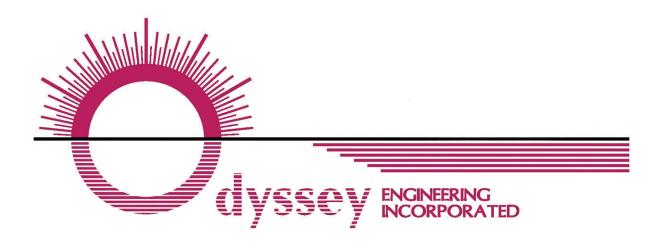
SPECIAL USE PERMIT MAJOR GRADING APPLICATION

FOR

NORTHERN NEVADA CONCRETE OFFICE

PREPARED BY:

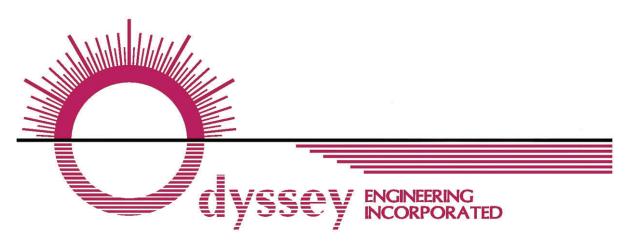


SEPTEMBER 8, 2025

Washoe County Development Application

Your entire application is a public record. If you have a concern about releasing personal information, please contact Planning and Building staff at 775.328.6100.

•					
Project Information	S	taff Assigned Case No.:			
Project Name: NORTHERN NEVADA CONCRETE OFFICE DEVELOPMENT					
Project Project includes the development of a commercial office/shop building and tracked equipment yard Description: as well as all underground utilities to support the development. Due to existing utility and elevation conditions, the proposed development requires an import greater than 5,000 cubic yards.					
Project Address: 175 Design Place	e, Sparks, NV, 89441				
Project Area (acres or square fe	et): 5.13				
Project Location (with point of re	eference to major cross	streets AND area locator):			
Development is located within	n the Spanish Sprir	ngs Business Center at the en	d of Design Place		
Assessor's Parcel No.(s):	Parcel Acreage:	Assessor's Parcel No.(s):	Parcel Acreage:		
538-141-26	5.13				
Indicate any previous Wash	oe County approval	s associated with this applicat	ion:		
Case No.(s).					
Applicant Inf	ormation (attach	additional sheets if necess	ary)		
Property Owner:		Professional Consultant:			
Name: Northern Nevada Holding Co	orp.	Name: Odyssey Engineering, Inc.			
Address: 15520 Donnybrook Court		Address: 895 Roberta Lane			
Reno, NV	Zip: 89511	Sparks, NV	Zip: 89431		
Phone: (775) 342-6240	Fax:	Phone: (775) 359-3303	Fax:		
Email: dave@nnvconcrete.net	ail: dave@nnvconcrete.net Email: eric@odysseyreno.com				
Cell: (775) 771-8675	Other:	Cell:	Other:		
Contact Person: David Elizondo		Contact Person: Eric Wilkinson			
Applicant/Developer:		Other Persons to be Contacted:			
Name: SAME AS OWNER		Name:			
Address:		Address:			
	Zip:		Zip:		
Phone:	Fax:	Phone:	Fax:		
Email:		Email:			
Cell:	Other:	Cell:	Other:		
Contact Person:		Contact Person:			
For Office Use Only					
Date Received:	Initial:	Planning Area:			
County Commission District:		Master Plan Designation(s):			
CAB(s):		Regulatory Zoning(s):			



September 8, 2025

Washoe County Community Services
Planning Department
1001 E. 9th Street
Reno, NV 89512

RE: Northern Nevada Concrete Office

Request for Special Use Permit

Major Grading Project

Dear Staff.

On behalf of the property owner and developer, Northern Nevada Holding Corp., Odyssey Engineering, Incorporated is pleased to submit the attached application and supporting information for the Northern Nevada Concrete Office located within the Spanish Springs Business Park in Spanish Springs, Washoe County, Nevada.

The development is to include a commercial office, warehouse, and tracked equipment storage yard. The project is located at the northwest end of Design Place, a cul-de-sac and is bordered by private property on the east and south boundary, a regional drainage way along the western boundary, and Sha-Neva Road, a private road, along the northern boundary. The proposed development will lie within Assessor's Parcel Number 538-141-26, with an address of 175 Design Place (Figure 1).

The total existing property area is 5.13 Acres and lies undeveloped. The current zoning of the parcel is designated as Industrial (I). This application is in support of a Special Use Permit to request a Major Grading Project per Washoe County Development Code Section 438.

The Northern Nevada Concrete Office development is proposed to include an combined office and shop concrete tilt building, concrete pavement parking lot, concrete, pavement exterior yard & shop access, exterior tracked equipment storage area, landscaping, and underground drainage, sanitary sewer, and water facilities.

The proposed development is served by Washoe County for sanitary sewer, Truckee Meadows Water Authority of domestic water services, City of Sparks for reclaim irrigation services, AT&T and Charter (dba Spectrum) for communication services, Spanish Springs Business Center Owners Association for fire water and storm drainage services and Truckee Meadows Fire Protection District for fire fighting and EMS services.

Based on the existing elevations of both finish grade and inverts of adjacent storm drain facilities of the subject property, the site will need to be brought to a higher grade to allow for positive drainage to accept the proposed development. Due to the area of the site grading quantities were analyzed.

Per Section 438.28 Major Grading Permit Thresholds of the Washoe County Development Code, below is an analysis of the proposed development's grading area, volume and depth.

Table 1 – Proposed Development Grading Area Quantities (WC 110.438.28(a)(i) & WC 110.438.28(b)(3) and (4))

Finish Grade Material	Area
Parking and Drive Aisle Area	74,326 SF
Portland Cement Concrete Pavement	(1.71 AC)
(PCCP)	
Landscape	13,451 SF
	(0.31 AC)
Building	12,702 SF
	(0.29 AC)
Tracked Equipment Yard	117,247 SF
(3/4" Gravel Section)	(2.69 AC)
Sidewalk	1,034 SF
(Concrete Hardscape)	(0.02 AC)
Gross Project Development Area:	218,759 SF
	(5.02 AC)
Net Project Development Area:	117,247 SF
	(2.69 AC)

Table 2 – Proposed Development Grading Volume Quantities (WC 110.438.28(a)(ii) & WC 110.438.28(b)(4))

Finish Grade Material	Cut Volume (Excavation)	Fill Volume (Import)
Portland Cement Concrete	111 CY	6,724 CY
Pavement (PCCP)		
Parking and Drive Aisle Area		
Landscape	71 CY	1,294 CY
Building	0 CY	2,230 CY
Tracked Equipment Yard	123 CY	4,661 CY
(3/4" Gravel Section)		
Sidewalk	0 CY	96 CY
(Concrete Hardscape)		
Gross Project	304 CY	15,005 CY
Development Volume:		
Net Project Development	233 CY	13,615 CY
Volume:		
Total Gross Project Volume:		14,701 CY (Import)
	Total Net Project Volume:	13,382 CY (Import)

Table 3 – Proposed Development Depth of Excavation (WC 110.438.28(a)(1)(iii))

Finish Grade Material	Max Cut Depth (FT)	Max Fill Depth (FT)
Portland Cement Concrete	2.07	3.66
Pavement (PCCP)		
Parking and Drive Aisle		
Area		
Landscape	3.40	4.71
Building	0.00	3.58
Tracked Equipment Yard	1.01	3.60
(3/4" Gravel Section)		
Sidewalk	0.00	2.87
(Concrete Hardscape)		

Based on the analysis within Tables 1, 2 & 3 we find that the development is over the area and volume grading quantity thresholds and under the depth of grading quantity threshold, and shall be considered a Major Grading Project.

Below includes supplemental information for Special Use Permit Applications and Special Use Permit Applications for Grading.

Special Use Permit Application Supplemental Information (per document dated February 2024)

Question 1: What is the project being requested?

Response: Project includes the development of a commercial office/shop building and tracked equipment yard as well as all underground utilities to support the development. Due to existing utility and elevation conditions, the proposed development requires an import greater than 5,000 cubic yards. Also the area of disturbance due to grading is 5.02 acres. Both the area disturbed and the amount of import volume break major grading project thresholds per Washoe County Development Code.

Question 2: Provide a site plan with all existing and proposed structures (e.g. new structures, roadway improvements, utilities, sanitation, water supply, drainage, parking, signs, etc.)

Response: Please reference the provided documents which include Civil Site, Grading and Utility Plans, Landscape Plans, and Architectural building floor and elevation plans.

Question 3: What is the intended phasing schedule for the construction and completion of the project?

Response: The project is proposed to be constructed within a single phase and completion is estimated to be within 12 to 18 months after start of construction.

Question 4: What physical characteristics of your location and/or premises are especially suited to deal with the impacts and the intensity of your proposed use?

Response: Physical characteristics of the location for the proposed development is especially suited for this use, based on the development being located within an existing business/industrial park in Spanish Springs and being zoned for Industrial uses.

Question 5: What are the anticipated beneficial aspects or affects your project will have on adjacent properties and the community?

Response: Beneficial aspects of the proposed development, when related to the adjacent properties include grading improvements, in which water will be conveyed to existing infrastructure.

Question 6: What are the anticipated negative impacts or affect your project will have on adjacent properties? How will you mitigate these impacts?

Response: We do not anticipate any negative impacts on adjacent developed properties.

Question 7: Provide specific information on landscaping, parking, type of signs and lighting, and all other code requirements pertinent to the type of use being purposed. Show and indicate these requirements on submitted drawings with the application.

Response: All pertinent requirements based on the proposed use of the development will follow current Washoe County Development Code.

Question 8: Are there any restrictive covenants, recorded conditions, or deed restrictions (CC&Rs) that apply to the area subject to the special use permit request? (If so, please attach a copy.)

Response: Yes, Spanish Springs Business Center CC&Rs are attached to this submittal.

Question 9: Utilities

a. Sewer Service: Washoe Countyb. Electrical Service: NV Energy

c. Telephone Service: AT&T and Charter (dba Spectrum)

d. LPG or Natural Gas Service: NV Energy

e. Solid Waste Disposal Service: Waste Management

f. Cable Television Service: AT&T and Charter (dba Spectrum)
g. Water Service: Truckee Meadows Water Authority

For most uses, Washoe County Code, Chapter 110, Article 422, Water and Sewer Resource Requirements, requires the dedication of water rights to Washoe County. Please indicate the type and quantity of water rights you have available should dedication be required.

Response: The subject property is within Truckee Meadows Water Authority service territory and has dedicated water rights for the development. Attached to this submittal is a Will Serve Letter from TMWA for the development.

Question 10: Community Services

a. Fire Station: Truckee Meadows Fire Protection District Station

46

b. Health Care Facility: Northern Nevada Medical Center Urgent Care

Renown Urgent Care

c. Elementary School: Alyce Taylor Elementary School

d. Middle School: Shaw Middle School

e. High School: Spanish Springs High School

f. Parks: Gator Swamp

g. Library: Spanish Springs Library

h. Citifare Bus Stop: Baring Boulevard

Special Use Permit Application for Grading Supplemental Information (per document dated February 2024)

Question 1: What is the Purpose of the Grading?

Response: The purpose of the grading is to facilitate the development of an underground storm drain system, which will route on-site drainage flows to adjacent regional drainage channels. Currently, the existing elevations are the same or lower than adjacent storm drain infrastructure elevations and would not provide for positive drainage.

Question 2: How many cubic yards of material are you proposing to excavate on site?

Response: 304 Cubic Yards.

Question 3: How many square feet of surface of the property are you disturbing?

Response: 218,759 Square Feet (5.02 Acres)

Question 4: How many cubic yards of material are you exporting or importing? If none, how are you managing to balance the work on-site?

Response: The total amount of imported material is 14,701 Cubic Yards. The 304 cubic yards of cut (excavated material) is to remain on the subject property.

Question 5: Is it possible to develop your property without surpassing the grading thresholds requiring a Special Use Permit? (Explain fully your answer.)

Response: It is not possible to develop this property as proposed without surpassing the grading thresholds, due to the existing site elevations being the same or lower than adjacent storm drain infrastructure. The amount of import proposed allows the site to drain into on-site underground infrastructure and out to existing regional drainage channels.

Question 6: Has any portion of the grading shown on the plan been done previously? (If yes, explain the circumstances, the year the work was done, and who completed the work.)

Response: No.

Question 7: Have you shown all areas on your site plan that are proposed to be disturbed by grading? (If no, explain your answer.)

Response: Yes.

Question 8: Can the disturbed area be seen from off-site? If yes, from which directions and which properties or roadways?

Response: The disturbed area will be able to be seen from off-site. The site will be able to be seen from public right of way via Design Place on the south eastern corner of the site and from private property on the west, north and east boundaries.

Question 9: Could neighboring properties also be served by the proposed access/grading requested (i.e. if you are creating a driveway, would it be used for access to additional neighboring properties)?

Response: No.

Question 10: What is the slope (horizontal/vertical) of the cut and fill areas proposed to be? What methods will be used to prevent erosion until the revegetation is established?

Response: On-Site slopes are proposed to be 1 to 5% (100:1 to 20:1). Where proposed elevations are higher than existing elevations at the property boundary, a concrete retaining wall is proposed. Revegetation is not proposed for this development. Any disturbed area within the development is proposed to be treated with a finish grade surface, such as concrete, landscaping or aggregate, to prevent any erosion.

Question 11: Are you planning any berms?

Response: No.

Question 12: If your property slopes and you are leveling a pad for a building, are retaining walls going to be required? If so, how high will the walls be and what is their construction (i.e. rockery, concrete, timber, manufactured block)?

Response: Where proposed elevations are higher than existing elevations at the property boundary, a concrete retaining wall is proposed.

Question 13: What are you proposing for visual mitigation of the work?

Response: It is proposed that a temporary construction fence will be placed during construction and a permanent slated fence will be installed in the completed condition.

Question 14: Will the grading proposed require removal of any trees? If so, what species, how many and of what size?

Response: Existing Trees will be removed around the existing City of Sparks Truck Fill Station, which lies on the subject property under easement. The existing trees will be removed to install drainage facilities and a concrete barrier wall, to separate the proposed development and the truck fill use. 6 trees will be removed with sizes no more than 8" in diameter.

Question 15: What type of revegetation seed mix are you planning to use and how many pounds per acre do you intend to broadcast? Will you use mulch and, if so, what type?

Response: The proposed development will not have revegetation. All disturbed ground will receive other erosion mitigation in the form of permanent landscaping, pavement, or aggregate treatment.

Question 16: How are you providing temporary irrigation to the disturbed area?

Response: No.

Question 17: Have you reviewed the revegetation plan with the Washoe Storey Conservation District? If yes, have you incorporated their suggestions?

Response: No.

Question 18: Are there any restrictive covenants, recorded conditions, or deed restrictions (CC&Rs) that may prohibit the requested grading?

Response: No.

Attached to this cover letter are supporting documents required per Washoe County's Special Use Permit application requirements.

Please reach out to our office if you have any questions or require additional materials.

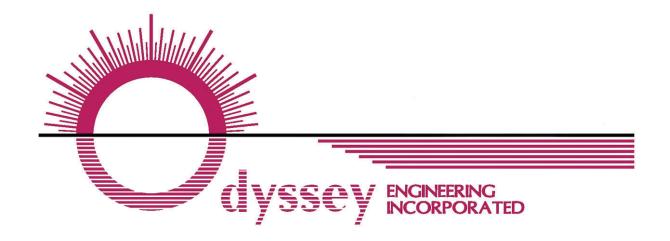
Sincerely,

Odyssey Engineering, Inc.

E William San

Eric Wilkinson, P.E. Project Manager

FIGURE 1 VICINITY MAP



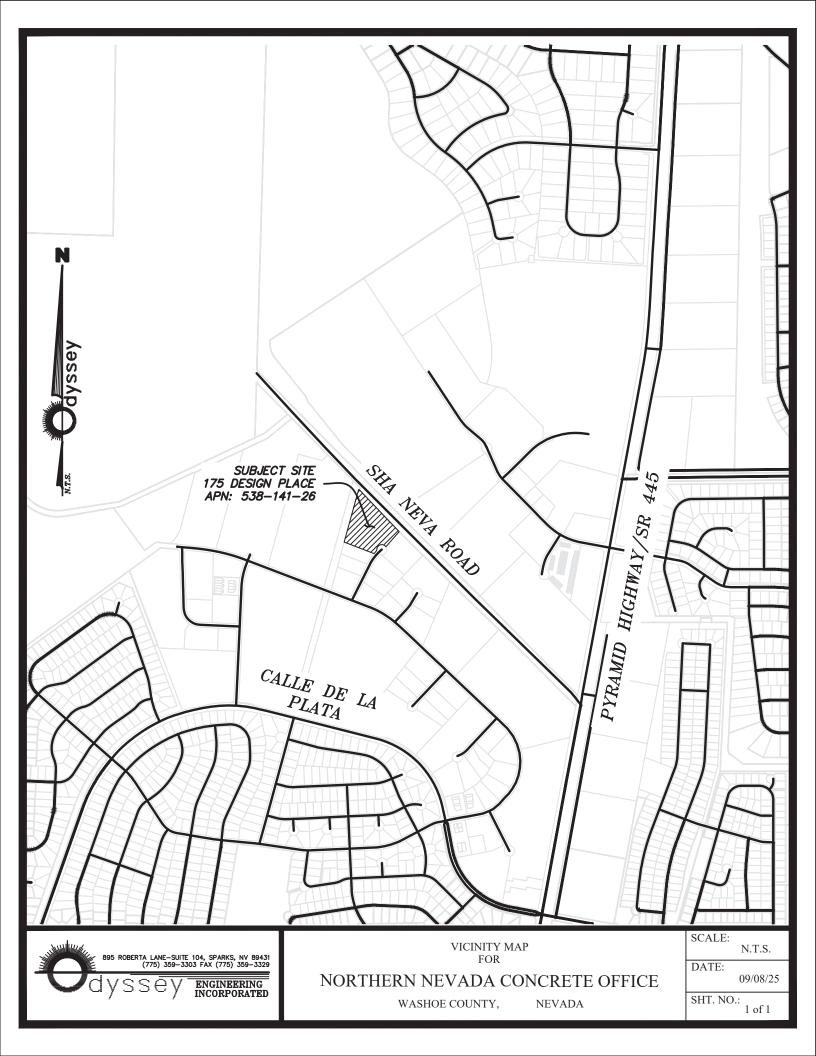
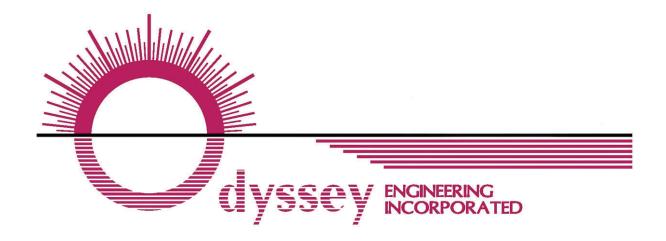


FIGURE 2 ZONING MAP



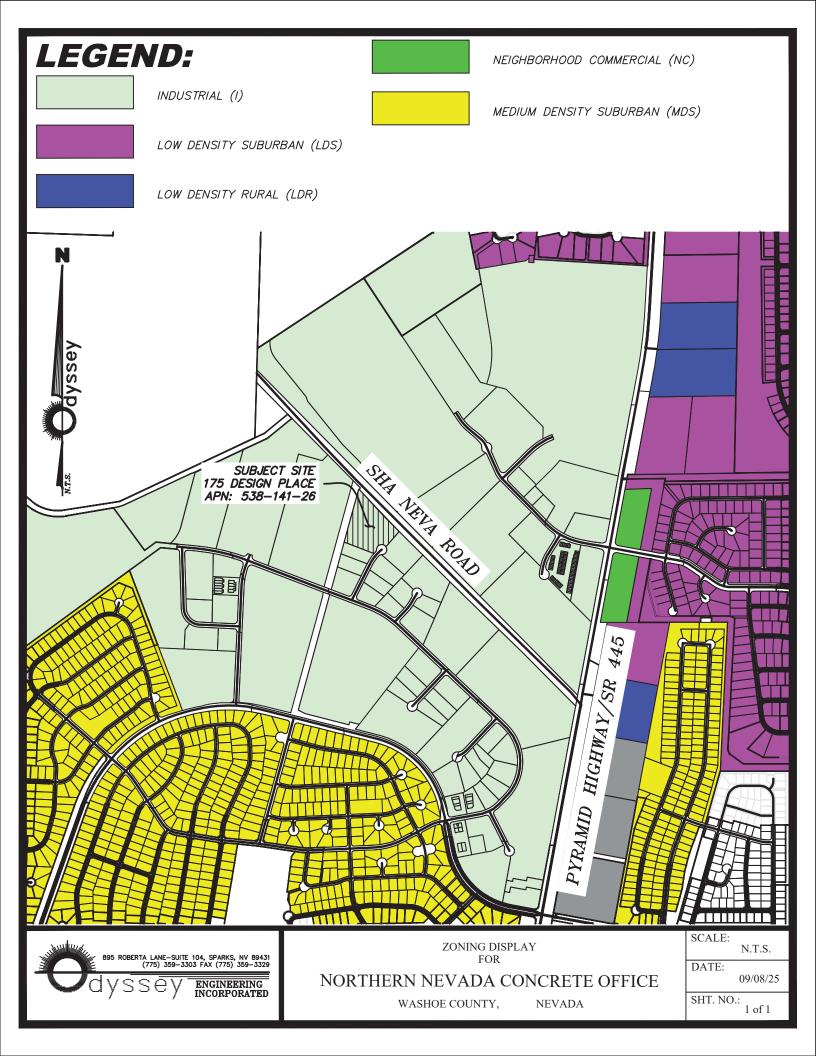
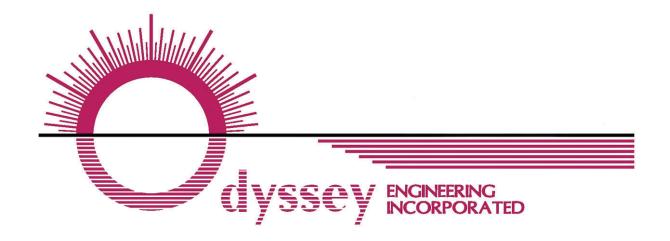
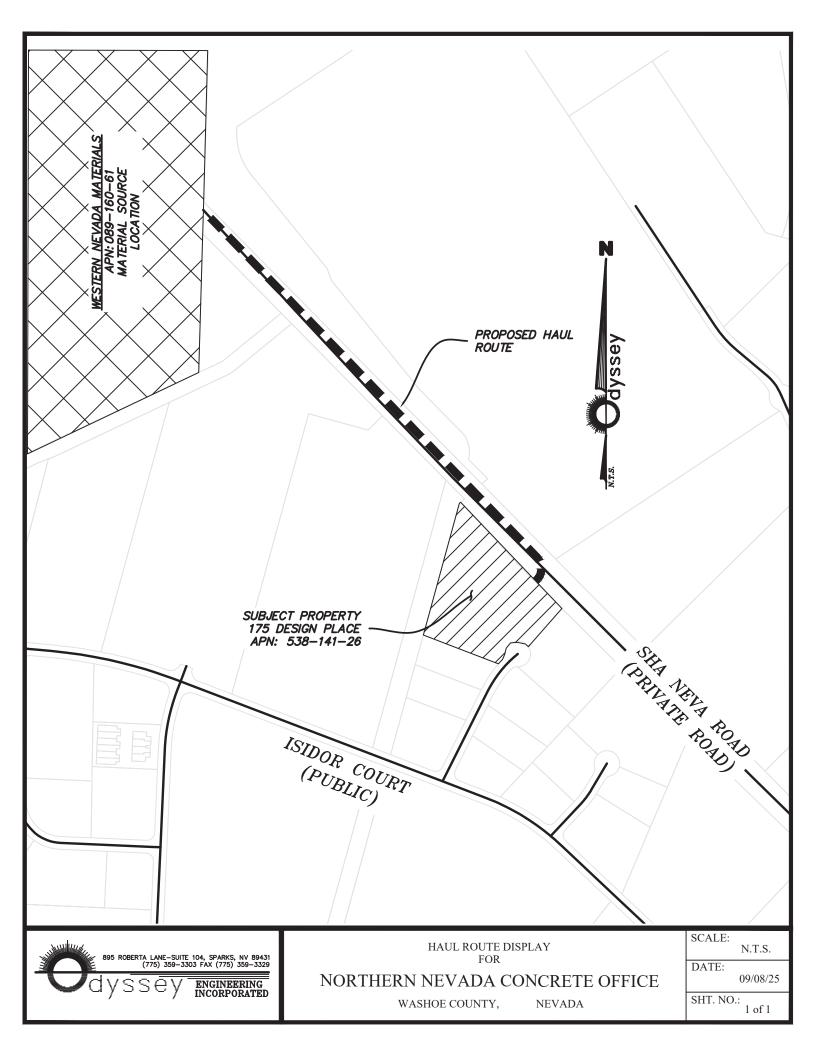
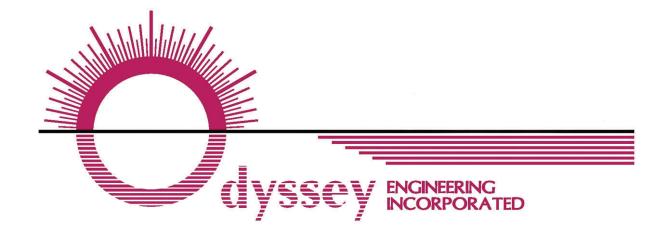


FIGURE 3 HAUL ROUTE DISPLAY





TMWA WILL SERVE LETTER





May 30, 2025

Department Building and Safety, Building Permits Washoe County 1001 E. Ninth St Reno, NV 89512

Project: Northern Nevada Concrete

Design (175) Place Commercial Building Resources Dedicated (AF): 1.02 APN/Service Property: 538-141-26

RE: Will-Serve Commitment Letter

This letter constitutes a commitment to deliver water to the Project identified above which is located within Truckee Meadows Water Authority's (TMWA's) retail service territory and the applicant has dedicated sufficient water rights to TMWA to meet the water demand noted above. The water demand is an estimate based on the plans and information provided by the applicant. Should actual water use exceed this estimate, TMWA reserves the right to require the applicant or its successor to dedicate additional water resources to TMWA or the appropriate governmental entity as provided in TMWA's Rules.

This commitment is made subject to all applicable TMWA Rules. This commitment does not constitute an obligation to provide water service to the Project under NAC 445A or to provide planning, design, or construction of the water facilities necessary for service to the project. The provision of water service is conditional upon applicant's satisfaction of any obligations in an annexation agreement, or water infrastructure agreement, all other applicable provisions of TMWA's Rules and Rate Schedules and requirements of the local health authority, including, without limitation and where applicable, the submission of specific development proposal with a complete Application for Service, payment of fees, review and approval of a water facility plan, the construction and dedication of water system facilities, final approval of the water facilities plan by the local health authority, and approval of and execution of a Water Service Agreement.

Please be advised that completing this process can be time consuming, and there is no guarantee of how long the approval process, including approval from the local health authority, may take or that such approval will be granted. Once final approval is received from the local health authority, TMWA will prepare the Water Service Agreement which includes all fees the applicant must pay TMWA prior to water being delivered to the project.

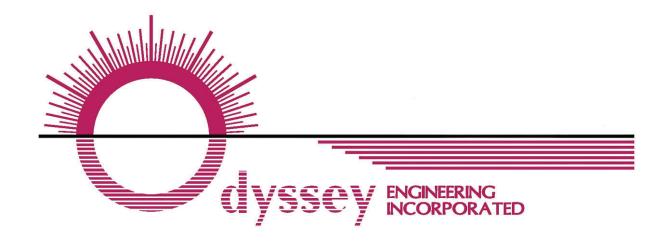
Should the approval of this Project expire or be terminated by the local governing body, this commitment shall automatically terminate and be deemed void.

Very truly yours,

C. Quaglisri

Eddy Quaglieri, P.E. Water Rights Manager

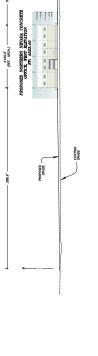
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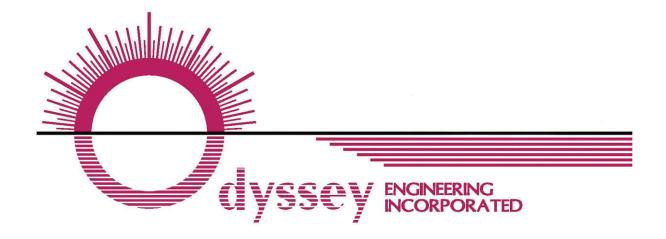


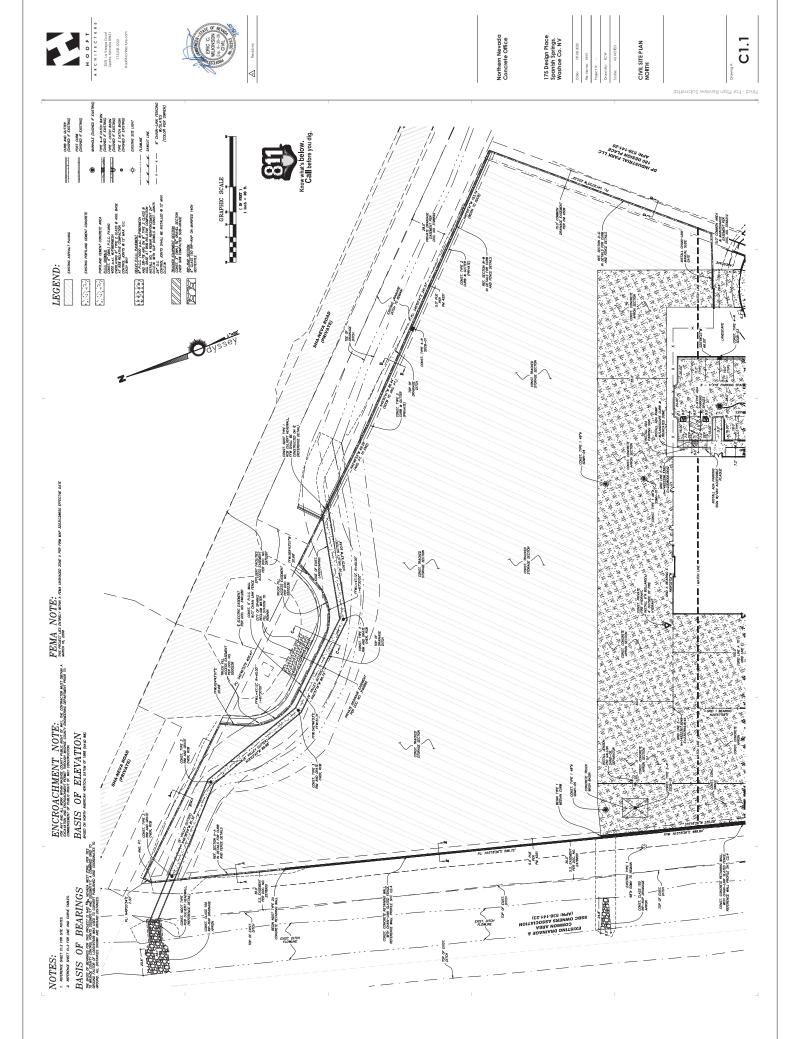
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CIVIL

PLAN SET





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Northern Nevada Concrete Office

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175 Design Place Spanish Springs, Washoe Co. NV

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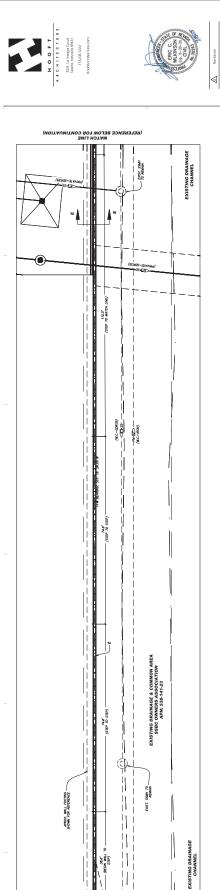
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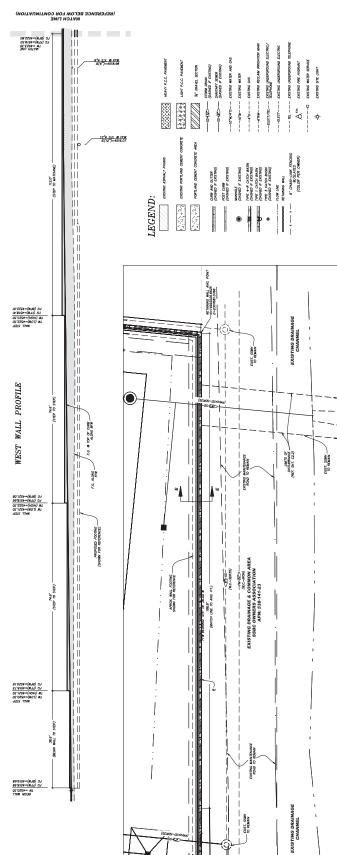
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Northern Nevada Concrete Office

175 Design Place Spanish Springs, Washoe Co. NV

Washoe Co. NV

Date: 09-08-2025

Project #: .

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Sode: ASNOED

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C2.3

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MATCH LINE TO ANG. PT.

F.G. & TOP OF CURB

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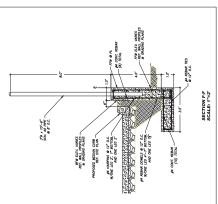
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Northern Nevada Concrete Office

175 Design Place Spanish Springs, Washoe Co. NV

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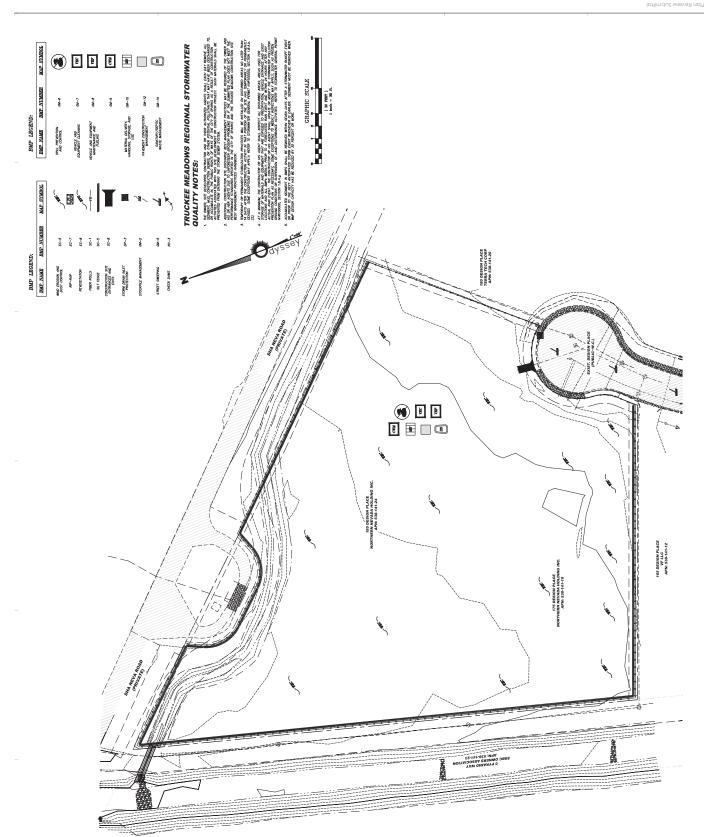
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CIVIL RETAINING WALL PROFILE

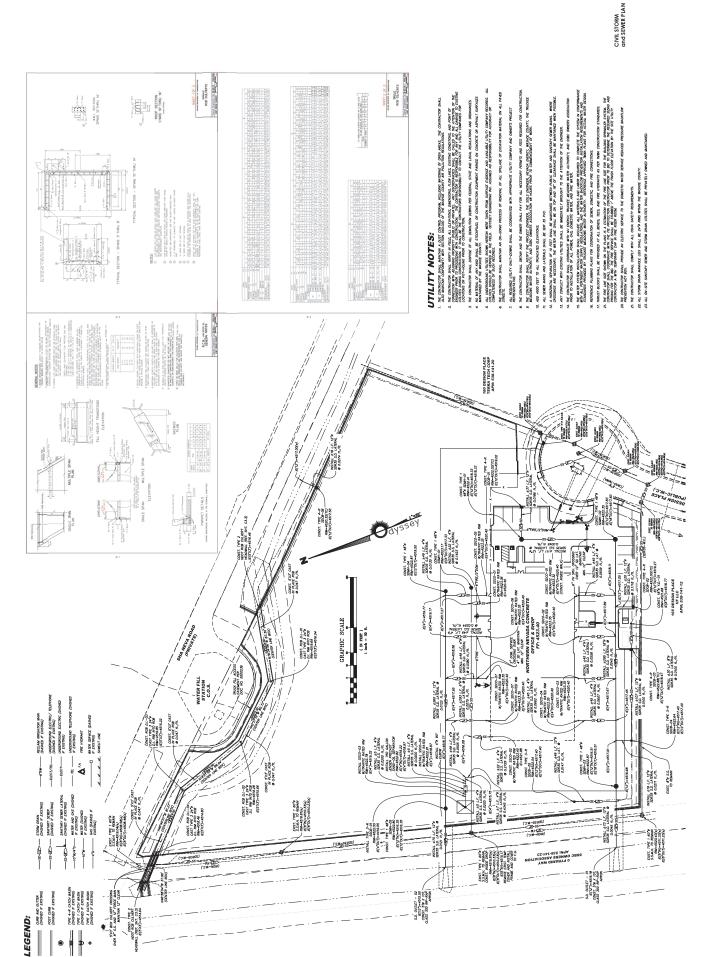
C2.4

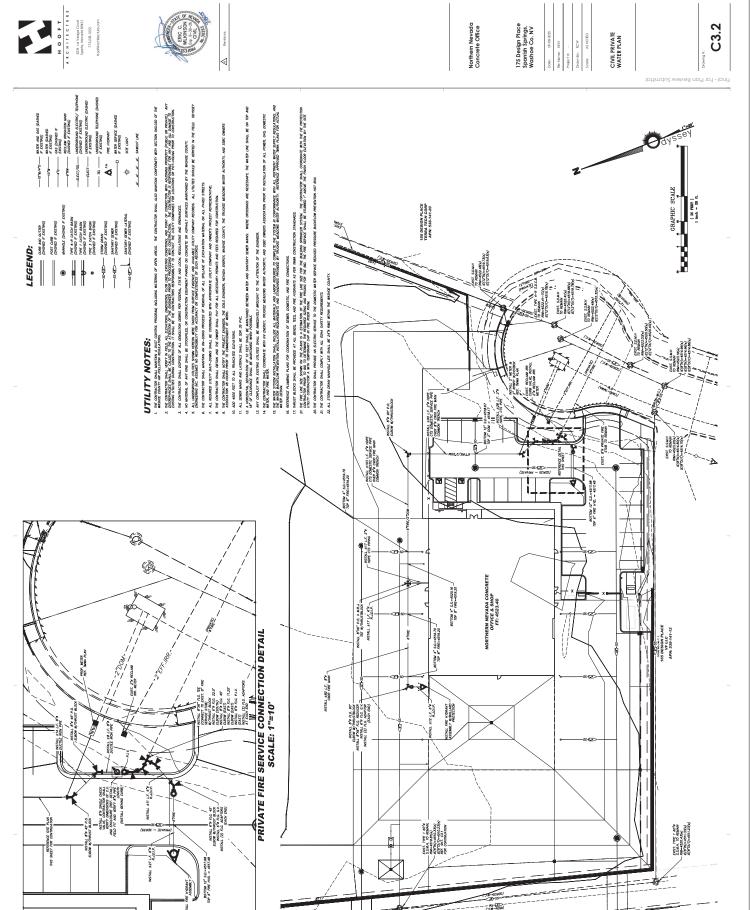
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CIVIL EROSION CONTROL PLAN









C3.2

C3.3

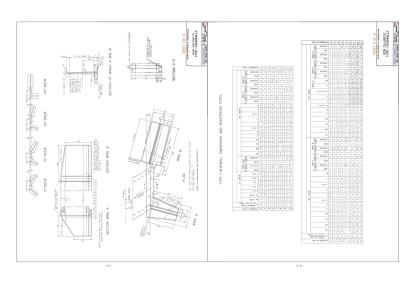
Northern Nevada Concrete Office

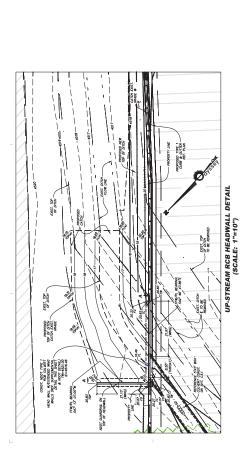
175 Design Place Spanish Springs, Washoe Co. NV

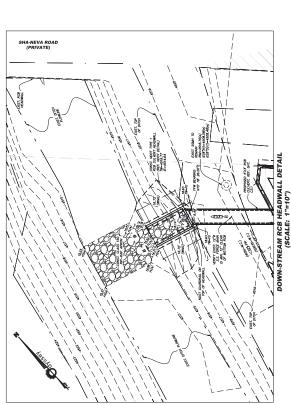
RCB CULVERT HEADWALL DETAILS

QUANTIY NOTE: VERIFY REBAR AND CONCRETE QUANTITIES, NDOT TYPE I DETAIL MAY NOT BE ACCURATE 21.13' (WING) F.G. -PROPOSED SCOUR PAD, REF. NDOT TYPE 1 RCB HEADWALL DETAIL, SECTION A—A ,00 8.50' (THROAT) · 7W=4521.30 21.97' (WING) MING WALL FOOTING, FOOTING, FOOTING, FOOTING, FOOTING PAD, E. TO OF FOOTING=1.00' TOPE RES. MIOT TOPE SECTION B-B (TYP)

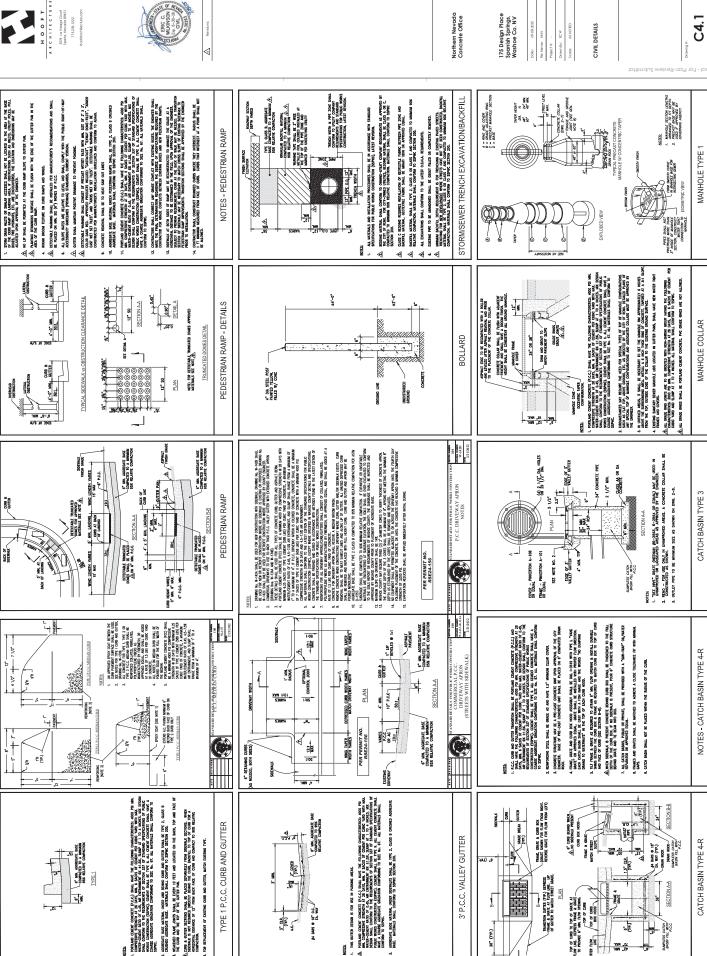
SECTION A.A UP-STREAM RCB HEADWALL PROFILE (SCALE: N.T.S.)







