WHEN RECORDED, MAIL TO:
Utah Department of Transportation
Right of Way, Fourth Floor
Box 148420
Salt Lake City, UT 84114-8240

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Book - 10550 Pg - 9588-9672
GARY W. OTT
RECORDER, SALT LAKE COUNTY, UTAH
UT ST-DEPT OF TRANSPORTATION
BOX 148420 ATT: JASON HENLEY
SLC UT 84114-8420
BY: MSP, DEPUTY - WI 85 P.

UTAH DEPARTMENT OF TRANSPORTATION DRAINAGE AGREEMENT

Salt Lake County Tax ID No. 15-15-177-019-0000

This Drainage Agreement made and entered into this 1st day of February 20 17 between Utah Department of Transportation ("Department") and CRE Properties, LLC ("Permitee"), who owns the property described in Exhibit A.

RECITALS

The Permittee (property owner) desires to construct a drainage system and a drainage connection within the Department Right of Way subject to the requirements and conditions described in the Permit.

Department's Policy 08A-06 requires the Permittee to sign the Drainage Agreement as part of the permitting process for a drainage connection.

The parties agree as follows:

(1) **COMPLIANCE:** Permittee must comply with the conditions in the permit and applicable state and federal statutes, regulations and rules. The Department may perform inspection of Permittee's drainage system to monitor compliance with the Permit and with state and federal statutes, regulations, and rules. Permittee grants the Department access to the Permittee's property for inspection or to perform any repairs to prevent damage to the Department's Right of Way. The Department's inspection does not relieve the Permittee of its responsibilities in meeting the Permit conditions. The Permittee is responsible for the Department's inspection costs. Permittee's responsibilities include:

PMP

a) Permittee is responsible for repairing and restoring any portion of the Department Right of Way and drainage systems located therein that may be damaged as a result of making the drainage connection or as the result of any subsequent drainage originating from the Permittee's property.

b) Permittee must not increase its drainage discharge into the Department's drainage system without the written permission of the Department.

c) A bonded contractor must apply for the required permit to install drainage systems in the Department Right of Way prior to the commencement of any such work.

d) The Permittee is responsible to obtain environmental clearances, permits, or other approvals from any other local, state or federal agency that may have regulatory jurisdiction or oversight.

(2) MAINTENANCE: Permittee's drainage system must at all times be maintained, repaired, constructed, and operated by and at the expense of the Permittee. The drainage system will be serviced without access from any interstate highway or ramp. The Department may notify the Permittee of any maintenance requirements if the Permittee fails to maintain the drainage system. The Department reserves the right, without relieving the Permittee of its obligations, to reconstruct or make repairs to the drainage system, as it may consider necessary, and the Permittee must reimburse the Department for its cost if the Permittee fails to comply with the Department's written notification and complete the required maintenance.

(3) FUTURE IMPACTS: The Department has the right to change its drainage system for any future transportation project. If the Department's drainage system is reconstructed or modified, the Department reserves the right to hold the Permittee responsible for the cost to reconnect to the Department's drainage system. The Department is not responsible for any costs the Permittee incurs due to the drainage system being reconstructed or modified.

(4) LIABILITY: Pursuant to R930-7-6(2)(b), the Permittee is required to guarantee satisfactory performance under this Permit. The Department may proceed against Permittee to recover all expenses incurred by the Department, its employees, or contractors in repairing the sections of roadway damaged by the Permittee or its drainage system, including the failure to restore the Right of Way to Department standards. The Permittee will be liable for all costs the Department incurs under this agreement.

The Permittee will indemnify, defend, and hold harmless the Department, its employees, and the State of Utah from responsibility for any damage or liability arising from Permittee's construction, maintenance, repair, or any other related operation of the drainage system pursuant to the Permit issued under this agreement.

The Permittee will not hold the Department liable for damages resulting from any back-up or flow into the Permittee's drainage system or property. The Permittee accepts all risks associated with the connection to the Department's drainage system. The Permittee is responsible for all liability resulting from the discharge of pollutants into the Department's drainage system from its property or drainage system.

(5) CANCELLATION OF PERMIT: Any failure on the part of Permittee to comply with the terms and conditions set forth in the Permit or this Agreement may result in cancellation of the Permit. Failure of the Permittee to pay any sum of money for costs incurred by the Department in association with inspection, reconstruction, repair, or maintenance of the drainage system may also result in cancellation of the Permit. Non-compliance with either the Permit or Agreement may result in the Department removing the drainage system and restoring the highway and Right of Way at the sole expense of the Permittee. The Department will notify the Permittee in writing prior to any cancellation, setting forth the violations, and will provide the Permittee a reasonable time to correct the violations to the satisfaction of the Department. The Department may order the Permittee to remove its drainage system if the violations are not corrected.

(6) SUCCESSORS AND ASSIGNS: All covenants, obligations and agreements will be binding upon the parties, their successors and assigns and run with the land as described in Exhibit A until the drainage connection is removed from the Department's Right of Way.

(7) MISCELLANEOUS:

a) Each party agrees to undertake and perform all further acts that are reasonably necessary to carry out the intent and purpose of the Agreement at the request of the other party.

b) This Agreement does not create any type of agency relationship, joint venture, or partnership between the Department and Permittee.

c) The failure of either party to insist upon strict compliance of any of the terms and conditions, or failure or delay by either party to exercise any rights or remedies provided in this Agreement, or by law, will not release either party from any obligations arising under this Agreement.

d) This Agreement shall be deemed to be made under and shall be governed by the laws of the State of Utah in all respects. Each person signing this Agreement warrants that the person has full legal capacity, power and authority to execute this Agreement for and on behalf of the respective party and to bind such party.

e) If any portion of this Agreement is held to be invalid or unenforceable for any reason by a court of competent jurisdiction, such invalidity or unenforceability shall not affect any other provision, and this Agreement shall be construed as if such invalid or unenforceable provision had never been included.

IN WITNESS WEREOF, the parties hereto have executed this Agreement the day and year first above written.

CURRENT PROPERTY OWNER/PERMITTEE			
Name Printed:	CRE Properties, LLC	Signature:	Patricia M. Rawlings

State of Utah) IDAHO
County of BANNOCK)
On this 6 day of February, in the year 2017, the owner of the property personally appeared before me as the signer of this agreement, who duly acknowledged to me that he/she executed this agreement pursuant to the authority delegated to him/her as the current property owner of said property. Witness my hand and official seal.

(NOTARY SEAL)

GARY A. CLARK NOTARY PUBLIC STATE OF IDAHO

Notary Public

UTAH DEPARTMENT OF TRANSPORTATION – Region Permits Officer			
Name Printed:	NATHAN STEPHENS	Signature:	

State of Utah)
County of Salt Lake)
On this 20 day of April, in the year 2017, the owner of the property personally appeared before me as the signer of this agreement, who duly acknowledged to me that he/she executed this agreement pursuant to the authority delegated to him/her as the current property owner of said property. Witness my hand and official seal.

(NOTARY SEAL)

Notary Public

NOTARY PUBLIC
ASHLEE ANN PARRISH
Commission No. 669987
Commission Expires
SEPTEMBER 12, 2017
STATE OF UTAH

EXHIBIT A (Legal Description of Permittee's Property)

LOT 1 LEGAL DESCRIPTION

A PARCEL OF LAND LOCATED WITHIN SOUTHEAST QUARTER OF THE NORTHWEST QUARTER OF SECTION 15, TOWNSHIP 1 SOUTH, RANGE 1 WEST, SALT LAKE BASE MERIDIAN, SAID PARCEL BEING FURTHER DESCRIBED AS FOLLOWS:

COMMENCING AT A MAG NAIL, MARKING THE NORTH QUARTER CORNER OF SAID SECTION 15, T1S, R1W, SLBM; THENCE S00°10'10"E ALONG THE QUARTER SECTION LINE 2229.74 FEET; THENCE WEST, 70.94 FEET TO THE WEST RIGHT OF WAY LINE OF REDWOOD ROAD AND THE POINT OF BEGINNING;

THENCE S00°03'08"E, ALONG SAID REDWOOD ROAD WEST RIGHT OF WAY, 177.26 FEET TO A POINT

ON THE NORTH LINE OF THE MAVERIK PROPERTY;

THENCE S89°57'55"W ALONG SAID NORTH LINE, 214.76 FEET TO A POINT BEING THE NORTHWEST CORNER OF THE MAVERIK PROPERTY;

THENCE S89°57'55"W, 28.07 FEET;

THENCE N00°03'08"W, 177.05 FEET;

THENCE N89°54'52"E, 242.83 FEET TO THE POINT OF BEGINNING;

SAID PARCEL CONTAINS 43,018 SQUARE FEET OR 0.99 ACRES MORE OR LESS.

EXHIBIT B

(include drainage plan showing state route, mile post and location of all drainage systems and drainage calculations)

SEE NEXT PAGE: Storm Water Calculations for the Proposed Carl's Jr. Restaurant, located at milepost marker 56 and State Route SR-68, including the plan of all drainage systems.

EXHIBIT B

STORM WATER CALCULATIONS

FOR THE PROPOSED CARL'S JR. RESTAURANT

Redwood Road and 1700 South
Salt Lake City, UT

CEI Engineering Associates, Inc.

CEI Project No. 29630.0

Rev-0
January 2017

PROFESSIONAL ENGINEER
No. 7420338-2202
ANDREW D. SLYTER
STATE OF UTAH

1/26/2017

Presented By
CEI Engineering Associates, Inc.
3108 SW Regency Parkway, Suite 2
Bentonville, AR 72712
Ph: (479) 273-9472 / Fax: (479) 273-0844

INTENT OF REPORT:

It is the intent of this report to show that the stormwater management facilities designed for the Carl's Jr proposed near the northwest corner of south Redwood Road and West 1700 South and Salt Lake City, Utah described within meets or exceeds the requirements of the Utah Department of Transportation Development Standards, addressing runoff control requirements and safe conveyance of stormwater within and/or from the site without damage to downstream properties or the UDOT drainage system.

PROJECT LOCATION AND CHARACTERISTICS:

The subject site is bounded by 1700 South on the south, Redwood Road on the east, vacant land on the west, and commercial development on the north. The site is located at Milepost Marker 56 and State Route SR-68. The site is approximately 0.99 acres. The Carl's Jr. will be single-story and approximately 2,450 square feet with a 400 square foot patio and associated parking and drive-thru lanes. See *Appendix A – Site Location Map*.

Geotechnical investigation encountered approximately 6 feet of sandy clay. The sandy clay is fine to coarse grain sand, brown to dark brown, moist and stiff. Underlying the sandy clay is silty sand from depths ranging 6 to 14 feet. The silty sand is light brown to brown, moist to saturated and medium dense. Sandy clay was encountered under the silty sand and continued till the termination of the borings. It is olive with gray and light brown, saturated and soft. See *Appendix B- Soil Information*.

Flood Zone: No portion of the existing site is located within a defined 100-year floodplain, but is located within Zone X (see *Appendix C* for Flood Insurance Rate Map Panel #49035C0280E, revised September 21, 2001). Zone X is defined as Areas determined to be outside the 500-year floodplain.

RUNOFF CALCULATION METHODOLOGY:

The peak flows for the design storms were calculated using the Rational Method, $Q=CC_fiA$
where

Q = Peak flow rate in cubic feet per second (cfs)
C = Runoff Coefficient
C_f= Frequency Factor
i = Rainfall intensity in inches per hour
A = Watershed area in acres

The Rational Method formula employs the following assumptions:

a) The rainfall intensity, i, is uniformly distributed over the entire watershed
b) The runoff rate, Q, resulting from any rainfall intensity, i, is a maximum when this rainfall intensity lasts as long or longer than the time of concentration, tc.
c) The maximum runoff resulting from a rainfall intensity is a simple fraction of such rainfall intensity.
d) The frequency of peak runoff is the same as that of the rainfall intensity for a given time of concentration, tc.
e) The runoff coefficient is the uniform within the watershed for various storm frequencies and durations.

The runoff coefficient, C, was chosen as 0.9. C_f was not used in this circumstance, as the product of C_f and C was greater than 1. The intensity, i, was calculated in Hydraflow using the estimate information provided by NOAA Atlas 14, shown below in Table 1: Intermediate Intensity Values.

Table 1: Intermediate Intensity Values

Intermediate Intensity Values (in/hr)				
Return-Period	**5-Minute**	**15-Minute**	**30-Minute**	**60-Minute**
2-Year	1.75	1.00	0.70	0.40
5-Year	2.45	1.60	1.00	0.65
10-Year	3.00	1.95	1.35	0.80
25-Year	4.00	2.50	1.80	1.10
50-Year	5.00	3.25	2.10	1.45
100-Year	6.10	3.95	2.60	1.70

Hydraflow Storm Sewers Extension for AutoCAD Civil 3D is a full-featured storm sewer design package. Users input known variables (C values, site area, and precipitation depth), and Hydraflow uses a user-specific method (Rational in this case) to calculate generated flow. Hydraflow also allows the user to model storm sewer designs in order to verify capacity.

After the required variables were entered, Hydraflow calculated the peak discharge to be 5.424 cfs for the 100-year event. See Table 2: Hydraflow Peak Discharge Results. For other storm frequencies, see *Appendix D: Hydrographs*.

Table 2: Hydraflow Peak Discharge Results

Hyd. No. 1

Post Development Runoff

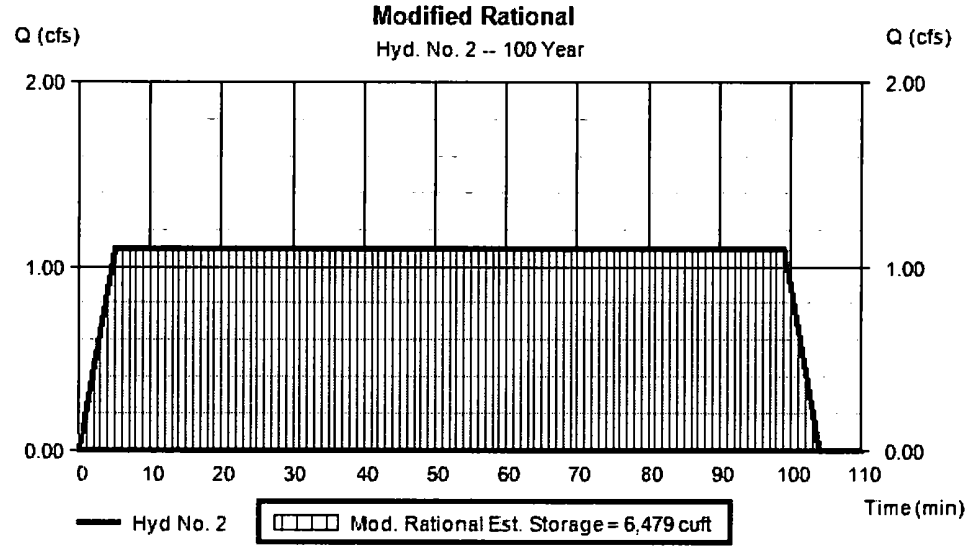
Hydrograph type	= Rational	Peak discharge	= 5.424 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 1,627 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 6.088 in/hr	Tc by User	= 5.00 min
IDF Curve	= Salt Lake City IDF.IDF	Asc/Rec limb fact	= 1/1

DETENTION SIZING METHODOLOGY:

The proposed detention facilities have been designed to handle the 24-hour duration, 100-year frequency storm event using the Modified Rational Method. This report was prepared in accordance with the allowable release rates stipulated by the Utah Department of Transportation, 0.2 cfs/acre. At a 0.99 acre site, this release rate is 0.2 cfs. Due to this constraint, the system has been designed instead to release water through infiltration. The infiltration rate is a function of the soil's hydrologic soil group. For this site, a large portion is classified through the Web Soil Survey as "made land", and the remainder of the site is classified as Hydrologic Soil Group C. The infiltration rate of Group C is 0.2 inches/hour, per the Minnesota Pollution Control Agency.

After considering the target infiltration rate of 0.2 inches/hour, the underground system will need to detain 6,479 cubic feet. See Image 1: Hydraflow Storage Estimate.

Image 1: Hydraflow Storage Estimate.



The storage capacity of the proposed pond is 6,677 cubic feet and will accommodate the 100-year storm event, as required by the Utah Department of Transportation. See *Appendix E: Pond Report* for pond storage details.

DETENTION POND CHARACTERISTICS:

The underground detention systems will consist of underground chambers with an open bottom to allow water to infiltrate out. There will be four barrels eighty-five feet long and five feet in diameter. The system will be designed and manufactured by Triton Stormwater Solutions.

