CITY OF ALBUQUERQUE

Planning Department
Alan Varela, Director

Mayor Timothy M. Keller

April 27, 2022

Charles Moseley, PE
Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032

RE: Costco Fuel OSR
1420 Reniassance Blvd. NE
Grading and Drainage Plan
Engineer's Stamp Date: 03/15/2022
Hydrology File: F16D005G

Dear Mr. Moseley:

Based upon the information provided in your submittal received 3/30/2022, the Grading & Drainage Plan **is not** approved for Grading Permit. The following comments need to be addressed for approval of the above referenced project:

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

General Notes

1. Please ensure the G&D has engineer stamp dated and signed on each sheet.
2. Please provide calculations for land use per DPM.
    a. Land treatments, flows, volumes etc…
3. Please clarify if this request is for a conceptual plan or will it be for building permit?
    a. Looking at the executive summary, the grading is requested and building permit will be later but is this for conceptual/DRB site plan?
4. Provide an overall G&D plan with basin delineations. Include site plan.
5. Please clearly show existing survey points and proposed grades if changing. Contours not adequate to show accurate changes in grade.
6. Provide top of wall and bottom of wall points.
7. Provide a detail of the wall
8. Are the waterlines on site public? Water Authority?
    a. Please verify with Water Authority and show all applicable easements. Please provide depths if so and ensure proper cover of the lines and coordinate this with the Water Authority.
9. Overall, the plan needs more detail of what it is tying into essentially. The proposed infrastructure has points but adjacent to that there is no info to see what existing grades are via survey etc… Contours are not real accurate most of the time.
10. Please clearly label amount of impervious area being installed and what existing was.
    a. Flows, volumes etc…
11. Provide calculations for storm water quality volume required. (redevelopment)
12. Cleary show where the SWQV is going and how it is being discharged into the appropriate street or drain.
13. Provide downstream capacity for any flow especially in excess of existing development.
14. More detail is needed overall.

As a reminder, if the project total area of disturbance (including the staging area and any work within the adjacent Right-of-Way) is 1 acre or more, then an Erosion and Sediment Control (ESC) Plan and Owner's certified Notice of Intent (NOI) is required to be submitted to the Stormwater Quality Engineer (Doug Hughes, PE, jhughes@cabq.gov, 924-3420) 14 days prior to any earth disturbance.

If you have any questions, please contact me at 924-3695 or dggutierrez@cabq.gov

Sincerely,

David G. Gutierrez, P.E.
Senior Engineer, Hydrology
Planning Department

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 6/2018)

Project Title: Costco Fuel OSR Building Permit #: _____ Hydrology File #: _____

DRB#: _____ EPC#: _____ Work Order#: _____

Legal Description: NA

City Address: 1420 Renaissance Blvd. NE

Applicant: Barghausen Consulting Engineers, Inc. Contact: Charles Moseley

Address: 18215 72nd Avenue South, Kent, WA 98032

Phone#: 425-656-7406 Fax#: 425-251-8782 E-mail: cmoseley@barghausen.com

Other Contact: Barghausen Consulting Engineers, Inc. Contact: Megan Palmer

Address: _____

Phone#: 425-656-1072 Fax#: _____ E-mail: mpalmer@barghausen.com

TYPE OF DEVELOPMENT: _____ PLAT (# of lots) _____ RESIDENCE X DRB SITE ___ ADMIN SITE

IS THIS A RESUBMITTAL? _____ Yes X No

DEPARTMENT _____ TRANSPORTATION X HYDROLOGY/DRAINAGE

Check all that Apply:

TYPE OF SUBMITTAL:

____ ENGINEER/ARCHITECT CERTIFICATION
____ PAD CERTIFICATION
____ CONCEPTUAL G & D PLAN
X GRADING PLAN
X DRAINAGE REPORT
____ DRAINAGE MASTER PLAN
____ FLOODPLAIN DEVELOPMENT PERMIT APPLIC
____ ELEVATION CERTIFICATE
____ CLOMR/LOMR
____ TRAFFIC CIRCULATION LAYOUT (TCL)
____ TRAFFIC IMPACT STUDY (TIS)
____ STREET LIGHT LAYOUT
____ OTHER (SPECIFY) _____
____ PRE-DESIGN MEETING?

TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

____ BUILDING PERMIT APPROVAL
____ CERTIFICATE OF OCCUPANCY

____ PRELIMINARY PLAT APPROVAL
____ SITE PLAN FOR O APPROVAL
____ SITE PLAN FOR BLDG. PERMIT APPROVAL
____ FINAL PLAT APPROVAL

____ SIA/ RELEASE OF FINANCIAL GUARANTEE
____ FOUNDATION PERMIT APPROVAL
X GRADING PERMIT APPROVAL
____ SO-19 APPROVAL
____ PAVING PERMIT APPROVAL
____ GRADING/ PAD CERTIFICATION
____ WORK ORDER APPROVAL
____ CLOMR/LOMR
____ FLOODPLAIN DEVELOPMENT PERMIT
____ OTHER (SPECIFY) _____

DATE SUBMITTED: 3/30/2022 By: Barghausen Consulting Engineers, Inc.

COA STAFF: ELECTRONIC SUBMITTAL RECEIVED:_____

FEE PAID:_____

BARGHAUSEN

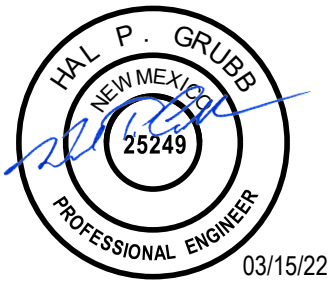
PRELIMINARY DRAINAGE REPORT

Fuel Facility OSR

1420 Renaissance Boulevard N.E.
Albuquerque, New Mexico 87107

CW No. 21-0313

Costco Loc. No. 116



Prepared for:
Costco Wholesale
999 Lake Drive
Issaquah, WA 98027

March 15, 2022
Our Job No. 10896

BARGHAUSEN CONSULTING ENGINEERS, INC.
18215 72ND AVENUE SOUTH KENT, WA 98032 P) 425.251.6222 F) 425.251.8782
BRANCH OFFICES: CHEHALIS, WA KLAMATH FALLS, OR LONG BEACH, CA RICHLAND, WA ROSEVILLE, CA
barghausen.com

TABLE OF CONTENTS

APPENDICES

MANUFACTURER'S SUPPORTING DOCUMENTS

1.0 EXECUTIVE SUMMARY

The proposed Costco Fuel Facility On-Site Relocation (OSR) is located at 1420 Renaissance Boulevard N.E., within a portion of Section 34, Township 11 North, Range 3 East, City of Albuquerque, Bernalillo County, New Mexico.

The project proposes to relocate the existing Fuel Facility from the northwest portion of the site to the southwest portion of the site with 12 new island dispensers. The site is currently developed with a full range of utilities on site. The project proposes to route runoff to a combination of the existing and replaced flow control devices and provide water quality treatment devices to meet the treatment criteria set forth in the 2020 Development Process Manual (DPM) for City of Albuquerque.

The proposed Costco Fuel Facility OSR will be constructed in the southwest portion of the site and will be designed to match existing paving grades and drainage design as closely as possible. Proposed conditions are further described in Appendix C.

Stormwater quality is required for the disturbed area, per the 2020 Development Process Manual (DPM) for the City of Albuquerque. A Contech CDS unit will be installed offline prior to the off-site discharge to provide stormwater treatment for the project equivalent to the disturbed area.

Flow control is currently provided with parking lot ponding to serve as detention facilities. The project proposes to replace a single parking lot pond with an equivalent underground detention system to accommodate the new Fuel Facility improvements.

The project is matching or improving the existing volume and flow discharge and is not anticipated to negatively impact downstream capacity or flows.

The project requests, in conjunction with this submittal, the approval of a Major Amendment and Grading and Drainage Review. A Building Permit submittal will be made at a later time.

2.0 INTRODUCTION

The project requires the replacement of the removed parking lot flow control/detention facility with equivalent detention and flows, the addition of water quality treatment for the Fuel Facility area with an oil/water separator. The disturbed area of the site will be treated with a CDS water quality unit that will be offline with a flow splitter to direct the water quality flow rate to the CDS unit for the equivalent disturbed area on the site.

3.0 PROJECT DESCRIPTION

The site (a.k.a, subject property) consists of two (2) tracts, 4B and 4C (UPC: 101606121920630710), 16.30 acres in total. The proposed development will be limited to approximately 2.76 acres of disturbed area on the subject property. The site's legal description is "TR 4B and 4C Plat for Renaissance Center TR 4A, 4B, 4C, 4D, 4E, and 4F CONT 16.3041 AC." Please see Appendix A, Vicinity Map, for a graphical depiction of the exact site location.

The site is located outside of a flood hazard area within Zone X on FEMA Flood Insurance Rate Map (FIRM) Number 35001C0138H dated August 16, 2022. Existing conditions are further described in Appendix B.

4.0 BACKROUND DOCUMENTS

The project was previously developed in 1996 as part of the Renaissance Tract 4B and 4C development with the Costco site.

The previous Drainage Report for the Renaissance Tract 4B and 4C is included in Appendix E of this report.

5.0 EXISTING CONDITIONS

The entire property is currently developed with asphalt paving, parking, landscaping, and an existing Costco Warehouse and Fuel Facility.

The site generally slopes downward from the northeast property boundary toward the southwest of the site and contains slopes ranging from 2 to 5 percent.

The on-site runoff collects in centralized parking lot ponds that drain to catch basins containing orifice plates on the outlets for flow control. The conveyance system discharges into a public drainage easement along the southwestern part of the site. The site is bordered by public rights-of-way on the north (Renaissance Boulevard N.E.), south (Montaño Road N.E.), and west (Alexander Boulevard N.E.).

There are no known existing drainage problems with the on-site drainage system or the public system immediately downstream of the project site.

Please refer to Appendix B – Existing Conditions Exhibit for additional information.

TABLE 3.1

Storm Drainage – Project Area Existing Condition

Pervious Area (SF)	Impervious Area (SF)	Total Area (SF)	Total Area (AC)
13,346	**106,913**	**120,259**	**2.76**

6.0 DEVELOPED CONDITIONS

The project proposes the demolition of the existing fuel facility and appurtenances and the relocation of the existing parking. The new fuel facility will consist of 12 MPDs, a new fuel canopy, a new controller enclosure, and the relocation of associated utilities. Other site improvements will include paved concrete, asphalt parking, maneuvering areas, concrete curbs, sidewalk, and landscaped areas.

Stormwater will be captured on site with existing and proposed catch basins. The new fuel facility is proposed within an existing parking lot detention basin. Underground detention is proposed to match the volume and flows of the removed parking lot detention facility. The site will be treated with an offline CDS Water Quality Unit sized to treat the equivalent volume for the proposed disturbed impervious surface area; please refer to the CDS Water Quality manufacturer's supporting documents for additional information.

The area under the fueling canopy will be hydraulically isolated in accordance with Section 6-12(D)(3) of the DPM. A concrete swale will be constructed along the lower west edge of the fueling

area to intercept and convey the runoff to a hydraulically separated storm drain inlet. The runoff will then be directed to an oil/water separator and then discharge into the existing storm system.

Table 4.1

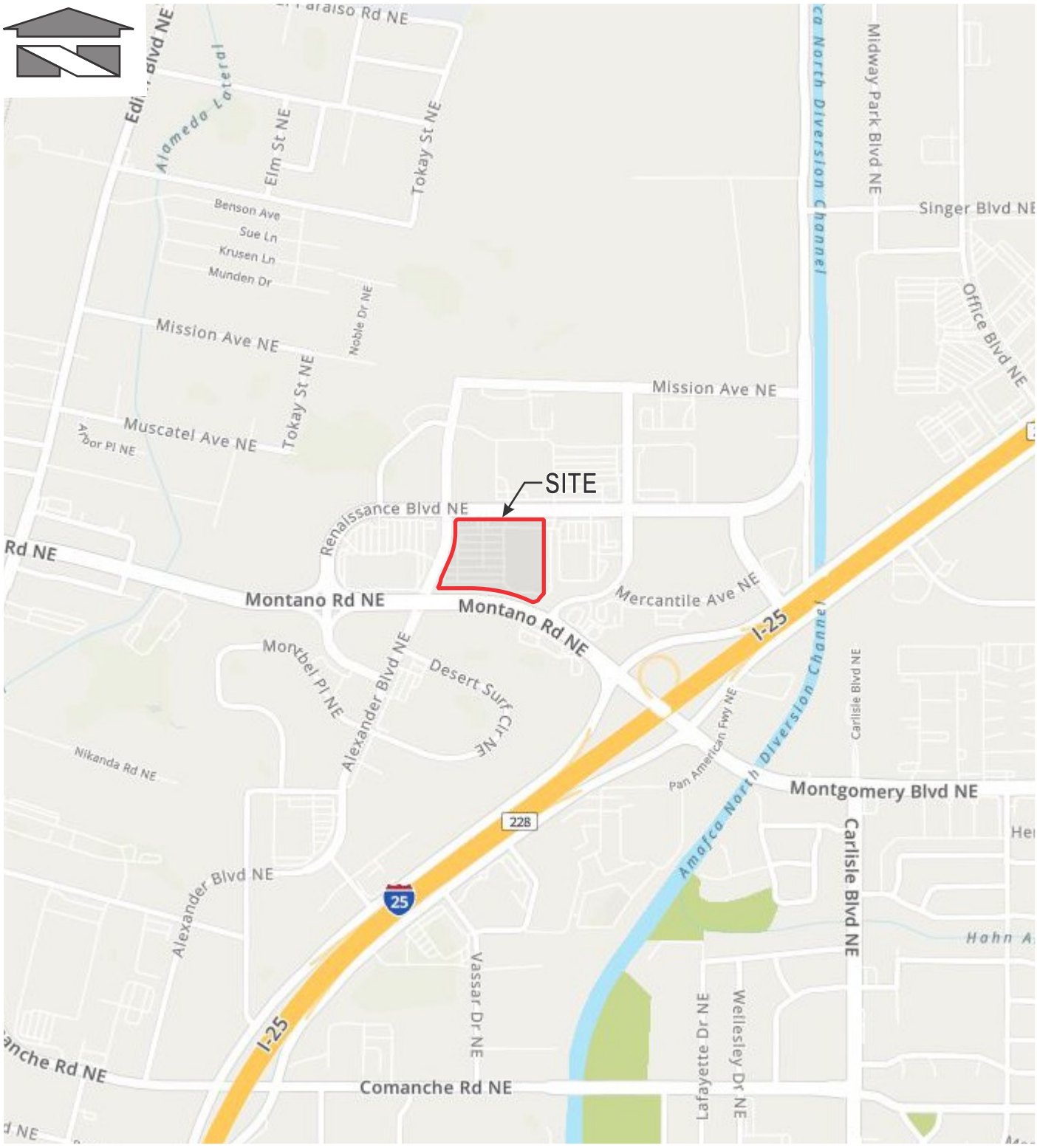
Storm Drainage – Proposed Condition

Pervious Area (SF)	Impervious Area (SF)	Total Area (SF)	Total Area (AC)
13,004	**107,255**	**120,259**	**2.76**

Please refer to Appendix C – Developed Conditions Exhibit and Appendix D – Calculations for additional information.

APPENDIX A

VICINITY MAP



REFERENCE: MapQuest (2022)

Scale:
Horizontal: **N.T.S.** Vertical: **N/A**

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222 **barghausen.com**

For:
Costco Gasoline #116
Albuquerque, New Mexico

Title:
VICINITY MAP

Job Number
10896

DATE: 03/15/22

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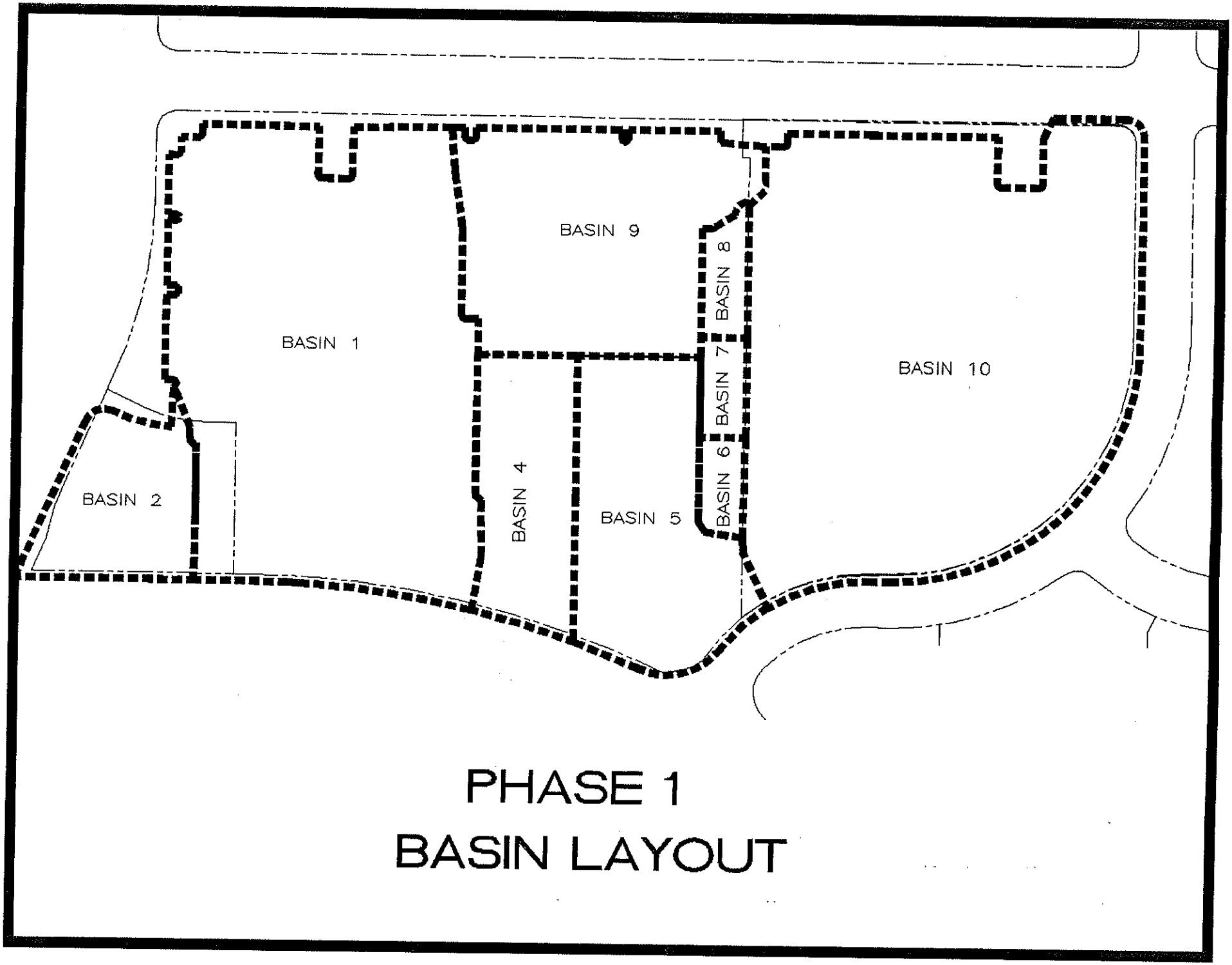
APPENDIX B

EXISTING CONDITIONS EXHIBIT



PHASE 1
BASIN LAYOUT

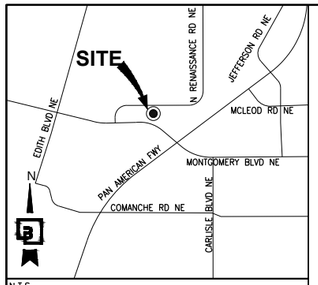
APPENDIX C

DEVELOPED CONDITIONS EXHIBIT

COSTCO WHOLESALE

COVER SHEET

COSTCO WHOLESALE OSR
□4□0 RENAISSANCE BLVD. N.E.
ALBUQUERQUE□NM □□□0□
COSTCO WHOLESALE FACILITY #□□□



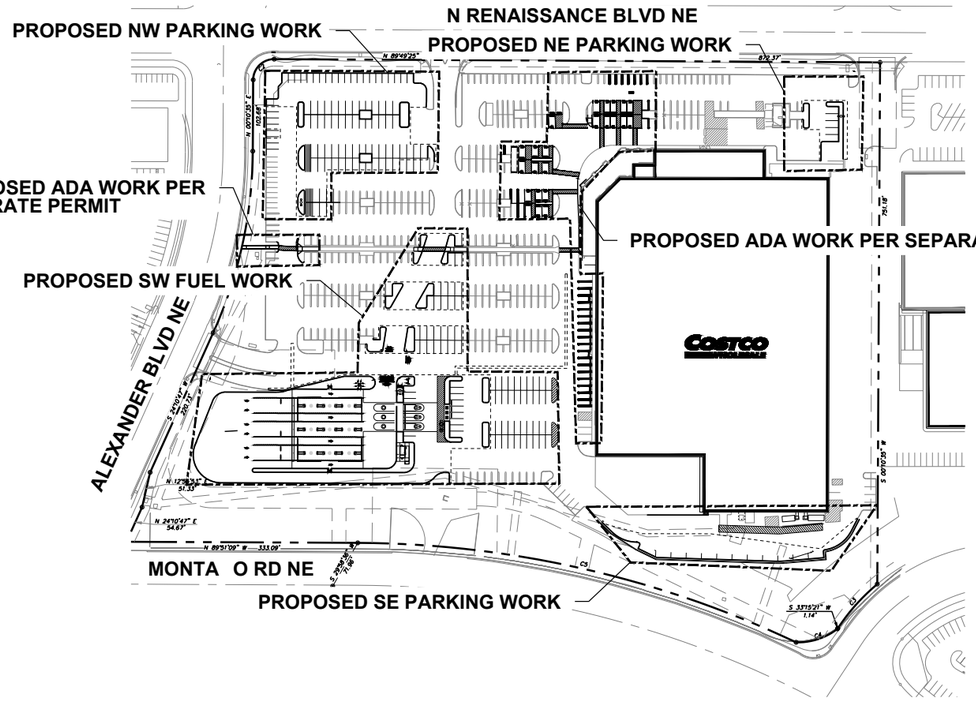
N.T.S.

