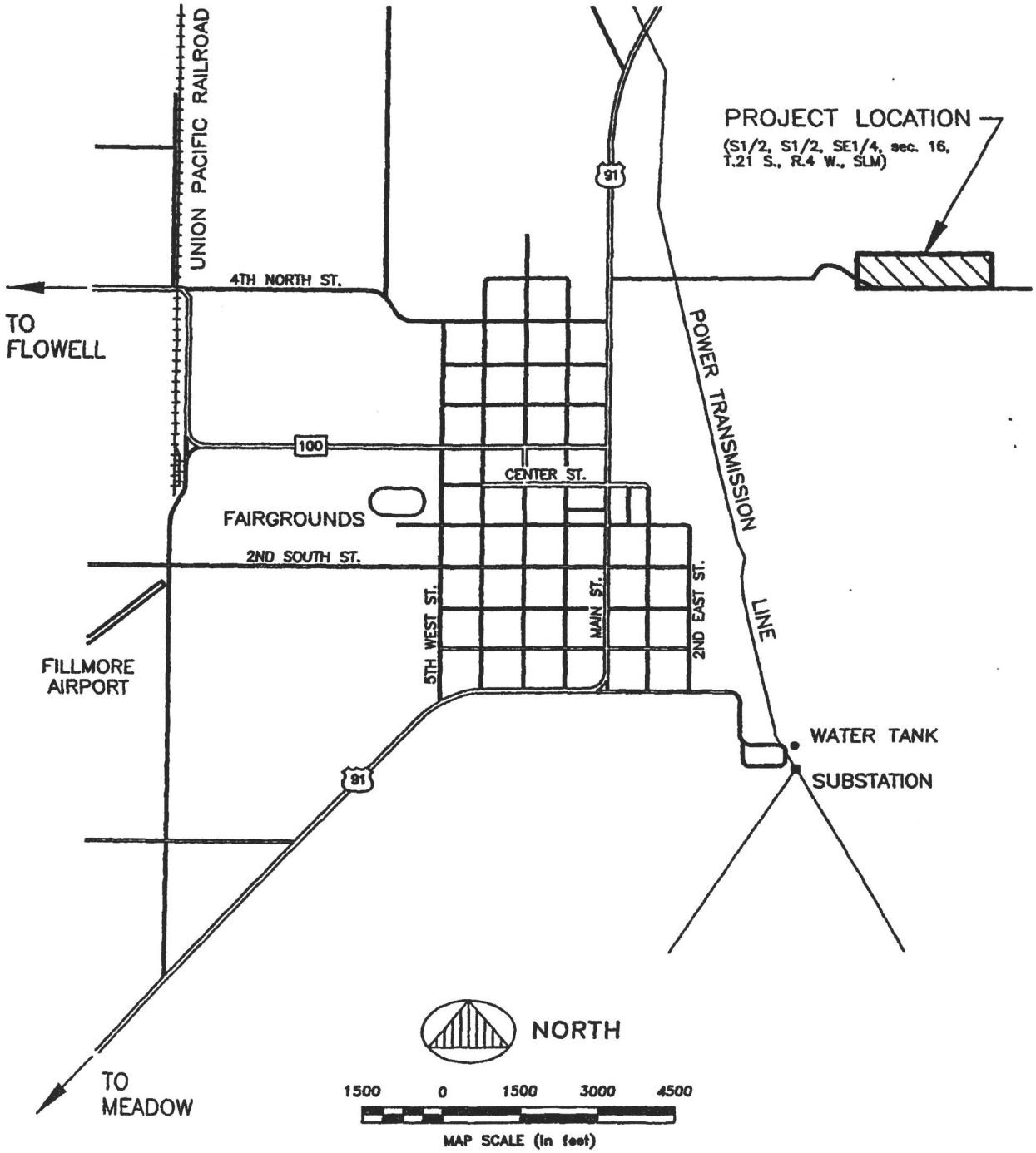
VECTOR ENGINEERING, INC Carson City, NV • Grass Valley, CA • El Dorado Hills, CA	SITE VICINITY MAP	FIGURE
JOB NO. 945013.02 APPR. CEN DATE: 8/1/97	FILLMORE CLASS IV LANDFILL MILLARD COUNTY, UTAH	1



Base map from U.S.G.S. Fillmore, Utah 7.5-Minute Quadrangle (1961).

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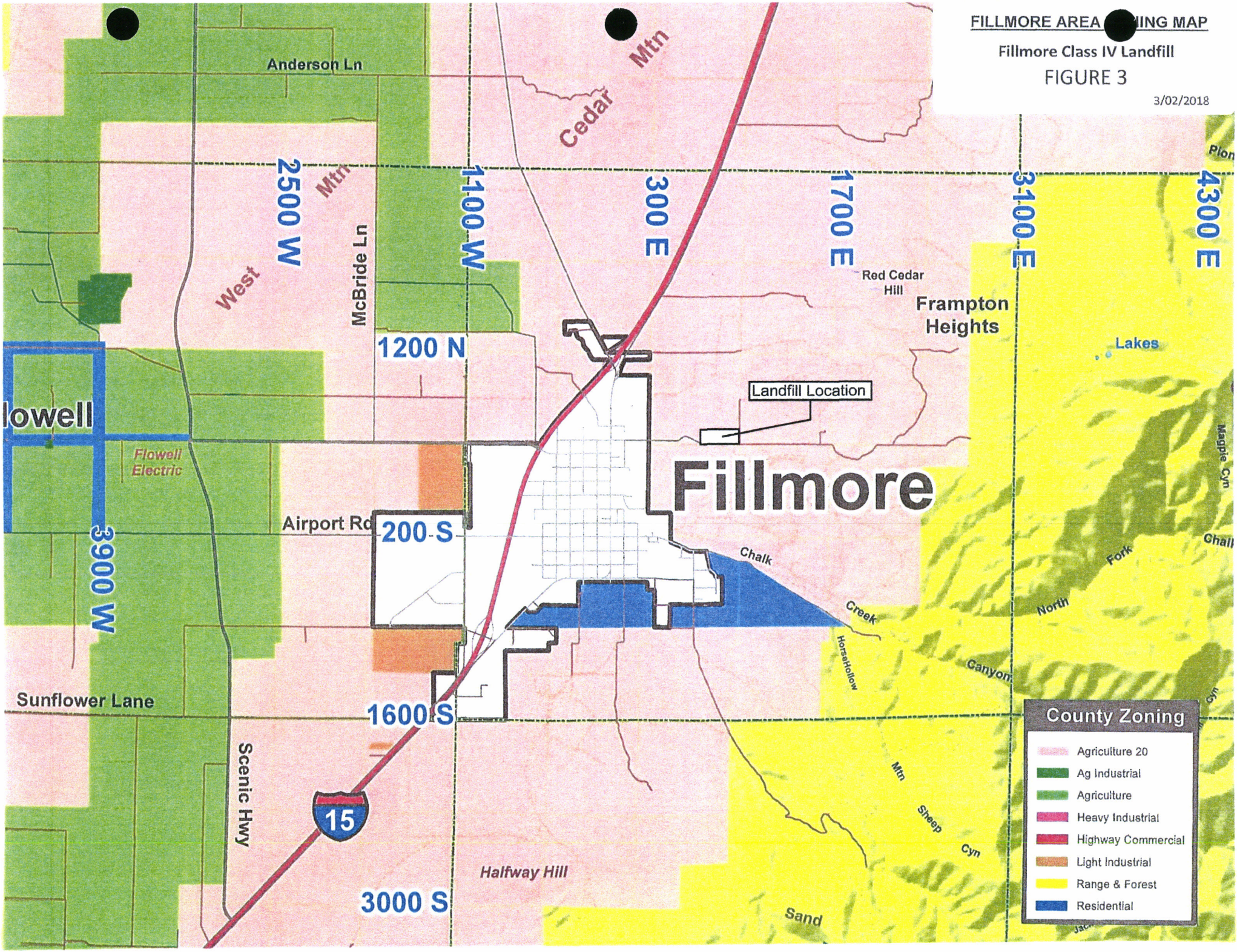
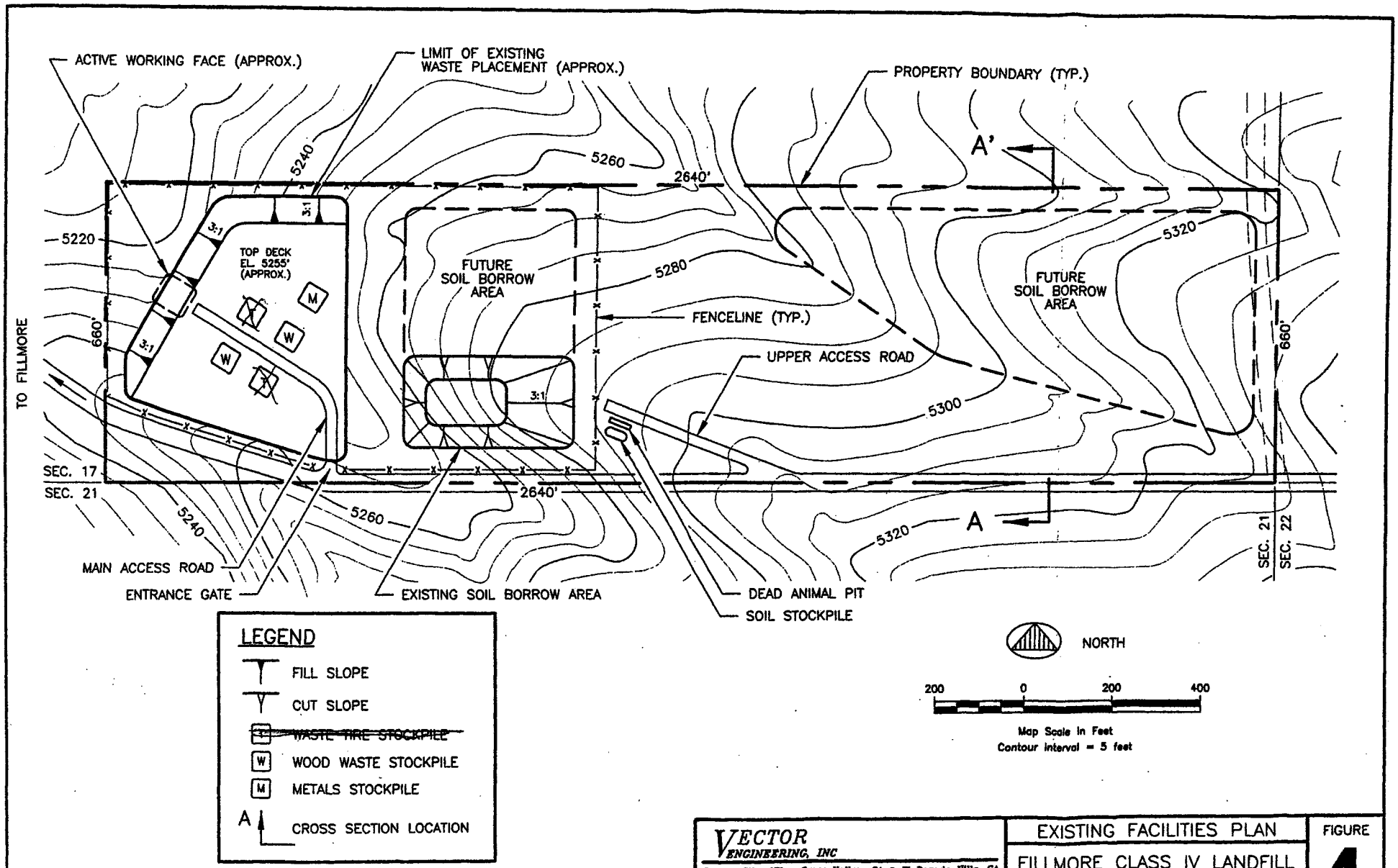
VECTOR ENGINEERING, INC Carson City, NV • Grass Valley, CA • El Dorado Hills, CA	SITE LOCATION MAP	FIGURE
JOB NO. 945013.02 APPR. CEN DATE: 8/1/97	FILLMORE CLASS IV LANDFILL MILLARD COUNTY, UTAH	2


FILLMORE AREA ZONING MAP
Fillmore Class IV Landfill
FIGURE 3
3/02/2018
Anderson Ln
Cedar Mtn
West Mtn
2500 W
McBride Ln
1100 W
300 E
1700 E
3100 E
4300 E
Red Cedar Hill
Frampton Heights
Lakes
1200 N
Landfill Location
Fillmore
Flowell
Flowell Electric
Airport Rd
200 S
3900 W
Chalk Creek
North Fork
Canyon
Horse Hollow
Magpie Cyn
Sunflower Lane
1600 S
Scenic Hwy
15
Halfway Hill
3000 S
Sheep Mtn
Sand
County Zoning
Agriculture 20
Ag Industrial
Agriculture
Heavy Industrial
Highway Commercial
Light Industrial
Range & Forest
Residential



Base topographic map modified from U.S.G.S. Fillmore, Utah 7.5-Minute Quadrangle (1961).
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VECTOR ENGINEERING, INC
Carson City, NV • Grass Valley, CA • El Dorado Hills, CA
JOB NO. 945013.02 APPR. CEN DATE: 8/1/97