EMERGENCY SPILLWAY:

In the event of a storm of larger magnitude than the 100-year occurrence, the underground system will fill to capacity. A 12" pipe has been provided that will connect to a grate inlet in Redwood Road from a curb inlet on site. In regular storm events, this pipe is not intended to carry water to the UDOT system. This pipe is placed above the 100-year water surface elevation so that it will act as an emergency safety precaution only. See *Appendix F: Grading Plan.*

STORMWATER QUALITY:

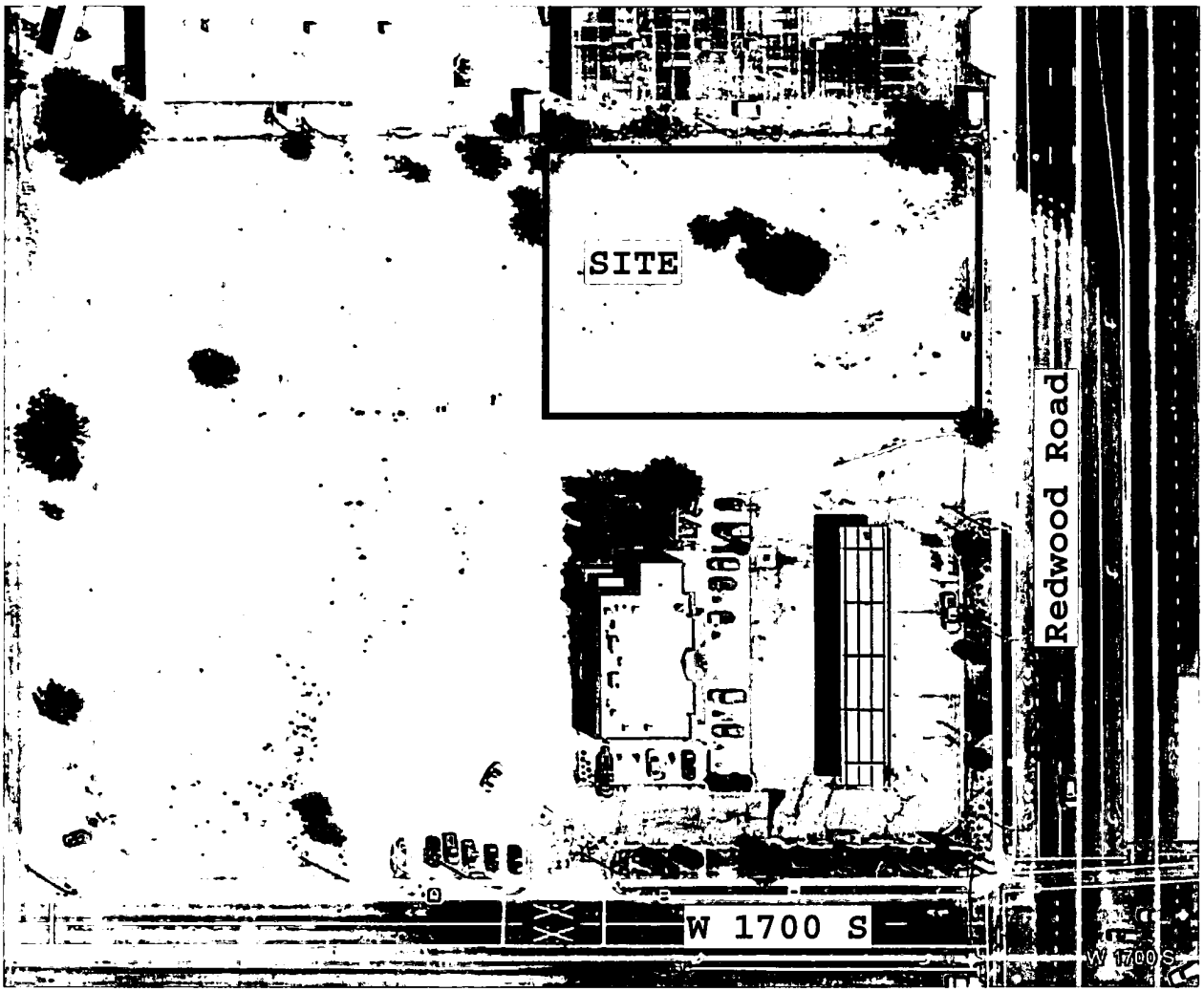
The Utah Department of Transportation requires that all stormwater connecting to their systems be treated for quality first. This proposed design does not discharge any water into the DOT's system, excepting for rare events larger than the 100-year storm. Therefore, the water quality requirements do not apply to this design.

CONCLUSIONS:

The discharge generated by this site is 5.424 cfs. The underground storage system will detain 6,677 cubic feet. The proposed detention systems will adequately detain the 100 year event runoff, and no adverse downstream effects are expected due to the proposed development. Should there be an event greater than the 100-year storm, stormwater will be conveyed to the UDOT storm system in Redwood Road via a 12" pipe.

Appendix A

Location Map


SITE
Redwood Road
W 1700 S
W 1700 S

Appendix B
Soil Information

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 Salt Lake Area, Utah

December 27, 2016

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

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

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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

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.

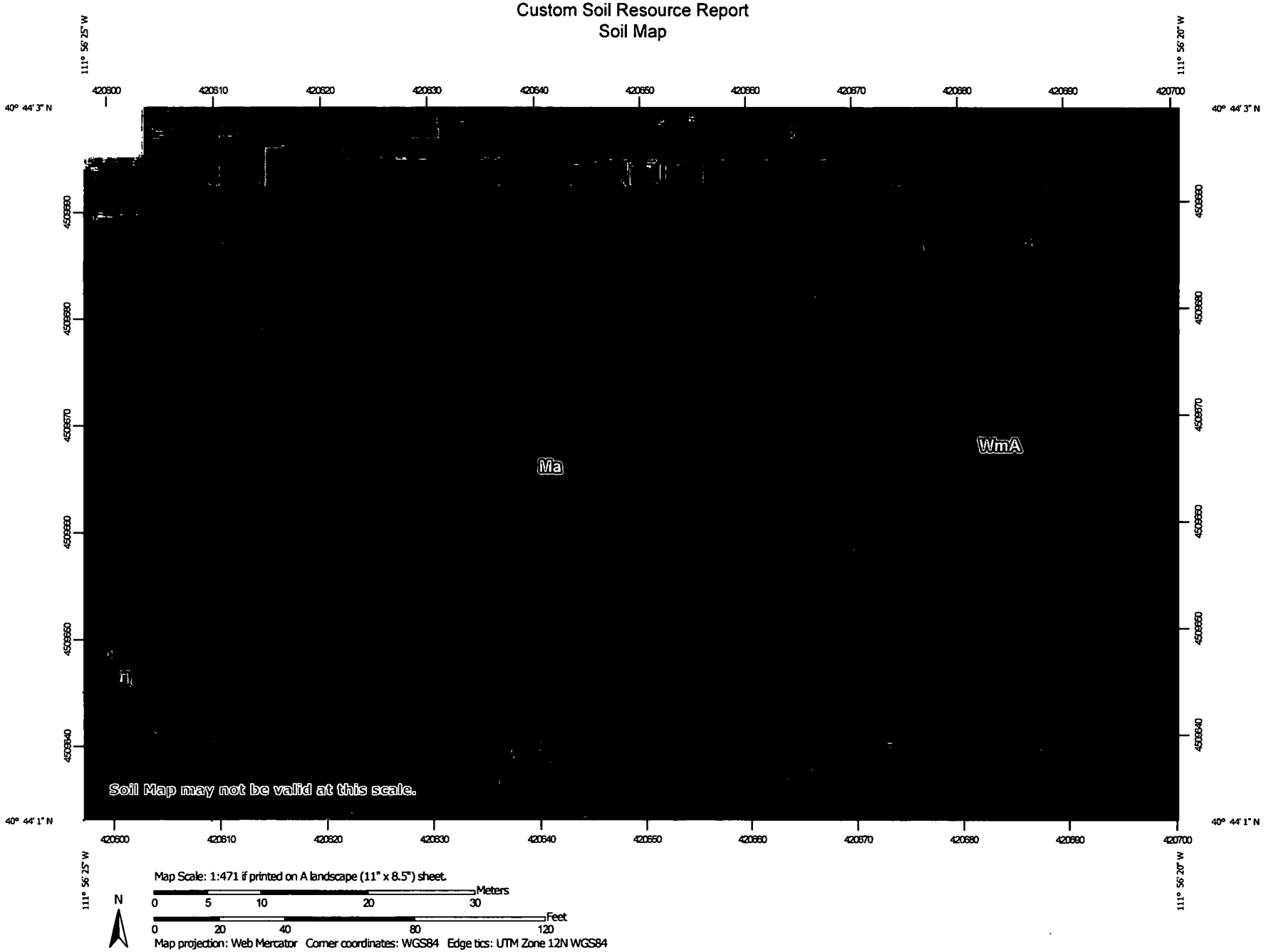
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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 section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



BK 10550 PG 9611

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Salt Lake Area, Utah
Survey Area Data: Version 9, Sep 9, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 28, 2014—Jul 22, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Salt Lake Area, Utah (UT612)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Ma	Made land	0.8	81.9%
WmA	Welby silt loam, 0 to 1 percent slopes	0.2	18.1%
Totals for Area of Interest		**1.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Salt Lake Area, Utah

Ma—Made land

Map Unit Composition

Made land: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

WmA—Welby silt loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: j6lc
Elevation: 4,200 to 4,400 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Welby and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Welby

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits

Typical profile

Ap - 0 to 8 inches: silt loam
A3 - 8 to 16 inches: silt loam
B2 - 16 to 25 inches: silt loam
C1ca - 25 to 33 inches: loam
C2ca - 33 to 44 inches: silt loam
C3 - 44 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0

Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): 2c
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)
Hydric soil rating: No

Minor Components

Hillfield

Percent of map unit: 3 percent

Deckerman

Percent of map unit: 3 percent

Taylorsville

Percent of map unit: 3 percent

Parleys

Percent of map unit: 3 percent

Kidman

Percent of map unit: 3 percent

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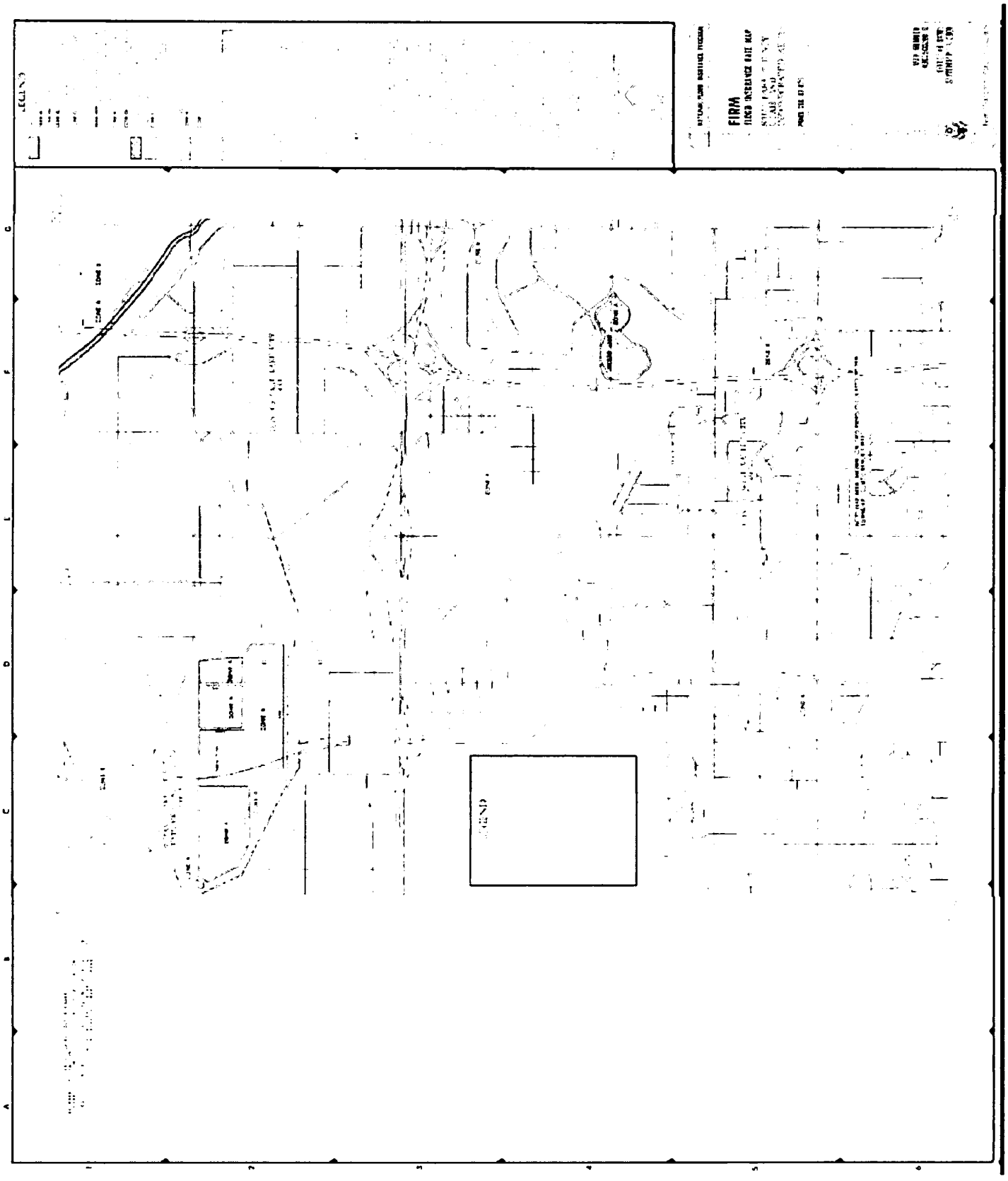
Appendix C

FEMA Firmette


FIRM

Appendix D

Hydrographs

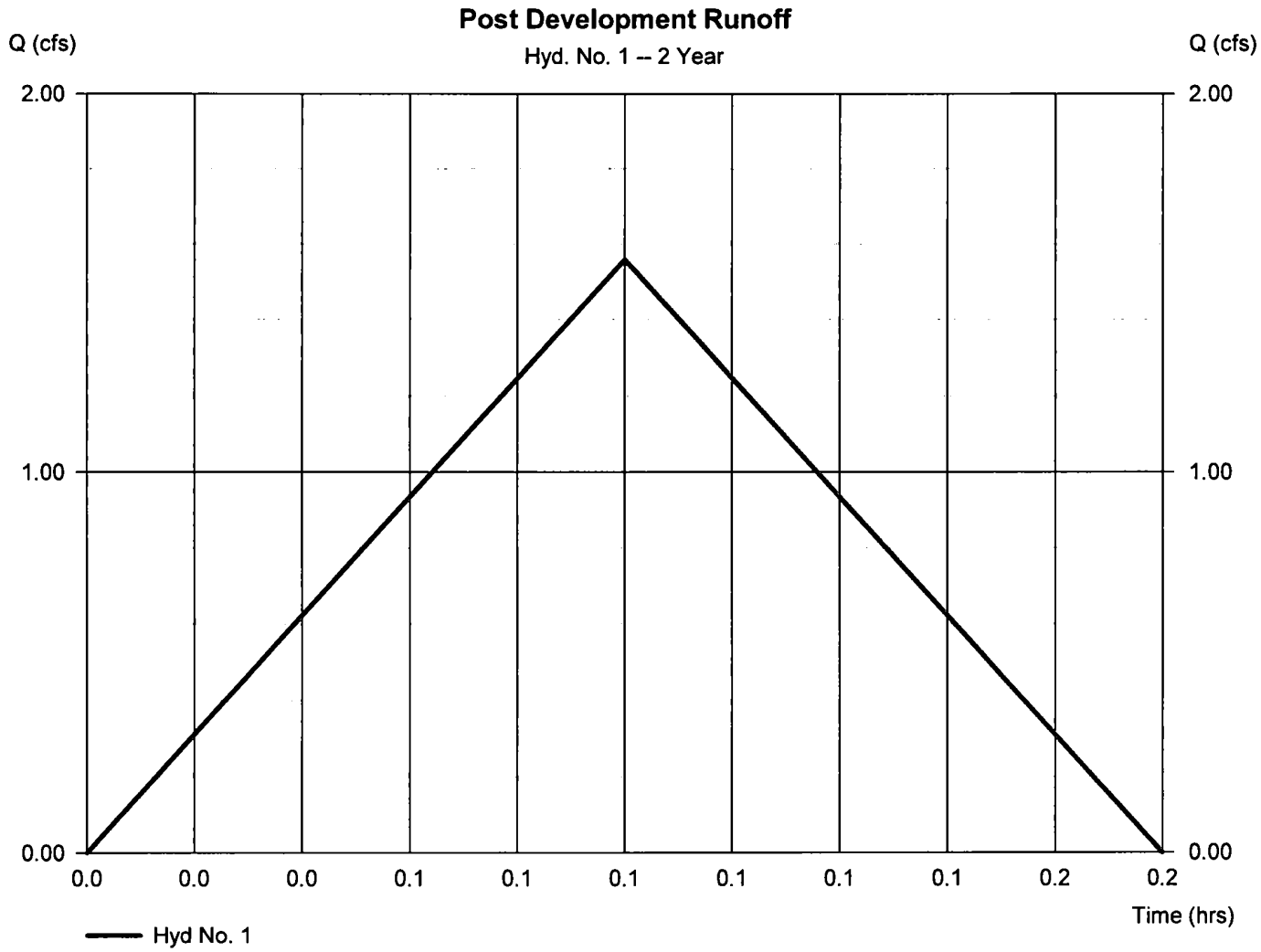
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v11 — Thursday, 01 / 26 / 2017

Hyd. No. 1

Post Development Runoff

Hydrograph type	= Rational	Peak discharge	= 1.558 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 467 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 1.749 in/hr	Tc by User	= 5.00 min
IDF Curve	= Salt Lake City IDF.IDF	Asc/Rec limb fact	= 1/1