QUANTITY NOTE: VERIFY REBAR AND CONCRETE QUANTITIES, NDOT TYPE I DETAIL MAY NOT BE ACCURATE 16.72' (MING) PROPOSED SCOUR PAD, REF. NDOT TYPE 1 RCB HEADWALL DETAIL, SECTION B—B SECTION B-B DOWN-STREAM RCB HEADWALL PROFILE (SCALE: N.T.S.) TW=4518.63 BOX E=4514.60 8.14" (THROAT) 16.72' (WING) MING WALL FOOTING, FOOTING, FOOTING, FOOTING OF SCOUR PAD, E. TO TOP OF FOOTING—1.00° TYPE 2. RCSH HEADWALL DETAIL, SECTION B—B (TYP)



C4.1

SERVICE LATERALS SHALL HAPE, A MINIMUM SLOPE OF 1/4-WCH PER FOOT UNLESS OF MPROVED BY THE CITY DIGHTER.

DORE DRILL FOR LATERAL PPER COMMETTION AND INSTALL APPROVED THE SADEL THE OR MESER A TIE TYPE LATERAL TAY. (COMMETTION TO EXSTING MAIN)

SENER

SEE DETAIL 'A'







PROPERTY CHRISE SAUL BE RESPONSEL FOR OPENION, MANTEUMICE AND REMR OF THE STREY LITER, PER SPARS MANCHAL, COOF.

NOTES - SANITARY SEWER LATERAL

SANITARY SEWER LATERAL

∆ A RESUDIT IZERIE CORRECTOR PER ACTIN C P21-09 SHALI IR. USED AT THE MANNOLL PPER CONSCIENTO DESIGNAT HIS REMOMBRISMS OF HIS IV. TO THE VEST-CONSCIENT SHOULD SHALL BE AM "1-100" THE PRE-CO-MARKET CONSCIENT OF HIS PRE-CONSCIENT OF A PROCEDURE CONSCIENT OF A PROCEDURE CO

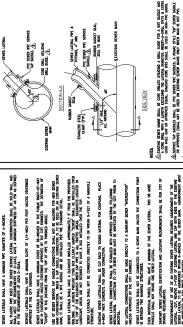
NON-SHEW GOOT SHALL MAY THE POLICHMING CHARACTERSTICS, 3000 PSI MAL COMPRESSIT Stream is to their Mar Sects or Center for Character the Character the Character than Annual Teach and I TO 4 Warder. Martinal Shall Comprode To Stope SECTION 202. STORM DAMA PRE CONNECTIONS TO MANDLE BARES AND SECTIONS REQUIRE AN AGENCY—APPROVED NOW OF SEAL, OF WITHIN STORM AND RESPONDED ON ALTONIA DAMA INSTILLATIONS TO PROVINCE AN INSTRAINE CONNECTION, UTILIZ A DAMAC STILL "LICE" MANDLE ADAPTER GASSET ON APPROVED EQUAL IN CONJUNCTION WITH THE NOM-SHRIMK GROUP. ALL PIPE OPENHAS TO NEW MANHOLES MUST BE ETHER CAST—IN-PLACE OR PRE-FORMED AND PIPE OPENHASS TO EXISTING MANHOLES MAST BE CORE DRILLED. A RESULENT FLEDBLE COMMECTOR INSTALLED BY ACCORDANCE WITH STANDARD DETAIL R-2230 MAY BE USED TO SATISSY THE REDURGEMENTS OF NOTE 2 ABOVE.

3. THE INTERIOR MANHOLE COMMECTION SHALL HAVE A SMOOTH TRANSTICM RETWEEN 199° LD. AND MANHOLE BASE TOTALLER. NO GROUT OR COMCRETE SHALL BE PLACED AROUND THE RESULDIT FLUXEL CONTECTOR.

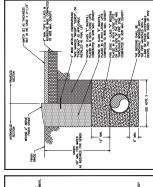
RESILIENT FLEXIBLE CONNECTOR

STORM DRAIN PIPE TO MANHOLE CONNECTION

S" MAX. WITH 45" ON-SHRINK GROUT CHAMFER











TYPICAL VALVE BOX & GATE VALVE DETAIL

LIQUID CAPACITY: 750 GALLONS.

BOX DESKAL LOAD: H-20 TRAFFIC FROM.
1" TO 6" YO SULL COPER.
FOR COMPLEE DESKA AND PROCUCT.
RECOMMENDED CONTACT (ENSEN PRECAST.

4. ALL PIPE OPENINGS TO NEW MANHOLES MUST BE ETHER CAST-IN-PLACE OR PRE-FORMED AND PIPE OPENINGS TO EXISTING MANHOLES MAST BE CORE DISILED.

1. CLEMBUTS SHALL BE LOCATED S' FROM BUILDING. 2. REF. MECHANICAL PLANS FOR EXACT CLEAROUT LOCATIONS.

SANITARY SEWER PIPE TO MANHOLE CONNECTION

NON-SHEW, GROUT SHALL HAPT THE FOLLOWING CHARACTERISTICS, 3000 PSI BINL COMPRESS TREATMENT AT 28 DAYS, BINL, S LACKS OF CEGENT PRO CABIC, YARD, AND SLIJIPP AT 1 TO 4 HOUSE. ALL BATTERIA SHALL CONFORM TO STANDING SPECIFICATIONS OF PUBLIC WORSE CONFINCING (SOWIE) SECTION 202. Austrace State of Section and Section Section and Section Section

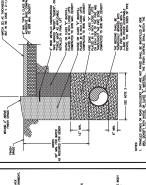
DRAIN ROCK

PROVIDE SHOOTH TRANSTITION
BETWEEN PRE LD. AND
MANHOLE BASE FLOWINE
MANHOLE BASE FLOWINE

REQUIRED IN TRAFFIC AREAS ONLY) 7

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175 Design Place Spanish Springs, Washoe Co. NV



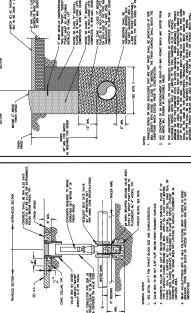
To more than a state man a sta

VALVE BOX W/ COVER --LABILED "MATE" CHRSTY G-5 OR EQUAL 6" WHITE PAC CONDUCTOR PAYE 52R 35 OR APPROVED EQUAL TO BE PAUME & CENTERED ON VALVE STEW-

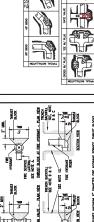
750 GALLON SAND-OIL INTERCEPTOR MOBIL P756E-50 ACCEPTED BY UPG.

WALL OF MANHOLE SECTION (TYP.)









MARLER 4-25 OR AMERICAN WATEROUS PACES WENG-250 WITH 5-1/4" VALVE OFFINING ON THE DEPARTMENT WATEROOFF DOLLAR, PRESS WALL ME 1" FOR 5 TH AND REST STATES, STATES AND THE STATES WEND THE TOTAL WATEROOFF SALVE WENT WATEROOFF SALVE WENT TO SALVE WENT WATEROOFF SALVE WENT WATER ASSEMBLY.

when compared to the constitution of the compared to the compa

OPERATING NUT - PENTAGON

FIRE HYDRANT COLOR SCHEDULE.

BEG.

BEG. NEGRANTS TO BE FACTORY ENMELLED SAFETY YELLOW. HYDRANIS TO BE FACTORY ENAMELLED SAFETY RED. E DAMET TO SEE FACTORY DAMBLED SAFETY MED. SERVICED SAFETY MED. HE REDAMERS TO BE FACTORY DAMBLED SAFETY MED HIGH REFLECTIVE WHITE TOP.

SANITARY SEWER CLEANOUT

THE KITGHARTS SHALL BY PLACED WITHIN THE BERT-OF-NAY OF LEGIZIEN GAWITZ DOTTION THE RESTRICT CHARGE AND AND STREET THE RESTRICT AND THE RESTRICT AND THE RESTRICT AND THE RESTRICT AND THE RESTRICT OF THE RES

aaa approa, is required for hydrant location where no soemalk exses bening curb or where a landscape stipp is between the curb and the soemalk. PRE HYDRIANS SHALL BE TESTED BY THE AND PROR TO COMBISTIBLES BEING BROUGHT ON SITE. FOR TERMOL TECHNISHY/BACKTLL SPECFALINIS SEE DETAK BELDIE. ALL DENN ROCK SHALL B PLAGED PROR TO INSPECTION AND BACKTLL.

UNIT WAS BUILDED, FOR JOB OF THE AMERICAN CONTRIBUTION OF THE AMERICAN COMPANY THE AMERICAN COMPANY THE AMERICAN COMPANY THE SET SET WHEN THE COMPANY THE AMERICAN ON COMPANY THESE SET SET AMERICAN COMPANY THE SET SET. ALL WATER MAIN SHIT DOWNS AND/OR RESTALATION OF TAPPING SLETCE SHALL BE COORDINATED THE WATER PORTIONE THE WASHING SOCIETATION. TAPPING SLETCES TO BE USED ONLY FOR EXCESSING STALATIONS.

6" VILVE BOX SVALL BE DAL ADDAL & ADDSO OR APPROVED EQUAL, CASTINES SVALL BE CAST MON GRAY AND MEET THE RECUMENENTS OF ASTIN AA8-74, CLASS 309, NO PAINT.

A COL BOOK OF THE STATE OF THE

CONCRETE THRUST BLOCK, SEE DETAIL ON 301D, NOTE A.

NTEGRAL 5" STORZ PUMPER NOZZLE ASSEMBLY

FRE HTDANTS SAML BE INSPECTID BY AND INSPECTION. INSPECTIONS SAML BE SOFFDLED A MARKEL OF THE BLYBOCKED DARW REPORTS. VISINGS. DATA FIRE PREVENTIONS BULKAN TO SCHEDULE INSPECTIONS.

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INBUST BLOCK HOTS A. THAKIS BLOCK SEE ASSUARS MAXIMA OF MALTE FIRE HYDAMI SERVICE. THRUST BLOOKS FOR LARGE SERVICES REGIME APPROVAL OF MAL	B. THE PRINCES GLOCK STORMER CALLER SEASON OF THE CONCESSION COUNTY. NEW CAUCHAINGS SHOWN WITH BY THIS TOWN CHARLES THE PROJECT STORMER TO THE CAUCHAINGS SHOWN HIME THIS TOOK COESSION OF THAT SHALL BE NESSED ON THE REQUIREMENTS OF THE MIST CHARGE THE PRINCESSION OF THE WITH CHARLES THE PRINCESSION OF THE WITH CHARLES SHALL BE SHALL BE SHIPMERTOR THE SHALL SHALL SHALL SHALL SHALL SHALL SHALL SHALL BE SHIPMERTOR WITH SHALL	C. THRUST BLOCKS SHALL BE POUND ALANST UNDSTURED SOL. IN CASES WHORE THIS IS NOTICLL, BACKENEL ARE BEEN UNDER BECKEN WILL BE ACADE WITH ADDRESALE BASE COMPLETED TO SOS SELAME COMPLETION, CUT-SICK COMPACTED AGREGATE BASE TO LEVOSE, A TIME SMEWER, THEN PACE THRUST BLOCK.
THRUST BLOCK MOTES A. THRUST BLOCK SOTE ASSUMES MAXIM FOR LLAGER SERVICES REQUIRE LAPPR	B. THE THRUST BLOCK DESIGN SHALL BI NATIFE CALCULATIONS SHOWN WITH THE ON THE REQUIREMENTS OF THE MOST SOIL, EYALLWITH REPORT OR A SWED THE PROLECT FLANK.	C. THRUST BLOCKS SHALL BE POURED A NOT PRACTICAL, BACKFILL AREA BENI ADDREGATE BASE COMPACTED TO 953 ADDREGATE BASE TO ENPOSE A FIRM

CIVIL DETAILS



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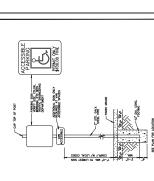


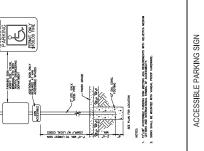


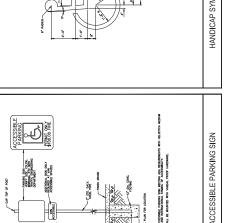




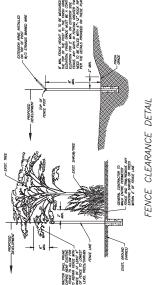
DOUBLE GATE DETAIL

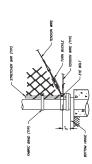


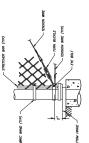


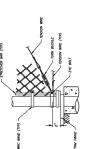


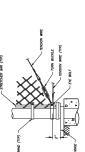


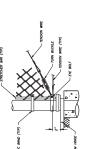


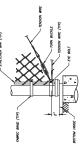




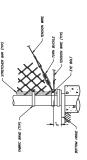


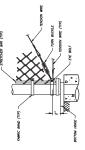


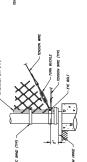










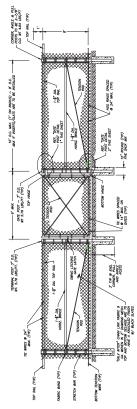




PULL POST DETAIL 2

GATE POST DETAIL 1







POST INDICATOR VALVE

POST INDICATOR VALVE

PLAN VIEW

ROCK RIP-RAP DETAIL

PROFILE VIEW

CONST. 6"-12" ROCK RP-RAP 2"
WOLE ON ETHER SIZE OF FENCING
WERE GAPS IN FENCE ARE
LECULEM AND LEWENT)

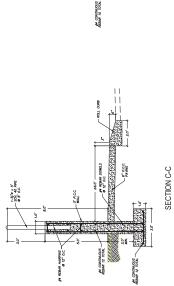
HOOFT ARCHITECTURE SAN EVVORCED Sport Workson SHOLT TYSSALEZ HOMMACHROWSON

SECTION D-D

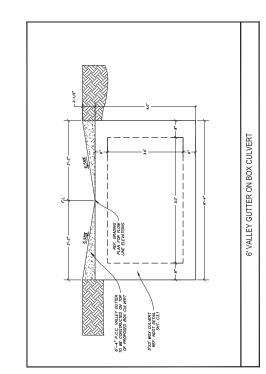
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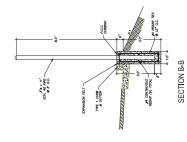
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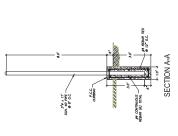
CIVIL DETAILS



370 x 9'-8" 50h. 40 PPE 6 8' 0.0





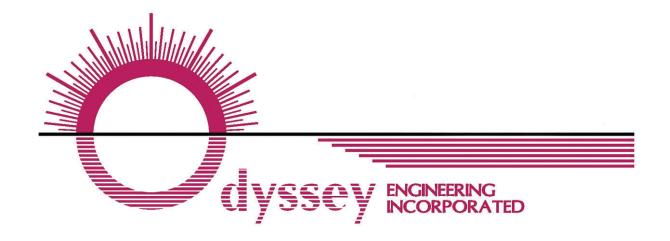


6" 6" MIN. AGGREGATE BASE
COMPACTED TO A MINIMUM
95% RELATIVE COMPACTION SLOPE=50:1 F8" P.C.C SIDEWALK & GUTTER 6" MIN. ACCREGATE BASE COMPACTED TO 95% RELATIVE COMPACTION

PEACRID PAJE ANNES SHALL SE PROFF TO TITL AND LOCATED ON THE BACK, TOP AND FACE OF THE CAME & BHITT STATES SHALL SE FALSES STANKING TRANS SERVELL SECTIONS. WHEN SECTIONS. IS ANY SERVED DESCRIP SHALL ON THE CAME AND SECRIFICATION OF A MOREOMETR, DESTRUCT IN THE PROFESSION OF THE PAGE OF THE PAGE OF THE COMPANION. AGGEGATE BASE MATERIAL UNDER AND BEHAND CHRS AND GUTTER SHALL BE TYPE 2, CLASS B CRUSHED AGGREGATE BASE. MATERIALS SHALL CONTORN TO SSEMIC SECTION 200.

TYPE 2 ROLL CURB & GUTTER

LANDSCAPE PLAN SET



Hooft Architecture

7

ИОВТНЕВИ ИЕУАРА СОИСЯЕТЕ

Landscape Cover sheet

18. INSTALL ALL PIPE AND CONTROL WIRES IN LANDSCAPE BEDS AND IN COPMON TRENCHES IMPREVER POSSIBLE.

AL RETAIL ALL PIET AND CONTROL WEE WHICH RES BUCKER PAYNES WITHIN SCH. AD PACE SLEEDER - TO A MINNEY SLEEP BY A REQUIRED WITHIN SCH. AD PACE SLEEDER - TO A MINNEY SLEEP BY A CONTROL ALLON MEN'ALLATON WHICH SINDING. PROVIDE (I) SLEEVE PIET, PROVIDE SERVENT. IS. CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE FOR COMPLETE DRAINAGE OF THE MAINLINES BY INSTAMMAUAL DRAINS AS INDICATED ON PLAN AND AT ALL SYSTEM LOW POINTS.

AFTER FLIBBING, AND WEN ALL VALVES AND GLICK COPPLES ARE IN FLACE, ALL MAIN SUPPLY LINES SHALL BE THE DAY TO SHOOT FOR SOURCE MAY KINGTON BUT IN VALVES LOCKED. INVALVENT PRESSED FOR A PERSON OF NOT BOTH AND ALL ACRES ALL LOCKS BOTHS BUT SHOWS LEAVE SHALL BE CLIAMED, REVIVER, AND TESTED. (6. OFERVIOUS, TESTING, PERFORM OPERATIONAL, TESTING AFTER HIDROGRATIC TESTING IS COMPLETED CONTENS INCOMPLETED (CONS.) AND THAT IN CONTENS INCOMPLETED (CONS.) AND THAT INCOMPLETED CONTENS INCOMPLETED (CONS.) AND THAT INCOMPLETED CONTENS INCOMPLETED (CONS.) AND THAT INCOMPLETED CONTENS INCOMPLETED (CONTENS INCOMPLETED CONTENS INCOMPLETED CONTEN 6. PRING SHALL DE COMPLETELY FLUSIED OF FOREIGN PARTICLES DEFORE ATTACHING IRRIGATION COMPONENT PONIN VALVES.

20. PRIOR TO SYSTEM INSTALLATION CONTRACTOR SHALL VERIFY AND SUBART TO COMERS REPRESENTATIVE WRITING, AVAILABLE FLOW AND PRESSURE AT POINT-OF-CONDICTION AS DESCRIBED IN SPECIFICATION NA ABOVE.

24. CONTRACTOR BHALL UKCHOTHOMALY GURBANTER THE IRREBANCH BYBERN FOR A PERIOD OF ONE YEAR TROM THE DATE OF THE LOST AND YAMBON THE BHALL OVER THE TONE OF THE PARTIES OF THE DATE OF THE PARTIES OF THE OWNER THE PARTIES OF THE PARTIE

28, ATTRS SYSTEM IS INSTALLED AND APPROVIED, INSTRUCT OWNERS DESIGNATED PERSONNEL, IN COMPLETE OPERATION OF ADMINISTRY STRUCKING SYSTEM, ATT DO OF PRICES ATTENDED SEASON FOLLOWING THE ADMINISTRY SERIOUS SEASON FOLLOWING THE ADMINISTRY SERIOUS STRUCKING THAN OWNERS SERIOUS SERIOUS THAN OWNERS SERIOUS SERIOUS TO THAN 18 THE ADMINISTRY SPECIALLY THAN OWNERS SERIOUS SERIOUS TO THAN 18 THE ADMINISTRY SERIOUS SERIOUS TO THE ADMINISTRY SERIOUS SERIO

LANDSCAPE DATA

SITE AREA = 223,419 SQ FT (5,129 ACRES) PEVELOPED SITE AREA = 208,081 SQ FT (ACRES) ZONING, I (INDUSTRIAL) APN: 596-141-19 \$ 596-141-24 ADDRESS: 175 AND 185 DESIGN PLACE

REQUIRED LANDSCAPE AREA = 20,303 SQ FT (10% OF DEVELOPED SITE)

PROVIDED LANDSCAPE AREA = 27,438 SQ FT
ORNAMENTAL LANDSCAPE = 4,948 SQ FT
EXISTING VEGETATION TO REVAIN = 5,501 SQ
DECORATIVE STAMPED CONCRETE = 12,591 SQ

REES REGIRED = 24*

LNDSCART REES = 26

LNDSCART REES = 26

WANNER REES = 20

TO REQUIRED LANDSCAPE AREA

TO PROPER PROPER PROPER PROPERTY OF PROPERTY PROPERTY PROPERTY PROPERTY OF PARCES (27 95 ACES PROVIDED)

NCLUDES
- PRONTAGE TREES = 7
- I TREE PER 90 LN FT OF FRONTAGE

SHRUBS REGUIRED = 174 TREES PROVIDED = 51

LANDSCAPE 20,303 - DEC CONC. 12,581) = 1,116 90 FT/300 REQUIRED TREES, (REQUIRED

CONTRACTOR BULL VISITED VALUE IN TO AN PROBREM DOWNERAM FROM FOR ANY OWN OF LESS THAT STATE HET VALUE IN THE VALUE IN THE VALUE OF CONTRACTOR BULL VISIT WHICH STATE STATE STATE AND ANY OF LESS THAT BUTCH WITH VALUE OF CONTRACTOR BULL VISIT WHITE STATE STATE ANY OF THE STATE OF ST 9. THE CONTRACTOR SHALL APPLY AND PAY FOR ALL PERMITS REQUIRED FOR INSTALLATION OF THE IRRUPTED AS DEPICTED ON THESE PLANS. 2. THE CONTRACTOR SHALL VERIFY EXISTING SITE CONDITIONS AND ENSURE THAT ALL LOCAL CODES ARE MET.

S. AL SYRIKLER EQUIPMENT NOT OTHERWISE DETAILED OR SPECIFIED SHALL DE INSTALLED PER MANEACTARER RECOMPEDATIONS AND SPECIFICATIONS.

ALL BLECTRICAL WIRE PROM CONTROLLER TO VALVES SHALL BE IZ GAUSE UL DIRECT BURIAL OR LARGER REQUIRED BY LENGTH PER MANUFACTURERS SPECIFICATIONS.

E CORNOCIOS 94-14, ER RESPONSE I FOR BREAK SOUNDS PROGRACION, ALL LANGESTER, PARES SIGH THAN A MEN THE CONTROLL AND THE RESPONSE IN THE PROGRAMME COLORES TRACKRICATE. THE CONTROLL THE AND THE STANDARD STANDARD STANDARD AND THE STANDARD STANDARD

AND CONTROLLED CONTROLLED WITH THE PRESENT OF THE PRESENT OF THE PRESENT OF THE PRESENT OF THE PRESENCE OF THE

CONTACTOR IS RESPONSEE FOR PROVIDING PLANT WATERIAL FER SYNBOLS AND SPACING INDICATED ON PLAN. BOOKS THE CANAL DATE WHOSES ON PLANT LIST. NO SESSUITATIONS MELL ES ACCEPTED WINCH ENTERSON PRITTED.

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IO. BOIL AVENDMENT, WLESS OTHERWISE INDICATED BY THE SOIL TEST SOIL AMENDMENT SHALL BE NAME COMPOSET. OF TOTSOIL, BARK HAMS, AND COMPOST, SUBMIT TO OMER'S REPRESENTATIVE FOR APPROVAL.

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MACHINE CONTROL OF A HOUR PARK, INC.

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I PLAN IS DAGRAMMATIC ONLY. ALL LOCAL GOVERNING CODES SHALL BE PET, ENACT LOCATOR OF TREES AND SHALL BE PET, ENACT LOCATOR OF TREES AND SHALL BE PET, ENACT LOCATOR OF THE OWNERS AND 2. A MANEAD OF TWO PROPERS DATA BETTOOKEN, ANY TROBENS, CLAES LATERSAGE SERVICE ALBIT FOR TROPACTOR OF IN WINNAL 645 LINES IEEE/TROC CARES. TELEVING CARES. THE PROPER OF TALEVING THE CARES. THE PROPER OF TALEVING THE CARES. THE PROPERTY OF TALEVING THE CARES. THE CARES.

LANDSCAPE SPECIFICATIONS

6 CONTRACTOR SHALL BE RESPONSELE TO FIELD VERBY SHE CONDITIONS FRICK TO CONSTITUTION AND TO THE OWNERS REPRESENTANTE SHALL COUNTRINGE SHALL REPORT CONSTITUTION SHE THE PLANS. NUMBER OF SHALL SHALL CONTRIVED OF CONDITION AND RESPONSELL TY FOR CORRECTION.

DAMAGESI. CONTRACTOR SHALL PROMPTLY REPAIR ALL DAMAGES TO EXISTING SITE AT NO COST TO OWER

CONTROLLOR AMERITANI, MA ACCIDANTE INTERNALLY INTERNALLY ON ACCIDANCE OF CONTROLLOR DESCRIPTION OF CONTROLLOR OF C

2. CONTRACTOR AREES IN A NATIONAL SECURIOR SERVICES. CONTRACTOR SINCE RECEIVED CONTRACTOR WILL BE RECEIVED TO A SEASE SOLE AND COMPLETE RESPONSIBILITY FOR ADD 911 CANDINGS PRESENTED TO ASSESS TO CONTRACTOR OF THE PROCESS. NALLOWS SMETT OF SHEET OF THE PROCESS. THE PROCESS SMETT OF THE PROCESS. THE PROCESS SMETT OF THE PROCESS. THE RECEIVED SMETT OF THE PROCESS.

2), COMPLETE WARRANTY CARDS FOR AUTOMATIC CONTROLLER AND OTHER IRRIGARITS, ETC.) SHALL BE DELIVERED TO OWNER.

Scale in Feet

001

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A MERITING REMEMBERS THE WAR TO TO THE WAR TO WAR THE WAR THE WAR WAS THE WAR WAS THE WAR TO WAR TO TO WAR THE WAY THE WAR THE WAR THE WAR THE WAR TO WAR THE WAR TO WAR THE WAR THE WAR THE WAR TO WAR THE WAR TO WAR THE WAR THE WAR THE WAR THE WAR TO WAR THE WAR THE WAR THE WAR THE WAR THE WAR TO WAR THE WAR TO WAR THE WAR T

MENT REQUIRED SOIL REPORT, AND SAMPLE OF PROPOSED SOIL AMENDMENTS TO OWNERS 3 TO INSTALLATION.

6. IT 16 THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE AND PROVIDE PLANT MATERIAL AS SPECIFIED ON THE PLAN, THE CONTRACT AND SIGNAT A REQUEST TO PROVIDE SUBSTITUTIONS FOR THE SPECIFIED PLANT MATERIAL THE TALL THE CONTRACT CONTRACTOR.

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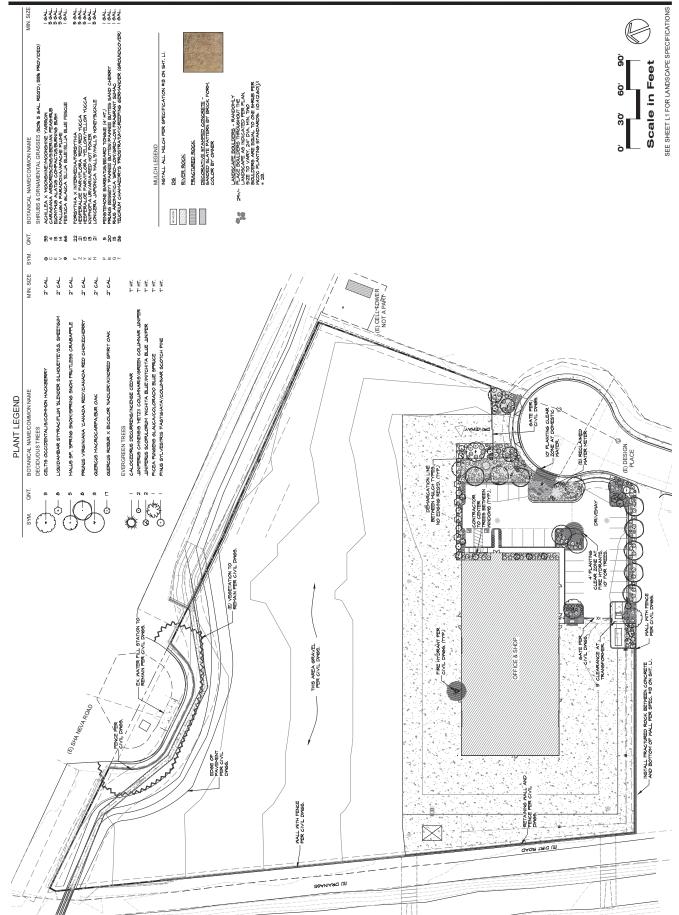


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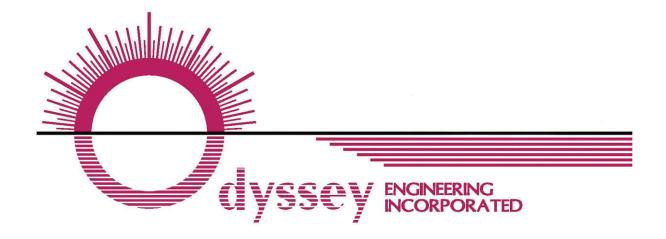


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SITE LIGHTING PLAN & PHOTOMETRIC





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Northern Nevada Concrete Office

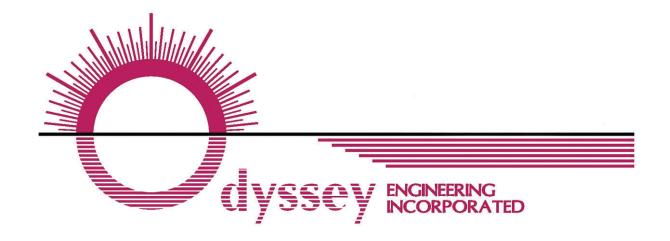
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A SITE LIGHTING PHOTOMETRIC PLAN

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175 Design Place Spanish Springs, Washoe Co. NV

Northern Nevada Concrete Office

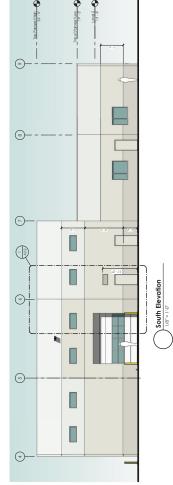
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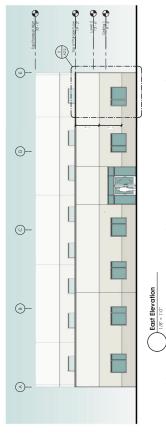
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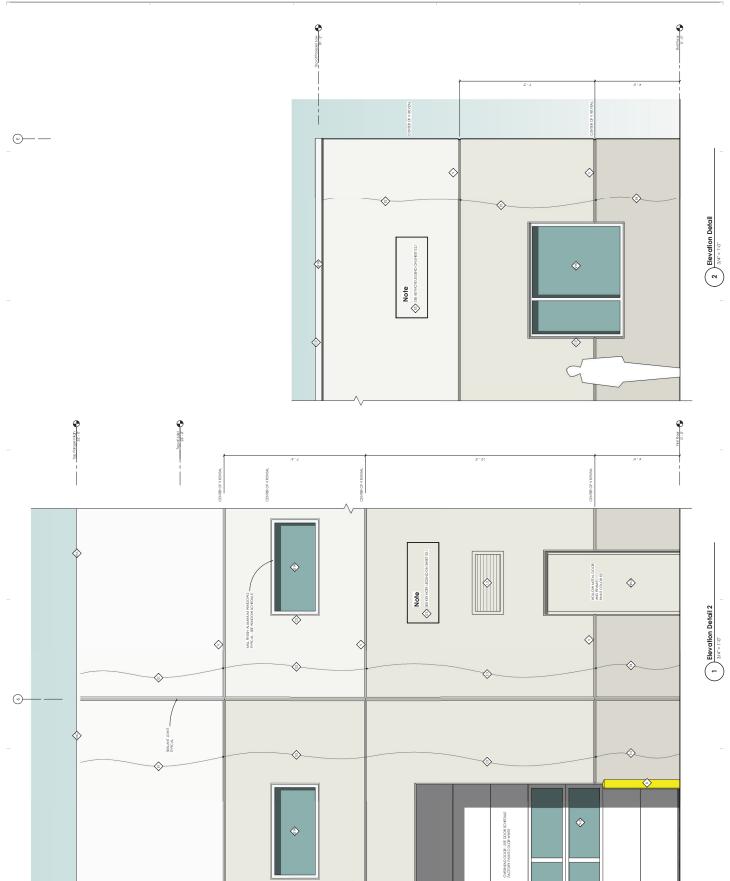




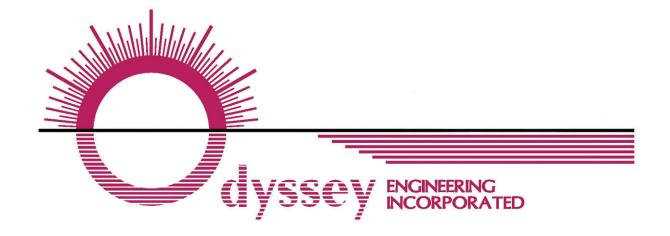


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GEOTECHNICAL REPORT



Black Eagle Consulting, Inc. Geotechnical and Construction Services

Geotechnical Investigation

Northern Nevada Concrete Office and Shop

Spanish Springs, Washoe County, Nevada

March 31, 2021

Prepared for Northern Nevada Holding Corp.



RE: Geotechnical Investigation

Northern Nevada Concrete Office and Shop Spanish Springs, Washoe County, Nevada

Dear Mr. Elizondo:

Black Eagle Consulting, Inc. is pleased to present the results of our geotechnical investigation for the above-referenced project. Our investigation consisted of research, field exploration, laboratory testing, and engineering analysis to allow formulation of geotechnical conclusions and recommendations for design and construction of this facility.