VICINITY MAP

N

0 50' 100' 200'

SCALE: 1"=100'



LEGEND

EXISTING CONCRETE	PROPOSED ASPHALT
EXISTING CURB AND GUTTER	PROPOSED SLURRY SEAL
EXISTING EDGE OF PAVEMENT	PROPOSED CONCRETE
EXISTING CANOPY DRIPLINE	PROPOSED CURB AND GUTTER
EXISTING STORM DRAIN	SAWCUT LINE
EXISTING WATER LINE	PROPOSED STORM PIPE
EXISTING CATCH BASIN	PROPOSED WATER LINE
EXISTING STORM CLEANOUT	PROPOSED SANITARY SEWER LINE
EXISTING SPOT ELEVATION	PROPOSED CATCH BASIN
EXISTING TELECOM LINE	PROPOSED CLEANOUT
EXISTING SANITARY SEWER	PROPOSED SPOT GRADE
EXISTING POWER	PROPOSED GRADING SLOPE
	PROPOSED TOP OF PUMP ISLAND
	MATCH EXISTING GRADE
	PROPOSED TOP OF PAVEMENT/ TOP OF CURB
	LOW POINT/FLOW LINE/HIGH POINT

GENERAL SITE DEVELOPMENT NOTES:

1. THE CONTRACTOR SHALL OBTAIN AND HAVE AVAILABLE COPIES OF THE APPLICABLE GOVERNING AGENCY STANDARDS AT THE JOB SITE DURING THE RELATED CONSTRUCTION OPERATIONS.
2. CONTRACTOR SHALL ENSURE THAT ALL NECESSARY PERMITS HAVE BEEN OBTAINED PRIOR TO COMMENCING WORK.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE LOCATION, DIMENSION AND DEPTH OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION WHETHER SHOWN ON THESE PLANS OR NOT. UTILITIES OTHER THAN THOSE SHOWN MAY EXIST ON THIS SITE. ONLY THOSE UTILITIES WITH EVIDENCE OF THEIR INSTALLATION VISIBLE AT GROUND SURFACE OR SHOWN ON RECORD DRAWING PROVIDED BY OTHERS ARE SHOWN HEREON. EXISTING UNDERGROUND UTILITY LOCATIONS SHOWN ARE APPROXIMATE ONLY AND ARE SUBJECT TO A DEGREE OF UNKNOWN VARIATION. SOME UNDERGROUND LOCATIONS SHOWN HEREON MAY HAVE BEEN TAKEN FROM PUBLIC RECORDS. BARGHAUSEN CONSULTING ENGINEERS, INC. ASSUMES NO LIABILITY FOR THE ACCURACY OF PUBLIC RECORDS OR RECORDS OF OTHERS. IF CONFLICTS SHOULD OCCUR, THE CONTRACTOR SHALL CONSULT BARGHAUSEN CONSULTING ENGINEERS, INC. TO RESOLVE ALL PROBLEMS PRIOR TO PROCEEDING WITH CONSTRUCTION.
4. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW ALL OF THE DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THE PROJECT WORK SCOPE PRIOR TO THE INITIATION OF CONSTRUCTION. SHOULD THE CONTRACTOR FIND A CONFLICT WITH THE DOCUMENTS RELATIVE TO THE SPECIFICATIONS OR THE RELATIVE CODES, IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE PROJECT ENGINEER OF RECORD IN WRITING PRIOR TO THE START OF CONSTRUCTION. FAILURE BY THE CONTRACTOR TO NOTIFY THE PROJECT ENGINEER SHALL CONSTITUTE ACCEPTANCE OF FULL RESPONSIBILITY BY THE CONTRACTOR TO COMPLETE THE SCOPE OF WORK AS DEFINED BY THE DRAWINGS AND IN FULL COMPLIANCE WITH LOCAL REGULATIONS AND CODES.
5. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE APPROPRIATE UTILITIES INVOLVED PRIOR TO CONSTRUCTION.
6. INSPECTION OF SITE WORK WILL BE ACCOMPLISHED BY A REPRESENTATIVE OF THE GOVERNING JURISDICTION. INSPECTION OF PRIVATE FACILITIES WILL BE ACCOMPLISHED BY A REPRESENTATIVE OF THE OWNER. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE INSPECTOR 24 HOURS IN ADVANCE OF BACKFILLING ALL CONSTRUCTION.
7. PRIOR TO ANY CONSTRUCTION OR DEVELOPMENT ACTIVITY THE CONTRACTOR SHALL CONTACT THE AGENCY AND/OR UTILITY INSPECTION PERSONNEL AND ARRANGE ANY REQUIRED PRE-CONSTRUCTION MEETING(S). CONTRACTOR SHALL PROVIDE ONE WEEK MINIMUM ADVANCE NOTIFICATION TO OWNER, FIELD ENGINEER AND ENGINEER OF PRE-CONSTRUCTION MEETINGS.
8. THE CONTRACTOR IS RESPONSIBLE FOR WORKER AND SITE SAFETY AND SHALL COMPLY WITH THE LATEST OSHA STANDARDS AND REGULATIONS, OR ANY OTHER AGENCY HAVING JURISDICTION FOR EXCAVATION AND TRENCHING PROCEDURES. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE "MEANS AND METHODS" REQUIRED TO MEET THE INTENT AND PERFORMANCE CRITERIA OF OSHA, AS WELL AS ANY OTHER ENTITY THAT HAS JURISDICTION FOR EXCAVATION AND/OR TRENCHING PROCEDURES.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER NEEDED ACTIONS TO PROTECT THE LIFE, HEALTH, AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACTOR. ANY WORK WITHIN THE TRAVELED RIGHT-OF-WAY THAT MAY INTERRUPT NORMAL TRAFFIC FLOW SHALL REQUIRE AT LEAST ONE FLAGGER FOR EACH LANE OF TRAFFIC AFFECTED.
10. PROTECTIVE MEASURES SHALL BE TAKEN BY THE CONTRACTOR TO PROTECT ALL ADJACENT PUBLIC AND PRIVATE PROPERTIES AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION OF ALL EXISTING UTILITY SERVICES THAT ARE TO REMAIN OPERATIONAL WITHIN THE CONSTRUCTION AREA WHETHER SHOWN OR NOT SHOWN ON THE PLANS.
11. TWO (2) COPIES OF THESE APPROVED PLANS MUST BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS. ONE (1) SET WITH RECORDS OF AS-BUILT INFORMATION SHALL BE SUBMITTED TO BARGHAUSEN CONSULTING ENGINEERS, INC. AT COMPLETION OF PROJECT.
12. CONTRACTOR SHALL OBTAIN SERVICES OF A LICENSED LAND SURVEYOR TO STAKE HORIZONTAL CONTROL FOR ALL NEW IMPROVEMENTS. STAKING CONTROL SHALL BE TAKEN FROM ELECTRONIC PLAN FILES PROVIDED BY BARGHAUSEN CONSULTING ENGINEERS, INC.
13. CONTRACTOR SHALL REQUEST FROM BARGHAUSEN CONSULTING ENGINEERS, INC., PRIOR TO ANY CONSTRUCTION STAKING OR CONSTRUCTION WORK, A FORMAL CONSTRUCTION RELEASE PLAN SET OR SPECIFIC RELEASE IN WRITING. THE APPROVED AGENCY PERMIT DRAWINGS WILL NOT BE CONSIDERED CONSTRUCTION RELEASE PLANS BY BARGHAUSEN CONSULTING ENGINEERS, INC. UNLESS BARGHAUSEN CONSULTING ENGINEERS, INC. HAS GIVEN A FORMAL WRITTEN RELEASE OR ISSUED A CONSTRUCTION RELEASE PLAN SET.

SURVEY BENCHMARK:

THE BENCHMARK USED FOR THIS SURVEY IS THE 1.75" CITY OF ALBERQUERQUE SURVEY CONTROL DISK STAMPED "ACS BM 10-F15", EPOXIED TO THE CENTER OF THE TOP OF A DROP INLET, LOCATED ON THE NORTH SIDE OF MONTANO ROAD 85' EAST OF THE ALAMEDA LATERAL, HAVING AN ELEVATION OF 5002.45 FEET. (NAVD88).

BASIS OF BEARINGS:

THE BASIS OF BEARING IS NAD 83, NEW MEXICO STATE PLANE CENTER ZONE AS MEASURED USING CITY OF ALBUQUERQUE BENCHMARKS 9_F15 AND 10_F15.

CIVIL SHEET INDEX:

PROJECT DATA:

PROJECT ADDRESS:	1420 RENAISSANCE BLVD. N.E. ALBUQUERQUE, NM 87107
JURISDICTION:	ALBUQUERQUE
APN:	1-016-061-219206-3-07-10
ZONING:	MX-M

PROJECT AREA SUMMARY:

	EXISTING	PROPOSED
IMPERVIOUS:	106,913 SF	107,255 SF
PERVIOUS:	13,346 SF	13,004 SF

TOTAL DISTURBANCE = 120,259 SF

GRADING QUANTITIES:

TOTAL CUT (CY) = 6,500
TOTAL FILL (CY) = 1,000

EARTHWORK QUANTITIES ARE APPROXIMATE AND HIGHLY DEPENDANT ON SOIL CONDITIONS ENCOUNTERED DURING CONSTRUCTION. CONTRACTOR SHOULD PERFORM INDEPENDENT ESTIMATE FOR BIDDING.

PROJECT TEAM:

OWNER
COSTCO WHOLESALE
999 LAKE DRIVE
ISSAQUAH, WA 98027

SURVEYOR
SUPERIOR SURVEYING SERVICES, INC.
2122 W. LANE CACTUS DRIVE, SUITE 11
PHOENIX, AZ 85027
PHONE: (623) 869-0223
FAX: (623) 869-0726
CONTACT: RANDY S. DELBRIDGE

LANDSCAPE ARCHITECT
BARGHAUSEN CONSULTING ENGINEERS, INC.
18215 72ND AVE. S.
KENT, WA 98032
PHONE: (425) 251-6222
FAX: (425) 251-8782
CONTACT: JEFF VARLEY

CIVIL ENGINEER
BARGHAUSEN CONSULTING ENGINEERS, INC.
18215 72ND AVE. S.
KENT, WA 98032
PHONE: (425) 251-6222
FAX: (425) 251-8782
CONTACT: MEGAN E.S. PALMER

ARCHITECT
MG2 CORPORATION
1101 SECOND AVENUE, SUITE 100
SEATTLE, WA 98101
PHONE: (206) 962-6500
FAX: (206) 962-6499
CONTACT: ISAAC PEREZ

GEOTECHNICAL ENGINEER
KLEINFELDER
24411 RIDGE ROUTE DR., SUITE 225
LAGUNA HILLS, CA 92653
PHONE: (949) 727-4466
FAX: (949) 727-9242
CONTACT: RUSS FERRYMAN

SITE PLAN NOTE:

A SITE PLAN PREPARED BY MG2 HAS BEEN PROVIDED TO BARGHAUSEN CONSULTING ENGINEERS, INC. BARGHAUSEN CONSULTING ENGINEERS HAS NOT VERIFIED THAT THE SITE PLAN IS COMPLIANT WITH ALL CITY OR COSTCO STANDARDS.

EXISTING TOPOGRAPHY/SURVEY INFORMATION NOTE:

A TOPOGRAPHIC AND BOUNDARY SURVEY PREPARED BY SUPERIOR SURVEYING SERVICES, INC. DATED NOVEMBER 4, 2021, HAS BEEN PROVIDED AS THE EXISTING CONDITIONS MAP TO BARGHAUSEN CONSULTING ENGINEERS, INC. BARGHAUSEN CONSULTING ENGINEERS, INC. HAS NOT VERIFIED THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED. THE SITE DESIGN HAS BEEN BASED ON THE ABOVE-NOTED SURVEYS. DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF BARGHAUSEN CONSULTING ENGINEERS, INC.

FEMA FLOODPLAIN:

THE SUBJECT SITE IS LOCATED WITHIN ZONE X (FEMA FIRM NO 35001C0138H DATED AUGUST 16, 2012), AND THIS PROJECT WILL NOT BE SUBJECT TO ANY FLOOD CONTROL REQUIREMENTS

CAUTION:

POTENTIAL UTILITY CONFLICT. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING AND NEW UTILITIES PRIOR TO CONSTRUCTION. SEE UTILITY CONFLICT NOTE. THE EXISTING WATER, STORM, AND SANITARY SEWER SERVICE SHOWN IS APPROXIMATE, BASED ON FIELD SURVEYS AND "AS-BUILT" RECORDS. THE GENERAL CONTRACTOR SHALL "POTHOLE" THE EXISTING UTILITIES TO VERIFY THE DIAMETER AND LOCATION (INCL. ELEVATIONS) PRIOR TO CONSTRUCTION. ANY DISCREPANCIES IN THE LOCATION OF THE EXISTING PIPE OR INCOMPATIBILITY OF THE DESIGN SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE OWNERS REPRESENTATIVE, AND BARGHAUSEN CONSULTING ENGINEERS (425-251-6222).

MONUMENT PROTECTION NOTE:

CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR OBTAINING PERMITS FROM ANY JURISDICTIONS HAVING AUTHORITY FOR REMOVING AND REPLACING ALL SURVEY MONUMENTATION THAT MAY BE AFFECTED BY CONSTRUCTION ACTIVITY. UPON COMPLETION OF CONSTRUCTION, ALL MONUMENTS DISPLACED, REMOVED, OR DESTROYED SHALL BE REPLACED BY A REGISTERED LAND SURVEYOR, AT THE COST AND AT THE DIRECTION OF THE CONTRACTOR, PURSUANT TO THESE REGULATIONS. THE APPROPRIATE FORMS FOR REPLACEMENT OF SAID MONUMENTATION SHALL ALSO BE THE RESPONSIBILITY OF THE CONTRACTOR.

No.	Date	By	Ckd.	Appr.	Revision

Title:

COVER SHEET
RENAISSANCE BLVD. N.E.
ALBUQUERQUE, NM 87107
COSTCO WAREHOUSE LOCATION #116

For:

COSTCO WHOLESALE
999 LAKE DRIVE
ISSAQUAH, WA 98027

HALP GRUBB NEW MEXICO 25249 PROFESSIONAL ENGINEER

Scale: Horizontal 1" = 100' Vertical N/A

Designed JSI Drawn JSI Checked MESP Approved CRJ Date 1/24/22

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

Job Number 10896

Sheet C□.13

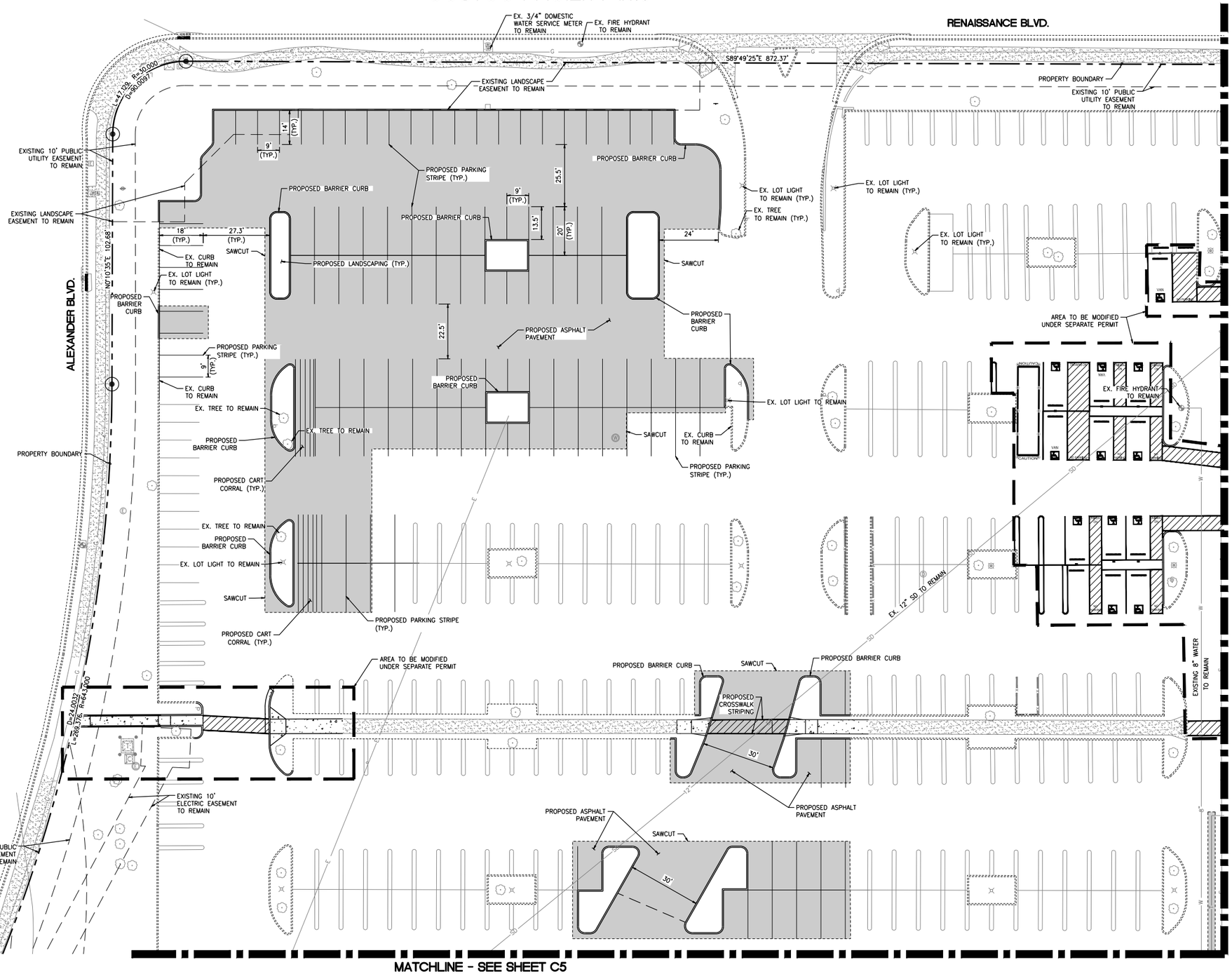
P:\10000s\10896\preliminary\2021-OSR\10896-PD.dwg 3/14/2022 9:55 AM LHOLLINGSWORTH

PRELIMINARY SITE PLAN NW QTR
COSTCO WHOLESALE FUEL FACILITY RELOCATION
1420 RENAISSANCE BLVD. N.E. ALBUQUERQUE, NM 87107
COSTCO FACILITY #116

N

0 10' 20' 40'

SCALE: 1"=20'



No.	Date	By	Ckd.	Appr.	Revision

Title: PRELIMINARY SITE PLAN NW QTR
RENAISSANCE BLVD. N.E.
ALBUQUERQUE, NM 87107
COSTCO WAREHOUSE LOCATION #116

For:
COSTCO WHOLESALE
999 LAKE DRIVE
ISSAQUAH, WA 98027

HAL P. GRUBB
NEW MEXICO
25249
PROFESSIONAL ENGINEER

Scale: Horizontal 1" = 20' Vertical N/A

Designed JSI Drawn JSI Checked MESP Approved CBU Date 1/24/22

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222 barghausen.com

Job Number 10896

Sheet C2 of 13

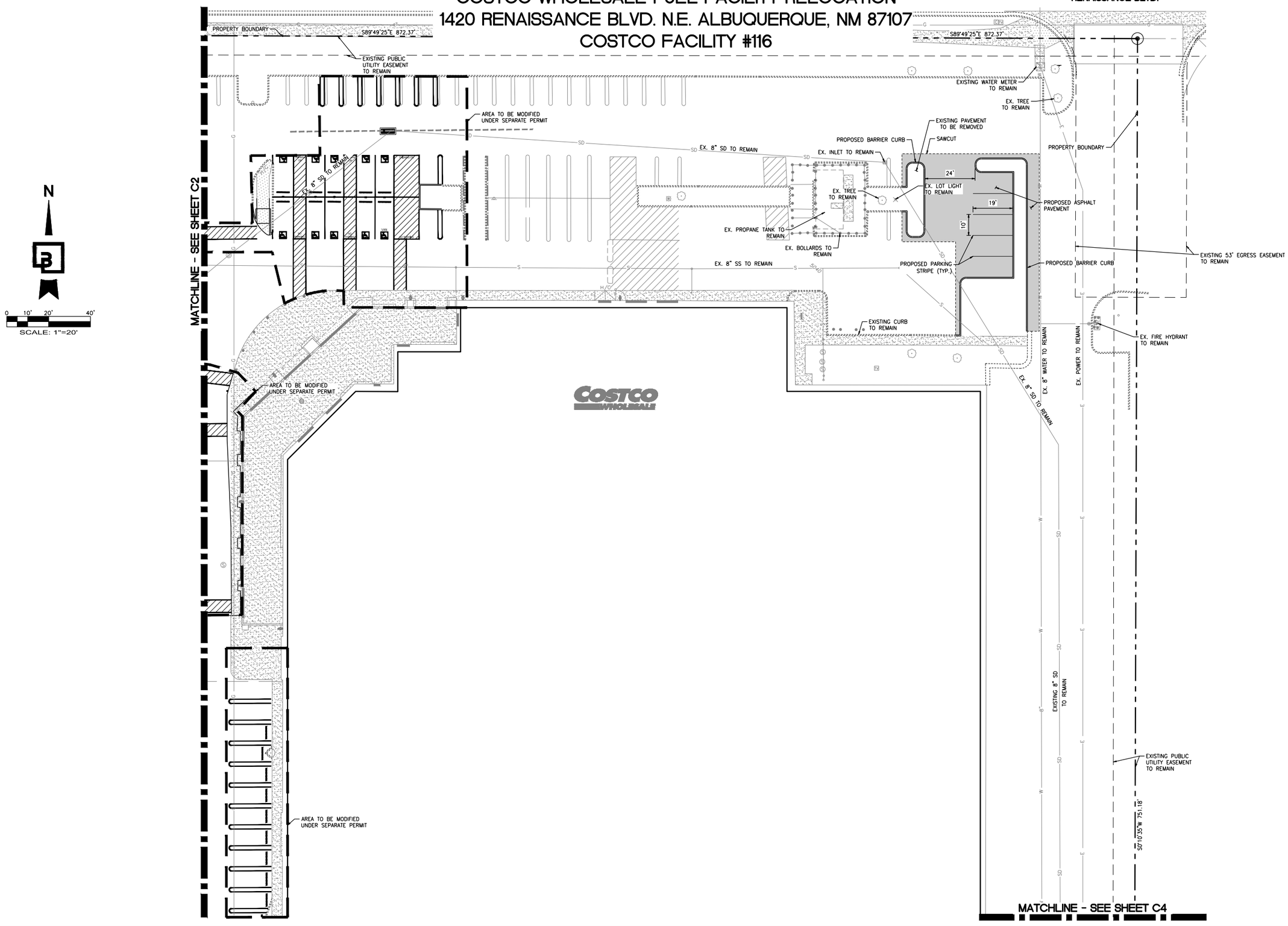
P:\10000s\10896\preliminary\2021-QSR\10896-PA.dwg 3/14/2022 10:35 AM LHOLLINGSWORTH