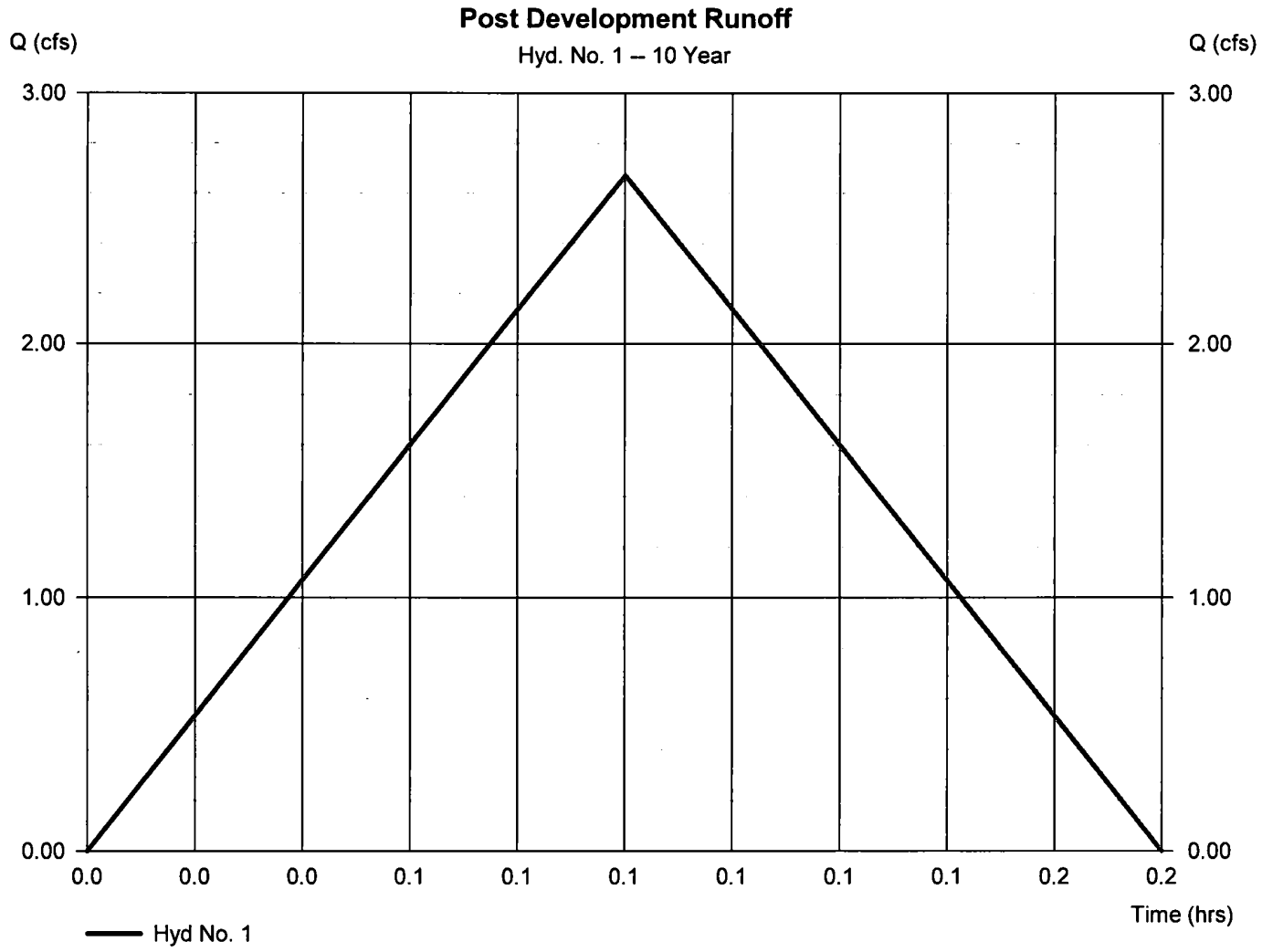


Hydrograph Report

Hyd. No. 1

Post Development Runoff

Hydrograph type	= Rational	Peak discharge	= 2.670 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 801 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 2.997 in/hr	Tc by User	= 5.00 min
IDF Curve	= Salt Lake City IDF.IDF	Asc/Rec limb fact	= 1/1

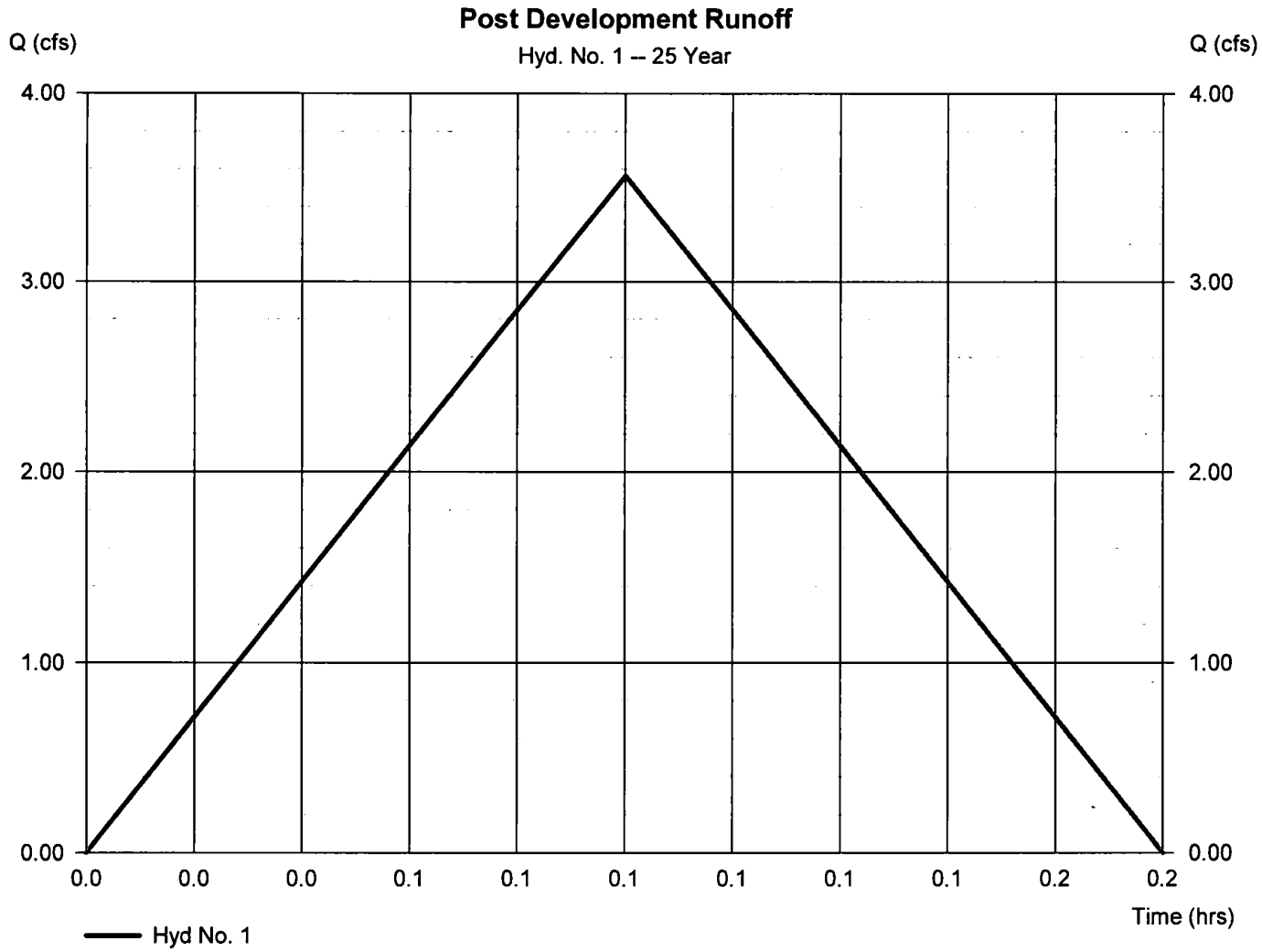


Hydrograph Report

Hyd. No. 1

Post Development Runoff

Hydrograph type	= Rational	Peak discharge	= 3.563 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 1,069 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 3.999 in/hr	Tc by User	= 5.00 min
IDF Curve	= Salt Lake City IDF.IDF	Asc/Rec limb fact	= 1/1

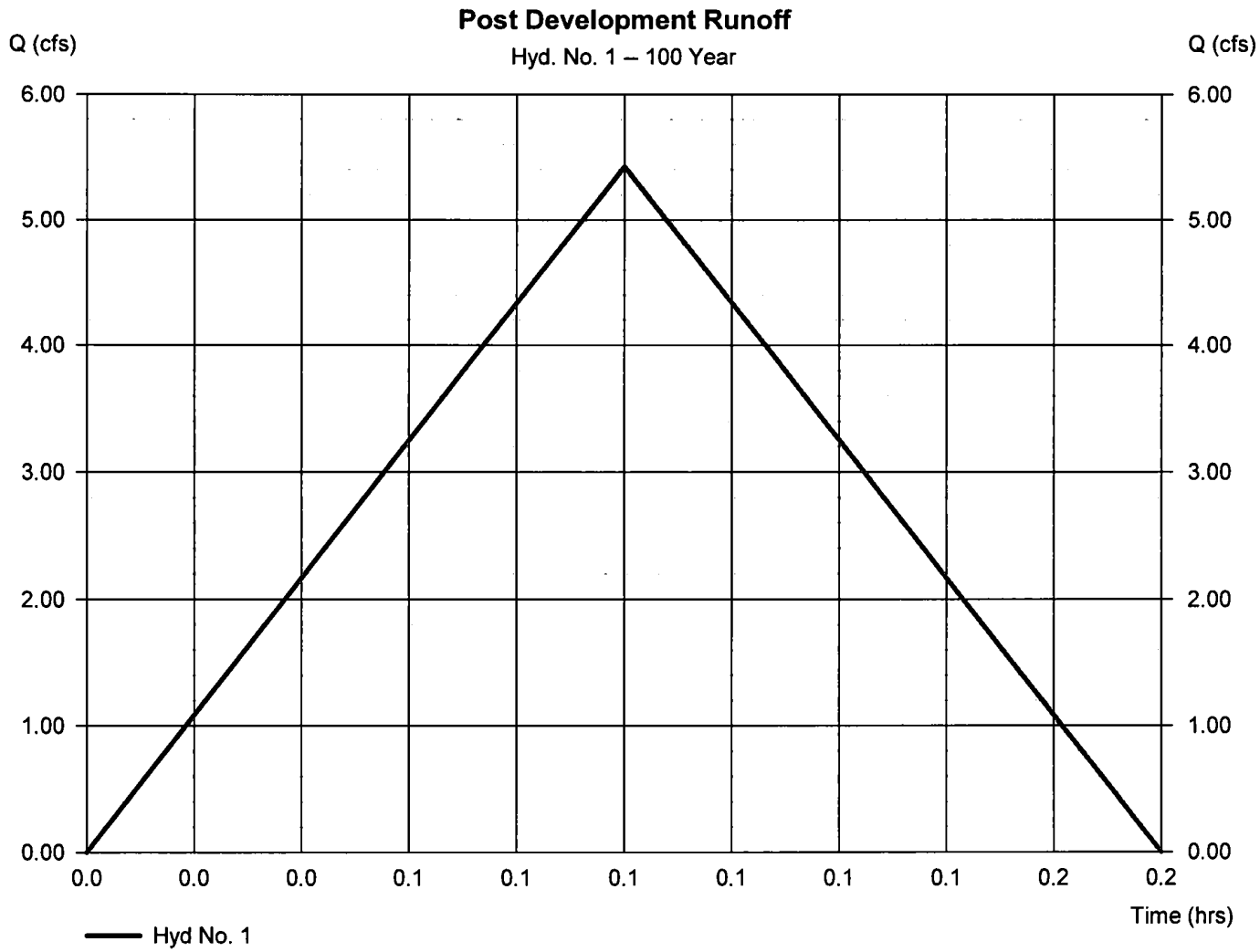


Hydrograph Report

Hyd. No. 1

Post Development Runoff

Hydrograph type	= Rational	Peak discharge	= 5.424 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 1,627 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 6.088 in/hr	Tc by User	= 5.00 min
IDF Curve	= Salt Lake City IDF.IDF	Asc/Rec limb fact	= 1/1



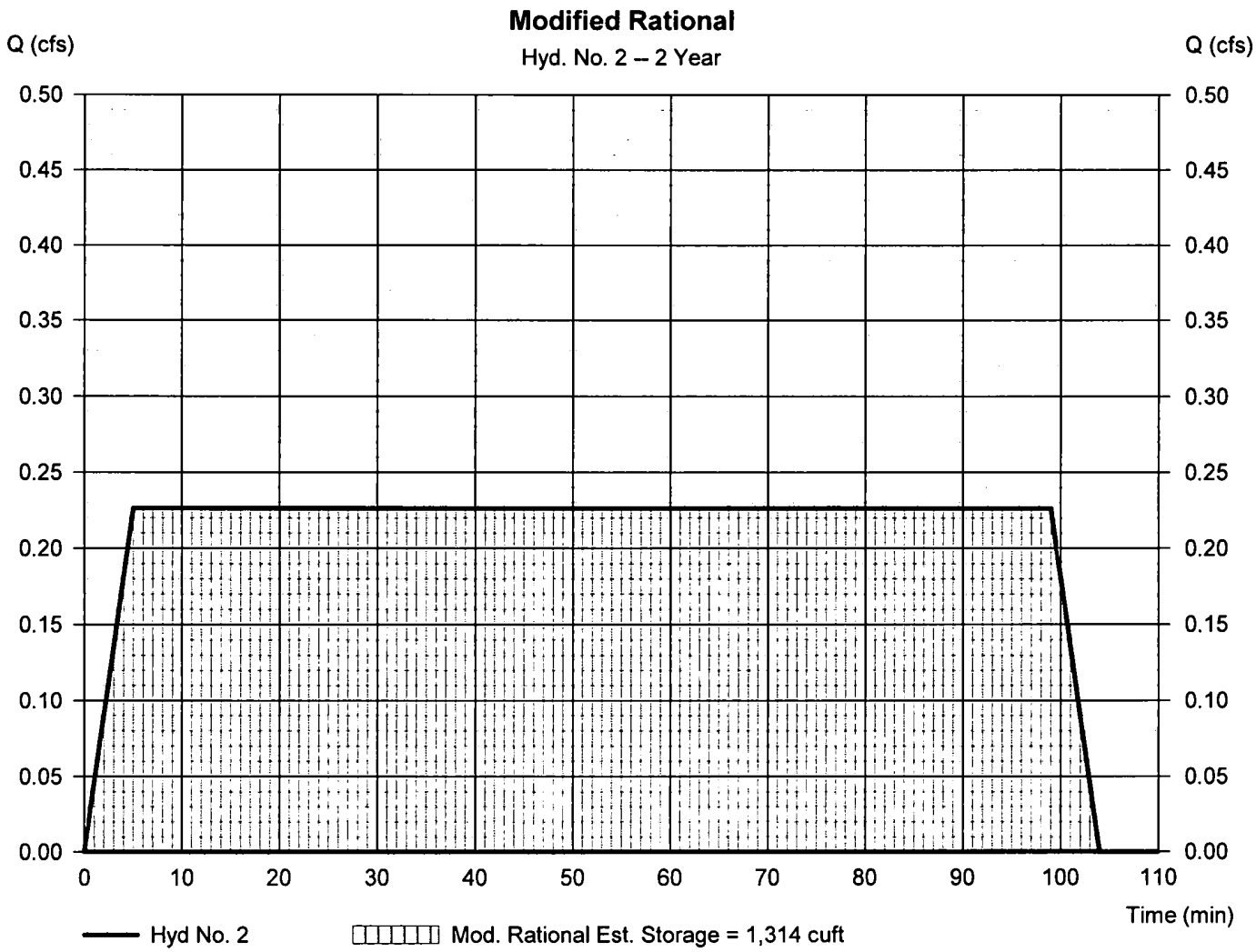
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v11 — Thursday, 01 / 26 / 2017

Hyd. No. 2

Modified Rational

Hydrograph type	= Mod. Rational	Peak discharge	= 0.226 cfs
Storm frequency	= 2 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 1,345 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 0.254 in/hr	Tc by User	= 5.00 min
IDF Curve	= Salt Lake City IDF.IDF	Storm duration	= 19.8 x Tc
Target Q	=0.010 cfs	Est. Req'd Storage	=1,314 cuft

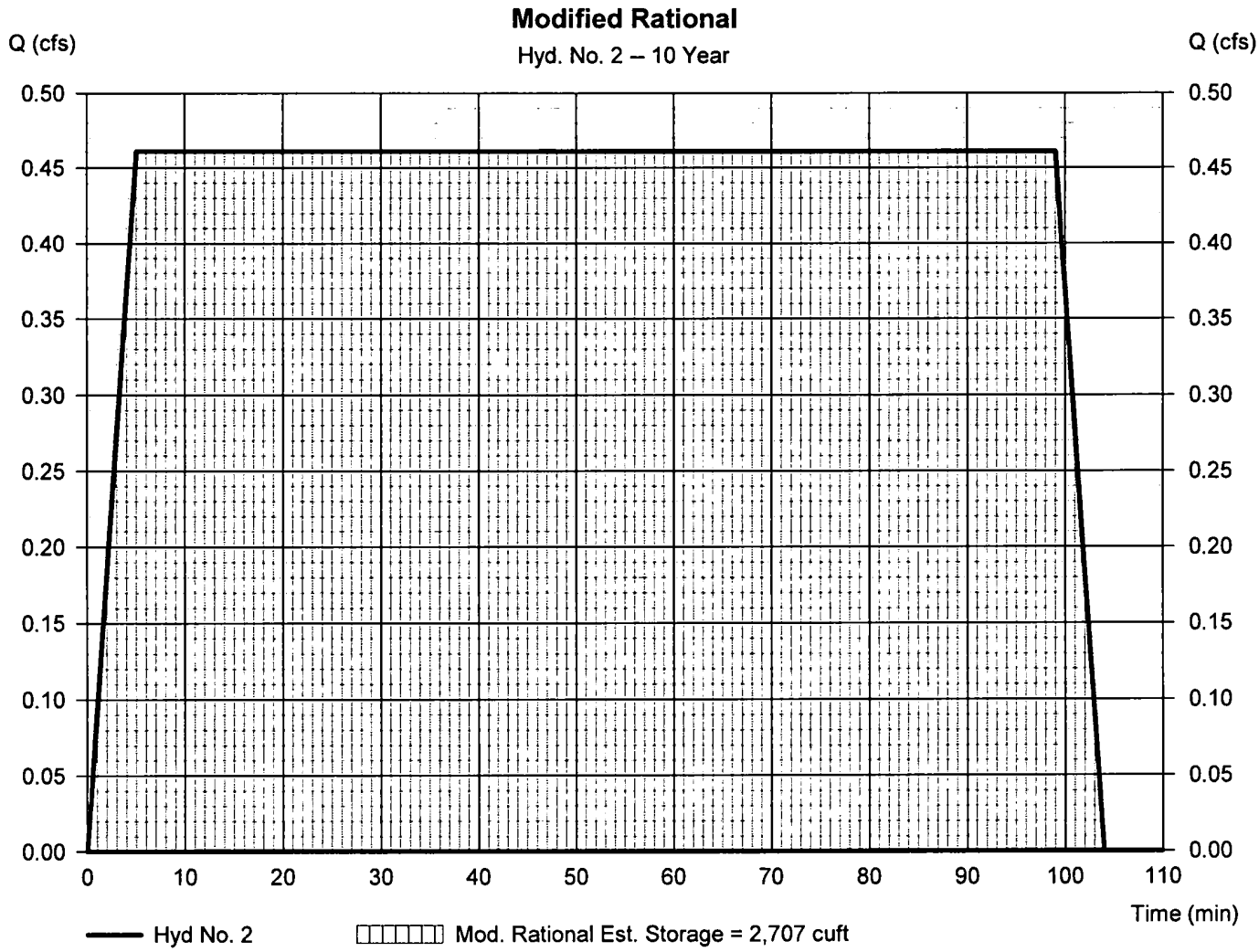


Hydrograph Report

Hyd. No. 2

Modified Rational

Hydrograph type	= Mod. Rational	Peak discharge	= 0.461 cfs
Storm frequency	= 10 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 2,738 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 0.517 in/hr	Tc by User	= 5.00 min
IDF Curve	= Salt Lake City IDF.IDF	Storm duration	= 19.8 x Tc
Target Q	=0.010 cfs	Est. Req'd Storage	=2,707 cuft

