Community & Economic
Development Department
www.adcogov.org

ADAMS COUNTY
COLORADO

4430 South Adams County Parkway
1st Floor, Suite W2000
Brighton, CO 80601-8204
PHONE 720.523.6800
FAX 720.523.6998

Re-submittal Form

Case Name/ Number: PLT2022-00026; Berkeley Villas Final Plat

Case Manager: Layla Bajelan

Re-submitted Items:

- [ ] Development Plan/ Site Plan
- [x] Plat
- [ ] Parking/ Landscape Plan
- [x] Engineering Documents
- [x] Subdivision Improvements Agreement (Microsoft Word version)
- [ ] Other: _____

* **All re-submittals must have this cover sheet and a cover letter addressing review comments.**

Please note the re-submittal review period is 21 days.

The cover letter must include the following information:

- Restate each comment that requires a response
- Provide a response below the comment with a description of the revisions
- Identify any additional changes made to the original document

For County Use Only:

Date Accepted:

Staff (accepting intake):

Resubmittal Active: Addressing, Building Safety, Neighborhood Services,

Engineering, Environmental, Parks, Planner, ROW, SIA - Finance, SIA - Attorney

October 17, 2022

Adams County
Attn: Layla Bajelan
4430 S Adams County Pkwy
Brighton, CO 80601

Re: Berkeley Villas Final Plat
Project Number: PLT2022-00026

Dear Ms. Bajelan:

Thank you for taking the time along with County staff to review the initial applications of Final Plat and Subdivision Engineering Review for Berkeley Villas. Valuable feedback was received on August 4, 2022. Please see the following pages for detailed response to comments. Should you have any questions or concerns, you may reach me at 303-892-1166 or by email, bbailey@norris-design.com.

We look forward to our continued work with Adams County to make this project a success.

Sincerely,
Norris Design

Rebeccah Bailey

Beccah Bailey
Planner

Commenting Division: Development Engineering Review
Name of Reviewer: Greg Labrie
Resubmittal Required

1. It is assumed that all interior roadways are to be private roads. The private roads are required to be placed in tracts on the final plat.
   Response: Final Plat reflects roads within the tracts.

2. All Concrete Facilities have been previously constructed along the 56th Ave. frontage. All proposed Handicap Ramps will be constructed to current ADA Standard.
   Response: All handicap ramps are designed to meet ADA standards.

3. The proposed outfall to the detention pond is to a manhole that does not exist. Please provide clarification and details on how and where the detention pond will outfall.
   Response: TTLC is negotiating an easement and cost sharing agreement with Maverik (adjacent property owner) that will allow connection of the outfall to the proposed manhole. TTLC has the right to self-preform the construction of this proposed manhole, should it not be constructed by Maverik in time. Copies of referenced easement and agreement can be provided if needed.

4. No construction will begin at this location until these construction plans have been approved by the engineering staff of the Community and Economic Development Dept.
   Response: Comment noted, thank you.

5. When the civil design plans are approved, the applicant will be required to apply for an Infrastructure Permit (INF) from the Epermitcenter and a Stormwater Permit from Public Works Stormwater Division. If applicant proposes to import greater than 10 CY of soil to this site, additional permitting is required. Per Section 4-04-02- 02, of the Adams County Development Standards and Regulations, a Temporary or Special Use Permit is required to ensure that only clean, inert soil is imported into any site within un-incorporated Adams County. A Conditional Use Permit will be required if the importation exceeds 500,000 CY.
   Response: Comment noted, thank you.

6. No construction will begin at this location until a Pre-Construction Meeting has been completed with the Public Works Staff at this location.
   Response: Comment noted, thank you.

7. No construction will begin at this location until a Subdivision Improvement Agreement (SIA) has been completed and approved by the Adams County Board of County Commissioners (BoCC). The SIA that was submitted shall include a cost estimate for the public and private improvements.
   Response: The SIA cost estimate is included with this application.

8. It is clear that these construction plans are not ready for approval. Please include all necessary details, including the utility plans, drainage plans, and civil construction plans for the site improvements.
   Response: Water and Sanitary plans have been submitted to Berkeley Water and Sanitation District and all district comments are being addressed. Adequate information for construction has been provided.

Commenting Division: Planner Review
Name of Reviewer: Layla Bajelan
Resubmittal Required

1. PLN01: Public Land Dedication (PLD) fees in the amount of $131,907.78 will be required once the application is scheduled for public hearing. Please do not pay this until your case is scheduled for public hearing.
   Response: Noted. Fees will be paid by TTLC as directed in advance of public hearing.

2. PLN02: Proposed Final Plat conforms to the approved preliminary plat.
   Response: Final Plat conforms to approved preliminary plat.

3. PLN03: Please apply for a Subdivision Improvement Agreement.
   Response: Applications for Subdivision Improvement Agreement have been included with this response submittal.

4. PLN04: Applicant will need to apply for and be approved for a Waiver from the Subdivision Design Standards to allow for private roadways.
   Response: Waiver from the Subdivision Standards has been included with this application.

Commenting Division: Neighborhood Services Review
Name of Reviewer: Gail Moon
Complete

There are no OPEN violations at these parcel numbers (018251703041, 0182517103030, 0182517103052, 0182517103053, 0182517103038, 0182517103064, 0182517103063, 0182517103050) at this time. NO COMMENT

Commenting Division: ROW Review
Name of Reviewer: David Dittmer
Resubmittal Required

1. ROW1: Revise PLT Case Number on all sheets
   Response: PLT Case Numbers revised on all sheets.

2. ROW2: Add a line for spacing between Acknowledgement and STATE OF _____
   Response: Line added for spacing.

3. ROW3: Remove Planning Commission acceptance/recommendation block as Final Plats are not heard by them again.
   Response: Planning Commission acceptance block removed.

4. ROW4: Format the County Attorney's approval block correctly
   Response: County Attorney's approval block corrected.

5. ROW5: Need to add recording block for Clerk and Recorder
   Response: Clerk and Recorder block included in lower right-hand corner of cover.

6. **ALL EASEMENTS MUST BE VACATED PRIOR TO APPROVAL OF FINAL PLAT**
   Response: Per phone call and email with David Dittmer easements will be vacated prior to issuance of building permit.

Commenting Division: Addressing Review
Name of Reviewer: David Dittmer
Complete
Response:

Comments Received from Adams County Fire Rescue – Steve Loeffler
The following information provides guidance on general fire code requirements typically applicable to new development projects. However, please be aware that this list is NOT all encompassing. **It is the responsibility of the contractor to read this comment letter in its entirety and make sure that all requirements are satisfied.**

General:

1. The 2018 International Fire Code is the current fire code adopted within the city and all development must be in compliance with its requirements. The 2018 IFC can be accessed online for free by going to https://codes.iccsafe.org/public/document/IFC2018. Amendments to this code can be located by going to http://www.adcogov.org/sites/default/files/Ordinance%20No.%204_1.pdf.
   Response: Comment noted, thank you.

2. Site and building design and construction shall be in accordance with the provisions of the 2018 International Fire Code (IFC) as adopted by Adams County. All construction shall be in accordance with IFC Chapter 33, *Fire Safety During Construction and Demolition*.
   Response: Comment noted, thank you.

3. Please be aware that these comments are subject to change as more information is received or if there are changes to the plans during subsequent reviews.
   Response: Comment noted, thank you.

Access Requirements:

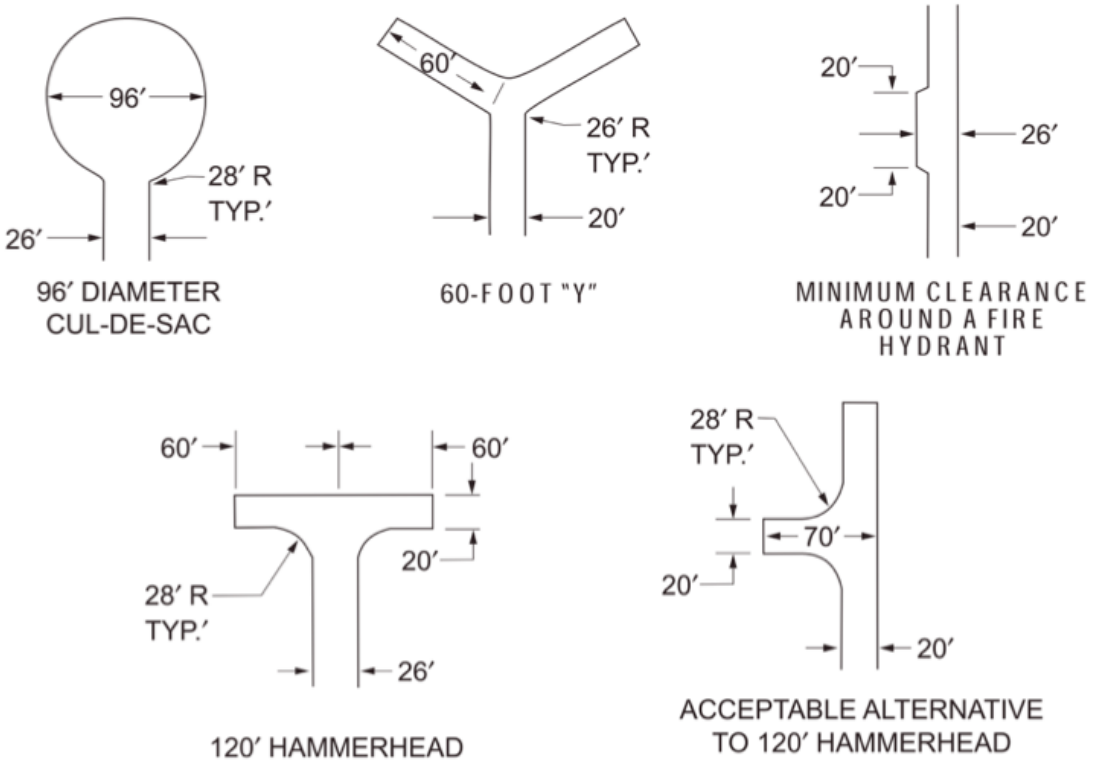
4. **Approved access roads must be constructed prior to any vertical construction and/or to combustible materials being delivered to the site,** whichever comes first. Temporary access roads are prohibited unless specifically approved by the Fire District. Fire apparatus access must be designed and maintained to support the imposed loads of fire apparatus (i.e. 85,000 lbs), and must have a surface that provides all-weather driving capabilities. Vehicle access shall be provided to within 150 feet of temporary or permanent fire department connections.
   Response: Comment noted, thank you.

5. Fire apparatus access roads shall be a minimum of 24' wide or 26' when a hydrant is present or the building exceeds 30' in height. **The alleys are shown as being 20' wide on the plan. What is going to be the maximum height of the buildings?**
   Response: It was determined that the 30' ROW loop around the site would serve as the fire apparatus access road with arial access.

6. Fire apparatus access roads shall be within 150' of all ground level exterior portions of the building.
   Response: Fire apparatus access roads are within 150' of ground level exterior portions of the building

7. Any dead-end fire apparatus access road in excess of 150' shall be provided with an approved turnaround. **It does not appear that the dead-end alley ways exceed 150' in length. If they do, a turnaround will be required.**
   Response: No dead-end alley ways exceed 150' except in the case of the SW alley where the dead-end exceeds 150' in length alternatives to a turnaround were used with the permission of Adams

County Fire. The alleyway was expanded to 26' wide, signage was proposed, and a fire hydrant was added in close proximity to the alley. This was discussed and approved by Adams County Fire.



8. Any temporary construction or permanent security gates shall be a minimum of 24 feet and a no parking fire lane sign shall be posted on the gate. The gates shall also have a Knox key switch installed for emergency operation if automatic.
   Response: Comment noted, thank you.

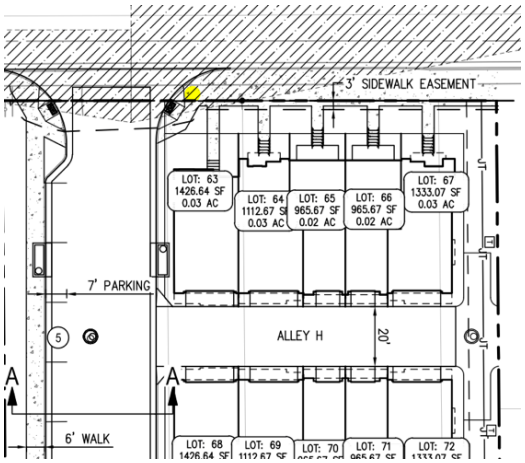
9. New and existing buildings shall have approved address numbers, building numbers, or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Numbers shall be a minimum of 4 inches high with a minimum stroke width of 0.5 inch. Please be aware that the size of the number may need to be larger than 4 inches is not clearly visible from the street or road.
   a. A temporary sign must be provided if the permanent signage is not yet installed.
      Response: Comment noted, thank you.

Fire Protection Water Supply and Hydrants:

10. **Water mains and all required hydrants shall be installed before the delivery of combustible materials to the site**. Hydrants shall be maintained operational at all times thereafter, unless alternate provisions for water supply are approved by the Fire District. Any private fire service mains and fire hydrants and all fire sprinkler service lines shall be installed by a State of Colorado Licensed Fire Suppression System Contractor – Underground Contractor and meet the requirements of National Fire Protection Association Standard 24. Plans for the underground fire sprinkler service line shall be submitted for review and approval

to ACFR. A current list of registered contractors can be found by going to https://www.colorado.gov/dfpc/fire-suppression-system-contractors. Once installed, all underground fire sprinkler service lines must be inspected by an ACFR inspector before covering. Attached is a guideline for the inspections required for an underground fire sprinkler service line.
Response: Comment noted, thank you.

11. Unobstructed access to fire hydrants shall be maintained at all times. Fire department personnel shall not be deterred or hindered from gaining immediate access to fire protection equipment or fire hydrants. A 3-foot (radius) clear space shall be maintained around the circumference of fire hydrants. Within that 6-foot diameter circle and within a 6-foot-wide path leading to the 4.5-inch outlet of a hydrant, vegetation shall be no higher than 4 inches above grade. The unobstructed vertical clearance within that 6-foot circle and 6-foot approach path shall not be less than 7 feet, unless otherwise approved by the Fire District.
Response: Comment noted, thank you.



12. A fire hydrant shall be located within 600' (fully sprinkled building) of all ground level exterior portions of the building. **An additional hydrant located on the corner near the east access road connection to West 56th Avenue.**
Response: Hydrant is provided near east access road connection to west 56th Avenue.

13. The number and distribution of fire hydrants is based on the required fire flow. You may refer to Appendix C of the 2018 IFC for guidance.
Response: Comment noted, thank you.

TABLE B105.1(1)
REQUIRED FIRE FLOW FOR ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES

FIRE-FLOW CALCULATION AREA (square feet)	AUTOMATIC SPRINKLER SYSTEM (Design Standard)	MINIMUM FIRE FLOW (gallons per minute)	FLOW DURATION (hours)
0–3,600	No automatic sprinkler system	1,000	1
3,601 and greater	No automatic sprinkler system	Value in Table B105.1(2)	Duration in Table B105.1(2) at the required fire-flow rate
0–3,600	Section 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*	500	$^1/_2$
3,601 and greater	Section 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*	$^1/_2$ value in Table B105.1(2)	1

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m.

TABLE B105.1(2)
REFERENCE TABLE FOR TABLES B105.1(1) AND B105.2

FIRE-FLOW CALCULATION AREA (square feet)					FIRE FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Type IA and IB[a]	Type IIA and IIIA[a]	Type IV and V-A[a]	Type IIB and IIIB[a]	Type V-B[a]		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-183,400	92,401-103,100	59,101-66,000	42,701-47,700	26,301-29,300	4,500	
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. Types of construction are based on the *International Building Code*.

b. Measured at 20 psi residual pressure.

TABLE C102.1
REQUIRED NUMBER AND SPACING OF FIRE HYDRANTS[h]

FIRE-FLOW REQUIREMENT (gpm)	MINIMUM NUMBER OF HYDRANTS	AVERAGE SPACING BETWEEN HYDRANTS[a, b, c, f, g] (feet)	MAXIMUM DISTANCE FROM ANY POINT ON STREET OR ROAD FRONTAGE TO A HYDRANT[d, f, g]
1,750 or less	1	500	250
1,751–2,250	2	450	225
2,251–2,750	3	450	225
2,751–3,250	3	400	225
3,251–4,000	4	350	210
4,001–5,000	5	300	180
5,001–5,500	6	300	180
5,501–6,000	6	250	150
6,001–7,000	7	250	150
7,001 or more	8 or more[e]	200	120

For SI: 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m.

a. Reduce by 100 feet for dead-end streets or roads.

b. Where streets are provided with median dividers that cannot be crossed by fire fighters pulling hose lines, or where arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500 feet on each side of the street and be arranged on an alternating basis.

c. Where new water mains are extended along streets where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at spacing not to exceed 1,000 feet to provide for transportation hazards.

d. Reduce by 50 feet for dead-end streets or roads.

e. One hydrant for each 1,000 gallons per minute or fraction thereof.

f. A 50-percent spacing increase shall be permitted where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 of the *International Fire Code*.

g. A 25-percent spacing increase shall be permitted where the building is equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.2 or 903.3.1.3 of the *International Fire Code* or Section P2904 of the *International Residential Code*.

h. The fire code official is authorized to modify the location, number and distribution of fire hydrants based on site-specific constraints and hazards.

Automatic Fire Sprinkler System:

As stated in Section 903.2.8 of the 2018 International Fire Code as adopted and amended by Adams County, an approved residential fire sprinkler system is REQUIRED. Please be aware that if a residential fire sprinkler system is going to be installed in accordance with NFPA 13D the fire sprinkler plans must be submitted to us for review under a separate permit. If the system will be a multipurpose system and designed and installed in accordance with IRC section P2904, plans shall be submitted to Adams County Building Division for review and permitting. If a P2904 system is to be installed, please provide us with a record of the Building Division's approval.

Response: Noted, 13D fire sprinkler plans will be provided.

Other Helpful Information:

14. Please be aware that the fire code does not specify building fire rating or set-back requirements. These are located within the building code and therefore are out of our scope. This preliminary review does not approve anything covered under the building code. These requirements need to be verified with the County's Building and Planning Departments.
    Response: Comment noted, thank you.

15. Please be aware that we are a separate entity from the County and anytime you submit to the county, you will need to submit to us separately utilizing our online portal. The link is below:
    https://go.citygrows.com/acfr-fire-prevention
    Response: Comment noted, thank you.

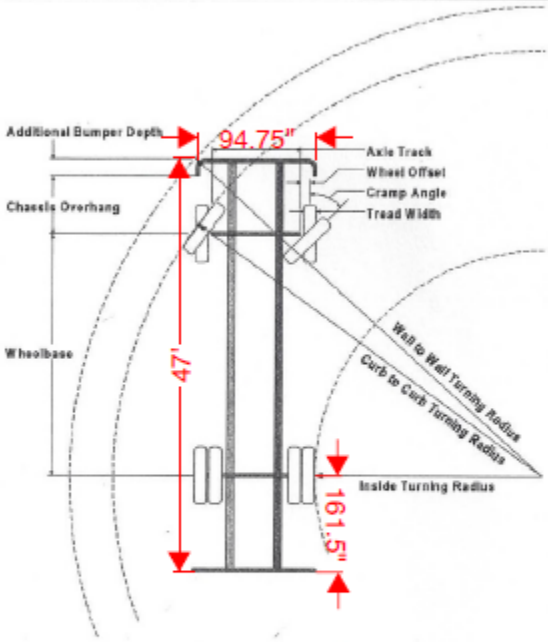
16. The following reviews and permits are often needed for new development projects:
    a. Site Development and Water Plans
        i. Civil Plans
        ii. Utility Plans
        iii. Auto-turn Exhibit (use attached apparatus specifications)
    b. New Construction Building Plans
        i. Architectural
    c. Fire Protection System Plans
        i. Fire Sprinkler
        Response: Comment noted, thank you.

17. Site development plans must be reviewed and approved before plans for all buildings and fire protection systems are submitted to us for review and permitting. All fees (permit and impact) shall be paid at time of permit pick-up.
    Response: Comment noted, thank you.

Turning Performance Analysis

09/28/2017

Bid Number: 593
Department: Adams County Fire Rescue
Chassis: Arrow XT Chassis, PAP, PUC
Body: Aerial, Platform 100', PUC, Alum Body



Parameters:

Inside Cramp Angle:	40°
Axle Track:	82.92 in.
Wheel Offset:	5.30 in.
Tread Width:	17.50 in.
Chassis Overhang:	68.99 in.
Additional Bumper Depth:	16.00 in.
Front Overhang:	84.99 in.
Wheelbase:	277.50 in.

Calculated Turning Radii:

Inside Turn:	26 ft. 5 in.
Curb to curb:	42 ft. 8 in.
Wall to wall:	49 ft. 0 in.

Comments:

Other Notes:

The front bumper extends 16 inches from the face of the cab.

The width is 19' with outriggers fully extended.

Angle of approach & departure:15 degree

Category Description:	OptionID:	Option Description:
Axle, Front, Custom	0090913	Axle, Front, Oshkosh TAK-4, Non Drive, 24,000 lb, Qtm/AXT/DCF
Wheels, Front	0019618	Wheels, Front, Alcoa, 22.50" x 13.00", Aluminum, Hub Pilot
Tires, Front	0582746	Tires, Front, Goodyear, G296 MSA, 445/65R22.50, 20 ply
Bumpers	0606536	Bumper, 16" Extended, Steel Painted, Arrow XT
Aerial Devices	0592931	Aerial, 100' Pierce Platform, 50 MPH Wind Rating, 150lb Tip Load Allowance

Notes:

Actual inside cramp angle may be less due to highly specialized options.

Curb to Curb turning radius calculated for 9.00 inch curb.

Comments Received by Commerce City Planning Department – Omar Yusuf

Thank you for allowing Commerce City to comment on the Major Subdivision Final Plat to create 82 lots and 8 non-residential tracks on 4.6 acres for the location at 2880 W 56th Avenue that may have an impact on our jurisdiction. The city has no comments:
Response: Comment noted, thank you.

Comments Received by Crestview Water & Sanitation District – Mitchell Terry

This development is out of Crestview's service area so Crestview has no comments for this project.
Response: Comment noted, thank you.

Comments Received by Denver Water – Kela Naso

Denver Water has no comment on the major subdivision final plat. However, this development will require a formal Denver Water plan review submittal. The owner/ developer's engineer should reach out to our plan review department at watersalesplanreview@denverwater.org to begin the process. If you have any questions or concerns, please let me know.
Response: Noted, water plans have been submitted to Denver Water.

Comments Received by Colorado Division of Water Resources – Joanna Williams

We have reviewed the information received on July 7, 2022 for a final plat to subdivide 4.6-acres into 82 residential lots on which townhomes will be developed and 8 non-residential tracks. This office previously commented on the TTLC 56th & Federal Subdivision to rezone the 4.6 acres in a letter dated June 9, 2021.

Water Supply Demand
Estimated water demand and proposed uses were not provided.

Source of Water Supply
The proposed water source for the property is service provided by Denver Water. According to the letter dated November 25, 2019 from Denver Water ("letter"), the property is within Denver Water's service area and is eligible to receive water service and also the property is within the Berkeley Water and Sanitation District's ("District") service area and is eligible to receive water service subject to Denver Water's Engineering Standards and Operating Rules and payment of applicable charges. This office has not received information that these requirements have been met. According to information available to our office, Denver Water took over the District's water system on January 1, 2018. Denver Water is considered to be a reliable water source.

State Engineer's Office Opinion
Based upon the above and pursuant to sections 30-28-136(1)(h)(I) and 30-28-136(1)(h)(II), C.R.S., it is our opinion that the proposed water supply is adequate and can be provided without causing injury to decreed water rights, as long as the Denver Water is committed to supply water to the lots.
Response: Comment noted, thank you.

Comments Received by Lumen Plat Review

Our engineer has reviewed this plat and their comments are: "Pole line with Lumen facilities may run through property. Please verify location as Lumen records may be off." If you require signatures, you can contact the engineer CC'd on this email and if you have any further questions, please don't hesitate to reach out.
Response: Comment noted, thank you.

Comments Received by RTD – C. Scott Woodruff

The RTD has no comment on this project.
Response: Comment noted, thank you.

Comments Received by Tri-County Health Department – Kathy Boyer

Thank you for the opportunity to review and comment on the Final Plat for 84 single-family attached townhome units on 4.9 acres located at 2880 and 2922 West 56th Avenue. Tri-County Health Department (TCHD) staff previously reviewed the application for the Rezoning, Preliminary Plat for Major Subdivision, and Site Plan and provided

comments in letters dated June 30, 2021, September 21, 2021, November 5, 2021, and January 6, 2022. TCHD has no comments on the Final Plat
Response: Comment noted, thank you.

Comments Received by Xcel Energy – Donna George

Public Service Company of Colorado's (PSCo) Right of Way & Permits Referral Desk advises the property owner/developer/contractor to continue working with Jaime Hainge (Designer) for approval of design details for Berkeley Villas Final Plat.
Response: Comment noted, thank you.

For additional easements that may need to be acquired by separate document for new facilities, Jaime must contact a Right-of-Way and Permits Agent.

Comments Received by Adams County Stormwater Comments – Juliana Archuleta

Drainage Report:

1) Describe pond spillway, proposed spillway path and ultimate discharge point.
   Response: Spillway discussion added to report.

2) Include the sub-basin for public road improvements, size, imperviousness, scope of work, how is this are receiving water quality?, where?
   Response: Sub-basin added for public sidewalk improvements.

3) Include a section on the drainage report to specify what Minimum Design Standards Section 9-04-04 for design of the water quality drainage facility. The project can apply a combination of Exclusions and Design Standards to different areas of the project. Note that water quality is required for the site, as well as for public improvements. Break down the total acreage, and include a table showing each off-site and on-site sub-basin treatment and size to facilitate review. List and justify any deviations and use of any exemptions listed in Section 9-04

> Design Post-construction BMP/water quality treatment according to requirements under Section 9-04-04 MINIMUM DESIGN STANDARD. Post-construction BMPs for applicable development and redevelopment sites shall meet one of the design standards listed on the regulation. Refer to the regulation directly, otherwise here is the standard that is commonly utilized:
>
> 1. Water Quality Capture Volume (WQCV) Standard: The post-construction BMP shall be designed to provide treatment and/or infiltration of the WQCV and:
>
> a. 100% of the applicable development site is captured, except the County may exclude up to 20%, not to exceed one (1) acre, of the applicable development site area when the Developer has determined that it is not practicable to capture runoff from portions of the proposed site that will not drain towards post-construction BMPs. In addition, the Developer must also determine the implementation of a <u>separate post-construction BMP</u> for the portion of the site that is not practicable. (for example: driveway access that drains directly to the street) ; AND

b. Evaluation of the minimum drain time shall be based on the pollutant removal mechanism and functionality of the post-construction BMP implemented. Consideration of drain time shall include maintaining vegetation necessary for operation of the post-construction BMP (for example: wetland vegetation)
Response: Adams County Water Quality standards are being followed and flows not capture on-site do not exceed 1 acre or 20%.

For a full copy of Chapter 9, Section 04-04 visit: http://www.adcogov.org/development-standards-regulations

Please document/explain compliance with minimum design standards are met (1.a and 1.b) on the Drainage Report. Clearly address any uncontrolled run-off and also any **off-site public** improvement runoff. Both flows must comply with the requirements shown above.
Response: Compliance with minimum design standards are being met and described in drainage report. Off-site public improvement runoff is also addressed in the report.

