

STAFF REPORT FOR THE PLANNING COMMISSION MEETING OF JANUARY 31, 2024

FILE NO: LU-2023-0452

AGENDA ITEM: 6.C

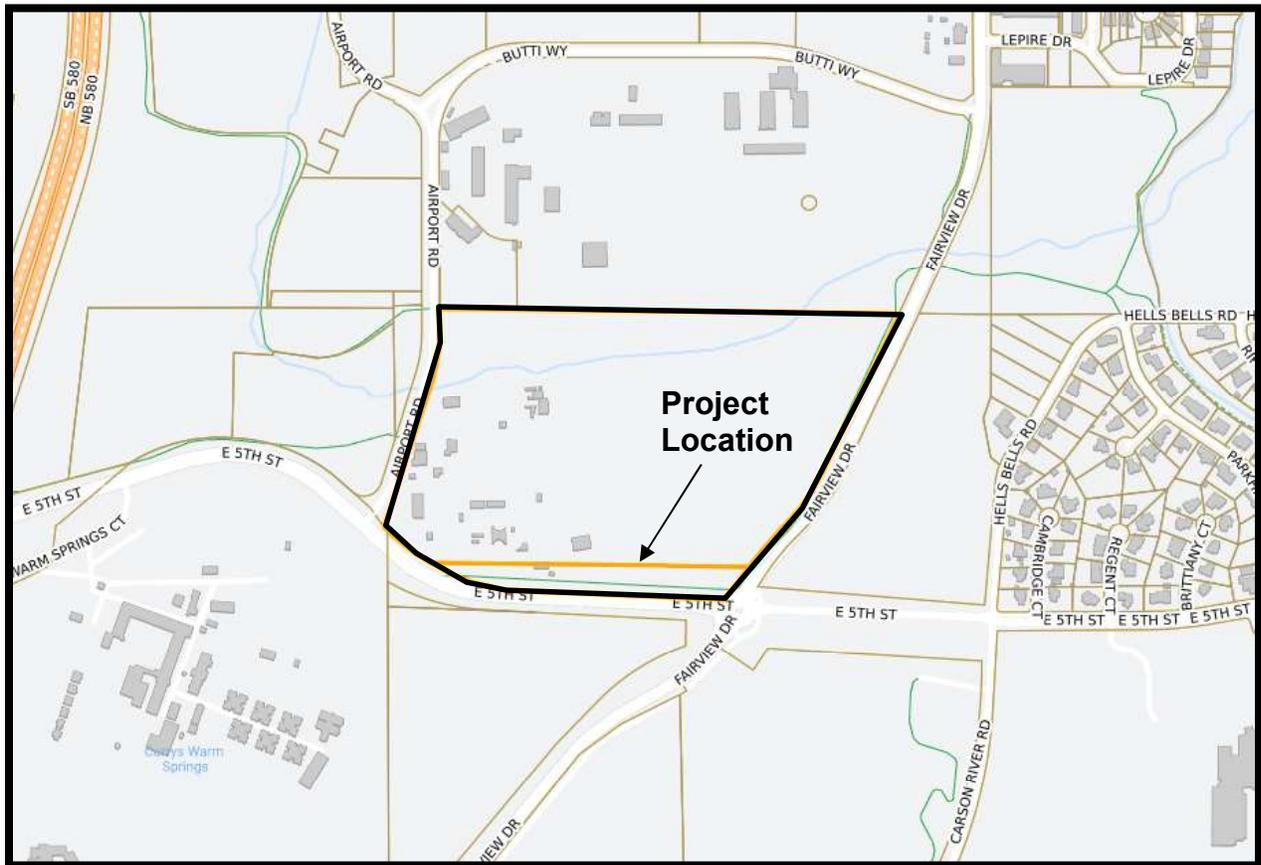
STAFF AUTHOR: Heather Manzo, Associate Planner

AGENDA TITLE: For Possible Action: Discussion and possible action regarding a request for a special use permit (“SUP”) to allow for the construction of an office and warehouse building and temporary placement of an office trailer on a site zoned Public Regional (“PR”), located at 3320 East 5th Street, Assessor’s Parcel Numbers (“APNs”) 010-031-06 and 010-031-07. (Heather Manzo, hmanzo@carson.org)

Staff Summary: The Carson City Public Works Department (“Applicant”), is requesting an SUP for an 8,025 square foot building to house offices and equipment to support Public Works operations. The proposed building will be located on the south side of the site. The Applicant is also requesting placement of a temporary office trailer which will be removed upon completion of the requested building. The Planning Commission is authorized to approve the SUP.

RECOMMENDED MOTION: “I move to approve LU-2023-0452 based on the ability to make the required findings and subject to the conditions of approval included in the staff report.”

VICINITY MAP:



RECOMMENDED CONDITIONS OF APPROVAL:

1. All development must be substantially in accordance with the approved plans, except as otherwise modified by the conditions of approval.
2. All on and off-site improvements must conform to City standards and requirements.
3. The use for which this permit is approved shall commence within twelve (12) months of the date of final approval. A single, one (1) year extension of time must be requested in writing to the Planning Division of the Community Development Department thirty (30) days prior to the one (1) year expiration date. If this permit is not initiated within one (1) year and no extension is granted, the permit becomes null and void.
4. The Applicant must sign and return the Notice of Decision for conditions of approval within ten (10) days of receipt of notification. If the Notice of Decision is not signed and returned within ten (10) days, then the item may be rescheduled for the next Planning Commission meeting for further consideration.
5. Prior to the issuance of any site improvement or building permit, the Applicant shall demonstrate that a reversion to acreage, or other acceptable mapping, has been recorded to ensure construction of the project is contained on one parcel.
6. Building materials must be consistent with the approved plans. All exposed metal surfaces must be painted in flat, non-glossy paint or an earth tone or muted color to match the existing building.
7. Prior to the issuance of a building permit, the applicant shall have plans approve that include exterior lighting details, including manufacturer cut sheets which demonstrate compliance with the non-residential lighting standards contained in Division 1.3 of the Carson City Development Standards (CCDS).

LEGAL REQUIREMENTS: Carson City Municipal Code (“CCMC”) 18.02.050 (Review); 18.02.080 (Special Use Permit); 18.04.185 (Public Regional)

MASTER PLAN DESIGNATION: Public / Quasi-Public

ZONING DISTRICT: Public Regional (PR)

KEY ISSUES: Will the use be compatible with the surrounding neighborhood and be in keeping with the standards of the CCMC?

SURROUNDING ZONING AND LAND USE INFORMATION:

NORTH: Public Works Corporate Yard

EAST: Public / vacant

WEST: Public / vacant

SOUTH: Public / State of Nevada

ENVIRONMENTAL INFORMATION:

FLOOD ZONE: Zone X (minimal flood hazard)

EARTHQUAKE FAULT: Zone I and II (Beyond 500 feet)

SLOPE/DRAINAGE: Site is generally flat

SITE DEVELOPMENT INFORMATION:

LOT SIZE: ±52.79 acres

STRUCTURE SIZE: 8,025 square foot permanent structure and a 720 square foot temporary office trailer.

VARIANCES REQUESTED: None

DISCUSSION:

Based on available records, the subject site has been the location of the Carson City Public Works Wastewater Resource Recovery Facility since before 1989. Over time, the City has added buildings and infrastructure as necessary to provide services to the community. This request is for a new office and equipment storage building that would be located along the East 5th Street frontage with a ±71 foot setback. The design includes a metal building with offices and a large shop to house Public Works vehicles and equipment. Architectural elements have been added to the building to comply with the Carson City Development Standards. In addition to the requested permanent building, a temporary office building is proposed to temporarily house Public Works employees until the new building is completed. CCMC 18.05.030 (3) allows for placement of temporary office trailers when accessory to an established business and which complies with the use limitations outlined in this section of code, which includes a time limit of one year for a temporary office. Per CCMC 18.04.185, development activity and the establishment of a use may only occur within the PR zone with the approval of an SUP. The Planning Commission is authorized to approve the SUP.

PUBLIC COMMENTS:

Public notices were mailed to 37 property owners within 1,000 feet of the subject site on January 19, 2024. As of the writing of this report, staff has not received any written comments. Any comments that are received after this report is completed will be submitted to the Planning Commission prior to or at the meeting on January 31, 2024, depending on the date of submission of the comments to the Planning Division.

OTHER CITY DEPARTMENTS OR OUTSIDE AGENCY COMMENTS:

Plans were routed to commenting agencies, and the following comments were received. Comments have been incorporated into the conditions of approval, as appropriate.

Development Engineering

The Carson City Public Works Department, Development Engineering Division (“Development Engineering”) has no preference or objection to the special use request and offers no conditions of approval.

Development Engineering has reviewed the application within the areas of purview relative to adopted standards and practices and the provisions of CCMC 18.02.080, Conditional Uses. Development Engineering offers the following discussion:

CCMC 18.02.080(5)(a) - Master Plan

The request is not in conflict with any Engineering Master Plans.

CCMC 18.02.080(5)(b) – Use, Peaceful Enjoyment, Economic Value, Compatibility

Development Engineering has no comment on this finding.

CCMC 18.02.080(5)(c) - Traffic/Pedestrians

The project will have a negligible impact on pedestrian and vehicular traffic.

CCMC 18.02.080(5)(d) - Public Services

There is sufficient capacity in the City’s water, sanitary sewer, and storm drainage facilities to

serve this project.

CCMC 18.02.080(5)(e) – Title 18 Standards

The project must meet all Carson City Development Standards and Standard Details.

CCMC 18.02.080(5)(f) – Public health, Safety, Convenience, and Welfare

The project meets engineering standards for health and safety.

Earthquake faults: There are no known earthquake fault lines within 500 feet of the project.

FEMA flood zones: The project is in an X flood zone with no special requirements.

Site slope: The site is relatively level.

CCMC 18.02.080(5)(g) – Material Damage or Prejudice to Other Property

Development Engineering has no comment on this finding.

CCMC 18.02.080(5)(h) – Adequate Information

The plans and reports provided were adequate for this analysis.

Fire Department

1. The project shall comply with the 2018 International Fire Code.
2. The project shall comply with the 2018 Northern Nevada Amendments.
3. Any building 5000 square feet or larger shall be provided with an approved automatic fire sprinkler system.
4. The fire department connection location shall be approved by the Carson City Fire Department (“Fire Department”). A fire hydrant shall be located within 100 feet of the fire department connection.
5. An approved fire alarm system shall be provided.
6. Emergency first responder radio coverage shall be provided for the Carson City Sheriff’s Office and the Fire Department. The radio testing, coverage and installation shall be in accordance with section 510 of the 2018 International Fire Code.

Building Division

1. Plans for construction must specifically identify each of the respective adopted 2018 Code Series and Northern Nevada Amendments (Building and Fire) that govern the design, construction, and inspection of the proposed facility.
2. All plan submittals must comply with The Blue Book, A Reference Guide for the Nevada Design and Construction Industry.
3. Apply at Carson City permit center digitally at permitcenter.carson.org.
4. A formatted (minimum 11x17) set of plans shall be submitted for Building permit plan review. Plan set must include all MEPs, Structural, Architectural, Entitlements, Energy, Special Inspections, and Civil pages, etc.

FINDINGS:

Staff’s recommendation is based upon the findings as required by CCMC 18.02.080 (Special Use Permits) enumerated below and substantiated in the public record for the project.