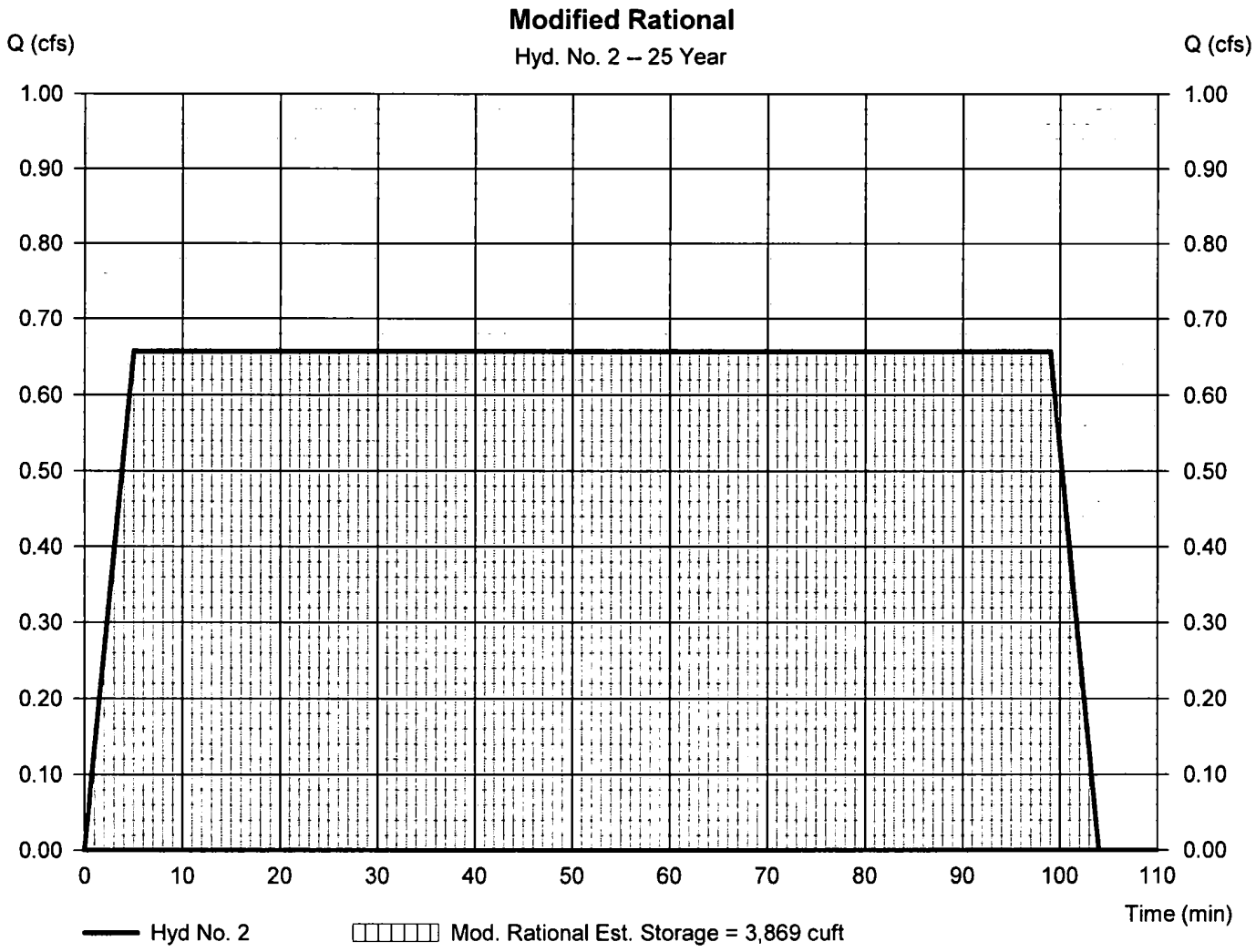


Hydrograph Report

Hyd. No. 2

Modified Rational

Hydrograph type	= Mod. Rational	Peak discharge	= 0.657 cfs
Storm frequency	= 25 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 3,901 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 0.737 in/hr	Tc by User	= 5.00 min
IDF Curve	= Salt Lake City IDF.IDF	Storm duration	= 19.8 x Tc
Target Q	=0.010 cfs	Est. Req'd Storage	=3,869 cuft

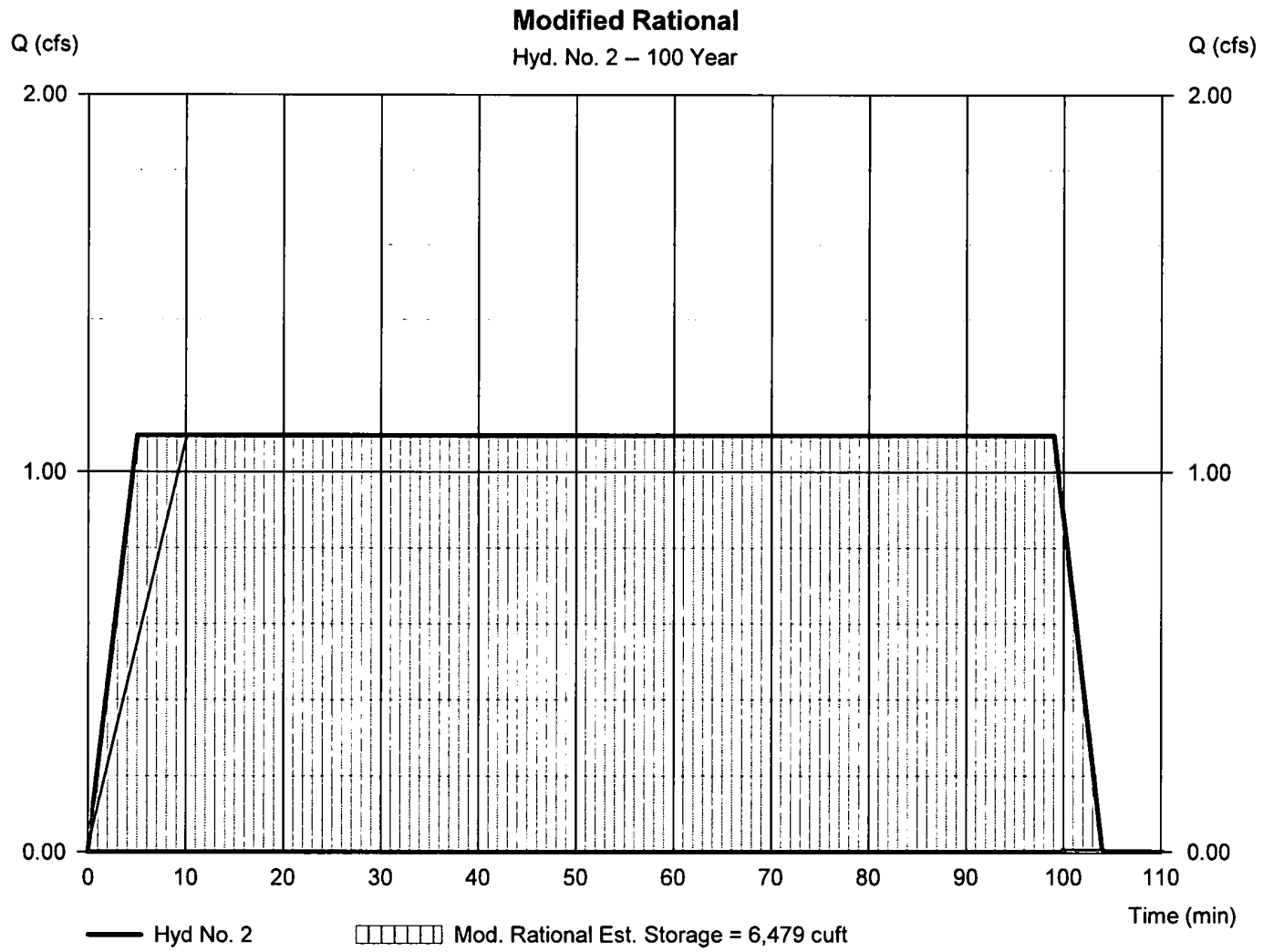


Hydrograph Report

Hyd. No. 2

Modified Rational

Hydrograph type	= Mod. Rational	Peak discharge	= 1.096 cfs
Storm frequency	= 100 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 6,511 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 1.230 in/hr	Tc by User	= 5.00 min
IDF Curve	= Salt Lake City IDF.IDF	Storm duration	= 19.8 x Tc
Target Q	=0.010 cfs	Est. Req'd Storage	=6,479 cuft



Appendix E

Pond Storage

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v11 — Thursday, 01 / 26 / 2017

Pond No. 1 - Underground Detention

Pond Data

UG Chambers -Invert elev. = 4225.00 ft, Rise x Span = 5.00 x 5.00 ft, Barrel Len = 85.00 ft, No. Barrels = 4, Slope = 1.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	4225.00	n/a	0	0
0.58	4225.58	n/a	116	116
1.17	4226.17	n/a	528	643
1.75	4226.75	n/a	793	1,436
2.34	4227.34	n/a	923	2,359
2.92	4227.92	n/a	980	3,339
3.51	4228.51	n/a	980	4,319
4.09	4229.10	n/a	923	5,243
4.68	4229.68	n/a	793	6,035
5.26	4230.27	n/a	527	6,562
5.85	4230.85	n/a	115	6,677

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	Inactive	Inactive	Inactive
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 4230.37	0.00	0.00	0.00
Length (ft)	= 100.00	0.00	0.00	0.00
Slope (%)	= 0.40	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

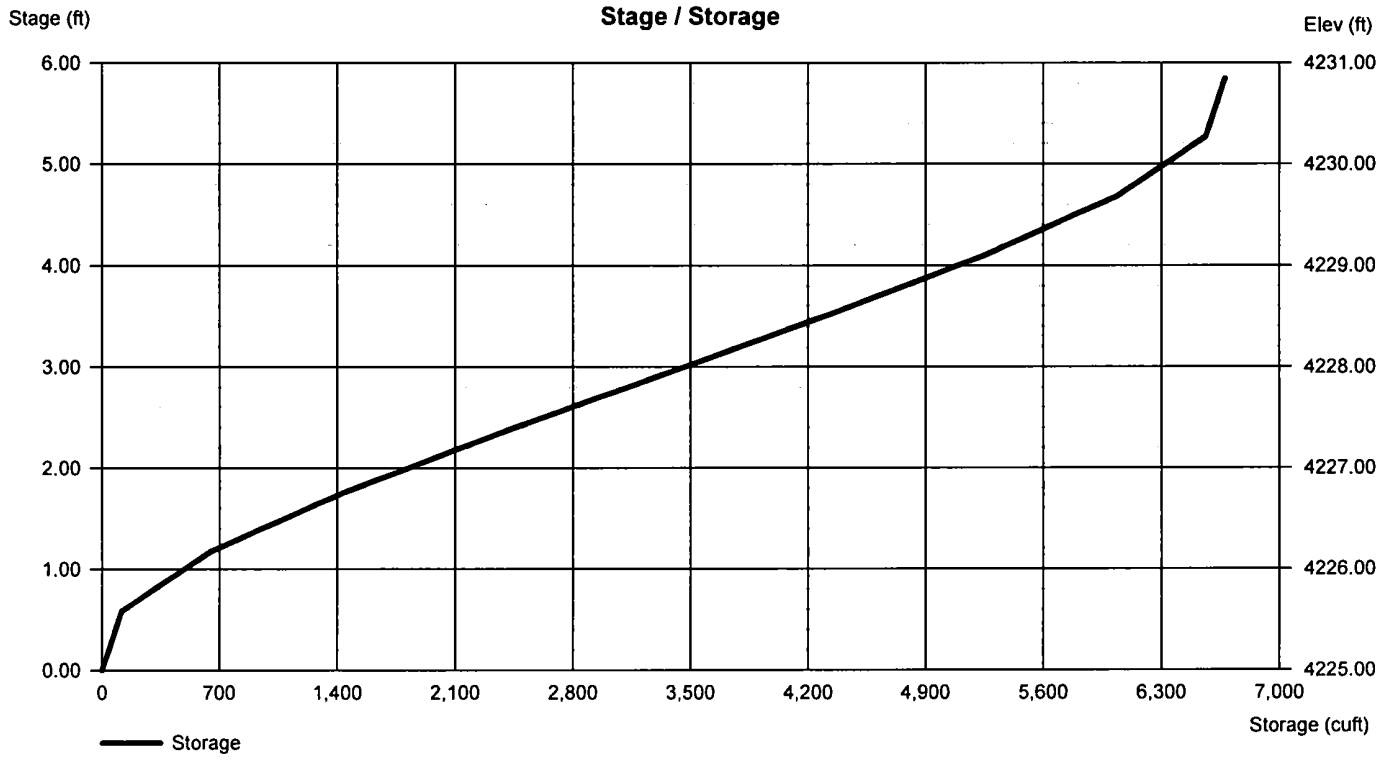
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	Inactive	Inactive	0.00
Crest El. (ft)	= 4230.87	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	—	—	—
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.200 (by Wet area)

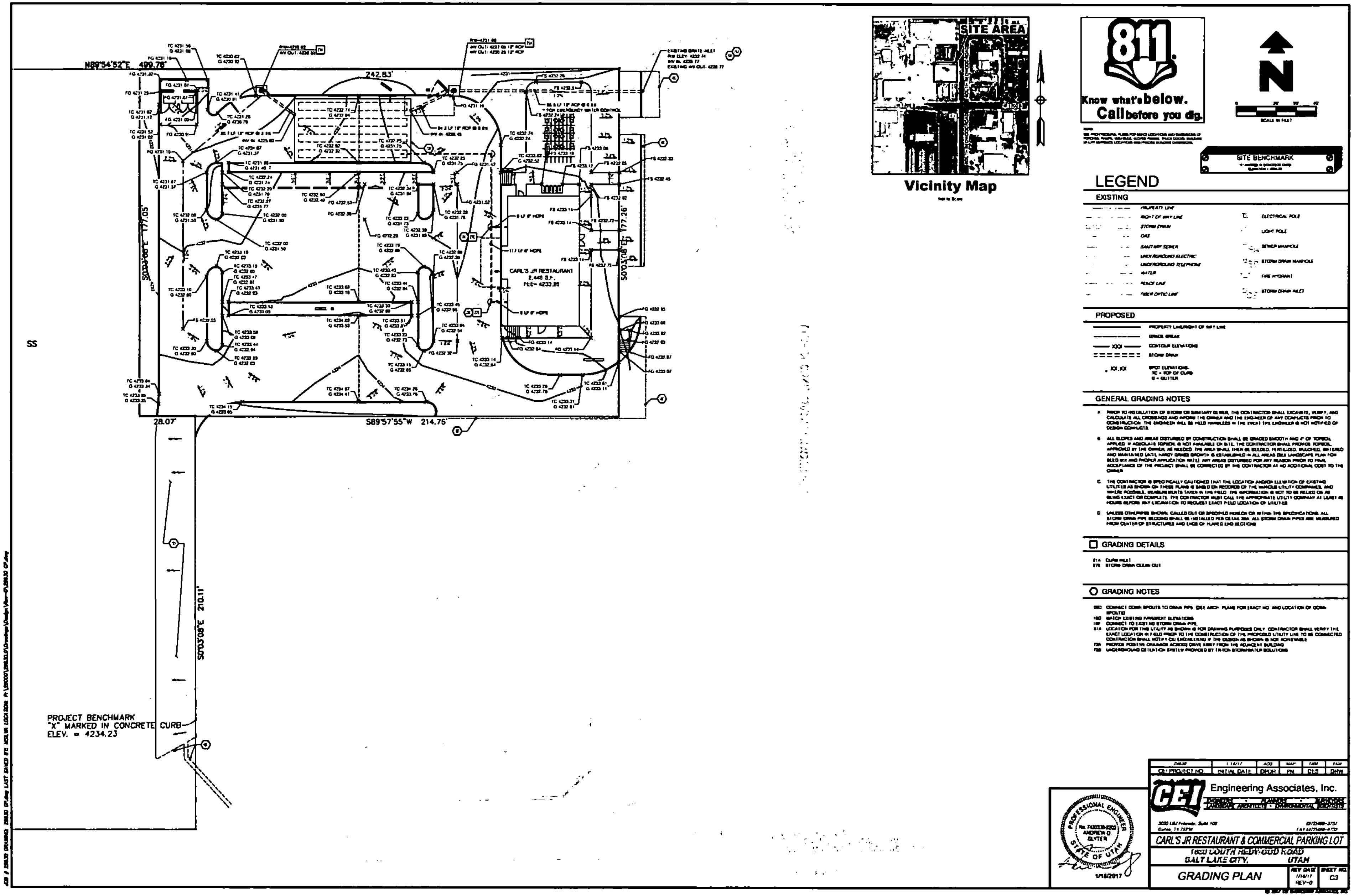
TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Appendix F

Grading Plan



N89°54'52"E 499.78'
242.83'
S00°03'08"E 177.05'
S00°03'08"E 177.26'
S89°57'55"W 214.76'
28.07'
S00°03'08"E 210.11'
CARL'S JR RESTAURANT
2,446 S.F.
FFE= 4233.20
PROJECT BENCHMARK
"X" MARKED IN CONCRETE CURB
ELEV. = 4234.23
SS
SITE AREA
Vicinity Map
811
Know what's below.
Call before you dig.
N
SCALE IN FEET
SITE BENCHMARK
LEGEND
EXISTING
PROPERTY LINE
RIGHT OF WAY LINE
STORM DRAIN
GAS
SANITARY SEWER
UNDERGROUND ELECTRIC
UNDERGROUND TELEPHONE
WATER
FENCE LINE
FIBER OPTIC LINE
ELECTRICAL POLE
LIGHT POLE
SEWER MANHOLE
STORM DRAIN MANHOLE
FIRE HYDRANT
STORM DRAIN INLET
PROPOSED
GRADE BREAK
CONTOUR ELEVATIONS
STORM DRAIN
SPOT ELEVATIONS
TC = TOP OF CURB
G = GUTTER
GENERAL GRADING NOTES
GRADING DETAILS
CURB INLET
STORM DRAIN CLEAN OUT
GRADING NOTES
CEI Engineering Associates, Inc.
CARL'S JR RESTAURANT & COMMERCIAL PARKING LOT
SALT LAKE CITY, UTAH
GRADING PLAN
C3
PROFESSIONAL ENGINEER
ANDREW D. SLYTER
STATE OF UTAH
1/18/2017

STORM WATER CALCULATIONS

FOR THE PROPOSED CARL'S JR. RESTAURANT

Redwood Road and 1700 South
Salt Lake City, UT

CEI Engineering Associates, Inc.