A two-story office/shop building will be constructed in the southern portion of the overall parcel. The building will be surrounded by a concrete apron on the north, west, and south sides of the shop and by asphalt paved parking lots on the west and southwest sides of the office portion. The building will be steel-framed construction with a concrete floor slab.

The native soils consist of fine-grained materials which extend for considerable depth at the site. These fine-grained soils are poor foundation materials and should be separated from all structural improvements by imported granular structural fill.

We appreciate having the opportunity to work with you on this project. If you have any questions regarding the content of the attached report, please do not hesitate to contact us.

Sincerely,

Black Eagle Consulting, Inc.

LINDSEY M.
OWENS
Exp. 12-31-21
Of CIVIL
No. 27759

Lindsey Owens, P.E. Project Engineer

Senior Consultant

Copies to: Addressee (3 copies and PDF via email)

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Introduction

Introduction

Presented herein are the results of Black Eagle Consulting, Inc.'s (BEC's) geotechnical investigation, laboratory testing, and associated geotechnical design recommendations for the proposed Northern Nevada Concrete Office and Shop to be located in Spanish Springs, Washoe County, Nevada. These recommendations are based on surface and subsurface conditions encountered in our explorations and on details of the proposed project as described in this report. The objectives of this study were to:

- 1. Determine general soil and groundwater conditions pertaining to design and construction of the proposed facilities.
- 2. Provide recommendations for design and construction of the project as related to these geotechnical conditions.

The area covered by this report is shown on Plate 1 (Plot Plan). Our investigation included field exploration, laboratory testing, and engineering analysis to determine the physical and mechanical properties of the various on-site materials. Results of our field exploration and testing programs are included in this report and form the basis for all conclusions and recommendations.

The services described above were conducted in accordance with the BEC Professional Geotechnical Agreement dated March 2, 2021, which was signed by Mr. David Elizondo, President of Northern Nevada Holding Corp.

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Project Description

The project site consists of 2 adjoining parcels (APNs 538-141-19 and -24) comprising a total of 5.13 acres lying in northwestern Spanish Springs, Washoe County, Nevada. The parcels are contained within Section 23, Township 21 North, Range 20 East, Mount Diablo Meridian. The parcels are undeveloped land bordered by Sha Neva Road to the north, a large drainage channel on the west, an industrial building on the south, and by Design Place and an undeveloped commercial/industrial lot on the east. Access is provided by Design Place which is a paved cul-de-sac with curbs, gutters and sidewalks.

Development Information

Project improvements will consist of an approximately 100-foot by 200-foot office/shop building which will include a variety of concrete aprons, paved driveways and parking lots as well as an equipment and materials storage yard. The building will be located in the southern portion of the site and will be steel-framed construction with a concrete floor slab. The eastern 500 square feet will be 2-story office space with an elevator. The remaining western portion of the building will be divided into material storage, fabrication, and maintenance shop functions. A 30-foot-wide concrete apron will border the shop portion of the building. A paved driveway off of Design Place will access paved parking lots on the east and south sides of the office portion of the structure. A paved equipment access drive will be constructed around the south, west, and north sides of the concrete apron. The entire northern area of the overall parcel will be a gravel surfaced yard.

Grading Concepts

Due to the gentle slope across the site, depths of cuts and fills are expected to be minimal, consisting predominantly of importing structural fill to separate improvements from the native fine-grained soils and raising improvements to provide for adequate drainage.

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Site Conditions

The site is flat and level, exhibiting a very gentle slope to the south and west. Much of the site has been stripped of vegetation many years ago, but sparse sagebrush and other desert brush have regrown.

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Exploration

Test Pits

The site was explored on March 8, 2021, by excavating 4 test pits using a backhoe. Locations of the test pits are shown on Plate 1. The maximum depth of exploration was 10 feet below the existing ground surface. Bulk samples for index testing were collected from the trench wall sides at specific depths in each soil horizon. Pocket penetrometer testing was performed in exposed, fine-grained soil strata to assess inplace, unconfined compressive strength for evaluating trench stability. The test pits were backfilled immediately after exploration. Backfill was loosely placed and the area re-graded to the extent possible with equipment on hand.

Material Classification

A geologist examined and identified all soils in the field in accordance with American Society for Testing and Materials (ASTM) D 2488. During test pit exploration, representative bulk samples were placed in sealed plastic bags and returned to our Reno, Nevada, laboratory for testing. Additional soil classification was subsequently performed in accordance with ASTM 2487 (Unified Soil Classification System [USCS]) upon completion of laboratory testing, as described in the Laboratory Testing section. Logs of the test pits are presented as Plate 2 (Test Pit Logs), and a USCS chart has been included as Plate 3 (USCS Soil Classification Chart).

Laboratory Testing

All soils testing performed in the BEC soils laboratory is conducted in general accordance with the standards and methodologies described in Volume 4.08 of the ASTM Standards.

Index Tests

Samples of each significant soil type were analyzed to determine their in-situ moisture content (ASTM D 2216), grain size distribution (ASTM D 422), and plasticity index (ASTM D 4318). The results of these tests are shown on Plate 4 (Index Test Results). Test results were used to classify the soils according to ASTM D 2487 and to verify field logs, which were then updated as appropriate. Classification in this manner provides an indication of the soil's mechanical properties and can be correlated with



Grain Size Analysis

published charts (Bowles, 1996; Naval Facilities Engineering Command [NAVFAC], 1986a and b) to evaluate bearing capacity, lateral earth pressures, and settlement potential.

Chemical Tests

Chemical testing was performed on representative samples of site foundation soils to evaluate the site materials' potential to corrode steel and PCC in contact with the ground. The samples were tested for pH, resistivity, redox potential, soluble sulfates, and sulfides. The results of the chemical tests are shown on Plate 5 (Chemical Test Results). Chemical testing was performed by Silver State Analytical Laboratories of Reno, Nevada.

Geologic and General Soil Conditions

The Preliminary Geologic Map of the Griffith Canyon Quadrangle (Garside et al., 2010) shows the site lies in young alluvium of Holocene age. Field exploration found this young alluvium to consist almost exclusively of low plasticity silt and clay soils extending to depths of at least 10 feet across the site. The soil is brown, dry to moist, stiff to hard, and contains 50 to 55 percent low plasticity fines and 45 to 50 percent fine to medium sand. Thin, surficial layers of clayey sand are sometimes present.

Groundwater was not encountered during exploration and is expected to lie at a depth well below that which would affect design or construction.

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Geologic Hazards

Seismicity

Much of the western United States is a region of moderate to intense seismicity related to movement of crustal masses (plate tectonics). By far, the most seismically active regions, outside of Alaska, are in the vicinity of the San Andreas Fault system of western California. Other seismically active areas include the Wasatch Front in Salt Lake City, Utah, which forms the eastern boundary of the Basin and Range physiographic province, and the eastern front of the Sierra Nevada mountains, which is the western margin of the province. The Reno-Sparks area lies along the eastern base of the Sierra Nevada, within the western extreme of the Basin and Range. It must be recognized that there are probably few regions in the United States not underlain at some depth by older bedrock faults. Even areas within the interior of North America have a history of strong seismic activity.

Spanish Springs lies within an area with a high potential for strong earthquake shaking. Seismicity within the area is considered about average for the western Basin and Range Province (Ryall and Douglas, 1976). It is generally accepted that a maximum credible earthquake in this area would be in the range of magnitude 7 to 7.5 along the frontal fault system of the eastern Sierra Nevada. The most active segment of this fault system in the Reno area is located at the base of the mountains near Thomas Creek, Whites Creek, and Mt. Rose Highway, some 15 miles southwest of the project.

Faults

An earthquake hazards map is not available for the project area. The published geologic map (Garside et al., 2010) and the Nevada Bureau of Mines and Geology (NBMG) *MyHazards* web-mapping tool (NBMG, 2021) show several faults within the Spanish Springs valley. The nearest faults are roughly north-south trending and are located about 4,300 feet west and 4,800 feet southeast of the site. The western fault is the range front fault located at the base of the Hungry Range and is Holocene in age.

Because no faults are mapped near the site, no further fault hazard investigation or fault mitigation is necessary for the project.

Ground Motion and Liquefaction

The United States Geological Survey seismic design maps that have been incorporated with the American Society of Civil Engineers (ASCE) Online *ASCE 7 Hazard Tool* indicate that there is a 2 percent probability that a *bedrock* ground acceleration of 0.54 g will be exceeded in any 50-year interval (ASCE, 2021). Only localized amplification of ground motion would be expected during an earthquake. Some amplification of ground motion could result from the site's location on the margin of the Great Basin physiographic province. Basin edge effects, as they are called, are poorly understood but can be significant (Somerville, 1999).



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Because the site area is underlain by fine-grained soils, liquefaction potential is minimal.

Flood Plains

The Federal Emergency Management Agency (FEMA) has identified the site as lying in unshaded Zone X, or outside the limits of a 500-year flood plain (FEMA, 2009).

Other Geologic Hazards

A high potential for dust generation is present if grading is performed in dry weather. Fine-grained soils are present across the site. No other geologic hazards were identified.

General Information

The native soils are exclusively fine-grained, with low expansion potential. All structural improvements will require separation from these expansive materials by importing granular structural fill.

The recommendations provided herein, and particularly under **Site Preparation, Mass Grading, Foundation,** and **Quality Control**, are intended to minimize risks of structural distress related to consolidation or expansion of native soils and/or structural fills. These recommendations, along with proper design and construction of the structure and associated improvements, work together as a system to improve overall performance. If any aspect of this system is ignored or is poorly implemented, the performance of the project will suffer. Sufficient quality control should be performed to verify that the recommendations presented in this report are followed.

Structural areas referred to in this report include all areas of buildings, concrete slabs, and asphalt pavements as well as pads for any minor structures. The term engineer, as presented below, pertains to the civil or geological engineer that has prepared the geotechnical engineering report for the project or who serves as a qualified geotechnical professional on behalf of the owner.

All compaction requirements presented in this report are relative to ASTM D 1557. For the purposes of this project:

- Fine-grained soils are defined as those with more than 40 percent by weight passing the number 200 sieve and a plastic index lower than 15.
- Clay soils are defined as those with more than 30 percent passing the number 200 sieve and a plastic index greater than 15.
- Granular soils are those not defined by the above criteria.

Any evaluation of the site for the presence of surface or subsurface hazardous substances is beyond the scope of this investigation. When suspected hazardous substances are encountered during routine geotechnical investigations, they are noted in the exploration logs and immediately reported to the client. No such substances were revealed during our exploration.

Site Preparation

All vegetation shall be stripped and grubbed from structural areas and removed from the site. A stripping depth of 0.1 to 0.2 feet is anticipated.



Fine-grained soils were found to exist from the ground surface down to depths of at least 10 feet below the ground surface. These soils were classified as dry to moist, stiff to hard, and as exhibiting high plasticity. Laboratory testing performed on these materials determined the fine-grained soils have low expansion potential (Nelson and Miller, 1992).

All fine-grained soils shall be covered by at least 2 feet of structural fill beneath footings and floor slabs and 1.5 feet (including base thickness) beneath pavements and exterior flatwork. It must be emphasized that unless fine-grained soils could be completely removed from structural areas, some differential movement should be anticipated. Any over-excavation shall be backfilled with structural fill to footing grade, or subgrade for pavements and slabs. The width of over-excavation shall extend laterally from the edge of footings, concrete slabs or asphalt pavements at least one-half the depth of the over-excavation.

The required separation may be achieved by any combination of site filling or over-excavation and replacement. Depending on final design elevations, considerable over-excavation could be required.

The native soils shall be moisture-conditioned to 2 to 4 percent over optimum for a minimum depth of 12 inches. This moisture level will significantly decrease the magnitude of shrink-swell movements in the upper foot of soil. The high moisture content must be maintained by periodic surface wetting, or other methods, until the surface is covered by at least 1 lift of fill.

All areas to receive structural fill or structural loading shall be densified to at least 90 percent relative compaction. In all cases, the final surface shall be smooth, firm, and exhibit no signs of deflection.

If wet weather construction is anticipated, surface soils may be well above optimum moisture and impossible to compact. In some situations, moisture conditioning may be possible by scarifying the top 12 inches of subgrade and allowing it to air-dry to near optimum moisture prior to compaction. Where this procedure is ineffective or where construction schedules preclude delays, mechanical stabilization will be necessary. Mechanical stabilization may be achieved by over-excavation and/or placement of an initial 12-to 18-inch-thick lift of 12-inch-minus, 3-inch-plus, well graded, angular rock fill. The more angular and well graded the rock is, the more effective it will be. This fill shall be densified with large equipment, such as a self-propelled sheeps-foot or a large loader, until no further deflection is noted. Additional lifts of rock may be necessary to achieve adequate stability. The use of a separator geotextile will prevent mud from pumping up between the rocks, thereby increasing rock-to-rock contact and decreasing the required thickness of stabilizing fill. The separator geotextile shall meet or exceed the following minimum properties presented in Table 1 (Minimum Required Properties for Separator Geotextile).

TABLE 1 - MINIMUM REQUIRED PROPERTIES FOR SEPARATOR GEOTEXTILE			
Trapezoid Strength (ASTM D 4533)	80 x 80 lbs.		
Puncture Strength (ASTM D 4833)	500 lbs.		
Grab Tensile Strength/Elongation (ASTM D 4632)	200 x 200 @ 50 %		

As an alternate to rock fill, a geotextile/gravel system may be used for stabilization. Aggregate base (*Standard Specifications for Public Works Construction* [*SSPWC*], 2016), Class C or D drain rock (*SSPWC*, 2016), or pit run gravels shall be placed above the geotextile. Regardless of which alternate is selected, a test section is recommended to determine the required thickness of stabilization.

Trenching, Excavation and Utility Backfill

The native fine-grained soils will excavate easily with conventional construction equipment. Temporary trenches with near-vertical sidewalls should be stable to a depth of approximately 4 feet. Temporary trenches are defined as those that will be open for less than 48 hours. Excavations to greater depths will require shoring or laying back of sidewalls to maintain adequate stability. Regulations contained in Part 1926, Subpart P, of Title 29 of the Code of Federal Regulations (2010) require that temporary sidewall slopes be no greater than those presented in Table 2 (Maximum Allowable Temporary Slopes).

TABLE 2 - MAXIMUM ALLOWABLE TEMPORARY SLOPES			
Soil or Rock Type	Maximum Allowable Slopes ¹ for Deep Excavations less than 20 Feet Deep ²		
Stable Rock	Vertical (90 degrees)		
Type A ³	3H:4V (53 degrees)		
Type B	1H:1V (45 degrees)		
Type C	3H:2V (34 degrees)		
Notes:			

¹ Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.

The State of Nevada, Department of Industrial Relations, Division of Occupational Safety and Health Administration (OSHA) has adopted and strictly enforces these regulations, including the classification system and the maximum slopes. In general, Type A soils are cohesive, non-fissured soils with an unconfined compressive strength of 1.5 tons per square foot (tsf) or greater. Type B are cohesive soils with

²Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.

³ A short-term (open 24 hours or less) maximum allowable slope of 1H:2V ([horizontal to vertical] 63 degrees) is allowed in excavation in Type A soils that are 12 feet or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet in depth shall be 3H:4V (53 degrees).

an unconfined compressive strength between 0.5 and 1.5 tsf. Type C soils have an unconfined compressive strength below 0.5 tsf. Numerous additional factors and exclusions are included in the formal definitions. The client, owner, design engineer, and contractor shall refer to Appendix A and B of Subpart P of the previously referenced Federal Register for complete definitions and requirements on sloping and benching of trench sidewalls. Appendices C through F of Subpart P apply to requirements and methodologies for shoring.

On the basis of our exploration, the native soils are predominately Type B. Any area in question shall be considered Type B unless specifically examined by the engineer during construction. All trenching shall be performed and stabilized in accordance with local, state, and OSHA standards.

Utility Trench Backfill

The maximum particle size in trench backfill shall be 4 inches. Bedding and backfill over the pipe will require import and shall conform to the requirements of the utility having jurisdiction. Bedding and initial backfill shall be densified to at least 90 percent relative compaction.

Mass Grading

Native fine-grained soils shall be placed as fill only in nonstructural areas. Imported structural fill is required on this project, and it should satisfy the specifications presented in Table 3 (Guideline Specification for Imported Structural Fill).

TABLE 3 - GUIDELINE SPECIFICATION FOR IMPORTED STRUCTURAL FILL				
Sieve Size	Percent by Weight Passing			
4 Inch	100			
3/4 Inch	70 – 100			
No. 40	15 – 70			
No. 200	5 – 30			
Percent Passing No. 200 Sieve	Maximum Liquid Limit Maximum Plastic I			
5 – 10	50	20		
11 – 20	40	15		

These recommendations are intended as guidelines to specify a readily available, prequalified material. Adjustments to the recommended limits can be provided to allow the use of other granular, non-expansive material. Any such adjustments must be made and approved by the engineer, in writing, prior to importing fill to the site.



Any structural fill within the building area shall be placed in maximum 8-inch-thick loose lifts each densified to at least 95 percent relative compaction. All other structural fill shall be densified to a minimum 90 percent relative compaction. Nonstructural fill shall be densified to at least 85 percent relative compaction to minimize consolidation and erosion. Grading shall not be performed with or on frozen soils.

Seismic Design Parameters

The 2018 International Building Code ([IBC] International Code Council [ICC], 2018), adopted by Washoe County, requires a detailed soils evaluation to a depth of 100 feet to develop appropriate soils criteria. Based on our experience with the subsurface soil conditions and geology at the Northern Nevada Concrete Office and Shop site as well as our previous deep borings and geophysical surveys in the general area of the project site lying on the same or similar geological deposits, a Site Class D is appropriate. The Site Class D soil profile is for stiff soils with a shear velocity between 600 and 1,200 feet per second, or with an N (Standard Penetration Test) value between 15 and 50, or an undrained shear strength between 1,000 and 2,000 pounds per square foot (psf).

The 2018 *IBC* seismic design loads are based on the ASCE 7-16 Standards titled *Minimum Design Loads* and Associated Criteria for Buildings and Other Structures (ASCE, 2017). The recommended seismic design criteria using the 2018 *IBC* are presented in Table 4 (Seismic Design Criteria Using 2018 *International Building Code*). It is noted that for Site Class D and the site location, the determination of site coefficient (F_v) as well as site-adjusted and design spectral response values at long periods (S_{M1} and S_{D1}, respectively) follows an exception provided under Section 11.4.8 of ASCE 7-16 for Site Class D to alleviate detailed, site-specific ground motion hazard analyses for the project. The assumption related to this exception is shown in the footnote, and additional discussion is provided below Table 4.



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TABLE 4 - SEISMIC DESIGN CRITERIA USING 2018 INTERNATIONAL BUILDING COL	<i>E</i> (ASCE, 2021)
Approximate Latitude	39.6777
Approximate Longitude	-119.7099
Spectral Response at Short Periods, S _s , percent of gravity	134.0
Spectral Response at 1-Second Period, S ₁ , percent of gravity	46.3
Site Class	D
Risk Category	II
Site Coefficient Fa, decimal	1.0
Site Coefficient F _v , decimal	1.84*
Site Adjusted Spectral Response at Short Periods, S _{MS} , percent of gravity	134.0
Site Adjusted Spectral Response at Long Periods, S _{M1} , percent of gravity	85.1*
Design Spectral Response at Short Periods, S _{DS} , percent of gravity	89.3
Design Spectral Response at Long Periods, S _{D1} , percent of gravity	56.7*
Seismic Design Category	D
*These values assume the use of seismic response coefficient (C) to calculate seismic base shear is deter-	mined by the etructural

^{*}These values assume the use of seismic response coefficient (C_s) to calculate seismic base shear is determined by the structural engineer in accordance with Section 11.4.8 (Exception Note 2 for Site Class D) and Section 12.8.1 of ASCE 7-16 (ASCE, 2017).

As noted earlier and in Table 4, the determination of site coefficient (F_v) as well as site-adjusted and design spectral response values at long periods (S_{M1} and S_{D1} , respectively) assumes the seismic response coefficient (C_s) for the structure/structural elements will be calculated by a structural engineer in accordance with Exception Note 2 of Section 11.4.8 of ASCE 7-16 for Site Class D and then following Section 12.8.1 of ASCE 7-16 (ASCE, 2017). The equation to calculate C_s shall be selected based on the fundamental period of the structure (T_s) in seconds. It is emphasized that this assumption requires the seismic response coefficient calculated from Section 12.8.1 of ASCE 7-16 be increased by 50 percent when the fundamental period of the structure is greater than 1.5 times the short period for the site (T_s). The short period, T_s , for the site is equal to S_{D1}/S_{DS} , or 0.635 seconds based on the parameters provided in Table 4. In general, the fundamental periods of typical single-story to mid-rise structures are expected to be significantly lower than the above-discussed criteria needing a 50 percent increase in seismic response coefficient and associated seismic loads. If requested, BEC can provide site-specific ground motion analyses/evaluation services as a separate scope of work, which may require additional field exploration along with detailed analyses.

Foundation

Conventional Shallow Foundations

Individual column footings and continuous wall footings underlain by a minimum of 2 feet of structural fill can be designed for a net maximum allowable bearing pressure of 2,500 psf and should have minimum



footing widths of 24 and 12 inches, respectively. The net allowable bearing pressure is the pressure at the base of the footing in excess of the adjacent overburden pressure. This allowable bearing value should be used for dead plus ordinary live loads. Ordinary live loads are that portion of the design live load that will be present during the majority of the life of the structure. Design live loads are loads that are produced by the use and occupancy of the building, such as by moveable objects, including people or equipment, as well as snow loads. This bearing value may be increased by one-third for total loads. Total loads are defined as the maximum load imposed by the required combinations of dead load, design live loads, snow loads, and wind or seismic loads.

With this allowable bearing pressure, total foundation movements of approximately ¾ inch should be anticipated. Differential movement between footings with similar loads, dimensions, and base elevations should not exceed two-thirds of the values provided above for total movements.

Lateral loads, such as wind or seismic, may be resisted by passive soil pressure and friction on the bottom of the footing. The recommended coefficient of base friction is 0.45 and has been reduced by a factor of 1.5 on the ultimate soil strength. Design values for active and passive equivalent fluid pressures are 38 and 375 psf per foot of depth, respectively. These design values are based on spread footings bearing on and backfilled with structural fill. All exterior footings should be placed a minimum 2 feet below adjacent finished grade for frost protection.

Elevator Pit

Elevator pit walls will act as retaining walls. Table 5 (Lateral Earth Pressure Values [Equivalent Fluid Density]) provides design parameters for fully drained retaining walls with vertical back faces, horizontal backfill, and no surcharge loads next to the top of the wall. Recommendations for retaining wall drainage are provided in the **Retaining Wall Drainage Design** section. Surcharge loads should be added to the following values.

TABLE 5 - LATERAL EARTH PRESSURE VALUES (EQUIVALENT FLUID DENSITY), pcf1				
Poteined Slane	Static		Dynamic	
Retained Slope	Active*	Passive**	Active*	Passive**
Level	32	160	41	240

¹Pounds per Cubic Foot

Restrained walls should be designed to resist an at-rest equivalent fluid density of 55 pounds per cubic foot.

^{*}For walls that are free to yield at least 0.2 percent of the wall height.

^{**}The values presented have been reduced from the ultimate passive resistance values by 67 and 50 percent to limit deflection under static and dynamic conditions, respectively.

The bottom slab of the elevator pit should be over-excavated 1.5 feet and replaced with structural fill, with the last 6 inches comprised of Type 2 base densified to at least 95 percent relative compaction. The bottom of the over-excavation should be moisture conditioned to 2 to 4 percent over optimum moisture and densified to at least 90 percent relative compaction.

Lateral loads will be resisted by friction along the base of retaining wall footings and by passive resistance against buried foundation walls. Pit wall footings cast directly on properly compacted structural fill may be designed using a coefficient of base friction of 0.45. This factor has been reduced by a factor of 1.5 on the ultimate soil strength.

Retaining Wall Drainage Design

Retaining wall drainage can be accomplished by installing granular backfill or a prefabricated drain system that is hydraulically connected to the foundation drain system. The drain rock section shall be a minimum of 12 inches wide and extend to floor subgrade.

A prefabricated drain system consists of a three-dimensional mesh or waffle structure with a geotextile on one side, such as Mirafi® *Miradrain G100N*, that is fastened to the back side of the wall with the geotextile side facing the backfill. The prefabricated drain mat connects at the bottom of the wall either to a drain pipe or empties into drain rock backfill wrapped in a geotextile at the base of the wall that then drains downslope of the structure. Where drain pipes are employed, the pipes shall outlet downslope from the end of the wall. With a prefabricated drain system, backfill can be any soil material except clay.

A sump and pump system should be considered to evacuate moisture from any source.

Backfill behind retaining walls shall be compacted to 90 percent of the material's maximum dry density in accordance with ASTM D 1557, but it shall not be densified to more than approximately 92 percent relative density to minimize pressure against the walls. Care must be exercised when compacting backfill against retaining walls and foundations. To reduce temporary construction loads on the walls, heavy equipment shall not be used for placing and compacting fill within a region as determined by a 0.5H:1V (horizontal to vertical) line drawn upward from the bottom of the wall, or within 3 feet of the wall, whichever is greater. We recommend that hand-operated compaction equipment be used to compact soils adjacent to walls.

Subsidence

Subsidence of about 0.1 feet should be anticipated from construction traffic.

Slope Stability and Erosion Control

There are no major cut or fill slopes planned for this project. Dust potential at this site will be high during dry periods. Temporary (during construction) and permanent (after construction) erosion control will be required



for all disturbed areas. The contractor shall prevent dust from being generated during construction in compliance with all applicable city, county, state, and federal regulations. The contractor shall submit an acceptable dust control plan to the Washoe County District Health Department prior to starting site preparation or earthwork. Project specifications should include an indemnification by the contractor of the owner and engineer for any dust generation during the construction period. The owner will be responsible for mitigation of dust after accepting the project.

In order to minimize erosion and downstream impacts to sedimentation from this site, best management practices with respect to stormwater discharge shall be implemented.

Site Drainage

Surface Drainage

Adequate surface drainage shall be provided so moisture is directed away from the structure. A system of roof gutters and downspouts is recommended to collect roof drainage and direct it away from the foundations unless pavement extends to the walls.

Stem wall backfill shall be thoroughly compacted to decrease permeability and reduce the potential for irrigation and stormwater to migrate below the floor slab.

The ponding of water on finished grade or at the edge of pavements shall be prevented by grading the site in accordance with *IBC* (ICC, 2018) requirements.

Concrete Slabs

All concrete slabs shall be directly underlain by Type 2, Class B aggregate base (*SSPWC*, 2016). The strength of the base material is particularly critical for impact loads (fork lifts) and point loads, such as occur with storage racks. The thickness of base material beneath PCC flatwork shall be 6 inches. Aggregate base courses shall be densified to at least 95 percent relative compaction.

Final design of the floor slab shall be performed by the project structural engineer. Any interior concrete slab-on-grade floors shall be a minimum of 4 inches thick. Floor slab reinforcement, as a minimum, shall consist of No. 3 reinforcing steel placed on 24-inch centers in each direction, or flat sheets of 6x6, W4.0xW4.0 welded wire mesh (WWM). Rolls of WWM are not recommended for use because vertically centered placement of rolled WWM within a floor slab is difficult to achieve. All reinforcing steel and WWM shall be centered in the floor slab through the use of concrete dobies or an approved equivalent.

A coefficient of subgrade reaction (K-value) of 150 pounds per cubic inch shall be used for design of concrete slabs.



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The structural section for exterior truck ramps, aprons, and dolly pads shall be a minimum of 6 inches of 4,000 pounds per square inch (psi) concrete overlying 6 inches of Type 2, Class B aggregate base (*SSPWC*, 2016). Valley gutters shall include at least 6 inches of fibermesh concrete (4,000 psi). These exterior rigid pavements have been designed using the American Association of State Highway and Transportation Officials (1993) method for concrete with a 28-day flexural strength of 570 psi (approximately 4,000 psi compressive strength).

Northern Nevada is a region with exceptionally low relative humidity. As a consequence, concrete flatwork is prone to excessive shrinking and curling. Concrete mix proportions and construction techniques, including the addition of water and improper curing, can adversely affect the finished quality of concrete and result in cracking, curling, and the spalling of slabs. We recommend that all placement and curing be performed in accordance with procedures outlined by the American Concrete Institute (2011) and this report. Special considerations shall be given to concrete placed and cured during hot or cold weather temperatures, low humidity conditions, and windy conditions such as are common in the area.

Proper control joints and reinforcement shall be provided to minimize any damage resulting from shrinkage, as discussed below. In particular, crack-control joints shall be installed on maximum 10-foot centers and shall be installed to a minimum depth of 25 percent of the slab thickness. Saw-cuts, zip strips, and/or trowel joints are acceptable; however, saw-cut joints must be installed as soon as initial set allows and prior to the development of internal stresses that will result in a random crack pattern. If trowel joints are used in the main living area floor slab, they will need to be grouted over prior to installation of floor coverings.

Concrete shall not be placed on frozen in-place soils.

Any interior concrete slab-on-grade floors with moisture sensitive flooring, such as the office area, will require a moisture barrier system. Installation shall conform to the specifications provided for a Class B vapor restraint (ASTM E 1745-97). The vapor barrier shall consist of placing a 10-mil-thick Stego® Wrap Vapor Barrier or an approved equal directly on a properly prepared subgrade surface. A 4-inch-thick layer of aggregate base shall be placed over the vapor barrier and compacted with a vibratory plate.

The base layer that overlies the moisture barrier membrane shall remain compacted and a uniform thickness maintained during the concrete pour, as its intended purpose is to facilitate even curing of the concrete and minimize curling of the slab. Extra attention shall be given during construction to ensure that rebar reinforcement and equipment do not damage the integrity of the vapor barrier. Care must be taken so that concrete discharge does not scour the base material from the vapor barrier. This can be accomplished by maintaining the discharge hose in the concrete and allowing the concrete to flow out over the base layer.

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Asphalt Concrete

Asphalt Concrete Pavement Design

Paved areas subject to truck traffic shall consist of 4 inches of asphalt concrete underlain by 6 inches of Type 2, Class B aggregate base (*SSPWC*, 2016) and 12 inches of structural fill. Paved areas restricted to automobile parking have asphalt sections reduced to 3 inches. All aggregate base beneath asphalt pavements shall be densified to at least 95 percent relative compaction.

Pavement Maintenance

Asphalt concrete pavements have been designed for a standard 20-year life expectancy as detailed above. Due to the local climate and available construction aggregates, a 20-year performance life requires diligent maintenance. Between 15 and 20 years after initial construction (average 17 years), major rehabilitation (structural overlay or reconstruction) is often necessary if maintenance has been lax. To achieve maximum performance life, maintenance must include regular crack sealing, seal coats, and patching as needed. Thermal block cracks occur within 5 to 7 years after initial construction. Crack filling is commonly necessary at least every other year. Seal coats, typically with a Type II slurry seal, are generally needed every 5 years depending on surface wear. Failure to provide thorough maintenance will significantly reduce pavement design life and performance.

Corrosion Potential

Metal Pipe Design Parameters

Laboratory testing was performed to evaluate the corrosion potential of the soils with respect to metal pipe in contact with the ground. The results of the laboratory testing indicate that the site foundation soils exhibit low corrosion potential (American Water Works Association, 1999). As a result, metal pipe in contact with the ground will not require corrosion protection.

Portland Cement Concrete Mix Design Parameters

Soluble sulfate content has been determined for representative samples of the site foundation soils. The sulfate was extracted from the soil at a 10:1 water to soil ratio in order to assure that all soluble sodium sulfate was dissolved. The results are reported in milligrams of sulfate per kilogram of soil and can be directly converted to percent by dividing by 10,000. The percent sulfate in the soil is used to determine the sulfate exposure Class (S) from the information presented in Table 6 (Sulfate Exposure Class).



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TABLE 6 - SULFATE EXPOSURE CLASS*									
			Water-Soluble Sulfate (SO ₄) in Soil, Percent by Weight						
	Not Applicable	S0	SO ₄ < 0.10						
S Sulfate	Moderate	S1	0.10 ≤ SO ₄ < 0.20						
	Severe	S2	0.20 ≤ SO ₄ ≤ 2.00						
	Very Severe	S3	SO ₄ > 2.00						
1									

^{*}From Table 4.2.1 Exposure Categories and Classes. ACI 318, *Buildings Code and Comments*.

The results of the testing (Plate 5) indicate that concrete in contact with the site foundation soils should be designed for Class S0 Sulfate exposure. Therefore, Type II cement can be used for all concrete work.

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Anticipated Construction Problems

Depending on the season of construction, soft, wet surface soils may make it difficult for construction equipment to travel and operate. Native fine-grained soils are difficult to densify.

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Quality Control

All plans and specifications should be reviewed for conformance with this geotechnical report and approved by the engineer prior to submitting them to the building department for review.

The recommendations presented in this report are based on the assumption that sufficient field testing and construction review will be provided during all phases of construction. We should review the final plans and specifications to check for conformance with the intent of our recommendations. Prior to construction, a prejob conference should be scheduled to include, but not be limited to, the owner, architect, civil engineer, general contractor, earthwork and materials subcontractors, building official, and engineer. The conference will allow parties to review the project plans, specifications, and recommendations presented in this report and discuss applicable material quality and mix design requirements. All quality control reports should be submitted to and reviewed by the engineer.

During construction, we should have the opportunity to provide sufficient on-site observation of preparation and grading, over-excavation, fill placement, foundation installation, and paving. These observations would allow us to verify that the geotechnical conditions are as anticipated and that the contractor's work is in conformance with the approved plans and specifications.

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Standard Limitations Clause

This report has been prepared in accordance with generally accepted geotechnical practices. The analyses and recommendations submitted are based on field exploration performed at the locations shown on Plate 1. This report does not reflect soils variations that may become evident during the construction period, at which time re-evaluation of the recommendations may be necessary. We recommend our firm be retained to perform construction observation in all phases of the project related to geotechnical factors to ensure compliance with our recommendations.

This report has been produced to provide information allowing the architect or engineer to design the project. The owner is responsible for distributing this report to all designers and contractors whose work is affected by geotechnical aspects. In the event there are changes in the design, location, or ownership of the project from the time this report is issued, recommendations should be reviewed and possibly modified by the engineer. If the engineer is not granted the opportunity to make this recommended review, he or she can assume no responsibility for misinterpretation or misapplication of his or her recommendations or their validity in the event changes have been made in the original design concept without his or her prior review. The engineer makes no other warranties, either express or implied, as to the professional advice provided under the terms of this agreement and included in this report.

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LEGEND

■ TP-01 APPROXIMATE TEST PIT LOCATION

Base map provided by Google Earth.

VICINITY MAP



NORTHERN NEVADA HOLDING CORP.

