SINCE 1948
DAVIS ENGINEERING SERVICE, INC.

June 8, 2016

Eric K. Jacobs, P.G.
Colorado Department of Public Health and the Environment
Hazardous Materials and Waste Management Division
HMWMD-B2
4300 South Cherry Creek Drive South
Denver, Colorado 80246-1530

Re: Saguache County Landfill EDOP Modification – Final Cover Design
Saguache County Landfill
Saguache, Colorado
SW/SAG/SAG 2.2

Dear Mr. Jacobs:

This letter is written in response to your letter dated May 26, 2016 which includes your technical review comments for the project referenced above. This letter is submitted in behalf of the Saguache County Board of Commissioners (County) who owns and operates the landfill.

As requested, please find enclosed a redlined copy of EDOP Modifications together with update attachments. We request your review and approval of these documents.

In the following paragraphs we have copied your comments in standard font followed by our response in italic font.

Comment #1: The EDOP Mod proposes to raise the final cover elevation from the currently approved elevation of 7,500 feet above mean sea level (ft-amsl) to 7,747.20 ft-amsl. This elevation therefore limits waste disposal elevations to 7,744.20 ft-masl. Please specify these elevation limitations in the EDOP Mod.

The recommended elevation limitations have been added to the final paragraph of Section 1.1, please see revised plan.

Comment #2: Attachment 1 (Construction Drawings for final Cover Redesign) includes a plan view of the landfill identifying waste cell locations. Waste cells appear to be identified by the year the construction of the extensions were completed. Each waste cell extension is prefaced by the term "Liner" suggesting each waste cell has an engineered lining system constructed in accordance with the Engineering Design and Operations Plan (EDOP) in effect at the time of construction. As discovered in 2011 not all cells were appropriately constructed resulting in unlined waste cells. Update the referenced figure to appropriately identify unlined cells.

Sheet 1 of 4 of has been revised, please see Attachment #1. Rather than "Liner" each yearly expansion is labeled as "Waste Cell Extension".

Since year 2000 constructed cell extensions contain as a minimum a Geosynthetic Clay Liner (GCL) which, in the County's opinion should not be categorized as "Unlined" cells. Each cell extension may not consist of all liner components required by the approved EDOP at that time, but it does consist of at least a GCL. Furthermore, the correspondence in our file is somewhat confusing and seemed to indicate the installation of the GCL was adequate. Also, the County has some evidence that would support an assumption that the "Original Waste Cells" constructed during years 1987 through 1990 were lined with clay as required in the first EDOP. Therefore, in the County's opinion all constructed cell extensions are "Lined" although it is now recognized that a portion of the liners may be of an unapproved design. The County would like to make it clear that any further cell extension will follow the current approved EDOP and a double liner system will be installed.

Comment #3: The EDOP Mod request retraction of the fourth modification addressed by the November 24, 2014 EDOP approval letter citing the initial shallow slope design. The Division agrees to revise this modification once an EDOP Mod can be approved but disagrees with removal of the post-closure care inspection and maintenance requirements. Once the EDOP Mod is approved the Division will agree to an annual inspection and maintenance requirement in place of quarterly inspections consistent with the EPA publication Design and Construction of RCRA/CERCLA Final Covers (EPA 625 4-91 025, May 1991). All other inspection and maintenance requirements will remain unchanged.

The request has been modified to "revise" the modification in the approval letter referenced above rather than "omit" in the second paragraph of Section 1.0, please see revised plan. The County requests annual instead of quarterly inspection and maintenance of the final cover.

Comment #4: The EDOP Mod states the "….generally accepted amount of erosion in the industry is 5.0 tons/acre/year". Please provide a reference to this citation. Also please review the EPA (Draft) Technical Guidance for RCRA/CERCLA Final Covers (EPA 540-R-04-007) which states that the design sheet erosion rate should not exceed 4.5 tonnes/ha/year (this document references EPA 625 4-91 025, May 1991). Note that generally accepted industry erosion RCRA final covers is 4.5 tonnes/ha/year. When converted, this is approximately 2.0 tons/acre/year.

We agree with the referenced EPA document, so Section 1.4 has been modified accordingly, see revised plan.

During further research of this topic it was determined that the "K" we have used was too high. According to Web Soil Survey (NRCS) the "K" values in this area range from 0.15 to

0.20, so a conservative approach was taken and 0.20 was used for the "K" value in this calculation. Therefore, the highest soil loss calculated was 1.76 tons/acre/year. Please see revised Attachment #3 for further details.

Comment #5: The EDOP Mod states that "…with the proposed final cover changes there will not be any slopes under 5%". Attachment 3 of the EDOP Mod addresses RUSLE erosion calculations. Table 1 associated with these RUSLE calculations indicates the easterly slope has a portion with a 0.2% slope (see Slope 3). Please address this apparent discrepancy and recalculate the erosion calculations as necessary.

As you have pointed out the easterly slope erosion calculation does include a portion of the slope which is 0.2%. This is correct because the easterly end of the landfill cap cannot be higher than the existing ground surface due to the power transmission lines in this area. So no recalculation is needed.

The wording throughout the EDOP Modification document has been changed so that everything is consistent, please see revised plan.

We look forward to hearing from you. If you have any questions, please contact us. Thank You!

Sincerely,
Davis Engineering Service, Inc.

Clinton M. Phillips, P.E.

Encl.: as noted

xc: Saguache County Road & Bridge-Randy Arredondo w/encl.