CEI Project No. 29630.0

Rev-0
January 2017

PROFESSIONAL ENGINEER
No. 7420338-2202
ANDREW D. SLYTER
STATE OF UTAH

1/26/2017

Presented By
CEI Engineering Associates, Inc.
3108 SW Regency Parkway, Suite 2
Bentonville, AR 72712
Ph: (479) 273-9472 / Fax: (479) 273-0844

INTENT OF REPORT:

It is the intent of this report to show that the stormwater management facilities designed for the Carl's Jr proposed near the northwest corner of south Redwood Road and West 1700 South and Salt Lake City, Utah described within meets or exceeds the requirements of the Utah Department of Transportation Development Standards, addressing runoff control requirements and safe conveyance of stormwater within and/or from the site without damage to downstream properties or the UDOT drainage system.

PROJECT LOCATION AND CHARACTERISTICS:

The subject site is bounded by 1700 South on the south, Redwood Road on the east, vacant land on the west, and commercial development on the north. The site is approximately 0.99 acres. The Carl's Jr. will be single-story and approximately 2,450 square feet with a 400 square foot patio and associated parking and drive-thru lanes. See *Appendix A – Site Location Map*.

Geotechnical investigation encountered approximately 6 feet of sandy clay. The sandy clay is fine to coarse grain sand, brown to dark brown, moist and stiff. Underlying the sandy clay is silty sand from depths ranging 6 to 14 feet. The silty sand is light brown to brown, moist to saturated and medium dense. Sandy clay was encountered under the silty sand and continued till the termination of the borings. It is olive with gray and light brown, saturated and soft. See *Appendix B- Soil Information*.

Flood Zone: No portion of the existing site is located within a defined 100-year floodplain, but is located within Zone X (see *Appendix C* for Flood Insurance Rate Map Panel #49035C0280E, revised September 21, 2001). Zone X is defined as Areas determined to be outside the 500-year floodplain.

RUNOFF CALCULATION METHODOLOGY:

The peak flows for the design storms were calculated using the Rational Method, $Q=CC_fiA$
where

Q = Peak flow rate in cubic feet per second (cfs)
C = Runoff Coefficient
C_f= Frequency Factor
i = Rainfall intensity in inches per hour
A = Watershed area in acres

The Rational Method formula employs the following assumptions:

a) The rainfall intensity, i, is uniformly distributed over the entire watershed
b) The runoff rate, Q, resulting from any rainfall intensity, i, is a maximum when this rainfall intensity lasts as long or longer than the time of concentration, tc.
c) The maximum runoff resulting from a rainfall intensity is a simple fraction of such rainfall intensity.
d) The frequency of peak runoff is the same as that of the rainfall intensity for a given time of concentration, tc.
e) The runoff coefficient is the uniform within the watershed for various storm frequencies and durations.

The runoff coefficient, C, was chosen as 0.9. C_f was not used in this circumstance, as the product of C_f and C was greater than 1. The intensity, i, was calculated in Hydraflow using the estimate information provided by NOAA Atlas 14, shown below in Table 1: Intermediate Intensity Values.

Table 1: Intermediate Intensity Values

Intermediate Intensity Values (in/hr)				
Return-Period	**5-Minute**	**15-Minute**	**30-Minute**	**60-Minute**
2-Year	1.75	1.00	0.70	0.40
5-Year	2.45	1.60	1.00	0.65
10-Year	3.00	1.95	1.35	0.80
25-Year	4.00	2.50	1.80	1.10
50-Year	5.00	3.25	2.10	1.45
100-Year	6.10	3.95	2.60	1.70

Hydraflow Storm Sewers Extension for AutoCAD Civil 3D is a full-featured storm sewer design package. Users input known variables (C values, site area, and precipitation depth), and Hydraflow uses a user-specific method (Rational in this case) to calculate generated flow. Hydraflow also allows the user to model storm sewer designs in order to verify capacity.

After the required variables were entered, Hydraflow calculated the peak discharge to be 5.424 cfs for the 100-year event. See Table 2: Hydraflow Peak Discharge Results. For other storm frequencies, see *Appendix D: Hydrographs.*

Table 2: Hydraflow Peak Discharge Results

Hyd. No. 1

Post Development Runoff

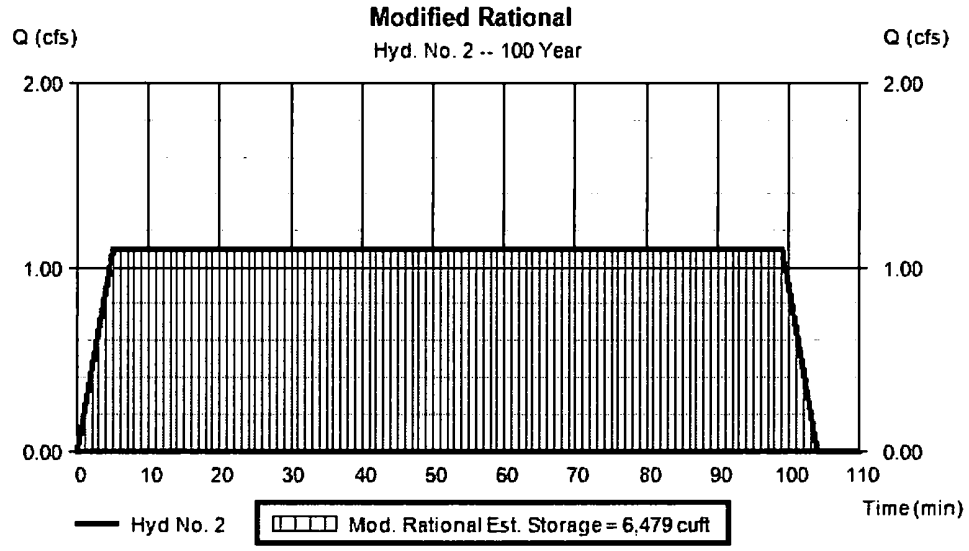
Hydrograph type	= Rational	Peak discharge	= 5.424 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 1,627 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 6.088 in/hr	Tc by User	= 5.00 min
IDF Curve	= Salt Lake City IDF.IDF	Asc/Rec limb fact	= 1/1

DETENTION SIZING METHODOLOGY:

The proposed detention facilities have been designed to handle the 24-hour duration, 100-year frequency storm event using the Modified Rational Method. This report was prepared in accordance with the allowable release rates stipulated by the Utah Department of Transportation, 0.2 cfs/acre. At a 0.99 acre site, this release rate is 0.2 cfs. Due to this constraint, the system has been designed instead to release water through infiltration. The infiltration rate is a function of the soil's hydrologic soil group. For this site, a large portion is classified through the Web Soil Survey as "made land", and the remainder of the site is classified as Hydrologic Soil Group C. The infiltration rate of Group C is 0.2 inches/hour, per the Minnesota Pollution Control Agency.

After considering the target infiltration rate of 0.2 inches/hour, the underground system will need to detain 6,479 cubic feet. See Image 1: Hydraflow Storage Estimate.

Image 1: Hydraflow Storage Estimate.



The storage capacity of the proposed pond is 6,677 cubic feet and will accommodate the 100-year storm event, as required by the Utah Department of Transportation. See *Appendix E: Pond Report* for pond storage details.

DETENTION POND CHARACTERISTICS:

The underground detention systems will consist of underground chambers with an open bottom to allow water to infiltrate out. There will be four barrels eighty-five feet long and five feet in diameter. The system will be designed and manufactured by Triton Stormwater Solutions.

EMERGENCY SPILLWAY:

In the event of a storm of larger magnitude than the 100-year occurrence, the underground system will fill to capacity. A 12" pipe has been provided that will connect to a grate inlet in Redwood Road from a curb inlet on site. In regular storm events, this pipe is not intended to carry water to the UDOT system. This pipe is placed above the 100-year water surface elevation so that it will act as an emergency safety precaution only. See *Appendix F: Grading Plan.*

STORMWATER QUALITY:

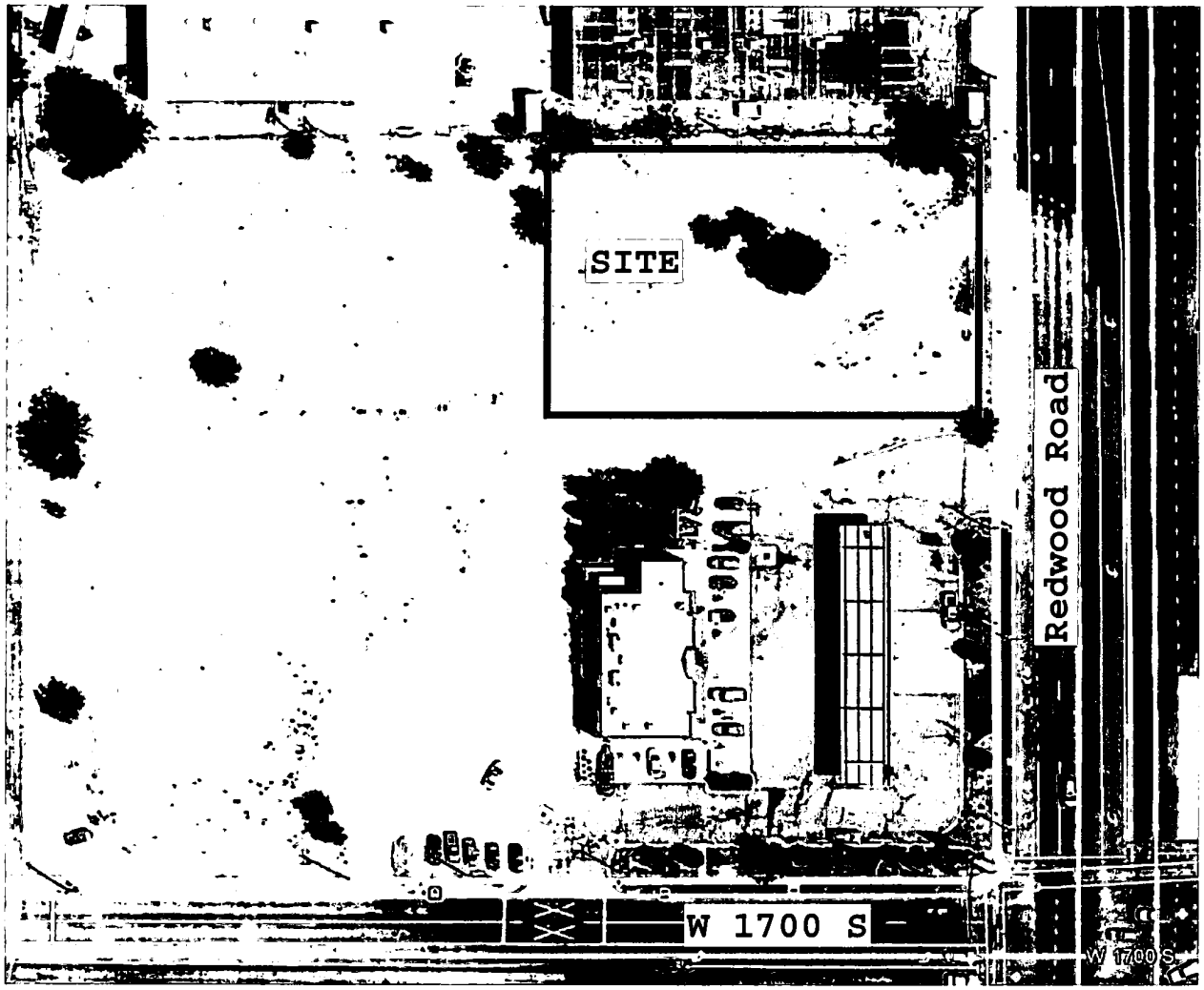
The Utah Department of Transportation requires that all stormwater connecting to their systems be treated for quality first. This proposed design does not discharge any water into the DOT's system, excepting for rare events larger than the 100-year storm. Therefore, the water quality requirements do not apply to this design.

CONCLUSIONS:

The discharge generated by this site is 5.424 cfs. The underground storage system will detain 6,677 cubic feet. The proposed detention systems will adequately detain the 100 year event runoff, and no adverse downstream effects are expected due to the proposed development. Should there be an event greater than the 100-year storm, stormwater will be conveyed to the UDOT storm system in Redwood Road via a 12" pipe.

Appendix A

Location Map


SITE
Redwood Road
W 1700 S
W 1700 S

Appendix B
Soil Information

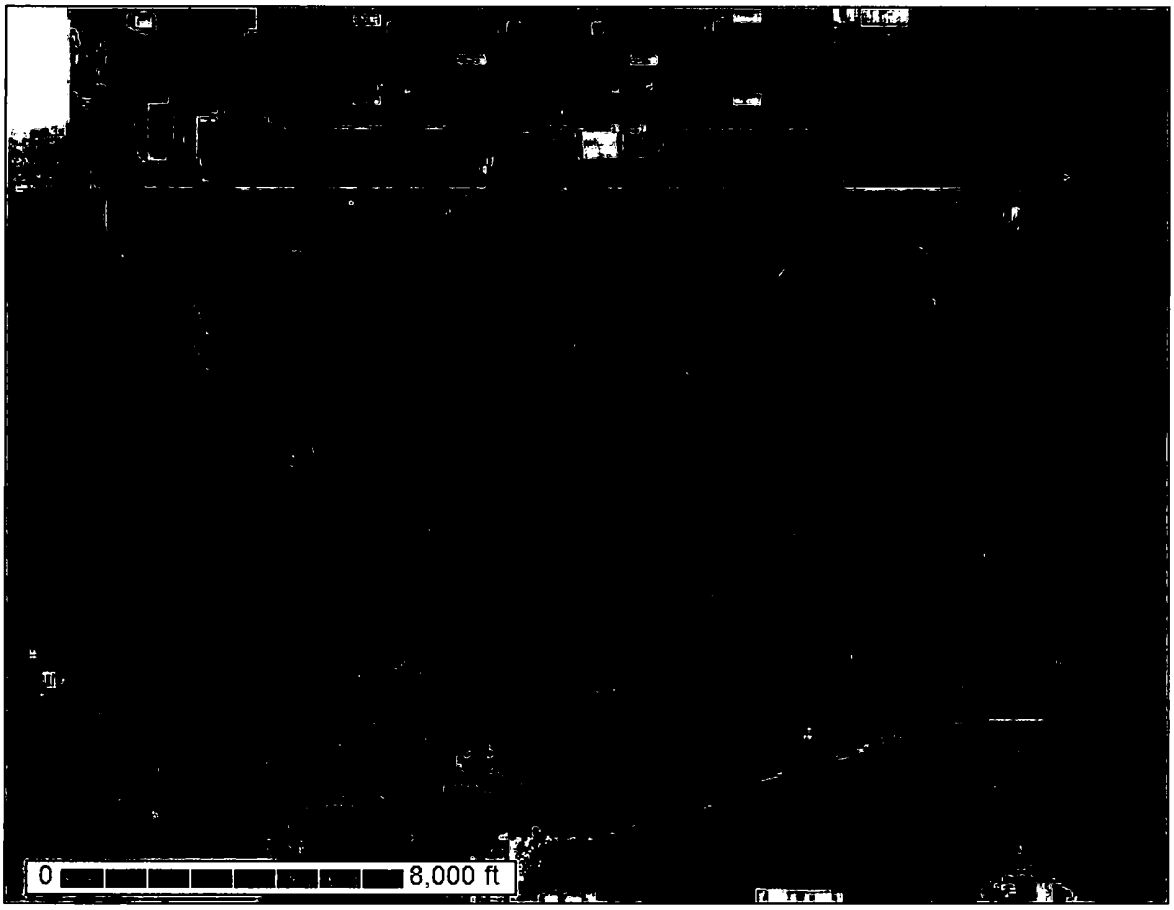
United States Department of Agriculture

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 Salt Lake Area, Utah



December 27, 2016

BK 10550 PG 9642

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

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.

