DS # 4511

DS INDEX:

APN: PORTION OF 126-36-201-002

PROJECT: CCSD NORTHWEST SATELLITE TRANSPORTATION FACILITY

SUBMITTAL 2ND

CITY OF LAS VEGAS INTER-OFFICE MEMORANDUM			DATE: February 7, 2011
TO: **Land Development Services** Department of Public Works			FROM: Albert Sung, P.E. Flood Control Project Engineer Department of Public Works
SUBJECT:	Drainage Study for: **CCSD Northwest Satellite Transportation Facility**		**COPIES TO:** L. R. Nelson Consulting Engineers
Cross Streets:	NEC of Shaumber Road & Washburn Road		KGA Architecture
File Number:	F:\Depot\DSMemos\DS4511B.doc		Bart Anderson, P.E., DevCo
Parcel Number:	Portion of 126-36-201-002		Clark County School District Design Management
Zoning Action:	VAR-38553; GPA-38556 & SDR-38557		CCRFCD
FEMA Flood Zone	YES	NO **X**	CCPW
Proposed Storm Drain	YES **X**	NO	BLM

HISTORY	DATE RECEIVED	DATE REVIEWED	COMMENTS	REVIEW FEES	FEES PAID Transaction #
1st Submittal	11/22/2010	12/8/2010	Not Approved	N/C	N/C
2nd Submittal	1/24/2011	2/7/2011	See Comments Below	N/C	N/C
			TOTAL FEES (LDDRS):	**N/C**	----

REMARKS:

The Drainage Study for the subject project has been reviewed and:

	is approved subject to conformance to all City standards and the following conditions:
X	must be resubmitted or supplemented including the following:
	is conditionally approved subject to Clark County Regional Flood Control District concurrence.
	is conditionally approved subject to Clark County Public Works Department concurrence.

1. **Second request**: *Sites with a grade difference of 2 feet above or below existing are required to have approval from the City Planning and Development Department. The engineer must submit copies of the grading plans and detail sheet with a letter justifying the grade difference to the City Planning Department (229-6301). The engineer must provide Planning approval with the next submittal.*

2. **This comment is repeated until it is complete**: Per Condition #14 of **SDR-38557**: Coordinate with City of Las Vegas Right-of-Way Section of the Department of Public Works to determine all materials and information needed to submit an application to the Bureau of Land Management (BLM) for an appropriate Right-of-Way Grant Easement for Washburn Road, Alpine Ridge, Hammer Lane and Cliff Shadows (Shaumber), including those portions required for the appropriate geometric connection of this site to Ann Road, prior to the issuance of any permits.

3. Per Condition #16 of **SDR-38557**: Coordinate with the property owner of APN# 126-36-301-001 and the BLM to determine the final disposition of the existing truck haul route adjacent to the site with respect to the roadway designs proposed for this site. Provide written documentation that this property owner and/or the BLM agrees with the final geometric design of the roadways shown on the approved site plan prior to the issuance of permits for the site.

4. The site is adjacent to or crosses an existing or proposed *Clark County Regional Flood Control District* (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

5. The subject site is also adjacent to the *Clark County 215 Beltway* to the northeast and the jurisdiction of *Clark County* to the south. The engineer must coordinate with *Clark County Public Works Department* (CCPW) and incorporate any concerns for boundary conditions. CCPW concurrence is required prior to final acceptance of the study.

6. **Access Road (Sheets C4.07, C4.08 & C4.09)**:
   (i) Show grading limits along both sides of the access road and where to daylight to the existing adjacent grades.
   (ii) Any grading beyond the 80'-access right of way will require temporary use easement from the BLM. This is required in addition to Comment #4. All necessary permits or documentations must be obtained prior to the final approval of improvement plans.
   (iii) Provide access ramps to the upstream and downstream ends of the culverts for future maintenance. Show the ramps on the pertinent plans in the next submittal.
   (iv) Section B/C4.07 shows side slope of 2:1 which requires guard rail for driving safety. Either revise the side slope to 3:1 maximum or provide guard rail accordingly.

7. **Sheet C3.01**:

   (i) **Second request**: Label all the perimeter street names.

8. **Sheet C3.02**:

   (i) Show grading and daylight design on the north side of Hammer Lane and extend the offsite grading on the west side of Shaumber Road north of the intersection.

   (ii) **Second request**: Label the slope of the proposed scarp on the grading plan.

   (iii) The length of all modified Type C inlets are in multiples of 2.5'. Revise all the callouts accordingly. This comment applies to all other pertinent sheets.

   (iv) No Type A inlet is allowed anymore. Revise Storm Drain Note #14 accordingly.

   (v) Provide laterals at SDMH #6 (in Hammer) and at SDMH #20 (in Shaumber) for future connections.

   (vi) Provide access ramp down to the bottom of the proposed riprap inlet at the west side of Shaumber Road.

9. **Sheet C3.03**:

   Show grading and daylight design on the north side of Hammer Lane and provide laterals at SDMH #7 and #8.

10. **Sheet C3.04**:

    (i) Provide a section at Alpine Ridge Way to verify the proposed super-elevation.

    (ii) A bold-line is shown along the edge of pavement in Alpine Ridge Way. Explain what this bold-line represents in the next addendum.

11. **Sheet C3.05**:

(i) **Second request**: Label the proposed slope of the scarp on the grading plan.

(ii) Provide laterals at SDMH #2 and SDMH #3.

12. **Sheet C3.08**:

(i) A bold line is shown along the edge of pavement in Washburn Road. Explain what this bold line represents.

(ii) Provide an access ramp to the bottom of the riprap inlet west of Shaumber Road.

(iii) Show daylight design of roadway in Washburn west of Shaumber Road.

13. **Sheet C3.09**:

(i) Explain what the bold line along the edge of pavement in Washburn is.

14. **Sheet C3.10**:

(i) Show daylight in the south half of Washburn Road.

NOTE: Please be advised that all land surface area disturbances over 1 acre or any area adjacent to a water way must submit to the *Nevada Division of Environmental Protection* a "Notice of Intent" to discharge that certifies a stormwater pollution prevention plan has been developed and is maintained on site; for inclusion in the Stormwater General Permit No. NVR100000. A phased construction unit in a contiguous subdivision is considered under construction until all stripped or disturbed surface areas have been covered by paving, building construction or planting. For more information, including forms and applications see http://ndep.nv.gov/bwpc/storm01.htm or call (775) 687-9429.

NOTES: This drainage study assumes that the project will be constructed in one phase. If improvement plans are submitted to break the project into separate phases, a drainage study update will be required for each phase addressing the interim condition.

END OF REMARKS
ays

T/R/S: T19S/R59E/36
AREA F-36

Post-it® Fax Note 7671	Date 2/7/11	# of pages ▶ 3
To Jon Hayslip	From Albert Sung	
Co./Dept. LRN	Co. CLV	
Phone #	Phone # 229-2001	
Fax # 451-2296	Fax #	

ADDENDUM #1 TO THE TECHNCIAL DRAINAGE STUDY FOR CCSD NORTHWEST TRANSPORTATION FACILITY

CITY OF LAS VEGAS, CLARK COUNTY, NEVADA
Project Number: 032-085-092
January 2011

Prepared For:

KGA Architecture.
9075 West Diablo Drive
Las Vegas, NV 89148

Prepared By:

L.R. Nelson Consulting Engineers
6765 W. Russell Rd., Suite 200
Las Vegas, Nevada 89118
(702) 798-7978

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: CCSD NORTHWEST SATELLITE TRANSPORTATION FACILITY Date: Jan 20, 2011

Location of Development: a) Descriptive (Cross Streets) North/South: Cliff Shadows

East/West: Washburn

b) Section: 36 Township: 19 South Range: 59 East

c) APN : 126-36-201-002 (portion of)

Name of Owner: USA / Clark County School District Design Management / Planning and Design

Telephone No.: 702-799-8710 Fax No.: 702-799-8745 E-Mail Address:

Address: 4170 McLeod Drive, Las Vegas, NV 89121

Contact Person-Name: Jon Hayslip **Telephone No.:** (702) -798-7978

* **E-Mail Address:** jon.hayslip@lrneng.com **Fax No.:** 451-2296

Firm: L. R. Nelson Consulting Engineers

Address: 6765 W. Russell Road, Suite 200, Las Vegas, NV 89118

Type of Land Development/Land Disturbance Process:

☐	Rezoning	☐	Subdivision Map	☐	Clearing and Grading Only
☐	Parcel Map	☐	Planned Unit Development	☐	Other (Please specify below)
☐	Large Parcel Map	☒	Building Permit		

1. Total Owned Land Area: At Site: 131.7 Ac. (+/-) Being Developed/Disturbed: 40 Ac. (+/-)
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ **Yes**** ☒ **No**
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☐ **Yes**** ☒ **No**
4. Proposed type of development (Residential, Commercial, Etc.): CCSD Transportation
5. Approximate upstream land area which drains to the subject site: 62 Ac. (+/-)
6. Has the site drainage been evaluated in the past? ☒ **YES** ☐ **NO** If yes, please identify documentation: 90% Lone Mn Beltway Det. Basins/Gowan Beltway West-Western Clark County 215 Bruce Woodbury Beltway-Craig to Hualapai (Aug 2008) GCW for CCPW
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Adjacent roadway & existing Alpine Ridge low point into existing Beltway Channel
8. Briefly describe your proposed schedule for the subject project: As soon as possible.

1/20/11

REGISTERED PROFESSIONAL ENGINEER - STATE OF NEVADA
JON H. HAYSLIP
CIVIL
No. 12584

Engineer's Seal EXP. 6/30/11

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

***New Required Field**

****Review and concurrence of the Clark County Regional Flood Control District is required.**

DS4511
Local Entity File No.

Revision	Date

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

Project Number: 032-085-092

January 20, 2011

City of Las Vegas
Department of Public Works
731 South Fourth Street
Las Vegas, Nevada 89101

Attention: **Mr. Albert Sung, P.E.**
Flood Control Project Engineer

Reference: **CCSD Northwest Satellite Transportation Facility (DS4511)**

Mr. Sung:

The purpose of this letter is to respond to your remarks dated December 8, 2010. The review comments have been re-stated with an associated response. On December 16, 2010 at 10:30 am, a meeting was held at the City of Las Vegas with members from Traffic, Land Planning, Public Works, Flood Control L. R. Nelson Consulting Engineers to discuss the project elements related to comments received in the initial drainage study submittal.

DRAINAGE STUDY REVIEW

1. Sites with a grade difference of 2 feet above or below existing are required to have approval from the City Planning and Development Department. The engineer must submit copies of the grading plans and detail sheet with a letter justifying the grade difference to the City Planning Department (229-6301). The engineer must provide Planning approval with the next submittal.

   Response:

   L. R. Nelson Consulting Engineers has prepared and forwarded the letter to the City Planning Department for their review. The documents were delivered in the December 16, 2010 meeting for review. A copy of the Planning approval letter is included in Appendix E to satisfy the request.

2. The site is adjacent to or crosses an existing or proposed Clark County Regional Flood Control District (CCRFCD) master planned facility. Therefore, CCRFCD concurrence is required prior to final approval of the drainage study.

   Response:

   A copy of the original drainage study and all addenda will be forwarded to the CCRFCD for concurrence after receiving the City of Las Vegas conditional approval.

3. The subject site is also adjacent to the Clark County 215 Beltway to the northeast and the jurisdiction of Clark County to the south. The engineer must coordinate with Clark County Public Works Department (CCPW) and incorporate any concerns for boundary conditions. CCPW concurrence is required prior to final acceptance of the study.

   Response:

   A copy of the original drainage study and all addenda will be forwarded to the CCRFCD for concurrence after receiving the City of Las Vegas conditional approval.

4. Provide a copy of the zoning/planning conditions associated with this site (VAR-38553; GPA-38556 & SDR-38557) with the next submittal to verify compliance with conditions. Flood Control will not issue conditional approval of the drainage study without the associated zoning/planning conditions (issued by the City Council). Any associated conditions of approval that revise the site drainage parameters will require that the drainage study be revised and resubmitted.

   Response:

   Copies of VAR-38553 & SDR-38557 are located in Appendix E for review. A copy of the general Plan Amendment (GPA-38556) is currently under review by the City of Las Vegas as discussed in the meeting.

5. Regarding the access road from Ann Road to the subject site and the overall site grading consisting of substantial elevation differential, it is recommended for the engineer to set up a meeting between the engineer/developer and the City officials such as Planning, Traffic, Flood Control and Land Development. This meeting should be set up and have the issues resolved prior to the submittal of the next addendum.

   Response:

   The meeting held in the second floor of the City of Las Vegas Planning conference room on Thursday December 16, 2010 with the City officials from Planning, Traffic, Flood Control and Land Development. It was agreed upon by the members in attendance, that the alignment of the long term temporary access road from the Ann Road to the subject site would constructed with thicker structural section to accommodate bus and truck traffic. Dennis Moyer, CLV, concurred with thickened roadway section is an acceptable design.

   Additionally, the design of subject site with regards to elevation differential was discussed in prior meetings with City of Las Vegas staff and reiterated in December 16th meeting. Grading of the large site on natural slopes of 5 to 6 percent coupled with the requirements of the Clark County School Districts development gradient criteria approximately 2 to 3 percent required lowering west side and raising the east side supported by large 2 tiered retaining walls was necessary to achieve slopes provided on the proposed grading plans.

6. Regarding the Best Management Practices (BMP) criteria towards the stormwater quality management for the parking area of the subject development, the engineer must contact Flood Control Section to determine BMP prior to the final approval of the drainage study.

   Response:

   Three (3) BMP are located on the CCSD site to address stormwater quality management for the parking areas. The proposed BMP are located on Sheets C3.03, C3.09 and C3.10 which will filter the nuisance flow for onsite basins ON1, ON3 and FUT1, respectively. The estimated parking lot surface

area that will drain through the proposed BMP is approximately 10.75 acres. The BMP details are shown on sheets C3.03 and C3.09.

In another matter related to the CCSD project, these details were shown and discussed in a meeting on January 11, 201, that was requested by Mr. Albert Sung, P.E., and Mr. Robert Welch, P.E., City of Las Vegas.

7. Per Condition #14 of SDR-38557: Coordinate with City of Las Vegas Right-of-Way Section of the Department of Public Works to determine all materials and information needed to submit an application to the Bureau of Land Management (BLM) for an appropriate Right-of-Way Grant Easement for Washburn Road, Alpine Ridge, Hammer Lane and Cliff Shadows (Shaumber), including those portions required for the appropriate geometric connection of this site to Ann Road, prior to the issuance of any permits.

Response:

Vern Harkins, P.E., Project manager has been working with the CCSD consultant, City of Las Vegas Right-of-Way Section of the Department of Public Works to process the BLM application in accordance with Condition #14 of SDR-38557 which was discussed in the meeting. A copy of the application and supporting documents for the appropriate Right-of-Way Grant is included in Appendix E for review.

8. Per Condition #16 of SDR-38557: Coordinate with the property owner of Assessor Parcel Number 126-36-301-001 and the BLM to determine the final disposition of the existing truck haul route adjacent to this site with respect to the roadway designs proposed for this site. Provide written documentation that this property owner and/or the BLM agree with the final geometric design of the roadways shown on the approved site plan prior to the issuance of any permits. Once it is determined what portions of the truck haul route must be modified to accommodate the roadways being designed for this site, coordinate the final geometric traffic control and roadway design with the Traffic Engineering Section of Public Works Department.

Response:

This item was discussed during the meeting with Dennis Moyer, P.E., CLV, and it was agreed upon that a specific haul route out of the private and BLM gravel pits would depend upon the route selection by the driver of each individual truck with haul trailer. Due to this condition, Mr. Harkins stated the each of the roadways around the CCSD property would have a thicker asphalt and sub-grade section than was typically recommended for this type of roadway section. The offsite roadway section proposed for the project will be 5.5-in of asphalt over 6-in of Type II and has been detailed accordingly on the enclosed plans.

Additionally, Mr. Moyer stated that a 14-ft over-pave section will be required for the proposed half-street improvements. It was discussed and agreed upon that the over-pave section will be provided on all the roadways around the CCSD site with the exception of Washburn Road due to the topography along the southern boundary adjacent to the existing gravel pit operation.

9. **Sheet C3.01:**

(i) Show the proposed access road to Ann Road.

Response:

The access road plans are included with this addendum. The design elements of the road were discussed in the meeting and it was agreed to provide a 48-ft wide section with 5.5-in asphalt section

on top of 6-in of Type II. The access road and cross section details are included with the enclosed plan set.

(ii) Label all the perimeter street names.

Response:

All the perimeter street names are labeled on the enclosed plans.

(iii) Show the proposed onsite and offsite storm drains schematically on the general overall site plan.

Response:

The proposed onsite and offsite storm drains are shown schematically on the general overall site plan on Sheet C3.01.

10. Provide plan and profile for the proposed access road from the subject development to Ann Road.

Response:

The plan and profile for the proposed access road from the subject development to Ann Road is included with this addendum for review.

11. Figure 8 to Figure 10 (Existing, Interim and Ultimate Drainage Basin Maps):

(i) It appears that a blue boxed area block off a big portion of Basin HLBW1-CA from impacting the subject development. Explain what the blue boxed areas are in the next submittal.

Response:

The blue boxed area is the ultimate development boundary conditions included on the original G.C. Wallace drainage study figures which encompass the existing below grade gravel pit operations. The area located to the west of blue line (Puli Road alignment) shown on Figures 8 through 10 is the existing BLM gravel pit area. This information is also referenced within Appendix D in the document known as *Mining and Reclamation Plan for the Lone Mountain Community Pit* prepared by PBS&J dated March 31, 2008 and shown on Appendix B and J.

(ii) The subject study assumes that the offsite areas remain undeveloped in the ultimate condition which is not correct. The areas adjacent to the west and south of the subject site are within the Lone Mountain Pit Community Planning Area and can be developed in the future. Revise the Ultimate Drainage Basin Map and all pertinent hydrologic and hydraulic calculations accordingly.

Response:

An analysis was presented for the ultimate condition regarding the area to the west based upon the land planning document provided in the G.C. Wallace study. Hydrologic flow rates for this ultimate condition were established in the original submittal based upon a (ultimate) unit flow rate per acre using the information cited in the study and displayed on Figure 10. Review of the hydrologic parameters such as Curve Number and Land Use in the referenced drainage study appears to be reasonable assessment for the "***ultimate***" condition and L. R. Nelson Consulting Engineers concurs with the work provided by G. C. Wallace Engineers.

Based upon the discussion with flood control staff and current state of the economy, development of the area to the west and south represent unique challenges to the region. Due to the topographic nature (i.e. steep slope), lack of (public) funding for development in the area to the west and private

ownership of the gravel extraction pit to the south, the ultimate condition analysis presented in the original drainage study represents approximation of future condition flow rates based upon the cited planning document developed for the area.

Further review of the planning documents *(Mining and Reclamation Plan for the Lone Mountain Community Pit)* in Appendix D indicated under Section IV, Reclamation Plan, that the area will be returned to "*conducive to development*" based upon regulatory conditions. Additionally, the document states that *"It is not intended to return the reclaimed areas to pre-existing vegetation, topographic or other natural conditions"* and area will be stabilized based upon with side slopes of 3:1 (H:V) and the area contoured for future development. Based upon this information, the gravel pit to the west under BLM control will not be filled in and provide below grade detention capabilities in the future. The offsite area shown between Puli Road (blue line) and Shaumber (Cliff Shadows) alignment as shown on Figure 10 in the original submittal utilized the ultimate condition flow rate analysis with the assumption that is will be routed to the west ROW (Shaumber) of the CCSD facility.

The gravel pit south of CCSD site will remain in private ownership and when and if property changes ownership, it also falls under the same reclamation plan and would be reasonable to assume it would proved below grade detention and not directly drain onto the site or applicable watershed impacting the site. The information referenced from the *Mining and Reclamation Plan for the Lone Mountain Community Pit* is underlined/highlighted and included in Appendix D for review.

(iii) Address how the ultimate drainage condition impacts the regional facilities within the Northwest Beltway right-of-way.

Response:

It is unclear what the City of Las Vegas specifically requesting since the improvement plans for *Western Clark County 215 Bruce Woodbury Beltway Craig Road to Hualapai Way, 90% Submittal Plan Set, August 2008* specifically provided the hydrologic and hydraulic analysis for the feeder channels, reinforced concrete box culverts and open channels along the future beltway alignment based upon "ultimate" conditions. Based upon additional review of the reference document, the following narrative is provided to hopefully address the comment.

The flow in the ultimate drainage condition impacts regional facilities feeder channel as shown on the RSD6 from the improvement plans for *Western Clark County 215 Bruce Woodbury Beltway Craig Road to Hualapai Way, 90% Submittal Plan Set, August 2008*. The feeder channel shown on Sheet RSD6 (Appendix D) is a 3-ft by 3-ft rectangular section between Stations 60+98.51 through 65+56.98 near the Bardon Road alignment and existing low point known as COM5 on offsite basin map shown in Figure 10 within the original submittal. The hydrologic analysis presented in the original study lumped offsite and onsite flow at this location (COM5).

Node COMBALL is located upstream of COM5 and based upon the estimated 100-Year design storm captured flow from the offsite and onsite inlets, approximately 262.4 cfs that would discharge from the RCP outlets just beyond the Alpine Ridge Way ROW in the ultimate condition to this proposed beltway improvements.

12. The hydraulic calculations portion of the drainage study presented only the interim condition for the streets. Provide street hydraulic calculations for the perimeter streets for future improved condition, i.e. street sections with curb and gutter and sidewalk etc. for the ultimate drainage condition. Note that street hydraulics criteria such as dry-lane and DV ratio in 10- and 100-year events must be met in all perimeter streets.

Response:

Hydraulic calculations have been provided for the future improved condition, i.e. street sections with curb and gutter and sidewalk etc. for the ultimate drainage condition using the future flow rates established in this addendum submittal. Dry lane (DL) and Depth times Velocity (DV) products are computed on the Bentley FlowMaster calculation sheets included in Appendix C. The results computed results on these sheets indicate the DL and DV criteria have been met.

The hydrologic revisions are provided for the ultimate condition for the future half-street sections surrounding the CCSD site. In the original submittal the roadway basins adjacent to the site were listed as R1 (i.e. Road #1 section). The future roadway basins have been mirrored (delineated) on the opposite side and listed as R1U (i.e. Road #1 Ultimate section). These basins are shown on Figure 11A in Appendix A of this addendum. Flows computed for the 10- and 100-Year design storm for these basins were added algebraically to the applicable offsite and onsite basin flow rates compiled on the basin maps included in Appendix A. The HEC-1 model is included in Appendix B and summarized below.

Table 1: 1/2 ROW Flow Rates - Ultimate Condition

BASIN NAME	AREA (ac)	CN VALUE	Q10 (cfs)	Q100 (cfs)
R0U	0.90	98	2	4
R1U	0.25	98	1	1
R2U	0.90	98	2	4
R3U	0.84	98	2	3
R4U	0.39	98	1	2
R5U	0.71	98	2	3

Hydraulic calculations are provided in Appendix C for the ultimate condition roadways as requested based upon the flow rates and discussed in the response portion of the Comment No. 12. These street depths of flow calculations include the captured drop inlet flow reduction except where noted on the Bentley FlowMaster calculations sheets. The roadways included for the ultimate condition analysis were based upon the estimated flow to be conveyed within the half-street section of each ROW surrounding the CCSD site and are labeled on the Bentley FlowMaster calculations sheets accordingly. A narrative is provided for the future or ultimate condition assumptions for the ROW surrounding the CCSD site.

Shaumber

The offsite area to the west of the CCSD site between Washburn and Hammer (Basins OFF3A, OFF3B and OFF4A shown on Figure 10A) have assumed future development will route the 100-Year flow internally until reaching the proposed 42-in lateral located north portion (west side) of Shaumber basin on the historic wash alignment. The 42-in lateral was placed at this location to capture the flow in the largest wash along the west boundary of the CCSD site under interim condition. The future or ultimate condition assumption is that flow would be routed internally to this facility due to the flat roadway grade of 0.6 percent does not provide the required conveyance capacity need to meet the 10-Year dry lane and possible 100-Year DV product criteria. Therefore, basins R0U and R1U (West ½ of

Shaumber) are assumed to be the only the storm runoff that falls within the future west half of this ROW. Depth of flow and DV product calculations for the west half ultimate ROW are based upon this assumption. The east half future condition calculations for Shaumber were included in the original drainage study submittal. Within the notes section of the Bentley FlowMaster calculations sheets, 10- and 100-Year flow rates are listed from the referenced basin, node or drop inlet by pass flow, to establish the design flow rates for the corresponding depth of flow calculation.

Hammer Lane

The estimated future or ultimate flow rate in the north half of Hammer Lane is based upon the storm runoff within the ROW only, since the existing grade falls off to the northeast between 5 and 10 percent towards the future beltway alignment. Based upon the depth of flow calculations (Section 5) in Appendix C, flow is contained within the curb of each half street until reaching the super-elevation section (Section 6) where both halves of the ROW flow combine as it travel towards the Alpine Ridge sump. Within the notes section of the Bentley FlowMaster calculations sheets, 10- and 100-Year flow rates are listed from the referenced basin, node or drop inlet by pass flow, to establish the design flow magnitude for the corresponding depth of flow calculation.

Washburn Road

The estimated flow rate for north half of Washburn Road for the future or ultimate condition was based determined using the established GCW unit flow rates for the 10- and 100-Year design storms and revising offsite basin OFF4A and OFF4B. Basin OFF4B was assumed to be located between the Puli and Shaumber ROW alignments that would contribute flow to the north half of the ROW. Basin OFF4B represents an area approximately 120-ft north of Washburn centerline (40-ft ROW + 10-ft Landscaping + 18-ft Parking Stall + 24-ft Drive Aisle + 18-ft Parking Stall + 10-ft Building Setback from Parking Stall) and 1344-ft (+/-) between Puli and Washburn ROW. This represents approximately 3.70 acres contributing to north half of Washburn Road west of the intersection with Shaumber or 5.4 cfs and 11.0 cfs, respectively based upon the unit flow per acre established in the GCW study and summarized on Figure 10A in Appendix A. A proposed storm drain has been located on the northwest corner of Washburn and Shaumber to allow for flow capture in the interim and future conditions. The storm drain hydraulic analysis discussed later in this addendum is assumed to convey the future (or ultimate) 100-Year flow rate from this location thus leaving only the rainfall conveyed within the north-half of the Washburn ROW (per drainage plan) between Washburn and Alpine Ridge. Hydraulic depth of flow calculations included in Appendix C are based upon these assumptions and corresponding cross section locations are located on Figure 11A in Appendix A.

Basin OFF4A acreage was adjusted downward and the 10- and 100-Year flow rates re-computed and shown of Figure 10A.

The south half of Washburn Road was based upon the 40-ft wide section by 1344-ft (+/-) between Puli and Washburn ROW or 1.23 acres for an estimated 10- and 100-Year flow rate of 1.8 cfs and 3.7 cfs, respectively.

Alpine Ridge

A drop inlet was placed at upstream of Alpine Ridge in the north half of Washburn Road to capture a portion of the 10- and 100-Year future (or ultimate) and convey it underground within the storm drain system that turns north with Alpine Ridge. Flow within the west half of Alpine Ridge combines with the drop inlet bypass flow from the Washburn inlet. Depth of flow calculations are provided for this section accordingly. It has been assumed the east half of Alpine Ridge (basin R5U) combines with the flow from basin OFF6. Currently, basin OFF6 drains into the east half of the ROW (see Figure 10A) and it is assumed approximately the same area and flow rate could or would be routed within the fully improved ROW. Therefore, the ultimate flow rates for OFF6 were combined with R5U to compute the depths of flow calculations for this section of future (or ultimate) ROW.

Within the notes section of the Bentley FlowMaster calculations sheets, 10- and 100-Year flow rates are listed from the referenced basin or node or drop inlet by pass flow or combination thereof, to establish the design flow rates for the corresponding depth of flow calculation.

13. Sheet C3.02:

(i) For traffic reasons, remove the proposed cross valley gutters in Hammer Lane and the driveway entrance. A drop inlet shall be either relocated or provided at the upstream side of the curb return.

Response:

Based upon the meeting, the proposed cross valley gutter in Hammer Lane have been removed and a nuisance inlet located upstream of the driveway on Sheet C3.03. On sheet C3.02, the inlet originally sized to capture the 100-Year flow downstream of the driveway in Shaumber has been relocated upstream of the driveway near Sta. 20+00.

(ii) Provide a cross section at Shaumber Road. The section must include onsite features up to or beyond the chain link fence and offsite features to the proposed scarp.

Response:

A cross section has been provided as requested showing the requested information.

(iii) Label the slope of the proposed scarp on the grading plan.

Response:

The slope of the proposed scarp on the grading plan has been labeled as requested.

(iv) Show the design of a berm at the back of the sidewalk in Shaumber Road for onsite flood protection. Label the top of berm elevation (TB) at regular intervals.

Response:

The design of a berm at the back of the sidewalk in Shaumber Road for onsite flood protection has been labeled along the top of berm elevation (TB) at regular intervals as requested.

(v) Address the maintenance issue of the interim inlets on the west half of Shaumber Road. Provide riprap for erosion protection per riprap sizing calculations.

Response:

The maintenance issue of the interim inlets on the west half of Shaumber Road will be provided by the Clark County School District. Erosion protection for the entrance will consist of loose rip-rap with D_{50} of 12 inches and thickness equal to 24 inches (i.e. 2 D_{50}). The size and type of erosion protection was based upon hydraulic calculations located in Appendix C.

14. Sheet C3.03:

Provide a drop inlet at the upstream end of the driveway in Hammer Lane and remove the proposed valley gutter.

Response:

The proposed cross valley gutter in Hammer Lane have been removed and a nuisance inlet located upstream of the driveway on Sheet C3.03

15. Sheet C3.04:

(i) According to Traffic Section, the 90-degree turn in Alpine Ridge Way appears to require a super-elevation cross section. Contact Mr. Victor Bolanos of traffic for the design criteria at 229-6901.

Response:

Based upon the initial meeting with the City of Las Vegas, a super-elevation section in Alpine Ridge Way has been provided as requested.

(ii) The two proposed drop inlets in Alpine Ridge Way are in a sump condition. The maximum allowable ponding depth is 1'. Provide drop inlet sizing calculation. Show an overflow path in case the inlets are totally clogged.

Response:

The nuisance inlet has been removed and a 27.5-ft "CM" in length with 25-ft of grate opening has been provided to limit the ponding below one (1) foot of depth. Hydraulic calculations for this drop inlet were provided for the equal length curb and grate opening of 25-ft with a 50 percent clogging factor. The additional 2.5-ft extended curb opening per Std. Dwg. 412A was not included in the hydraulic calculation because the assumption that debris will negate this short section of since of opening. Hydraulic calculations are included in Appendix C for the Alpine Ridge Sump condition which demonstrates under worst case condition, the depth of ponding is less than one (1) foot. Hydraulic calculations for the intercepted flow for the inlet are included in Appendix C.

Due to the City of Las Vegas requested super-elevation in the Alpine Ridge sump, an overflow path cannot be obtained for the 100-Year design storm.

(iii) Remove the proposed valley gutter at the low point in Alpine Ridge Way.

Response:

The valley gutter at the proposed low point within the original submittal has been removed and the roadway section has been re-designed to include a super elevation. The drop inlets in the area have been reconfigured at the low point to meet the ponding criteria of 1 foot or less. Hydraulic calculations for the sump condition drop inlet, a 27.5-ft "CM" in length with 25-ft of grate opening

(iv) Provide a cross section at Alpine Ridge Way. The section must extend to show how the grading daylight to the offsite Beltway area and the connection to the Beltway 215 Channel.

Response:

Grading beyond the limits of the project and outside of the allowed BLM granted useable area cannot be achieved. A cross section at Alpine Ridge Way showing the grading within the limits of the application and extends to the existing Beltway 215 Channel.

(v) Provide riprap protection at the two discharging points for erosion protection per riprap sizing calculations.

Response:

Rip-rap protection has been provided on the plans based upon the maximum velocity computed of 14.64 feet-per-second (fps) for the outlet storm drain. Rip-rap sizing calculations included in Appendix C indicate the loose rip-rap size would be in excess of 3 feet with a thickness great than 6 feet. Per the recommendations of Figure 706 of the CCRCFD HC&DDM and based upon this velocity, the erosion protection recommend is based upon Table 703 which requires a grouted rip-rap section. The outlet area near Sta. 23+50 is now detailed to show the 24-in section with d_{50} equal to 12-in and each layer to be solid grouted per the detail and notes now included.

16. Sheet C3.05:

(i) Provide drop inlets at the upstream side of the driveways and remove the valley gutter.

Response:

Drop inlets (nuisance) at the upstream side of the driveways are now provided and the valley gutters have been removed as requested on Sheet C3.05.

(ii) Label the proposed slope of the scarp on the grading plan.

Response:

The proposed slope of the scarp on the grading plan has been labeled as requested.

(iii) Show the design of a berm at the back of sidewalk in Shaumber Road for onsite flood protection. Label the top of berm elevation at regular intervals.

Response:

The design of a berm at the back of the sidewalk in Shaumber Road for onsite flood protection has been labeled along the top of berm elevation (FG/HP) at regular intervals as requested.

17. Sheet C3.06:

The proposed onsite inlet (DI#10) appears to be in a sump condition. Address whether an overflow path is provided in a worst case scenario that the inlet is totally clogged in the next submittal.

Response:

An overflow path is provided for DI#10 is shown on the 11-in x 17-in sheet (Figure 12) included in Appendix A. The calculations are based upon the Broad Crested Weir Equation to compute estimated depth for the 100-Year flow for basin ON2 assuming it becomes totally clogged. Since the control (weir) section is irregular in shape, individual areas were computed and summarized below. The individual cross-sectional areas (Section #) are shown on the figure along with this table.

WEIR OVERFLOW ESTIMATE

Est. WSE	Section #	C	L (ft)	H (ft)	Rect Q (ft)	Act Q (ft)	Remarks
4.71	1	3	15.24	0.24	5.4	2.7	Triangular Shaped Weir
4.83	2	3	11.53	0.36	7.5	3.7	Triangular Shaped Weir
4.83	3	3	15.24	0.12	1.9	1.9	Rectangular Shaped Weir
					Total Q	8.3	> 8 cfs of Q100 for Basin ON2

18. Sheet C3.08:

(i) Relocate the drop inlet in Shaumber Road to the upstream side of the driveway and remove the proposed valley gutter.

Response:

The drop inlet in Shaumber Road has been moved to the upstream side of the driveway and the proposed valley gutter has been removed as requested based on the City of Las Vegas meeting.

(ii) It appears that the proposed grades in Washburn Road has a huge disconnect with the existing grades as shown on the grading plan. Show the design of how proposed grades daylight into the existing grades in the next submittal. Provide a cross section to show as such.

Response:

Additional grading information has been provided to show the proposed grading along Washburn Road as requested.

(iii) Show transition design of roadway at the intersection of Shaumber Road and Washburn Road.

Response:

The design of roadway at the intersection of Shaumber Road and Washburn Road has been provided as requested.

(iv) Show a berm as indicated in Section A/C3.09 with top of berm elevations at regular intervals.

(iv) Show a berm as indicated in Section A/C3.09 with top of berm elevations at regular intervals.

Response:

The berm and accompanying information has been provided as requested.

(v) Provide a 24" storm drain in Washburn Road.

Response:

A 24-in storm drain has been provided as requested along with a Jensen Precast inlet has been located at the northwest corner of the intersection. WSPG hydraulic analysis has been provided to show the ultimate (worst case flow) can convey the estimated future condition flow rate along Washburn Road.

19. Sheet C3.09:

(i) Show the proposed berm on the plan along Washburn Road.

Response:

The proposed berm has been placed on the plan along Washburn Road as requested.

(ii) Provide a drop inlet at the upstream end of the driveway and remove the valley gutter. Provide a 24" storm drain in Washburn Road.

Response:

A nuisance drop inlet at the upstream end of the driveway has been provided and connected to a 18-in diameter lateral storm drain to the 24-in main line in Washburn Road. The ultimate condition analysis shows the DV product and Dry Lane criteria has been met along Washburn Road along this section of roadway. Hydraulic calculations are included in Appendix C for the depth of flow and storm drain analysis.

20. Sheet C3.10:

(i) Per the onsite drainage basin map, the onsite flows of the subject development are to be routed to the northeast corner of the site for discharge. However, the grading plan shows otherwise: a valley gutter is proposed across Alpine Ridge Way which will facilitate the outfall from the concrete channel to the east and continue in Washburn Road. This can be corrected by installing a drop inlet adjacent to the outfall connected to a storm drain in Washburn Road and Alpine Ridge Way.

Response:

A 13.75-ft Type 'CM' drop inlet (10-ft with 50% clogging factor applied) has been located in Washburn Road upstream of Alpine Ridge Road to capture a portion of the flow conveyed within the north half of the roadway section. Depths of flow and drop inlet capture capacity calculations are included in Appendix C for this location. The valley gutter as been removed and the grading revised back to the original design to direct the flow per the onsite drainage basin map.

(ii) Remove the valley gutter in Alpine Ridge Way.

Response:

The valley gutter has been removed as requested.

21. Sheet C4.01 and Sheet C4.02:

Revise the drop inlets location and remove the valley gutters per previous comment.

Response:

The inlets and valley gutters have been relocated as requested and based upon the discussions with the City of Las Vegas staff in the meetings.

22. Sheet C4.03:

(i) The flow in Drop Inlet #4 has a velocity component against the main storm drain when it reaches SDMH #13. Extend SDMH #13 to a position to eliminate this situation.

Response:

The configuration has been revised and the WSPG model updated accordingly. Plan revisions are shown sheet C4.03 and the WSG hydraulic model, drop inlet capture capacity calculations are located in Appendix C.

(ii) Provide riprap at the two discharging points in Station 23+50.73 and Station 23+68.81 for erosion protection per riprap sizing calculations.

Response:

Erosion protection has been provided at the outlet based upon based upon the storm drain exit velocity with the greatest magnitude. In this case, the main line collection flow from Shaumber/Hammer alignment has the highest velocity of 14.64 fps. Based upon the calculated rip-rap size of 3.2-ft and thickness requirement of 6.4-ft for this outlet shown in Appendix C, it is proposed to provide a grouted rip-rap pad with D50 of 12-in and thickness equal to 24-in with each 12-in layer grouted solid as shown on the enclosed plans and detail(s).

(iii) Per the profile of "Lateral at SDMH #13", the flow in the lateral is not "Nuisance Flow Only" as indicated. Review and revise accordingly.

Response:

The nuisance flow sump condition drop inlet has been removed and replaced with a 27.5-ft Type "CM" per C.C.U.A.S.D. No. 412A at this location. Hydraulic calculations for this drop inlet were provided for the equal length curb and grate opening of 25-ft with a 50 percent clogging factor. The additional 2.5-ft extended curb opening per Std. Dwg. 412A was not included in the hydraulic calculation because the assumption that debris will negate this short section of since of opening. Hydraulic calculations are included in Appendix C for the Alpine Ridge Sump condition which demonstrates under worst case condition, the depth of ponding is less than one (1) foot.

23. Sheet C4.05:

Revise the drop inlet location and remove the valley gutters per previous comment.

Response:

The drop inlets locations and valley gutters have been revised accordingly.

24. Sheet C4.06:

Revise the drop inlet location and remove the valley gutters per previous comment.

Response:

The drop inlets locations and valley gutters have been revised accordingly.

25. Sheet C4.07:

Extend the plan and profile design of the access road to Ann Road.

Response:

The plan and profile design of the access road to Ann Road is included with this submittal. Hydraulic calculations along with erosion protection at the outlets and have been provided for the two (2) culvert crossings shown on Sheets C4.08 and C4.09 for interim condition flow for this temporary access road.

26. Revise all drop inlets to Type "CM" or Neenah Pre-cast inlets. The length of the inlets are in the multiple of 2.5' for Type "CM" or 3.0' for Neenah. Review and revise all callouts accordingly.

Response:

All drop inlets have been revised to be Type "CM" per C.C.U.A.S.D. No. 412A as requested as shown on the enclosed plans based upon the meeting.

27. The engineer must consult with Land Development staff about the over paving requirement on all perimeter street improvements.

Response:

Based upon the initial meeting with the City of Las Vegas staff, the over paving requirement on all perimeter street improvements has been agreed upon to be 14-ft except along Washburn Road due to the south half of centerline and the proximity to the gravel pit top of bank.

28. Standard Form 1:

(i) An engineer's seal is missing

Response:

A copy of the Standard Form 1 for the initial submittal is included in Appendix D for the Study.

(ii) Revise the Assessor Parcel Number (APN) of the subject property to "126-36-201-002 (portion of)".

Response:

The APN has been revised accordingly on the included Standard Form 1.

If you have any questions regarding this letter or this project please do not hesitate to call me at (702) 798-7978. Thank you in advance for your time and assistance with this matter.

Sincerely,

L. R. Nelson Consulting Engineers, Inc.

Jon Hayslip, P.E., CFM
Flood Control Manager

JH/bb

Enclosure

Appendix A: Figures

Appendix B: Hydrologic Calculations

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *              JUN  1998                *
 *            VERSION 4.1                *
 *                                       *
 *  RUN DATE   06JAN11  TIME  15:36:37   *
 *                                       *
 *****************************************
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**************************************
*                                    *
*    U.S. ARMY CORPS OF ENGINEERS    *
*    HYDROLOGIC ENGINEERING CENTER   *
*          609 SECOND STREET         *
*       DAVIS, CALIFORNIA 95616      *
*           (916) 756-1104           *
*                                    *
**************************************
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```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM


```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   1          ID
   2          ID        TECHNICAL DRAINAGE STUDY FOR CLARK COUNTY SCHOOL DISTRICT
   3          ID                NORTHWEST TRANSPORTIATION FACILITY
   4          ID                      CLARK COUNTY, NEVADA
   5          ID
   6          ID    PREPARED BY:      L.R. NELSON CONSULTING ENGINEERS, INC.
   7          ID                        6765 W. RUSSELL ROAD, SUITE 200
   8          ID                             LAS VEGAS, NV  89118
   9          ID
  10          ID    FILENAME:CCSDONIU.DAT
  11          ID    ADDENDUM #1
  12          ID
  13          ID    FUTURE HALF STREETS ONLY SURROUNDING THE PROJECT
  14          ID
  15          ID    JOB# 032-085-092
  16          ID    DEVELOPED ONSITE CONDITION
  17          ID    TECHNICAL DRAINAGE STUDY
  18          ID    JR.02 = 10-YR STORM - P10=1.74"
  19          ID    JR.03 = 100-YR STORM - P100=3.15"
  20          ID    SDN #3
  21          ID
              *DIAGRAM
  22          IT       5       0       0     300
  23          IO       5
  24          IN       5
  25          JR    PREC   .5524       1

  26          KK     R0U
  27          KM   OFFSITE ROADWAY BASIN - SHAUMBER WEST 1/2 ROW
  28          BA  .00140
  29          PB    3.15
  30          PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
  31          PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
  32          PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
  33          PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
  34          PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
  35          PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
  36          PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
  37          PC    .998    .999   1.00
  38          LS       0   98.0
  39          UK    34.5   .0200      .1     100
  40          RD     977    .006    .016            TRAP    34.5       0
              *

  41          KK     R1U
  42          KM   OFFSITE ROADWAY BASIN - SHAUMBER WEST 1/2 ROW
  43          BA  .00039
  44          LS       0    98.0
  45          UK    34.5     .02      .1     100
  46          RD     278    .006    .016            TRAP    34.5       0
              *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  47      KK     R2U
  48      KM   OFFSITE ROADWAY BASIN - HAMMER NORTH 1/2 ROW
  49      BA  .00141
  50      LS       0    98.0
  51      UK    24.5     .02      .1     100
  52      RD    1300   .0539    .016            TRAP    24.5       0
          *
  53      KK     R3U
  54      KM   OFFSITE ROADWAY BASIN - WASHBURN SOUTH 1/2 ROW
  55      BA  .00131
  56      LS       0    98.0
  57      UK    24.5     .02      .1     100
  58      RD     920    .047    .016            TRAP    24.5       0
          *
  59      KK     R4U
  60      KM   OFFSITE ROADWAY BASIN - WASHBURN SOUTH 1/2 ROW
  61      BA  .00061
  62      LS       0    98.0
  63      UK    24.5     .02      .1     100
  64      RD     430    .044    .016            TRAP    24.5       0
          *
  65      KK     R5U
  66      KM   OFFSITE ROADWAY BASIN - ALPINE RIDGE WEST 1/2 ROW
  67      BA  .00111
  68      LS       0    98.0
  69      UK    24.5     .02      .1     100
  70      RD    1044   .0214    .016            TRAP    24.5       0
          *
  71      ZZ
```

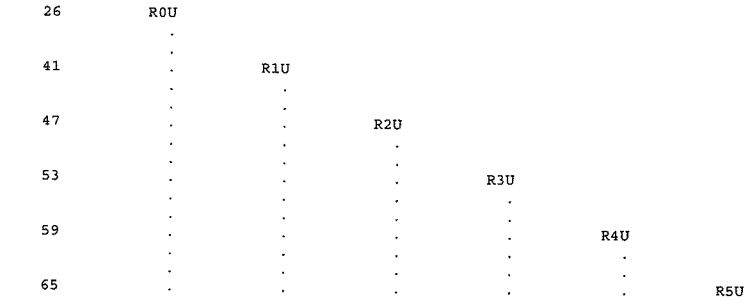
1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   06JAN11  TIME  15:36:37   *
*                                       *
*****************************************
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```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```

TECHNICAL DRAINAGE STUDY FOR CLARK COUNTY SCHOOL DISTRICT
NORTHWEST TRANSPORTIATION FACILITY
CLARK COUNTY, NEVADA

PREPARED BY: L.R. NELSON CONSULTING ENGINEERS, INC.
6765 W. RUSSELL ROAD, SUITE 200
LAS VEGAS, NV 89118

FILENAME:CCSDONIU.DAT
ADDENDUM #1

FUTURE HALF STREETS ONLY SURROUNDING THE PROJECT

JOB# 032-085-092
DEVELOPED ONSITE CONDITION
TECHNICAL DRAINAGE STUDY
JR.02 = 10-YR STORM - P10=1.74"
JR.03 = 100-YR STORM - P100=3.15"
SDN #3

```
 23 IO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                      NMIN           5  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME        0000  STARTING TIME
                        NQ         300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE     2    0  ENDING DATE
                     NDTIME       0055  ENDING TIME
                     ICENT          19  CENTURY MARK

                   COMPUTATION INTERVAL      .08 HOURS
                        TOTAL TIME BASE   24.92 HOURS

         ENGLISH UNITS
              DRAINAGE AREA          SQUARE MILES
              PRECIPITATION DEPTH    INCHES
              LENGTH, ELEVATION      FEET
              FLOW                   CUBIC FEET PER SECOND
              STORAGE VOLUME         ACRE-FEET
              SURFACE AREA           ACRES
              TEMPERATURE            DEGREES FAHRENHEIT

    JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                   .55      1.00
```

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .55	RATIO 2 1.00
HYDROGRAPH AT						
+	R0U	.00	1	FLOW	2.	4.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	R1U	.00	1	FLOW	1.	1.
				TIME	3.50	3.42
HYDROGRAPH AT						
+	R2U	.00	1	FLOW	2.	4.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	R3U	.00	1	FLOW	2.	3.
				TIME	3.50	3.42
HYDROGRAPH AT						
+	R4U	.00	1	FLOW	1.	2.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	R5U	.00	1	FLOW	2.	3.
				TIME	3.50	3.50

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .55									
	R0U MANE	5.00	3.69	210.00	2.91	5.00	3.69	210.00	2.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2178E+00 OUTFLOW= .2176E+00 BASIN STORAGE= .1922E-02 PERCENT ERROR= -.8

FOR PLAN = 1 RATIO= .55									
	R0U MANE	5.00	1.94	210.00	1.51	5.00	1.94	210.00	1.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1133E+00 OUTFLOW= .1129E+00 BASIN STORAGE= .1965E-02 PERCENT ERROR= -1.5

FOR PLAN = 1 RATIO= 1.00									
	R0U MANE	5.00	3.69	210.00	2.91	5.00	3.69	210.00	2.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2178E+00 OUTFLOW= .2176E+00 BASIN STORAGE= .1922E-02 PERCENT ERROR= -.8

FOR PLAN = 1 RATIO= .55									
	R1U MANE	4.40	1.01	206.79	2.91	5.00	.96	205.00	2.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .6068E-01 OUTFLOW= .6053E-01 BASIN STORAGE= .5351E-03 PERCENT ERROR= -.6

FOR PLAN = 1 RATIO= .55									
	R1U MANE	5.00	.58	210.00	1.52	5.00	.58	210.00	1.52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3155E-01 OUTFLOW= .3156E-01 BASIN STORAGE= .5216E-03 PERCENT ERROR= -1.7

FOR PLAN = 1 RATIO= 1.00									
	R1U MANE	4.40	1.01	206.79	2.91	5.00	.96	205.00	2.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .6068E-01 OUTFLOW= .6053E-01 BASIN STORAGE= .5351E-03 PERCENT ERROR= -.6

FOR PLAN = 1 RATIO= .55									
	R2U MANE	5.00	3.85	210.00	2.87	5.00	3.85	210.00	2.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2194E+00 OUTFLOW= .2159E+00 BASIN STORAGE= .1203E-02 PERCENT ERROR= 1.0

FOR PLAN = 1 RATIO= .55									
	R2U MANE	5.00	2.03	210.00	1.52	5.00	2.03	210.00	1.52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1141E+00 OUTFLOW= .1142E+00 BASIN STORAGE= .1104E-02 PERCENT ERROR= -1.1

FOR PLAN = 1 RATIO= 1.00									
	R2U MANE	5.00	3.85	210.00	2.87	5.00	3.85	210.00	2.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2194E+00 OUTFLOW= .2159E+00 BASIN STORAGE= .1203E-02 PERCENT ERROR= 1.0

FOR PLAN = 1 RATIO= .55									
	R3U MANE	4.22	3.46	206.58	2.90	5.00	3.26	205.00	2.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2038E+00 OUTFLOW= .2029E+00 BASIN STORAGE= .8100E-03 PERCENT ERROR= .1

FOR PLAN = 1 RATIO= .55									
	R3U MANE	5.00	1.95	210.00	1.51	5.00	1.95	210.00	1.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1060E+00 OUTFLOW= .1052E+00 BASIN STORAGE= .8310E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00									
	R3U MANE	4.22	3.46	206.58	2.90	5.00	3.26	205.00	2.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2038E+00 OUTFLOW= .2029E+00 BASIN STORAGE= .8100E-03 PERCENT ERROR= .1

FOR PLAN = 1 RATIO= .55

Appendix A: Figures

Appendix B: Hydrologic Calculations

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *               JUN  1998               *
 *            VERSION 4.1                *
 *                                       *
 *  RUN DATE   06JAN11  TIME  15:36:37   *
 *                                       *
 *****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*            (916) 756-1104             *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   1          ID
   2          ID        TECHNICAL DRAINAGE STUDY FOR CLARK COUNTY SCHOOL DISTRICT
   3          ID                  NORTHWEST TRANSPORTIATION FACILITY
   4          ID                       CLARK COUNTY, NEVADA
   5          ID
   6          ID    PREPARED BY:      L.R. NELSON CONSULTING ENGINEERS, INC.
   7          ID                        6765 W. RUSSELL ROAD, SUITE 200
   8          ID                             LAS VEGAS, NV  89118
   9          ID
  10          ID    FILENAME:CCSDONIU.DAT
  11          ID    ADDENDUM #1
  12          ID
  13          ID    FUTURE HALF STREETS ONLY SURROUNDING THE PROJECT
  14          ID
  15          ID    JOB# 032-085-092
  16          ID    DEVELOPED ONSITE CONDITION
  17          ID    TECHNICAL DRAINAGE STUDY
  18          ID    JR.02 = 10-YR STORM - P10=1.74"
  19          ID    JR.03 = 100-YR STORM - P100=3.15"
  20          ID    SDN #3
  21          ID
              *DIAGRAM
  22          IT       5       0       0     300
  23          IO       5
  24          IN       5
  25          JR    PREC    .5524       1