4) Only up to 20% of the whole project, not exceeding 1 acre can be released w/o treatment if there is a justification (physical constraint). Areas that will remain landscaped may be removed, just state the exemption#11: "Areas to remain undeveloped"
Response: Noted, less than 20% of the project and less than 1 acre of the project is being released without treatment.

5) All Neighboring properties:
   a. Extend grading and drainage plan to show all neighboring properties and how water will be draining along adjacent properties.
   Response: Plan extended to show neighboring properties

   b. See off-site flows from W 55th Ave: add a section to discuss off-site flows from the northern side of the property. How is this run-on water going to be managed? Drainage? Detention/Water quality?
   Response: A storm sewer stub is being provided on the south side of the project where the flows are shown to enter the site. The property owner to the south can connect to this stub to pass the off-site flows onto our site. It was discussed with Juliana Archuleta that the offsite flows will just need to be run through our pipe network and not treated for water quality.

6) Drainage Report: Master Drainage Plans. Add a section to address Master plan and compliance with adopted drainage master plans. To find the Master Drainage Plan for this area, you need to go to the MHFD website, maps, search by stream, click on the OneBase, use the select Square/Plus/Arrow icon and select Clear Creek. Then search by year on the list of documents. MHFD will launch a CONFLUENCE app with all data in the near future.
Response: Master Plan reference added to report and discussion on compliance with master plan added.

7) **Drainage Report + CD's:** Minimization of Directly Connected Impervious Area is an LID technique that should have been incorporated per Step#1 or the 4-step process described on UDFCD's Urban Storm Drainage Criteria Manual, Volume 3. Denote LID techniques on the CD's, and **add a LID section on the Drainage report explaining how the LID standards below is being met.**
Response: LID section added to drainage report and discussion on how LID standards being met included. LID techniques being met and added to plans.

Resources: https://www.fcgov.com/utilities//img/site_specific/uploads/fcscm-appendix-c.pdf?1549566344

LOW IMPACT DEVELOPMENT (LID) STANDARDS AND REQUIREMENTS - Section 9-01-03-14:

LOW IMPACT DEVELOPMENT (LID) STANDARDS AND REQUIREMENTS - Section 9-01-03-14:
All construction projects shall reduce drainage impacts to the maximum extent practicable, and implement practices such as:

1. On-site structural and non-structural BMPs to promote infiltration, evapo-transpiration or use of stormwater,
2. Minimization of Directly Connected Impervious Area (MDCIA),
3. Green Infrastructure (GI),
4. Preservation of natural drainage systems that result in the infiltration, evapo-transpiration or use of stormwater in order to protect water quality and aquatic habitat.
5. Use of vegetation, soils, and roots to slow and filter stormwater runoff.

6. Management of stormwater as a resource rather than a waste product by creating functional, attractive, and environmentally friendly developments.
7. Treatment of stormwater flows as close to the impervious area as possible.
8. Trees removed/replaced
9. Rain barrels, up to a max of 2 55-gallons drums per water law (not for multifamily, industrial or commercial uses)
   Response: LID techniques incorporated into plan

LID shall be designed and maintained to meet the standards of these Regulations and the Urban Drainage and Flood Control District's Urban Storm Drainage Criteria Manual, Volume 3.

8) **Drainage Plans/CD's - Roof drain disconnection Section 9-01-06-08:** Roof downspouts, roof drains, or roof drainage piping shall discharge onto the ground and shall not be directly connected to the storm drainage system. Please address all "Roof Basin", on what direction will roof drains? Make sure the sub-basins account for roof pitch. Describe how the roof drains will be disconnected. Indicate on the construction plans.
Response: Geotech report indicates that connecting downspouts directly to the storm drainage system is recommended due to the soil type. Other various LID techniques are being utilized.

9) **Prohibition of Illicit Discharges/Connections Section 9-05-02 / 9-01-06-01**:

a. **Dumpster Area/Trash Enclosures:** Indicate trash dumpster area AND Recycling dumpster area. Size for both services. Prevent run-on into the dumpster area, locate dumpster areas away from storm inlets, grade the trash enclosure area towards a grassy area, berm area to prevent run-off. Indicate dumpster area on the plan.
Response: Each townhome has a designated spot in the garage for single family trash and recycling bins that will be collected once a week via the alleyways.

b. **Snow Removal and stockpiling:** Assign a depressed area or barrier to allow snow piles to melt and sand to be later sweep or collected. Add a "Dedicated Snowpile Area" sign. Pushing snowpiles against the pond or any storm inlet is not allowed.
Response: Dedicated snowpile areas will be located at the end of the alleyways and melt runoff will be collected by the storm drainage system

c. **Vehicle washing activities (vehicle maintenance shops, warehouses, carwashes, car sales lot, transportation fleet, delivery vehicles, etc):** Provide indoor drains connected to sand-oil separator, otherwise design a paved outdoor washing bay area to contain process wastewater and sediments from entering the storm sewer system (designated location to clean vehicles, no infiltration allowed, evaporation is ok, but there has to be a plan for pumping and routing this discharge to the sanitary sewer system, designed to prevent run-on and run-off). If no washing is allowed, then discourage cleaning by removing hose bibs and installing signs prohibiting cleaning.
Response: Vehicle washing activities will not occur on-site and will be discouraged as no hose bibs will be provided along the alleyways.

d. **Vehicle/Equipment repair and maintenance:** Accommodate all vehicle equipment repair and maintenance indoors, provide floor drain to sanitary sewer only is system is pretreated and authorized by Sanitation District. Tanks containers or sinks use for parts cleaning or rinsing shall not be connected to storm drains. Secondary containment shall be provided for exterior work or

storage areas, for motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid batteries, and other hazardous materials/waste. Drains shall not be installed within the secondary containment area.
Response: Does not apply to this project, no vehicle/ equipment repair will be occurring on site.

e. **E-coli:** Reduce sources of pet waste by adding pet-waste stations (bags and garbage cans) along residential Tracts and open spaces. Do not place dog parks in or near drainage structures. Place signage to pick-up dog waste. Grade trails away from the stream, incorporate vegetative buffers.
Response: Pet waste stations will be provided.

10) Each building appears to have a group of area drains infront of each townhome:
    a. Confirm if this is an area drain, of if there is a different purpose.
    b. Please consider converting these areas to rain gardens to promote infiltration.
    c. Provide access MH on each pipe turn.
    d. Provide IP for all area drains on the EC plan Interim
    Response: This was discussed in a call with Juliana and it was agreed that there was not room for rain gardens but other LID techniques would be provided on-site. MH are provided at each pipe turn and IP protection shown on EC interim plan.

11) **Construction Drawings:** private and public storm sewer system must be electronically locatable. Add tracer wire details to CD's
https://adcogov.org/sites/default/files/Appendix_C_Tracer%20Wire%20Spec_Rev2.pdf
Response: Tracer wire details added to CD's.

12) **Construction Drawings:** Storm Manhole cover and Grate inlet requirements:
http://www.adcogov.org/sites/default/files/2%20-%20Standard_Manhole_Cover-Revised.pdf
http://www.adcogov.org/sites/default/files/3%20-%20Private_Manhole_Cover.pdf
http://www.adcogov.org/sites/default/files/4%20-%20Type13_Grate_Frame.pdf
http://www.adcogov.org/sites/default/files/5%20-%20Type16_Grate.pdf
Response: Comment noted, thank you.

13) Inlets Type 10R, must have 2 access MH entries to facilitate inlet box cleaning. Clarify on the plans.
Response: 2 access manholes shown on type 10R inlets.

14) Area drain, provide area drain details, grate, lid, landscape area around, place large angular rock 3-6 inch, 2 ft around each inlet to avoid mulch and dirt to plug area drain over time.
Response: Note added to landscape drain plan. Grate and lid details added to site detail sheet.

15) **Stormwater Pre-treatment:** Please consider adding a Hydrodynamic separator upstream of the proposed pond. This is a strategic and innovative technique to reduce pond maintenance. The Hydrodynamic separator will help remove trash and sediment at a centralized location instead of impacting the whole pond. Contech CDS HS units, or Stormtrap Defender were found to be ones that do not allow re-suspension and or bypass of floating trash.
Response: Noted, design team will discuss including hydrodynamic separator.

16) **Pond maintenance road:** Indicate location on the grading plan. Specify angular clean rock, 6 inch. Shape road in V-shape, to avoid erosion along the edges.
Response: Pond access is not necessary as pond structures can be accessed by adjacent roadways. Discussion added to report. This was also discussed with Juliana.

17) **Grading Plan:** Missing, add adjacent properties, steep slopes. Consult approved plans for convenience store as well to ensure there are no issues during construction.
Response: We have been coordinating with the adjacent convenience store project to ensure there are no issues during construction. Adjacent properties shown on grading plan.

18) EC plan: provide detail drawing for all proposed EC BMPs. Follow UDFCD criteria. http://udfcd.org/wp-content/uploads/uploads/vol3%20criteria%20manual/Chapter%207%20Construction%20BMPs.pdf
Response: Details have been provided.

19) EC plan Initial:
    a. Add BMPs for W 56th ave area.
    b. Add existing top soil pile location (to be preserved during construction and use during final stabilization phase).
    Response: BMP's for W 56th area shown and top soil pile location also shown.

20) EC plan Interim:
    a. Add IP for all area drain inlets.
    b. Add BMPs on the ROW/Street perpendicular to flow direction.
    c. Indicate that the pond needs to be Mulch and Seeded BEFORE converting the sediment basin to a permanent detention pond.
    d. Add top soil pile location.
    e. Add BMPs around all medias, walkways, sidewalks, and back alleys once internal roads/foundations/alleys are paved.
    f. Provide VTC for each lot/building.
    g. Provide IP for pond outlet structure
    h. Indicate the pond will function as sediment basin (SB) during construction.
    i. Indicate all areas mush be soil roughened (SR)
    j. Add Erosion control logs on each side of the pond's concrete trickle channel.
    Response: Additional BMP's provided. VTC will be provided at the edge of each alley as the buildings are constructed.

21) EC plan Final:
    a. Indicate which areas will be mulch and seed, and which areas will follow approved landscape plans. Will the front of each townhome will be landscape by contractor, or is this optional? Clarify. If buyer is to finish landscape, then BMPs are required upon sell.
    b. Circle which seed mix will be use according to site specific soil type. Is the pond seed mix the same as the upland areas? Clarify.
    c. Provide landscape plan.
    Response: This information will be provided at time of final EC Plan.

22) **Stormwater Management Plan (SWMP)** - Section 9-03-03. Please use the Adams County SWMP template (Per code applicant must create document using the Adams County template, or equivalent): http://www.adcogov.org/sites/default/files/Adams-County-SWMP-%20Template-Final.docx
Response: Adams County SWMP template used.

23) **O&M plan for pond:** Needs to be submitted for review next time. Include stormwater pre-treatment and/or potential rain gardens (LID). **Drainage Facility:** Prepare the Post-construction BMP O&M manual – https://www.adcogov.org/sites/default/files/Storm_Drainage_Facilities_Operation_and_Maintenance_Manual.pdf Once the document is approved the applicant must record it at time of construction and provide reception number.

Response: O&M plan provided.

24) **Drainage Facility:** Access and Drainage Easement to access water quality BMP. Drainage access easement is needed for the county to access the drainage facility (for enforcement purposes in case of lack of maintenance by property owner). Please provide recorded document for my records. If the easement is recorded as a stand alone document; otherwise provide recorded Plat showing the drainage/access easement and including on the following Plat Notes: "Maintenance of all proposed private drainage improvements is a continuing obligation of the land owner, its successors, and assigns, to ensure the storm sewer facilities function as designed and continue serving the intended functions in perpetuity". Note that the applicant is responsible to coordinate with the ROW Specialist the legal description and map exhibit. Then a resolution and agreement need to be signed, and once all documents are approved the County, the county takes care of the recording process.
Response: No access easement required as the pond structures can be accessed via the adjacent roadways. Note regarding maintenance added to Plat. This was discussed on a phone call with Juliana.

Resident Comments
Sybenie Hernandez

Hello,
I am a concerned community member. I live in and own a home on 56th and Clay. I would like to share my thoughts on the Case Number: PLT2022-00026.

Given the current state of the economy and the growing number of people experiencing homelessness in the area, this project should not be allowed to move forward without devoting at least 50% of the residential space to affordable housing and low income units.

With a median household income and a poverty rate close to 10% in Adams County, building affordable and low income housing is the only ethical way forward. The number of unhoused individuals in the area continues to grow. The trends in housing prices that we have witnessed here recently have driven up the costs of long term residents. Once they can no longer afford their long term residence they are at risk of becoming unhoused. Our residents deserve better care from our public officials.

If we do not force developers to devote significant portions of their residential developments to affordable and low income housing, we are creating greater inequity in a community that is already struggling.

Please do right by ALL of our beautiful community members in Adams County.

Thank you for your time and attention!
Response: Proposed housing will be market rate for townhome development in the Denver Metro Area. For sale townhomes are a necessary component of the housing goals for the County and fill the need of the housing gap in the Denver Metro Area.

Stefan – 404.786.0913

Good morning,

We received the Request for Comments and Final Plat for Berkeley Villas in the mail and had a few questions on how far east Berkeley Villas is supposed to go. The notices we received say the address for Berkeley Villas is 2922

W. 56th Ave Denver 80221, which shows 4.05 acres on the map. The notice says this development is 4.6 acres. We are trying to figure out what other addresses / lots etc are being redeveloped in addition to 2922 W 56th Ave.

If someone has a few minutes to chat about it with me, it would be much appreciated.
Response: 2860 W. 56th, 2898 W. 56th, 2902 W. 56th, 2880 W. 56th, and 2992 W. 56th

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.

BERKELEY VILLAS

SITUATED IN THE NORTHEAST 1/4 OF SECTION 17, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH P.M., COUNTY OF ADAMS, STATE OF COLORADO

CONSTRUCTION DOCUMENTS

LEGAL DESCRIPTION

A PARCEL OF LAND BEING ALL OF PLOT 4, PORTION OF PLOTS 5 THROUGH 7, AND A PORTION OF LOT 19, RE-SUBDIVISION OF WESTMOORLAND, AND ALL OF LOT 8A, RE-SUBDIVISION OF WESTMOORLAND PLAT CORRECTION NO. 2, SITUATED IN THE NORTHEAST QUARTER OF SECTION 17, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH/ PRINCIPAL MERIDIAN, COUNTY OF ADAMS, STATE OF COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF SAID PLOT 4;
THENCE SOUTH 00°29'37" EAST ALONG THE EAST LINE OF SAID PLOT 4, A DISTANCE OF 310.01 FEET TO THE SOUTHEAST CORNER OF SAID PLOT 4;
THENCE SOUTH 89°59'11" WEST ALONG THE SOUTH LINES OF SAID PLOTS 4 AND 5, A DISTANCE OF 220.78 FEET TO THE NORTHEAST CORNER OF SAID PLOT 19;
THENCE SOUTH 00°33'42" EAST ALONG THE EAST LINE OF SAID PLOT 19, A DISTANCE OF 150.01 FEET TO THE SOUTHEAST CORNER OF THE NORTH 150 FEET OF SAID PLOT 19;
THENCE SOUTH 89°59'11" WEST ALONG THE SOUTH LINE OF THE NORTH 150 FEET OF SAID PLOT 19, THE SOUTH LINE OF SAID PLOT 7, AND THE SOUTH LINE OF SAID LOT 8A, A DISTANCE OF 410.39 FEET TO THE SOUTHWEST CORNER OF SAID LOT 8A;
THENCE ALONG THE PERIMETER OF SAID LOT 8A THE FOLLOWING THREE (3) COURSES:
1) NORTH 00°32'42" WEST, A DISTANCE OF 160.00 FEET;
2) NORTH 89°59'27" EAST, A DISTANCE OF 100.00 FEET;
3) NORTH 00°32'42" WEST, A DISTANCE OF 300.03 FEET TO A POINT ON THE SOUTH RIGHT OF WAY LINE OF WEST 56TH/ AVENUE;
THENCE NORTH 89°59'11" EAST ALONG SAID SOUTH LINE, A DISTANCE OF 224.66 FEET TO THE NORTHWEST CORNER OF THAT PARCEL DESCRIBED AT RECEPTION NO. 2015000102887;
THENCE SOUTH 00°32'42" EAST ALONG THE WEST LINE OF SAID PARCEL, A DISTANCE OF 160.01 FEET TO THE SOUTHWEST CORNER OF SAID PARCEL
THENCE NORTH 89°59'12" EAST ALONG THE SOUTH LINE OF SAID PARCEL AND ALONG THE SOUTH LINE OF A PARCEL DESCRIBED AT RECEPTION NO. 2012000092509, A DISTANCE OF 140.99 FEET TO THE SOUTHEAST CORNER OF SAID PARCEL DESCRIBED AT RECEPTION NO. 2012000092509;
THENCE NORTH 00°33'42" WEST ALONG THE EAST LINE OF SAID PARCEL, A DISTANCE OF 160.01 FEET TO A POINT ON THE SOUTH RIGHT OF WAY LINE OF WEST 56TH/ AVENUE;
THENCE NORTH 89°59'11" EAST ALONG SAID SOUTH LINE, A DISTANCE OF 165.80 FEET TO THE POINT OF BEGINNING.

SAID PARCEL CONTAINS 204,691 SQUARE FEET OR 4.70 ACRES, MORE OR LESS.

BASIS OF BEARINGS

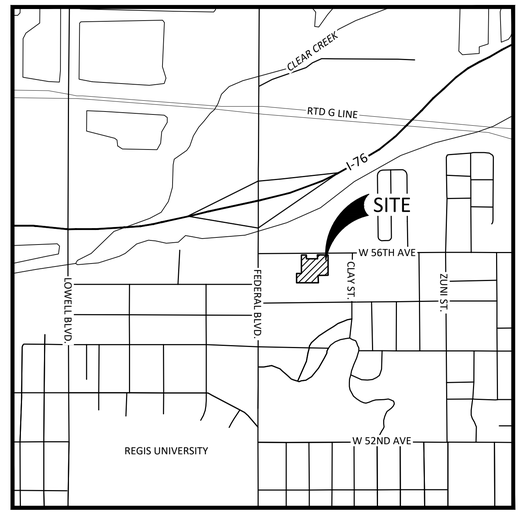
BEARINGS ARE BASED ON THE ASSUMPTION THAT THE NORTH LINE OF THE NORTHEAST QUARTER OF SECTION 17 BEARS NORTH 89°59'11 EAST. THE NORTH QUARTER CORNER IS MONUMENTED BY A 3-1/4" ALUMINUM CAP IN A RANGE BOX, STAMPED: "RUSSELL PLS 23519 1989". THE NORTHEAST CORNER IS MONUMENTED BY A 3-1/4" ALUMINUM CAP IN A RANGE BOX, STAMPED: "FLATIRONS 1996 LS 16406".

NOTES

1. PUBLIC IMPROVEMENTS SHALL CONFORM TO ADAMS COUNTY STANDARD AND SPECIFICATIONS AND LATEST EDITION OF COLORADO DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS.
2. ALL CONSTRUCTION SHALL FOLLOW ADAMS COUNTY DEVELOPMENT RULES AND REGULATIONS, AND ALL APPLICABLE STATE AND FEDERAL REGULATIONS AND LAWS.
3. ALL PAVEMENT REPAIRS REQUIRED SHALL BE MADE IN ACCORDANCE WITH THE ADAMS COUNTY DEVELOPMENT STANDARDS BY THE PERMITTEE. PERMITTEE SHALL ALSO BE RESPONSIBLE, WHEN APPLICABLE, FOR ANY REPAIRS NECESSARY THAT ARE CAUSED AS A RESULT OF WORK ASSOCIATED WITH THIS PERMIT. THE MAINTENANCE RESPONSIBILITY OF WORK REPAIRS SHALL BE AN OBLIGATION OF THE PERMITTEE FOR A PERIOD OF ONE YEAR FOLLOWING FINAL ACCEPTANCE BY ADAMS COUNTY.
4. PERMITTEE SHALL BE RESPONSIBLE FOR SAFETY MEASURES SUFFICIENT TO PROTECT THE TRAVELING PUBLIC FROM ANY HARM DURING EXECUTION OF THIS PERMIT.
5. THE PERMITTEE SHALL PROVIDE THE ADAMS COUNTY TRAFFIC SECTION A METHOD OF HANDLING TRAFFIC (MHT) FOR REVIEW AND APPROVAL PRIOR TO A PERMIT BEING ISSUED. PERMITTEE'S FACILITIES SHALL BE PLACED IN A LOCATION MUTUALLY AGREED UPON BY THE PERMITTEE AND ADAMS COUNTY AND IN ACCORDANCE WITH THE DETAILS AND SPECIFICATIONS SHOWN ON THE APPROVED CONSTRUCTION PLANS. PERMITTEE UNDERSTANDS THAT ADAMS COUNTY MAY NEED TO MAINTAIN, REPLACE, MODIFY OR IMPROVE COUNTY FACILITIES IN THE RIGHT-OF-WAY, PERMITTEE SHALL BE SOLELY RESPONSIBLE FOR RE-LOCATING, AT PERMITTEE'S SOLE COST, FACILITIES THAT ADAMS COUNTY DETERMINES NEED TO BE RE-LOCATED. ADAMS COUNTY SHALL GIVE 30 CALENDAR DAYS WRITTEN NOTICE WHEN IT DETERMINES FACILITIES NEED TO BE RE-LOCATED.
6. PERMITTEE SHALL INFORM ADAMS COUNTY OF CONSTRUCTION METHODS, EQUIPMENT AND OPERATIONAL PROCEDURES THAT WILL BE UTILIZED. IF THE PROPOSED METHODS, EQUIPMENT AND OPERATIONAL PROCEDURES ARE NOT IN COMPLIANCE WITH ADAMS COUNTY STANDARDS, POLICIES, AND PROCEDURES THEN THE PERMITTEE MUST MAKE THE APPROPRIATE CHANGES TO GET THE PROPOSED PLAN INTO COMPLIANCE.
7. PERMITTEE SHALL ADVISE ADAMS COUNTY 24 HOURS PRIOR TO CONSTRUCTION EXCLUDING WEEKENDS AND HOLIDAYS AND SHALL NOTIFY ADAMS COUNTY A MINIMUM OF 12 HOURS IN ADVANCE IF THIS DATE IS CHANGED.
8. CLEARING OF TREES, BUSHES AND OTHER VEGETATION SHALL BE HELD TO THE MINIMUM REQUIRED FOR CONSTRUCTION AND SAFETY.
9. THE PERMITTEE SHALL PROVIDE TO ADAMS COUNTY, DOCUMENTATION SHOWING THE LOCATION AND INSTALLATION OF EROSION AND SEDIMENT CONTROL DETAILS AS REQUIRED.
10. PERMITTEE SHALL RETURN THE RIGHT-OF-WAY TO ITS ORIGINAL CONDITION AS NEAR PRACTICABLE AND SHALL REMOVE ALL RUBBISH AND DEBRIS FOLLOWING COMPLETION OF CONSTRUCTION AND BEFORE FINAL INSPECTION BY THE COUNTY. THIS INCLUDES THE REPLACEMENT OF ANY FACILITY AS DESIGNATED BY THE COUNTY INSPECTOR, INCLUDING BUT NOT LIMITED TO ROAD STRIPING, REFLECTORS AND DELINEATORS. IF FINAL INSPECTION DETERMINES THAT ADDITIONAL CORRECTIVE MEASURES ARE NECESSARY, CORRECTIVE MEASURES SHALL BE INITIATED AND COMPLETED WITHIN 30 CALENDAR DAYS.
11. PERMITTEE WILL BEGIN ANY AND ALL WORK ASSOCIATED WITH THIS PERMIT WITHIN 6 MONTHS OF THE DATE OF ITS ISSUANCE, OR THE PERMIT WILL BE CLOSED OUT AND A NEW PERMIT AND FEE WILL BE REQUIRED.

ABBREVIATIONS

BW	BOTTOM OF WALL (FG)
CONC	CONCRETE
DIA	DIAMETER
DR	DOOR
E	EAST, EASTING
EL	ELEVATION
EOA	EDGE OF ASPHALT
EOC	EDGE OF CONCRETE
EOP	EDGE OF PAVEMENT
ESMT	EASEMENT
EX	EXISTING
FES	FLARED END SECTION
FF	FINISHED FLOOR
FG	FINISHED GRADE
FH	FIRE HYDRANT
FL	FLOW LINE
HC	HANDICAP
HORZ	HORIZONTAL
HP	HIGH POINT
INV	INVERT
LP	LOW POINT
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
N	NORTH, NORTHING
PR	PROPOSED
PRKG	PARKING
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
ROW	RIGHT-OF-WAY
SAN	SANITARY
SS	SANITARY SEWER
STM	STORM
TBC	TOP/BACK OF CURB
TW	TOP OF WALL (FG)
TYP	TYPICAL
WAT	WATER



VICINITY MAP
SCALE: 1" = 1000'

SHEET INDEX

1	COVER
2	SWQ - INTITAL
3	SWQ - INTERIM
4	SWQ - FINAL
5	SWQ - NOTES
6	OVERALL UTILITY PLAN
7	DETAILED GRADING PLAN
8	DETAILED GRADING PLAN
9	DETAILED GRADING PLAN
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13	DETAILED GRADING PLAN
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16	STORM PLAN & PROFILE
17	LANDSCAPE DRAIN PLAN
18	LANDSCAPE DRAIN TABLES
19	DETENTION POND PLAN
20	DETENTION POND DETAILS
21	PAVING PLAN
22	SIGNAGE & STRIPING PLAN
23	SITE DETAILS
24	SITE DETAILS

Know what's below.
Call before you dig.