EXISTING FACILITIES PLAN
FILLMORE CLASS IV LANDFILL
MILLARD COUNTY, UTAH

FIGURE 4

Millard County Landfill Topographic Survey
October 2017

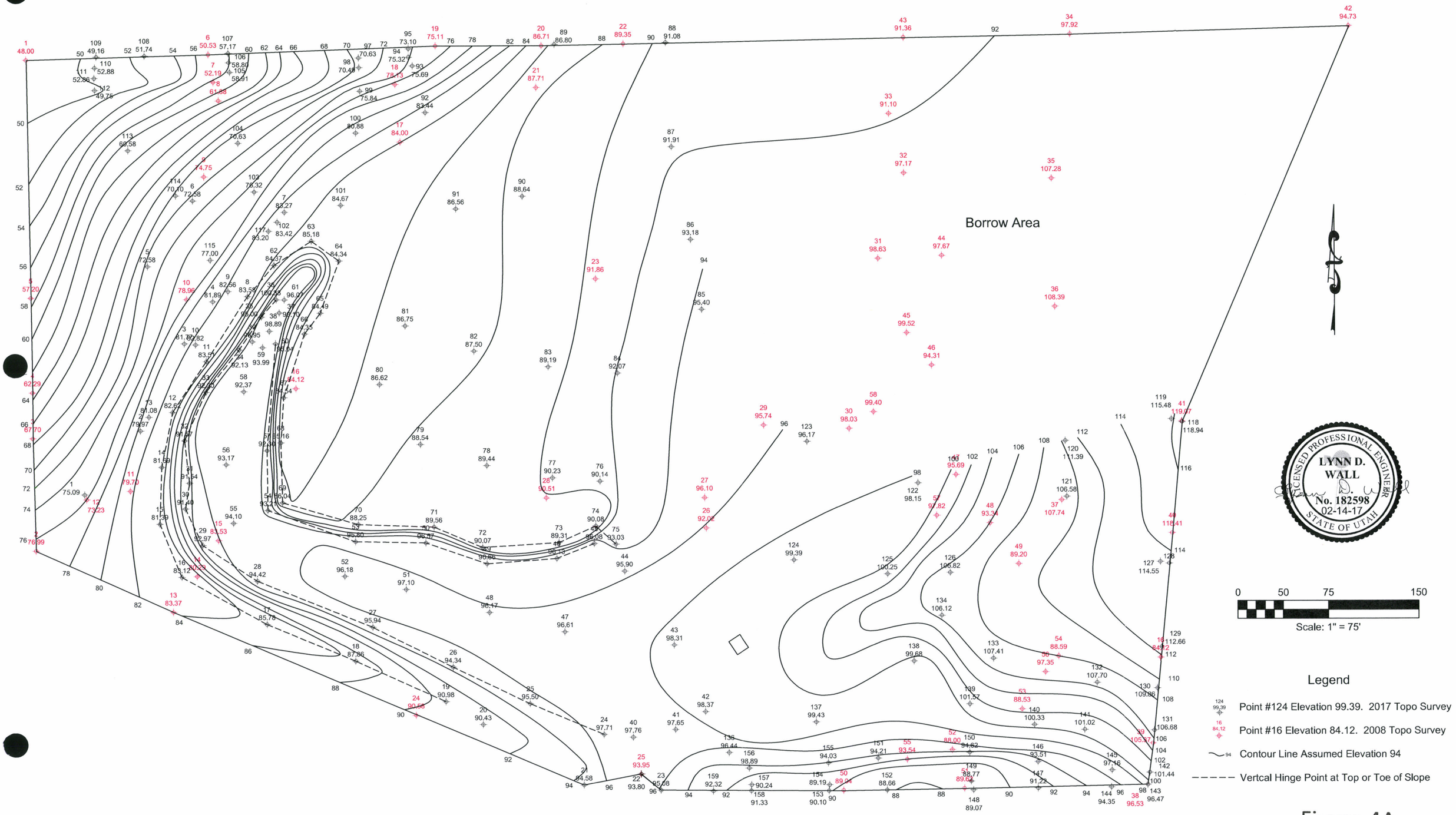


Figure 4A

Millard County Landfill Topographic Survey
October 2017

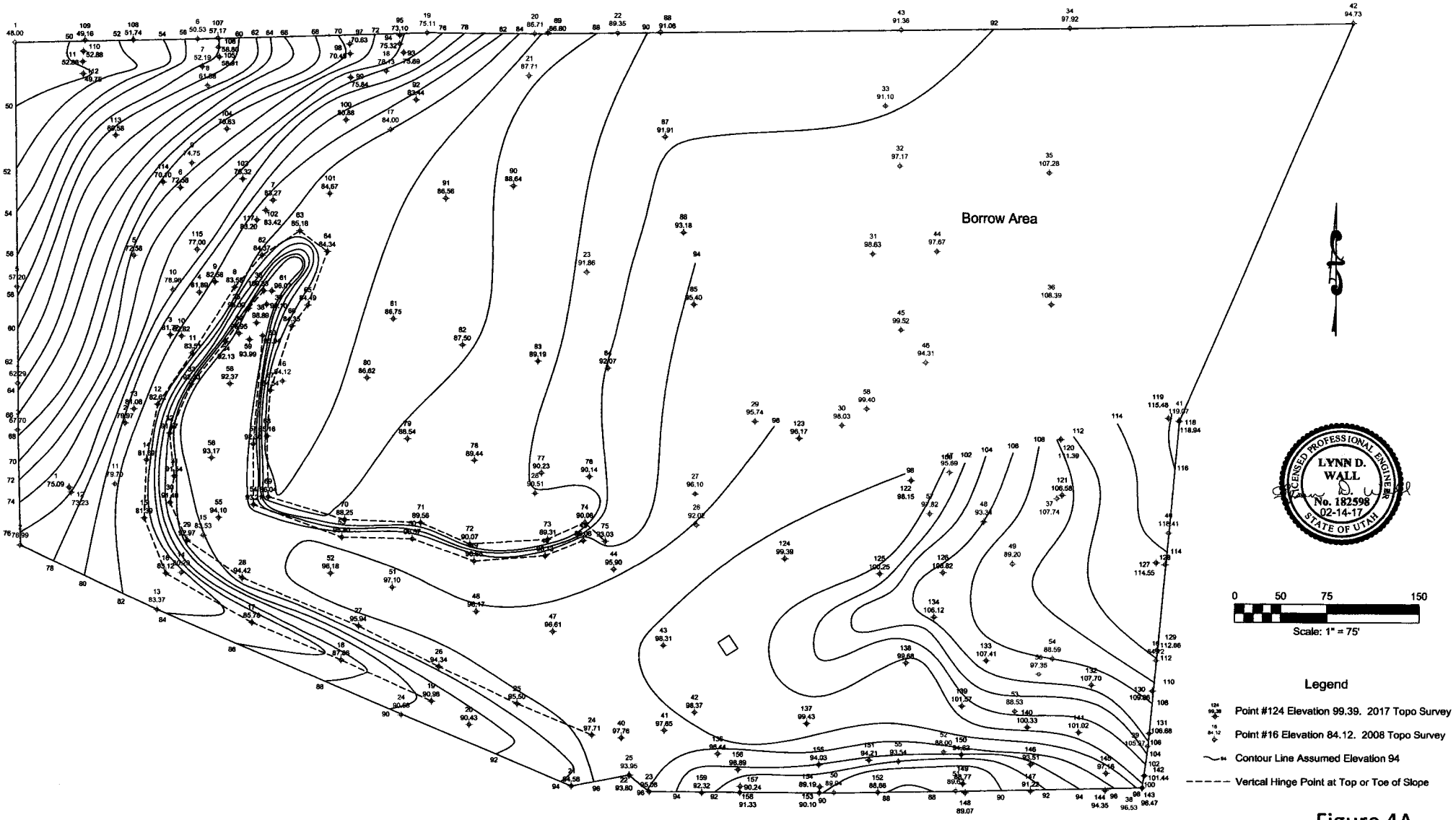
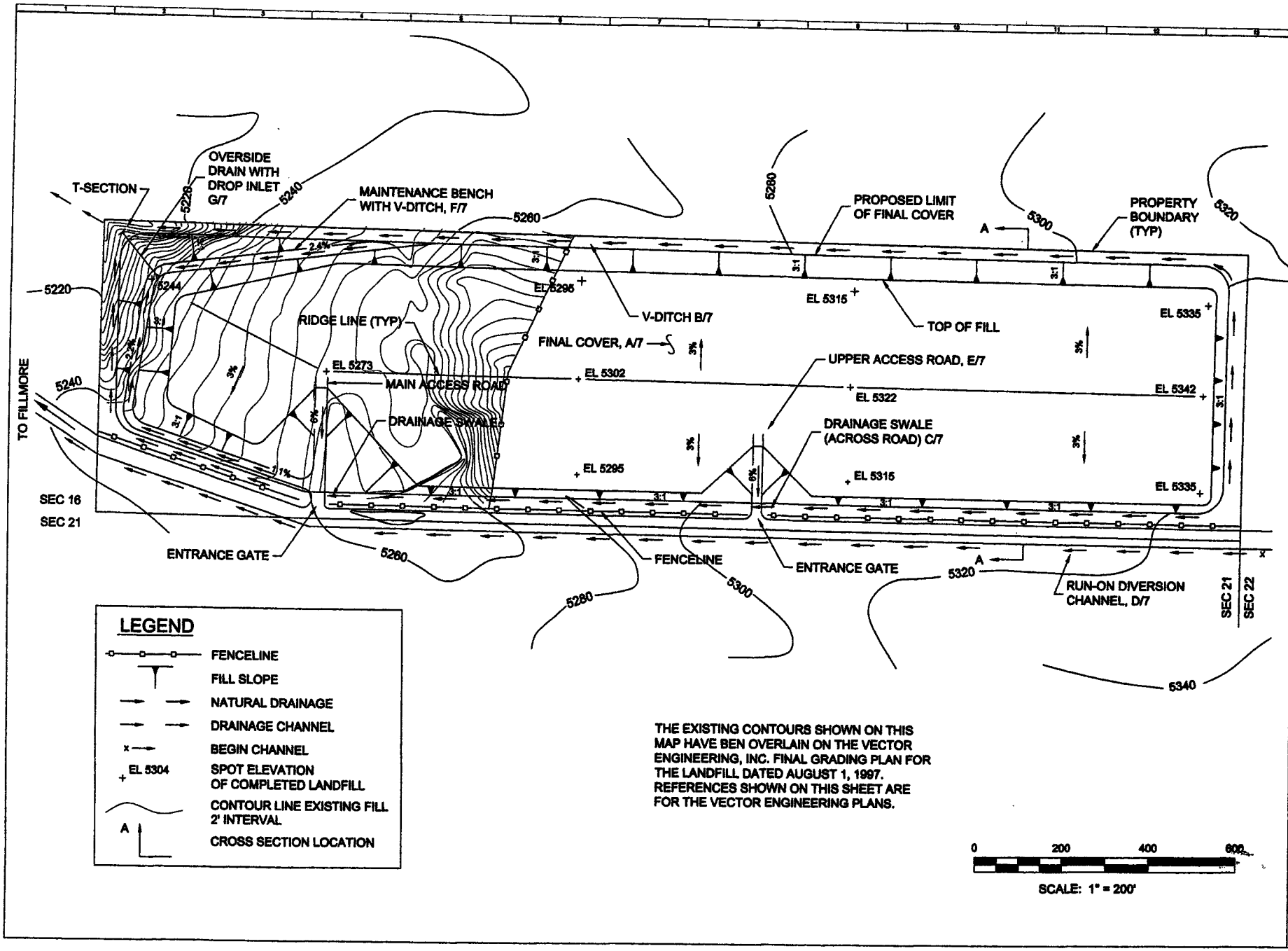