1. Will be consistent with the objectives of the Master Plan elements.

The proposed permanent structure and temporary office building is consistent with the Master Plan. The subject property is in the Public/Quasi-Public (“PQP”) master plan designation. The PQP designation is intended for schools, government offices, community centers, fire stations, airports, libraries, hospitals and other similar uses. The building will be constructed on the Carson City Wastewater Reclamation facility property and will be used to support city services.

2. Will not be detrimental to the use, peaceful enjoyment, economic value, or development of surrounding properties or the general neighborhood; and is compatible with and preserves the character and integrity of adjacent development and neighborhoods or includes improvements or modifications either on-site or within the public right-of-way to mitigate development related to adverse impacts such as noise, vibrations, fumes, odors, dust, glare or physical activity.

The project will not be detrimental to the use, peaceful enjoyment, economic value or development of surrounding properties or the general neighborhood. The proposed permanent building and the temporary office are consistent with the uses and improvements already located at the site. The site currently operates as the Carson City Wastewater Reclamation facility and contains office buildings, and storage and maintenance buildings as well as necessary infrastructure to treat wastewater. The site is immediately adjacent to other similarly zoned parcels with the Public Works Corporate Yard facility to the north and publicly owned primarily vacant lands located to the west, east and south of the site. The proposed permanent and temporary buildings will have little impact resulting from noise, vibrations, fumes, odors, dust, glare or physical activity. Any exterior lighting will be required to meet Division 1.3 of the Development Standards to ensure that lights are shielded and directed downward away from adjoining properties and the night sky.

3. Will have little or no detrimental effect on vehicular or pedestrian traffic.

The proposed project is within the existing Carson City Wastewater Reclamation Facility. Due to the project’s limited scope and existing access and drive aisles, there will be negligible effect on vehicular or pedestrian traffic.

4. Will not overburden existing public services and facilities, including schools, police and fire protection, water, sanitary sewer, public roads, storm drainage, and other public improvements.

The proposed project is within the existing Carson City Wastewater Reclamation Facility. The proposed addition will not overburden existing public services and facilities. The proposed use will have a negligible impact to City sewer, water and storm drainage. The Fire Department currently serves this site. The building permit will be reviewed for compliance with the Carson City Fire Code, Northern Nevada Amendments (2018 IFC).

5. Meets the definition and specific standards set forth elsewhere in this Title for such particular use and meets the purpose statement of that district.

The primary purpose of the Public Regional zoning district is to provide for federal, state and city facilities whose main purpose is to serve regional needs. Public uses such as government facilities are the primary purpose of the Public Regional zoning district. The addition of an office and shop building to the existing Carson City Wastewater Reclamation Facility is consistent with this purpose. Per CCMC 18.04.185, the use may only be established subject to a SUP. As conditioned, the project will meet the definition and specific standards set forth in Title 18.

6. *Will not be detrimental to the public health, safety, convenience and welfare.*

The proposed building is consistent with other existing uses within the Carson City Wastewater Reclamation Facility. The project will not be detrimental to the public health, safety, convenience and welfare. The structure will require a building permit to ensure that the building is constructed to current standards.

7. *Will not result in material damage or prejudice to other property in the vicinity, as a result of proposed mitigation measures.*

The proposed temporary and permanent buildings are consistent with other buildings and uses on the site. The site currently operates as the Carson City Wastewater Reclamation facility and contains office buildings, and storage and maintenance buildings as well as wastewater treatment infrastructure. The site is immediately adjacent to other similarly zoned parcels with the Public Works Corporate Yard to the north and primarily vacant, publicly owned properties to the west, east and south. Due to the projects design, location and limited scope, it will not result in material damage or prejudice to other property in the vicinity.

Attachments:

Application LU-2023-0452

RECEIVED

DEC 18 2023

Carson City Planning Division
108 E. Proctor Street • Carson City NV 89701
Phone: (775) 887-2180 • E-mail: planning@carson.org

FOR OFFICE USE ONLY:

CCMC 18.02.080

SPECIAL USE PERMIT

FILE # LU-2023-0452

FEE*: \$2,450.00 MAJOR
\$2,200.00 MINOR (Residential zoning districts)
+ noticing fee
*Due after application is deemed complete by staff

APPLICANT PHONE #
Carson City Public Works 775-887-2355

MAILING ADDRESS, CITY, STATE, ZIP
3505 Butti Way, Carson City, NV 89701

EMAIL ADDRESS
Gmunoz@carson.org

PROPERTY OWNER PHONE #
Carson City 775-887-2100

MAILING ADDRESS, CITY, STATE, ZIP
201 N. Carson Street, Carson City, NV 89701

EMAIL ADDRESS
Gmunoz@carson.org

APPLICANT AGENT/REPRESENTATIVE PHONE #
Mirica Krajewski 775.215.5034

MAILING ADDRESS, CITY STATE, ZIP
9060 Double Diamond Pkwy, Unit 1B, Reno, NV 89421

EMAIL ADDRESS
mkrajewski@roanderson.com

- SUBMITTAL PACKET – 4 Complete Packets (1 Unbound Original and 3 Copies) including:
 - Application Form
 - Detailed Written Project Description
 - Site Plan
 - Building Elevation Drawings and Floor Plans
 - Special Use Permit Findings
 - Master Plan Policy Checklist
 - Applicant's Acknowledgment Statement
 - Documentation of Taxes Paid-to-Date
 - Project Impact Reports (Engineering)

CD or USB DRIVE with complete application in PDF
Application Received and Reviewed By:

Submittal Deadline: Planning Commission application submittal schedule.

Note: Submittals must be of sufficient clarity and detail for all departments to adequately review the request. Additional information may be required.

Project's Assessor Parcel Number(s): 01003106	Street Address 3320 E Fifth Street
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Project's Master Plan Designation Public / Quasi-Public and Open Space	Project's Current Zoning Public Regional "PR"	Nearest Major Cross Street(s) E. 5th Street and Fairview Drive
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Please provide a brief description of your proposed project and/or proposed use below. Provide additional pages to describe your request in more detail. This project proposes the construction of a warehouse on a 52.79 acre parcel owned by the Carson City Utilities Department. The facility will allow the integration of staff and equipment in one central building and will improve coordination, cross training, and efficiency. Additional details in submittal.

PROPERTY OWNER'S AFFIDAVIT

I, ROBERT C. NELLIS, being duly deposed, do hereby affirm that I am the record owner of the subject property, and that I have knowledge of, and I agree to, the filing of this application.

<u>Robert C. Nellis</u> Signature	<u>3505 BUTTI WAY</u> Address	<u>12/14/23</u> Date
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Use additional page(s) if necessary for additional owners.

STATE OF NEVADA
COUNTY

On December 14th, 2023, Robert Nellis, personally appeared before me, a notary public, personally known (or proved) to me to be the person whose name is subscribed to the foregoing document and who acknowledged to me that he/she executed the foregoing document.

[Signature]
Notary Public



NOTE: If your project is located within the Historic District or airport area, it may need to be scheduled before the Historic Resources Commission or the Airport Authority in addition to being scheduled for review by the Planning Commission. Planning staff can help you make this determination.

If there is any additional information that would provide a clearer picture of your proposal that you would like to add for presentation to the Planning Commission, please be sure to include it in your detailed description.

Please type and sign the statement on the following page at the end of your findings response.

ACKNOWLEDGMENT OF APPLICANT

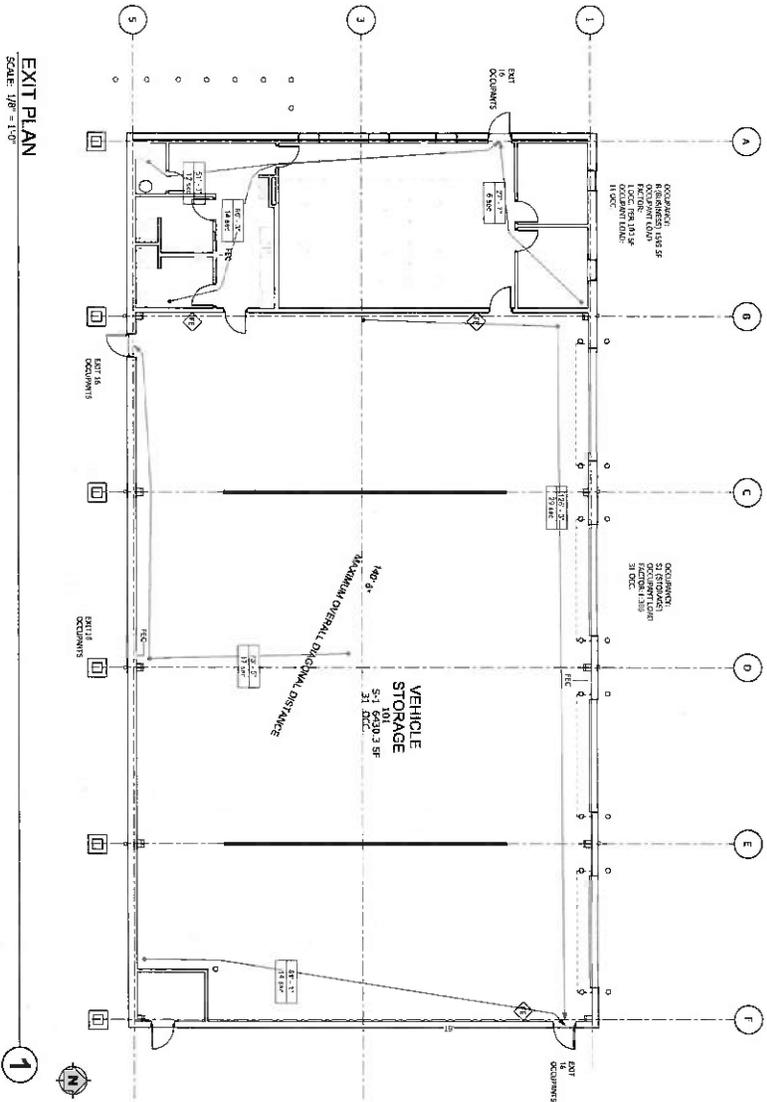
I certify that the forgoing statements are true and correct to the best of my knowledge and belief. I agree to fully comply with all conditions as established by the Planning Commission. I am aware that this permit becomes null and void if the use is not initiated within one-year of the date of the Planning Commission's approval; and I understand that this permit may be revoked for violation of any of the conditions of approval. I further understand that approval of this application does not exempt me from all City code requirements.

Robert C. Nellis
Applicant's Signature

ROBERT C. NELLIS
Print Name

12/14/23
Date

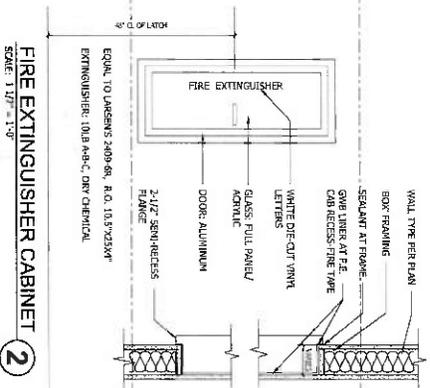
EXIT PLAN
SCALE: 1/8" = 1'-0"



PLANNING FEATURES:
 - 27 OCCUPANTS, 21 SEAT-GOSES.
 - TWO RESTROOMS TO 25, EACH GENDER SEATED BY 8 OCCUPANTS.
 - ONE RESTROOM TO 25, EACH GENDER SEATED BY 8 OCCUPANTS.
 - ONE RESTROOM TO 25, EACH GENDER SEATED BY 8 OCCUPANTS.