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

ISSUE DATE: 06-13-2022	PROJECT #: 200810
DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

Filepath: K:\200810\ENGINEERING\CD\CD - COVER.DWG Layout: LAYOUT1
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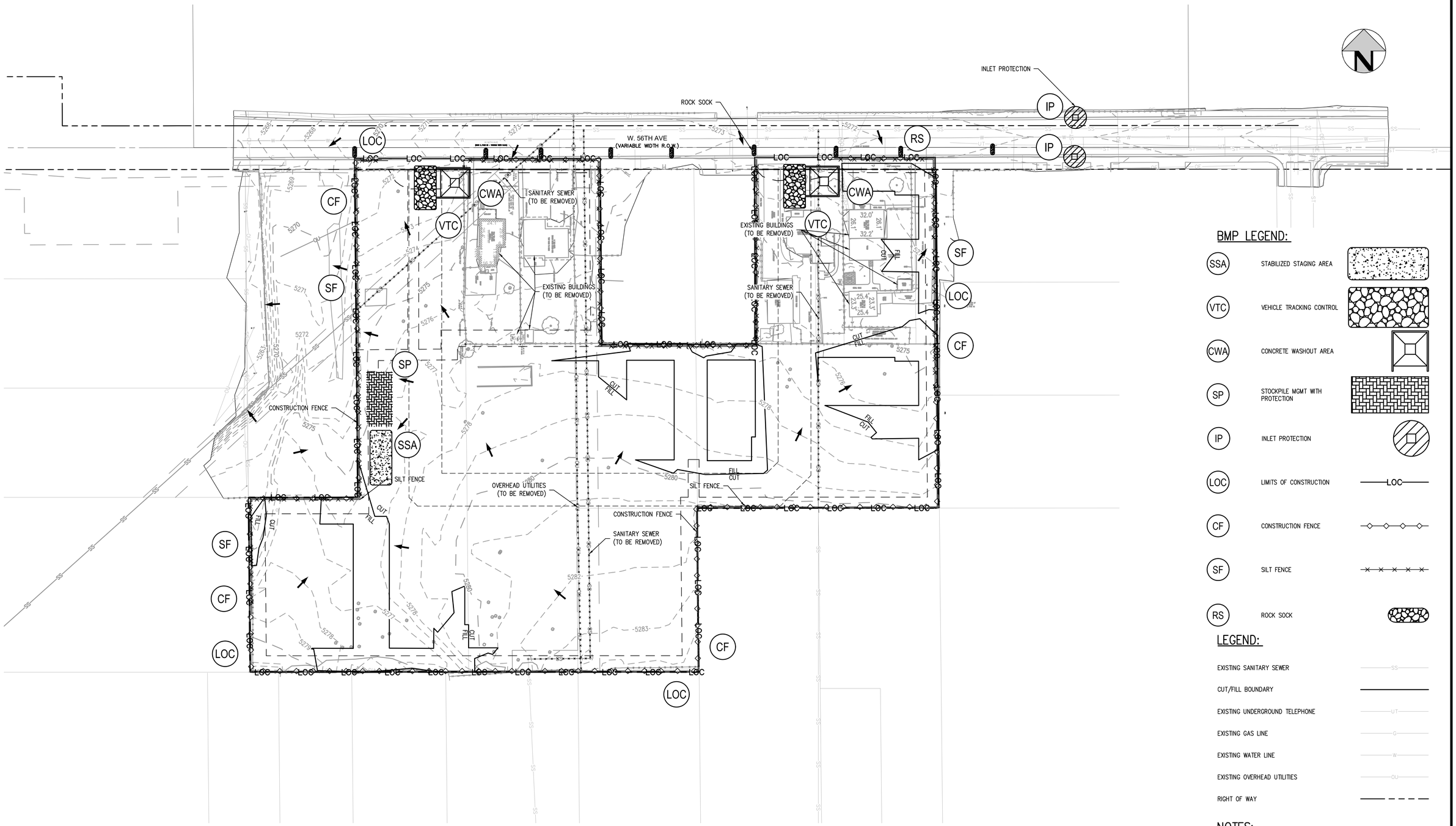

BMP LEGEND:

SSA	STABILIZED STAGING AREA	
VTC	VEHICLE TRACKING CONTROL	
CWA	CONCRETE WASHOUT AREA	
SP	STOCKPILE MGMT WITH PROTECTION	
IP	INLET PROTECTION	
LOC	LIMITS OF CONSTRUCTION	LOC
CF	CONSTRUCTION FENCE	
SF	SILT FENCE	
RS	ROCK SOCK	

LEGEND:

EXISTING SANITARY SEWER	SS
CUT/FILL BOUNDARY	
EXISTING UNDERGROUND TELEPHONE	UT
EXISTING GAS LINE	G
EXISTING WATER LINE	W
EXISTING OVERHEAD UTILITIES	OU
RIGHT OF WAY	

NOTES:

1. CONTRACTOR MAY SUBSTITUTE SILT FENCE FOR SEDIMENT CONTROL LOGS AS APPROPRIATE.
2. ALL DOWNSTREAM AREA DRAINS SHALL HAVE INLET PROTECTION UNTIL THE UPSTREAM AREA HAS BEEN FORMALLY LANDSCAPED AND ESTABLISHED.
3. REFER TO SHEET 5 FOR ADDITIONAL SWQ NOTES.

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

40 0 40 80
SCALE: 1" = 40'

DESIGNED BY: MP
CHECKED BY: JRS
DRAWN BY: MP

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
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HarrisKocherSmith.com

THE TRUE LIFE COMPANIES

BERKELEY VILLAS
SWQ - INTITAL

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT #: 200810
SHEET NUMBER
2

FILEPATH: K:\200810\ENGINEERING\EROSION\CD_GESC\CD_INITIAL.DWG LAYOUT: LAYOUT1
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PLOTTED: MON 10/17/22 11:33:33A BY: HUNTER THOMPSON

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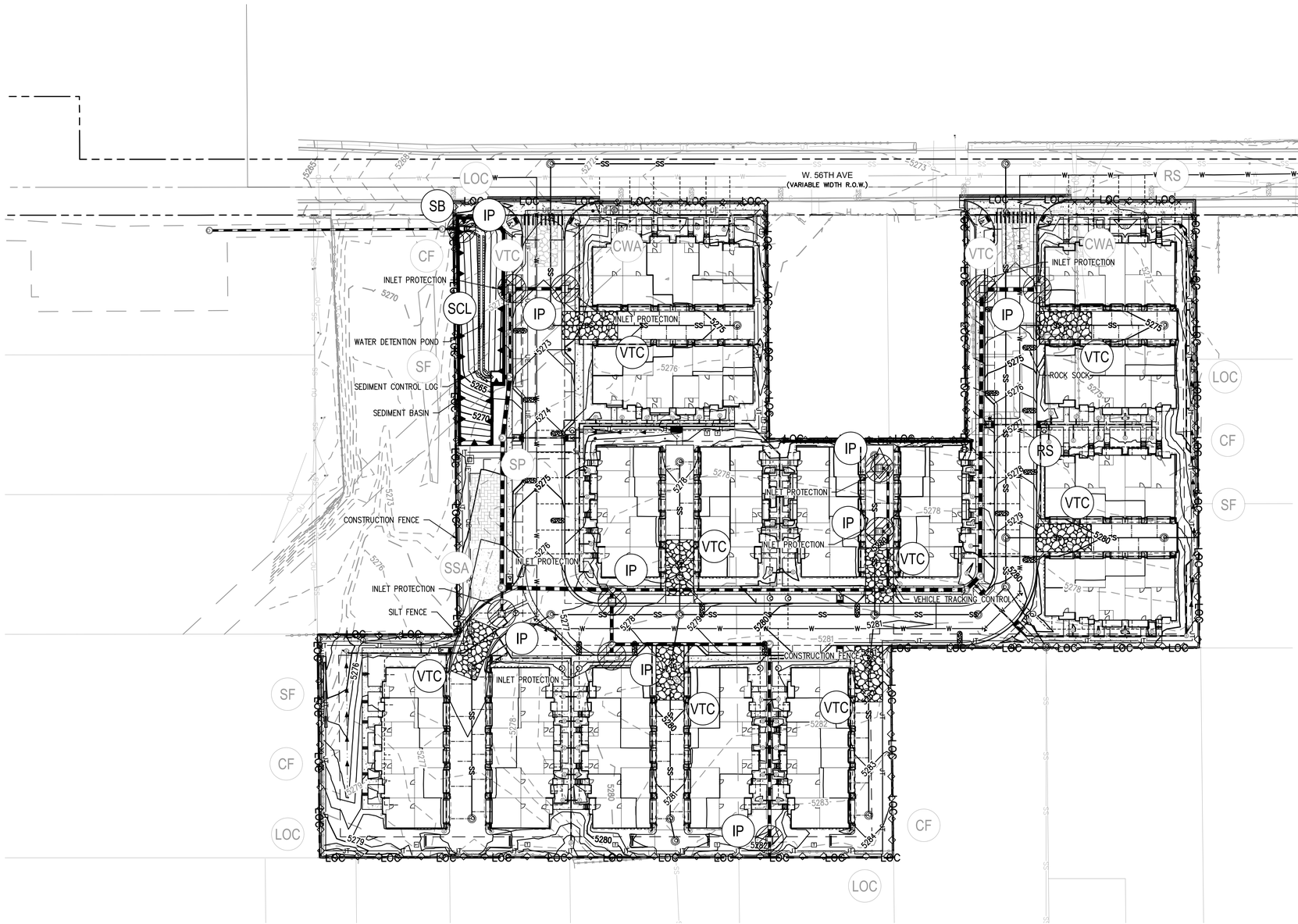

BMP LEGEND:

SSA	STABILIZED STAGING AREA	SSA	STABILIZED STAGING AREA
VTC	VEHICLE TRACKING CONTROL	SCL	SEDIMENT CONTROL LOG
CWA	CONCRETE WASHOUT AREA		
SP	STOCKPILE MGMT WITH PROTECTION		
IP	INLET PROTECTION		
LOC	LIMITS OF CONSTRUCTION	LOC	
CF	CONSTRUCTION FENCE		
SF	SILT FENCE		
RS	ROCK SOCK		

LEGEND:

PR STORM SEWER W/MANHOLE		EXISTING SANITARY SEWER	SS
PR STORM INLET		CUT/FILL BOUNDARY	
PR SANITARY SEWER W/MANHOLE	SS	EXISTING UNDERGROUND TELEPHONE	UT
PR WATER LINE	W	EXISTING GAS LINE	G
PR FIRE HYDRANT		EXISTING WATER LINE	W
PR GAS LINE	G	EXISTING OVERHEAD UTILITIES	OU
PR JOINT TRENCH	JT	RIGHT OF WAY	

NOTES:

1. CONTRACTOR MAY SUBSTITUTE SILT FENCE FOR SEDIMENT CONTROL LOGS AS APPROPRIATE.
2. ALL DOWNSTREAM AREA DRAINS SHALL HAVE INLET PROTECTION UNTIL THE UPSTREAM AREA HAS BEEN FORMALLY LANDSCAPED AND ESTABLISHED.
4. INCLUDE INLET PROTECTION FOR ALL AREA DRAIN INLETS.
5. THE DETENTION POND MUST BE MULCHED AND SEEDED BEFORE CONVERTING THE AREA FROM A SEDIMENT BASIN TO A DETENTION POND.
6. REFER TO SHEET 5 FOR ADDITIONAL SWQ NOTES.

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

40 0 40 80
SCALE: 1" = 40'

DESIGNED BY: MP
CHECKED BY: JRS
DRAWN BY: MP

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
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THE TRUE LIFE COMPANIES

BERKELEY VILLAS
SWQ - INTERIM

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT #: 200810
SHEET NUMBER
3

FILEPATH: K:\2008\10\ENGINEERING\SONICD - GESC\CD - INTERIM.DWG LAYOUT: LAYOUT1
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PLOTTED: MON 10/17/22 11:33:51A BY: HUNTER THOMPSON

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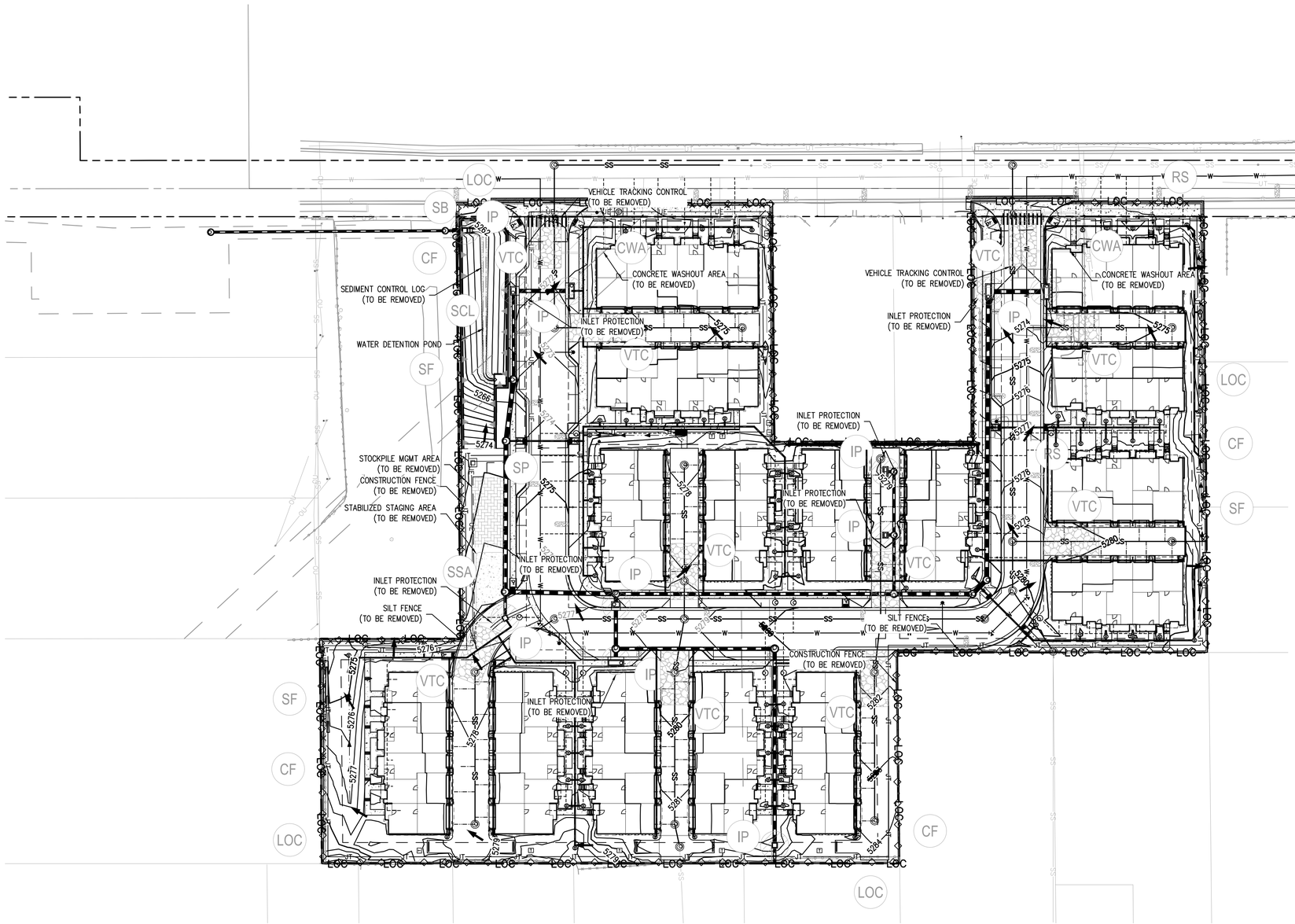

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SSA	STABILIZED STAGING AREA	SSA	STABILIZED STAGING AREA
SCL	SEDIMENT CONTROL LOG		

LEGEND:

PR STORM SEWER W/MANHOLE		EXISTING SANITARY SEWER	SS
PR STORM INLET		CUT/FILL BOUNDARY	
PR SANITARY SEWER W/MANHOLE	SS	EXISTING UNDERGROUND TELEPHONE	UT
PR WATER LINE	W	EXISTING GAS LINE	G
PR FIRE HYDRANT		EXISTING WATER LINE	W
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THE TRUE LIFE COMPANIES

BERKELEY VILLAS
SWQ - FINAL

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT #: 200810
SHEET NUMBER
4

FILEPATH: K:\2008\01\ENGINEERING\EROSION\CD - GESC\CD_FINAL DWG LAYOUT: LAYOUT1
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ADAMS COUNTY EROSION CONTROL PLAN - GENERAL NOTES:

1 ALL CONSTRUCTION PROJECTS, REGARDLESS OF THE SIZE, SHALL INSTALL, MAINTAIN AND REPAIR STORMWATER POLLUTION CONTROL MEASURES (CMS) TO EFFECTIVELY MINIMIZE EROSION, SEDIMENT TRANSPORT, AND THE RELEASE OF POLLUTANTS RELATED TO CONSTRUCTION ACTIVITY. CMS EXAMPLE INCLUDE: SEDIMENT CONTROL LOGS (SCL), SILT FENCE (SF), DIKES/SWALES, SEDIMENT TRAPS (ST), INLET PROTECTION (IP), OUTLET PROTECTION (OP), CHECK DAMS (CD), SEDIMENT BASINS (SB), TEMPORARY/PERMANENT SEEDING AND MULCHING (MU), SOIL ROUGHENING, MAINTAINING EXISTING VEGETATION AND PROTECTION OF TREES. CMS MUST BE SELECTED, DESIGNED, ADEQUATELY SIZED, INSTALLED AND MAINTAINED IN ACCORDANCE WITH GOOD ENGINEERING, HYDROLOGIC AND POLLUTION CONTROL PRACTICES. CMS/BMPS INSTALLATION AND MAINTENANCE DETAILS SHALL CONFORM TO URBAN DRAINAGE FLOOD CONTROL CRITERIA MANUAL VOLUME 3, OR THE COLORADO DEPARTMENT OF TRANSPORTATION (CDOT) ITEM CODE BOOK. CMS MUST FILTER, SETTLE, CONTAIN OR STRAIN POLLUTANTS FROM STORMWATER FLOWS IN ORDER TO PREVENT BYPASS OF FLOWS WITHOUT TREATMENT. CMS MUST BE APPROPRIATE TO TREAT THE RUNOFF FROM THE AMOUNT OF DISTURBED AREA, THE EXPECTED FLOW RATE, DURATION, AND FLOW CONDITIONS (I.E., SHEET OR CONCENTRATED FLOW). CMS/BMPS SHALL BE SPECIFIED IN THE SWMP (IF APPLICABLE), AND THE LOCATIONS SHOWN ON THE EC PLAN.

1) PRIOR TO CONSTRUCTION, PROJECTS DISTURBING 1 OR MORE ACRES OF LAND, OR ANY PROJECT BELONGING TO A COMMON PLAN OF DEVELOPMENT DISTURB 1 OR MORE ACRES, MUST OBTAIN:
   - A GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES, FROM THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, AND
   - AN ADAMS COUNTY STORMWATER QUALITY PERMIT WITHIN THE UNINCORPORATED ADAMS COUNTY MS4 AREA.

2) PERMITTED PROJECTS SHALL DEVELOP A STORMWATER MANAGEMENT PLAN (SWMP), AKA EROSION AND SEDIMENT CONTROL PLAN (ESCP), IN COMPLIANCE WITH CDPHE MINIMUM REQUIREMENTS. THE APPROVED SWMP, INCLUDING EROSION CONTROL (EC) PLAN (SITE MAP), SHALL BE KEPT ON SITE AND UPDATED AT ALL TIMES. THE QUALIFIED STORMWATER MANAGER IS RESPONSIBLE FOR IMPLEMENTING THE SWMP AND CMS (AKA BMPS) DURING CONSTRUCTION.

3) PERMITTED PROJECTS SHALL PERFORM REGULAR STORMWATER INSPECTIONS EVERY 7 CALENDAR DAYS; OR EVERY 14 CALENDAR DAYS AND WITHIN 24 HOURS AFTER ANY PRECIPITATION OR SNOWMELT EVENT THAT CAUSES SURFACE EROSION. INSPECTION FREQUENCY CAN BE REDUCED FOR POST-STORM EVENT INSPECTIONS AT TEMPORARILY IDLE SITES AND ALSO FOR STORMWATER INSPECTIONS AT COMPLETED SITES WAITING FOR FINAL STABILIZATION. INSPECTION REPORTS MUST IDENTIFY ANY INCIDENTS OF NON-COMPLIANCE.

4) TRACKING OF DIRT ONTO PAVED PUBLIC OR PRIVATE PAVED ROADS IS NOT ALLOWED. THE USE OF DIRT RAMPS TO ENTER/EXIT FROM AN UNPAVED INTO A PAVED AREA IS PROHIBITED. VEHICLE TRACKING CONTROLS SHALL BE IMPLEMENTED, OTHERWISE ENTRANCE AREA MUST DRAIN THRU A CM TOWARDS THE PRIVATE SITE.

5) TRUCK LOADS OF FILL MATERIAL IMPORTED TO OR CUT MATERIAL EXPORTED FROM THE SITE SHALL BE PROPERLY COVERED TO PREVENT LOSS OF THE MATERIAL DURING TRANSPORTATION ON PUBLIC ROW. HAUL ROUTES MUST BE PERMITTED BY THE COUNTY. NO MATERIAL SHALL BE TRANSPORTED TO ANOTHER SITE WITHOUT APPLICABLE PERMITS.

6) CONTROL MEASURES DESIGNED FOR CONCRETE WASHOUT WASTE MUST BE IMPLEMENTED. THIS INCLUDES WASHOUT WASTE DISCHARGED TO THE GROUND AND WASHOUT WASTE FROM CONCRETE TRUCKS AND MASONRY OPERATIONS.

7) TEMPORARY CMS/BMPS SHALL BE REMOVED AFTER THE SITE HAS REACHED FINAL STABILIZATION.

8) DEWATERING OPERATIONS DISCHARGING OFF-SITE INTO ANY WATERS CONVEYANCE SYSTEMS INCLUDING WETLANDS, IRRIGATION DITCHES, CANALS, RIVERS, STREAMS OR STORM SEWER SYSTEMS, REQUIRE A STATE CONSTRUCTION DEWATERING PERMIT.

9) PERMITTED PROJECTS SHALL KEEP THE CDPHE'S STORMWATER DISCHARGE PERMIT, STORMWATER MANAGEMENT PLAN (SWMP) AND INSPECTION LOGS AVAILABLE ON-SITE THROUGHOUT THE DURATION OF THE PROJECT, AND FOR AN ADDITIONAL 3 YEARS AFTER PERMIT CLOSE-OUT.

10) PERMITTED LANDOWNER AND/OR CONTRACTOR SHALL CLOSE THE STATE AND CITY/COUNTY PERMIT ONCE FINAL STABILIZATION IS REACHED. STORMWATER INSPECTIONS SHALL CONTINUE UNTIL INACTIVATION NOTICE IS FILED WITH CDPHE.

PERFORMANCE STANDARD NOTES:

1. STORMWATER RUNOFF FROM DISTURBED AREAS MUST FLOW TO AT LEAST ONE (1) CM TO MINIMIZE SEDIMENT IN THE DISCHARGE. DO NOT ALLOW SEDIMENT TO LEAVE THE SITE. THE BEST WAY TO PREVENT SEDIMENT OR POLLUTANTS FROM ENTERING THE STORM SEWER SYSTEM IS TO STABILIZE THE SITE AS QUICKLY AS POSSIBLE, PREVENTING EROSION AND STOPPING SEDIMENT RUN-OFF AT ITS SOURCE.
2. PHASE CONSTRUCTION TO MINIMIZE DISTURBED AREAS, INCLUDING DISTURBANCE OF STEEP SLOPES. (I.E. THE ENTIRE PROJECT SITE SHOULD NOT BE DISTURBED IF CONSTRUCTION WILL ONLY BE OCCURRING IN ONE PARTICULAR SECTION OF THE SITE).LIMIT SOIL EXPOSURE TO THE SHORTEST POSSIBLE PERIOD OF TIME. PROTECT NATURAL FEATURES AND EXISTING VEGETATION WHENEVER POSSIBLE. REMOVAL OF EXISTING VEGETATION SHALL BE LIMITED TO THE AREA REQUIRED FOR IMMEDIATE CONSTRUCTION OPERATIONS. MAINTAIN PRE-EXISTING VEGETATION (OR EQUIVALENT CMS) FOR AREAS WITHIN 50 HORIZONTAL FT OF RECEIVING waters.
3. SOIL COMPACTION MUST BE MINIMIZED FOR AREAS WHERE INFILTRATION CMS WILL OCCUR OR WHERE FINAL STABILIZATION WILL BE ACHIEVED THROUGH VEGETATIVE COVER.
4. ALL SOIL IMPORTED TO OR EXPORTED FROM THE SITE SHALL BE PROPERLY COVERED TO PREVENT THE LOSS OF MATERIAL DURING TRANSPORT.
5. DUST EMISSIONS RESULTING FROM GRADING ACTIVITIES OR WIND SHALL BE CONTROLLED.
6. INSTALL CONSTRUCTION FENCE (ORANGE) TO PROTECT WETLANDS AND OTHER SENSITIVE AREAS AND TO PREVENT ACCESS, AND TO DELINEATE THE LIMITS OF CONSTRUCTION. DO NOT USE SILT FENCE TO PROTECT WETLANDS SINCE TRENCHING MAY IMPACT THESE areas.
7. CMS INTENDED TO CAPTURE OVERLAND, LOW VELOCITY SHEET FLOW AT A FAIRLY LEVEL GRADE SHALL ONLY BE INSTALLED ALONG CONTOURS.
8. INSTALL CMS, SUCH AS CHECK DAMS, PERPENDICULAR TO THE CONCENTRATED FLOWS TO REDUCE FLOW VELOCITY.
9. STORM DRAIN INLETS WITHIN AND ADJACENT TO THE CONSTRUCTION SITE MUST BE PROTECTED. ANY PONDING OF STORMWATER AROUND INLET PROTECTION MUST NOT CAUSE EXCESSIVE FLOODING OR DAMAGE ADJACENT AREAS OR STRUCTURES.
10. INSTALL VEHICLE TRACKING CONTROL (VTC) TO ENTER/EXIT UNPAVED AREA. DO NOT USE RECYCLED CRUSHED CONCRETE OR ASPHALT MILLINGS FOR VEHICLE TRACKING PADS.
11. STRAW BALES SHALL NOT BE USED FOR PRIMARY EROSION OR SEDIMENT CONTROL (I.E. STRAW BALES MAY BE USED FOR REINFORCEMENT BEHIND ANOTHER BMP SUCH AS SILT FENCE).
12. OUTLETS SYSTEMS (SUCH AS SKIMMER OR PERFORATED RISER PIPE) SHALL BE INSTALLED TO WITHDRAW WATER FROM OR NEAR THE SURFACE LEVEL WHEN DISCHARGING FROM BASINS. WATER CANNOT DRAIN FROM THE BOTTOM OF THE POND.
13. TEMPORARY STABILIZATION MUST BE IMPLEMENTED FOR EARTH DISTURBING ACTIVITIES ON ANY PORTION OF THE SITE WHERE LAND DISTURBING ACTIVITIES HAVE PERMANENTLY OR TEMPORARILY CEASED (FOR MORE THAN 14 CALENDAR DAYS). TEMPORARY STABILIZATION METHODS EXAMPLES: TARPS, SOIL TACKIFIER, AND HYDROSEED. TEMPORARY STABILIZATION REQUIREMENT MAY EXCEED THE 14 DAY SCHEDULE WHEN EITHER THE FUNCTION OF THE SPECIFIC AREA REQUIRES IT TO REMAIN DISTURBED, OR, PHYSICAL CHARACTERISTICS OF THE TERRAIN AND CLIMATE PREVENT STABILIZATION AS LONG AS THE CONSTRAINTS AND ALTERNATIVE SCHEDULE IS DOCUMENTED ON THE SWMP, AND LOCATIONS ARE IDENTIFIED ON THE EC PLAN (SITE MAP).
14. RUNOFF FROM STOCKPILE AREA MUST BE CONTROLLED. SOILS THAT WILL BE STOCKPILED FOR MORE THAN 30 DAYS SHALL BE PROTECTED FROM WIND AND WATER EROSION WITHIN 14 DAYS OF STOCKPILE CONSTRUCTION. INSTALL CMS/BMPS 5 FT AWAY FROM THE TOE OF THE STOCKPILE'S SLOPE.
15. WATER USE TO CLEAN CONCRETE TRUCKS SHALL BE DISCHARGED INTO A CONCRETE WASHOUT AREA (CWA). THE PREDEFINED CONTAINMENT AREA MUST BE IDENTIFIED WITH A SIGN, AND SHALL ALLOW THE LIQUIDS TO EVAPORATE OR DRY OUT. CWA DISCHARGES THAT MAY REACH GROUNDWATER MUST FLOW THROUGH SOIL THAT HAS BUFFERING CAPACITY PRIOR TO REACHING GROUNDWATER. THE CONCRETE WASHOUT LOCATION SHALL BE NOT BE LOCATED IN AN AREA WHERE SHALLOW GROUNDWATER MAY BE PRESENT AND WOULD RESULT IN BUFFERING CAPACITY NOT BEING ADEQUATE, SUCH AS NEAR NATURAL DRAINAGES, SPRINGS, OR WETLANDS. IN THIS CASE, A LINER UNDERNEATH IS NEEDED FOR AREAS WITH HIGH GROUNDWATER LEVELS. CWA SHALL NOT BE PLACED IN LOW AREAS, DITCHES OR ADJACENT TO STATE WATERS. PLACE CWA 50 FT AWAY FROM STATE WATERS.
16. WASTE, SUCH AS BUILDING MATERIALS, WORKERS TRASH AND CONSTRUCTION DEBRIS, MUST BE PROPERLY MANAGED TO PREVENT STORMWATER POLLUTION.
17. INSTALL STABILIZED STAGING AREA (SSA) TO STORE MATERIALS, CONSTRUCTION TRAILER, ETC.
18. IF CONDITIONS IN THE FIELD WARRANT ADDITIONAL CMS/BMPS TO THE ONES ORIGINALLY APPROVED ON THE SWMP OR EC PLAN (CIVIL DRAWING), THE LANDOWNER OR CONTRACTOR SHALL IMPLEMENT MEASURES DETERMINED NECESSARY, AS DIRECTED BY THE COUNTY.
19. PERMANENT CMS/BMPS FOR SLOPES, CHANNELS, DITCHES, OR DISTURBED LAND AREA SHALL BE PERFORMED IMMEDIATELY AFTER FINAL GRADING. CONSIDER THE USE EROSION CONTROL BLANKETS ON SLOPES 3:1 OR STEEPER AND AREAS WITH CONCENTRATED FLOWS SUCH AS SWALES, LONG CHANNELS AND ROADSIDE DITCHES.
20. THE DISCHARGE OF SANITARY WASTE INTO THE STORM SEWER SYSTEM IS PROHIBITED. PORTABLE TOILETS MUST BE PROVIDED, SECURED AND PLACED ON PERMEABLE SURFACES, AWAY FROM THE CURBSIDE, STORM INLETS AND/OR DRAINAGE WAYS.
21. REMOVE TEMPORARY CMS/BMPS ONCE FINAL STABILIZATION IS REACHED, UNLESS OTHERWISE AUTHORIZED.
22. FINAL STABILIZATION MUST BE IMPLEMENTED. FINAL STABILIZATION IS REACHED WHEN ALL SOIL DISTURBING ACTIVITIES HAVE BEEN COMPLETED, AND EITHER A UNIFORM VEGETATIVE COVER HAS BEEN ESTABLISHED WITH AN INDIVIDUAL PLANT DENSITY OF AT LEAST 70% OF PRE-DISTURBANCE LEVELS, OR EQUIVALENT PERMANENT ALTERNATIVE METHOD HAS BEEN IMPLEMENTED.
23. PROVIDE SPILL PREVENTION AND CONTAINMENT MEASURES FOR CONSTRUCTION MATERIALS, WASTE AND FUEL STORAGE AREAS. BULK STORAGE (55 GALLONS OR GREATER) OF PETROLEUM PRODUCTS AND LIQUID CHEMICALS MUST HAVE SECONDARY CONTAINMENT, OR EQUIVALENT PROTECTION, IN ORDER TO CONTAIN SPILLS AND TO PREVENT SPILLED MATERIAL FROM ENTERING STATE WATERS.
24. REPORT SPILLS OR RELEASES OF CHEMICAL, OIL, PETROLEUM PRODUCT, SEWAGE, ETC., WHICH MAY REACH THE STORM SEWER OR ENTER STATE WATERS WITHIN 24-HOURS FROM TIME OF DISCOVERY. GUIDANCE AVAILABLE AT WWW.CDPHE.STATE.CO.US/EMP/SPILLSANDRELEASED.HTM. STATE OF COLORADO SPILL LINE: 1-877-518-5608. ADAMS COUNTY STORMWATER HOTLINE: 720-523-6400; PUBLIC WORKS 303-453-8787 AND THE TRI-COUNTY HEALTH DEPARTMENT AT 303-220-9200.