PLOT PLAN
NORTHERN NEVADA CONCRETE OFFICE AND YARD
WASHOE COUNTY, NEVADA

Plate 1

Black Eagle Consulting, Inc. Project No. 2546-01-1

						T	EST PIT LOG	
TEST PIT NO.:	TP-	01					DATE:	3/8/2021
EXCAVATOR TY	үре: Вас	khoe	9				DEPTH TO GROUND WATER (ft):	NE
LOGGED BY:	LJJ						GROUND ELEVATION (ft):	NA
SAMPLE NO. SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DЕРТН (ff.)	USCS SYMBOL	LITHOLOGY	DESCRIPTION	
					SC		Clayey Sand Brown, moist, loose, with an estimated 35 medium plasticity fines and 65% fine to coarse sand.	
A 🖰 GRAB		9.0	3	5—	ML		Sandy Silt Brown, dry to moist, very stiff, with 50% low fines and 50% mostly fine to medium sand.	plasticity
							PR	ROJECT NO.:

TEST_PIT 2546011.GPJ BLACKEAGLE.GDT 3/31/21

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Northern Nevada Concrete Office and Yard

Washoe County, Nevada

2546-01-1

PLATE:

2

							TI	EST PIT LOG	
TES	ST PIT NO.:	TP	-02					DATE:	3/8/2021
EXC	CAVATOR T	YPE: Ba	ckho	9				DEPTH TO GROUND WATER (ft):	NE
LOC	GGED BY:	LJ、	J					GROUND ELEVATION (ft):	NA
SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DЕРТН (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION	
					_			Sandy Lean Clay Brown, dry to moist, very stiff, with 55 plasticity fines and 45% mostly fine to medium sand.	% low
Α	♥ GRAB		7.3	9	-				
					5	CL			
									OJECT NO.:
- 1								PR	OULUT NO

TEST PIT 2546011.GPJ BLACKEAGLE.GDT 3/31/21

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Northern Nevada Holding Corp. Northern Nevada Concrete Office and Yard PLATE: Washoe County, Nevada

2546-01-1

2

-				T	EST PIT LOG	
TEST PIT NO.:	TP-03			MANAGE AND	DATE:	3/8/2021
EXCAVATOR TYPE	: Backhoe			-	DEPTH TO GROUND WATER (ft):	NE
LOGGED BY:	LJJ				GROUND ELEVATION (ft):	NA
SAMPLE NO. SAMPLE TYPE	(tsf) MOISTURE (%)	PLASTICITY INDEX DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION	
			SC		Clayey Sand Brown, moist, loose, with an estimated 35 medium plasticity fines and 65% fine to coarse sand.	;%
		5	- ML		Sandy Silt Brown, dry to moist, very stiff, with an estimation to medium plasticity fines and 45% mostly fine to medium sand.	ated 55% nedium
		10				
					PR	ROJECT NO.:

TEST_PIT 2546011.GPJ BLACKEAGLE.GDT 3/31/21

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Northern Nevada Concrete Office and Yard

Washoe County, Nevada

2546-01-1

PLATE:

2

							T	EST PIT LOG	
TES	T PIT NO	.: TP	-04		·			DATE:	3/8/2021
EXC	AVATOR	түре: Ва	ckho	е				DEPTH TO GROUND WATER (ft):	NE
LOGGED BY: LJJ					GROUND ELEVATION (ft):	NA			
SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DЕРТН (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION	
	S	d. (t)	N	Δ.	5	ML		Sandy Silt Brown, dry to moist, very stiff, with an estimation to medium plasticity fines and 45% mostly fine to medium plasticity fines and 45% mostly fines and 45% most	ated 55% nedium
					10-				
								PR	ROJECT NO.:

PIT 2546011.GPJ BLACKEAGLE.GDT 3/31/21

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Northern Nevada Holding Corp. Northern Nevada Concrete Office and Yard PLATE: Washoe County, Nevada

2546-01-1

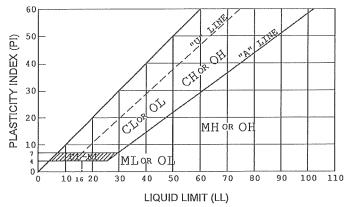
2

SOIL CLASSIFICATION CHART

			SYMI	BOLS	TYPICAL
MA	JOR DIVIS	SIONS		LETTER	DESCRIPTIONS
	GRAVEL.	CLEAN GRAVELS		GW	WELL-GRADED GRAVELS, GRAVEL- SAND MIXTURES, LITTLE OR NO FINES
	AND GRAVELLY SOILS	(LITTLE OR NO FINES)	00.00 00.00 00.00	GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, UTTLE OR NO FINES
COARSE GRAINED SOILS	MORE THAN 50% OF COARSE	GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
JOILO	FRACTION RETAINED ON NO. 4 SIEVE	(APPRECIABLE AMOUNT OF FINES)		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
1 (SAND	CLEAN SANDS		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	AND SANDY SOILS	(UTTLE OR NO FINES)		SP	POORLY-GRADEO SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE	SANDS WITH FINES		SM	SILTY SANDS, SAND - SILT MIXTURES
	FRACTION PASSING ON NO. 4 SIEVE			sc	CLAYEY SANDS, SAND - CLAY MUXTURES
				ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
FINE GRAINED	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
SOILS				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS				МН	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
SMALLER THAN NO, 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMT GREATER THAN 50		СН	INORGANIC CLAYS OF HIGH PLASTICITY
				ОН	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
Н	IGHLY ORGANIC S		77: 77: 77: 77: 5: 77: 76: 76: 7 77: 77: 77: 77:	PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS
	FILL MATERIAL				FILL MATERIAL, NON-NATIVE

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

PLASTICITY CHART



FOR CLASSIFICATION OF FINE-GRAINED SOILS AND FINE-GRAINED FRACTION OF COARSE-GRAINED SOILS

EXPLORATION SAMPLE TERMINOLOGY

Sample Type	Sample Symbol	Sample Code
Auger Cuttings		Auger
Bulk (Grab) Sample	and a	Grab
Modified California Sampler		MC
Shelby Tube		SH or ST
Standard Penetration Test		SPT
Split Spoon		SS
No Sample		

GRAIN SIZE TERMINOLOGY

Component of Sample	Size Range
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75mm)
Sand	# 4 to #200 sieve (4.75mm to 0.074mm)
Silt or Clay	Passing #200 sieve (0.074mm)

RELATIVE DENSITY OF GRANULAR SOILS

N - Blows/ft	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
greater than 50	Very Dense

CONSISTENCY OF COHESIVE SOILS

Unconfined Compressive Strength, psf	N - Blows/ft	Consistency
less than 500	0 - 1	Very Soft
500 - 1,000	2 - 4	Soft
1,000 - 2,000	5 - 8	Firm
2,000 - 4,000	9 - 15	Stiff
4,000 - 8,000	16 - 30	Very Stiff
8,000 - 16,000	31 - 60	Hard
greater than 16,000	greater than 60	Very Hard

Black Eagle Consulting, Inc. 1345 Capital Blvd., Suite A Reno, Nevada 89502-7140 Telephone: (775) 359-6600 Fax: (775) 359-7766

USCS Soil Classification Chart

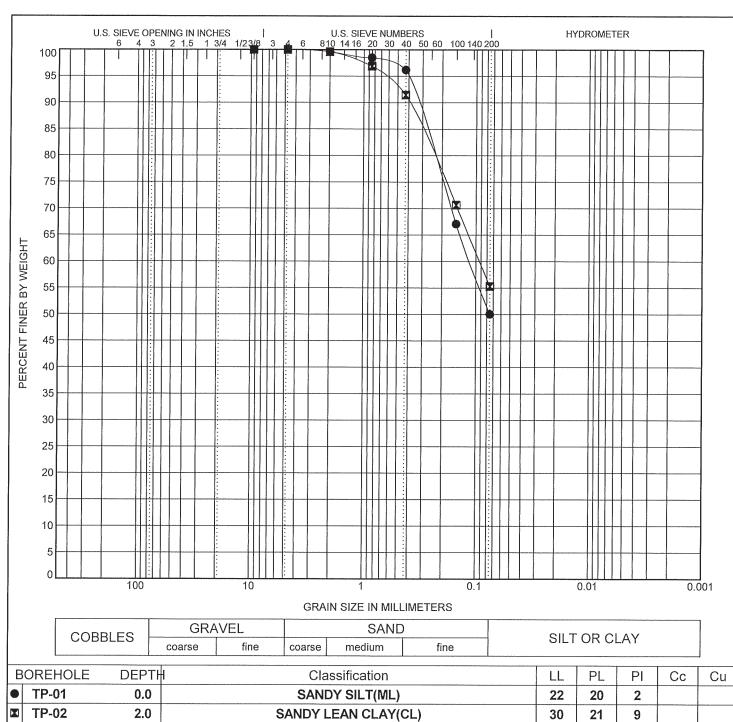
Project: Northern Nevada Concrete Office and Yard

Location: Washoe County, Nevada Project Number: 2546-01-1 Pla

Plate:

3





	BOREHOLE	DEPTH		LL	PL	PI	Сс	Cu				
	TP-01	0.0		SANDY SILT(ML)						2		
X	TP-02 2.0 SANDY LEAN CLAY(CL)						30	21	9			
-												
	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	1	%Silt	%(Clay
٠ ا ـ						1				•		

	ROKEHOLE	DELLH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
GDT	TP-01	0.0	9.5	0.112			0.0	49.9	50	0.1
₽ P	TP-02	2.0	9.5	0.093		.,	0.0	44.7	55	5.3
SN a						-				
ST										
GIN										
2				L						

Black Eagle Consulting, Inc. 1345 Capital Blvd., Suite A Reno, Nevada 89502-7140 Telephone: (775) 359-6600

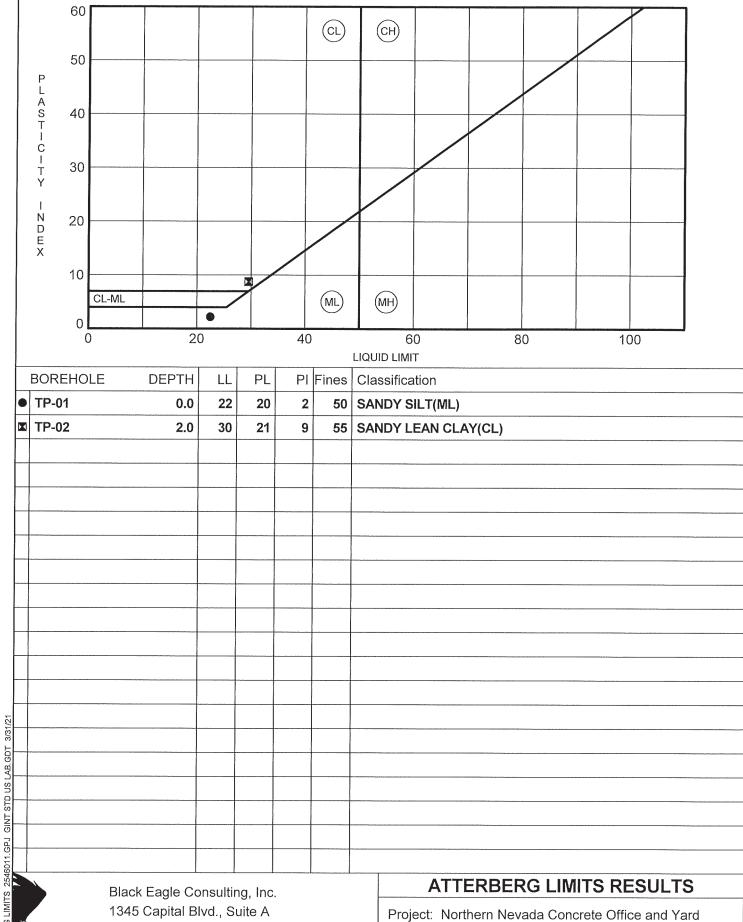
GRAIN SIZE DISTRIBUTION

Project: Northern Nevada Concrete Office and Yard

Loction: Washoe County, Nevada

Project Number: 2546-01-1

PLATE: 4a



Reno, Nevada 89502-7140 Telephone: (775) 359-6600

Loction: Washoe County, Nevada

Project Number: 2546-01-1

PLATE: 4b



Silver State Labs-Reno

www.ssalabs.com

Analytical Report

Workorder#:

21030735

Date Reported:

Sampled By: Client

3/22/2021

Client:

BLACK EAGLE CONSULTING, INC

Project Name:

2546-01-1/ TP-4A No NV Concrete

PO #:

Laboratory Accreditation Number: NV015/CA2990

Laboratory ID 21030735-01

Client Sample ID

Date/Time Sampled

Date Received

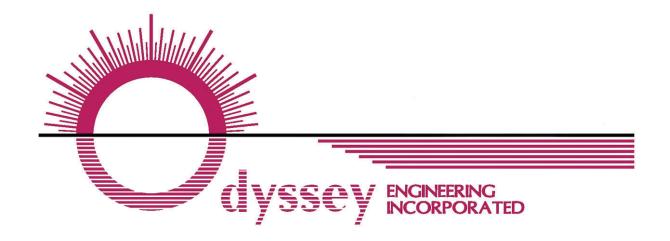
TP-4A No NV Concrete

03/11/2021 0:00

3/15/2021

Parameter	Method	Result	Units	PQL	Analyst	Date/Time Analyzed	Data Flag
Oxidation-Reduction Potential	SM 2580B	415	mV		AC	03/22/2021 10:48	
pH	SW-846 9045D	7.40	pH Units		AC	03/18/2021 11:01	
pH Temperature	SW-846 9045D	21.0	°C		AC	03/18/2021 11:01	
Resistivity	EPA 120.1	4000	Ohms-cm		AC	03/19/2021 11:37	
Sulfate	EPA 9056	11	mg/Kg	2	MA	03/19/2021 22:14	S
Sulfide	AWWA C105	Negative	POS/NEG		CTR	03/19/2021 15:12	

PROPOSED HYDROLOGY

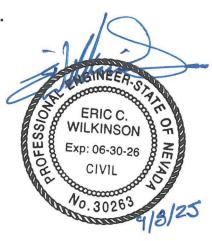


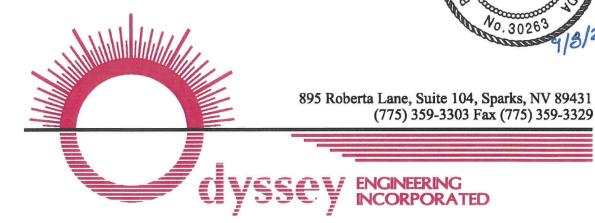
HYDROLOGY REPORT FOR NORTHERN NEVADA CONCRETE

PREPARED FOR:

Northern Nevada Holding Corp. 15520 Donnybrook Ct. Reno, NV 89511

PREPARED BY:





January 2025

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APPENDICES

APPENDIX A – SUPPORTING DATA

APPENDIX B – Existing 100-Year 24-HR HEC-1 CALCULATIONS

APPENDIX C – Proposed 100-Year 24-HR HEC-1 CALCULATIONS

APPENDIX D – EXISTING 100-YEAR 10-DAY HEC-1 CALCULATIONS

APPENDIX E – Proposed 100-Year 10-Day HEC-1 CALCULATIONS

APPENDIX F – RATIONAL METHOD ANALYSIS

LIST OF TABLES

TABLE 1: PROPOSED HEC-1 HYDROLOGY BASIN CALCULATIONS

TABLE 2: EXISTING HEC-1 HYDROLOGY BASIN CALCULATIONS

LIST OF FIGURES

FIGURE 1 – LOCATION MAP

1 INTRODUCTION:

1.1 PROJECT DESCRIPTION

The proposed Northern Nevada Concrete project will be developed on approximately 5.13 acres, situated north of the Design Place Court cul-de-sac and south of Sha Neva Road (see attached vicinity and site maps). The project is located in the northwest quarter of Section 23, Township 21 North, Range 20 East, Mount Diablo Meridian. This report is intended to evaluate the runoff for the fully developed condition. The development of the Northern Nevada Concrete site was included in the original Spanish Springs Business Center. As such, the proposed development has already been factored into the existing storm drain infrastructure design.

1.2 PROJECT LOCATION

The proposed project site is located south of Sha Neva Road, north of Design Place Court Cul-de-sac, east of existing industrial buildings and west of future commercial building currently under construction. Currently the site lies within Assessor Parcel Number (APN) 538-141-26. Reference attached Vicinity Map and Site Map for proposed site location.

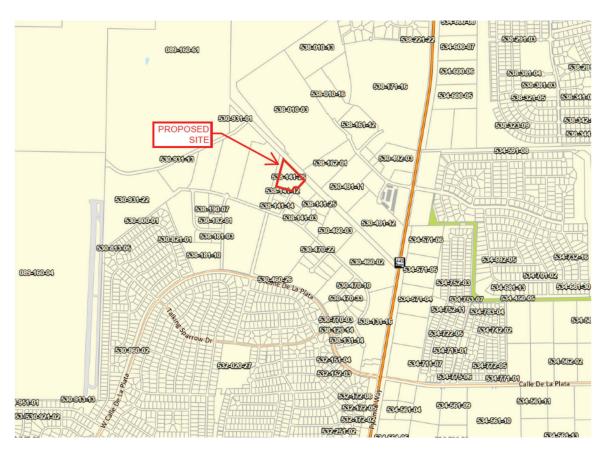


Figure 1: Location Map

1.3 FEMA FLOODPLAINS

The Flood Insurance Rate Map, Panel No. 32031C3045G (*panel not printed) dated March 16, 2009 designated this site area as being in a non-shaded zone "X", which denotes the area to be outside the 500-year floodplain. A Letter of map revision (LOMAR) was completed for channeled infill dated October 6, 2014. Reference Appendix A for the attached FIRM Map and LOMAR Map.

1.4 PREVIOUS STUDIES

The following studies have included hydrologic and hydraulic analyses of the site.

- Drainage Report for Spanish Springs Business Center Design Place by C&M Engineering and Desing dated March, 2005
- Technical Memorandum Boneyard Flat Hydrology Study by DEW Hydrology dated September, 2019 revised October 2019

2 METHODOLOGY

2.1 HEC-1 METHODOLOGY

Hydrologic analyses were performed to determine the peak discharge for the 100-year peak flow events to obtain the total run off volume. *AutoDesk Storm and Sanitary Analysis (SSA)* was used to perform a *HEC-1* analysis to model the hydrologic basins that are within the proposed site development for both the existing and proposed conditions.

The parameters are as follows:

- HEC-1 Hydrograph Method: SCS Dimensionless
- **HEC-1 Loss Method:** SCS Curve Number
- Routing Method: Kinematic Wave
- Meteorological Method 10-day: 100-year cumulative storm for Washoe (Reno) County, Nevada, with a total rainfall amount of 7.76 in using a SCS Spillway 1-day 10-day storm distribution.
- **Meteorological Method 24-hr:** 100-year cumulative storm for Washoe (Reno) County, Nevada, with a total rainfall amount of 3.56 in using a SCS Type II 24-hr storm distribution.

2.2 RATIONAL METHODOLOGY

The Rational Method was used for proposed storm drain routing and pipe flow calculations (reference the attached Rational Method Basin Hydrology worksheet). This method is described in the Washoe County Public Works Design Manual.

The parameters are as follows:

Design flow = Q=CiA

Q = Runoff (cubic feet per second)

C = Runoff Coefficient

i = Rainfall Intensity (inches per hour)

A = Watershed Area (acres)

Truckee Meadows Regional Drainage Manual rational formula method runoff coefficients were used for existing and proposed conditions using table 701 form Truckee Meadows Regional Drainage Manual. Final runoff coefficients use can be found in provided table 701. The time of concentration for each basin has been determined to use the minimum 10-minutes because of the small size of the hydro basins, a minimum 10-minute time of concentration per City of Reno Desing Manual chapter 2. The rainfall intensities were determined using NOAA. The 5-year rainfall intensity was found to be 1.51 in./hr. and the 100-year rainfall intensity was found to be 3.81 in./hr. Reference NOAA table for intensities.

2.1 BASIN DELINEATION AND PARAMETERS

The proposed site development has been broken a single existing drainage basin for predevelopment conditions and three (3) drainage basins for post-development conditions using existing site and proposed site grading characteristics for a total of approximately 5.13 acres.

2.2 PRECIPITATION DATA

Precipitation for the 5-year and 100-year, 24-hour and 10-day storm events are developed using rainfall depths from NOAA Atlas 14, Volume 1, Version 5, and a balanced storm approach for the rainfall distribution. Reference NOAA table for 5-year and 100-year depths in Appendix A.

3 SSA MODEL

3.1 EXISTING SITE CONDITIONS AND DRAINAGE

The Northern Nevada Concrete site currently remains in its native condition, characterized by open space with a mixture of rocky and clayey soils, light shrubbery, native grasses, and sagebrush. The site is relatively flat, with an average slope of 2% draining northwest toward existing drainage channels designed to collect runoff from the proposed site and surrounding areas. Refer to the attached Existing Hydrology Display Map (H-1) for additional details. Basin curve numbers were defined based on previous hydrology studies that included this site. A minimum lag time of 10 minutes was applied to the existing basin.

NORTHERN NEVADA CONCRETE EXISTING HYDROLOGY HEC-1: 100-YEAR 10-DAY AND 24 HOUR STORM

HYDRO BASIN NUMBER	Area (acres)	10-DAY CN	100-YEAR 10-DAY HEC-1 PEAK FLOW (cfs)	100-YEAR 10-DAY HEC-1 TOTAL RUNOFF (ft ³)	24-HR CN	100-YEAR 24-HR HEC-1 PEAK FLOW (cfs)	100-YEAR 24-HR HEC-1 TOTAL RUNOFF (ft ³)
				-			
EXISTING SITE	5.13	52.00	1.19	28,916.40	70.00	5.23	18,640.80

Table 1: Existing HEC-1 Hydrology Basin Calculations

3.2 PROPOSED SITE CONDITIONS AND DRAINAGE

The proposed Northern Nevada Concrete site is divided into three drainage basins based on the planned surface characteristics, including paving, buildings, and landscaping. Surface flow from the developed site will be collected via strategically placed catch basins and drop inlets. The accumulated runoff will be conveyed through private storm drain systems, ultimately discharging into existing drainage channels located to the north and west of the site. Refer to the attached Proposed Hydrology Display Map (H-2) for details.

Proposed basin curve number calculations are based on the planned surface characteristics for a 24-hour storm event, with adjustments for a 10-day storm event derived from a previous study. A minimum lag time of 10 minutes has been applied to all proposed basins.

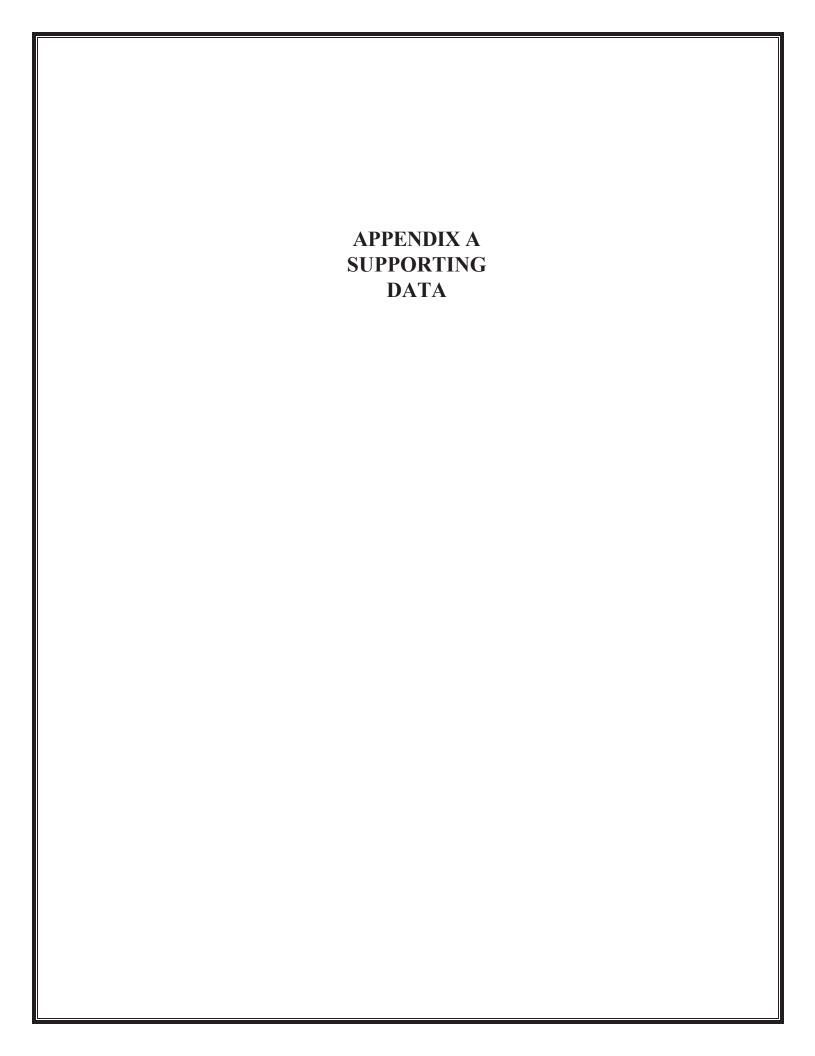
NORTHERN NEVADA CONCRETE PROPOSED HYDROLOGY HEC-1: 100-YEAR 10-DAY AND 24 HOUR STORM

HYDRO BASIN NUMBER	Area (acres)	10-DAY CN	100-YEAR 10-DAY HEC-1 PEAK FLOW (cfs)	100-YEAR 10-DAY HEC-1 TOTAL RUNOFF (ft ³)	24-HR CN	100-YEAR 24-HR HEC-1 PEAK FLOW (cfs)	100-YEAR 24-HR HEC-1 TOTAL RUNOFF (ft³)
			•			•	•
AC/CONC. AREA	1.59	96.00	3.97	22,927.50	98.00	6.05	11,831.40
BUILDING AREA	0.46	96.00	0.23	6,374.40	98.00	1.69	3,290.40
IMPERVIOUS/LANDSCAPING	3.08	32.00	0.39	12,155.40	50.00	3.01	6,724.50
			_	_		·	
TOTAL PROPOSED	5.13	-	4.59	41,457.30	-	10.75	21,846.30

Table 2: Proposed HEC-1 Hydrology Basin Calculations

4 CONCLUSIONS:

The development of the Northern Nevada Concrete site has been designed in accordance with the hydrological requirements identified in previous studies, which included storage at a 1:1 ratio for the developed condition. However, updated regulations by Washoe Couty now necessitate a 1.3 factor applied to the required storage capacity. To meet this new requirement, an additional 5,768 cubic yards of storage credits have been secured, ensuring compliance with the county's standards. Base on this analysis and previous analysis we can conclude the flood zone will not be effected by the development of the Northern Nevada Concrete Site.





175 Design Place Spanish Springs, Washoe Co. NV

CIVIL OVERALL SITE PLAN

C0.0

NOTES TO USERS

is for use in administering the National Flood Insurance Program. It necessarily identify all areas subject to flooding, particularly from local sources of small size. The community map repository should be for possible updated or additional flood hazard information.

and confident determines in seaso where last Frood Elevations in the other states and Elevation in seaso where the seasons are reconstant to consider and Elevation and El

Base Flood Elevations shown on this map apply only indohed the control field of the control of

In the floodways were computed at cross sections and interpor cross section. The floodways were based on hybratile consideration of to requirements of the National Report Instance Program. Flood insurance Program. Flood insurance from the National Report Insurance Program. Flood insurance for the Insurance Program. Flood insurance for the Insurance Program of the Flood insurance for the Insurance Insura

reas not in Special Flood Hazard Areas may be protected by flood structures. Refer to Section 2.4 "Flood Protection Measures" of the urance Study report for information on flood control structures for this

2010 used in the propression of this imap was State Plane Nevada West of 2701 used in the protzontal disturb was NAD 83, GR580 Differences in herioli, projection of State Plane zones used in the production of FIRMs heriolion may result in sight proferioral differences in map beauses soldion boundaries. These differences do not affect the accuracy of this soldion boundaries.

mation Services (18512 180512 2eodetic Survey #8202 1-1-West Highway 1110, Maryland 20910-3282

current elevation, description, and/or location information for bench rown on this map, please contact the Information Services Branch altonal Geodetic Survey at (301) 713-3242, or visit its website at IMBS. DOBB. 400.

p road centerline information shown on this FIRM was provided by the County GIS Program. This date, dated 2005 or later, was provided in nat, at a scale of 1:1,200 in urban areas and 1:2,400 in rural areas.

reflects more detailed and up-to-date stream channel configuration in the persons. EMM (or the persons in the persons EMM may have been adjusted on the persons EMM may have been adjusted on the that were treated from the persons EMM may have been adjusted on the three persons in the food insurance. As a result with Police of Insurance. As a result with a shown white is the person in the food insurance. As a result with a shown of this map.

• limits shown on this map are based on the best data available at the biblication. Because changes due to enrowachors or de-annexations may tread after this map was published, map users should contact appropriate officials to verify current corporate limit locations.

lefer to the separately printed Map Index for an overview map is originally adding the property and original property adding to the property adding for Communities take containing Mational Plood Insurance Place and Communities as well as a listing of the panels on which is located.

to FEMA Map Service Center at 1-800-358-9616 for information on product services. The Newhole products may include product services of Mich Ministers (The Insuland Products and Service of Mich Program at Proceedings of Service Centers on The FEMA Mich Robert Centers and may also be reached 1-100-258-9520 and its website at Table Information at Table Mich Service Centers and the website of Table Information Services.

e questions about this map or questions concerning the National Flood Program in general, please call 1-877-FEMA MAP (1-877-336-2827) or EMA website at http://www.fema.gov.

ZONE X City of Sparks 320021 ZONE X Washoe County Unincorporated Areas 320019 2310000 FT (3) ZONE X Washoe County Unincorporated Areas 320019 Washoe County Unincorporated Areas 320019 1% ANNUAL CHANCE PLOOD DISCHARGE CONTAINED IN CHANNEL ZONE X OASIS DRIVE anish Springs Wash WHITE ROSE DRIVE ZONE X City of Sparks 320021 1% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CHANNEL 22 ZONE X JOINS PANEL 3051 ZONE X NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 20 NORTH, RANGE 20 EAST AND TOWNSHIP 21 NORTH, RANGE 20 EAST. Washoe County Unincorporated Areas 320019 T. 21 N.

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUND BY THE 1% ANNUAL CHANCE FLOOD

Flood depths of 1 to 3 feet (usually areas of ponding); Ba Blevations determined. Flood deaths of 1 to 3 feet (usually sheet flow on stoning ternain): depths determined. For areas of alluvial fan flooding, veloci determined: Area to be protected from 1% annual chance flood by a Fede protection system under construction; no Base Flood Edetermined. Coastal flood zone with velocity hazard (wave action); Ber Bevaltors defermined. he floodway is the channel of a stream plus any adjacent floodplan areas that must be rencoekment, so that the 1% annual chance flood can be carried without substantial flood heights. FLOODWAY AREAS IN ZONE AE OTHER FLOOD AREAS