BEST AVAILABLE MEASUREMENT FOR THE UNMARKED CONSTRUCTION:
 OCCUPANCY 5 - 36,000 SF (11 SEAT-GOSES)
 OCCUPANCY 5.1 - 36,000 SF (11 SEAT-GOSES)
 NON-SPECIFIC OCCUPANCY CLASSIFICATION CAN BE ENTERED ON S.I.
 TOTAL BUILDING AREA - 149,177 SF - 24,000 SF ALUMINUM
 OCCUPANCY 1 - 10,000 SF (3 SEAT-GOSES)
 OCCUPANCY 1.1 - 10,000 SF (3 SEAT-GOSES)
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SEE REVISIONS TO THE FIRE EXTINGUISHER AND CABINET DRAWINGS FOR THE FIRE EXTINGUISHER AND CABINET DRAWINGS.



FIRE EXTINGUISHER CABINET
SCALE: 1/8" = 1'-0"

EXIT ANALYSIS

DATE: 10/1/2020

BY: J. ADLER

PROJECT: 3320 E 5TH ST, CARSON CITY, NEVADA

CARSON WASTE WATER RECLAMATION FACILITY SEWER DEPARTMENT WAREHOUSE

PROJECT P32012202
3320 E 5TH ST
CARSON CITY, NEVADA

BIC

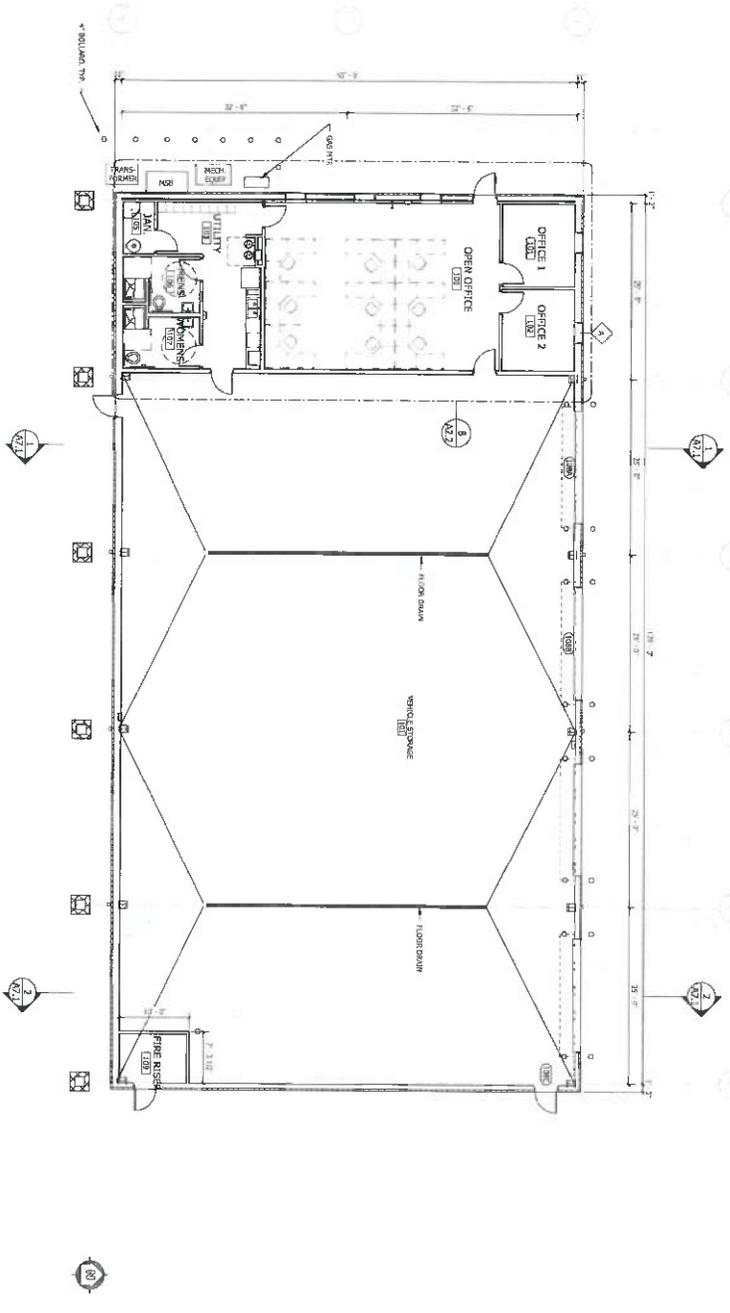
448 S. Virginia Street
Carson City, NV 89401
709.727.8112 www.bic.com

DATE: 10/1/2020

BY: J. ADLER

A0.2

PLAN VIEW
SCALE: 1/8" = 1'-0"



1

DATE	12/5/2023
PROJECT	CARSON WASTE WATER RECLAMATION FACILITY SEWER DEPARTMENT WAREHOUSE
CLIENT	CITY OF CARSON
DESIGNER	BIG BROTHERS & SISTERS ARCHITECTS
SCALE	1/8" = 1'-0"
DATE	12/5/2023
BY	ADN
CHECKED	ADN
APPROVED	ADN
DATE	12/5/2023

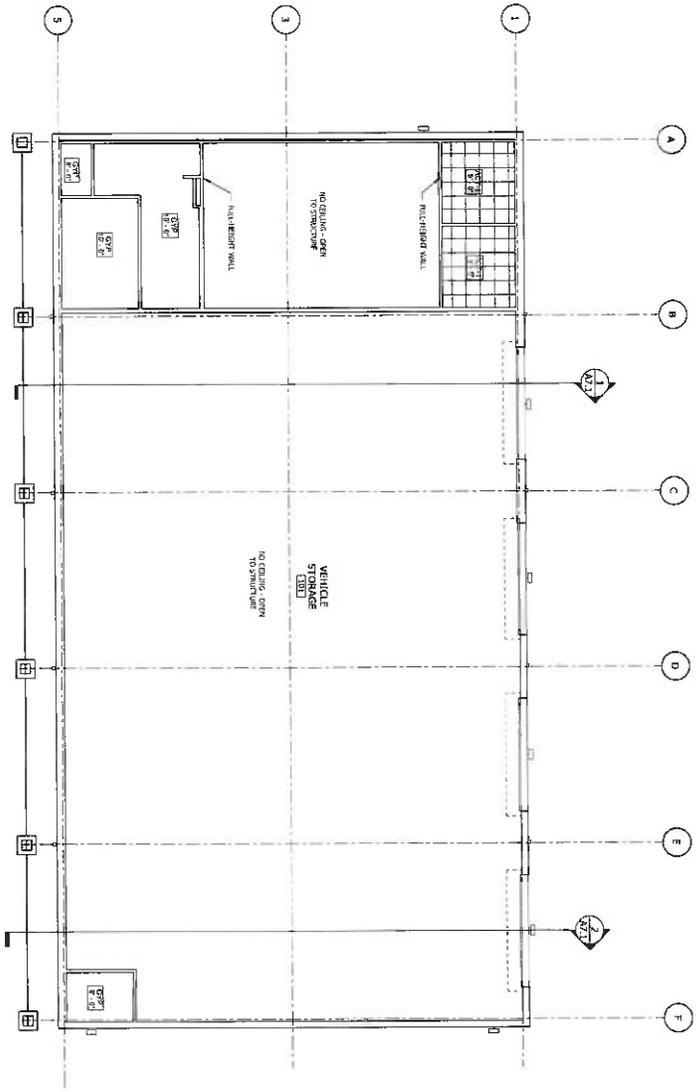
FLOOR PLAN

CARSON WASTE WATER RECLAMATION FACILITY SEWER DEPARTMENT WAREHOUSE
 PROJECT P02012202
 3800 E 5TH ST
 CARSON CITY, NEVADA



BIG BROTHERS & SISTERS ARCHITECTS
 444 E. Virginia Street
 Reno, NV 89501
 (775) 827-0200 | www.bigs.com

A2.1



REFLECTED CEILING PLAN
SCALE 1/8" = 1'-0"

REFLECTED CEILING LEGEND
SCALE 1/8" = 1'-0"

	RECESSED LIGHTS		PENDANT LIGHTS
	LAY IN FIXTURES		MECH. DIFFUSERS
	WALL AND SURFACE LIGHTS		ACCESS PANEL AS REQ.
	ACT 1 GRID AND CEILING		FIRE SPRINKLER HEADS

NOTE: SEE ELECTRICAL SCHEDULE FOR FULL DESCRIPTION OF FIXTURES AND CIRCUITS

NOTE: FIRE SPRINKLER HEADS SHALL BE CENTERED ON ACT TILE

REFLECTED CEILING LEGEND
SCALE 1/8" = 1'-0"

A3.1

CARSON WASTE WATER RECLAMATION
FACILITY SEWER DEPARTMENT
WAREHOUSE
PROJECT R2207-0202
3520 E 5TH ST
CARSON CITY, NEVADA



BIC
ARCHITECTS, ENGINEERS & PLANNERS
4000 SOUTH MAIN STREET
SUITE 100
CARSON CITY, NEVADA 89401
TEL: 795.633.1111 FAX: 795.633.1112
WWW.BICARCHITECTS.COM

Master Plan Policy Checklist

Special Use Permits & Major Project Reviews & Administrative Permits

PURPOSE

The purpose of a development checklist is to provide a list of questions that address whether a development proposal is in conformance with the goals and objectives of the 2006 Carson City Master Plan that are related to non-residential and multi-family residential development. This checklist is designed for developers, staff, and decision-makers and is intended to be used as a guide only.

Development Name: _____

Reviewed By: _____

Date of Review: _____

DEVELOPMENT CHECKLIST

The following five themes are those themes that appear in the Carson City Master Plan and which reflect the community's vision at a broad policy level. Each theme looks at how a proposed development can help achieve the goals of the Carson City Master Plan. A check mark indicates that the proposed development meets the applicable Master Plan policy. The Policy Number is indicated at the end of each policy statement summary. Refer to the Comprehensive Master Plan for complete policy language.

CHAPTER 3: A BALANCED LAND USE PATTERN



The Carson City Master Plan seeks to establish a balance of land uses within the community by providing employment opportunities, a diverse choice of housing, recreational opportunities, and retail services.

Is or does the proposed development:

- Meet the provisions of the Growth Management Ordinance (1.1d, Municipal Code 18.12)?
- Use sustainable building materials and construction techniques to promote water and energy conservation (1.1e, f)?
- Located in a priority infill development area (1.2a)?
- Provide pathway connections and easements consistent with the adopted Unified Pathways Master Plan and maintain access to adjacent public lands (1.4a)?

- Protect existing site features, as appropriate, including mature trees or other character-defining features (1.4c)?
- At adjacent county boundaries or adjacent to public lands, coordinated with the applicable agency with regards to compatibility, access and amenities (1.5a, b)?
- In identified Mixed-Use areas, promote mixed-use development patterns as appropriate for the surrounding context consistent with the land use descriptions of the applicable Mixed-Use designation, and meet the intent of the Mixed-Use Evaluation Criteria (2.1b, 2.2b, 2.3b, Land Use Districts, Appendix C)?
- Meet adopted standards (e.g. setbacks) for transitions between non-residential and residential zoning districts (2.1d)?
- Protect environmentally sensitive areas through proper setbacks, dedication, or other mechanisms (3.1b)?
- Sited outside the primary floodplain and away from geologic hazard areas or follows the required setbacks or other mitigation measures (3.3d, e)?
- Provide for levels of services (i.e. water, sewer, road improvements, sidewalks, etc.) consistent with the Land Use designation and adequate for the proposed development (Land Use table descriptions)?
- If located within an identified Specific Plan Area (SPA), meet the applicable policies of that SPA (Land Use Map, Chapter 8)?