MAINTENANCE STANDARD NOTES:

1. MAINTAIN AND REPAIR CMS ACCORDING TO APPROVED EROSION CONTROL PLAN (CIVIL DRAWING) TO ASSURE THEY CONTINUE PERFORMING AS ORIGINALLY INTENDED.
2 CMS/BMPS REQUIRING MAINTENANCE OR ADJUSTMENT SHALL BE REPAIRED IMMEDIATELY AFTER OBSERVATION OF THE FAILING BMP.
3 CMS SHALL BE CLEANED WHEN SEDIMENT LEVELS ACCUMULATE TO HALF THE DESIGN UNLESS OTHERWISE SPECIFIED.
4 SWMP AND EC PLAN SHALL BE CONTINUOUSLY UPDATED TO REFLECT NEW OR REVISED CMS/BMPS DUE TO CHANGES IN DESIGN, CONSTRUCTION, OPERATION, OR MAINTENANCE, TO ACCURATELY REFLECT THE ACTUAL FIELD CONDITIONS. A NOTATION SHALL BE MADE IN THE SWMP, INCLUDING DATE OF CHANGES IN THE FIELD, IDENTIFICATION OF THE CMS REMOVED, MODIFIED OR ADDED, AND THE LOCATIONS OF THOSE CMS. UPDATES MUST BE MADE WITHIN 72-HOURS FOLLOWING THE CHANGE.
5 MAINTAIN VEHICLE TRACKING CONTROL (VTC), IF SEDIMENT TRACKING OCCURS, CLEAN UP IMMEDIATELY. SWEEP BY HAND OR THE USE STREET SWEEPERS (WITH VACUUM SYSTEM). FLUSHING OFF PAVED SURFACES WITH WATER IS PROHIBITED.
6 CWA MUST BE CLEANED ONCE WASTE ACCUMULATION REACHES ⅔ OF THE WET STORAGE CAPACITY OF THE STRUCTURE. LEGALLY DISPOSED OF CONCRETE WASTE. DO NOT BURY ON-SITE.
7 CLEAN-UP SPILLS IMMEDIATELY AFTER DISCOVERY, OR CONTAIN UNTIL APPROPRIATE CLEANUP METHODS CAN BE EMPLOYED. FOLLOW MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP, ALONG WITH PROPER DISPOSAL METHODS. RECORDS OF SPILLS, LEAKS, OR OVERFLOWS THAT RESULT IN DISCHARGE OF POLLUTANTS MUST BE DOCUMENTED AND MAINTAINED.
8 REMOVE SEDIMENT FROM STORM SEWER INFRASTRUCTURE (PONDS, STORM PIPES, OUTLETS, INLETS, ROADSIDE DITCHES, ETC.), AND RESTORE VOLUME CAPACITY UPON COMPLETION OF PROJECT OR PRIOR TO INITIAL ACCEPTANCE OF PUBLIC IMPROVEMENTS (IF APPLICABLE). DO NOT FLUSH SEDIMENT OFFSITE, CAPTURE ON-SITE AND DISPOSED OF AT AN APPROVED LOCATION.

THESE NOTES ARE NOT INTENDED TO BE ALL-INCLUSIVE, BUT TO HIGHLIGHT THE BASIC STORMWATER POLLUTION PREVENTION REQUIREMENTS FOR CONSTRUCTION ACTIVITIES TO COMPLY WITH CDPS STORMWATER CONSTRUCTION PERMIT AND BE IN CONFORMANCE WITH COUNTY STANDARDS

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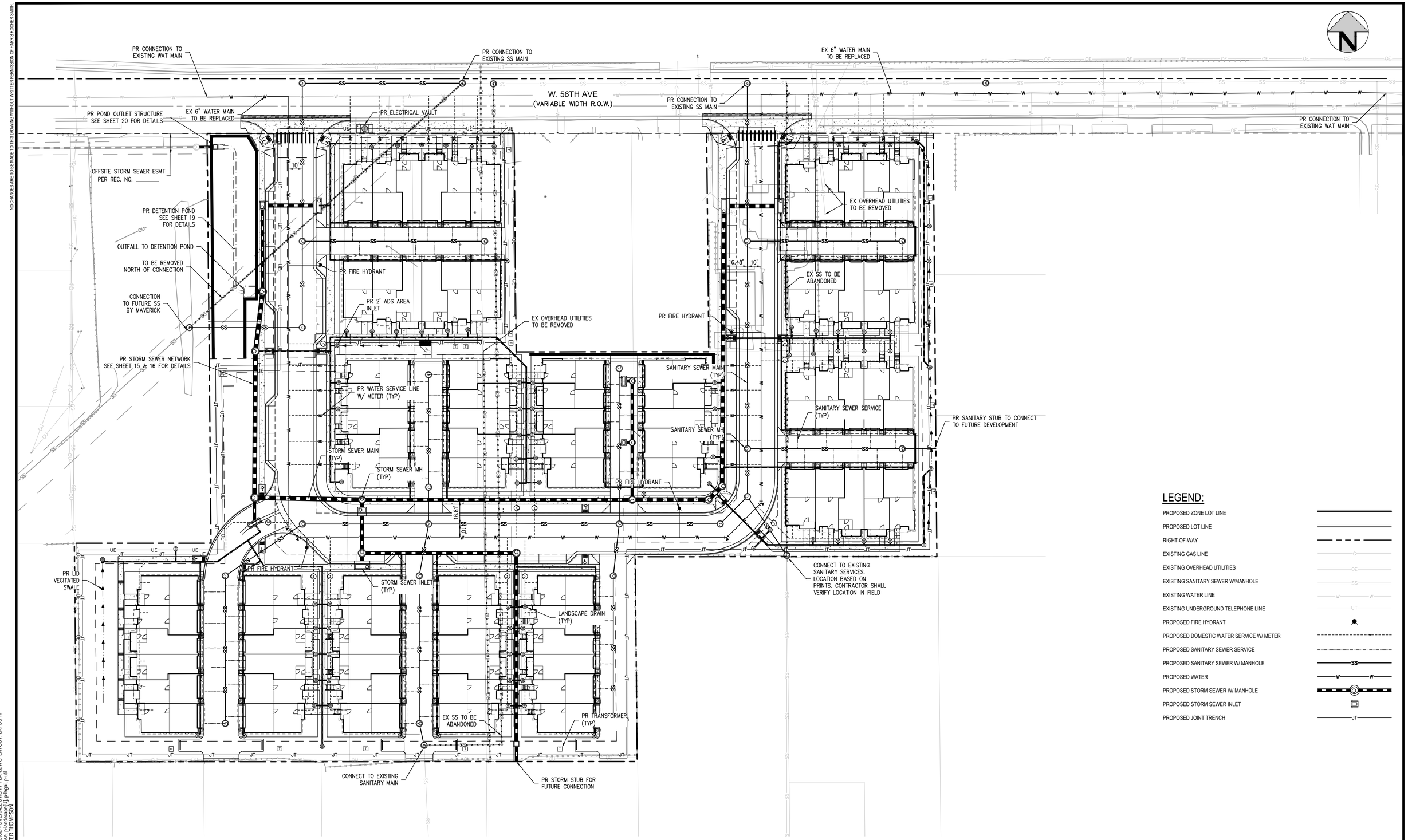

LEGEND:

PROPOSED ZONE LOT LINE	
PROPOSED LOT LINE	
RIGHT-OF-WAY	
EXISTING GAS LINE	G
EXISTING OVERHEAD UTILITIES	OE
EXISTING SANITARY SEWER W/MANHOLE	SS
EXISTING WATER LINE	W
EXISTING UNDERGROUND TELEPHONE LINE	UT
PROPOSED FIRE HYDRANT	
PROPOSED DOMESTIC WATER SERVICE W/ METER	
PROPOSED SANITARY SEWER SERVICE	
PROPOSED SANITARY SEWER W/ MANHOLE	SS
PROPOSED WATER	W
PROPOSED STORM SEWER W/ MANHOLE	
PROPOSED STORM SEWER INLET	
PROPOSED JOINT TRENCH	JT

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PLOTTED: MON 10/17/22 11:34:26A BY: HUNTER THOMPSON

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THE TRUE LIFE COMPANIES

BERKELEY VILLAS
OVERALL UTILITY PLAN

COLORADO LICENSED
NON RUSSELL STAFFORD
47210
PROFESSIONAL ENGINEER

PROJECT #: 200810
SHEET NUMBER
6

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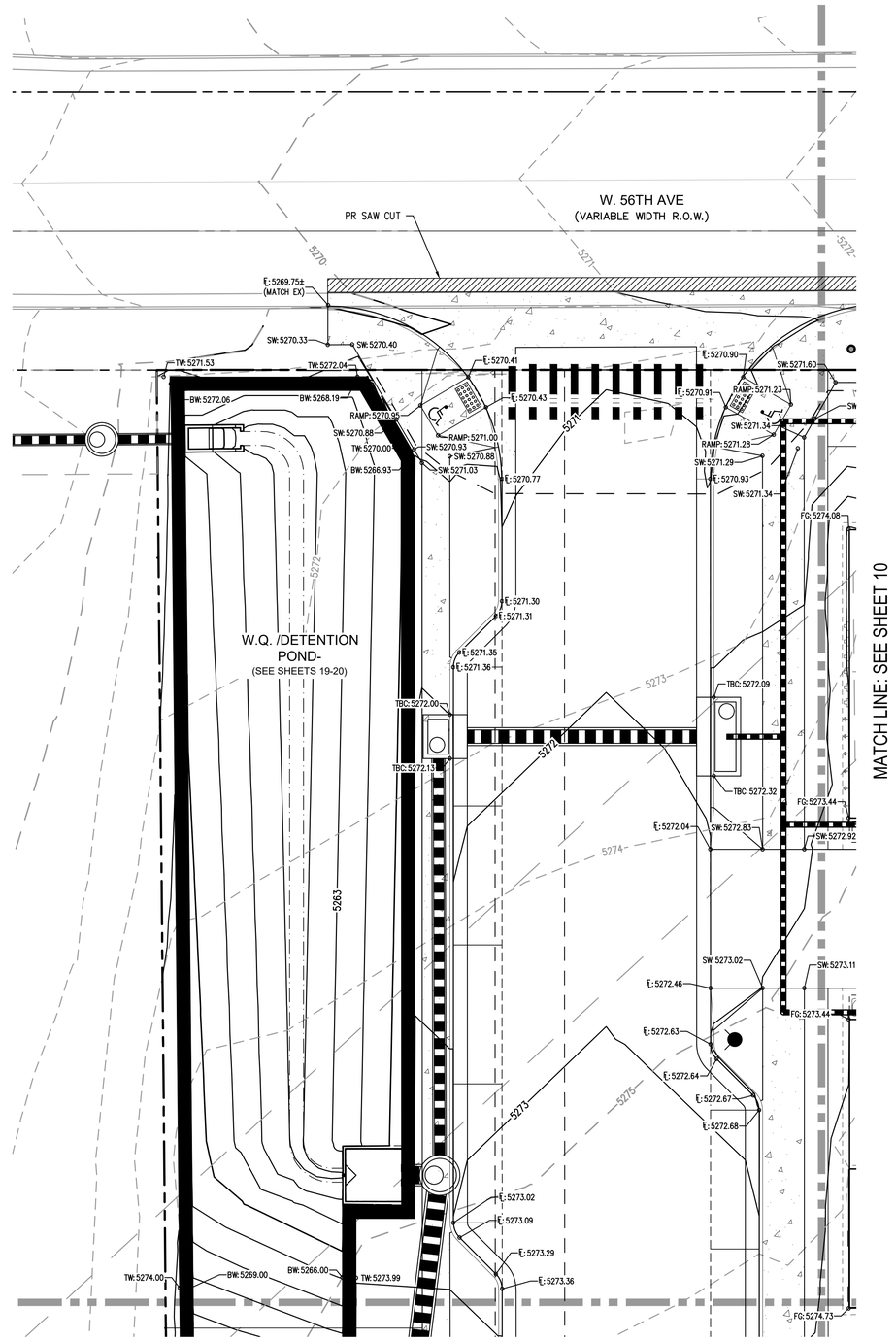

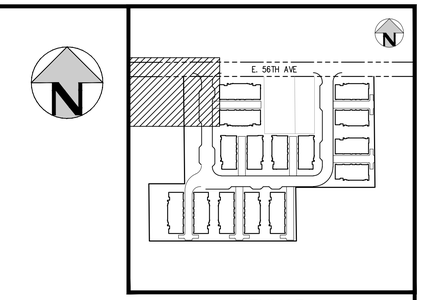

KEYMAP

SCALE 1" = 200'

GENERAL GRADING NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT HANDRAILS, STAIRS, CURB RAMPS, AND RAMPS ARE INSTALLED IN CONFORMANCE WITH ALL APPLICABLE LOCAL STATE AND/OR FEDERAL REGULATIONS AND STANDARDS, INCLUDING BUT NOT LIMITED TO, THE AMERICANS WITH DISABILITIES ACT (ADA), THE FAIR HOUSING ACT (FHA) AND THE AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI).
2. CROSS SLOPES IN THE RIGHT OF WAY, ALONG THE ACCESSIBLE ROUTE OR AT LANDINGS SHALL NOT EXCEED 2% IN ANY DIRECTION.
3. LONGITUDINAL SLOPES ALONG THE ACCESSIBLE ROUTE SHALL NOT EXCEED 5%. LONGITUDINAL SLOPES ON RAMPS SHALL NOT EXCEED 8.33%. RAMPS, EXCEPT CURB RAMPS, SHALL HAVE HANDRAILS ON BOTH SIDES.
4. GUTTER SLOPES AT THE CURB RAMPS SHALL NOT EXCEED 5% WITH A 2' MINIMUM TRANSITION.
5. GUTTER PANS SURROUNDING HANDICAP SPACES SHALL MATCH THE SLOPE OF THE ADJACENT PAVEMENT WITH A MAXIMUM 2% SLOPE IN ALL DIRECTIONS.
6. ALL GRADES ARE FINISHED GRADE, UNLESS OTHERWISE NOTED.
7. ROCK MULCH, IF PLACED UPSTREAM OF CONCRETE FLATWORK OR GRASSED AREA, SHALL BE PLACED ON TOP OF FINISHED GRADE SHOWN ON THESE PLANS. ROCK MULCH AREAS SHALL BE DESIGNED AND CONSTRUCTED TO ADEQUATELY DRAIN AND NOT RETAIN WATER. ALL LANDSCAPE EDGE MATERIALS SHALL NOT PREVENT DRAINAGE TO PASS THROUGH.
8. ALL GRADES ADJACENT TO THE BUILDINGS SHALL BE AT MINIMUM 8-INCHES BELOW FINISHED FLOOR ELEVATION, UNLESS OTHERWISE NOTED.
9. NON-PAVED GRADES ADJACENT TO BUILDINGS SHALL SLOPE AWAY FROM ALL BUILDINGS AT A MINIMUM OF 10% FOR 10'. ALL PAVED GRADES ATTACHED TO BUILDINGS SHALL SLOPE AWAY FROM ALL BUILDINGS AT A MINIMUM OF 1%, UNLESS OTHERWISE NOTED.
10. ALL GRADES FOR WALLS ARE FINISHED GRADE ELEVATIONS AT BOTTOM OF FRONT FACE (BW) AND TOP-BACK OF WALL (TW). THE WALL ELEVATIONS DO NOT INDICATE FOUNDATION DEPTHS OR ELEVATIONS. RETAINING WALL DETAILS SHALL BE PROVIDED BY OTHERS.
11. REFER TO STRUCTURAL PLANS FOR BUILDING FOUNDATION STEP LOCATIONS WHEN APPLICABLE.
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13. SEE LANDSCAPE ARCHITECT PLANS FOR HEIGHT AND TOP OF COURTYARD AMENITIES (PLANTER CURBS, SEAT WALLS, BENCHES, FIRE WALL, MEDIA WALL, BARS, AND GRILLS).
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LEGEND:

- PROPERTY BOUNDARY/ZONE LOT
- RIGHT-OF-WAY
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHTS
- EXPOSED FOUNDATION
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- EXISTING CONTOURS (5410)
- PROPOSED CONTOURS (5410)

Know what's below. Call before you dig.

10 0 10 20
SCALE: 1" = 10'

DESIGNED BY: <DESIGNER>
CHECKED BY: <REVIEWER>
DRAWN BY: <DRAWN>

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

THE TRUE LIFE COMPANIES

BERKELEY VILLAS
DETAILED GRADING PLAN

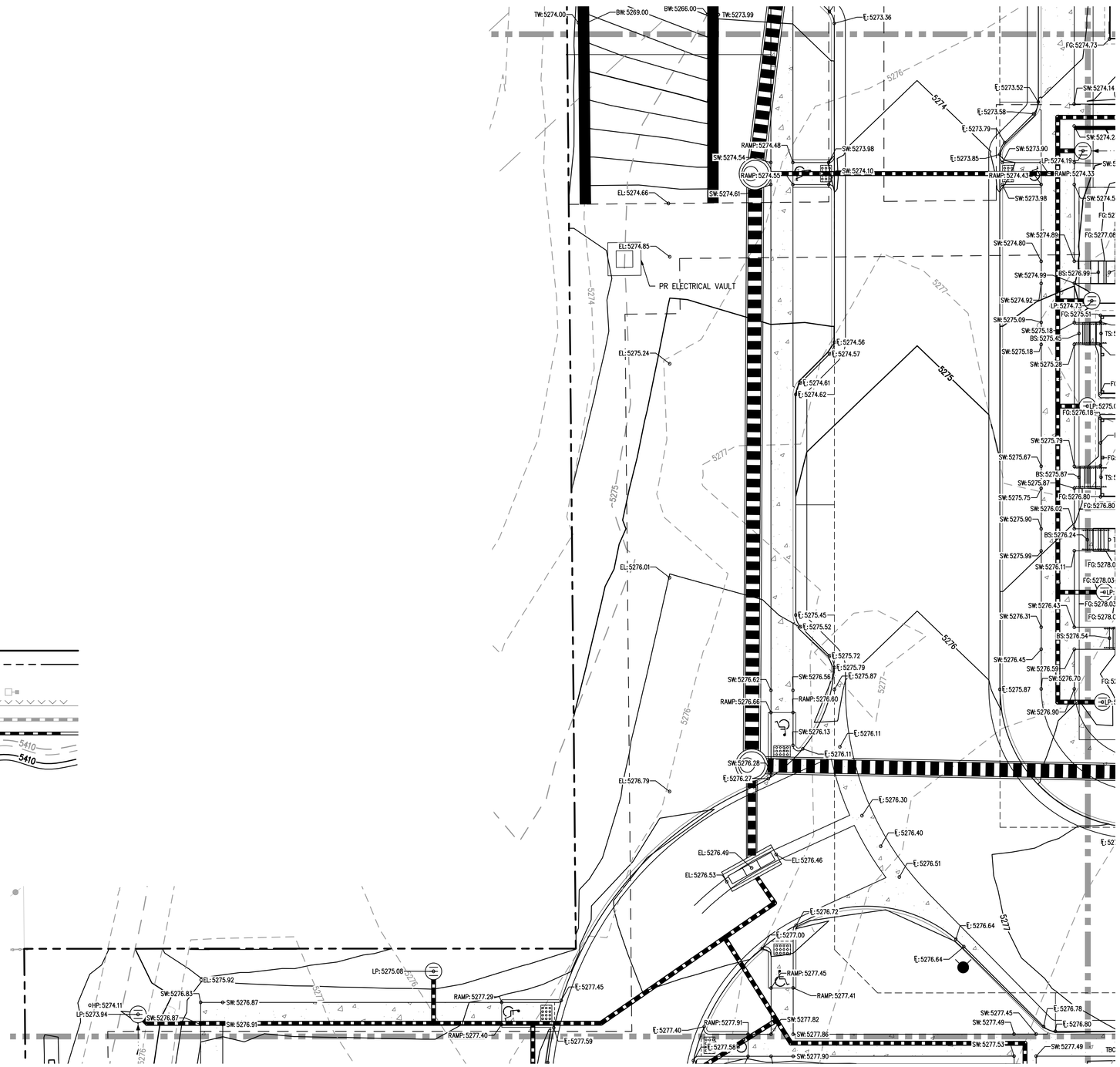
COLORADO LICENSED
JOHN RUSSELL STAFFORD
47210
PROFESSIONAL ENGINEER

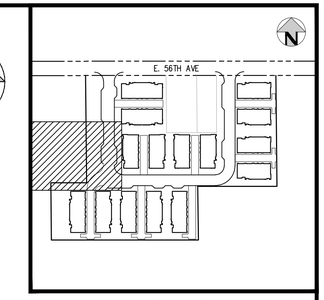
PROJECT #: 200810
SHEET NUMBER
7

FILEPATH: K:\200810\ENGINEERING\GRADING\CD - DETAILED GRADING PLAN A.DWG LAYOUT: LAYOUT1
NO XREFS
PLOTTED: MON 10/17/22 11:40:03A BY: HUNTER THOMPSON

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.

MATCH LINE: SEE SHEET 7





KEYMAP

SCALE 1" = 200'

LEGEND:

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- RIGHT-OF-WAY
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHTS
- EXPOSED FOUNDATION
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- PROPOSED CONTOURS (5410)

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SCALE: 1" = 10'

DESIGNED BY: <DESIGNER>
CHECKED BY: <REVIEWER>
DRAWN BY: <DRAWN>

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

HARRIS KOCHER SMITH
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Denver, Colorado 80203
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THE TRUE LIFE COMPANIES

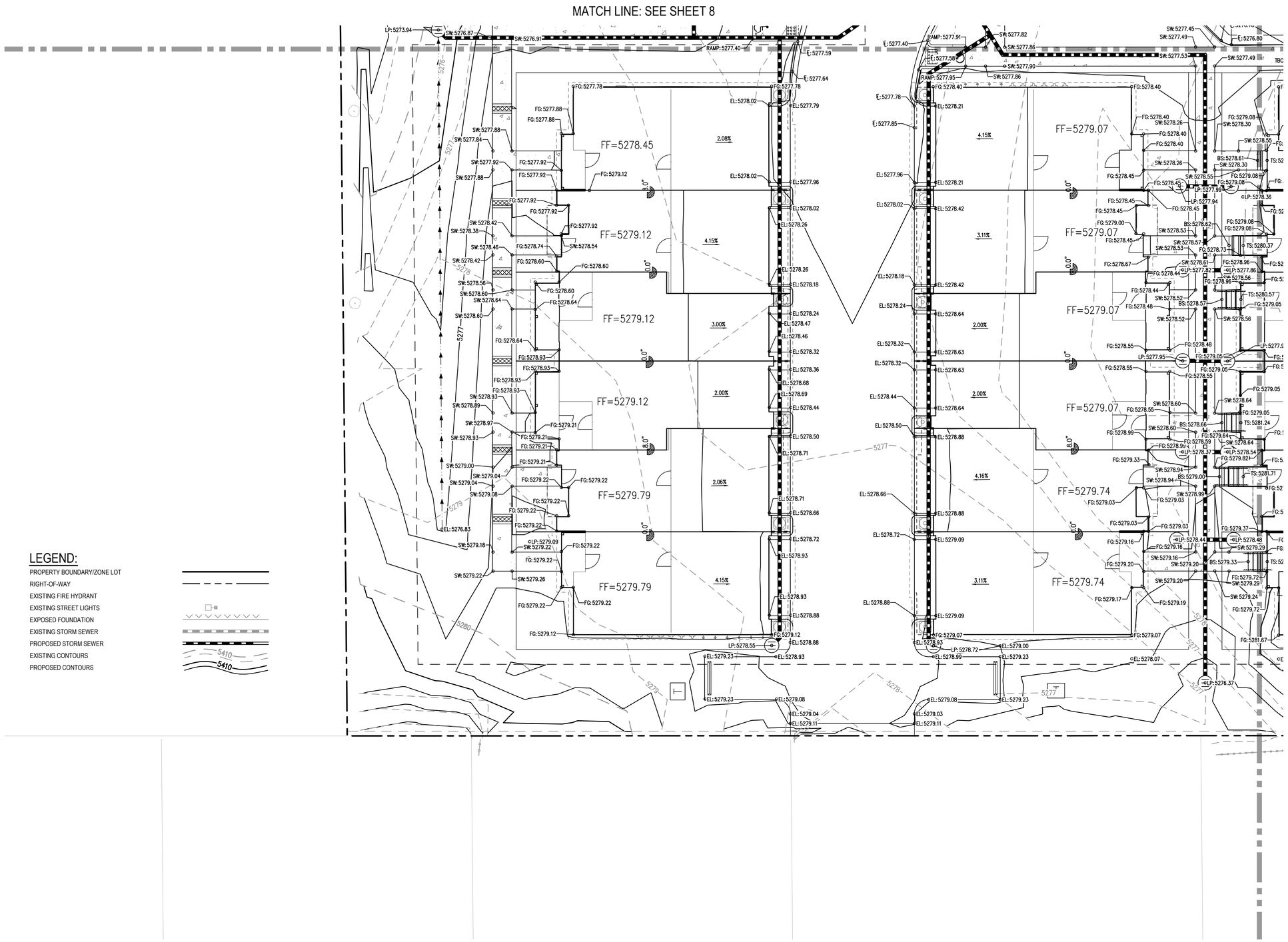
BERKELEY VILLAS
DETAILED GRADING PLAN

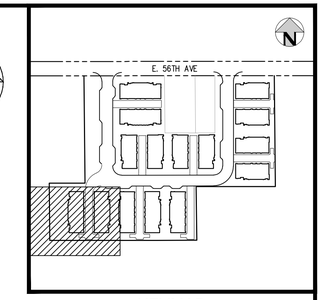
PROJECT #: 200810

SHEET NUMBER
8

FILEPATH: K:\200810\ENGINEERING\GRADING\CD - DETAILED GRADING PLAN A.DWG LAYOUT: LAYOUT2
NO XREFS
PLOTTED: MON 10/17/22 11:40:06A BY: HUNTER THOMPSON

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.