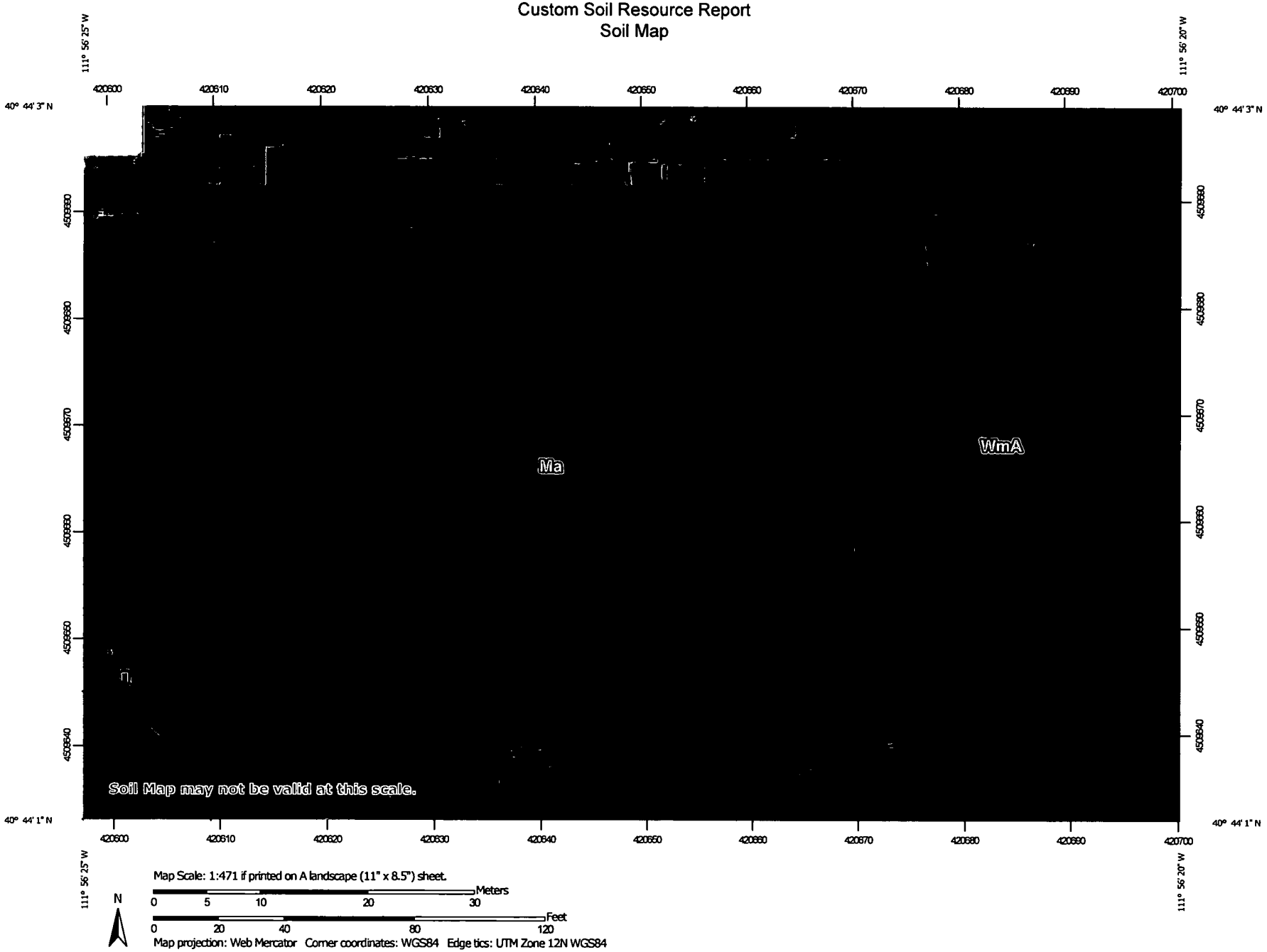
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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 section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



BK 10550 PG 9650

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Salt Lake Area, Utah
Survey Area Data: Version 9, Sep 9, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 28, 2014—Jul 22, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Salt Lake Area, Utah (UT612)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Ma	Made land	0.8	81.9%
WmA	Welby silt loam, 0 to 1 percent slopes	0.2	18.1%
Totals for Area of Interest		**1.0**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Salt Lake Area, Utah

Ma—Made land

Map Unit Composition

Made land: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

WmA—Welby silt loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: j6lc
Elevation: 4,200 to 4,400 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 49 to 51 degrees F
Frost-free period: 130 to 150 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Welby and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Welby

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits

Typical profile

Ap - 0 to 8 inches: silt loam
A3 - 8 to 16 inches: silt loam
B2 - 16 to 25 inches: silt loam
C1ca - 25 to 33 inches: loam
C2ca - 33 to 44 inches: silt loam
C3 - 44 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0

Available water storage in profile: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): 2c
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: C
Ecological site: Upland Loam (Bonneville Big Sagebrush) North (R028AY310UT)
Other vegetative classification: Upland Loam (Mountain Big Sagebrush) (028AY310UT)
Hydric soil rating: No

Minor Components

Hillfield

Percent of map unit: 3 percent

Deckerman

Percent of map unit: 3 percent

Taylorsville

Percent of map unit: 3 percent

Parleys

Percent of map unit: 3 percent

Kidman

Percent of map unit: 3 percent

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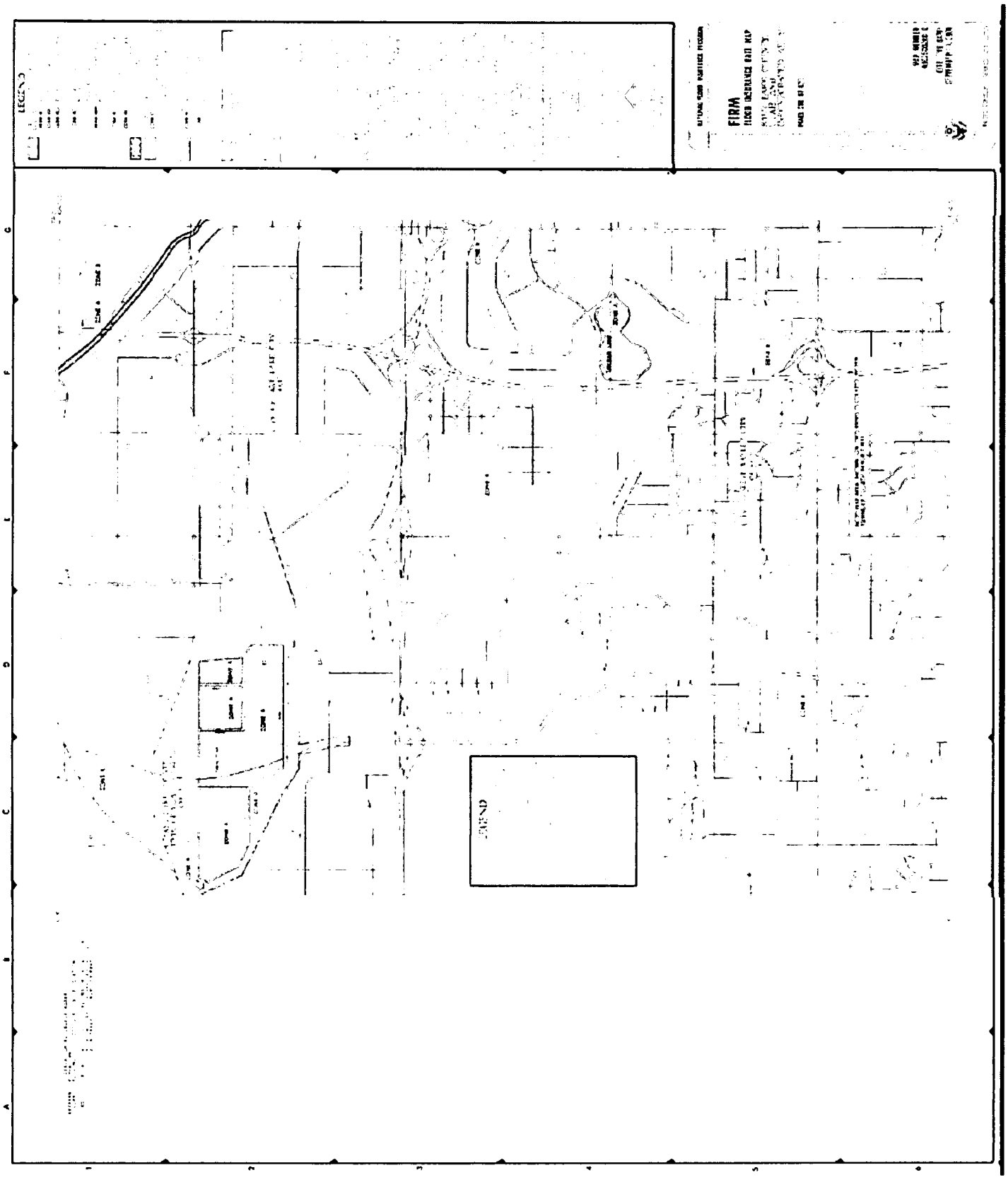
Appendix C
FEMA Firmette


LEGEND
FIRM

Appendix D

Hydrographs

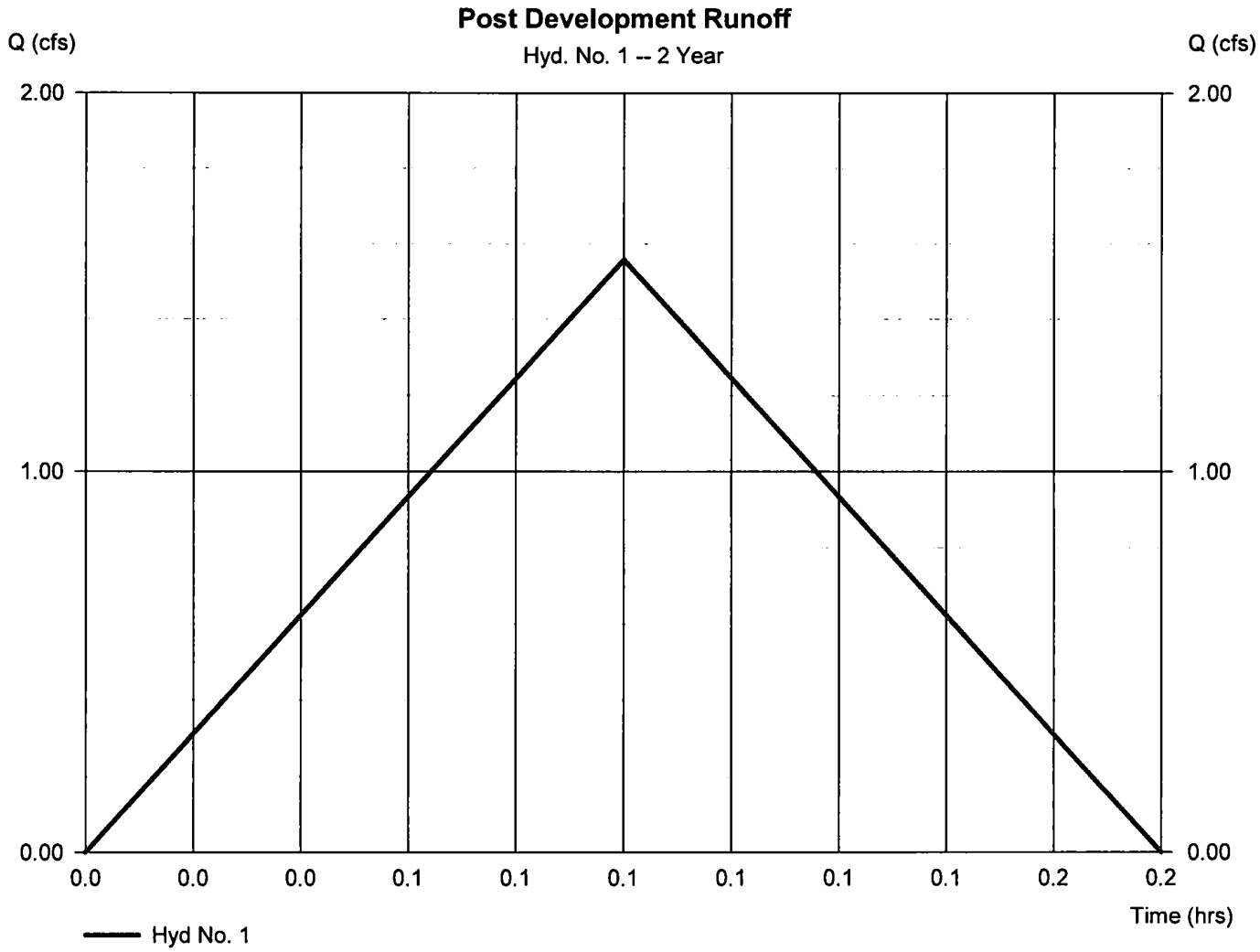
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v11 — Thursday, 01 / 26 / 2017

Hyd. No. 1

Post Development Runoff

Hydrograph type	= Rational	Peak discharge	= 1.558 cfs
Storm frequency	= 2 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 467 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 1.749 in/hr	Tc by User	= 5.00 min
IDF Curve	= Salt Lake City IDF.IDF	Asc/Rec limb fact	= 1/1



Hydrograph Report

Hyd. No. 1

Post Development Runoff

Hydrograph type	= Rational	Peak discharge	= 2.670 cfs
Storm frequency	= 10 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 801 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 2.997 in/hr	Tc by User	= 5.00 min
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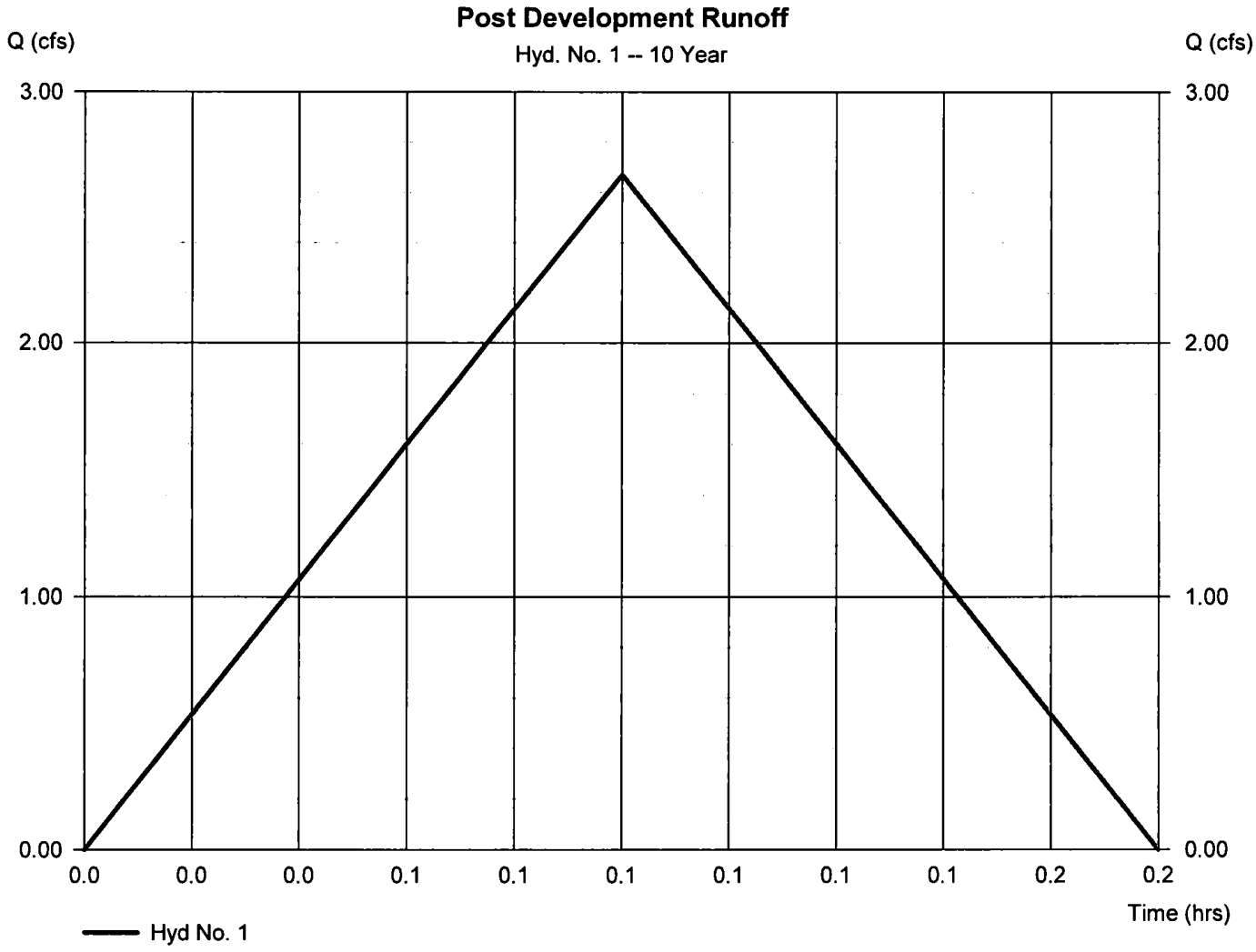
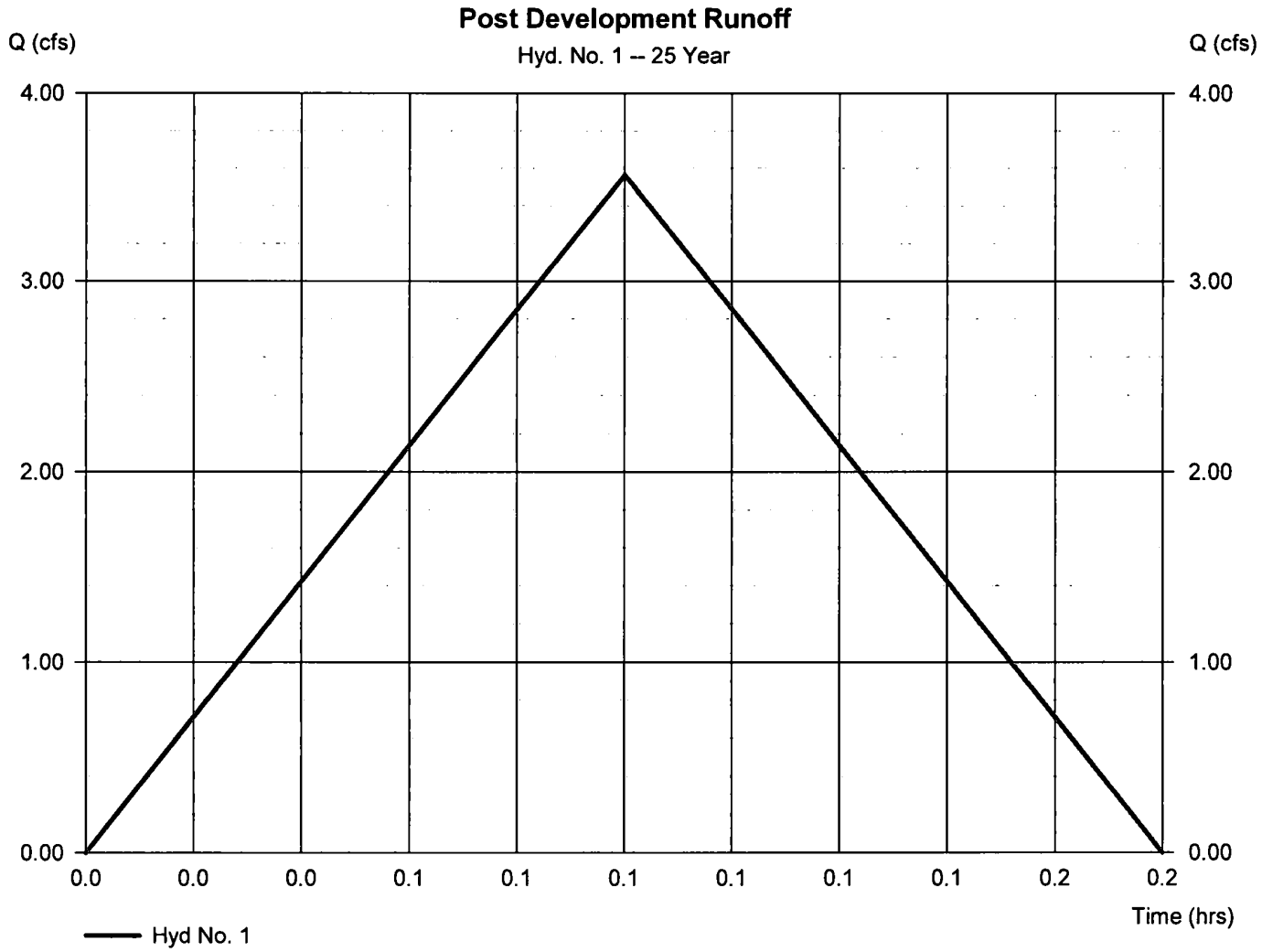