Saguache County Landfill
Engineering Design and Operations Plan (EDOP) Modification

Prepared for

Saguache County Commissioners

~~May~~ June 2016
by
Davis Engineering Service, Inc.
P.O. Box 1840, 1314 11th Street
Alamosa, Colorado 81101
Phone No. (719) 589-3004

I hereby certify that this report on the Saguache County Landfill was prepared by me or under my direct supervision.

_____

Clinton M. Phillips, P.E.
Licensed Engineer
Colorado Certificate No. 51205

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1.0) Final Cover Modification

The purpose of this document is to describe the proposed changes with respect to the final cover for the Saguache County Landfill. The document is prepared by Davis Engineering Service, Inc. (DES) on behalf of the Saguache County Commissioners.

The County requests that the fourth modification in the "Approval with Modification: Engineering Design and Operation Plan (November 2014 Revision)" letter prepared by the CDPH&E on November 24, 2014 be ~~omitted~~revised. This modification was implemented because the final cover slopes were shallow. With the proposed final cover changes there will not be any slopes under 5%, with the exception of the easterly end of the planned waste cells. The final cover cannot go any higher than existing ground level in this area due to the overhead power transmission lines. The slope in this area will be consistent with the existing ground surface as shown on in Attachment 1. The County requests once this EDOP Modification is approved that the frequency be changed to annual rather than quarterly for the inspection and maintenance requirement on the final cover.

1.1) Final Cover Design Modifications

The purposed changes in the final cover design and background explaining why the County is proposing changes are describes below. The finished grade for the final cover will be increased such that ~~all~~ majority of the final cover slopes on the landfill cap will meet the minimum slope requirement of 5% (20:1) as described in Section 3.5.2 of the solid waste regulations (6 CCR 1007-2, Part 1 Regulations Pertaining to Solid Waste Sites and Facilities). The proposed final cover grade changes are reflected in the attached design plans listed as Attachment #1.

When the new Engineering Design and Operation Plan (EDOP) was approved in November 2014 the final cover design included slopes less than 5%. A discussion took place between the County and the Colorado Department Public Health & Environment (CDPH&E) before the EDOP was approved. It was decided that the EDOP would be approved with the final cover slopes less than 5%, but the County expressed interest in possible changes in the future which would result in final cover grades that would meet the regulation requirements of a minimum slope of 5%. As stated above the easterly portion of the landfill cannot go any higher than existing ground surface due to overhead power transmission lines, so the slope will match the existing ground surface in this area.

The final cover grades are being increased so runoff created by precipitation and snow melt is drained from the capped cells in the landfill. This should assure there is no water ponding

or subsidence leading to potential for water ponding. In addition, vegetation will be easier to establish and maintain on the cap resulting in minimal erosion. The final cover grade at each edge of the cell will be 25% for 10 vertical feet (40 horizontal feet) and then the final cover grade will decrease to 5%. The total height of the final cover above the existing ground elevation will be ±30 feet, with the exception of easterly end of the landfill. This area cannot be raised higher than existing ground surface because of the overhead power transmission lines that run across the landfill property.

The final cover elevation will be changed from the approved elevation of ±7,530 feet above mean sea level (ft-amsl) to 7,747.20 ft-amsl. The waste elevation is then limited to 7,744.20 since the final cover plan requires three feet of cover.

1.2) Fill Operation Modifications

The County plans to add supplemental fill containing both waste and cap to obtain the required slope over areas that have already been capped to increase the volume of the landfill. This will allow the County to increase the volume of the landfill without changing the layout of the cells or deepening the cells.

The County plans to remove some of the cap material that has been placed on the closed cells but will not expose the waste in the closed cells. The final cover on the closed cells is 3 feet deep (field verified). The County will only remove ±2 feet of the soil cap and add supplemental fill containing both waste and cap to obtain the required slope. The final cover will be installed per Section 5.3 of the approved EDOP.

1.3) Certificate of Designation Explanation

The Certificate of Designation (CD) states "*THAT the construction, operation and closure be done in accordance with the plan approved by the CDPH&E, and*". The County has taken the position that the first and only CD was intended to authorize any landfill configuration, including height, provided it is approved by the CDPH&E. Therefore it is the Counties opinion that a CD modification is not required. A copy of the Certificate of Designation has been included at Attachment 2 at the end of this document.