COASTAL BARRIER RESOURCES SYSTEM (CBRS) OTHER AREAS

OTHERWISE PROTECTED AREAS (OPAs)

~~~ 513~~~ (EL 987)

-----(B) 7\*0745°; 32'22'30° N<sub>ecc</sub>92<sub>ec</sub>

5000-foot grid ticks: Nevada State Plane coordinate s West zone (FIPSZONE 2703), Transverse Mercator pr

For community map revision history prior to countywide mapping, refer to the C Map History table located in the Flood Insurance Study report for this jurisdictio

MAP SCALE 1" = 1000'

PANEL 2865G FIRM 

FLOOD INSURANCE RATE

WASHOE COUNTY, NEVADA and incorporated areas

PANEL 2865 OF 3475 (SEE MAP INDEX FOR FIRM PANEL L.

320021 2865 320019 2865 CONTAINS: COMMUNITY SPARKS, CITY OF WASHOE COUNTY

City of Sparks 320021

320310

MAP RE MARCH 1

Federal Emergency Management

LOMR-APP Page 1 of 4 Issue Date: June 6, 2014 Effective Date: October 20, 2014 Case No.: 14-09-1338P

Follows Conditional Case No.: 11-09-3110R



## Federal Emergency Management Agency

Washington, D.C. 20472

#### LETTER OF MAP REVISION **DETERMINATION DOCUMENT**

|                            | COMMUNITY AND REVISION INFORMATION                                          | PROJECT DESCRIPTION                                                                         | BASIS OF REQUEST                                                  |  |  |  |
|----------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------|--|--|--|
| COMMUNITY                  | Washoe County<br>Nevada<br>(Unincorporated Areas)                           | CHANNELIZATION<br>FILL                                                                      | HYDRAULIC ANALYSIS<br>HYDROLOGIC ANALYSIS<br>NEW TOPOGRAPHIC DATA |  |  |  |
|                            | COMMUNITY NO.: 320019                                                       |                                                                                             |                                                                   |  |  |  |
| IDENTIFIER                 | Boneyard Flat                                                               | APPROXIMATE LATITUDE & LONGITUDE: 39.683, -119.717<br>SOURCE: USGS QUADRANGLE DATUM: NAD 83 |                                                                   |  |  |  |
|                            | ANNOTATED MAPPING ENCLOSURES                                                | ANNOTATED STUDY ENCLOSURES                                                                  |                                                                   |  |  |  |
| TYPE: FIRM*<br>TYPE: FIRM* | NO.: 32031C2855G DATE: March 16, 2009 NO.: 32031C2865G DATE: March 16, 2009 | DATE OF EFFECTIVE FLOOD INSURANCE STUDY: June 18, 2013 STILLWATER ELEVATION TABLE: 9        |                                                                   |  |  |  |

#### FLOODING SOURCE(S) & REVISED REACH(ES)

Central Channel - from the inlet of Boneyard Flat to approximately 50 feet downstream of West Calle De La Plata Road

Stormy Channel - from the confluence with Central Channel to approximately 230 feet upstream

Boneyard Flat - from the outlet of Central Channel to approximately 4,000 feet north of the end of Shea Neva Road

| SUMMARY OF REVISIONS           |                    |                  |           |           |  |  |
|--------------------------------|--------------------|------------------|-----------|-----------|--|--|
| Flooding Source                | Effective Flooding | Revised Flooding | Increases | Decreases |  |  |
| Central Channel                | Zone X (unshaded)  | Contained        | YES       | NONE      |  |  |
| Stormy Channel                 | Zone A             | Contained        | NONE      | YES       |  |  |
| Boneyard Flat                  | Zone A             | Zone AE          | YES       | YES       |  |  |
|                                | No BFEs            | BFEs             | YES       | NONE      |  |  |
| * BFFs - Base Flood Flevations |                    |                  |           |           |  |  |

#### **DETERMINATION**

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panels revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMĆ Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

> Luis Rodriguez, P.E., Chief Engineering Management Branch Federal Insurance and Mitigation Administration

Enclosures reflect changes to flooding sources affected by this revision.

\* FIRM - Flood Insurance Rate Map; \*\* FBFM - Flood Boundary and Floodway Map; \*\*\* FHBM - Flood Hazard Boundary Map

Issue Date: June 6, 2014 Effective Date: October 20, 2014 Case No.: 14-09-1338P LOMR-APP



## Federal Emergency Management Agency

Washington, D.C. 20472

# LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

#### COMMUNITY INFORMATION

#### APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

NFIP regulations Paragraph 60.3(b)(7) requires communities to ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management ordinances; therefore, responsibility for maintenance of the altered or relocated watercourse, including any related appurtenances such as bridges, culverts, and other drainage structures, rests with your community. We may request that your community submit a description and schedule of maintenance activities necessary to ensure this requirement.

#### **COMMUNITY REMINDERS**

We based this determination on the base (1-percent-annual-chance) flood discharges computed in the submitted hydrologic analysis. Future development of projects upstream could cause increased discharges, which could cause increased flood hazards. A comprehensive restudy of your community's flood hazards would consider the cumulative effects of development on discharges and could, therefore, indicate that greater flood hazards exist in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This revision has met our criteria for removing an area from the base floodplain to reflect the placement of fill. However, we encourage you to require that the lowest adjacent grade and lowest floor (including basement) of any structure placed within the subject area be elevated to or above the Base (1-percent-annual-chance) Flood Elevation.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief Engineering Management Branch Federal Insurance and Mitigation Administration



## Federal Emergency Management Agency

Washington, D.C. 20472

## LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Mr. Jeff Lusk
Acting Director, Mitigation Division
Federal Emergency Management Agency, Region IX
1111 Broadway Street, Suite 1200
Oakland, CA 94607-4052
(510) 627-7175

#### STATUS OF THE COMMUNITY NFIP MAPS

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel(s) and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

Luis Rodriguez, P.E., Chief Engineering Management Branch Federal Insurance and Mitigation Administration

132942 PT202.BKR.14091338P.H20

102-I-A-C



## Federal Emergency Management Agency

Washington, D.C. 20472

# LETTER OF MAP REVISION DETERMINATION DOCUMENT (CONTINUED)

#### **PUBLIC NOTIFICATION OF REVISION**

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below and through FEMA's Flood Hazard Mapping website at https://www.floodmaps.fema.gov/fhm/Scripts/bfe main.asp.

LOCAL NEWSPAPER Name: The Reno Gazette-Journal

Dates: June 13, 2014 and June 20, 2014

Within 90 days of the second publication in the local newspaper, a citizen may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90-day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised flood hazard determination information presented in this LOMR may be changed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Map Information eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 847 South Pickett Street, Alexandria, VA 22304-4605. Additional Information about the NFIP is available on our website at http://www.fema.gov/nfip.

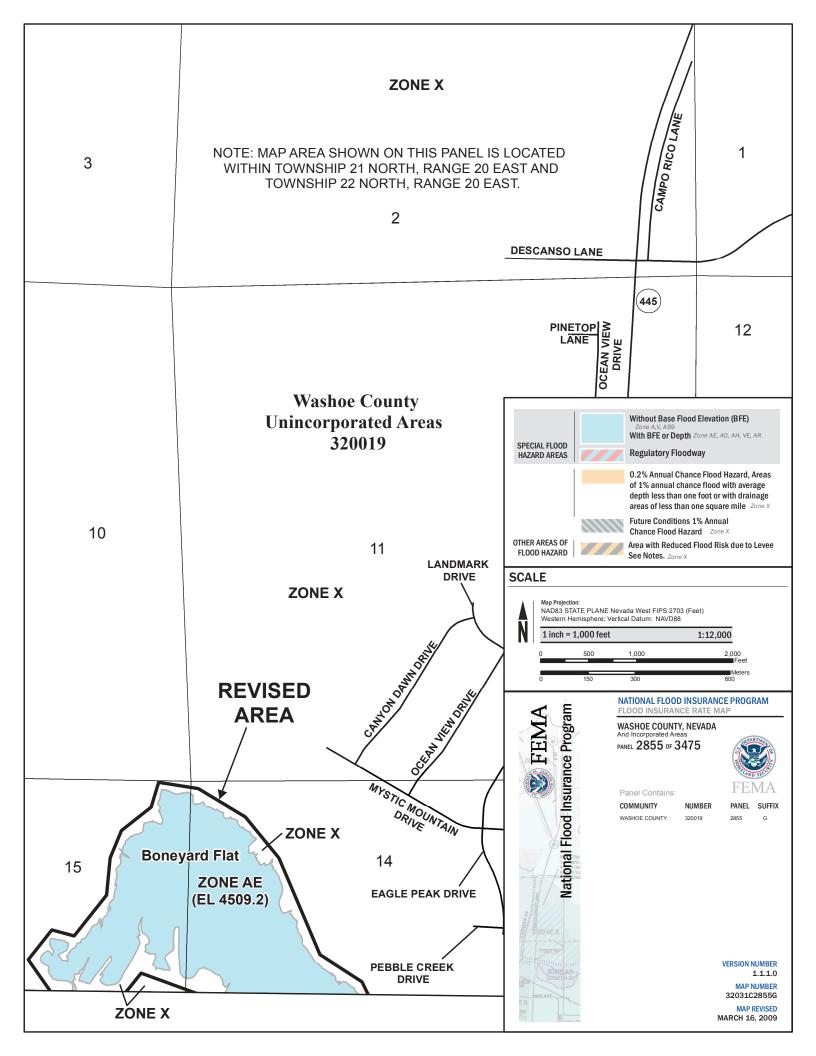
Luis Rodriguez, P.E., Chief Engineering Management Branch Federal Insurance and Mitigation Administration

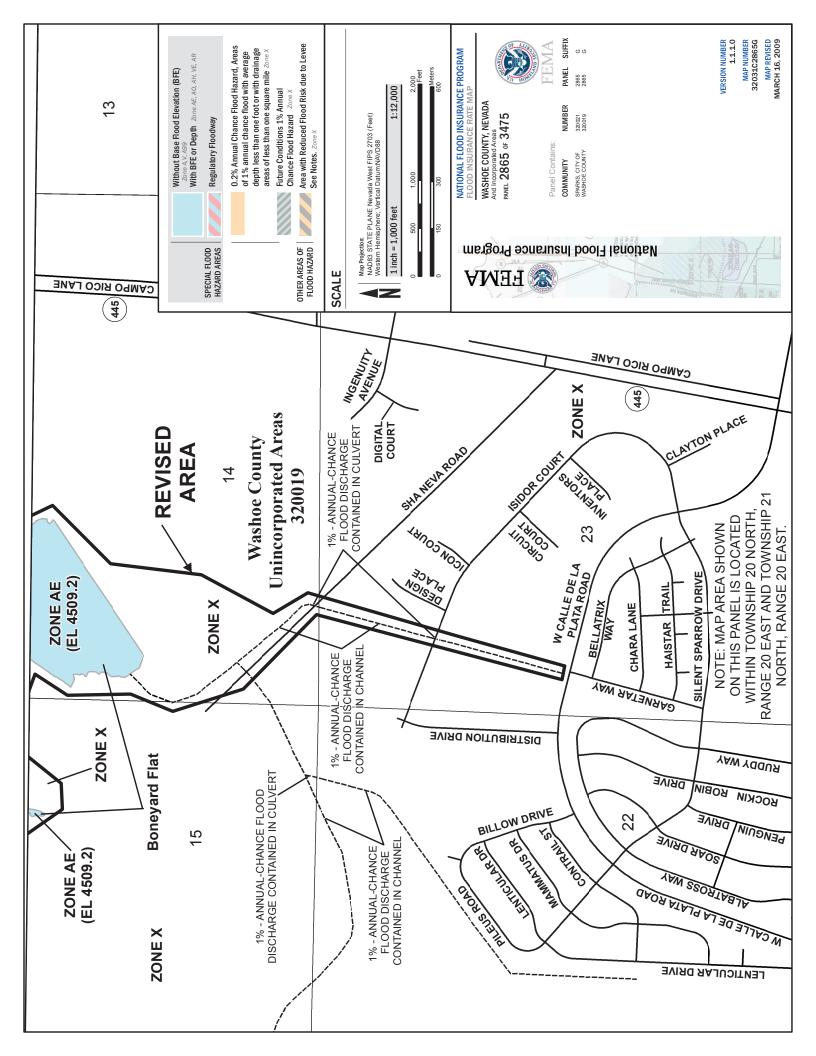
**Table 9. Summary of Stillwater Elevations** 

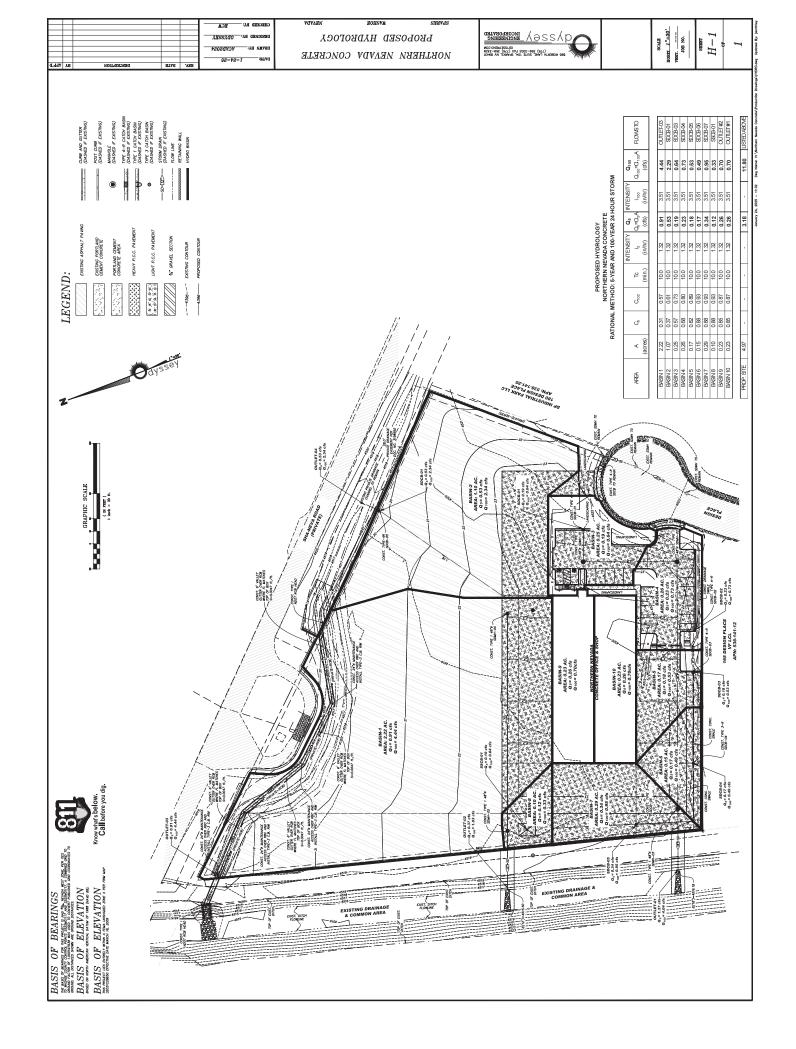
Elevation (Feet NAVD<sup>1</sup>)

| Flooding Source | 10-Percent | 2-Percent | 1-Percent | <u>0.2-Percent</u> |
|-----------------|------------|-----------|-----------|--------------------|
| Boneyard Flat   |            |           | 4,509.2   |                    |

<sup>&</sup>lt;sup>1</sup>North American Vertical Datum of 1988









#### NOAA Atlas 14, Volume 1, Version 5 Location name: Sparks, Nevada, USA\* Latitude: 39.6771°, Longitude: -119.7098° Elevation: 4523 ft\*\*

\* source: ESRI Maps \*\* source: USGS



#### POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF tabular | PF graphical | Maps & aerials

#### PF tabular

| PDS      | PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches) <sup>1</sup> |                               |                               |                               |                               |                               |                               |                            |                            |                           |
|----------|----------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|----------------------------|----------------------------|---------------------------|
| Duration |                                                                                                          |                               |                               | Averaç                        | ge recurrenc                  | e interval (y                 | /ears)                        |                            |                            |                           |
| Duration | 1                                                                                                        | 2                             | 5                             | 10                            | 25                            | 50                            | 100                           | 200                        | 500                        | 1000                      |
| 5-min    | <b>0.099</b><br>(0.083-0.114)                                                                            | <b>0.124</b> (0.103-0.144)    | <b>0.166</b> (0.140-0.196)    | <b>0.206</b> (0.174-0.246)    | <b>0.275</b> (0.226-0.332)    | <b>0.340</b> (0.271-0.416)    | <b>0.417</b> (0.324-0.519)    | <b>0.512</b> (0.383-0.652) | <b>0.667</b> (0.472-0.880) | <b>0.811</b> (0.550-1.10) |
| 10-min   | <b>0.151</b><br>(0.126-0.174)                                                                            | <b>0.188</b> (0.157-0.220)    | <b>0.252</b> (0.213-0.298)    | <b>0.314</b><br>(0.264-0.374) | <b>0.419</b> (0.344-0.506)    | <b>0.517</b><br>(0.413-0.633) | <b>0.635</b><br>(0.493-0.790) | <b>0.779</b> (0.582-0.993) | <b>1.02</b> (0.719-1.34)   | <b>1.23</b> (0.837-1.67)  |
| 15-min   | <b>0.187</b><br>(0.157-0.216)                                                                            | <b>0.233</b><br>(0.195-0.272) | <b>0.313</b> (0.264-0.369)    | <b>0.390</b><br>(0.328-0.463) | <b>0.519</b> (0.427-0.627)    | <b>0.640</b> (0.512-0.785)    | <b>0.787</b><br>(0.611-0.980) | <b>0.966</b> (0.722-1.23)  | <b>1.26</b> (0.891-1.66)   | <b>1.53</b> (1.04-2.07)   |
| 30-min   | <b>0.252</b><br>(0.211-0.291)                                                                            | <b>0.314</b> (0.262-0.366)    | <b>0.421</b> (0.355-0.498)    | <b>0.525</b> (0.441-0.623)    | <b>0.699</b><br>(0.575-0.844) | <b>0.863</b> (0.690-1.06)     | <b>1.06</b> (0.823-1.32)      | <b>1.30</b> (0.972-1.66)   | <b>1.70</b> (1.20-2.24)    | <b>2.06</b> (1.40-2.78)   |
| 60-min   | <b>0.312</b><br>(0.261-0.360)                                                                            | <b>0.388</b> (0.325-0.454)    | <b>0.521</b> (0.439-0.616)    | <b>0.649</b> (0.546-0.772)    | <b>0.865</b> (0.711-1.04)     | <b>1.07</b> (0.854-1.31)      | <b>1.31</b> (1.02-1.63)       | <b>1.61</b> (1.20-2.05)    | <b>2.10</b> (1.48-2.77)    | <b>2.55</b> (1.73-3.44)   |
| 2-hr     | <b>0.412</b> (0.363-0.476)                                                                               | <b>0.512</b> (0.453-0.594)    | <b>0.659</b> (0.576-0.766)    | <b>0.790</b> (0.681-0.915)    | <b>0.991</b> (0.832-1.16)     | <b>1.17</b> (0.963-1.38)      | <b>1.39</b> (1.11-1.66)       | <b>1.67</b> (1.30-2.07)    | <b>2.18</b> (1.62-2.79)    | <b>2.66</b> (1.90-3.48)   |
| 3-hr     | <b>0.496</b><br>(0.441-0.565)                                                                            | <b>0.617</b> (0.553-0.706)    | <b>0.774</b><br>(0.689-0.884) | <b>0.904</b><br>(0.797-1.04)  | <b>1.09</b> (0.945-1.25)      | <b>1.26</b> (1.07-1.46)       | <b>1.45</b> (1.22-1.71)       | <b>1.74</b> (1.42-2.08)    | <b>2.23</b> (1.77-2.82)    | <b>2.69</b> (2.08-3.52)   |
| 6-hr     | <b>0.705</b><br>(0.631-0.796)                                                                            | <b>0.881</b> (0.787-0.998)    | <b>1.09</b> (0.971-1.24)      | <b>1.25</b> (1.11-1.42)       | <b>1.47</b> (1.28-1.68)       | <b>1.63</b> (1.40-1.87)       | <b>1.79</b> (1.53-2.08)       | <b>2.00</b> (1.68-2.35)    | <b>2.42</b> (1.99-2.89)    | <b>2.83</b> (2.29-3.55)   |
| 12-hr    | <b>0.942</b><br>(0.841-1.06)                                                                             | <b>1.18</b> (1.06-1.33)       | <b>1.49</b> (1.33-1.68)       | <b>1.73</b> (1.53-1.95)       | <b>2.05</b> (1.80-2.33)       | <b>2.30</b> (1.99-2.63)       | <b>2.55</b> (2.18-2.95)       | <b>2.80</b> (2.35-3.28)    | <b>3.14</b> (2.57-3.74)    | <b>3.44</b> (2.76-4.17)   |
| 24-hr    | <b>1.18</b> (1.06-1.34)                                                                                  | <b>1.49</b> (1.34-1.68)       | <b>1.92</b> (1.71-2.16)       | <b>2.27</b> (2.02-2.56)       | <b>2.76</b> (2.43-3.11)       | <b>3.15</b> (2.74-3.56)       | <b>3.56</b> (3.07-4.06)       | <b>3.99</b> (3.40-4.58)    | <b>4.59</b> (3.83-5.33)    | <b>5.07</b> (4.16-5.95)   |
| 2-day    | <b>1.43</b> (1.26-1.62)                                                                                  | <b>1.81</b> (1.60-2.06)       | <b>2.36</b> (2.08-2.69)       | <b>2.81</b> (2.46-3.20)       | <b>3.45</b> (2.99-3.94)       | <b>3.97</b> (3.41-4.56)       | <b>4.52</b> (3.83-5.24)       | <b>5.10</b> (4.27-5.97)    | <b>5.93</b> (4.85-7.04)    | <b>6.60</b> (5.30-7.96)   |
| 3-day    | <b>1.56</b> (1.38-1.77)                                                                                  | <b>1.98</b> (1.75-2.26)       | <b>2.62</b> (2.31-2.99)       | <b>3.15</b> (2.76-3.59)       | <b>3.90</b> (3.38-4.47)       | <b>4.51</b> (3.86-5.20)       | <b>5.17</b> (4.36-6.01)       | <b>5.87</b> (4.88-6.89)    | <b>6.88</b> (5.58-8.20)    | <b>7.70</b> (6.14-9.31)   |
| 4-day    | <b>1.69</b> (1.49-1.92)                                                                                  | <b>2.16</b> (1.91-2.46)       | <b>2.88</b> (2.54-3.29)       | <b>3.48</b> (3.05-3.98)       | <b>4.35</b> (3.76-4.99)       | <b>5.05</b> (4.31-5.84)       | <b>5.82</b> (4.90-6.78)       | <b>6.64</b> (5.50-7.80)    | <b>7.83</b> (6.32-9.35)    | <b>8.80</b> (6.97-10.7)   |
| 7-day    | <b>1.99</b> (1.74-2.29)                                                                                  | <b>2.55</b> (2.23-2.94)       | <b>3.44</b> (2.99-3.97)       | <b>4.17</b> (3.60-4.82)       | <b>5.22</b> (4.45-6.06)       | <b>6.08</b> (5.12-7.11)       | <b>7.01</b> (5.83-8.27)       | <b>8.00</b> (6.56-9.54)    | <b>9.44</b> (7.55-11.4)    | <b>10.6</b> (8.35-13.0)   |
| 10-day   | <b>2.24</b> (1.95-2.59)                                                                                  | <b>2.90</b> (2.53-3.34)       | <b>3.90</b> (3.39-4.51)       | <b>4.71</b> (4.07-5.45)       | <b>5.85</b> (5.00-6.81)       | <b>6.77</b> (5.73-7.92)       | <b>7.76</b> (6.48-9.15)       | <b>8.80</b> (7.25-10.5)    | <b>10.3</b> (8.28-12.4)    | <b>11.5</b> (9.08-14.0)   |
| 20-day   | <b>2.80</b> (2.45-3.22)                                                                                  | <b>3.62</b> (3.17-4.18)       | <b>4.88</b> (4.26-5.62)       | <b>5.84</b> (5.07-6.72)       | <b>7.13</b> (6.15-8.22)       | <b>8.13</b> (6.95-9.41)       | <b>9.15</b> (7.74-10.7)       | <b>10.3</b> (8.58-12.1)    | <b>11.8</b> (9.70-14.2)    | <b>13.1</b> (10.6-15.9)   |
| 30-day   | <b>3.29</b> (2.88-3.81)                                                                                  | <b>4.27</b> (3.73-4.93)       | <b>5.74</b> (5.00-6.62)       | <b>6.85</b> (5.95-7.90)       | <b>8.35</b> (7.20-9.64)       | <b>9.49</b> (8.12-11.0)       | <b>10.7</b> (9.04-12.5)       | <b>11.9</b> (9.94-14.0)    | <b>13.6</b> (11.2-16.3)    | <b>15.0</b> (12.2-18.1)   |
| 45-day   | <b>3.96</b> (3.46-4.50)                                                                                  | <b>5.13</b> (4.48-5.83)       | <b>6.86</b> (5.97-7.80)       | <b>8.15</b> (7.08-9.26)       | <b>9.83</b> (8.49-11.2)       | <b>11.1</b> (9.54-12.7)       | <b>12.4</b> (10.5-14.3)       | <b>13.7</b> (11.5-15.9)    | <b>15.7</b> (13.0-18.4)    | <b>17.2</b> (14.1-20.4)   |
| 60-day   | <b>4.55</b> (3.96-5.19)                                                                                  | <b>5.93</b> (5.16-6.75)       | <b>7.92</b> (6.89-9.01)       | <b>9.32</b> (8.10-10.6)       | <b>11.1</b> (9.59-12.7)       | <b>12.4</b> (10.7-14.2)       | <b>13.7</b> (11.7-15.7)       | <b>14.9</b> (12.6-17.3)    | <b>16.7</b> (14.0-19.6)    | <b>18.1</b> (15.0-21.3)   |

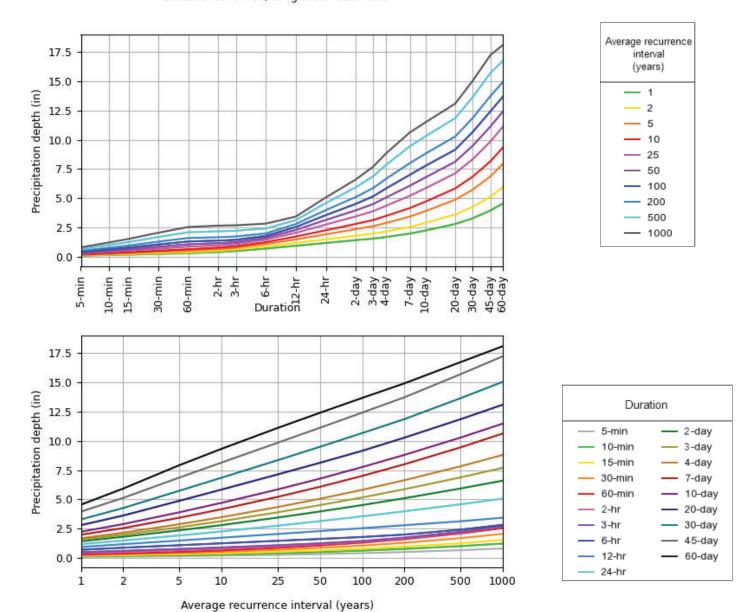
<sup>&</sup>lt;sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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### PDS-based depth-duration-frequency (DDF) curves Latitude: 39.6771°, Longitude: -119.7098°



NOAA Atlas 14, Volume 1, Version 5

Created (GMT): Fri Jan 24 18:04:11 2025

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# Maps & aerials

Small scale terrain



#### NOAA Atlas 14, Volume 1, Version 5 Location name: Sparks, Nevada, USA\* Latitude: 39.6771°, Longitude: -119.7098° Elevation: 4523 ft\*\*

\* source: ESRI Maps \*\* source: USGS



#### POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF tabular | PF graphical | Maps & aerials

## PF tabular

| PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour) <sup>1</sup> |                               |                                                                      |                               |                                          |                               |                                          |                               |                               |                               |                               |  |  |  |
|---------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------------------------------------------------------|-------------------------------|------------------------------------------|-------------------------------|------------------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--|--|--|
| Duration                                                                                                      |                               | Average recurrence interval (years)  1 2 5 10 25 50 100 200 500 1000 |                               |                                          |                               |                                          |                               |                               |                               |                               |  |  |  |
| Duration                                                                                                      | 1                             | 2                                                                    | 5                             | 10                                       | 25                            | 50                                       | 100                           | 200                           | 500                           | 1000                          |  |  |  |
| 5-min                                                                                                         | <b>1.19</b> (0.996-1.37)      | <b>1.49</b> (1.24-1.73)                                              | <b>1.99</b> (1.68-2.35)       | <b>2.47</b> (2.09-2.95)                  | <b>3.30</b> (2.71-3.98)       | <b>4.08</b> (3.25-4.99)                  | <b>5.00</b> (3.89-6.23)       | <b>6.14</b> (4.60-7.82)       | <b>8.00</b> (5.66-10.6)       | <b>9.73</b> (6.60-13.2)       |  |  |  |
| 10-min                                                                                                        | <b>0.906</b> (0.756-1.04)     | <b>1.13</b> (0.942-1.32)                                             | <b>1.51</b> (1.28-1.79)       | <b>1.88</b> (1.58-2.24)                  | <b>2.51</b> (2.06-3.04)       | <b>3.10</b> (2.48-3.80)                  | <b>3.81</b> (2.96-4.74)       | <b>4.67</b> (3.49-5.96)       | <b>6.10</b> (4.31-8.03)       | <b>7.40</b> (5.02-10.0)       |  |  |  |
| 15-min                                                                                                        | <b>0.748</b><br>(0.628-0.864) |                                                                      |                               | <b>1.56 2.08</b> (1.31-1.85) (1.71-2.51) |                               | <b>2.56 3.15</b> (2.05-3.14) (2.44-3.92) |                               | <b>3.86</b> (2.89-4.92)       |                               |                               |  |  |  |
| 30-min                                                                                                        | <b>0.504</b><br>(0.422-0.582) | <b>0.628</b> (0.524-0.732)                                           | <b>0.842</b><br>(0.710-0.996) | <b>1.05</b> (0.882-1.25)                 | <b>1.40</b> (1.15-1.69)       | <b>1.73</b> (1.38-2.11)                  | <b>2.12</b> (1.65-2.64)       | <b>2.60</b> (1.94-3.31)       | <b>3.39</b> (2.40-4.47)       | <b>4.12</b> (2.80-5.57)       |  |  |  |
| 60-min                                                                                                        | <b>0.312</b><br>(0.261-0.360) | <b>0.388</b> (0.325-0.454)                                           | <b>0.521</b> (0.439-0.616)    | <b>0.649</b> (0.546-0.772)               | <b>0.865</b> (0.711-1.04)     | <b>1.07</b> (0.854-1.31)                 | <b>1.31</b> (1.02-1.63)       | <b>1.61</b> (1.20-2.05)       | <b>2.10</b> (1.48-2.77)       | <b>2.55</b> (1.73-3.44)       |  |  |  |
| 2-hr                                                                                                          | <b>0.206</b><br>(0.181-0.238) | <b>0.256</b><br>(0.226-0.297)                                        | <b>0.329</b> (0.288-0.383)    | <b>0.395</b> (0.340-0.457)               | <b>0.495</b> (0.416-0.578)    | <b>0.586</b><br>(0.481-0.692)            | <b>0.694</b> (0.555-0.830)    | <b>0.837</b> (0.649-1.04)     | <b>1.09</b> (0.808-1.40)      | <b>1.33</b> (0.952-1.74)      |  |  |  |
| 3-hr                                                                                                          | <b>0.165</b><br>(0.146-0.188) | <b>0.205</b> (0.184-0.235)                                           | <b>0.257</b><br>(0.229-0.294) | <b>0.301</b> (0.265-0.344)               | <b>0.362</b> (0.314-0.417)    | <b>0.417</b><br>(0.355-0.485)            | <b>0.484</b><br>(0.404-0.569) | <b>0.578</b> (0.472-0.692)    | <b>0.742</b> (0.588-0.939)    | <b>0.896</b> (0.693-1.17)     |  |  |  |
| 6-hr                                                                                                          | <b>0.117</b><br>(0.105-0.132) | <b>0.147</b><br>(0.131-0.166)                                        | <b>0.182</b><br>(0.162-0.206) | <b>0.209</b> (0.185-0.237)               | <b>0.245</b><br>(0.214-0.279) | <b>0.271</b><br>(0.234-0.312)            | <b>0.299</b><br>(0.255-0.347) | <b>0.334</b> (0.280-0.393)    | <b>0.404</b><br>(0.331-0.481) | <b>0.473</b> (0.382-0.592)    |  |  |  |
| 12-hr                                                                                                         | <b>0.078</b><br>(0.069-0.087) | <b>0.098</b><br>(0.087-0.110)                                        | <b>0.123</b> (0.110-0.139)    | <b>0.143</b> (0.127-0.161)               | <b>0.170</b> (0.148-0.193)    | <b>0.190</b> (0.165-0.218)               | <b>0.211</b><br>(0.180-0.244) | <b>0.232</b> (0.195-0.271)    | <b>0.260</b> (0.213-0.310)    | <b>0.285</b> (0.229-0.345)    |  |  |  |
| 24-hr                                                                                                         | <b>0.049</b><br>(0.044-0.055) | <b>0.062</b> (0.055-0.070)                                           | <b>0.080</b><br>(0.071-0.090) | <b>0.094</b> (0.083-0.106)               | <b>0.114</b> (0.101-0.129)    | <b>0.131</b> (0.114-0.148)               | <b>0.148</b> (0.127-0.169)    | <b>0.166</b><br>(0.141-0.190) | <b>0.191</b> (0.159-0.222)    | <b>0.211</b><br>(0.173-0.248) |  |  |  |
| 2-day                                                                                                         | <b>0.029</b><br>(0.026-0.033) | <b>0.037</b><br>(0.033-0.042)                                        | <b>0.049</b><br>(0.043-0.055) | <b>0.058</b> (0.051-0.066)               | <b>0.071</b><br>(0.062-0.082) | <b>0.082</b><br>(0.070-0.095)            | <b>0.094</b><br>(0.079-0.109) | <b>0.106</b> (0.088-0.124)    | <b>0.123</b> (0.101-0.146)    | <b>0.137</b><br>(0.110-0.165) |  |  |  |
| 3-day                                                                                                         | <b>0.021</b><br>(0.019-0.024) | <b>0.027</b><br>(0.024-0.031)                                        | <b>0.036</b><br>(0.032-0.041) | <b>0.043</b><br>(0.038-0.049)            | <b>0.054</b><br>(0.046-0.062) | <b>0.062</b><br>(0.053-0.072)            | <b>0.071</b><br>(0.060-0.083) | <b>0.081</b> (0.067-0.095)    | <b>0.095</b><br>(0.077-0.113) | <b>0.106</b><br>(0.085-0.129) |  |  |  |
| 4-day                                                                                                         | <b>0.017</b><br>(0.015-0.020) | <b>0.022</b><br>(0.019-0.025)                                        | <b>0.030</b><br>(0.026-0.034) | <b>0.036</b><br>(0.031-0.041)            | <b>0.045</b><br>(0.039-0.052) | <b>0.052</b><br>(0.044-0.060)            | <b>0.060</b><br>(0.051-0.070) | <b>0.069</b> (0.057-0.081)    | <b>0.081</b> (0.065-0.097)    | <b>0.091</b> (0.072-0.111)    |  |  |  |
| 7-day                                                                                                         | <b>0.011</b><br>(0.010-0.013) | <b>0.015</b> (0.013-0.017)                                           | <b>0.020</b> (0.017-0.023)    | <b>0.024</b><br>(0.021-0.028)            | <b>0.031</b> (0.026-0.036)    | <b>0.036</b><br>(0.030-0.042)            | <b>0.041</b><br>(0.034-0.049) | <b>0.047</b> (0.039-0.056)    | <b>0.056</b><br>(0.044-0.068) | <b>0.063</b> (0.049-0.077)    |  |  |  |
| 10-day                                                                                                        | <b>0.009</b><br>(0.008-0.010) | <b>0.012</b> (0.010-0.013)                                           | <b>0.016</b><br>(0.014-0.018) | <b>0.019</b> (0.016-0.022)               | <b>0.024</b><br>(0.020-0.028) | <b>0.028</b><br>(0.023-0.033)            | <b>0.032</b><br>(0.027-0.038) | <b>0.036</b> (0.030-0.043)    | <b>0.042</b><br>(0.034-0.051) | <b>0.047</b><br>(0.037-0.058) |  |  |  |
| 20-day                                                                                                        | <b>0.005</b><br>(0.005-0.006) | <b>0.007</b><br>(0.006-0.008)                                        | <b>0.010</b> (0.008-0.011)    | <b>0.012</b> (0.010-0.014)               | <b>0.014</b> (0.012-0.017)    | <b>0.016</b> (0.014-0.019)               | <b>0.019</b> (0.016-0.022)    | <b>0.021</b> (0.017-0.025)    | <b>0.024</b><br>(0.020-0.029) | <b>0.027</b><br>(0.021-0.033) |  |  |  |
| 30-day                                                                                                        | <b>0.004</b><br>(0.003-0.005) | <b>0.005</b><br>(0.005-0.006)                                        | <b>0.007</b><br>(0.006-0.009) | <b>0.009</b><br>(0.008-0.010)            | <b>0.011</b> (0.009-0.013)    | <b>0.013</b><br>(0.011-0.015)            | <b>0.014</b><br>(0.012-0.017) | <b>0.016</b> (0.013-0.019)    | <b>0.018</b> (0.015-0.022)    | <b>0.020</b><br>(0.017-0.025) |  |  |  |
| 45-day                                                                                                        | <b>0.003</b><br>(0.003-0.004) | <b>0.004</b><br>(0.004-0.005)                                        | <b>0.006</b><br>(0.005-0.007) | <b>0.007</b><br>(0.006-0.008)            | <b>0.009</b><br>(0.007-0.010) | <b>0.010</b><br>(0.008-0.011)            | <b>0.011</b><br>(0.009-0.013) | <b>0.012</b> (0.010-0.014)    | <b>0.014</b><br>(0.012-0.017) | <b>0.015</b><br>(0.013-0.018) |  |  |  |
| 60-day                                                                                                        | <b>0.003</b><br>(0.002-0.003) | <b>0.004</b><br>(0.003-0.004)                                        | <b>0.005</b><br>(0.004-0.006) | <b>0.006</b><br>(0.005-0.007)            | <b>0.007</b><br>(0.006-0.008) | <b>0.008</b><br>(0.007-0.009)            | <b>0.009</b><br>(0.008-0.010) | <b>0.010</b> (0.008-0.011)    | <b>0.011</b> (0.009-0.013)    | <b>0.012</b><br>(0.010-0.014) |  |  |  |

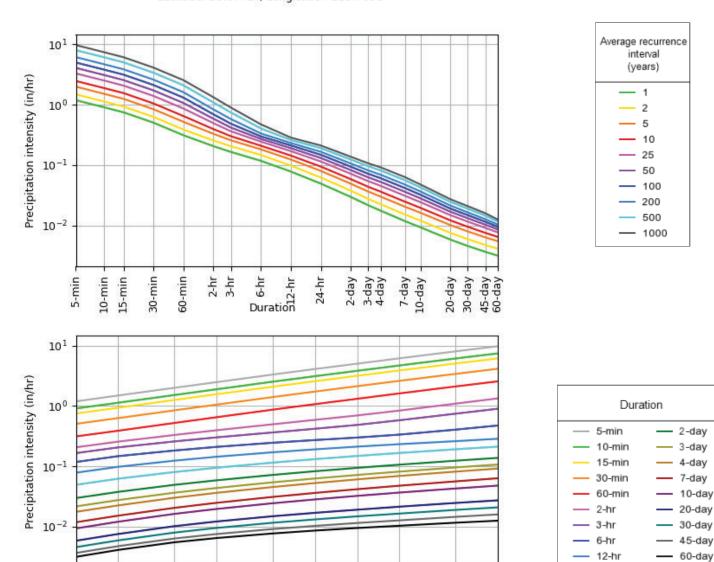
<sup>&</sup>lt;sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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### PDS-based intensity-duration-frequency (IDF) curves Latitude: 39.6771°, Longitude: -119.7098°



NOAA Atlas 14, Volume 1, Version 5

2

10

25

Average recurrence interval (years)

50

Created (GMT): Fri Jan 24 18:02:08 2025

1000

500

2-day

3-day 4-day

7-day

10-day 20-day

30-day

45-day

24-hr

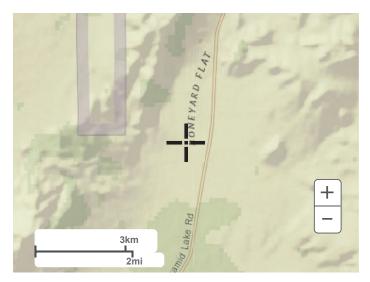
Back to Top

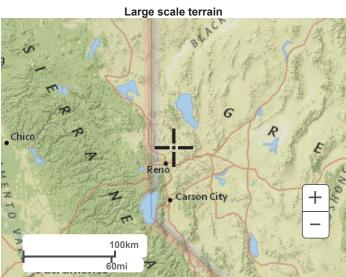
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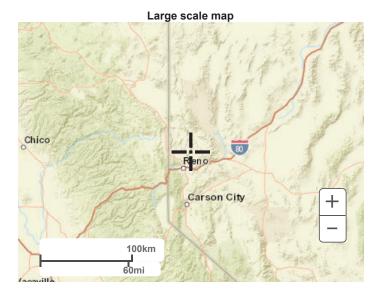
200

# Maps & aerials

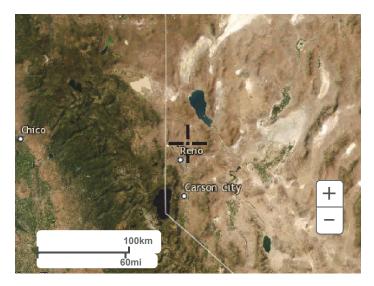
Small scale terrain







Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

<u>Disclaimer</u>

| APPENDIX B<br>EXISTING<br>100-YR. 24-HR. SSA<br>CALCULATIONS |  |
|--------------------------------------------------------------|--|
|                                                              |  |
|                                                              |  |

\*\*\*\*\* Project Description File Name ..... EXIST. HEC1 SSA 24 HR.SPF \*\*\*\*\*\* Analysis Options Flow Units ..... cfs Subbasin Hydrograph Method. HEC-1 Time of Concentration..... SCS TR-55 Storage Node Exfiltration.. None Starting Date ... JAN-01-2025 00:00:00
Ending Date ... JAN-02-2025 00:00:00
Report Time Step ... 00:05:00 Element Count Number of subbasins . . . . 1
Number of nodes . . . . 1
Number of links . . . . 0 \*\*\*\*\* Subbasin Summary Subbasin Total TD acres 5.13 EXIST \*\*\*\*\* Node Summary Element Invert Elevation ft Type Node Invert Maximum Ponded External Elev. Area ft² ft 0.00 0.00 EX OUTFALL 0.00 Depth inches 3.559 Volume Mgallons 0.000 0.138 0.000 0.000 \*\*\*\*\*\* Subbasin Runoff Summary Total Total Runoff Total Pear Runoff Subbasin Total ID Precip ... cfs in in EXIST 3.56 0.99 5.23

Autodesk® Storm and Sanitary Analysis 2024 - Version 13.6.268 (Build 0)

Analysis began on: Mon Jan 27 12:30:15 2025 Analysis ended on: Mon Jan 27 12:30:16 2025 Total elapsed time: 00:00:01 1 \*\*\*\*\*\*\*\*\*\*\*\*\*\* FLOOD HYDROGRAPH PACKAGE (HEC-1) JUN 1998 VERSION 4.1 RUN DATE 27JAN25 TIME 12:30:15 \*\*\*\*\*\*\*\*\*\*\*\*

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

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XXXXXXX XXXXX X X X X X XX XXXXXXX XXXX XXXXX Х XXXXXXX XXX

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

HEC-1 INPUT

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE. THE DEFINITION OF -AMEKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRANTY 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

PAGE 1 LINE  $\texttt{ID}.\dots..1\dots..2\dots..3\dots..4\dots..5\dots..6\dots..7\dots..8\dots...9\dots..10$ ID HEC-1 Analysis using SSA IT 5 1JAN25 0 0 5 1JAN25 2JAN25 0 0 2 KK EXIST 0 0.0 0 5 KO 2.2 0.0080 0.0000 0.0000 0.0000 BF 1JAN25 0.0000 0.0036 0.0072 0.0108 0.0145 0.0182 0.0220 0.0258 0.0296 0.0335 0.0374 0.0413 0.0453 0.0493 0.0533 0.0574 0.0615 0.0657 0.0698 0.0741 PC 10 PC 0.0374 0.0453 11 PC 0.0826 0.0913 0.0957 0.1001 0.1046 0.1091 0.1136 0.1182 0.1275 0.1759 0.2300 0.1228 0.1321 0.1369 0.1416 0.1512 0.1561 0.1709 0.1810 0.2358 0.1862 0.2417 0.1914 0.2476 0.2021 0.2130 0.2721 1.3 PC. 0.1967 0.2075 0.2186 14 PC 0.2243 0.2536 0.2597 0.2659 1.5 PC PC 0.2848 0.3524 0.2912 0.3596 0.2978 0.3668 0.3043 0.3110 0.3815 0.3177 0.3245 0.3314 0.3383 0.3454 0.4194 16 0.3889 0.4614 0.5689 0.7082 0.4806 0.5920 0.7455 1.0923 PC PC 0.4272 0.5233 0.4352 0.5347 0.4436 0.5461 0.4523 0.5575 0.4908 0.6042 17 18 0 4708 0.5012 0 5121 0.6170 19 PC PC 0.6444 0.6590 0.8639 0.6745 0.6909 0.7262 0.7661 1.2615 0.7882 0.8117 0.8947 0.9289 0.9665 20 0.8366 1.5336 2.0216 2.4278 21 PC 2.3603 2.4872 2.5384 2.5816 2.6166 2.6467 2 6748 2 7012 2.7257 22 2.7898 2.8090 2.8272 2.8444 2.8608 2.8765 2.9322 PC 2.9192 2.9576 2.9699 2.9819 3.0053 3.1071 3.0166 3.0277 24 3.0385 3.0490 3.0593 3.0694 3.0792 3.0981 3.1159 3.0888 PC PC 3.1328 3.2102 3.1410 3.2175 3.1490 3.2247 3.1570 3.2317 3.1648 3.2387 3.1803 3.2524 3.1879 3.2591 3.1726 3.1955 3.2029 3.2658 27 28 PC PC 3.2788 3.3384 3.2851 3.3439 3.2914 3.2976 3.3037 3.3598 3.3097 3.3156 3.3699 3.3214 3.3748 3.3272 3.3797 3.3328 3.3649 3.3937 3.3983 3.4029 3.4434 3.4478 3.4120 3.4166 3.4565 3.4609 3.4211 3.4652 3.4256 3.4695 29 PC 3.3891 3.4075 3.4301 PC 3.4345 3.4522 30 31 PC 3.4781 3.4824 3.4866 3.4909 3.4951 3.4993 3.5034 3.5076 3.5117 3.5159 3.5200 3.5240 3.5281 3.5322 3.5442 3.5482 3.5362 3.5402 33 PC. 3.5600 LS 0.8600 70.000 25.000 35 UD 0.4100 U.S. ARMY CORPS OF ENGINEERS HYDROLOGIC ENGINEERING CENTER 609 SECOND STREET FLOOD HYDROGRAPH PACKAGE (HEC-1) JUN 1998 VERSION 4.1 609 SECOND STREET
DAVIS, CALIFORNIA 95616 RUN DATE 27JAN25 TIME 12:30:15 \* (916) 756-1104

HEC-1 Analysis using SSA

OUTPUT CONTROL VARIABLES 3 TO

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|   |                |                | HYDROGRAP                                     | H AT STATI           | ON EXIST        |                                       |                          |                         |               |                  |                      |
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|   | PEAK FLOW      | TIME           |                                               | 6-HR                 |                 | VERAGE FLOW<br>72-HR                  | 24.00-F                  | IR                      |               |                  |                      |
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\*\*\* NORMAL END OF HEC-1 \*\*\*

| APPENDIX C<br>PROPOSED<br>100-YR. 24-HR. SSA<br>CALCULATIONS |  |
|--------------------------------------------------------------|--|
|                                                              |  |
|                                                              |  |

| Autodock® Storm on                                                                                               | d Canitary An                                    | alwaia 2024 -                                        | Vorgion 13 6       | 260 (Duild  | 0)     |  |
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| *****                                                                                                            | *                                                |                                                      |                    |             |        |  |
| Project Descriptio                                                                                               |                                                  |                                                      |                    |             |        |  |
| File Name                                                                                                        |                                                  | P. HEC1 SSA 2                                        | 4 HR.SPF           |             |        |  |
| *****                                                                                                            |                                                  |                                                      |                    |             |        |  |
| Analysis Options *******                                                                                         |                                                  |                                                      |                    |             |        |  |
| Flow Units Subbasin Hydrograp Time of Concentrat Storage Node Exfil Starting Date Ending Date Report Time Step . | oh Method. HEC<br>ion SCS<br>tration. Non<br>JAN | -1<br>TR-55<br>e<br>-01-2025 00:00<br>-02-2025 00:00 |                    |             |        |  |
| ****                                                                                                             |                                                  |                                                      |                    |             |        |  |
| Element Count                                                                                                    |                                                  |                                                      |                    |             |        |  |
| Number of subbasin<br>Number of nodes<br>Number of links                                                         | 1                                                |                                                      |                    |             |        |  |
| *****                                                                                                            |                                                  |                                                      |                    |             |        |  |
| Subbasin Summary                                                                                                 |                                                  |                                                      |                    |             |        |  |
| Subbasin                                                                                                         | Total                                            |                                                      |                    |             |        |  |
| ID                                                                                                               | Area<br>acres                                    |                                                      |                    |             |        |  |
| AC_CONCPAVING<br>BLDG<br>Sub-08                                                                                  | 1.59<br>0.46<br>3.08                             |                                                      |                    |             |        |  |
| ****                                                                                                             |                                                  |                                                      |                    |             |        |  |
| Node Summary                                                                                                     |                                                  |                                                      |                    |             |        |  |
| Node<br>ID                                                                                                       | Element<br>Type                                  | Elevatio                                             | ft ft              | Area<br>ft² | Inflow |  |
| PROP.                                                                                                            | OUTFALL                                          |                                                      | 0.00               |             |        |  |
| **************************************                                                                           | ntinuity                                         | Volume<br>acre-ft                                    | Depth<br>inches    |             |        |  |
| Total Precipitation Surface Runoff                                                                               | n                                                | 1.522                                                | 3.559<br>0.104     |             |        |  |
| Continuity Error (                                                                                               | (%)                                              | -0.001                                               |                    |             |        |  |
| **************************************                                                                           | nuity                                            | Volume<br>acre-ft                                    | Volume<br>Mgallons |             |        |  |
| ****************** External Inflow                                                                               |                                                  | 0.000                                                | 0.000              |             |        |  |
| External Outflow . Initial Stored Vol                                                                            | ume                                              | 0.466                                                | 0.152              |             |        |  |
| Final Stored Volum                                                                                               | ıe                                               | 0.000                                                | 0.000              |             |        |  |

Continuity Error (%) .... 0.000

Subbasin Runoff Summary

| Subbasin        | Total  | Total  | Peak   |
|-----------------|--------|--------|--------|
| ID              | Precip | Runoff | Runoff |
|                 | in     | in     | cfs    |
|                 |        |        |        |
| AC CONC. PAVING | 3.56   | 1.94   | 5.88   |
| BLDG            | 3.56   | 1.88   | 1.65   |
| Sub-08          | 3.56   | 0.53   | 2.91   |

Analysis began on: Mon Jan 27 12:58:58 2025 Analysis ended on: Mon Jan 27 12:58:59 2025 Total elapsed time: 00:00:01

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

PAGE 1

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| Х    | Х    | XXXXXXX | XX | XXX |       | Х   |
|------|------|---------|----|-----|-------|-----|
| X    | X    | X       | X  | X   |       | XX  |
| X    | X    | X       | X  |     |       | X   |
| XXXX | XXXX | XXXX    | X  |     | XXXXX | X   |
| X    | X    | X       | X  |     |       | X   |
| X    | X    | X       | X  | X   |       | X   |
| X    | X    | XXXXXXX | XX | XXX |       | XXX |

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

HEC-1 INPUT

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
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

LOSS RATE:GREEN AND AMPT INFILTRATION

| LINE | ID.      | 1.      | 2.               | 3.     | 4.     | 5.               | 6.               | 7.               | 8.               | 9.               | 10               |      |   |
|------|----------|---------|------------------|--------|--------|------------------|------------------|------------------|------------------|------------------|------------------|------|---|
|      | ID       |         | nalysis          |        | A      |                  |                  |                  |                  |                  |                  |      |   |
|      | IT       |         | 1JAN25           | 0 0    |        | 2JAN25           | 0 0              |                  |                  |                  |                  |      |   |
| 3    | IO       | 0       |                  |        |        |                  |                  |                  |                  |                  |                  |      |   |
| 4    | KK       | AC_CONC | PAVING           |        |        |                  |                  |                  |                  |                  |                  |      |   |
|      | KO       | _ 3     | - 0              | 0.0    | 0      | 22               |                  |                  |                  |                  |                  |      |   |
|      | BA       | 0.0025  |                  |        |        |                  |                  |                  |                  |                  |                  |      |   |
|      | BF       | 0.0000  |                  | 0.0000 |        |                  |                  |                  |                  |                  |                  |      |   |
|      | IN       | 6       | 1JAN25           |        | 0 0100 | 0 0145           | 0 0100           |                  |                  |                  | 0 0005           |      |   |
|      | PC       | 0.0000  | 0.0036           | 0.0072 | 0.0108 |                  | 0.0182           |                  |                  |                  | 0.0335           |      |   |
|      | PC<br>PC | 0.0374  | 0.0413           | 0.0453 | 0.0493 | 0.0533           | 0.0574           | 0.0615           | 0.0657<br>0.1091 | 0.0698           | 0.0741<br>0.1182 |      |   |
|      | PC       | 0.1228  | 0.1275           | 0.1321 | 0.1369 | 0.1416           | 0.1464           | 0.1512           | 0.1561           | 0.1610           | 0.11659          |      |   |
|      | PC       | 0.1709  | 0.1273           | 0.1321 | 0.1369 | 0.1914           | 0.1967           | 0.2021           | 0.2075           | 0.2130           | 0.2186           |      |   |
|      | PC       | 0.2243  | 0.2300           | 0.2358 | 0.2417 | 0.2476           | 0.2536           | 0.2597           | 0.2659           | 0.2721           | 0.2784           |      |   |
|      | PC       | 0.2848  | 0.2912           | 0.2978 | 0.3043 | 0.3110           | 0.3177           | 0.3245           | 0.3314           | 0.3383           | 0.3454           |      |   |
|      | PC       | 0.3524  | 0.3596           | 0.3668 | 0.3741 | 0.3815           | 0.3889           | 0.3964           | 0.4040           | 0.4117           | 0.4194           |      |   |
|      | PC       | 0.4272  | 0.4352           | 0.4436 | 0.4523 | 0.4614           | 0.4708           | 0.4806           | 0.4908           | 0.5012           | 0.5121           |      |   |
|      | PC       | 0.5233  | 0.5347           | 0.5461 | 0.5575 | 0.5689           | 0.5803           | 0.5920           | 0.6042           | 0.6170           | 0.6304           |      |   |
| 19   | PC       | 0.6444  | 0.6590           | 0.6745 | 0.6909 | 0.7082           | 0.7262           | 0.7455           | 0.7661           | 0.7882           | 0.8117           |      |   |
| 20   | PC       | 0.8366  | 0.8639           | 0.8947 | 0.9289 | 0.9665           | 1.0075           | 1.0923           | 1.2615           | 1.5336           | 2.0216           |      |   |
| 21   | PC       | 2.3603  | 2.4278           | 2.4872 | 2.5384 | 2.5816           | 2.6166           | 2.6467           | 2.6748           | 2.7012           | 2.7257           |      |   |
|      | PC       | 2.7483  | 2.7695           | 2.7898 | 2.8090 | 2.8272           | 2.8444           | 2.8608           | 2.8765           | 2.8914           | 2.9057           |      |   |
|      | PC       | 2.9192  | 2.9322           | 2.9451 | 2.9576 | 2.9699           |                  | 2.9937           | 3.0053           | 3.0166           | 3.0277           |      |   |
|      | PC       | 3.0385  | 3.0490           | 3.0593 | 3.0694 |                  | 3.0888           | 3.0981           | 3.1071           | 3.1159           | 3.1245           |      |   |
|      | PC       | 3.1328  | 3.1410           | 3.1490 | 3.1570 | 3.1648           | 3.1726           | 3.1803           | 3.1879           | 3.1955           | 3.2029           |      |   |
|      | PC       | 3.2102  | 3.2175           | 3.2247 | 3.2317 | 3.2387           | 3.2456           | 3.2524           | 3.2591           | 3.2658           | 3.2723           |      |   |
|      | PC       | 3.2788  | 3.2851           | 3.2914 | 3.2976 | 3.3037           | 3.3097           | 3.3156           | 3.3214           | 3.3272           | 3.3328           |      |   |
|      | PC<br>PC | 3.3384  | 3.3439           | 3.3492 | 3.3545 | 3.3598<br>3.4075 | 3.3649<br>3.4120 | 3.3699<br>3.4166 | 3.3748           | 3.3797<br>3.4256 | 3.3845<br>3.4301 |      |   |
|      | PC       | 3.4345  | 3.4390           | 3.4434 | 3.4478 | 3.4522           | 3.4565           | 3.4609           | 3.4652           | 3.4695           | 3.4738           |      |   |
|      | PC       | 3.4781  | 3.4824           | 3.4866 | 3.4909 | 3.4951           | 3.4993           | 3.5034           | 3.5076           | 3.5117           | 3.5159           |      |   |
|      | PC       | 3.5200  | 3.5240           | 3.5281 |        |                  | 3.5402           |                  |                  | 3.5521           | 3.5561           |      |   |
|      | PC       | 3.5600  |                  |        |        |                  |                  |                  |                  |                  |                  |      |   |
|      | LS       | 0.0800  | 96.000           | 25.000 |        |                  |                  |                  |                  |                  |                  |      |   |
| 35   | UD       | 0.1000  |                  |        |        |                  |                  |                  |                  |                  |                  |      |   |
|      |          |         |                  |        |        |                  |                  |                  |                  |                  |                  |      |   |
|      | KK       | BLDG    | _                | 0 0    | •      | 0.0              |                  |                  |                  |                  |                  |      |   |
|      | KO       | 3       | 0                | 0.0    | 0      | 22               |                  |                  |                  |                  |                  |      |   |
|      | BA       | 0.0007  | 0 0000           | 0 0000 |        |                  |                  |                  |                  |                  |                  |      |   |
|      | BF<br>IN | 0.0000  | 0.0000<br>1JAN25 | 0.0000 |        |                  |                  |                  |                  |                  |                  |      |   |
|      | PC       | 0.0000  | 0.0036           | 0.0072 | 0.0108 | 0 0145           | 0.0182           | 0 0220           | 0.0258           | 0.0296           | 0.0335           |      |   |
|      | PC       | 0.0374  | 0.0036           | 0.0072 | 0.0108 | 0.0533           | 0.0182           |                  |                  | 0.0290           | 0.0333           |      |   |
|      | PC       | 0.0783  | 0.0826           | 0.0869 | 0.0913 | 0.0957           | 0.1001           | 0.1046           | 0.1091           | 0.1136           | 0.1182           |      |   |
|      | PC       | 0.1228  | 0.1275           | 0.1321 | 0.1369 | 0.1416           | 0.1464           | 0.1512           | 0.1561           | 0.1610           | 0.1659           |      |   |
|      | PC       | 0.1709  | 0.1759           | 0.1810 | 0.1862 | 0.1914           | 0.1967           | 0.2021           | 0.2075           | 0.2130           | 0.2186           |      |   |
|      | PC       | 0.2243  | 0.2300           | 0.2358 | 0.2417 | 0.2476           | 0.2536           | 0.2597           | 0.2659           | 0.2721           | 0.2784           |      |   |
|      | PC       | 0.2848  | 0.2912           | 0.2978 | 0.3043 | 0.3110           | 0.3177           | 0.3245           | 0.3314           | 0.3383           | 0.3454           |      |   |
|      | PC       | 0.3524  | 0.3596           | 0.3668 | 0.3741 | 0.3815           | 0.3889           | 0.3964           | 0.4040           | 0.4117           | 0.4194           |      |   |
|      | PC       | 0.4272  | 0.4352           | 0.4436 | 0.4523 | 0.4614           | 0.4708           | 0.4806           | 0.4908           | 0.5012           | 0.5121           |      |   |
|      | PC       | 0.5233  | 0.5347           | 0.5461 | 0.5575 | 0.5689           | 0.5803           | 0.5920           | 0.6042           | 0.6170           | 0.6304           |      |   |
|      | PC       | 0.6444  | 0.6590           | 0.6745 | 0.6909 | 0.7082           | 0.7262           | 0.7455           | 0.7661           | 0.7882           | 0.8117           |      |   |
|      | PC       | 0.8366  | 0.8639           | 0.8947 | 0.9289 | 0.9665           | 1.0075           | 1.0923           | 1.2615           | 1.5336           | 2.0216           |      |   |
| 53   | PC       | 2.3603  | 2.42/8           | 2.40/2 |        | Z.5816<br>INPUT  | 2.6166           | 2.040/           | 2.0/48           | 2.7012           | 2.7257           | PAGE | 2 |
| Δ.   |          |         |                  |        | HEC-1  | INPUT            |                  |                  |                  |                  |                  | PAGE | 4 |

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LINE
                           ID.....1....2....3....4.....5....6....7....8....9....10
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                                4.2500
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   FLOOD HYDROGRAPH PACKAGE (HEC-1)
                                                                                                            U.S. ARMY CORPS OF ENGINEERS HYDROLOGIC ENGINEERING CENTER
                        1998
            VERSION 4.1
                                                                                                               609 SECOND STREET
DAVIS, CALIFORNIA 95616
  RUN DATE 27JAN25 TIME 12:58:58
                                                                                                                    (916) 756-1104
***********
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#### HEC-1 Analysis using SSA