CHAPTER 4: EQUITABLE DISTRIBUTION OF RECREATIONAL OPPORTUNITIES



The Carson City Master Plan seeks to continue providing a diverse range of park and recreational opportunities to include facilities and programming for all ages and varying interests to serve both existing and future neighborhoods.

Is or does the proposed development:

- Provide park facilities commensurate with the demand created and consistent with the City's adopted standards (4.1b)?
- Consistent with the Open Space Master Plan and Carson River Master Plan (4.3a)?

CHAPTER 5: ECONOMIC VITALITY



The Carson City Master Plan seeks to maintain its strong diversified economic base by promoting principles which focus on retaining and enhancing the strong employment base, include a broader range of retail services in targeted areas, and include the roles of technology, tourism, recreational amenities, and other economic strengths vital to a successful community.

Is or does the proposed development:

- Encourage a citywide housing mix consistent with the labor force and non-labor force populations (5.1j)
- Encourage the development of regional retail centers (5.2a)
- Encourage reuse or redevelopment of underused retail spaces (5.2b)?
- Support heritage tourism activities, particularly those associated with historic resources, cultural institutions and the State Capitol (5.4a)?
- Promote revitalization of the Downtown core (5.6a)?
- Incorporate additional housing in and around Downtown, including lofts, condominiums, duplexes, live-work units (5.6c)?

CHAPTER 6: LIVABLE NEIGHBORHOODS AND ACTIVITY CENTERS



The Carson City Master Plan seeks to promote safe, attractive and diverse neighborhoods, compact mixed-use activity centers, and a vibrant, pedestrian-friendly Downtown.

Is or does the proposed development:

- Use durable, long-lasting building materials (6.1a)?
- Promote variety and visual interest through the incorporation of varied building styles and colors, garage orientation and other features (6.1b)?
- Provide variety and visual interest through the incorporation of well-articulated building facades, clearly identified entrances and pedestrian connections, landscaping and other features consistent with the Development Standards (6.1c)?
- Provide appropriate height, density and setback transitions and connectivity to surrounding development to ensure compatibility with surrounding development for infill projects or adjacent to existing rural neighborhoods (6.2a, 9.3b 9.4a)?
- If located in an identified Mixed-Use Activity Center area, contain the appropriate mix, size and density of land uses consistent with the Mixed-Use district policies (7.1a, b)?
- If located Downtown:
 - Integrate an appropriate mix and density of uses (8.1a, e)?
 - Include buildings at the appropriate scale for the applicable Downtown Character Area (8.1b)?
 - Incorporate appropriate public spaces, plazas and other amenities (8.1d)?
- Incorporate a mix of housing models and densities appropriate for the project location and size (9.1a)?

CHAPTER 7: A CONNECTED CITY



The Carson City Master Plan seeks promote a sense of community by linking its many neighborhoods, employment areas, activity centers, parks, recreational

amenities and schools with an extensive system of interconnected roadways, multi-use pathways, bicycle facilities, and sidewalks.

Is or does the proposed development:

- Promote transit-supportive development patterns (e.g. mixed-use, pedestrian-oriented, higher density) along major travel corridors to facilitate future transit (11.2b)?
- Maintain and enhance roadway connections and networks consistent with the Transportation Master Plan (11.2c)?
- Provide appropriate pathways through the development and to surrounding lands, including parks and public lands, consistent with the Unified Pathways Master Plan (12.1a, c)?

Conceptual Drainage Study for Carson City Wastewater Recovery Facility (WWRF)

Prepared: December 2023

Prepared For:

BJG Architecture and Engineering

George Ghusn, Jr., SE
449 South Virginia Street, 4th Floor
Reno, NV 89501



Prepared By:

R.O. ANDERSON ENGINEERING, INC.

1603 Esmeralda Avenue
Minden, Nevada 89423
Phone: (775) 782-2322
Facsimile: (775) 782-7084



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1 Introduction

1.1 Description of Project

This report describes the new 8,025 square feet new warehouse building to accommodate four truck bays, equipment storage, additional office space along with a parking lot and drive area on approximately 0.77-acre (33,483 square feet) portion of a larger 52.79-acre parcel of land. Although the portion of the project is undeveloped, the rest of the area encompasses several outbuildings and the Carson City Wastewater Treatment Facility. The site is located on properties owned by Carson City Public Works and Carson City Utilities. It is worth noting that as the building straddles a property line, a lot-line deletion will be processed for the property line that runs through the middle of the project. Further, the report will only focus on the 0.77-acre portion of the site, as that is the only area that will be disturbed. Of the 33,483 square feet of land that is to be improved, 27,500 square feet of that will be impervious. For further reference, a site development plan is included in Figure 1.

1.2 Existing Site Conditions

Although the portion of the project that will be constructed is undeveloped with native dirt and vegetation, the remainder of the area encompasses several outbuildings and the Carson City Wastewater Treatment Facility. The existing site has little topographic relief, flowing from the southwest to the northeast at less than a 2-percent average grade. There are no wetlands, nor does there appear to be any sensitive areas prone to erosion. There are several drainage basins scattered throughout the 52.79 acres, with one located just east of the proposed project. Additionally, there is an existing storm drain running through the site that will be utilized for drainage.

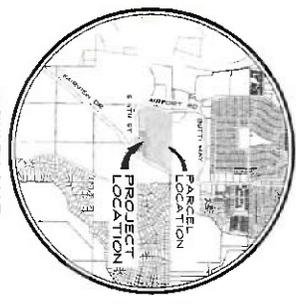
1.3 General Location

The project is located off 5th Street next to the existing sewer treatment plant in Carson City, Nevada. The property has been assigned Assessor's Parcel Number (APNs) 01003106 & 107. The subject parcel adjoins Airport Road to the west and Fairview

SITE IMPROVEMENT PLANS FOR WASTEWATER RESOURCE RECOVERY FACILITY WAREHOUSE CARSON CITY, NEVADA



FIGURE 2 - SITE PLAN



PROJECT SUMMARY

A.P.N.
OWNER
PROJECTS
EXISTING ZONING
FLOOD ZONE
TOTAL AREA
PARCEL TOTALS
TOTAL IMPROVED AREA - 8,000 SQ FT

PROJECT SUMMARY
CARSON CITY PUBLIC WORKS DEPT
CARSON CITY, NEVADA 89701
R.O. ANDERSON ENGINEERING, INC.
PROJECTS
FURNISH NEVADA 89403
(775) 762-2222

EXISTING ZONING
FR - FUTURE RESIDENTIAL
UNITS PER ACRE 10
FLOOD ZONE
3.71 AC
ALLOWED 5% PARKING SPACES
PROVIDED 22 PARKING SPACES
TOTAL IMPROVED AREA - 8,000 SQ FT

PROJECT CONTROL

DATE	DESCRIPTION
10/16/2023	DESIGN REVIEW
10/16/2023	REVISIONS
10/16/2023	FINAL PLAN
10/16/2023	SHEET INDEX

SHEET INDEX

- 0 - OVERALL SITE PLAN
- 02 - SITE, UTILITY & DRAINAGE PLAN

UTILITY COMPANY CONTACTS

POWER
NIPAC
1100 S. 10TH STREET, CARSON CITY, NV 89701
PHONE: (775) 884-2000

TELEPHONE
NIPAC
1100 S. 10TH STREET, CARSON CITY, NV 89701
PHONE: (775) 884-2000

WATER
NIPAC
1100 S. 10TH STREET, CARSON CITY, NV 89701
PHONE: (775) 884-2000

SEWER
NIPAC
1100 S. 10TH STREET, CARSON CITY, NV 89701
PHONE: (775) 884-2000

SIGNATURES

CARSON CITY UTILITIES
DATE

PRELIMINARY
For Review Only



NO.	DATE	REVISION BLOCK	BY

SCALE: 1" = 100'

R.O. Anderson

WASTEWATER RESOURCE RECOVERY FACILITY WAREHOUSE
BLDG ARCHITECTURE

OVERALL SITE PLAN

DESIGNER: JAL
ENGINEER: JAL
SCALE: 1" = 100'
DATE: 10/16/2023 OF 2 SHEETS

Drive to the east. Figure 2 – Vicinity Map provided below shows the relative location of the project site.

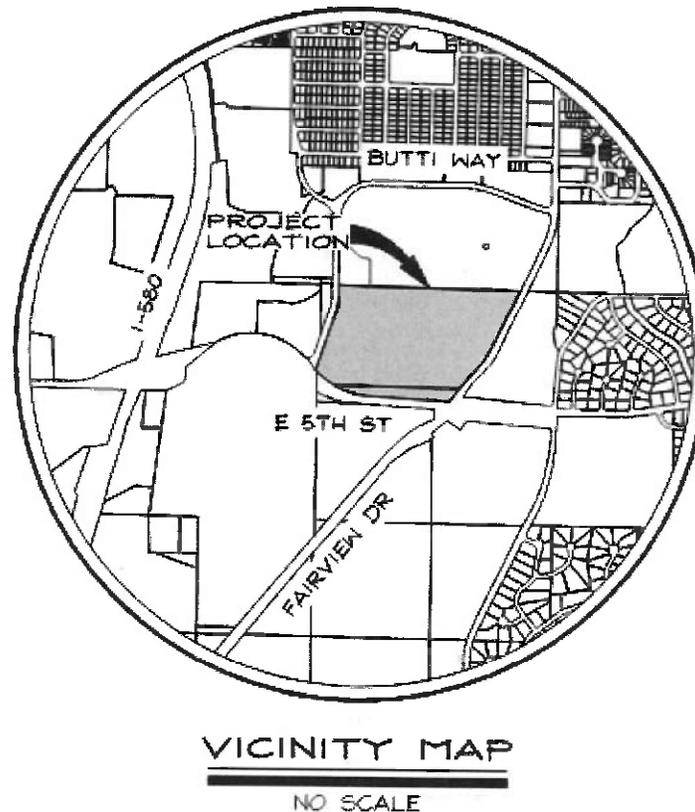


Figure 2 – Vicinity Map

2 Existing and Proposed Hydrology

2.1 Existing and Proposed Drainage Basin Boundaries

As the project takes up only a small footprint of the much larger parcel, the existing and proposed drainage boundaries largely remain the same. However, stormwater resulting from improvements will drain to an existing drainage pond just east of the project utilizing existing drainage infrastructure.

2.2 Design Storm

According to the Carson City Drainage Manual, (CCDM) manual storm runoff (rates and volume) can be estimated using Rational Formula, SCS TR-55 or HEC-1 methods if the drainage area is less than 100 acres. For this project, hydrologic modeling was performed using Autodesk® Hydraflow Hydrograph Extension Software, which includes NRCS (SCS) TR-55 procedures. Consistent with County development requirements, the pre-and post-development runoff peak flow rates and volumes were estimated for 10-, and 100-year return interval storm events. Although not specifically required by the Carson City Design Manual, the Nevada Department of Transportation (NDOT) requires the analysis of the 50-year storm event as well.