  26          KK     R0U
  27          KM   OFFSITE ROADWAY BASIN - SHAUMBER WEST 1/2 ROW
  28          BA  .00140
  29          PB    3.15
  30          PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
  31          PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
  32          PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
  33          PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
  34          PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
  35          PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
  36          PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
  37          PC    .998    .999   1.00
  38          LS       0   98.0
  39          UK    34.5   .0200      .1     100
  40          RD     977    .006    .016            TRAP    34.5       0
              *

  41          KK     R1U
  42          KM   OFFSITE ROADWAY BASIN - SHAUMBER WEST 1/2 ROW
  43          BA  .00039
  44          LS       0    98.0
  45          UK    34.5     .02      .1     100
  46          RD     278    .006    .016            TRAP    34.5       0
              *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  47      KK     R2U
  48      KM   OFFSITE ROADWAY BASIN - HAMMER NORTH 1/2 ROW
  49      BA  .00141
  50      LS       0    98.0
  51      UK    24.5     .02      .1     100
  52      RD    1300   .0539    .016            TRAP    24.5       0
          *

  53      KK     R3U
  54      KM   OFFSITE ROADWAY BASIN - WASHBURN SOUTH 1/2 ROW
  55      BA  .00131
  56      LS       0    98.0
  57      UK    24.5     .02      .1     100
  58      RD     920    .047    .016            TRAP    24.5       0
          *

  59      KK     R4U
  60      KM   OFFSITE ROADWAY BASIN - WASHBURN SOUTH 1/2 ROW
  61      BA  .00061
  62      LS       0    98.0
  63      UK    24.5     .02      .1     100
  64      RD     430    .044    .016            TRAP    24.5       0
          *

  65      KK     R5U
  66      KM   OFFSITE ROADWAY BASIN - ALPINE RIDGE WEST 1/2 ROW
  67      BA  .00111
  68      LS       0    98.0
  69      UK    24.5     .02      .1     100
  70      RD    1044   .0214    .016            TRAP    24.5       0
          *
  71      ZZ
```

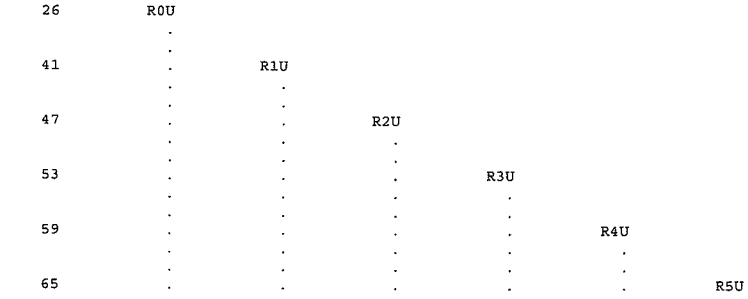
1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN   1998                *
*          VERSION 4.1                  *
*                                       *
*  RUN DATE   06JAN11  TIME  15:36:37   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

TECHNICAL DRAINAGE STUDY FOR CLARK COUNTY SCHOOL DISTRICT
NORTHWEST TRANSPORTIATION FACILITY
CLARK COUNTY, NEVADA

PREPARED BY: L.R. NELSON CONSULTING ENGINEERS, INC.
6765 W. RUSSELL ROAD, SUITE 200
LAS VEGAS, NV 89118

FILENAME:CCSDONIU.DAT
ADDENDUM #1

FUTURE HALF STREETS ONLY SURROUNDING THE PROJECT

JOB# 032-085-092
DEVELOPED ONSITE CONDITION
TECHNICAL DRAINAGE STUDY
JR.02 = 10-YR STORM - P10=1.74"
JR.03 = 100-YR STORM - P100=3.15"
SDN #3

```
 23 IO          OUTPUT CONTROL VARIABLES
                     IPRNT           5  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT           HYDROGRAPH TIME DATA
                      NMIN           5  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1    0  STARTING DATE
                     ITIME         0000  STARTING TIME
                        NQ          300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2    0  ENDING DATE
                    NDTIME         0055  ENDING TIME
                    ICENT           19  CENTURY MARK

                  COMPUTATION INTERVAL      .08 HOURS
                       TOTAL TIME BASE   24.92 HOURS

         ENGLISH UNITS
              DRAINAGE AREA          SQUARE MILES
              PRECIPITATION DEPTH    INCHES
              LENGTH, ELEVATION      FEET
              FLOW                   CUBIC FEET PER SECOND
              STORAGE VOLUME         ACRE-FEET
              SURFACE AREA           ACRES
              TEMPERATURE            DEGREES FAHRENHEIT

    JP          MULTI-PLAN OPTION
                      NPLAN           1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                    .55      1.00
```

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .55	RATIO 2 1.00
HYDROGRAPH AT						
+	R0U	.00	1	FLOW	2.	4.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	R1U	.00	1	FLOW	1.	1.
				TIME	3.50	3.42
HYDROGRAPH AT						
+	R2U	.00	1	FLOW	2.	4.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	R3U	.00	1	FLOW	2.	3.
				TIME	3.50	3.42
HYDROGRAPH AT						
+	R4U	.00	1	FLOW	1.	2.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	R5U	.00	1	FLOW	2.	3.
				TIME	3.50	3.50

1

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .55									
	R0U MANE	5.00	3.69	210.00	2.91	5.00	3.69	210.00	2.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2178E+00 OUTFLOW= .2176E+00 BASIN STORAGE= .1922E-02 PERCENT ERROR= -.8

FOR PLAN = 1 RATIO= .55									
	R0U MANE	5.00	1.94	210.00	1.51	5.00	1.94	210.00	1.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1133E+00 OUTFLOW= .1129E+00 BASIN STORAGE= .1965E-02 PERCENT ERROR= -1.5

FOR PLAN = 1 RATIO= 1.00									
	R0U MANE	5.00	3.69	210.00	2.91	5.00	3.69	210.00	2.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2178E+00 OUTFLOW= .2176E+00 BASIN STORAGE= .1922E-02 PERCENT ERROR= -.8

FOR PLAN = 1 RATIO= .55									
	R1U MANE	4.40	1.01	206.79	2.91	5.00	.96	205.00	2.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .6068E-01 OUTFLOW= .6053E-01 BASIN STORAGE= .5351E-03 PERCENT ERROR= -.6

FOR PLAN = 1 RATIO= .55									
	R1U MANE	5.00	.58	210.00	1.52	5.00	.58	210.00	1.52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3155E-01 OUTFLOW= .3156E-01 BASIN STORAGE= .5216E-03 PERCENT ERROR= -1.7

FOR PLAN = 1 RATIO= 1.00									
	R1U MANE	4.40	1.01	206.79	2.91	5.00	.96	205.00	2.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .6068E-01 OUTFLOW= .6053E-01 BASIN STORAGE= .5351E-03 PERCENT ERROR= -.6

FOR PLAN = 1 RATIO= .55									
	R2U MANE	5.00	3.85	210.00	2.87	5.00	3.85	210.00	2.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2194E+00 OUTFLOW= .2159E+00 BASIN STORAGE= .1203E-02 PERCENT ERROR= 1.0

FOR PLAN = 1 RATIO= .55									
	R2U MANE	5.00	2.03	210.00	1.52	5.00	2.03	210.00	1.52

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1141E+00 OUTFLOW= .1142E+00 BASIN STORAGE= .1104E-02 PERCENT ERROR= -1.1

FOR PLAN = 1 RATIO= 1.00									
	R2U MANE	5.00	3.85	210.00	2.87	5.00	3.85	210.00	2.87

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2194E+00 OUTFLOW= .2159E+00 BASIN STORAGE= .1203E-02 PERCENT ERROR= 1.0

FOR PLAN = 1 RATIO= .55									
	R3U MANE	4.22	3.46	206.58	2.90	5.00	3.26	205.00	2.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2038E+00 OUTFLOW= .2029E+00 BASIN STORAGE= .8100E-03 PERCENT ERROR= .1

FOR PLAN = 1 RATIO= .55									
	R3U MANE	5.00	1.95	210.00	1.51	5.00	1.95	210.00	1.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1060E+00 OUTFLOW= .1052E+00 BASIN STORAGE= .8310E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00									
	R3U MANE	4.22	3.46	206.58	2.90	5.00	3.26	205.00	2.90

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2038E+00 OUTFLOW= .2029E+00 BASIN STORAGE= .8100E-03 PERCENT ERROR= .1

FOR PLAN = 1 RATIO= .55

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *             JUN  1998                 *
 *           VERSION 4.1                 *
 *                                       *
 *  RUN DATE   10JAN11  TIME  11:17:26   *
 *                                       *
 *****************************************
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*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX           XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1 HEC-1 INPUT PAGE 1

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  1           ID
  2           ID        TECHNICAL DRAINAGE STUDY FOR CLARK COUNTY SCHOOL DISTRICT
  3           ID                  NORTHWEST TRANSPORTIATION FACILITY
  4           ID                        CLARK COUNTY, NEVADA
  5           ID
  6           ID    PREPARED BY:      L.R. NELSON CONSULTING ENGINEERS, INC.
  7           ID                        6765 W. RUSSELL ROAD, SUITE 200
  8           ID                             LAS VEGAS, NV  89118
  9           ID
 10           ID    FILENAME:CCSDONU1.DAT
 11           ID    JOB# 032-085-092
 12           ID    DEVELOPED ONSITE CONDITION - ADDENDUM #1
 13           ID    TECHNICAL DRAINAGE STUDY
 14           ID    JR.02 = 10-YR STORM - P10=1.74"
 15           ID    JR.03 = 100-YR STORM - P100=3.15"
 16           ID    SDN #3
 17           ID
              *DIAGRAM
 18           IT       5       0       0     300
 19           IO       5
 20           IN       5
 21           JR    PREC   .5524       1

 22           KK     ON3
 23           KM   ONSITE BASIN ON3 - DRAINS TO WASHBURN
 24           BA  .00510
 25           PB    3.15
 26           PC    .000    .020    .057    .070    .087    .108    .124    .130    .130    .130
 27           PC    .130    .130    .130    .133    .140    .142    .148    .158    .172    .181
 28           PC    .190    .197    .199    .200    .201    .204    .214    .229    .241    .249
 29           PC    .251    .256    .270    .278    .281    .283    .295    .322    .352    .409
 30           PC    .499    .590    .710    .744    .781    .812    .819    .835    .851    .856
 31           PC    .860    .868    .876    .888    .910    .926    .937    .950    .970    .976
 32           PC    .982    .985    .987    .989    .990    .993    .993    .994    .995    .998
 33           PC    .998    .999   1.00
 34           LS       0   87.7
 35           UK     140  .0286      .1     100
 36           RD     470  .0245    .016            TRAP        0      35
              *

 37           KK      R3
 38           KM   ROADWAY BASIN - WASHBURN HALF STREET SECTION
 39           BA  .00142
 40           LS       0      98
 41           UK    24.5     .02      .1     100
 42           RD     870     .05    .016            TRAP     24.5       0
              *

 43           KK     ON4
 44           KM   ONSITE BASIN ON4 - DRAINS TO WASHBURN
 45           BA  .00380
 46           LS       0    94.2
 47           UK     140  .0286      .1     100
 48           RD     560  .0245    .016            TRAP        0      35
              *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  49      KK   COMB1
  50      KM   COMBINE ON3+R3+ON4 IN WASHBURN AT SOUTHERN DW
  51      HC       3
          *

  52      KK      R4
  53      KM   ROADWAY BASIN - WASHBURN HALF STREET TO ALPINE RIDGE
  54      KM   U/S NODE COMB1 ROUTED THROUGH AND COMBINED WITH R4
  55      KM   VIA RD.08 = "YES"
  56      BA  .00106
  57      LS       0    88.4
  58      UK    24.5     .02      .1     100
  59      RD     400     .05    .016            TRAP    24.5       0     YES
          *

  60      KK     ON2
  61      KM   ONSITE BASIN ON2
  62      BA  .00295
  63      LS       0    94.8
  64      UK      90     .02      .1     100
  65      RD     450   .0461    .016            TRAP      24       0
          *

  66      KK    RTE1
  67      KM   ROUTE ON2 THROUGH ON5
  68      RD     700   .0268    .016            TRAP      24       0
          *

  69      KK     ON5
  70      KM   ONSITE BASIN ON5
  71      BA  .01103
  72      LS       0    97.6
  73      UK     280    .025      .1     100
  74      RD     600   .0268    .016            TRAP      24       0
          *

  75      KK    FUT1
  76      KM   FUTURE ONSITE PORTION TO BE ASSUMED FULLY DEVELOPED
  77      BA  .00522
  78      LS       0    94.7
  79      UK     250    .025      .1     100
  80      RD     380    .005    .016            TRAP      20       0
          *

  81      KK    RTE2
  82      KM   ROUTE FUT1 THROUGH C&G IN ON5
  83      RD     280    .005    .016            TRAP      24       0
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  84      KK   COMB2
  85      KM   COMBINE ONSITE BASINS BEFORE ENTERING ON7
  86      HC       3
          *

  87      KK    RTE3
  88      KM   ROUTE COMB2 TO HAMMER ENTRANCE
  89      RD     750    .042    .016            TRAP      25       0
          *

  90      KK     ON1
  91      KM   ONSITE BASIN ON1
  92      BA  .00646
  93      LS       0    95.5
  94      UK     300     .04      .1     100
  95      RD     380    .005    .016            TRAP      24       0
          *

  96      KK     ON6
  97      KM   ONSITE BASIN ON6 - GAS STATION AREA
  98      BA  .00210
  99      LS       0    96.7
 100      UK      55     .04      .1     100
 101      RD     235   .0058    .016            TRAP      20       0
          *

 102      KK   COMB3
 103      KM   COMBINE BASINS AT OUTLET TO ON1
 104      HC       2
          *

 105      KK    RTE4
 106      KM   ROUTE COMB3 TO BEGINING OF ONSITE EXIT
 107      RD     840   .0256    .016            TRAP      24       0
          *

 108      KK     ON7
 109      KM   ONSITE BASIN ON7
 110      BA  .01560
 111      LS       0    97.4
 112      UK     140   .0286      .1     100
 113      RD     720   .0202    .016            TRAP      24       0
          *

 114      KK   COMB4
 115      KM   COMBINE FLOW AT DW INTO HAMMER
 116      HC       3
          *
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

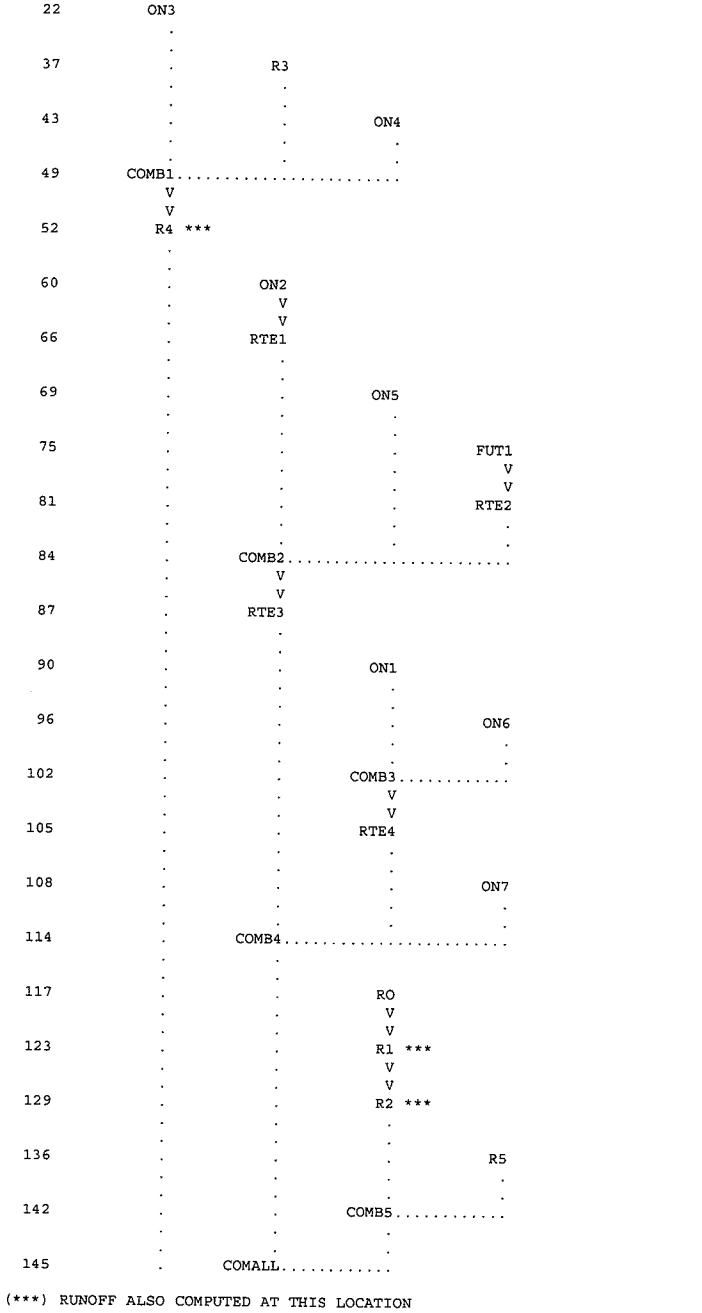
  117     KK      RO
  118     KM   ROADWAY BASIN - CLIFF SHADOWS/SHAUMBER
  119     BA  .00244
  120     LS       0    91.1
  121     UK    34.5     .02      .1     100
  122     RD     840    .024    .016            TRAP    34.5       0
          *
  123     KK      R1
  124     KM   ROADWAY BASIN - CLIFF SHADOWS/SHAUMBER
  125     BA  .00058
  126     LS       0    94.1
  127     UK    34.5     .02      .1     100
  128     RD     245    .006    .016            TRAP    34.5       0     YES
          *
  129     KK      R2
  130     KM   ROADWAY BASIN - HAMMER
  131     BA  .00297
  132     LS       0    91.6
  133     UK    24.5     .02      .1     100
  134     RD     900   .0560    .016            TRAP    24.5       0
  135     RD     250   .0256    .016            TRAP    24.5       0     YES
          *
  136     KK      R5
  137     KM   ROADWAY BASIN - ALPINE RIDGE HALF STREET
  138     BA  .00258
  139     LS       0    86.6
  140     UK    24.5     .02      .1     100
  141     RD    1090     .02    .016            TRAP    24.5       0
          *
  142     KK   COMB5
  143     KM   COMBINE DEVELOPED INTERIM FLOW AT LOW POINT IN ALPINE RIDGE
  144     HC       2
          *
  145     KK  COMALL
  146     KM   COMBINE ALL FLOW IN LOW POINT IN ALPINE RIDGE
  147     HC       2
          *
  148     ZZ
```

1

SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING
(.) CONNECTOR
(---->) DIVERSION OR PUMP FLOW
(<----) RETURN OF DIVERTED OR PUMPED FLOW



(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*                JUN   1998             *
*             VERSION 4.1               *
*                                       *
*  RUN DATE   10JAN11  TIME  11:17:26   *
*                                       *
*****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

TECHNICAL DRAINAGE STUDY FOR CLARK COUNTY SCHOOL DISTRICT
NORTHWEST TRANSPORTIATION FACILITY
CLARK COUNTY, NEVADA

PREPARED BY: L.R. NELSON CONSULTING ENGINEERS, INC.
6765 W. RUSSELL ROAD, SUITE 200
LAS VEGAS, NV 89118

FILENAME:CCSDONU1.DAT
JOB# 032-085-092
DEVELOPED ONSITE CONDITION - ADDENDUM #1
TECHNICAL DRAINAGE STUDY
JR.02 = 10-YR STORM - P10=1.74"
JR.03 = 100-YR STORM - P100=3.15"
SDN #3

```
 19 IO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                      NMIN          5  MINUTES IN COMPUTATION INTERVAL
                     IDATE      1   0  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2   0  ENDING DATE
                    NDTIME       0055  ENDING TIME
                     ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL      .08 HOURS
                       TOTAL TIME BASE    24.92 HOURS

        ENGLISH UNITS
             DRAINAGE AREA          SQUARE MILES
             PRECIPITATION DEPTH    INCHES
             LENGTH, ELEVATION      FEET
             FLOW                   CUBIC FEET PER SECOND
             STORAGE VOLUME         ACRE-FEET
             SURFACE AREA           ACRES
             TEMPERATURE            DEGREES FAHRENHEIT

    JP          MULTI-PLAN OPTION
                      NPLAN          1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                    .55      1.00
```

1

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

OPERATION	STATION	AREA	PLAN		RATIOS APPLIED TO PRECIPITATION RATIO 1 .55	RATIO 2 1.00
HYDROGRAPH AT						
+	ON3	.01	1	FLOW	4.	11.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	R3	.00	1	FLOW	2.	3.
				TIME	3.42	3.50
HYDROGRAPH AT						
+	ON4	.00	1	FLOW	4.	10.
				TIME	3.50	3.50
3 COMBINED AT						
+	COMB1	.01	1	FLOW	10.	23.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	R4	.01	1	FLOW	11.	25.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ON2	.00	1	FLOW	4.	8.
				TIME	3.50	3.50
ROUTED TO						
+	RTE1	.00	1	FLOW	3.	7.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ON5	.01	1	FLOW	13.	27.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	FUT1	.01	1	FLOW	6.	12.
				TIME	3.50	3.50
ROUTED TO						
+	RTE2	.01	1	FLOW	5.	12.
				TIME	3.50	3.50
3 COMBINED AT						
+	COMB2	.02	1	FLOW	22.	45.
				TIME	3.50	3.50
ROUTED TO						
+	RTE3	.02	1	FLOW	21.	44.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ON1	.01	1	FLOW	7.	15.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ON6	.00	1	FLOW	3.	5.
				TIME	3.50	3.50
2 COMBINED AT						
+	COMB3	.01	1	FLOW	10.	21.
				TIME	3.50	3.50
ROUTED TO						
+	RTE4	.01	1	FLOW	9.	20.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	ON7	.02	1	FLOW	21.	41.
				TIME	3.50	3.50
3 COMBINED AT						
+	COMB4	.04	1	FLOW	51.	104.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	RO	.00	1	FLOW	3.	5.
				TIME	3.50	3.42
HYDROGRAPH AT						
+	R1	.00	1	FLOW	3.	6.
				TIME	3.50	3.50
HYDROGRAPH AT						
+	R2	.01	1	FLOW	6.	13.
				TIME	3.50	3.50

```
 HYDROGRAPH AT
+                    R5        .00     1   FLOW          2.       5.
                                           TIME        3.50     3.50

  2 COMBINED AT
+                  COMB5       .01     1   FLOW          8.      18.
                                           TIME        3.50     3.50

  2 COMBINED AT
+                  COMALL      .05     1   FLOW         59.     122.
                                           TIME        3.50     3.50
1
                                SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
                                    (FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)
                                                                    INTERPOLATED TO
                                                                    COMPUTATION INTERVAL
          ISTAQ     ELEMENT       DT        PEAK     TIME TO      VOLUME      DT        PEAK     TIME TO      VOLUME
                                                                    PEAK                          PEAK
                                  (MIN)     (CFS)      (MIN)      (IN)      (MIN)      (CFS)      (MIN)       (IN)
          FOR PLAN = 1  RATIO=  .55
               ON3   MANE        1.77     10.85     208.89       1.91       5.00      10.58     210.00        1.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5242E+00 OUTFLOW= .5208E+00 BASIN STORAGE= .1814E-03 PERCENT ERROR=    .6

          FOR PLAN = 1  RATIO=  .55
               ON3   MANE        2.26      4.03     210.49        .74       5.00       3.99     210.00         .74

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2024E+00 OUTFLOW= .2020E+00 BASIN STORAGE= .1781E-03 PERCENT ERROR=    .1

          FOR PLAN = 1  RATIO= 1.00
               ON3   MANE        1.77     10.85     208.89       1.91       5.00      10.58     210.00        1.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5242E+00 OUTFLOW= .5208E+00 BASIN STORAGE= .1814E-03 PERCENT ERROR=    .6

          FOR PLAN = 1  RATIO=  .55
               R3    MANE        3.79      4.03     208.41       2.86       5.00       3.22     210.00        2.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2210E+00 OUTFLOW= .2169E+00 BASIN STORAGE= .7721E-03 PERCENT ERROR=   1.5

          FOR PLAN = 1  RATIO=  .55
               R3    MANE        4.84      2.13     208.07       1.51       5.00       1.88     205.00        1.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1149E+00 OUTFLOW= .1141E+00 BASIN STORAGE= .7622E-03 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO= 1.00
               R3    MANE        3.79      4.03     208.41       2.86       5.00       3.22     210.00        2.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2210E+00 OUTFLOW= .2169E+00 BASIN STORAGE= .7721E-03 PERCENT ERROR=   1.5

          FOR PLAN = 1  RATIO=  .55
               ON4   MANE        2.17      9.72     210.20       2.50       5.00       9.68     210.00        2.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5097E+00 OUTFLOW= .5075E+00 BASIN STORAGE= .2109E-03 PERCENT ERROR=    .4

          FOR PLAN = 1  RATIO=  .55
               ON4   MANE        2.61      4.54     208.79       1.17       5.00       4.41     210.00        1.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2373E+00 OUTFLOW= .2369E+00 BASIN STORAGE= .2090E-03 PERCENT ERROR=    .1

          FOR PLAN = 1  RATIO= 1.00
               ON4   MANE        2.17      9.72     210.20       2.50       5.00       9.68     210.00        2.51

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .5097E+00 OUTFLOW= .5075E+00 BASIN STORAGE= .2109E-03 PERCENT ERROR=    .4

          FOR PLAN = 1  RATIO=  .55
               R4    MANE        1.11     12.20     209.36       1.09       5.00      12.09     210.00        1.09

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5526E+00 EXCESS= .1122E+00 OUTFLOW= .6633E+00 BASIN STORAGE= .3398E-03 PERCENT ERROR=    .2

          FOR PLAN = 1  RATIO=  .55
               R4    MANE        1.17     10.85     210.58        .98       5.00      10.81     210.00         .98
```

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5526E+00 EXCESS= .4424E-01 OUTFLOW= .5965E+00 BASIN STORAGE= .3421E-03 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= 1.00

R4	MANE	.84	25.30	209.71	2.23	5.00	25.23	210.00	2.24

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1246E+01 EXCESS= .1122E+00 OUTFLOW= .1356E+01 BASIN STORAGE= .3375E-03 PERCENT ERROR= .1

FOR PLAN = 1 RATIO= .55

ON2	MANE	1.54	7.80	209.75	2.47	5.00	7.59	210.00	2.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4052E+00 OUTFLOW= .3885E+00 BASIN STORAGE= .4000E-03 PERCENT ERROR= 4.0

FOR PLAN = 1 RATIO= .55

ON2	MANE	2.04	3.73	210.29	1.19	5.00	3.71	210.00	1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1919E+00 OUTFLOW= .1868E+00 BASIN STORAGE= .4053E-03 PERCENT ERROR= 2.4

FOR PLAN = 1 RATIO= 1.00

ON2	MANE	1.54	7.80	209.75	2.47	5.00	7.59	210.00	2.48

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4052E+00 OUTFLOW= .3885E+00 BASIN STORAGE= .4000E-03 PERCENT ERROR= 4.0

FOR PLAN = 1 RATIO= .00

RTE1	MANE	3.80	3.44	212.78	1.19	5.00	3.26	210.00	1.19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1871E+00 EXCESS= .0000E+00 OUTFLOW= .1873E+00 BASIN STORAGE= .7272E-03 PERCENT ERROR= -.5

FOR PLAN = 1 RATIO= .00

RTE1	MANE	2.86	7.10	211.27	2.48	5.00	6.79	210.00	2.47

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3898E+00 EXCESS= .0000E+00 OUTFLOW= .3903E+00 BASIN STORAGE= .7111E-03 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .55

ON5	MANE	1.46	27.23	208.67	2.68	5.00	26.78	210.00	2.68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1690E+01 OUTFLOW= .1576E+01 BASIN STORAGE= .7240E-03 PERCENT ERROR= 6.7

FOR PLAN = 1 RATIO= .55

ON5	MANE	1.92	13.48	211.00	1.39	5.00	13.48	210.00	1.39

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .8683E+00 OUTFLOW= .8164E+00 BASIN STORAGE= .7574E-03 PERCENT ERROR= 5.9

FOR PLAN = 1 RATIO= 1.00

ON5	MANE	1.46	27.23	208.67	2.68	5.00	26.78	210.00	2.68

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1690E+01 OUTFLOW= .1576E+01 BASIN STORAGE= .7240E-03 PERCENT ERROR= 6.7

FOR PLAN = 1 RATIO= .55

FUT1	MANE	1.94	12.43	209.83	2.43	5.00	12.33	210.00	2.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .7142E+00 OUTFLOW= .6752E+00 BASIN STORAGE= .6414E-03 PERCENT ERROR= 5.4

FOR PLAN = 1 RATIO= .55

FUT1	MANE	2.65	5.65	209.20	1.17	5.00	5.63	210.00	1.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3373E+00 OUTFLOW= .3257E+00 BASIN STORAGE= .6404E-03 PERCENT ERROR= 3.3

FOR PLAN = 1 RATIO= 1.00

FUT1	MANE	1.94	12.43	209.83	2.43	5.00	12.33	210.00	2.43

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .7142E+00 OUTFLOW= .6752E+00 BASIN STORAGE= .6414E-03 PERCENT ERROR= 5.4

FOR PLAN = 1 RATIO= .00

RTE2	MANE	2.13	5.42	212.91	1.17	5.00	5.20	210.00	1.17

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3254E+00 EXCESS= .0000E+00 OUTFLOW= .3254E+00 BASIN STORAGE= .4695E-03 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00

```
          RTE2  MANE        1.56     11.96    211.71      2.43      5.00     11.81    210.00        2.43

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .6764E+00 EXCESS= .0000E+00 OUTFLOW= .6765E+00 BASIN STORAGE= .4675E-03 PERCENT ERROR=   -.1

      FOR PLAN = 1  RATIO=  .00
          RTE3  MANE        1.78     21.61    211.47      1.30      5.00     20.63    210.00        1.30

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1329E+01 EXCESS= .0000E+00 OUTFLOW= .1329E+01 BASIN STORAGE= .6783E-03 PERCENT ERROR=   -.1

      FOR PLAN = 1  RATIO=  .00
          RTE3  MANE        1.33     44.78    211.29      2.58      5.00     44.05    210.00        2.59

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .2643E+01 EXCESS= .0000E+00 OUTFLOW= .2644E+01 BASIN STORAGE= .6725E-03 PERCENT ERROR=    .0

      FOR PLAN = 1  RATIO=  .55
          ON1  MANE         1.90     15.79    208.77      2.49      5.00     15.42    210.00        2.49

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9121E+00 OUTFLOW= .8579E+00 BASIN STORAGE= .6933E-03 PERCENT ERROR=   5.9

      FOR PLAN = 1  RATIO=  .55
          ON1  MANE         2.56      7.50    209.78      1.23      5.00      7.46    210.00        1.23

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .4408E+00 OUTFLOW= .4237E+00 BASIN STORAGE= .6971E-03 PERCENT ERROR=   3.7

      FOR PLAN = 1  RATIO= 1.00
          ON1  MANE         1.90     15.79    208.77      2.49      5.00     15.42    210.00        2.49

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9121E+00 OUTFLOW= .8579E+00 BASIN STORAGE= .6933E-03 PERCENT ERROR=   5.9

      FOR PLAN = 1  RATIO=  .55
          ON6  MANE         1.55      6.02    209.14      2.69      5.00      5.41    210.00        2.69

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3107E+00 OUTFLOW= .3008E+00 BASIN STORAGE= .3593E-03 PERCENT ERROR=   3.1

      FOR PLAN = 1  RATIO=  .55
          ON6  MANE         2.01      3.13    208.81      1.36      5.00      2.87    210.00        1.35

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1555E+00 OUTFLOW= .1518E+00 BASIN STORAGE= .3684E-03 PERCENT ERROR=   2.1

      FOR PLAN = 1  RATIO= 1.00
          ON6  MANE         1.55      6.02    209.14      2.69      5.00      5.41    210.00        2.69

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .3107E+00 OUTFLOW= .3008E+00 BASIN STORAGE= .3592E-03 PERCENT ERROR=   3.1

      FOR PLAN = 1  RATIO=  .00
          RTE4  MANE        3.07      9.80    211.86      1.26      5.00      9.25    210.00        1.26

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .5745E+00 EXCESS= .0000E+00 OUTFLOW= .5748E+00 BASIN STORAGE= .8687E-03 PERCENT ERROR=   -.2

      FOR PLAN = 1  RATIO=  .00
          RTE4  MANE        2.32     19.91    211.08      2.54      5.00     19.52    210.00        2.53

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .1157E+01 EXCESS= .0000E+00 OUTFLOW= .1158E+01 BASIN STORAGE= .8648E-03 PERCENT ERROR=   -.1

      FOR PLAN = 1  RATIO=  .55
          ON7  MANE         1.61     41.93    208.93      2.66      5.00     40.75    210.00        2.66

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2372E+01 OUTFLOW= .2209E+01 BASIN STORAGE= .8679E-03 PERCENT ERROR=   6.8

      FOR PLAN = 1  RATIO=  .55
          ON7  MANE         2.10     21.55    209.61      1.36      5.00     21.05    210.00        1.36

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1211E+01 OUTFLOW= .1133E+01 BASIN STORAGE= .8553E-03 PERCENT ERROR=   6.4

      FOR PLAN = 1  RATIO= 1.00
          ON7  MANE         1.61     41.93    208.93      2.66      5.00     40.75    210.00        2.66

 CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2372E+01 OUTFLOW= .2209E+01 BASIN STORAGE= .8679E-03 PERCENT ERROR=   6.8
```

```
          FOR PLAN = 1  RATIO=  .55
               RO  MANE         4.42      5.88    207.59      2.15      5.00      5.15    205.00        2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2889E+00 OUTFLOW= .2802E+00 BASIN STORAGE= .1106E-02 PERCENT ERROR=   2.6

          FOR PLAN = 1  RATIO=  .55
               RO  MANE         5.00      2.65    210.00       .93      5.00      2.65    210.00         .93

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .1231E+00 OUTFLOW= .1211E+00 BASIN STORAGE= .1082E-02 PERCENT ERROR=    .8

          FOR PLAN = 1  RATIO= 1.00
               RO  MANE         4.42      5.88    207.59      2.15      5.00      5.15    205.00        2.14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2889E+00 OUTFLOW= .2802E+00 BASIN STORAGE= .1106E-02 PERCENT ERROR=   2.6

          FOR PLAN = 1  RATIO=  .55
               R1  MANE         2.29      3.94    210.29      1.22      5.00      3.92    210.00        1.23

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1211E+00 EXCESS= .7749E-01 OUTFLOW= .1971E+00 BASIN STORAGE= .4476E-03 PERCENT ERROR=    .5

          FOR PLAN = 1  RATIO=  .55
               R1  MANE         2.49      3.15    209.29       .97      5.00      3.12    210.00         .97

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1211E+00 EXCESS= .3597E-01 OUTFLOW= .1566E+00 BASIN STORAGE= .4622E-03 PERCENT ERROR=    .0

          FOR PLAN = 1  RATIO= 1.00
               R1  MANE         1.93      6.66    208.42      2.21      5.00      6.27    210.00        2.21

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2790E+00 EXCESS= .7749E-01 OUTFLOW= .3552E+00 BASIN STORAGE= .4653E-03 PERCENT ERROR=    .2

          FOR PLAN = 1  RATIO=  .55
               R2  MANE          .91     10.38    209.30      1.53      5.00      9.54    210.00        1.53

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1566E+00 EXCESS= .3589E+00 OUTFLOW= .4903E+00 BASIN STORAGE= .1040E-02 PERCENT ERROR=   4.7

          FOR PLAN = 1  RATIO=  .55
               R2  MANE         1.14      5.93    207.74       .96      5.00      5.74    210.00         .96

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1566E+00 EXCESS= .1552E+00 OUTFLOW= .3069E+00 BASIN STORAGE= .1054E-02 PERCENT ERROR=   1.2

          FOR PLAN = 1  RATIO= 1.00
               R2  MANE          .82     13.92    208.83      2.16      5.00     12.66    210.00        2.16

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3552E+00 EXCESS= .3589E+00 OUTFLOW= .6914E+00 BASIN STORAGE= .1040E-02 PERCENT ERROR=   3.0

          FOR PLAN = 1  RATIO=  .55
               R5  MANE         5.00      5.49    210.00      1.78      5.00      5.49    210.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2530E+00 OUTFLOW= .2448E+00 BASIN STORAGE= .1447E-02 PERCENT ERROR=   2.7

          FOR PLAN = 1  RATIO=  .55
               R5  MANE         5.00      2.15    210.00       .69      5.00      2.15    210.00         .69

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .9456E-01 OUTFLOW= .9498E-01 BASIN STORAGE= .1261E-02 PERCENT ERROR=  -1.8

          FOR PLAN = 1  RATIO= 1.00
               R5  MANE         5.00      5.49    210.00      1.78      5.00      5.49    210.00        1.78

CONTINUITY SUMMARY (AC-FT) - INFLOW= .0000E+00 EXCESS= .2530E+00 OUTFLOW= .2448E+00 BASIN STORAGE= .1447E-02 PERCENT ERROR=   2.7


*** NORMAL END OF HEC-1 ***
```

Appendix C: Hydraulic Calculations

Cross Section for Washburn Q10 - ULTIMATE - SECTION 1 - NORTH 1/2

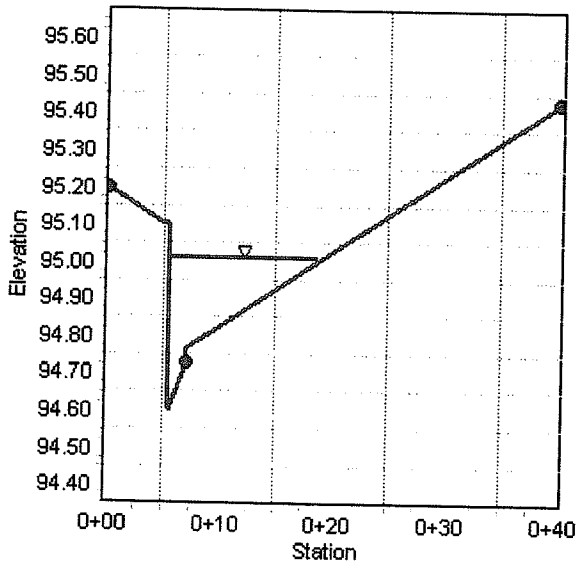
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04200	ft/ft
Normal Depth	0.41	ft
Discharge	10.00	ft³/s

Cross Section Image



WSE = 95.01

$$DL = \frac{(95.43 - 95.01)}{.02} = 21'$$

Worksheet for Washburn Q10 - ULTIMATE - SECTION 1 - NORTH 1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04200	ft/ft
Discharge	10.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	95.20
0+05.00	95.10
0+05.50	95.10
0+05.50	94.60
0+07.00	94.73
0+07.00	94.77
0+40.00	95.43

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 95.20)	(0+07.00, 94.73)	0.013
(0+07.00, 94.73)	(0+40.00, 95.43)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.41	ft
Elevation Range	94.60 to 95.43 ft		
Flow Area		1.91	ft²
Wetted Perimeter		13.79	ft
Hydraulic Radius		0.14	ft

DV = 0.41 X 5.23

DV = 2.1

Worksheet for Washburn Q10 - ULTIMATE - SECTION 1 - NORTH 1/2

Results

Top Width		13.33	ft
Normal Depth		0.41	ft
Critical Depth		0.54	ft
Critical Slope		0.00644	ft/ft
Velocity		5.23	ft/s
Velocity Head		0.42	ft
Specific Energy		0.83	ft
Froude Number		2.43	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.41	ft
Critical Depth	0.54	ft
Channel Slope	0.04200	ft/ft
Critical Slope	0.00644	ft/ft

Messages

Notes

Washburn Sta. 19+42.36

OFFSITE FLOW ESTIMATE FROM OFF4C Q10/Q100 (5.4 CFS / 11.0 CFS) ASSUMED TO BE REMOVED BY INLET ON NWC OF WASHBURN/SHAUMBER WICH LEAVES ON THE FRONTAGE AREA FLOW RATE OR:

COMB1 10 CFS / 23 CFS

Cross Section for Washburn Q100 - ULTIMATE - SECTION 1 - N1/2

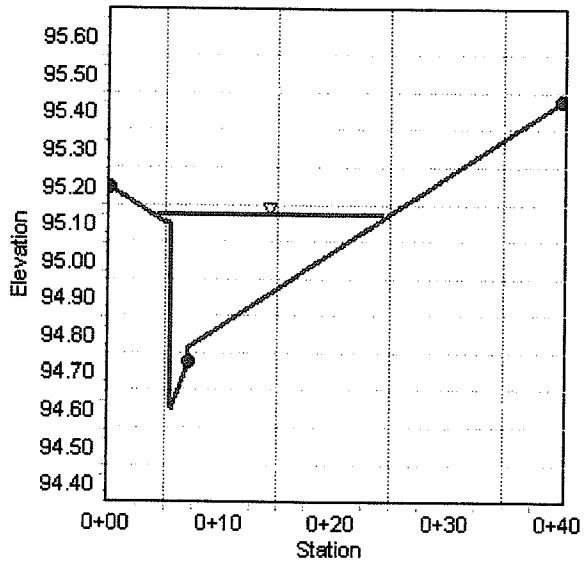
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04200	ft/ft
Normal Depth	0.52	ft
Discharge	23.00	ft³/s

Cross Section Image



WSE = 95.12

$$Dc = \frac{(95.13 - 95.12)}{.02} = 15.5'$$

Worksheet for Washburn Q100 - ULTIMATE - SECTION 1 - N1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04200	ft/ft
Discharge	23.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	95.20
0+05.00	95.10
0+05.50	95.10
0+05.50	94.60
0+07.00	94.73
0+07.00	94.77
0+40.00	95.43

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 95.20)	(0+07.00, 94.73)	0.013
(0+07.00, 94.73)	(0+40.00, 95.43)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.52	ft
Elevation Range	94.60 to 95.43 ft		
Flow Area		3.71	ft²
Wetted Perimeter		20.76	ft
Hydraulic Radius		0.18	ft

DV = 0.52 x 6.21

DV = 3.2

Worksheet for Washburn Q100 - ULTIMATE - SECTION 1 - N1/2

Results

Top Width		20.21	ft
Normal Depth		0.52	ft
Critical Depth		0.68	ft
Critical Slope		0.00574	ft/ft
Velocity		6.21	ft/s
Velocity Head		0.60	ft
Specific Energy		1.12	ft
Froude Number		2.55	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.52	ft
Critical Depth	0.68	ft
Channel Slope	0.04200	ft/ft
Critical Slope	0.00574	ft/ft

Messages

Notes

Washburn Sta. 19+42.36

OFFSITE FLOW ESTIMATE FROM OFF4C Q10/Q100 (5.4 CFS / 11.0 CFS) ASSUMED TO BE REMOVED BY INLET ON NWC OF WASHBURN/SHAUMBER WICH LEAVES ON THE FRONTAGE AREA FLOW RATE OR:

COMB1 10 CFS / 23 CFS

Cross Section for Washburn Q10 - ULTIMATE - SECTION 1 - SOUTH 1/2

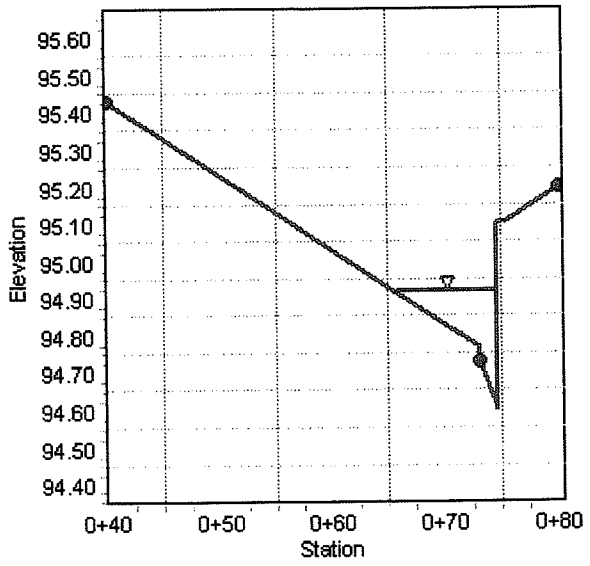
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04200	ft/ft
Normal Depth	0.32	ft
Discharge	3.80	ft³/s

Cross Section Image



WSE = 94.92

$$DL = \left(\frac{95.43 - 94.92}{.02}\right) = 25.5$$

Worksheet for Washburn Q100 - ULTIMATE - SECTION 1 - SOUTH 1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04200	ft/ft
Discharge	6.70	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+40.00	95.43
0+73.00	94.77
0+73.00	94.73
0+74.50	94.60
0+74.50	95.10
0+75.00	95.10
0+80.00	95.20

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+40.00, 95.43)	(0+73.00, 94.73)	0.016
(0+73.00, 94.73)	(0+80.00, 95.20)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.37	ft
Elevation Range	94.60 to 95.43 ft		
Flow Area		1.40	ft²
Wetted Perimeter		11.68	ft
Hydraulic Radius		0.12	ft

$DV = 0.37 \times 4.77$

$= 1.8 < 8 \therefore$ OK

Worksheet for Washburn Q100 - ULTIMATE - SECTION 1 - SOUTH 1/2

Results

Top Width		11.26	ft
Normal Depth		0.37	ft
Critical Depth		0.47	ft
Critical Slope		0.00660	ft/ft
Velocity		4.77	ft/s
Velocity Head		0.35	ft
Specific Energy		0.72	ft
Froude Number		2.38	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.37	ft
Critical Depth	0.47	ft
Channel Slope	0.04200	ft/ft
Critical Slope	0.00660	ft/ft

Messages

Notes

Washburn Sta. 19+42.36

OFFSITE FLOW ESTIMATE FROM OFF4C Q10/Q100 (1.8 CFS / 3.7 CFS) + R3U (2 CFS / 3 CFS) = 3.8 CFS / 6.7 CFS

Cross Section for Washburn Q10 - ULTIMATE - SECTION 2 - SOUTH 1/2

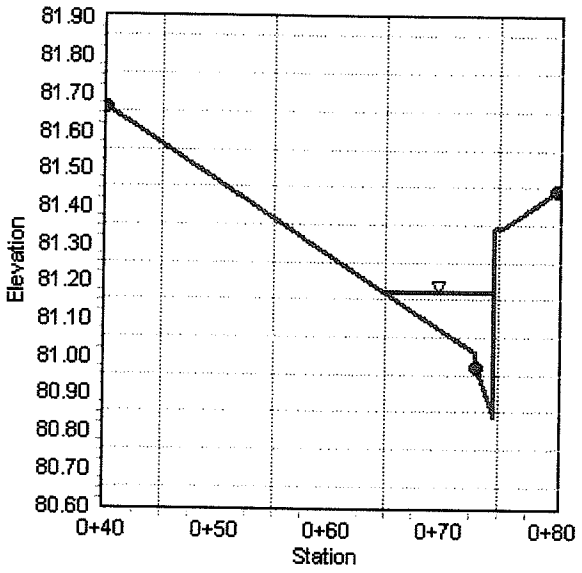
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04200	ft/ft
Normal Depth	0.33	ft
Discharge	4.80	ft³/s

Cross Section Image



WSE = 81.17

$$DL = \frac{(81.66 - 81.17)}{.02} = 24.5'$$

Worksheet for Washburn Q10 - ULTIMATE - SECTION 2 - SOUTH 1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04200	ft/ft
Discharge	4.80	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+40.00	81.66
0+73.00	81.01
0+73.00	80.97
0+74.50	80.84
0+74.50	81.34
0+75.00	81.34
0+80.00	81.44

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+40.00, 81.66)	(0+73.00, 80.97)	0.016
(0+73.00, 80.97)	(0+80.00, 81.44)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.33	ft
Elevation Range	80.84 to 81.66 ft	
Flow Area	1.09	ft²
Wetted Perimeter	10.22	ft
Hydraulic Radius	0.11	ft

DV = 0.33 x 4.41
= 1.3

Worksheet for Washburn Q10 - ULTIMATE - SECTION 2 - SOUTH 1/2

Results

Top Width		9.84	ft
Normal Depth		0.33	ft
Critical Depth		0.42	ft
Critical Slope		0.00686	ft/ft
Velocity		4.41	ft/s
Velocity Head		0.30	ft
Specific Energy		0.64	ft
Froude Number		2.34	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.33	ft
Critical Depth	0.42	ft
Channel Slope	0.04200	ft/ft
Critical Slope	0.00686	ft/ft

Messages

Notes

Washburn Sta. 22+70.32

OFFSITE FLOW ESTIMATE (Q10/Q100) FROM
OFF4C (1.8 CFS / 3.7 CFS)
+ R3U (2 CFS / 3 CFS)
+ R4U (1 CFS / 2 CFS)
= 4.8 CFS / 8.7 CFS

Cross Section for Washburn Q100 - ULTIMATE - SECTION 2 - SOUTH 1/2

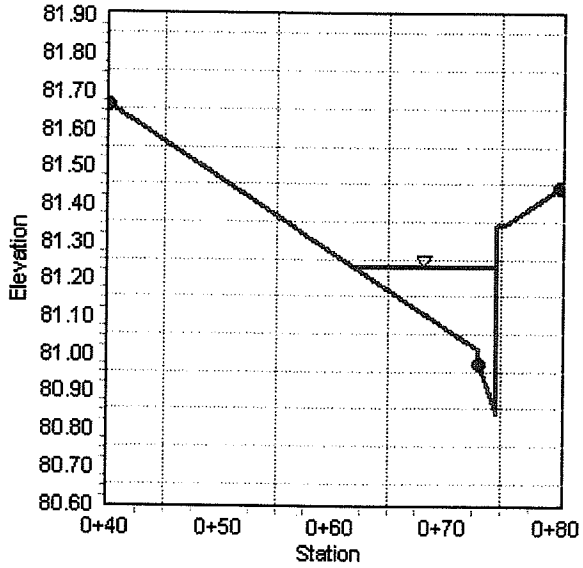
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04200	ft/ft
Normal Depth	0.39	ft
Discharge	8.70	ft³/s

Cross Section Image



WSE = 81.23

$$DL = \frac{(81.66 - 81.23)}{.02} = 21.5'$$

Worksheet for Washburn Q100 - ULTIMATE - SECTION 2 - SOUTH 1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04200	ft/ft
Discharge	8.70	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+40.00	81.66
0+73.00	81.01
0+73.00	80.97
0+74.50	80.84
0+74.50	81.34
0+75.00	81.34
0+80.00	81.44

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+40.00, 81.66)	(0+73.00, 80.97)	0.016
(0+73.00, 80.97)	(0+80.00, 81.44)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.39	ft
Elevation Range	80.84 to 81.66 ft		
Flow Area		1.73	ft²
Wetted Perimeter		13.14	ft
Hydraulic Radius		0.13	ft

DV = 0.39 x 5.04
= 2.02 < 8 ∴ OK

Worksheet for Washburn Q100 - ULTIMATE - SECTION 2 - SOUTH 1/2

Results

Top Width		12.71	ft
Normal Depth		0.39	ft
Critical Depth		0.51	ft
Critical Slope		0.00649	ft/ft
Velocity		5.04	ft/s
Velocity Head		0.40	ft
Specific Energy		0.79	ft
Froude Number		2.41	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.39	ft
Critical Depth	0.51	ft
Channel Slope	0.04200	ft/ft
Critical Slope	0.00649	ft/ft

Messages

Notes

Washburn Sta. 22+70.32

OFFSITE FLOW ESTIMATE (Q10/Q100) FROM
OFF4C (1.8 CFS / 3.7 CFS)
+ R3U (2 CFS / 3 CFS)
+ R4U (1 CFS / 2 CFS)
= 4.8 CFS / 8.7 CFS

Cross Section for Washburn Q10 - ULTIMATE - SECTION 2 - NORTH 1/2

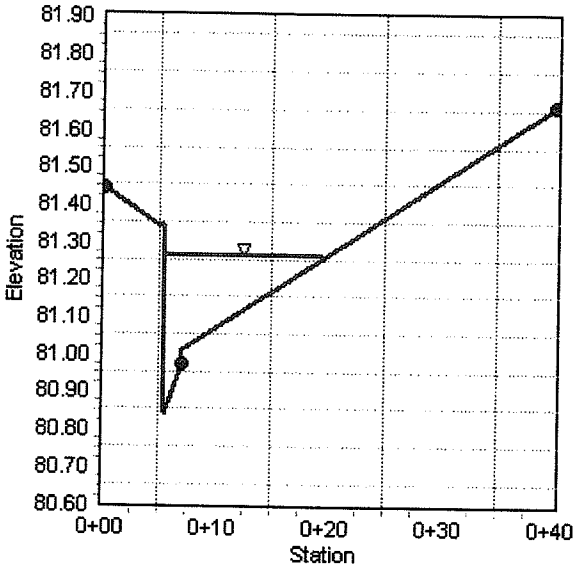
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04200	ft/ft
Normal Depth	0.42	ft
Discharge	11.00	ft³/s