Figure 4A

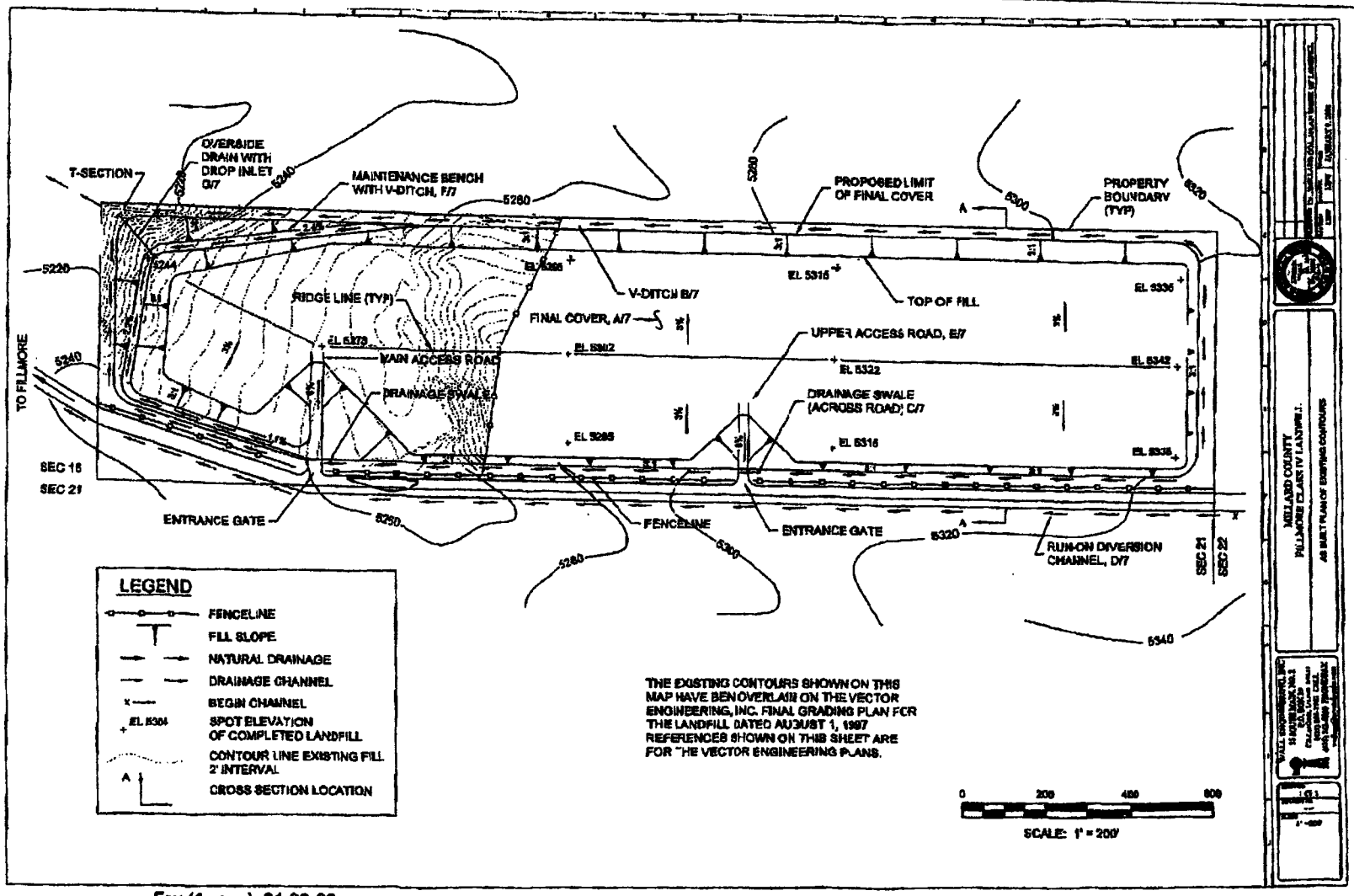


MILLARD COUNTY
FILLMORE CLASS IV LANDFILL
AS BUILT PLAN OF EXISTING CONTOURS

WALL ENGINEERING, INC
55 SOUTH MAIN, NO. 2
P.O. BOX 29
FILLMORE, UTAH 84631
(435) 743-6151 OFC
(435) 743-6809 PHONE/FAX

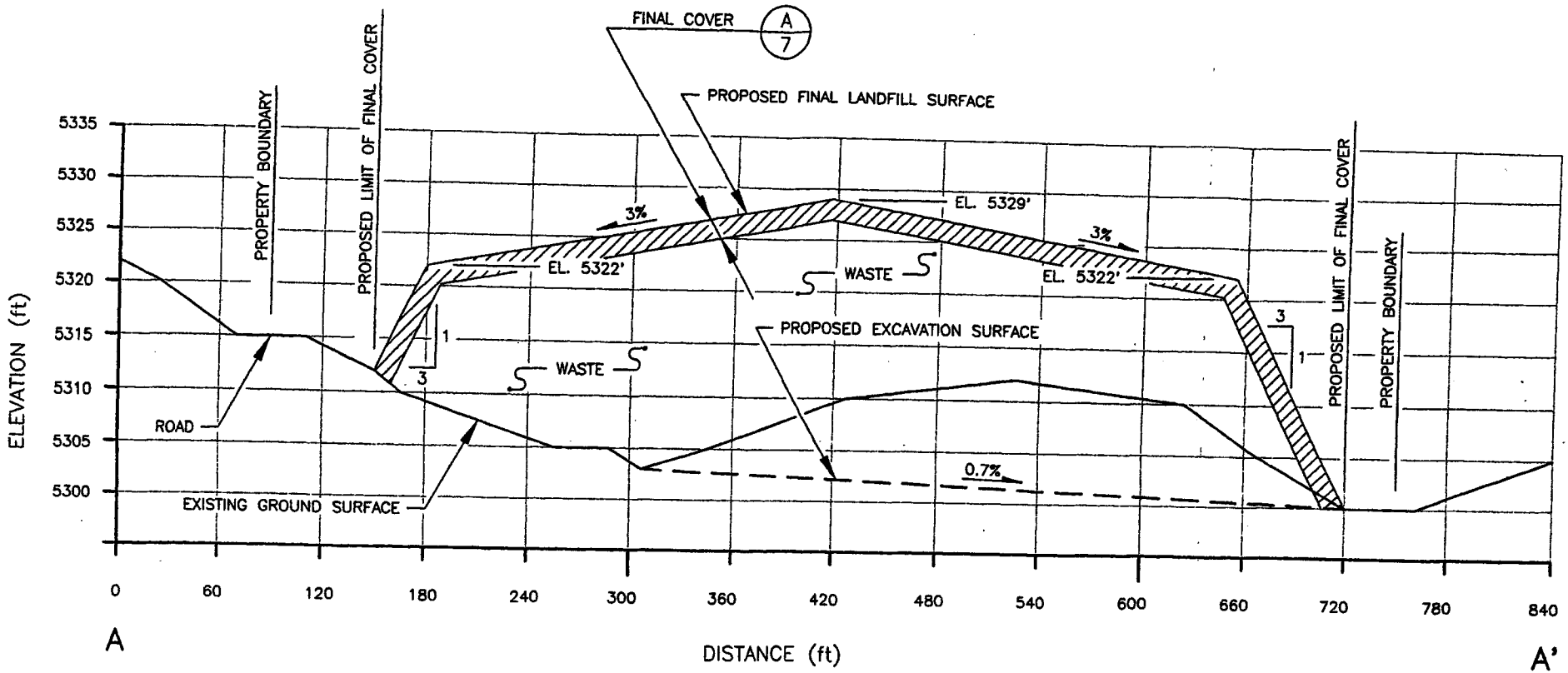
1 OF 1
1" = 200'

5



Fax (1 page) 01-09-08
To: Cheryl Dekker 435-864-1404 fax
From: Lynn Wall 435-743-6800 cell

Figure 5



NOTE: SEE FIGURES 4 AND 5 FOR CROSS SECTION LOCATION.

SCALE:
HORIZONTAL: 1" = 60'
VERTICAL: 1" = 10'

VECTOR ENGINEERING, INC
Carson City, NV • Grass Valley, CA • El Dorado Hills, CA
JOB NO. 945013.02 APPR: CEN DATE: 8/1/97

CROSS SECTION A–A'
FILLMORE CLASS IV LANDFILL
MILLARD COUNTY, UTAH

FIGURE 6

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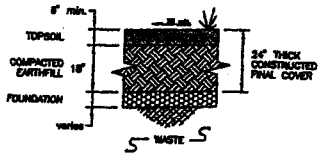
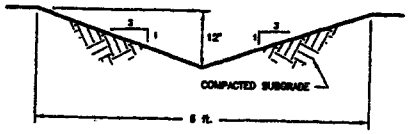
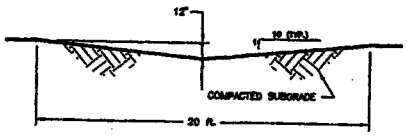


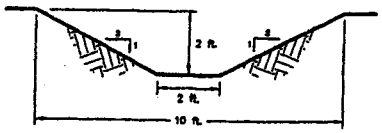
FINAL COVER (A 5,6) N.T.S.



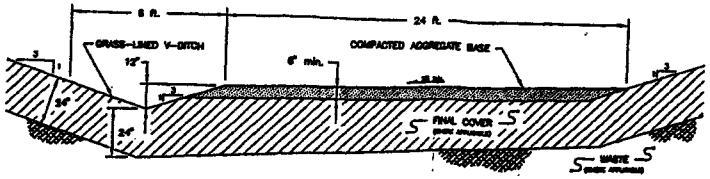
GRASS-LINED V-DITCH (B 5,9) N.T.S.



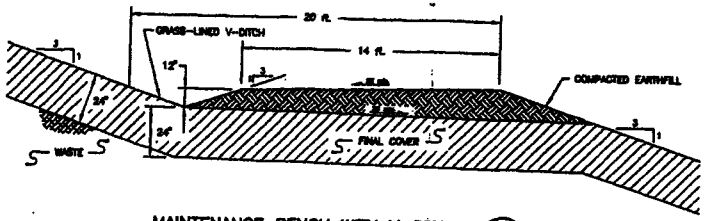
DRAINAGE SWALE (C 5,9) N.T.S.



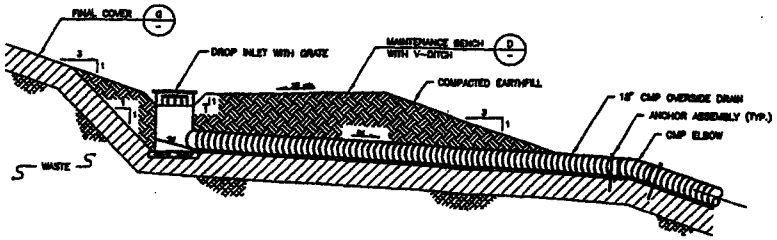
RUN-ON DIVERSION CHANNEL (D 5,8) N.T.S.



ACCESS ROAD (E 5) N.T.S.



MAINTENANCE BENCH WITH V-DITCH (F 5,9) N.T.S.

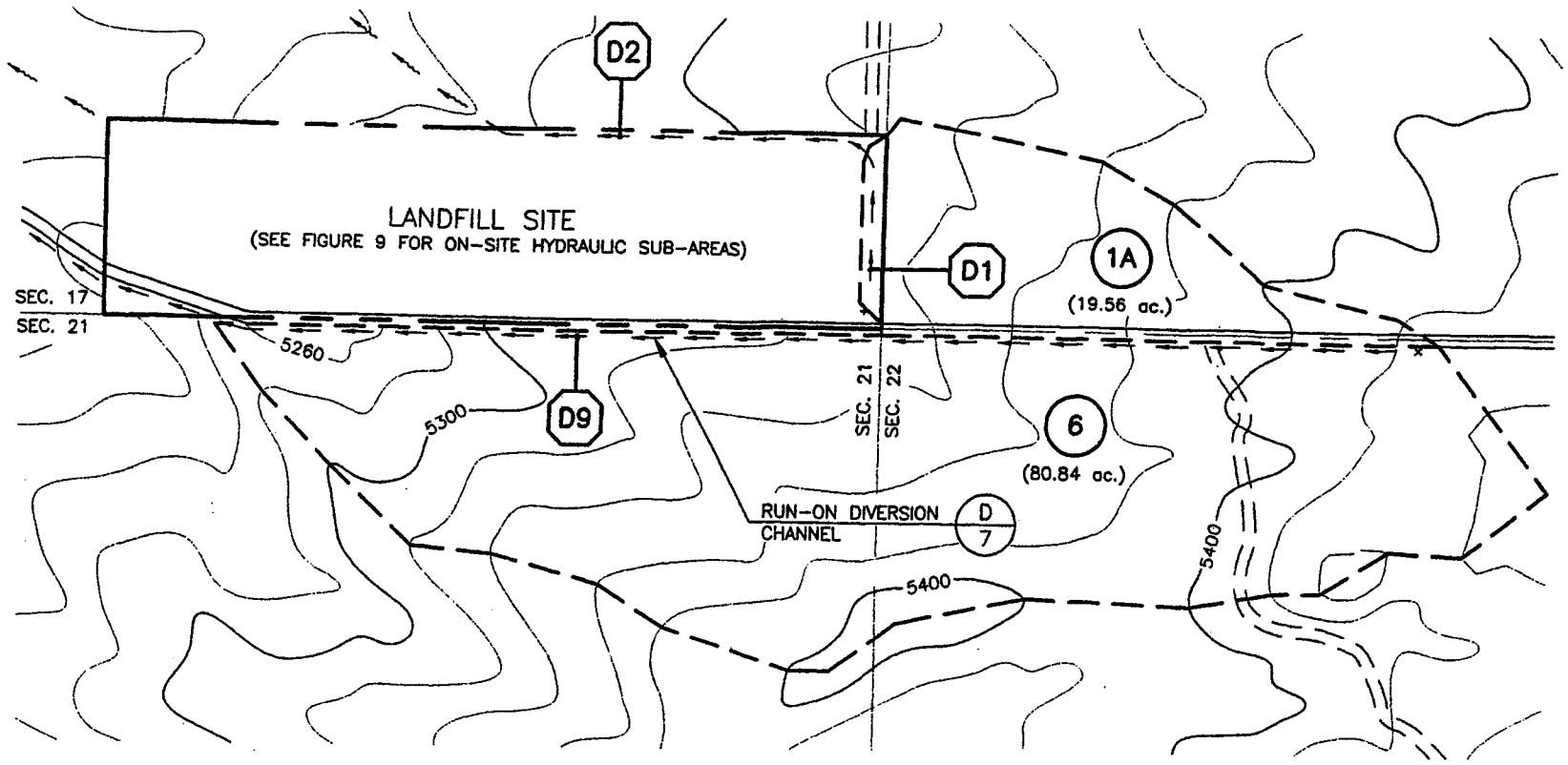


OVERSIDE DRAIN WITH DROP INLET (G 5,9) N.T.S.

9

J:\945013.02\fldetal.dwg @ 1"=200'

VECTOR ENGINEERING, INC Carson City, NV • Grass Valley, CA • El Dorado Hills, CA JOB NO. 945013.02 APPR. CEN DATE: 8/1/97	DETAILS FILLMORE CLASS IV LANDFILL MILLARD COUNTY, UTAH	FIGURE 7



LEGEND

- NATURAL DRAINAGE
- DRAINAGE CHANNEL
- BEGIN CHANNEL
- HYDRAULIC SUB-AREA BOUNDARY
- D1 — CHANNEL AND CULVERT DESIGNATION
- 4 — SUB-AREA DESIGNATION

NORTH

400 0 400 800

Map Scale in Feet
Contour Interval = 20 feet

Base topographic map modified from U.S.G.S. Fillmore, Utah 7.5-Minute Quadrangle (1961).
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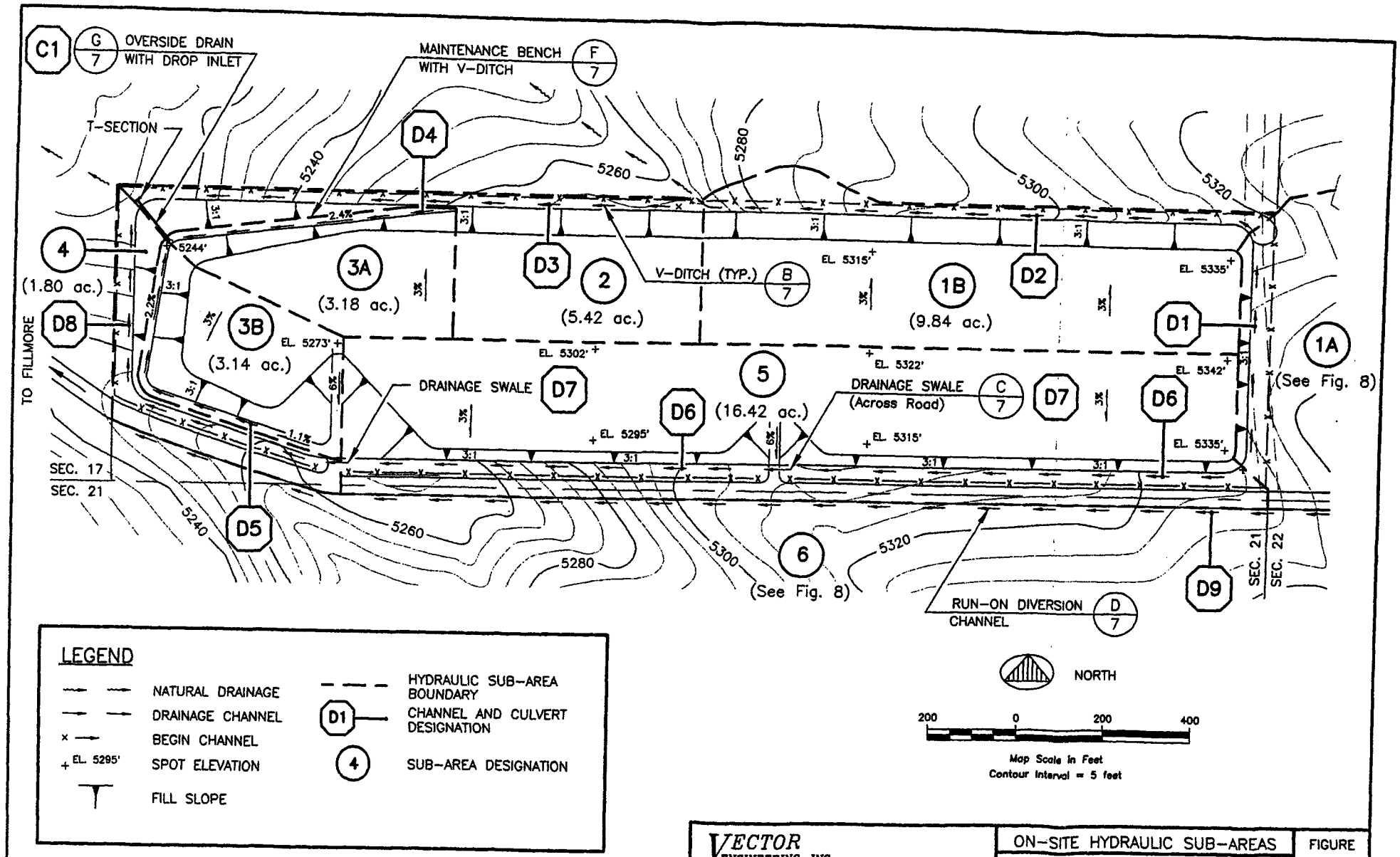
VECTOR ENGINEERING, INC
Carson City, NV • Grass Valley, CA • El Dorado Hills, CA

JOB NO. 945013.02 APPR. CEN DATE: 8/1/97

OFF-SITE HYDRAULIC SUB-AREAS

FILLMORE CLASS IV LANDFILL
MILLARD COUNTY, UTAH

FIGURE 8



LEGEND

- NATURAL DRAINAGE
- DRAINAGE CHANNEL
- BEGIN CHANNEL
- EL. 5295' SPOT ELEVATION
- FILL SLOPE
- HYDRAULIC SUB-AREA BOUNDARY
- D1 CHANNEL AND CULVERT DESIGNATION
- 4 SUB-AREA DESIGNATION