PRELIMINARY SITE PLAN NE QTR

COSTCO WHOLESALE FUEL FACILITY RELOCATION

1420 RENAISSANCE BLVD. N.E. ALBUQUERQUE, NM 87107

COSTCO FACILITY #116



No.	Date	By	Ckd.	Appr.	Revision

Title: PRELIMINARY SITE PLAN NE QTR
RENAISSANCE BLVD. N.E.
ALBUQUERQUE, NM 87107
COSTCO WAREHOUSE LOCATION #116

For: COSTCO WHOLESALE
999 LAKE DRIVE
ISSAQUAH, WA 98027

HAL P. GRUBB
NEW MEXICO
25249
PROFESSIONAL ENGINEER

Scale: Horizontal 1" = 20' Vertical N/A

Designed JSI
Drawn JSI
Checked MESP
Approved CRJ
Date 1/24/22

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222 barghausen.com

Job Number 10896

Sheet C3 of 13

P:\10000s\10896\preliminary\2021-OSR\10896-PA.dwg 3/14/2022 10:35 AM LHOLLINGSWORTH

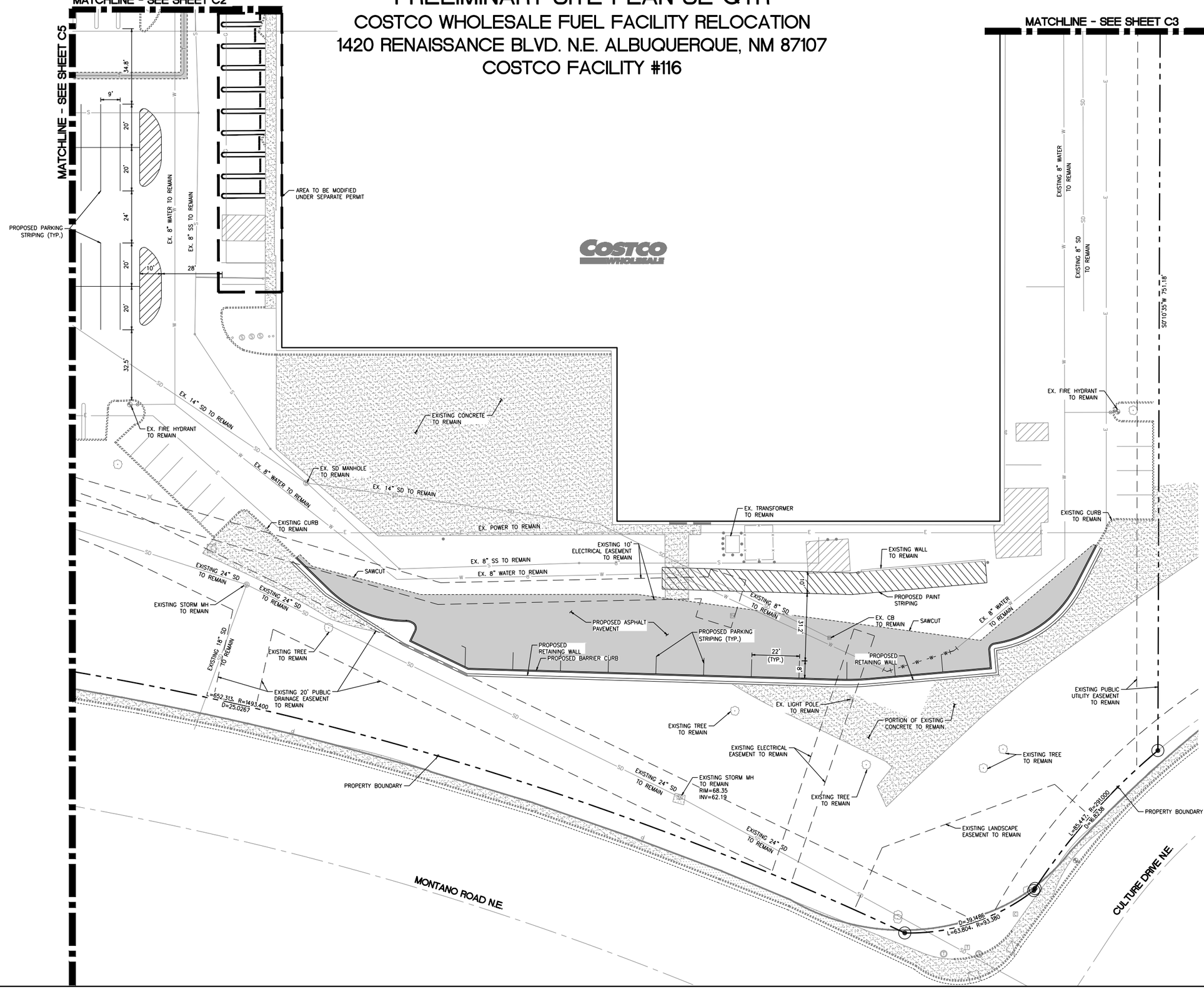
PRELIMINARY SITE PLAN SE QTR

COSTCO WHOLESALE FUEL FACILITY RELOCATION
1420 RENAISSANCE BLVD. N.E. ALBUQUERQUE, NM 87107
COSTCO FACILITY #116

N

0 10' 20' 40'

SCALE: 1"=20'



COSTCO WHOLESALE

HAL P. GRUBB NEW MEXICO 25249 PROFESSIONAL ENGINEER

No.	Date	By	Ckd.	Appr.	Revision

Title: PRELIMINARY SITE PLAN SE QTR
RENAISSANCE BLVD. N.E.
ALBUQUERQUE, NM 87107
COSTCO WAREHOUSE LOCATION #116

For: COSTCO WHOLESALE
999 LAKE DRIVE
ISSAQUAH, WA 98027

Scale: Horizontal 1" = 20' Vertical N/A

Designed JSI Drawn JSI Checked MESP Approved CRJ Date 1/24/22

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222 barghausen.com

Job Number 10896

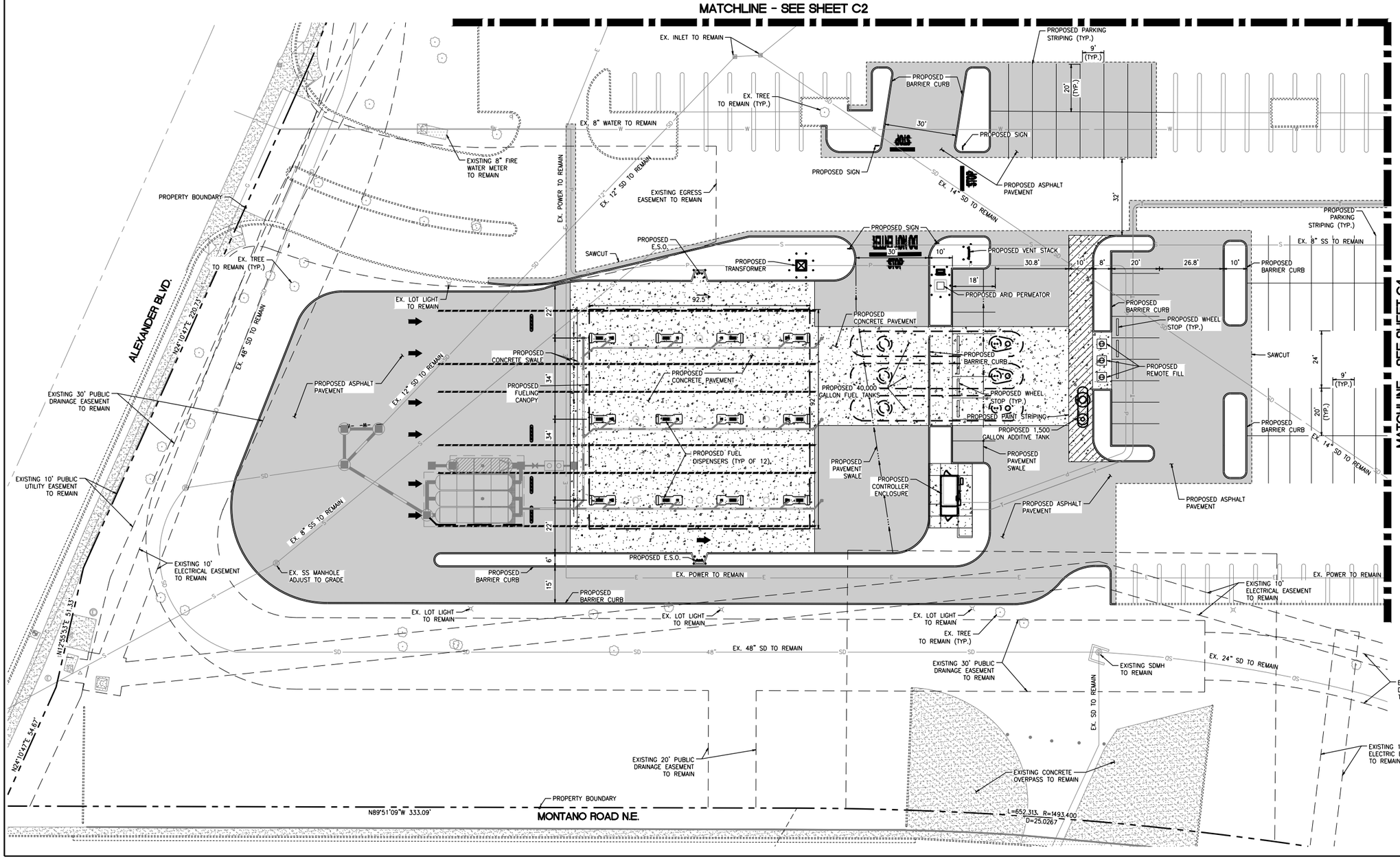
Sheet C4 of 13

P:\10000s\10896\preliminary\2021-OSR\10896-PA.dwg 3/14/2022 10:35 AM LHOLLINGSWORTH

PRELIMINARY SITE PLAN SW QTR
COSTCO WHOLESALE FUEL FACILITY RELOCATION
1420 RENAISSANCE BLVD. N.E. ALBUQUERQUE, NM 87107
COSTCO FACILITY #116

N

0 10' 20' 40'
SCALE: 1"=20'



No.	Date	By	Ckd.	Appr.	Revision

Title: PRELIMINARY SITE PLAN SW QTR
RENAISSANCE BLVD. N.E.
ALBUQUERQUE, NM 87107
COSTCO WAREHOUSE LOCATION #116

For:
COSTCO WHOLESALE
999 LAKE DRIVE
ISSAQUAH, WA 98027

HALP GRUBB
NEW MEXICO
25249
PROFESSIONAL ENGINEER

Scale: Horizontal 1" = 20' Vertical N/A

Designed JSL
Drawn JSL
Checked MFSP
Approved GRL
Date 1/24/22

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

Job Number 10896
Sheet C5 of 13

P:\10000s\10896\preliminary\2021-05PA\10896-PA.dwg 3/14/2022 10:35 AM LHOLLINGSWORTH

PRELIMINARY GRADING AND DRAINAGE PLAN NW QTR
COSTCO WHOLESALE FUEL FACILITY RELOCATION
1420 RENAISSANCE BLVD. N.E. ALBUQUERQUE, NM 87107
COSTCO FACILITY #116

N

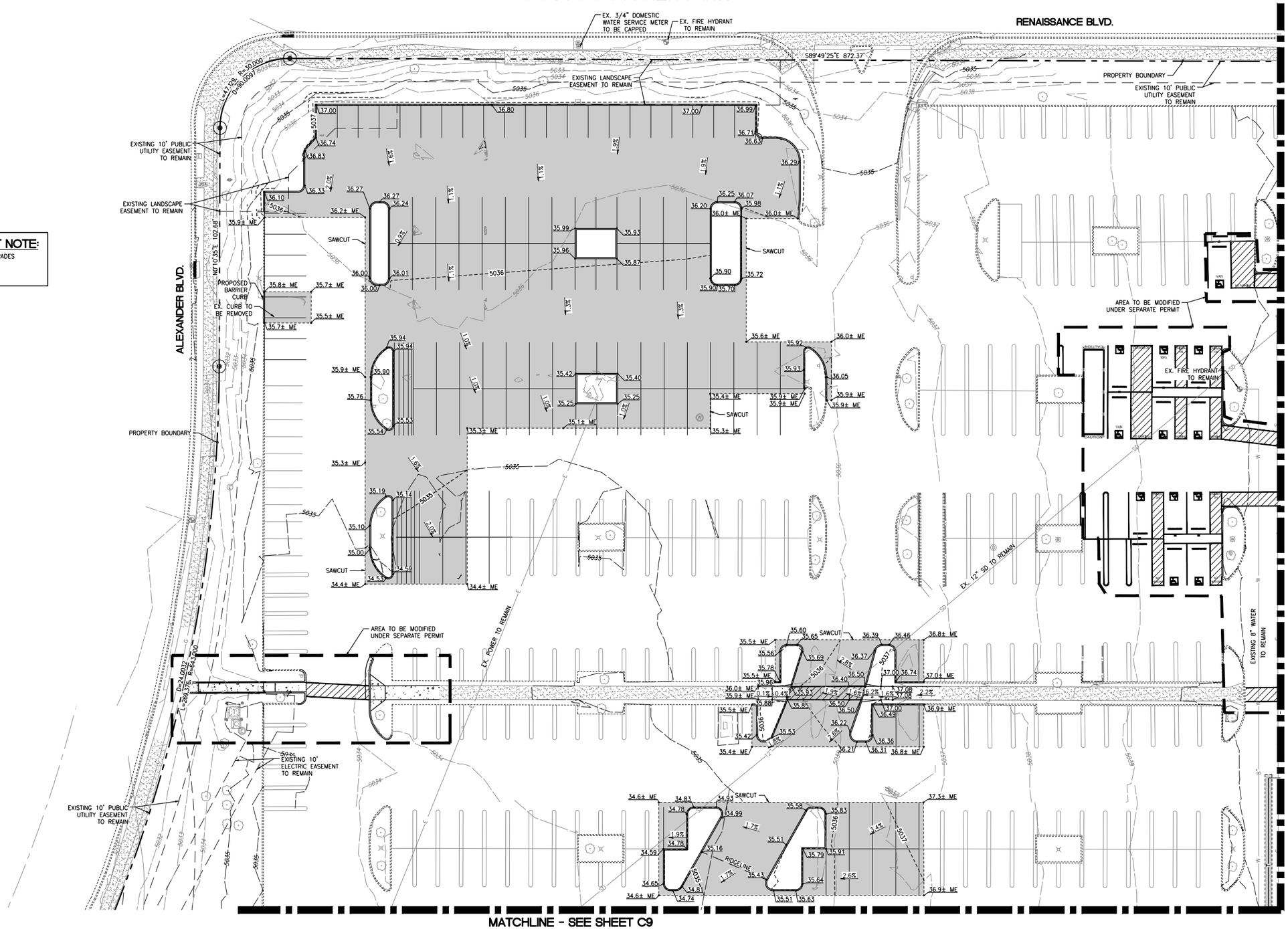
0 10' 20' 40'

SCALE: 1"=20'

ELEVATION ADJUSTMENT NOTE:

CONTRACTOR SHALL ADD 5000 TO ALL SPOT GRADES TO OBTAIN FINAL ELEVATIONS:

35.00 + 5000 = 5035.00



No.	Date	By	Ckd.	Appr.	Revision

Title:
PRELIMINARY GRADING AND DRAINAGE PLAN NW QTR
RENAISSANCE BLVD. N.E.
ALBUQUERQUE, NM 87107
COSTCO WAREHOUSE LOCATION #116

For:
COSTCO WHOLESALE
999 LAKE DRIVE
ISSAQUAH, WA 98027

HAL P. GRUBB
NEW MEXICO
25249
PROFESSIONAL ENGINEER

Scale: Horizontal 1" = 20' Vertical N/A

Designed JSI Drawn JSI Checked MESP Approved CBU Date 1/24/22

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222 barghausen.com

Job Number 10896

Sheet C6 of 13

P:\10000s\10896\preliminary\2021-OSR\10896-PGM.dwg 3/14/2022 10:38 AM LHOLLINGSWORTH

PRELIMINARY GRADING AND DRAINAGE PLAN NE QTR

COSTCO WHOLESALE FUEL FACILITY RELOCATION

1420 RENAISSANCE BLVD. N.E. ALBUQUERQUE, NM 87107

COSTCO FACILITY #116

N

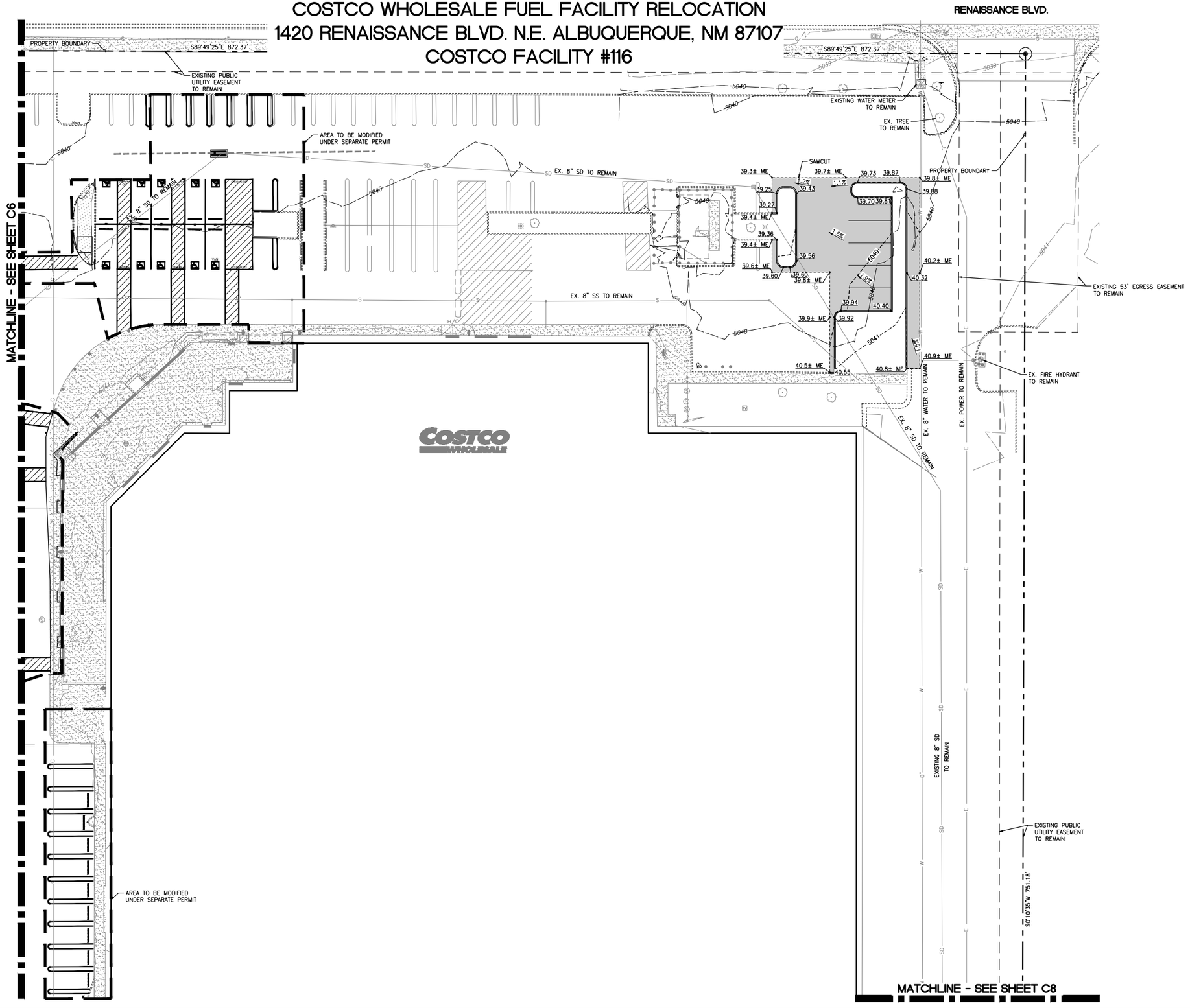
0 10' 20' 40'

SCALE: 1"=20'