Cross Section Image



WSE = 81.26

$DL = \frac{81.66 - 81.26}{.02} = 20.0'$

Worksheet for Washburn Q10 - ULTIMATE - SECTION 2 - NORTH 1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04200	ft/ft
Discharge	11.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	81.44
0+05.00	81.34
0+05.50	81.34
0+05.50	80.84
0+07.00	80.97
0+07.00	81.01
0+40.00	81.66

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 81.44)	(0+07.00, 80.97)	0.013
(0+07.00, 80.97)	(0+40.00, 81.66)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.42	ft
Elevation Range	80.84 to 81.66 ft		
Flow Area		2.07	ft²
Wetted Perimeter		14.47	ft
Hydraulic Radius		0.14	ft

DV = 0.42 x 5.32

DV = 2.2

Worksheet for Washburn Q10 - ULTIMATE - SECTION 2 - NORTH 1/2

Results

Top Width		14.01	ft
Normal Depth		0.42	ft
Critical Depth		0.55	ft
Critical Slope		0.00641	ft/ft
Velocity		5.32	ft/s
Velocity Head		0.44	ft
Specific Energy		0.86	ft
Froude Number		2.44	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.42	ft
Critical Depth	0.55	ft
Channel Slope	0.04200	ft/ft
Critical Slope	0.00641	ft/ft

Messages

Notes

Washburn Sta. 22+70.32

FLOW ESTIMATE FROM COMB1 (10 CFS /23 CFS) + BASIN R4 (1 CFS / 2 CFS) => 11 CFS / 25 CFS (Q10/Q100)

Cross Section for Washburn Q100 - ULTIMATE - SECTION 2 - NORTH 1/2

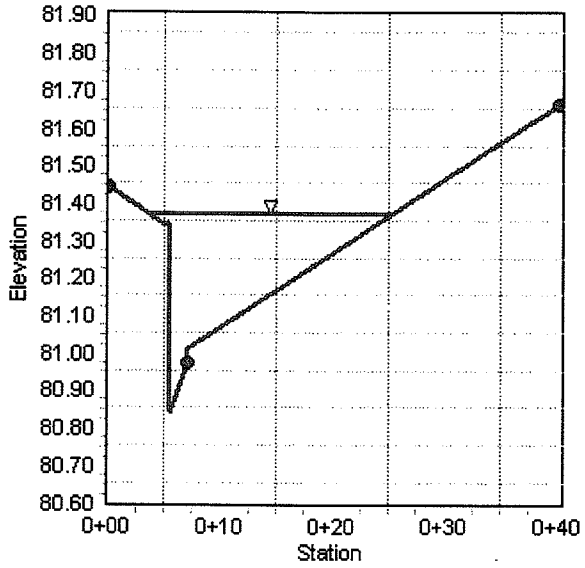
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04200	ft/ft
Normal Depth	0.53	ft
Discharge	25.00	ft³/s

Cross Section Image



WSE = 81.37

$$DL = \frac{(81.46 - 81.37)}{.02} = 14.5'$$

Worksheet for Washburn Q100 - ULTIMATE - SECTION 2 - NORTH 1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.04200	ft/ft
Discharge	25.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	81.44
0+05.00	81.34
0+05.50	81.34
0+05.50	80.84
0+07.00	80.97
0+07.00	81.01
0+40.00	81.66

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 81.44)	(0+07.00, 80.97)	0.013
(0+07.00, 80.97)	(0+40.00, 81.66)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.53	ft
Elevation Range	80.84 to 81.66 ft		
Flow Area		3.99	ft²
Wetted Perimeter		22.18	ft
Hydraulic Radius		0.18	ft

DV = 0.53 X 6.26

DV = 3.3 < 8

Worksheet for Washburn Q100 - ULTIMATE - SECTION 2 - NORTH 1/2

Results

Top Width		21.63	ft
Normal Depth		0.53	ft
Critical Depth		0.69	ft
Critical Slope		0.00564	ft/ft
Velocity		6.26	ft/s
Velocity Head		0.61	ft
Specific Energy		1.14	ft
Froude Number		2.57	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.53	ft
Critical Depth	0.69	ft
Channel Slope	0.04200	ft/ft
Critical Slope	0.00564	ft/ft

Messages

Notes

Washburn Sta. 22+70.32

FLOW ESTIMATE FROM COMB1 (10 CFS /23 CFS) + BASIN R4 (1 CFS / 2 CFS) => 11 CFS / 25 CFS (Q10/Q100)

Cross Section for Shaumber Q10 - ULT - SEC. 3 - W 1/2

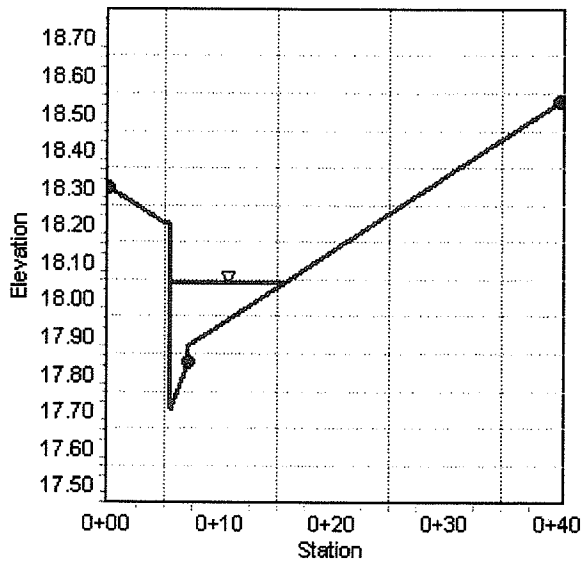
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00600	ft/ft
Normal Depth	0.34	ft
Discharge	2.00	ft³/s

Cross Section Image



WSE = 18.04

$DL = \frac{(18.53 - 18.04)}{.02} = 24.50'$

Worksheet for Shaumber Q10 - ULT - SEC. 3 - W 1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00600	ft/ft
Discharge	2.00	ft^3/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	18.30
0+05.00	18.20
0+05.50	18.20
0+05.50	17.70
0+07.00	17.83
0+07.00	17.87
0+40.00	18.53

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 18.30)	(0+07.00, 17.83)	0.013
(0+07.00, 17.83)	(0+40.00, 18.53)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.34	ft
Elevation Range	17.70 to 18.53 ft		
Flow Area		1.17	ft^2
Wetted Perimeter		10.55	ft
Hydraulic Radius		0.11	ft

DV = 0.34 X 1.71

DV = 0.6

Worksheet for Shaumber Q10 - ULT - SEC. 3 - W 1/2

Results

Top Width		10.16	ft
Normal Depth		0.34	ft
Critical Depth		0.33	ft
Critical Slope		0.00770	ft/ft
Velocity		1.71	ft/s
Velocity Head		0.05	ft
Specific Energy		0.39	ft
Froude Number		0.89	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.34	ft
Critical Depth	0.33	ft
Channel Slope	0.00600	ft/ft
Critical Slope	0.00770	ft/ft

Messages

Notes

Sta. 17+00 - Shaumber (Cliff Shadows)

BASIN R0U (2 cfs / 4 cfs)

Cross Section for Shaumber Q100 - ULT - SEC. 3 - W 1/2

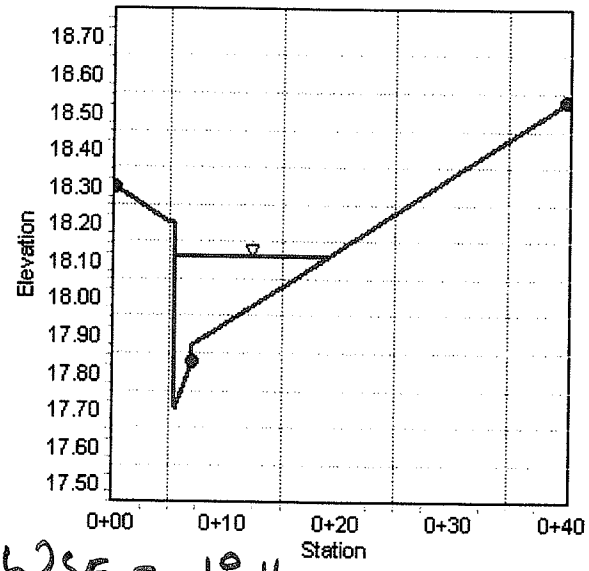
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00600	ft/ft
Normal Depth	0.41	ft
Discharge	4.00	ft³/s

Cross Section Image



WSE = 18.11

$DL = \frac{(18.53 - 18.11)}{.02} = 21.0'$

=

Worksheet for Shaumber Q100 - ULT - SEC. 3 - W 1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00600	ft/ft
Discharge	4.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	18.30
0+05.00	18.20
0+05.50	18.20
0+05.50	17.70
0+07.00	17.83
0+07.00	17.87
0+40.00	18.53

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 18.30)	(0+07.00, 17.83)	0.013
(0+07.00, 17.83)	(0+40.00, 18.53)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.41	ft
Elevation Range	17.70 to 18.53 ft	
Flow Area	2.00	ft²
Wetted Perimeter	14.11	ft
Hydraulic Radius	0.14	ft

DV = 0.41 x 7.00

DV = 2.8 < 8

=

Worksheet for Shaumber Q100 - ULT - SEC. 3 - W 1/2

Results

Top Width		13.65	ft
Normal Depth		0.41	ft
Critical Depth		0.40	ft
Critical Slope		0.00714	ft/ft
Velocity		2.00	ft/s
Velocity Head		0.06	ft
Specific Energy		0.48	ft
Froude Number		0.92	
Flow Type	Subcritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.41	ft
Critical Depth	0.40	ft
Channel Slope	0.00600	ft/ft
Critical Slope	0.00714	ft/ft

Messages

Notes

Sta. 17+00 - Shaumber (Cliff Shadows)

BASIN R0U (2 cfs / 4 cfs)

Cross Section for Alpine Ridge - Q10 ULTIMATE - SEC. 4 - W 1/2

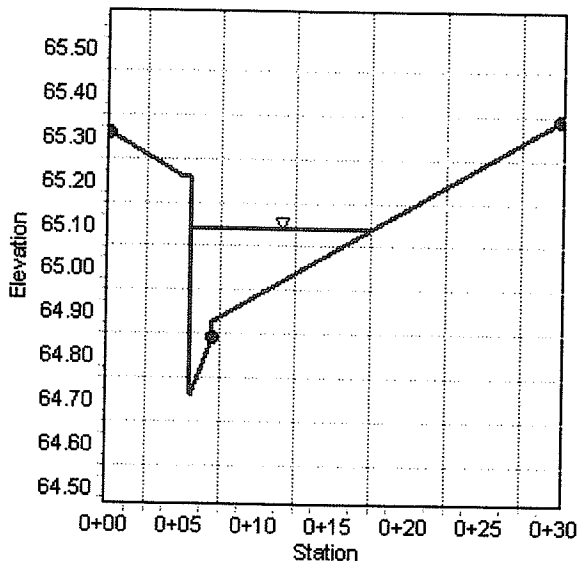
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02140	ft/ft
Normal Depth	0.38	ft
Discharge	5.70	ft^3/s

Cross Section Image



WSE = 65.09

$DL = \frac{(65.34 - 65.09)}{.02} = 12.5'$

Worksheet for Alpine Ridge - Q10 ULTIMATE - SEC. 4 - W 1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02140	ft/ft
Discharge	5.70	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	65.31
0+05.00	65.21
0+05.50	65.21
0+05.50	64.71
0+07.00	64.84
0+07.00	64.88
0+30.00	65.34

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 65.31)	(0+07.00, 64.84)	0.013
(0+07.00, 64.84)	(0+30.00, 65.34)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.38	ft
Elevation Range	64.71 to 65.34 ft	
Flow Area	1.61	ft²
Wetted Perimeter	12.57	ft
Hydraulic Radius	0.13	ft

DV = 0.38 X 3.54

DV = 1.3

=

Worksheet for Alpine Ridge - Q10 ULTIMATE - SEC. 4 - W 1/2

Results

Top Width	12.14	ft
Normal Depth	0.38	ft
Critical Depth	0.45	ft
Critical Slope	0.00677	ft/ft
Velocity	3.54	ft/s
Velocity Head	0.20	ft
Specific Energy	0.58	ft
Froude Number	1.72	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.38	ft
Critical Depth	0.45	ft
Channel Slope	0.02140	ft/ft
Critical Slope	0.00677	ft/ft

Messages

Notes

CALCULATION AT STA. 29+00 IN ALPINE RIDGE

10-YR TOTAL FLOW (11.0 CFS) FROM WASHBURN NOT CAPTURED BY DROP INLET FOR 10-YEAR LEAVING IS 3.7 CFS (BYPASS FLOW) AT THE INTERSECTION OF WASHBURN AND ALPINE RIDGE IN NORTH HALF OF ROW AND COMBINED WITH BASIN R5 (2 CFS) IS 5.7 CFS TOTAL FOR WEST HALF UNDER ULTIMATE CONDITION OR

3.7 + 2.0 = 5.7 CFS

Cross Section for Alpine Ridge - Q100 ULTIMATE - SEC. 4 - W 1/2

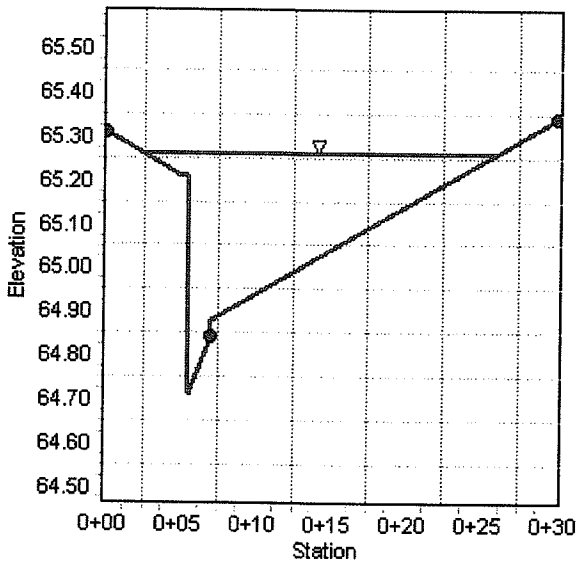
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02140	ft/ft
Normal Depth	0.55	ft
Discharge	20.10	ft³/s

Cross Section Image



INSE = 65.26

DL = $\frac{65.34 - 65.26}{102} = 4'$

Worksheet for Alpine Ridge - Q100 ULTIMATE - SEC. 4 - W 1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02140	ft/ft
Discharge	20.10	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	65.31
0+05.00	65.21
0+05.50	65.21
0+05.50	64.71
0+07.00	64.84
0+07.00	64.88
0+30.00	65.34

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 65.31)	(0+07.00, 64.84)	0.013
(0+07.00, 64.84)	(0+30.00, 65.34)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.55	ft
Elevation Range	64.71 to 65.34 ft		
Flow Area		4.42	ft²
Wetted Perimeter		24.01	ft
Hydraulic Radius		0.18	ft

DV = 0.55X 4.55

DV = 2.5 < 8

Worksheet for Alpine Ridge - Q100 ULTIMATE - SEC. 4 - W 1/2

Results

Top Width	23.46	ft
Normal Depth	0.55	ft
Critical Depth	0.65	ft
Critical Slope	0.00573	ft/ft
Velocity	4.55	ft/s
Velocity Head	0.32	ft
Specific Energy	0.87	ft
Froude Number	1.85	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.55	ft
Critical Depth	0.65	ft
Channel Slope	0.02140	ft/ft
Critical Slope	0.00573	ft/ft

Messages

Notes

CALCULATION AT STA. 29+00 IN ALPINE RIDGE

100-YR TOTAL FLOW (25.0 CFS) FROM WASHBURN NOT CAPTURED BY DROP INLET FOR 100-YEAR LEAVING IS 15.1 CFS (BYPASS FLOW) AT THE INTERSECTION OF WASHBURN AND ALPINE RIDGE IN NORTH HALF OF ROW AND COMBINED WITH BASIN R5 (5 CFS) IS 20.1 CFS TOTAL FOR WEST HALF UNDER ULTIMATE CONDITION OR

15.1 + 5.0 = 20.1 CFS

Cross Section for Alpine Ridge - Q10 ULTIMATE - SEC. 4 - E 1/2

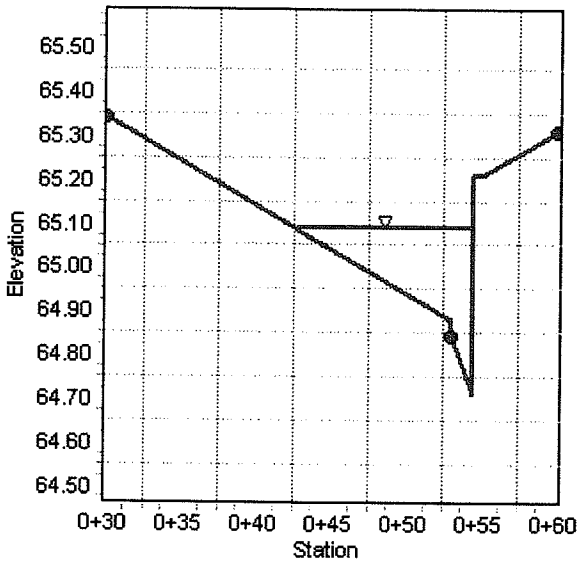
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02140	ft/ft
Normal Depth	0.38	ft
Discharge	5.30	ft^3/s

Cross Section Image



WSE = 65.09

$$DL = \frac{(65.34 - 65.09)}{.02} = 12.5'$$

Worksheet for Alpine Ridge - Q10 ULTIMATE - SEC. 4 - E 1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02140	ft/ft
Discharge	5.30	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+30.00	65.34
0+53.00	64.88
0+53.00	64.84
0+54.50	64.71
0+54.50	65.21
0+55.00	65.21
0+60.00	65.31

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+30.00, 65.34)	(0+53.00, 64.84)	0.016
(0+53.00, 64.84)	(0+60.00, 65.31)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.38	ft
Elevation Range	64.71 to 65.34 ft	
Flow Area	1.52	ft²
Wetted Perimeter	12.19	ft
Hydraulic Radius	0.12	ft

DV = 0.38 × 3.49

DV = 1.3

=

Worksheet for Alpine Ridge - Q10 ULTIMATE - SEC. 4 - E 1/2

Results

Top Width		11.77	ft
Normal Depth		0.38	ft
Critical Depth		0.44	ft
Critical Slope		0.00683	ft/ft
Velocity		3.49	ft/s
Velocity Head		0.19	ft
Specific Energy		0.56	ft
Froude Number		1.71	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.38	ft
Critical Depth	0.44	ft
Channel Slope	0.02140	ft/ft
Critical Slope	0.00683	ft/ft

Messages

Notes

CALCULATION AT STA. 29+00 IN ALPINE RIDGE - EAST HALF

BASIN R5U (2 CFS / 3 CFS) + OFF6 (3.3 CFS / 6.6 CFS) = 5.3 CFS / 9.6 CFS (Q10 / Q100)

Cross Section for Alpine Ridge - Q100 ULTIMATE - SEC. 4 - E 1/2

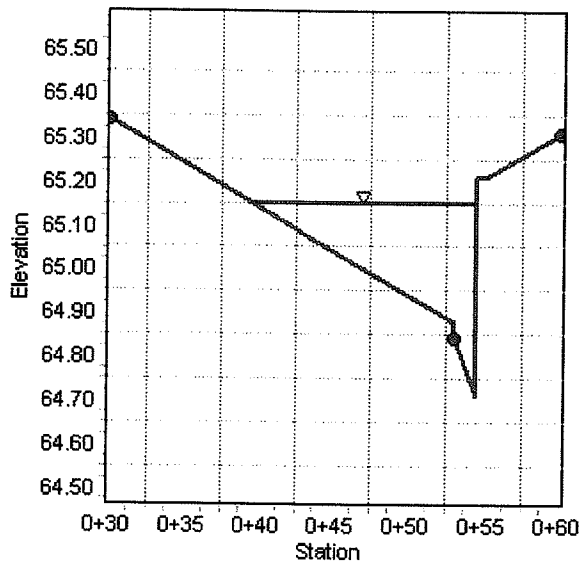
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02140	ft/ft
Normal Depth	0.44	ft
Discharge	9.60	ft³/s

Cross Section Image



WSE = 65.15

$$DL = \frac{(65.31 - 65.15)}{.02} = 8'$$

Worksheet for Alpine Ridge - Q100 ULTIMATE - SEC. 4 - E 1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02140	ft/ft
Discharge	9.60	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+30.00	65.34
0+53.00	64.88
0+53.00	64.84
0+54.50	64.71
0+54.50	65.21
0+55.00	65.21
0+60.00	65.31

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+30.00, 65.34)	(0+53.00, 64.84)	0.016
(0+53.00, 64.84)	(0+60.00, 65.31)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.44	ft
Elevation Range	64.71 to 65.34 ft	
Flow Area	2.40	ft²
Wetted Perimeter	15.54	ft
Hydraulic Radius	0.15	ft

DV = 0.44 x 4.00

DV = 1.8 < 3

Worksheet for Alpine Ridge - Q100 ULTIMATE - SEC. 4 - E 1/2

Results

Top Width	15.05	ft
Normal Depth	0.44	ft
Critical Depth	0.53	ft
Critical Slope	0.00649	ft/ft
Velocity	4.00	ft/s
Velocity Head	0.25	ft
Specific Energy	0.69	ft
Froude Number	1.76	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.44	ft
Critical Depth	0.53	ft
Channel Slope	0.02140	ft/ft
Critical Slope	0.00649	ft/ft

Messages

Notes

CALCULATION AT STA. 29+00 IN ALPINE RIDGE - EAST HALF

BASIN R5U (2 CFS / 3 CFS) + OFF6 (3.3 CFS / 6.6 CFS) = 5.3 CFS / 9.6 CFS (Q10 / Q100)

Cross Section for Hammer Q10 ULT. - SEC. 5 - N 1/2

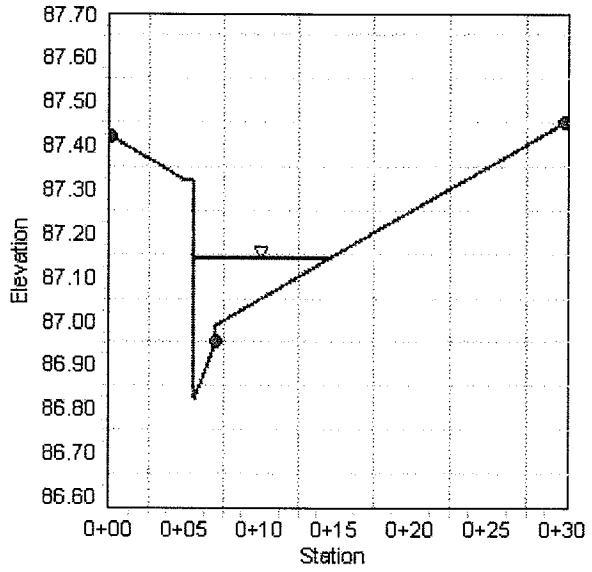
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.06320	ft/ft
Normal Depth	0.32	ft
Discharge	5.00	ft^3/s

Cross Section Image



WSE = 87.14

$DL = \frac{(87.45 - 87.14)}{.02} = 15.5'$

TV = 0.32 x 5.24 = 1.7

Worksheet for Hammer Q10 ULT. - SEC. 5 - N 1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.06320	ft/ft
Discharge	5.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	87.42
0+05.00	87.32
0+05.50	87.32
0+05.50	86.82
0+07.00	86.95
0+07.00	86.99
0+30.00	87.45

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 87.42)	(0+07.00, 86.95)	0.013
(0+07.00, 86.95)	(0+30.00, 87.45)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.32	ft
Elevation Range	86.82 to 87.45 ft	
Flow Area	0.95	ft²
Wetted Perimeter	9.42	ft
Hydraulic Radius	0.10	ft

Worksheet for Hammer Q10 ULT. - SEC. 5 - N 1/2

Results

Top Width		9.05	ft
Normal Depth		0.32	ft
Critical Depth		0.43	ft
Critical Slope		0.00678	ft/ft
Velocity		5.24	ft/s
Velocity Head		0.43	ft
Specific Energy		0.75	ft
Froude Number		2.85	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.32	ft
Critical Depth	0.43	ft
Channel Slope	0.06320	ft/ft
Critical Slope	0.00678	ft/ft

Messages

Notes

Hammer Sta. 16+00.00 - NORTH HALF

FLOW RATE FROM BASINS R0U + R1U + R2U = 2/4 + 1/1 + 2/4 = 5/9 (Q10/Q100)

Cross Section for Hammer Q100 ULT. - SEC. 5 - N 1/2

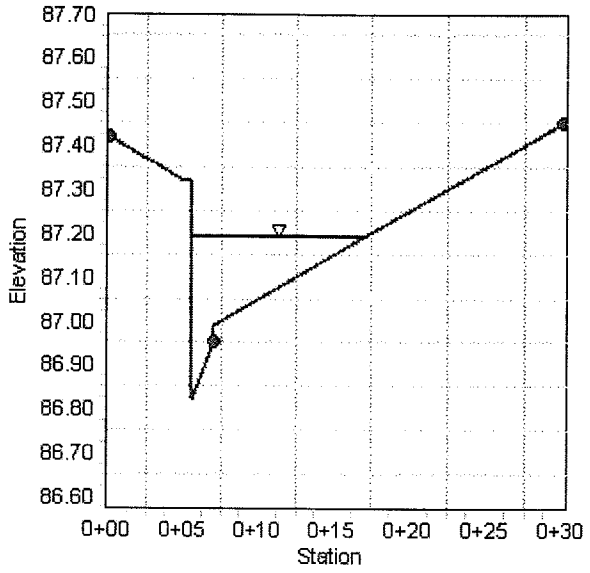
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.06320	ft/ft
Normal Depth	0.37	ft
Discharge	9.00	ft^3/s

Cross Section Image



WSE = 87.19

$$DL = \frac{87.45 - 87.19}{.02} = 13'$$

Worksheet for Hammer Q100 ULT. - SEC. 5 - N 1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.06320	ft/ft
Discharge	9.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	87.42
0+05.00	87.32
0+05.50	87.32
0+05.50	86.82
0+07.00	86.95
0+07.00	86.99
0+30.00	87.45

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 87.42)	(0+07.00, 86.95)	0.013
(0+07.00, 86.95)	(0+30.00, 87.45)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.37	ft DV = 0.37 X 5.97
Elevation Range	86.82 to 87.45 ft		
Flow Area		1.51	ft² DV = 2.2
Wetted Perimeter		12.13	ft
Hydraulic Radius		0.12	ft

Worksheet for Hammer Q100 ULT. - SEC. 5 - N 1/2

Results

Top Width		11.71	ft
Normal Depth		0.37	ft
Critical Depth		0.52	ft
Critical Slope		0.00645	ft/ft
Velocity		5.97	ft/s
Velocity Head		0.55	ft
Specific Energy		0.93	ft
Froude Number		2.94	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.37	ft
Critical Depth	0.52	ft
Channel Slope	0.06320	ft/ft
Critical Slope	0.00645	ft/ft

Messages

Notes

Hammer Sta. 16+00.00 - NORTH HALF

FLOW RATE FROM BASINS R0U + R1U + R2U = 2/4 + 1/1 + 2/4 = 5/9 (Q10/Q100)

Cross Section for Hammer Q100 ULT. - SEC. 5 - S 1/2

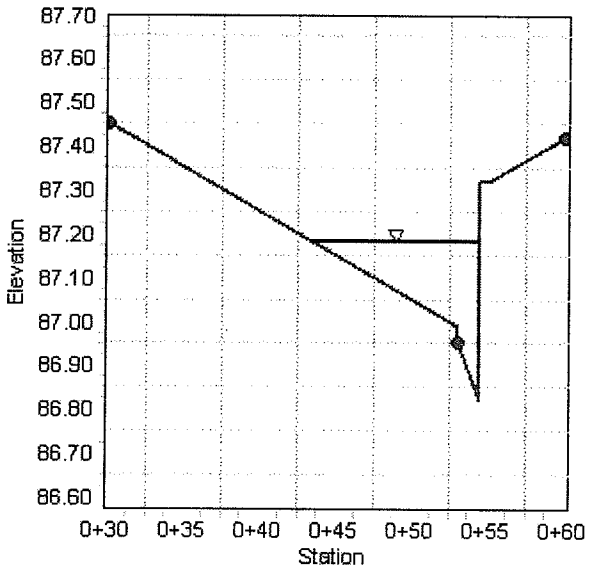
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.06320	ft/ft
Normal Depth	0.36	ft
Discharge	8.10	ft³/s

Cross Section Image



WSE = 87.18 (100-YR)

$DL = \frac{(87.45 - 87.18)}{.02} = 13.5'$ FOR 100YR DESIGN STORM

DV = 0.36 × 5.83 = 2.1 < 8

Worksheet for Hammer Q100 ULT. - SEC. 5 - S 1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.06320	ft/ft
Discharge	8.10	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+30.00	87.45
0+53.00	86.99
0+53.00	86.95
0+54.50	86.82
0+54.50	87.32
0+55.00	87.32
0+60.00	87.42

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+30.00, 87.45)	(0+53.00, 86.95)	0.016
(0+53.00, 86.95)	(0+60.00, 87.42)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.36	ft
Elevation Range	86.82 to 87.45 ft	
Flow Area	1.39	ft²
Wetted Perimeter	11.61	ft
Hydraulic Radius	0.12	ft

Worksheet for Hammer Q100 ULT. - SEC. 5 - S 1/2

Results

Top Width		11.20	ft
Normal Depth		0.36	ft
Critical Depth		0.50	ft
Critical Slope		0.00643	ft/ft
Velocity		5.83	ft/s
Velocity Head		0.53	ft
Specific Energy		0.89	ft
Froude Number		2.92	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.36	ft
Critical Depth	0.50	ft
Channel Slope	0.06320	ft/ft
Critical Slope	0.00643	ft/ft

Messages

Notes

Q100 FOR STA. 16+00 (HAMMER) IS BASED UPON:

DW #4 Q100 = 4.7 CFS - DROP INLET #2 Q100 CAPTURED = 4.6 CFS LEAVING Q100 BYPASS FLOW = 0.1 CFS + BASIN R1 Q100 = 1 CFS + BASIN R2 Q100 = 7 CFS OR (4.7 - 4.6) + 1 + 7 = 8.1 CFS

Cross Section for Hammer - Q10 ULT - SEC. 6

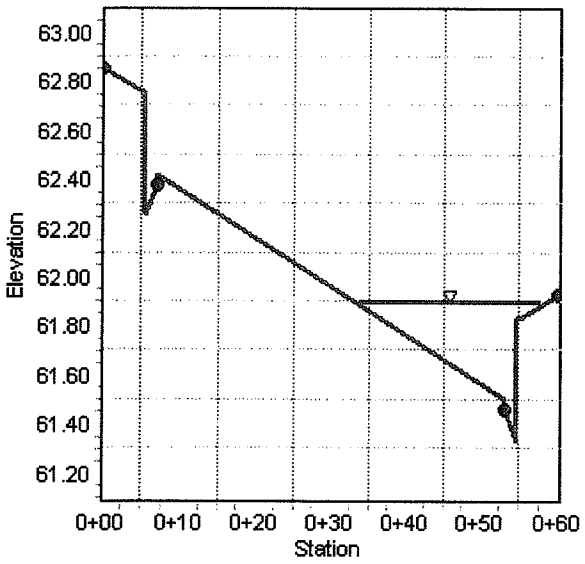
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02100	ft/ft
Normal Depth	0.56	ft
Discharge	21.00	ft³/s

Cross Section Image



WSE = 61.89

$$DL = \frac{\overset{LIP/AC}{62.42} - 61.89}{.02} = 26.5' \text{ (LIP/AC} \rightarrow \text{WSE)}$$

DL = CURB FACE → LIP/AC + LIP/AC → WSE

DL = 26.5 + 1.5 = 28.0' ÷ 2 = 14' EACH = WAY IN SUPER ELEV

Worksheet for Hammer - Q10 ULT - SEC. 6

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02100	ft/ft
Discharge	21.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	62.85
0+05.00	62.75
0+05.50	62.75
0+05.50	62.25
0+07.00	62.38
0+07.00	62.42
0+30.00	61.96
0+53.00	61.50
0+53.00	61.46
0+54.50	61.33
0+54.50	61.83
0+55.00	61.83
0+60.00	61.93

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 62.85)	(0+07.00, 62.38)	0.013
(0+07.00, 62.38)	(0+53.00, 61.46)	0.016
(0+53.00, 61.46)	(0+60.00, 61.93)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Worksheet for Hammer - Q10 ULT - SEC. 6

Results

Normal Depth		0.56	ft
Elevation Range	61.33 to 62.85 ft		
Flow Area		4.61	ft²
Wetted Perimeter		24.84	ft
Hydraulic Radius		0.19	ft
Top Width		24.29	ft
Normal Depth		0.56	ft
Critical Depth		0.66	ft
Critical Slope		0.00571	ft/ft
Velocity		4.55	ft/s
Velocity Head		0.32	ft
Specific Energy		0.88	ft
Froude Number		1.84	
Flow Type	Supercritical		

DV = 0.56 x 4.55

DV = 2.5

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.56	ft
Critical Depth	0.66	ft
Channel Slope	0.02100	ft/ft
Critical Slope	0.00571	ft/ft

Messages

Notes

Sta. 21+00

SURFACE FLOW FROM DRIVEWAY #5 IN HAMMER IS 16 CFS / 35 CFS + BYPASS FLOW IN EAST HALF OF SHAUMBER INTO SOUTH HALF OF HAMMER (0 / 8.1CFS) + BASIN R2U (5 CFS / 9 CFS, NORTH HALF OF SUPER-ELEVATED HAMMER) =

16/35 + 0/8.1 + 5/9 = 21CFS / 52.1 CFS (Q10/Q100)

Cross Section for Hammer - Q100 ULT - SEC. 6

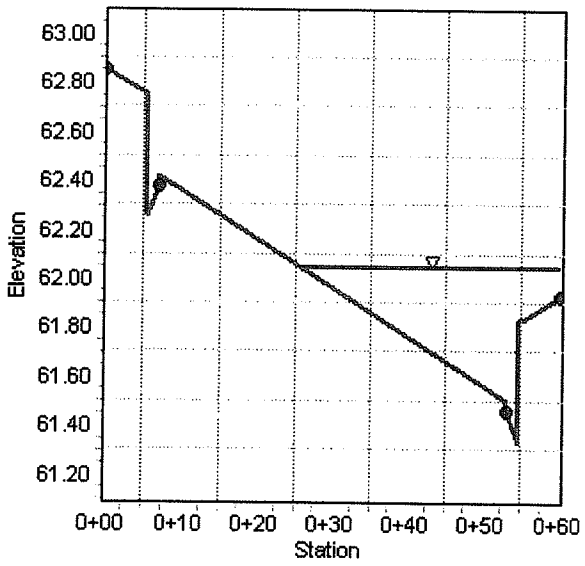
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02100	ft/ft
Normal Depth	0.71	ft
Discharge	52.10	ft³/s

Cross Section Image



Worksheet for Hammer - Q100 ULT - SEC. 6

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.02100	ft/ft
Discharge	52.10	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	62.85
0+05.00	62.75
0+05.50	62.75
0+05.50	62.25
0+07.00	62.38
0+07.00	62.42
0+30.00	61.96
0+53.00	61.50
0+53.00	61.46
0+54.50	61.33
0+54.50	61.83
0+55.00	61.83
0+60.00	61.93

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 62.85)	(0+07.00, 62.38)	0.013
(0+07.00, 62.38)	(0+53.00, 61.46)	0.016
(0+53.00, 61.46)	(0+60.00, 61.93)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Worksheet for Hammer - Q100 ULT - SEC. 6

Results

Normal Depth		0.71	ft
Elevation Range	61.33 to 62.85 ft		
Flow Area		9.08	ft²
Wetted Perimeter		34.53	ft
Hydraulic Radius		0.26	ft
Top Width		33.87	ft
Normal Depth		0.71	ft
Critical Depth		0.87	ft
Critical Slope		0.00496	ft/ft
Velocity		5.74	ft/s
Velocity Head		0.51	ft
Specific Energy		1.22	ft
Froude Number		1.96	
Flow Type	Supercritical		

DV = 0.71 x 5.74

DV = 4.1 < 8

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.71	ft
Critical Depth	0.87	ft
Channel Slope	0.02100	ft/ft
Critical Slope	0.00496	ft/ft

Messages

Notes

Sta. 21+00

SURFACE FLOW FROM DRIVEWAY #5 IN HAMMER IS 16 CFS / 35 CFS + BYPASS FLOW IN EAST HALF OF SHAUMBER INTO SOUTH HALF OF HAMMER (0 / 8.1CFS) + BASIN R2U (5 CFS / 9 CFS, NORTH HALF OF SUPER-ELEVATED HAMMER) =

16/35 + 0/8.1 + 5/9 = 21CFS / 52.1 CFS (Q10/Q100)

Cross Section for Shaumber Q10 - ULT - SEC. 7 - W 1/2

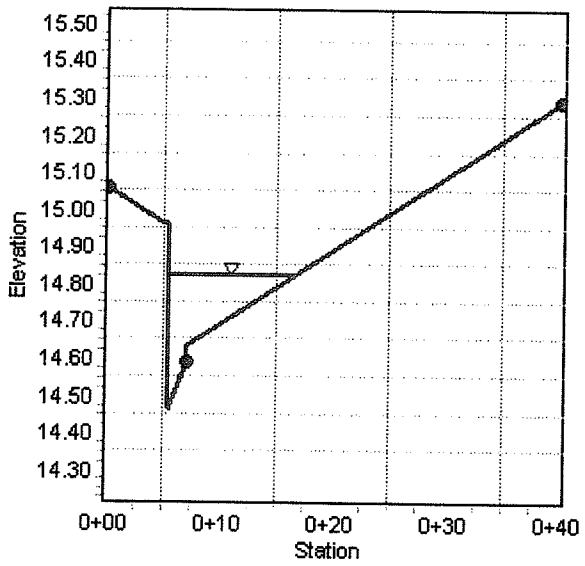
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00970	ft/ft
Normal Depth	0.36	ft
Discharge	3.00	ft³/s

Cross Section Image



WSE = 14.82

$$DC = \frac{(15.29 - 14.82)}{.02} = 23.5$$

Worksheet for Shaumber Q10 - ULT - SEC. 7 - W 1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00970	ft/ft
Discharge	3.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	15.06
0+05.00	14.96
0+05.50	14.96
0+05.50	14.46
0+07.00	14.59
0+07.00	14.63
0+40.00	15.29

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 15.06)	(0+07.00, 14.59)	0.013
(0+07.00, 14.59)	(0+40.00, 15.29)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.36	ft
Elevation Range	14.46 to 15.29 ft		
Flow Area		1.33	ft²
Wetted Perimeter		11.34	ft
Hydraulic Radius		0.12	ft

DV = 0.36 x 2.26

DV = 0.8

Worksheet for Shaumber Q10 - ULT - SEC. 7 - W 1/2

Results

Top Width		10.93	ft
Normal Depth		0.36	ft
Critical Depth		0.37	ft
Critical Slope		0.00733	ft/ft
Velocity		2.26	ft/s
Velocity Head		0.08	ft
Specific Energy		0.44	ft
Froude Number		1.14	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.36	ft
Critical Depth	0.37	ft
Channel Slope	0.00970	ft/ft
Critical Slope	0.00733	ft/ft

Messages

Notes

Sta. 17+00 - Shaumber (Cliff Shadows)

BASIN R0U (2 cfs / 4 cfs) + R1U (1 cfs / 1 cfs) = 3 cfs / 5 cfs (Q10/Q100)

Cross Section for Shaumber Q100 - ULT - SEC. 7 - W 1/2

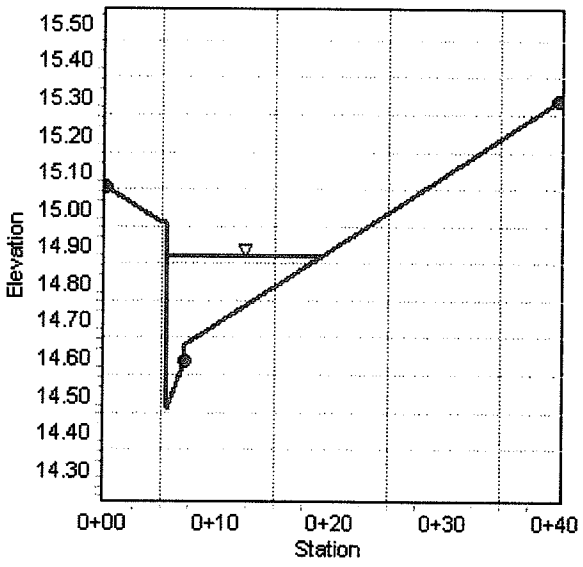
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00970	ft/ft
Normal Depth	0.41	ft
Discharge	5.00	ft³/s

Cross Section Image



Worksheet for Shaumber Q100 - ULT - SEC. 7 - W 1/2

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.00970	ft/ft
Discharge	5.00	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	15.06
0+05.00	14.96
0+05.50	14.96
0+05.50	14.46
0+07.00	14.59
0+07.00	14.63
0+40.00	15.29

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 15.06)	(0+07.00, 14.59)	0.013
(0+07.00, 14.59)	(0+40.00, 15.29)	0.016

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth		0.41	ft
Elevation Range	14.46 to 15.29 ft		
Flow Area		1.97	ft²
Wetted Perimeter		14.02	ft
Hydraulic Radius		0.14	ft

DV = 0.41 x 2.53

DV = 1.04 ≤ 8

Worksheet for Shaumber Q100 - ULT - SEC. 7 - W 1/2

Results

Top Width		13.56	ft
Normal Depth		0.41	ft
Critical Depth		0.43	ft
Critical Slope		0.00692	ft/ft
Velocity		2.53	ft/s
Velocity Head		0.10	ft
Specific Energy		0.51	ft
Froude Number		1.17	
Flow Type	Supercritical		

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.41	ft
Critical Depth	0.43	ft
Channel Slope	0.00970	ft/ft
Critical Slope	0.00692	ft/ft

Messages

Notes

Sta. 17+00 - Shaumber (Cliff Shadows)

BASIN R0U (2 cfs / 4 cfs) + R1U (1 cfs / 1 cfs) = 3 cfs / 5 cfs (Q10/Q100)

Washburn to Alpine Ridge Sump		
	WSPG	
Length	Sta	Remark
0.00	5000.00	Outlet/BEGIN
15.34	5015.34	Reach
5.00	5020.34	SDMH 13
95.75	5116.09	Reach
5.00	5121.09	SDMH 14
74.12	5195.21	Reach
5.00	5200.21	SDMH 15
317.28	5517.49	Reach
5.00	5522.49	SDMH 16
314.99	5837.48	Reach
5.00	5842.48	SDMH 17
314.99	6157.47	Reach
5.00	6162.47	SDMH 18
39.00	6201.47	Reach
5.00	6206.47	SDMH 19
222.44	6428.91	Inlet #13
5.00	6433.91	SDMH 25
222.44	6656.35	Reach
5.00	6661.35	Nus. DI/SDMH 24
296.99	6958.34	Reach
5.00	6963.34	SDMH 23
296.99	7260.33	Reach
5.00	7265.33	SDMH 22
296.89	7562.22	Reach
5.00	7567.22	SDMH 21
22.90	7590.12	Inlet/END
2590.12		Q100=11 cfs (ULT)

```
T1 CCSD NW TRANSPORTATION                                                    0
T2 ALPINE RIDGE STORM DRAIN - FILE:  CCSD2AR1.DAT
T3  JAN 2011 - ADDENDUM #1
SO    5000.0002850.500 11                          2850.500
R     5015.3402851.000 11       .013                                .000 -60.000 1
JX    5020.3402851.200 11 10    .013   36.700          2851.370     -90.0          .000
R     5116.0902852.100 11       .013                                .000   5.000 1
JX    5121.0902852.300 11  6    .013   11.200          2853.470      90.0          .000
R     5195.2102853.100 11       .013                                .000  78.461 1
JX    5200.2102853.300 10  9    .013   13.700          2854.270     -45.0          .000
R     5517.4902856.010 10       .013                                .000   5.000 1
JX    5522.4902856.210 10       .013
R     5837.4802863.060 10       .013                                .000    .000 1
JX    5842.4802863.260 10       .013
R     6157.4702867.860 10       .013                                .000    .000 1
JX    6162.4702868.060 10       .013
R     6201.4702869.940 10       .013                                .000  90.000 1
JX    6206.4702870.140 10  9    .013    9.900          2870.140     -45.0          .000
R     6428.9102880.600  9       .013                                .000    .000 1
JX    6433.9102880.800  9       .013
R     6656.3502889.600  9       .013                                .000  90.000 1
JX    6661.3502889.900  9  8    .013     .001          2890.300     -45.0          .000
R     6958.3402908.200  9       .013                                .000    .000 1
JX    6963.3402908.400  9       .013
R     7260.3302923.800  9       .013                                .000    .000 1
JX    7265.3302924.000  9       .013
R     7562.2202934.500  9       .013                                .000    .000 1
JX    7567.2202935.000  8       .013
R     7590.1202935.250  8       .013                                .000  45.000 1
SH    7590.1202935.250  8                          2936.750
CD   1  4   1     .000   2.000      .000  .000  .000   .00
CD   2  4   1     .000   2.000      .000  .000  .000   .00
CD   3  4   1     .000   2.000      .000  .000  .000   .00
CD   4  4   1     .000   2.000      .000  .000  .000   .00
CD   5  4   1     .000   2.000      .000  .000  .000   .00
CD   6  4   1     .000   2.000      .000  .000  .000   .00
CD   7  4   1     .000   2.000      .000  .000  .000   .00
CD   8  4   1     .000   1.500      .000  .000  .000   .00
CD   9  4   1     .000   2.000      .000  .000  .000   .00
CD  10  4   1     .000   3.000      .000  .000  .000   .00
CD  11  4   1     .000   4.000      .000  .000  .000   .00
Q             11.000    .0
```

FILE: CCSD2AR1.WSW W S P G W - EDIT LISTING - Version 14.06 Date: 1-19-2011 Time:11: 9:44

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	4	1		2.000														
CD	2	4	1		2.000														
CD	3	4	1		2.000														
CD	4	4	1		2.000														
CD	5	4	1		2.000														
CD	6	4	1		2.000														
CD	7	4	1		2.000														
CD	8	4	1		1.500														
CD	9	4	1		2.000														
CD	10	4	1		3.000														
CD	11	4	1		4.000														

W S P G W PAGE NO 1

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

CCSD NW TRANSPORTATION

HEADING LINE NO 2 IS -

ALPINE RIDGE STORM DRAIN - FILE: CCSD2AR1.DAT

HEADING LINE NO 3 IS -

JAN 2011 - ADDENDUM #1

W S P G W PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	5000.000	2850.500	11	2850.500

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	5015.340	2851.000	11	.013	.000	.000	-60.000	1

ELEMENT NO 3 IS A JUNCTION * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	5020.340	2851.200	11	10	0	.013	36.700	.000	2851.370	.000	-90.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	5116.090	2852.100	11	.013	.000	.000	5.000	1

ELEMENT NO 5 IS A JUNCTION * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	5121.090	2852.300	11	6	0	.013	11.200	.000	2853.470	.000	90.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 6 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	5195.210	2853.100	11	.013	.000	.000	78.461	1

ELEMENT NO 7 IS A JUNCTION * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	5200.210	2853.300	10	9	0	.013	13.700	.000	2854.270	.000	-45.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 8 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	5517.490	2856.010	10	.013	.000	.000	5.000	1

W S P G W PAGE NO 3

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 9 IS A JUNCTION * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	5522.490	2856.210	10	0	0	.013	.000	.000	.000	.000	.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 10 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	5837.480	2863.060	10	.013	.000	.000	.000	1

ELEMENT NO 11 IS A JUNCTION * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	5842.480	2863.260	10	0	0	.013	.000	.000	.000	.000	.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 12 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	6157.470	2867.860	10	.013	.000	.000	.000	1

ELEMENT NO 13 IS A JUNCTION * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	6162.470	2868.060	10	0	0	.013	.000	.000	.000	.000	.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 14 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	6201.470	2869.940	10	.013	.000	.000	90.000	1

ELEMENT NO 15 IS A JUNCTION * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	6206.470	2870.140	10	9	0	.013	9.900	.000	2870.140	.000	-45.000	.000

RADIUS	ANGLE
.000	.000

W S P G W PAGE NO 4

WATER SURFACE PROFILE - ELEMENT CARD LISTING

WARNING - ADJACENT SECTIONS ARE NOT IDENTICAL - SEE SECTION NUMBERS AND CHANNEL DEFINITIONS

ELEMENT NO 16 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	6428.910	2880.600	9	.013	.000	.000	.000	1