Base topographic map modified from U.S.G.S. Fillmore, Utah 7.5-Minute Quadrangle (1961).
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VECTOR ENGINEERING, INC
Carson City, NV • Grass Valley, CA • El Dorado Hills, CA
JOB NO. 945013.02 APPR. CEN DATE: 8/1/97

ON-SITE HYDRAULIC SUB-AREAS
FILLMORE CLASS IV LANDFILL
MILLARD COUNTY, UTAH

FIGURE 9

NITED STATES
:NT OF THE INTERIOR
.OGICAL SURVEY

FILLMORE QUADRANGLE
UTAH–MILLARD CO.
7.5 MINUTE SERIES (TOPOGRAPHI(
NE/4 FILLMORE 15' QUADRANGLE

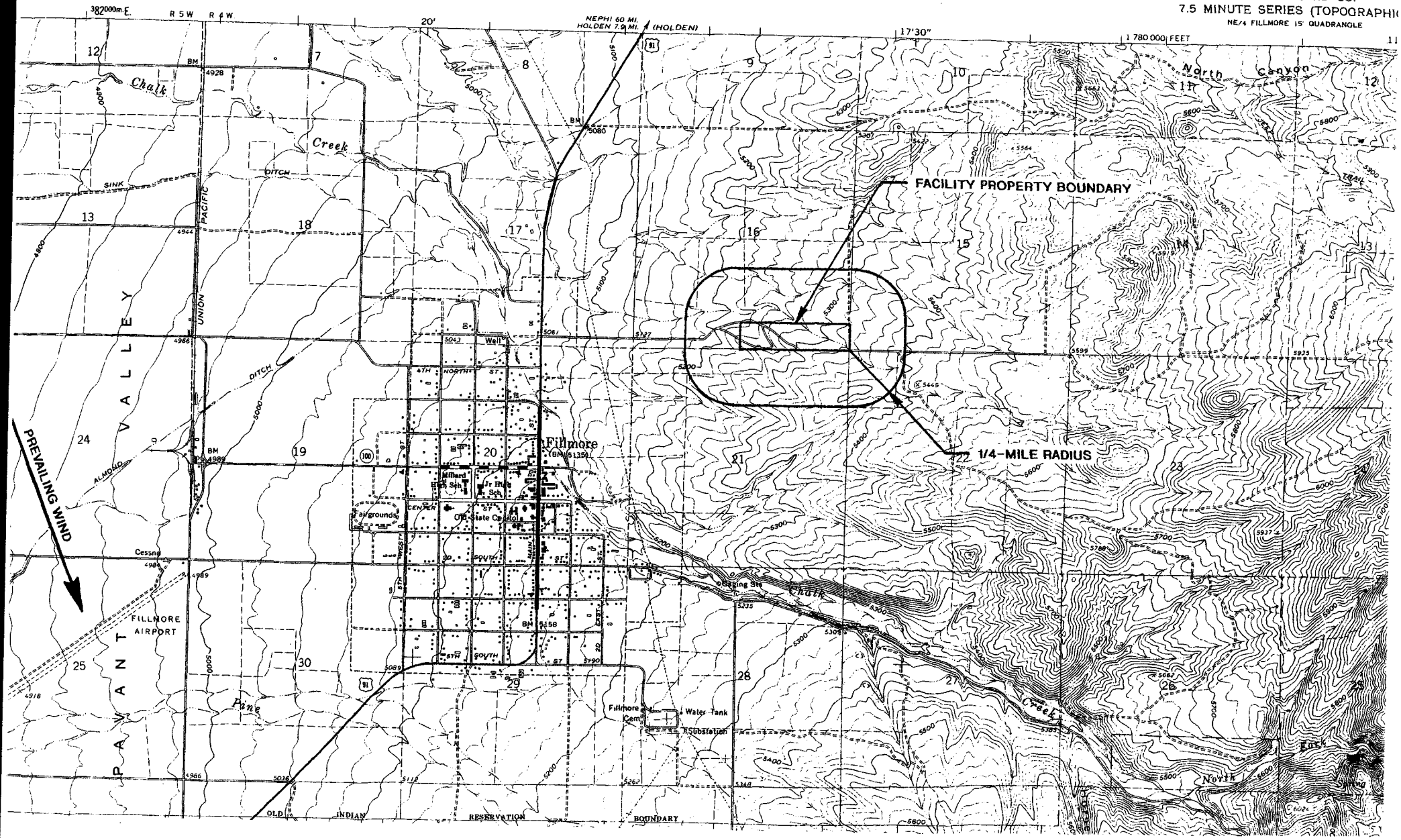


Plate 1

APPENDIX 2

Landfill Property Lease Agreement

INTERLOCAL AGREEMENT RENEWAL
LEASE OF LANDFILL

THIS RENEWAL, made and entered into effective this 5th day of December, 2017, by and between **MILLARD COUNTY**, a body corporate and politic and a legal subdivision of the State of Utah, whose mailing address is 50 South Main, Fillmore, Utah 84631, and **FILLMORE CITY**, a municipal corporation on the State of Utah, whose mailing address is P.O. Box 687, Fillmore, Utah. Millard County and Fillmore City are referred to collectively as the "parties"

RECITALS

The parties recite the following as the basis for entering this Renewal.

A. On August 18, 1997 the parties entered an Interlocal Agreement establishing the lease of the Fillmore City Landfill by Millard County and setting for terms of operation.

B. The August 18, 1997 Interlocal Agreement calls for 10 year renewals upon the agreement of both parties.

C. The parties now desire to renew the August 18, 1997 Interlocal Agreement for a 10 year period.

NOW, THEREFORE, for the mutual consideration expressed herein, the parties agree as follows:

Section 1. Renewal of Interlocal Agreement. The August 18, 1997 Interlocal Agreement is hereby renewed for a ten year period beginning on January 1, 2018 and ending on December 31, 2027 subject to all of the terms and conditions stated therein.

IN WITNESS WHEREOF, the parties hereto have executed this Renewal on the day and year first above written.

MILLARD COUNTY

By: Commission Chair

ATTEST:

FILLMORE CITY

By: Mayor

ATTEST:

APPENDIX 3

Loading Rate Calculations

FILLMORE CLASS IV LANDFILL
LOADING RATE CALCULATIONS
1996-2047

May,1996 Waste Received[1]:	8 cy
Estimated Waste Diversion[2]:	50%
Estimated Daily Volume[3]:	4 cy
Service Area Growth Rate[4]:	0.8% per year
Waste-to-Soil Ratio:	10 : 1
Target Fill Volume:	212,000 cy

		WASTE DISPOSAL			SOIL REQUIREMENT		TOTAL FILL	
Year	Years of Operation	Annual Total[5] (cy)	Disposal Rate (cy/day)	Cumulative Volume (cy)	In-Place Volume (cy)	Cumulative Volume (cy)	Annual Volume (cy)	Cumulative Volume (cy)
1996	0	1,040	4.0	1,040	104	104	1,144	1,144
1997	0	1,048	4.0	2,088	209	313	1,257	2,401
1998	1	1,057	4.1	3,145	315	627	1,371	3,772
1999	2	1,065	4.1	4,210	421	1,048	1,486	5,259
2000	3	1,074	4.1	5,284	528	1,577	1,602	6,861
2001	4	1,082	4.2	6,366	637	2,213	1,719	8,579
2002	5	1,091	4.2	7,457	746	2,959	1,837	10,416
2003	6	1,100	4.2	8,557	856	3,815	1,955	12,371
2004	7	1,108	4.3	9,665	967	4,781	2,075	14,446
2005	8	1,117	4.3	10,783	1,078	5,860	2,196	16,642
2006	9	1,126	4.3	11,909	1,191	7,050	2,317	18,959
2007	10	1,135	4.4	13,044	1,304	8,355	2,440	21,399
2008	11	1,144	4.4	14,188	1,419	9,774	2,563	23,962
2009	12	1,154	4.4	15,342	1,534	11,308	2,688	26,650
2010	13	1,163	4.5	16,505	1,650	12,958	2,813	29,463
2011	14	1,172	4.5	17,677	1,768	14,726	2,940	32,403
2012	15	1,181	4.5	18,858	1,886	16,612	3,067	35,470
2013	16	1,191	4.6	20,049	2,005	18,617	3,196	38,666
2014	17	1,200	4.6	21,249	2,125	20,742	3,325	41,991
2015	18	1,210	4.7	22,459	2,246	22,988	3,456	45,447
2016	19	1,220	4.7	23,679	2,368	25,355	3,588	49,034
2017	20	1,229	4.7	24,908	2,491	27,846	3,720	52,755
2018	21	1,239	4.8	26,148	2,615	30,461	3,854	56,609
2019	22	1,249	4.8	27,397	2,740	33,201	3,989	60,598
2020	23	1,259	4.8	28,656	2,866	36,066	4,125	64,722
2021	24	1,269	4.9	29,925	2,993	39,059	4,262	68,984
2022	25	1,279	4.9	31,205	3,120	42,179	4,400	73,384
2023	26	1,290	5.0	32,494	3,249	45,429	4,539	77,923
2024	27	1,300	5.0	33,794	3,379	48,808	4,679	82,602
2025	28	1,310	5.0	35,105	3,510	52,319	4,821	87,423
2026	29	1,321	5.1	36,425	3,643	55,961	4,963	92,387
2027	30	1,331	5.1	37,757	3,776	59,737	5,107	97,494
2028	31	1,342	5.2	39,099	3,910	63,647	5,252	102,746
2029	32	1,353	5.2	40,452	4,045	67,692	5,398	108,144
2030	33	1,364	5.2	41,815	4,182	71,873	5,545	113,689
2031	34	1,375	5.3	43,190	4,319	76,192	5,694	119,382
2032	35	1,386	5.3	44,575	4,458	80,650	5,843	125,225
2033	36	1,397	5.4	45,972	4,597	85,247	5,994	131,219
2034	37	1,408	5.4	47,380	4,738	89,985	6,146	137,365

		WASTE DISPOSAL			SOIL REQUIREMENT		TOTAL FILL	
Year	Years of Operation	Annual Total[5] (tons)	Disposal Rate (tons/day)	In-Place Volume (cy)	In-Place Volume (cy)	Cumulative Volume (cy)	Annual Volume (cy)	Cumulative Volume (cy)
2035	38	1,419	5.5	48,799	4,880	94,865	6,299	143,664
2036	39	1,430	5.5	48,804	4,880	99,746	6,311	149,975
2037	40	1,442	5.5	48,810	4,881	104,626	6,323	156,298
2038	41	1,453	5.6	48,815	4,882	109,508	6,335	162,632
2039	42	1,465	5.6	48,821	4,882	114,390	6,347	168,980
2040	43	1,477	5.7	48,827	4,883	119,273	6,359	175,339
2041	44	1,489	5.7	48,832	4,883	124,156	6,372	181,711
2042	45	1,500	5.8	48,838	4,884	129,040	6,384	188,095
2043	46	1,512	5.8	48,844	4,884	133,924	6,397	194,492
2044	47	1,525	5.9	48,850	4,885	138,809	6,410	200,901
2045	48	1,537	5.9	48,856	4,886	143,695	6,422	207,324
2046	49	1,549	6.0	48,862	4,886	148,581	6,435	213,759
2047	50	1,561	6.0	48,868	4,887	153,468	6,448	220,207

[1] Based on gate records maintained by Millard County.

[2] Assuming yard waste, tires, metal waste, and white goods are diverted from waste stream.

[3] Based on information in the Millard County Solid Waste Management Plan (Stansbury, 1993).

[4] Based on information provided in the Millard County Solid Waste Managment Plan (Stansbury, 1993).

[5] Based on waste disposal 260 days per year.

APPENDIX 4

Record keeping, Inspection, and Training Forms

MILLARD COUNTY LANDFILL
Daily Activity Log

DATE	TIME	INSPECTOR INITIALS	DRIVER'S NAME	DRIVER'S INITIALS	VEHICLE LICENSE	ESTIMATED WASTE VOLUME	RANDOM CHECK	OBSERVATIONS, DESCRIPTION OF REJECTED LOAD, REASON FOR REJECTION, VARIATIONS FROM OPS PLAN

FILLMORE CLASS IVb LANDFILL
QUARTERLY / PERIODIC INSPECTION LOG

DATE	TIME	INSPECTOR	OBSERVATIONS	RECOMMENDED ACTIONS	DATE COMPLETE

LANDFILL ANNUAL REPORT

For Calendar year 2017

Administrative Information (Please enter all the information requested below - type or print legibly)

Facility Name:_____

Facility Mailing Address:_____
(Number & Street, Box and/or Route)

City:_____ Zip Code:_____

County:_____ Permit No.:_____

Owner

Name:_____ Phone No.:( )_____

Mailing Address:_____
(Number & Street, Box and/or Route)

City:_____ State:Utah_____ Zip Code:_____

Contact's Name:_____ Title:_____

Contact's Mailing Address:_____

Phone No.:( )_____ Contact's Email Address:_____

Operator *(Complete this section only if the operator is not an employee of the Owner shown above)*

Name:_____ Phone No.:( )_____

Mailing Address:_____
(Number & Street, Box and/or Route)

City:_____ State:Utah_____ Zip Code:_____

Contact's Name:_____ Title:_____

Contact's Mailing Address:_____

Phone No.:( )_____ Contact's Email Address:_____

Facility Type and Status

☐ Class I ☐ Class IIIb ☐ Class V
☐ Class II ☐ Class IVa ☐ Class VI
☐ Class IIIa ☐ Class IVb

Facility operates separate cells for C/D and municipal waste. Yes ☐ No ☐

If facility was permanently closed during the year enter date closed:_____

Annual Disposal

Total tons received at facility for disposal:

Waste Type	Waste Origin: In-State	Waste Origin: Out-of-State	Total	Measurement: Tons	Measurement: Cubic Yards
Municipal	_____	_____	_____	☐	☐
Industrial	_____	_____	_____	☐	☐
C/D[1]	_____	_____	_____	☐	☐

[1]C/D waste includes all waste going to a Class IV or VI landfill cell

Conversion Factor Used

☐ None ☐ From rules ☐ Site Specific Conversion (please list):_____

Recycling

Material Recycled:_____ Tons ☐ Cubic Yds. ☐

(Material recycled should not be included in disposed tons reported. Report compost on separate form. Circle tons or yards)

Utah Disposal Fee

Disposal Fee Required to be Paid to State Yes ☐ No ☐ (If yes please show fees paid below)

Municipal	$_____	C/D	$_____
Industrial	$_____	Annual	$_____

(Municipal, Industrial and C/D are fees paid by Commercial Facilities. Annual fee is paid by facilities operated by a municipality)

Landfill Capacity

Current Landfill Remaining Capacity

Tons:_____ Cubic Yards:_____

Years:_____ Acres:_____

Acres Currently Open:_____ Acres Currently Closed:_____

Financial Assurance

Current Closure Cost Estimate:_____

Current Post-Closure Cost Estimate:_____

Current Amount or Balance in Mechanism:_____

(If facility permit has been renewed if balance does not equal or exceed total for closure and post-closure care please contact the Division)

Current Financial Assurance Mechanism:_____

(ie. Bond, Trust Fund, Corporate or government Test etc.)