The point precipitation depth data was obtained from the National Oceanic Atmospheric Administration (NOAA) website (NOAA, 2023). The rainfall depth was uniformly imposed on the watershed using Natural Resources Conservation Services (NRCS) Type II, 24-hour synthetic rainfall distribution (USDA, 1986). The 24-hour precipitation depth data for various return periods are shown in Table 1, and the detailed data is included in Appendix B of this report.

Table 1 – 24-Hour Cumulative Point Precipitation Depth Data

Return Period (Year)	Rainfall Depth (Inches)
10	2.09
50	2.82
100	3.16

The pre-developed on-site watershed is generally defined by the existing undeveloped property consisting of approximately 0.77-acres. The existing ground on-site gently slopes to the north and east with a slope of less than 2-percent. The site is largely undeveloped and is characterized by vegetative cover that is mainly large sagebrush with a light understory of grasses and weeds.

The NRCS TR-55 hydrologic method (USDA, 1986) was used to estimate runoff peak flow rates and volumes for the pre- and post-developed conditions. The on-site watershed delineation was performed and the hydrologic model parameters such as contributing

drainage area, time of concentration (T_c), and NRCS Curve Numbers (CN) for both pre- and post-developed conditions were estimated.

The pre-developed condition was divided into a single hydrologic subbasin and is equal to that of the proposed condition. The hydrologic model input parameters such as contributing subbasin area, associated CNs, and T_c were estimated and inserted into the hydrologic model. A CN of 67 that represents a ground cover of Sagebrush with Grass Understory in fair condition derived from the weighted average of the soils within HSG 'C' and HSG 'D' was used to model the onsite existing watershed conditions. T_c was calculated and estimated to be 10 minutes. After all the required hydrologic model input parameters have been estimated, the hydrologic model was executed to estimate runoff peak flow rates and volumes for pre-developed conditions using Autodesk® Hydraflow Hydrograph Extension Software.

Table 2 – Runoff Peak Flows and Volumes for Pre-Developed Conditions summarizes the hydrologic model input parameters, expected runoff peak discharge, and volume for each of the precipitation events considered for the pre-developed watershed conditions. The results from the pre-developed model are included in Appendix A.

Table 2 – Runoff Peak Flows and Volumes for Pre-Developed Conditions

Watershed/ Outfall	Area (acre)	CN	T_c (min)	Runoff Peak Discharge (cfs)			Runoff Volume (cu-ft)		
				10-yr	50-yr	100-yr	10-yr	50-yr	100-yr
PRE-1	0.77	67	10	0.116	0.452	0.652	584	1,435	1,920

2.3 Existing Drainage Issues

The subject site is hydraulically isolated by the surrounding street infrastructure to the south, west and east. Additionally, the site is bordered by a walking path to the south and topography allows stormwater to flow to the north, which results in the any off-site watershed to be minimal. An existing catch basin along the frontage of East Fifth Street captures street run-off from the southeast and southwest and directs it through a 24-inch corrugated metal pipe to a drainage basin just east of the project site. Additionally, there exists a 12-inch CPP storm-drain pipe that collects runoff just west of the project site and directs it to the drainage pond to the east.

As the project will be utilizing the existing drainage pond directly to the east, it will be necessary to determine the existing flow directed to the pond. The pond's capacity will be analyzed in the technical drainage report.

2.4 On-Site and Downstream Drainage

The on-site soils have been classified by the United States Department of Agriculture (USDA), Natural Resources and Conservation Services (NRCS) as Urban Land (Map Unit Symbol: 71). The soil characteristics information was obtained from the soils report downloaded from the NRCS Web Soil Survey portal (NRCS, 2023), and is included in

Appendix B . Unfortunately, there is not enough information to determine a Hydrologic Soil Group (HSG) for the site itself; however, we can safely assume that the project soil belongs to HSG 'C' and 'D' based on analyzing the parcel just south of the site. Soils characterized by HSG 'C' are those exhibiting a slow infiltration rate (high runoff potential) when thoroughly wet. Soils characterized by HSG 'D' are those exhibiting very slow infiltration rate (high runoff potential) when thoroughly wet. Detailed NRCS soil survey information is included in Appendix B of this report.

As only the existing drainage pond to the east of the project property will be utilized to contain the entire impervious runoff resulting from the project, downstream drainage is denoted as only the pond to the east.

2.5 Floodplain

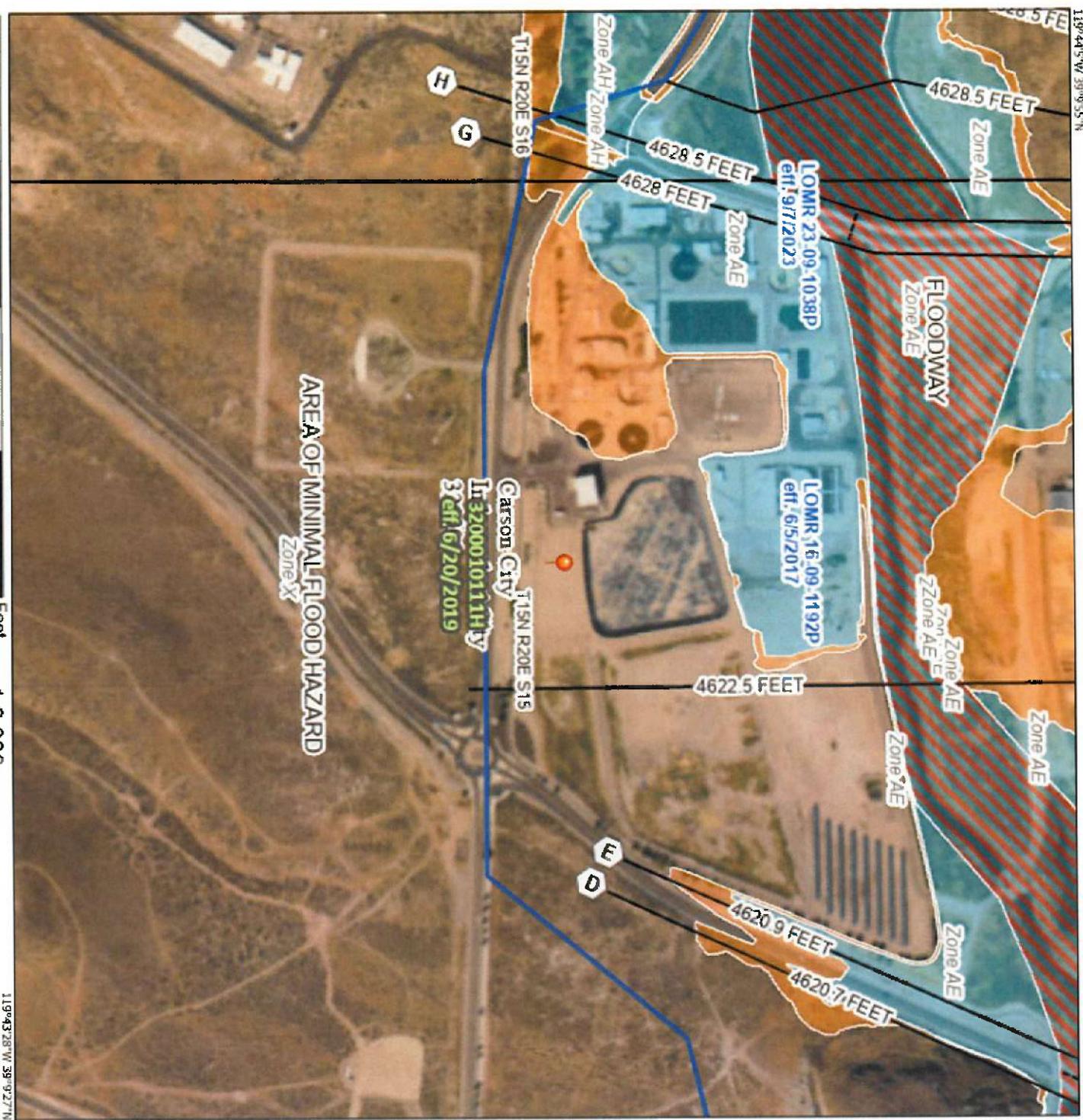
The Federal Emergency Management Agency (FEMA) identifies the parcel to be in "Zone X" as identified in the Flood Insurance Rate Map (FIRM) 3200010111H, last revised June 20, 2019. The "Zone X" designation represents areas of minimal flood hazard. A copy of the FIRM showing the project location in relation to the FEMA designated flood hazard boundaries is attached as Figure 4 – Effective FEMA FIRM.

2.6 Existing Irrigation

As the existing parcel is utilized for wastewater treatment, there is no irrigation of note on the project site.



119°44'5" W, 39°9'55" N



Legend

SEE THIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE)
 - Zone A, V, AE9
 - With BFE or Depth Zone AE, AO, AH, VE, AP
 - Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Area of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile (Zone X)
- Future Conditions 1% Annual Chance Flood Hazard (Zone X)
- Area with Reduced Flood Risk due to Levee, See Notes, Zone X
- Area with Flood Risk due to Levee, Zone D

OTHER AREAS

- Area of Minimal Flood Hazard (Zone X)
- Effective LOMIRs

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- 20+ Cross Sections with 1% Annual Chance Water Surface Elevation
- 17+ Coastal Transsect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transsect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS

- Digital Data Available
- No Digital Data Available
- Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **12/4/2023 at 5:52 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, continuity identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmapped areas cannot be used for regulatory purposes.

2.7 Sensitive and Critical Areas

There are no areas of sensitive or critical areas surrounding the proposed project site.

3 Erosion and Sediment Control Measures

3.1 Section 13

As Section 13 of Carson City Municipal Code applies only to erosion and sediment controls arising from construction activities resulting from projects greater than or equal to one acre in land disturbance, this specific section does not apply to this project, as the project is 0.77 of an acre.

3.2 Maintenance of BMPs

After installation, the proposed storm drain inlet shall be kept clear of debris, sediment, and trash at all times. The inlet will also be inspected and cleaned after each storm event to ensure that it is kept clean and clear.

4 Proposed Drainage Facilities

4.1 General Analysis

The overall approach to drainage for the project will be to collect post-developed run-off and direct it to an existing on-site stormwater retention facility (drainage pond) by tapping into an existing 12-inch CPP pipe. A detailed analysis of the pond volume will be shown in the subsequent technical drainage report.

4.2 Stormwater Quantity and Quality

Specific water quality treatment is not contemplated with this project; however run-off quality will be enhanced from being routed through the conveyance system and ponding in the retention pond.

Regarding quantity of the stormwater, as with the pre-developed, the post-developed condition was divided into a single hydrologic subbasin and is equal to that of the

proposed condition. The hydrologic model input parameters such as contributing subbasin area, associated CNs, and Tc were estimated and inserted into the hydrologic model. Combining the previously referenced CN of 67 and a CN of 98 (representing the roof and parking lot) along with the weighted average of the soils within HSG 'C' and HSG 'D' yielded a weighted average CN of 92. Tc was calculated and estimated to be 10 minutes. After all the required hydrologic model input parameters were estimated, the hydrologic model was executed to estimate runoff peak flow rates and volumes for post-developed conditions using Autodesk® Hydraflow Hydrograph Extension Software.

Table 3 – Runoff Peak Flows and Volumes for Post-Developed Conditions summarizes the hydrologic model input parameters, expected runoff peak discharge, and volume for each of the precipitation events considered for the post-developed watershed conditions. The results from the post-developed model are included in Appendix A.