KEYMAP

SCALE 1" = 200'

LEGEND:

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- RIGHT-OF-WAY
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Know what's below. Call before you dig.

SCALE: 1" = 10'

DESIGNED BY: <DESIGNER>
CHECKED BY: <REVIEWER>
DRAWN BY: <DRAWN>

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

THE TRUE LIFE COMPANIES

BERKELEY VILLAS
DETAILED GRADING PLAN

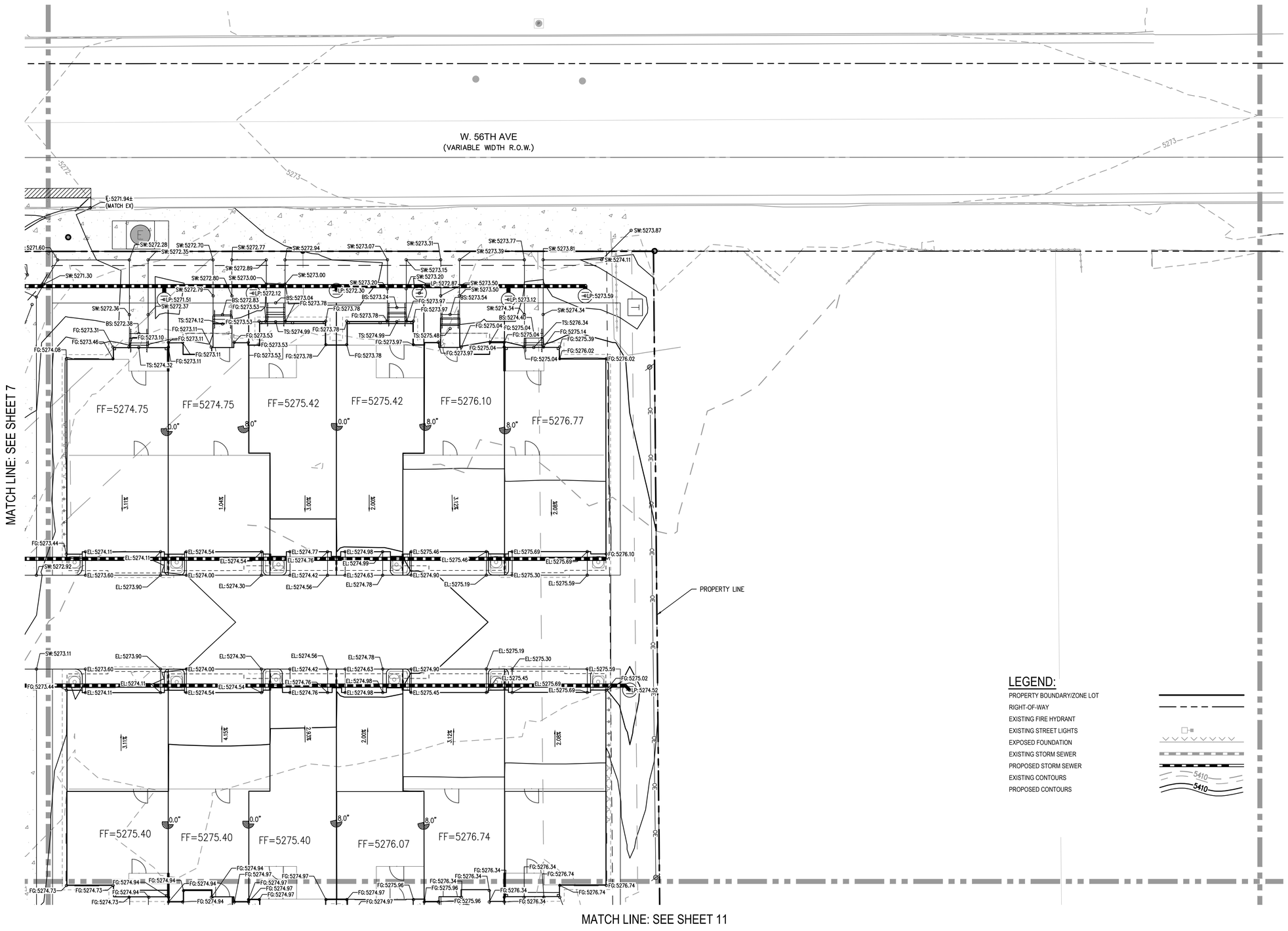
PROJECT #: 200810

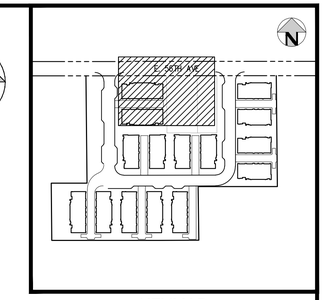
SHEET NUMBER

9

FILEPATH: K:\200810\ENGINEERING\GRADING\CD - DETAILED GRADING PLAN A.DWG LAYOUT: LAYOUT3
NO XREFS
PLOTTED: MON 10/17/22 11:40:09A BY: HUNTER THOMPSON

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.





KEYMAP

SCALE 1" = 200'

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Know what's below. Call before you dig.

SCALE: 1" = 10'

DESIGNED BY: <DESIGNER>
CHECKED BY: <REVIEWER>
DRAWN BY: <DRAWN>

ISSUE DATE: 06-13-2022

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THE TRUE LIFE COMPANIES

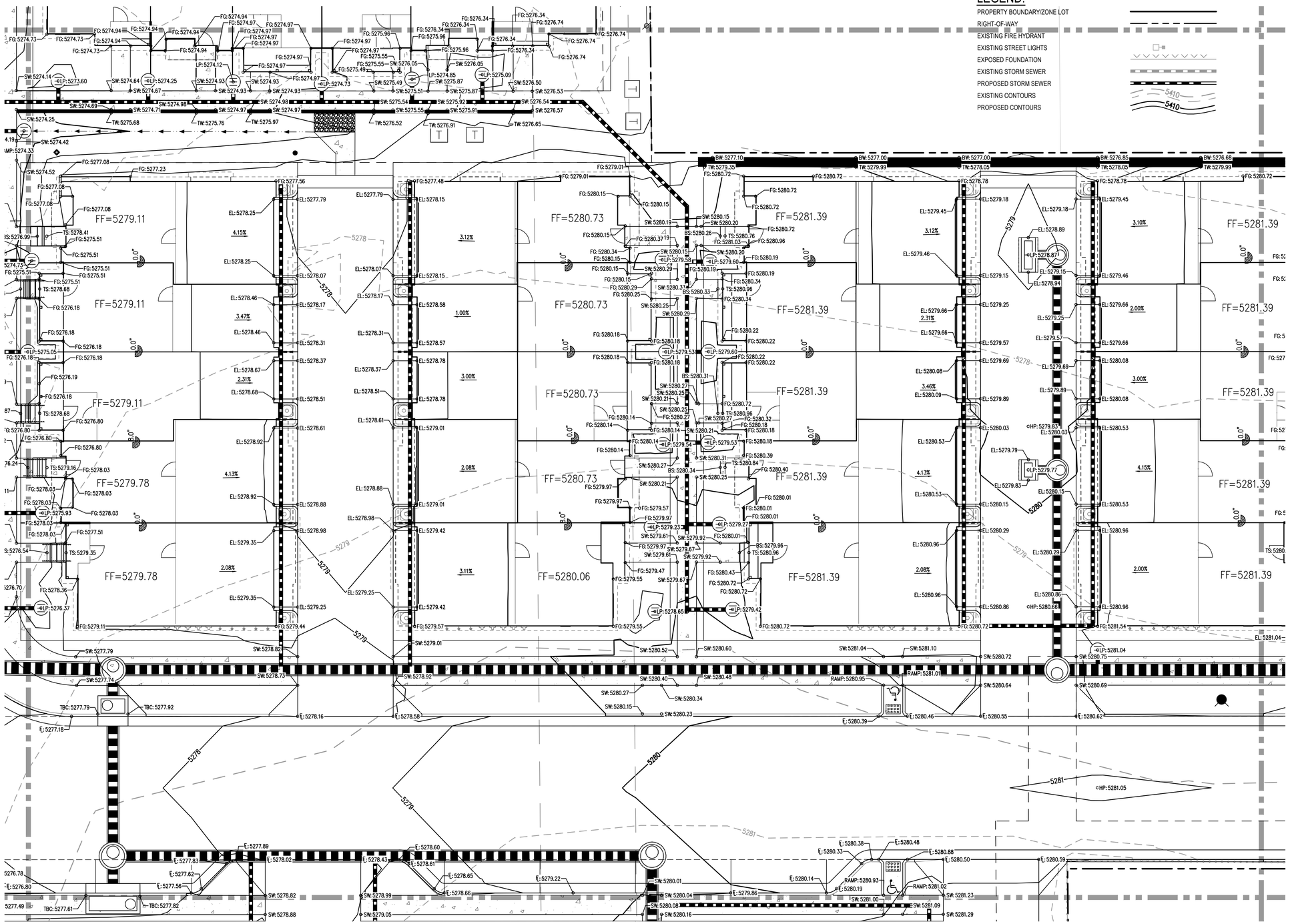
BERKELEY VILLAS
DETAILED GRADING PLAN

PROJECT #: 200810
SHEET NUMBER
10
10 OF 24

FILEPATH: K:\200810\ENGINEERING\GRADING\CD - DETAILED GRADING PLAN A.DWG LAYOUT: LAYOUT4
NO XREFS
PLOTTED: MON 10/17/22 11:40:13A BY: HUNTER THOMPSON

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.

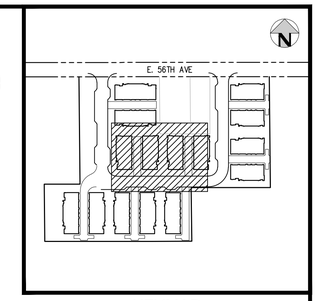
MATCH LINE: SEE SHEET 10



MATCH LINE: SEE SHEET 12

LEGEND:

- PROPERTY BOUNDARY/ZONE LOT
- RIGHT-OF-WAY
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHTS
- EXPOSED FOUNDATION
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- EXISTING CONTOURS
- PROPOSED CONTOURS



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9. NON-PAVED GRADES ADJACENT TO BUILDINGS SHALL SLOPE AWAY FROM ALL BUILDINGS AT A MINIMUM OF 10% FOR 10'. ALL PAVED GRADES ATTACHED TO BUILDINGS SHALL SLOPE AWAY FROM ALL BUILDINGS AT A MINIMUM OF 1%, UNLESS OTHERWISE NOTED.
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11. REFER TO STRUCTURAL PLANS FOR BUILDING FOUNDATION STEP LOCATIONS WHEN APPLICABLE.
12. PORTIONS OF STAIRS THAT DO NOT MEET THE MINIMUM 4-INCH RISER HEIGHT (DUE TO AN ADJACENT SLOPING PUBLIC WAY) SHALL HAVE A DISTINCTIVE MARKING STRIPE, 1-INCH TO 2-INCHES IN WIDTH, WITH A SLIP-RESISTANT SURFACE, IN ACCORDANCE WITH CURRENT INTERNATIONAL BUILDING CODE REGULATIONS.
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Know what's below. Call before you dig.

10 0 10 20
SCALE: 1" = 10'

DESIGNED BY: <DESIGNER>
CHECKED BY: <REVIEWER>
DRAWN BY: <DRAWN>

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

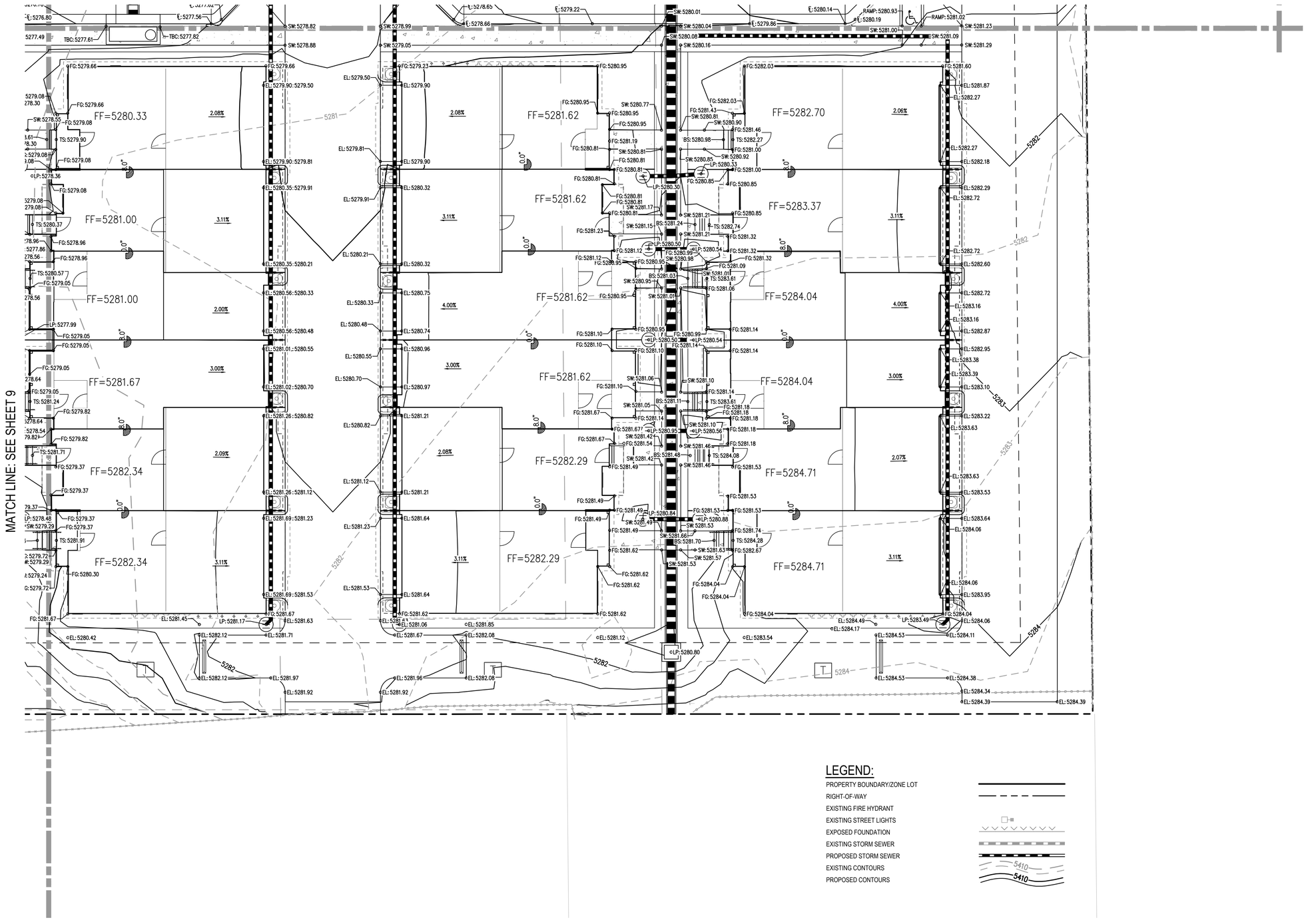
THE TRUE LIFE COMPANIES

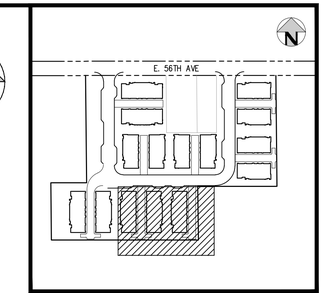
BERKELEY VILLAS
DETAILED GRADING PLAN

PROJECT #: 200810
SHEET NUMBER
11
11 OF 24

FILEPATH: K:\200810\ENGINEERING\GRADING\CD - DETAILED GRADING PLAN A.DWG LAYOUT: LAYOUT5
NO XREFS
PLOTTED: MON 10/17/22 11:40:18A BY: HUNTER.THOMPSON

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.





KEYMAP

SCALE 1" = 200'

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LEGEND:

- PROPERTY BOUNDARY/ZONE LOT
- RIGHT-OF-WAY
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHTS
- EXPOSED FOUNDATION
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- EXISTING CONTOURS (5410)
- PROPOSED CONTOURS (5410)

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

10 0 10 20
SCALE: 1" = 10'

DESIGNED BY: <DESIGNER>
CHECKED BY: <REVIEWER>
DRAWN BY: <DRAWN>

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

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THE TRUE LIFE COMPANIES

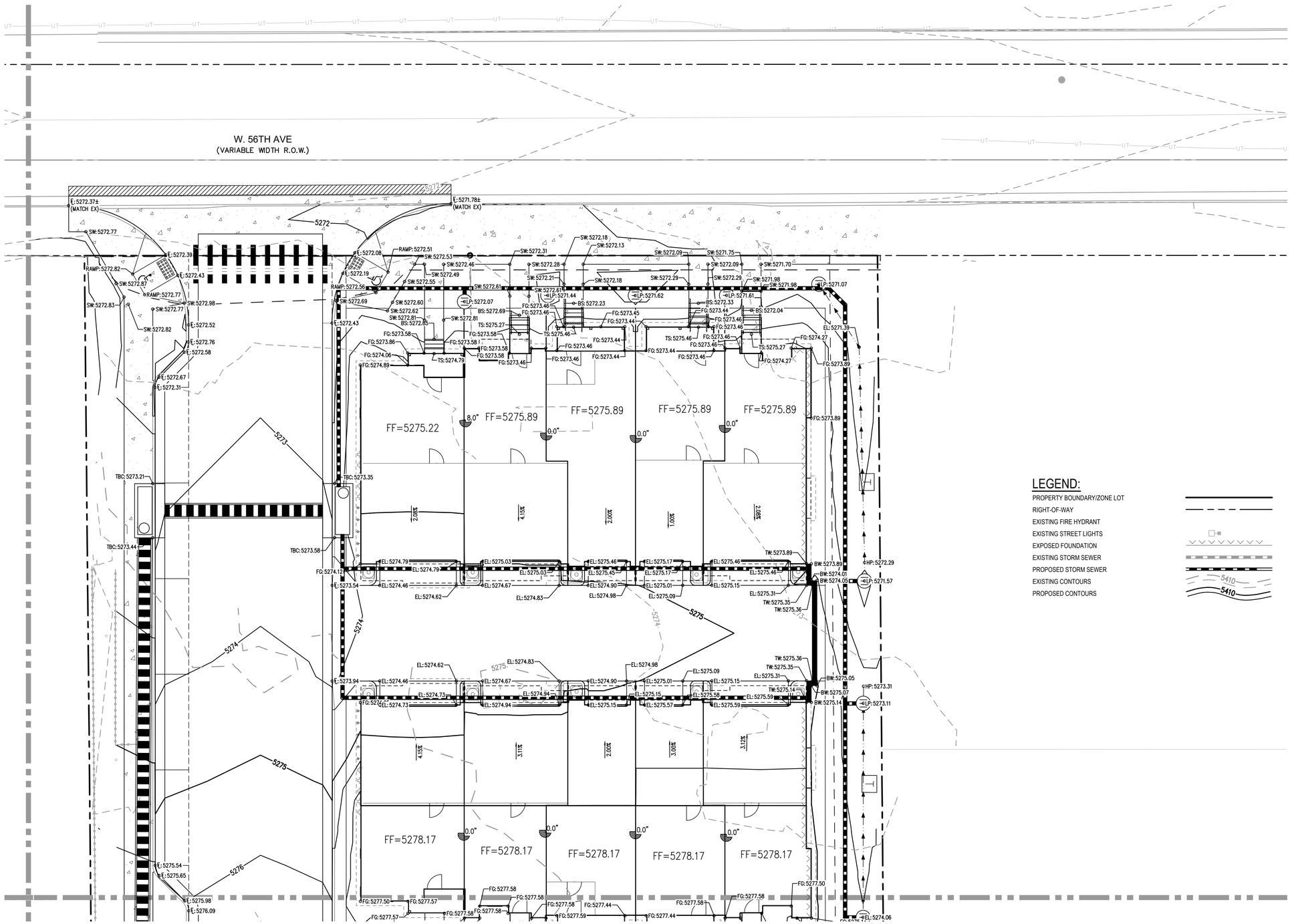
BERKELEY VILLAS
DETAILED GRADING PLAN

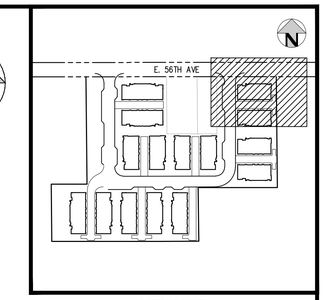
PROJECT #: 200810

SHEET NUMBER
12

FILEPATH: K:\200810\ENGINEERING\GRADING\CD - DETAILED GRADING PLAN B.DWG LAYOUT: LAYOUT1
NO XREFS
PLOTTED: MON 10/17/22 11:40:45A BY: HUNTER THOMPSON

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.





KEYMAP

SCALE 1" = 200'

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- PROPERTY BOUNDARY/ZONE LOT
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FILEPATH: K:\200810\ENGINEERING\GRADING\CD - DETAILED GRADING PLAN B.DWG LAYOUT: LAYOUT2
NO XREFs
PLOTTED: MON 10/17/22 11:40:51A BY: HUNTER THOMPSON

Know what's below. Call before you dig.

SCALE: 1" = 10'

DESIGNED BY: <DESIGNER>
CHECKED BY: <REVIEWER>
DRAWN BY: <DRAWN>

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

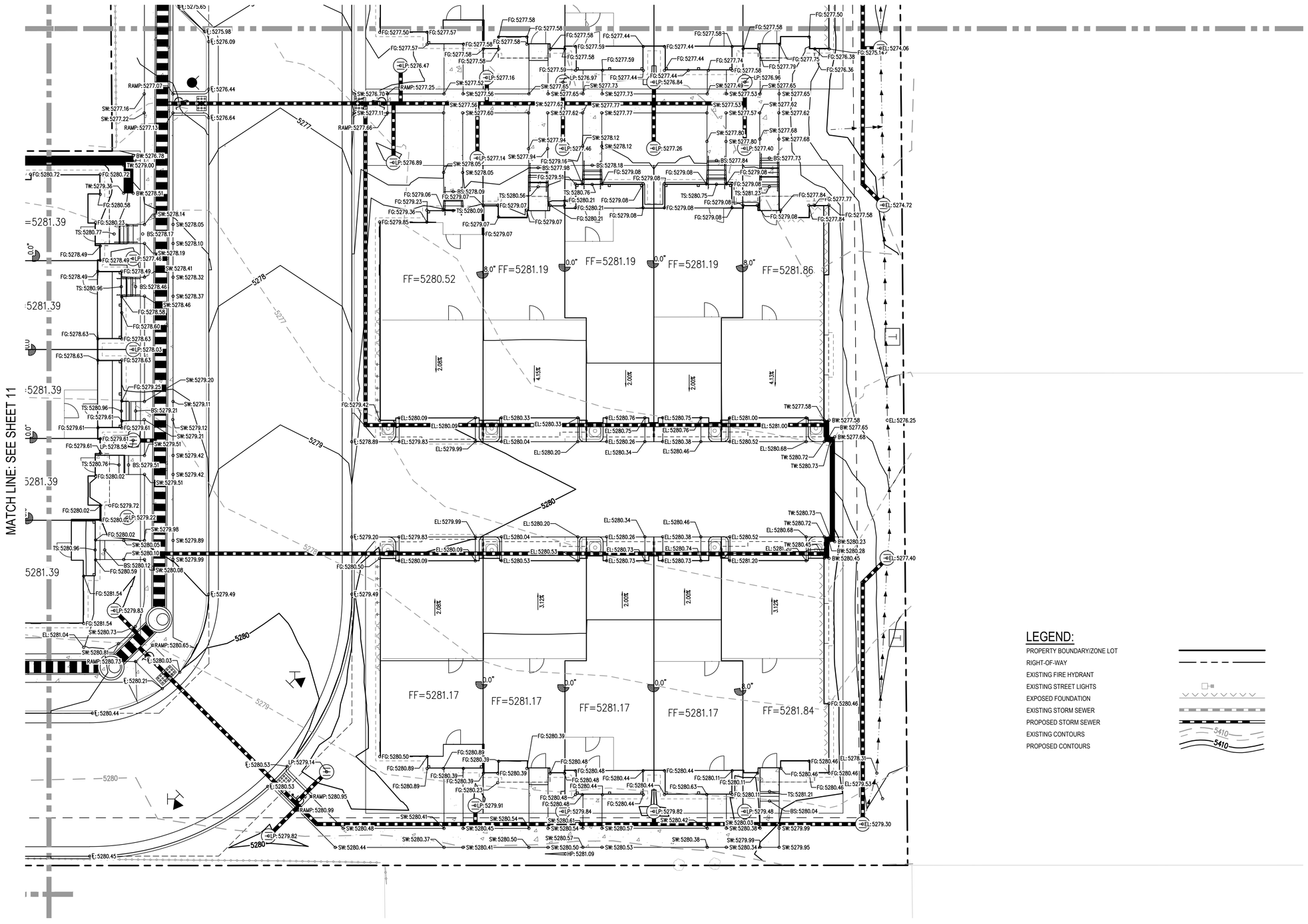
HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

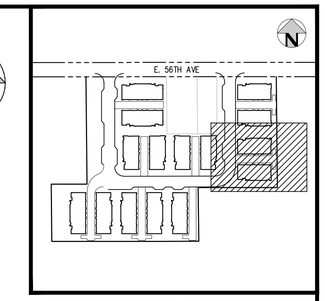
THE TRUE LIFE COMPANIES

BERKELEY VILLAS
DETAILED GRADING PLAN

PROJECT #: 200810
SHEET NUMBER
13

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.