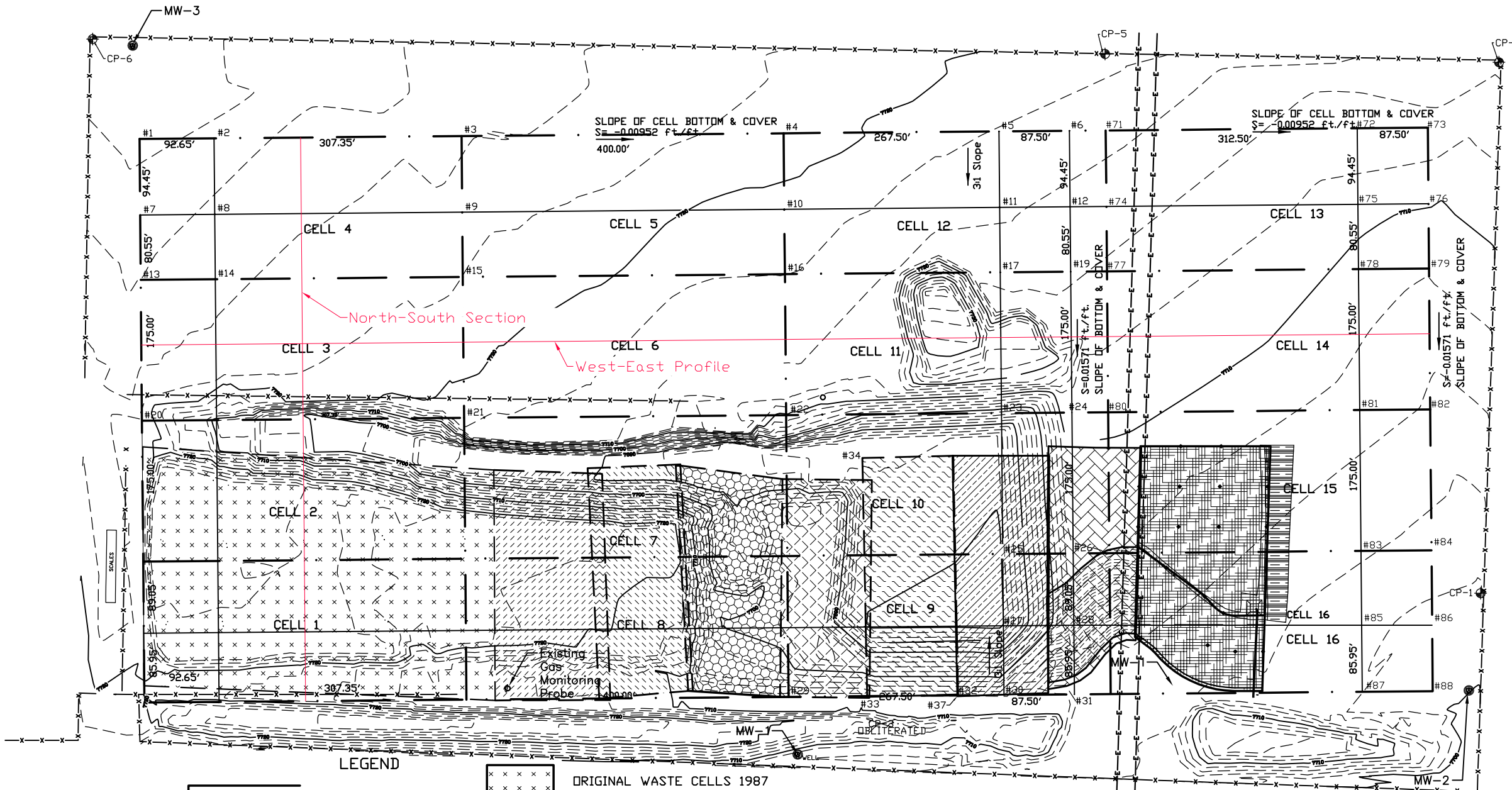
1.4) Erosion Control

The "Revised Universal Soil Loss Equation" was used to predict the soil erosion by water on the proposed final cover slope changes. When the final cover is increased to 5% the greatest predicted erosion calculated is ~~2.11~~1.76 tons/acre/year. The generally acceptable amount of erosion in the industry is 2~~5~~.0 tons/acre/year. These calculations are detailed in Attachment 3 at the end of this document. Therefore no additional berms or terracing is required.

After a major storm event and periodically throughout the year landfill personnel shall check the final slopes to make sure excessive erosion has not occurred. If any areas of the final cover have been damaged, then landfill personnel are responsible for repairing the final cover.

Another important part of the final cover is maintaining vegetation on the surface of the cells once they have been capped. The steeper slopes may require some type of vegetation netting which holds the vegetative seed in place on the slope. It is important for County management to understand that a soil enhancement and/or imported top soil will be needed to ensure growth of adequate vegetation on the cap.

Attachment 1
Construction Drawings for Final Cover Redesign



LEGEND

CELL 1	ORIGINAL LAYOUT OF CELLS
#8	LOCATION OF CELL BOTTOM GRADE-SEE TABLE
x—x—x—x—x	EXISTING FENCE
— — 7700 — —	ELEVATION CONTOURS (AS OF APRIL 6, 2006)
—E—E—E—	ELECTRIC LINES
	LEACHATE COLLECTION SYSTEM BERM
	CONTROL/SURVEY POINT
	ORIGINAL WASTE CELLS 1987
	2000 WASTE CELL EXTENSION
	2001 WASTE CELL EXTENSION
	2003 WASTE CELL EXTENSION
	2005 WASTE CELL EXTENSION
	2007 WASTE CELL EXTENSION
	2008 WASTE CELL EXTENSION
	2010 WASTE CELL EXTENSION
	2013 WASTE CELL EXTENSION

Note: All cell layouts and grades that do not contain waste may be redesigned to adequately collect leachate generation.

NOTE: SURFACE ELEVATIONS HAVE CHANGED AS A RESULT OF CONSTRUCTION ACTIVITIES.

DAVIS ENGINEERING SERVICE, INC.
SINCE 1948

DAVIS ENGINEERING SERVICE, INC.
1314 11th STREET, P.O. BOX 1949
ALAMOSA, COLORADO 81601
PHONE: (719) 589-3000
FAX: (719) 589-3712