Table 3 – Runoff Peak Flows and Volumes for Post-Developed Conditions

Watershed/ Outfall	Area (acre)	CN	Tc (min)	Runoff Peak Discharge (cfs)			Runoff Volume (cu-ft)		
				10-yr	50-yr	100-yr	10-yr	50-yr	100-yr
POST	0.77	92	10	1.456	2.169	2.501	3,799	1,435	6,666

5 Conclusions and Recommendations

5.1 Compliance with Carson City

The proposed improvements have been designed to generally comply with drainage codes for Carson City.

5.2 Compliance with FEMA Requirements

The project is located within Zone X. There are no special requirements for construction within this designation. Finished floor of the proposed building will be elevated to provide positive drainage away from foundations.

5.3 Impact of proposed Development

There is no negative impact anticipated to adjacent properties due to the development of this site. The existing on-site retention pond should mitigate the increase in flow rate and volume caused by the proposed development and will provide some measure of mitigating water quality concerns.

5.4 Recommendations

The following specific recommendations are applicable to this project:

- Ensure downstream drainage infrastructure is cleaned and operable prior to construction.
- Install and maintain temporary BMPs until completion of the project.
- Stabilize stockpiled material.

5.5 Conclusions

The project has been designed to mitigate potential impacts to storm water runoff caused by the proposed improvements.

6 Appendices

Appendix A Hydrology

**Appendix B NRCS Web Soil Survey, Precipitation Frequency Data Server,
Adjacent Property NRCS Web Soil Survey**

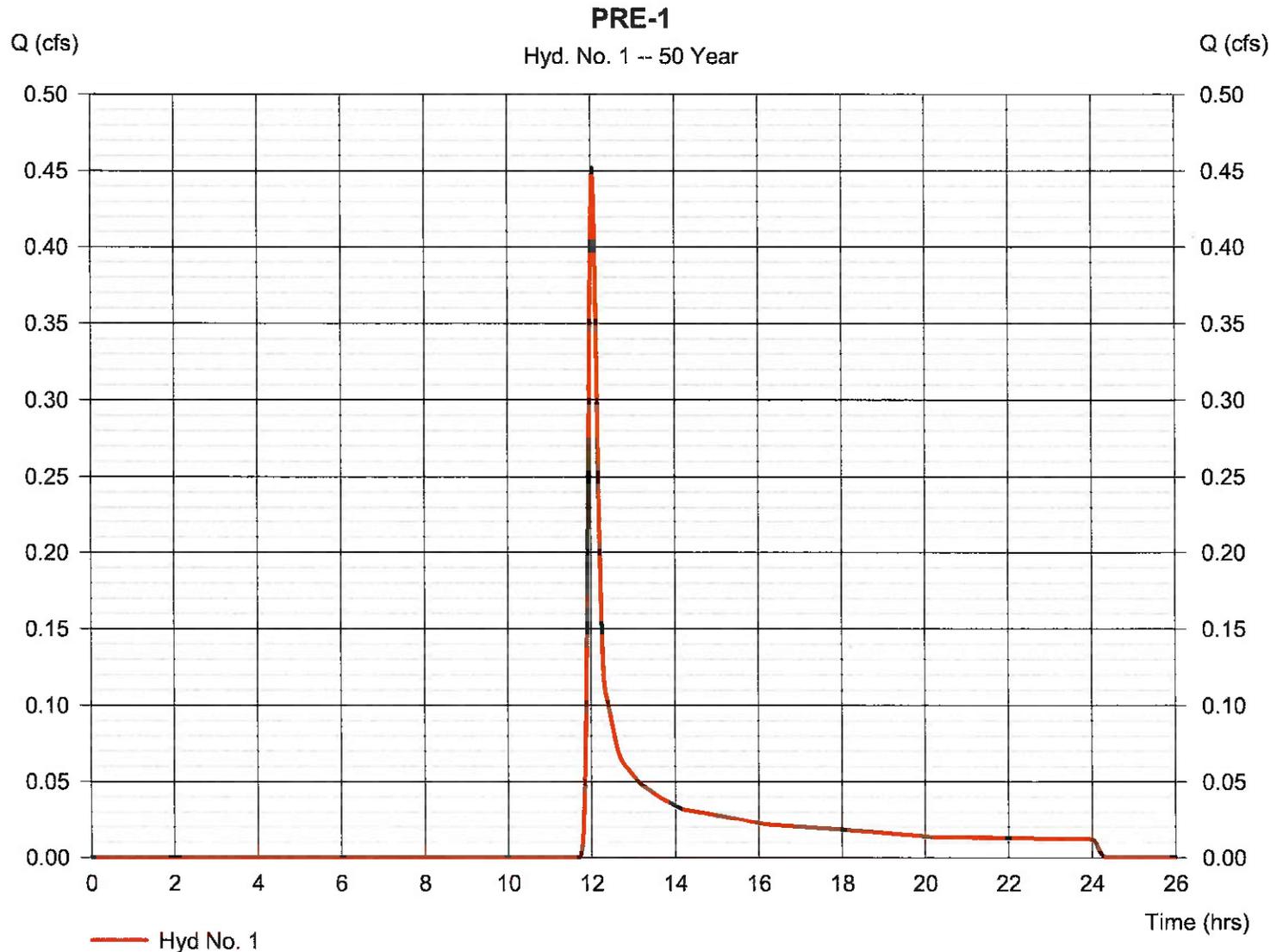
Appendix A

Hydrograph Report

Hyd. No. 1

PRE-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.452 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 1,435 cuft
Drainage area	= 0.770 ac	Curve number	= 67
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

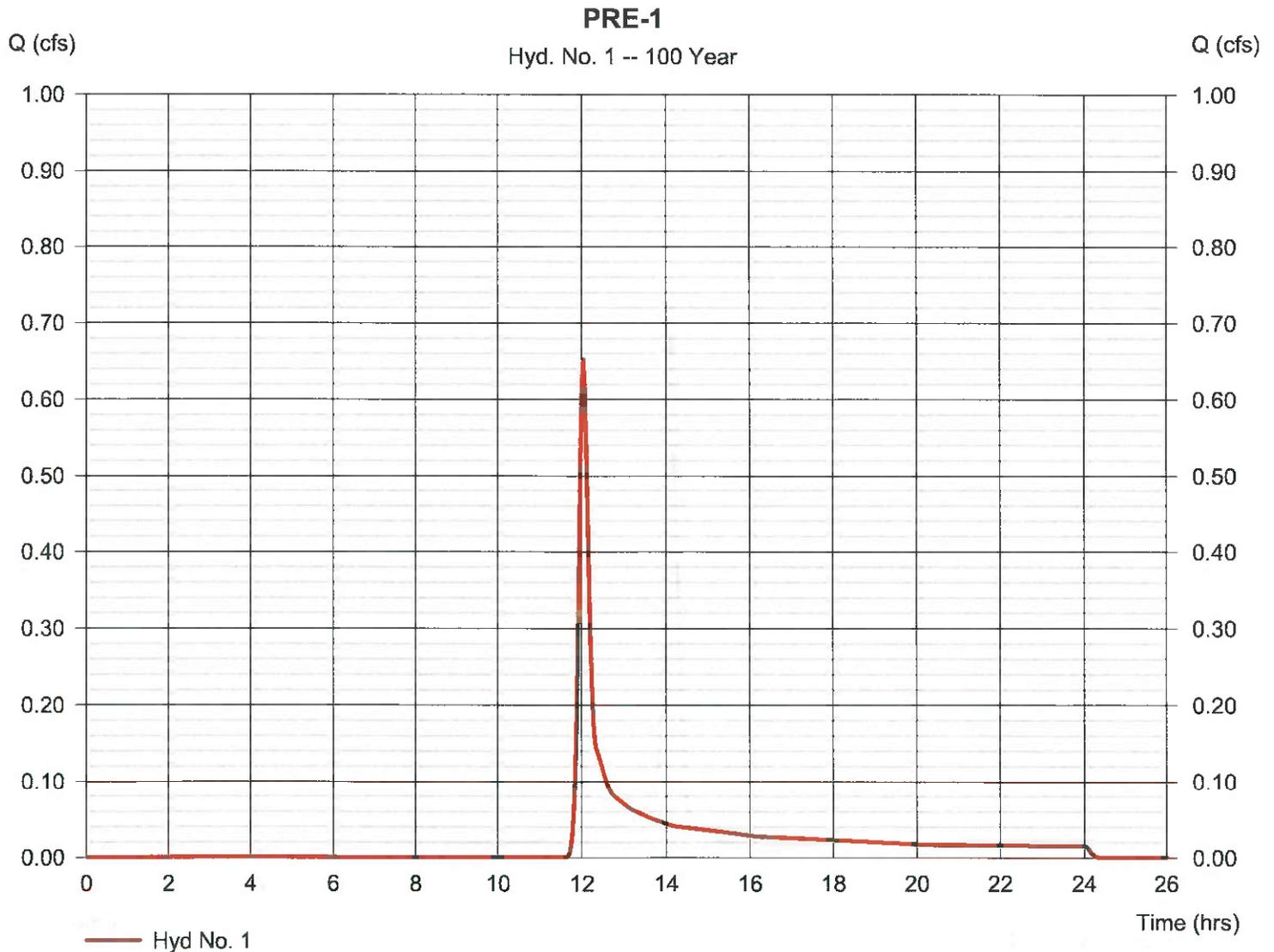
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Tuesday, 12 / 5 / 2023

Hyd. No. 1

PRE-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.652 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.03 hrs
Time interval	= 2 min	Hyd. volume	= 1,920 cuft
Drainage area	= 0.770 ac	Curve number	= 67
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.16 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