ELEMENT NO 17 IS A JUNCTION * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4

```
                          6433.910 2880.800    9     0     0   .013      .000      .000      .000      .000    .000      .000
                                                                                              RADIUS    ANGLE
                                                                                                .000      .000

ELEMENT NO  18 IS A REACH              *         *     *
                 U/S DATA    STATION     INVERT  SECT                N                        RADIUS    ANGLE     ANG PT  MAN H
                          6656.350 2889.600    9                 .013                          .000      .000     90.000      1
ELEMENT NO  19 IS A JUNCTION           *         *     *     *                 *                 *                   *
                 U/S DATA    STATION     INVERT  SECT LAT-1 LAT-2   N      Q3        Q4      INVERT-3 INVERT-4  PHI 3  PHI 4
                          6661.350 2889.900    9     8     0   .013      .001      .000  2890.300      .000 -45.000      .000
                                                                                              RADIUS    ANGLE
                                                                                                .000      .000

ELEMENT NO  20 IS A REACH              *         *     *
                 U/S DATA    STATION     INVERT  SECT                N                        RADIUS    ANGLE     ANG PT  MAN H
                          6958.340 2908.200    9                 .013                          .000      .000      .000      1
ELEMENT NO  21 IS A JUNCTION           *         *     *     *                 *                 *                   *
                 U/S DATA    STATION     INVERT  SECT LAT-1 LAT-2   N      Q3        Q4      INVERT-3 INVERT-4  PHI 3  PHI 4
                          6963.340 2908.400    9     0     0   .013      .000      .000      .000      .000    .000      .000
                                                                                              RADIUS    ANGLE
                                                                                                .000      .000

ELEMENT NO  22 IS A REACH              *         *     *
                 U/S DATA    STATION     INVERT  SECT                N                        RADIUS    ANGLE     ANG PT  MAN H
                          7260.330 2923.800    9                 .013                          .000      .000      .000      1
ELEMENT NO  23 IS A JUNCTION           *         *     *     *                 *                 *                   *
                 U/S DATA    STATION     INVERT  SECT LAT-1 LAT-2   N      Q3        Q4      INVERT-3 INVERT-4  PHI 3  PHI 4
                          7265.330 2924.000    9     0     0   .013      .000      .000      .000      .000    .000      .000
                                                                                              RADIUS    ANGLE
                                                                                                .000      .000

                                                    W S P G W                                                       PAGE NO   5
                                WATER SURFACE PROFILE - ELEMENT CARD LISTING
ELEMENT NO  24 IS A REACH              *         *     *
                 U/S DATA    STATION     INVERT  SECT                N                        RADIUS    ANGLE     ANG PT  MAN H
                          7562.220 2934.500    9                 .013                          .000      .000      .000      1
ELEMENT NO  25 IS A JUNCTION           *         *     *     *                 *                 *                   *
                 U/S DATA    STATION     INVERT  SECT LAT-1 LAT-2   N      Q3        Q4      INVERT-3 INVERT-4  PHI 3  PHI 4
                          7567.220 2935.000    8     0     0   .013      .000      .000      .000      .000    .000      .000
                                                                                              RADIUS    ANGLE
                                                                                                .000      .000

ELEMENT NO  26 IS A REACH              *         *     *
                 U/S DATA    STATION     INVERT  SECT                N                        RADIUS    ANGLE     ANG PT  MAN H
                          7590.120 2935.250    8                 .013                          .000      .000     45.000      1
ELEMENT NO  27 IS A SYSTEM HEADWORKS                 *                 *
                 U/S DATA    STATION     INVERT  SECT                          W S ELEV
                          7590.120 2935.250    8                           2936.750
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CCSD NW TRANSPORTATION
ALPINE RIDGE STORM DRAIN - FILE: CCSD2AR1.DAT
JAN 2011 - ADDENDUM #1

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
5000.000	2850.500	2.157	2852.657	82.50	11.94	2.21	2854.87	.00	2.75	3.99	4.000	.000	.00	1 .0
.215	.0326					.0102	.00	2.16	1.60	1.55	.013	.00	.00	PIPE
5000.215	2850.507	2.160	2852.667	82.50	11.92	2.20	2854.87	.00	2.75	3.99	4.000	.000	.00	1 .0
5.026	.0326					.0096	.05	2.16	1.59	1.55	.013	.00	.00	PIPE
5005.242	2850.671	2.245	2852.916	82.50	11.36	2.00	2854.92	.00	2.75	3.97	4.000	.000	.00	1 .0
3.841	.0326					.0085	.03	2.25	1.48	1.55	.013	.00	.00	PIPE
5009.083	2850.796	2.335	2853.131	82.50	10.83	1.82	2854.95	.00	2.75	3.94	4.000	.000	.00	1 .0
2.832	.0326					.0075	.02	2.33	1.37	1.55	.013	.00	.00	PIPE
5011.915	2850.888	2.429	2853.318	82.50	10.33	1.66	2854.97	.00	2.75	3.91	4.000	.000	.00	1 .0
1.934	.0326					.0066	.01	2.43	1.27	1.55	.013	.00	.00	PIPE
5013.849	2850.951	2.530	2853.481	82.50	9.85	1.51	2854.99	.00	2.75	3.86	4.000	.000	.00	1 .0
1.124	.0326					.0059	.01	2.53	1.18	1.55	.013	.00	.00	PIPE
5014.972	2850.988	2.637	2853.625	82.50	9.39	1.37	2854.99	.00	2.75	3.79	4.000	.000	.00	1 .0
.368	.0326					.0052	.00	2.64	1.09	1.55	.013	.00	.00	PIPE
5015.340	2851.000	2.752	2853.752	82.50	8.95	1.24	2855.00	.00	2.75	3.71	4.000	.000	.00	1 .0
JUNCT STR	.0400					.0030	.01	2.75	1.00		.013	.00	.00	PIPE
5020.340	2851.200	4.196	2855.396	45.80	3.64	.21	2855.60	.00	2.03	.00	4.000	.000	.00	1 .0
24.094	.0094					.0010	.02	4.20	.00	1.58	.013	.00	.00	PIPE

CCSD NW TRANSPORTATION
ALPINE RIDGE STORM DRAIN - FILE: CCSD2AR1.DAT
JAN 2011 - ADDENDUM #1

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
5044.434	2851.427	4.000	2855.427	45.80	3.64	.21	2855.63	.00	2.03	.00	4.000	.000	.00	1 .0
41.298	.0094					.0009	.04	4.00	.00	1.58	.013	.00	.00	PIPE
5085.732	2851.815	3.629	2855.444	45.80	3.82	.23	2855.67	.00	2.03	2.32	4.000	.000	.00	1 .0
22.712	.0094					.0009	.02	3.63	.30	1.58	.013	.00	.00	PIPE
5108.444	2852.028	3.414	2855.442	45.80	4.01	.25	2855.69	.00	2.03	2.83	4.000	.000	.00	1 .0
7.646	.0094					.0010	.01	3.41	.35	1.58	.013	.00	.00	PIPE
5116.090	2852.100	3.340	2855.440	45.80	4.09	.26	2855.70	.00	2.03	2.97	4.000	.000	.00	1 .0
JUNCT STR	.0400					.0008	.00	3.34	.37		.013	.00	.00	PIPE
5121.090	2852.300	3.367	2855.667	34.60	3.06	.15	2855.81	.00	1.75	2.92	4.000	.000	.00	1 .0
15.347	.0108					.0006	.01	3.37	.27	1.31	.013	.00	.00	PIPE
5136.437	2852.466	3.196	2855.662	34.60	3.21	.16	2855.82	.00	1.75	3.21	4.000	.000	.00	1 .0
13.323	.0108					.0006	.01	3.20	.31	1.31	.013	.00	.00	PIPE
5149.759	2852.610	3.045	2855.655	34.60	3.37	.18	2855.83	.00	1.75	3.41	4.000	.000	.00	1 .0
11.820	.0108					.0007	.01	3.04	.34	1.31	.013	.00	.00	PIPE
5161.579	2852.737	2.908	2855.645	34.60	3.54	.19	2855.84	.00	1.75	3.56	4.000	.000	.00	1 .0
10.632	.0108					.0008	.01	2.91	.38	1.31	.013	.00	.00	PIPE
5172.211	2852.852	2.782	2855.634	34.60	3.71	.21	2855.85	.00	1.75	3.68	4.000	.000	.00	1 .0
9.610	.0108					.0009	.01	2.78	.41	1.31	.013	.00	.00	PIPE

CCSD NW TRANSPORTATION
ALPINE RIDGE STORM DRAIN - FILE: CCSD2AR1.DAT
JAN 2011 - ADDENDUM #1

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
5181.821	2852.956	2.666	2855.622	34.60	3.89	.23	2855.86	.00	1.75	3.77	4.000	.000	.00	1 .0
8.705	.0108					.0010	.01	2.67	.45	1.31	.013	.00	.00	PIPE
5190.526	2853.050	2.557	2855.607	34.60	4.08	.26	2855.87	.00	1.75	3.84	4.000	.000	.00	1 .0
4.684	.0108					.0011	.01	2.56	.48	1.31	.013	.00	.00	PIPE
5195.210	2853.100	2.497	2855.597	34.60	4.19	.27	2855.87	.00	1.75	3.87	4.000	.000	.00	1 .0
JUNCT STR	.0400					.0011	.01	2.50	.51		.013	.00	.00	PIPE
5200.210	2853.300	2.362	2855.662	20.90	3.50	.19	2855.85	.00	1.47	2.46	3.000	.000	.00	1 .0
12.250	.0085					.0011	.01	2.36	.40	1.20	.013	.00	.00	PIPE
5212.459	2853.405	2.252	2855.657	20.90	3.67	.21	2855.87	.00	1.47	2.60	3.000	.000	.00	1 .0
10.839	.0085					.0012	.01	2.25	.44	1.20	.013	.00	.00	PIPE
5223.298	2853.497	2.152	2855.649	20.90	3.85	.23	2855.88	.00	1.47	2.70	3.000	.000	.00	1 .0
9.651	.0085					.0014	.01	2.15	.48	1.20	.013	.00	.00	PIPE
5232.949	2853.580	2.060	2855.640	20.90	4.04	.25	2855.89	.00	1.47	2.78	3.000	.000	.00	1 .0
8.639	.0085					.0016	.01	2.06	.52	1.20	.013	.00	.00	PIPE
5241.588	2853.654	1.975	2855.628	20.90	4.24	.28	2855.91	.00	1.47	2.85	3.000	.000	.00	1 .0
7.674	.0085					.0018	.01	1.97	.57	1.20	.013	.00	.00	PIPE
5249.263	2853.719	1.895	2855.614	20.90	4.44	.31	2855.92	.00	1.47	2.89	3.000	.000	.00	1 .0
6.795	.0085					.0020	.01	1.89	.61	1.20	.013	.00	.00	PIPE

CCSD NW TRANSPORTATION
ALPINE RIDGE STORM DRAIN - FILE: CCSD2AR1.DAT
JAN 2011 - ADDENDUM #1

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
5256.058	2853.777	1.819	2855.596	20.90	4.66	.34	2855.93	.00	1.47	2.93	3.000	.000	.00	1 .0
3.838	.0085					.0022	.01	1.82	.66	1.20	.013	.00	.00	PIPE
5259.896	2853.810	1.770	2855.580	20.90	4.81	.36	2855.94	.00	1.47	2.95	3.000	.000	.00	1 .0
HYDRAULIC JUMP														
5259.896	2853.810	1.204	2855.014	20.90	7.88	.96	2855.98	.00	1.47	2.94	3.000	.000	.00	1 .0
25.169	.0085					.0085	.21	1.20	1.46	1.20	.013	.00	.00	PIPE
5285.065	2854.025	1.204	2855.229	20.90	7.88	.96	2856.19	.00	1.47	2.94	3.000	.000	.00	1 .0
89.939	.0085					.0089	.80	1.20	1.46	1.20	.013	.00	.00	PIPE
5375.005	2854.793	1.176	2855.969	20.90	8.13	1.03	2857.00	.00	1.47	2.93	3.000	.000	.00	1 .0
43.388	.0085					.0100	.43	1.18	1.53	1.20	.013	.00	.00	PIPE
5418.393	2855.164	1.135	2856.299	20.90	8.53	1.13	2857.43	.00	1.47	2.91	3.000	.000	.00	1 .0
26.123	.0085					.0114	.30	1.13	1.64	1.20	.013	.00	.00	PIPE
5444.516	2855.387	1.096	2856.482	20.90	8.95	1.24	2857.73	.00	1.47	2.89	3.000	.000	.00	1 .0
19.582	.0085					.0130	.25	1.10	1.75	1.20	.013	.00	.00	PIPE
5464.098	2855.554	1.058	2856.612	20.90	9.38	1.37	2857.98	.00	1.47	2.87	3.000	.000	.00	1 .0
16.089	.0085					.0148	.24	1.06	1.88	1.20	.013	.00	.00	PIPE
5480.187	2855.691	1.022	2856.713	20.90	9.84	1.50	2858.22	.00	1.47	2.84	3.000	.000	.00	1 .0
13.867	.0085					.0169	.23	1.02	2.01	1.20	.013	.00	.00	PIPE

CCSD NW TRANSPORTATION
ALPINE RIDGE STORM DRAIN - FILE: CCSD2AR1.DAT
JAN 2011 - ADDENDUM #1

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
5494.054	2855.810	.987	2856.796	20.90	10.32	1.65	2858.45	.00	1.47	2.82	3.000	.000	.00	1 .0
12.303	.0085					.0193	.24	.99	2.15	1.20	.013	.00	.00	PIPE
5506.356	2855.915	.953	2856.868	20.90	10.83	1.82	2858.69	.00	1.47	2.79	3.000	.000	.00	1 .0
11.134	.0085					.0220	.24	.95	2.29	1.20	.013	.00	.00	PIPE
5517.490	2856.010	.921	2856.931	20.90	11.35	2.00	2858.93	.00	1.47	2.77	3.000	.000	.00	1 .0
JUNCT STR	.0400					.0226	.11	.92	2.45		.013	.00	.00	PIPE
5522.490	2856.210	.939	2857.149	20.90	11.05	1.90	2859.05	.00	1.47	2.78	3.000	.000	.00	1 .0
177.199	.0217					.0217	3.85	.94	2.36	.94	.013	.00	.00	PIPE
5699.689	2860.063	.939	2861.002	20.90	11.05	1.90	2862.90	.00	1.47	2.78	3.000	.000	.00	1 .0
103.267	.0217					.0205	2.12	.94	2.36	.94	.013	.00	.00	PIPE
5802.956	2862.309	.968	2863.277	20.90	10.60	1.74	2865.02	.00	1.47	2.80	3.000	.000	.00	1 .0
34.524	.0217					.0181	.63	.97	2.23	.94	.013	.00	.00	PIPE
5837.480	2863.060	1.002	2864.062	20.90	10.10	1.59	2865.65	.00	1.47	2.83	3.000	.000	.00	1 .0
JUNCT STR	.0400					.0158	.08	1.00	2.08		.013	.00	.00	PIPE
5842.479	2863.260	1.042	2864.302	20.90	9.58	1.42	2865.73	.00	1.47	2.86	3.000	.000	.00	1 .0
67.302	.0146					.0146	.98	1.04	1.93	1.04	.013	.00	.00	PIPE
5909.781	2864.243	1.042	2865.285	20.90	9.58	1.42	2866.71	.00	1.47	2.86	3.000	.000	.00	1 .0
103.140	.0146					.0150	1.54	1.04	1.93	1.04	.013	.00	.00	PIPE

CCSD NW TRANSPORTATION
ALPINE RIDGE STORM DRAIN - FILE: CCSD2AR1.DAT
JAN 2011 - ADDENDUM #1

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT or "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
L/Elem	Ch Slope													
6012.921	2865.749	1.029	2866.778	20.90	9.75	1.48	2868.25	.00	1.47	2.85	3.000	.000	.00	1 .0
61.460	.0146					.0164	1.01	1.03	1.98	1.04	.013	.00	.00	PIPE
6074.381	2866.646	.993	2867.640	20.90	10.22	1.62	2869.26	.00	1.47	2.82	3.000	.000	.00	1 .0
30.953	.0146					.0188	.58	.99	2.12	1.04	.013	.00	.00	PIPE
6105.334	2867.099	.960	2868.058	20.90	10.72	1.79	2869.84	.00	1.47	2.80	3.000	.000	.00	1 .0
21.431	.0146					.0214	.46	.96	2.26	1.04	.013	.00	.00	PIPE
6126.765	2867.412	.927	2868.339	20.90	11.25	1.96	2870.30	.00	1.47	2.77	3.000	.000	.00	1 .0
16.760	.0146					.0245	.41	.93	2.42	1.04	.013	.00	.00	PIPE
6143.525	2867.656	.896	2868.552	20.90	11.80	2.16	2870.71	.00	1.47	2.75	3.000	.000	.00	1 .0
13.945	.0146					.0279	.39	.90	2.59	1.04	.013	.00	.00	PIPE
6157.470	2867.860	.866	2868.726	20.90	12.37	2.38	2871.10	.00	1.47	2.72	3.000	.000	.00	1 .0
JUNCT STR	.0400					.0292	.15	.87	2.77		.013	.00	.00	PIPE
6162.470	2868.060	.874	2868.934	20.90	12.21	2.31	2871.25	.00	1.47	2.73	3.000	.000	.00	1 .0
5.507	.0482					.0276	.15	.87	2.71	.77	.013	.00	.00	PIPE
6167.978	2868.326	.893	2869.218	20.90	11.85	2.18	2871.40	.00	1.47	2.74	3.000	.000	.00	1 .0
7.138	.0482					.0248	.18	.89	2.61	.77	.013	.00	.00	PIPE
6175.115	2868.670	.924	2869.594	20.90	11.30	1.98	2871.58	.00	1.47	2.77	3.000	.000	.00	1 .0
5.578	.0482					.0217	.12	.92	2.44	.77	.013	.00	.00	PIPE

CCSD NW TRANSPORTATION
ALPINE RIDGE STORM DRAIN - FILE: CCSD2AR1.DAT
JAN 2011 - ADDENDUM #1

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
6180.693	2868.938	.956	2869.895	20.90	10.78	1.80	2871.70	.00	1.47	2.80	3.000	.000	.00	1 .0
4.460	.0482					.0190	.08	.96	2.28	.77	.013	.00	.00	PIPE
6185.153	2869.154	.990	2870.144	20.90	10.27	1.64	2871.78	.00	1.47	2.82	3.000	.000	.00	1 .0
3.614	.0482					.0167	.06	.99	2.13	.77	.013	.00	.00	PIPE
6188.767	2869.328	1.025	2870.353	20.90	9.80	1.49	2871.84	.00	1.47	2.85	3.000	.000	.00	1 .0
2.947	.0482					.0146	.04	1.03	1.99	.77	.013	.00	.00	PIPE
6191.714	2869.470	1.061	2870.531	20.90	9.34	1.35	2871.89	.00	1.47	2.87	3.000	.000	.00	1 .0
2.405	.0482					.0128	.03	1.06	1.86	.77	.013	.00	.00	PIPE
6194.119	2869.586	1.099	2870.685	20.90	8.91	1.23	2871.92	.00	1.47	2.89	3.000	.000	.00	1 .0
1.961	.0482					.0112	.02	1.10	1.74	.77	.013	.00	.00	PIPE
6196.081	2869.680	1.139	2870.819	20.90	8.49	1.12	2871.94	.00	1.47	2.91	3.000	.000	.00	1 .0
1.579	.0482					.0098	.02	1.14	1.63	.77	.013	.00	.00	PIPE
6197.660	2869.756	1.180	2870.936	20.90	8.10	1.02	2871.95	.00	1.47	2.93	3.000	.000	.00	1 .0
1.257	.0482					.0086	.01	1.18	1.52	.77	.013	.00	.00	PIPE
6198.917	2869.817	1.223	2871.040	20.90	7.72	.93	2871.96	.00	1.47	2.95	3.000	.000	.00	1 .0
.970	.0482					.0076	.01	1.22	1.42	.77	.013	.00	.00	PIPE
6199.887	2869.864	1.268	2871.131	20.90	7.36	.84	2871.97	.00	1.47	2.96	3.000	.000	.00	1 .0
.716	.0482					.0067	.00	1.27	1.32	.77	.013	.00	.00	PIPE

CCSD NW TRANSPORTATION
ALPINE RIDGE STORM DRAIN - FILE: CCSD2AR1.DAT
JAN 2011 - ADDENDUM #1

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
6200.603	2869.898	1.314	2871.212	20.90	7.02	.76	2871.98	.00	1.47	2.98	3.000	.000	.00	1 .0
.491	.0482					.0058	.00	1.31	1.24	.77	.013	.00	.00	PIPE
6201.094	2869.922	1.363	2871.285	20.90	6.69	.70	2871.98	.00	1.47	2.99	3.000	.000	.00	1 .0
.283	.0482					.0051	.00	1.36	1.15	.77	.013	.00	.00	PIPE
6201.377	2869.936	1.414	2871.349	20.90	6.38	.63	2871.98	.00	1.47	3.00	3.000	.000	.00	1 .0
.093	.0482					.0045	.00	1.41	1.07	.77	.013	.00	.00	PIPE
6201.470	2869.940	1.468	2871.408	20.90	6.08	.57	2871.98	.00	1.47	3.00	3.000	.000	.00	1 .0
JUNCT STR	.0400					.0024	.01	1.47	1.00		.013	.00	.00	PIPE
6206.470	2870.140	1.855	2871.995	11.00	2.40	.09	2872.08	.00	1.05	2.91	3.000	.000	.00	1 .0
6206.470	2870.140	.644	2870.784	11.00	12.59	2.46	2873.25	.00	1.19	1.87	2.000	.000	.00	1 .0
111.575	.0470					.0470	5.25	.64	3.25	.64	.013	.00	.00	PIPE
6318.045	2875.387	.644	2876.031	11.00	12.59	2.46	2878.49	.00	1.19	1.87	2.000	.000	.00	1 .0
68.470	.0470					.0461	3.16	.64	3.25	.64	.013	.00	.00	PIPE
6386.515	2878.606	.650	2879.257	11.00	12.42	2.39	2881.65	.00	1.19	1.87	2.000	.000	.00	1 .0
42.396	.0470					.0424	1.80	.65	3.18	.64	.013	.00	.00	PIPE
6428.910	2880.600	.673	2881.273	11.00	11.84	2.18	2883.45	.00	1.19	1.89	2.000	.000	.00	1 .0
JUNCT STR	.0400					.0396	.20	.67	2.98		.013	.00	.00	PIPE
6433.910	2880.800	.674	2881.474	11.00	11.83	2.17	2883.65	.00	1.19	1.89	2.000	.000	.00	1 .0
73.927	.0396					.0396	2.92	.67	2.97	.67	.013	.00	.00	PIPE

CCSD NW TRANSPORTATION
ALPINE RIDGE STORM DRAIN - FILE: CCSD2AR1.DAT
JAN 2011 - ADDENDUM #1

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
L/Elem	Ch Slope													
6507.836	2883.725	.674	2884.398	11.00	11.83	2.17	2886.57	.00	1.19	1.89	2.000	.000	.00	1 .0
70.035	.0396					.0404	2.83	.67	2.97	.67	.013	.00	.00	PIPE
6577.871	2886.495	.666	2887.162	11.00	12.01	2.24	2889.40	.00	1.19	1.89	2.000	.000	.00	1 .0
43.881	.0396					.0441	1.94	.67	3.04	.67	.013	.00	.00	PIPE
6621.752	2888.231	.644	2888.875	11.00	12.60	2.46	2891.34	.00	1.19	1.87	2.000	.000	.00	1 .0
20.706	.0396					.0504	1.04	.64	3.25	.67	.013	.00	.00	PIPE
6642.458	2889.051	.622	2889.672	11.00	13.21	2.71	2892.38	.00	1.19	1.85	2.000	.000	.00	1 .0
13.892	.0396					.0576	.80	.62	3.47	.67	.013	.00	.00	PIPE
6656.350	2889.600	.601	2890.201	11.00	13.86	2.98	2893.18	.00	1.19	1.83	2.000	.000	.00	1 .0
JUNCT STR	.0600					.0615	.31	.60	3.71		.013	.00	.00	PIPE
6661.350	2889.900	.600	2890.500	11.00	13.87	2.99	2893.49	.00	1.19	1.83	2.000	.000	.00	1 .0
201.824	.0616					.0616	12.44	.60	3.72	.60	.013	.00	.00	PIPE
6863.174	2902.336	.600	2902.936	11.00	13.87	2.99	2905.93	.00	1.19	1.83	2.000	.000	.00	1 .0
64.990	.0616					.0595	3.87	.60	3.72	.60	.013	.00	.00	PIPE
6928.164	2906.341	.611	2906.952	11.00	13.52	2.84	2909.79	.00	1.19	1.84	2.000	.000	.00	1 .0
30.176	.0616					.0538	1.62	.61	3.59	.60	.013	.00	.00	PIPE
6958.340	2908.200	.633	2908.833	11.00	12.89	2.58	2911.41	.00	1.19	1.86	2.000	.000	.00	1 .0
JUNCT STR	.0400					.0510	.26	.63	3.35		.013	.00	.00	PIPE

CCSD NW TRANSPORTATION
ALPINE RIDGE STORM DRAIN - FILE: CCSD2AR1.DAT
JAN 2011 - ADDENDUM #1

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
6963.340	2908.400	.628	2909.027	11.00	13.04	2.64	2911.67	.00	1.19	1.86	2.000	.000	.00	1 .0
190.503	.0519					.0519	9.88	.63	3.41	.63	.013	.00	.00	PIPE
7153.843	2918.278	.628	2918.906	11.00	13.04	2.64	2921.55	.00	1.19	1.86	2.000	.000	.00	1 .0
67.548	.0519					.0494	3.33	.63	3.41	.63	.013	.00	.00	PIPE
7221.391	2921.781	.644	2922.425	11.00	12.58	2.46	2924.88	.00	1.19	1.87	2.000	.000	.00	1 .0
25.477	.0519					.0440	1.12	.64	3.24	.63	.013	.00	.00	PIPE
7246.868	2923.102	.667	2923.769	11.00	11.99	2.23	2926.00	.00	1.19	1.89	2.000	.000	.00	1 .0
13.462	.0519					.0385	.52	.67	3.03	.63	.013	.00	.00	PIPE
7260.330	2923.800	.691	2924.491	11.00	11.43	2.03	2926.52	.00	1.19	1.90	2.000	.000	.00	1 .0
JUNCT STR	.0400					.0357	.18	.69	2.83		.013	.00	.00	PIPE
7265.330	2924.000	.694	2924.694	11.00	11.36	2.00	2926.70	.00	1.19	1.90	2.000	.000	.00	1 .0
195.267	.0354					.0354	6.91	.69	2.81	.69	.013	.00	.00	PIPE
7460.597	2930.906	.694	2931.600	11.00	11.36	2.00	2933.60	.00	1.19	1.90	2.000	.000	.00	1 .0
71.943	.0354					.0339	2.44	.69	2.81	.69	.013	.00	.00	PIPE
7532.540	2933.450	.710	2934.160	11.00	11.02	1.88	2936.04	.00	1.19	1.91	2.000	.000	.00	1 .0
29.680	.0354					.0305	.90	.71	2.69	.69	.013	.00	.00	PIPE
7562.220	2934.500	.735	2935.235	11.00	10.50	1.71	2936.95	.00	1.19	1.93	2.000	.000	.00	1 .0
JUNCT STR	.1000					.0197	.10	.74	2.51		.013	.00	.00	PIPE

WATER SURFACE PROFILE LISTING

Date: 1-19-2011 Time:11: 9:48

CCSD NW TRANSPORTATION
ALPINE RIDGE STORM DRAIN - FILE: CCSD2AR1.DAT
JAN 2011 - ADDENDUM #1

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS) / SF Ave	Vel Head / HF	Energy Grd.El. / SE Dpth	Super Elev / Froude N	Critical Depth / Norm Dp	Flow Top Width	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
7567.220	2935.000	1.233	2936.232	11.00	7.08	.78	2937.01	.00	1.27	1.15	1.500	.000	.00	1 .0
12.162	.0109					.0109	.13	1.23	1.07	1.23	.013	.00	.00	PIPE
7579.382	2935.133	1.233	2936.365	11.00	7.08	.78	2937.14	.00	1.27	1.15	1.500	.000	.00	1 .0
10.738	.0109					.0107	.11	1.23	1.07	1.23	.013	.00	.00	PIPE
7590.120	2935.250	1.270	2936.520	11.00	6.89	.74	2937.26	.00	1.27	1.08	1.500	.000	.00	1 .0

Culvert Calculator Report
Inlet #13 to SDMH #19 - Washburn

Comments:

Notes: 1. WSPG Sta. 6201.47, TW = 2871.408, Q100 = 9.9 cfs - STORM DRAIN LATERAL INFLOW

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,879.04	ft	Headwater Depth/Height	0.91	
Computed Headwater Elev	2,872.61	ft	Discharge	9.90	cfs
Inlet Control HW Elev.	2,872.46	ft	Tailwater Elevation	2,871.41	ft
Outlet Control HW Elev.	2,872.61	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	2,870.80	ft	Downstream Invert	2,870.14	ft
Length	25.40	ft	Constructed Slope	0.025984	ft/ft

Hydraulic Profile					
Profile	CompositeS1S2		Depth, Downstream	1.27	ft
Slope Type	Steep		Normal Depth	0.71	ft
Flow Regime	N/A		Critical Depth	1.13	ft
Velocity Downstream	4.71	ft/s	Critical Slope	0.005185	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.00	ft
Section Size	24 inch		Rise	2.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	2,872.61	ft	Upstream Velocity Head	0.46	ft
Ke	0.50		Entrance Loss	0.23	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,872.46	ft	Flow Control	Unsubmerged	
Inlet Type	Square edge w/headwall		Area Full	3.1	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
Inlet #6 to SDMH #15 - Alpine Ridge

Comments:

1. TW Elevation from WSPG Sta. 5195.21 = 2,855.597 Q100 = 13.7 cfs (Alpine Ridge model - Addendum #1) - STORM DRAIN LATERAL INFLOW

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,858.59	ft	Headwater Depth/Height	1.11	
Computed Headwater Elev	2,856.99	ft	Discharge	13.70	cfs
Inlet Control HW Elev.	2,856.86	ft	Tailwater Elevation	2,855.60	ft
Outlet Control HW Elev.	2,856.99	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	2,854.77	ft	Downstream Invert	2,854.27	ft
Length	24.90	ft	Constructed Slope	0.020080	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	1.02	ft
Slope Type	Steep		Normal Depth	0.91	ft
Flow Regime	Supercritical		Critical Depth	1.33	ft
Velocity Downstream	8.53	ft/s	Critical Slope	0.005971	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.00	ft
Section Size	24 inch		Rise	2.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	2,856.99	ft	Upstream Velocity Head	0.59	ft
Ke	0.50		Entrance Loss	0.29	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,856.86	ft	Flow Control	Unsubmerged	
Inlet Type	Square edge w/headwall		Area Full	3.1	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
Inlet #5 to SDMH #14 - Alpine Ridge

Comments:

1. TW Elevation from WSPG Sta. 5116.09, TW = 2855.440, Q100 = 11.2 cfs (Alpine Ridge model - Addendum #1) - STORM DRAIN LATERAL INFLOW

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,857.41	ft	Headwater Depth/Height	1.16	
Computed Headwater Elev	2,856.28	ft	Discharge	11.20	cfs
Inlet Control HW Elev.	2,855.93	ft	Tailwater Elevation	2,855.93	ft
Outlet Control HW Elev.	2,856.28	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	2,853.97	ft	Downstream Invert	2,853.47	ft
Length	24.10	ft	Constructed Slope	0.020747	ft/ft

Hydraulic Profile					
Profile	PressureProfile		Depth, Downstream	2.46	ft
Slope Type	N/A		Normal Depth	0.81	ft
Flow Regime	N/A		Critical Depth	1.20	ft
Velocity Downstream	3.57	ft/s	Critical Slope	0.005425	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.00	ft
Section Size	24 inch		Rise	2.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	2,856.28	ft	Upstream Velocity Head	0.20	ft
Ke	0.50		Entrance Loss	0.10	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,855.93	ft	Flow Control	Unsubmerged	
Inlet Type	Square edge w/headwall		Area Full	3.1	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Culvert Calculator Report
Inlet #4 to SDMH #13

Comments:

1. TW Elevation from WSPG Sta. 5015.34, TW = 2853.752, Q100 = 36.7 cfs (Alpine Ridge model - Addendum #1) - STORM DRAIN LATERAL INFLOW FOR REMAIN SURFACE FLOW UNDER ULTIMATE (WORST CASE) CONDITION

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,856.19	ft	Headwater Depth/Height	1.09	
Computed Headwater Elev	2,855.17	ft	Discharge	36.70	cfs
Inlet Control HW Elev.	2,854.97	ft	Tailwater Elevation	2,853.93	ft
Outlet Control HW Elev.	2,855.17	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	2,851.90	ft	Downstream Invert	2,851.37	ft
Length	26.72	ft	Constructed Slope	0.019835	ft/ft

Hydraulic Profile					
Profile	CompositeS1S2		Depth, Downstream	2.56	ft
Slope Type	Steep		Normal Depth	1.30	ft
Flow Regime	N/A		Critical Depth	1.97	ft
Velocity Downstream	5.71	ft/s	Critical Slope	0.005137	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	3.00	ft
Section Size	36 inch		Rise	3.00	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev.	2,855.17	ft	Upstream Velocity Head	0.86	ft
Ke	0.50		Entrance Loss	0.43	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,854.97	ft	Flow Control	Unsubmerged	
Inlet Type	Square edge w/headwall		Area Full	7.1	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Shaumber to Hammer to Alpine Ridge Sump		
	WSPG	
Length	Sta	Remark
0.00	1000.00	Outlet/BEGIN
15.16	1015.16	Reach
5.00	1020.16	SDMH 12
153.47	1173.63	Reach
5.00	1178.63	SDMH 11
157.36	1335.99	Reach
5.00	1340.99	SDHM 10
100.90	1441.89	Reach
5.00	1446.89	SDMH 9 @ DW5
232.70	1679.59	Reach
5.00	1684.59	SDMH 8
232.70	1917.29	Reach
5.00	1922.29	SDMH 7
206.42	2128.71	Reach
5.00	2133.71	SDMH 6
206.42	2340.13	Reach
5.00	2345.13	SDMH 5
179.26	2524.39	Reach
5.00	2529.39	SDMH 4
138.61	2668.00	Reach
5.00	2673.00	SDMH 20
189.99	2862.99	Reach
5.00	2867.99	SDMH 3
319.99	3187.98	Reach
5.00	3192.98	SDMH 2
207.38	3400.36	Reach
5.00	3405.36	SDMH 13
55.42	3460.78	Inlet/END
2460.78		

```
T1 CCSD NW Transportation                                                    0
T2 Main Line - CCSD2A1U.DAT
T3 January 2011 - ADDENDUM NO.1 - ULTIMATE CONDITION
SO    1000.0002850.500 19                          2850.500
R     1015.1602850.700 19       .013                                .000  32.402 1
JX    1020.1602850.900 19  5    .013    20.200          2852.900     45.0          .000
R     1173.2102852.380 19       .013                                .000 -22.300 1
JX    1178.2102852.580 19       .013
R     1335.9902854.260 19       .013                                .000 -22.300 1
JX    1340.9902854.460 19       .013
R     1441.8902856.400 19       .013                                .000    .000 1
JX    1446.8902856.900  3  6    .013    51.000          2857.400    -90.0          .000
R     1679.5902871.000  3       .013                                .000    .000 1
JX    1684.5902871.200  3       .013
R     1917.2902886.000  3       .013                                .000    .000 1
JX    1922.2902886.200  3  8    .013    23.000          2887.700    -90.0          .000
R     2128.7102897.540  3       .013                                .000    .000 1
JX    2133.7102897.740  3       .013
R     2340.1302900.340  3       .013                                .000 -90.000 1
JX    2345.1302900.500  3       .013
R     2524.3902902.380  3       .013                                .000    .000 1
JX    2529.3902902.580 16 12    .013    74.100          2904.340     45.0          .000
R     2668.0002905.370 16       .013                                .000    .000 1
JX    2673.0002905.570 16 13    .013     4.600          2906.070    -45.0          .000
R     2862.9902907.460 16       .013                                .000    .000 1
JX    2867.9902907.660 16 13    .013     0.001          2908.160    -45.0          .000
R     3187.9802910.910 16       .013                                .000    .000 1
JX    3192.9802911.110 16 13    .013     0.001          2911.610    -45.0          .000
R     3220.1502913.080 16       .013                                .000    .000 1
JX    3400.3602921.220 18 13    .013     2.200          2921.920     45.0          .000
R     3405.3602921.420 18       .013                                .000  45.000 1
SH    3460.7802925.970 18                          2925.970
CD    1  4   1     .000   3.500      .000  .000  .000   .00
CD    2  4   1     .000   3.500      .000  .000  .000   .00
CD    3  4   1     .000   3.500      .000  .000  .000   .00
CD    4  4   1     .000   3.500      .000  .000  .000   .00
CD    5  4   1     .000   2.000      .000  .000  .000   .00
CD    6  4   1     .000   3.000      .000  .000  .000   .00
CD    7  4   1     .000   3.000      .000  .000  .000   .00
CD    8  4   1     .000   2.000      .000  .000  .000   .00
CD    9  4   1     .000   3.000      .000  .000  .000   .00
CD   10  4   1     .000   3.000      .000  .000  .000   .00
CD   11  4   1     .000   3.000      .000  .000  .000   .00
CD   12  4   1     .000   3.500      .000  .000  .000   .00
CD   13  4   1     .000   1.500      .000  .000  .000   .00
CD   14  4   1     .000   3.000      .000  .000  .000   .00
CD   15  4   1     .000   3.000      .000  .000  .000   .00
CD   16  4   1     .000   2.000      .000  .000  .000   .00
CD   17  4   1     .000   2.000      .000  .000  .000   .00
CD   18  4   1     .000   2.000      .000  .000  .000   .00
CD   19  4   1     .000   4.000      .000  .000  .000   .00
Q              4.800    .0
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FILE: CCSD2A1U.WSW W S P G W - EDIT LISTING - Version 14.06 Date: 1-18-2011 Time:10:56:26

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	4	1		3.500														
CD	2	4	1		3.500														
CD	3	4	1		3.500														
CD	4	4	1		3.500														
CD	5	4	1		2.000														
CD	6	4	1		3.000														
CD	7	4	1		3.000														
CD	8	4	1		2.000														
CD	9	4	1		3.000														
CD	10	4	1		3.000														
CD	11	4	1		3.000														
CD	12	4	1		3.500														
CD	13	4	1		1.500														
CD	14	4	1		3.000														
CD	15	4	1		3.000														
CD	16	4	1		2.000														
CD	17	4	1		2.000														
CD	18	4	1		2.000														
CD	19	4	1		4.000														

W S P G W PAGE NO 1

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

CCSD NW Transportation

HEADING LINE NO 2 IS -

Main Line - CCSD2A1U.DAT

HEADING LINE NO 3 IS -

January 2011 - ADDENDUM NO.1 - ULTIMATE CONDITION

W S P G W PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * * *

U/S DATA	STATION	INVERT	SECT	W S ELEV
	1000.000	2850.500	19	2850.500

ELEMENT NO 2 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1015.160	2850.700	19	.013	.000	.000	32.402	1

ELEMENT NO 3 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1020.160	2850.900	19	5	0	.013	20.200	.000	2852.900	.000	45.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1173.210	2852.380	19	.013	.000	.000	-22.300	1

ELEMENT NO 5 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1178.210	2852.580	19	0	0	.013	.000	.000	.000	.000	.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 6 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1335.990	2854.260	19	.013	.000	.000	-22.300	1

ELEMENT NO 7 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1340.990	2854.460	19	0	0	.013	.000	.000	.000	.000	.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 8 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1441.890	2856.400	19	.013	.000	.000	.000	1

W S P G W PAGE NO 3

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 9 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1446.890	2856.900	3	6	0	.013	51.000	.000	2857.400	.000	-90.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 10 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1679.590	2871.000	3	.013	.000	.000	.000	1

ELEMENT NO 11 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1684.590	2871.200	3	0	0	.013	.000	.000	.000	.000	.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 12 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1917.290	2886.000	3	.013	.000	.000	.000	1

ELEMENT NO 13 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1922.290	2886.200	3	8	0	.013	23.000	.000	2887.700	.000	-90.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 14 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	2128.710	2897.540	3	.013	.000	.000	.000	1

ELEMENT NO 15 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	2133.710	2897.740	3	0	0	.013	.000	.000	.000	.000	.000	.000

RADIUS	ANGLE
.000	.000

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 16 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	2340.130	2900.340	3	.013	.000	.000	-90.000	1

ELEMENT NO 17 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	2345.130	2900.500	3	0	0	.013	.000	.000	.000	.000	.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 18 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	2524.390	2902.380	3	.013	.000	.000	.000	1

ELEMENT NO 19 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	2529.390	2902.580	16	12	0	.013	74.100	.000	2904.340	.000	45.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 20 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	2668.000	2905.370	16	.013	.000	.000	.000	1

ELEMENT NO 21 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	2673.000	2905.570	16	13	0	.013	4.600	.000	2906.070	.000	-45.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 22 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	2862.990	2907.460	16	.013	.000	.000	.000	1

ELEMENT NO 23 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	2867.990	2907.660	16	13	0	.013	.001	.000	2908.160	.000	-45.000	.000

RADIUS	ANGLE
.000	.000

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 24 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	3187.980	2910.910	16	.013	.000	.000	.000	1

ELEMENT NO 25 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	3192.980	2911.110	16	13	0	.013	.001	.000	2911.610	.000	-45.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 26 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	3220.150	2913.080	16	.013	.000	.000	.000	1

ELEMENT NO 27 IS A JUNCTION

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	3400.360	2921.220	18	13	0	.013	2.200	.000	2921.920	.000	45.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 28 IS A REACH

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	3405.360	2921.420	18	.013	.000	.000	45.000	1

ELEMENT NO 29 IS A SYSTEM HEADWORKS

U/S DATA	STATION	INVERT	SECT	W S ELEV
	3460.780	2925.970	18	2925.970

CCSD NW Transportation
Main Line - CCSD2A1U.DAT
January 2011 - ADDENDUM NO.1 - ULTIMATE CONDITION

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1000.000	2850.500	3.774	2854.274	179.90	14.64	3.33	2857.60	.00	3.77	1.85	4.000	.000	.00	1 .0
15.160	.0132					.0136	.21	3.77	1.00	4.00	.013	.00	.00	PIPE
1015.160	2850.700	3.845	2854.545	179.90	14.50	3.27	2857.81	.00	3.77	1.54	4.000	.000	.00	1 .0
JUNCT STR	.0400					.0130	.07	3.85	.90		.013	.00	.00	PIPE
1020.160	2850.900	4.923	2855.823	159.70	12.71	2.51	2858.33	.00	3.67	.00	4.000	.000	.00	1 .0
153.050	.0097					.0124	1.89	4.92	.00	4.00	.013	.00	.00	PIPE
1173.210	2852.380	5.644	2858.024	159.70	12.71	2.51	2860.53	.00	3.67	.00	4.000	.000	.00	1 .0
JUNCT STR	.0400					.0124	.06	5.64	.00		.013	.00	.00	PIPE
1178.210	2852.580	5.506	2858.086	159.70	12.71	2.51	2860.59	.00	3.67	.00	4.000	.000	.00	1 .0
157.780	.0106					.0124	1.95	5.51	.00	4.00	.013	.00	.00	PIPE
1335.990	2854.260	6.086	2860.346	159.70	12.71	2.51	2862.85	.00	3.67	.00	4.000	.000	.00	1 .0
JUNCT STR	.0400					.0124	.06	6.09	.00		.013	.00	.00	PIPE
1340.990	2854.460	5.948	2860.408	159.70	12.71	2.51	2862.92	.00	3.67	.00	4.000	.000	.00	1 .0
100.900	.0192					.0124	1.25	5.95	.00	2.71	.013	.00	.00	PIPE
1441.890	2856.400	5.381	2861.781	159.70	12.71	2.51	2864.29	.00	3.67	.00	4.000	.000	.00	1 .0
JUNCT STR	.1000					.0120	.06	5.38	.00		.013	.00	.00	PIPE
1446.890	2856.900	7.185	2864.084	108.70	11.30	1.98	2866.07	.00	3.16	.00	3.500	.000	.00	1 .0
7.229	.0606					.0117	.08	7.18	.00	1.62	.013	.00	.00	PIPE

CCSD NW Transportation
Main Line - CCSD2A1U.DAT
January 2011 - ADDENDUM NO.1 - ULTIMATE CONDITION

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1454.119	2857.338	6.831	2864.169	108.70	11.30	1.98	2866.15	.00	3.16	.00	3.500	.000	.00	1 .0
HYDRAULIC JUMP														
1454.119	2857.338	1.623	2858.960	108.70	24.90	9.63	2868.59	.00	3.16	3.49	3.500	.000	.00	1 .0
3.398	.0606					.0606	.21	1.62	3.92	1.62	.013	.00	.00	PIPE
1457.517	2857.544	1.623	2859.167	108.70	24.90	9.63	2868.80	.00	3.16	3.49	3.500	.000	.00	1 .0
222.073	.0606					.0587	13.03	1.62	3.92	1.62	.013	.00	.00	PIPE
1679.590	2871.000	1.653	2872.654	108.70	24.30	9.17	2881.82	.00	3.16	3.49	3.500	.000	.00	1 .0
JUNCT STR	.0400					.0571	.29	1.65	3.79		.013	.00	.00	PIPE
1684.590	2871.199	1.647	2872.847	108.70	24.42	9.26	2882.11	.00	3.16	3.49	3.500	.000	.00	1 .0
21.637	.0636					.0569	1.23	1.65	3.81	1.60	.013	.00	.00	PIPE
1706.227	2872.576	1.658	2874.233	108.70	24.22	9.11	2883.34	.00	3.16	3.50	3.500	.000	.00	1 .0
71.293	.0636					.0529	3.77	1.66	3.77	1.60	.013	.00	.00	PIPE
1777.520	2877.110	1.720	2878.830	108.70	23.09	8.28	2887.11	.00	3.16	3.50	3.500	.000	.00	1 .0
40.274	.0636					.0465	1.87	1.72	3.51	1.60	.013	.00	.00	PIPE
1817.794	2879.672	1.786	2881.458	108.70	22.02	7.53	2888.99	.00	3.16	3.50	3.500	.000	.00	1 .0
27.238	.0636					.0410	1.12	1.79	3.27	1.60	.013	.00	.00	PIPE
1845.032	2881.404	1.855	2883.259	108.70	20.99	6.84	2890.10	.00	3.16	3.49	3.500	.000	.00	1 .0
20.033	.0636					.0362	.72	1.85	3.04	1.60	.013	.00	.00	PIPE

CCSD NW Transportation
Main Line - CCSD2A1U.DAT
January 2011 - ADDENDUM NO.1 - ULTIMATE CONDITION

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1865.065	2882.678	1.927	2884.605	108.70	20.02	6.22	2890.83	.00	3.16	3.48	3.500	.000	.00	1 .0
15.442	.0636					.0319	.49	1.93	2.82	1.60	.013	.00	.00	PIPE
1880.507	2883.660	2.004	2885.664	108.70	19.09	5.66	2891.32	.00	3.16	3.46	3.500	.000	.00	1 .0
12.249	.0636					.0282	.35	2.00	2.62	1.60	.013	.00	.00	PIPE
1892.756	2884.439	2.084	2886.524	108.70	18.20	5.14	2891.67	.00	3.16	3.44	3.500	.000	.00	1 .0
9.888	.0636					.0250	.25	2.08	2.43	1.60	.013	.00	.00	PIPE
1902.645	2885.068	2.170	2887.238	108.70	17.35	4.67	2891.91	.00	3.16	3.40	3.500	.000	.00	1 .0
8.060	.0636					.0221	.18	2.17	2.25	1.60	.013	.00	.00	PIPE
1910.704	2885.581	2.260	2887.841	108.70	16.54	4.25	2892.09	.00	3.16	3.35	3.500	.000	.00	1 .0
6.586	.0636					.0196	.13	2.26	2.08	1.60	.013	.00	.00	PIPE
1917.290	2886.000	2.357	2888.357	108.70	15.77	3.86	2892.22	.00	3.16	3.28	3.500	.000	.00	1 .0
JUNCT STR	.0400					.0339	.17	2.36	1.92		.013	.00	.00	PIPE
1922.290	2886.200	1.504	2887.704	85.70	21.68	7.30	2895.00	.00	2.88	3.47	3.500	.000	.00	1 .0
7.489	.0549					.0491	.37	1.50	3.58	1.46	.013	.00	.00	PIPE
1929.779	2886.611	1.508	2888.119	85.70	21.62	7.26	2895.37	.00	2.88	3.47	3.500	.000	.00	1 .0
66.886	.0549					.0459	3.07	1.51	3.56	1.46	.013	.00	.00	PIPE
1996.665	2890.286	1.563	2891.849	85.70	20.61	6.60	2898.45	.00	2.88	3.48	3.500	.000	.00	1 .0
37.117	.0549					.0403	1.50	1.56	3.32	1.46	.013	.00	.00	PIPE

CCSD NW Transportation
Main Line - CCSD2A1U.DAT
January 2011 - ADDENDUM NO.1 - ULTIMATE CONDITION

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT or "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2033.782	2892.325	1.621	2893.946	85.70	19.65	6.00	2899.94	.00	2.88	3.49	3.500	.000	.00	1 .0
24.893	.0549					.0355	.88	1.62	3.10	1.46	.013	.00	.00	PIPE
2058.675	2893.692	1.682	2895.375	85.70	18.74	5.45	2900.83	.00	2.88	3.50	3.500	.000	.00	1 .0
18.206	.0549					.0312	.57	1.68	2.89	1.46	.013	.00	.00	PIPE
2076.880	2894.693	1.746	2896.439	85.70	17.86	4.96	2901.39	.00	2.88	3.50	3.500	.000	.00	1 .0
13.981	.0549					.0275	.38	1.75	2.69	1.46	.013	.00	.00	PIPE
2090.862	2895.461	1.813	2897.274	85.70	17.03	4.51	2901.78	.00	2.88	3.50	3.500	.000	.00	1 .0
11.053	.0549					.0242	.27	1.81	2.50	1.46	.013	.00	.00	PIPE
2101.915	2896.068	1.883	2897.951	85.70	16.24	4.10	2902.05	.00	2.88	3.49	3.500	.000	.00	1 .0
8.890	.0549					.0214	.19	1.88	2.33	1.46	.013	.00	.00	PIPE
2110.805	2896.556	1.957	2898.513	85.70	15.48	3.72	2902.24	.00	2.88	3.48	3.500	.000	.00	1 .0
7.224	.0549					.0189	.14	1.96	2.16	1.46	.013	.00	.00	PIPE
2118.029	2896.953	2.035	2898.989	85.70	14.76	3.38	2902.37	.00	2.88	3.45	3.500	.000	.00	1 .0
5.891	.0549					.0167	.10	2.04	2.01	1.46	.013	.00	.00	PIPE
2123.920	2897.277	2.118	2899.395	85.70	14.08	3.08	2902.47	.00	2.88	3.42	3.500	.000	.00	1 .0
4.790	.0549					.0148	.07	2.12	1.86	1.46	.013	.00	.00	PIPE
2128.710	2897.540	2.205	2899.745	85.70	13.42	2.80	2902.54	.00	2.88	3.38	3.500	.000	.00	1 .0
JUNCT STR	.0400					.0132	.07	2.21	1.72		.013	.00	.00	PIPE

CCSD NW Transportation
Main Line - CCSD2A1U.DAT
January 2011 - ADDENDUM NO.1 - ULTIMATE CONDITION

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2133.710	2897.740	2.280	2900.021	85.70	12.91	2.59	2902.61	.00	2.88	3.34	3.500	.000	.00	1 .0
8.409	.0126					.0126	.11	2.28	1.61	2.28	.013	.00	.00	PIPE
2142.119	2897.846	2.280	2900.126	85.70	12.91	2.59	2902.71	.00	2.88	3.34	3.500	.000	.00	1 .0
198.011	.0126					.0120	2.38	2.28	1.61	2.28	.013	.00	.00	PIPE
2340.130	2900.340	2.361	2902.701	85.70	12.41	2.39	2905.09	.00	2.88	3.28	3.500	.000	.00	1 .0
JUNCT STR	.0320					.0108	.05	2.36	1.51		.013	.00	.00	PIPE
2345.130	2900.500	2.457	2902.958	85.70	11.87	2.19	2905.15	.00	2.88	3.20	3.500	.000	.00	1 .0
83.687	.0105					.0101	.84	2.46	1.39	2.44	.013	.00	.00	PIPE
2428.817	2901.378	2.497	2903.875	85.70	11.67	2.11	2905.99	.00	2.88	3.16	3.500	.000	.00	1 .0
66.866	.0105					.0093	.62	2.50	1.35	2.44	.013	.00	.00	PIPE
2495.683	2902.079	2.613	2904.691	85.70	11.13	1.92	2906.61	.00	2.88	3.05	3.500	.000	.00	1 .0
22.821	.0105					.0084	.19	2.61	1.23	2.44	.013	.00	.00	PIPE
2518.504	2902.318	2.739	2905.057	85.70	10.61	1.75	2906.80	.00	2.88	2.89	3.500	.000	.00	1 .0
5.886	.0105					.0076	.04	2.74	1.12	2.44	.013	.00	.00	PIPE
2524.390	2902.380	2.882	2905.262	85.70	10.11	1.59	2906.85	.00	2.88	2.67	3.500	.000	.00	1 .0
JUNCT STR	.0400							2.88	1.00		.013	.00	.00	PIPE
2529.390	2902.580	.834	2903.414	11.60	9.35	1.36	2904.77	.00	1.22	1.97	2.000	.000	.00	1 .0
34.946	.0201					.0197	.69	.83	2.08	.83	.013	.00	.00	PIPE

CCSD NW Transportation
Main Line - CCSD2A1U.DAT
January 2011 - ADDENDUM NO.1 - ULTIMATE CONDITION

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2564.335	2903.283	.838	2904.122	11.60	9.29	1.34	2905.46	.00	1.22	1.97	2.000	.000	.00	1 .0
51.585	.0201					.0184	.95	.84	2.06	.83	.013	.00	.00	PIPE
2615.921	2904.322	.869	2905.191	11.60	8.86	1.22	2906.41	.00	1.22	1.98	2.000	.000	.00	1 .0
19.677	.0201					.0161	.32	.87	1.92	.83	.013	.00	.00	PIPE
2635.597	2904.718	.901	2905.619	11.60	8.45	1.11	2906.73	.00	1.22	1.99	2.000	.000	.00	1 .0
11.291	.0201					.0142	.16	.90	1.79	.83	.013	.00	.00	PIPE
2646.888	2904.945	.935	2905.880	11.60	8.05	1.01	2906.89	.00	1.22	2.00	2.000	.000	.00	1 .0
7.366	.0201					.0125	.09	.93	1.67	.83	.013	.00	.00	PIPE
2654.254	2905.093	.970	2906.063	11.60	7.68	.92	2906.98	.00	1.22	2.00	2.000	.000	.00	1 .0
5.066	.0201					.0110	.06	.97	1.56	.83	.013	.00	.00	PIPE
2659.320	2905.195	1.007	2906.202	11.60	7.32	.83	2907.03	.00	1.22	2.00	2.000	.000	.00	1 .0
3.537	.0201					.0097	.03	1.01	1.45	.83	.013	.00	.00	PIPE
2662.857	2905.267	1.046	2906.312	11.60	6.98	.76	2907.07	.00	1.22	2.00	2.000	.000	.00	1 .0
2.431	.0201					.0085	.02	1.05	1.35	.83	.013	.00	.00	PIPE
2665.287	2905.315	1.086	2906.402	11.60	6.66	.69	2907.09	.00	1.22	1.99	2.000	.000	.00	1 .0
1.567	.0201					.0075	.01	1.09	1.25	.83	.013	.00	.00	PIPE
2666.854	2905.347	1.129	2906.476	11.60	6.35	.63	2907.10	.00	1.22	1.98	2.000	.000	.00	1 .0
.873	.0201					.0066	.01	1.13	1.17	.83	.013	.00	.00	PIPE