SCALE	DATE
1"=150'	5/24/16

DESIGNED CMP
DRAWN CMP
CHECKED
APPROVED

0' 1" 1.5" 2"
ELEVATION BASE ASSUMED

REV.	DATE	BY	APVD.
1	6/8/16	CMP	

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STAMP

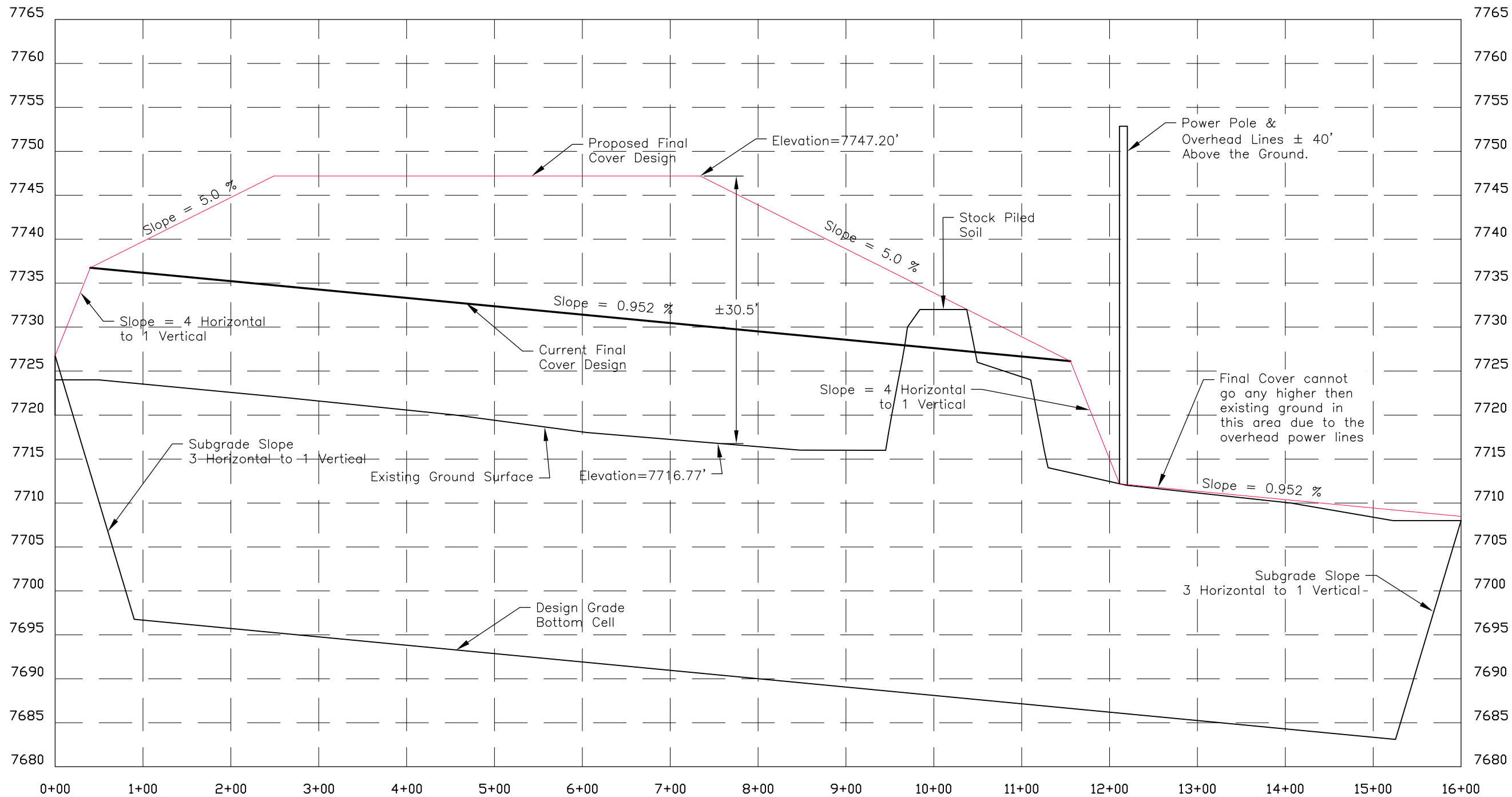
CLIENT
Saguache County Commissioners
P.O. 476.
Saguache, CO 81149

Saguache County Landfill

Plan View

E01997

Sheet 1 of 4



WEST–EAST SECTION THROUGH CELLS 3, 6, 11, & 14

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SINCE 1948

DESIGNED CMP/JAD
DRAWN CMP
CHECKED
APPROVED
SCALE 1"=125'
DATE 5/24/16

ELEVATION BASE ASSUMED

0' 1" 1.5" 2"

REV. DATE BY APVD.