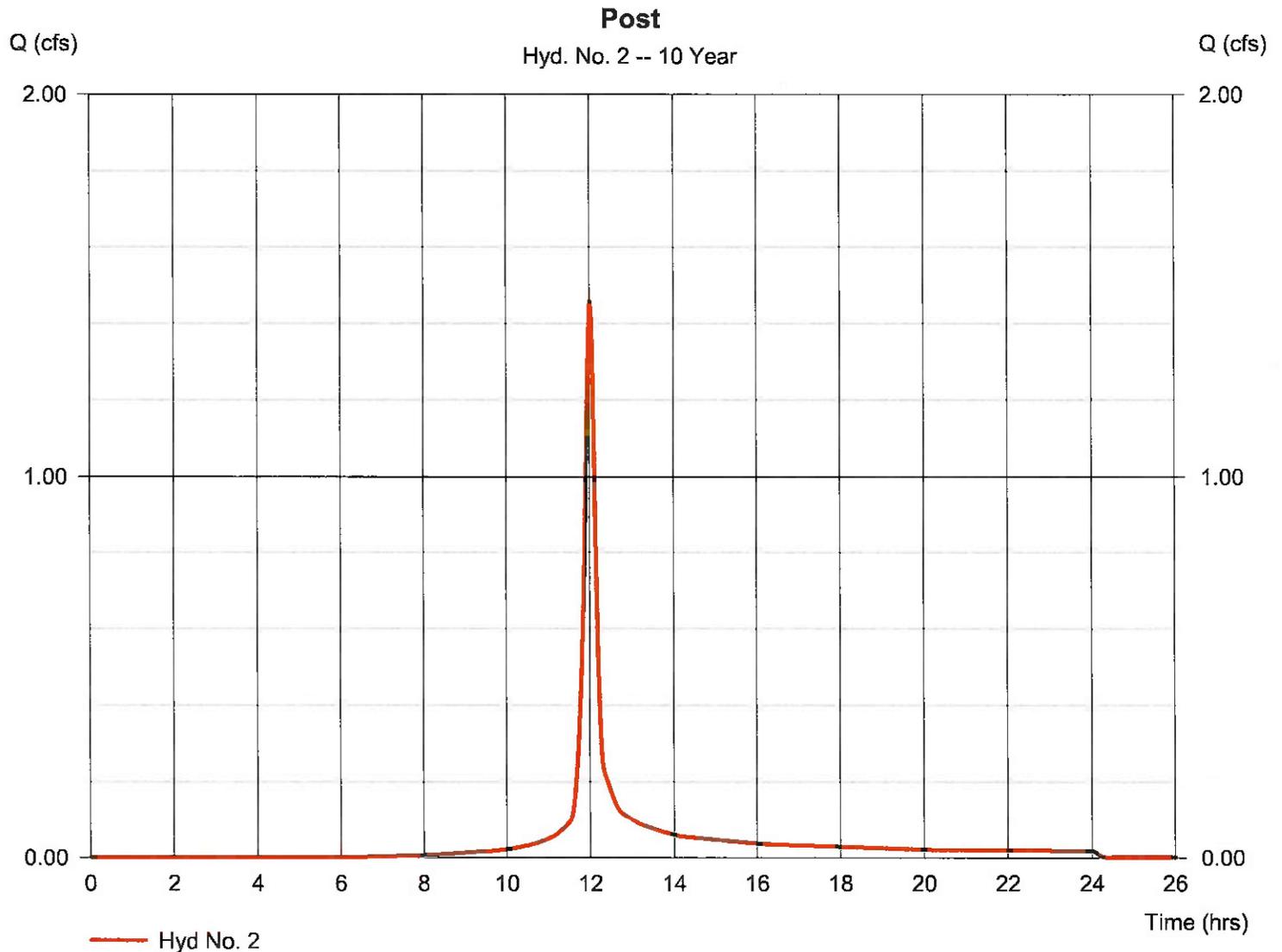
Wednesday, 12 / 6 / 2023

Hyd. No. 2

Post

Hydrograph type	= SCS Runoff	Peak discharge	= 1.456 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 3,799 cuft
Drainage area	= 0.770 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.140 \times 67) + (0.630 \times 98)] / 0.770$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

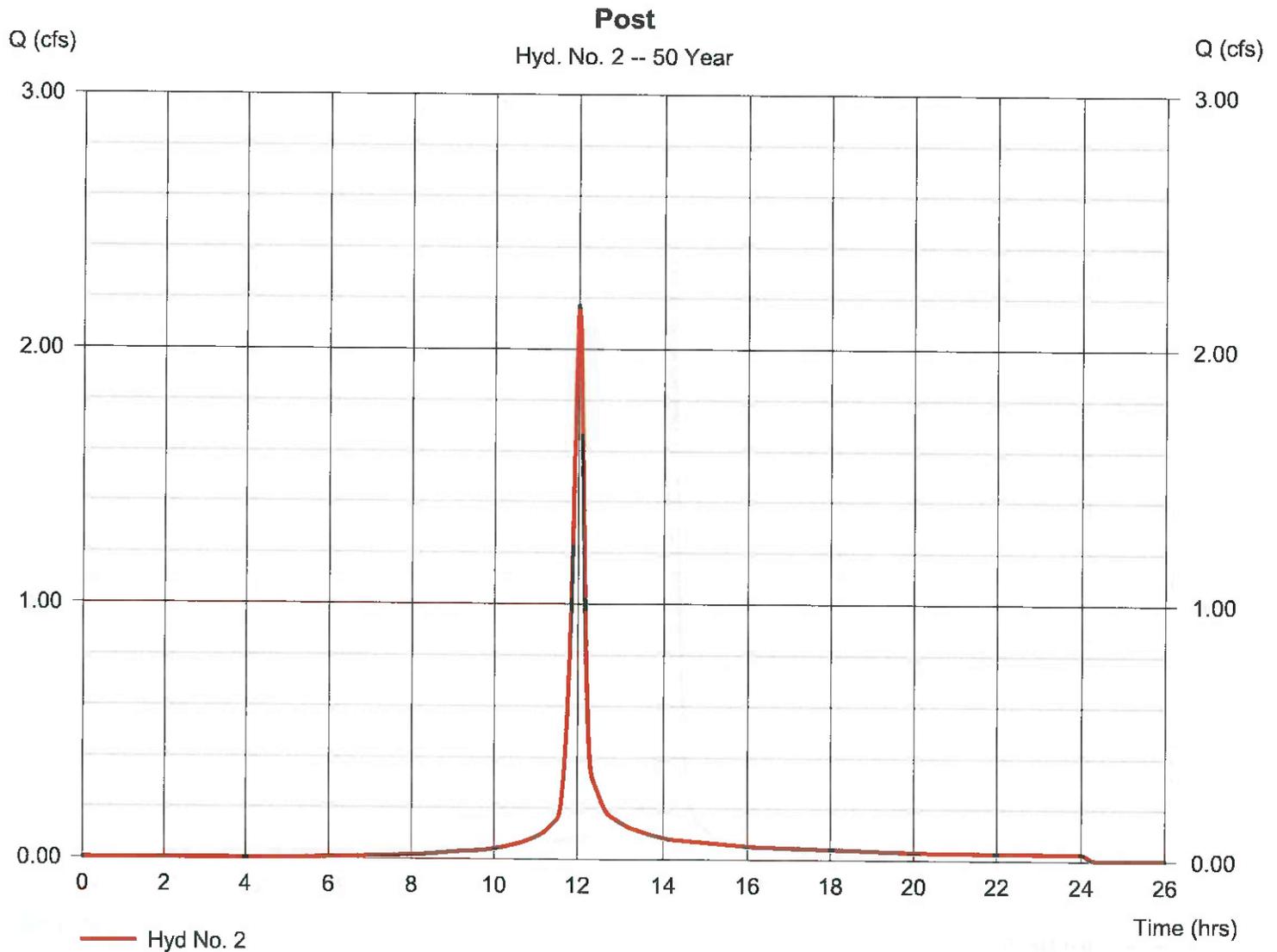
Wednesday, 12 / 6 / 2023

Hyd. No. 2

Post

Hydrograph type	= SCS Runoff	Peak discharge	= 2.169 cfs
Storm frequency	= 50 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 5,741 cuft
Drainage area	= 0.770 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.82 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = $[(0.140 \times 67) + (0.630 \times 98)] / 0.770$



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

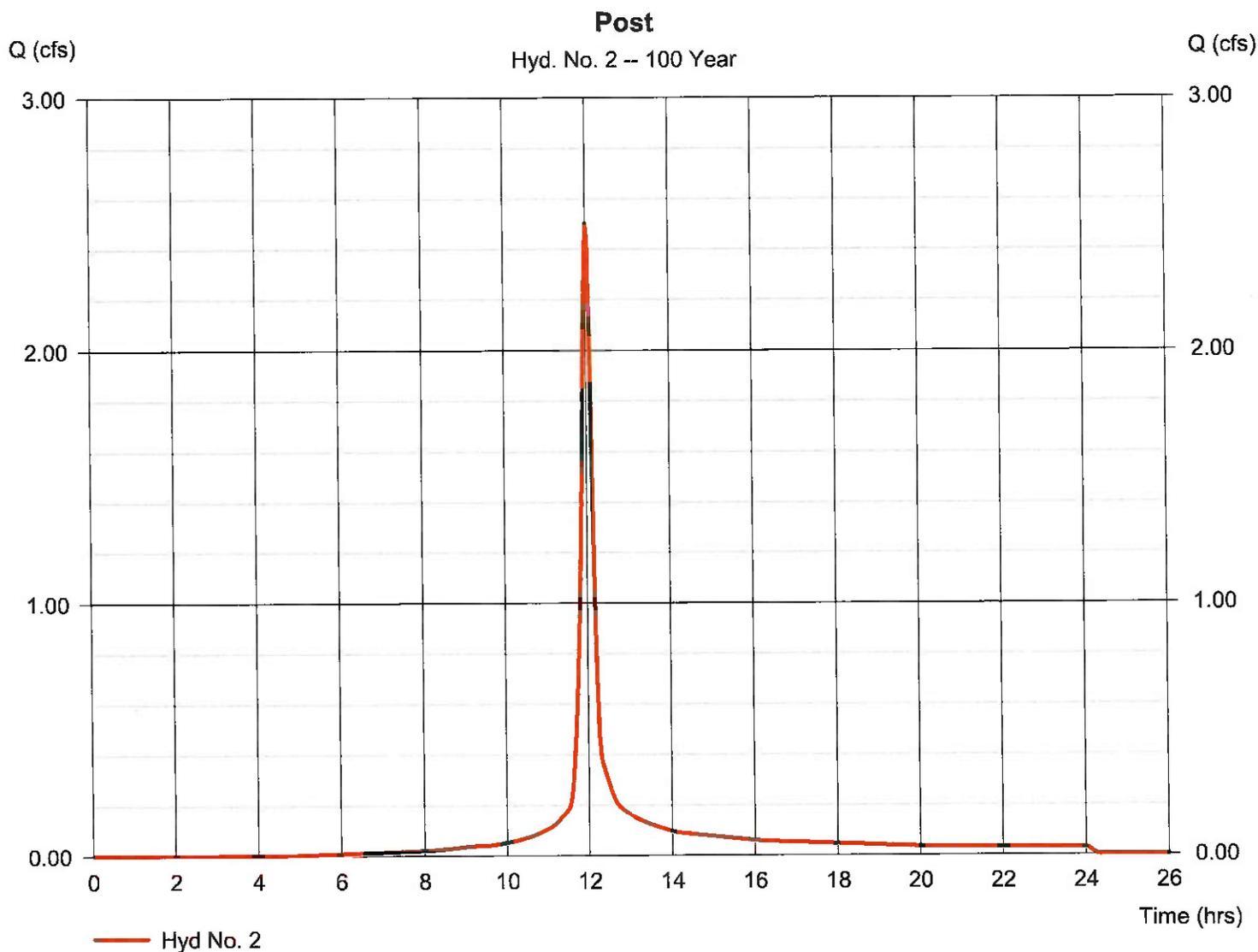
Wednesday, 12 / 6 / 2023

Hyd. No. 2

Post

Hydrograph type	= SCS Runoff	Peak discharge	= 2.501 cfs
Storm frequency	= 100 yrs	Time to peak	= 12.00 hrs
Time interval	= 2 min	Hyd. volume	= 6,666 cuft
Drainage area	= 0.770 ac	Curve number	= 92*
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 3.16 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

* Composite (Area/CN) = [(0.140 x 67) + (0.630 x 98)] / 0.770



Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2020.4

Tuesday, 12 / 5 / 2023

Hyd. No. 1

PRE-1

Hydrograph type	= SCS Runoff	Peak discharge	= 0.116 cfs
Storm frequency	= 10 yrs	Time to peak	= 12.07 hrs
Time interval	= 2 min	Hyd. volume	= 584 cuft
Drainage area	= 0.770 ac	Curve number	= 67
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= User	Time of conc. (Tc)	= 10.00 min
Total precip.	= 2.09 in	Distribution	= Type II
Storm duration	= 24 hrs	Shape factor	= 484