ELEVATION ADJUSTMENT NOTE:

CONTRACTOR SHALL ADD 5000 TO ALL SPOT GRADES TO OBTAIN FINAL ELEVATIONS:

35.00 + 5000 = 5035.00



No.	Date	By	Ckd.	Appr.	Revision

Title: PRELIMINARY GRADING AND DRAINAGE PLAN NE QTR
RENAISSANCE BLVD. N.E.
ALBUQUERQUE, NM 87107
COSTCO WAREHOUSE LOCATION #116

For:
COSTCO WHOLESALE
999 LAKE DRIVE
ISSAQUAH, WA 98027

HAL P. GRUBB
NEW MEXICO
25249
PROFESSIONAL ENGINEER

Scale: Horizontal 1" = 20' Vertical N/A

Designed JSI
Drawn JSI
Checked MESP
Approved CRJ
Date 1/24/22

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222 barghausen.com

Job Number 10896

Sheet C7 of 13

P:\10000s\10896\preliminary\2021-OSR\10896-PGM.dwg 3/14/2022 10:38 AM LHOLLINGSWORTH

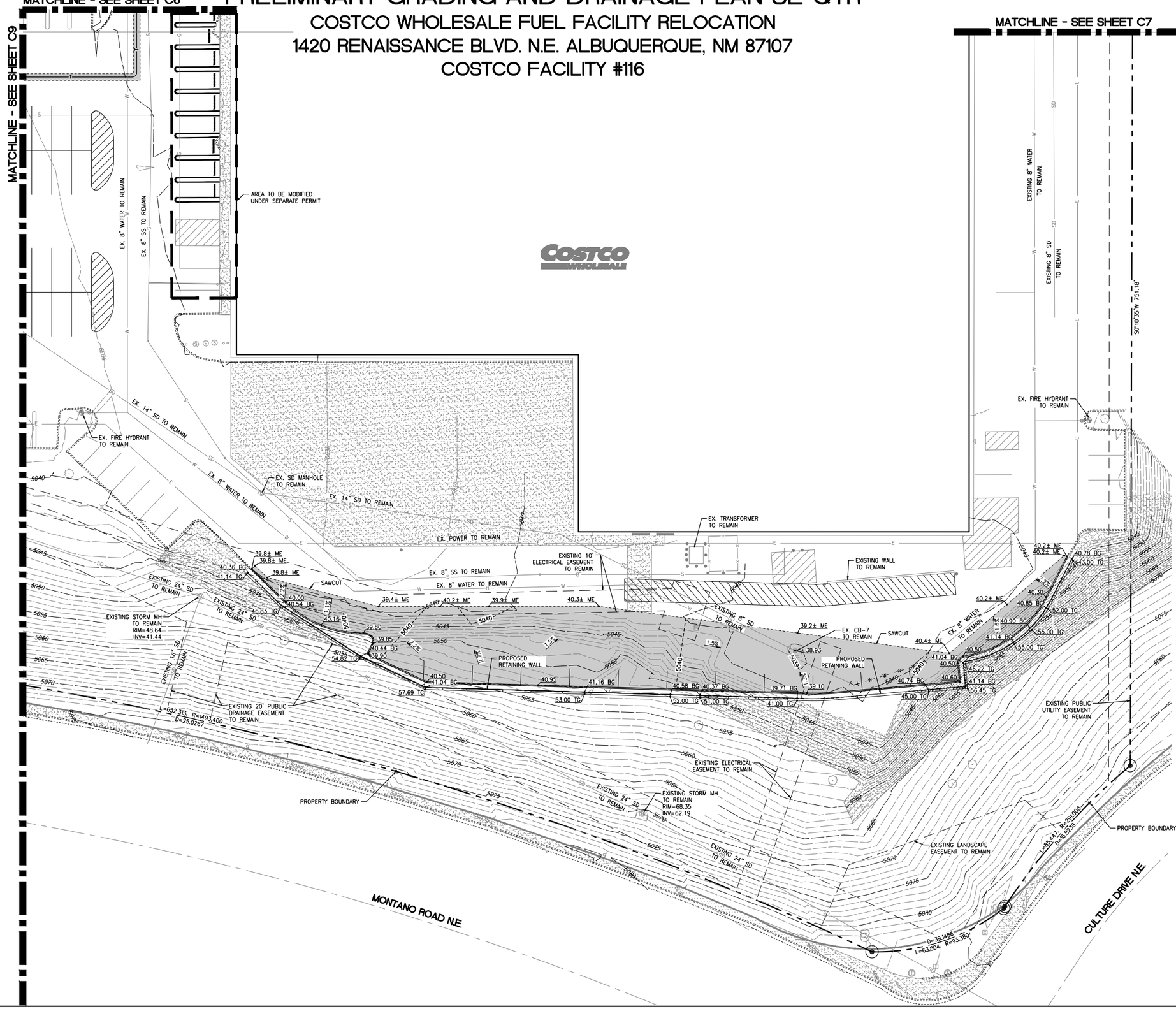
PRELIMINARY GRADING AND DRAINAGE PLAN SE QTR

COSTCO WHOLESALE FUEL FACILITY RELOCATION
1420 RENAISSANCE BLVD. N.E. ALBUQUERQUE, NM 87107
COSTCO FACILITY #116

N

0 10' 20' 40'
SCALE: 1"=20'

ELEVATION ADJUSTMENT NOTE:
CONTRACTOR SHALL ADD 5000 TO ALL SPOT GRADES TO OBTAIN FINAL ELEVATIONS:
35.00 + 5000 = 5035.00



COSTCO WHOLESALE

No.	Date	By	Ckd.	Appr.	Revision

Title:
PRELIMINARY GRADING AND DRAINAGE PLAN SE QTR
RENAISSANCE BLVD. N.E.
ALBUQUERQUE, NM 87107
COSTCO WAREHOUSE LOCATION #116

For:
COSTCO WHOLESALE
999 LAKE DRIVE
ISSAQUAH, WA 98027

HALP. GRUBB NEW MEXICO 25249 PROFESSIONAL ENGINEER

Scale: Horizontal 1" = 20' Vertical N/A

Designed JSI Drawn JSI Checked MESP Approved CRJ Date 1/24/22

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222 barghausen.com

Job Number 10896

Sheet C8 of 13

P:\10000s\10896\preliminary\2021-DSR\10896-PGM.dwg 3/14/2022 10:38 AM LHOLLINGSWORTH

PRELIMINARY GRADING AND DRAINAGE PLAN SW QTR

COSTCO WHOLESALE FUEL FACILITY RELOCATION

1420 RENAISSANCE BLVD. N.E. ALBUQUERQUE, NM 87107

COSTCO FACILITY #116

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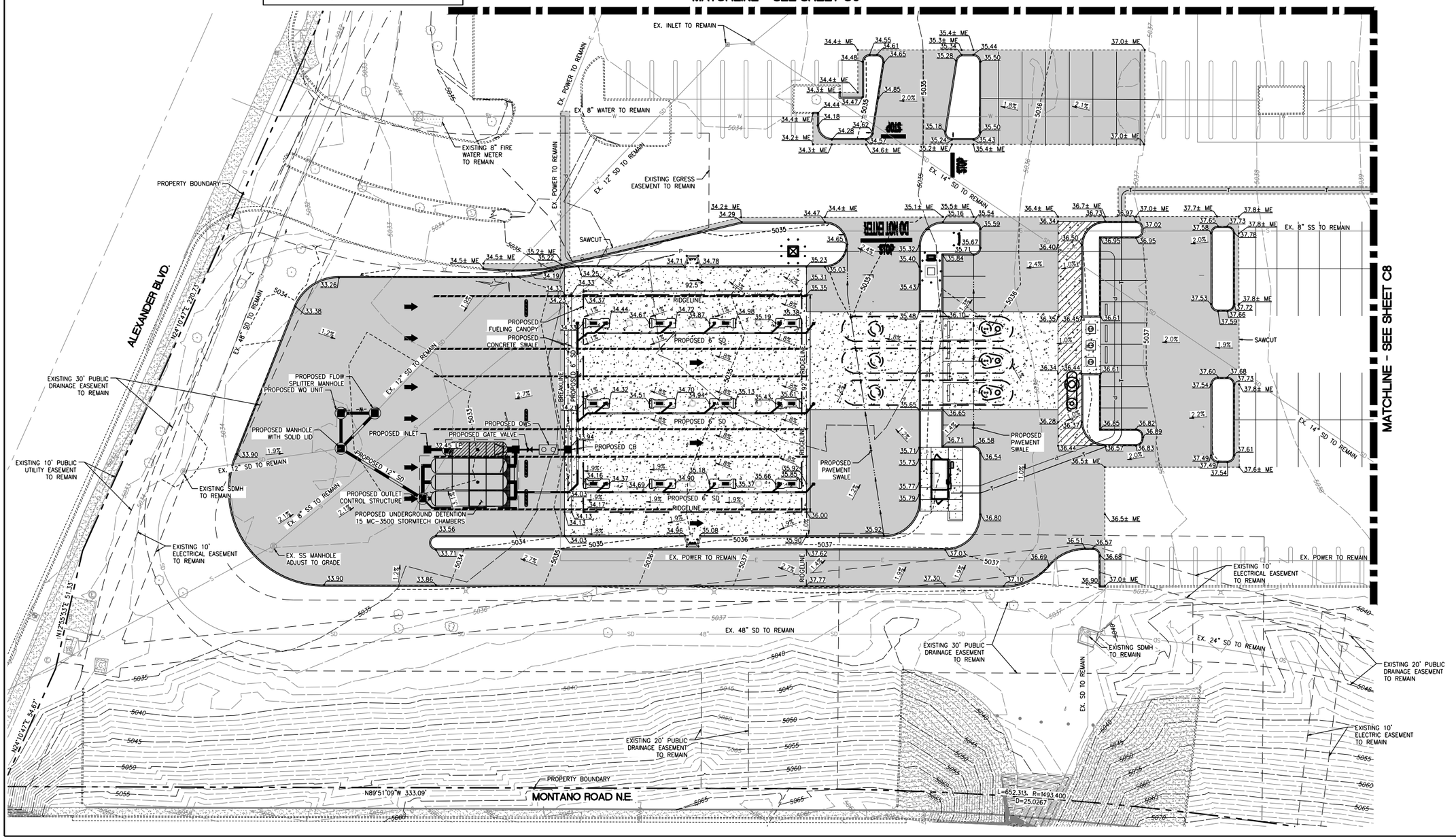
0 10' 20' 40'

SCALE: 1"=20'

ELEVATION ADJUSTMENT NOTE:

CONTRACTOR SHALL ADD 5000 TO ALL SPOT GRADES TO OBTAIN FINAL ELEVATIONS:

35.00 + 5000 = 5035.00



No.	Date	By	Ckd.	Appr.	Revision

Title: PRELIMINARY GRADING AND DRAINAGE PLAN SW QTR
RENAISSANCE BLVD. N.E.
ALBUQUERQUE, NM 87107
COSTCO WAREHOUSE LOCATION #116

For:

HAL P. GRUBBS
NEW MEXICO
25249
PROFESSIONAL ENGINEER

Scale: Horizontal 1" = 20' Vertical N/A

Designed JSL
Drawn JSL
Checked MESP
Approved CRL
Date 1/24/22

COSTCO WHOLESALE
999 LAKE DRIVE
ISSAQUAH, WA 98027

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

Job Number 10896

Sheet C9 of 13

P:\10000s\10896\preliminary\2021-DSR\10896-PGM.dwg 3/14/2022 10:38 AM LHOLLINGSWORTH

PRELIMINARY UTILITY PLAN NW QTR

COSTCO WHOLESALE FUEL FACILITY RELOCATION

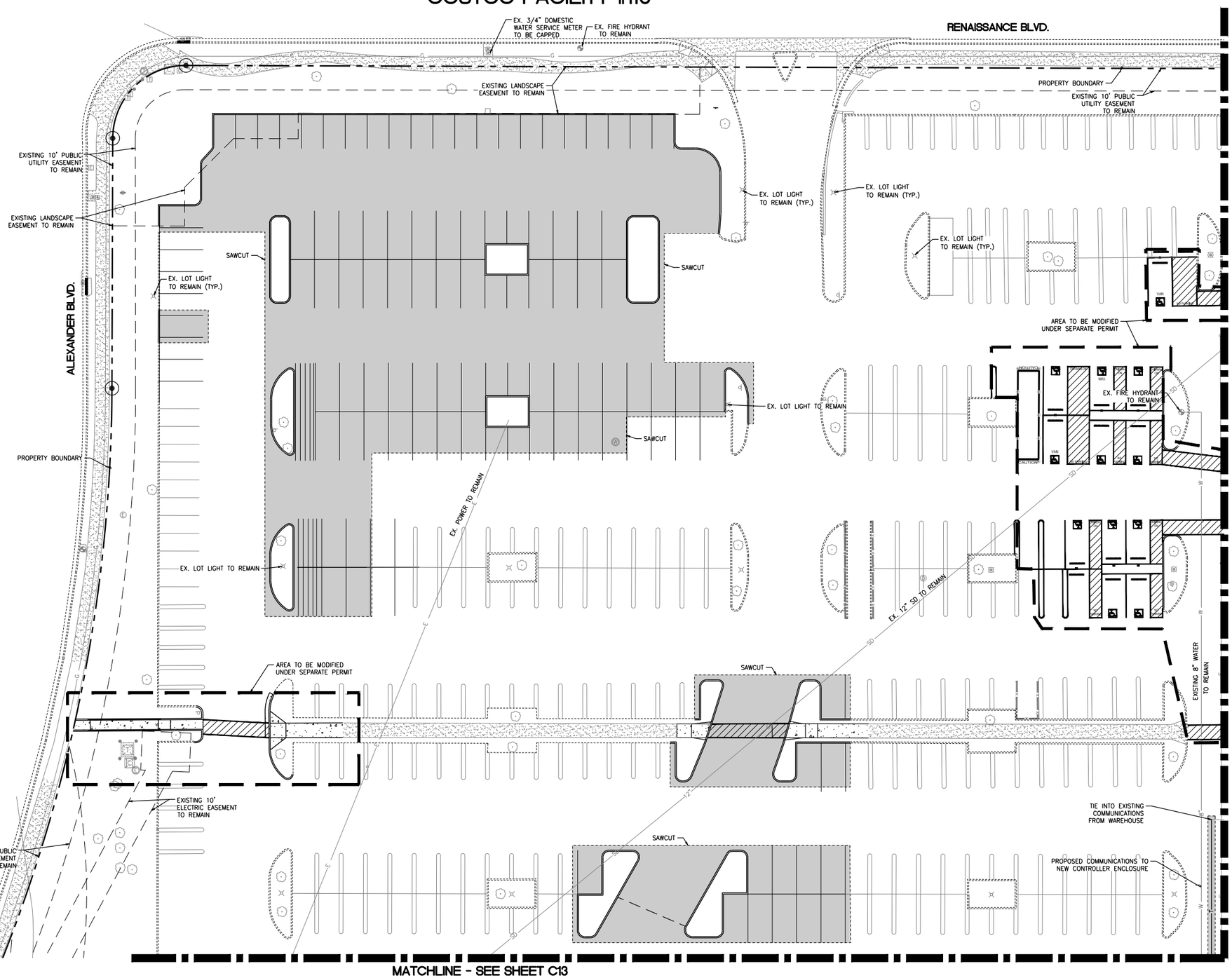
1420 RENAISSANCE BLVD. N.E. ALBUQUERQUE, NM 87107

COSTCO FACILITY #116

N

0 10' 20' 40'

SCALE: 1"=20'



No.	Date	By	Ckd.	Appr.	Revision

Title: PRELIMINARY UTILITY PLAN NW QTR
RENAISSANCE BLVD. N.E.
ALBUQUERQUE, NM 87107
COSTCO WAREHOUSE LOCATION #116

For: COSTCO WHOLESALE
999 LAKE DRIVE
ISSAQUAH, WA 98027

HAL P. GRUBB
NEW MEXICO
25249
PROFESSIONAL ENGINEER

Scale: Horizontal 1" = 20' Vertical N/A

Designed JSJ Drawn JSJ Checked MESP Approved CRJ Date 1/24/22

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

Job Number 10896

Sheet C10 of 13

P:\10000s\10896\preliminary\2021-OSR\10896-PU.dwg 3/14/2022 10:43 AM LHOLLINGSWORTH

PRELIMINARY UTILITY PLAN NE QTR

COSTCO WHOLESALE FUEL FACILITY RELOCATION

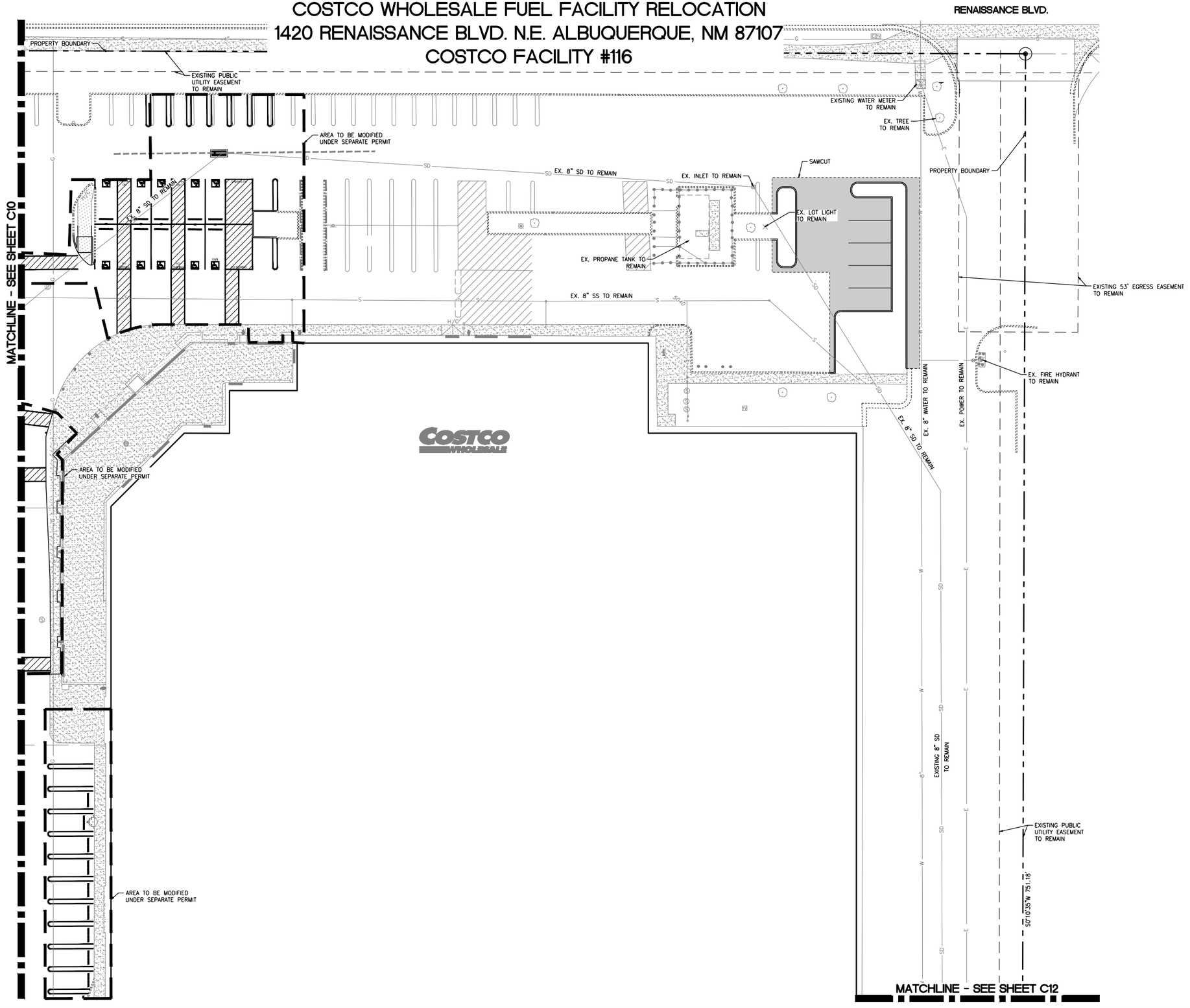
1420 RENAISSANCE BLVD. N.E. ALBUQUERQUE, NM 87107

COSTCO FACILITY #116

N

0 10' 20' 40'

SCALE: 1"=20'