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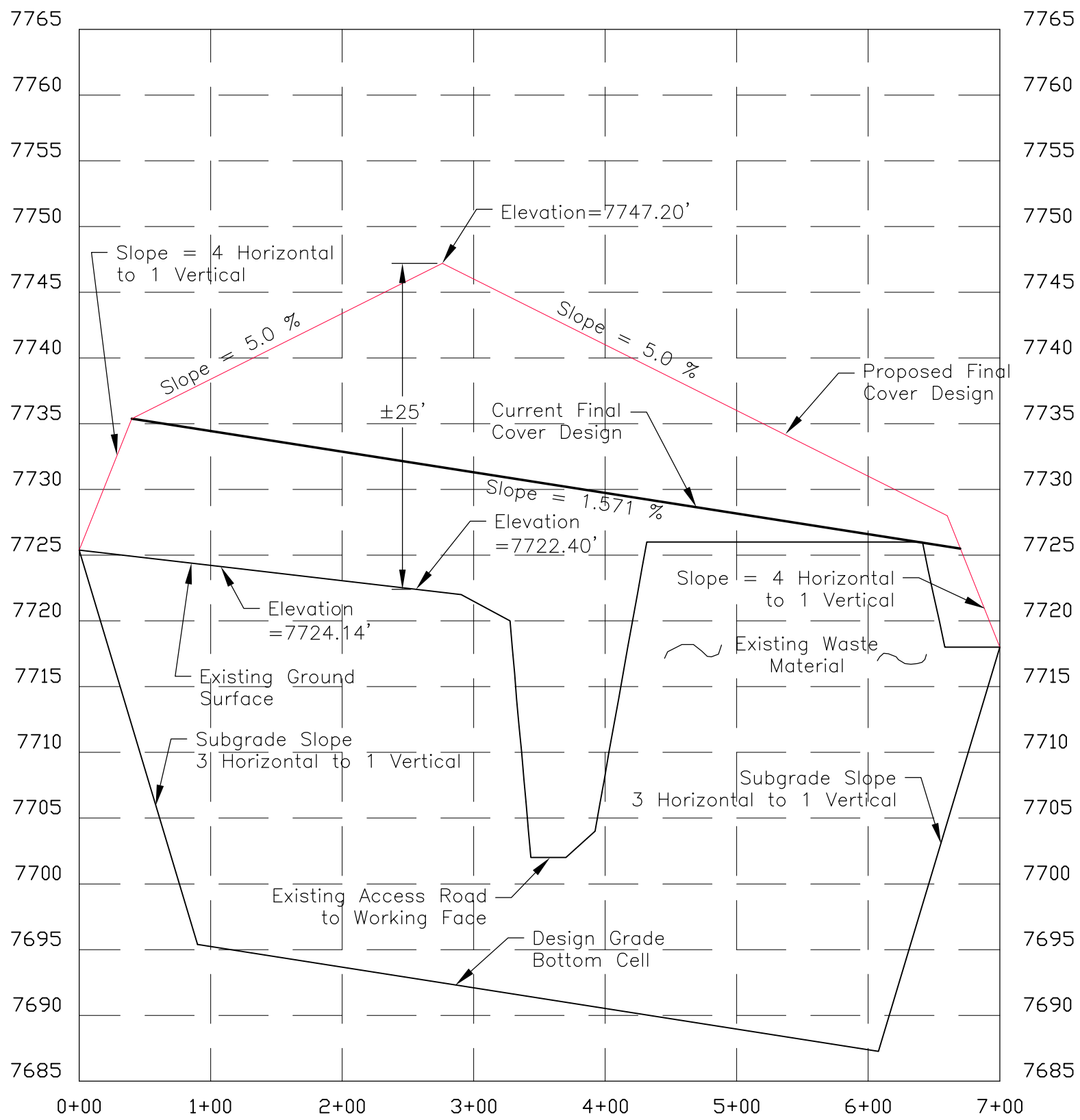
Saguache, CO 81149

Saguache County Landfill

East-West Profile View

E01997

Sheet 2 of 4



NORTH–SOUTH SECTION THROUGH CELLS 4, 3, 2, & 1

DAVIS ENGINEERING SERVICE, INC.

SINCE 1948

DESIGNED CMP/JAD
DRAWN CMP
CHECKED
APPROVED
SCALE 1"=100'
DATE 5/24/16

0' 1" 1.5" 2"

ELEVATION BASE ASSUMED

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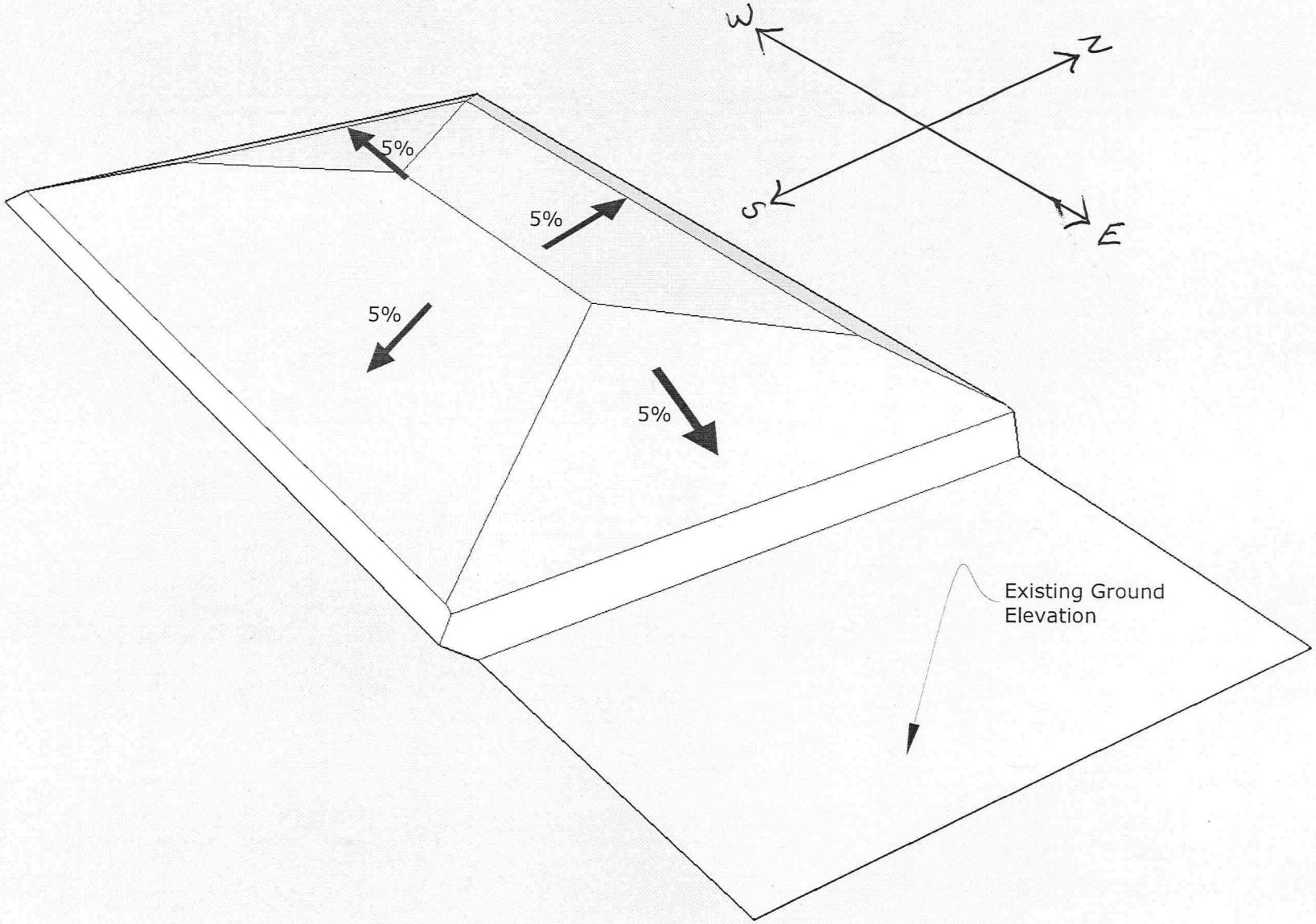
Saguache County Landfill