Mechanism Holder and Account Number:_____

(ie. Name of Bond Company, Bank etc. Account number)

Financial Assurance: Each facility must recalculate the cost of closure and post-closure care to account for inflation and design changes each year. The inflation factor can be found on the Division web page. Facilities that are using a trust account should include a copy of the most recent account statement.

Note Facilities using "Local Government Financial Test" or the "Corporate Financial Test" must provide the information required in R315-309-8(4) or R315-309-9(3) each year.

Other Reports and Information

Ground Water Monitoring: Class I and V landfills only. Check if exempt ☐

Explosive Gas Monitoring: Class I, II and V landfills only. Check if exempt ☐

Training Report: A report of all training programs or procedures completed by facility personnel during the year.

Does the facility have a landfill gas collection system Yes ☐ No ☐ If yes please briefly describe use of gas, e.g., flared or used for electricity generation. _____

Signature:_____ **Date:**_____

Signature should be by an executive officer, general partner, proprietor, elected official, or a duly authorized representative. A duly authorized representative must meet the requirements of the solid waste rules (UAC R315-310-2(4)(d)).

Print name:_____ Title:_____

MILLARD COUNTY LANDFILL
NOTIFICATION OF IN SERVICE TRAINING

Please Print

Employee's Name *(Last Name)* *(First Name)* *(Middle Initial)*

Employee Number *Social Security Number* *Class Completion Date*

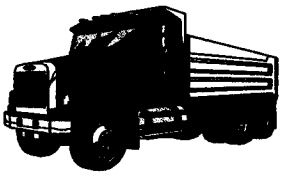
Title of School or Training *Location* *Number of Hours*

Employee Signature *Date*

I verify that this employee was present for the above listed training hours.

Training Officer, Instructor, or Supervisor *Date*

Millard County Landfill



Meeting Agenda

Meeting TitleLandfill Safety Meeting	**Landfill Safety Meeting**	**Start Time**	
		Stop Time	
Date		**Place**	

PERSONS ATTENDING

1		2	
3		4	
5		6	
7		8	
9		10	
11		12	

TOPICS OF DISCUSSION

		X
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

MEETING NOTES

APPENDIX 5

Drainage Design Calculations

Summary of Results

Table 5-1
Summary of Hydrologic Analyses

Time Elapsed (1) (hr)	Estimated Run-Off Flows by Sub-Area, in cfs (2)										
	1A	1B	Combined Flows	2	3A	3B	Combined Flows	4	5	Combined Flows	6
12.0	1	1	2	0	0	0	0	0	1	1	3
12.1	1	2	3	0	0	0	0	0	3	3	5
12.2	2	4	6	0	0	1	1	0	6	6	9
12.3	4	6	10	1	1	1	2	0	10	10	17
12.4	8	7	15	1	1	2	3	1	12	13	29
12.5	11	7	18	2	2	2	4	1	12	13	40
12.6	13	6	19	3	2	2	4	1	10	11	46
12.7	12	4	16	3	2	2	4	1	7	8	46
12.8	11	3	14	3	2	1	3	1	6	7	42
13.0	7	2	9	2	1	1	2	1	4	5	30
13.2	5	2	7	2	1	1	2	0	3	3	21
13.4	3	1	4	1	1	0	1	0	2	2	16
13.6	3	1	4	1	0	0	0	0	2	2	12
13.8	2	1	3	1	0	0	0	0	1	1	10
14.0	2	1	3	1	0	0	0	0	1	1	8
Peak	**13**	**7**	**19**	**3**	**2**	**2**	**4**	**1**	**12**	**13**	**46**

Notes:

1. Time elapsed since beginning of storm event, in hours.
2. Complete results of each hydrograph are not included in this summary.
3. See attached TR-55 data sheets for input and output details.

Table 5-2

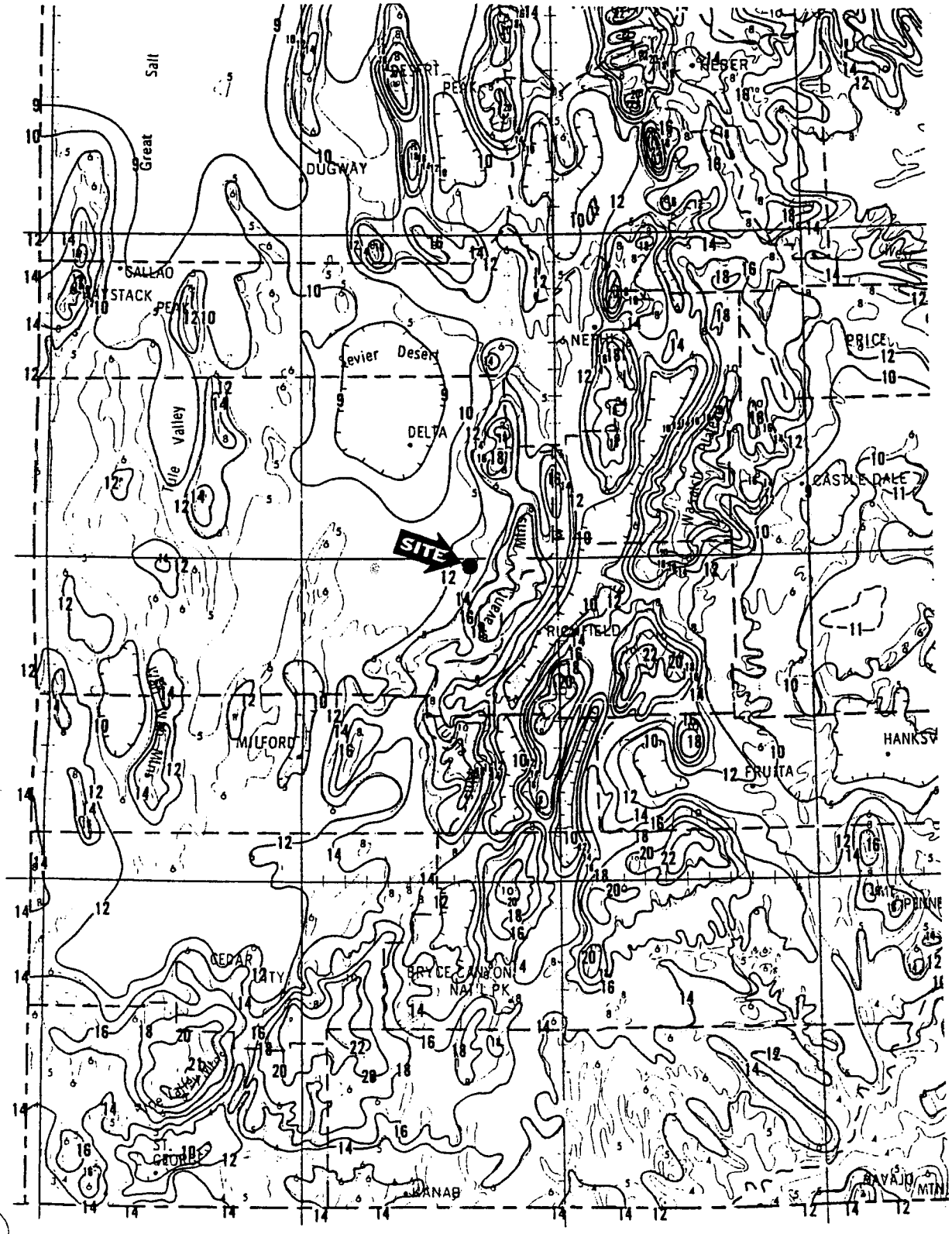
Summary of Hydraulic Analyses

Description	Open Channel Flow							Closed Conduit Flow					
	Channel Number	Contributing Sub-Areas	Lining	Slope	Discharge (cfs)	Flow Depth (ft)	Velocity (fps)	Culvert Number	Diameter (feet)	Slope	Discharge (cfs)	Flow Depth (feet)	Velocity (fps)
V-Ditch	D1	1A	Grass	1.7%	13	1.1	3.6						
V-Ditch	D2	1A, 1B	Grass	4.3%	19	1.1	5.6						
V-Ditch	D3	2	Grass	4.1%	3	0.5	3.5						
V-Ditch	D4	3A	Grass	2.4%	2	0.5	2.6						
V-Ditch	D5	3B	Grass	1.1%	2	0.6	1.9						
V-Ditch		3B	Grass	2.2%	2	0.5	2.5						
CMP Culvert		3A, 3B						C1	1.5	5.0%	4	0.6	6.4
CMP Culvert		3A, 3B						C1	1.5	33.3%	4	0.4	12.5
V-Ditch	D6	5	Grass	3.8%	12	0.9	4.8						
Swale	D7	5	Gravel	2.0%	12	0.7	2.8						
V-Ditch	D8	4, 5	Grass	1.1%	13	1.2	3.1						
		4, 5	Grass	6.1%	13	0.9	5.8						
Trap. Ditch	D9	6	Grass	3.2%	46	1.4	6.7						

Notes:

1. Refer to Figures 8 and 9 for channel and culvert designations and locations.
2. See attached TR-55 and Flowmaster data sheets for input and output details.

Figures and Charts



NORTH

FROM FIGURE 25, NOAA ATLAS 2, VOL. VI (UTAH)
PRECIPITATION IN TENTHS OF AN INCH

VECTOR ENGINEERING, INC

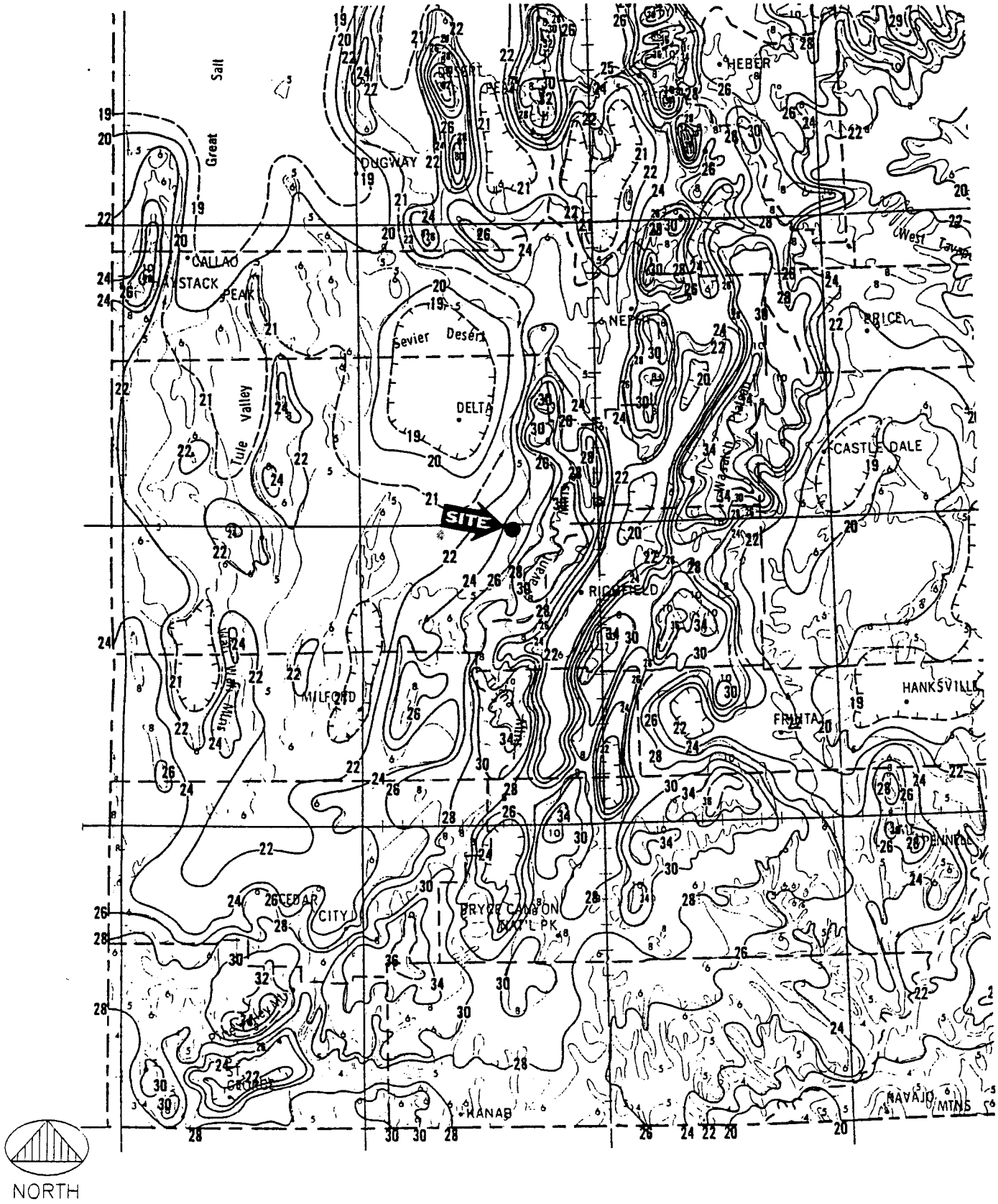
Carson City, NV ● Grass Valley, CA ● Santiago, Chile ● Mendoza, Argentina

JOB NO. 945013.02 APPR. CEN DATE: 8/1/97

2-YEAR, 24-HOUR PRECIPITATION

FILLMORE CLASS IV LANDFILL
Fillmore, Utah

FIGURE 5A



FROM FIGURE 28, NOAA ATLAS 2, VOL. VI (UTAH)
PRECIPITATION IN TENTHS OF AN INCH

VECTOR ENGINEERING, INC

Carson City, NV ● Grass Valley, CA ● Santiago, Chile ● Mendoza, Argentina

JOB NO. 945013.02 APPR. CEN DATE: 8/1/97

25-YEAR, 24-HOUR PRECIPITATION

FILLMORE CLASS IV LANDFILL
Fillmore, Utah

FIGURE 5B

Table 2-2c.—Runoff curve numbers for other agricultural lands[1]

Cover description		Curve numbers for hydrologic soil group—			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing.[2]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element.[3]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	[4]30	48	65	73
Woods—grass combination (orchard or tree farm).[5]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods.[6]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	[4]30	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

[1]Average runoff condition, and $I_a = 0.2S$.

[2]*Poor:* <50% ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: >75% ground cover and lightly or only occasionally grazed.

[3]*Poor:* <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

[4]Actual curve number is less than 30; use CN = 30 for runoff computations.