CCSD NW Transportation
Main Line - CCSD2A1U.DAT
January 2011 - ADDENDUM NO.1 - ULTIMATE CONDITION

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2667.727	2905.365	1.174	2906.539	11.60	6.05	.57	2907.11	.00	1.22	1.97	2.000	.000	.00	1 .0
.273	.0201					.0059	.00	1.17	1.08	.83	.013	.00	.00	PIPE
2668.000	2905.370	1.223	2906.593	11.60	5.76	.52	2907.11	.00	1.22	1.95	2.000	.000	.00	1 .0
JUNCT STR	.0400					.0034	.02	1.22	1.00		.013	.00	.00	PIPE
2673.000	2905.570	1.451	2907.021	7.00	2.87	.13	2907.15	.00	.94	1.79	2.000	.000	.00	1 .0
5.779	.0099					.0013	.01	1.45	.43	.76	.013	.00	.00	PIPE
2678.779	2905.627	1.388	2907.016	7.00	3.01	.14	2907.16	.00	.94	1.84	2.000	.000	.00	1 .0
5.192	.0099					.0015	.01	1.39	.47	.76	.013	.00	.00	PIPE
2683.971	2905.679	1.330	2907.009	7.00	3.16	.15	2907.16	.00	.94	1.89	2.000	.000	.00	1 .0
4.679	.0099					.0017	.01	1.33	.51	.76	.013	.00	.00	PIPE
2688.650	2905.726	1.276	2907.002	7.00	3.31	.17	2907.17	.00	.94	1.92	2.000	.000	.00	1 .0
4.201	.0099					.0019	.01	1.28	.56	.76	.013	.00	.00	PIPE
2692.851	2905.768	1.225	2906.993	7.00	3.47	.19	2907.18	.00	.94	1.95	2.000	.000	.00	1 .0
3.730	.0099					.0021	.01	1.23	.60	.76	.013	.00	.00	PIPE
2696.581	2905.805	1.177	2906.982	7.00	3.64	.21	2907.19	.00	.94	1.97	2.000	.000	.00	1 .0
2.650	.0099					.0024	.01	1.18	.65	.76	.013	.00	.00	PIPE
2699.231	2905.831	1.132	2906.963	7.00	3.82	.23	2907.19	.00	.94	1.98	2.000	.000	.00	1 .0
HYDRAULIC JUMP														

CCSD NW Transportation
Main Line - CCSD2A1U.DAT
January 2011 - ADDENDUM NO.1 - ULTIMATE CONDITION

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
2699.231	2905.831	.765	2906.596	7.00	6.34	.62	2907.22	.00	.94	1.94	2.000	.000	.00	1 .0
47.895	.0099					.0099	.48	.76	1.48	.76	.013	.00	.00	PIPE
2747.126	2906.307	.765	2907.072	7.00	6.34	.62	2907.70	.00	.94	1.94	2.000	.000	.00	1 .0
49.670	.0099					.0101	.50	.76	1.48	.76	.013	.00	.00	PIPE
2796.796	2906.802	.759	2907.560	7.00	6.41	.64	2908.20	.00	.94	1.94	2.000	.000	.00	1 .0
36.493	.0099					.0110	.40	.76	1.50	.76	.013	.00	.00	PIPE
2833.289	2907.165	.732	2907.897	7.00	6.72	.70	2908.60	.00	.94	1.93	2.000	.000	.00	1 .0
17.493	.0099					.0125	.22	.73	1.61	.76	.013	.00	.00	PIPE
2850.782	2907.339	.707	2908.046	7.00	7.05	.77	2908.82	.00	.94	1.91	2.000	.000	.00	1 .0
12.208	.0099					.0143	.17	.71	1.72	.76	.013	.00	.00	PIPE
2862.990	2907.460	.683	2908.143	7.00	7.39	.85	2908.99	.00	.94	1.90	2.000	.000	.00	1 .0
JUNCT STR	.0400					.0127	.06	.68	1.84		.013	.00	.00	PIPE
2867.990	2907.660	.761	2908.420	7.00	6.38	.63	2909.05	.00	.94	1.94	2.000	.000	.00	1 .0
156.202	.0102					.0102	1.59	.76	1.50	.76	.013	.00	.00	PIPE
3024.192	2909.246	.761	2910.007	7.00	6.38	.63	2910.64	.00	.94	1.94	2.000	.000	.00	1 .0
50.949	.0102					.0105	.54	.76	1.50	.76	.013	.00	.00	PIPE
3075.141	2909.764	.746	2910.510	7.00	6.55	.67	2911.18	.00	.94	1.93	2.000	.000	.00	1 .0
27.097	.0102					.0117	.32	.75	1.55	.76	.013	.00	.00	PIPE

CCSD NW Transportation
Main Line - CCSD2A1U.DAT
January 2011 - ADDENDUM NO.1 - ULTIMATE CONDITION

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
3102.238	2910.039	.720	2910.760	7.00	6.87	.73	2911.49	.00	.94	1.92	2.000	.000	.00	1 .0
15.407	.0102					.0133	.20	.72	1.66	.76	.013	.00	.00	PIPE
3117.646	2910.196	.696	2910.891	7.00	7.20	.81	2911.70	.00	.94	1.91	2.000	.000	.00	1 .0
11.311	.0102					.0152	.17	.70	1.78	.76	.013	.00	.00	PIPE
3128.957	2910.311	.672	2910.982	7.00	7.56	.89	2911.87	.00	.94	1.89	2.000	.000	.00	1 .0
9.176	.0102					.0173	.16	.67	1.90	.76	.013	.00	.00	PIPE
3138.132	2910.404	.649	2911.053	7.00	7.93	.98	2912.03	.00	.94	1.87	2.000	.000	.00	1 .0
7.841	.0102					.0198	.16	.65	2.03	.76	.013	.00	.00	PIPE
3145.973	2910.483	.627	2911.110	7.00	8.31	1.07	2912.18	.00	.94	1.86	2.000	.000	.00	1 .0
6.927	.0102					.0226	.16	.63	2.17	.76	.013	.00	.00	PIPE
3152.901	2910.554	.606	2911.159	7.00	8.72	1.18	2912.34	.00	.94	1.84	2.000	.000	.00	1 .0
6.242	.0102					.0258	.16	.61	2.32	.76	.013	.00	.00	PIPE
3159.143	2910.617	.585	2911.202	7.00	9.14	1.30	2912.50	.00	.94	1.82	2.000	.000	.00	1 .0
5.702	.0102					.0295	.17	.59	2.48	.76	.013	.00	.00	PIPE
3164.844	2910.675	.566	2911.240	7.00	9.59	1.43	2912.67	.00	.94	1.80	2.000	.000	.00	1 .0
5.265	.0102					.0337	.18	.57	2.65	.76	.013	.00	.00	PIPE
3170.109	2910.729	.547	2911.275	7.00	10.06	1.57	2912.85	.00	.94	1.78	2.000	.000	.00	1 .0
4.903	.0102					.0385	.19	.55	2.84	.76	.013	.00	.00	PIPE

Culvert Calculator Report
SD Inlet #2 to SDMH #20 - East 1/2 Lateral - Shaumber

Comments:

1. TW Elevation from WSPG Sta. 2509.37 = 2,906.593, Q100 = 4.6 cfs

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	2,916.41 ft	Headwater Depth/Height	0.88
Computed Headwater Elev	2,907.60 ft	Discharge	4.60 cfs
Inlet Control HW Elev.	2,907.50 ft	Tailwater Elevation	2,906.59 ft
Outlet Control HW Elev.	2,907.60 ft	Control Type	Entrance Control

Grades			
Upstream Invert	2,906.28 ft	Downstream Invert	2,906.07 ft
Length	25.40 ft	Constructed Slope	0.008268 ft/ft

Hydraulic Profile			
Profile	S2	Depth, Downstream	0.74 ft
Slope Type	Steep	Normal Depth	0.73 ft
Flow Regime	Supercritical	Critical Depth	0.82 ft
Velocity Downstream	5.31 ft/s	Critical Slope	0.005622 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	1.50 ft
Section Size	18 inch	Rise	1.50 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	2,907.60 ft	Upstream Velocity Head	0.33 ft
Ke	0.50	Entrance Loss	0.17 ft

Inlet Control Properties			
Inlet Control HW Elev.	2,907.50 ft	Flow Control	Unsubmerged
Inlet Type	Square edge w/headwall	Area Full	1.8 ft²
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

Culvert Calculator Report
Sta. 21+20.90-35 L to SDMH #4 - West 1/2 Lateral

Comments:

1. TW Elevation from WSPG Sta. 2524.29 = 2,905.262, Q100 = 74.1 cfs

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	2,915.00 ft	Headwater Depth/Height	1.35
Computed Headwater Elev	2,912.22 ft	Discharge	74.10 cfs
Inlet Control HW Elev.	2,912.05 ft	Tailwater Elevation	2,905.62 ft
Outlet Control HW Elev.	2,912.22 ft	Control Type	Entrance Control

Grades			
Upstream Invert	2,907.50 ft	Downstream Invert	2,902.58 ft
Length	55.43 ft	Constructed Slope	0.088761 ft/ft

Hydraulic Profile			
Profile	CompositeS1S2	Depth, Downstream	3.04 ft
Slope Type	Steep	Normal Depth	1.19 ft
Flow Regime	N/A	Critical Depth	2.70 ft
Velocity Downstream	8.35 ft/s	Critical Slope	0.006145 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	3.50 ft
Section Size	42 inch	Rise	3.50 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	2,912.22 ft	Upstream Velocity Head	1.35 ft
Ke	0.50	Entrance Loss	0.67 ft

Inlet Control Properties			
Inlet Control HW Elev.	2,912.05 ft	Flow Control	Submerged
Inlet Type	Square edge w/headwall	Area Full	9.6 ft²
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

Culvert Calculator Report
Inlet #3 to SDMH #12

Comments:

1. TW Elevation from WSPG Sta. 1015.16, TW = 2854.458, Q100 = 20.2 cfs

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	2,856.30 ft	Headwater Depth/Height	1.49
Computed Headwater Elev	2,856.22 ft	Discharge	20.20 cfs
Inlet Control HW Elev.	2,856.22 ft	Tailwater Elevation	2,854.46 ft
Outlet Control HW Elev.	2,856.15 ft	Control Type	Inlet Control

Grades			
Upstream Invert	2,853.25 ft	Downstream Invert	2,852.90 ft
Length	29.66 ft	Constructed Slope	0.011800 ft/ft

Hydraulic Profile			
Profile	S2	Depth, Downstream	1.43 ft
Slope Type	Steep	Normal Depth	1.38 ft
Flow Regime	Supercritical	Critical Depth	1.61 ft
Velocity Downstream	8.41 ft/s	Critical Slope	0.008211 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	2,856.15 ft	Upstream Velocity Head	0.86 ft
Ke	0.50	Entrance Loss	0.43 ft

Inlet Control Properties			
Inlet Control HW Elev.	2,856.22 ft	Flow Control	Submerged
Inlet Type	Square edge w/headwall	Area Full	3.1 ft²
K	0.00980	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	1
C	0.03980	Equation Form	1
Y	0.67000		

CCSD NW Transportation
Alpine Ridge Outlet
RIPRAP SIZING

These Equations are taken from the *Clark County Regional Flood District Hydrologic Criteria and Drainage Design Manual.*

Riprap lining sizing may be estimated by using:

$$V = 3*(D50^{0.5})*(Ss-1)/(S^{0.17}) \quad \text{Eq. 734}$$

V = Mean channel velocity in feet per second (from WSPG model)
S = Longitudinal channel slope in feet per foot
Ss = Specific gravity of rock (Minimum = 2.50)
D50 = Rock size in feet for which 50 percent of the riprap by weight is smaller

Section	V (ft/s)	Ss	S (ft/ft)	D50 (ft)	Thickness (ft)
Alpine Ridge Sta. 23+50 Sump	14.64	2.5	0.0308	3.24	6.48

The riprap blanket thickness should be at least twice the D50 and should extend up the side slopes at least one foot above the water surface.

Note: **Due to excessive D50, a grouted rip-rap section will used per details on the enclosed plans.**