North-South Section View

E01997

Sheet 3 of 4


W
N
S
E
5%
5%
5%
5%
Existing Ground
Elevation

Attachment 2
Certificate of Designation

Recorded at [illegible] May 16, 1989
Mary A. Moore [illegible] the County Recorder

CEPTION No. [illegible]
BOOK 454 PAGE 418

RESOLUTION OF DESIGNATION FOR A SOLID WASTE SITE IN NORTHERN SAGUACHE COUNTY

WHEREAS, the Board of County Commissioners are required by sections 30-20-104 and 30-20-105 of the Colorado Statutes to hold a public hearing in order to determine the desirability of designating specific sites for use as solid waste depositories in the County, and

WHEREAS, on May 1, 1989 at 1:00 P.M. a public hearing was held at the County Courthouse in Saguache concerning the site identified as the SE1/4 SW1/4 Section 28, Township 45 North, Range 9 East N.M.P.M., and

WHEREAS, those present at the hearing expressed a desire to have a permitted solid waste site in northern Saguache County, and

WHEREAS, the Board of Commissioners took public comments as required, and

WHEREAS, all other things required to be done in designating a site were determined to have been done.

NOW THEREFORE BE IT RESOLVED that the site located in the SE1/4 SW1/4 Section 28, Township 45 North, Range 9 East N.M.P.M. and containing 35 acres more or less be designated as a solid waste site for public use, and

THAT the construction, operation and closure be done in accordance with the plan approved by the Colorado Department of Health, and

THAT a copy of this resolution designating the above site as a solid waste facility be sent to the Colorado Department of Health, and

THAT adoption of this resolution is necessary for the health, safety and welfare of Saguache County residents.

READ, moved and adopted this fifteenth day of May, nineteen hundred eighty nine.

Keith Edwards

Keith Edwards, Chairman

Attest:

Harold L Freel

Harold Freel, Commissioners

Mary A Moore

Clerk to the Board

Chuck Grant

Chuck Grant, Commissioner

May 15 1989

Date

Attachment 3
Revised Universal Soil Loss Equation (RUSLE) Erosion Calculations

Revised Universal Soil Loss Equation (RUSLE) Erosion Calculation for Saguache County Landfill

The erosion was evaluated using the Revised Universal Soil Loss Equation (RUSLE), (USDA 1997). The cross sections evaluated are shown in the Final Cover Construction Drawing (Attachment 1).

Calculations:

$A = R*K*L_S*C*P$

A = Average annual soil loss (tons/acre/year)
R = Rainfall erosion index
K = Soil erodibility Factor
L_S = Slope length and steepness factor
C = Vegetative cover factor
P = Erosion control practice factor

Assumptions:

- R was taken from Figure 1 below, Isoerodent Map of Western United States (Renard, et al 1997). R was interpolated to be 10 ft*tonf*in/acre*hr*yr.
- K was obtained through Web Soil Survey, a K value of 0.20 tons*acre*hr/hundreds*acre*ft*tonsf*in (Web Soil Survey) was selected. See Figure 2 below.
- L_S was estimated using Table 4.3 of Figure 3 below (Renard, et al 1997). Values were interpolated from table to get L_S values for exact slopes.
- C was estimated using the anticipated final vegetation cover of 40% of the ground with no appreciable canopy, based on Figure 4 below (Haan, et al 1994). C was assumed to be 0.15.
- P value of 1.0 was selected to represent no maintenance.

References:

K.G. Renard, G.R. Foster, G.A. Weesies, D.K. McCool, and D.C. Yoder. 1997 *Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE)*. (Agricultural Handbook Number 703)
Washington, DC: U.S. Government Printing Office

Haan C.T., B.J. Barfield, and J.C. Hayes. 1994. *Design hydrology and sedimentology for small catchments.*
San Diego CA: Academic Press Inc.

Natural Resources Conservation Service – Web Soil Survey

http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

Results:

The results of the RUSLE calculations are detailed in the table below. The highest predicted erosion is 1.76 tons/acre/yr. This is lower than the allowable erosion of 2.0 tons/acre/yr so no additional berms or terracing is required.