[5]CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

[6]*Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Exhibit A-1, continued: Hydrologic soil groups for United States soils

BOLFAR	C	BORGEAU	B	BRACEVILLE	C	BREW	C	BRCKENHORN	D
BOLICKER	B	BORGES	D	BRACKEN	B	BREWER	C	BROLLIAR	D
BOLIO	D	BORIANA	D	BRACKETT	C	BREWLESS	C	BROMER	C
BOLIVAR	B	BORKY	C	BRAD	D	BREWSTER	D	BROMIDE	B
BOLLING	C	BORNSTEDT	C	BRADDOCK	B	BREWTON	C	BROMO	B
BOLSA	C	BORO	D	BRADEN	B	BRIBUTTE	D	BRONAUGH	B
BOLTON	B	BOROBEY	C	BRADENTON	B/D	BRICKEL	C	BRONCHO	B
BOLTUS	D	BORREGO	D	BRADENTON, FLOODED	D	BRICKHILL	C	BRONCHO, LOAMY SUBSTRATUM	A
BOMAR	C	BORREGUERO	C	BRADER	D	BRICKTON	C		
BOMBADIL	D	BORSKI	B	BRADSHAW	B	BRICO	C	BRONELL	B
BOMBAY	B	BORTH	C	BRADSON	B	BRIDGE	C	BRONSON	B
BOMOSEEN	C	BORUP	B/D	BRADWAY	C	BRIDGECREEK	C	BRONTE	C
BON	B	BORVANT	D	BRADY	B	BRIDGEHAMPTON	B	BROOKE	D
BONAIR	D	BOSANKO	D	BRADYVILLE	C	BRIDGEPORT	B	BROOKFIELD	B
BONANZA	B	BOSCO	B	BRAFFITS	B	BRIDGER	B	BROOKINGS	B
BONAPARTE	A	BOSKET	B	BRAGG	C	BRIDGESON	D	BROOKLYN	C/D
BONCLAIR	B	BOSLER	B	BRAHAM	B	BRIDGESON, DRAINED	C	BROOKMAN	D
BOND	D	BOSO	D	BRAILSFORD	C	BRIDGET	B	BROOKSHIRE	C
BONDFARM	D	BOSQUE	B	BRAINERD	C	BRIDGEWATER	B	BROOKSIDE	C
BONDMAN	D	BOSSBURG	D	BRALLIER	D	BRIEDWELL	B	BROOKSTON	B/D
BONDRANCH	D	BOSSBURG, DRAINED	C	BRAM	C	BRIEF	B	BROOKSTON, STONY	D
BONDUEL	C	BOSTON	C	BRAMARD	B	BRIER	D	BROOKSVILLE	D
BONE	D	BOSTRUM	D	BRAMLETT	C	BRIGGS	A	BROOME	B
BONEEK	B	BOSTWICK	B	BRANWELL	C	BRIGGSDALE	C	BROPHY	A/D
BONEYARD	C	BOSVILLE	C	BRANCH	B	BRIGGSVILLE	C	BROSE	D
BONFIELD	B	BOSWELL	D	BRANCROFT	C	BRIGHTON	B/D	BROSELEY	B
BONFRI	C	BOSWORTH	C	BRAND	D	BRIGHTWOOD	B	BROSS	B
BONG	A	BOTELLA	B	BRANDENBURG	A	BRILEY	B	BROUGHTON	D
BONHAM	C	BOTHWELL	B	BRANDON	B	BRILL	B	BROWARD	C
BONIFAY	A	BOTHWI	C	BRANDYWINE	C	BRILLIANT	B	BROWER	B
BONILLA	B	BOTON	B	BRANFORD	B	BRIMFIELD	C/D	BROWNBEAR	C
BONITA	D	BOTTINEAU	C	BRANHAM	C	BRIMLEY	B	BROWNDELL	D
BONJEA	D	BOTTLE	C	BRANSCOMB	B	BRIMSTONE	D	BROWNELL	B
BONN	D	BOTTLEROCK	C	BRANTFORD	B	BRINEGAR	B	BROWNFIELD	A
BONNEAU	A	BOULDER	B	BRANTLEY	C	BRINGMEE	B	BROWNLEE	B
BONNELL	C	BOULDER LAKE	D	BRANYON	D	BRINKER	C	BROWNRIGG	D
BONNER	B	BOULDER POINT	B	BRASHEAR	C	BRINKERT	C	BROWNSCOMBE	C
BONNERDALE	B	BOULDERCREEK	B	BRASSFIELD	B	BRINKERTON	D	BROWNSCREEK	B
BONNET	B	BOULDIN	B	BRATTON	B	BRINNUM	D	BROWNSDALE	C
BONNEVILLE	A	BOULFLAT	C	BRAUN	C	BRINNUM, DRAINED	C	BROWNSTO	B
BONNICK	A	BOUNCER	D	BRAVANE	D	BRIONES	B	BROWNSVILLE	C
BONNIE	C/D	BOUNDARY	B	BRAWLEY	D	BRIOS	A	BROWNTON	C/D
BONNIE, PONDED	C	BOURBON	B	BRAXTON	C	BRISBANE	B	BROXON	B
BONNYDOON	D	BOURNE	C	BRAY	D	BRISCO	B	BROYLES	B
BONO	D	BOUSIC	D	BRAYTON	C	BRISCOT	D	BRUBECK	D
BONSALL	D	BOW	D	BRAZILTON	D	BRISCOT, DRAINED	C	BRUCE	B/D
BONTA	B	BOWBAC	C	BRAZITO	A	BRISKY	D	BRUELLA	B
BONTI	C	BOWBELLS	B	BRAZITO, THICK SURFACE	B	BRISTOW	D	BRUELLA, HARD SUBSTRATUM	C
BONWIER	C	BOWDISH	C			BRITTC	D		
BONWIER, GRADED	D	BOWDLE	B	BRAZITO, THICK SURFACE, SALINE-ALKALI	C	BRITTON	D	BRUFFY	B
BONZ	C	BOWDOIN	D			BRITWATER	B	BRUHEL	B
BOOFORD	C	BOWDRE	C			BROAD	C	BRUIN	B
BOOFUSS	D	BOWEN	C	BRAZON	C	BROAD CANYON	B	BRUMAN	B
BOOKCLIFF	B	BOWERS	C	BRAZORIA	D	BROADALBIN	C	BRUMBAUGH	C
BOOKER	D	BOWES	B	BRECKENRIDGE	B/D	BROADAX	B	BRUNCAN	D
BOOKOUT	C	BOWIE	B	BRECKNOCK	B	BROADBROOK	C	BRUNDAGE	D
BOOKWOOD	B	BOWLAKE	C	BRECKSVILLE	C	BROADHEAD	C	BRUNEEL	D
BOOMER	B	BOWLUS	B	BREECE	B	BROADHURST	D	BRUNELDA	D
BOOMSTICK	D	BOWMAN	C	BREGAR	D	BROADMOOR	C	BRUNO	A
BOOMTOWN	D	BOWMANSVILLE	B/D	BREIEN	B	BROADUS	B	BRUNSWICK	B
BOONE	A	BOWNS	C	BREKO	B	BROADWELL	B	BRUNZELL	B
BOONESBORO	B	BOWSTRING	A/D	BREMER	C	BROBETT	C	BRUSHCREEK	C
BOONEVILLE	B	BOXELDER	C	BREMER, SANDY SUBSTRATUM	B	BROCK	D	BRUSHCREEK	B
BOONTON	C	BOXFORD	C			BROCKET	C	BRUSSELS	C
BOONVILLE	C	BOXVILLE	C	BREMO	C	BROCKGULCH	C	BRUSSETT	B
BOONVILLE	D	BOXWELL	C	BREMS	A	BROCKLISS	B	BRYAN	A
BOOTH	C	BOY	B	BRENDA	C	BROCKMAN	C	BRYANT	B
BOOTHBAY	C	BOYCE	D	BRENHAM	C	BROCKO	B	BRYARLY	D
BOOTJACK	D	BOYD	D	BRENNAN	B	BROCKPORT	D	BRYCAN	B
BOOTS	A/D	BOYER	B	BRENNER	D	BROCKROAD	C	BRYCE	D
BOQUILLAS	C	BOYETT	B	BRENT	D	BROCKSBURG	B	BRYHAN	B
BORACHO	C	BOYKIN	B	BRENTON	B	BROCKTON	D	BRYSTAL	B
BORAH	C	BOYLE	D	BRENTSVILLE	C	BROCKWAY	B	BUB	C
BORAVALL	D	BOYSAG	D	BRENTWOOD	B	BROCKWELL	B	BUBUS	B
BORDA	D	BOYSEN	D	BRESSA	C	BRODALE	C	BUCAN	C
BORDEAUX	B	BOZE	B	BRESSER	B	BRODY	C	BUCAN, GRAVELLY	D
BORDEN	B	BOZEMAN	B	BREVARD	B	BROE	B	BUCHANAN	C
BORDER	B	BRABAS	D	BREVATOR	C	BROGAN	B	BUCHEL	D
BOREALIS	D	BRACE	C	BREVORT	B/D	BROGDON	B	BUCHENAU	C

NOTES: TWO HYDROLOGIC SOIL GROUPS SUCH AS B/C INDICATES THE DRAINED/UNDRAINED SITUATION.
MODIFIERS SHOWN, E.G., BEDROCK SUBSTRATUM, REFER TO A SPECIFIC SOIL SERIES PHASE FOUND IN SOIL MAP LEGEND.

Exhibit A-1, continued: Hydrologic soil groups for United States soils

OXENDINE	D
OXERINE	C
OXFORD	D
OXHEAD	B
OXLEY	C
OXWALL	D
OYHUT	C
OYLEN	C
OZAMIS	D
OZAN	D
OZAUKEE	C
OZETTE	C
OZIAS	D
PAAIKI	B
PAALOA	B
PAAUMAU	A
PABLO	D
PACHAPPA	B
PACHECO	C
PACHECO, DRAINED	B
PACIFICO	C
PACK	C
PACKARD	D
PACKER	B
PACKMAN	B
PACKTRAIL	C
PACKWOOD	D
PACO	C
PACOLET	B
PACTOLA	B
PACTOLUS	A
PADDOCK	C/D
PADEN	C
PADILLA	C
PADINA	B
PADRES	B
PADRONES	B
PADUCAH	B
PADUS	B
PAESL	B
PAGARI	B
PAGEBROOK	D
PAGINA	C
PAGODA	C
PAGOSA	C
PAGUATE	C
PAHAKA	B
PAHOKEE	B/D
PAHRANAGAT	C
PAHRANAGAT, VERY POORLY DRAINED	D
PAHRANGE	C
PAHREAH	C
PAHROC	D
PAHRUMP	C
PAHSIMEROI	B
PAIA	B
PAICE	D
PAILO	B
PAINESVILLE	C
PAINT	D
PAISLEY	D
PAIT	B
PAJARA	C
PAJARITO	B
PAJUELA	B
PAKA	B
PAKALA	B
PAKINI	B
PALACIOUS	D
PALAFOX	C
PALANUSH	C
PALAPALAI	B
PALATINE	B
PALAU	B
PALAZZO	C
PALBOONE	B
PALINOR	C
PALISADE	B
PALIX	B
PALLS	C
PALM BEACH	A
PALMA	B
PALMAR	D
PALMAREJO	C
PALMER CANYON	C
PALMERDALE	B
PALMETTO	B/D
PALMETTO, DEPRESSIONAL	D
PALMICH	B
PALMS, OVERWASH	A/D
PALMS, MAAT>50	A/D
PALMS, MAAT<50	A/D
PALMS, PONDED	D
PALMS, SANDY SUBSTRATUM	A/C
PALMS, GRAVELLY SUBSTRATUM	A/D
PALMYRA	B
PALO	D
PALODURO	B
PALOMARIN	B
PALOMAS	B
PALOMINO	D
PALON	B
PALOPINTO	D
PALOS VERDES	D
PALOUSE	B
PALSGROVE	B
PALUXY	B
PAMISON	B
PAMLICO	D
PAMOA	B
PAMSDEL	C
PAMUNKEY	B
PANA	B
PANAEWA	D
PANAK	B
PANAMA	B
PANAMINT	B
PANASOFFKEE	C/D
PANCHERI	B
PANDO	B
PANDOAH	C
PANDORA	B/D
PANDURA	D
PANE	B
PANGBORN	D
PANGUITCH	B
PANHANDLE	B
PANHILL	B
PANIN	B
PANIOGUE	B
PANIOGUE, WET	C
PANITCHEN	B
PANKEY	C
PANMOD	C
PANOCHE	B
PANOCHE, SALINE-ALKALI, WET	C
PANOLA	D
PANOR	B
PANORAMA	B
PANOZA	B
PANSEY	B
PANTANO	B
PANTEGO	D
PANTERA	B
PANTHER	C
PANTON	C
PAOLA	B
PAOLI	B
PAPAA	B
PAPAC	C
PAPAGUA	B
PAPAI	B
PAPALOTE	B
PAPINEAU	C
PAPOOSE	C
PAPA	A
PARACHUTE	B
PARADISE	D
PARADOX	C
PARANAT	B
PARANAT, DRAINED, SALINE	B/D
PARASOL	D
PARCELAS	B
PARCHIN	A/D
PARCHIN, COOL	A/D
PARDALOE	A/D
PARDEE	D
PARDEEVILLE	A/C
PAREHAT	
PAREMT	A/D
PARIATO	
PARIETTE	B
PARISA	D
PARISIAN	B
PARKALLEY	B
PARKAY	B
PARKDALE	D
PARKE	B
PARKER	D
PARKFIELD	D
PARKHILL	B
PARKINSON	B
PARKS	B
PARKVIEW	B
PARKVILLE	D
PARKWOOD	B
PARLEYS	C
PARLIN	B
PARLO	B
PARMELE	D
PARMELOW	B
PARMENTER	B
PARMLFED	B
PARNELL	C/D
PARQUAT	B
PARR	B
PARRAN	C
PARRISH	B/D
PARRITA	D
PARSHALL	B
PARSIPPANY	D
PARSONS	B
PARTLOW	B
PARTOY	B
PARTRI	B
PARTRIDGE	B
PASAGSHAK	C
PASCO	B
PASCO, DRAINED	C
PASO SECO	C
PASQUETTI	B
PASQUETTI, MODERATELY WET	C
PASQUETTI, DRAINED	C
PASQUOTANK	D
PASS CANYON	B
PASSAR	B
PASSCREEK	B
PASTERN	D
PASTIK	D
PASTORIUS	B/D
PASTURA	B
PATAMA	D
PATCHIN	D
PATE	A
PATELZICK	B
PATENT	D
PATHEAD	C
PATILLAS	C
PATILO	A
PATIO	C
PATIT CREEK	C
PATNA	D
PATOS	B
PATOUTVILLE	B
PATRICIA	C
PATRICK	B
PATROLE	C
PATTANI	D
PATTEE	B
PATTENBURG	B
PATTER	B
PATTERSON	D
PATTON	C
PAUL	B
PAULDING	D
PAULINA	B
PAULSON	C
PAULVILLE	B/D
PAUMALU	D
PAUNSAUGUNT	C
PAUSANT	C
PAUWELA	D
PAVAIAI	B
PAVANT	B
PAVER	B
PAVILLION	B
PAVO	B
PAVOHROO	C
PAWCATUCK	B/D
PAWHUSKA	B
PAWLING	B
PAWNEE	B
PAXICO	C
PAXTON	B/D
PAXVILLE	B
PAYETTE	C
PAYMASTER	B
PAYNE	C
PAYNECREEK	C
PAYSON	B
PEACHAM	C
PEACHLAND	C/D
PEARL	B
PEARL HARBOR	B
PEARSOLL	D
PEASLEY	C
PEASPEAR	D
PEAVINE	B
PEAWICK	C/D
PEBBLEPOINT	D
PECATONICA	D
PECKHAM	D
PECKISH	C
PECOS	A
PECTURE	D
PEDCAT	D
PEDEE	C
PEDERNALES	D
PEDIGO	D
PEDLEFORD	C
PEDOLI	
PEDRICK	C
PEDRO	B/D
PEEBLES	D
PEEKO	C
PEEL	C
PEELER	D
PEERLESS	C
PEETZ	B
PEEVER	D
PEEYYWELL	C
PEGLEG	D
PEGLER	C
PEGRAM	D
PEKAY	C
PEKIN	C
PELAHATCHIE	B
PELAN	B
PELEE	C
PELELIU	B
PELHAM	B
PELIC	C
PELION	C
PELKIE	B
PELLA	B
PELLEJAS	C
PELLICER	D
PELONCILLO	B
PELTIER	C
PEMBERTON	B
PEMBROKE	B
PEMENE	B/D
PEMI	B
PENA	D
PENAPON	D
PENASCO	D
PENCE	B
PEND OREILLE	B
PENDANT	D
PENDARVIS	B
PENDEN	B
PENDER	C
PENDERGRASS	C
PENDLETON	B
PENDPOY	B
PENELAS	B
PENEY	B
PENGILLY	D
PENGRA	D
PENINSULA	B
PENISTAJA	D
PENITENTE	B
PENLAW	B
PENN	C
PENNEKAMP	B
PENNELL	B
PENNEY	C
PENNICHUCK	B
PENNSUCO	D
PENO	D
PENOYER	D
PENROSE	D
PENSORE	B
PENTHOUSE	D
PENTZ	D
PENWELL	D
PENWOOD	C
PENZANCE	D
PEOGA	C
PEOH	C
PEOH, DRAINED	C
PEOLA	D
PEONE	D
PEONE, DRAINED	D
PEORIA	C
PEOTONE	C
PEPAL	C
PEPOON	C
PEPPER	C
PEPTON	B
PEQUAMING	C
PEQUEA	C
PEQUOP	D
PERALTA	C
PERAZZO	C
PERCETON	B
PERCHAS	B
PERCILLA	A
PERCIVAL	C
PERCOUN	C
PERCY	C
PERDIN	D
PERELLA	B
PERELLA, MODERATELY WET	C
PERHAM	C
PERICO	B