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T1 CCSD NW TRANSPORTATION SITE                                                0
T2 LOWER ONSITE SD SYSTEM - CCSDL1A1.DAT
T3 JAN 2011 - REVISE STARTING HGL TO 2864.084 FROM 2863.885 FOR ULT WORST CASE
SO   1000.0002857.400  1                          2864.084
R    1099.5002859.490  1       .013                                  .000 -90.000 1
JX   1104.5002859.690  2       .013
R    1197.9502861.660  2       .013                                  .000  27.273 1
JX   1202.9502861.860  3       .013
R    1390.3402869.540  3       .013                                  .000  22.216 1
JX   1395.3402869.740  4       .013
R    1584.3402875.560  4       .013                                  .000    .000 1
JX   1589.3302875.760  6  7    .013   21.100          2876.260       -59.6         .000
R    1845.8202878.310  6       .013                                  .000 -45.000 1
JX   1850.8202878.810  7       .013
R    1855.4402878.880  7       .013                                  .000 -59.583 1
SH   1855.4402878.880  7                          2885.000
CD   1  4   1    .000   3.000     .000  .000  .000   .00
CD   2  4   1    .000   3.000     .000  .000  .000   .00
CD   3  4   1    .000   3.000     .000  .000  .000   .00
CD   4  4   1    .000   3.000     .000  .000  .000   .00
CD   5  4   1    .000   3.000     .000  .000  .000   .00
CD   6  4   1    .000   3.000     .000  .000  .000   .00
CD   7  4   1    .000   2.500     .000  .000  .000   .00
Q            29.900   .0
```

LOWER ONSITE SD SYSTEM

CONNECTING TO MAINLINE IN HANAMER

REVISIONS

FILE: CCSDL1A1.WSW W S P G W - EDIT LISTING - Version 14.06 Date: 1-19-2011 Time:10:45: 2

WATER SURFACE PROFILE - CHANNEL DEFINITION LISTING PAGE 1

CARD CODE	SECT NO	CHN TYPE	NO OF PIER/PIP	AVE PIER WIDTH	HEIGHT 1 DIAMETER	BASE WIDTH	ZL	ZR	INV DROP	Y(1)	Y(2)	Y(3)	Y(4)	Y(5)	Y(6)	Y(7)	Y(8)	Y(9)	Y(10)
CD	1	4	1		3.000														
CD	2	4	1		3.000														
CD	3	4	1		3.000														
CD	4	4	1		3.000														
CD	5	4	1		3.000														
CD	6	4	1		3.000														
CD	7	4	1		2.500														

W S P G W PAGE NO 1

WATER SURFACE PROFILE - TITLE CARD LISTING

HEADING LINE NO 1 IS -

CCSD NW TRANSPORTATION SITE

HEADING LINE NO 2 IS -

LOWER ONSITE SD SYSTEM - CCSDL1A1.DAT

HEADING LINE NO 3 IS -

JAN 2011 - REVISE STARTING HGL TO 2864.084 FROM 2863.885 FOR ULT WORST CAS

W S P G W PAGE NO 2

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 1 IS A SYSTEM OUTLET * *

U/S DATA	STATION	INVERT	SECT
	1000.000	2857.400	1

W S ELEV
2864.084

ELEMENT NO 2 IS A REACH * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1099.500	2859.490	1	.013	.000	.000	-90.000	1

ELEMENT NO 3 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1104.500	2859.690	2	0	0	.013	.000	.000	.000	.000	.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 4 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1197.950	2861.660	2	.013	.000	.000	27.273	1

ELEMENT NO 5 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1202.950	2861.860	3	0	0	.013	.000	.000	.000	.000	.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 6 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1390.340	2869.540	3	.013	.000	.000	22.216	1

ELEMENT NO 7 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1395.340	2869.740	4	0	0	.013	.000	.000	.000	.000	.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 8 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1584.340	2875.560	4	.013	.000	.000	.000	1

W S P G W PAGE NO 3

WATER SURFACE PROFILE - ELEMENT CARD LISTING

ELEMENT NO 9 IS A JUNCTION * * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1589.330	2875.760	6	7	0	.013	21.100	.000	2876.260	.000	-59.600	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 10 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1845.820	2878.310	6	.013	.000	.000	-45.000	1

ELEMENT NO 11 IS A JUNCTION * * * * * *

U/S DATA	STATION	INVERT	SECT	LAT-1	LAT-2	N	Q3	Q4	INVERT-3	INVERT-4	PHI 3	PHI 4
	1850.820	2878.810	7	0	0	.013	.000	.000	.000	.000	.000	.000

RADIUS	ANGLE
.000	.000

ELEMENT NO 12 IS A REACH * * *

U/S DATA	STATION	INVERT	SECT	N	RADIUS	ANGLE	ANG PT	MAN H
	1855.440	2878.880	7	.013	.000	.000	-59.583	1

ELEMENT NO 13 IS A SYSTEM HEADWORKS *

U/S DATA	STATION	INVERT	SECT
	1855.440	2878.880	7

W S ELEV
2885.000

W S P G W - CIVILDESIGN Version 14.06
Program Package Serial Number: 3057

WATER SURFACE PROFILE LISTING

CCSD NW TRANSPORTATION SITE
LOWER ONSITE SD SYSTEM - CCSDL1A1.DAT
JAN 2011 - REVISE STARTING HGL TO 2864.084 FROM 2863.885 FOR ULT WORST

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1000.000	2857.400	6.684	2864.084	51.00	7.22	.81	2864.89	.00	2.32	.00	3.000	.000	.00	1 .0
99.500	.0210					.0058	.58	6.68	.00	1.55	.013	.00	.00	PIPE
1099.500	2859.490	5.456	2864.946	51.00	7.22	.81	2865.75	.00	2.32	.00	3.000	.000	.00	1 .0
JUNCT STR	.0400					.0058	.03	5.46	.00		.013	.00	.00	PIPE
1104.500	2859.690	5.286	2864.975	51.00	7.22	.81	2865.78	.00	2.32	.00	3.000	.000	.00	1 .0
89.828	.0211					.0058	.53	5.29	.00	1.55	.013	.00	.00	PIPE
1194.328	2861.583	4.025	2865.608	51.00	7.22	.81	2866.42	.00	2.32	.00	3.000	.000	.00	1 .0
HYDRAULIC JUMP														
1194.328	2861.583	1.292	2862.875	51.00	17.52	4.77	2867.64	.00	2.32	2.97	3.000	.000	.00	1 .0
3.622	.0211					.0397	.14	1.29	3.12	1.55	.013	.00	.00	PIPE
1197.950	2861.660	1.286	2862.946	51.00	17.61	4.82	2867.76	.00	2.32	2.97	3.000	.000	.00	1 .0
JUNCT STR	.0400					.0400	.20	1.29	3.14		.013	.00	.00	PIPE
1202.950	2861.860	1.287	2863.147	51.00	17.61	4.81	2867.96	.00	2.32	2.97	3.000	.000	.00	1 .0
85.552	.0410					.0389	3.33	1.29	3.14	1.28	.013	.00	.00	PIPE
1288.501	2865.366	1.307	2866.673	51.00	17.25	4.62	2871.29	.00	2.32	2.98	3.000	.000	.00	1 .0
67.927	.0410					.0355	2.41	1.31	3.05	1.28	.013	.00	.00	PIPE
1356.428	2868.150	1.355	2869.506	51.00	16.44	4.20	2873.70	.00	2.32	2.99	3.000	.000	.00	1 .0
33.912	.0410					.0312	1.06	1.36	2.84	1.28	.013	.00	.00	PIPE

CCSD NW TRANSPORTATION SITE
LOWER ONSITE SD SYSTEM - CCSDL1A1.DAT
JAN 2011 - REVISE STARTING HGL TO 2864.084 FROM 2863.885 FOR ULT WORST

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head / SF Ave	Energy Grd.El. / HF	Super Elev / SE Dpth	Critical Depth / Froude N	Flow Top Width / Norm Dp	Height/Dia.-FT / "N"	Base Wt or I.D. / X-Fall	ZL / ZR	No Wth Prs/Pip / Type Ch
1390.340	2869.540	1.406	2870.946	51.00	15.68	3.82	2874.76	.00	2.32	2.99	3.000	.000	.00	1 .0
JUNCT STR	.0400					.0289	.14	1.41	2.65		.013	.00	.00	PIPE
1395.340	2869.740	1.416	2871.155	51.00	15.54	3.75	2874.91	.00	2.32	3.00	3.000	.000	.00	1 .0
24.027	.0308					.0282	.68	1.42	2.62	1.39	.013	.00	.00	PIPE
1419.367	2870.480	1.426	2871.906	51.00	15.39	3.68	2875.59	.00	2.32	3.00	3.000	.000	.00	1 .0
60.245	.0308					.0261	1.57	1.43	2.58	1.39	.013	.00	.00	PIPE
1479.612	2872.335	1.480	2873.815	51.00	14.68	3.34	2877.16	.00	2.32	3.00	3.000	.000	.00	1 .0
31.799	.0308					.0230	.73	1.48	2.40	1.39	.013	.00	.00	PIPE
1511.412	2873.314	1.537	2874.851	51.00	13.99	3.04	2877.89	.00	2.32	3.00	3.000	.000	.00	1 .0
20.644	.0308					.0203	.42	1.54	2.24	1.39	.013	.00	.00	PIPE
1532.055	2873.950	1.596	2875.546	51.00	13.34	2.76	2878.31	.00	2.32	2.99	3.000	.000	.00	1 .0
14.628	.0308					.0179	.26	1.60	2.08	1.39	.013	.00	.00	PIPE
1546.684	2874.400	1.658	2876.059	51.00	12.72	2.51	2878.57	.00	2.32	2.98	3.000	.000	.00	1 .0
10.837	.0308					.0158	.17	1.66	1.93	1.39	.013	.00	.00	PIPE
1557.521	2874.734	1.724	2876.458	51.00	12.13	2.28	2878.74	.00	2.32	2.97	3.000	.000	.00	1 .0
8.204	.0308					.0139	.11	1.72	1.80	1.39	.013	.00	.00	PIPE
1565.724	2874.987	1.794	2876.781	51.00	11.57	2.08	2878.86	.00	2.32	2.94	3.000	.000	.00	1 .0
6.250	.0308					.0123	.08	1.79	1.66	1.39	.013	.00	.00	PIPE

WATER SURFACE PROFILE LISTING Date: 1-19-2011 Time:10:45: 7

CCSD NW TRANSPORTATION SITE
LOWER ONSITE SD SYSTEM - CCSDL1A1.DAT
JAN 2011 - REVISE STARTING HGL TO 2864.084 FROM 2863.885 FOR ULT WORST

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1571.975	2875.179	1.867	2877.046	51.00	11.03	1.89	2878.93	.00	2.32	2.91	3.000	.000	.00	1 .0
4.707	.0308					.0109	.05	1.87	1.54	1.39	.013	.00	.00	PIPE
1576.682	2875.324	1.945	2877.270	51.00	10.51	1.72	2878.99	.00	2.32	2.86	3.000	.000	.00	1 .0
3.442	.0308					.0097	.03	1.95	1.42	1.39	.013	.00	.00	PIPE
1580.124	2875.430	2.029	2877.459	51.00	10.02	1.56	2879.02	.00	2.32	2.81	3.000	.000	.00	1 .0
2.360	.0308					.0086	.02	2.03	1.31	1.39	.013	.00	.00	PIPE
1582.484	2875.503	2.119	2877.621	51.00	9.56	1.42	2879.04	.00	2.32	2.73	3.000	.000	.00	1 .0
1.390	.0308					.0077	.01	2.12	1.21	1.39	.013	.00	.00	PIPE
1583.873	2875.546	2.215	2877.761	51.00	9.11	1.29	2879.05	.00	2.32	2.64	3.000	.000	.00	1 .0
.467	.0308					.0069	.00	2.22	1.10	1.39	.013	.00	.00	PIPE
1584.340	2875.560	2.323	2877.883	51.00	8.69	1.17	2879.05	.00	2.32	2.51	3.000	.000	.00	1 .0
JUNCT STR	.0401					.0043	.02	2.32	1.00		.013	.00	.00	PIPE
1589.330	2875.760	3.443	2879.203	29.90	4.23	.28	2879.48	.00	1.77	.00	3.000	.000	.00	1 .0
61.425	.0099					.0020	.12	3.44	.00	1.41	.013	.00	.00	PIPE
1650.755	2876.371	3.000	2879.371	29.90	4.23	.28	2879.65	.00	1.77	.00	3.000	.000	.00	1 .0
30.879	.0099					.0019	.06	3.00	.00	1.41	.013	.00	.00	PIPE
1681.635	2876.677	2.722	2879.399	29.90	4.44	.31	2879.71	.00	1.77	1.74	3.000	.000	.00	1 .0
16.121	.0099					.0018	.03	2.72	.40	1.41	.013	.00	.00	PIPE

WATER SURFACE PROFILE LISTING Date: 1-19-2011 Time:10:45: 7

CCSD NW TRANSPORTATION SITE
LOWER ONSITE SD SYSTEM - CCSDL1A1.DAT
JAN 2011 - REVISE STARTING HGL TO 2864.084 FROM 2863.885 FOR ULT WORST

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
1697.755	2876.838	2.560	2879.398	29.90	4.65	.34	2879.73	.00	1.77	2.12	3.000	.000	.00	1 .0
12.503	.0099					.0020	.02	2.56	.47	1.41	.013	.00	.00	PIPE
1710.258	2876.962	2.427	2879.389	29.90	4.88	.37	2879.76	.00	1.77	2.36	3.000	.000	.00	1 .0
10.240	.0099					.0022	.02	2.43	.53	1.41	.013	.00	.00	PIPE
1720.499	2877.064	2.311	2879.374	29.90	5.12	.41	2879.78	.00	1.77	2.52	3.000	.000	.00	1 .0
3.724	.0099					.0023	.01	2.31	.59	1.41	.013	.00	.00	PIPE
1724.223	2877.101	2.266	2879.367	29.90	5.22	.42	2879.79	.00	1.77	2.58	3.000	.000	.00	1 .0
HYDRAULIC JUMP														
1724.223	2877.101	1.365	2878.466	29.90	9.55	1.42	2879.88	.00	1.77	2.99	3.000	.000	.00	1 .0
1.917	.0099					.0111	.02	1.36	1.65	1.41	.013	.00	.00	PIPE
1726.139	2877.120	1.365	2878.485	29.90	9.55	1.42	2879.90	.00	1.77	2.99	3.000	.000	.00	1 .0
47.268	.0099					.0119	.56	1.36	1.64	1.41	.013	.00	.00	PIPE
1773.407	2877.590	1.316	2878.906	29.90	10.02	1.56	2880.47	.00	1.77	2.98	3.000	.000	.00	1 .0
30.248	.0099					.0136	.41	1.32	1.76	1.41	.013	.00	.00	PIPE
1803.655	2877.891	1.269	2879.160	29.90	10.51	1.71	2880.88	.00	1.77	2.96	3.000	.000	.00	1 .0
23.081	.0099					.0154	.36	1.27	1.89	1.41	.013	.00	.00	PIPE
1826.736	2878.120	1.225	2879.345	29.90	11.02	1.89	2881.23	.00	1.77	2.95	3.000	.000	.00	1 .0
19.084	.0099					.0176	.34	1.22	2.03	1.41	.013	.00	.00	PIPE

CCSD NW TRANSPORTATION SITE
LOWER ONSITE SD SYSTEM - CCSDL1A1.DAT
JAN 2011 - REVISE STARTING HGL TO 2864.084 FROM 2863.885 FOR ULT WORST

Station / L/Elem	Invert Elev / Ch Slope	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS) / SF Ave	Vel Head / HF	Energy Grd.El. / SE Dpth	Super Elev / Froude N	Critical Depth / Norm Dp	Flow Top Width / "N"	Height/Dia.-FT / X-Fall	Base Wt or I.D. / ZR	ZL	No Wth Prs/Pip Type Ch
1845.820	2878.310	1.182	2879.492	29.90	11.56	2.07	2881.57	.00	1.77	2.93	3.000	.000	.00	1 .0
JUNCT STR	.1000					.0135	.07	1.18	2.17		.013	.00	.00	PIPE
1850.820	2878.810	1.697	2880.508	29.90	8.43	1.10	2881.61	.00	1.86	2.33	2.500	.000	.00	1 .0
.471	.0151					.0082	.00	1.70	1.20	1.39	.013	.00	.00	PIPE
1851.290	2878.817	1.705	2880.522	29.90	8.39	1.09	2881.61	.00	1.86	2.33	2.500	.000	.00	1 .0
3.174	.0151					.0077	.02	1.70	1.19	1.39	.013	.00	.00	PIPE
1854.464	2878.865	1.780	2880.646	29.90	8.00	.99	2881.64	.00	1.86	2.26	2.500	.000	.00	1 .0

DROP INLET TABLE CAPTURE & BYPASS FLOW RATE SUMMARY TABLE

Inlet #	Offsite Location	Inlet Type	Q100 (cfs)	Total Curb Est. Length (ft)	Lg (ft)	Lc (ft)	Lc w/ 50%CF	Total Inlet Length (ft)	Q Captured (cfs)	Q Bypass (cfs)	Notes
1	Cliff Shadows	Sweeper	2.3	8	2.5	5.5	2.75	10.75	2.2	0.1	P&P Inlet #1
2	Cliff Shadows	Sweeper	4.8	10	2.5	7.5	3.75	13.75	4.6	0.2	P&P Inlet #2
3	Hammer	Sweeper	52.1	13.5	2.5	11	5.5	19	20.2	31.9	P&P Inlet #3
5	Alpine Ridge	Sweeper	16.0	11	2.5	8.5	4.25	15.25	11.2	4.8	P&P Inlet #5
6	Alpine Ridge	Sweeper	29.7	13.5	2.5	11	5.5	19	13.7	16.0	P&P Inlet #6

DROP INLET CAPTURE & SIZING TABLE

Inlet #	Onsite Location	Inlet Type	Q100 (cfs)	Total Curb Est. Length (ft)	Lg (ft)	Lc (ft)	Lc w/ 50%CF	Total Inlet Length (ft)	Q Captured (cfs)	Q Bypass (cfs)	Notes
10	ON2 Sump	Sweeper	8	10	2.5	7.5	*	10	8	0	*Sump Conditon w/50% CF applied
12	COMB2 Node	Sweeper	45	10	7.5	2.5	1.25	11.25	29.9	15.1	Onsite Inlet @ COMB2 node (U/S)
11	D/S - COMB2	Sweeper	29.3	10	7.5	2.5	1.25	11.25	21.1	8.2	15.1 cfs (bypass) + 14.2 = 29.3 cfs

Inlet #	Offsite Location	Inlet Type	ULT. Q (cfs)	Total Curb Est. Length (ft)	Lg (ft)	Lc (ft)	Lc w/ 50%CF	Total Inlet Length (ft)	Q Captured (cfs)	Q Bypass (cfs)	Notes
14	Washburn	Sweeper	25	10	2.5	7.5	3.75	13.75	9.9	15.1	Washburn Q100 @ Sta. 22+70.32
14	Washburn	Sweeper	11	10	2.5	7.5	3.75	13.75	7.3	3.7	Washburn Q10 @ Sta. 22+70.32

Notes:

Lg = Length of Grate
Lc = Length of Curb
CF = Clogging Factor

Hydraulic Analysis Report

Project Data

Project Title: CCSD NW Transportation Center

Designer:

Project Date: Tuesday, January 18, 2011

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: Washburn - Inlet 13 @ Sec #2 - Q10

Notes: Clogging Factor (CF) is 50% where grate width is reduced from 1.50' to 0.75'

Parameters

Longitudinal Slope of Road:	0.0420 (ft/ft)
Cross-Slope of Pavement:	0.0200 (ft/ft)
Cross-Slope of Gutter:	0.0867 (ft/ft)
Mannings:	0.0160
Gutter Width:	1.5000 (ft)
Design Flow:	11.0000 (cfs)
Width of Spread:	13.0446 (ft)
Gutter Depression:	1.2006 (in)
Area of Flow:	1.7767 (ft^2)
Eo (Gutter Flow to Total Flow):	0.3463
Gutter Depth at Curb:	4.3313 (in)
Inlet Location:	Inlet on Grade
Inlet Type:	Sweeper Combo
Grate Type:	P - 1-7/8
Grate Width:	0.7500 (ft)
Grate Length:	10.0000 (ft)
Length of Inlet:	12.5000 (ft)
Local Depression:	2.0000 (in)
Intercepted Flow:	7.3455 (cfs)
Bypass Flow:	3.6545 (cfs)
Approach Velocity:	6.1914 (ft/s)
Splash-over Velocity:	33.2026 (ft/s)
Efficiency:	0.6678

Hydraulic Analysis Report

Project Data

Project Title: CCSD NW Transportation Center

Designer:

Project Date: Tuesday, January 18, 2011

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: Washburn - Inlet 13 @ Sec #2 - Q100

Notes: Clogging Factor (CF) is 50% where grate width is reduced from 1.50' to 0.75'

Parameters

Longitudinal Slope of Road:	0.0420 (ft/ft)
Cross-Slope of Pavement:	0.0200 (ft/ft)
Cross-Slope of Gutter:	0.0867 (ft/ft)
Mannings:	0.0160
Gutter Width:	1.5000 (ft)
Design Flow:	25.0000 (cfs)
Width of Spread:	18.0612 (ft)
Gutter Depression:	1.2006 (in)
Area of Flow:	3.3371 (ft^2)
Eo (Gutter Flow to Total Flow):	0.2469
Gutter Depth at Curb:	5.5353 (in)
Inlet Location:	Inlet on Grade
Inlet Type:	Sweeper Combo
Grate Type:	P - 1-7/8
Grate Width:	0.7500 (ft)
Grate Length:	2.5000 (ft)
Length of Inlet:	10.0000 (ft)
Local Depression:	2.0000 (in)
Intercepted Flow:	9.9439 (cfs)
Bypass Flow:	15.0561 (cfs)
Approach Velocity:	7.4915 (ft/s)
Splash-over Velocity:	9.1077 (ft/s)
Efficiency:	0.3978

Hydraulic Analysis Report

Project Data

Project Title: CCSD NW Transportation

Designer:

Project Date: Wednesday, January 19, 2011

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: Alpine Ridge - Inlet #6 - Q100

Notes: I. Inlet calculation clogging factors (CF) for grate are 50% and applied by reducing the width by this amount. --

Parameters

Longitudinal Slope of Road:	0.0134 (ft/ft)
Cross-Slope of Pavement:	0.0200 (ft/ft)
Cross-Slope of Gutter:	0.0867 (ft/ft)
Mannings:	0.0160
Gutter Width:	1.5000 (ft)
Design Flow:	29.7000 (cfs)
Width of Spread:	24.0723 (ft)
Gutter Depression:	1.2006 (in)
Area of Flow:	5.8698 (ft^2)
Eo (Gutter Flow to Total Flow):	0.1822
Gutter Depth at Curb:	6.9780 (in)
Inlet Location:	Inlet on Grade
Inlet Type:	Sweeper Combo
Grate Type:	P - 1-7/8
Grate Width:	0.7500 (ft)
Grate Length:	2.5000 (ft)
Length of Inlet:	11.0000 (ft)
Local Depression:	2.0000 (in)
Intercepted Flow:	13.6750 (cfs)
Bypass Flow:	16.0250 (cfs)
Approach Velocity:	5.0598 (ft/s)
Splash-over Velocity:	9.1077 (ft/s)
Efficiency:	0.4604

Hydraulic Analysis Report

Project Data

Project Title: CCSD NW Transportation

Designer:

Project Date: Wednesday, January 19, 2011

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: Alpine Ridge - Inlet #5 - Q100

Notes: I. Inlet calculation clogging factors (CF) for grate are 50% and applied by reducing the width by this amount. --

Parameters

Longitudinal Slope of Road:	0.0143 (ft/ft)
Cross-Slope of Pavement:	0.0200 (ft/ft)
Cross-Slope of Gutter:	0.0867 (ft/ft)
Mannings:	0.0160
Gutter Width:	1.5000 (ft)
Design Flow:	16.0000 (cfs)
Width of Spread:	18.7233 (ft)
Gutter Depression:	1.2006 (in)
Area of Flow:	3.5807 (ft^2)
Eo (Gutter Flow to Total Flow):	0.2377
Gutter Depth at Curb:	5.6942 (in)
Inlet Location:	Inlet on Grade
Inlet Type:	Sweeper Combo
Grate Type:	P - 1-7/8
Grate Width:	0.7500 (ft)
Grate Length:	2.5000 (ft)
Length of Inlet:	13.5000 (ft)
Local Depression:	2.0000 (in)
Intercepted Flow:	11.2124 (cfs)
Bypass Flow:	4.7876 (cfs)
Approach Velocity:	4.4685 (ft/s)
Splash-over Velocity:	9.1077 (ft/s)
Efficiency:	0.7008

Hydraulic Analysis Report

Project Data

Project Title: CCSD NW Transportation

Designer:

Project Date: Wednesday, January 19, 2011

Project Units: U.S. Customary Units

Notes:

Curb and Gutter Analysis: Alpine Ridge Sump

Notes:

Parameters

Longitudinal Slope of Road:	0.0143 (ft/ft)
Cross-Slope of Pavement:	0.0200 (ft/ft)
Cross-Slope of Gutter:	0.0867 (ft/ft)
Mannings:	0.0160
Gutter Width:	1.5000 (ft)
Design Flow:	36.7000 (cfs)
Width of Spread:	25.7811 (ft)
Gutter Depression:	1.2006 (in)
Area of Flow:	6.7217 (ft^2)
Eo (Gutter Flow to Total Flow):	0.1694
Gutter Depth at Curb:	7.3881 (in)
Inlet Location:	Inlet in Sag
Percent Clogging:	50.0000 %
Inlet Type:	Equal-length Combo
Grate Type:	P - 1-7/8
Grate Width:	1.5000 (ft)
Grate Length:	25.0000 (ft)
Length of Inlet:	25.0000 (ft)
Curb opening height:	6.0000 (in)
Local Depression:	2.0000 (in)
Perimeter:	28.0000 (ft)
Effective Perimeter:	14.0000 (ft)
Area:	50.4167 (ft^2)
Effective Area:	25.2083 (ft^2)
Depth at center of grate:	0.9140 (ft)
Computed Width of Spread at Sag:	43.9486 (ft)
Flow type:	Weir Flow
Efficiency:	1.0000

Cross Section for Shaumber Northern Inlet Area

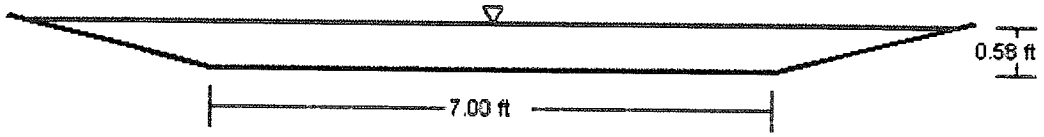
Project Description

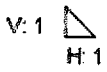
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.033	
Channel Slope	0.25000	ft/ft
Normal Depth	0.58	ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	7.00	ft
Discharge	71.60	ft³/s

Cross Section Image





Worksheet for Shaumber Northern Inlet Area

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.033	
Channel Slope	0.25000	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	7.00	ft
Discharge	71.60	ft^3/s

Results

Normal Depth	0.58	ft
Flow Area	5.36	ft^2
Wetted Perimeter	11.75	ft
Hydraulic Radius	0.46	ft
Top Width	11.61	ft
Critical Depth	1.18	ft
Critical Slope	0.01722	ft/ft
Velocity	13.35	ft/s
Velocity Head	2.77	ft
Specific Energy	3.34	ft
Froude Number	3.46	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.58	ft
Critical Depth	1.18	ft
Channel Slope	0.25000	ft/ft

Worksheet for Shaumber Northern Inlet Area

GVF Output Data

Critical Slope	0.01722	ft/ft

Messages

Notes

ESTIMATED Q100 OF 71.6 CFS PER OFF4A, OFF3A & OFF3B UNDER INTERIM CONDITIONS

VELOCITY USED TO ESTIMATE RIP-RAP SIZE

CCSD NW Transportation
Shaumber Northern Inlet Area
RIPRAP SIZING

These Equations are taken from the *Clark County Regional Flood District Hydrologic Criteria and Drainage Design Manual.*

Riprap lining sizing may be estimated by using:

V = 3*(D50^0.5)*(Ss-1)/(S^0.17) Eq. 734

V = Mean channel velocity in feet per second (from WSPG model)
S = Longitudinal channel slope in feet per foot
Ss = Specific gravity of rock (Minimum = 2.50)
D50 = Rock size in feet for which 50 percent of the riprap by weight is smaller

Section	V (ft/s)	Ss	S (ft/ft)	D50 (ft)	Thickness (ft)
Near Sta. 12+50	12.79	2.5	0.25	5.04	10.08

The riprap blanket thickness should be at least twice the D50 and should extend up the side slopes at least one foot above the water surface.

Note: **Due to excessive D50, a grouted rip-rap section will used per details on the enclosed plans.**

Cross Section for Shaumber Southern Inlet Area

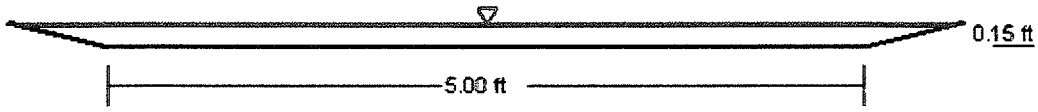
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.25000	ft/ft
Normal Depth	0.15	ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	5.00	ft
Discharge	4.80	ft^3/s

Cross Section Image



V: 1
H: 1

Worksheet for Shaumber Southern Inlet Area

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.035	
Channel Slope	0.25000	ft/ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	4.00	ft/ft (H:V)
Bottom Width	5.00	ft
Discharge	4.80	ft^3/s

Results

Normal Depth	0.15	ft
Flow Area	0.85	ft^2
Wetted Perimeter	6.25	ft
Hydraulic Radius	0.14	ft
Top Width	6.22	ft
Critical Depth	0.28	ft
Critical Slope	0.02915	ft/ft
Velocity	5.63	ft/s
Velocity Head	0.49	ft
Specific Energy	0.65	ft
Froude Number	2.68	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.15	ft
Critical Depth	0.28	ft
Channel Slope	0.25000	ft/ft

Worksheet for Shaumber Southern Inlet Area

GVF Output Data

Critical Slope	0.02915	ft/ft

Messages

Notes

ESTIMATED Q100 OF 4.8 CFS PER OFF4B UNDER INTERIM CONDITIONS

VELOCITY USED TO ESTIMATE RIP-RAP SIZE

CCSD NW Transportation
Shaumber Southern Inlet Area
RIPRAP SIZING

These Equations are taken from the *Clark County Regional Flood District Hydrologic Criteria and Drainage Design Manual.*

Riprap lining sizing may be estimated by using:

$$V = 3*(D50^{0.5})*(Ss-1)/(S^{0.17}) \quad \text{Eq. 734}$$

V = Mean channel velocity in feet per second (from WSPG model)
S = Longitudinal channel slope in feet per foot
Ss = Specific gravity of rock (Minimum = 2.50)
D50 = Rock size in feet for which 50 percent of the riprap by weight is smaller

Section	V (ft/s)	Ss	S (ft/ft)	D50 (ft)	Thickness (ft)
Near Sta. 12+50	5.63	2.5	0.25	0.98	1.95

The riprap blanket thickness should be at least twice the D50 and should extend up the side slopes at least one foot above the water surface.

Note: **Due to excessive D50, a grouted rip-rap section will used per details on the enclosed plans.**

Culvert Calculator Report
Shaumber Access Road Culvert - Sheet C4.08

Comments:
TW depth based upon Normal Depth computed 2 pipe diameters downstream of outlet.

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	2,915.50 ft	Headwater Depth/Height	1.11
Computed Headwater Elev	2,912.12 ft	Discharge	31.30 cfs
Inlet Control HW Elev.	2,912.04 ft	Tailwater Elevation	2,905.37 ft
Outlet Control HW Elev.	2,912.12 ft	Control Type	Entrance Control

Grades			
Upstream Invert	2,909.90 ft	Downstream Invert	2,905.50 ft
Length	72.00 ft	Constructed Slope	0.061111 ft/ft

Hydraulic Profile			
Profile	S2	Depth, Downstream	0.75 ft
Slope Type	Steep	Normal Depth	0.72 ft
Flow Regime	Supercritical	Critical Depth	1.43 ft
Velocity Downstream	14.44 ft/s	Critical Slope	0.006508 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.013
Section Material	Concrete	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	2		

Outlet Control Properties			
Outlet Control HW Elev.	2,912.12 ft	Upstream Velocity Head	0.66 ft
Ke	0.20	Entrance Loss	0.13 ft

Inlet Control Properties			
Inlet Control HW Elev.	2,912.04 ft	Flow Control	Transition
Inlet Type	Groove end projecting	Area Full	6.3 ft²
K	0.00450	HDS 5 Chart	1
M	2.00000	HDS 5 Scale	3
C	0.03170	Equation Form	1
Y	0.69000		

Cross Section for SHAUMBER CULVERT NO. 1 TW ESTIMATE

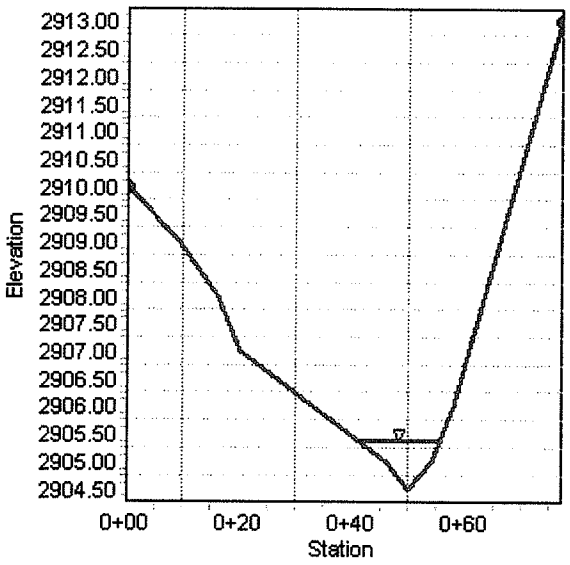
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.07690	ft/ft
Normal Depth	0.87	ft
Discharge	31.30	ft³/s

Cross Section Image



Worksheet for SHAUMBER CULVERT NO. 1 TW ESTIMATE

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.07690	ft/ft
Discharge	31.30	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00.00	2910.00
0+09.00	2909.00
0+16.00	2908.00
0+20.00	2907.00
0+46.00	2905.00
0+50.00	2904.50
0+54.00	2905.00
0+58.00	2906.00
0+77.00	2913.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.00, 2910.00)	(0+77.00, 2913.00)	0.045

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	0.87	ft
Elevation Range	2904.50 to 2913.00 ft	
Flow Area	6.07	ft²
Wetted Perimeter	14.34	ft

Worksheet for SHAUMBER CULVERT NO. 1 TW ESTIMATE

Results

Hydraulic Radius	0.42	ft
Top Width	14.22	ft
Normal Depth	0.87	ft
Critical Depth	0.99	ft
Critical Slope	0.03796	ft/ft
Velocity	5.16	ft/s
Velocity Head	0.41	ft
Specific Energy	1.28	ft
Froude Number	1.39	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.87	ft
Critical Depth	0.99	ft
Channel Slope	0.07690	ft/ft
Critical Slope	0.03796	ft/ft

Messages

Notes

BASIN OFF2 Q100 = 31.3 CFS

INTERIM SHAUMBER ACCESS ROADWAY CULVERT TAILWATER ESTIMATE - X-SECTION LOCATED 2 PIPE DIAMETERS (30") DOWNSTREAM OF OPENING.

Culvert Calculator Report
Shaumber Access Road Culvert - Sheet C4.09

Comments: Q100 = 30.3 CFS FROM BASIN OFF1A
PIPES DAYLIGHT ONTO FORMER ACCESS ROAD APSPHALT SECTION

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	2,892.50	ft	Headwater Depth/Height	1.09	
Computed Headwater Elev	2,896.18	ft	Discharge	30.30	cfs
Inlet Control HW Elev.	2,896.07	ft	Tailwater Elevation	0.00	ft
Outlet Control HW Elev.	2,896.18	ft	Control Type	Entrance Control	

Grades					
Upstream Invert	2,894.00	ft	Downstream Invert	2,883.00	ft
Length	142.00	ft	Constructed Slope	0.077465	ft/ft

Hydraulic Profile					
Profile	S2		Depth, Downstream	0.67	ft
Slope Type	Steep		Normal Depth	0.67	ft
Flow Regime	Supercritical		Critical Depth	1.40	ft
Velocity Downstream	16.48	ft/s	Critical Slope	0.006362	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	2.00	ft
Section Size	24 inch		Rise	2.00	ft
Number Sections	2				

Outlet Control Properties					
Outlet Control HW Elev.	2,896.18	ft	Upstream Velocity Head	0.64	ft
Ke	0.20		Entrance Loss	0.13	ft

Inlet Control Properties					
Inlet Control HW Elev.	2,896.07	ft	Flow Control	Unsubmerged	
Inlet Type	Groove end projecting		Area Full	6.3	ft²
K	0.00450		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	3	
C	0.03170		Equation Form	1	
Y	0.69000				

Appendix D: Referenced Information

HYDROLOGIC CRITERIA AND DRAINAGE MANUAL

DRAINAGE STUDY INFORMATION FORM

Name of Development: CCSD NORTHWEST SATELLITE TRANSPORTATION FACILITY Date: Nov 17, 2010

Location of Development: a) Descriptive (Cross Streets) North/South: Cliff Shadows

East/West: Washburn

b) Section: 36 Township: 19 South Range: 59 East

c) APN : 126-36-2001-002 (portion of)

Name of Owner: USA / Clark County School District Design Management / Planning and Design

Telephone No.: 702-799-8710 Fax No.: 702-799-8745 E-Mail Address:

Address: 4170 McLeod Drive, Las Vegas, NV 89121

Contact Person-Name: Jon Hayslip **Telephone No.:** (702) -798-7978

* **E-Mail Address:** jon.hayslip@lrneng.com **Fax No.:** 451-2296

Firm: L. R. Nelson Consulting Engineers

Address: 6765 W. Russell Road, Suite 200, Las Vegas, NV 89118

Type of Land Development/Land Disturbance Process:

☐	Rezoning	☐	Subdivision Map	☐	Clearing and Grading Only
☐	Parcel Map	☐	Planned Unit Development	☐	Other (Please specify below)
☐	Large Parcel Map	☒	Building Permit		

1. Total Owned Land Area: At Site: 131.7 Ac. (+/-) Being Developed/Disturbed: 40 Ac. (+/-)
2. Is a portion or all of the subject property located in a designated FEMA Flood Hazard Area? ☐ **Yes**** ☒ **No**
3. Is the property bordered or crossed by an existing or proposed Clark County Regional Flood Control District Master Planned Facility? ☐ **Yes**** ☒ **No**
4. Proposed type of development (Residential, Commercial, Etc.): CCSD Transportation
5. Approximate upstream land area which drains to the subject site: 62 Ac. (+/-)
6. Has the site drainage been evaluated in the past? ☒ **YES** ☐ **NO** If yes, please identify documentation: 90% Lone Mn Beltway Det. Basins/Gowan Beltway West-Western Clark County 215 Bruce Woodbury Beltway-Craig to Hualapai (Aug 2008) GCW for CCPW
7. If known, please briefly identify the proposed discharge point(s) of runoff from the site: Adjacent roadway & existing Alpine Ridge low point into existing Beltway Channel
8. Briefly describe your proposed schedule for the subject project: As soon as possible.

1/20/11

REGISTERED PROFESSIONAL ENGINEER – STATE OF NEVADA
JON H. HAYSLIP
CIVIL
No. 12584

Engineer's Seal EXP. 6/30/11

Submit this form as part of the required drainage study to the local entity which has jurisdiction over the subject property. This form may provide sufficient information to serve as the Conceptual Drainage Study.

*New Required Field

**Review and concurrence of the Clark County Regional Flood Control District is required.

Revision	Date

Local Entity File No.

REFERENCE:

STANDARD FORM 1

Updated 05/01/2008

PLANNING & DEVELOPMENT
CITY OF LAS VEGAS
Comprehensive Planning

City of Las Vegas

Meeting Attendance Sheet

Project Name NW Transportation Facility

Page 1 of 1
Date 12/16/10
Time 10:30 (am) pm

	Name	Company/Department	Address	
1.	ROB WELCH	CLV FLOOD		Phone 229-4477 Fax
2.	Albert Sung	CLV Flood		Phone 229-2001 Fax
3.	Dennis Moyer	CLV Land Dev		Phone 229-2002 Fax
4.	Kevin Berg	CLV Land Dev		Phone 229 4837 Fax
5.	Victor Bolanos	CLV Traffic		Phone 229-6901 Fax
6.	Bart Anderson	CLV	DEVCO	Phone 229-2198 Fax
7.	Greg McDermott	CLV	PW-Roadway Planning	Phone 229-2143 Fax
8.	JON HAYSLIP	LRN		Phone 798-7978 Fax
9.	VERNON HAWKINS	LRN		Phone 798-7978 Fax
10.	Doug Rankin	CLV	Planning	Phone 229-5408 Fax
11.				Phone Fax
12.				Phone Fax
13.				Phone Fax
14.				Phone Fax
15.				Phone Fax
16.				Phone Fax
17.				Phone Fax

mtg & phone forms;comp plan3;fh;ce/9-1-98

DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Mining and Reclamation Pla for the Lone Mountain Community P

LAS VEGAS, NEVAD

March 31, 2008

Provisions for Restoration and Reuse of the Site

The excavated portions of the pit will not be filled in. The excavation will be carried out to provide stable slopes and even bottom surfaces, and the soil will be stabilized in accordance with the reclamation plan. It is anticipated the site will eventually become developed in accordance with Clark County and City Land Use Plans. A conceptual plan is shown on Appendix I.

Preservation of Recreational Opportunities, Air Quality and Archeological Resources

Fugitive dust will be controlled by water trucks spraying the pit areas and roadways and by a wet suppression system (fogging water sprays) for the crushers, screens, conveyor drop points, or other processing equipment as necessary when the aggregate processing plants are in operation. All operations must comply with federal New Source Performance Standards (NSPS) for Non-Metallic Mineral Processing plants, 40 CFR part 60. Roadway surfaces may be treated with binding emulsion to further control fugitive dust. If dust palliatives are used they should comply with the Nevada Department of Environmental Protection's Guidelines on Dust Palliative Use in Clark County, Nevada.

Extraction operations will continue in accordance with BLM and Clark County air quality and operational regulations. Air Quality permits will be required by Clark County for any new or expanding material sale contracts.

Cultural resources surveys have been undertaken on all public lands of the Lone Mountain Material Sale area. The results of that field work are on file with the BLM. Should any prehistoric or historic remains/artifacts be discovered during site development or mining, work shall temporarily be halted at the specific site and the State Historic Preservation Office of the Department of Museums, Library and Arts, and the applicable Indian Tribe shall be notified.

A significant portion of the community pit will remain undisturbed. Approximately 1,684 acres will be left undisturbed and, as owned by BLM, will provide passive recreation opportunities for many years. It is unclear what impact a westward shift of the Las Vegas disposal boundary would have on these areas. An additional 185 acres are adjacent to existing and proposed active recreation areas, as part of the Lone Mountain Regional Park. This area will become available for active recreation in consonance with Park activities.

IV. RECLAMATION PLAN

Reclamation will include recontouring of all disturbed slopes, spreading of salvaged growth medium (if available) and stabilization of rock slopes.

Reclamation will be carried out by individual site operators to leave a site in a safe and stable condition, not prone to wind and water erosion. It is not intended to return the reclaimed areas to pre-existing vegetation, topographic or other natural conditions. The area will be left in a state conducive to development in accordance with the referenced Land Use Plan and current Clark County and City of Las Vegas standards.

Recontouring and Stabilization of Slopes

Appendices D & E show the proposed slopes at the cessation of operations. The slopes in sand and gravel will not exceed 3:1 (horizontal to vertical). Slopes will be recontoured to better enhance natural revegetation, to mitigate erosion, and to render them more visually appealing. The 3:1 slopes will blend in well with the natural topography. Reclaimed slopes and the floor of the quarry shall also be recontoured to have a natural looking undulating, curvilinear surfaces. The slopes in bedrock will not exceed 2:1 and most will be less than 3:1.

FUTURE/ULTIMATE CONDITIONS REFERENCE

Spreading Salvaged Growth Medium

Topsoil or growth medium, when encountered, will be stockpiled for later use in reclamation. Stockpile locations will vary as mining progresses. Since reclamation will be concurrent if possible, it will be necessary to keep any growth medium adjacent to current excavations in anticipation of using the material as slopes become available. On growth medium stockpiles a visible crust will be maintained for dust control. This will be accomplished by either watering the stockpiles to establish a crust or adding a palliative when necessary.

Buildings, Equipment and Scale Removal

All temporary structures, scales, equipment and non-mineral waste will be removed from the BLM material sale sites once mining is completed. If wells were constructed, they will be abandoned in accordance with relevant regulations. Electrical or other possible utility lines will be removed from the individual sites as directed by the BLM.

Bonding

Bonding is an integral part of a mining and reclamation program on public lands. Bonding is to assure that the property is reclaimed and that no potential hazards remain on the site. The winning bidder for each material sale conducted by the BLM will be required to post an adequate bond to assure reclamation will be completed at the cessation of mining. A reclamation cost estimate, usually provided by the successful bidder, will be required in order to determine the amount of the bond. The reclamation cost estimate will be reviewed by the BLM for adequacy.

Appendix E: Agency Development Conditions

PLANNING & DEVELOPMENT
DEVELOPMENT SERVICES CENTER
731 S. Fourth Street
Las Vegas, NV 89101

Voice: 702-229-6301
Fax: 702-474-0352
TTY 702-386-9108
www.lasvegasnevada.gov

July 30, 2010

Ms. Linda Perri
Clark County School District
4212 Eucalyptus Annex
Las Vegas, Nevada 89121

RE: VAR-38553 - VARIANCE RELATED TO SDR-38557
PLANNING COMMISSION MEETING OF JULY 29, 2010

Dear Ms. Perri:

Your request for a Variance TO ALLOW AN 11-FOOT TALL RETAINING WALL WHERE SIX FEET IS THE MAXIMUM ALLOWED AND TO ALLOW THE COMBINED HEIGHT OF RETAINING AND SCREENING WALLS TO BE 14 FEET WHERE 12 FEET IS THE MAXIMUM ALLOWED on a 37.20-acre portion of 131.70 acres at the northwest corner of Washburn Road and Alpine Ridge Way (APN 126-36-201-002), C-V (Civic) Zone, Ward 6 (Ross), was considered by the Planning Commission on July 29, 2010.

The Planning Commission voted to ***APPROVE*** your request, subject to the following:

Planning and Development

1. Approval of and conformance to the Conditions of Approval for Site Development Plan Review (SDR-38557) shall be required, if approved.

2. This approval shall be void two years from the date of final approval, unless a building permit has been issued for new construction. An Extension of Time may be filed for consideration by the City of Las Vegas.

3. Prior to occupancy, all necessary building permits shall be obtained and final inspections shall be completed in compliance with Title 19 and all codes as required by the Building and Safety Department.

4. These Conditions of Approval shall be affixed to the cover sheet of any plan set submitted for building permit.

5. All City Code requirements and design standards of all City departments must be satisfied, except as modified herein.

This action by the Planning Commission on **July 29, 2010** is final unless a written appeal is filed with the City Clerk within ten days of the date of the Planning Commission's decision as allowed by code or there is a review action filed by the City Council within the same time period. For additional information on appeals or review requests please access http://www.lasvegasnevada.gov/CheckStatus/DevelopmentApp.htm, or contact the Department of Planning and Development at 702.229.6301 after ***August 9, 2010***. No building permits or business licenses related to these items shall be issued prior to the expiration of the required ten day waiting period, or until any filed appeal is resolved pursuant to LVMC Title 19.18.

Sincerely,

Steve Gebeke
Planning Supervisor
Case Planning Division

SG:clb

cc: Mr. Nathan Goodman
KGA Architecture
9075 West Diablo Drive, 3rd Floor
Las Vegas, Nevada 89148

PLANNING & DEVELOPMENT
DEVELOPMENT SERVICES CENTER
731 S. Fourth Street
Las Vegas, NV 89101

Voice: 702-229-6301
Fax: 702-474-0352
TTY 702-386-9108
www.lasvegasnevada.gov

July 30, 2010