Table 1 – Results from RUSLE Calculations

General Area	Slope Section	**R** (ft*tonsf*in /acre*hr*year)	**K** (ton*ac-hr/hundreds ac-ft*tonf*in)	Slope (%)	Length	**L_S** (Per Section)	**C**	**P**	**A** (ton/ac/yr)
West-East Section: Westerly Slope	Section 1	10	0.2	25	40	2.226	0.15	1	0.67
	Section 2	10	0.2	5	208	1.045	0.15	1	0.31
					Totals	**3.271**			**0.98**
West-East Section: Easterly Slope	Section 1	10	0.2	5	421.2	1.552	0.15	1	0.47
	Section 2	10	0.2	25	55.9	2.906	0.15	1	0.87
	Section 3	10	0.2	0.2	388.7	0.060	0.15	1	0.02
					Totals	**4.518**			**1.36**
North-South Section: Northerly Slope	Section 1	10	0.2	25	40	2.226	0.15	1	0.67
	Section 2	10	0.2	5	276.1	1.223	0.15	1	0.37
					Totals	**3.449**			**1.03**
North-South Section: Southerly Slope	Section 1	10	0.2	5	383.9	3.644	0.15	1	1.09
	Section 2	10	0.2	25	40	2.226	0.15	1	0.67
					Totals	**5.870**			**1.76**

Figure 1 – Isoerodent Map of Western United States (Units are hundreds ft*tonf*in/(ac*h*yr))

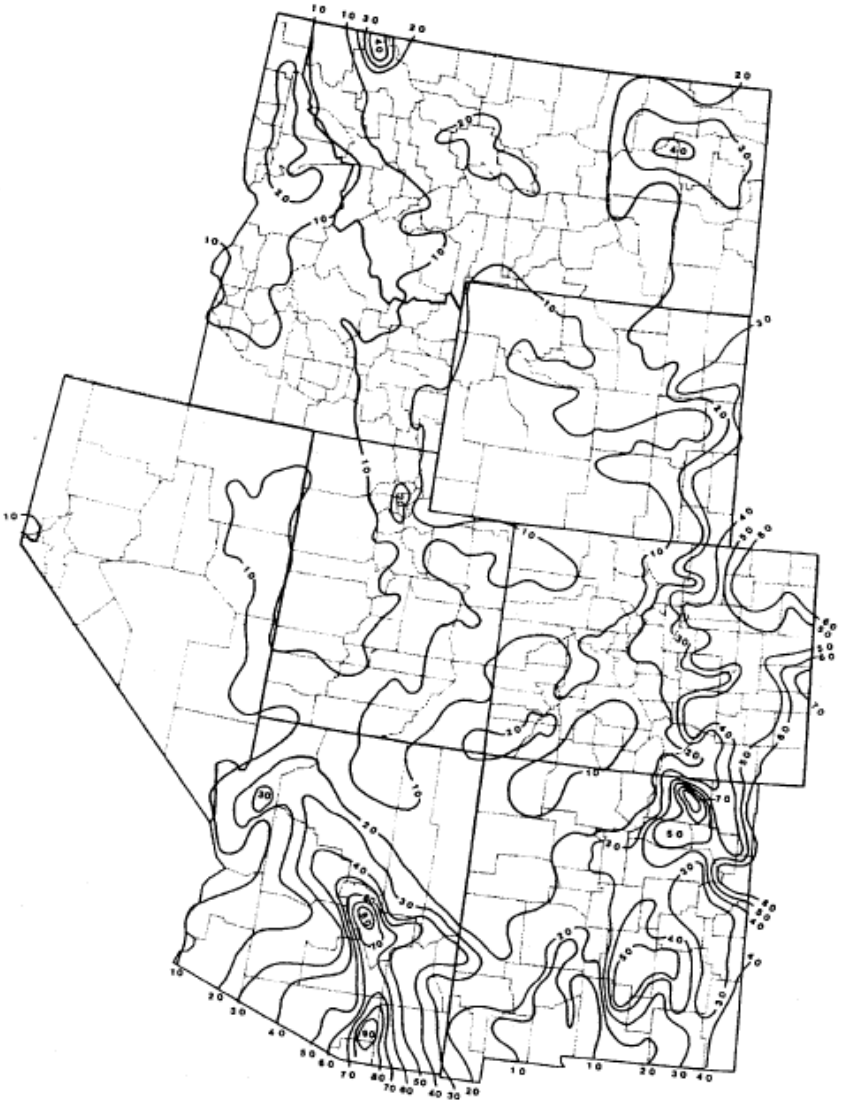


Figure 2 – Table 8.4 K Values Estimated based on Textural Information (Web Soil Survey)

Tables — K Factor, Whole Soil — Summary By Map Unit

Summary by Map Unit — Saguache County Area, Colorado (CO633)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
15	Costilla gravelly loamy sand, 0 to 3 percent slopes	.15	78.9	12.0%
29	Graypoint gravelly sandy loam, 0 to 3 percent slopes	.15	19.7	3.0%
50	Mosca loamy sand, 0 to 3 percent slopes	.20	73.5	11.2%
58	Rock River gravelly loam, 3 to 15 percent slopes	.20	472.2	72.1%
81	Villa Grove sandy clay loam	.17	10.8	1.6%
Totals for Area of Interest			**655.2**	**100.0%**

Description — K Factor, Whole Soil

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

"Erosion factor Kw (whole soil)" indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Rating Options — K Factor, Whole Soil

Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)

Figure 3 – Table 4.3 Values for topographic factor, LS, for high ratio of rill to interrill erosion (Renard, et al 1997)

Table 4-3.
Values for topographic factor, LS, for high ratio of rill to interrill erosion.[1]