No.	Date	By	Ckd.	Appr.	Revision

Title: PRELIMINARY UTILITY PLAN NE QTR
RENAISSANCE BLVD. N.E.
ALBUQUERQUE, NM 87107
COSTCO WAREHOUSE LOCATION #116

For: COSTCO WHOLESALE
999 LAKE DRIVE
ISSAQUAH, WA 98027

HAL P. GRUBB
NEW MEXICO
25249
PROFESSIONAL ENGINEER

Scale: Horizontal 1" = 20' Vertical N/A

Designed JSI
Drawn JSI
Checked MESP
Approved CRJ
Date 1/24/22

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222 barghausen.com

Job Number 10896

Sheet C11 of 13

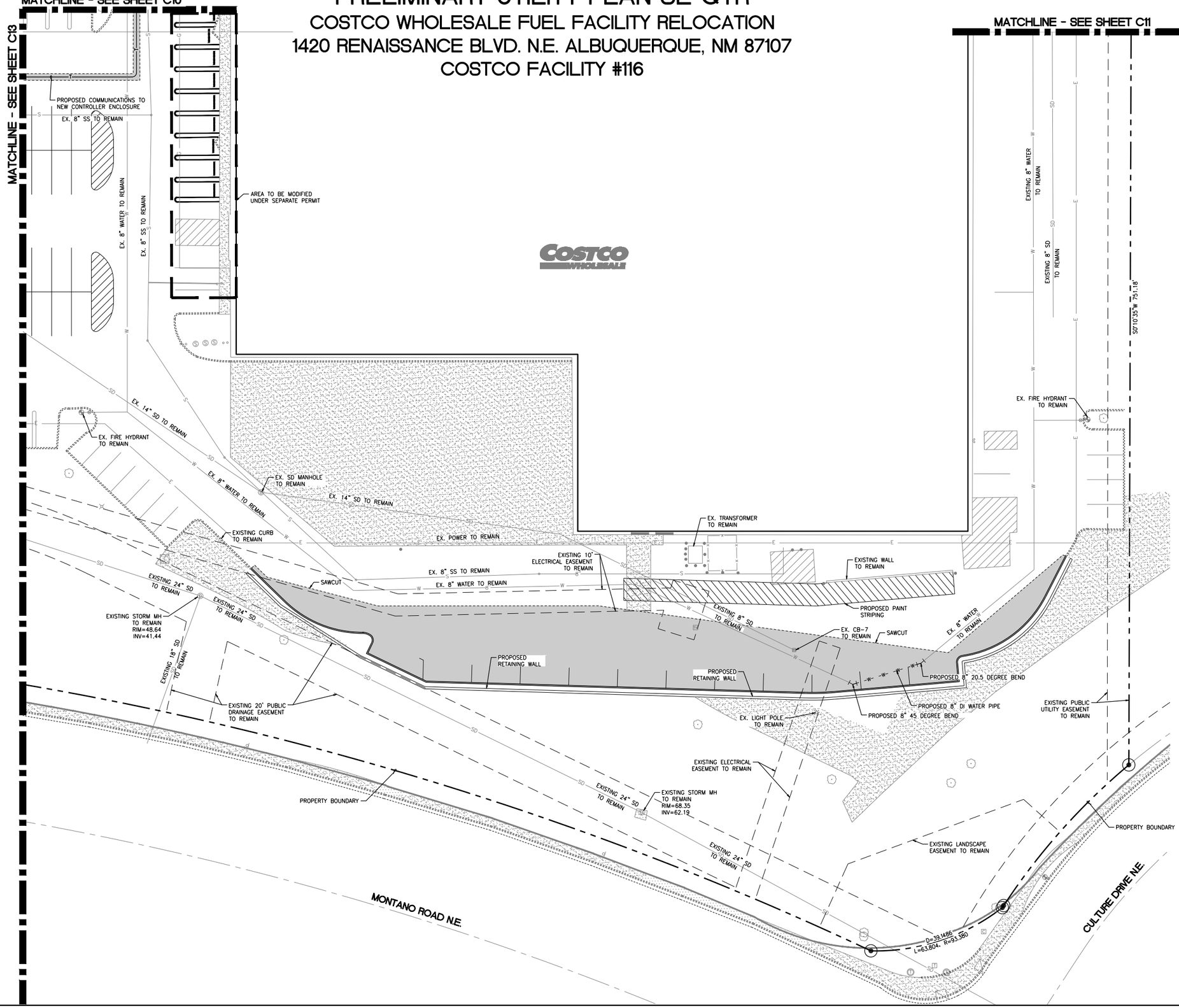
P:\10000s\10896\preliminary\2021-OSR\10896-PU.dwg 3/14/2022 10:43 AM LHOLLINGSWORTH

PRELIMINARY UTILITY PLAN SE QTR

COSTCO WHOLESALE FUEL FACILITY RELOCATION
1420 RENAISSANCE BLVD. N.E. ALBUQUERQUE, NM 87107
COSTCO FACILITY #116

N

0 10' 20' 40'
SCALE: 1"=20'



COSTCO WHOLESALE

No.	Date	By	Ckd.	Appr.	Revision

Title: PRELIMINARY UTILITY PLAN SE QTR
RENAISSANCE BLVD. N.E.
ALBUQUERQUE, NM 87107
COSTCO WAREHOUSE LOCATION #116

For: COSTCO WHOLESALE
999 LAKE DRIVE
ISSAQUAH, WA 98027

HAL P. GRUBB
NEW MEXICO
25249
PROFESSIONAL ENGINEER

Scale: Horizontal 1" = 20' Vertical N/A
Designed JSL Drawn JSL Checked MESP Approved CBL Date 1/24/22

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222 barghausen.com

Job Number 10896
Sheet C12 of 13

P:\10000s\10896\preliminary\2021-OSR\10896-PU.dwg 3/14/2022 10:43 AM LHOLLINGSWORTH

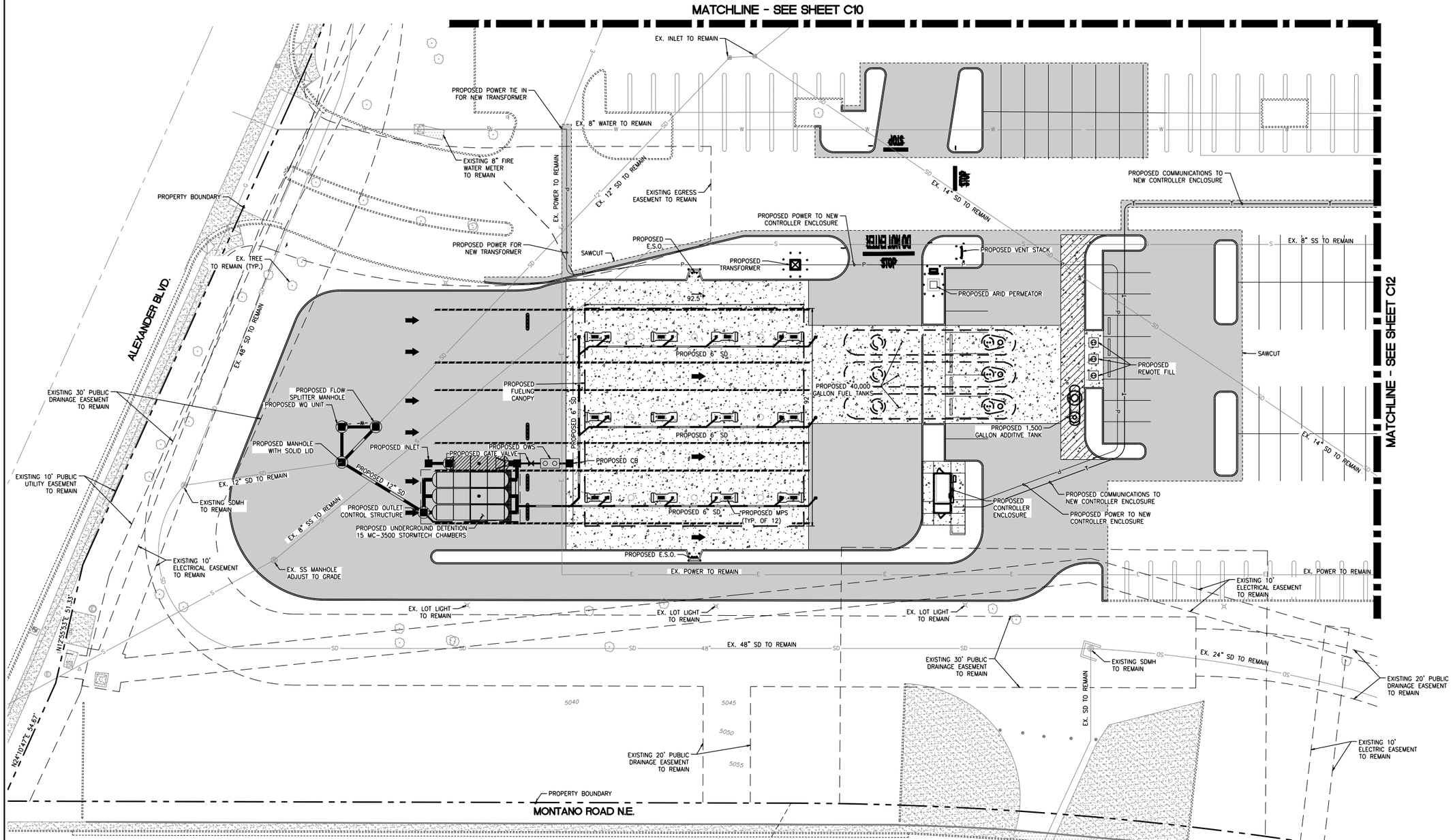
PRELIMINARY UTILITY PLAN SW QTR

COSTCO WHOLESALE FUEL FACILITY RELOCATION
1420 RENAISSANCE BLVD. N.E. ALBUQUERQUE, NM 87107
COSTCO FACILITY #116

N

0 10' 20' 40'

SCALE: 1"=20'



No.	Date	By	Ckd.	Appr.	Revision

Title: PRELIMINARY UTILITY PLAN SW QTR
RENAISSANCE BLVD. N.E.
ALBUQUERQUE, NM 87107
COSTCO WAREHOUSE LOCATION #116

For: COSTCO WHOLESALE
999 LAKE DRIVE
ISSAQUAH, WA 98027

HALEY P. GRUBER
NEW MEXICO
25249
PROFESSIONAL ENGINEER

Scale: Horizontal 1" = 20' Vertical N/A

Designed JSL Drawn JSL Checked MESP Approved CRL Date 1/24/22

Barghausen Consulting Engineers, Inc.
18215 72nd Avenue South
Kent, WA 98032
425.251.6222
barghausen.com

Job Number 10896

Sheet C13 of 13

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APPENDIX D

TREATMENT CALCULATIONS

Summary for Subcatchment 1S: WQU

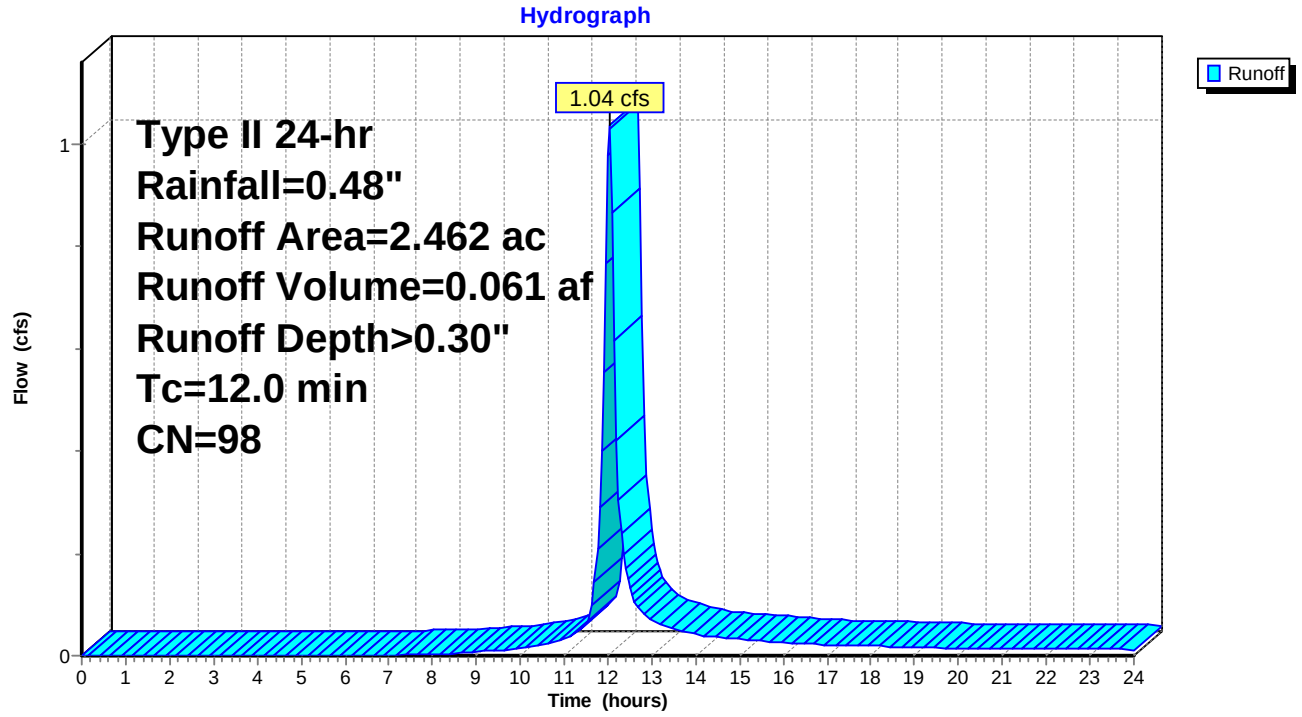
Runoff = 1.04 cfs @ 12.04 hrs, Volume= 0.061 af, Depth> 0.30"

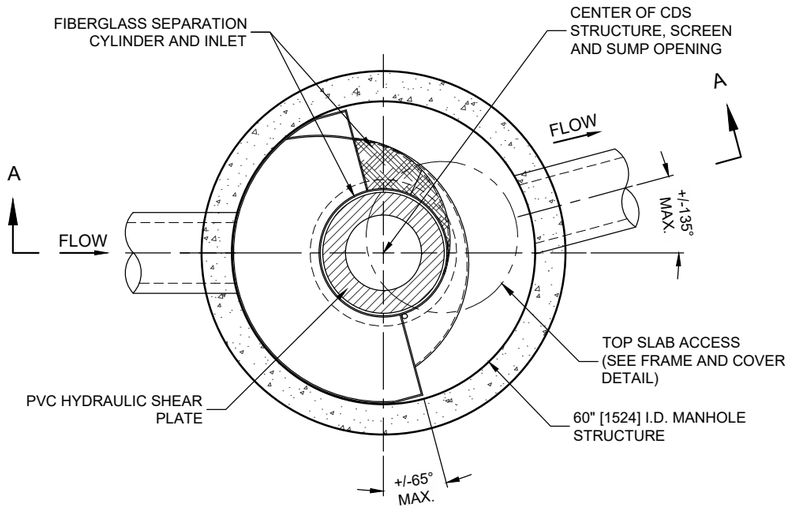
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=0.48"

	Area (ac)	CN	Description
*	2.462	98	
	2.462		100.00% Impervious Area

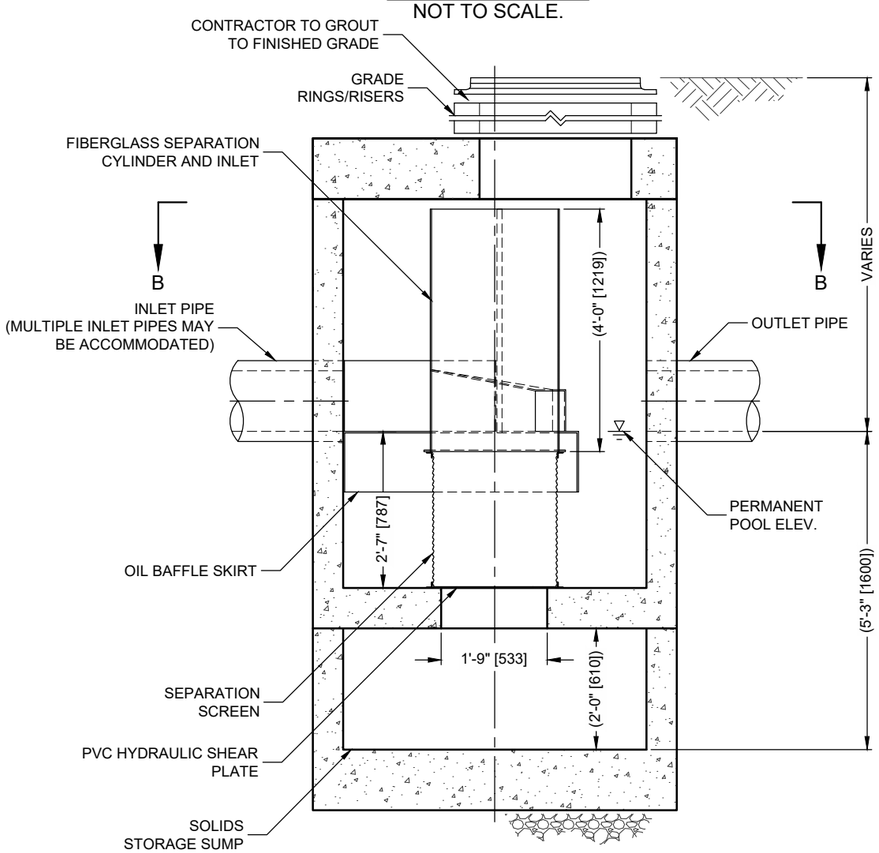
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0					**Direct Entry,**

Subcatchment 1S: WQU





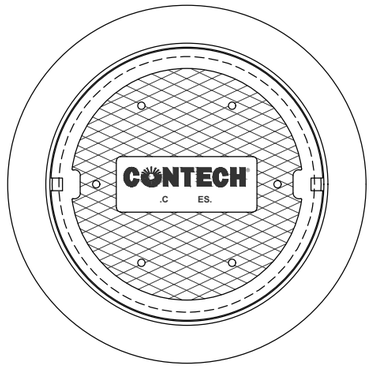
PLAN VIEW B-B
NOT TO SCALE.



ELEVATION A-A
NOT TO SCALE.

CDS2020-5-C DESIGN NOTES

CDS2020-5-C STANDARD CONFIGURATION IS SHOWN.



FRAME AND COVER
(DIAMETER VARIES)
NOT TO SCALE

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO..
5. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
6. CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
ES.
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS2020-5-C ONLINE CDS STANDARD DETAIL

APPENDIX E

ORIGINAL STORM REPORT BY TIERRA WEST DEVELOPMENT MANAGEMENT SERVICES, APPROVED AUGUST 5, 1996

CITY OF
Albuquerque
Public Works Department

Martin J. Chávez, Mayor

Robert E. Gurulé, Director

April 18, 1997

Ronald Bohannan
Tierra West
4421 McCleod Rd. Suite D
Albuquerque, New Mexico 87109

RE: ENGINEER CERTIFICATION FOR PRICE/COSTCO (F16-D5G) ENGINEER'S CERTIFICATION STATEMENT DATED 4/15/97

Dear Mr. Bohannan:

Based on the information provided on your April 15,1997 submittal, Engineer Certification for the above referenced site is acceptable.

If I can be of further assistance, please feel free to contact me 924-3986.

C: Andrew Garcia
File

Sincerely

Bernie J. Montoya CE
Engineering Associate

CITY OF
Albuquerque

August 5, 1996

Martin J. Chávez, Mayor

Shahab Biazar
Tierra West
4421 McCleod Rd. NE
Suite D
Albuquerque, NM 87109

RE: PRICE/COSTCO (F16-D5G). UPDATED DRAINAGE REPORT FOR FINAL PLAT AND BUILDING PERMIT APPROVALS. ENGINEER'S STAMP DATED 7-16-96.

Dear Mr. Biazar:

Based on the updated information provided on your July 30, 1996 submittal, the above referenced project is approved for Final Plat and Building Permit.

Prior to Certificate of Occupancy, an Engineer's Certification is required.

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Andrew Garcia
File

CITY OF
Albuquerque

July 3, 1996

Martin J. Chávez, Mayor

Shahab Biazar
Tierra West
4421 McCleod Rd. NE
Suite D
Albuquerque, NM 87109

RE: PRICE/COSTCO (F16-D5G) GRADING AND DRAINAGE PLAN FOR FINAL PLAT AND BUILDING PERMIT APPROVALS. ENGINEER'S STAMP DATED 6-24-96.

Dear Mr. Biazar:

Based on the information provided on your June 27, 1996 submittal, the above referenced project is approved for Final Plat and Building Permit.

Prior to Certificate of Occupancy, an Engineer's Certification is required.

If I can be of further assistance, please feel free to contact me at 768-3622.

Sincerely,

Lisa Ann Manwill
Engineering Assoc./Hyd.

c: Andrew Garcia
File

DRAINAGE REPORT

for

Renaissance Tract 4B and 4C

Prepared by

Tierra West Development Management Sevices
4421 McLeod Road NE, Suite D
Albuquerque, New Mexico 87109

Prepared for

Jack S. Frank
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April 1996
Revised June 1996
Revised July 1996

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Location

Tract 4, Renaissance is located east of Alexander Boulevard between Montano Road and Renaissance Boulevard, NE. Price/Costco is proposing to build a new 159,587 square foot building on a portion of Tract 4 that has been designated as Tract 4B. The site is shown on the attached Zone Atlas Map F-16 and contains a total of 23.4 acres of which Price/Costco will occupy approximately 14.8 acres. A future development has been shown on the balance of the property on Tract 4 and designated as Tract 4A. The adjoining Tract 4A is located to the east of Tract 4B between Century Boulevard and the realignment of Mercantile Avenue and Renaissance Boulevard. Tract 4A contains 8.6 acres and has two proposed commercial buildings totaling 75,000 SF. Tract 4C contains 1.46 acres and is located at the southwest corner of Tract 4. It will be used by Price/Costco for additional parking. The purpose of this report is to provide the drainage analysis and management plan to construct the new Price/Costco building as well as subdividing Tract 4 into three parcels.

Existing Drainage Conditions

The site is currently undeveloped. All of the undeveloped flows sheet flow to the corner of Alexander and Renaissance to a temporary pond. This pond fills and then discharges clean water to both Alexander and Renaissance Boulevards.

The undeveloped flow has been divided into two basins. Basin 1 contains the Price/Costco site and Tract 4C, while basin 2 delineates Tract 4A which will be developed in the future. The undeveloped flow of Tract 4A will be routed to a new desilting pond and then allowed to spill over to the Price/Costco site. The developed flows of Tract 4A will be routed to the storm drain in Renaissance Boulevard upon development of Tract 4A. Basin 1 has a runoff flow of 33.73 cfs while Basin 2 has a runoff flow of 21.08 cfs.

FEMA Map and Soil Condition

The site is located on FEMA Map section 350002 panel 16 as shown on the attached excerpt. The map shows that the site does not lie within any 100 year flood plains.