Ms. Linda Perri
Clark County School District
4212 Eucalyptus Annex
Las Vegas, Nevada 89121

RE: SDR-38557 - SITE DEVELOPMENT PLAN REVIEW RELATED TO VAR-38553
PLANNING COMMISSION MEETING OF JULY 29, 2010

Dear Ms. Perri:

Your request for a Site Development Plan Review FOR A PROPOSED 41,000 SQUARE-FOOT TRANSIT YARD on a 37.20-acre portion of 131.70 acres at the northwest corner of Washburn Road and Alpine Ridge Way (APN 126-36-201-002), C-V (Civic) Zone, Ward 6 (Ross), was considered by the Planning Commission on July 29, 2010.

The Planning Commission voted to ***APPROVE*** your request, subject to the following:

Planning and Development

1. Any changes based upon right-of-way, traffic or drainage studies or street improvements required for city public utilities shall not reduce the perimeter landscape buffer, height of walls or plant materials from that on submitted landscape plans date stamped 07/09/10. Any changes based upon subsequently submitted studies must be accommodated elsewhere on the site.

2. Approval of and conformance to the Conditions of Approval for Variance (VAR-38553) shall be required, if approved.

3. This approval shall be void two years from the date of final approval, unless a building permit has been issued for the principal building on the site. An Extension of Time may be filed for consideration by the City of Las Vegas.

4. All development shall be in conformance with the site plans and landscape plan date stamped 07/09/10, and building elevations date stamped 06/14/10, except as amended by conditions herein.

5. An Exception from Title 19.10.010 is hereby approved, to allow 114 parking lot trees where 128 trees are required.

6. Prior to occupancy, all necessary building permits shall be obtained and final inspections shall be completed in compliance with Title 19 and all codes as required by the Building and Safety Department.

7. These Conditions of Approval shall be affixed to the cover sheet of any plan set submitted for building permit.

8. A technical landscape plan, signed and sealed by a Registered Architect, Landscape Architect, Residential Designer or Civil Engineer, must be submitted prior to or at the same time application is made for a building permit. A permanent underground sprinkler system is required, and shall be permanently maintained in a satisfactory manner; the landscape plan shall include irrigation specifications.

9. Reflective glazing at the pedestrian level is prohibited. Glazing above the pedestrian level shall be limited to a maximum reflectance rating of 22% (as defined by the National Institute of Standards and Technology).

10. All utility boxes exceeding 27 cubic feet in size shall meet the standards of LVMC Title 19.12.040.

11. Parking lot lighting standards shall be no more than 30 feet in height and shall utilize downward-directed lights with full cut-off luminaries. Lighting on the exterior of buildings shall be shielded and shall be downward-directed. Non-residential property lighting shall be directed away from residential property or screened, and shall not create fugitive lighting on adjacent properties.

12. A fully operational fire protection system, including fire apparatus roads, fire hydrants and water supply, shall be installed and shall be functioning prior to construction of any combustible structures.

13. All City Code requirements and design standards of all City Departments must be satisfied, except as modified herein.

Public Works

14. Coordinate with the City of Las Vegas Right-of-Way Section of the Department of Public Works to determine all materials and information needed to submit an application to the Bureau of Land Management (BLM) for an appropriate Right-of-Way Grant Easement for Washburn Road, Alpine Ridge, Hammer Lane, and Cliff Shadows Parkway, including those portions required for the appropriate geometric connection of this site to Ann Road, prior to the issuance of any permits.

15. Construct half street improvements including appropriate overpaving, where legally able, on Washburn Road, Alpine Ridge, Hammer Lane, and Cliff Shadows Parkway adjacent to this site concurrent with development of this site. Provide a minimum of two lanes of paved, legal access to this site prior to occupancy of this development. Extend all required underground utilities, such as electrical, telephone, etc., located within public rights-of-way, past the boundaries of this site prior to construction of hard surfacing (asphalt or concrete).

16. Coordinate with the property owner of Assessor Parcel Number #126-36-301-001 and the BLM to determine the final disposition of the existing truck haul route adjacent to this site with respect to the roadway designs proposed for this Site. Provide written documentation that this property owner and/or the BLM agrees with the final geometric design of the roadways shown on the Approved Site Plan prior to the issuance of permits for this Site. Once it is determined what portions of the truck haul route must be modified to accommodate the roadways being designed for this Site, coordinate the final geometric traffic control and roadway design with the Traffic Engineering Section of the Department of Public Works.

17. Coordinate with the Collection System Planning Section of the Department of Public Works to determine an appropriate location for public sewer connection to this site, prior to the issuance of any permits. Provide public sewer easements for all public sewers not located within existing public street right-of-way prior to the issuance of any permits. Improvement Drawings submitted to the City for review shall not be approved for construction until all required public sewer easements necessary to connect this site to the existing public sewer system have been granted to the City.

18. A Drainage Plan and Technical Drainage Study must be submitted to and approved by the Department of Public Works prior to the issuance of any building or grading permits, submittal of any construction drawings or the submittal of a Map subdividing this site, whichever may occur first. Provide and improve all drainageways recommended in the approved drainage plan/study. The developer of this site shall be responsible to construct such neighborhood or local drainage facility improvements as are recommended by the City of Las Vegas Neighborhood Drainage Studies and approved Drainage Plan/Study concurrent with development of this site.

19. A Traffic Impact Analysis must be submitted to and approved by the Department of Public Works prior to the issuance of any building or grading permits, submittal of any construction drawings. Comply with the recommendations of the approved Traffic Impact Analysis prior to occupancy of the site. The Traffic Impact Analysis shall also include a section addressing Standard Drawings #234.1 #234.2 and #234.3 to determine additional right-of-way requirements for bus turnouts adjacent to this site, if any; dedicate all areas recommended by the approved Traffic Impact Analysis. All additional rights of way required by Standard Drawing #201.1 for exclusive right turn lanes and dual left turn lanes shall be dedicated prior to or concurrent with the commencement of on site development activities unless specifically noted as not required in the approved Traffic Impact Analysis. If additional rights of way are not required and Traffic Control devices are or may be proposed at this site outside of the public right of way, all necessary easements for the location and/or access of such devices shall be granted prior to the issuance of permits for this site. Phased compliance will be allowed if recommended by the approved Traffic Impact Analysis. No recommendation of the approved Traffic Impact Analysis, nor compliance therewith, shall be deemed to modify or eliminate any condition of approval imposed by the Planning Commission or the City Council on the development of this site.

This action by the Planning Commission on **July 29, 2010** is final unless a written appeal is filed with the City Clerk within ten days of the date of the Planning Commission's decision as allowed by code or there is a review action filed by the City Council within the same time period. For additional information on appeals or review requests please access http://www.lasvegasnevada.gov/CheckStatus/DevelopmentApp.htm, or contact the Department of Planning and Development at 702.229.6301 after ***August 9, 2010***. No building permits or business licenses related to these items shall be issued prior to the expiration of the required ten day waiting period, or until any filed appeal is resolved pursuant to LVMC Title 19.18.

Sincerely,

Steve Gebeke
Planning Supervisor
Case Planning Division

SG:clb

cc: Mr. Nathan Goodman
KGA Architecture
9075 West Diablo Drive, 3rd Floor
Las Vegas, Nevada 89148

NOTES

This map is for assessment use only and does NOT represent a survey.

No liability is assumed for the accuracy of the data delineated herein. Information on roads and other non-assessed parcels may be obtained from the Road Document Listing in the Assessor's Office.

This map is compiled from official records, including surveys and deeds, but only contains the information required for assessment. See the recorded documents for more detailed legal information.

USE THIS SCALE(FEET) WHEN MAP REDUCED FROM 11X17 ORIGINAL

0 50 100 200 400 600 800

MAP LEGEND

AVERAGE OA VALUE 55

ASSESSOR'S PARCELS - CLARK CO., NV.
M. W. Schofield, Assessor

———	PARCEL BOUNDARY	001	PARCEL NUMBER
———	SUBD BOUNDARY	1.00	ACREAGE
- - - - - -	ROAD EASEMENT	202	PARCEL SUB/SEQ NUMBER
———	PM/LD BOUNDARY	PB 25-45	PLAT RECORDING NUMBER
----------	NON-PARCEL LOT LINE	5	BLOCK NUMBER
——— ———	MATCH LINE / LEADER LINE	5	LOT NUMBER
001	ROAD ID NUMBER	GL5	GOV. LOT NUMBER

BOOK T19S R59E

	R58E	R59E	R60E
T19S	98	99	100
T20S	136	137	138

SEC. 36

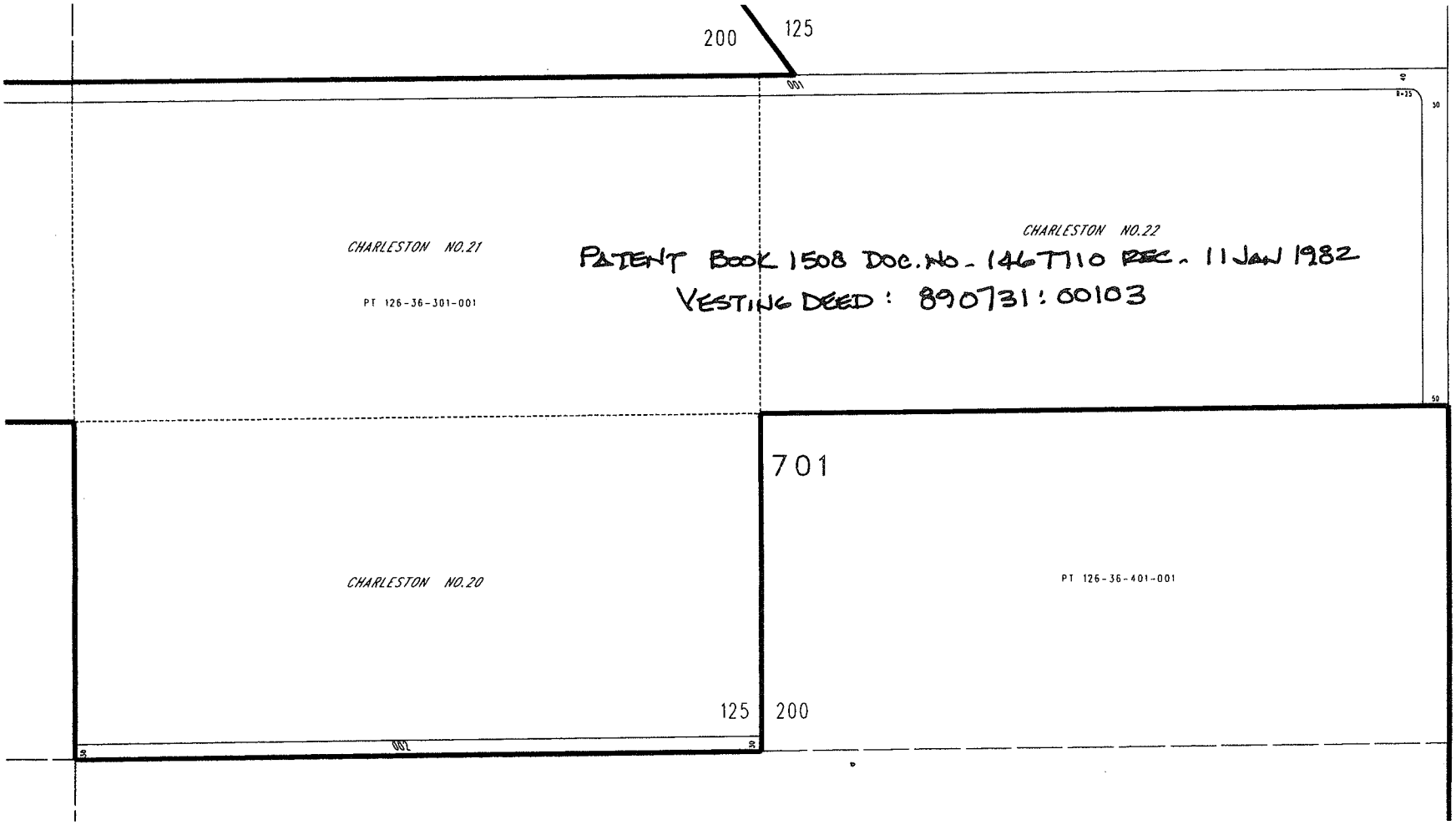
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

MAP N 2 SE 4

8	4	8	4
5	1	5	1
6	2	6	2
7	3	7	3
8	4	8	4
5	1	5	1

126-36-7

Scale:1"=200' Rev:06/07/07



TAX DIST 125,200

*Affix I.R.S $ 12,320.00

8907310C103

(3)

GRANT, BARGAIN, SALE DEED

THIS INDENTURE WITNESSETH: That Stocks Mill & Supply Co., Inc., a Nevada corporation

in consideration of $ 10.00 the receipt of which is hereby acknowledged, does hereby Grant, Bargain, Sell and Convey to Nevada Ready Mix Corporation, a Delaware corporation

all that real property situate in the County of Clark State of Nevada, bounded and described as follows:

See Exhibit "A" attached hereto and incorporated herein.

Together with all and singular the tenements, hereditaments and appurtenances thereunto belonging or in any wise appertaining.

Witness my hand on this 20th day of July, 1989

STOCKS MILL & SUPPLY CO., INC.
a Nevada Corporation

By: Richard D. Ford, President

STATE OF NEVADA
County of Clark } ss.

On this 20 day of July 1989, personally appeared before me, a Notary Public, Richard D. Ford

who acknowledged that he executed the above instrument

Signed: Katherine Y. Nusbaum

Notary Public

KATHERINE Y. NUSBAUM
Notary Public State of Nevada
Clark County
My Appointment Expires Aug 23, 1991

NEVADA TITLE OFFICE
116 SOUTH FOURTH STREET
LAS VEGAS NEVADA 89101

Order No. 89-03-0342 BK

When Recorded, mail to Nevada Ready Mix
P.O. Box 42725
Las Vegas, NV 89116

Recorder's Stamp.

BOOK 1508

1467710

3-1

Form 1860–9
(March 1965)
(formerly 4–1043)

N-24948

The United States of America

To all to whom these presents shall come, Greeting:

WHEREAS, Charleston Stone Products, Inc. is entitled to a Land Patent pursuant to the general mining laws, R.S. 2329, 2331; as amended, 30 U.S.C. 35, for the lands embraced within the Charleston Placer No. 13, Charleston Placer No. 14, Charleston Placer No. 15, Charleston Placer No. 16, Charleston Placer No. 17, Charleston Placer No. 18, Charleston Placer No. 19, Charleston Placer No. 20, Charleston Placer No. 21 and Charleston Placer No. 22, designated and described as follows:

Mount Diablo Meridian, Nevada

T. 19 S., R. 59 E.,
sec. 35, S½NE¼SW¼, S½NW¼SE¼, N½NW¼SE¼, N½NE¼SE¼;
sec. 36, N½NW¼SW¼, S½NW¼SW¼, N½NE¼SW¼, S½NW¼SE¼, N½NW¼SE¼, N½NE¼SE¼.

The area described contains 200 acres.

NOW KNOW YE, that there is, therefore, granted by the UNITED STATES, unto the above named claimant, the land above described; TO HAVE AND TO HOLD the said land with all the rights, privileges, immunities, and appurtenances, of whatsoever nature, thereunto belonging, unto the said claimant, its successors and assigns, forever:

EXCEPTING AND RESERVING TO THE UNITED STATES:

1. A right-of-way thereon for ditches or canals constructed by the authority of the United States (Act of August 30, 1890, 26 Stat. 391, 43 U.S.C. sec. 945).

2. The grant hereby made is restricted in its exterior limits to the boundaries of the said mining premises, and to any veins or lodes of quartz or other rock in place bearing gold, silver, cinnabar, lead, tin, copper, or other valuable deposits, which may have been discovered within said limits subsequent to and which were not known to exist on June 25, 1979.

3. Should any vein or lode of quartz or other rock in place bearing gold, silver, cinnabar, lead, tin, copper, or other valuable deposits be claimed or known to exist within the above described premises on June 25, 1979, the same is expressly excepted and excluded from this patent (30 U.S.C. 37).

Patent Number

GPO 841-080

900712 01046

ORIGINAL when this statement appears in blue

GRANT, BARGAIN, SALE, DEED

THIS INDENTURE WITNESSETH: That **NEVADA READY MIX, A DELAWARE CORPORATION** in consideration of One Dollar (1.00) and other good and valuable consideration, the receipt of which is hereby acknowledged, do(es) hereby Grant, Bargain, Sell, and Convey to the County of Clark, a political subdivision of the State of Nevada, all that real property situate in the County of Clark, State of Nevada, bounded and described as follows:

WASHBURN ROAD, HUALPAI WAY, LA MADRE WAY

The North Forty Feet (40.00') and the East Fifty feet (50.00') of the North One-Half (N ½) of the North One-Half (N ½) of the South One-Half (S ½) of Section 36, Township 19 South, Range 59 East, M.D.M., Nevada; together with that certain spandrel area in the Northeast corner thereof, also being the Southwest corner of the intersection of **WASHBURN ROAD AND HUALPAI WAY**, bounded as follows: on the North by the South Line of the North Forty Feet (40.00'); on the East by the West line of the East Fifty feet (50.00'); and on the Southwest by the arc of a curve concave Southwesterly, having a radius of Twenty-five feet (25.00') and being tangent to the South line of said North Forty Feet (40.00') and to the West line of said East Fifty feet (50.00').

The South Thirty feet (30.00') of the Northwest Quarter (NW ¼) of the Southwest Quarter (SW ¼) and the South Thirty feet (30.00') of the Northwest Quarter (NW ¼) of the Southeast Quarter (SE ¼) Section 36, Township 19 South, Range 59 East, M.D.M., Nevada.

PARCEL NUMBER: 470-550-003
INQUIRY NUMBER: 351-90
UC: 230-89

PLEASE RETURN TO
Leanne Wondra
DEPARTMENT OF PUBLIC WORKS

Together with all and singular the tenements, hereditaments, appurtenances thereunto belonging and in any way appertaining.

WITNESS my/our hand(s) this 12 day of July, 1990.

NEVADA READY MIX, A DELAWARE CORPORATION

BY: _____
DARRELL E. THORNTON

Signature of individual reviewing and approving document: Leanne Wondra
Department: Land Devel. Date: 7/12/90

STATE OF NEVADA)
) SS.
COUNTY OF CLARK)

On the 12 day of July, 1990, before me, a notary public, personally appeared Darrell E. Thornton, personally known (or proved) to me to be the person(s) whose name(s) is/are subcribed to the above instrument, who acknowledged that he executed the above instrument.

Linda L. Nole
NOTARY PUBLIC, in and for said County and State

My Commission Expires: 1-2-94

LINDA L NOLE
Notary Public - State of Nevada
CLARK COUNTY
My Appointment Expires Jan. 2, 19[illegible]

RECORDER'S USE ONLY

CLARK COUNTY, NEVADA
JOAN L. SWIFT, RECORDER
RECORDED AT REQUEST OF:
CC/PUBLIC WORKS

07-12-90 16:39 NA1 0
OFFICIAL RECORDS
BOOK: 900712 INST: 01046
FEE: .00 RPTT: EX#002

Northwest Transportation Facility

Recent discussions with the City of Las Vegas, Clark County, and the Clark County School District (CCSD), have identified the need for public roadway, drainage, and sewer in the vicinity of the approximately 40 acre CCSD R&PP lease site (N-88117). Current planning by the City of Las Vegas has identified alignments for portions of Cliff Shadows Parkway (Schaumber), Hammer Lane, Alpine Ridge Way, and Washburn Road. These roadways will provide paved access to the R&PP lease site as well as other current and planned development in the area.

Initially, the Cliff Shadows Parkway (Schaumber) alignment will extend from Washburn north to the existing Ann Road alignment to provide legal access to the area and allow for the installation of drainage and sewer facilities. However, in order to accommodate the future installation of the Beltway (215) and Ann Road interchange the Cliff Shadows Parkway (Schaumber) alignment swings out to the west in order to intersect the planned Beltway (215) and Ann Road interchange. Currently, due to funding issues associated with the interchange, the timing for the construction of the interchange is not known.

Based on the initial planning and design, the following Rights-of-Way for Roadway, drainage, and sewer will be applied for by the City of Las Vegas.

Cliff Shadows Parkway (Schaumber):

Washburn north to Hammer Lane
180 feet in width (40 feet East of CL and 140 feet west of CL)*
140 ft x 1,336 ft= 187,040 ft^2 = 4.29 acres of new disturbance**
NOTE: the additional 100' is necessary for drainage facilities to collect and control storm water flows before they get to the roadway. Additionally, anticipated cut activities associated with achieving the final road grade will necessitate grading at no more than a 3:1 slope on the west side of the alignment to the topography.

Hammer Lane north to Ann
100 feet (50 feet on either side of the CL)
100 ft x 1,406 ft= 140,600 ft^2 = 3.23 acres of new disturbance
NOTE: This width is necessary to accommodate truck/bus turn lanes at the intersection with the current Ann Road alignment and the future Beltway (215) Ann Road interchange.

Alpine Ridge:

Washburn north to Hammer
60 feet (30 feet on either side of CL)
30 ft x 1,225 ft= 36,750 ft^2 = 0.84 acres of new disturbance.

Hammer Lane:

Cliff Shadows Parkway (Schaumber) east to Alpine Ridge
60 feet (30 feet on either side of CL)
30 ft x 1,225 ft= 36,750 ft^2 = 0.84 acres of new disturbance.

Washburn Road:

Cliff Shadows Parkway (Schaumber) east to Alpine Ridge
40 feet (all within the R&PP lease site; adjacent parcel to the south is private)
0 ft x 1,326 ft= 0 ft^2 = 0 acres of new disturbance.

TOTAL : Approximately 9.2 acres of additional new disturbance for roadway, drainage, and sewer.

Other Utilities:

The type and dimensions of the sewer line(s) which may be installed at a later date will be dependent upon development needs in the area as determined by the City of Las Vegas.

It is anticipated that all of the other utilities (i.e. water, electric, gas, phone, etc.) will be located within existing or planned roadways in the vicinity of the site.

Mineral Material:

In conjunction with the roadway cut and slope areas on the west side of the Cliff Shadows Parkway (Schaumber) alignment, approximately 45,000 yds^3 of material will be excavated. It is anticipated that this material will be applied for under a Fee Use Permit and used on the 40 acre R&PP lease site.

Legal Descriptions:

MDMB
Township 19 South, Range 59 East Section 36, E2NENWNW, E2SENWNW, SENW.

*= Represents the total ROW width to be applied for by the City of Las Vegas
**= Represents the dimensions of the ROW outside the R&PP lease site which were not included in the previously scoped project.

FINANCE & OPERATIONS DIVISION, *Real Property Management*

4212 EUCALYPTUS AVENUE • LAS VEGAS, NV 89121 • (702) 799-5214 • FAX (702) 799-5436

CCSD
CLARK COUNTY
SCHOOL DISTRICT

December 18, 2009

Kimber Liebhauser
Bureau of Land Management
4701 N. Torrey Pines Dr.
Las Vegas, NV 89130

RE: Northwest Transportation Yard R&PP Application
Sec. 36- T.19S R.59E
126-36-201-002

The Clark County School District is submitting the enclosed R&PP Lease Application for the Northwest Transportation Facility located:

Sec. 36- T.19S R.59E
SE1/4NW1/4
126-36-201-002

Please contact me at 799-5214, ext. 5407, if you have any questions.

Sincerely:

Christina Price

Christina Price, Realty Specialist
Real Property Management

/cp

Form 2740-1
(January 2007)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

APPLICATION FOR LAND FOR RECREATION OR PUBLIC PURPOSES

(Act of June 14, 1926, as amended; 43 U.S.C. 869; 869-4)

FORM APPROVED
OMB NO 1004-0012
Expires November 30, 2009

Date	Serial Number (BLM use only)
12/17/2009	

Home phone *(include area code)*

1a. Applicant's name	b. Address *(include zip code)*	Business phone *(include area code)*
CLARK COUNTY SCHOOL DISTRICT	2832 E. Flamingo Road, Las Vegas, NV 89121	702-799-5214 Ext. /5407

2. Give legal description of lands applied for *(include metes and bounds description, if necessary)*

SUBDIVISION	SECTION	TOWNSHIP	RANGE	MERIDIAN
SE1/4NW1/4	Sec. 36	T. 19 S.	R. 59 E.	MDBM

County of	State of	Containing *(acres)*
CLARK	NEVADA	40 ACRES

3a. This application is for: ☑ Lease ☐ Purchase *(If lease, indicate year)*

b. Proposed use is ☐ Public Recreation ☑ Other Public Purposes

4. Describe the proposed use of the land. The description must specifically identify an established or definitely proposed project. Attach a detailed plan and schedule for development, a management plan which includes a description of how any revenues will be used, and any known environmental or cultural concerns specific to the land.

TRANSPORTATION FACILITY

See Exhibits 4b thru 4d

5. If applicant is State or Political subdivision thereof, cite your statutory or other authority to hold land for these purposes.

NEVADA REVISED STATUTES 393.10

6. Attach a copy of your authority for filing this application and to perform all acts incident thereto.

7. If land described in this application has not been classified for recreation and/or public purposes pursuant to the Recreation and Public Purposes Act, consider this application as a petition for such classification.

(Continued on page 2)

8. Are all activities, facilities, services, financial aid, or other benefits as a result of your proposed development provided without regard to race, color, religion, national origin, sex, or age? ☑ Yes ☐ No *(If "no," describe the situation or activity and your plans for achieving compliance.)*

9. Are all activities, facilities, and services constructed or provided as a result of your proposed development accessible to and usable by persons with disabilities? ☑ Yes ☐ No *(If "no," describe the situation or activity and the reasons for nonaccessibility).*

Applicant's Signature | Date 12-17-9

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious, or fraudulent statements or representation as to any matter within its jurisdiction.

GENERAL INSTRUCTIONS

1. Type or print plainly in ink.
2. Submit application and related plans to the BLM District or Resource Area Office in which the land is located.
3. Study controlling regulations in 43 CFR 2740 *(Sales)* and 43 CFR 2912 *(Leases)*.
4. If applicant is non-governmental association or corporation, attach a copy of your charter, articles of incorporation or other creating authority. If this information has been previously filed with any BLM office, refer to previous filing by date, place, and case serial number.
5. If applicant is non-governmental association or corporation, attach a copy of your authority to operate in the State where the lands applied for are located. If previously filed with any BLM office, refer to previous filing by date, place, and case serial number.

SPECIFIC INSTRUCTIONS
(Items not listed are self-explanatory)

Item

2. If land is surveyed, give complete legal description. If land is unsurveyed, description should be by metes and bounds connected, if feasible, by course and distance with a corner of public land survey. If possible, approximate legal subdivisions of unsurveyed lands should be stated. Acreage applied for must not exceed that specified by regulations.

3a Generally, title to lands will not be granted upon initial approval of an application. In order to assure proper development or use plans, the general practice will be to issue a lease or lease with option to purchase after development is essentially completed. In any case, term of lease may not exceed 20 years for non-profit organizations or 25 years for governmental agencies, instrumentalitiesor political subdivisions.

4. Leases and patents under this act are conditioned upon continuing public enjoyment of the purposes for which the land is classified. The plan of development, use, and maintenance must show, at a minimum:
   a. A need for proposed development by citing population trends, shortage of facilities in area, etc.
   b That the land will benefit an existing or definitely proposed public project authorized by proper authority.
   c. Type and general location of all proposed improvements, including public access *(roads, trails, etc.)*. This showing may take the form of inventory lists, maps, plats, drawings, or blueprints in any combination available and necessary to describe the finished project. Site designs should be provided for intensive use sites and general information about improvements existing or planned on lands within the overall project.
   d. An estimate of the construction costs, how the proposed project will be financed, including a list of financial sources, and an estimated timetable for actual construction of all improvements and facilities.
   e. A plan of management to include operating rules, proposed source and disposition of revenues arising from the proposed operation, personnel requirements, etc.
   f. A specific maintenance plan to include, for example, sewage and garbage disposal, road maintenance, upkeep and repair of grounds and physical facilities, etc.
   g. Applications for solid waste disposal sites must comply with guidelines established by the Environmental Protection Agency (40 CFR 258) and must include a detailed physical description of the site including a map, description of ground water situation, soil characteristics and management plan.

6. This may consist of a copy of a delegation of authority, resolution or other evidence of authority from the governing board of the applicant's organization, copy of the by-laws of the organization, or the like.

(Continued page 3)

NOTICES

The Privacy Act of 1974 and the regulation in 43 CFR 2.48 (d) provide that you be furnished the following information in connection with information required by this application for a Land Use Authorization.
AUTHORITY: 43 U.S.C. 869 et seq.; 43 CFR Part 2740
PRINCIPAL PURPOSE: The information is to be used to process your application.
ROUTINE USES: (1) The adjudication of the applicant's request for a Land Use Authorization. (2) Documentation for public information. (3) Transfer to appropriate Federal agencies when concurrence is required prior to granting a right in use of public lands or resources. (4) (5) Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecutions.
EFFECT OF NOT PROVIDING INFORMATION: Disclosure of the information is mandatory for processing of the application. If all the information is not provided, the application may be rejected.

The Paperwork Reduction Act of 1995 requires us to inform you that:
BLM collects this information to process your request for Federal lands under the provisions of June 14, 1926 (43 U.S.C. 869 as amended), Recreation and Public Purposes Act.
Information will be used to illustrate whether the applicant meets requirements of regulations found in 43 CFR Subpart 2740. Response to this request is mandatory, see regulations found in 43 CFR Subpart 2741.4.
BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT: Public reporting burden for this form is estimated to average 40 hours per response, including the time for reviewing instructions, gathering, and maintaining data and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to the U.S. Department of the Interior, Bureau of Land Management (1004-0012), Bureau Information Collection Clearance Officer (WO-630), 1849 C Street, N.W., Mail Stop 401 LS, Washington, D.C. 20240.

RESOLUTION

Be it hereby resolved by the Board of School Trustees of the Clark County School District that on this 22nd day of May, 2008, Jeff Weiler, Chief Financial Officer, Finance and Operations Division, is hereby authorized to sign all documents and applications necessary and pertinent to obtaining rights to lands under federal jurisdiction for the purpose of providing a site, or sites, for educational and related school facilities.

CLARK COUNTY SCHOOL DISTRICT
BOARD OF SCHOOL TRUSTEES

Mary Beth Scow, President

Carolyn Edwards, Clerk

APPROVED AS TO FORM:

4/28/08

C. W. Hoffman, Jr., General Counsel

STATE OF NEVADA
COUNTY OF CLARK

On this 22nd day of May, 2008, personally appeared before me, a Notary Public in and for said county and state, Mary Beth Scow and Carolyn Edwards, known to me to be the president and clerk of the BOARD OF SCHOOL TRUSTEES, CLARK COUNTY SCHOOL DISTRICT, a political subdivision of the State of Nevada, and upon oath did each depose that they are the officers of said subdivision as above designated.

Notary Public in and for the above county and state.

PATRICIA A. O'GARA
Notary Public State of Nevada
No. 07-2982-1
My appt. exp. May 4, 2011

STANDARD OPERATING PROCEDURES

1. If a tortoise wanders onto the site during construction, all activity would cease until the tortoise wanders out of harms way of its own volition.

2. All construction workers would be notified of the current threatened status of the desert tortoise and the prohibition of "take"; they would also be instructed to check under all vehicles before moving such vehicles (tortoises often take cover under vehicles).

3. The BLM would be notified before construction of this proposed action.

4. All boring or trenches would be either backfilled, securely covered, or fenced at the end of each work day to insure that no desert tortoise inadvertently fall into such boring holes or trenches.

5. If an active burrow is found on the site during construction, all work would cease and the BLM authorized officer would be notified.

6. Any necessary vegetation permits would be obtained from the State of Nevada when State of Nevada Sensitive, Protected rare, or Protected endangered plan species exist on the construction site, which may be impacted.

(Signature required for concurrence)

CLARK COUNTY SCHOOL DISTRICT
Finance & Operations Division
2832 E. Flamingo Road
Las Vegas, NV 89121

Jeff Weiler, Chief Financial Officer

12-17-09
DATE

Exhibit 4b(a) – SITE DEVELOPMENT

The site is located on approximately forty acres of land located north of Washburn Road, between the I-215 Beltway and Puli Drive.

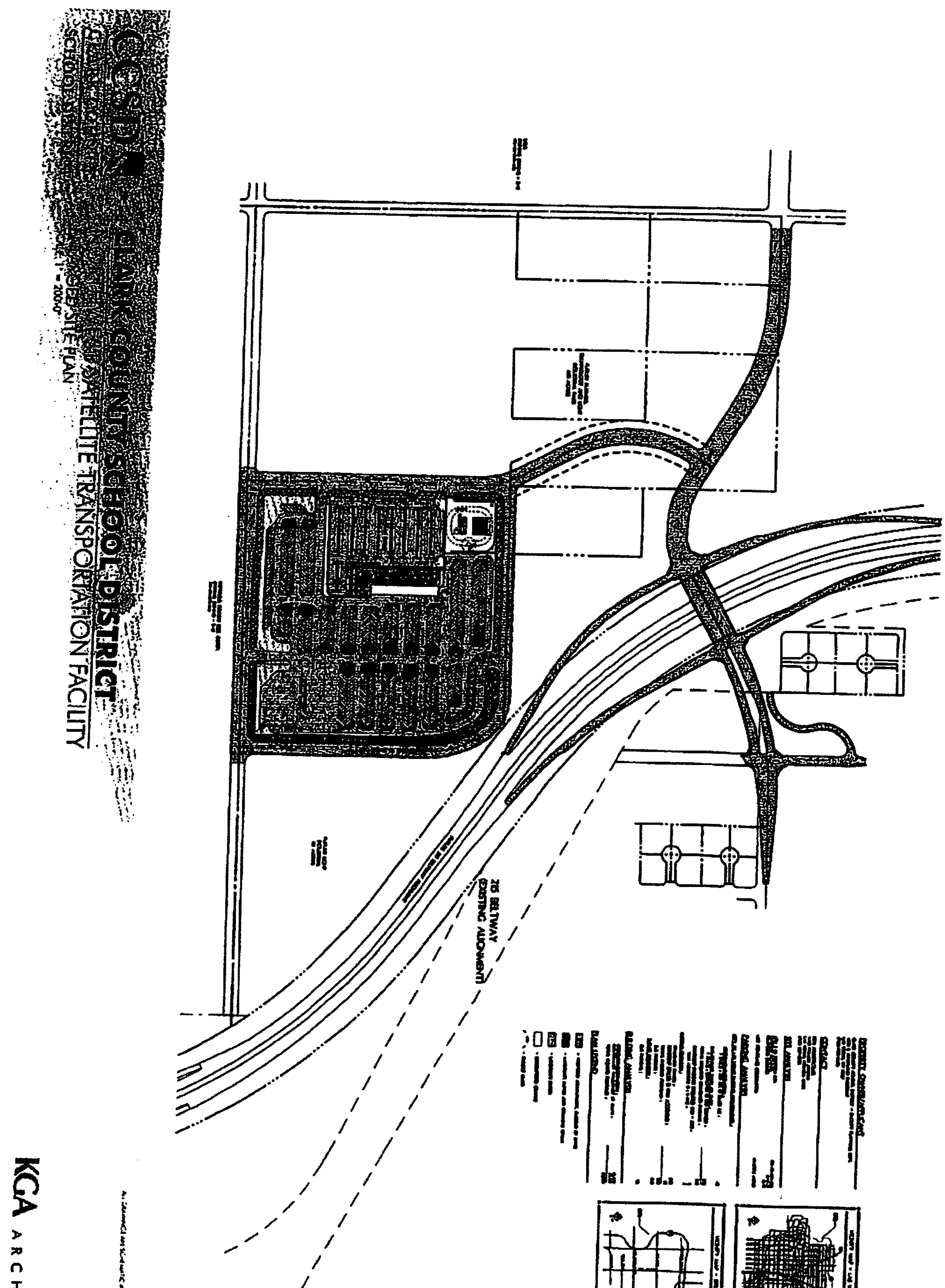
As of September 2009, the official enrollment of the Clark County School District was 309,476. The total number of students eligible to be transported district wide on a daily basis is 112,136.

There are currently almost 1,500 buses, including special education buses, assigned to the five bus yards servicing the Las Vegas valley students. The White Transportation facility is located at Arville Street and Harmon Road; the Tate Transportation facility is located at Cheyenne Avenue and Revere Street; the Robertson Transportation facility is located at Eastern Avenue and Stewart Avenue; the Koepsell Transportation facility is located at Galleria Drive and Russell Road; and the Wallace Transportation facility is located at Las Vegas Boulevard and Welpman Way.

The need for an additional transportation facility to service the students has become critical due to an increase in development in the west and northwest area of the valley.

A preliminary site plan, based on the aforementioned transportation facilities, is attached. The total cost of construction cannot be established at this time. The facility will be built to code as required by the City and the State.

The funding for this project will be from sale of bonds as approved by the electorate of Clark County in 1998.



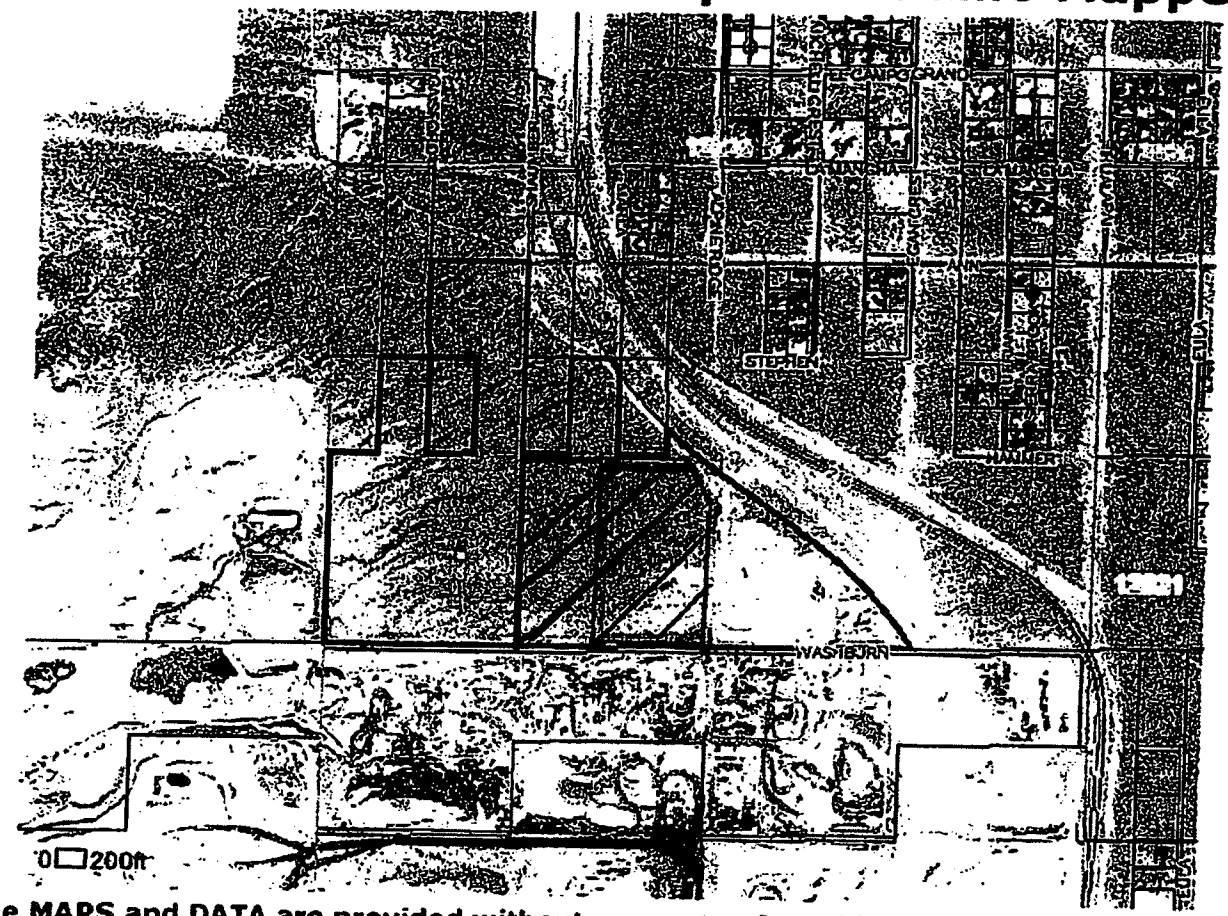
SE1/4NW1/4

Sec 36 T.19S. R.59E.

APN 126-36-201-002

4b (3-1)

Southern Nevada GIS ~ OpenWeb Info Mapper



The MAPS and DATA are provided without warranty of any kind, expressed or implied.

Date created: 12/17/2009

Property Information

Parcel Number:	12636201002
Owner Name(s):	USA
Site Address:	0
Jurisdiction:	Las Vegas - 89166
Zoning Classification:	Undeveloped/ (U(PCD))

Miscellaneous Information

Subdivision Name: PT N2 SEC 36 19 59
Construction Year: 0
Last Sales Date: 00/0000
Last Sales Price: $0
Recorded Doc Number: 9999999999999
T-R-S: 19-59-36
Census Tract: 3203
Estimated Lot Size: 131.7 acres

Elected Officials

Commission District: C - LARRY BROWN	**City Ward:** 6 - STEVEN D. ROSS
U.S. Senate: JOHN ENSIGN, HARRY REID	**U.S. Congress:** 03 - DINA TITUS
State Senate: 9 - DENNIS NOLAN	**State Assembly:** 4 - RICHARD MCARTHUR
School District: E - TERRI JANISON	**University Regent:** 12 - VACANT
Board of Education: 1 - GLORIA BONAVENTURA	**Minor Civil Division:** Las Vegas Township

N _____
2800
(NV -050.1)

____ No hazardous materials will be used or transported across the requested right-of-way.

__X__ The following hazardous materials will be used on or transported across the requested right-of-way.

See Attached List (Transportation Facility)

CLARK COUNTY SCHOOL DISTRICT
Finance & Operations Division
2832 E. Flamingo Road
Las Vegas, NV 89121

Jeff Weiler
Chief Financial Officer

12-17-09
Date

HAZARDOUS MATERIALS INVENTORY

Facility Name:_ Transportation_____
Room#:_Parts Room_____

Inventoried By::_____
Date Completed:_____

(1) Product or Chemical Name (From Label)	(2) Manufacturer Address & Phone (From Label)	(3) Physical State (S,L,G)	(4) Quantities On Hand MAX	AVG	(5) Container Type	Size	(6) Storage Location	FOR OFFICE USE ONLY
PREMALUBE	Box 152170 Irving TX 75015 (972)-438-1381	S	4	2	Metal	55 gal	Warehouse	
ODOR BEA GONE	Beaver Research Corp 1025 W. North St.	L	12	6	Can	12 oz	Parts Room	
	Kalamazoo MI 49007 (800)-544-0133							
PREMALUBE	Box 152170 Irving TX 75015 (972)-438-1381	S	4	2	Metal	55 gal	Warehouse	
FLARES	Standard Fusee Corp. P.O. Box 1047 Easton	S	24	12	Box		Shop	
	MD 21601 (800)-637-7800							
PREMIUM VACUUM PUMP OIL	Robinair SPX Corp. 1224 Robinair Way	L	24	12	Plastic	1 qt	Parts Room	
	Montpelier OH 43543 (419)-485-5561							
AES HEAVY DUTY ANTIFREEZE	Automotive Environmental Services 2081 Bay	L	1	1	Plastic	210 gal	Shop	
	Rd. E. Palo Alto CA 94303 (888)-242-8502							
AEROSOL PAINT REMOVER	ZEP Manufacturing Co P.O. Box 2015 Atlanta	L	12	6	Can	16 oz	Shop	
	GA 30301 (404)-352-1480							
ENVIRO-KLEEN	Enviro Safe products 7415 Hawk Shadow Ave	L	4	2	Plastic	5 gal	Parts Room	
	Las Vegas NV 89113 (702)-873-0594							
ALUMINUM OXIDE RESIN GRINDING WHEEL	Norton Co. 1 Bond St. Worcester MA 01615	S	6	3	Metal		Shop/Parts Room	
	(508)-795-5000							

Use More Than 1 Line if Necessary

DO NOT REDUCE THE SIZE OF THIS FORM

Supercedes All Other Forms

HAZARDOUS MATERIALS INVENTORY

Facility Name:_ Transportation_____
Room#:_Parts Room_____

Inventoried By::_____
Date Completed:_____

(1) Product or Chemical Name (From Label)	(2) Manufacturer Address & Phone (From Label)	(3) Physical State (S,L,G)	(4) Quantities On Hand MAX	AVG	(5) Container Type	Size	(6) Storage Location	FOR OFFICE USE ONLY
OIL SORB 22	National Sanitary Supply 255 E. 5th St. suite	S	50	30	Bag	50 lb	Warehouse	
	2900 Cincinnati OH 45202 (800)-535-5053							
PRE-CLEAN PLUS	KO Manufacturing Inc. P.O. Box 3574	S	4	2	Plastic	5 gal	Shop	
	Springfield MO 65808 (417)-866-8000							
76 UNOBA EP GREASE	76 Lubricants Co. 7 Cummins Point Rd	S	12	6	Tube	1 lb	Parts Room	
	Stanford CT 06901 (800)-762-0942							
WIPE OFF	Sunrise Environments Scientific P.O. Box	L	6	3	Metal	16.5 oz	Parts Room	
	10207 Reno NV (775)-359-8494							
ALUMINUM SAFE METAL CLEANER	KO Manufacturing Inc 2720 E. Division P.O.	L	6	3	Metal	1 gal	Shop	
	Box 3574 Springfield MO 65808							
	(417)-866-8000							
METAL GROOM PLUS AEROSOL	X-Ergon Box 152170 Irving TX 75015	L	12	6	Metal	16 oz	Shop	
	(972)-438-1381							
ALL PRO	Atco International 1401 Barclay circle Marietta	L	18	3	Plastic	1 gal	Shop	
	GA 30060 (770)-424-7550							

Use More Than 1 Line if Necessary

DO NOT REDUCE THE SIZE OF THIS FORM

Supercedes All Other Forms

HAZARDOUS MATERIALS INVENTORY

Facility Name:_ Transportation_____
Room#:_Parts Room_____

Inventoried By::_____
Date Completed:_____

(1) Product or Chemical Name (From Label)	(2) Manufacturer Address & Phone (From Label)	(3) Physical State (S,L,G)	(4) Quantities On Hand MAX	AVG	(5) Container Type	Size	(6) Storage Location	FOR OFFICE USE ONLY
HAND WASH ONE STEP	L.A. Chemical 3880 E. Craig Rd N. Las Vegas	L	18	3	Plastic	1 gal	Parts Room	
	NV 89030 (702)-644-7787							
CHEVRON 15W40 RPM	Haycock 715 W. Bonanza Rd Las Vegas NV	L	60	24	Plastic	1 qt	Parts Room	
	89125 (702)-382-1620							
GO AWAY	Nex-Gen 13230 Raymer St. N. Hollywood CA	L	12	6	Plastic	1 gal	Shop	
	91605 (818)-982-5242							
AUTO LEAD FREE GAS	River city Petroleum 840 Delta Lane P.O. Box	L	12000	5000	In grnd	12000	Fuel Island	
	235 W. Sacramento CA 95691 (916)-371-4960							
NO. 2 DIESEL FUEL	River city Petroleum 840 Delta Lane P.O. Box	L	20000	5000	In grnd	20000	Fuel Island	
	235 W. Sacramento CA 95691 (916)-371-4960							
KT PAINT YELLOW	Brock Supply Co. P.O. Box 1000 Tempe AZ	L	12	6	Plastic	2 oz	Parts Room	
	85280 (602)-968-2222							