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- RIGHT-OF-WAY
- EXISTING FIRE HYDRANT
- EXISTING STREET LIGHTS
- EXPOSED FOUNDATION
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- EXISTING CONTOURS (5410)
- PROPOSED CONTOURS (5410)

Know what's below. Call before you dig.

SCALE: 1" = 10'

DESIGNED BY: <DESIGNER>
CHECKED BY: <REVIEWER>
DRAWN BY: <DRAWN>

ISSUE DATE: 06-13-2022

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THE TRUE LIFE COMPANIES

BERKELEY VILLAS
DETAILED GRADING PLAN

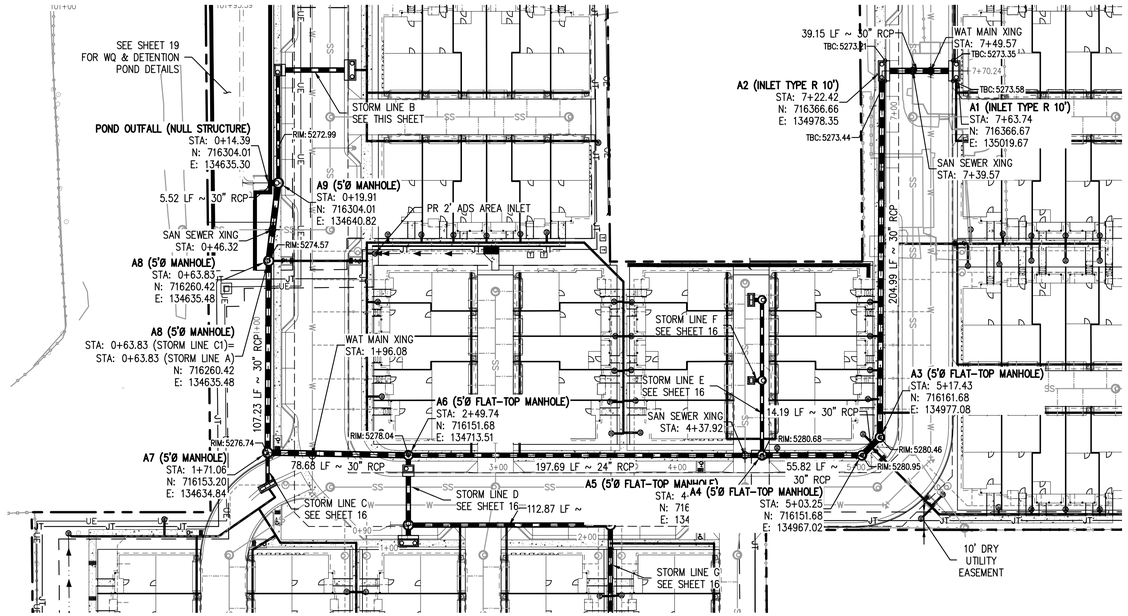
PROJECT #: 200810

SHEET NUMBER

14

FILEPATH: K:\200810\ENGINEERING\GRADING\CD - DETAILED GRADING PLAN B.DWG LAYOUT: LAYOUT3
NO XREFS
PLOTTED: MON 10/17/22 11:40:56A BY: HUNTER THOMPSON

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.



STORM LINE A

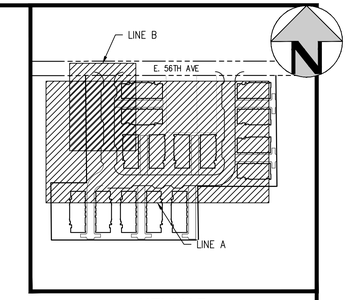
SCALE: 1" = 40'

NOTES:

1. THE CONTRACTOR SHALL NOTIFY COLORADO 811 PRIOR TO EXCAVATION, IN ACCORDANCE WITH COLORADO STATE STATUTES.

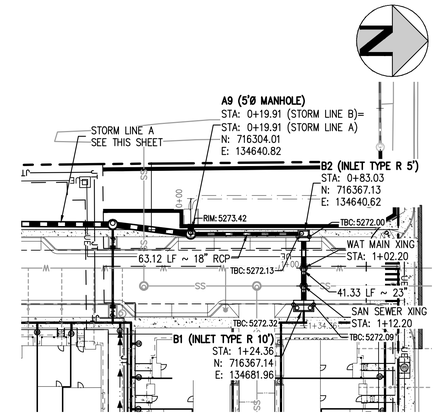
2. THE LOCATION OF EXISTING UNDERGROUND UTILITIES IS APPROXIMATE AND SHOWN ACCORDING TO THE BEST INFORMATION AVAILABLE, AS SUPPLIED BY THE UTILITY OWNERS. PRIOR TO EXCAVATION, THE CONTRACTOR SHALL VERIFY EXISTENCE, SIZE AND LOCATION OF EXISTING UTILITIES AND IMMEDIATELY NOTIFY HARRIS KOCHER SMITH OF ANY DISCREPANCIES. THE CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL DAMAGES TO EXISTING UNDERGROUND FACILITIES.

3. ALL PRIVATE AND PUBLIC STORM SEWER SYSTEMS MUST BE ELECTRONICALLY LOCATABLE. TRACER WIRE DETAILS CAN BE FOUND ON SITE DETAIL SHEETS.



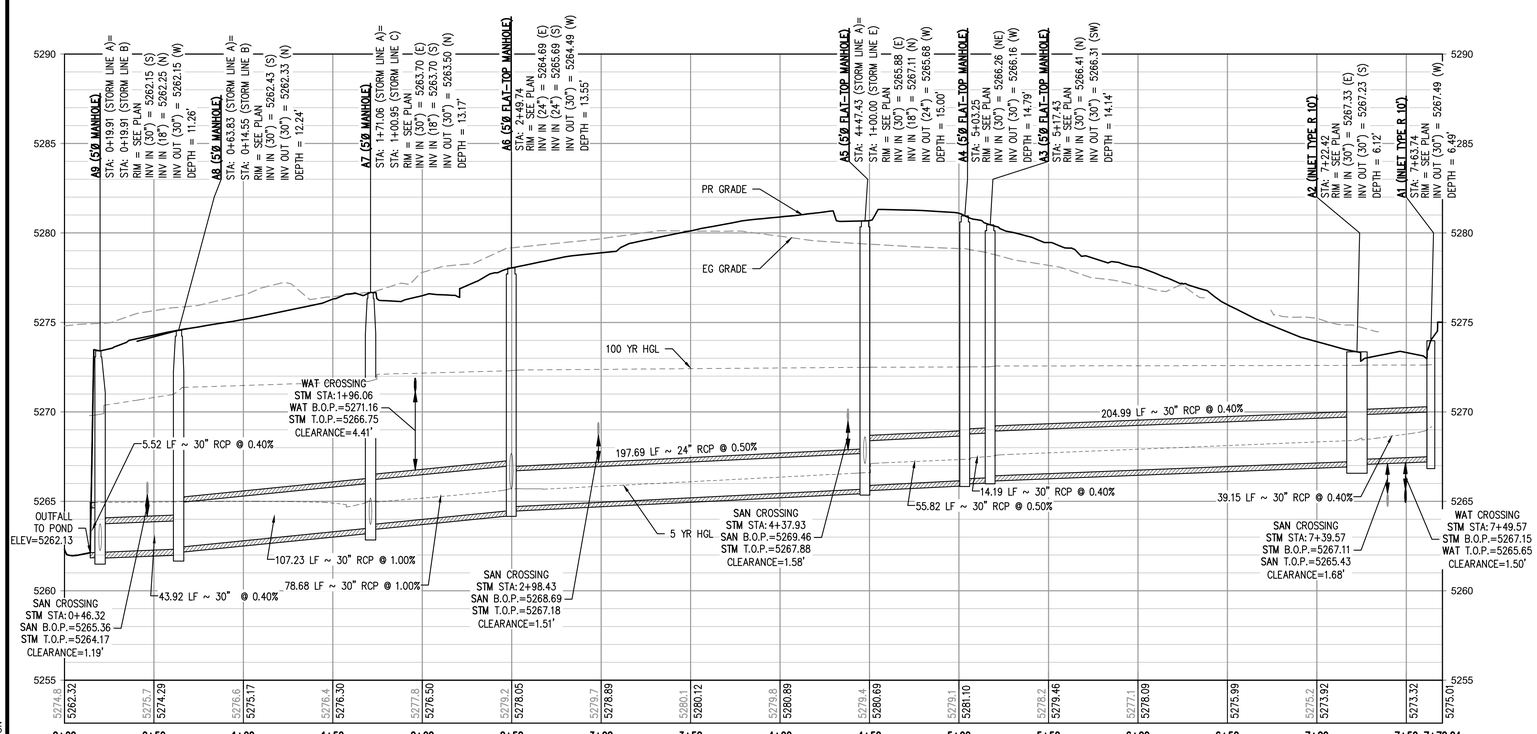
KEYMAP

SCALE 1" = 200'



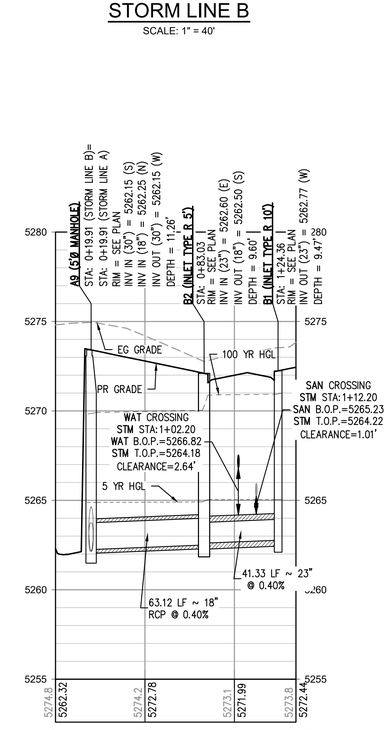
STORM LINE B

SCALE: 1" = 40'



STORM LINE A PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'



STORM LINE B PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

Know what's below. Call before you dig.

40 0 40 80
SCALE: 1" = 40'

DESIGNED BY: SM
CHECKED BY: JRS
DRAWN BY: MDP

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

THE TRUE LIFE COMPANIES

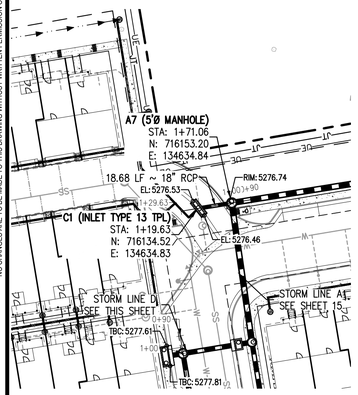
BERKELEY VILLAS
STORM PLAN & PROFILE

COLORADO LICENSED
JOHN RUSSELL STAPLETON
47210
PROFESSIONAL ENGINEER

PROJECT #: 200810
SHEET NUMBER
15

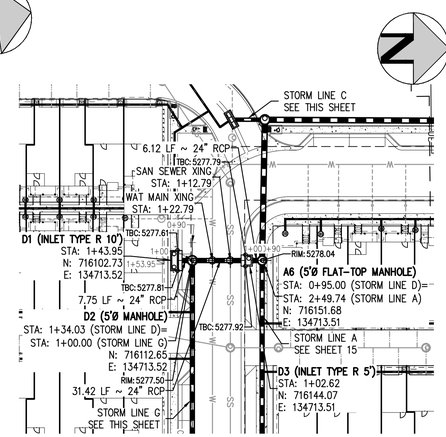
FILEPATH: K:\200810\ENGINEERING\UTILITIES\STORM\CD - STORM PB.P.DWG LAYOUT: LAYOUT1
6 XREFs: cd - stamp, e-base, keymap, p-base, p-legal, p-util
PLOTTED: MON 10/17/22 11:41:03A BY: HUNTER THOMPSON

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.



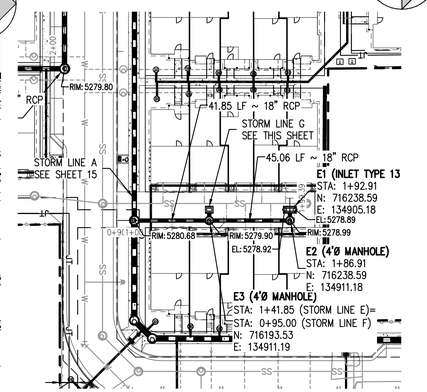
STORM LINE C

SCALE: 1" = 40'



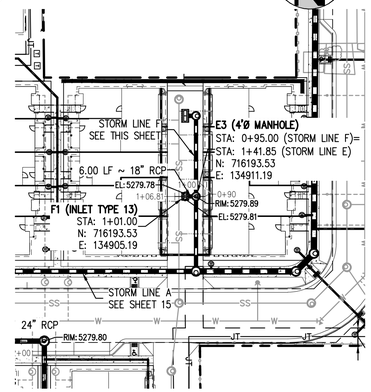
STORM LINE D

SCALE: 1" = 40'



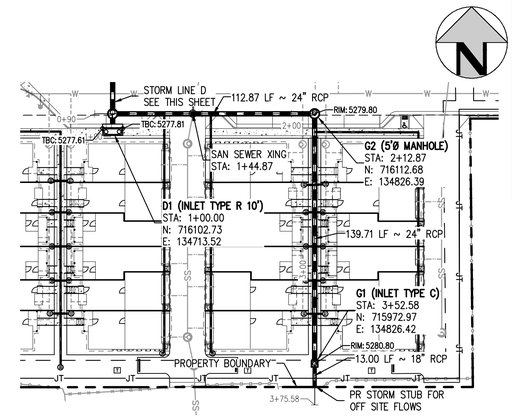
STORM LINE E

SCALE: 1" = 40'



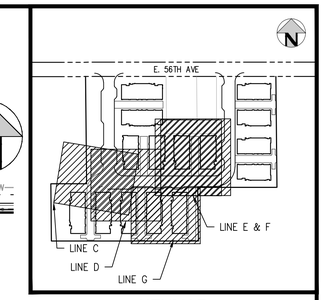
STORM LINE F

SCALE: 1" = 40'



STORM LINE G

SCALE: 1" = 40'



KEYMAP

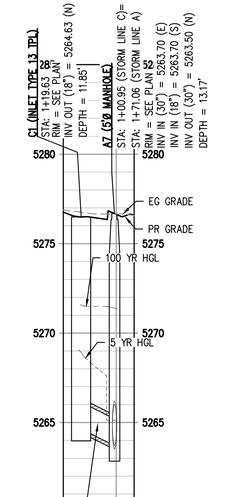
SCALE 1" = 200'

NOTES:

1. THE CONTRACTOR SHALL NOTIFY COLORADO 811 PRIOR TO EXCAVATION, IN ACCORDANCE WITH COLORADO STATE STATUTES.

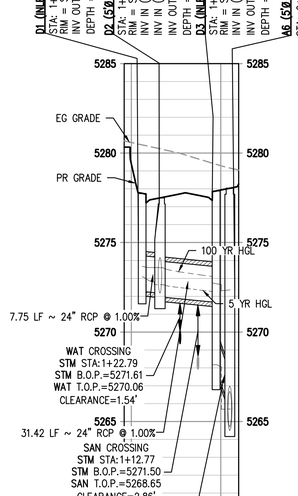
2. THE LOCATION OF EXISTING UNDERGROUND UTILITIES IS APPROXIMATE AND SHOWN ACCORDING TO THE BEST INFORMATION AVAILABLE, AS SUPPLIED BY THE UTILITY OWNERS. PRIOR TO EXCAVATION, THE CONTRACTOR SHALL VERIFY EXISTENCE, SIZE AND LOCATION OF EXISTING UTILITIES AND IMMEDIATELY NOTIFY HARRIS KOCHER SMITH OF ANY DISCREPANCIES. THE CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL DAMAGES TO EXISTING UNDERGROUND FACILITIES.

3. ALL PRIVATE AND PUBLIC STORM SEWER SYSTEMS MUST BE ELECTRONICALLY LOCATABLE. TRACER WIRE DETAILS CAN BE FOUND ON SITE DETAIL SHEETS.



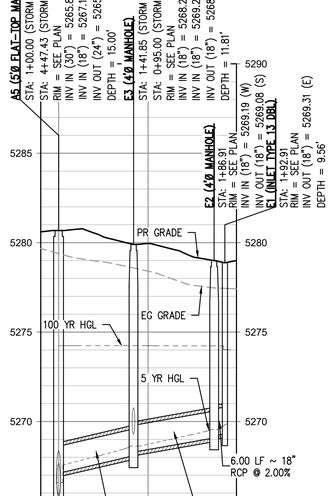
STORM LINE C PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'



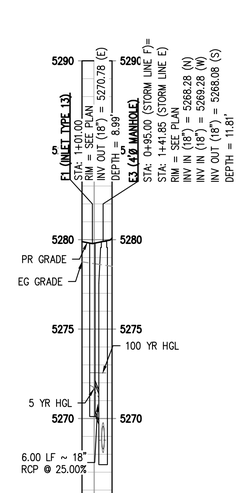
STORM LINE D PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'



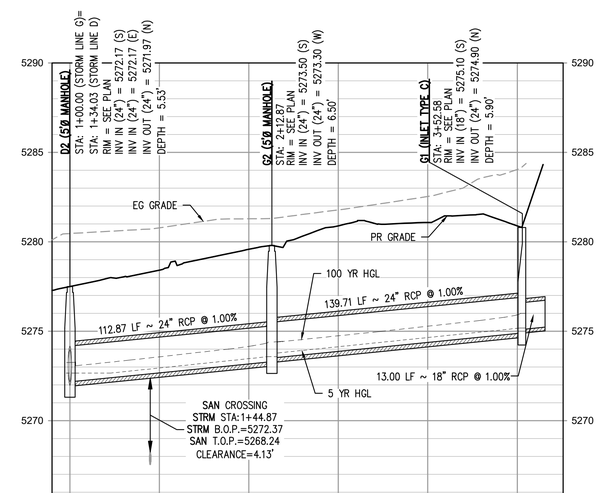
STORM LINE E PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'



STORM LINE F PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'



STORM LINE G PROFILE

HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 4'

Know what's below. Call before you dig.

40 0 40 80
SCALE: 1" = 40'

DESIGNED BY: SM
CHECKED BY: JRS
DRAWN BY: MDP

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
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P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

THE TRUE LIFE COMPANIES

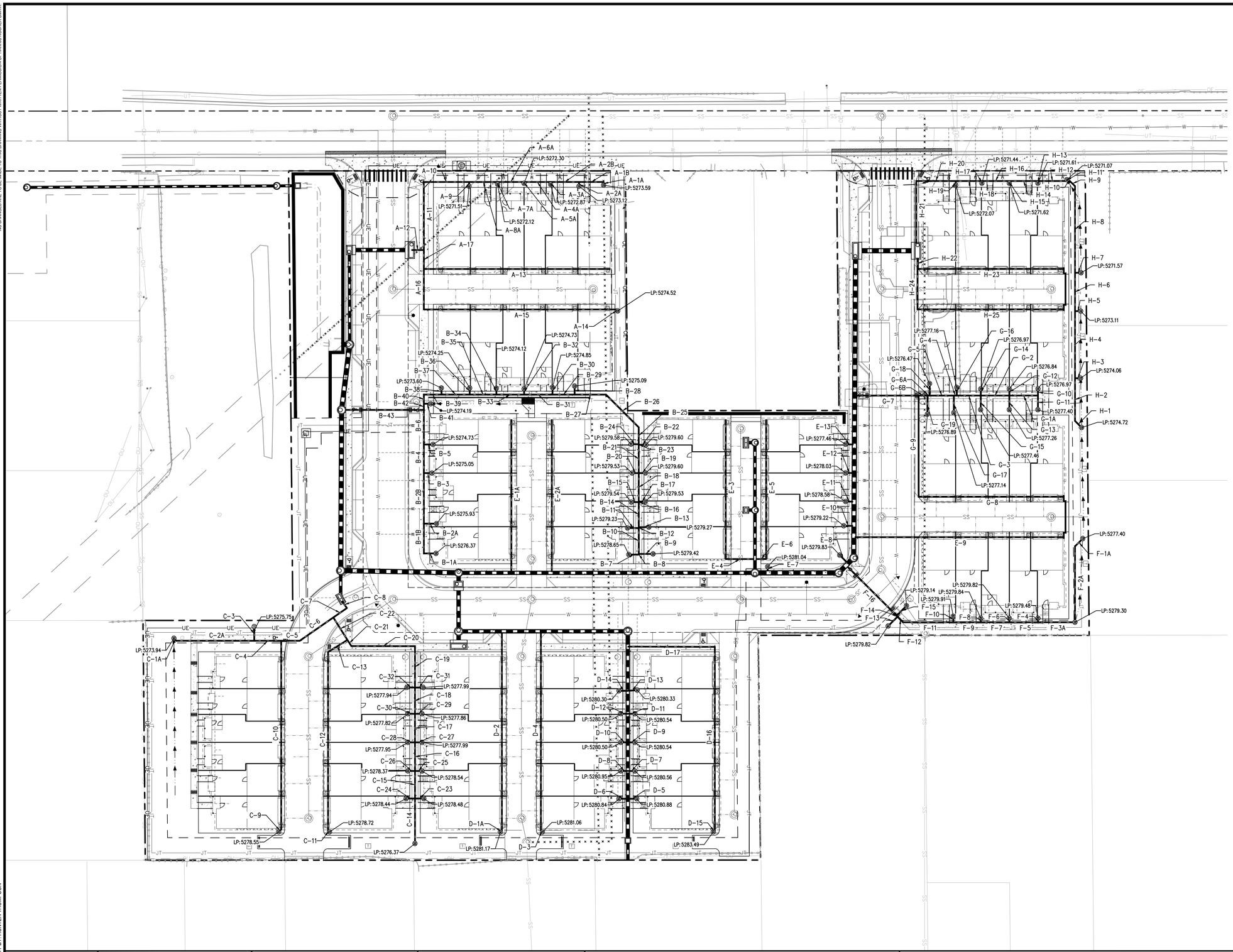
BERKELEY VILLAS
STORM PLAN & PROFILE

COLORADO LICENSED
JOHN RUSSELL STAPELEY
47210
PROFESSIONAL ENGINEER

PROJECT #: 200810
SHEET NUMBER
16

FILEPATH: K:\200810\ENGINEERING\UTILITIES\STORM\CD - STORM P&P.DWG LAYOUT: 16 STORM PLAN & PROFILE
6 XREFs: cd - stamp, p-base, keymap, p-base, p-legal, p-plat
PLOTTED: MON 10/17/22 11:41:10A BY: HUNTER THOMPSON

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.



GENERAL LANDSCAPE DRAIN NOTES:

1. CONTRACTOR SHALL USE 90-DEGREE WYES AT PERPENDICULAR JOINTS WHERE POSSIBLE.
2. CONTRACTOR SHALL USE CONCENTRIC REDUCERS UNLESS OTHERWISE NOTED. WHERE ECCENTRIC REDUCERS ARE USED THE INVERTS MUST MATCH.
3. CONTRACTOR SHALL USE STANDARD PVC FITTINGS WHEN POSSIBLE UNLESS OTHERWISE NOTED ON THE PLAN.
4. ALL LANDSCAPE DRAINS PIPES SHALL BE WATERTIGHT PVC, RIGID HDPE WITH SMOOTH INNER WALL, OR ENGINEER APPROVED EQUIVALENT.
5. ALL LANDSCAPE DRAIN PIPES SHALL BE A MINIMUM OF 2-FT DEEP (UNLESS OTHERWISE NOTED) AND SHALL HAVE A 0.50% MINIMUM SLOPE.
6. LANDSCAPE DRAIN GRATES IN LANDSCAPED AREAS SHALL BE NYLOPLAST 12-INCH DOME STYLE GRATES/COVERS, OR ENGINEER-APPROVED EQUIVALENT.
7. LANDSCAPE DRAIN GRATES IN PAVEMENT SHALL BE PEDESTRIAN-FRIENDLY, 4-INCH ROUND BRASS GRATES OR ENGINEER-APPROVED EQUIVALENT UNLESS OTHERWISE NOTED ON THE PLAN.
8. LANDSCAPE DRAINS LOCATED AT THE END OF A LINE SHALL BE INSTALLED WITH A RISER AND 90 DEGREE BEND MATCHING THE SIZE OF THE PIPE CONNECTING TO THE DRAIN AS CALLED OUT IN THE LANDSCAPE DRAIN TABLE.
9. LANDSCAPE DRAINS CONNECTING TO ROOF DOWNSPOUTS SHALL BE INSTALLED WITH A RISER AND 90 DEGREE BEND MATCHING THE SIZE OF THE PIPE CONNECTING TO THE ROOF DRAIN AS CALLED OUT IN THE LANDSCAPE DRAIN TABLE.
10. INLINE LANDSCAPE DRAINS SHALL BE INSTALLED WITH A RISER AND TEE FITTING MATCHING THE SIZE OF THE MAIN LINE CONNECTION AS CALLED OUT IN THE LANDSCAPE DRAIN TABLE. IF TWO OR MORE PIPE SIZES INTERSECT AT THE INLINE DRAIN CONNECTION THEN THE LARGER PIPE SIZE SHALL DICTATE THE SIZE OF THE RISER.
11. AT ANY LOCATION WHERE MORE THAN TWO LANDSCAPE DRAIN PIPES INTERSECT AND CANNOT BE CONNECTED WITH STANDARD FITTINGS, A DRAIN BASIN SHALL BE INSTALLED. THE DRAIN BASIN SHALL BE SIZED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.
12. CONTRACTOR SHALL PLACE LARGE, ANGULAR ROCKS (3 IN. - 6 IN.), 2-FT AROUND EACH AREA INLET WHERE APPLICABLE.

LEGEND:

- PROPOSED ZONE LOT LINE
- PROPOSED LOT LINE
- RIGHT-OF-WAY
- EXISTING STORM SEWER W/MANHOLE
- EXISTING STORM SEWER INLET
- EXISTING SANITARY SEWER W/MANHOLE
- EXISTING WATER LINE
- EXISTING FIRE HYDRANT
- PROPOSED FIRE HYDRANT
- PROPOSED DOMESTIC WATER SERVICE W/ METER
- PROPOSED SANITARY SEWER SERVICE
- PROPOSED SANITARY SEWER W/ MANHOLE
- PROPOSED WATER
- PROPOSED STORM SEWER W/ MANHOLE
- PROPOSED STORM SEWER INLET

Know what's below. Call before you dig.

30 0 30 60
SCALE: 1" = 30'

DESIGNED BY: MDP
CHECKED BY: JRS
DRAWN BY: MDP

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
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THE TRUE LIFE COMPANIES

BERKELEY VILLAS
LANDSCAPE DRAIN PLAN

PROJECT #: 200810
SHEET NUMBER
17

FILEPATH: K:\200810\ENGINEERING\UTILITIES\STORM\CD_LANDSCAPE DRAIN PLAN.DWG LAYOUT: LAYOUT1
7 XREFs: e-base, e-legal, e-util, p-base, p-landscape, p-legal, p-util
PLOTTED: MON 10/17/22 11:41:54A BY: HUNTER THOMPSON

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.