The site contains two different soil types from the Soil Conservation Service Survey of Bernilillo County. These are a Wink-Embudo complex and a Bluepoint-Kokan association. The Wink-Embudo complex has a moderate hazard of water erosion and medium runoff. The Bluepoint-Kokan association has slow runoff and moderate to severe hazard of water erosion. However, the site is the location of an old gravel pit and the existing soils are a blend of native materials.

On-Site Drainage Management Plan

The site is being developed in two phases. Phase 1 will build Tract 4B on which Price/Costco will be located. A temporary desilting basin and minor grading will be performed on Tract 4A (Phase 2) to direct the undeveloped flow to the desilting pond. These flows will drop any sediment in the desilting pond and enter the site being built for Price/Costco. When Tract 4A is developed the developed flows will be detained on-site in a parking lot pond and then directed to the storm sewer in Renaissance Boulevard. All the sites are subject to a limited discharge due to downstream constraints.

Phase 1

According to the Renaissance Master Plan only 0.1 cfs/acre can be discharged from the site. The site is 14.8 acres, consequently 1.48 cfs of runoff is allowed for Tract 4B. The entire site has been divided into nine different detention basins and ten different ponds. Basins 1, 2, 4-9 fall within Tract 4B and Tract 4C in order to pond the storm water and allow the release rate to be controlled to the allowable 1.48 cfs or less. Orifice plates have been used in the drop inlets to

reduce the amount of discharge. Two storm drain lines collect the runoff from the nine basins and convey it to the storm drain lines in Alexander Boulevard. The two different routes are routed to pond 2 which limits the combined discharge to 1.37 cfs which is less than 1.48 cfs and within the guidelines established by the Renaissance Master Plan.

The following is a tabulation of the routing used to collect all of the flows.

Route 1

Pond 6 will drain to pond 7 with a discharge of 0.04 cfs.

Pond 7 will drain to pond 8 with a discharge of 0.06 cfs.

Pond 8 will drain to ponds 9 and 10 which act as one large pond with a discharge of 0.06 cfs.

Ponds 9 and 10 will drain to pond 1 with a discharge of 2.15 cfs.

Route 2

Pond 5 will drain to pond 4 with a discharge of 3.64 cfs.

Pond 4 will drain to pond 1 with a discharge of 6.87 cfs.

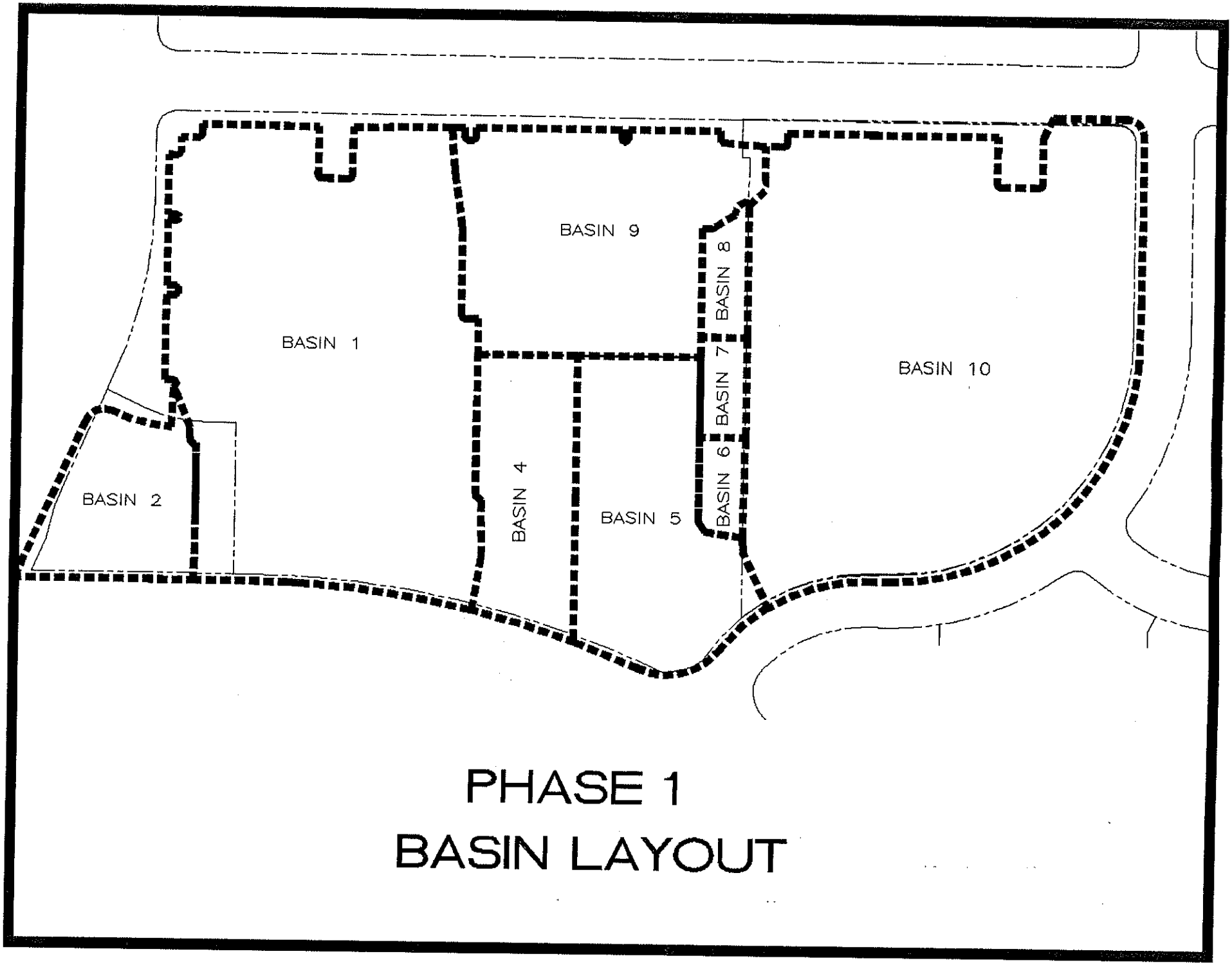
Pond 1 will drain to pond 2 with a discharge of 0.99 cfs.

Pond 2 will outflow to an existing manhole in Alexander Boulevard at a rate of 1.37 cfs limited by a 4 inch orifice plate. The storm sewer in Alexander drains to the Renaissance Detention Pond.

The existing runoff from Basin 10 (Tract 4A) will be captured in a proposed desilting pond within Tract 4A. A proposed berm on the east side of Tract 4B between 4B and 4A will also ensure that no upland flows enter Tract 4B from the east.

Phase 2

A final development plan will be submitted for Tract 4A prior to the build out of the tract. The plan shown is conceptual only.



PHASE 1
BASIN LAYOUT

Tract 4A:

The drainage management plan has shown Tract 4A will be divided into five different basins as shown on the Drainage and Grading Plan. Orifice plates have been used in the drop inlets to reduce the amount of discharge to only 0.1 cfs/acre. The runoff will be drained from the site in two different routes.

Route 1

Basin A and basin E of Tract 4A will drain to basin 9 located within Tract 4B and then be routed to Alexander Boulevard.

Route 2

Pond D will drain into pond C with a discharge flow of 0.05 cfs.

Pond C will drain to pond B with a discharge flow of 3.69 cfs.

Pond B will drain into the existing drop inlet in Renaissance Boulevard with a discharge flow of 0.83 cfs limited by a 3½ inch orifice plate. This is less than the allowable discharge of 0.86 cfs.

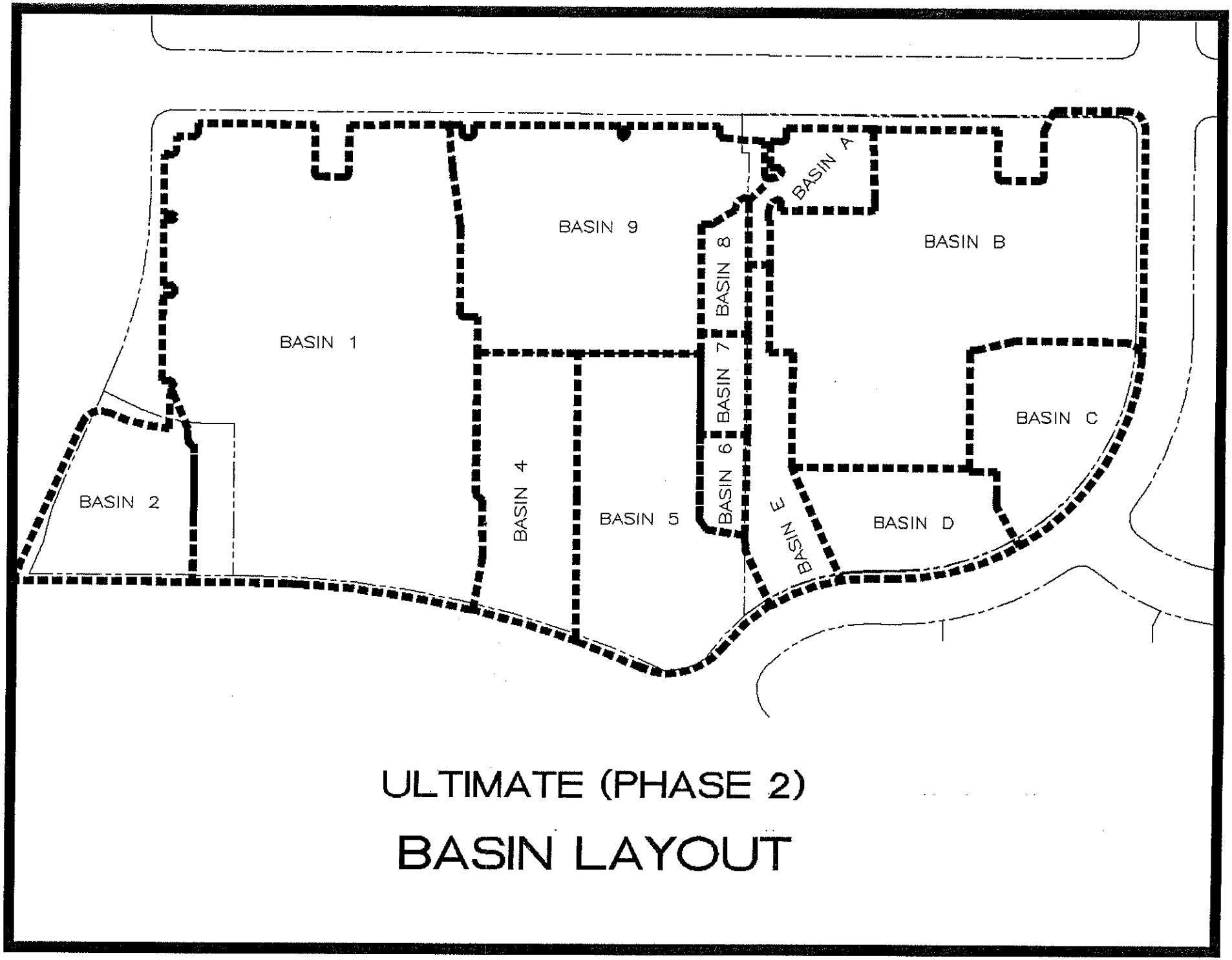
Summary

Phase 1

Tract 4B contains eight basins which will be routed through nine ponds and will limit the developed flow to 1.37 cfs. A 4 inch orifice plate on the last pond limits the flow from the site. All upland flows will be diverted using berms to direct the runoff to the new desilting pond located adjacent to Tract 4B. Clean water will spill over from Tract 4A into the site to the ponding areas.

Phase 2

Tract 4A will be divided into five different basins. Two of the basins will drain to Tract 4B and be routed to an existing manhole in Alexander Boulevard. The other three basins are routed through three ponds and are limited to a 0.83 cfs discharge by a proposed 3½ inch orifice plate. These flows will be routed to the storm drain in Renaissance Boulevard. Upon final development a new submittal will be made on the phase 2 project.



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ULTIMATE (PHASE 2)

BASIN LAYOUT

RUNOFF CALCULATIONS

The site is @ Zone 2

LAND TREATMENT

Proposed
D = 90 %
B = 10 %

Existing
B = 100 %

DEPTH (INCHES) @ 100-YEAR STORM

P_{60} = 2.01 inches

P_{360} = 2.35 inches

P_{1440} = 2.75 inches

DEPTH (INCHES) @ 10-YEAR STORM

P_{60} = 2.01 x 0.667
= 1.34 inches

P_{360} = 1.57

P_{1440} = 1.83

See the summary output from AHYMO calculations.

Also see the following summary tables.

TRACT 4 - EXISTING

DRAINAGE BASINS - EXISTING

BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
1	645090.49	14.8092	0.023139
2	403132.88	9.2547	0.014460

BASINS RUNOFF CALCULATION RESULTS - EXISTING

BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
1	33.73	13.84	0.96	0.343
2	21.08	8.65	0.6	0.215

PHASE 1

DRAINAGE BASINS - PROPOSED

SUB-BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
1	304535.25	6.9912	0.010924
2	53578.32	1.2300	0.001922
4	60440.28	1.3875	0.002168
5	91550.02	2.1017	0.003284
6	10274.83	0.2359	0.000369
7	10660.89	0.2447	0.000382
8	12621.95	0.2898	0.000453
9	166445.07	3.8211	0.005970
10	357069.51	8.1972	0.012808

BASINS RUNOFF CALCULATION RESULTS - PROPOSED

SUB-BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
1	31.38	20.33	1.261	0.787
2	2.84	1.16	0.080	0.029
4	6.24	4.04	0.250	0.156
5	9.45	6.12	0.379	0.236
6	1.08	0.7	0.043	0.027
7	1.11	0.72	0.044	0.028
8	1.32	0.85	0.052	0.033
9	17.16	11.11	0.689	0.430
10	18.89	7.74	0.532	0.191

NOTE: BASIN 3 DOES NOT EXIST AND HAS BEEN DELIBERATELY LEFT OUT

PHASE 2 - TRACT 4A

DRAINAGE BASINS - PROPOSED

SUB-BASIN	AREA (SF)	AREA (AC)	AREA (MI^2)
A	24634.58	0.5655	0.000884
B	205654.18	4.7212	0.007377
C	51910.10	1.1917	0.001862
D	46278.70	1.0624	0.001660
E	28591.95	0.6564	0.001026

BASINS RUNOFF CALCULATION RESULTS - PROPOSED

SUB-BASIN	Q-100 CFS	Q-10 CFS	V-100 AC-FT	V-10 AC-FT
A	2.56	1.65	0.102	0.064
B	21.2	13.73	0.851	0.531
C	5.36	3.47	0.215	0.134
D	4.78	3.1	0.192	0.12
E	2.96	1.92	0.118	0.074

SEE THE FOLLOWING SHEET FOR SAMPLE CALCULATION ON THE BASINS RUNOFF

DROP INLET CALCULATIONS

Orifice Equation
Q = CA sqrt(2gH)
C = 0.6
g = 32.2

PRICE/COSTCO (TRACT 4B)

POND	AREA (SF)	Q (CFS)	H (FT)	H ALLOW (FT)
1	4.60	31.38	2.0073	2
2	2.30	2.84	0.0658	1.5
4	2.30	6.24	0.3175	0.5
5	2.30	9.45	0.7281	0.75
6	2.30	1.08	0.0095	0.75
7	2.30	1.11	0.0100	0.75
8	2.30	1.32	0.0142	0.75
9	4.21	17.16	0.7166	1.5

TRACT 4A

POND	AREA (SF)	Q (CFS)	H (FT)	H ALLOW (FT)
B	4.21	21.2	1.0938	1.5
C	2.30	5.36	0.2343	1
D	2.30	4.78	0.1863	1.26

VOLUME OF DESILTING POND

VOLUME = (AREA OF TOP * AREA OF BOTTOM)/2 * DEPTH

Tract 4A

AREA OF TOP (FT^2) =	30000
AREA OF BOTTOM (FT^2) =	27264
SIDE SLOPE =	4:1
DEPTH (FT) =	1
VOLUME PROVIDED (CFS) =	28632
VOLUME REQUIRED (CFS) =	23123.92

OVERFLOW FOR DESILTING POND

Tract 4A

WEIR EQUATION Q = CLH^3/2	
Q (BASIN A AND E) =	5.52
C =	2.95
H (FT) =	0.5
L (FT) =	?

L (FT) = 5.292514

USE 5 FEET 4 INCHES FOR LENGTH OF SPILLWAY

TRACT 4B PONDS - PROPOSED

POND	AREA (SF)	AREA (AC)	AREA (MI^2)
1	95529.95	2.1931	0.003427
2	14508.43	0.3331	0.000520
4	8800.00	0.2020	0.000316
5	12935.75	0.2970	0.000464
6	10274.83	0.2359	0.000369
7	10660.89	0.2447	0.000382
8	12621.95	0.2898	0.000453
9	11396.54	0.2616	0.000409
10	23810.36	0.5466	0.000854

POND	DROP INLET	ORIFICE DIAMETER (IN)	MAX WT. HEIGHT (FT)	OUTFLOW (CFS)
1	Two Single 'D'	3.5	32.49	0.99
2	Single 'D'	4	31.17	1.37
4	Single 'D'	13	34.28	6.87
5	Single 'D'	8	37.59	3.64
6	Single 'D'	1	37.39	0.06
7	Single 'D'	1	37.37	0.05
8	Single 'D'	1	37.39	0.06
9	Single 'D'	8		
10	Double 'D'	5	37.64	2.15

SAMPLE POND VOLUME CALCULATIONS (POND 1)

A_b = Bottom of Pond Surface Area (ft^2)
A_t = Top of Pond Surface Area (ft^2)
D = Water Depth in Pond (ft)
C = Change in Surface Area / Water Depth
D_I = Water depth from bottom of inlet to top of inlet

Volume in Pond (ft^3) = $A_b * D_I + 0.5 * C * D^2$

$C = (A_t - A_b) / D$

A_b = 13.59 ft^2
A_t = 102960.78 ft^2
D = 1.75
C = 58826.97

OUTFLOW CALCULATIONS

$Q=CA\sqrt{2gH}$

C = 0.6
$A = \pi r^2$
r = radius of orifice (ft)
g = 32.2
H = height of water measured from center of orifice plate (ft)
Q = outflow (cfs)

POND 1

TOP OF POND AREA (SF)=	95529.95
BOTTOM OF POND AREA (SF)=	13.59
TOTAL DEPTH (FT) =	2
C (CHANGE IN SURFACE AREA)=	47758.18
DIAMETER OF ORIFICE (IN)=	3.5
AREA OF ORIFICE (SF) =	0.066813

ELEV (FT)	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
22.9200	0.0000	0.0000	0.0000
30.5000	7.5800	0.0024	0.8857
30.5200	7.6000	0.0026	0.8869
30.7200	7.8000	0.0290	0.8985
30.9200	8.0000	0.0992	0.9099
31.1200	8.2000	0.2133	0.9212
31.3200	8.4000	0.3712	0.9324
31.5200	8.6000	0.5730	0.9434
31.7200	8.8000	0.8187	0.9543
31.9200	9.0000	1.1082	0.9651
32.1200	9.2000	1.4415	0.9758
32.3200	9.4000	1.8188	0.9863
32.5000	9.5800	2.1957	0.9957

POND 2

TOP OF POND AREA (SF)=	14508.43
BOTTOM OF POND AREA (SF)=	6.8
TOTAL DEPTH (FT) =	1.5
C (CHANGE IN SURFACE AREA)=	9667.753
DIAMETER OF ORIFICE (IN)=	4
AREA OF ORIFICE (SF) =	0.087266

ELEV (FT)	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
20.4100	0.0000	0.0000	0.0000
30.0000	9.5900	0.0015	1.2899
30.1000	9.6900	0.0026	1.2967
30.2000	9.7900	0.0060	1.3035
30.3000	9.8900	0.0115	1.3102
30.4000	9.9900	0.0193	1.3170
30.5000	10.0900	0.0293	1.3236
30.6000	10.1900	0.0415	1.3303
30.7000	10.2900	0.0560	1.3369
30.8000	10.3900	0.0726	1.3435
30.9000	10.4900	0.0915	1.3501
31.0000	10.5900	0.1126	1.3566
31.1000	10.6900	0.1359	1.3631
31.2000	10.7900	0.1615	1.3695
31.3000	10.8900	0.1892	1.3760
31.4000	10.9900	0.2192	1.3824
31.5000	11.0900	0.2514	1.3887

POND 4

ELEV (FT)	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
31.3400	0.0000	0.0000	0.0000
32.3400	1.0000	0.0002	3.0047
33.3400	2.0000	0.0003	5.3596
33.8400	2.5000	0.0004	6.2109
33.9400	2.6000	0.0024	6.3675
34.0400	2.7000	0.0085	6.5203
34.1400	2.8000	0.0186	6.6696
34.2400	2.9000	0.0327	6.8157
34.34	3.0000	0.0509	6.9587

TOP OF POND AREA (SF)=	8800
BOTTOM OF POND AREA (SF)=	6.8
TOTAL DEPTH (FT) =	0.5
C (CHANGE IN SURFACE AREA)=	17586.4
DIAMETER OF ORIFICE (IN)=	13
AREA OF ORIFICE (SF) =	0.921751

POND 5

ELEV (FT)	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
32.5700	0.0000	0.0000	0.0000
33.5700	1.0000	0.0002	1.3723
34.5700	2.0000	0.0003	2.1698
35.5700	3.0000	0.0005	2.7446
36.5700	4.0000	0.0006	3.2184
36.9200	4.3500	0.0007	3.3685
36.9700	4.4000	0.0012	3.3894
37.0700	4.5000	0.0052	3.4308
37.1700	4.6000	0.0132	3.4717
37.2700	4.7000	0.0252	3.5122
37.3700	4.8000	0.0413	3.5522
37.4700	4.9000	0.0613	3.5917
37.5700	5.0000	0.0854	3.6308
37.6700	5.1000	0.1135	3.6695