KT PAINT WHITE	Brock Supply Co. P.O. Box 1000 Tempe AZ	L	12	6	Plastic	2 oz	Parts Room	
	85280 (602)-968-2222							
POWER STEAM I	Royce Industries 2225 S. 400 W. Salt Lake UT	L	2	1	Plastic	55 gal	Wash Rack	
	84115 (801)-485-4900							

Use More Than 1 Line if Necessary

DO NOT REDUCE THE SIZE OF THIS FORM

Revised
Supercedes All Other Forms

HAZARDOUS MATERIALS INVENTORY

Facility Name:_ . . Transportation_____
Room#:_Parts Room_____

Inventoried By::_____
Date Completed:_____

(1) Product or Chemical Name (From Label)	(2) Manufacturer Address & Phone (From Label)	(3) Physical State (S,L,G)	(4) Quantities On Hand MAX	AVG	(5) Container Type	Size	(6) Storage Location	FOR OFFICE USE ONLY
STRETCH FILM	Tenneco Packaging Products 1900 N. Field Ct.	S	6	3	Roll		Parts Room	
	Lake Forest IL (888)-828-2850							
FLEET CLEAN SOAP	L.A. Chemical 3880 E. Craig Rd N. Las Vegas	L	2	1	Plastic	55 gal	Warehouse	
	NV 89030 (702)-644-7787							
RADIATOR PAINT	The Barbee Co. 418 E. Breckenridge Rd	L	2	1	Plastic	5 gal	Radiator Shop	
	Louisville KY (502)- 584-2155							
SOLDER FLUX	The Barbee Co. 418 E. Breckenridge Rd	S	2	1	Metal	50 lb	Radiator Shop	
	Louisville KY (502)- 584-2155							
PARTS WASH SOLVENT	Safety Kleen 1000 N. Randall Rd Elgin IL	L	2	2	Metal	20 gal	Shop	
	60123 (800)-669-5840							
CARBURETOR CLEANER	Safety Kleen 1000 N. Randall Rd Elgin IL	L	1	1	Metal	20 gal	Shop	
	60123 (800)-669-5840							
PROPANE	R&H Gas 4300 N. Pecos Las Vegas NV	G	2	2	Metal	30 gal	Outside Shop	
	(702)-694-9313							
GREASE L-52	Union Oil Co. 1201 W. 5th St. Los Angles CA	S	3	2	Metal	55 gal	Warehouse	
	(213)-977-7589							

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Supercedes All Other Forms

HAZARDOUS MATERIALS INVENTORY

Facility Name:_' Transportation_____
Room#:_Parts Room_____

Inventoried By::_____
Date Completed:_____

(1) Product or Chemical Name (From Label)	(2) Manufacturer Address & Phone (From Label)	(3) Physical State (S,L,G)	(4) Quantities On Hand MAX	AVG	(5) Container Type	Size	(6) Storage Location	FOR OFFICE USE ONLY
WHEEL BEARING GREASE	Texaco 2000 W. Chester White Plains NY	S	5	2	Metal	5 gal	Warehouse	
	(914)-831-3400							
ATF DEXRON III	Union Oil Co. 1201 W. 5th St. Los Angles CA	L	10	5	Metal	55 gal	Warehouse	
	(213)-977-7589							
BRAKE FLUID	Wagner Brake Division 930 Roosevelt	L	10	5	Metal	5 gal	Warehouse	
	Chesterfield MO (314)-537-8700							
R-12 REFRIGERANT	Racon 6040 S. Ridge Rd. Witchita KS	G	40	20	Metal	30 lb	Warehouse	
	(415)-821-5388							
WELDING ROD	Alloy Rods Corp. P.O. Box 517 Wilson	S	4	2	Metal	50 lb	Parts Room	
	Hanover PA (717)-637-8911							
AUTOMOTIVE BODY FILLER	Fibre Glass-Evercoat Co. 6600 Cornell Rd	S	6	3	Metal	1 gal	Body Shop	
	Cincinnati OH 45242 (513)-489-7600							
CREAM HARDENER	Fibre Glass-Evercoat Co. 6600 Cornell Rd	S	12	6	Plastic	2 oz	Body Shop	
	Cincinnati OH 45242 (800)-729-7600							
GEAR OIL	Union Oil Co. 1201 W. 5th St. Los Angles CA	L	4	2	Metal	55 gal	Warehouse	
	(800)-424-9300							

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HAZARDOUS MATERIALS INVENTORY

Facility Name: Transportation
Room#: Parts Room

Inventoried By::
Date Completed:

(1) Product or Chemical Name (From Label)	(2) Manufacturer Address & Phone (From Label)	(3) Physical State (S,L,G)	(4) Quantities On Hand MAX	AVG	(5) Container Type	Size	(6) Storage Location	FOR OFFICE USE ONLY
GASKET REMOVER	Permatex/Loctite 4450 Cranwood Ct	L	40	12	Metal	15 oz	Parts Room	
	Cleveland OH (800)-321-9188							
WHITE LITHIUM GREASE	Sta-Lube 3039 Ana St Rancho Dominguez	L	20	5	Tube	1.5 oz	Parts Room	
	CA (213)-774-1574							
WEATHER-STRIP ADHESIVE	3m 3m Center St. Paul MN (612)-733-1110	S	24	10	Tube	5 oz	Parts Room	
DRIP CHECK SEALER	3m 3m Center St. Paul MN (612)-733-1110	S	5	3	Tube	5 oz	Parts Room	
CLEAR AUTO GLASS SEALER	3m 3m Center St. Paul MN (612)-733-1110	S	5	3	Tube	5 oz	Parts Room	
ANTIFREEZE	Haycock 715 W. Bonanza Rd Las Vegas NV	L	6	3	Metal	55 gal	Warehouse	
	(702)-382-1620							
15W40 BULK OIL	Haycock 715 W. Bonanza Rd Las Vegas NV	L	1650	800	In Grnd	550 gal	Yard	
	(702)-382-1620							
B12 CHEMTOOL	Berryman 3800 E. Randol Arlington TX	L	280	120	Metal	16 oz	Parts Room	
	(800)-535-5053							
TIRE CEMENT	Camel Tire Care P.O. Box 769 Muskogee OK	L	24	12	Metal	8 oz	Parts Room	
	(918)-687-5427							

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HAZARDOUS MATERIALS INVENTORY

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Room#:_Parts Room

Inventoried By::
Date Completed:

(1) Product or Chemical Name (From Label)	(2) Manufacturer Address & Phone (From Label)	(3) Physical State (S,L,G)	(4) Quantities On Hand MAX	AVG	(5) Container Type	Size	(6) Storage Location	FOR OFFICE USE ONLY
SPRAY PAINT	Master Corp. 1900 Exetee Rd Germantown PA	L	400	250	Metal	12 oz	Parts Room	
	(901)-757-5700							
THREAD LOC	Fel-Pro Inc. 7450 N. McCormick Skokie IL	L	40	20	Plastic	1.22 oz	Parts Room	
	(312)-674-7700							
ANTI SEIZE	Permatex/Loctite 4450 Cranwood Cleveland	L	24	12	Plastic	8 oz	Parts Room	
	OH (800)-321-9188							
REAR VIEW MIRROR ADHESIVE	Pmatex/Loctite 4450 Cranwood Cleveland	L	12	6	Plastic	1 oz	Parts Room	
	OH (800)-321-9188							
TEFLON THREAD SEALER	Pmatex/Loctite 4450 Cranwood Cleveland	L	48	24	Tube	1 oz	Parts Room	
	OH (800)-321-9188							
RUBBER LUBE	JTM Products P.O. Box 22747 Beachwood OH	L	36	12	Plastic	1 gal	Parts Room	
	(216)-831-0404							
SUPER BONDER	Permatex-Loctite 4450 Cranwood Cleveland	L	60	30	Tube	.07 oz	Parts Room	
	OH (800)-321-9188							
PENETRATING OIL	Sta-Lube Inc. 3039 Ana St. Rancho Dominguez	L	48	12	Metal	15 oz	Parts Room	
	CA (213)-537-5650							

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Room#:_Parts Room_____

Inventoried By::_____
Date Completed:_____

(1) Product or Chemical Name (From Label)	(2) Manufacturer Address & Phone (From Label)	(3) Physical State (S,L,G)	(4) Quantities On Hand MAX	AVG	(5) Container Type	Size	(6) Storage Location	FOR OFFICE USE ONLY
BATTERY TERMINAL COAT	Permatex/Loctite 4450 Cranwood Cleveland	L	12	6	Metal	5 oz	Parts Room	
	OH (800)-321-9188							
SILICONE SPRAY	Permatex/Loctite 4450 Cranwood Cleveland	L	36	12	Metal	10.25 oz	Parts Room	
	OH (800)-321-9188							
MIRROR BRITE	L.A. Chemical 3880 Craig Rd N. Las Vegas	L	12	4	Plastic	1 gal	Parts Room	
	NV (702)-644-7787							
TEST TANK POWDER	Johnson Manufacturing 114 Lost Grove	S	24	12	Plastic	12 oz	Parts Room	
	Princeton IA (319)-289-5123							
HOT TANK CLEANER	L.A. Chemical 3880 Craig Rd N. Las Vegas	S	200 lb	100 lb	Plastic	50 lb	Shop	
	NV (702)-644-7787							
CARB & CHOKE CLEANER	Permatex/Loctite 4450 Cranwood Cleveland	L	400	200	Metal	11 oz	Parts Room	
	OH (800)-321-9188							
MURATIC ACID	L.A. Chemical 3880 Craig Rd N. Las Vegas	L	4	2	Plastic	1 gal	Parts Room	
	NV (702)-644-7787							
HYDRAULIC FLUID	Citgo Petroleum Corp P.O. Box 3758 Tulsa OK	L	1	1	Metal	55 gal	Shop	
	(318)-491-6215							

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HAZARDOUS MATERIALS INVENTORY

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Room#:_Parts Room_____

Inventoried By::_____
Date Completed:_____

(1) Product or Chemical Name (From Label)	(2) Manufacturer Address & Phone (From Label)	(3) Physical State (S,L,G)	(4) Quantities On Hand MAX	AVG	(5) Container Type	Size	(6) Storage Location	FOR OFFICE USE ONLY
BLITZ FOGGER	National Sanitary 13217 S. Figuera Los Angles	L	24	12	Metal	7.5 oz	Parts Room	
	CA (213)-327-6795							
NAL-COOL	Carquest 5500 S. Hattie Ok City OK	L	2	1	Plastic	55 gal	Warehouse	
	(405)-672-2311							
BRAKE CLEAN	Berryman 3800 Randol Arlington TX	L	240	120	Metal	14 oz	Parts Room	
	(800)-535-5053							
DISC BRAKE QUIET	Permatex/Loctite 4450 Cranwood Cleveland	L	36	12	Metal	8 oz	Parts Room	
	OH (216)-663-3011							
SOLDER ACID CORE	Champ Edwardsville Ks	S	15	6	Plastic	1 lb	Parts Room	
SOLDER ROSIN CORE	Champ Edwardsville Ks	S	15	6	Plastic	1 lb	Parts Room	
SOLDER SOLID	Modine	S	4	2	Plastic	25 lb	Parts Room	
RED DEVIL POWDER FLUX	Federal Metals 1142 S. Norwood Tulsa OK	S	1	1	Plastic	50 lb	Shop	
	74112 (800)-880-4461							
R134A FREON	Refron Inc. 1841 E. Craig Rd Las Vegas NV	L	8	4	Metal	125 lb	Warehouse	
	(800)-221-0603							

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(1) Product or Chemical Name (From Label)	(2) Manufacturer Address & Phone (From Label)	(3) Physical State (S,L,G)	(4) Quantities On Hand MAX	AVG	(5) Container Type	Size	(6) Storage Location	FOR OFFICE USE ONLY
POWER STEERING FLUID	Carquest 5500 S. Hattie Ok City OK	L	60	30	Plastic	12 oz	Parts Room	
	(405)-672-2311							
LEAD ACID BATTERY	Batteries West 4320 W. Reno Las Vegas NV	S	250	125	Polypr	Various	Warehouse	
	(702)-876-6039							
ULTRA BLUE	Permatex/Loctite 4450 Cranwood Cleveland	S	40	20	Tube	3.35 oz	Parts Room	
	OH (800)-321-9188							
ULTRA COPPER	Permatex/Loctite 4450 Cranwood Cleveland	S	40	20	Tube	3 oz	Parts Room	
	OH (800)-321-9188							
TOP GRIT	Pace National 500 7th Ave S. Kirkland WA	L	12	6	Plastic	1 gal	Parts Room	
	(800)-424-9300							
POLYESTER OIL	Cooper Industries 6565 Wells Ave St. Louis	L	12	6	Plastic	1 qt	Parts Room	
	MO (314)-977-0300							
REFRIGERANT OIL	ICI Americas Inc. Wilmington DE	L	12	6	Plastic	1 qt	Parts Room	
	(302)-886-3000							
PAG OIL	Cooper Industries 6565 Wells Ave St. Louis	L	12	6	Plastic	1 qt	Parts Room	
	MO (314)-977-0300							

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SEM COLOR COAT	Sem Products Inc. 651 Michael Wylie Dr.	L	120	60	Metal	13 oz	Parts Room	
	Charlotte NC 28127 (704)-522-1006							
LACQUER THINNER	DuPont Co. Automotive Wilmington DE 19898	L	2	1	Metal	1 gal	Shop	
	(800)-441-7515							
ACRYLIC ENAMEL	DuPont Co. Automotive Wilmington DE 19898	L	2	1	Metal	1 gal	Shop	
	(800)-441-7515							
ENAMEL REDUCER	DuPont Co. Automotive Wilmington DE 19898	L	2	1	Metal	1 gal	Shop	
	(800)-441-7515							
ACTIVATOR	DuPont Co. Automotive Wilmington DE 19898	L	2	1	Metal	1 gal	Shop	
	(800)-441-7515							
PRIMER SEALER	DuPont Co. Automotive Wilmington DE 19898	L	2	1	Metal	1 gal	Shop	
	(800)-441-7515							
CHROMATE PRIMER	DuPont Co. Automotive Wilmington DE 19898	L	2	1	Metal	1 gal	Shop	
	(800)-441-7515							
LACQUER REMOVER	DuPont Co. Automotive Wilmington DE 19898	L	2	1	Metal	1 gal	Shop	
	(800)-441-7515							

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Facility Name:_ Transportation_____
Room#:_Parts Room_____

Inventoried By:_____
Date Completed:_____

(1) Product or Chemical Name (From Label)	(2) Manufacturer Address & Phone (From Label)	(3) Physical State (S,L,G)	(4) Quantities On Hand MAX	AVG	(5) Container Type	Size	(6) Storage Location	FOR OFFICE USE ONLY
URO FINISHES	DuPont Co. Automotive Wilmington DE 19898	L	2	1	Metal	1 gal	Shop	
	(800)-441-7515							
CHROMABASE ACTIVATOR	DuPont Co. Automotive Wilmington DE 19898	L	2	1	Metal	1 gal	Shop	
	(800)-441-7515							
BINDERS & BASEMAKERS	DuPont Co. Automotive Wilmington DE 19898	L	2	1	Metal	1 gal	Shop	
	(800)-441-7515							
VOC PRODUCTS	DuPont Co. Automotive Wilmington DE 19898	L	2	1	Metal	1 gal	Shop	
	(800)-441-7515							
CHROMAPREMIER	DuPont Co. Automotive Wilmington DE 19898	L	2	1	Metal	1 gal	Shop	
	(800)-441-7515							
AREOSHELL	Equilon Enterprises LLC P.O. Box 674414	L	12	6	Metal	1 gal	Parts Room	
	Houston TX 77267 (800)-424-9300							
FRANKLIN SPRAY AND WIPE	Franklin Cleaning Tech. P.O. Box 214 Great	L	12	6	Plastic	32 oz	Parts Room	
	Bend KS 67530 (800)-810-4829							

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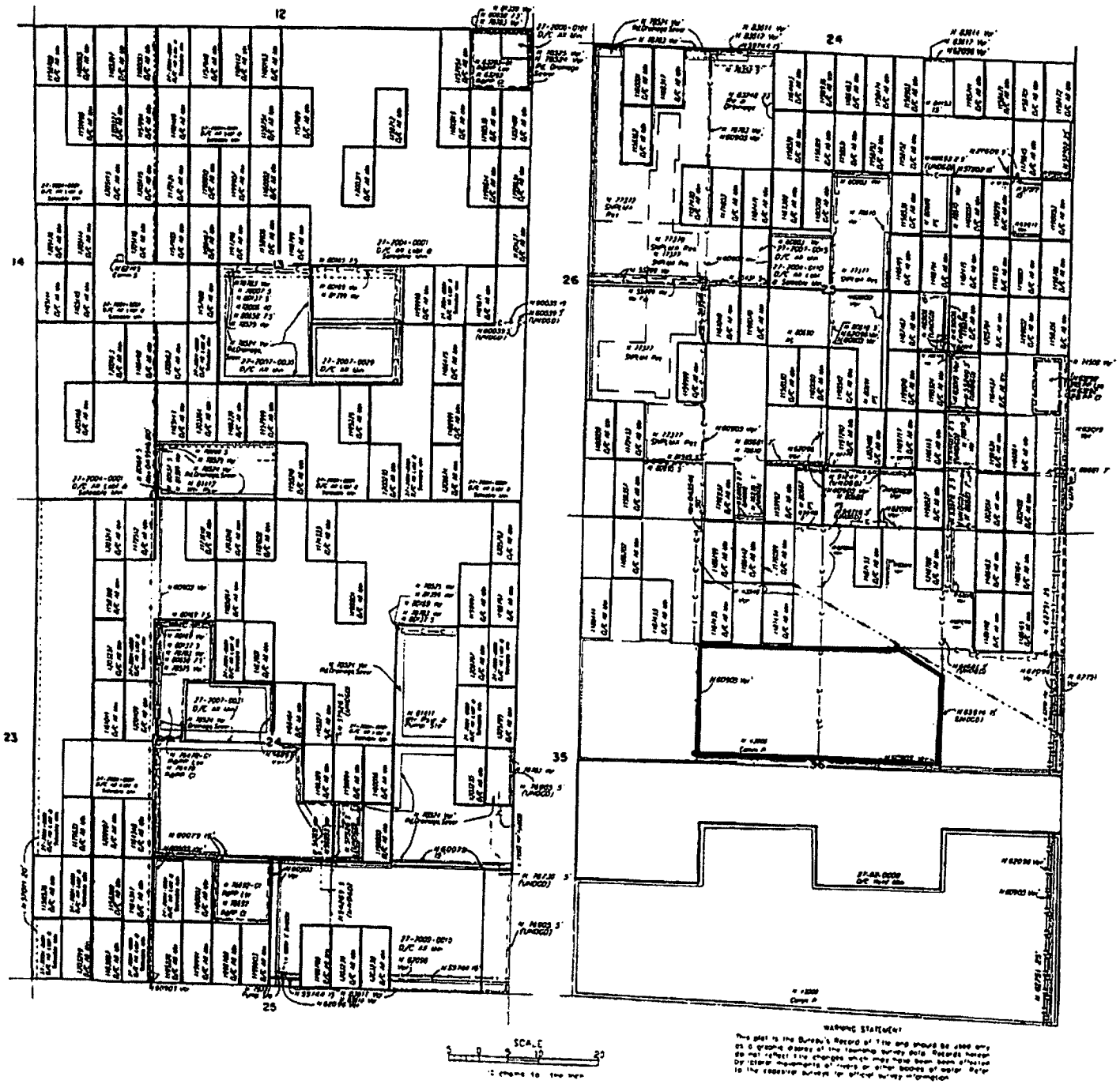
PRINTED 12/11/07

TOWNSHIP 19 SOUTH RANGE 59 EAST OF THE MOUNT DIABLO MERIDIAN, NEVADA



STATUS OF PUBLIC DOMAIN LAND AND MINERAL TITLES

MT PLAT

Suppl Sec 13,24,25,36

INDEX TO SEGREGATED TRACTS				
RESURVEY TRACT NO	ORIGINAL SURVEY T	R	SEC	SUBDIVISION

FOR ORDERS EFFECTING DISPOSAL OR USE OF UNSURVEYED LANDS WITHDRAWN FOR CLASSIFICATION, MINERALS, WATER AND/OR OTHER PUBLIC PURPOSES, REFER TO INDEX OF MISCELLANEOUS DOCUMENTS.

CURRENT TO	BY
4/24/09	MS
6/12/09	MS
8/19/09	MS
8/24/09	MS
12/1/09	MS

N 050
T 19S
R 59E

EXHIBIT 4b(b) – MANAGEMENT PLAN

The site is located on approximately forty acres of land located north of Washburn Road, between the I-215 Beltway and Puli Drive.

As of September 2009, the official enrollment of the Clark County School District was 309,476. The total number of students eligible to be transported district wide on a daily basis is 112,136.

There are currently almost 1,500 buses, including special education buses, assigned to the five bus yards servicing the Las Vegas valley students. The White Transportation facility is located at Arville Street and Harmon Road; the Tate Transportation facility is located at Cheyenne Avenue and Revere Street; the Robertson Transportation facility is located at Eastern Avenue and Stewart Avenue; the Koepsell Transportation facility is located at Galleria Drive and Russell Road; and the Wallace Transportation facility is located at Las Vegas Boulevard and Welpman Way.

The need for an additional transportation facility to service the students has become critical due to an increase in development in the west and northwest area of the valley.

A preliminary site plan, based on the aforementioned transportation facilities, is attached. The total cost of construction cannot be established at this time. The facility will be built to code as required by the City and the State.

The funding for this project will be from the sale of bonds as approved by the electorate of Clark County in 1998.

EXHIBIT 4b(c) - POPULATION TRENDS, ETC.

Given the growth in the Las Vegas Valley over the past ten years and the increase of Clark County's population nearly two million people and a student population increase of over 92,300 to an enrollment of 309,476 students, the need to continue to address the needs of these and future students remains the priority of the Clark County School District.

Within Clark County there are currently 213 elementary schools, 59 middle schools, and 48 high schools. The outlying areas within the jurisdiction of Clark County are included in these figures. In addition to these schools, there are 20 Education Services Division special school facilities, and 12 support facilities. The five transportation centers currently service 1,275 bus routes with a staff of 1,377 drivers in the Las Vegas Valley.

Land values are gradually slowing down but are still averaging over $200,000 per acre, and the cost of construction has tripled over the past ten years. It is therefore beneficial and fiscally prudent to the taxpayer that the school district continues to make use of BLM land for school and facility sites where available.

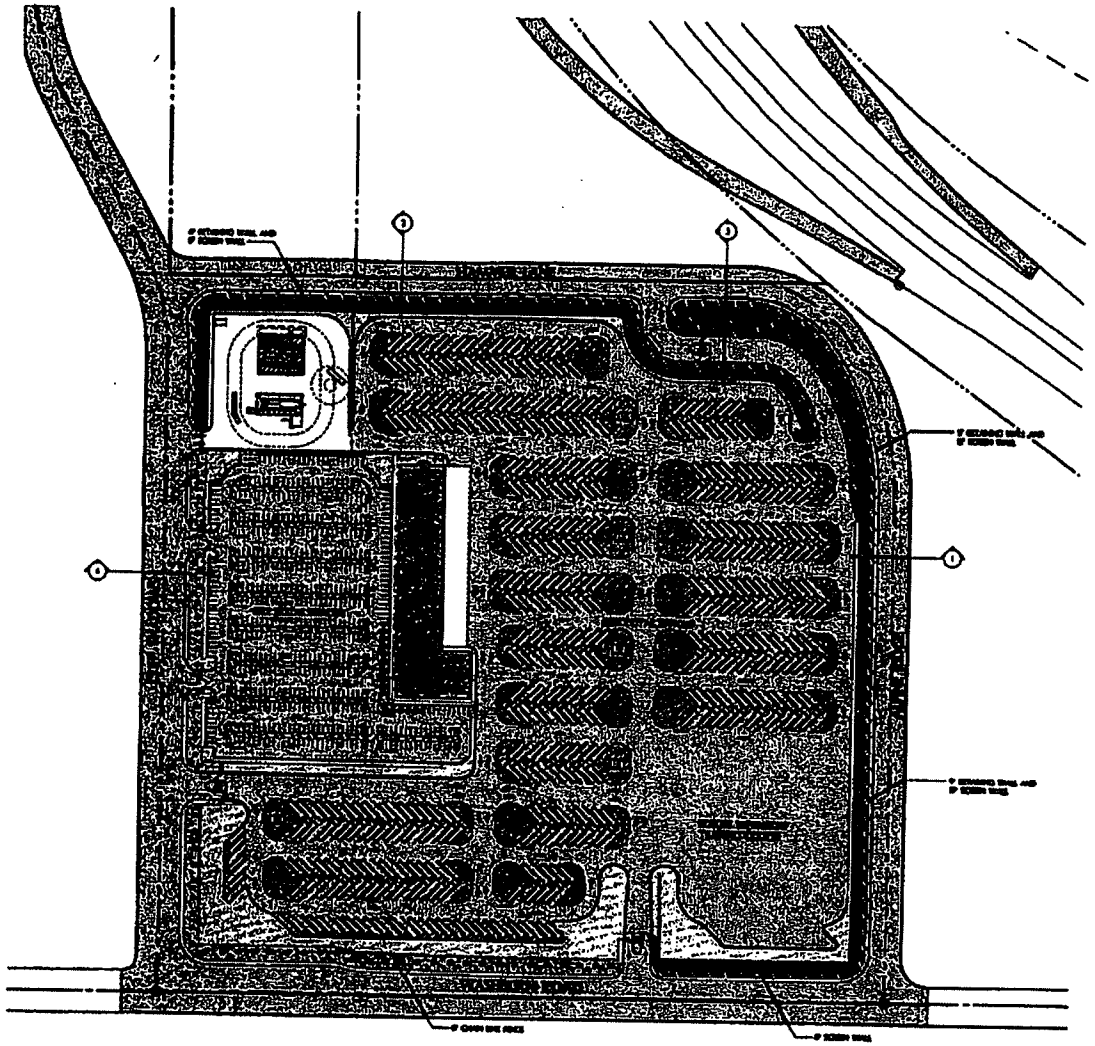
Map Exhibit 4b(a-1) shows the location of this site.

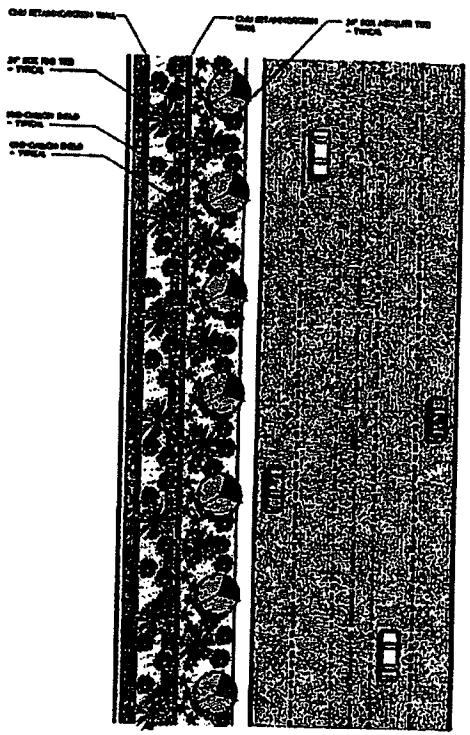
EXHIBIT 4b (d) – MAINTENANCE PLAN

All public utilities are available in the service area for this site. Cost for providing these services to the site are a normal part of a construction contract. When installed offsites are accepted by the various public utility companies, the services are the responsibility of the public utilities. All onsite utilities and their maintenance and continued satisfactory operation are the responsibility of the school district maintenance department.

Service streets to the site are the responsibility of the governmental agency having jurisdiction for such streets—such as the county or city road department. Those rights-of-way for public access within the boundaries of the school sites are improved by the school district to acceptable standards which may include street paving, curbs, gutters, sidewalks, fire hydrants and street lights. Upon completion of these offsite improvements, the rights-of-way are then dedicated or granted to either to the city or county for maintenance and public use and service.

All maintenance and repair for both buildings and grounds are the responsibility of the maintenance department of the Facilities and Transportation Services Division. Employing skilled and semi-skilled personnel, this agency has within its structural framework all craft personnel for painting, plumbing, carpentry, cement, electrical and metal repair and fabrication as well as a total grounds maintenance unit for all phases of necessary landscaping maintenance.





LANDSCAPE BUFFER DETAIL

PLAN LEGEND

- PROPOSED ADMIN./MAINTENANCE BUILDING (17 BAYS)
- LANDSCAPE BUFFER AND RETAINING WALLS
- LANDSCAPE BUFFER
- DECOMPOSED GRANITE

CCSD

CLARK COUNTY SCHOOL DISTRICT

NORTHWEST SATELLITE TRANSPORTATION FACILITY

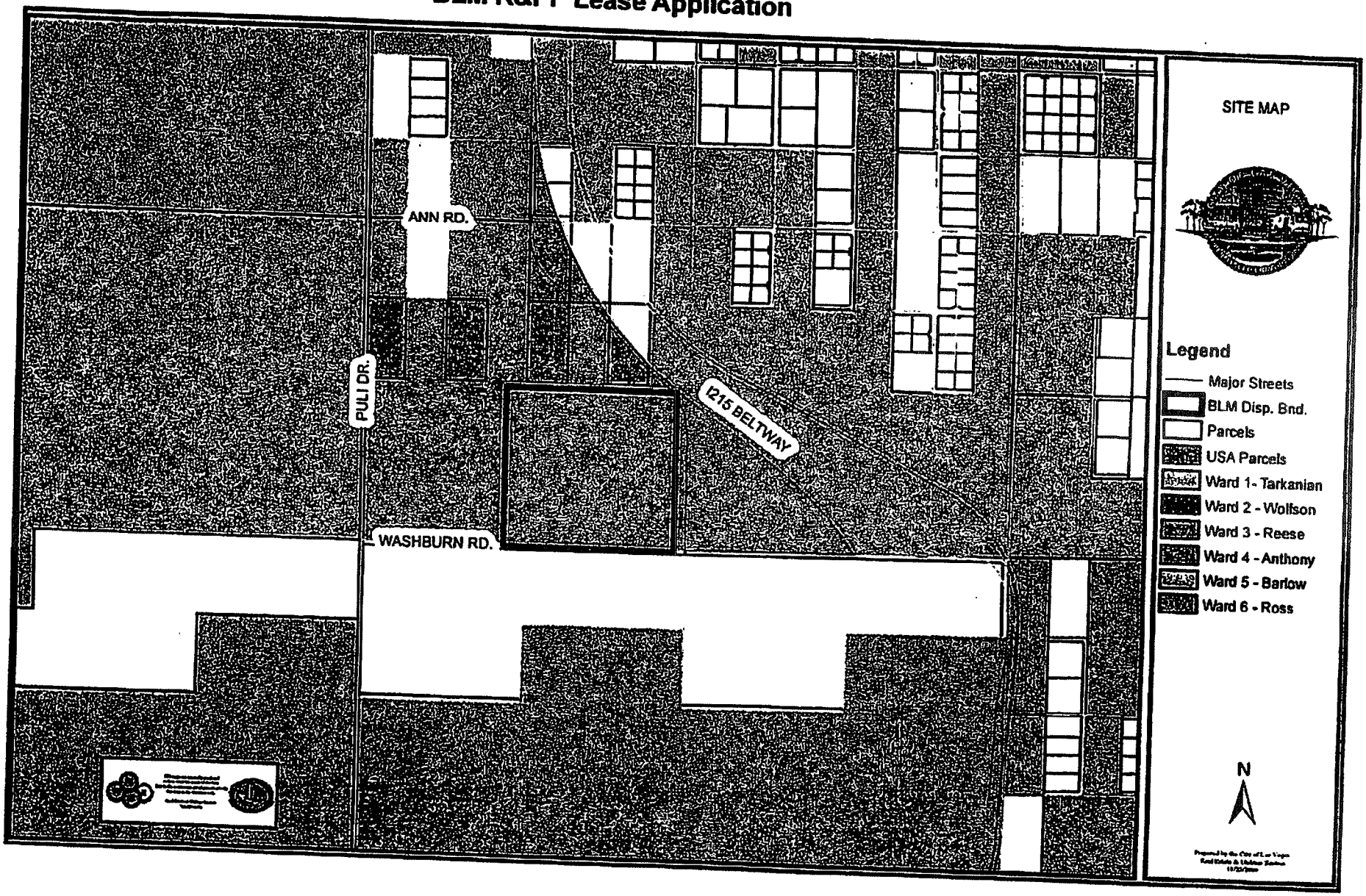
SITE PLAN

1" = 100'-0"

ALL DRAWINGS ARE SCHEMATIC IN NATURE AND ARE SUBJECT TO MODIFICATION

KGA ARCHITECTURE

Joint Selection Request for Clark County School District
BLM R&PP Lease Application



Albert Sung

From: Robert Welch
Sent: Thursday, February 10, 2011 11:32 AM
To: Greg McDermott; Albert Sung
Subject: FW: CCSD Bus Yard Info (N-88117): Clark Co. Comment
Attachments: CCSD Bus Yard - Clark Co Comment Map - 2-10-11.pdf; CCSD Bus Yard - Clark Co Comment - 2-10-11.pdf

fyi

-----Original Message-----
From: rrury@blm.gov [mailto:rrury@blm.gov]
Sent: Thursday, February 10, 2011 10:47 AM
To: Robert Welch; Mary A. Wulff
Cc: Robin Yoakum; Rebecca Rury
Subject: CCSD Bus Yard Info (N-88117): Clark Co. Comment

Per our conversation, I have attached a PDF of the letter and map that I found in the CCSD Bus Yard file regarding maintaining the roadway along the eastern & northern border of their site.

Just so you know, the NORA public comment period ends today and the lease can be issued after February 25th. I only skimmed the EA but did not find any comments from the Minerals division relating to access for the Mineral contractor to the east....kind of strange, I thought, but it looks like the County may have covered the bases.

Let me know if you need anything else.

Rebecca
x6262
515-5087 (BLM)

(See attached file: CCSD Bus Yard - Clark Co Comment Map - 2-10-11.pdf)(See attached file: CCSD Bus Yard - Clark Co Comment - 2-10-11.pdf)

Department of Public Works

500 S Grand Central Pky • Box 554000 • Las Vegas NV 89155-4000
(702) 455-6000 • Fax (702) 455-6040
Denis Cederburg, P.E., Director • E-Mail: dlc@ClarkCountyNV.gov
Las Vegas, Nevada

January 11, 2011

Certified Mail
Return receipt requested

Bob Ross, Field Manager
Bureau of Land Management
Las Vegas Field Office
4701 North Torrey Pines Drive
Las Vegas, NV 89130-2301

R&PP APPLICATION N-88117, CLARK COUNTY SCHOOL DISTRICT - NORTHWEST SATELLITE TRANSPORTATION FACILITY; ASSESSOR'S PARCEL NO.: 126-36-201-002

Dear Mr. Ross:

Clark County Public Works (CCPW) is in receipt of a notification letter from Clark County School District dated January 4, 2011, concerning R&PP Application N-88117 for the proposed Northwest Satellite Transportation Facility located in Section 36, Township 19 South, Range 59 East, M.D.M.

CCPW has no objection to the proposed R&PP action; however, the County requires that the existing roadway (haul road) located along the easterly and northeasterly boundaries of the future transportation site be incorporated in the plans and perpetuated. The existing roadway is authorized under Grants N-61323 (Clark County 215 Bruce Woodbury Beltway) and N-60903 (Alpine Ridge Way), and is required in connection with the operation and maintenance of the Beltway in the general area.

Thank you for the opportunity to provide comments regarding this application. If there are any questions, please contact the undersigned on (702) 455-6098; via fax on (702) 455-6113; or you may forward email to pwyatt@ClarkCountyNV.gov.

Sincerely,

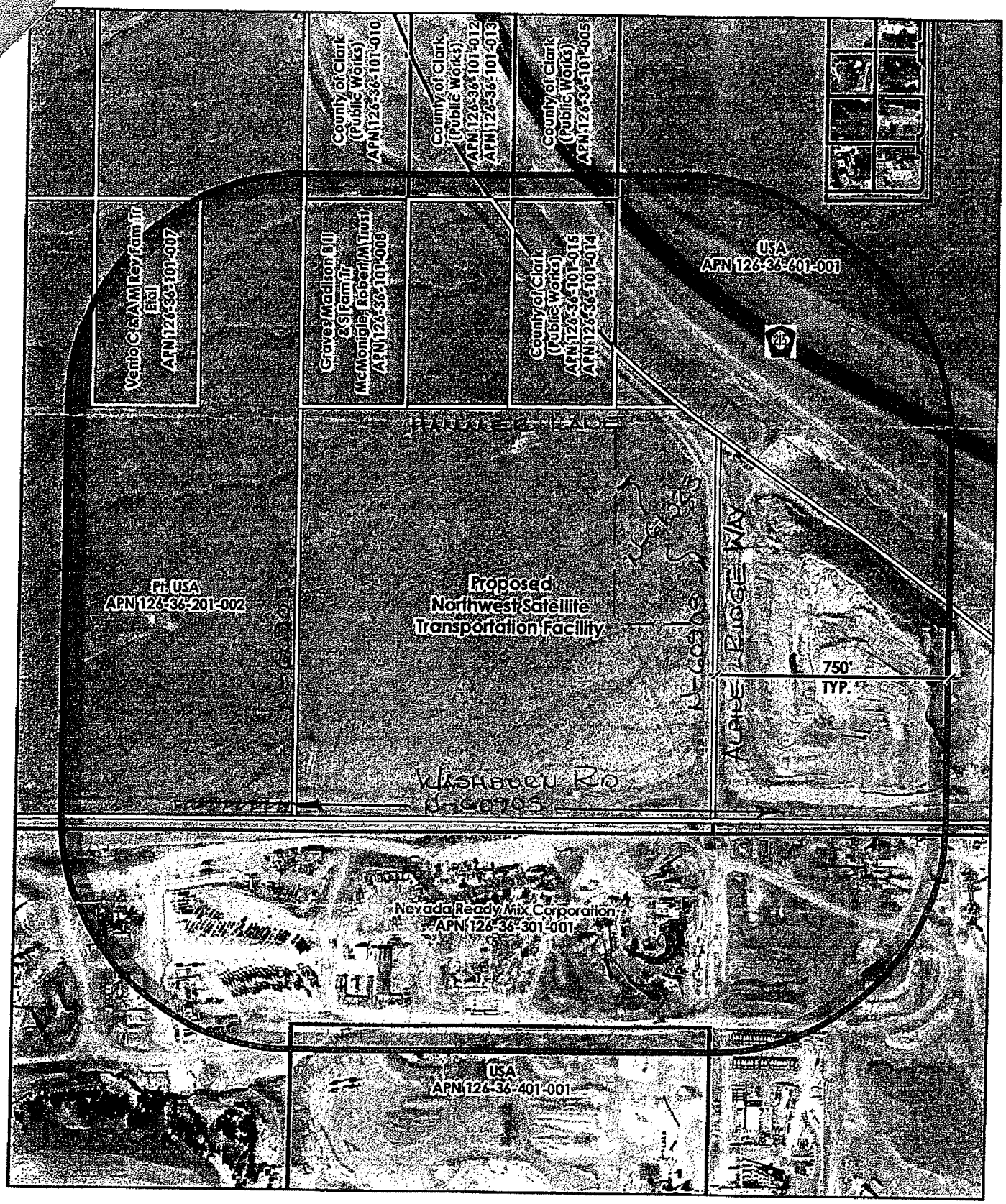
Pamela Wyatt
Right-of-Way Agent II

PW:pw

Enclosures

cc: Dorothy Dickey, Bureau of Land Management
William Garrett, Ventajas LLC
Jean Miniaci, CCSD Real Property Management
Jim Marlett, Survey Division
Lorraine St. Pierre, Survey Division

id.:h:\BLM notices\response.comments.CCSD.NW.transportation.site.011111



Proposed Northwest Satellite Transportation Facility
a Portion of APN 126-36-201-002

N

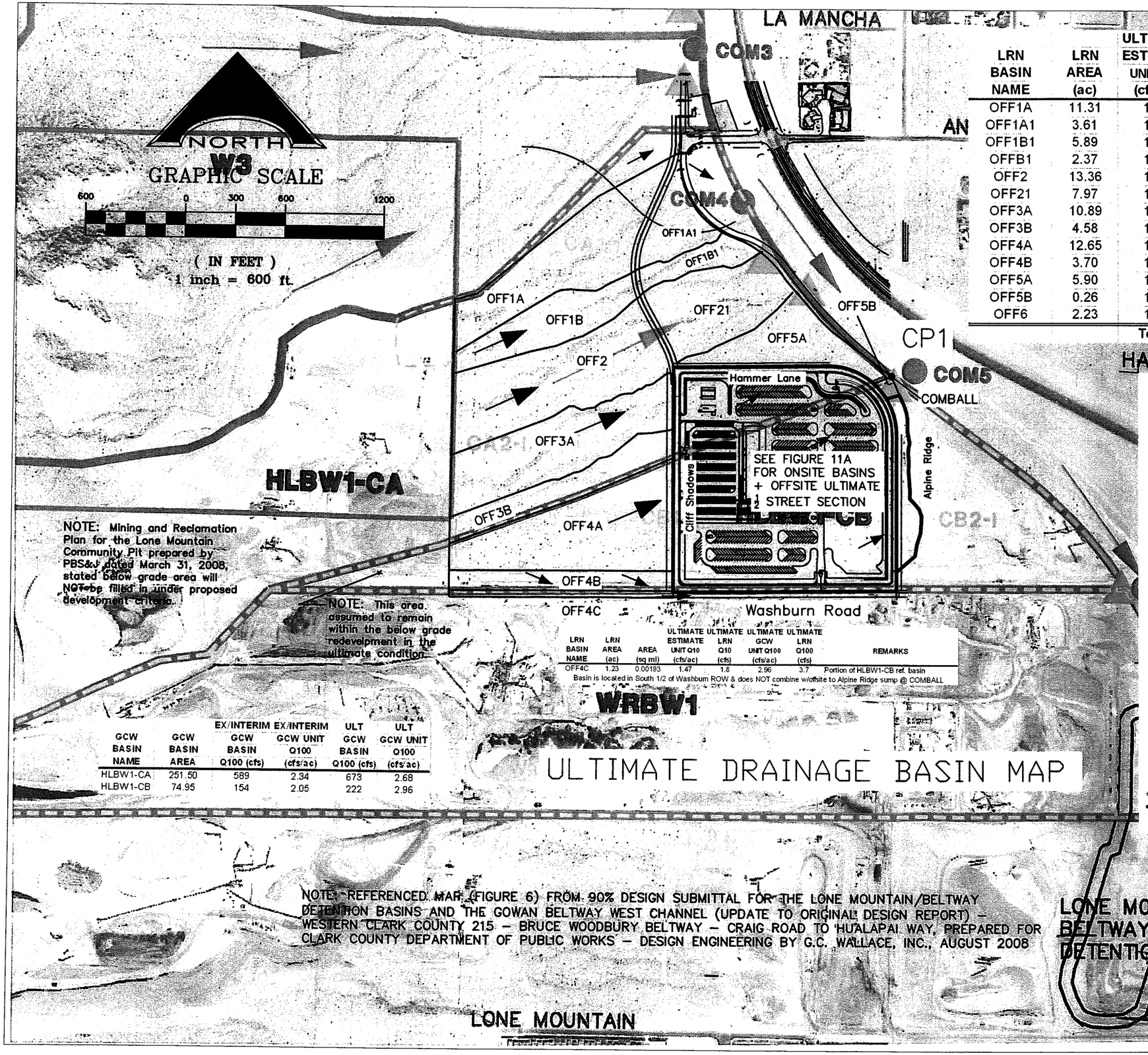
L.R. NELSON CONSULTING ENGINEERS

6765 W. RUSSELL RD., SUITE 200
LAS VEGAS, NV 89118
PHONE: (702)798-7978 FAX: (702)451-2296

TRANSMITTAL

DATE: Monday, January 24, 2011	
TO: Mr. Albert Sung, P.E., Flood Control Project Engineer	
FIRM / AGENCY NAME: **City of Las Vegas** **Department of Public Works** **Development Services Center** **Engineering Planning** **731 S. Fourth Street** **Las Vegas, NV 89101**	
	PROJECT NUMBER: 032-085-092
REFERENCE: Clark County School District Northwest Transportation Facility (DS 4511)	
Submitting the following: **1 – Copy of Addendum No. 1 to the Technical Drainage Study for the above referenced project** **1 – Copy of the Improvement Plans for the Addendum to the Technical Drainage Study for the above referenced project**	
SENT BY: Jon Hayslip, P.E.	**Received by:**
	Date:

01/20/11



LRN BASIN NAME	LRN AREA (ac)	ULTIMATE ESTIMATE UNIT Q10 (cfs/ac)	ULTIMATE LRN Q10 (cfs)	ULTIMATE GCW UNIT Q100 (cfs/ac)	ULTIMATE LRN Q100 (cfs)	REMARKS
OFF1A	11.31	1.35	15.3	2.68	30.3	Portion of HLBW1-CA ref. basin
OFF1A1	3.61	1.35	4.9	2.68	9.7	Portion of HLBW1-CA ref. basin
OFF1B1	5.89	1.35	7.9	2.68	15.8	Portion of HLBW1-CA ref. basin
OFFB1	2.37	1.35	3.2	2.68	6.3	Portion of HLBW1-CA ref. basin
OFF2	13.36	1.35	18.0	2.68	35.8	Portion of HLBW1-CA ref. basin
OFF21	7.97	1.35	10.8	2.68	21.3	Portion of HLBW1-CA ref. basin
OFF3A	10.89	1.35	14.7	2.68	29.2	Portion of HLBW1-CA ref. basin
OFF3B	4.58	1.35	6.2	2.68	12.3	Portion of HLBW1-CA ref. basin
OFF4A	12.65	1.47	18.6	2.96	37.4	Portion of HLBW1-CB ref. basin
OFF4B	3.70	1.47	5.4	2.96	11.0	Portion of HLBW1-CB ref. basin
OFF5A	5.90	1.35	8.0	2.68	15.8	Portion of HLBW1-CA ref. basin
OFF5B	0.26	1.47	0.4	2.96	0.8	Portion of HLBW1-CB ref. basin
OFF6	2.23	1.47	3.3	2.96	6.6	Portion of HLBW1-CB ref. basin
		Totals	116.6		232.3	Total Q10 & Q100 Estimate (cfs)

HEC-1 ID/ Conc. Point	Area (ac)	CN Value	10-YR (cfs)	100-YR (cfs)	REMARKS
ON3	3.27	87.8	4	11	Onsite Parking Area
R3	0.91	98.0	2	3	Washburn
ON4	2.43	94.2	4	10	Onsite Parking Area
COMB1	n/a	n/a	10	23	Combine Q @ Washburn & South Entrance
R4+	0.68	88.4	(1) 11	(2) 25	Washburn (U/S combined & routed -> R4)
ON2	1.89	94.8	4	8	Onsite Parking Area
RTE1	n/a	n/a	3	7	Route ON2 through ON5
ON5	7.06	97.6	13	27	Onsite Parking Area
FUT1	3.34	94.7	6	12	Future area assumed to be paved
RTE2	n/a	n/a	5	12	Route FUT1 through ON5
COMB2	n/a	n/a	22	45	Combine Flow @ ON7/ON5 Boundary
RTE3	n/a	n/a	21	44	Route Flow to Exit in Hammer
ON1	4.14	95.5	7	15	Onsite Parking Area
ON6	1.34	96.7	3	5	Onsite Parking Area
COMB3	n/a	n/a	10	21	Combine Flow at Inlet Area
RTE4	n/a	n/a	9	20	Route through ON7
ON7	9.98	97.4	21	41	Onsite Parking Area
COMB4	n/a	n/a	51	104	Combine All Flow Leaving Hammer
R0	1.56	91.1	3	5	Cliff Shadows (Shaumber)
R0U*	0.90	98.0	2	4	Cliff Shadows (Shaumber) W ½ - Future
R1+	0.37	94.1	(<1) 3	(1) 6	Cliff Shadows (U/S R0 routed -> R1)
R1U*	0.25	98.0	1	1	Cliff Shadows (Shaumber) W ½ - Future
R2+	1.90	91.6	(3) 6	(7) 13	Cliff Shadows (U/S R1 routed -> R2)
R2U*	0.90	98.0	2	4	Hammer – North ½ - Future
R5	1.65	86.6	2	5	Alpine Ridge ½ Street + Onsite Frontage
R5U*	0.71	98.0	2	3	Alpine Ridge E ½ - Future
COMB5	n/a	n/a	8	18	Combine Q on N½ of Alpine Ridge Low Point
COMBALL	n/a	n/a	66	134	Totals of Computed Q

+ 10-/100-Year flow rates are computed for the basin and combined w/upstream basin via RD.08 = "YES" in the HEC-1 model in Appendix B

* 10-/100-Year flow rates are computed from separate HEC-1 model and algebraically added onsite basins and combined

LRN BASIN NAME	LRN AREA (ac)	AREA (sq mi)	ULTIMATE ESTIMATE UNIT Q10 (cfs/ac)	ULTIMATE LRN Q10 (cfs)	ULTIMATE GCW UNIT Q100 (cfs/ac)	ULTIMATE LRN Q100 (cfs)	REMARKS
OFF4C	1.23	0.00193	1.47	1.8	2.96	3.7	Portion of HLBW1-CB ref. basin

Basin is located in South 1/2 of Washburn ROW & does NOT combine w/offsite to Alpine Ridge sump @ COMBALL

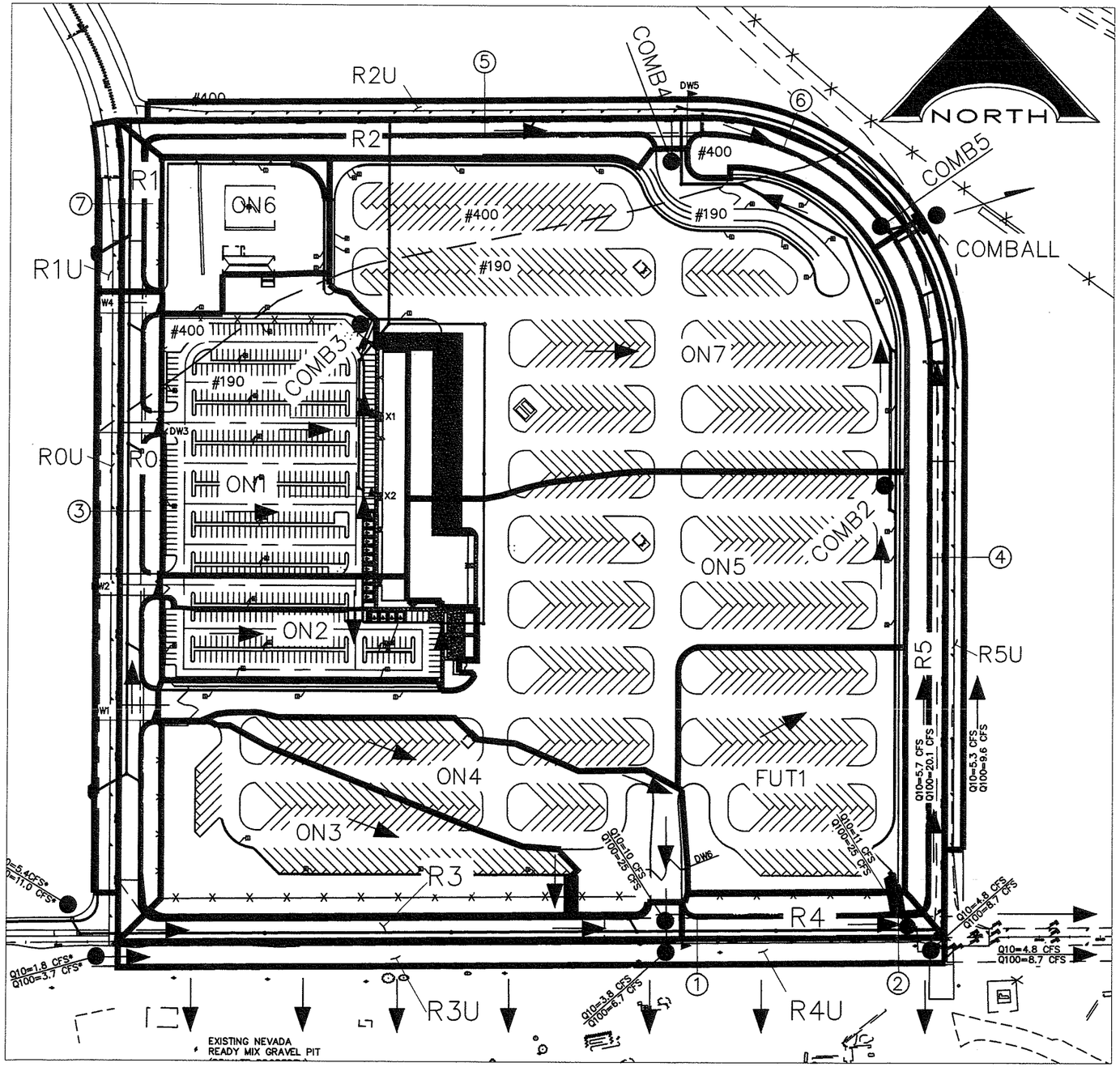
GCW BASIN NAME	GCW BASIN AREA	EX/INTERIM GCW BASIN Q100 (cfs)	EX/INTERIM GCW UNIT Q100 (cfs/ac)	ULT GCW BASIN Q100 (cfs)	ULT GCW UNIT Q100 (cfs/ac)
HLBW1-CA	251.50	589	2.34	673	2.68
HLBW1-CB	74.95	154	2.05	222	2.96

NOTE: REFERENCED MAP (FIGURE 6) FROM 90% DESIGN SUBMITTAL FOR THE LONE MOUNTAIN/BELTWAY DETENTION BASINS AND THE GOWAN BELTWAY WEST CHANNEL (UPDATE TO ORIGINAL DESIGN REPORT) – WESTERN CLARK COUNTY 215 – BRUCE WOODBURY BELTWAY – CRAIG ROAD TO 'HUALAPAI WAY, PREPARED FOR CLARK COUNTY DEPARTMENT OF PUBLIC WORKS – DESIGN ENGINEERING BY G.C. WALLACE, INC., AUGUST 2008

10 & 100 YEAR ULTIMATE CONDITION

NODE	Q10 (cfs)	Q100 (cfs)	Remarks
CP1	182.6	366.2	Combined OFFSITE + ONSITE

FIGURE 10A



GRAPHIC SCALE

200 0 100 200 400

(IN FEET)
1 inch = 200 ft.

LEGEND

- BASIN LINE
- FLOW DIRECTION
- OFF1 BASIN NAME
- CONCENTRATION / COMBINATION POINT
- CP CONCENTRATION POINT NAME
- COM1 COMBINATION POINT NAME
- HSG SCS BOUNDARY
- #190 HSG SCS NUMBER

BASIN NAME	AREA (ac)	CN VALUE	Q10 (cfs)	Q100 (cfs)
ROU	0.90	98	2	4
R1U	0.25	98	1	1
R2U	0.90	98	2	4
R3U	0.84	98	2	3
R4U	0.39	98	1	2
R5U	0.71	98	2	3

HEC-1 ID/ Conc. Point	Area (ac)	CN Value	10-YR (cfs)	100-YR (cfs)	REMARKS
ON3	3.27	87.8	4	11	Onsitc Parking Area
R3	0.91	98.0	2	3	Washburn
ON4	2.43	94.2	4	10	Onsitc Parking Area
COMB1	n/a	n/a	10	23	Combine Q @ Washburn & South Entrance
R4*	0.68	88.4	(1) 11	(2) 25	Washburn (U/S combined & routed -> R4)
ON2	1.89	94.8	4	8	Onsite Parking Area
RTE1	n/a	n/a	3	7	Route ON2 through ON5
ON5	7.06	97.6	13	27	Onsite Parking Area
FUT1	3.34	94.7	6	12	Future area assumed to be paved
RTE2	n/a	n/a	5	12	Route FUT1 through ON5
COMB2	n/a	n/a	22	45	Combine Flow @ ON7/ON5 Boundary
RTE3	n/a	n/a	21	44	Route Flow to Exit in Hammer
ON1	4.14	95.5	7	15	Onsite Parking Area
ON6	1.34	96.7	3	5	Onsite Parking Area
COMB3	n/a	n/a	10	21	Combine Flow at Inlet Area
RTE4	n/a	n/a	9	20	Route through ON7
ON7	9.98	97.4	21	41	Onsitc Parking Area
COMB4	n/a	n/a	51	104	Combine All Flow Leaving Hammer
R0	1.56	91.1	3	5	Cliff Shadows (Shaumber)
R0U*	0.90	98.0	2	4	Cliff Shadows (Shaumber) W ½ - Future
R1*	0.37	94.1	(<1) 3	(1) 6	Cliff Shadows (U/S R0 routed -> R1)
R1U*	0.25	98.0	1	1	Cliff Shadows (Shaumber) W ½ - Future
R2*	1.90	91.6	(3) 6	(7) 13	Cliff Shadows (U/S R1 routed -> R2)
R2U*	0.90	98.0	2	4	Hammer – North ½ - Future
R5	1.65	86.6	2	5	Alpine Ridge ½ Street + Onsite Frontage
R5U*	0.71	98.0	2	3	Alpine Ridge E ½ - Future
COMB5	n/a	n/a	8	18	Combine Q on N½ of Alpine Ridge Low Point
COMBALL	n/a	n/a	66	134	Totals of Computed Q

10-/100-Year flow rates are computed for the basin and combined upstream basin via RD.08 = "YES" in the HEC-1 model in Appendix B

10-/100-Year flow rates are computed from separate HEC-1 model and algebraically added onsite basins and combined

PROPOSED ONSITE DRAINAGE BASIN MAP

FIGURE 11A

(12) INSTALL A 15.25' MODIFIED TYPE "C" INLET PER C.C.A.U.S.D. 412A.

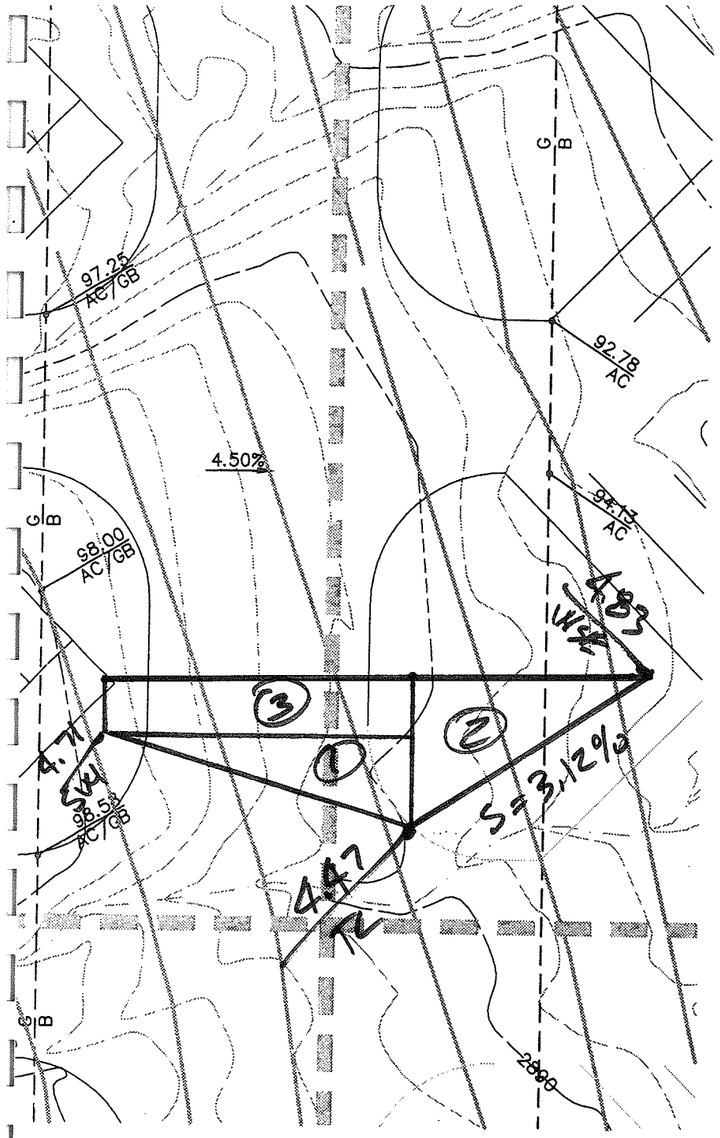
(13) INSTALL A 19' MODIFIED TYPE "C" INLET PER C.C.A.U.S.D. 412A.

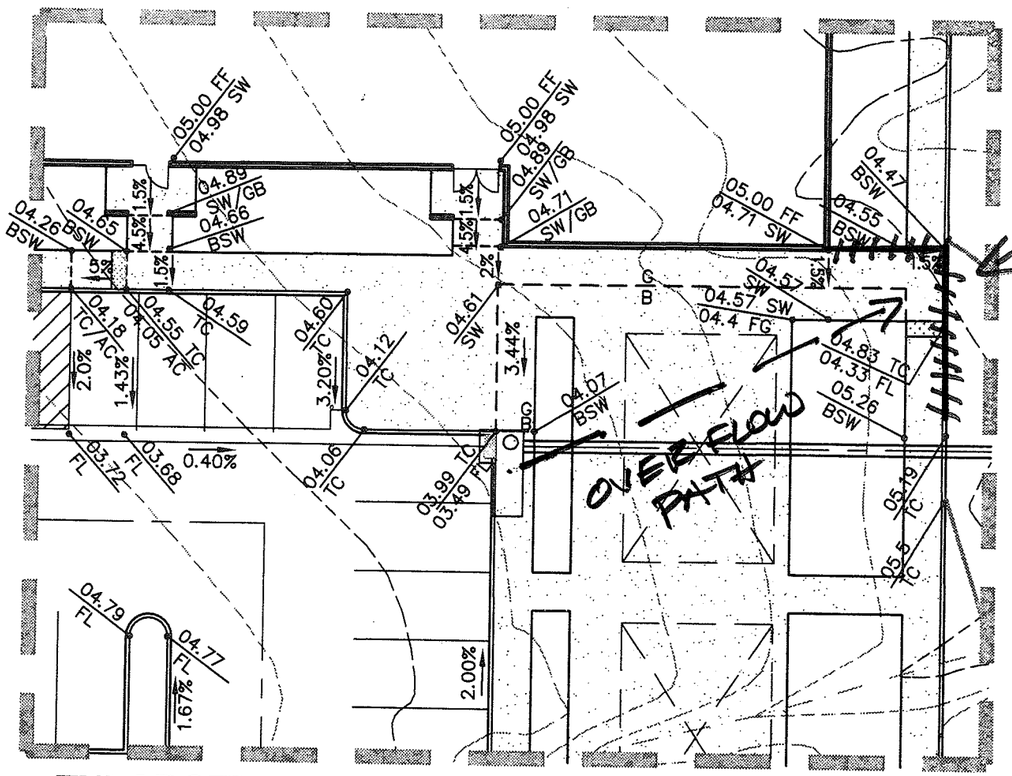
(14) INSTALL A 4' TYPE "A" INLET PER C.C.A.U.S.D. 411.

(15) INSTALL AN RCP END SECTION PER NDOT DETAIL R-2.3.1.

(16) INSTALL A 5.5' MODIFIED TYPE "C" INLET PER C.C.A.U.S.D. 412A

ALL STORM DRAIN PIPE SHALL BE CLASS III (MIN.) UNLESS OTHERWISE NOTED.





ENLARGED PLAN

SCALE 1"=20'

BASIS OF BEARING

TH 00°05'54" WEST, BEING THE BEARING
T HALF (E 1/2) OF THE NORTHWEST QU/
NSHIP 19 SOUTH, RANGE 59 EAST, AS S
RK COUNTY, NEVADA RECORDER'S OFFICE

BENCHMARK

OF LAS VEGAS BENCHMARK 5LV99 36N6
VET AND PLATE IN A FENCE POST BASE AT THE SOUTHWEST CORNER OF
NE RIDGE AND HAMMER LANE
/ATION = 2951.24 FEET (869.059 METERS) NAVD 1988 DATUM

WEIR OVERFLOW ESTIMATE

Est. WSE	Section #	C	L (ft)	H (ft)	Rect Q (ft)	Act Q (ft)	Remarks
4.71	1	3	15.24	0.24	5.4	2.7	Triangular Shaped Weir
4.83	2	3	11.53	0.36	7.5	3.7	Triangular Shaped Weir
4.83	3	3	15.24	0.12	1.9	1.9	Rectangular Shaped Weir
					Total Q	8.3	> 8 cfs of Q100 for Basin ON2

JAGEMENT AGENCY
COMMUNITY-PANEL
27, 2002 THE SITE
S DESCRIBED AS
E FLOODPLAIN.

) THE APPROVED
DRAINAGE STUDY FOR THIS SITE ON FILE AT CITY OF LAS VEGAS
PER

VERNON R. HARKINS P.E. No. 9898 DATE

L. R. NELSON CONSULTING ENGINEERS, I
· STRUCTURAL
· CIVIL
· SURVEY
· PLANNING
6765 West Russell Road, Suit
Las Vegas, Nevada
(702) 798-7978
(702) 451-2296 FAX

KGA ARCHITECTURE
9075 West Diablo Drive, Third Floor
Las Vegas, Nevada 89148
702.367.6900
LAS VEGAS
1701 Directors Boulevard, Suite 770
Austin, Texas 78744
512.441.8200
AUSTIN
www.KGArchitecture.com

CLARK COUNTY SCHOOL DISTRICT
DESIGN MANAGEMENT / PLANNING AND DESIGN
4170 McLEOD DRIVE LAS VEGAS, NEVADA 89121

PROJECT: CCSD NORTHWEST SATELLITE TRANSPORTATION FACILITY

DRAWING TITLE: GRADING PLAN

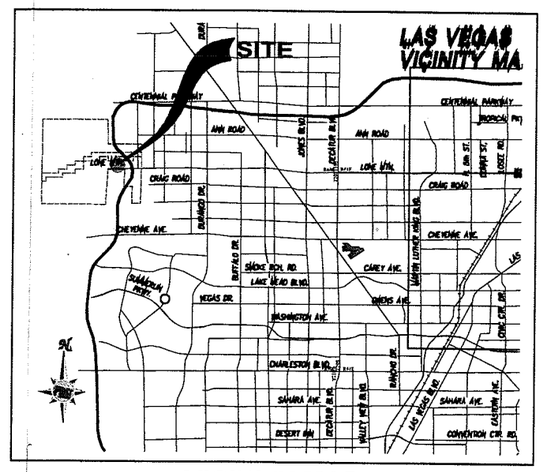
SHEET NO. C3.06
SHEET 21 OF 71

CLV#

HTE#

FIGURE 12

PROJECT SITE



VICINITY MAP

N.T.S.

LEGEND

- Project Area
- Las Vegas Valley Disposal Boundary
- Red Rock Canyon National Conservation Area
- Areas previously inventoried for resources
- Current mining in the community pit
- Private Land within Project Area
- Future Interchange
- Planned Community Development
- Public Facility
- Public Lands Management Area (BLM)
- Park Recreation – Open Space
- Rural
- Rural Estate
- Rural Neighborhood Preservation
- Right Of Way
- Water Distribution Line – 36 inches
- Sanitary Sewer – 36 inches

N

SCALE: 1"=800'

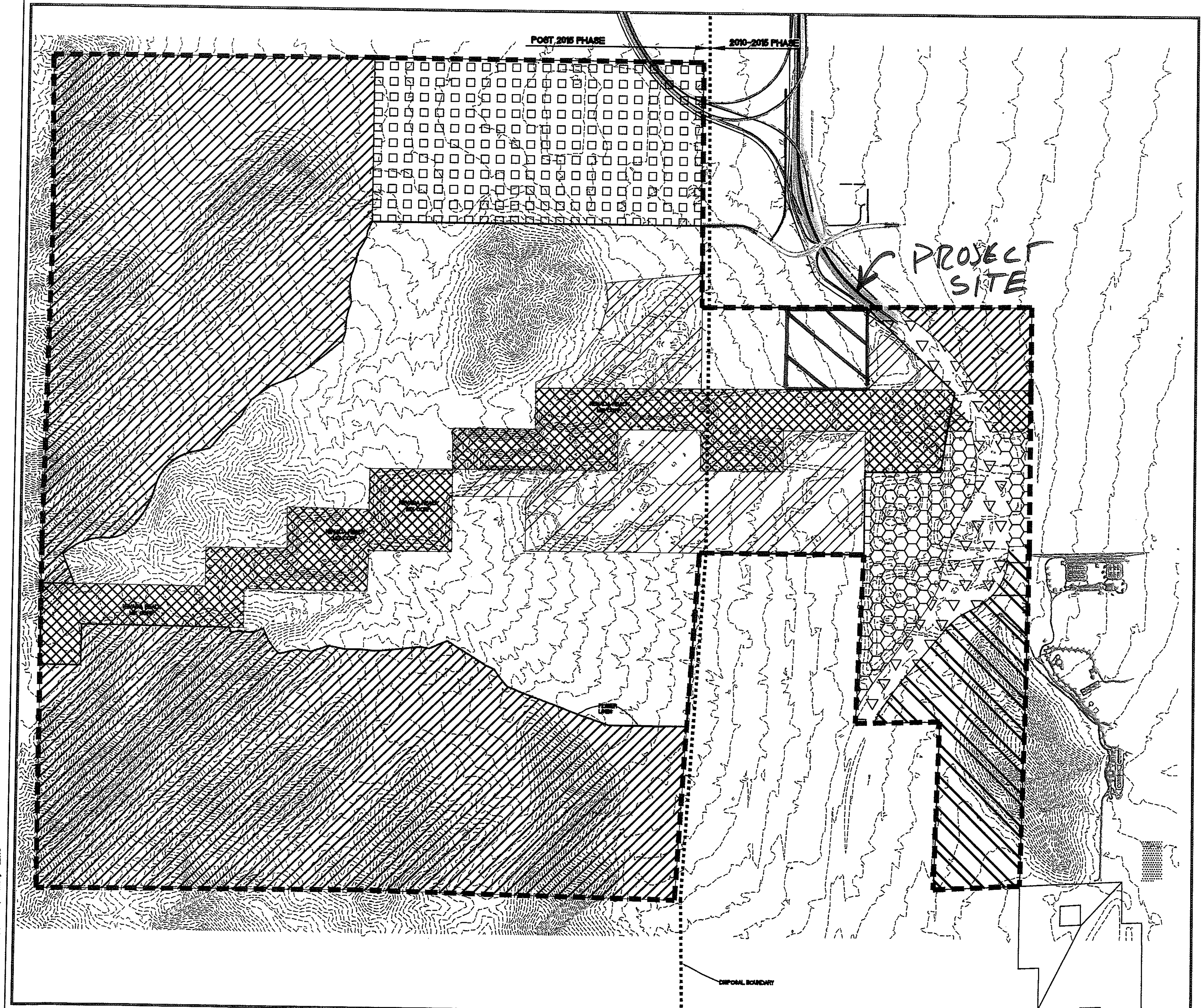
APPENDIX B

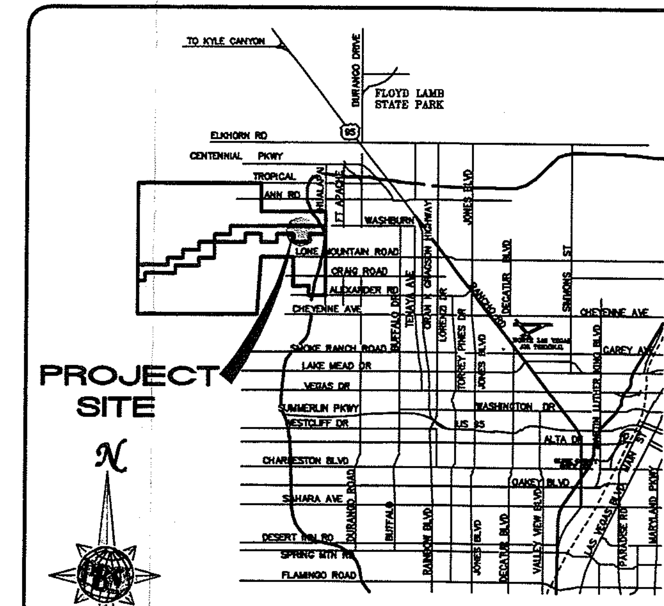
PBSJ
2270 Corporate Circle
Suite 100
Henderson, Nevada 89074
Telephone: 702/263-7275
Fax: 702/263-7200
ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

LONE MOUNTAIN MINE & RECLAMATION PLAN EXISTING LAND USE PLAN

SHEET 1 OF 1 DATE: 03/21/08 PROJECT NUMBER 511997.XX

X:\Projects\511997\CADD\FG\Planning\2004\Planning.dwg Layout: Layout1 Mar 26, 2008 - 2:32pm





VICINITY MAP

LEGEND

- Project Area
- Disposal Boundary

AREA ESTIMATE

SITE BOUNDARY	4,054 ACRES
PIT AREA INCLUDES NRM AND BLM INSIDE PIT AREAS	1,630 ACRES
NRM AREA	348 ACRES IN PIT, 14 ACRES OUT OF PIT
PARK SITE	173 ACRES
OPEN SPACE	1,700 ACRES
BLM AREA INSIDE PIT AREA	320 ACRES
BLM AREA OUTSIDE PIT AREA	123 ACRES
DRAINAGE EASEMENT	329 ACRES
ROADWAY AREA	85 ACRES

N

GRAPHIC SCALE

800 0 400 800 1600 3200

(IN FEET)

1 inch = 800 ft.

PBSJ

ENGINEERING · PLANNING · SURVEYING · CONSTRUCTION SERVICES

APPENDIX J

LONE MOUNTAIN MINE AND RECLAMATION PLAN PROPOSED LAND USE AREA PLAN

Job Number 511997	Drawn by DJE	Scale 1" = 800'	
Sheet Number 1 OF 1	Designed By DJE	File No.	
	Checked By CAL	1997IMP	

PLOT DATE: Mar 26, 2008 - 2:29pm

DRAWING: ACRES.dwg

No.	REVISIONS	Date	Init.	Appr.	Date

APPROX. LOCATION FOR CON5 INFLOW TO FUTURE REGIONAL BELTWAY CHANNEL

SCALE 1" = 50'

50 0 50 100
SCALE FEET

STA 769+50.00 MATCHLINE – SEE SHEET RSD7

NOTE:
SEE SHEET RG5 FOR LINE, CURVE AND COORDINATE CALL-OUTS FOR ALL ALIGNMENTS AND POINT NUMBERS.

DISCLAIMER NOTE

UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UNDERGROUND AND OVERHEAD UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

Call before you Dig
Avoid cutting underground utility lines accidently.
Call 811 or 1-800-227-2600

AVOID HITTING OVERHEAD POWER LINES. IT'S COSTLY.
CALL BEFORE YOU DO OVERHEAD
1-702-227-2929

APPROVED

WESTERN CLARK COUNTY 215 BRUCE WOODBURY BELTWAY - CRAIG ROAD TO HUALAPAI WAY

GRADING AND DRAINAGE PLAN

STA 755+50.00 TO STA 769+50.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA WILLIAM R. HUNTER 13455

PROJECT No: 451.002.001 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
1555 S. RAINBOW BOULEVARD · LAS VEGAS, NV 89146
T: 702.804.2000 · F: 702.804.2299 · GCWALLACE.COM

SCALE
HORIZ: AS SHOWN
VERT: NONE
FIELD BOOK

DRAWING NO.
RSD6
SHT. OF

F:\451-002-001\Dwg\H1

KNguyen

MATCH RSD6

SCALE 50

N

SOUTHWEST DESERT EQUITIES LLC
126-36-101-008

DAYLIGHT (0.5% FROM TOE)

DAYLIGHT (2:1 FROM MANWAY)

20'X4' BLOCKOUT

20'X4' BLOCKOUT

20'X4' BLOCKOUT

8'x7.5' CHANNEL

L65

PT=72+97.83

"RC-2"

RSD40

RSD56

RSD54

C16

14'x8' RECTANGULAR CHANNEL

USA
126-36-201-002

COUNTY OF CLARK
(PUBLIC WORKS)
126-36-101-010

USA
126-36-101-016

"GBWC"

14'x9' PRECAST RCB

C11

WOODBURY BELTWAY

WESTERN CLARK COUNTY 215 BRUCE

COUNTY OF CLARK
(PUBLIC WORKS)
126-36-101-012

COUNTY OF CLARK
(PUBLIC WORKS)
126-36-101-014

NEVADA POWER EASEMENT
NEV 04354546 100'

COUNTY OF CLARK
(PUBLIC WORKS)
126-36-101-005

COUNTY OF CLARK
(PUBLIC WORKS)
126-36-101-013

COUNTY OF CLARK
(PUBLIC WORKS)
126-36-101-013

RSD18

RSD20

PT=779+31.53

ANN ROAD

FUTURE

WESTERN BELTWAY
(SEE ROADWAY SHEETS)

RIBACK FAMILY TRUST and RIBACK
STEVEN J. & WENDY J. TRS
126-25-401-016

MARLA STREET

16TH LINE

USA
126-36-201-002

USA
126-25-401-020

SHAUMBER ROAD

MATCH GRADE SHEETS
SEE ROADWAY SHEETS
STA 1782+45.37

L59

COUNTY OF CLARK
(PUBLIC WORKS)
126-25-401-024

"S"

L47

14'x9' PRECAST RCB

COUNTY OF CLARK
(PUBLIC WORKS)
126-25-401-025

PC=783+91.02

USA
126-25-401-021

MATCHLINE - SEE SHEET RSD8

STA 784+00.00

DISCLAIMER NOTE

UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL EXISTING UNDERGROUND AND OVERHEAD UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

Call before you Dig
Avoid digging underground utility lines. It's smart.
Call 811
or 1-800-227-2600

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CALL BEFORE YOU DO OVERHEAD
1-702-227-2929

NOTE:
SEE SHEET RG5 FOR LINE, CURVE AND COORDINATE CALL-OUTS FOR ALL ALIGNMENTS AND POINT NUMBERS.

APPROVED

CLARK COUNTY NEVADA

WESTERN CLARK COUNTY 215 BRUCE WOODBURY BELTWAY - CRAIG ROAD TO HUALAPAI WAY

GRADING AND DRAINAGE PLAN

STA 769+50.00 TO STA 784+00.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROJECT No: 451.002.001 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

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1555 S. RAINBOW BOULEVARD · LAS VEGAS, NV 89146
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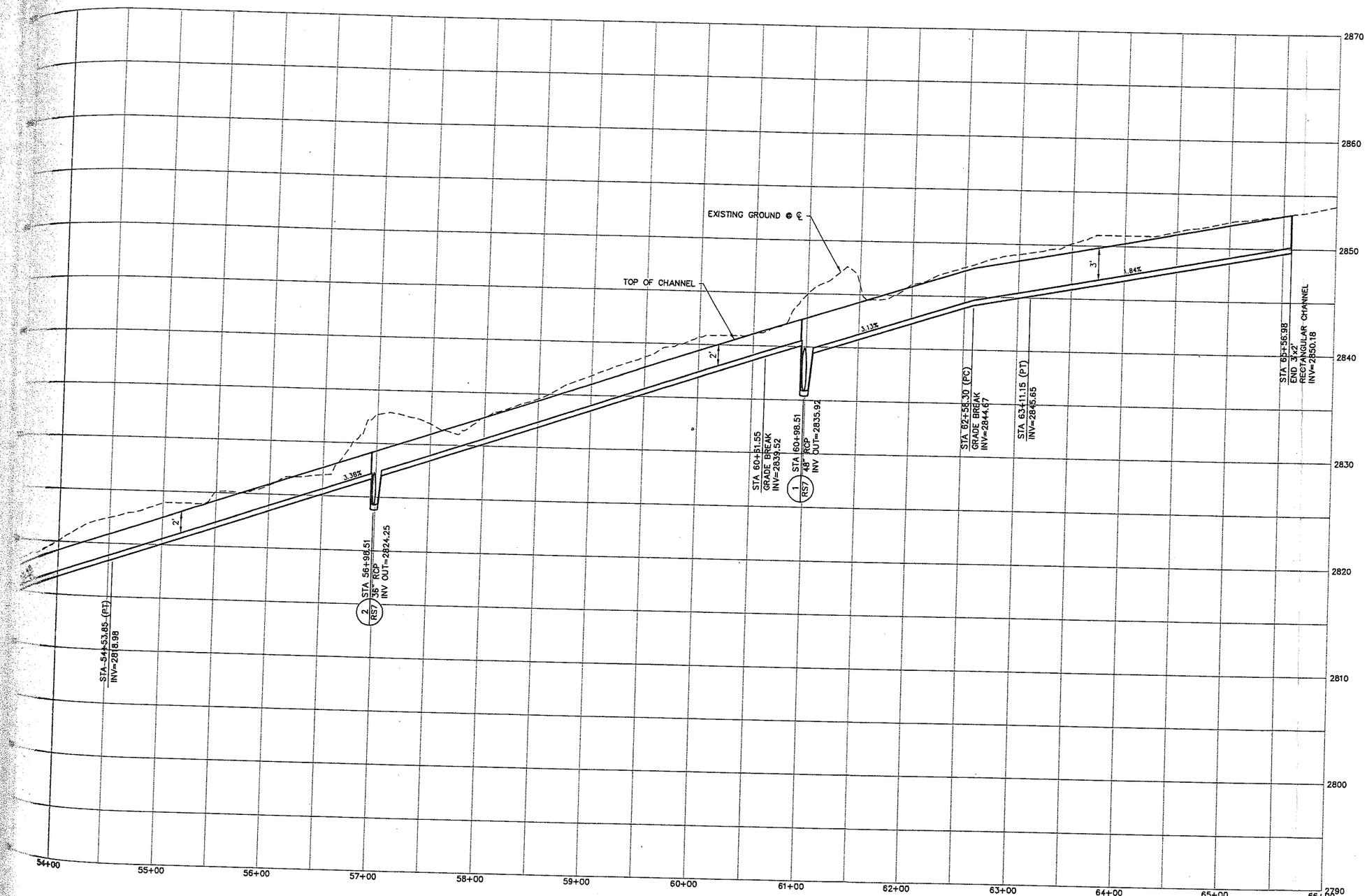
SCALE
HORIZ: AS SHOWN
VERT: NONE
FIELD BOOK

DRAWING NO.
RSD7
SHT. OF

F:\451-002-001\Dwg\Hydro\Improv\WB_SD38.dwg 07-25-08 17:03:51 BDemitrocpulo



50 0 50 100
SCALE FEET

SCALE: HORIZ. – 1" = 50'
VERT. – 1" = 5'

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APPROVED

CLARK COUNTY NEVADA

WESTERN CLARK COUNTY 215 BRUCE WOODBURY BELTWAY - CRAIG ROAD TO HUALAPAI WAY

3'x2' RECTANGULAR CHANNEL

STA 53+50.00 TO STA 66+00.00

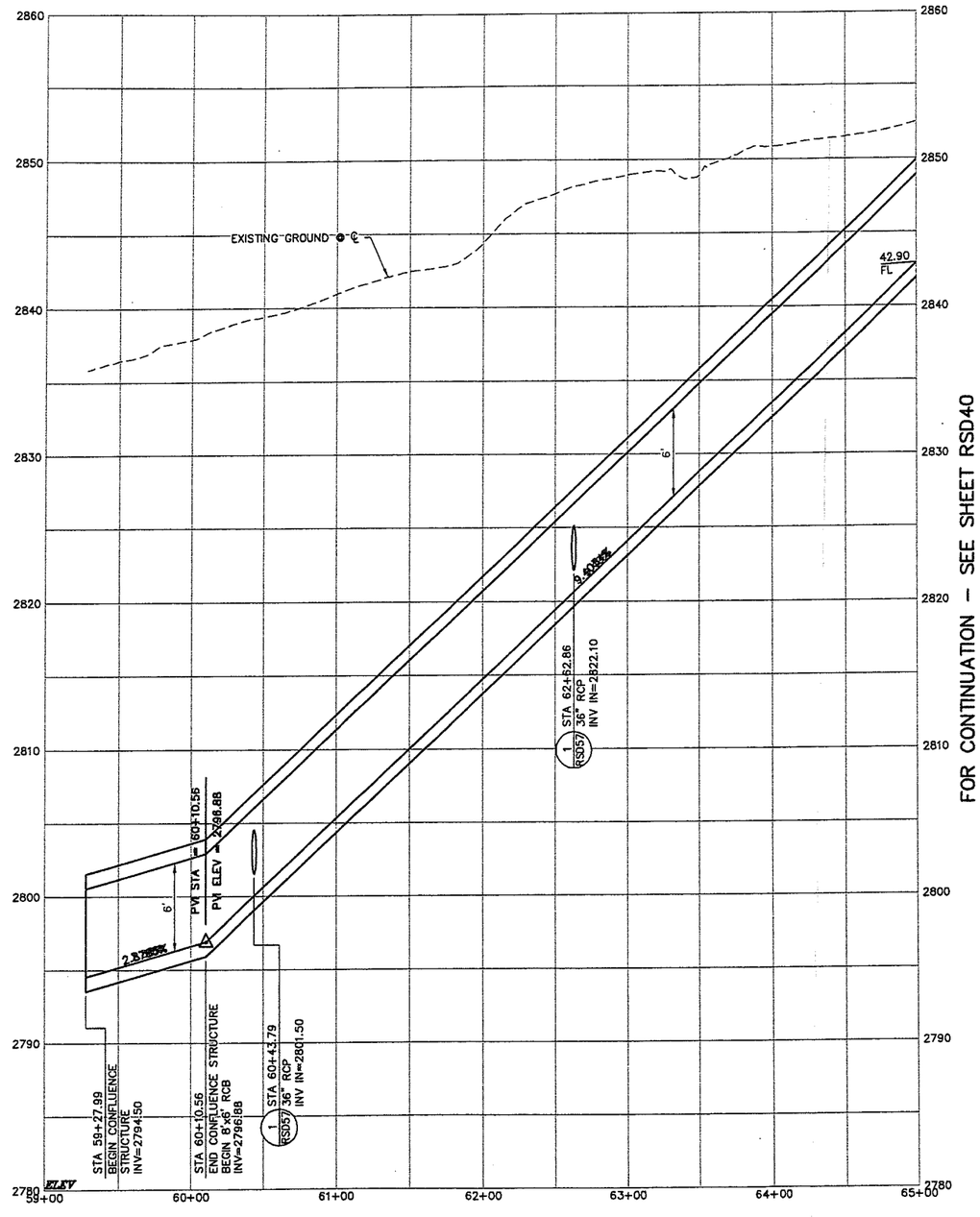
CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER STATE OF NEVADA WILLIAM R. HUNKER No. 8855

PROJECT No: 451.002.001 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY:

G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
1555 S. RAINBOW BOULEVARD · LAS VEGAS, NV 89146
T: 702.804.2000 · F: 702.804.2299 · GCWALLACE.COM

SCALE	
HORIZ:	1"=50'
VERT:	1"=5'
FIELD BOOK	
DRAWING NO.	RSD38
SHT.	OF



FOR CONTINUATION — SEE SHEET RSD40

50 0 50 100
SCALE FEET

SCALE: HORIZ. – 1" = 50'
VERT. – 1" = 5'

DISCLAIMER NOTE

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1-702-227-2929

APPROVED

CLARK COUNTY NEVADA

WESTERN CLARK COUNTY 215 BRUCE WOODBURY BELTWAY - CRAIG ROAD TO HUALAPAI WAY

8'x6' RECTANGULAR CHANNEL

STA 59+00.00 TO STA 65+00.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROJECT No: 451.002.001 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
1555 S. RAINBOW BOULEVARD · LAS VEGAS, NV 89146
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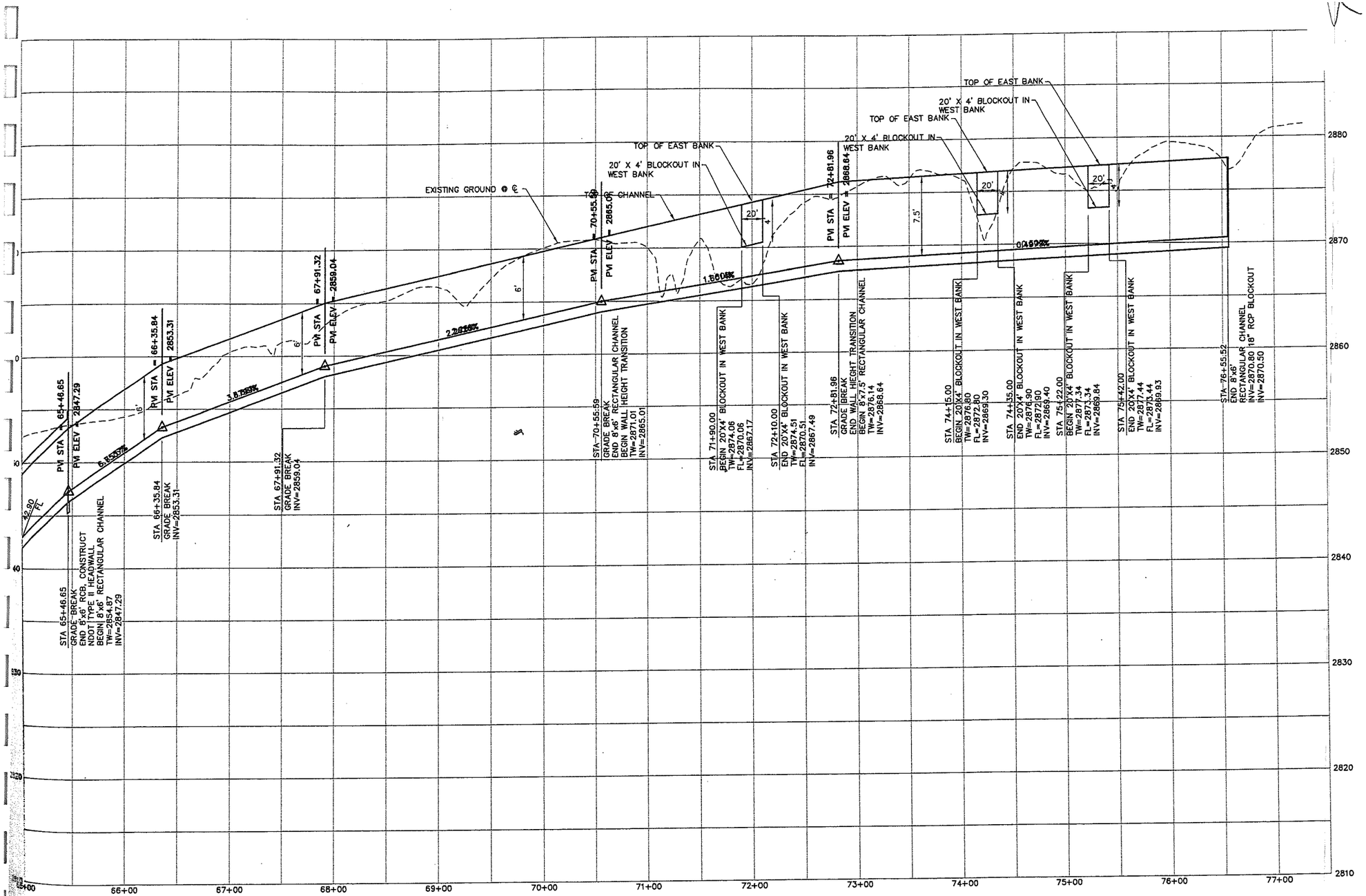
SCALE
HORIZ: 1"=50'
VERT: 1"=5'
FIELD BOOK

DRAWING NO.
RSD39
SHT. OF



50 0 50 100
SCALE FEET

SCALE: HORIZ. – 1" = 50'
VERT. – 1" = 5'

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1-702-227-2929

DESCRIPTION	APPROVED

CLARK COUNTY NEVADA

WESTERN CLARK COUNTY 215 BRUCE WOODBURY BELTWAY - CRAIG ROAD TO HUALAPAI WAY

8'x6' RECTANGULAR CHANNEL

STA 65+00.00 TO STA 77+00.00

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROFESSIONAL ENGINEER — WILLIAM R. HUNNICUTT — STATE OF NEVADA — No. 9835

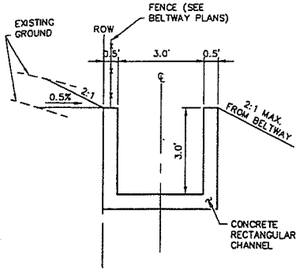
PROJECT No: 451.002.001 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

G. C. WALLACE COMPANIES
ENGINEERS | PLANNERS | SURVEYORS
1555 S. RAINBOW BOULEVARD · LAS VEGAS, NV 89146
T: 702.804.2000 · F: 702.804.2299 · GCWALLACE.COM

SCALE	
HORIZ:	1"=50'
VERT:	1"=5'
FIELD BOOK	

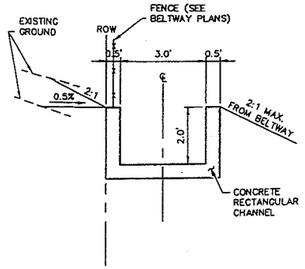
DRAWING NO.
RSD40

SHT. OF



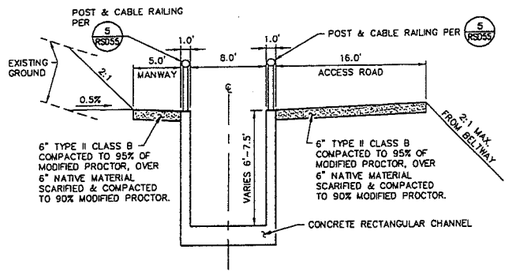
CHANNEL SECTION

NOT TO SCALE FOR STRUCTURAL SEE D/RS7 — 9 RSD57



CHANNEL SECTION

NOT TO SCALE FOR STRUCTURAL SEE F/RS7 — 8 RSD57

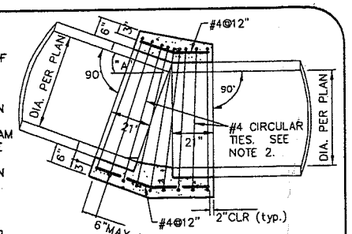


CHANNEL SECTION

NOT TO SCALE FOR STRUCTURAL SEE B/RS6 — 6 RSD57

NOTES:

1. WHERE THE SLOPE OF THE UPSTREAM PIPE IS GREATER THAN THE SLOPE OF THE DOWNSTREAM PIPE, JOIN SOFFITS. WHERE THE SLOPE OF THE UPSTREAM PIPE IS LESS THAN THE SLOPE OF THE DOWNSTREAM PIPE, JOIN INVERTS.
2. WHERE THE SPACE BETWEEN THE PIPE EXTREMITIES EXCEEDS 2 1/2 INCHES, THE NUMBER OF CIRCULAR TIES SHALL BE INCREASED TO MAINTAIN A MAXIMUM SPACING OF 6 INCHES CENTER TO CENTER. CIRCULAR TIES SHALL HAVE A DIAMETER 5 INCHES GREATER THAN THE OUTSIDE DIAMETER OF THE LARGER PIPE.



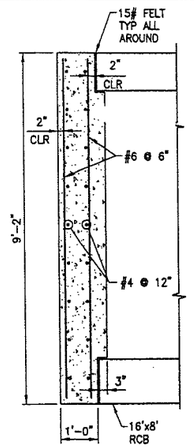
PLAN

CIRCULAR TIES:

PIPE DIAMETER	SPACE BETWEEN PIPE EXTREMITIES	NO. OF CIRCULAR TIES
54"	2 1/2"	9
60"	2 1/2" or less	9
66"	2 1/2" or less	9

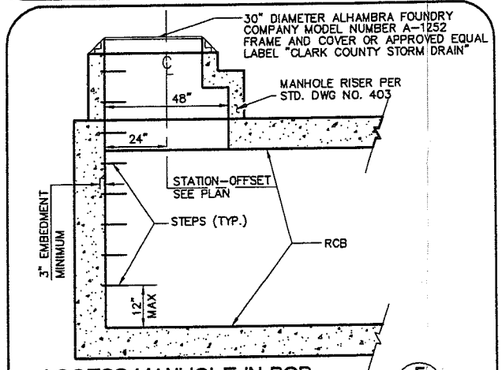
REINFORCED CONCRETE COLLAR DETAIL

NOT TO SCALE — 3 RSD57



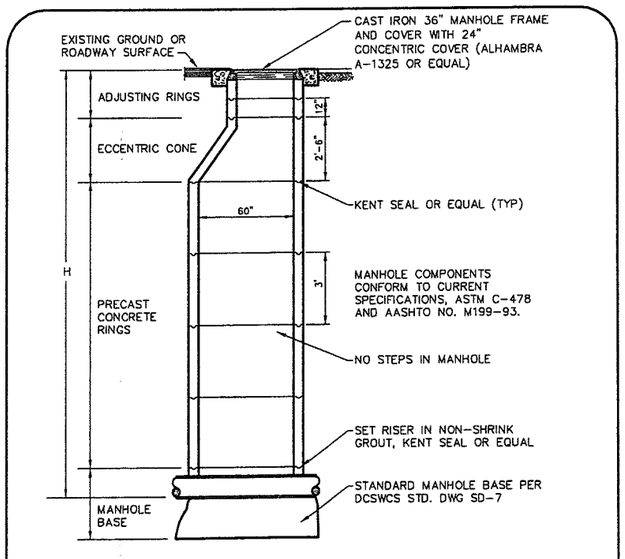
RCB PLUG DETAIL

NOT TO SCALE — 2 RSD57



ACCESS MANHOLE IN RCB

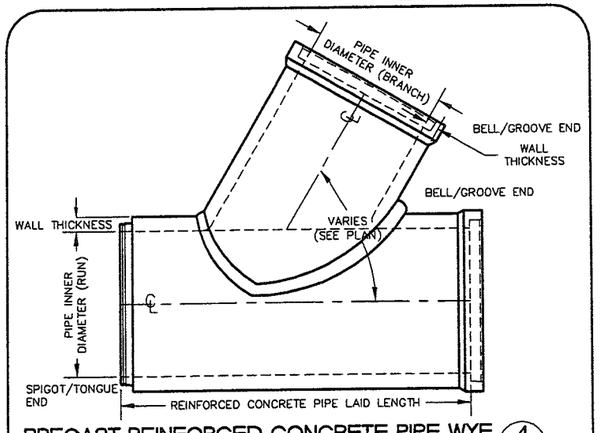
NOT TO SCALE — 5 RSD57



FOR USE WHEN H > 18 FT. (TMH TO INVERT)
(OVER 25 FT. PROVIDE STRUCTURAL DETAIL FOR BASE)

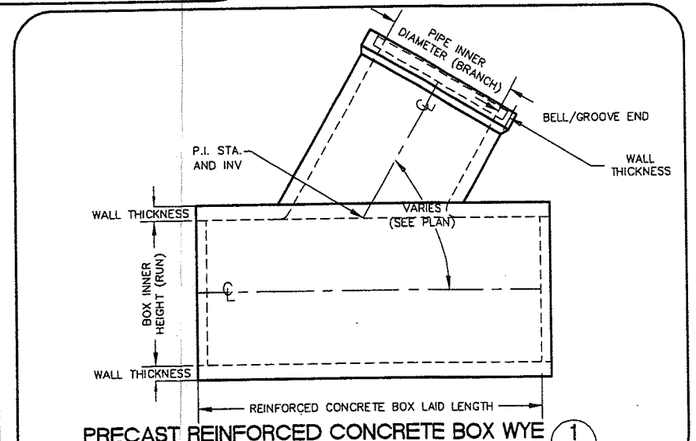
DEEP STORM DRAIN MANHOLE DETAIL

NOT TO SCALE — 7 RSD57



PRECAST REINFORCED CONCRETE PIPE WYE

NOT TO SCALE — 4 RSD57



PRECAST REINFORCED CONCRETE BOX WYE

NO SCALE — 1 RSD57

DESCRIPTION	APPROVED

WESTERN CLARK COUNTY 215 BRUCE WOODBURY BELTWAY - CRAIG ROAD TO HUALAPAI WAY

DETAILS

CLARK COUNTY, NEVADA, DEPARTMENT OF PUBLIC WORKS

PROJECT No: 451.002.001 DRAWN BY:
DESIGNED BY: CHECKED BY:
APPROVED BY

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SCALE
HORIZ: AS SHOWN
VERT: AS SHOWN
FIELD BOOK

DRAWING NO. RSD57
SHT. OF