Hydrograph Report

Hyd. No. 1

Post Development Runoff

Hydrograph type	= Rational	Peak discharge	= 3.563 cfs
Storm frequency	= 25 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 1,069 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 3.999 in/hr	Tc by User	= 5.00 min
IDF Curve	= Salt Lake City IDF.IDF	Asc/Rec limb fact	= 1/1

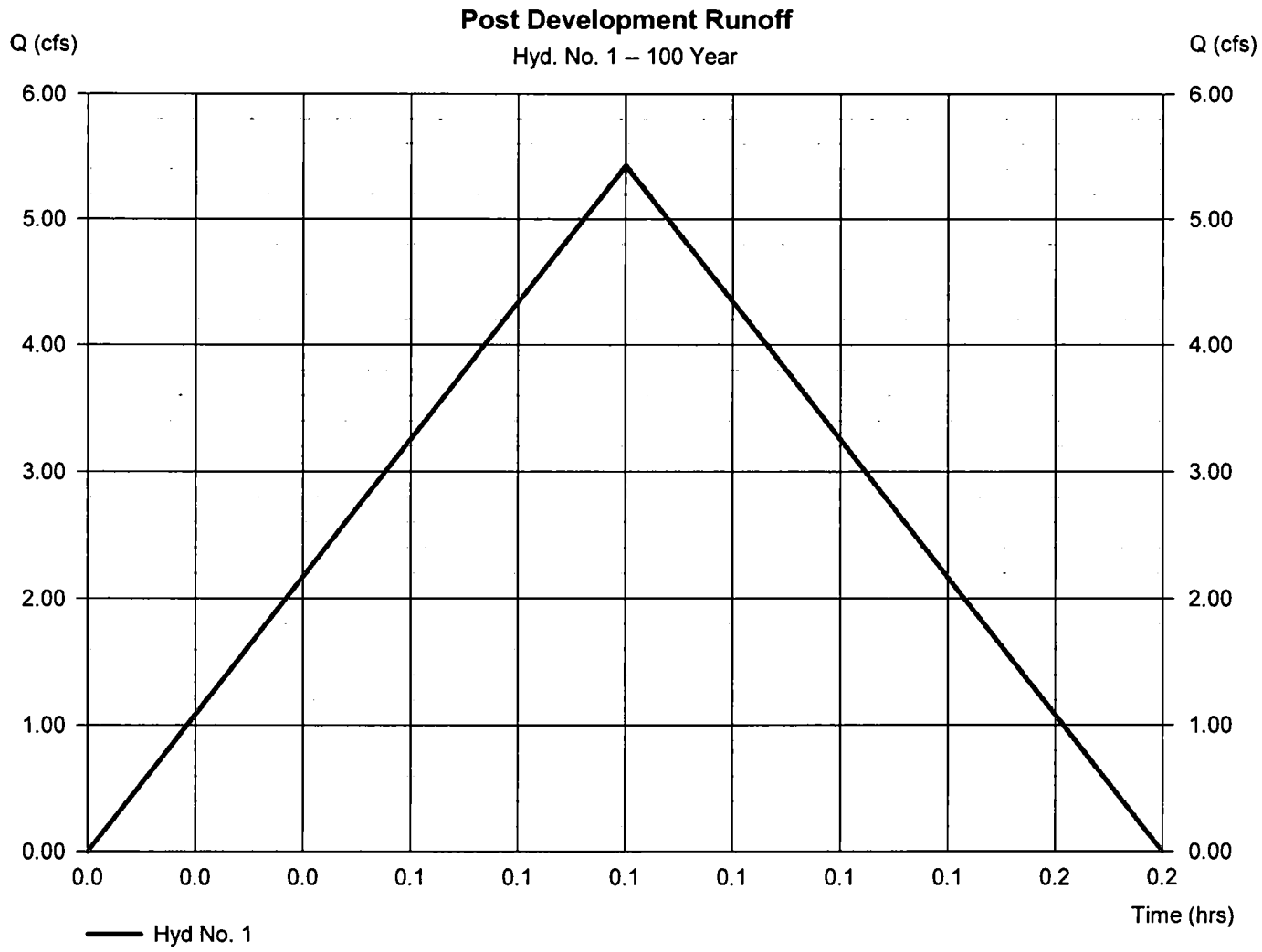


Hydrograph Report

Hyd. No. 1

Post Development Runoff

Hydrograph type	= Rational	Peak discharge	= 5.424 cfs
Storm frequency	= 100 yrs	Time to peak	= 0.08 hrs
Time interval	= 1 min	Hyd. volume	= 1,627 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 6.088 in/hr	Tc by User	= 5.00 min
IDF Curve	= Salt Lake City IDF.IDF	Asc/Rec limb fact	= 1/1



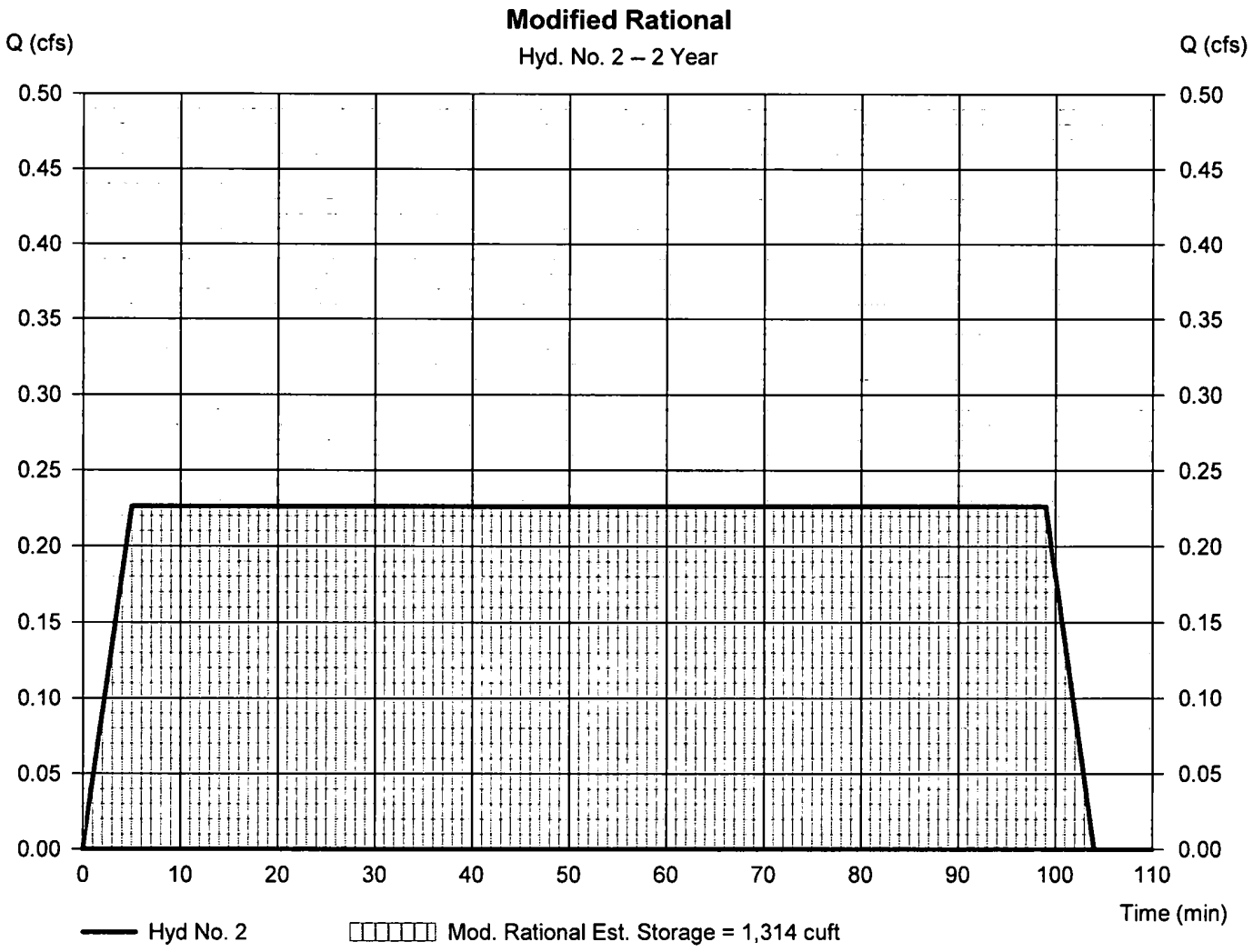
Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v11 — Thursday, 01 / 26 / 2017

Hyd. No. 2

Modified Rational

Hydrograph type	= Mod. Rational	Peak discharge	= 0.226 cfs
Storm frequency	= 2 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 1,345 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 0.254 in/hr	Tc by User	= 5.00 min
IDF Curve	= Salt Lake City IDF.IDF	Storm duration	= 19.8 x Tc
Target Q	=0.010 cfs	Est. Req'd Storage	=1,314 cuft

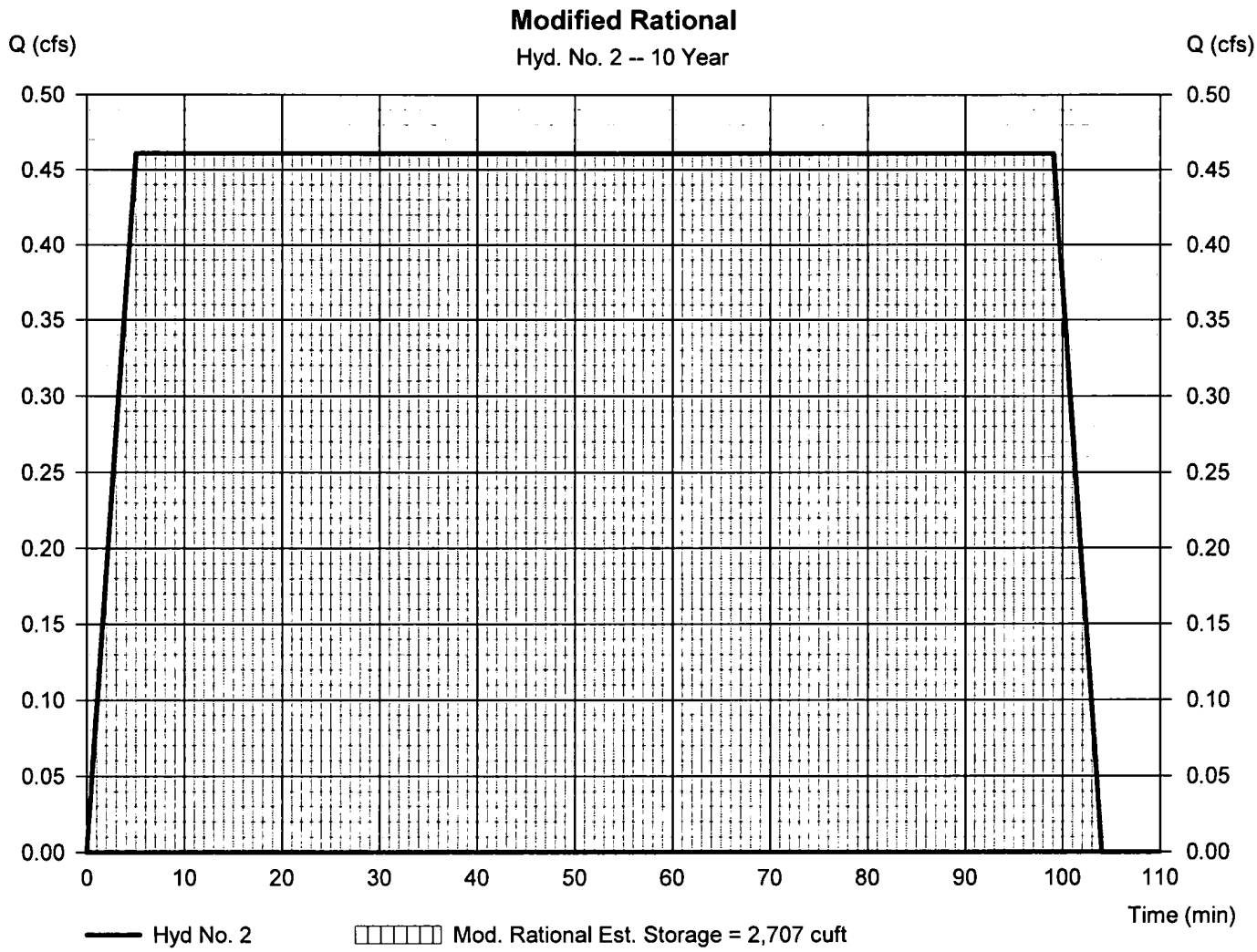


Hydrograph Report

Hyd. No. 2

Modified Rational

Hydrograph type	= Mod. Rational	Peak discharge	= 0.461 cfs
Storm frequency	= 10 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 2,738 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 0.517 in/hr	Tc by User	= 5.00 min
IDF Curve	= Salt Lake City IDF.IDF	Storm duration	= 19.8 x Tc
Target Q	=0.010 cfs	Est. Req'd Storage	=2,707 cuft

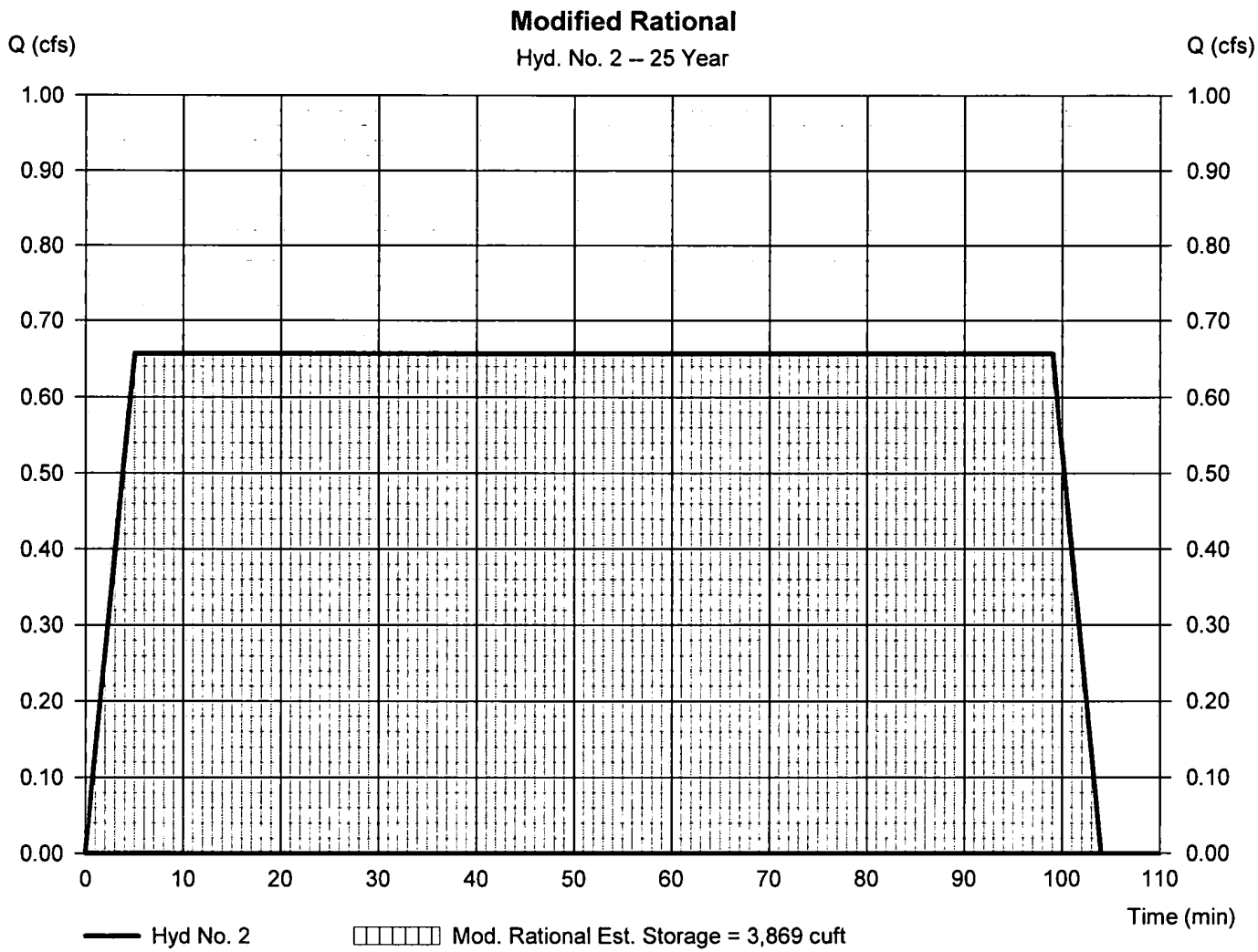


Hydrograph Report

Hyd. No. 2

Modified Rational

Hydrograph type	= Mod. Rational	Peak discharge	= 0.657 cfs
Storm frequency	= 25 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 3,901 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 0.737 in/hr	Tc by User	= 5.00 min
IDF Curve	= Salt Lake City IDF.IDF	Storm duration	= 19.8 x Tc
Target Q	=0.010 cfs	Est. Req'd Storage	=3,869 cuft