PIPE TABLE

NAME	SIZE	LENGTH	MATERIAL	SLOPE	UPSTREAM INVERT	DOWNSTREAM INVERT
A-1A	8"	2.08'	HDPE	1.00%	5269.43	5269.41
A-1B	8"	16.38'	HDPE	1.00%	5269.41	5269.25
A-2A	8"	2.87'	HDPE	1.00%	5269.28	5269.25
A-2B	8"	18.98'	HDPE	1.00%	5269.25	5269.06
A-3A	8"	1.51'	HDPE	1.00%	5269.08	5269.06
A-4A	8"	17.69'	HDPE	1.00%	5269.06	5268.88
A-5A	8"	0.94'	HDPE	1.00%	5268.89	5268.88
A-6A	8"	17.69'	HDPE	1.00%	5268.88	5268.70
A-7A	8"	1.52'	HDPE	1.00%	5268.72	5268.70
A-8A	8"	18.98'	HDPE	1.00%	5268.70	5268.51
A-9	8"	2.88'	HDPE	1.00%	5268.54	5268.51
A-10	8"	30.23'	HDPE	1.00%	5268.51	5268.21
A-11	8"	45.40'	HDPE	1.00%	5268.21	5267.76
A-12	8"	8.18'	HDPE	1.00%	5267.80	5267.72
A-13	8"	124.32'	HDPE	1.00%	5269.17	5267.93
A-14	8"	1.39'	HDPE	1.00%	5271.81	5271.80
A-15	8"	128.44'	HDPE	2.80%	5271.80	5268.20

PIPE TABLE

NAME	SIZE	LENGTH	MATERIAL	SLOPE	UPSTREAM INVERT	DOWNSTREAM INVERT
A-16	8"	27.00'	HDPE	1.00%	5268.20	5267.93
A-17	8"	12.69'	HDPE	1.00%	5267.93	5267.80
B-1A	8"	8.13'	HDPE	1.00%	5272.20	5272.12
B-1B	8"	19.92'	HDPE	1.00%	5272.12	5271.92
B-2A	8"	8.46'	HDPE	1.00%	5272.00	5271.92
B-2B	8"	33.74'	HDPE	1.00%	5271.92	5271.58
B-3	8"	5.38'	HDPE	1.00%	5271.63	5271.58
B-4	8"	19.09'	HDPE	1.00%	5271.58	5271.39
B-5	8"	6.17'	HDPE	1.00%	5271.45	5271.39
B-6	8"	23.07'	HDPE	1.00%	5271.39	5271.16
B-7	8"	6.67'	HDPE	1.00%	5275.94	5275.87
B-8	8"	0.40'	HDPE	1.00%	5275.87	5275.87
B-9	8"	9.58'	HDPE	1.00%	5275.97	5275.87
B-10	8"	17.26'	HDPE	1.00%	5275.87	5275.70
B-11	8"	7.45'	HDPE	1.00%	5275.77	5275.70
B-12	8"	0.61'	HDPE	1.00%	5275.70	5275.69
B-13	8"	6.82'	HDPE	1.00%	5275.76	5275.69

PIPE TABLE

NAME	SIZE	LENGTH	MATERIAL	SLOPE	UPSTREAM INVERT	DOWNSTREAM INVERT
B-14	8"	16.70'	HDPE	1.00%	5275.69	5275.52
B-15	8"	4.98'	HDPE	1.00%	5275.57	5275.52
B-16	8"	0.40'	HDPE	1.00%	5275.52	5275.52
B-17	8"	4.48'	HDPE	1.00%	5275.56	5275.52
B-18	8"	18.99'	HDPE	1.00%	5275.52	5275.33
B-19	8"	4.56'	HDPE	1.00%	5275.38	5275.33
B-20	8"	4.40'	HDPE	1.00%	5275.37	5275.33
B-21	8"	18.92'	HDPE	1.00%	5275.33	5275.14
B-22	8"	4.85'	HDPE	1.00%	5275.19	5275.14
B-23	8"	0.38'	HDPE	1.00%	5275.14	5275.14
B-24	8"	5.12'	HDPE	1.00%	5275.19	5275.14
B-25	8"	11.25'	HDPE	1.00%	5275.14	5275.03
B-26	8"	30.88'	HDPE	5.00%	5275.03	5273.49
B-27	8"	20.97'	HDPE	5.00%	5273.56	5272.51
B-28	8"	5.69'	HDPE	1.00%	5272.57	5272.51
B-29	8"	14.72'	HDPE	1.00%	5272.51	5272.36
B-30	8"	4.74'	HDPE	1.00%	5272.41	5272.36

PIPE TABLE

NAME	SIZE	LENGTH	MATERIAL	SLOPE	UPSTREAM INVERT	DOWNSTREAM INVERT
B-31	8"	18.93'	HDPE	1.00%	5272.36	5272.17
B-32	8"	3.78'	HDPE	1.00%	5272.21	5272.17
B-33	8"	18.52'	HDPE	1.00%	5272.17	5271.98
B-34	8"	4.19'	HDPE	1.00%	5272.02	5271.98
B-35	8"	17.80'	HDPE	1.00%	5271.96	5271.78
B-36	8"	4.42'	HDPE	1.00%	5271.82	5271.78
B-37	8"	18.84'	HDPE	1.00%	5271.82	5271.63
B-38	8"	4.37'	HDPE	0.50%	5271.65	5271.63
B-39	8"	11.75'	HDPE	1.00%	5271.63	5271.51
B-40	8"	6.08'	HDPE	1.00%	5271.51	5271.45
B-41	8"	4.60'	HDPE	1.00%	5271.50	5271.45
B-42	8"	4.12'	HDPE	7.01%	5271.45	5271.16
B-43	8"	51.94'	HDPE	10.00%	5271.16	5265.97
C-1A	8"	2.28'	HDPE	1.00%	5271.93	5271.91
C-2A	8"	51.97'	HDPE	1.00%	5271.91	5271.39
C-3	8"	9.42'	HDPE	1.00%	5271.48	5271.39
C-4	8"	17.99'	HDPE	1.00%	5271.39	5271.21

PIPE TABLE

NAME	SIZE	LENGTH	MATERIAL	SLOPE	UPSTREAM INVERT	DOWNSTREAM INVERT
C-5	8"	12.35'	HDPE	1.00%	5271.21	5271.09
C-6	8"	27.27'	HDPE	1.00%	5271.09	5270.82
C-7	8"	11.02'	HDPE	1.00%	5270.82	5270.71
C-8	8"	5.64'	HDPE	1.00%	5270.71	5270.65
C-9	8"	2.28'	HDPE	1.00%	5275.84	5275.82
C-10	8"	125.92'	HDPE	3.66%	5275.82	5271.21
C-11	8"	1.42'	HDPE	1.00%	5276.01	5276.00
C-12	8"	119.05'	HDPE	3.23%	5276.00	5272.16
C-13	8"	15.27'	HDPE	1.00%	5272.16	5272.01
C-14	8"	30.06'	HDPE	0.50%	5273.65	5273.50
C-15	8"	18.42'	HDPE	1.00%	5273.50	5273.32
C-16	8"	19.09'	HDPE	1.00%	5273.32	5273.13
C-17	8"	19.04'	HDPE	1.00%	5273.13	5272.94
C-18	8"	17.54'	HDPE	1.00%	5272.94	5272.76
C-19	8"	27.59'	HDPE	1.00%	5272.76	5272.48
C-20	8"	42.44'	HDPE	1.00%	5272.48	5272.06
C-21	8"	4.89'	HDPE	1.00%	5272.06	5272.01

PIPE TABLE

NAME	SIZE	LENGTH	MATERIAL	SLOPE	UPSTREAM INVERT	DOWNSTREAM INVERT
C-22	8"	17.69'	HDPE	6.73%	5272.01	5270.82
C-23	8"	5.95'	HDPE	5.00%	5273.80	5273.50
C-24	8"	5.95'	HDPE	5.00%	5273.80	5273.50
C-25	8"	4.70'	HDPE	5.00%	5273.56	5273.32
C-26	8"	4.69'	HDPE	5.00%	5273.55	5273.32
C-27	8"	4.70'	HDPE	5.00%	5273.37	5273.13
C-28	8"	4.69'	HDPE	5.00%	5273.36	5273.13
C-29	8"	4.71'	HDPE	5.00%	5273.18	5272.94
C-30	8"	4.69'	HDPE	5.00%	5273.17	5272.94
C-31	8"	5.46'	HDPE	5.00%	5273.03	5272.76
C-32	8"	5.36'	HDPE	5.00%	5273.03	5272.76
D-1A	8"	1.38'	HDPE	1.00%	5278.46	5278.44
D-2	8"	131.66'	HDPE	4.52%	5278.44	5272.49
D-3	8"	1.42'	HDPE	1.00%	5278.35	5278.34
D-4	8"	131.64'	HDPE	4.25%	5278.34	5272.74
D-5	8"	5.98'	HDPE	10.00%	5275.14	5274.54
D-6	8"	5.92'	HDPE	10.00%	5275.13	5274.54

PIPE TABLE

NAME	SIZE	LENGTH	MATERIAL	SLOPE	UPSTREAM INVERT	DOWNSTREAM INVERT
D-7	8"	4.73'	HDPE	10.00%	5274.83	5274.36
D-8	8"	4.67'	HDPE	10.00%	5274.83	5274.36
D-9	8"	4.73'	HDPE	10.00%	5274.65	5274.18
D-10	8"	4.67'	HDPE	10.00%	5274.65	5274.18
D-11	8"	4.73'	HDPE	10.00%	5274.47	5274.00
D-12	8"	4.67'	HDPE	10.00%	5274.47	5274.00
D-13	8"	6.34'	HDPE	10.00%	5274.45	5273.82
D-14	8"	5.86'	HDPE	10.00%	5274.41	5273.82
D-15	8"	1.38'	HDPE	1.00%	5280.78	5280.77
D-16	8"	122.50'	HDPE	1.00%	5280.77	5279.54
D-17	8"	58.02'	HDPE	10.00%	5279.54	5273.74
E-1A	8"	101.52'	HDPE	5.00%	5271.08	5266.00
E-2A	8"	101.52'	HDPE	5.00%	5271.08	5266.00
E-3	8"	93.08'	HDPE	5.00%	5273.72	5269.07
E-4	8"	18.74'	HDPE	10.00%	5269.07	5267.20
E-5	8"	93.08'	HDPE	5.00%	5272.52	5267.87
E-6	8"	6.74'	HDPE	10.00%	5267.87	5267.20

PIPE TABLE

NAME	SIZE	LENGTH	MATERIAL	SLOPE	UPSTREAM INVERT	DOWNSTREAM INVERT
E-7	8"	2.87'	HDPE	10.00%	5266.65	5266.36
E-8	8"	6.62'	HDPE	10.00%	5267.31	5266.65
E-9	8"	138.67'	HDPE	5.96%	5275.12	5266.85
E-10	8"	6.04'	HDPE	10.00%	5267.50	5266.90
E-11	8"	4.90'	HDPE	10.00%	5267.44	5266.95
E-12	8"	5.02'	HDPE	10.00%	5267.50	5267.00
E-13	8"	5.14'	HDPE	10.00%	5267.56	5267.05
F-1A	8"	7.28'	HDPE	1.00%	5274.69	5274.62
F-2A	8"	50.71'	HDPE	1.00%	5274.62	5274.11
F-3A	8"	24.72'	HDPE	1.00%	5274.11	5273.86
F-4	8"	2.66'	HDPE	1.00%	5273.89	5273.86
F-5	8"	19.08'	HDPE	1.00%	5273.86	5273.67
F-6	8"	2.66'	HDPE	1.00%	5273.70	5273.67
F-7	8"	19.08'	HDPE	1.00%	5273.67	5273.48
F-8	8"	2.65'	HDPE	1.00%	5273.51	5273.48
F-9	8"	18.37'	HDPE	1.00%	5273.48	5273.30
F-10	8"	3.90'	HDPE	1.00%	5273.34	5273.30

PIPE TABLE

NAME	SIZE	LENGTH	MATERIAL	SLOPE	UPSTREAM INVERT	DOWNSTREAM INVERT
F-11	8"	33.28'	HDPE	1.00%	5273.30	5272.97
F-12	8"	5.39'	HDPE	1.00%	5272.97	5272.92
F-13	8"	8.90'	HDPE	1.00%	5273.01	5272.92
F-14	8"	0.88'	HDPE	1.00%	5272.92	5272.91
F-15	8"	9.25'	HDPE	1.00%	5273.00	5272.91
F-16	8"	46.32'	HDPE	13.54%	5272.91	5266.64
G-1A	8"	19.09'	HDPE	1.00%	5274.15	5273.96
G-2	8"	19.04'	HDPE	1.00%	5273.96	5273.77
G-3	8"	15.99'	HDPE	1.00%	5273.77	5273.61
G-4	8"	1.97'	HDPE	1.00%	5273.61	5273.59
G-5	8"	16.11'	HDPE	1.00%	5273.59	5273.43
G-6A	8"	1.50'	HDPE	1.00%	5273.43	5273.41
G-6B	8"	5.89'	HDPE	1.00%	5273.41	5273.36
G-7	8"	42.68'	HDPE	14.43%	5273.36	5267.20
G-8	8"	96.17'	HDPE	1.00%	5275.00	5274.04
G-9	8"	67.53'	HDPE	1.00%	5274.04	5273.36
G-10	8"	4.46'	HDPE	2.34%	5274.25	5274.15

PIPE TABLE

NAME	SIZE	LENGTH	MATERIAL	SLOPE	UPSTREAM INVERT	DOWNSTREAM INVERT
G-11	8"	9.46'	HDPE	0.50%	5274.19	5274.15
G-12	8"	4.46'	HDPE	1.00%	5274.00	5273.96
G-13	8"	9.46'	HDPE	1.00%	5274.05	5273.96
G-14	8"	4.46'	HDPE	1.00%	5273.81	5273.77
G-15	8"	9.46'	HDPE	1.00%	5273.86	5273.77
G-16	8"	5.41'	HDPE	1.00%	5273.66	5273.61
G-17	8"	11.50'	HDPE	1.00%	5273.71	5273.59
G-18	8"	7.93'	HDPE	1.00%	5273.51	5273.43
G-19	8"	12.42'	HDPE	1.00%	5273.53	5273.41
H-1	8"	6.21'	HDPE	3.00%	5271.94	5271.75
H-2	8"	28.55'	HDPE	3.00%	5271.75	5270.89
H-3	8"	3.75'	HDPE	5.00%	5271.08	5270.89
H-4	8"	44.73'	HDPE	3.00%	5270.89	5269.55
H-5	8"	3.82'	HDPE	5.00%	5269.74	5269.55
H-6	8"	25.63'	HDPE	1.00%	5269.55	5269.29
H-7	8"	4.05'	HDPE	1.00%	5269.33	5269.29
H-8	8"	57.78'	HDPE	0.50%	5269.29	5269.00

PIPE TABLE

NAME	SIZE	LENGTH	MATERIAL	SLOPE	UPSTREAM INVERT	DOWNSTREAM INVERT
H-9	8"	4.88'	HDPE	0.50%	5269.00	5268.98
H-10	8"	2.00'	HDPE	0.50%	5268.98	5268.97
H-11	8"	0.85'	HDPE	0.50%	5268.97	5268.97
H-12	8"	19.30'	HDPE	0.50%	5268.97	5268.87
H-13	8"	1.50'	HDPE	0.50%	5268.88	5268.87
H-14	8"	19.08'	HDPE	0.50%	5268.87	5268.77
H-15	8"	1.51'	HDPE	0.50%	5268.78	5268.77
H-16	8"	18.30'	HDPE	0.50%	5268.77	5268.68
H-17	8"	1.50'	HDPE	0.50%	5268.69	5268.69
H-18	8"	17.42'	HDPE	0.50%	5268.68	5268.59
H-19	8"	2.80'	HDPE	0.50%	5268.60	5268.59
H-20	8"	26.33'	HDPE	0.50%	5268.59	5268.46
H-21	8"	41.56'	HDPE	0.50%	5268.46	5268.25
H-22	8"	7.20'	HDPE	1.00%	5270.90	5270.83
H-23	8"	96.91'	HDPE	1.00%	5271.87	5270.90
H-24	8"	27.00'	HDPE	1.00%	5271.17	5270.90
H-25	8"	96.92'	HDPE	1.00%	5272.14	5271.17

FILEPATH: K:\200810\ENGINEERING\UTILITIES\STORM\CD - LANDSCAPE DRAIN PLAN.DWG LAYOUT: LAYOUT2
7 XREFs: e-base, e-legal, e-util, p-base, p-landscape, p-legal, p-util
PLOTTED: MON 10/17/22 11:41:56A BY: HUNTER THOMPSON

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

DESIGNED BY: FDM
CHECKED BY: JRS
DRAWN BY: FDM

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
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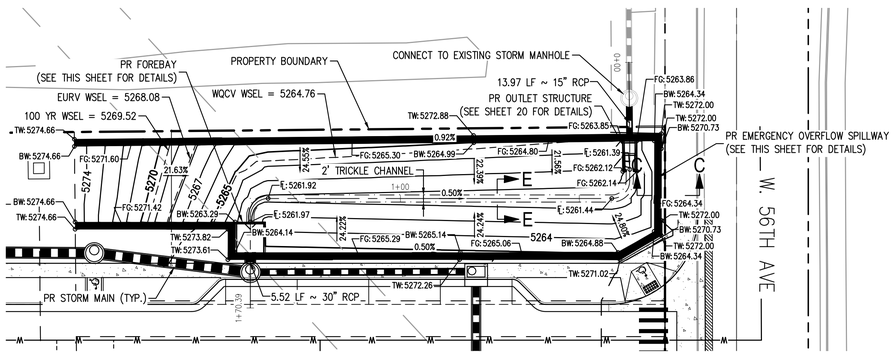
HarrisKocherSmith.com

THE TRUE LIFE COMPANIES

BERKELEY VILLAS
LANDSCAPE DRAIN TABLES

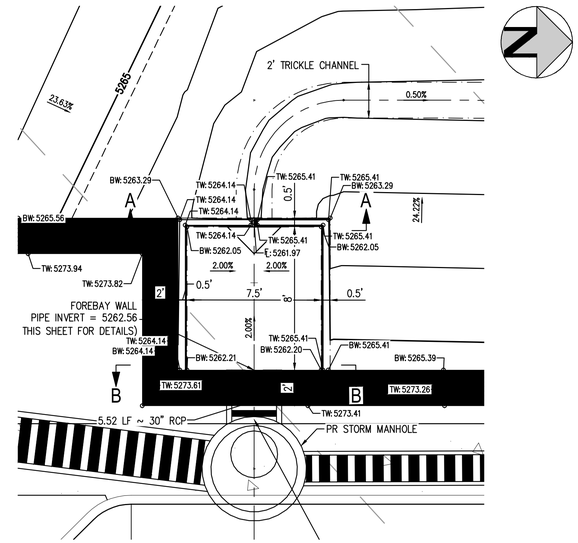
PROJECT #: 200810
SHEET NUMBER
18

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.



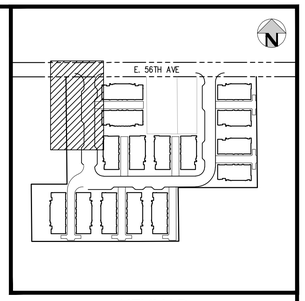
WATER QUALITY/DETENTION POND – PLAN

SCALE: 1" = 20'



FOREBAY PLAN

SCALE: 1" = 4'

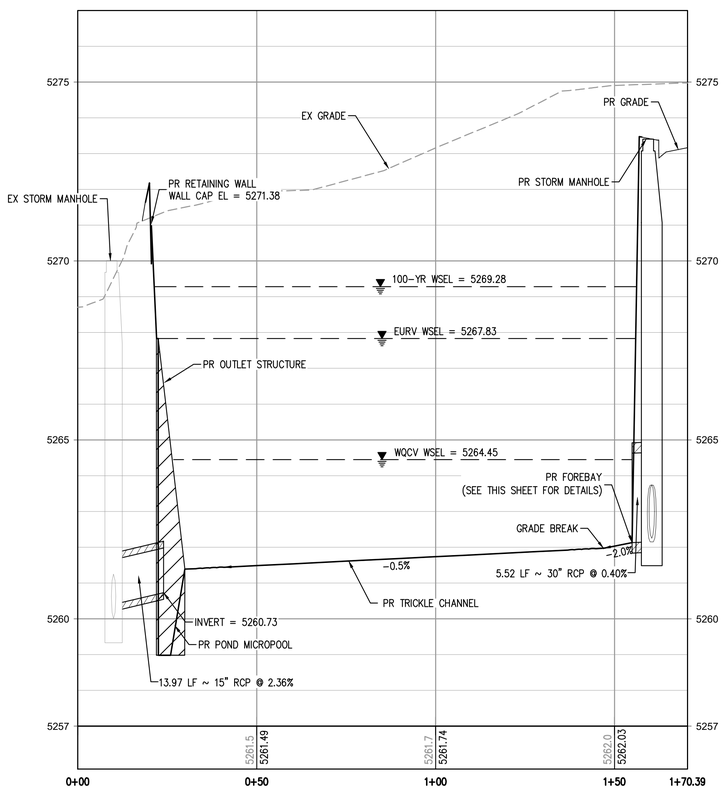


KEYMAP

SCALE 1" = 200'

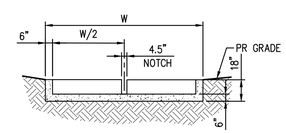
STRUCTURAL DESIGN NOTE:

CONTRACTOR SHALL PROVIDE ENGINEERED SHOP DRAWINGS, DESIGNED BY A LICENSED ENGINEER, DETAILING THE STRUCTURAL DESIGN OF THE FOREBAY, ENERGY DISSIPATING BAFFLES, OUTLET STRUCTURE, INLET COLLAR, AND RETAINING WALLS. SHOP DRAWING MUST BE APPROVED BY ENGINEER OF RECORD AND ADAMS COUNTY PRIOR TO CONSTRUCTION. RETAINING WALLS TO BE DESIGNED WITH APPROPRIATE SAFETY RAILING AND WALL GEOGRID SHALL NOT EXTEND INTO THE RIGHT OF WAY.



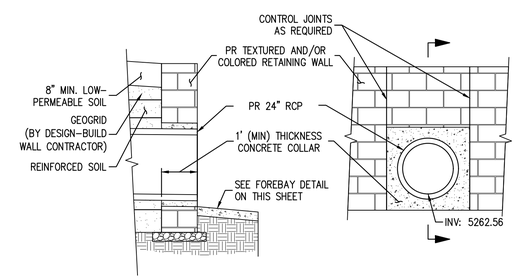
WATER QUALITY - DETENTION PROFILE

HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 2'



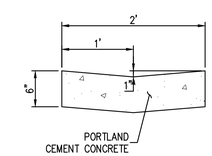
SECTION A–A
FOREBAY NOTCH (TYP)

N.T.S.



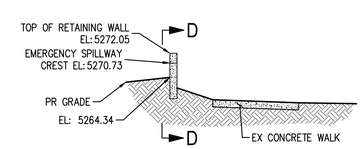
SECTION B–B
EAST FOREBAY INLET PIPE AND WALL

N.T.S.



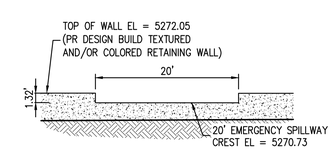
SECTION E–E
2' TRICKLE CHANNEL

NTS



SECTION C–C
EMERGENCY OVERFLOW SPILLWAY

NTS



SECTION D–D
EMERGENCY OVERFLOW SPILLWAY

NTS

Know what's below. Call before you dig.

SCALE: 1" = 10'

DESIGNED BY: JA
CHECKED BY: JRS
DRAWN BY: JA

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

HARRIS KOCHER SMITH
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THE TRUE LIFE COMPANIES

BERKELEY VILLAS
DETENTION POND PLAN

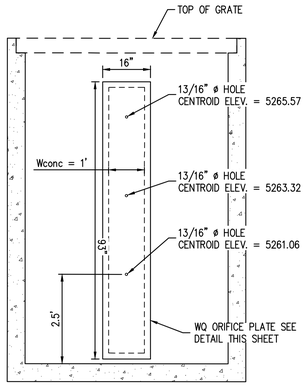
PROJECT #: 200810

SHEET NUMBER

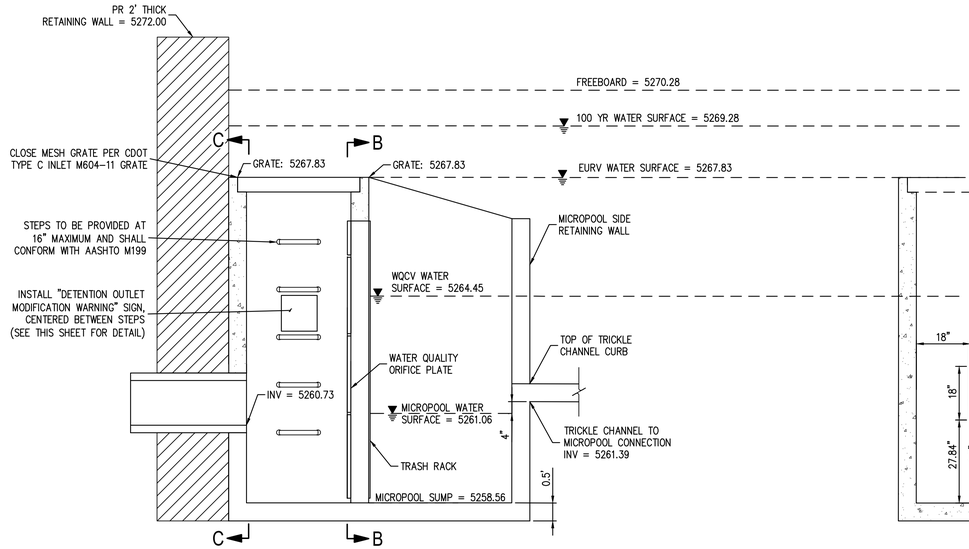
19

FILEPATH: K:\200810\ENGINEERING\UTILITIES\STORM\CD_DETENTION POND PLAN.DWG LAYOUT: LAYOUT1
7 XREFs: e-base, e-legal, e-utl, keymap, p-base, p-legal, p-utl
PLOTTED: MON 10/17/22 11:42:31A BY: HUNTER THOMPSON

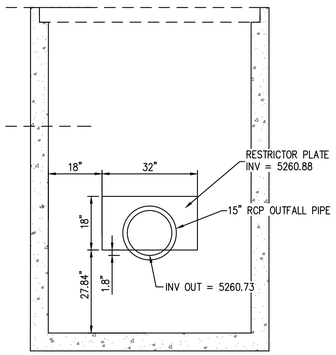
NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.