```
OUTPUT CONTROL VARIABLES
3 TO
                         IPRNT 0 PRINT CONTROL
IPLOT 0 PLOT CONTROL
QSCAL 0. HYDROGRAPH PLOT SCALE
                 HYDROGRAPH TIME DATA
  IT
                                      JAN25 MINUTES IN COMPUTATION INTERVAL
1JAN25 STARTING DATE
0000 STARTING TIME
289 NUMBER OF HYDROGRAPH ORDINATES
                         NMIN
                         IDATE
                         TTTME
                             NQ
                                      2JAN25 ENDING DATE
0000 ENDING TIME
                        NDDATE
                        NDTIME
                                           19 CENTURY MARK
                        ICENT
                    COMPUTATION INTERVAL
                                                    .08 HOURS
                          TOTAL TIME BASE 24.00 HOURS
        ENGLISH UNITS
               DRAINAGE AREA
                                          SOUARE MILES
               PRECIPITATION DEPTH
                                          INCHES
               LENGTH, ELEVATION
                                          FEET
                                           CUBIC FEET PER SECOND
               FLOW
               STORAGE VOLUME
                                           ACRE-FEET
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ACRES

DEGREES FAHRENHEIT

SURFACE AREA

TEMPERATURE

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4 KK
                  AC_CONC._PAVING
  5 KO
                  OUTPUT CONTROL VARIABLES
                          IPRNT
                                               PRINT CONTROL
                          IPLOT
                                                PLOT CONTROL
                                                HYDROGRAPH PLOT SCALE
PUNCH COMPUTED HYDROGRAPH
                                           0.
                          OSCAL
                          IPNCH
                           IOUT
                                           22 SAVE HYDROGRAPH ON THIS UNIT
1 FIRST ORDINATE PUNCHED OR SAVED
                          ISAV1
                                          289
                          TSAV2
                                               LAST ORDINATE PUNCHED OR SAVED
                                         .083 TIME INTERVAL IN HOURS
                        TIMINT
  8 IN
                  TIME DATA FOR INPUT TIME SERIES
                                      6 TIME INTERVAL IN MINUTES
1JAN25 STARTING DATE
0 STARTING TIME
                          JXMIN
                        JXDATE
                SUBBASIN RUNOFF DATA
                   SUBBASIN CHARACTERISTICS
  6 BA
                                         .00 SUBBASIN AREA
                         TAREA
                   BASE FLOW CHARACTERISTICS
  7 BF
                                    .00 INITIAL FLOW
.00 BEGIN BASE FLOW RECESSION
1.00000 RECESSION CONSTANT
                         STRTQ
                          ORCSN
                   PRECIPITATION DATA
                                        3.56 BASIN TOTAL PRECIPITATION
  9 PB
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  9 PI
                     INCREMENTAL PRECIPITATION PATTERN
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                  SCS LOSS RATE
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25.00
                                               CURVE NUMBER
PERCENT IMPERVIOUS AREA
                        CRVNBR
 35 UD
                   SCS DIMENSIONLESS UNITGRAPH
                                          .10 LAG
                          TLAG
                                                                   UNIT HYDROGRAPH
                                                              8 END-OF-PERIOD ORDINATES
                  5.
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                           HYDROGRAPH AT STATION AC_CONC._PAVING
                          3.56, TOTAL LOSS =
                                                     .34, TOTAL EXCESS =
   TOTAL RAINFALL =
                                                                                3.22
PEAK FLOW
                                                   MAXIMUM AVERAGE FLOW
                TIME
                                          6-HR
                                                                                 24.00-HR
                                                      24-HR
                                                                     72-HR
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(HR)

(CFS)

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12.00
                                                                                     0.
3.215
       6.
                                                        3.215
                          (INCHES)
                            (AC-FT)
                                                           0.
                           CUMULATIVE AREA =
                                                     .00 SO MI
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 36 KK
                   BLDG
 37 KO
                   OUTPUT CONTROL VARIABLES
                                       3 PRINT CONTROL
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0. HYDROGRAPH PLOT SCALE
                          IPRNT
                          TPLOT
                          QSCAL
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                                                PUNCH COMPUTED HYDROGRAPH
SAVE HYDROGRAPH ON THIS UNIT
                          IPNCH
                          ISAV1
ISAV2
                                                FIRST ORDINATE PUNCHED OR SAVED LAST ORDINATE PUNCHED OR SAVED
                         TIMINT
                                         .083 TIME INTERVAL IN HOURS
  40 IN
                  TIME DATA FOR INPUT TIME SERIES
                                      6 TIME INTERVAL IN MINUTES
1JAN25 STARTING DATE
                          JXMIN
                         JXDATE
                         JXTIME
                                            0 STARTING TIME
                SUBBASIN RUNOFF DATA
                   SUBBASIN CHARACTERISTICS
TAREA .00 SUBBASIN AREA
 38 BA
  39 BF
                   BASE FLOW CHARACTERISTICS
                                    .00 INITIAL FLOW
.00 BEGIN BASE FLOW RECESSION
                          STRTO
                          QRCSN
                          RTIOR
                                     1.00000 RECESSION CONSTANT
                   PRECIPITATION DATA
                          STORM
                                         3.56 BASIN TOTAL PRECIPITATION
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 41 PI
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SCS DIMENSIONLESS UNITGRAPH TLAG

.08

25.00

SCS LOSS RATE

STRTL CRVNBR

> UNIT HYDROGRAPH 8 END-OF-PERIOD ORDINATES

0.

INITIAL ABSTRACTION

PERCENT IMPERVIOUS AREA

CURVE NUMBER

66 LS

67 IID

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HYDROGRAPH AT STATION BLDG

TOTAL RAINFALL = 3.56, TOTAL LOSS = .34, TOTAL EXCESS = PEAK FLOW TIME MAXIMUM AVERAGE FLOW 24.00-HR 6-HR 24-HR 72-HR (CFS) (HR) (CFS) 12.00 0. 2.404 0. 3.215 0. 3.215 0. 3.215 (INCHES) 0. (AC-FT) 0. CUMULATIVE AREA = .00 SQ MI

OUTPUT CONTROL VARIABLES 69 KO 3 PRINT CONTROL IPRNT IPLOT PLOT CONTROL 0. HYDROGRAPH PLOT SCALE OSCAL IPNCH PUNCH COMPUTED HYDROGRAPH 22 1 SAVE HYDROGRAPH ON THIS UNIT FIRST ORDINATE PUNCHED OR SAVED IOUT 289 LAST ORDINATE PUNCHED OR SAVED .083 TIME INTERVAL IN HOURS TSAV2 72 IN TIME DATA FOR INPUT TIME SERIES 6 TIME INTERVAL IN MINUTES
1JAN25 STARTING DATE
0 STARTING TIME JXMIN JXDATE JXTIME SUBBASIN RUNOFF DATA 70 BA SUBBASIN CHARACTERISTICS .00 SUBBASIN AREA TAREA BASE FLOW CHARACTERISTICS 71 BF .00 INITIAL FLOW
.00 BEGIN BASE FLOW RECESSION
1.00000 RECESSION CONSTANT STRTQ ORCSN RTIOR PRECIPITATION DATA 73 PB STORM 3.56 BASIN TOTAL PRECIPITATION INCREMENTAL PRECIPITATION PATTERN 73 PI .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 0.0 .00 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .02 .02 .03 .03 .03 .03 .13 .28 .05 .04 .03 .19 .30 .38 .06 .05 .02 .02 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .01 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 0.0 .00 .00 .00 0.0 0.0 0.0 .00 .00 .00 .00 .00 .00 98 LS SCS LOSS RATE INITIAL ABSTRACTION 32.00 25.00 CRVNBR CURVE NUMBER

PERCENT IMPERVIOUS AREA

RTIMP

UNIT HYDROGRAPH
8 END-OF-PERIOD ORDINATES
11. 16. 7. 3. 1. 0. 0.

HYDROGRAPH AT STATION Sub-08

TOTAL RAINFALL = 3.56, TOTAL LOSS = 2.67, TOTAL EXCESS = .89 MAXIMUM AVERAGE FLOW 24-HR 72-HR PEAK FLOW TIME 24.00-HR + (CFS) (HR) (CFS) 0. .629 0. 0. .889 3. 12.00 0. 0. (INCHES) (AC-FT) .889 .889 0. 0. CUMULATIVE AREA = .00 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

0.

|   | OPERATION     | STATION   | PEAK<br>FLOW | TIME OF<br>PEAK | AVERAGE FI | OW FOR MAXIMU | M PERIOD | BASIN<br>AREA | MAXIMUM<br>STAGE | TIME OF<br>MAX STAGE |
|---|---------------|-----------|--------------|-----------------|------------|---------------|----------|---------------|------------------|----------------------|
| + | OLEMATION     | SIAIION   | LHOW         | LEAN            | 6-HOUR     | 24-HOUR       | 72-HOUR  | ANDA          | DIAGE            | MAA SIAGE            |
|   | HYDROGRAPH AT |           |              |                 |            |               |          |               |                  |                      |
| + |               | AC_CONCPA | VING         | 6.              | 12.00      | 1.            | 0.       | 0.            | .00              |                      |
| + | HYDROGRAPH AT | BLDG      | 2.           | 12.00           | 0.         | 0.            | 0.       | .00           |                  |                      |
| + | HYDROGRAPH AT | Sub-08    | 3            | . 12.00         | 0.         | 0.            | 0.       | .00           |                  |                      |

<sup>\*\*\*</sup> NORMAL END OF HEC-1 \*\*\*

| 100 | APPENDIX D<br>EXISTING<br>-YR 10-DAY<br>ALCULATIO | SSA |  |
|-----|---------------------------------------------------|-----|--|
|     |                                                   |     |  |
|     |                                                   |     |  |

Total elapsed time: 00:00:08

1\*\*\*\*\*\*\*\*\* FLOOD HYDROGRAPH PACKAGE (HEC-1) JUN 1998 VERSION 4.1 \* RUN DATE 27JAN25 TIME 12:43:22 \*\*\*\*\*\*\*

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

PAGE 1

\*\*\*\*\*\*\*

| X    | Х    | XXXXXXX | XX | XXX |       | Х   |
|------|------|---------|----|-----|-------|-----|
| X    | X    | X       | X  | X   |       | XX  |
| X    | X    | X       | X  |     |       | X   |
| XXXX | XXXX | XXXX    | X  |     | XXXXX | X   |
| X    | X    | X       | X  |     |       | X   |
| X    | X    | X       | X  | X   |       | X   |
| X    | X    | XXXXXXX | XX | XXX |       | XXX |

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

HEC-1 INPUT

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        | D1               | 23          | 4      | 5.     | 6.     | 7.     | 8.     | 9.     | 10     |      |   |
| 1 ID           | D HEC-1 Analysis | s using SSA | 4      |        |        |        |        |        |        |      |   |
| 2 IT           |                  |             |        | 1JAN25 | 0 0    |        |        |        |        |      |   |
| 3 10           |                  |             | -      |        | 0 0    |        |        |        |        |      |   |
| 3 10           | o o              |             |        |        |        |        |        |        |        |      |   |
| 4 KK           |                  |             |        |        |        |        |        |        |        |      |   |
| 5 KO           |                  | 0.0         | 0      | 22     |        |        |        |        |        |      |   |
| 6 BA           |                  |             |        |        |        |        |        |        |        |      |   |
| 7 BF           |                  | 0.0000      |        |        |        |        |        |        |        |      |   |
| 8 IN           |                  |             |        |        |        |        |        |        |        |      |   |
| 9 PC           |                  |             | 0.0003 |        |        |        |        |        |        |      |   |
| 10 PC          |                  |             |        | 0.0053 | 0.0061 | 0.0069 | 0.0078 | 0.0087 | 0.0097 |      |   |
| 11 PC          |                  |             |        | 0.0155 | 0.0168 |        | 0.0194 | 0.0208 | 0.0221 |      |   |
| 12 PC          |                  |             |        | 0.0286 | 0.0299 | 0.0312 | 0.0326 | 0.0339 | 0.0352 |      |   |
| 13 PC          |                  |             |        | 0.0418 | 0.0431 | 0.0444 | 0.0457 | 0.0471 | 0.0484 |      |   |
| 14 PC          | C 0.0497 0.0510  |             |        | 0.0550 | 0.0563 | 0.0577 | 0.0590 | 0.0603 | 0.0617 |      |   |
| 15 PC          |                  |             |        | 0.0683 | 0.0696 | 0.0710 | 0.0723 | 0.0736 | 0.0750 |      |   |
| 16 PC          | 0.0763 0.0776    | 0.0790      |        | 0.0817 | 0.0830 | 0.0843 | 0.0857 | 0.0870 | 0.0884 |      |   |
| 17 PC          | 0.0897 0.0913    | 0.0924      | 0.0938 | 0.0951 | 0.0964 | 0.0978 | 0.0991 | 0.1005 | 0.1018 |      |   |
| 18 PC          | C 0.1032 0.1045  |             |        | 0.1086 | 0.1100 | 0.1113 | 0.1127 | 0.1140 | 0.1154 |      |   |
| 19 PC          | 0.1167 0.1183    | 0.1194      | 0.1208 | 0.1222 | 0.1235 | 0.1249 | 0.1263 | 0.1276 | 0.1290 |      |   |
| 20 PC          |                  |             |        | 0.1358 | 0.1372 | 0.1386 | 0.1399 | 0.1413 | 0.1427 |      |   |
| 21 PC          | C 0.1440 0.1454  | 0.1468      | 0.1482 | 0.1495 | 0.1509 | 0.1523 | 0.1537 | 0.1550 | 0.1564 |      |   |
| 22 PC          |                  |             |        | 0.1633 | 0.1647 | 0.1661 | 0.1675 | 0.1689 | 0.1703 |      |   |
| 23 PC          |                  |             |        |        | 0.1786 | 0.1800 | 0.1814 | 0.1828 | 0.1842 |      |   |
| 24 PC          |                  |             |        | 0.1911 | 0.1925 | 0.1939 | 0.1953 | 0.1967 | 0.1981 |      |   |
| 25 PC          |                  |             |        | 0.2052 | 0.2066 | 0.2080 | 0.2094 | 0.2108 | 0.2122 |      |   |
| 26 PC          |                  |             |        | 0.2193 | 0.2207 | 0.2221 | 0.2235 | 0.2249 | 0.2263 |      |   |
| 27 PC          |                  |             |        | 0.2334 | 0.2349 | 0.2363 | 0.2377 | 0.2391 | 0.2406 |      |   |
| 28 PC          |                  |             |        | 0.2477 | 0.2491 | 0.2506 | 0.2520 | 0.2534 | 0.2549 |      |   |
| 29 PC          |                  |             |        | 0.2621 | 0.2635 | 0.2649 | 0.2664 | 0.2678 | 0.2692 |      |   |
| 30 PC          |                  |             |        | 0.2765 | 0.2779 | 0.2794 | 0.2808 | 0.2823 | 0.2837 |      |   |
| 31 PC          |                  |             |        | 0.2910 | 0.2925 | 0.2939 | 0.2954 | 0.2969 | 0.2983 |      |   |
| 32 PC          |                  |             |        | 0.3056 | 0.3071 | 0.3086 | 0.3100 | 0.3115 | 0.3130 |      |   |
| 33 PC          |                  |             |        | 0.3203 | 0.3218 | 0.3233 | 0.3247 | 0.3262 | 0.3277 |      |   |
| 34 PC          |                  |             |        | 0.3351 | 0.3366 | 0.3381 | 0.3396 | 0.3410 | 0.3425 |      |   |
| 35 PC<br>36 PC |                  |             |        | 0.3500 | 0.3515 | 0.3530 | 0.3695 | 0.3360 | 0.3373 |      |   |
| 37 PC          |                  |             |        | 0.3800 | 0.3816 | 0.3831 | 0.3846 |        | 0.3723 |      |   |
| 38 PC          |                  |             |        | 0.3952 | 0.3968 | 0.3983 | 0.3998 | 0.4013 | 0.4029 |      |   |
| 39 PC          |                  |             |        | 0.4105 | 0.4120 | 0.4136 | 0.4151 | 0.4166 | 0.4182 |      |   |
| 40 PC          |                  |             |        | 0.4259 | 0.4274 | 0.4290 | 0.4305 | 0.4321 | 0.4336 |      |   |
| 41 PC          |                  |             |        | 0.4414 | 0.4429 | 0.4445 | 0.4460 | 0.4476 | 0.4491 |      |   |
| 42 PC          |                  |             |        | 0.4570 | 0.4585 | 0.4601 | 0.4617 | 0.4632 | 0.4648 |      |   |
| 43 PC          |                  |             |        | 0.4727 | 0.4742 | 0.4758 | 0.4774 | 0.4789 | 0.4805 |      |   |
| 44 PC          |                  |             |        | 0.4884 | 0.4900 | 0.4916 | 0.4932 | 0.4948 | 0.4964 |      |   |
| 45 PC          |                  |             |        | 0.5043 | 0.5060 | 0.5075 | 0.5091 | 0.5108 | 0.5123 |      |   |
| 46 PC          |                  |             |        | 0.5204 | 0.5220 | 0.5236 | 0.5252 | 0.5268 | 0.5284 |      |   |
| 47 PC          | 0.5300 0.531     |             |        | 0.5365 | 0.5381 | 0.5397 | 0.5414 | 0.5430 | 0.5446 |      |   |
| 48 PC          |                  |             |        | 0.5528 | 0.5544 | 0.5560 | 0.5577 | 0.5593 | 0.5609 |      |   |
| 49 PC          |                  |             |        | 0.5692 | 0.5708 | 0.5725 | 0.5741 | 0.5757 | 0.5774 |      |   |
| 50 PC          |                  |             |        | 0.5857 | 0.5873 | 0.5890 | 0.5906 | 0.5923 | 0.5940 |      |   |
| 51 PC          |                  |             |        | 0.6023 | 0.6039 | 0.6056 | 0.6073 | 0.6090 | 0.6106 |      |   |
| 52 PC          |                  |             | 0.6173 |        | 0.6207 | 0.6224 | 0.6241 | 0.6258 | 0.6274 |      |   |
| 53 PC          |                  |             |        | 0.6359 |        | 0.6393 | 0.6410 | 0.6427 | 0.6444 |      |   |
|                | C 0.6461 0.6478  | 0.6495      |        |        | 0.6546 | 0.6563 | 0.6580 | 0.6597 | 0.6614 |      |   |
| 1              |                  |             | HEC-1  | INPUT  |        |        |        |        |        | PAGE | 2 |
|                |                  |             |        |        |        |        |        |        |        |      |   |

| LINE       | ID12345678910                                                                                                                                        |   |
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| 55         | PC 0.6632 0.6649 0.6666 0.6683 0.6700 0.6718 0.6735 0.6752 0.6769 0.6787                                                                             |   |
| 56         | PC 0.6804 0.6821 0.6839 0.6856 0.6873 0.6891 0.6908 0.6925 0.6943 0.6960                                                                             |   |
| 57         | PC 0.6978 0.6995 0.7013 0.7030 0.7048 0.7065 0.7083 0.7100 0.7118 0.7135                                                                             |   |
| 58<br>59   | PC 0.7153 0.7170 0.7188 0.7206 0.7223 0.7241 0.7259 0.7276 0.7294 0.7312<br>PC 0.7329 0.7347 0.7365 0.7383 0.7401 0.7418 0.7436 0.7454 0.7472 0.7490 |   |
| 60         | PC 0.7508 0.7526 0.7543 0.7561 0.7579 0.7597 0.7615 0.7633 0.7651 0.7669                                                                             |   |
| 61         | PC 0.7687 0.7705 0.7723 0.7741 0.7759 0.7778 0.7796 0.7814 0.7832 0.7850                                                                             |   |
| 62         | PC 0.7868 0.7886 0.7905 0.7923 0.7941 0.7959 0.7978 0.7996 0.8014 0.8033                                                                             |   |
| 63         | PC 0.8051 0.8069 0.8088 0.8106 0.8124 0.8143 0.8161 0.8180 0.8198 0.8217                                                                             |   |
| 64<br>65   | PC 0.8235 0.8254 0.8272 0.8291 0.8309 0.8328 0.8346 0.8365 0.8384 0.8402<br>PC 0.8421 0.8439 0.8458 0.8477 0.8496 0.8515 0.8533 0.8552 0.8571 0.8590 |   |
| 66         | PC 0.8608 0.8627 0.8646 0.8665 0.8684 0.8703 0.8722 0.8741 0.8760 0.8779                                                                             |   |
| 67         | PC 0.8798 0.8817 0.8836 0.8855 0.8874 0.8893 0.8912 0.8932 0.8951 0.8970                                                                             |   |
| 68         | PC 0.8989 0.9009 0.9028 0.9047 0.9066 0.9086 0.9105 0.9124 0.9144 0.9163                                                                             |   |
| 69         | PC 0.9182 0.9202 0.9221 0.9241 0.9260 0.9280 0.9299 0.9318 0.9338 0.9358                                                                             |   |
| 70<br>71   | PC 0.9377 0.9397 0.9416 0.9436 0.9456 0.9475 0.9495 0.9515 0.9534 0.9554<br>PC 0.9574 0.9594 0.9614 0.9633 0.9653 0.9673 0.9693 0.9713 0.9733 0.9753 |   |
| 72         | PC 0.9574 0.9594 0.9614 0.9633 0.9653 0.9673 0.9693 0.9713 0.9733 0.9753<br>PC 0.9773 0.9793 0.9813 0.9833 0.9853 0.9873 0.9893 0.9913 0.9933 0.9953 |   |
| 73         | PC 0.9974 0.9994 1.0014 1.0034 1.0055 1.0075 1.0095 1.0115 1.0136 1.0156                                                                             |   |
| 74         | PC 1.0177 1.0197 1.0217 1.0238 1.0258 1.0279 1.0299 1.0320 1.0341 1.0361                                                                             |   |
| 75         | PC 1.0382 1.0402 1.0423 1.0444 1.0465 1.0485 1.0506 1.0527 1.0548 1.0568                                                                             |   |
| 76         | PC 1.0589 1.0610 1.0631 1.0652 1.0673 1.0694 1.0715 1.0736 1.0757 1.0778                                                                             |   |
| 77<br>78   | PC 1.0799 1.0820 1.0841 1.0862 1.0883 1.0905 1.0926 1.0947 1.0968 1.0990 PC 1.1011 1.1032 1.1054 1.1075 1.1097 1.1118 1.1139 1.1161 1.1182 1.1204    |   |
| 79         | PC 1.1225 1.1247 1.1269 1.1290 1.1312 1.1334 1.1355 1.1377 1.1399 1.1421                                                                             |   |
| 80         | PC 1.1442 1.1464 1.1486 1.1508 1.1530 1.1552 1.1574 1.1596 1.1618 1.1640                                                                             |   |
| 81         | PC 1.1662 1.1684 1.1706 1.1729 1.1751 1.1773 1.1795 1.1818 1.1840 1.1862                                                                             |   |
| 82         | PC 1.1884 1.1907 1.1929 1.1952 1.1974 1.1997 1.2019 1.2042 1.2064 1.2087                                                                             |   |
| 83<br>84   | PC 1.2110 1.2132 1.2155 1.2178 1.2200 1.2223 1.2246 1.2269 1.2292 1.2315<br>PC 1.2337 1.2360 1.2383 1.2406 1.2429 1.2452 1.2476 1.2499 1.2522 1.2545 |   |
| 85         | PC 1.2568 1.2592 1.2615 1.2638 1.2625 1.2625 1.2708 1.2732 1.2755 1.2779                                                                             |   |
| 86         | PC 1.2802 1.2826 1.2849 1.2873 1.2897 1.2920 1.2944 1.2968 1.2992 1.3015                                                                             |   |
| 87         | PC 1.3039 1.3063 1.3087 1.3111 1.3135 1.3159 1.3183 1.3207 1.3231 1.3255                                                                             |   |
| 88         | PC 1.3280 1.3304 1.3328 1.3352 1.3377 1.3401 1.3425 1.3450 1.3474 1.3499                                                                             |   |
| 89         | PC 1.3523 1.3548 1.3572 1.3597 1.3622 1.3646 1.3671 1.3696 1.3721 1.3746<br>PC 1.3771 1.3796 1.3820 1.3845 1.3870 1.3896 1.3921 1.3946 1.3971 1.3996 |   |
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| 92         | PC 1.4276 1.4302 1.4328 1.4353 1.4379 1.4405 1.4431 1.4457 1.4483 1.4509                                                                             |   |
| 93         | PC 1.4535 1.4561 1.4587 1.4613 1.4640 1.4666 1.4692 1.4719 1.4745 1.4771                                                                             |   |
| 94         | PC 1.4798 1.4824 1.4851 1.4877 1.4904 1.4931 1.4958 1.4984 1.5011 1.5038                                                                             |   |
| 95         | PC 1.5065 1.5092 1.5119 1.5146 1.5173 1.5200 1.5228 1.5255 1.5282 1.5309                                                                             |   |
| 96<br>97   | PC 1.5337 1.5364 1.5392 1.5419 1.5447 1.5474 1.5502 1.5530 1.5557 1.5585<br>PC 1.5613 1.5641 1.5669 1.5697 1.5725 1.5753 1.5781 1.5810 1.5838 1.5866 |   |
| 98         | PC 1.5895 1.5923 1.5952 1.5980 1.6009 1.6037 1.6066 1.6095 1.6124 1.6152                                                                             |   |
| 99         | PC 1.6181 1.6210 1.6239 1.6269 1.6298 1.6327 1.6356 1.6385 1.6415 1.6444                                                                             |   |
| 100        | PC 1.6474 1.6503 1.6533 1.6562 1.6592 1.6622 1.6652 1.6682 1.6711 1.6742                                                                             |   |
| 101        | PC 1.6771 1.6802 1.6832 1.6862 1.6892 1.6923 1.6953 1.6984 1.7014 1.7045                                                                             |   |
| 102<br>103 | PC 1.7076 1.7107 1.7137 1.7168 1.7199 1.7230 1.7261 1.7292 1.7324 1.7355<br>PC 1.7386 1.7418 1.7449 1.7481 1.7512 1.7544 1.7576 1.7608 1.7640 1.7672 |   |
| 104        | PC 1.7704 1.7736 1.7768 1.7800 1.7833 1.7865 1.7897 1.7930 1.7963 1.7995                                                                             |   |
| 105        | PC 1.8028 1.8061 1.8094 1.8127 1.8160 1.8193 1.8227 1.8260 1.8293 1.8327                                                                             |   |
| 106        | PC 1.8360 1.8394 1.8428 1.8462 1.8496 1.8530 1.8563 1.8598 1.8632 1.8666                                                                             |   |
| 107<br>108 | PC 1.8701 1.8735 1.8770 1.8805 1.8839 1.8874 1.8909 1.8944 1.8980 1.9015<br>PC 1.9050 1.9085 1.9121 1.9157 1.9192 1.9228 1.9264 1.9300 1.9336 1.9372 |   |
| 109        | PC 1.9409 1.9445 1.9481 1.9518 1.9555 1.9592 1.9628 1.9666 1.9703 1.9740                                                                             |   |
|            | HEC-1 INPUT PAGE                                                                                                                                     | 3 |
| LINE       | ID12345678910                                                                                                                                        |   |
| 110        | PC 1.9777 1.9815 1.9852 1.9890 1.9928 1.9966 2.0004 2.0042 2.0080 2.0118                                                                             |   |
| 111        | PC 2.0157 2.0195 2.0234 2.0273 2.0312 2.0351 2.0390 2.0430 2.0469 2.0509                                                                             |   |
| 112<br>113 | PC 2.0548 2.0588 2.0628 2.0668 2.0709 2.0749 2.0789 2.0830 2.0871 2.0912<br>PC 2.0953 2.0994 2.1035 2.1076 2.1118 2.1160 2.1201 2.1244 2.1286 2.1328 |   |
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| 115        | PC 2.1804 2.1848 2.1893 2.1938 2.1982 2.2027 2.2072 2.2117 2.2163 2.2208                                                                             |   |
| 116        | PC 2.2254 2.2300 2.2346 2.2393 2.2439 2.2487 2.2533 2.2581 2.2628 2.2676                                                                             |   |
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| 120        | PC 2.4270 2.4326 2.4382 2.4438 2.4495 2.4552 2.4609 2.4667 2.4724 2.4783                                                                             |   |
| 121        | PC 2.4842 2.4901 2.4961 2.5021 2.5081 2.5143 2.5204 2.5266 2.5328 2.5390                                                                             |   |
| 122        | PC 2.5453 2.5517 2.5581 2.5645 2.5709 2.5775 2.5840 2.5906 2.5972 2.6039 PC 2.6106 2.6174 2.6242 2.6312 2.6382 2.6453 2.6524 2.6596 2.6668 2.6742    |   |
| 123        | PC 2.6106 2.6174 2.6242 2.6312 2.6382 2.6453 2.6524 2.6596 2.6668 2.6742                                                                             |   |
| 124<br>125 | PC 2.6816 2.6891 2.6966 2.7043 2.7119 2.7197 2.7275 2.7354 2.7433 2.7514<br>PC 2.7594 2.7676 2.7759 2.7842 2.7925 2.8011 2.8097 2.8186 2.8275 2.8366 |   |
| 126        | PC 2.8458 2.8553 2.8648 2.8746 2.8843 2.8944 2.9045 2.9148 2.9252 2.9359                                                                             |   |
| 127        | PC 2.9466 2.9575 2.9685 2.9798 2.9910 3.0026 3.0142 3.0260 3.0379 3.0518                                                                             |   |
| 128        | PC 2.9466 2.9575 2.9685 2.9798 2.9910 3.0026 3.0142 3.0260 3.0379 3.0518<br>PC 3.0656 3.0827 3.0999 3.1203 3.1408 3.1645 3.1883 3.2153 3.2424 3.2727 |   |
| 129        | PC 3.3030 3.3367 3.3704 3.4073 3.4442 3.4845 3.5247 3.5683 3.6118 3.6587                                                                             |   |
| 130        | PC 3.7055 3.7557 3.8058 3.8565 3.9072 3.9550 4.0028 4.0476 4.0925 4.1344                                                                             |   |
| 131<br>132 | PC 4.1763 4.2153 4.2543 4.2904 4.3265 4.3596 4.3928 4.4230 4.4532 4.4805                                                                             |   |
| 133        | PC 4.5078 4.5322 4.5565 4.5780 4.5994 4.6179 4.6364 4.6528 4.6692 4.6850 PC 4.7007 4.7160 4.7312 4.7458 4.7605 4.7746 4.7887 4.8023 4.8159 4.8288    |   |
| 134        | PC 4.8418 4.8543 4.8667 4.8786 4.8905 4.918 4.9131 4.9239 4.9347 4.9449                                                                              |   |
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    FLOOD HYDROGRAPH PACKAGE (HEC-1)
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               JUN 1998
VERSION 4.1
                                                                                                                      HYDROLOGIC ENGINEERING CENTER
                                                                                                                             609 SECOND STREET
                                                                                                                          DAVIS, CALIFORNIA 95616
(916) 756-1104
   RUN DATE 27JAN25 TIME 12:43:22
                              HEC-1 Analysis using SSA
*** ERROR *** SPECIFIED START AND END DATES RESULT IN TOO MANY TIME PERIODS
   3 TO
                    OUTPUT CONTROL VARIABLES
                                            0 PRINT CONTROL
0 PLOT CONTROL
                            IPRNT
                            TPT.OT
                                              0. HYDROGRAPH PLOT SCALE
                            QSCAL
                    HYDROGRAPH TIME DATA
                                               5 MINUTES IN COMPUTATION INTERVAL
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STARTING TIME
NUMBER OF HYDROGRAPH ORDINATES
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                                            19 CENTURY MARK
                          TOENT
                      COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 166.58 HOURS
            ENGLISH UNITS
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1JAN25 STARTING DATE
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JXDATE