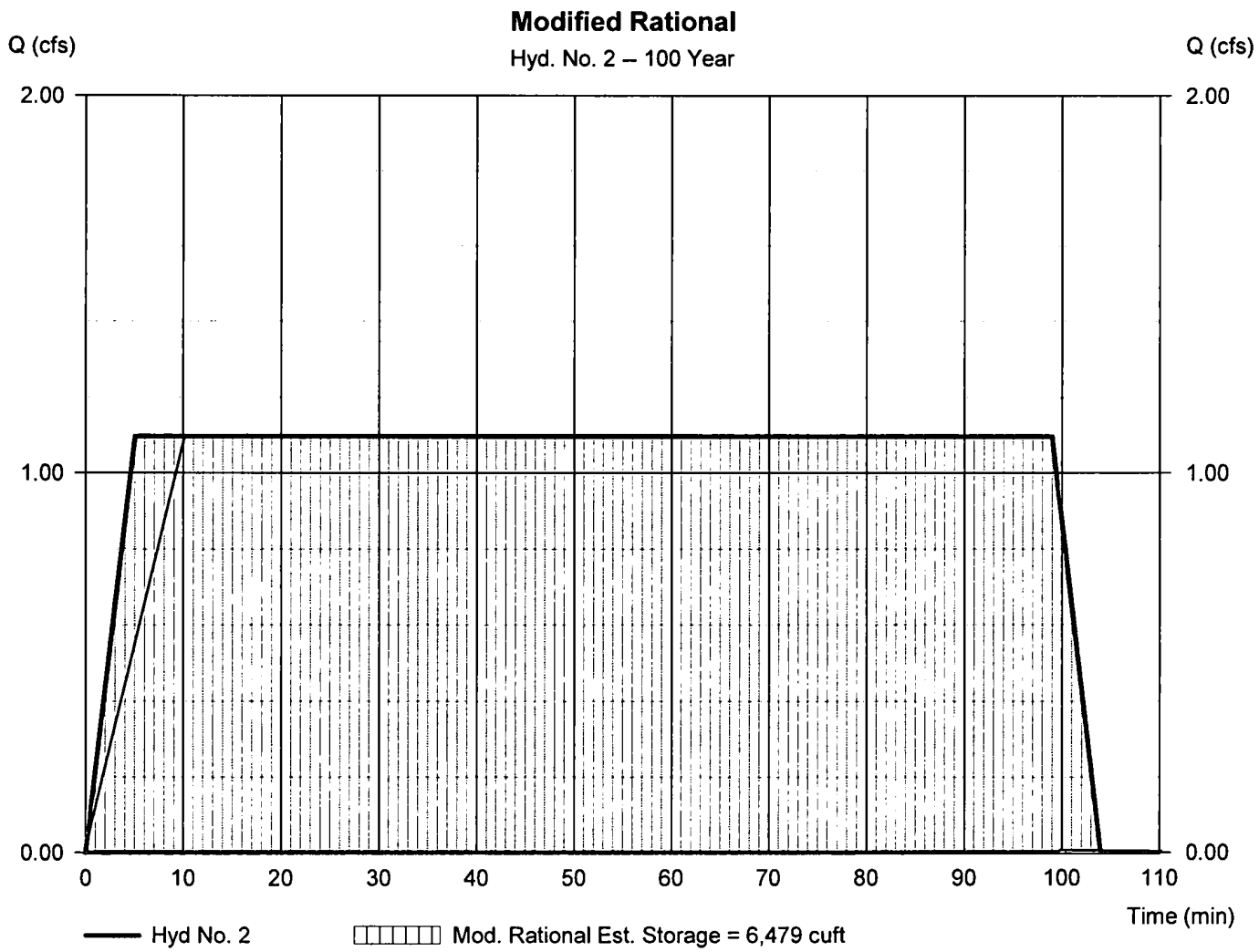


Hydrograph Report

Hyd. No. 2

Modified Rational

Hydrograph type	= Mod. Rational	Peak discharge	= 1.096 cfs
Storm frequency	= 100 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 6,511 cuft
Drainage area	= 0.990 ac	Runoff coeff.	= 0.9
Intensity	= 1.230 in/hr	Tc by User	= 5.00 min
IDF Curve	= Salt Lake City IDF.IDF	Storm duration	= 19.8 x Tc
Target Q	=0.010 cfs	Est. Req'd Storage	=6,479 cuft



Appendix E

Pond Storage

Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2016 by Autodesk, Inc. v11 — Thursday, 01 / 26 / 2017

Pond No. 1 - Underground Detention

Pond Data

UG Chambers -Invert elev. = 4225.00 ft, Rise x Span = 5.00 x 5.00 ft, Barrel Len = 85.00 ft, No. Barrels = 4, Slope = 1.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	4225.00	n/a	0	0
0.58	4225.58	n/a	116	116
1.17	4226.17	n/a	528	643
1.75	4226.75	n/a	793	1,436
2.34	4227.34	n/a	923	2,359
2.92	4227.92	n/a	980	3,339
3.51	4228.51	n/a	980	4,319
4.09	4229.10	n/a	923	5,243
4.68	4229.68	n/a	793	6,035
5.26	4230.27	n/a	527	6,562
5.85	4230.85	n/a	115	6,677

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	Inactive	Inactive	Inactive
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 4230.37	0.00	0.00	0.00
Length (ft)	= 100.00	0.00	0.00	0.00
Slope (%)	= 0.40	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

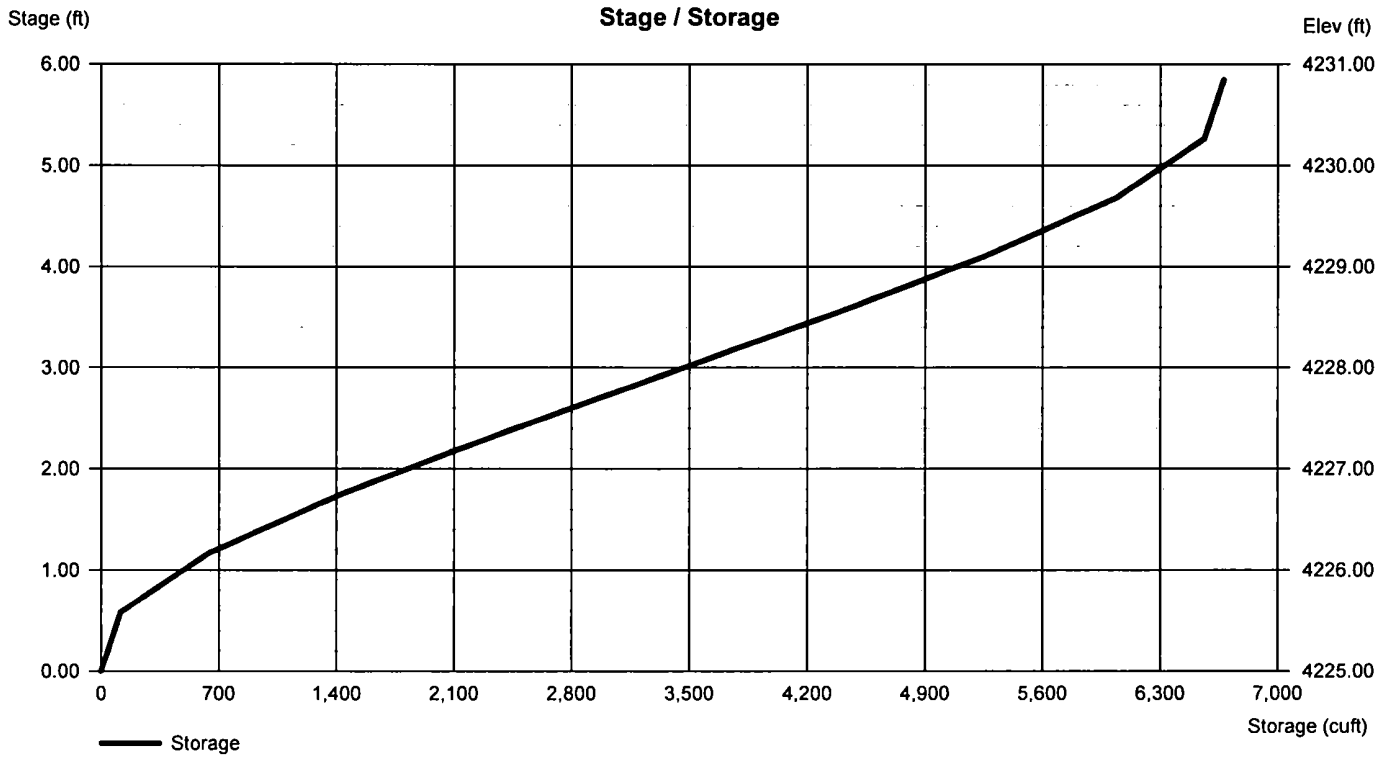
Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 0.00	Inactive	Inactive	0.00
Crest El. (ft)	= 4230.87	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	—	—	—
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.200 (by Wet area)

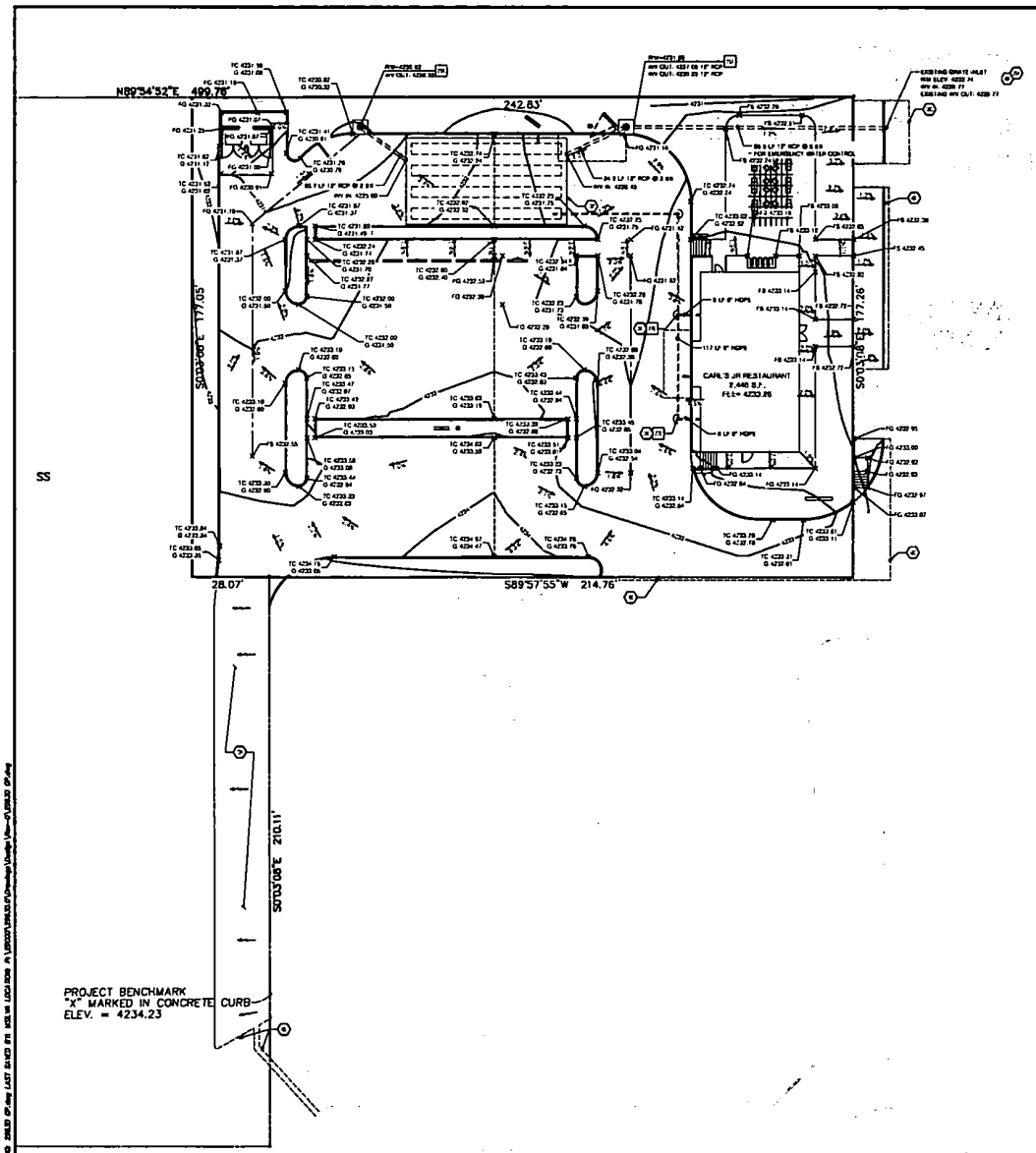
TW Elev. (ft) = 0.00

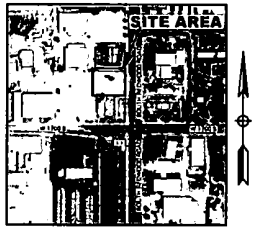
Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Appendix F

Grading Plan





Vicinity Map

811
Know what's below.
Call before you dig.

N

SCALE: 1" = 40'

SITE BENCHMARK

LEGEND

EXISTING

- ASPHALT LINE
- RIGHT OF WAY LINE
- STORM DRAIN
- CAS
- SANITARY SEWER
- UNDERGROUND ELECTRIC
- UNDERGROUND TELEPHONE
- WATER
- FENCE LINE
- FIBER OPTIC LINE
- ELECTRICAL POLE
- LIGHT POLE
- SEWER MANHOLE
- STORM DRAIN MANHOLE
- FIRE HYDRANT
- STORM DRAIN INLET

PROPOSED

- PROPERTY LINE/RIGHT OF WAY LINE
- SPACE BREAK
- CONTOUR ELEVATIONS
- STORM DRAIN
- SPOT ELEVATIONS: FC = TOP OF CURB; G = GUTTER

GENERAL GRADING NOTES

A. PRIOR TO INSTALLATION OF STORM OR SANITARY SEWER, THE CONTRACTOR SHALL EXCAVATE, VERIFY, AND CALCULATE ALL CROSSINGS AND INFORM THE OWNER AND THE ENGINEER OF ANY CONFLICTS PRIOR TO CONSTRUCTION. THE ENGINEER WILL BE HELD HARMLESS IN THE EVENT THIS SCHEDULE IS NOT ADHERED OF DESIGN CONFLICTS.

B. ALL SLOPES AND AREAS DISTURBED BY CONSTRUCTION SHALL BE GRADED SMOOTH AND 4" OF TOPSOIL APPLIED 4" ADEQUATE TOPSOIL IS NOT AVAILABLE ON SITE, THE CONTRACTOR SHALL PROVIDE TOPSOIL APPROVED BY THE OWNER, AS NEEDED. THE AREA SHALL THEN BE SEEDED, FERTILIZED, MULCHED, WATERED AND MAINTAINED UNTIL HARDY GRASS GROWTH IS ESTABLISHED IN ALL AREAS SEE LANDSCAPE PLAN FOR SEED MIX AND PROPER APPLICATION RATE) ANY AREAS DISTURBED FOR ANY REASON PRIOR TO FINAL ACCEPTANCE OF THE PROJECT SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

C. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS made in the field. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANY AT LEAST 48 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES.

G. UNLESS OTHERWISE SHOWN, CALLED OUT OR SPECIFIED HEREON OR WITHIN THE SPECIFICATIONS, ALL STORM DRAIN PIPE BEDDING SHALL BE INSTALLED PER DETAIL 204. ALL STORM DRAIN PIPES ARE MEASURED FROM CENTER OF STRUCTURES AND ENDS OF PLANS (END SECTION).

GRADING DETAILS

- 21A CURB INLET
- 27A STORM DRAIN CLEAN OUT

GRADING NOTES

- 18D CONNECT DOWN SPOUTS TO DRAIN PIPE. SEE ARCH. PLANS FOR EXACT NO. AND LOCATION OF DOWN SPOUTS
- 18G MATCH EXISTING PAVEMENT ELEVATIONS
- 19F CONNECT TO EXISTING STORM DRAIN PIPE
- 21A LOCATION FOR THIS UTILITY AS SHOWN IS FOR GRADING PURPOSES ONLY. CONTRACTOR SHALL VERIFY THE EXACT LOCATION IN FIELD PRIOR TO THE CONSTRUCTION OF THE PROPOSED UTILITY LINE TO BE CONNECTED. CONTRACTOR SHALL NOTIFY CEI ENGINEERING IF THE DESIGN AS SHOWN IS NOT ACHIEVABLE.
- 25A PROVIDE POSITIVE DRAINAGE ACROSS DRIVE AWAY FROM THE ADJACENT BUILDING
- 29B UNDERGROUND DETENTION SYSTEM PROVIDED BY TriTON STORMWATER SOLUTIONS

PROFESSIONAL ENGINEER — No. 7062229-2202 — ANDREW D. GLITTER — STATE OF UTAH
1/18/2017

	1/18/17	AJG	BAP	TYB	TAP
CEI PROJECT NO.	INITIAL DATE	DRGN	PM	CHK	APPV

CEI Engineering Associates, Inc.
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Fax (801)489-8756

CARL'S JR RESTAURANT & COMMERCIAL PARKING LOT
7630 SOUTH REDWOOD ROAD
SALT LAKE CITY, UTAH

GRADING PLAN

REV DATE	SHEET NO.
1/18/17 REV-0	C3

BK 10550 PG 9672