NOTES: TWO HYDROLOGIC SOIL GROUPS SUCH AS B/C INDICATES THE DRAINED/UNDRAINED SITUATION. MODIFIERS SHOWN, E.G., BEDROCK SUBSTRATUM, REFER TO A SPECIFIC SOIL SERIES PHASE FOUND IN SOIL MAP LEGEND.

TR55 Results - Final Site Conditions

TR-55 CURVE NUMBER COMPUTATION VERSION 1.11

Project : FILLMORE CLASS IV LANDFILL User: RBB Date: 01-08-97
County : MILLARD State: UT Checked: Cen Date: 1/9/97
Subtitle: HYDRAULIC ANALYSIS: SUB-AREA 1
Subarea : 1a

COVER DESCRIPTION		Hydrologic Soil Group A	B	C	D
		Acres (CN)			
OTHER AGRICULTURAL LANDS					
Pasture, grassland or range	good	-	-	-	19.6(80)
Total Area (by Hydrologic Soil Group)					19.6

SUBAREA: 1a TOTAL DRAINAGE AREA: 19.6 Acres WEIGHTED CURVE NUMBER:80

TR-55 CURVE NUMBER COMPUTATION VERSION 1.11

Project : FILLMORE CLASS IV LANDFILL User: RBB Date: 01-08-97
County : MILLARD State: UT Checked: cen Date: 1/9/97
Subtitle: HYDRAULIC ANALYSIS: SUB-AREA 1
Subarea : 1b

COVER DESCRIPTION		Hydrologic Soil Group A	B	C	D
		Acres (CN)			
OTHER AGRICULTURAL LANDS					
Pasture, grassland or range	good	-	-	-	9.84(80)
Total Area (by Hydrologic Soil Group)					9.84

SUBAREA: 1b TOTAL DRAINAGE AREA: 9.84 Acres WEIGHTED CURVE NUMBER:80

TR-55 Tc and Tt THRU SUBAREA COMPUTATION VERSION 1.11

Project : FILLMORE CLASS IV LANDFILL User: RBB Date: 01-08-97
County : MILLARD State: UT Checked: Cen Date: 1/9/97
Subtitle: HYDRAULIC ANALYSIS: SUB-AREA 1

---------- Subarea #1 - 1a ----------

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	1.4	300	.051	E					0.387
Shallow Concent'd		1558	.051	u					0.119
Open Channel		580						2.1	0.077
								Time of Concentration =	0.58*
Shallow Concent'd		1558	.051	u					0.119
Open Channel		580						2.1	0.077
								Travel Time =	0.20*

---------- Subarea #2 - 1b ----------

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	1.4	300	.03	e					0.478
Open Channel		1252						3.3	0.105
								Time of Concentration =	0.58*
Open Channel		1252						3.3	0.105
								Travel Time =	0.11*

--- Sheet Flow Surface Codes ---

A Smooth Surface
B Fallow (No Res.)
C Cultivated < 20 % Res.
D Cultivated > 20 % Res.
E Grass-Range, Short
F Grass, Dense
G Grass, Burmuda
H Woods, Light
I Woods, Dense

--- Shallow Concentrated Surface Codes ---

P Paved
U Unpaved

* - Generated for use by TABULAR method

TR-55 TABULAR DISCHARGE METHOD VERSION 1.11

Project : FILLMORE CLASS IV LANDFILL User: RBB Date: 01-08-97
County : MILLARD State: UT Checked: Cen Date: 1/9/97
Subtitle: HYDRAULIC ANALYSIS: SUB-AREA 1

Total watershed area: 0.046 sq mi Rainfall type: II Frequency: 25 years

	Subareas	
	1a	1b
Area(sq mi)	0.03*	0.02*
Rainfall(in)	2.6	2.6
Curve number	80*	80*
Runoff(in)	0.96	0.96
Tc (hrs)	0.58*	0.58*
(Used)	0.50	0.50
TimeToOutlet	0.11*	0.00
(Used)	0.20	0.00
Ia/P	0.19	0.19

Time (hr)	Total Flow	Subarea Contribution to Total Flow (cfs) 1a	1b
11.0	0	0	0
11.3	0	0	0
11.6	0	0	0
11.9	1	1	0
12.0	2	1	1
12.1	3	1	2
12.2	6	2	4
12.3	10	4	6
12.4	15	8	7P
12.5	18	11	7
12.6	19P	13P	6
12.7	16	12	4
12.8	14	11	3
13.0	9	7	2
13.2	7	5	2
13.4	4	3	1
13.6	4	3	1
13.8	3	2	1
14.0	3	2	1
14.3	3	2	1
14.6	2	1	1
15.0	2	1	1
15.5	2	1	1
16.0	1	1	0
16.5	1	1	0
17.0	1	1	0
17.5	1	1	0
18.0	1	1	0
19.0	1	1	0
20.0	1	1	0
22.0	0	0	0
26.0	0	0	0

P - Peak Flow * - value(s) provided from TR-55 system routines

TR-55 CURVE NUMBER COMPUTATION VERSION 1.11

Project : FILLMORE CLASS IV LANDFILL User: RBB Date: 01-08-97
County : MILLARD State: UT Checked: CEU Date: 1/9/97
Subtitle: HYDRAULIC ANALYSIS: SUB-AREA 2 through 4
Subarea : 2

COVER DESCRIPTION		Hydrologic Soil Group A	B	C	D
		Acres (CN)			
OTHER AGRICULTURAL LANDS					
Pasture, grassland or range	good	-	-	-	5.42(80)
Total Area (by Hydrologic Soil Group)					5.42

SUBAREA: 2 TOTAL DRAINAGE AREA: 5.42 Acres WEIGHTED CURVE NUMBER:80

TR-55 CURVE NUMBER COMPUTATION VERSION 1.11

Project : FILLMORE CLASS IV LANDFILL User: RBB Date: 01-08-97
County : MILLARD State: UT Checked: Cen Date: 1/9/97
Subtitle: HYDRAULIC ANALYSIS: SUB-AREA 2 through 4
Subarea : 3a

COVER DESCRIPTION		Hydrologic Soil Group A	B	C	D
		Acres (CN)			
OTHER AGRICULTURAL LANDS					
Pasture, grassland or range	good	-	-	-	3.18(80)
Total Area (by Hydrologic Soil Group)					3.18

SUBAREA: 3a TOTAL DRAINAGE AREA: 3.18 Acres WEIGHTED CURVE NUMBER:80

TR-55 CURVE NUMBER COMPUTATION VERSION 1.11

Project : FILLMORE CLASS IV LANDFILL User: RBB Date: 01-08-97
County : MILLARD State: UT Checked: cem Date: 1/9/97
Subtitle: HYDRAULIC ANALYSIS: SUB-AREA 2 through 4
Subarea : 3b

COVER DESCRIPTION		Hydrologic Soil Group A	B	C	D
		Acres (CN)			
OTHER AGRICULTURAL LANDS					
Pasture, grassland or range	good	-	-	-	3.14(80)
Total Area (by Hydrologic Soil Group)					3.14

SUBAREA: 3b TOTAL DRAINAGE AREA: 3.14 Acres WEIGHTED CURVE NUMBER:80

TR-55 CURVE NUMBER COMPUTATION VERSION 1.11

Project : FILLMORE CLASS IV LANDFILL User: RBB Date: 01-08-97
County : MILLARD State: UT Checked: Cen Date: 1/9/97
Subtitle: HYDRAULIC ANALYSIS: SUB-AREA 2 through 4
Subarea : 4

COVER DESCRIPTION		Hydrologic Soil Group A	B	C	D
		Acres (CN)			
OTHER AGRICULTURAL LANDS					
Pasture, grassland or range	good	-	-	-	1.8(80)
Total Area (by Hydrologic Soil Group)					1.8

SUBAREA: 4 TOTAL DRAINAGE AREA: 1.8 Acres WEIGHTED CURVE NUMBER:80

TR-55 Tc and Tt THRU SUBAREA COMPUTATION VERSION 1.11

Project : FILLMORE CLASS IV LANDFILL User: RBB Date: 01-08-97
County : MILLARD State: UT Checked: cem Date: 1/9/97
Subtitle: HYDRAULIC ANALYSIS: SUB-AREA 2 through 4

Subarea #1 - 2

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	1.4	300	.03	E					0.478
Open Channel		1255						3.25	0.107
								Time of Concentration =	0.59*
Open Channel		1255						3.25	0.107
								Travel Time =	0.11*

Subarea #2 - 3a

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	1.4	296	.03	e					0.473
Open Channel		654						2.5	0.073
								Time of Concentration =	0.55*
Open Channel		654						2.5	0.073
								Travel Time =	0.07*

Subarea #3 - 3b

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	1.4	262	.03	e					0.429
Open Channel		282						1.7	0.046
Open Channel		299						2.4	0.035
								Time of Concentration =	0.51*
Open Channel		282						1.7	0.046
Open Channel		299						2.4	0.035
								Travel Time =	0.08*

* - Generated for use by TABULAR method

TR-55 Tc and Tt THRU SUBAREA COMPUTATION VERSION 1.11

Project : FILLMORE CLASS IV LANDFILL User: RBB Date: 01-08-97
County : MILLARD State: UT Checked: Cem Date: 1/9/97
Subtitle: HYDRAULIC ANALYSIS: SUB-AREA 2 through 4

---------- Subarea #4 - 4 ----------

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	1.4	300	.011	e					0.715
Shallow Concent'd		180	.011	u					0.030
Open Channel		444						4	0.031
								Time of Concentration =	0.78*
									=====
Shallow Concent'd		180	.011	u					0.030
Open Channel		444						4	0.031
								Travel Time =	0.06*
									=====

--- Sheet Flow Surface Codes ---

A Smooth Surface
B Fallow (No Res.)
C Cultivated < 20 % Res.
D Cultivated > 20 % Res.
E Grass-Range, Short
F Grass, Dense
G Grass, Burmuda
H Woods, Light
I Woods, Dense

--- Shallow Concentrated --- Surface Codes ---

P Paved
U Unpaved

* - Generated for use by TABULAR method

TR-55 TABULAR DISCHARGE METHOD VERSION 1.11

Project : FILLMORE CLASS IV LANDFILL User: RBB Date: 01-08-97
County : MILLARD State: UT Checked: Cen Date: 1/9/97
Subtitle: HYDRAULIC ANALYSIS: SUB-AREA 2 through 4

Total watershed area: 0.021 sq mi Rainfall type: II Frequency: 25 years

	Subareas			
	2	3a	3b	4
Area(sq mi)	0.01*	0.00*	0.00*	0.00*
Rainfall(in)	2.6	2.6	2.6	2.6
Curve number	80*	80*	80*	80*
Runoff(in)	0.96	0.96	0.96	0.96
Tc (hrs)	0.59*	0.55*	0.51*	0.78*
(Used)	0.50	0.50	0.50	0.75
TimeToOutlet	0.21*	0.14*	0.06*	0.00
(Used)	0.30	0.20	0.10	0.00
Ia/P	0.19	0.19	0.19	0.19

Time (hr)	Total Flow	Subarea Contribution to Total Flow (cfs) 2	3a	3b	4
11.0	0	0	0	0	0
11.3	0	0	0	0	0
11.6	0	0	0	0	0
11.9	0	0	0	0	0
12.0	0	0	0	0	0
12.1	0	0	0	0	0
12.2	1	0	0	1	0
12.3	3	1	1	1	0
12.4	5	1	1	2P	1P
12.5	7	2	2P	2	1
12.6	8P	3P	2	2	1
12.7	8	3	2	2	1
12.8	7	3	2	1	1
13.0	5	2	1	1	1
13.2	4	2	1	1	0
13.4	2	1	1	0	0
13.6	1	1	0	0	0
13.8	1	1	0	0	0
14.0	1	1	0	0	0
14.3	0	0	0	0	0
14.6	0	0	0	0	0
15.0	0	0	0	0	0
15.5	0	0	0	0	0
16.0	0	0	0	0	0
16.5	0	0	0	0	0
17.0	0	0	0	0	0
17.5	0	0	0	0	0
18.0	0	0	0	0	0
19.0	0	0	0	0	0
20.0	0	0	0	0	0
22.0	0	0	0	0	0
26.0	0	0	0	0	0