	Horizontal slope length (ft)																
Slope (%)	<3	6	9	12	15	25	50	75	100	150	200	250	300	400	600	800	1000
0.2	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06
0.5	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.09	0.09	0.10	0.10	0.10	0.11	0.12	0.12	0.13
1.0	0.09	0.09	0.09	0.09	0.09	0.10	0.13	0.14	0.15	0.17	0.18	0.19	0.20	0.22	0.24	0.26	0.27
2.0	0.13	0.13	0.13	0.13	0.13	0.16	0.21	0.25	0.28	0.33	0.37	0.40	0.43	0.48	0.56	0.63	0.69
3.0	0.17	0.17	0.17	0.17	0.17	0.21	0.30	0.36	0.41	0.50	0.57	0.64	0.69	0.80	0.96	1.10	1.23
4.0	0.20	0.20	0.20	0.20	0.20	0.26	0.38	0.47	0.55	0.68	0.79	0.89	0.98	1.14	1.42	1.65	1.86
5.0	0.23	0.23	0.23	0.23	0.23	0.31	0.46	0.58	0.68	0.86	1.02	1.16	1.28	1.51	1.91	2.25	2.55
6.0	0.26	0.26	0.26	0.26	0.26	0.36	0.54	0.69	0.82	1.05	1.25	1.43	1.60	1.90	2.43	2.89	3.30
8.0	0.32	0.32	0.32	0.32	0.32	0.45	0.70	0.91	1.10	1.43	1.72	1.99	2.24	2.70	3.52	4.24	4.91
10.0	0.35	0.37	0.38	0.39	0.40	0.57	0.91	1.20	1.46	1.92	2.34	2.72	3.09	3.75	4.95	6.03	7.02
12.0	0.36	0.41	0.45	0.47	0.49	0.71	1.15	1.54	1.88	2.51	3.07	3.60	4.09	5.01	6.67	8.17	9.57
14.0	0.38	0.45	0.51	0.55	0.58	0.85	1.40	1.87	2.31	3.09	3.81	4.48	5.11	6.30	8.45	10.40	12.23
16.0	0.39	0.49	0.56	0.62	0.67	0.98	1.64	2.21	2.73	3.68	4.56	5.37	6.15	7.60	10.26	12.69	14.96
20.0	0.41	0.56	0.67	0.76	0.84	1.24	2.10	2.86	3.57	4.85	6.04	7.16	8.23	10.24	13.94	17.35	20.57
25.0	0.45	0.64	0.80	0.93	1.04	1.56	2.67	3.67	4.59	6.30	7.88	9.38	10.81	13.53	18.57	23.24	27.66
30.0	0.48	0.72	0.91	1.08	1.24	1.86	3.22	4.44	5.58	7.70	9.67	11.55	13.35	16.77	23.14	29.07	34.71
40.0	0.53	0.85	1.13	1.37	1.59	2.41	4.24	5.89	7.44	10.35	13.07	15.67	18.17	22.95	31.89	40.29	48.29
50.0	0.58	0.97	1.31	1.62	1.91	2.91	5.16	7.20	9.13	12.75	16.16	19.42	22.57	28.60	39.95	50.63	60.84
60.0	0.63	1.07	1.47	1.84	2.19	3.36	5.97	8.37	10.63	14.89	18.92	22.78	26.51	33.67	47.18	59.93	72.15

[1]Such as for freshly prepared construction and other highly disturbed soil conditions with little or no cover (not applicable to thawing soil)

Figure 4 – C Factors for Permanent Pasture, Rangeland, Idle Land, and Grazed Woodlands (Haan, et al 1994)

Table 8B.2 *C* Factors for Permanent Pasture, Rangeland, Idle Land, and Grazed Woodlands (after Wischmeier and Smith, 1978)[a]

Vegetal canopy			Cover that contacts the surface Percentage ground cover					
Type and height of raised canopy[b]	Canopy cover (%)	Type[d]	0	20	40	60	80	95–100
No appreciable canopy		G	0.45	0.20	0.10	0.042	0.013	0.003
		W	0.45	0.24	0.15	0.090	0.043	0.011
Canopy of tall weeds or short brush (0.5-m fall height)	25	G	0.36	0.17	0.09	0.038	0.012	0.003
		W	0.36	0.20	0.13	0.082	0.041	0.011
	50	G	0.26	0.13	0.07	0.035	0.012	0.003
		W	0.26	0.16	0.11	0.075	0.039	0.011
	75	G	0.17	0.10	0.06	0.031	0.011	0.003
		W	0.17	0.12	0.09	0.067	0.038	0.011
Appreciable brush or bushes (2-m fall height)	25	G	0.40	0.18	0.09	0.040	0.013	0.003
		W	0.40	0.22	0.14	0.085	0.042	0.011
	50	G	0.34	0.16	0.085	0.038	0.012	0.003
		W	0.34	0.19	0.13	0.081	0.041	0.011
	75	G	0.28	0.14	0.08	0.036	0.012	0.003
		W	0.28	0.17	0.12	0.077	0.040	0.011
Trees, but no appreciable low brush (4-m fall height)	25	G	0.42	0.19	0.10	0.041	0.013	0.003
		W	0.42	0.23	0.14	0.087	0.042	0.011
	50	G	0.39	0.18	0.09	0.040	0.013	0.003
		W	0.39	0.21	0.14	0.085	0.042	0.011
	75	G	0.36	0.17	0.09	0.039	0.012	0.003
		W	0.36	0.20	0.13	0.083	0.041	0.011

[a]All values shown assume: (1) random distribution of mulch or vegetation and (2) mulch of appreciable depth where it exists. Idle land refers to land with undisturbed profiles for at least a period of 3 consecutive years. Also to be used for burned forest land and forest land that has been harvested less than 3 years ago.

[b]Average fall height of waterdrops from canopy to soil surface in meters.

[c]Portion of total surface area that would be hidden from view by canopy in a vertical projection (a bird's-eye view).

[d]G, cover at surface is grass, grasslike plants, decaying compacted duff, or litter at least 2 in. deep. W, cover at surface is mostly broadleaf herbaceous plants (as weeds with little lateral root network near the surface) and/or undecayed residue.