POND 6

ELEV (FT)	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
34.4200	0.0000	0.0000	0.0000
35.4200	1.0000	0.0002	0.0257
36.4200	2.0000	0.0003	0.0368
36.9200	2.5000	0.0004	0.0412
37.0200	2.6000	0.0020	0.0420
37.1200	2.7000	0.0067	0.0428
37.2200	2.8000	0.0145	0.0436
37.3200	2.9000	0.0255	0.0444
37.4200	3.0000	0.0397	0.0452
37.5200	3.1000	0.0570	0.0459
37.6200	3.2000	0.0774	0.0467
37.6700	3.2500	0.0888	0.0470

POND 7

ELEV (FT)	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
32.9200	0.0000	0.0000	0.0000
33.9200	1.0000	0.0002	0.0257
34.9200	2.0000	0.0003	0.0368
36.9200	4.0000	0.0006	0.0522
37.0200	4.1000	0.0023	0.0529
37.1200	4.2000	0.0071	0.0536
37.2200	4.3000	0.0153	0.0542
37.3200	4.4000	0.0267	0.0548
37.4200	4.5000	0.0414	0.0555
37.5200	4.6000	0.0593	0.0561
37.6200	4.7000	0.0805	0.0567
37.6700	4.7500	0.0923	0.0570

POND 8

ELEV (FT)	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
31.3200	0.0000	0.0000	0.0000
32.3200	1.0000	0.0002	0.0257
33.3200	2.0000	0.0003	0.0368
34.3200	3.0000	0.0005	0.0452
35.3200	4.0000	0.0006	0.0522
36.9200	5.6000	0.0009	0.0619
37.0200	5.7000	0.0028	0.0625
37.1200	5.8000	0.0086	0.0630
37.2200	5.9000	0.0183	0.0636
37.3200	6.0000	0.0318	0.0641
37.4200	6.1000	0.0491	0.0646
37.5200	6.2000	0.0704	0.0652
37.6200	6.3000	0.0955	0.0657
37.6700	6.3500	0.1095	0.0660

POND 9 + 10

ELEV (FT)	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
26.71	0	0.0000	0.0000
28.71	2	0.0003	0.8788
30.71	4	0.0008	1.2784
32.71	6	0.0015	1.5800
34.71	8	0.0021	1.8326
36.17	9.46	0.0025	1.9970
36.21	9.5	0.0032	2.0013
36.31	9.6	0.0105	2.0120
36.41	9.7	0.0258	2.0227
36.51	9.8	0.0493	2.0333
36.61	9.9	0.0808	2.0439
36.71	10	0.1204	2.0544
36.81	10.1	0.1681	2.0649
36.91	10.2	0.2239	2.0753
37.01	10.3	0.2877	2.0857
37.11	10.4	0.3596	2.0960
37.17	10.46	0.4067	2.1021
37.27	10.56	0.4147	2.1124
37.37	10.66	0.4390	2.1225
37.47	10.76	0.4794	2.1327
37.57	10.86	0.5360	2.1427
37.67	10.96	0.6087	2.1528

POND B

ELEV (FT)	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
36.5100	0.0000	0.0000	0.0000
37.5100	1.0000	0.0003	0.2973
38.5100	2.0000	0.0006	0.4381
39.5100	3.0000	0.0009	0.5435
40.5100	4.0000	0.0012	0.6316
41.5100	5.0000	0.0016	0.7088
41.8500	5.3400	0.0017	0.7332
41.9100	5.4000	0.0030	0.7374
42.0100	5.5000	0.0112	0.7444
42.1100	5.6000	0.0268	0.7513
42.2100	5.7000	0.0499	0.7582
42.3100	5.8000	0.0804	0.7650
42.4100	5.9000	0.1183	0.7717
42.5100	6.0000	0.1637	0.7784
42.6100	6.1000	0.2165	0.7850
42.7100	6.2000	0.2768	0.7916
42.8100	6.3000	0.3445	0.7981
42.9100	6.4000	0.4197	0.8045
43.0100	6.5000	0.5023	0.8109
43.1100	6.6000	0.5923	0.8173
43.2100	6.7000	0.6898	0.8236
43.3500	6.8400	0.8387	0.8323

POND C

ELEV (FT)	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
38.8300	0.0000	0.0000	0.0000
39.8300	1.0000	0.0002	1.3723
40.8300	2.0000	0.0003	2.1698
41.8300	3.0000	0.0005	2.7446
42.8300	4.0000	0.0006	3.2184
43.6300	4.8000	0.0007	3.5522
43.7300	4.9000	0.0020	3.5917
43.8300	5.0000	0.0058	3.6308
43.9300	5.1000	0.0121	3.6695
44.0000	5.1700	0.0180	3.6964

POND D

ELEV (FT)	DEPTH (FT)	VOLUME (AC-FT)	Q (CFS)
40.8400	0.0000	0.0000	0.0000
41.8400	1.0000	0.0002	0.0263
42.8400	2.0000	0.0003	0.0371
43.3400	2.5000	0.0004	0.0415
43.4400	2.6000	0.0017	0.0423
43.5400	2.7000	0.0057	0.0432
43.6400	2.8000	0.0124	0.0439
43.7400	2.9000	0.0217	0.0447
43.8400	3.0000	0.0337	0.0455
43.9400	3.1000	0.0483	0.0462
44.0400	3.2000	0.0656	0.0470
44.1400	3.3000	0.0856	0.0477
44.2400	3.4000	0.1082	0.0484
44.3400	3.5000	0.1334	0.0491
44.4400	3.6000	0.1614	0.0498
44.5400	3.7000	0.1919	0.0505
44.6000	3.7600	0.2116	0.0509

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/08/1996

INPUT FILE = a:exist.dat USER NO.= R_BOHANN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START										TIME= .00
RAINFALL TYPE= 2										RAIN24= 2.750
COMPUTE NM HYD	100.10	-	1	.02314	33.73	.960	.77824	1.533	2.278	PER IMP= .00
COMPUTE NM HYD	100.20	-	1	.01446	21.08	.600	.77824	1.533	2.278	PER IMP= .00
START										TIME= .00
RAINFALL TYPE= 2										RAIN24= 1.830
COMPUTE NM HYD	110.10	-	1	.02314	13.84	.343	.27831	1.533	.935	PER IMP= .00
COMPUTE NM HYD	110.20	-	1	.01446	8.65	.215	.27831	1.533	.935	PER IMP= .00
FINISH										

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =07/12/1996

INPUT FILE = a:9441p.dat USER NO.= R_BOHANN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
START										TIME= .00
RAINFALL TYPE= 2										RAIN24= 2.750
COMPUTE NM HYD	100.10	-	1	.01092	31.38	1.261	2.16378	1.510	4.489	PER IMP= 90.00
COMPUTE NM HYD	100.20	-	1	.00192	2.84	.080	.77901	1.532	2.310	PER IMP= .00
COMPUTE NM HYD	100.40	-	1	.00217	6.24	.250	2.16382	1.510	4.499	PER IMP= 90.00
COMPUTE NM HYD	100.50	-	1	.00328	9.45	.379	2.16381	1.510	4.495	PER IMP= 90.00
COMPUTE NM HYD	100.60	-	1	.00037	1.08	.043	2.16395	1.510	4.562	PER IMP= 90.00
COMPUTE NM HYD	100.70	-	1	.00038	1.11	.044	2.16394	1.510	4.558	PER IMP= 90.00
COMPUTE NM HYD	100.80	-	1	.00045	1.32	.052	2.16392	1.510	4.552	PER IMP= 90.00
COMPUTE NM HYD	100.90	-	1	.00597	17.16	.689	2.16379	1.510	4.491	PER IMP= 90.00
COMPUTE NM HYD	100.10	-	1	.01281	18.89	.532	.77901	1.532	2.305	PER IMP= .00
START										TIME= .00
RAINFALL TYPE= 2										RAIN24= 1.830
COMPUTE NM HYD	110.10	-	1	.01092	20.33	.787	1.35005	1.510	2.907	PER IMP= 90.00
COMPUTE NM HYD	110.20	-	1	.00192	1.16	.029	.27917	1.532	.947	PER IMP= .00
COMPUTE NM HYD	110.40	-	1	.00217	4.04	.156	1.35007	1.510	2.913	PER IMP= 90.00
COMPUTE NM HYD	110.50	-	1	.00328	6.12	.236	1.35007	1.510	2.911	PER IMP= 90.00
COMPUTE NM HYD	110.60	-	1	.00037	.70	.027	1.35016	1.510	2.947	PER IMP= 90.00
COMPUTE NM HYD	110.70	-	1	.00038	.72	.028	1.35015	1.510	2.944	PER IMP= 90.00
COMPUTE NM HYD	110.80	-	1	.00045	.85	.033	1.35015	1.510	2.942	PER IMP= 90.00
COMPUTE NM HYD	110.90	-	1	.00597	11.11	.430	1.35006	1.510	2.909	PER IMP= 90.00
COMPUTE NM HYD	110.10	-	1	.01281	7.74	.191	.27917	1.532	.944	PER IMP= .00
FINISH										

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =04/15/1996

INPUT FILE = a:4ap.dat USER NO.= R_BOHANN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
START										TIME= .00
RAINFALL TYPE= 2										RAIN24= 2.750
COMPUTE NM HYD	100.10	-	1	.00088	2.56	.102	2.16386	1.510	4.519	PER IMP= 90.00
COMPUTE NM HYD	100.20	-	1	.00738	21.20	.851	2.16379	1.510	4.490	PER IMP= 90.00
COMPUTE NM HYD	100.30	-	1	.00186	5.36	.215	2.16382	1.510	4.501	PER IMP= 90.00
COMPUTE NM HYD	100.40	-	1	.00166	4.78	.192	2.16382	1.510	4.503	PER IMP= 90.00
COMPUTE NM HYD	100.50	-	1	.00103	2.96	.118	2.16385	1.510	4.514	PER IMP= 90.00
START										TIME= .00
RAINFALL TYPE= 2										RAIN24= 1.830
COMPUTE NM HYD	110.10	-	1	.00088	1.65	.064	1.35010	1.510	2.924	PER IMP= 90.00
COMPUTE NM HYD	110.20	-	1	.00738	13.73	.531	1.35006	1.510	2.908	PER IMP= 90.00
COMPUTE NM HYD	110.30	-	1	.00186	3.47	.134	1.35008	1.510	2.914	PER IMP= 90.00
COMPUTE NM HYD	110.40	-	1	.00166	3.10	.120	1.35008	1.510	2.915	PER IMP= 90.00
COMPUTE NM HYD	110.50	-	1	.00103	1.92	.074	1.35010	1.510	2.921	PER IMP= 90.00
FINISH										

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =07/12/1996

INPUT FILE = a:3pond.dat USER NO.= R_BOHANN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	
START										TIME=	.00
RAINFALL TYPE= 2										RAIN24=	2.750
COMPUTE NM HYD	101.60	-	1	.00037	1.07	.045	2.27939	1.500	4.526	PER IMP=	90.00
ROUTE RESERVOIR	501.60	1	2	.00037	.04	.045	2.27790	2.333	.190	AC-FT=	.032
COMPUTE NM HYD	101.70	-	3	.00038	1.11	.046	2.27939	1.500	4.526	PER IMP=	90.00
ADD HYD	106.70	2& 3	1	.00075	1.15	.091	2.27866	1.500	2.392		
ROUTE RESERVOIR	501.70	1	2	.00075	.06	.085	2.12116	3.000	.115	AC-FT=	.037
COMPUTE NM HYD	101.80	-	3	.00045	1.31	.055	2.27938	1.500	4.521	PER IMP=	90.00
ADD HYD	107.80	2& 3	1	.00120	1.36	.140	2.18069	1.500	1.771		
ROUTE RESERVOIR	501.80	1	2	.00120	.06	.100	1.55272	3.366	.084	AC-FT=	.044
COMPUTE NM HYD	101.90	-	3	.00788	22.49	.958	2.27928	1.500	4.460	PER IMP=	90.00
ADD HYD	108.90	2& 3	1	.00908	22.56	1.058	2.18298	1.500	3.880		
ROUTE RESERVOIR	501.90	1	4	.00908	2.15	1.058	2.18351	2.200	.370	AC-FT=	.586
COMPUTE NM HYD	101.50	-	1	.00328	9.38	.399	2.27929	1.500	4.465	PER IMP=	90.00
ROUTE RESERVOIR	501.50	1	2	.00328	3.64	.399	2.27987	1.766	1.732	AC-FT=	.092
COMPUTE NM HYD	101.40	-	3	.00217	6.20	.264	2.27930	1.500	4.470	PER IMP=	90.00
ADD HYD	105.40	2& 3	1	.00545	9.75	.663	2.27965	1.500	2.794		
ROUTE RESERVOIR	501.40	1	2	.00545	6.87	.663	2.27974	1.667	1.968	AC-FT=	.039
COMPUTE NM HYD	101.10	-	3	.01092	31.18	1.328	2.27927	1.500	4.459	PER IMP=	90.00
ADD HYD	109.10	3& 4	1	.02001	33.25	2.386	2.23580	1.500	2.596		
ADD HYD	104.20	2& 1	1	.02546	39.91	3.049	2.24520	1.500	2.450		
ROUTE RESERVOIR	501.30	1	3	.02546	1.00	1.531	1.12717	6.199	.061	AC-FT=	2.184
COMPUTE NM HYD	101.20	-	5	.00192	5.50	.234	2.27930	1.500	4.471	PER IMP=	90.00
ADD HYD	102.10	5& 3	1	.02738	6.44	1.764	1.20804	1.500	.367		
ROUTE RESERVOIR	501.20	1	2	.02738	1.37	1.763	1.20725	2.233	.078	AC-FT=	.153
FINISH											

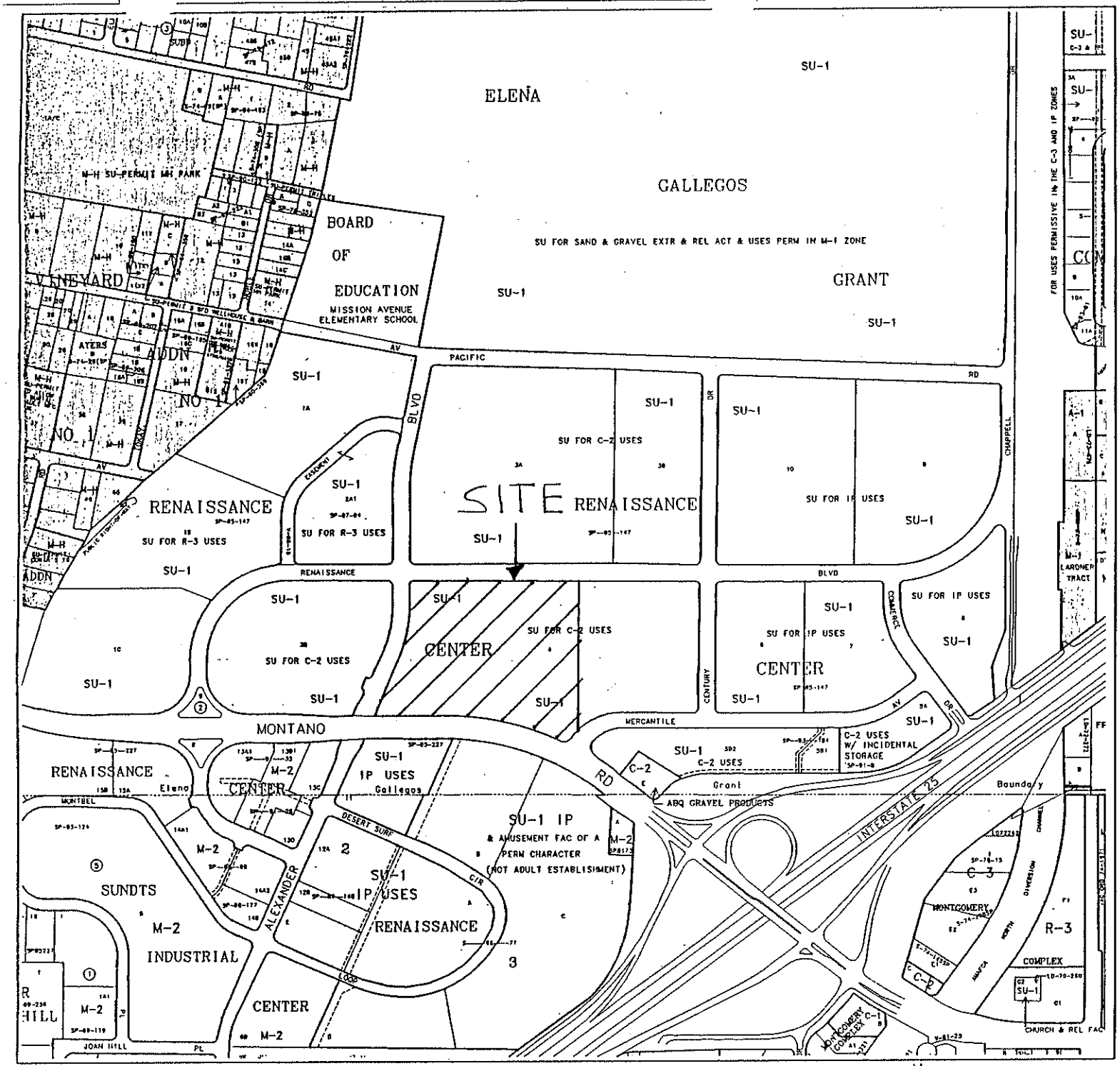
AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994

INPUT FILE = A:POND4A.DAT

RUN DATE (MON/DAY/YR) =04/17/1996

USER NO.= R_BOHANN.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION	
START											
RAINFALL TYPE= 2										TIME=	.00
										RAIN24=	2.750
COMPUTE NM HYD	101.40	-	1	.00166	4.75	.202	2.27930	1.500	4.473	PER IMP=	90.00
ROUTE RESERVOIR	501.40	1	2	.00166	.05	.076	.86398	3.000	.047	AC-FT=	.161
COMPUTE NM HYD	101.30	-	3	.00186	5.33	.226	2.27930	1.500	4.472	PER IMP=	90.00
ADD HYD	104.30	2& 3	1	.00352	5.38	.303	1.61223	1.500	2.385		
ROUTE RESERVOIR	501.30	1	2	.00352	3.69	.303	1.61217	1.600	1.637	AC-FT=	.016
COMPUTE NM HYD	101.20	-	3	.00738	21.06	.897	2.27928	1.500	4.461	PER IMP=	90.00
ADD HYD	103.20	2& 3	1	.01090	24.70	1.200	2.06371	1.500	3.542		
ROUTE RESERVOIR	501.20	1	2	.01090	.83	1.199	2.06354	2.533	.119	AC-FT=	.831
FINISH											



SCALE IN FEET

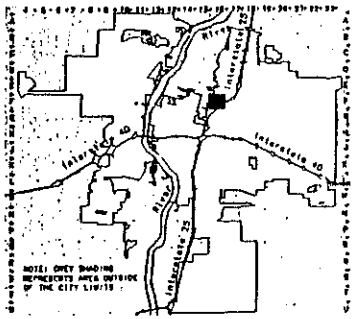
250 0 500 1000

PHOTOCOPY--NOT TO SCALE

North

AGIS — AC City of Albuquerque

Map Amended through July 11, 1994



LEGAL DESCRIPTION

T11N

R3E

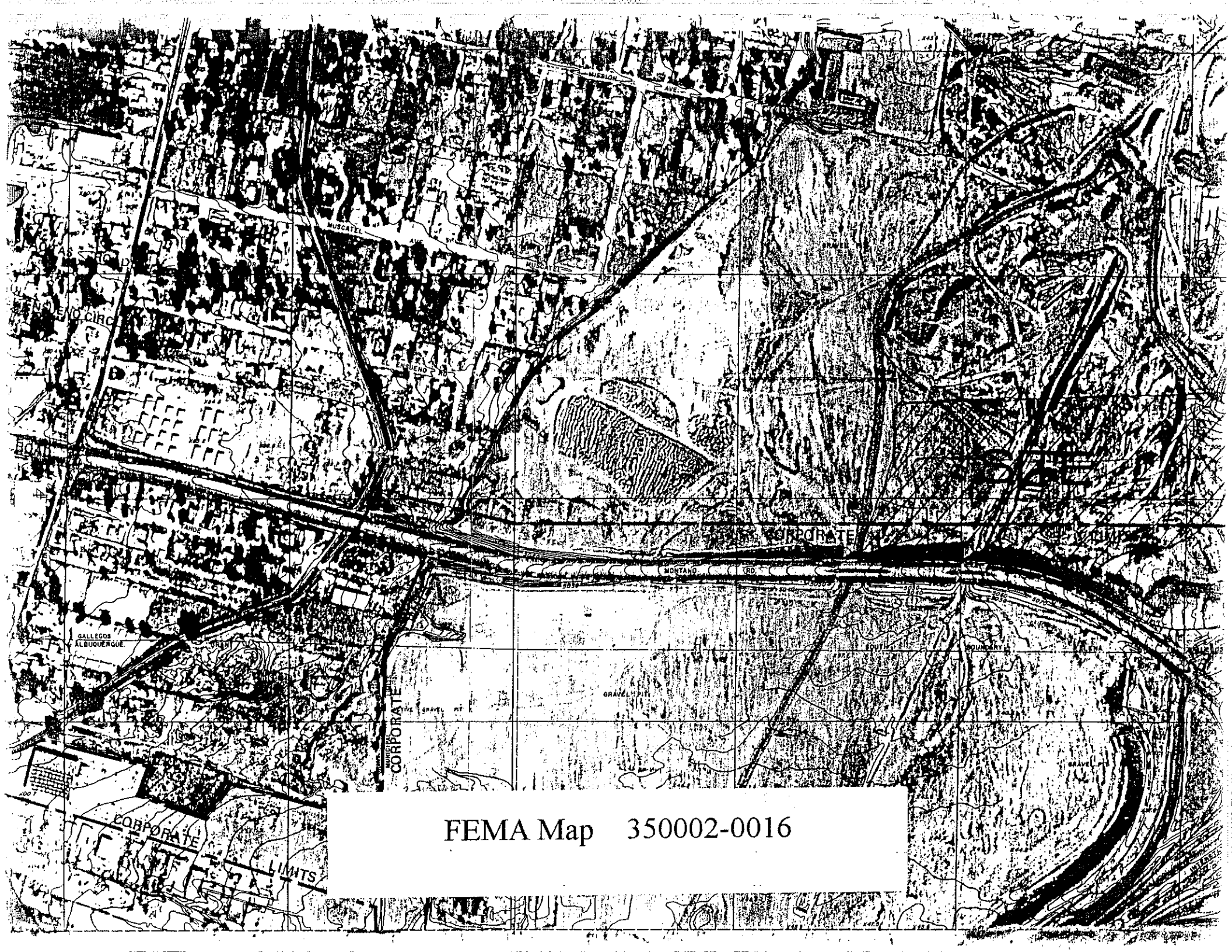
SEC 34

UNIFORM PROPERTY CODE

1-018-081

F-16-Z

2.15cfs



FEMA Map 350002-0016

MANUFACTURERS SUPPORTING DOCUMENTS

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
VISIT OUR APP

10896

ALBUQUERQUE, NM

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 450 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

1. STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
10. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

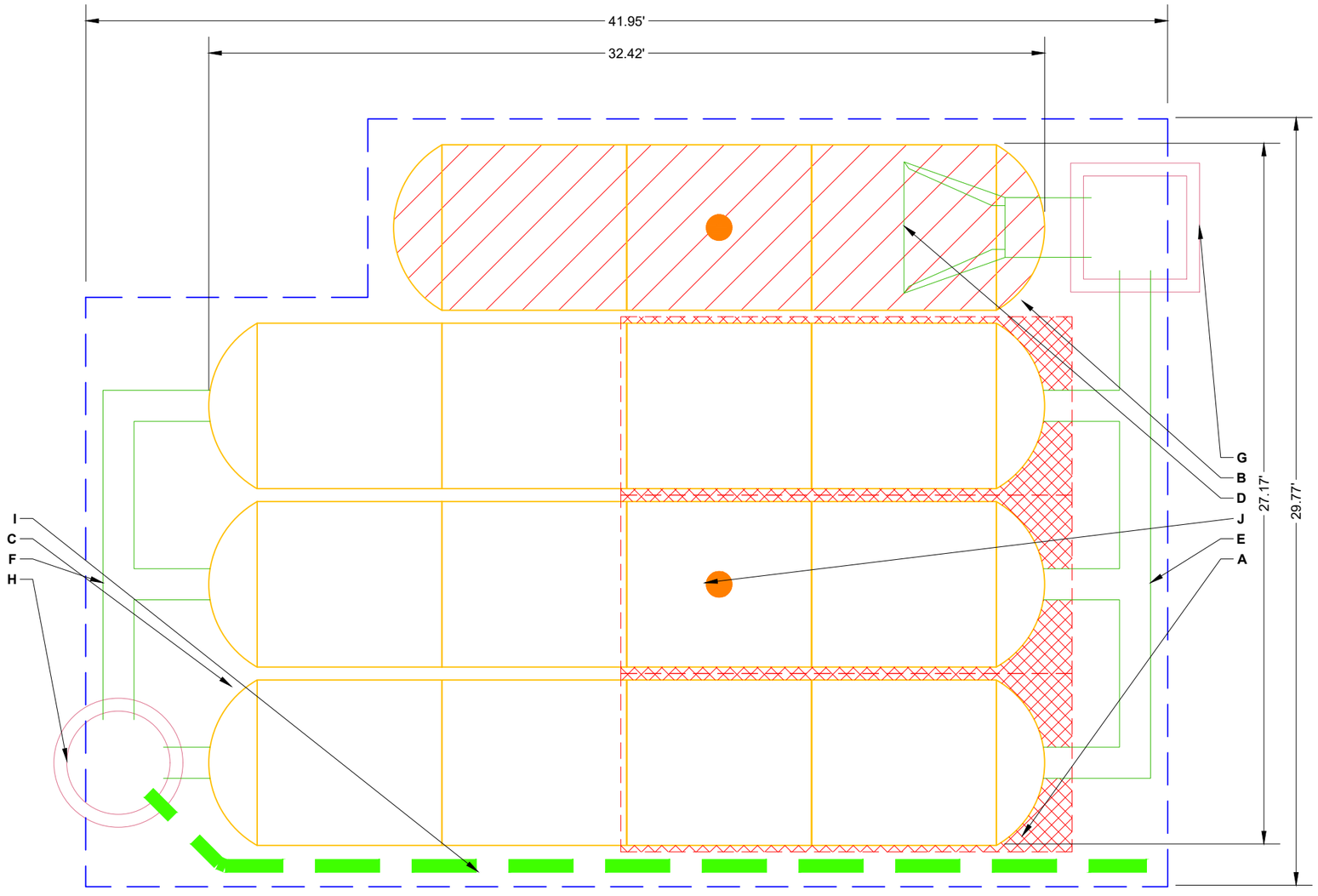
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT		CONCEPTUAL ELEVATIONS	
15	STORMTECH MC-3500 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	12.50
8	STORMTECH MC-3500 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	6.50
12	STONE ABOVE (in)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	6.00
9	STONE BELOW (in)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	6.00
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	6.00
3642	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	5.50
		TOP OF MC-3500 CHAMBER:	4.50
		12" x 12" TOP MANIFOLD INVERT:	2.95
		24" ISOLATOR ROW PLUS INVERT:	0.92
1173	SYSTEM AREA (SF)	12" x 12" BOTTOM MANIFOLD INVERT:	0.86
143.4	SYSTEM PERIMETER (ft)	12" BOTTOM CONNECTION INVERT:	0.86
		BOTTOM OF MC-3500 CHAMBER:	0.75
		UNDERDRAIN INVERT:	0.00
		BOTTOM OF STONE:	0.00

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	12" TOP CORED END CAP, PART#: MC3500IEPP12T / TYP OF ALL 12" TOP CONNECTIONS	26.36"	
PREFABRICATED END CAP	B	24" BOTTOM CORED END CAP, PART#: MC3500IEPP24BC / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	2.06"	
PREFABRICATED END CAP	C	12" BOTTOM CORED END CAP, PART#: MC3500IEPP12B / TYP OF ALL 12" BOTTOM CONNECTIONS	1.35"	
FLAMP	D	INSTALL FLAMP ON 24" ACCESS PIPE / PART#: MC350024RAMP		
MANIFOLD	E	12" x 12" TOP MANIFOLD, ADS N-12	26.36"	
MANIFOLD	F	12" x 12" BOTTOM MANIFOLD, ADS N-12	1.35"	
CONCRETE STRUCTURE	G	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		6.7 CFS IN
CONCRETE STRUCTURE	H	OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		4.0 CFS OUT
UNDERDRAIN	I	6" ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		
INSPECTION PORT	J	4" SEE DETAIL (TYP 2 PLACES)		



ISOLATOR ROW PLUS
(SEE DETAIL)

PLACE MINIMUM 17.50' OF ADSPLUS175 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

10896
ALBUQUERQUE, NM
DATE:
DRAWN: LH
PROJECT #:
CHECKED: N/A

DESCRIPTION	CHK	DRW	DATE

ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

0 5' 10'

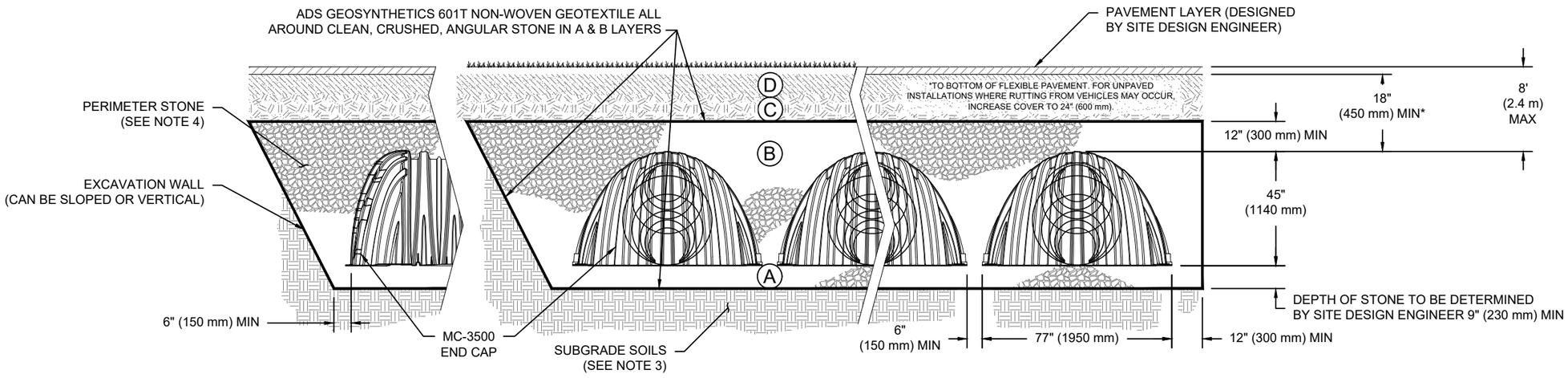
StormTech®
Chamber System

888-892-2694 | WWW.STORMTECH.COM

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 450 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

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ALBUQUERQUE, NM
DATE: DRAWN: LH
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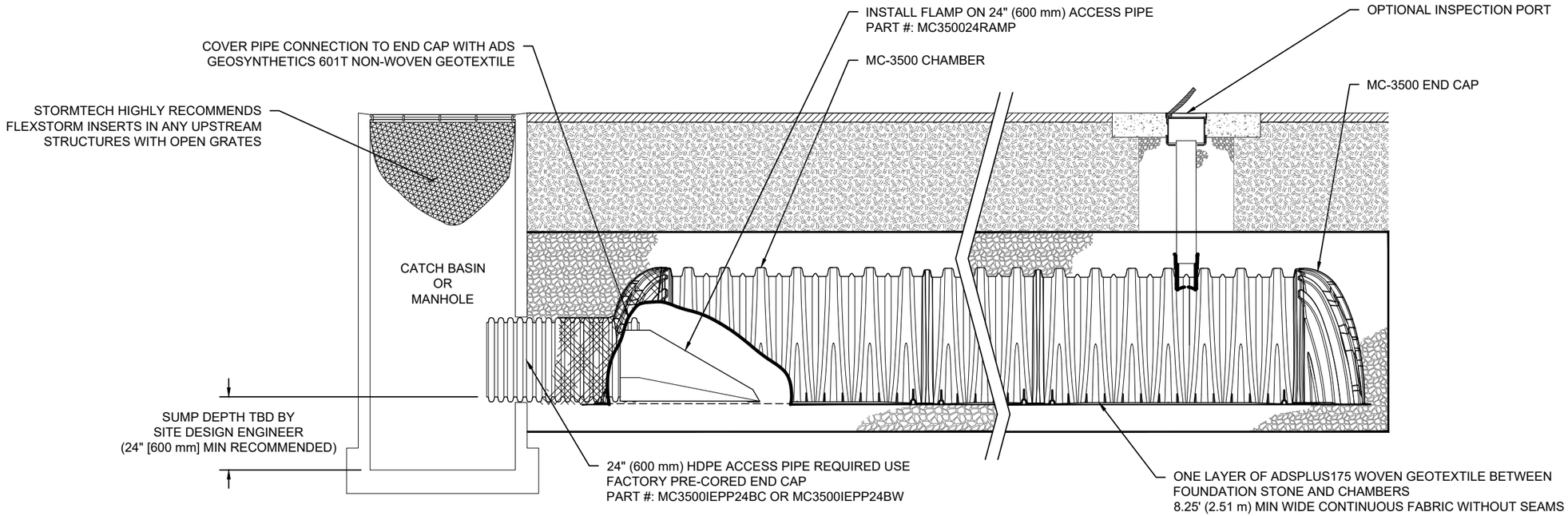


MC-3500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

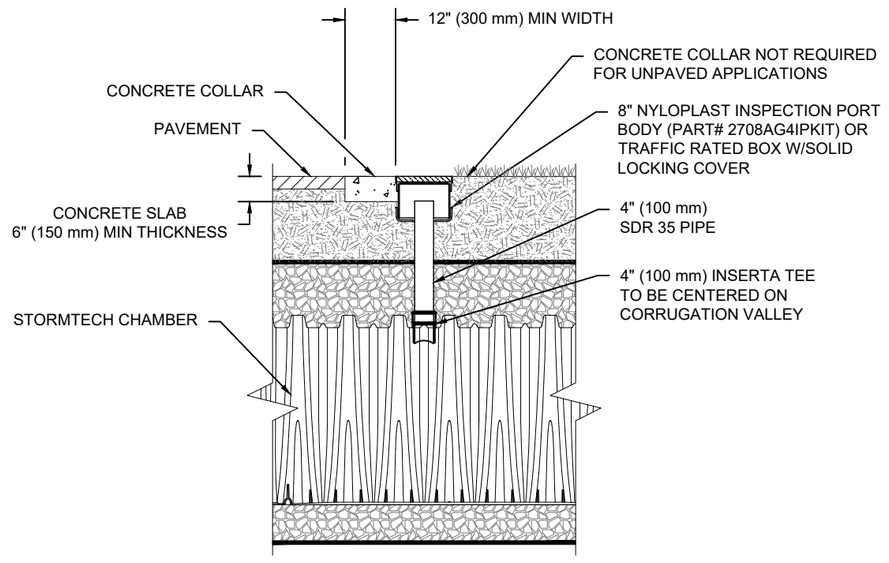
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION VALLEY.

4" PVC INSPECTION PORT DETAIL
(MC SERIES CHAMBER)
NTS

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UNDERDRAIN DETAIL

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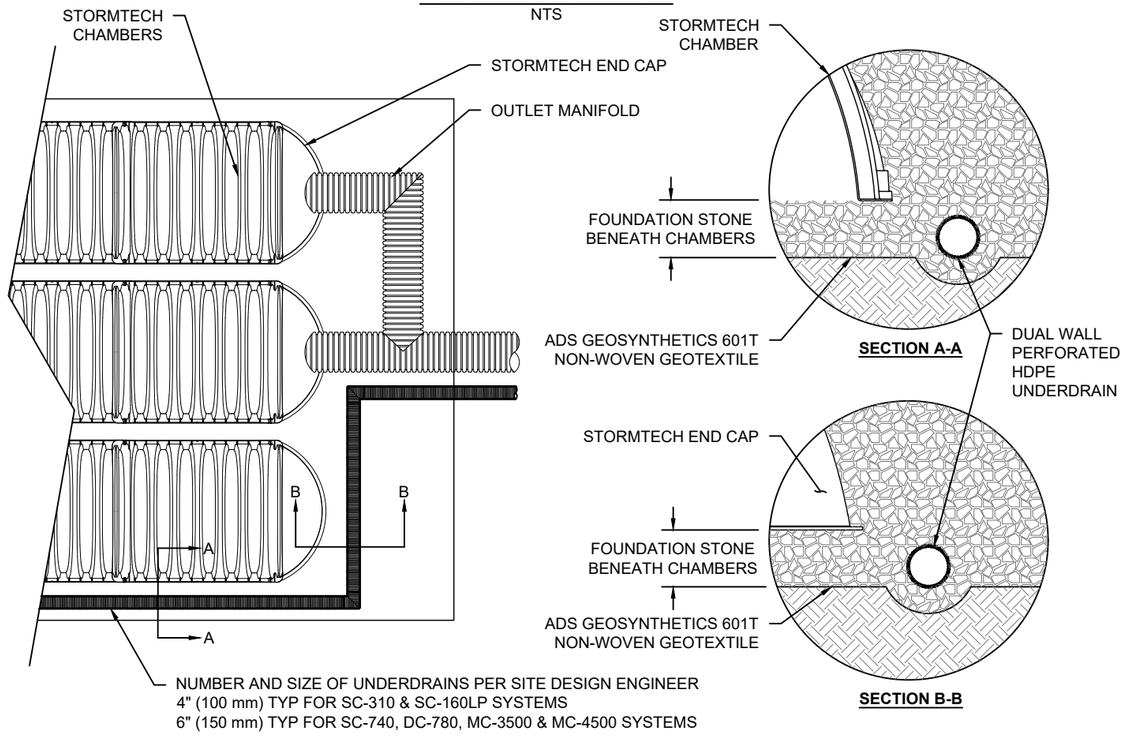

MC-SERIES END CAP INSERTION DETAIL

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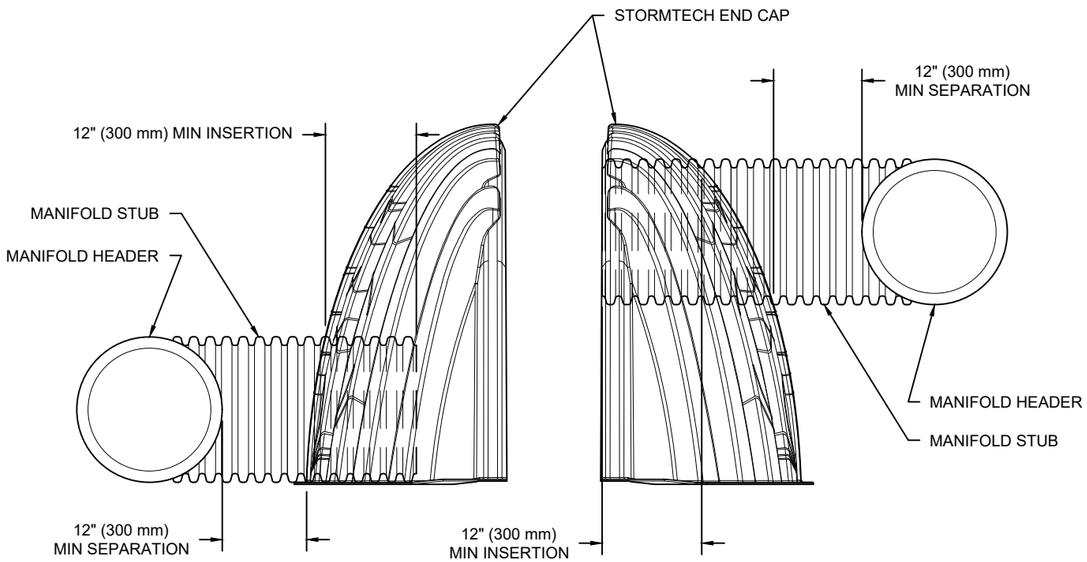
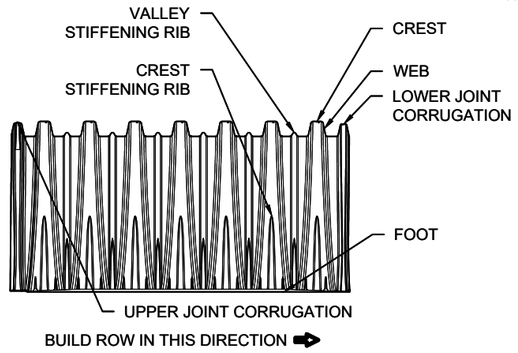
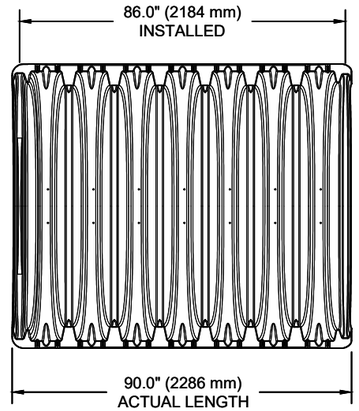


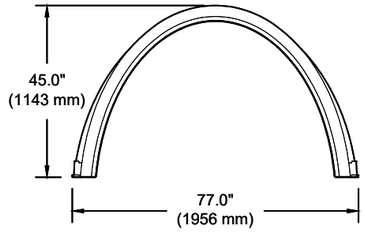
NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

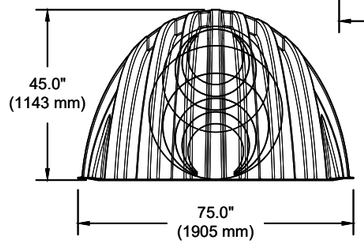
MC-3500 TECHNICAL SPECIFICATION

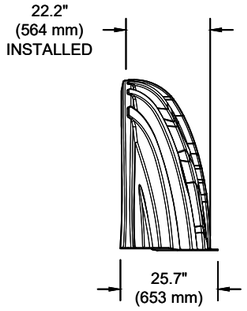
NTS











NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3.11 m³)
MINIMUM INSTALLED STORAGE*	175.0 CUBIC FEET	(4.96 m³)
WEIGHT	134 lbs.	(60.8 kg)

NOMINAL END CAP SPECIFICATIONS

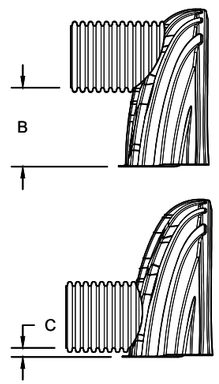
SIZE (W X H X INSTALLED LENGTH)	75.0" X 45.0" X 22.2"	(1905 mm X 1143 mm X 564 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET	(1.28 m³)
WEIGHT	49 lbs.	(22.2 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION, 6" SPACING BETWEEN CHAMBERS, 6" (152 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY

STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A WELDED CROWN PLATE END WITH "C"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B		---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B		---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B		---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B		---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B		---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18TW			
MC3500IEPP18BC		---	1.77" (45 mm)
MC3500IEPP18BW			
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24TW			
MC3500IEPP24BC		---	2.06" (52 mm)
MC3500IEPP24BW			
MC3500IEPP30BC	30" (750 mm)	---	2.75" (70 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL



CUSTOM PRECORED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

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