P - Peak Flow * - value(s) provided from TR-55 system routines

TR-55 CURVE NUMBER COMPUTATION VERSION 1.11

Project : FILLMORE CLASS IV LANDFILL User: RBB Date: 01-08-97
County : MILLARD State: UT Checked: cen Date: 1/9/97
Subtitle: HYDRAULIC ANALYSIS: SUB-AREA 5
Subarea : 5

COVER DESCRIPTION		Hydrologic Soil Group A	B	C	D
		Acres (CN)			
OTHER AGRICULTURAL LANDS					
Pasture, grassland or range	good	-	-	-	16.4(80)
Total Area (by Hydrologic Soil Group)					16.4

SUBAREA: 5 TOTAL DRAINAGE AREA: 16.4 Acres WEIGHTED CURVE NUMBER:80

TR-55 Tc and Tt THRU SUBAREA COMPUTATION VERSION 1.11

Project : FILLMORE CLASS IV LANDFILL User: RBB Date: 01-08-97
County : MILLARD State: UT Checked: Cen Date: 1/9/97
Subtitle: HYDRAULIC ANALYSIS: SUB-AREA 5

---------- Subarea #1 - 5 ----------

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	1.4	278	.03	E					0.450
Open Channel		1751						3.15	0.154
								Time of Concentration =	0.60*
Open Channel		1751						3.15	0.154
								Travel Time =	0.15*

--- Sheet Flow Surface Codes ---

A Smooth Surface
B Fallow (No Res.)
C Cultivated < 20 % Res.
D Cultivated > 20 % Res.
E Grass-Range, Short
F Grass, Dense
G Grass, Burmuda
H Woods, Light
I Woods, Dense

--- Shallow Concentrated --- Surface Codes ---

P Paved
U Unpaved

* - Generated for use by TABULAR method

TR-55 TABULAR DISCHARGE METHOD VERSION 1.11

Project : FILLMORE CLASS IV LANDFILL User: RBB Date: 01-08-97
County : MILLARD State: UT Checked: Cen Date: 1/9/97
Subtitle: HYDRAULIC ANALYSIS: SUB-AREA 5

Total watershed area: 0.026 sq mi Rainfall type: II Frequency: 25 years

---------- Subareas ----------

	5
Area(sq mi)	0.03*
Rainfall(in)	2.6
Curve number	80*
Runoff(in)	0.96
Tc (hrs)	0.60*
(Used)	0.50
TimeToOutlet	0.00
Ia/P	0.19

Time (hr)	Total Flow	Subarea Contribution to Total Flow (cfs) 5
11.0	0	0
11.3	0	0
11.6	0	0
11.9	1	1
12.0	1	1
12.1	3	3
12.2	6	6
12.3	10	10
12.4	12P	12P
12.5	12	12
12.6	10	10
12.7	7	7
12.8	6	6
13.0	4	4
13.2	3	3
13.4	2	2
13.6	2	2
13.8	1	1
14.0	1	1
14.3	1	1
14.6	1	1
15.0	1	1
15.5	1	1
16.0	1	1
16.5	1	1
17.0	1	1
17.5	1	1
18.0	1	1
19.0	0	0
20.0	0	0
22.0	0	0
26.0	0	0

P - Peak Flow * - value(s) provided from TR-55 system routines

TR-55 CURVE NUMBER COMPUTATION VERSION 1.11

Project : FILLMORE CLASS IV LANDFILL User: RBB Date: 01-08-97
County : MILLARD State: UT Checked: Cen Date: 1/9/97
Subtitle: HYDRAULIC ANALYSIS: SUB-AREA 6
Subarea : 6

COVER DESCRIPTION		Hydrologic Soil Group A	B	C	D
		Acres (CN)			
OTHER AGRICULTURAL LANDS					
Pasture, grassland or range	good	-	-	-	80.8(80)
Total Area (by Hydrologic Soil Group)					80.8

SUBAREA: 6 TOTAL DRAINAGE AREA: 80.8 Acres WEIGHTED CURVE NUMBER:80

TR-55 Tc and Tt THRU SUBAREA COMPUTATION VERSION 1.11

Project : FILLMORE CLASS IV LANDFILL User: RBB Date: 01-08-97
County : MILLARD State: UT Checked: Cen Date: 1/9/97
Subtitle: HYDRAULIC ANALYSIS: SUB-AREA 6

Subarea #1 - 6

Flow Type	2 year rain	Length (ft)	Slope (ft/ft)	Surface code	n	Area (sq/ft)	Wp (ft)	Velocity (ft/sec)	Time (hr)
Sheet	1.4	300	.049	E					0.393
Shallow Concent'd		2100	.049	u					0.163
Open Channel		2291						2.9	0.219
								Time of Concentration =	0.78*
Shallow Concent'd		2100	.049	u					0.163
Open Channel		2291						2.9	0.219
								Travel Time =	0.38*

--- Sheet Flow Surface Codes ---

A Smooth Surface
B Fallow (No Res.)
C Cultivated < 20 % Res.
D Cultivated > 20 % Res.
E Grass-Range, Short
F Grass, Dense
G Grass, Burmuda
H Woods, Light
I Woods, Dense

--- Shallow Concentrated Surface Codes ---

P Paved
U Unpaved

* - Generated for use by TABULAR method

TR-55 TABULAR DISCHARGE METHOD VERSION 1.11

Project : FILLMORE CLASS IV LANDFILL User: RBB Date: 01-08-97
County : MILLARD State: UT Checked: cm Date: 1/9/97
Subtitle: HYDRAULIC ANALYSIS: SUB-AREA 6

Total watershed area: 0.126 sq mi Rainfall type: II Frequency: 25 years

---------- Subareas ----------

	6
Area(sq mi)	0.13*
Rainfall(in)	2.6
Curve number	80*
Runoff(in)	0.96
Tc (hrs)	0.78*
(Used)	0.75
TimeToOutlet	0.00
Ia/P	0.19

Time (hr)	Total Flow	Subarea Contribution to Total Flow (cfs) 6
11.0	1	1
11.3	1	1
11.6	2	2
11.9	2	2
12.0	3	3
12.1	5	5
12.2	9	9
12.3	17	17
12.4	29	29
12.5	40	40
12.6	46P	46P
12.7	46	46
12.8	42	42
13.0	30	30
13.2	21	21
13.4	16	16
13.6	12	12
13.8	10	10
14.0	8	8
14.3	7	7
14.6	6	6
15.0	5	5
15.5	4	4
16.0	4	4
16.5	4	4
17.0	3	3
17.5	3	3
18.0	3	3
19.0	3	3
20.0	2	2
22.0	2	2
26.0	0	0

P - Peak Flow * - value(s) provided from TR-55 system routines

FlowMaster - Final Site Conditions

Triangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: FILLMORE LANDFILL

Comment: SUB-AREA 1A: V-DITCH D1

Solve For Depth

Given Input Data:

Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0170 ft/ft
Discharge.....	13.00 cfs

Computed Results:

Depth.....	1.10 ft
Velocity.....	3.59 fps
Flow Area.....	3.63 sf
Flow Top Width...	6.60 ft
Wetted Perimeter.	6.95 ft
Critical Depth...	1.03 ft
Critical Slope...	0.0239 ft/ft
Froude Number....	0.85 (flow is Subcritical)

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Haestad Methods, Inc. * 37 Brookside Rd * Waterbury, Ct 06708

Triangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: FILLMORE LANDFILL

Comment: SUB-AREAS 1A & 1B: V-DITCH D2

Solve For Depth

Given Input Data:

Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0430 ft/ft
Discharge.....	19.00 cfs

Computed Results:

Depth.....	1.06 ft
Velocity.....	5.58 fps
Flow Area.....	3.40 sf
Flow Top Width...	6.39 ft
Wetted Perimeter.	6.74 ft
Critical Depth...	1.20 ft
Critical Slope...	0.0227 ft/ft
Froude Number....	1.35 (flow is Supercritical)

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Triangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: FILLMORE LANDFILL

Comment: SUB-AREA 2: V-DITCH D3

Solve For Depth

Given Input Data:

Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0410 ft/ft
Discharge.....	3.00 cfs

Computed Results:

Depth.....	0.54 ft
Velocity.....	3.46 fps
Flow Area.....	0.87 sf
Flow Top Width...	3.23 ft
Wetted Perimeter.	3.40 ft
Critical Depth...	0.57 ft
Critical Slope...	0.0291 ft/ft
Froude Number....	1.18 (flow is Supercritical)

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Triangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: FILLMORE LANDFILL

Comment: SUB-AREA 3A: V-DITCH D4 ON BENCH

Solve For Depth

Given Input Data:

Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0240 ft/ft
Discharge.....	2.00 cfs

Computed Results:

Depth.....	0.51 ft
Velocity.....	2.56 fps
Flow Area.....	0.78 sf
Flow Top Width...	3.06 ft
Wetted Perimeter.	3.23 ft
Critical Depth...	0.49 ft
Critical Slope...	0.0307 ft/ft
Froude Number....	0.89 (flow is Subcritical)

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Triangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: FILLMORE LANDFILL

Comment: SUB-AREA 3B: V-DITCH D5 ON BENCH @ S=0.011

Solve For Depth

Given Input Data:

Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0110 ft/ft
Discharge.....	2.00 cfs

Computed Results:

Depth.....	0.59 ft
Velocity.....	1.91 fps
Flow Area.....	1.05 sf
Flow Top Width...	3.55 ft
Wetted Perimeter.	3.74 ft
Critical Depth...	0.49 ft
Critical Slope...	0.0307 ft/ft
Froude Number....	0.62 (flow is Subcritical)

Triangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: FILLMORE LANDFILL

Comment: SUB-AREA 3B: V-DITCH D5 ON BENCH @ S=0.022

Solve For Depth

Given Input Data:

Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0220 ft/ft
Discharge.....	2.00 cfs

Computed Results:

Depth.....	0.52 ft
Velocity.....	2.47 fps
Flow Area.....	0.81 sf
Flow Top Width...	3.11 ft
Wetted Perimeter.	3.28 ft
Critical Depth...	0.49 ft
Critical Slope...	0.0307 ft/ft
Froude Number....	0.86 (flow is Subcritical)

Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: FILLMORE LANDFILL

Comment: SUB-AREAS 3A & 3B: CULVERT C1 ACROSS BENCH

Solve For Actual Depth

Given Input Data:

Diameter.....	1.50 ft
Slope.....	0.0500 ft/ft
Manning's n.....	0.024
Discharge.....	4.00 cfs

Computed Results:

Depth.....	0.58 ft
Velocity.....	6.37 fps
Flow Area.....	0.63 sf
Critical Depth....	0.77 ft
Critical Slope....	0.0184 ft/ft
Percent Full.....	38.52 %
Full Capacity.....	12.72 cfs
QMAX @.94D.....	13.69 cfs
Froude Number.....	1.71 (flow is Supercritical)

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Circular Channel Analysis & Design
Solved with Manning's Equation

Open Channel - Uniform flow

Worksheet Name: FILLMORE LANDFILL

Comment: SUB-AREAS 3A & 3B: CULVERT C1 OVERSIDE DRAIN

Solve For Actual Depth

Given Input Data:

Diameter.....	1.50 ft
Slope.....	0.3300 ft/ft
Manning's n.....	0.024
Discharge.....	4.00 cfs

Computed Results:

Depth.....	0.35 ft
Velocity.....	12.54 fps
Flow Area.....	0.32 sf
Critical Depth....	0.77 ft
Critical Slope....	0.0184 ft/ft
Percent Full.....	23.62 %
Full Capacity.....	32.69 cfs
QMAX @.94D.....	35.16 cfs
Froude Number.....	4.42 (flow is Supercritical)

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Triangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: FILLMORE LANDFILL

Comment: SUB-AREA 5: V-DITCH D6

Solve For Depth

Given Input Data:

Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0380 ft/ft
Discharge.....	12.00 cfs

Computed Results:

Depth.....	0.92 ft
Velocity.....	4.75 fps
Flow Area.....	2.52 sf
Flow Top Width...	5.50 ft
Wetted Perimeter.	5.80 ft
Critical Depth...	1.00 ft
Critical Slope...	0.0242 ft/ft
Froude Number....	1.24 (flow is Supercritical)

Open Channel Flow Module, Version 3.12 (c) 1990
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Triangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: FILLMORE LANDFILL

Comment: SUB-AREA 5: DRAINAGE SWALES D7 ACROSS ROADS

Solve For Depth

Given Input Data:

Left Side Slope..	10.00:1 (H:V)
Right Side Slope.	10.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0200 ft/ft
Discharge.....	12.00 cfs

Computed Results:

Depth.....	0.65 ft
Velocity.....	2.83 fps
Flow Area.....	4.24 sf
Flow Top Width...	13.02 ft
Wetted Perimeter.	13.08 ft
Critical Depth...	0.62 ft
Critical Slope...	0.0266 ft/ft
Froude Number....	0.87 (flow is Subcritical)

Open Channel Flow Module, Version 3.12 (c) 1990
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Triangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: FILLMORE LANDFILL

Comment: SUB-AREAS 4 & 5: V-DITCH D8 @ S=0.011

Solve For Depth

Given Input Data:

Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0110 ft/ft
Discharge.....	13.00 cfs

Computed Results:

Depth.....	1.19 ft
Velocity.....	3.05 fps
Flow Area.....	4.27 sf
Flow Top Width...	7.16 ft
Wetted Perimeter.	7.54 ft
Critical Depth...	1.03 ft
Critical Slope...	0.0239 ft/ft
Froude Number....	0.70 (flow is Subcritical)

Triangular Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: FILLMORE LANDFILL

Comment: SUB-AREAS 4 & 5: V-DITCH D8 @ S=0.061

Solve For Depth

Given Input Data:

Left Side Slope..	3.00:1 (H:V)
Right Side Slope.	3.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0610 ft/ft
Discharge.....	13.00 cfs

Computed Results:

Depth.....	0.87 ft
Velocity.....	5.79 fps
Flow Area.....	2.25 sf
Flow Top Width...	5.19 ft
Wetted Perimeter.	5.47 ft
Critical Depth...	1.03 ft
Critical Slope...	0.0239 ft/ft
Froude Number....	1.55 (flow is Supercritical)

Trapezoidal Channel Analysis & Design
Open Channel - Uniform flow

Worksheet Name: FILLMORE LANDFILL

Comment: SUB-AREA 6: DIVERSION CHANNEL D9, TRAP DITCH

Solve For Depth

Given Input Data:

Bottom Width.....	2.00 ft
Left Side Slope..	2.00:1 (H:V)
Right Side Slope.	2.00:1 (H:V)
Manning's n.....	0.035
Channel Slope....	0.0320 ft/ft
Discharge.....	46.00 cfs

Computed Results:

Depth.....	1.42 ft
Velocity.....	6.68 fps
Flow Area.....	6.89 sf
Flow Top Width...	7.69 ft
Wetted Perimeter.	8.36 ft
Critical Depth...	1.58 ft
Critical Slope...	0.0202 ft/ft
Froude Number....	1.24 (flow is Supercritical)