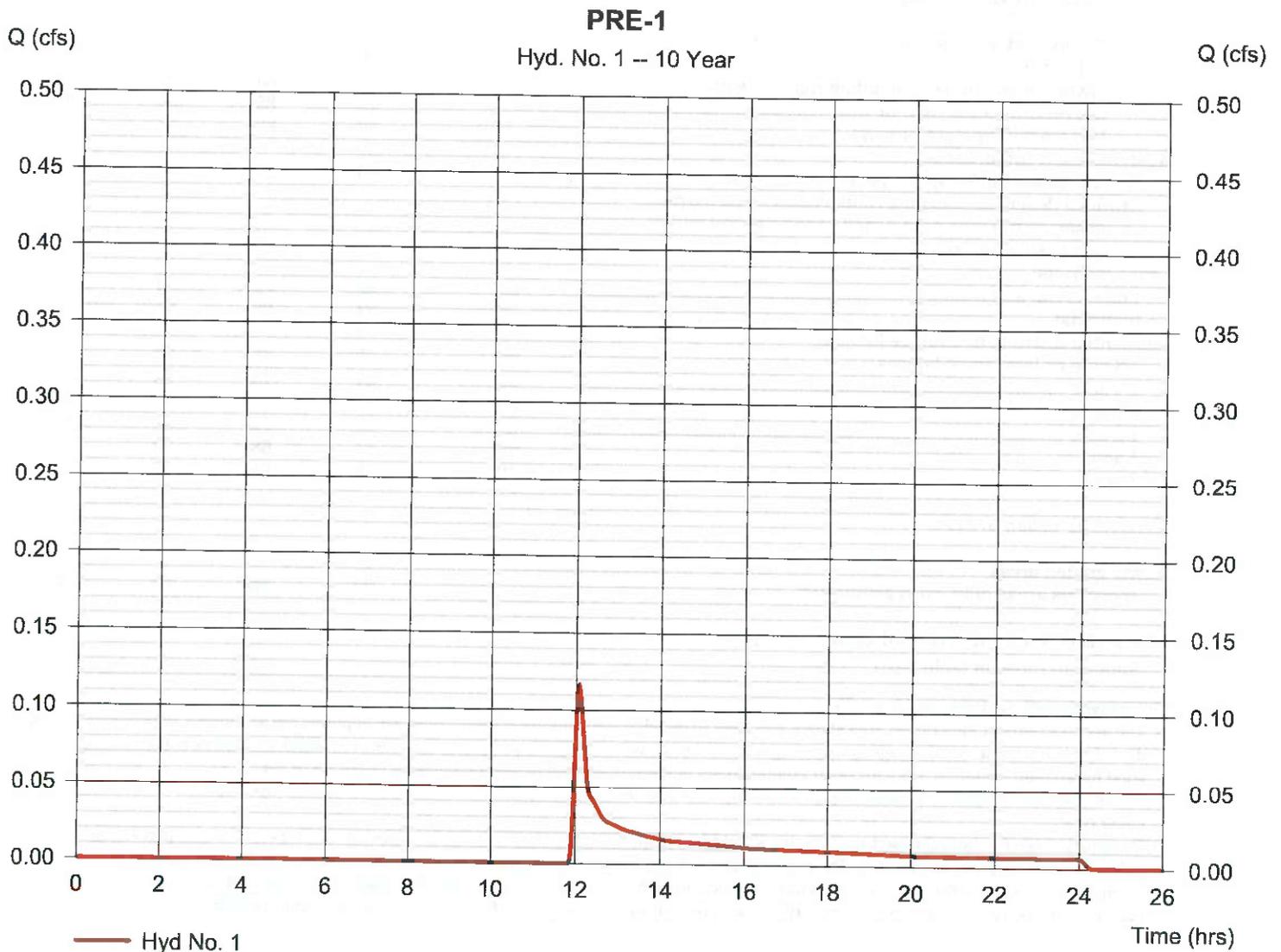


Table 2-2a Runoff curve numbers for urban areas ^{1/}

Cover description	Average percent impervious area ^{2/}	Curve numbers for hydrologic soil group			
		A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
Open space (lawns, parks, golf courses, cemeteries, etc.) ^{3/} :					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only) ^{4/}		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
<i>Developing urban areas</i>					
Newly graded areas					
(pervious areas only, no vegetation) ^{5/}		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

¹ Average runoff condition, and $I_a = 0.2S$.² The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.³ CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.⁴ Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.⁵ Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4 based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2b Runoff curve numbers for cultivated agricultural lands ^{1/}

Cover description			Curve numbers for hydrologic soil group			
Cover type	Treatment ^{2/}	Hydrologic condition ^{3/}	A	B	C	D
Fallow	Bare soil	—	77	86	91	94
	Crop residue cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row crops	Straight row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & terraced (C&T)	Poor	66	74	80	82
		Good	62	71	78	81
C&T+ CR	Poor	65	73	79	81	
	Good	61	70	77	80	
Small grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C&T	Poor	61	72	79	82
		Good	59	70	78	81
C&T+ CR	Poor	60	71	78	81	
	Good	58	69	77	80	
Close-seeded or broadcast legumes or rotation meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C&T	Poor	63	73	80	83
		Good	51	67	76	80

^{1/} Average runoff condition, and $I_a=0.2S$

^{2/} Crop residue cover applies only if residue is on at least 5% of the surface throughout the year.

^{3/} Hydraulic condition is based on combination factors that affect infiltration and runoff, including (a) density and canopy of vegetative areas, (b) amount of year-round cover, (c) amount of grass or close-seeded legumes, (d) percent of residue cover on the land surface (good $\geq 20\%$), and (e) degree of surface roughness.

Poor: Factors impair infiltration and tend to increase runoff.

Good: Factors encourage average and better than average infiltration and tend to decrease runoff.

Table 2-2c Runoff curve numbers for other agricultural lands ^{1/}

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

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

² *Poor*: <50% ground cover or heavily grazed with no mulch.

Fair: 50 to 75% ground cover and not heavily grazed.

Good: > 75% ground cover and lightly or only occasionally grazed.

³ *Poor*: <50% ground cover.

Fair: 50 to 75% ground cover.

Good: >75% ground cover.

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

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

⁶ *Poor*: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.

Fair: Woods are grazed but not burned, and some forest litter covers the soil.

Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Table 2-2d Runoff curve numbers for arid and semiarid rangelands ^{1/}

Cover description		Curve numbers for hydrologic soil group			
Cover type	Hydrologic condition ^{2/}	A ^{3/}	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

^{1/} Average runoff condition, and $I_{a1} = 0.2S$. For range in humid regions, use table 2-2c.

^{2/} Poor: <30% ground cover (litter, grass, and brush overstory).

Fair: 30 to 70% ground cover.

Good: > 70% ground cover.

^{3/} Curve numbers for group A have been developed only for desert shrub.

Appendix B



United States Department of Agriculture

NRCS

Natural Resources Conservation Service

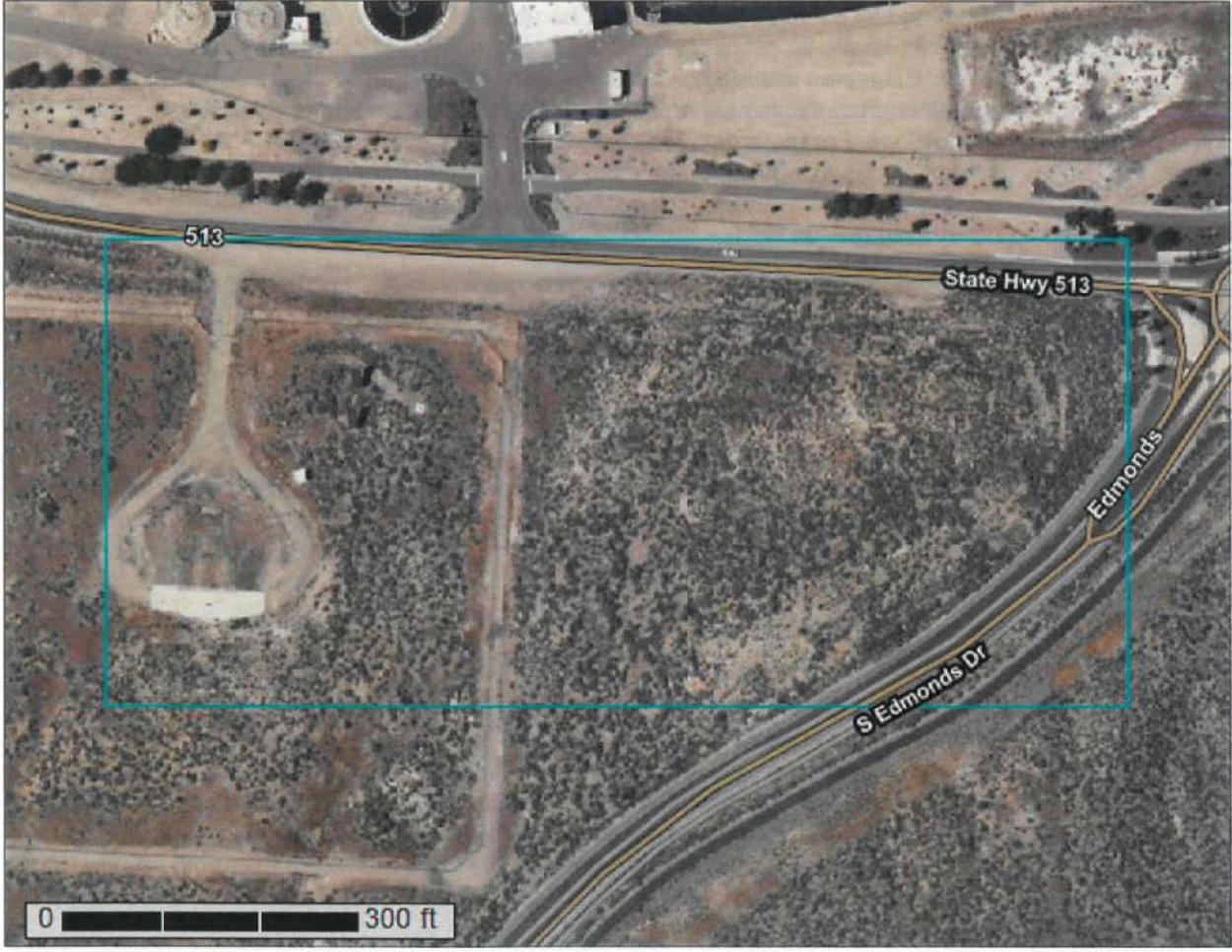
A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Carson City Area, Nevada

Preface

The National Cooperative Soil Survey (NCSS) is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants. The NCSS is the largest soil survey program in the world, providing soil information to farmers, ranchers, and landowners. The Carson City Area, Nevada, is a part of the NCSS. This report is a product of the NCSS. It provides information on the soil resources of the Carson City Area, Nevada. This information is intended to help the landowner make decisions on various land uses. The landowner is responsible for identifying and complying with existing and proposed regulations.

Various land use regulations of Federal, State, and local governments may require special methods on land use or land treatment. It is the landowner's responsibility to determine if and when such regulations apply to the land. The information in this report is intended to help the landowner make decisions on various land uses. The landowner is responsible for identifying and complying with existing and proposed regulations.



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map shows the distribution of soil types in the study area. The map is based on field observations and soil sampling. The soil types are identified by their color and texture. The map is a valuable tool for soil resource management and planning.