JXTIME 0 STARTING TIME

SUBBASIN RUNOFF DATA

6 BA

SUBBASIN CHARACTERISTICS
TAREA .01 SUBBASIN AREA

7 BF

BASE FLOW CHARACTERISTICS

STRTQ .00 INITIAL FLOW
QRCSN .00 BEGIN BASE FLOW RECESSION
RTIOR 1.00000 RECESSION CONSTANT

PRECIPITATION DATA

STORM 6.58 BASIN TOTAL PRECIPITATION

| 9 PB | STORM       | 6.58       | BASIN TO | OTAL PRECI | PITATION |     |     |     |     |     |
|------|-------------|------------|----------|------------|----------|-----|-----|-----|-----|-----|
| 9 PI | INCREMENTAL | PRECIPITA' |          |            |          |     |     |     |     |     |
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|      | .00         | .00        | .00      | .00        | .00      | .00 | .00 | .00 | .00 | .00 |
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| .00<br>.00<br>.00<br>.00<br>.00        | .00                                    | .00                                    | .00                                                  | .00                                    | .00                             | .00                                    | .00                                                  | .00                                    | .00                                    |
| .00<br>.00<br>.00<br>.00<br>.00        | .00                                    | .00                                    | .00                                                  | .00                                    | .00                             | .00                                    | .00                                                  | .00                                    | .00                                    |
| .00                                    | .00                                    | .00                                    | .00                                                  | .00                                    | .00                             | .00                                    | .00                                                  | .00                                    | .00                                    |
| .00<br>.00<br>.00<br>.00<br>.00        | .00                                    | .00                                    | .00<br>.00<br>.00<br>.00<br>.00<br>.00               | .00                                    | .00                             | .00                                    | .00                                                  | .00                                    | .00                                    |
| .00<br>.00<br>.00<br>.00<br>.00        | .00                                    | .00                                    | .00                                                  | .00                                    | .00                             | .00                                    | .00                                                  | .00                                    | .00                                    |
| .00<br>.00<br>.01<br>.01<br>.01        | .00<br>.00<br>.01<br>.01<br>.01        | .00<br>.00<br>.01                      | .00<br>.00<br>.01                                    | .00<br>.00<br>.01<br>.01<br>.01        | .00<br>.00<br>.01<br>.01<br>.01 | .00<br>.01<br>.01<br>.01<br>.01        | .00<br>.01<br>.01                                    | .00<br>.01<br>.01                      | .00<br>.01<br>.01<br>.01<br>.01        |
| .01<br>.01<br>.01<br>.02<br>.03<br>.04 | .01<br>.01<br>.01<br>.02<br>.03<br>.04 | .01<br>.01<br>.01<br>.02<br>.03<br>.04 | .01<br>.01<br>.01<br>.01<br>.01<br>.02<br>.03<br>.04 | .01<br>.01<br>.01                      | 0.1                             | .01<br>.01<br>.01<br>.02<br>.03<br>.04 | .01<br>.01<br>.01<br>.01<br>.01<br>.02<br>.04<br>.04 | .01<br>.01<br>.01<br>.03<br>.04<br>.04 | .01<br>.01<br>.01<br>.03<br>.04<br>.04 |
| .03<br>.02<br>.01<br>.01<br>.01<br>.01 | .03<br>.02<br>.01<br>.01<br>.01        | .03<br>.02<br>.01<br>.01<br>.01        | .02<br>.01<br>.01<br>.01<br>.01                      | .02<br>.01<br>.01<br>.01<br>.01<br>.01 | .02<br>.01<br>.01<br>.01<br>.01 | .02<br>.01<br>.01<br>.01<br>.01<br>.01 | .02<br>.01<br>.01<br>.01<br>.01                      | .02<br>.01<br>.01<br>.01<br>.01        | .02<br>.01<br>.01<br>.01<br>.01        |
| .01<br>.01<br>.01<br>.01<br>.00<br>.00 | .01<br>.01<br>.01<br>.01<br>.00<br>.00 | .01<br>.01<br>.01<br>.01<br>.00        | .01<br>.01<br>.01<br>.01<br>.00                      | .01<br>.01<br>.01<br>.01<br>.00<br>.00 | .01<br>.01<br>.01<br>.00<br>.00 | .01<br>.01<br>.01<br>.01<br>.00<br>.00 | .01<br>.01<br>.01<br>.01<br>.00                      | .01<br>.01<br>.01<br>.00<br>.00        | .01<br>.01<br>.01<br>.00<br>.00        |
| .00                                    | .00                                    | .00                                    | .00                                                  | .00                                    | .00                             | .00                                    | .00                                                  | .00                                    | .00                                    |
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|                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                             |
|                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                             |
|                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                             |
|                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                             |
|                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                             |
|                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                             |
|                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                             |
|                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                                    |                                                             |
| .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                         |
| .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                         |
| .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                         |
| .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                         |
| .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                         |
| .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                         |
| .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                         |
| .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                         |
| .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                         |
| .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                | .00                                                                |                                                             |

250 LS SCS LOSS RATE

1.86 INITIAL ABSTRACTION 52.00 CURVE NUMBER 20.00 PERCENT IMPERVIOUS AREA STRTL CRVNBR

RTIMP

251 UD SCS DIMENSIONLESS UNITGRAPH TLAG

UNIT HYDROGRAPH
8 END-OF-PERIOD ORDINATES
2. 1. 0. 11.

\*\*\*

HYDROGRAPH AT STATION EXIST.\_SITE

TOTAL RAINFALL = 6.58, TOTAL LOSS = 3.99, TOTAL EXCESS = 2.59

MAXIMUM AVERAGE FLOW 24-HR 72-HR PEAK FLOW 6-HR 166.58-HR (CFS) (HR) (CFS) 1. 121.42 2.592 (INCHES) (AC-FT) .826 2.241 CUMULATIVE AREA = .01 SQ MI

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

|   | OPERATION     | STATION     | PEAK<br>FLOW | TIME OF<br>PEAK | AVERAGE FI | LOW FOR MAXIN | MUM PERIOD | BASIN<br>AREA | MAXIMUM<br>STAGE | TIME OF<br>MAX STAGE |
|---|---------------|-------------|--------------|-----------------|------------|---------------|------------|---------------|------------------|----------------------|
| + |               |             |              |                 | 6-HOUR     | 24-HOUR       | 72-HOUR    |               |                  |                      |
|   | HYDROGRAPH AT |             |              |                 |            |               |            |               |                  |                      |
| + |               | EXIST. SITE |              | 1. 12           | 1.42       | 1.            | 0.         | 0.            | .01              |                      |

\*\*\* NORMAL END OF HEC-1 \*\*\*

| PR<br>100-YR | PENDIX E<br>COPOSED<br>J. 10-DAY SSA<br>CULATIONS |  |
|--------------|---------------------------------------------------|--|
|              |                                                   |  |
|              |                                                   |  |

| Autodesk® Storm and S                          |               |                   | Version 13.6       | .268 (Build | 0)     |  |
|------------------------------------------------|---------------|-------------------|--------------------|-------------|--------|--|
| ******                                         |               |                   |                    |             |        |  |
| Project Description                            |               |                   |                    |             |        |  |
| File Name                                      | PRO           | P. HEC1 SSA 10    | DAY.SPF            |             |        |  |
|                                                |               |                   |                    |             |        |  |
| *****                                          |               |                   |                    |             |        |  |
| Analysis Options                               |               |                   |                    |             |        |  |
| Flow Units                                     |               | 1                 |                    |             |        |  |
| Subbasin Hydrograph N<br>Time of Concentration |               |                   |                    |             |        |  |
| Storage Node Exfiltra                          |               |                   | 0.0                |             |        |  |
| Starting Date<br>Ending Date                   |               |                   |                    |             |        |  |
| Report Time Step                               |               |                   |                    |             |        |  |
|                                                |               |                   |                    |             |        |  |
| *********** Element Count                      |               |                   |                    |             |        |  |
| *****                                          | 2             |                   |                    |             |        |  |
| Number of subbasins Number of nodes            |               |                   |                    |             |        |  |
| Number of links                                | 0             |                   |                    |             |        |  |
|                                                |               |                   |                    |             |        |  |
| ***********                                    |               |                   |                    |             |        |  |
| Subbasin Summary                               |               |                   |                    |             |        |  |
| Subbasin                                       | Total         |                   |                    |             |        |  |
| ID                                             | Area<br>acres |                   |                    |             |        |  |
|                                                |               |                   |                    |             |        |  |
| AC_CONCPAVING<br>BLDG                          | 1.59<br>0.46  |                   |                    |             |        |  |
| LANDSCAPE                                      | 3.08          |                   |                    |             |        |  |
|                                                |               |                   |                    |             |        |  |
| ********                                       |               |                   |                    |             |        |  |
| Node Summary                                   |               |                   |                    |             |        |  |
|                                                | Element       |                   | t Maximum          |             |        |  |
| 10                                             | Type          | Elevatio<br>f     | n Elev.<br>t ft    |             | Inflow |  |
| PROP. (                                        | OUTFALL       |                   | 0 0.00             |             |        |  |
| rkor.                                          | JOIFALL       | 0.0               | 0.00               | 0.00        |        |  |
| ******                                         | * * * * *     | Volume            | Depth              |             |        |  |
| Runoff Quantity Cont                           | inuity        | acre-ft           | inches             |             |        |  |
| **************************************         |               | 3.317             | 7.760              |             |        |  |
| Surface Runoff                                 |               | 0.095             | 0.223              |             |        |  |
| Continuity Error (%)                           |               | 0.000             |                    |             |        |  |
|                                                |               |                   |                    |             |        |  |
| **************************************         |               | Volume<br>acre-ft | Volume<br>Mgallons |             |        |  |
| *********                                      |               |                   |                    |             |        |  |
| External Inflow External Outflow               |               | 0.000<br>0.952    | 0.000<br>0.310     |             |        |  |
| Initial Stored Volume                          | e             | 0.000             | 0.000              |             |        |  |
| Final Stored Volume                            |               | 0.000             | 0.000              |             |        |  |

Continuity Error (%) .... 0.000

Subbasin Runoff Summary

| Subbasin<br>ID                     | Total<br>Precip<br>in | Total<br>Runoff<br>in | Peak<br>Runoff<br>cfs |
|------------------------------------|-----------------------|-----------------------|-----------------------|
| AC_CONCPAVING<br>BLDG<br>LANDSCAPE | 7.76<br>7.76<br>7.76  | 3.97<br>3.82<br>1.09  | 0.81<br>0.23<br>0.39  |

Analysis began on: Mon Jan 27 13:00:42 2025 Analysis ended on: Mon Jan 27 13:00:51 2025 Total elapsed time: 00:00:09

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

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

HEC-1 INPUT

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 ID HEC-1 Analysis using SSA IT 5 1JAN25 0 0 IO 0 11JAN25 0 0 2 KK AC\_CONC.\_PAVING
KO 3 0 0.0 0
BA 0.0025 2.2 0.0000 0.0000 0.0000 BF 6 1JAN25 PC 0.0000 0.0000 0.0001 0.0003 0.0004 0.0007 0.0010 0.0014 0.0017 0.0022 PC 0.0027 0.0033 0.0039 0.0046 0.0053 0.0061 0.0069 0.0078 0.0087 0.0097 0.0087 10 0.0108 0.0119 11 PC 0.0130 0.0143 0 0155 0.0168 0.0181 0 0194 0 0208 0 0221 0.0234 0.0247 0.0260 0.0273 0.0286 0.0312 0.0326 0.0299 0.0378 0.0365 0.0497 1.3 PC. 0.0391 0.0405 0.0418 0.0431 0.0444 0.0457 0.0471 0.0484 14 PC 0.0524 0.0537 0.0550 0.0563 0.0577 0.0590 0.0603 1.5 PC PC 0.0630 0.0643 0.0776 0.0656 0.0790 0.0670 0.0683 0.0696 0.0710 0.0830 0.0843 0.0723 0.0857 0.0736 0.0750 16 0.0763 0.0803 0.0817 0.0870 PC PC 0.0911 0.1045 0.0924 0.1059 0.0964 0.0978 0.1100 0.1113 0.0991 0.1127 17 0 0897 0.0938 0.0951 0 1005 0 1018 0.1032 0.1072 0.1086 0.1140 19 PC 0.1167 0.1181 0.1317 0.1194 0.1208 0.1222 0.1235 0.1249 0.1372 0.1386 0.1263 0.1276 0.1290 0.1303 0.1331 0.1344 0.1358 0.1399 20 0.1413 21 PC 0.1440 0.1454 0.1468 0 1482 0.1495 0.1509 0.1523 0.1537 0.1550 0 1564 0.1620 22 PC PC 0.1578 0.1592 0.1606 0.1633 0.1647 0.1661 0.1675 0.1689 2.3 0.1744 0.1786 0.1800 0.1939 0.1814 0.1953 0.1828 0.1842 24 0.1856 0.1870 0.1883 0.1898 0.1911 0.1925 0.1967 0.1981 PC PC 0.1996 0.2136 0.2009 0.2150 0.2037 0.2178 0.2052 0.2193 0.2080 0.2221 0.2094 0.2235 0.2023 0.2066 0.2108 0.2122 0.2164 27 28 PC PC 0.2278 0.2292 0.2434 0.2306 0.2448 0.2320 0.2334 0.2477 0.2349 0.2363 0.2506 0.2377 0.2520 0.2391 0 2406 0.2420 0.2563 0.2707 0.2577 0.2721 0.2592 0.2736 0.2621 0.2765 0.2664 29 PC 0.2606 0.2635 0.2649 0.2678 0.2692 PC 0.2750 0.2779 0.2794 30 0.2823 31 PC 0.2852 0.2867 0.2881 0.2896 0.2910 0.2925 0.2939 0.2954 0.2969 0.2983 0.2998 0.3012 0.3027 0.3042 0.3056 0.3071 0.3086 0.3100 0.3130 PC. 0.3247 0.3396 33 0.3144 0.3159 0.3174 0.3189 0.3203 0.3218 0.3233 0.3262 0.3277 34 0.3292 0.3307 0.3321 0.3336 0.3351 0.3366 0.3381 0.3410 0.3425 PC PC 0.3455 0.3605 0.3485 0.3635 0.3530 0.3545 0.3695 35 0.3440 0.3470 0.3500 0.3515 0.3560 0.3575 36 0.3589 0.3620 0.3650 0.3665 PC PC 0.3740 0.3891 0.3755 0.3907 0.3785 0.3937 0.3800 0.3952 0.3831 0.3846 0.3998 37 38 0.3770 0 3816 0 3861 0 3876 0.3968 0.4044 0.4059 0.4090 0.4136 0.4151 0.4305 39 PC 0.4074 0.4105 0.4120 0.4166 0.4182 0.4228 0.4259 40 0.4274 0.4321 0.4460 41 PC 0.4352 0.4367 0.4383 0.4398 0.4414 0.4429 0.4445 0.4476 0.4491 PC PC 0.4507 0.4523 0.4538 0.4570 0.4601 0.4617 42 0.4679 0.4837 0.4758 0.4916 0.4774 0.4932 43 0.4664 0.4695 0.4711 0.4742 0.4789 0.4805 44 0.4821 0.4853 0.4869 0.4884 0.4900 0.4964 PC PC 0.4996 0.5155 0.5043 0.5204 0.5075 0.5236 0.5091 0.5252 45 0.4980 0.5012 0.5028 0.5060 0.5108 0.5123 0.5172 0.5188 0.5317 0.5479 0.5333 0.5495 0.5349 0.5512 0.5365 0.5528 0.5397 0.5560 0.5414 0.5577 0.5430 0.5593 47 PC 0.5300 0.5381 0.5446 0.5692 0.5675 0.5741 49 PC. 0.5626 0.5642 0.5659 0.5708 0.5725 0.5757 0.5774 0.5807 0.5840 0.5857 50 PC 0.5790 0.5824 0.5873 0.5890 0.5906 0.5923 51 PC 0.5956 0.5973 0.5989 0.6006 0.6023 0.6039 0.6056 0.6073 0.6090 0.6106 0.6140 0.6157 0.6173 0.6190 0.6224 0.6241 0.6258 0.6123 0.6207 0.6376 0.6393 0.6325 0.6359 0.6529 53 0.6291 0.6308 0.6342 0.6410 0.6427 0.6444 0.6512 0.6495 0.6546 0.6563 0.6580 0.6478 0.6597 0.6614

HEC-1 INPUT

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| LINE       | ID12345678910                                                                                                                                        |   |
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| 55         | PC 0.6632 0.6649 0.6666 0.6683 0.6700 0.6718 0.6735 0.6752 0.6769 0.6787                                                                             |   |
| 56         | PC 0.6804 0.6821 0.6839 0.6856 0.6873 0.6891 0.6908 0.6925 0.6943 0.6960                                                                             |   |
| 57         | PC 0.6978 0.6995 0.7013 0.7030 0.7048 0.7065 0.7083 0.7100 0.7118 0.7135                                                                             |   |
| 58<br>59   | PC 0.7153 0.7170 0.7188 0.7206 0.7223 0.7241 0.7259 0.7276 0.7294 0.7312<br>PC 0.7329 0.7347 0.7365 0.7383 0.7401 0.7418 0.7436 0.7454 0.7472 0.7490 |   |
| 60         | PC 0.7508 0.7526 0.7543 0.7561 0.7579 0.7597 0.7615 0.7633 0.7651 0.7669                                                                             |   |
| 61         | PC 0.7687 0.7705 0.7723 0.7741 0.7759 0.7778 0.7796 0.7814 0.7832 0.7850                                                                             |   |
| 62         | PC 0.7868 0.7886 0.7905 0.7923 0.7941 0.7959 0.7978 0.7996 0.8014 0.8033                                                                             |   |
| 63         | PC 0.8051 0.8069 0.8088 0.8106 0.8124 0.8143 0.8161 0.8180 0.8198 0.8217                                                                             |   |
| 64<br>65   | PC 0.8235 0.8254 0.8272 0.8291 0.8309 0.8328 0.8346 0.8365 0.8384 0.8402<br>PC 0.8421 0.8439 0.8458 0.8477 0.8496 0.8515 0.8533 0.8552 0.8571 0.8590 |   |
| 66         | PC 0.8608 0.8627 0.8646 0.8665 0.8684 0.8703 0.8722 0.8741 0.8760 0.8779                                                                             |   |
| 67         | PC 0.8798 0.8817 0.8836 0.8855 0.8874 0.8893 0.8912 0.8932 0.8951 0.8970                                                                             |   |
| 68         | PC 0.8989 0.9009 0.9028 0.9047 0.9066 0.9086 0.9105 0.9124 0.9144 0.9163                                                                             |   |
| 69         | PC 0.9182 0.9202 0.9221 0.9241 0.9260 0.9280 0.9299 0.9318 0.9338 0.9358                                                                             |   |
| 70<br>71   | PC 0.9377 0.9397 0.9416 0.9436 0.9456 0.9475 0.9495 0.9515 0.9534 0.9554<br>PC 0.9574 0.9594 0.9614 0.9633 0.9653 0.9673 0.9693 0.9713 0.9733 0.9753 |   |
| 72         | PC 0.9574 0.9594 0.9614 0.9633 0.9653 0.9673 0.9693 0.9713 0.9733 0.9753<br>PC 0.9773 0.9793 0.9813 0.9833 0.9853 0.9873 0.9893 0.9913 0.9933 0.9953 |   |
| 73         | PC 0.9974 0.9994 1.0014 1.0034 1.0055 1.0075 1.0095 1.0115 1.0136 1.0156                                                                             |   |
| 74         | PC 1.0177 1.0197 1.0217 1.0238 1.0258 1.0279 1.0299 1.0320 1.0341 1.0361                                                                             |   |
| 75         | PC 1.0382 1.0402 1.0423 1.0444 1.0465 1.0485 1.0506 1.0527 1.0548 1.0568                                                                             |   |
| 76         | PC 1.0589 1.0610 1.0631 1.0652 1.0673 1.0694 1.0715 1.0736 1.0757 1.0778                                                                             |   |
| 77<br>78   | PC 1.0799 1.0820 1.0841 1.0862 1.0883 1.0905 1.0926 1.0947 1.0968 1.0990 PC 1.1011 1.1032 1.1054 1.1075 1.1097 1.1118 1.1139 1.1161 1.1182 1.1204    |   |
| 79         | PC 1.1225 1.1247 1.1269 1.1290 1.1312 1.1334 1.1355 1.1377 1.1399 1.1421                                                                             |   |
| 80         | PC 1.1442 1.1464 1.1486 1.1508 1.1530 1.1552 1.1574 1.1596 1.1618 1.1640                                                                             |   |
| 81         | PC 1.1662 1.1684 1.1706 1.1729 1.1751 1.1773 1.1795 1.1818 1.1840 1.1862                                                                             |   |
| 82         | PC 1.1884 1.1907 1.1929 1.1952 1.1974 1.1997 1.2019 1.2042 1.2064 1.2087                                                                             |   |
| 83<br>84   | PC 1.2110 1.2132 1.2155 1.2178 1.2200 1.2223 1.2246 1.2269 1.2292 1.2315<br>PC 1.2337 1.2360 1.2383 1.2406 1.2429 1.2452 1.2476 1.2499 1.2522 1.2545 |   |
| 85         | PC 1.2568 1.2592 1.2615 1.2638 1.2625 1.2625 1.2708 1.2732 1.2755 1.2779                                                                             |   |
| 86         | PC 1.2802 1.2826 1.2849 1.2873 1.2897 1.2920 1.2944 1.2968 1.2992 1.3015                                                                             |   |
| 87         | PC 1.3039 1.3063 1.3087 1.3111 1.3135 1.3159 1.3183 1.3207 1.3231 1.3255                                                                             |   |
| 88         | PC 1.3280 1.3304 1.3328 1.3352 1.3377 1.3401 1.3425 1.3450 1.3474 1.3499                                                                             |   |
| 89         | PC 1.3523 1.3548 1.3572 1.3597 1.3622 1.3646 1.3671 1.3696 1.3721 1.3746<br>PC 1.3771 1.3796 1.3820 1.3845 1.3870 1.3896 1.3921 1.3946 1.3971 1.3996 |   |
| 90<br>91   | PC 1.3771 1.3796 1.3820 1.3845 1.3870 1.3896 1.3921 1.3946 1.3971 1.3996<br>PC 1.4022 1.4047 1.4072 1.4098 1.4123 1.4148 1.4174 1.4199 1.4225 1.4251 |   |
| 92         | PC 1.4276 1.4302 1.4328 1.4353 1.4379 1.4405 1.4431 1.4457 1.4483 1.4509                                                                             |   |
| 93         | PC 1.4535 1.4561 1.4587 1.4613 1.4640 1.4666 1.4692 1.4719 1.4745 1.4771                                                                             |   |
| 94         | PC 1.4798 1.4824 1.4851 1.4877 1.4904 1.4931 1.4958 1.4984 1.5011 1.5038                                                                             |   |
| 95         | PC 1.5065 1.5092 1.5119 1.5146 1.5173 1.5200 1.5228 1.5255 1.5282 1.5309                                                                             |   |
| 96<br>97   | PC 1.5337 1.5364 1.5392 1.5419 1.5447 1.5474 1.5502 1.5530 1.5557 1.5585<br>PC 1.5613 1.5641 1.5669 1.5697 1.5725 1.5753 1.5781 1.5810 1.5838 1.5866 |   |
| 98         | PC 1.5895 1.5923 1.5952 1.5980 1.6009 1.6037 1.6066 1.6095 1.6124 1.6152                                                                             |   |
| 99         | PC 1.6181 1.6210 1.6239 1.6269 1.6298 1.6327 1.6356 1.6385 1.6415 1.6444                                                                             |   |
| 100        | PC 1.6474 1.6503 1.6533 1.6562 1.6592 1.6622 1.6652 1.6682 1.6711 1.6742                                                                             |   |
| 101        | PC 1.6771 1.6802 1.6832 1.6862 1.6892 1.6923 1.6953 1.6984 1.7014 1.7045                                                                             |   |
| 102<br>103 | PC 1.7076 1.7107 1.7137 1.7168 1.7199 1.7230 1.7261 1.7292 1.7324 1.7355<br>PC 1.7386 1.7418 1.7449 1.7481 1.7512 1.7544 1.7576 1.7608 1.7640 1.7672 |   |
| 104        | PC 1.7704 1.7736 1.7768 1.7800 1.7833 1.7865 1.7897 1.7930 1.7963 1.7995                                                                             |   |
| 105        | PC 1.8028 1.8061 1.8094 1.8127 1.8160 1.8193 1.8227 1.8260 1.8293 1.8327                                                                             |   |
| 106        | PC 1.8360 1.8394 1.8428 1.8462 1.8496 1.8530 1.8563 1.8598 1.8632 1.8666                                                                             |   |
| 107<br>108 | PC 1.8701 1.8735 1.8770 1.8805 1.8839 1.8874 1.8909 1.8944 1.8980 1.9015<br>PC 1.9050 1.9085 1.9121 1.9157 1.9192 1.9228 1.9264 1.9300 1.9336 1.9372 |   |
| 109        | PC 1.9409 1.9445 1.9481 1.9518 1.9555 1.9592 1.9628 1.9666 1.9703 1.9740                                                                             |   |
|            | HEC-1 INPUT PAGE                                                                                                                                     | 3 |
| LINE       | ID12345678910                                                                                                                                        |   |
| 110        | PC 1.9777 1.9815 1.9852 1.9890 1.9928 1.9966 2.0004 2.0042 2.0080 2.0118                                                                             |   |
| 111        | PC 2.0157 2.0195 2.0234 2.0273 2.0312 2.0351 2.0390 2.0430 2.0469 2.0509                                                                             |   |
| 112<br>113 | PC 2.0548 2.0588 2.0628 2.0668 2.0709 2.0749 2.0789 2.0830 2.0871 2.0912<br>PC 2.0953 2.0994 2.1035 2.1076 2.1118 2.1160 2.1201 2.1244 2.1286 2.1328 |   |
| 114        | PC 2.0953 2.0994 2.1035 2.1076 2.1118 2.1160 2.1201 2.1244 2.1286 2.1328<br>PC 2.1370 2.1413 2.1456 2.1499 2.1542 2.1585 2.1629 2.1672 2.1716 2.1760 |   |
| 115        | PC 2.1804 2.1848 2.1893 2.1938 2.1982 2.2027 2.2072 2.2117 2.2163 2.2208                                                                             |   |
| 116        | PC 2.2254 2.2300 2.2346 2.2393 2.2439 2.2487 2.2533 2.2581 2.2628 2.2676                                                                             |   |
| 117        | PC 2.2724 2.2772 2.2820 2.2869 2.2917 2.2966 2.3015 2.3065 2.3114 2.3164<br>PC 2.3214 2.3264 2.3314 2.3365 2.3416 2.3468 2.3519 2.3571 2.3623 2.3675 |   |
| 118<br>119 | PC 2.3214 2.3264 2.3314 2.3365 2.3416 2.3468 2.3519 2.3571 2.3623 2.3675 PC 2.3728 2.3781 2.3834 2.3888 2.3941 2.3996 2.4050 2.4104 2.4159 2.4215    |   |
| 120        | PC 2.4270 2.4326 2.4382 2.4438 2.4495 2.4552 2.4609 2.4667 2.4724 2.4783                                                                             |   |
| 121        | PC 2.4842 2.4901 2.4961 2.5021 2.5081 2.5143 2.5204 2.5266 2.5328 2.5390                                                                             |   |
| 122        | PC 2.5453 2.5517 2.5581 2.5645 2.5709 2.5775 2.5840 2.5906 2.5972 2.6039 PC 2.6106 2.6174 2.6242 2.6312 2.6382 2.6453 2.6524 2.6596 2.6668 2.6742    |   |
| 123        | PC 2.6106 2.6174 2.6242 2.6312 2.6382 2.6453 2.6524 2.6596 2.6668 2.6742                                                                             |   |
| 124<br>125 | PC 2.6816 2.6891 2.6966 2.7043 2.7119 2.7197 2.7275 2.7354 2.7433 2.7514<br>PC 2.7594 2.7676 2.7759 2.7842 2.7925 2.8011 2.8097 2.8186 2.8275 2.8366 |   |
| 126        | PC 2.8458 2.8553 2.8648 2.8746 2.8843 2.8944 2.9045 2.9148 2.9252 2.9359                                                                             |   |
| 127        | PC 2.9466 2.9575 2.9685 2.9798 2.9910 3.0026 3.0142 3.0260 3.0379 3.0518                                                                             |   |
| 128        | PC 2.9466 2.9575 2.9685 2.9798 2.9910 3.0026 3.0142 3.0260 3.0379 3.0518<br>PC 3.0656 3.0827 3.0999 3.1203 3.1408 3.1645 3.1883 3.2153 3.2424 3.2727 |   |
| 129        | PC 3.3030 3.3367 3.3704 3.4073 3.4442 3.4845 3.5247 3.5683 3.6118 3.6587                                                                             |   |
| 130        | PC 3.7055 3.7557 3.8058 3.8565 3.9072 3.9550 4.0028 4.0476 4.0925 4.1344                                                                             |   |
| 131<br>132 | PC 4.1763 4.2153 4.2543 4.2904 4.3265 4.3596 4.3928 4.4230 4.4532 4.4805                                                                             |   |
| 133        | PC 4.5078 4.5322 4.5565 4.5780 4.5994 4.6179 4.6364 4.6528 4.6692 4.6850 PC 4.7007 4.7160 4.7312 4.7458 4.7605 4.7746 4.7887 4.8023 4.8159 4.8288    |   |
| 134        | PC 4.8418 4.8543 4.8667 4.8786 4.8905 4.918 4.9131 4.9239 4.9347 4.9449                                                                              |   |
| 135        | PC 4.9551 4.9648 4.9746 4.9841 4.9936 5.0030 5.0123 5.0214 5.0306 5.0395                                                                             |   |
| 136        | PC 5.0485 5.0572 5.0660 5.0746 5.0831 5.0915 5.0999 5.1081 5.1162 5.1242                                                                             |   |
| 137<br>138 | PC 5.1322 5.1400 5.1478 5.1554 5.1630 5.1704 5.1779 5.1852 5.1925 5.1997 PC 5.2069 5.2140 5.2211 5.2281 5.2351 5.2420 5.2489 5.2557 5.2624 5.2691    |   |
| 138        | PC 5.2069 5.2140 5.2211 5.2281 5.2351 5.2420 5.2489 5.2557 5.2624 5.2691 PC 5.2758 5.2824 5.2890 5.2954 5.3019 5.3083 5.3147 5.3209 5.3272 5.3333    |   |
| 140        | PC 5.3395 5.3456 5.3517 5.3577 5.3637 5.3697 5.3756 5.3815 5.3874 5.3932                                                                             |   |
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     FLOOD HYDROGRAPH PACKAGE (HEC-1)
                                                                                                                     U.S. ARMY CORPS OF ENGINEERS
                                                                                                                     HYDROLOGIC ENGINEERING CENTER
                           1998
                    JUN
                VERSION 4.1
                                                                                                                            609 SECOND STREET
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DAVIS, CALIFORNIA 95616
  RUN DATE 27JAN25 TIME 13:00:42
                                                                                                                               (916) 756-1104
                               HEC-1 Analysis using SSA
*** ERROR *** SPECIFIED START AND END DATES RESULT IN TOO MANY TIME PERIODS
                    OUTPUT CONTROL VARIABLES

IPRNT 0 PRINT CONTROL

IPLOT 0 PLOT CONTROL

QSCAL 0. HYDROGRAPH PLOT SCALE
   3 IO
                    HYDROGRAPH TIME DATA
     IT
                             NMIN
                                               5 MINUTES IN COMPUTATION INTERVAL
                            IDATE
                                         1JAN25
                                                  STARTING DATE
STARTING TIME
                                          0000 STARTING TIME
2000 NUMBER OF HYDROGRAPH ORDINATES
                            ITIME
                               NQ
                           NDDATE
                                         7JAN25 ENDING DATE
2235 ENDING TIME
                           ICENT
                                             19 CENTURY MARK
                      COMPUTATION INTERVAL .08 HOURS TOTAL TIME BASE 166.58 HOURS
            ENGLISH UNITS
                  DRAINAGE AREA
                                             SQUARE MILES
                  PRECIPITATION DEPTH
                                             INCHES
                  LENGTH, ELEVATION
                                             FEET
                                             CUBIC FEET PER SECOND
                  STORAGE VOLUME
                                             ACRE-FEET
                  SURFACE AREA
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                  TEMPERATURE
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
                    AC_CONC._PAVING
   4 KK
                    OUTPUT CONTROL VARIABLES
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PLOT CONTROL
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PUNCH COMPUTED HYDROGRAPH
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                    TIME DATA FOR INPUT TIME SERIES

JXMIN 6 TIME INTERVAL IN MINUTES

JXDATE 1JAN25 STARTING DATE

JXTIME 0 STARTING TIME
   8 IN
                  SUBBASIN RUNOFF DATA
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   6 BA
                                            .00 SUBBASIN AREA
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                    BASE FLOW CHARACTERISTICS
   7 BF
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1.00000 RECESSION CONSTANT
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250 LS
                    SCS LOSS RATE
                                        .08 INITIAL ABSTRACTION
96.00 CURVE NUMBER
100.00 PERCENT IMPERVIOUS AREA
                           STRTL
                          CRVNBR
                    SCS DIMENSIONLESS UNITGRAPH
251 IID
                                                                     UNIT HYDROGRAPH
                                                                 8 END-OF-PERIOD ORDINATES
                             HYDROGRAPH AT STATION AC_CONC._PAVING
    TOTAL RAINFALL =
                            6.58, TOTAL LOSS =
                                                       .00, TOTAL EXCESS = 6.58
                                                     MAXIMUM AVERAGE FLOW
PEAK FLOW
                                                                                 166.58-HR
                                                       24-HR
                                            6-HR
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   (CFS)
                (HR)
                              (CFS)
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1.777
            121.42
                           (INCHES)
                                                         3.135
                                                                        4.859
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252 KK
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                   OUTPUT CONTROL VARIABLES
253 KO
                           IPRNT
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0 PLOT CONTROL
                                             0. HYDROGRAPH PLOT SCALE
0 PUNCH COMPUTED HYDROGRAPH
                           OSCAT.
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                                          22 SAVE HYDROGRAPH ON THIS UNIT
1 FIRST ORDINATE PUNCHED OR SAVED
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                                          .083 TIME INTERVAL IN HOURS
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JXMIN 6 TIME INTERVAL IN MINUTES

JXDATE 1JAN25 STARTING DATE

JXTIME 0 STARTING TIME
256 IN
                 SUBBASIN RUNOFF DATA
                    SUBBASIN CHARACTERISTICS
                                     .00 SUBBASIN AREA
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                   BASE FLOW CHARACTERISTICS
STRTQ .00 INITIAL FLOW
QRCSN .00 BEGIN BASE FLOW RECESSION
RTIOR 1.00000 RECESSION CONSTANT
255 BF
                    PRECIPITATION DATA
257 PB
                           STORM
                                       6.58 BASIN TOTAL PRECIPITATION
257 PI
                      INCREMENTAL PRECIPITATION PATTERN
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498 LS

SCS LOSS RATE
STRTL .08 INITIAL ABSTRACTION
CRVNBR 96.00 CURVE NUMBER
RTIMP 90.00 PERCENT IMPERVIOUS AREA

499 UD SCS DIMENSIONLESS UNITGRAPH
TLAG .10 LAG

UNIT HYDROGRAPH

8 END-OF-PERIOD ORDINATES 2. 0.

HYDROGRAPH AT STATION BLDG

TOTAL RAINFALL = 6.58, TOTAL LOSS = .05, TOTAL EXCESS =

MAXIMUM AVERAGE FLOW PEAK FLOW TIME 6-HR 24-HR 72-HR 166.58-HR (CFS) (HR) (CFS) 0. 1.775 0. 3.132 (INCHES) 4.852 6.530 (AC-FT) 0.

> CUMULATIVE AREA = .00 SQ MI

500 KK LANDSCAPE

501 KO OUTPUT CONTROL VARIABLES

IPRNT IPLOT PRINT CONTROL PLOT CONTROL HYDROGRAPH PLOT SCALE PUNCH COMPUTED HYDROGRAPH 0. OSCAL IPNCH 22 SAVE HYDROGRAPH ON THIS UNIT FIRST ORDINATE PUNCHED OR SAVED IOUT 1 FIRST ORDINATE PUNCHED OR SAVED
2000 LAST ORDINATE PUNCHED OR SAVED
.083 TIME INTERVAL IN HOURS ISAV1 TSAV2

TIMINT

TIME DATA FOR INPUT TIME SERIES 504 TN

PUT TIME UNTERVAL
6 TIME INTERVAL
1JAN25 STARTING DATE
0 STARTING TIME JXMIN TIME INTERVAL IN MINUTES JXDATE JXTIME

SUBBASIN RUNOFF DATA

502 BA SUBBASIN CHARACTERISTICS

TAREA .00 SUBBASIN AREA

BASE FLOW CHARACTERISTICS 503 BF

STRTQ ORCSN

.00 INITIAL FLOW
.00 BEGIN BASE FLOW RECESSION
1.00000 RECESSION CONSTANT

.00

RTIOR

PRECIPITATION DATA

STORM 6.58 BASIN TOTAL PRECIPITATION 505 PB

505 PI

.00

INCREMENTAL PRECIPITATION PATTERN .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 0.0 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 0.0 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00

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|--------|-----------------------------|---------------------------------|-----------------------------------------|-----------------------------------------|----------------------------------------|-----|-----------------------------------------|-----------------------------------------|-----------------------------------------|----------------------------------------|
| 746 LS | SCS LOSS                    | 00 .00<br>RATE                  | .00<br>4.25 INITIA                      | .00<br>L ABSTRACTI                      | .00                                    | .00 | .00                                     | .00                                     | .00                                     |                                        |
| 746 LS | ST<br>CRV<br>RT<br>SCS DIME | PRTL VNBR 3 PIMP 2 ENSIONLESS U | 2.00 CURVE<br>5.00 PERCEN               | NUMBER                                  |                                        |     |                                         |                                         |                                         |                                        |

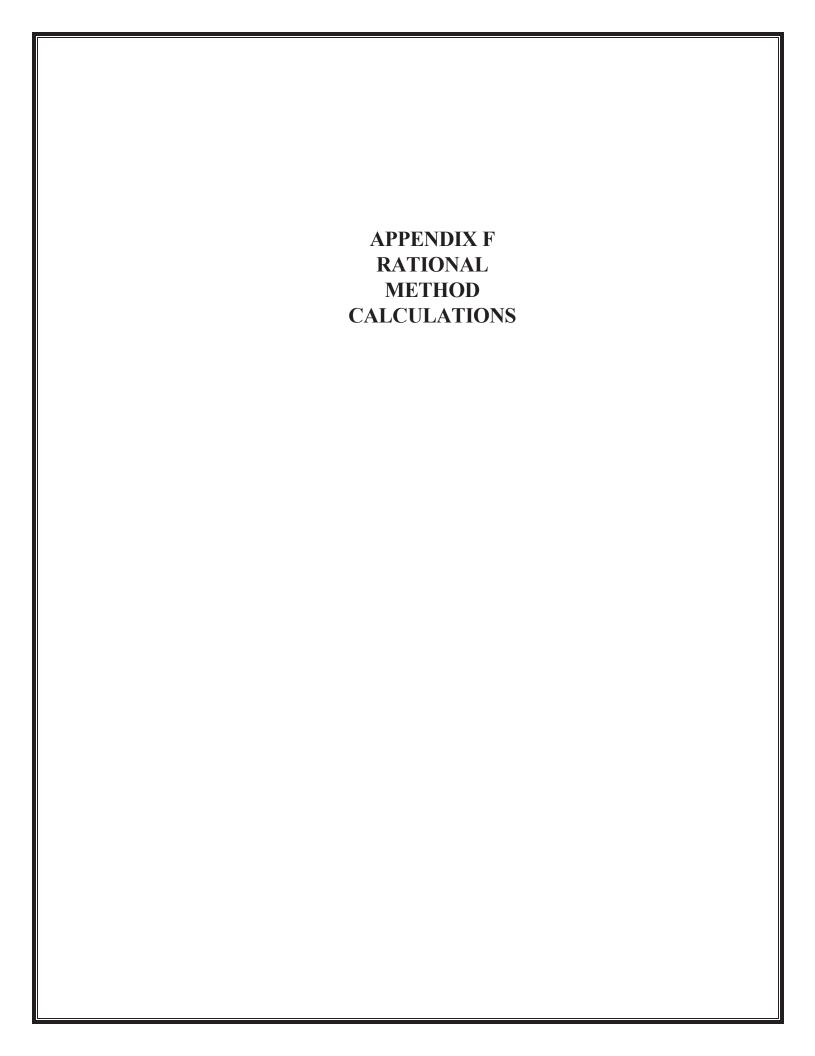
UNIT HYDROGRAPH
8 END-OF-PERIOD ORDINATES
1. 0. 0. 0. 11. 16. 7. 3. \*\*\* 11. 16. \*\*\*

### HYDROGRAPH AT STATION LANDSCAPE

TOTAL RAINFALL = 6.58, TOTAL LOSS = 4.76, TOTAL EXCESS = 1.82 PEAK FLOW TIME MAXIMUM AVERAGE FLOW 166.58-HR 6-HR 24-HR 72-HR (CFS) (HR) (CFS) 0. .456 0. 121.33 0. 1.379 0. 1.817 (INCHES) (AC-FT) 0. 0. 0. CUMULATIVE AREA = .00 SQ MI RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

TIME OF AVERAGE FLOW FOR MAXIMUM PERIOD PEAK BASIN MAXIMUM TIME OF OPERATION STATION FLOW PEAK AREA STAGE MAX STAGE 6-HOUR 24-HOUR 72-HOUR HYDROGRAPH AT AC\_CONC.\_PAVING 1. 121.42 0. 0. 0. .00 HYDROGRAPH AT 0. 121.33 0. BLDG 0. 0. .00 HYDROGRAPH AT LANDSCAPE 0. 121.33 0. 0. 0.

\*\*\* NORMAL END OF HEC-1 \*\*\*



## EXISTING HYDROLOGY NORTHERN NEVADA CONCRETE RATIONAL METHOD: 5-YEAR AND 100-YEAR 24 HOUR STORM

| <b>Q</b> <sub>100</sub> | Q <sub>100</sub> =Ci <sub>100</sub> A | (cfs)   | 8.78        | 8.78        |  |
|-------------------------|---------------------------------------|---------|-------------|-------------|--|
|                         |                                       |         |             |             |  |
| INTENSITY               | <mark>i</mark> 100                    | (in/hr) | 3.51        |             |  |
| Q <sub>5</sub>          | Q <sub>5</sub> =Ci <sub>5</sub> A     | (cfs)   | 1.32        | 1.32        |  |
| INTENSITY               | is                                    | (in/hr) | 1.32        | 1           |  |
|                         | Tc                                    | (min.)  | 10.0        | -           |  |
|                         | C <sub>100</sub>                      |         | 0.20 0.50   | -           |  |
|                         | င်                                    |         | 0.20        | -           |  |
|                         | ∢                                     | (acres) | 2.00        | 2.00        |  |
|                         | AREA                                  |         | EXIST. SITE | EXIST. SITE |  |

# PROPOSED HYDROLOGY NORTHERN NEVADA CONCRETE RATIONAL METHOD: 5-YEAR AND 100-YEAR 24 HOUR STORM

| 20                                    |                                                               |
|---------------------------------------|---------------------------------------------------------------|
| FLOWS .                               |                                                               |
| Q <sub>100</sub> =Ci <sub>100</sub> A | (cfs)                                                         |
| <mark>i</mark> 100                    | (in/hr)                                                       |
| $Q_5=Ci_5A$                           | (cfs)                                                         |
| i.                                    | (in/hr)                                                       |
| Тс                                    | (min.)                                                        |
| C <sub>100</sub>                      |                                                               |
| ပ်                                    |                                                               |
| ∢                                     | (acres)                                                       |
| AREA                                  |                                                               |
|                                       | REA A $C_5$ $C_{100}$ Tc $i_5$ $Q_5 = Ci_5 A$ $i_{100}$ $C_5$ |

| OUTLET #1 | 0.70 | 3.51 | 0.26 | 1.32 | 10.0 | 0.87 | 0.85 | 0.23 | BASIN 10 |
|-----------|------|------|------|------|------|------|------|------|----------|
| OUTLET #2 | 0.70 | 3.51 | 0.26 | 1.32 | 10.0 | 0.87 | 0.85 | 0.23 | BASIN 9  |
| SSCB-01   | 0.33 | 3.51 | 0.12 | 1.32 | 10.0 | 0.93 | 0.88 | 0.10 | BASIN 8  |
| SDCB-07   | 0.95 | 3.51 | 0.34 | 1.32 | 10.0 | 0.93 | 0.88 | 0.29 | BASIN 7  |
| SDCB-06   | 0.49 | 3.51 | 0.17 | 1.32 | 10.0 | 0.93 | 0.88 | 0.15 | BASIN 6  |
| SDCB-05   | 0.53 | 3.51 | 0.18 | 1.32 | 10.0 | 0.89 | 0.82 | 0.17 | BASIN 5  |
| SDCB-04   | 0.73 | 3.51 | 0.23 | 1.32 | 10.0 | 0.80 | 0.68 | 0.26 | BASIN 4  |
| SDCB-03   | 0.64 | 3.51 | 0.19 | 1.32 | 10.0 | 0.73 | 0.57 | 0.25 | BASIN 3  |
| SDCB-01   | 2.34 | 3.51 | 0.53 | 1.32 | 10.0 | 0.61 | 0.37 | 1.10 | BASIN 2  |
| OUTLET-03 | 4.44 | 3.51 | 0.91 | 1.32 | 10.0 | 0.57 | 0.31 | 2.22 | BASIN 1  |

| LISTED ABOVE |  |
|--------------|--|
| 11.85        |  |
| -            |  |
| 3.19         |  |
| -            |  |
| -            |  |
| -            |  |
| -            |  |
| 2.00         |  |
| PROP. SITE   |  |

| BAS         | IN 1 WEIGH | ITED ( | C-VALU | JE CALC. |          |
|-------------|------------|--------|--------|----------|----------|
| DESCRIPTION | AREA (sf)  | C5     | C100   | A*C5     | A*C100   |
| STREET      | 15694.67   | 0.88   | 0.93   | 13811.31 | 14596.04 |
| WALK        | 0.00       | 0.87   | 0.90   | 0.00     | 0.00     |
| ROOF        | 0.00       | 0.85   | 0.87   | 0.00     | 0.00     |
| LANDSCAPE   | 81008.53   | 0.20   | 0.50   | 16201.71 | 40504.27 |
| TOTAL       | 96703.20   | 0.31   | 0.57   | 30013.01 | 55100.31 |

| BASI        | N 2 WEIGH | ITED ( | C-VALU | JE CALC. |          |
|-------------|-----------|--------|--------|----------|----------|
| DESCRIPTION | AREA (sf) | C5     | C100   | A*C5     | A*C100   |
| STREET      | 11830.94  | 0.88   | 0.93   | 10411.23 | 11002.78 |
| WALK        | 0.00      | 0.87   | 0.90   | 0.00     | 0.00     |
| ROOF        | 0.00      | 0.85   | 0.87   | 0.00     | 0.00     |
| LANDSCAPE   | 36085.06  | 0.20   | 0.50   | 7217.01  | 18042.53 |
| TOTAL       | 47916.00  | 0.37   | 0.61   | 17628.24 | 29045.31 |

| BASIN 3 WEIGHTED C-VALUE CALC.              |          |      |      |         |         |  |  |  |  |  |  |
|---------------------------------------------|----------|------|------|---------|---------|--|--|--|--|--|--|
| DESCRIPTION AREA (sf) C5 C100 A*C5 A*C100   |          |      |      |         |         |  |  |  |  |  |  |
| STREET                                      | 5864.70  | 0.88 | 0.93 | 5160.94 | 5454.17 |  |  |  |  |  |  |
| WALK                                        | 0.00     | 0.87 | 0.90 | 0.00    | 0.00    |  |  |  |  |  |  |
| ROOF                                        | 0.00     | 0.85 | 0.87 | 0.00    | 0.00    |  |  |  |  |  |  |
| LANDSCAPE 5025.30 0.20 0.50 1005.06 2512.65 |          |      |      |         |         |  |  |  |  |  |  |
| TOTAL                                       | 10890.00 | 0.57 | 0.73 | 6166.00 | 7966.82 |  |  |  |  |  |  |

| BASIN 4 WEIGHTED C-VALUE CALC.            |          |      |      |         |         |  |  |  |  |  |  |
|-------------------------------------------|----------|------|------|---------|---------|--|--|--|--|--|--|
| DESCRIPTION AREA (sf) C5 C100 A*C5 A*C100 |          |      |      |         |         |  |  |  |  |  |  |
| STREET                                    | 7941.29  | 0.88 | 0.93 | 6988.33 | 7385.40 |  |  |  |  |  |  |
| WALK                                      | 0.00     | 0.87 | 0.90 | 0.00    | 0.00    |  |  |  |  |  |  |
| ROOF                                      | 0.00     | 0.85 | 0.87 | 0.00    | 0.00    |  |  |  |  |  |  |
| LANDSCAPE                                 | 3384.31  | 0.20 | 0.50 | 676.86  | 1692.16 |  |  |  |  |  |  |
| TOTAL                                     | 11325.60 | 0.68 | 0.80 | 7665.20 | 9077.55 |  |  |  |  |  |  |

| BASIN 5 WEIGHTED C-VALUE CALC.            |         |      |      |         |         |  |  |  |  |  |
|-------------------------------------------|---------|------|------|---------|---------|--|--|--|--|--|
| DESCRIPTION AREA (sf) C5 C100 A*C5 A*C100 |         |      |      |         |         |  |  |  |  |  |
| STREET                                    | 6715.85 | 0.88 | 0.93 | 5909.95 | 6245.74 |  |  |  |  |  |
| WALK                                      | 0.00    | 0.87 | 0.90 | 0.00    | 0.00    |  |  |  |  |  |
| ROOF                                      | 0.00    | 0.85 | 0.87 | 0.00    | 0.00    |  |  |  |  |  |
| LANDSCAPE                                 | 689.35  | 0.20 | 0.50 | 137.87  | 344.68  |  |  |  |  |  |
| TOTAL                                     | 7405.20 | 0.82 | 0.89 | 6047.82 | 6590.42 |  |  |  |  |  |

| BASIN 6 WEIGHTED C-VALUE CALC.            |         |      |      |         |         |  |  |  |  |  |  |
|-------------------------------------------|---------|------|------|---------|---------|--|--|--|--|--|--|
| DESCRIPTION AREA (sf) C5 C100 A*C5 A*C100 |         |      |      |         |         |  |  |  |  |  |  |
| STREET                                    | 6534.00 | 0.88 | 0.93 | 5749.92 | 6076.62 |  |  |  |  |  |  |
| WALK 0.00 0.87 0.90 0.00 0.00             |         |      |      |         |         |  |  |  |  |  |  |
| ROOF                                      | 0.00    | 0.85 | 0.87 | 0.00    | 0.00    |  |  |  |  |  |  |
| LANDSCAPE 0.00 0.20 0.50 0.00 0.00        |         |      |      |         |         |  |  |  |  |  |  |
| TOTAL                                     | 6534.00 | 0.88 | 0.93 | 5749.92 | 6076.62 |  |  |  |  |  |  |

| BASIN 7 WEIGHTED C-VALUE CALC.            |          |      |      |          |          |  |  |  |  |  |
|-------------------------------------------|----------|------|------|----------|----------|--|--|--|--|--|
| DESCRIPTION AREA (sf) C5 C100 A*C5 A*C100 |          |      |      |          |          |  |  |  |  |  |
| STREET                                    | 12632.40 | 0.88 | 0.93 | 11116.51 | 11748.13 |  |  |  |  |  |
| WALK                                      | 0.00     | 0.87 | 0.90 | 0.00     | 0.00     |  |  |  |  |  |
| ROOF                                      | 0.00     | 0.85 | 0.87 | 0.00     | 0.00     |  |  |  |  |  |
| LANDSCAPE                                 | 0.00     | 0.20 | 0.50 | 0.00     | 0.00     |  |  |  |  |  |
| TOTAL                                     | 12632.40 | 0.88 | 0.93 | 11116.51 | 11748.13 |  |  |  |  |  |

| BASIN 8 WEIGHTED C-VALUE CALC.            |         |      |      |         |         |  |  |  |  |  |  |
|-------------------------------------------|---------|------|------|---------|---------|--|--|--|--|--|--|
| DESCRIPTION AREA (sf) C5 C100 A*C5 A*C100 |         |      |      |         |         |  |  |  |  |  |  |
| STREET 4356.00 0.88 0.93 3833.28 4051.08  |         |      |      |         |         |  |  |  |  |  |  |
| WALK 0.00 0.87 0.90 0.00 0.00             |         |      |      |         |         |  |  |  |  |  |  |
| ROOF                                      | 0.00    | 0.85 | 0.87 | 0.00    | 0.00    |  |  |  |  |  |  |
| LANDSCAPE 0.00 0.20 0.50 0.00 0.00        |         |      |      |         |         |  |  |  |  |  |  |
| TOTAL                                     | 4356.00 | 0.88 | 0.93 | 3833.28 | 4051.08 |  |  |  |  |  |  |

| Γ        |                 | _                                                          |                            |                 |                       |                        |                       |                 |                        |                         |                         |                          |                          |                          |                        |                         |                 |
|----------|-----------------|------------------------------------------------------------|----------------------------|-----------------|-----------------------|------------------------|-----------------------|-----------------|------------------------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|------------------------|-------------------------|-----------------|
|          |                 | Max<br>Flow<br>Depth<br>(ft)                               | 0.17                       | 0.12            | 0.10                  | 0.11                   | 0.31                  | 0.18            | 90.0                   | 0.23                    | 0.21                    | 0.35                     | 0.38                     | 0.42                     | 0.47                   | 0.17                    | 0.21            |
|          |                 | Max Flow Max Depth / Design / Total Flow Depth Ratio Ratio | 0.17                       | 0.12            | 0.10                  | 0.11                   | 0.31                  | 0.18            | 0.04                   | 0.23                    | 0.14                    | 0.23                     | 0.26                     | 0.28                     | 0.31                   | 0.17                    | 0.21            |
|          |                 | Max Flow<br>/ Design<br>Flow<br>Ratio                      | 90.0                       | 0.03            | 0.02                  | 0.03                   | 0.21                  | 0.07            | 0.00                   | 0.12                    | 0.04                    | 0.12                     | 0.14                     | 0.17                     | 0.21                   | 0.07                    | 60.0            |
|          |                 | Design<br>Flow<br>Capacity<br>(cfs)                        | 4.42                       | 9.70            | 8.43                  | 6.11                   | 5.44                  | 4.41            | 35.83                  | 2.21                    | 6.51                    | 6.53                     | 6.57                     | 6.48                     | 6.55                   | 3.65                    | 3.65            |
|          |                 | Max<br>Flow<br>Velocity<br>(fps)                           | 3.46                       | 5.52            | 4.27                  | 3.43                   | 5.51                  | 3.80            | 4.49                   | 1.93                    | 1.82                    | 2.49                     | 2.66                     | 2.73                     | 2.95                   | 4.68                    | 2.92            |
|          |                 | Peak<br>Flow<br>(cfs)                                      | 0.27                       | 0.29            | 0.18                  | 0.17                   | 1.16                  | 0.32            | 0.10                   | 0.27                    | 0.27                    | 0.77                     | 0.94                     | 1.09                     | 1.38                   | 0.24                    | 0.34            |
| 7. DI CI | ABLE            | Manning'<br>s                                              | 0.0140                     | 0.0140          | 0.0140                | 0.0140                 | 0.0140                | 0.0140          | 0.0140                 | 0.0140                  | 0.0140                  | 0.0140                   | 0.0140                   | 0.0140                   | 0.0140                 | 0.0140                  | 0.0140          |
| V DOIG T | 3-YR PIPE IABLE | Pipe<br>Diameter<br>(in.)                                  | 12.00                      | 12.00           | 12.00                 | 12.00                  | 12.00                 | 12.00           | 18.00                  | 12.00                   | 18.00                   | 18.00                    | 18.00                    | 18.00                    | 18.00                  | 12.00                   | 12.00           |
| u        | ი<br>ი          | Average<br>Slope<br>(%)                                    | 1.7800                     | 8.5900          | 6.4900                | 3.4100                 | 2.7000                | 1.7800          | 13.4900                | 0.4500                  | 0.4400                  | 0.4500                   | 0.4500                   | 0.4400                   | 0.4500                 | 1.2200                  | 1.2100          |
|          |                 | Outlet<br>Invert<br>Elevatio<br>n (ft)                     | 4518.33                    | 4517.47         | 4517.24               | 4516.75                | 4517.00               | 4516.51         | 4516.35                | 4517.83                 | 4517.47                 | 4517.24                  | 4516.75                  | 4516.51                  | 4516.18                | 4516.35                 | 4515.50         |
|          |                 | Inlet<br>Invert<br>Elevatio<br>n (ft)                      | 4519.02                    | 4519.27         | 4518.47               | 4517.40                | 4517.50               | 4517.40         | 4519.55                | 4518.33                 | 4517.83                 | 4517.47                  | 4517.24                  | 4516.75                  | 4516.51                | 4519.50                 | 4516.35         |
|          |                 | Length<br>(ft)                                             | 38.70                      | 20.96           | 18.95                 | 19.07                  | 18.50                 | 20.00           | 23.72                  | 112.15                  | 80.93                   | 51.36                    | 108.15                   | 54.45                    | 73.18                  | 259.18                  | 70.00           |
|          |                 | To<br>(Outlet)<br>Node                                     | SDMH-01                    | JUNC-2A         | JUNC-2B               | JUNC-2C                | Out-04                | SDMH-03         | SDMH-05                | SDMH-02                 | JUNC-2A                 | JUNC-2B                  | JUNC-2C                  | SDMH-03                  | Out-01                 | SDMH-05                 | Out-02          |
|          |                 | From<br>(Inlet)<br>Node                                    | -AT-01   SDCB-01   SDMH-01 | SDCB-02 JUNC-2A | AT-03 SDCB-03 JUNC-2B | LAT-04 SDCB-04 JUNC-2C | LAT-05 SDCB-05 Out-04 | SDCB-06 SDMH-03 | LAT-10 SSCB-01 SDMH-05 | MAIN-01 SDMH-01 SDMH-02 | MAIN-02 SDMH-02 JUNC-2A | MAIN-02A JUNC-2A JUNC-2B | MAIN-02B JUNC-2B JUNC-2C | MAIN-02C JUNC-2C SDMH-03 | MAIN-03 SDMH-03 Out-01 | MAIN-04 SDMH-04 SDMH-05 | MAIN-05 SDMH-05 |
|          |                 | Element<br>ID                                              | LAT-01                     | LAT-02          | LAT-03                | LAT-04                 | LAT-05                | LAT-06          | LAT-10                 | MAIN-01                 | MAIN-02                 | MAIN-02A                 | MAIN-02B                 | MAIN-02C                 | MAIN-03                | MAIN-04                 | MAIN-05         |

| _                 |                                        |                            | _               |                        | _                      |                       | _                      |                        |                             |                         | _                        |                          | _                        |                        | _                       | _                      |
|-------------------|----------------------------------------|----------------------------|-----------------|------------------------|------------------------|-----------------------|------------------------|------------------------|-----------------------------|-------------------------|--------------------------|--------------------------|--------------------------|------------------------|-------------------------|------------------------|
|                   | Max<br>Flow<br>Depth<br>(ft)           | 0.27                       | 0.18            | 0.16                   | 0.17                   | 0.52                  | 0.29                   | 60.0                   | 0.38                        | 0.33                    | 0.56                     | 0.63                     | 69.0                     | 0.78                   | 0.28                    | 0.33                   |
|                   | Max Depth<br>/ Total<br>Depth<br>Ratio | 0.27                       | 0.18            | 0.16                   | 0.17                   | 0.52                  | 0.29                   | 90'0                   | 0.38                        | 0.22                    | 0.38                     | 0.42                     | 0.46                     | 0.52                   | 0.28                    | 0.33                   |
|                   | Max Flow<br>/ Design<br>Flow<br>Ratio  | 0.16                       | 0.07            | 90.0                   | 0.07                   | 0.54                  | 0.18                   | 0.01                   | 0.31                        | 0.10                    | 0:30                     | 0.37                     | 0.43                     | 0.54                   | 0.17                    | 0.24                   |
|                   | Design<br>Flow<br>Capacity<br>(cfs)    | 4.42                       | 9.70            | 8.43                   | 6.11                   | 5.44                  | 4.41                   | 35.83                  | 2.21                        | 6.51                    | 6.53                     | 6.57                     | 6.48                     | 6.55                   | 3.65                    | 3.65                   |
|                   | Max<br>Flow<br>Velocity<br>(fps)       | 4.13                       | 7.26            | 5.77                   | 4.38                   | 7.06                  | 4.57                   | 5.94                   | 2.51                        | 2.40                    | 3.24                     | 3.44                     | 3.53                     | 3.79                   | 5.85                    | 3.81                   |
|                   | Peak<br>Flow<br>(cfs)                  | 69.0                       | 0.72            | 0.46                   | 0.40                   | 2.92                  | 0.80                   | 0.26                   | 0.68                        | 0.68                    | 1.96                     | 2.40                     | 2.78                     | 3.54                   | 0.62                    | 0.87                   |
| TABLE             | Manning'<br>s                          | 0.0140                     | 0.0140          | 0.0140                 | 0.0140                 | 0.0140                | 0.0140                 | 0.0140                 | 0.0140                      | 0.0140                  | 0.0140                   | 0.0140                   | 0.0140                   | 0.0140                 | 0.0140                  | 0.0140                 |
| 100-YR PIPE TABLE | Pipe<br>Diameter<br>(in.)              | 12.00                      | 12.00           | 12.00                  | 12.00                  | 12.00                 | 12.00                  | 18.00                  | 12.00                       | 18.00                   | 18.00                    | 18.00                    | 18.00                    | 18.00                  | 12.00                   | 12.00                  |
| 100               | Average<br>Slope<br>(%)                | 1.7800                     | 8.5900          | 6.4900                 | 3.4100                 | 2.7000                | 1.7800                 | 13.4900                | 0.4500                      | 0.4400                  | 0.4500                   | 0.4500                   | 0.4400                   | 0.4500                 | 1.2200                  | 1.2100                 |
|                   | Outlet<br>Invert<br>Elevatio<br>n (ft) | 4518.33                    | 4517.47         | 4517.24                | 4516.75                | 4517.00               | 4516.51                | 4516.35                | 4517.83                     | 4517.47                 | 4517.24                  | 4516.75                  | 4516.51                  | 4516.18                | 4516.35                 | 4515.50                |
|                   | Inlet<br>Invert<br>Elevatio<br>n (ft)  | 4519.02                    | 4519.27         | 4518.47                | 4517.40                | 4517.50               | 4517.40                | 4519.55                | 4518.33                     | 4517.83                 | 4517.47                  | 4517.24                  | 4516.75                  | 4516.51                | 4519.50                 | 4516.35                |
|                   | Length<br>(ft)                         | 38.70                      | 20.96           | 18.95                  | 19.07                  | 18.50                 | 20.00                  | 23.72                  | 112.15                      | 80.93                   | 51.36                    | 108.15                   | 54.45                    | 73.18                  | 259.18                  | 70.00                  |
|                   | To<br>(Outlet)<br>Node                 | SDMH-01                    | SDCB-02 JUNC-2A | JUNC-2B                | JUNC-2C                | Out-04                | SDMH-03                | SDMH-05                | SDMH-02                     | JUNC-2A                 | JUNC-2B                  | JUNC-2C                  | SDMH-03                  | Out-01                 | SDMH-05                 | Out-02                 |
|                   | From<br>(Inlet)<br>Node                | LAT-01   SDCB-01   SDMH-01 | SDCB-02         | LAT-03 SDCB-03 JUNC-2B | LAT-04 SDCB-04 JUNC-2C | LAT-05 SDCB-05 Out-04 | LAT-06 SDCB-06 SDMH-03 | LAT-10 SSCB-01 SDMH-05 | MAIN-01   SDMH-01   SDMH-02 | MAIN-02 SDMH-02 JUNC-2A | MAIN-02A JUNC-2A JUNC-2B | MAIN-02B JUNC-2B JUNC-2C | MAIN-02C JUNC-2C SDMH-03 | MAIN-03 SDMH-03 Out-01 | MAIN-04 SDMH-04 SDMH-05 | MAIN-05 SDMH-05 Out-02 |
|                   | Element<br>ID                          | LAT-01                     | LAT-02          | LAT-03                 | LAT-04                 | LAT-05                | PT-06                  | LAT-10                 | MAIN-01                     | MAIN-02                 | MAIN-02A                 | MAIN-02B                 | MAIN-02C                 | MAIN-03                | MAIN-04                 | MAIN-05                |

## **Inlet Report**

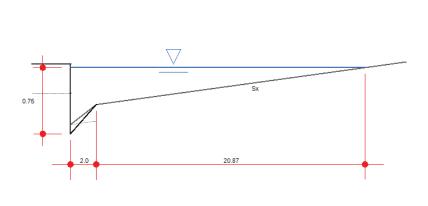
Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc.

Monday, Jan 27 2025

### **CATCH BASIN CAPACITY**

| Combination Inlet  |         | Calculations        |         |
|--------------------|---------|---------------------|---------|
| Location           | = Sag   | Compute by:         | Known Q |
| Curb Length (ft)   | = 2.00  | Q (cfs)             | = 8.00  |
| Throat Height (in) | = 3.00  |                     |         |
| Grate Area (sqft)  | = 2.10  | Highlighted         |         |
| Grate Width (ft)   | = 2.00  | Q Total (cfs)       | = 8.00  |
| Grate Length (ft)  | = 2.00  | Q Capt (cfs)        | = 8.00  |
|                    |         | Q Bypass (cfs)      | = -0-   |
| Gutter             |         | Depth at Inlet (in) | = 8.97  |
| Slope, Sw (ft/ft)  | = 0.113 | Efficiency (%)      | = 100   |
| Slope, Sx (ft/ft)  | = 0.020 | Gutter Spread (ft)  | = 22.87 |
| Local Depr (in)    | = 1.25  | Gutter Vel (ft/s)   | = -0-   |
| Gutter Width (ft)  | = 2.00  | Bypass Spread (ft)  | = -0-   |
| Gutter Slope (%)   | = -0-   | Bypass Depth (in)   | = -0-   |
| Gutter n-value     | = -0-   |                     |         |
|                    |         |                     |         |

All dimensions in feet



Inlet Section

| APPENDIX G<br>BONE YARD FLAT<br>STORAGE<br>CALCULATIONS |  |
|---------------------------------------------------------|--|
|                                                         |  |
|                                                         |  |



January 6th, 2025

Spanish Spring Business Center

RE: Washoe County Code Update - Boneyard Flats

**Dear Association Members:** 

There have been a couple of changes to storm water mitigation for the Spanish Spring Business Center (SSBC) that we want to make sure all owners are aware of.

In August of 2024 the Washoe County Development Code was updated with the addition of the following section to the code:

110.438.44(c) Grading, including fill, within FEMA's Special Flood Hazard Area (SFHA) of Swan Lake, Silver Lake, White Lake, Boneyard Flat, or other closed basin flood pools as identified by the County Engineer, shall require a minimum volume mitigation ratio of 1.3:1.

The entire SSBC north of Calle de la Plata flows into Boneyard Flats, which is identified as a closed basin flood pool that is affected by this requirement.

The SSBC Association has banked credits in Boneyard Flats that are available for purchase to offset this requirement allowing property owners to develop their parcels without providing retention basins onsite.

Tectonics Design Group has been identified by the SSBC and Washoe County as the administrator of these credits. If you have any questions about this process please contact:

Jon Browning, PE
Tectonics Design Group
jon@tdg-inc.com
775-624-7134

### Background:

A bit of history regarding this change in the code. In 2017 a series of wet storm events led to the water levels of Swan Lake to rise causing flooding of roads and some structures in the North Valley area in Reno surrounding Swan Lake. While these storms did not present any concerns for the SSBC, they led to the County revisiting their regulation of closed basins.

In 2019 Washoe County hired a 3<sup>rd</sup> party consultant to review the flood mapping for Boneyard Flats. As part of this exercise, they had the flood limits analyzed for a 10-day storm rather than the traditional 24-hr storm. This analysis showed that the currently mapped flood elevation of 4509.2 may be incorrect if a series of large storms over a 10-day period occurred. This modified analysis showed a potential flood elevation for Boneyard Flats of 4519.0. This increase to the flood elevation of almost 10 feet prompted quick action from the community including involvement from impacted properties and the SSBC.

A collective effort led to removing material from the Boneyard to lower the potential flood elevation and raising adjacent properties to bring them above the flood elevation. Some of the additional material removed was taken outside of the business park.

By the end of 2020, through these efforts, the potential flood elevation for Boneyard Flats was determined to be 4518.6.

As part of these efforts Jesse Haw was able to secure some credits in Boneyard Flats that are available for purchase to assist in utilizing a larger footprint when developing land in the park.

### Calculations for Stormwater Runoff Volume Control

SITE NAME: B8 - 1210

Total Basin Disturbed Area: 5.13 acres

100-Year, 10-Day Rainfall: 7.76 in From Tech Memo

### **Pre-Development Conditions**

| Cover Type | Soil<br>Type | Area<br>(sf) | Area<br>(ac) | CN (from<br>TR-55) | S                      | Q Runoff <sup>1</sup> (in)                              | (ft <sup>3</sup> )       | Runoff Volume <sup>2</sup><br>(CY) |
|------------|--------------|--------------|--------------|--------------------|------------------------|---------------------------------------------------------|--------------------------|------------------------------------|
|            |              |              |              |                    | $\frac{1000}{CN} - 10$ | $\frac{\left(P - 0.2S\right)^2}{\left(P - 0.8S\right)}$ | $Q \times 1/12 \times A$ |                                    |
| Sage Brush | С            | 223462.8     | 5.13         | 51.85              | 9.3                    | 2.3                                                     | 42716.5                  | 1582.1                             |
|            |              |              |              |                    |                        |                                                         |                          |                                    |
|            |              |              |              |                    |                        |                                                         |                          |                                    |
|            |              |              |              |                    |                        |                                                         |                          |                                    |
|            |              |              |              |                    |                        |                                                         |                          |                                    |
| TOTAL:     |              | <u> </u>     | 5.13         |                    | 1                      | 1                                                       | 42716.5                  | 1582.1                             |

### **Post-Development Conditions**

| Cover Type         | Soil<br>Type | Area<br>(sf) | Area<br>(ac) | CN* | s    | Q Runoff <sup>1</sup><br>(in) | Runoff Volume <sup>2</sup> (ft <sup>3</sup> ) | Runoff Volume <sup>2</sup><br>(CY) |
|--------------------|--------------|--------------|--------------|-----|------|-------------------------------|-----------------------------------------------|------------------------------------|
| AC/Concrete        | N/A          | 69299.72     | 1.59         | 96  | 0.4  | 7.3                           | 42050.2                                       | 1557.4                             |
| Building           | N/A          | 20089.77     | 0.46         | 96  | 0.4  | 7.3                           | 12190.2                                       | 451.5                              |
| Desert Landscaping | Α            | 133989.74    | 3.08         | 32  | 21.3 | 0.5                           | 5555.9                                        | 205.8                              |
|                    |              |              |              |     |      |                               |                                               |                                    |
|                    |              |              |              |     |      |                               |                                               |                                    |
|                    |              |              |              |     |      |                               |                                               |                                    |
|                    |              |              |              |     |      |                               |                                               |                                    |
|                    |              |              |              |     |      |                               |                                               |                                    |
| TOTAL:             |              | 1            | 5.13         |     |      | l.                            | 59796.3                                       | 2214.7                             |

(ft<sup>3</sup>) (CY)

Runoff Volume Increase (ft<sup>3</sup>): 17,080 633

Runoff Volume Increase = (Post-Dev. Runoff Volume) MINUS (Pre-Dev. Runoff Volume)

Runoff (in) = Q = (P - la)<sup>2</sup> / (P- la)+S
 la =0.2S therefore;
 Runoff (in) = Q = (P - 0.2S)<sup>2</sup> / (P+ 0.8S)

Where: P = Hour Rainfall (in)
S = 1000/ CN - 10
CN = Curve Number
Q = Runoff (in)

2. Runoff Volume (ft<sup>3</sup>) =  $Q \times 1/12 \times Area$ 

Area = Area of specific land cover (ft<sup>2</sup>)

<sup>\*</sup> Runoff Volume must be calculated separately for pervious and impervious areas (don't use a weighted CN)

### Spanish Springs Associates Limited Partnership 550 West Plumb Lane, Suite B, #505 Reno, Nevada 89509

RECEIPT OF PAYMENT

| Date:                                  | 02/25/25  | <b>i</b> |                                                                           | Receipt #                          | 2502201P  |
|----------------------------------------|-----------|----------|---------------------------------------------------------------------------|------------------------------------|-----------|
|                                        |           |          | Stormwater Run Off Volume Transfer<br>For Spanish Springs Business Center |                                    |           |
| Paid by: Northern Nevada Holding Corp. |           |          |                                                                           |                                    |           |
| APN#                                   | 538-141-2 | 6        | 633 CY X \$20.00/CY                                                       | 175 Design Pl.<br>Sparks, NV 89441 | 12,660.00 |
|                                        |           |          |                                                                           |                                    |           |
|                                        |           |          |                                                                           |                                    |           |
| Total Rece                             | ived:     | Check #  | 1535                                                                      | \$                                 | 12,660.00 |
| - otal nece                            | cu        | encen n  |                                                                           | ·                                  |           |
|                                        |           |          |                                                                           |                                    |           |

Received by:

Díane Banks

Diane Banks

Spanish Springs Associates Limited Partnership