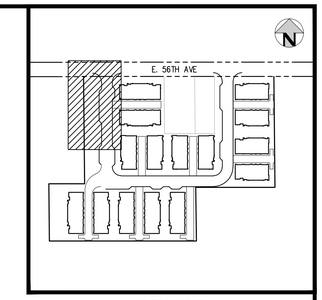
OUTLET STRUCTURE
SECTION B–B



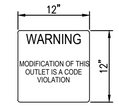
OUTLET STRUCTURE
SECTION A–A



OUTLET STRUCTURE
SECTION C–C



KEYMAP
SCALE 1" = 200'



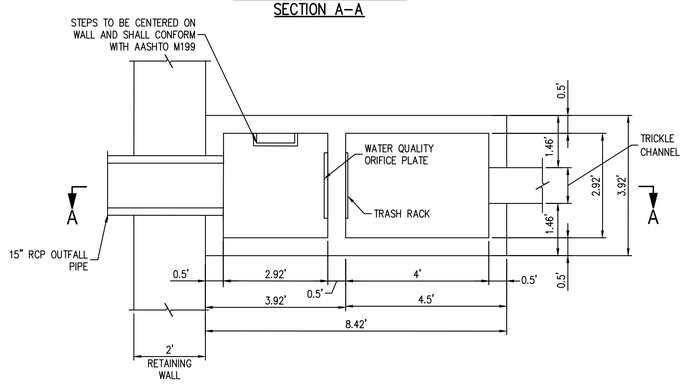
DETENTION OUTLET MODIFICATION
WARNING SIGN DETAIL
N.T.S.

NOTES:

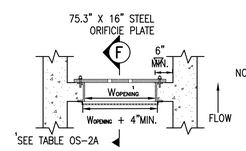
1. OUTLET BOX REINFORCEMENT SHALL BE A MODIFIED TYPE C INLET BOX PER CDOT STANDARDS M–604–1.
2. ALL ORIFICE PLATES SHALL BE 1/2" STAINLESS STEEL PER MHFD STANDARDS.
3. FASTEN ORIFICE PLATES AND TRASH RACK TO WALLS WITH 5/16" DIAMETER BOLTS CAST INTO THE CONCRETE. BOLTS FOR ORIFICE PLATES SHALL BE LOCATED TO ALIGN WITH BOLT HOLES SHOWN IN THE ORIFICE PLATE DETAILS. BOLTS FOR TRASH RACK SHALL BE EVENLY SPACED AT 12" O.C. MAXIMUM.

STRUCTURAL DESIGN NOTE:

CONTRACTOR SHALL PROVIDE ENGINEERED SHOP DRAWINGS, DESIGNED BY A LICENSED ENGINEER, DETAILING THE STRUCTURAL DESIGN OF THE FOREBAY, ENERGY DISSIPATING BAFFLES, OUTLET STRUCTURE, INLET COLLAR, AND RETAINING WALLS. SHOP DRAWING MUST BE APPROVED BY ENGINEER OF RECORD AND ADAMS COUNTY PRIOR TO CONSTRUCTION. RETAINING WALLS TO BE DESIGNED WITH APPROPRIATE SAFETY RAILING AND WALL GEOGRID SHALL NOT EXTEND INTO THE RIGHT OF WAY.



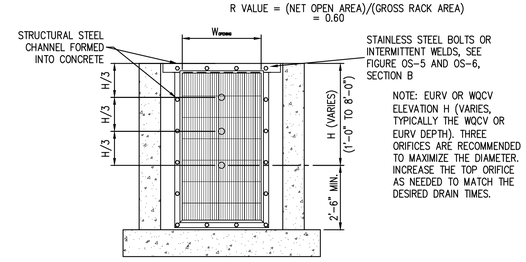
OUTLET STRUCTURE
PLAN VIEW
N.T.S.



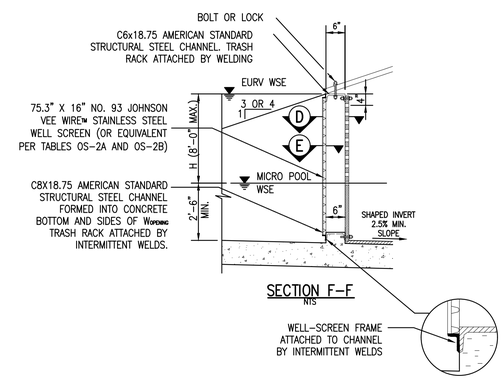
SECTION D–D
NTS

SECTION E–E
NTS

R VALUE = (NET OPEN AREA)/(GROSS RACK AREA)
= 0.60



ORIFICE PLATE & TRASH RACK ELEVATION VIEW



SECTION F–F
NTS

TYPICAL OUTLET STRUCTURE
WITH WELL SCREEN TRASH RACK

ORIFICE PLATE & TRASH RACK NOTES:

ORIFICE PLATE NOTES:

1. PROVIDE CONTINUOUS NEOPRENE GASKET MATERIAL BETWEEN THE ORIFICE PLATE AND CONCRETE.
2. BOLT PLATE TO CONCRETE 12" MAX. ON CENTER. SEE TABLE OS-2 FOR PLATE THICKNESS.

EURV AND WQCV TRASH RACKS:

1. WELL-SCREEN TRASH RACKS SHALL BE STAINLESS STEEL AND SHALL BE ATTACHED BY INTERMITTENT
2. WELDS ALONG THE EDGE OF THE MOUNTING FRAME.
3. BAR GATE TRASH RACKS SHALL BE ALUMINUM AND SHALL BE BOLTED USING STAINLESS STEEL HARDWARE.
4. TRASH RACK OPEN AREAS ARE FOR SPECIFIED TRASH RACK MATERIALS. TOTAL TRASH RACK SIZE MAY NEED TO BE ADJUSTED FOR MATERIALS HAVING DIFFERENT OPEN AREA/GROSS AREA RATIO (R VALUE).
5. STRUCTURAL DESIGN OF TRASH RACKS SHALL BE BASED ON FULL HYDROSTATIC HEAD WITH ZERO HEAD DOWNSTREAM OF THE RACK.

OVERFLOW SAFETY GRATES:

1. ALL SAFETY GRATES SHALL BE MOUNTED USING STAINLESS STEEL HARDWARE AND PROVIDED WITH HINGED AND LOCKABLE OR BOLTABLE ACCESS PANELS.
2. SAFETY GRATES SHALL BE STAINLESS STEEL, ALUMINUM, OR STEEL. STEEL GRATES SHALL BE HOT DIP GALVANIZED AND MAY BE HOT POWDER COATED AFTER GALVANIZING.
3. SAFETY GRATES SHALL BE DESIGNED SUCH THAT THE DIAGONAL DIMENSION OF EACH OPENING IS SMALLER THAN THE DIAMETER OF THE OUTLET PIPE.
4. STRUCTURAL DESIGN OF SAFETY GRATES SHALL BE BASED ON FULL HYDROSTATIC HEAD WITH ZERO HEAD DOWNSTREAM OF THE RACK.

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

DESIGNED BY: JA
CHECKED BY: JRS
DRAWN BY: JA

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

HARRIS KOCHER SMITH
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Denver, Colorado 80203
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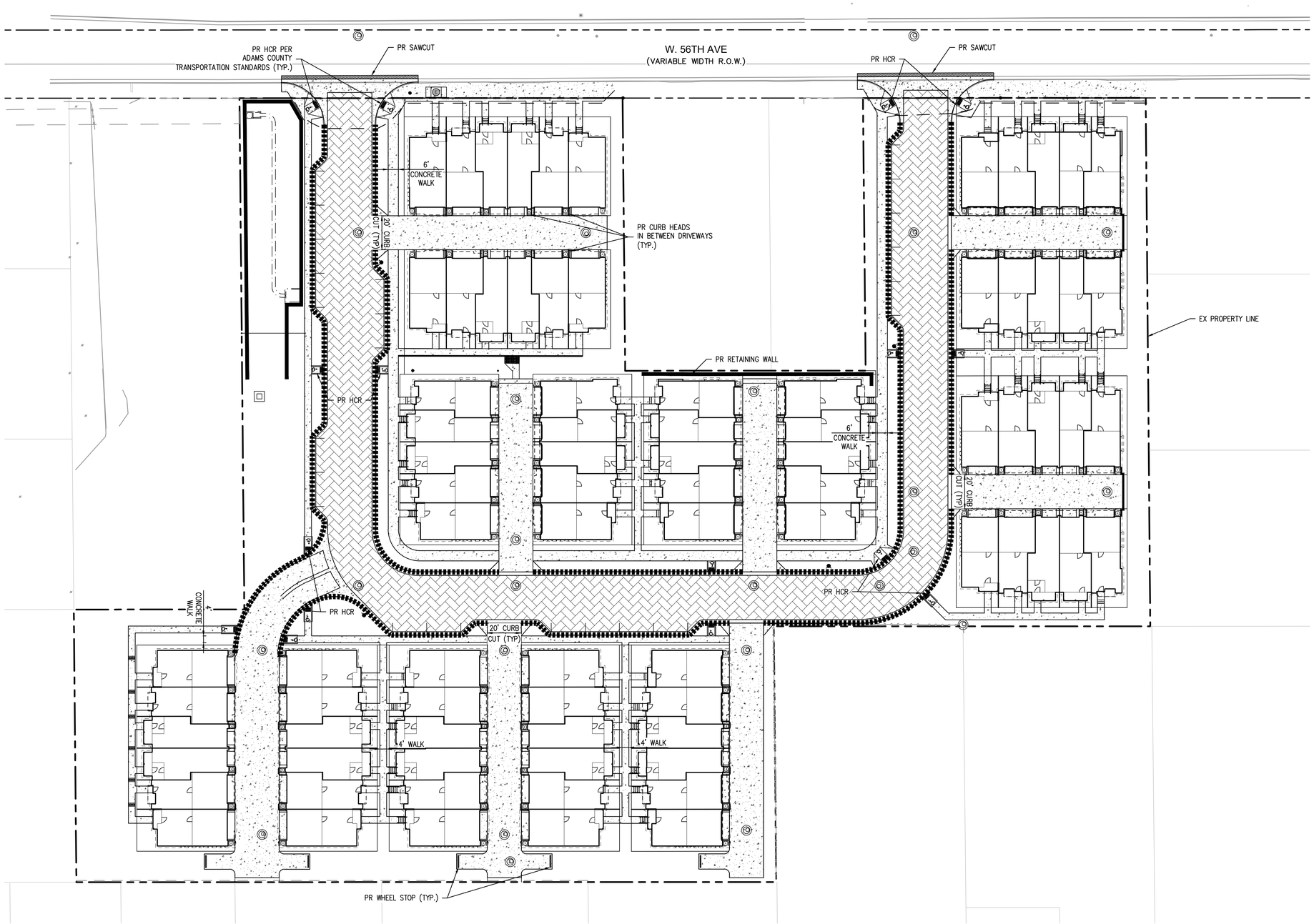
THE TRUE LIFE COMPANIES

BERKELEY VILLAS
DETENTION POND DETAILS

PROJECT #: 200810
SHEET NUMBER
20

FILEPATH: K:\200810\ENGINEERING\UTILITIES\STORM\CD - DETENTION POND DETAILS.DWG LAYOUT: 19 DETENTION POND DETAILS
NO XREFS
PLOTTED: MON 10/17/22 11:42:44A BY: HUNTER THOMPSON

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.



LEGEND:

PROPOSED 6" VERTICAL CURB & GUTTER (1' CATCH)

CONCRETE PAVEMENT

ASPHALT PAVEMENT

NOTES:

APPROVED GEOTECH REPORT BY CTL THOMPSON DATED DECEMBER 10, 2019 AND REVISED JANUARY 29, 2021

FILEPATH: K:\200810\ENGINEERING\ROADWAY\CD - PAVING PLAN.DWG LAYOUT: 20 PAVING PLAN
6 XREFs: e-base, e-legal, e-util, p-base, p-legal, p-util
PLOTTED: MON 10/17/22 11:42:51A BY: HUNTER THOMPSON

Know what's below. Call before you dig.

30 0 30 60
SCALE: 1" = 30'

DESIGNED BY: HT
CHECKED BY: SM
DRAWN BY: HT

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
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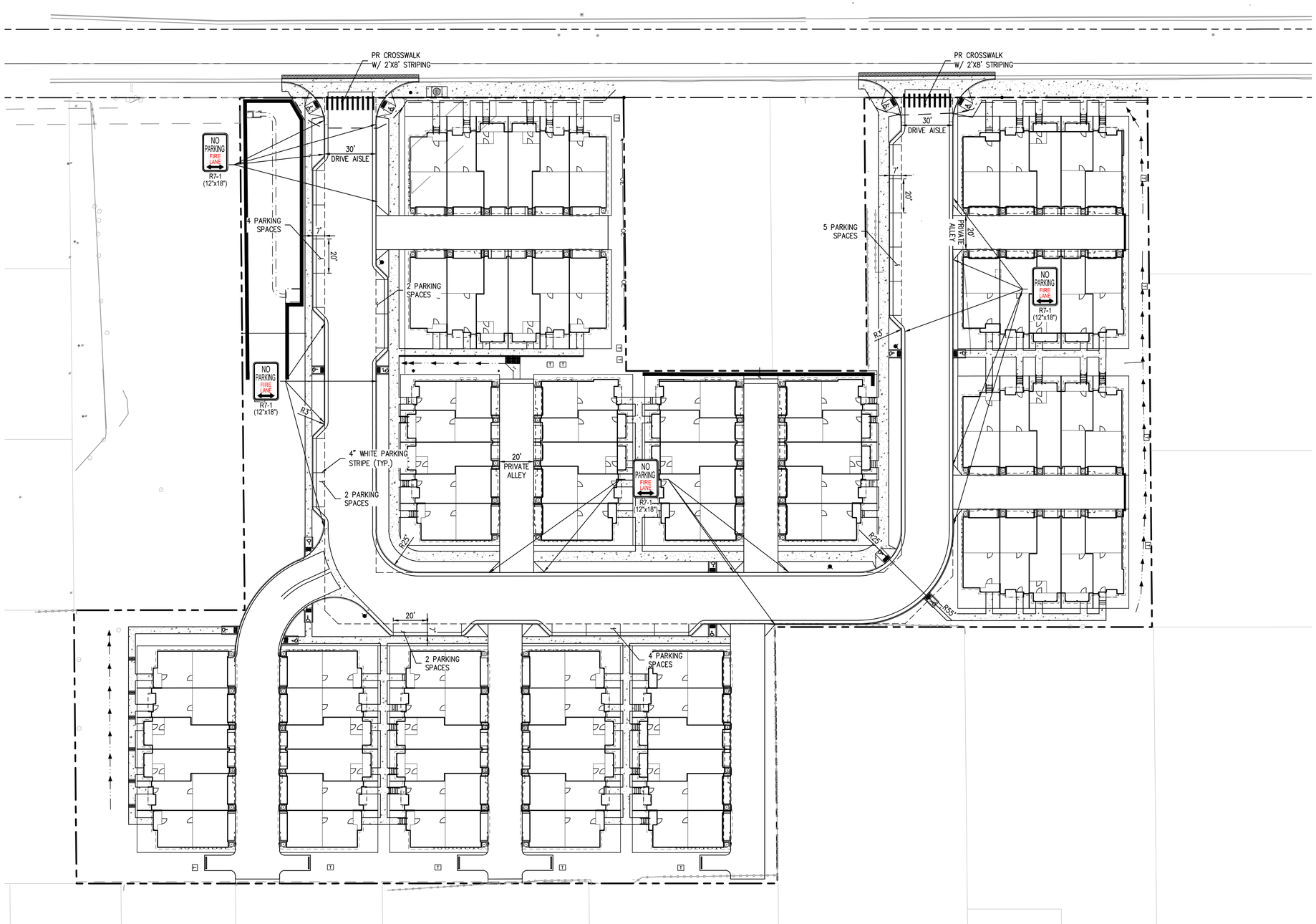
HarrisKocherSmith.com

THE TRUE LIFE COMPANIES

BERKELEY VILLAS
PAVING PLAN

PROJECT #: 200810
SHEET NUMBER
21

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.



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FILEPATH: K:\200810\ENGINEERING\ROADWAY\CD - SIGNAGE & STRIPING PLAN.DWG LAYOUT: 21 SIGNAGE & STRIPING PLAN
NO XREFs
PLOTTED: MON 10/17/22 11:43:00A BY: HUNTER THOMPSON

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

30 0 30 60
SCALE: 1" = 30'

DESIGNED BY: HT
CHECKED BY: SM
DRAWN BY: HT

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

THE TRUE LIFE COMPANIES

BERKELEY VILLAS
SIGNAGE & STRIPING PLAN

PROJECT #: 200810
SHEET NUMBER
22

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Storm Sewer Utility - Trace Wire Specification

- **Service Laterals on public property** - Trace wire must terminate at an approved grade level/in-ground trace wire access box, located at the edge of the road right-of-way, and out of the roadway.
- **Service Laterals on private property** - Trace wire must terminate at an approved above-ground trace wire access box, affixed to the building exterior directly above where the utility enters the building, at an elevation not greater than 5 vertical feet above finished grade, or terminate at an approved grade level/in-ground trace wire access box, located within 2 linear feet of the building being served by the utility.
- **Long-runs, in excess of 500 linear feet without service laterals** - Trace wire access must be provided utilizing an approved grade level/in-ground trace wire access box, located at the edge of the road right-of-way, and out of the roadway. The grade level/in-ground trace wire access box shall be delineated using a minimum 48" polyethylene marker post, color coded per APWA standard for the specific utility being marked.

Grounding

- Trace wire must be properly grounded at all dead ends/stubs
- Grounding of trace wire shall be achieved by use of a drive-in magnesium grounding anode rod with a minimum of 20ft of #12 red HDPE insulated copper clad steel wire connected to anode (minimum 1.5 lb.) specifically manufactured for this purpose, and buried at the same elevation as the utility.
- When grounding the trace wire at dead ends/stubs, the grounding anode shall be installed in a direction 180 degrees opposite of the trace wire, at the maximum possible distance.
- When grounding the trace wire in areas where the trace wire is continuous and neither the mainline trace wire or the grounding anode wire will be terminated at/above grade, install grounding anode directly beneath and in-line with the trace wire. Do not coil excess wire from grounding anode. In this installation method, the grounding anode wire shall be trimmed to an appropriate length before connecting to trace wire with a mainline to lateral lug connector.
- Where the anode wire will be connected to a trace wire access box, a minimum of 2 ft. of excess/slack wire is required after meeting final elevation.

Installation

General

- Trace wire installation shall be performed in such a manner that allows proper access for connection of line tracing equipment, proper locating of wire without loss or deterioration of low frequency (512Hz) signal for distances in excess of 1,000 linear feet, and without distortion of signal caused by multiple wires being installed in close proximity to one another.
- Trace wire systems must be installed as a single continuous wire, except where using approved connectors. No looping or coiling of wire is allowed.

Storm Sewer Utility - Trace Wire Specification

Materials

General

All trace wire and trace wire products shall be domestically manufactured in the U.S.A.

All trace wire shall have HDPE insulation intended for direct bury, color coated per APWA standard for the specific utility being marked.

Trace wire

- **Open Trench -** Trace wire shall be #12 AWG Copper Clad Steel, High Strength with minimum 450 lb. break load, with minimum 30 mil HDPE insulation thickness.
- **Directional Drilling/Boring -** Trace wire shall be #12 AWG Copper Clad Steel, Extra High Strength with minimum 1,150 lb. break load, with minimum 30 mil HDPE insulation thickness.
- **Trace wire – Pipe Bursting/Slip Lining -** Trace wire shall be 7 x 7 Stranded Copper Clad Steel, Extreme Strength with 4,700 lb. break load, with minimum 50 ml HDPE insulation thickness.

Connectors

- All mainline trace wires must be interconnected in intersections, at mainline tees and mainline crosses. At tees, the three wires shall be joined using a single 3-way lockable connector. At Crosses, the four wires shall be joined using a 4-way connector. Use of two 3-way connectors with a short jumper wire between them is an acceptable alternative.
- **Direct bury wire connectors** – shall include 3-way lockable connectors and mainline to lateral lug connectors specifically manufactured for use in underground trace wire installation. Connectors shall be dielectric silicon filled to seal out moisture and corrosion, and shall be installed in a manner so as to prevent any uninsulated wire exposure.
- Non locking friction fit, twist on or taped connectors are prohibited.

Termination/Access

- All trace wire termination points must utilize an approved trace wire access box (above ground access box or grade level/in-ground access box as applicable), specifically manufactured for this purpose.
- All grade level/in-ground access boxes shall be appropriately identified with "sewer" or "water" cast into the cap and be color coded.
- A minimum of 2 ft. of excess/slack wire is required in all trace wire access boxes after meeting final elevation.
- All trace wire access boxes must include a manually interruptible conductive/connective link between the terminal(s) for the trace wire connection and the terminal for the grounding anode wire connection.
- Grounding anode wire shall be connected to the identified (or bottom) terminal on all access boxes.

Storm Sewer Utility - Trace Wire Specification

- Any damage occurring during installation of the trace wire must be immediately repaired by removing the damaged wire and installing a new section of wire with approved connectors. Taping and/or spray coating shall not be allowed.
- Trace wire shall be installed at the bottom half of the pipe and secured (taped/tied) at 5' intervals.
- Trace wire must be properly grounded as specified.
- Trace wire on all service laterals/stubs must terminate at an approved trace wire access box located directly above the utility, at the edge of the road right-of-way, but out of the roadway. (See Trace wire Termination/Access)
- At all mainline dead-ends, trace wire shall go to ground using an approved connection to a drive-in magnesium grounding anode rod, buried at the same depth as the trace wire. (See Grounding)
- Mainline trace wire shall not be connected to existing conductive pipes. Treat as a mainline dead-end, ground using an approved waterproof connection to a grounding anode buried at the same depth as the trace wire.
- All service lateral trace wires shall be a single wire, connected to the mainline trace wire using a mainline to lateral lug connector, installed without cutting/splicing the mainline trace wire.
- In occurrences where an existing trace wire is encountered on an existing utility that is being extended or tied into, the new trace wire and existing trace wire shall be connected using approved splice connectors and shall be properly grounded at the splice location as specified.

Storm Sewer System

This section shall be included at the discretion of the facility owner.

- If the storm sewer system includes service laterals for connection of private drains and tile lines, it shall be specified the same as a sanitary sewer application.
- Lay mainline trace wire continuously, by-passing around the outside of manholes/structure on the North or East side.

Prohibited Products and Methods

The following products and methods shall not be allowed or acceptable

- Uninsulated trace wire
- Trace wire insulations other than HDPE
- Trace wires not domestically manufactured
- Non locking, friction fit, twist on or taped connectors
- Brass or copper ground rods
- Wire connections utilizing taping or spray-on waterproofing
- Looped wire or continuous wire installations, that has multiple wires laid side-by-side or in close proximity to one another
- Trace wire wrapped around the corresponding utility
- Brass fittings with trace wire connection lugs

Storm Sewer Utility - Trace Wire Specification

- Wire terminations within the roadway, i.e. in valve boxes, cleanouts, manholes, etc.
- Connecting trace wire to existing conductive utilities

Testing

- After all of the trench backfill operations are successfully completed, and prior to the final paving, the CONTRACTOR shall perform continuity and trace tests on all tracer wire in the presence of the AGENCY. If the tracer wirer is found to be not continuous after testing, the CONTRACTOR shall repair or replace the failed segment of the wire. The CONTRACTOR shall be responsible for all costs to confirm, locate, and repair any breaks in the tracer wire identified in the continuity test. In addition, the CONTRACTOR shall reimburse the AGENCY for all costs incurred by the AGENCY in relation to retesting the tracer wire continuity including, but not limited to, inspection and observation. The CONTRACTOR is advised to use care in the installation and backfilling operations to prevent damage to the wire. The CONTRACTOR shall notify the AGENCY a minimum of two (2) working days in writing prior to installation of paving over the pipelines.

- All new trace wire installations shall be located using typical low frequency (512Hz) line tracing equipment, witnessed by the contractor, engineer and facility owner as applicable, prior to acceptance of ownership.

- This verification shall be performed upon completion of rough grading and again prior to final acceptance of the project.

- Continuity testing in lieu of actual line tracing shall not be accepted.

- Verification shall be witnessed by the utility or their designated representative.

Storm Sewer Utility - Trace Wire Specification

Products

The following products have been deemed acceptable and appropriate. These products are a guide only to help you choose the correct applications for your tracer wire project.

- Copper clad Steel (CCS) trace wire
  - Open Trench – Copperhead #12 High Strength part # 1230*-HS**
  - Directional Drilling/Boring - Copperhead Extra High Strength part # 1245*-EHS**
  - Pipe Bursting/Slip Lining – Copperhead SoloShot Extreme Strength 7 x 7 Stranded part # PBX-50*-**
    - * Denotes color: B=Blue, G-Green, P=Purple
    - **Denotes spool size. 500' 1000' 2500'
- Connectors
  - Copperhead 3-way locking connector part # LSC1230*
  - DryConn 3- way Direct Bury Lug: Copperhead Part # 3WB-01
- Termination/Access
  - Non-Roadway access boxes applications: Trace wire access boxes Grade level Copperhead adjustable lite duty Part # LD14*TP
  - Concrete / Driveway access box applications: Trace wire access boxes Grade level Copperhead Part # CD14*TP 14"
  - Fire hydrant trace wire access box applications: Above ground two terminal Cobra Test Station, denoting "F" includes hydrant mounting flange. Copperhead part # T2*-FLPKG-5/8 to fit hydrants with 5/8" bolts and T2*-FLPKG-3/4 to fit hydrants with ¾" b olts.

- Grounding
  - Drive in Magnesium Anode: Copperhead Part # ANO-12 (1.5 lb)

Manufacture product options:

The information provided by Copperhead Industries gives you product options to help you choose the correct wire – termination/access points – connectors and grounding products. Other manufactures provide these products; this information is only a guide.

FILEPATH: K:\200810\ENGINEERING\CD\CD - DETAILS.DWG LAYOUT: 22 - SITE DETAILS
NO XREFS
PLOTTED: MON 10/17/22 11:43:15A BY: HUNTER THOMPSON

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

DESIGNED BY:
CHECKED BY:
DRAWN BY:

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

THE TRUE LIFE COMPANIES

BERKELEY VILLAS
SITE DETAILS

PROJECT #: 200810
SHEET NUMBER
23
23 OF 24

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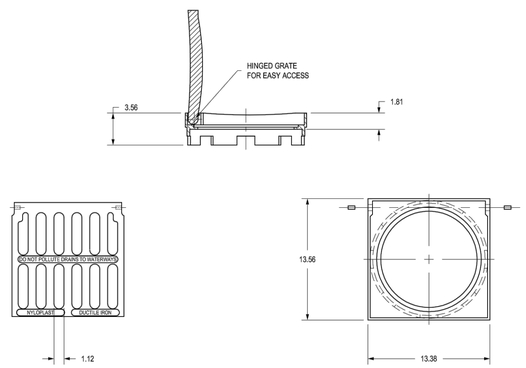
1299CGS

APPROX. DRAIN AREA = 60.62 SQ IN
APPROX. WEIGHT WITH FRAME = 40.68 LBS



DIMENSIONS ARE FOR REFERENCE ONLY
ACTUAL DIMENSIONS MAY VARY
DIMENSIONS ARE IN INCHES
GRATE MEETS H-20 LOAD RATING
QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70-50-05
PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT
LOCKING DEVICE AVAILABLE UPON REQUEST SEE DRAWING NO.
7001-110-035

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DRAWN BY	EBC	MATERIAL	DUCTILE IRON
DATE	03-03-06		
REVISED BY	CCA	PROJECT NO./NAME	
DATE	08-28-13		
DWG SIZE	A	SCALE 1:8	SHEET 1 OF 1

ADS Nyloplast — 3130 VERONA AVE, BUFORD, GA 30518, PHN (770) 932-2443, FAX (770) 932-2490, www.nyloplast-us.com

TITLE: 12 IN STANDARD GRATE ASSEMBLY
DWG NO. 7001-110-203 REV D

1599CGS

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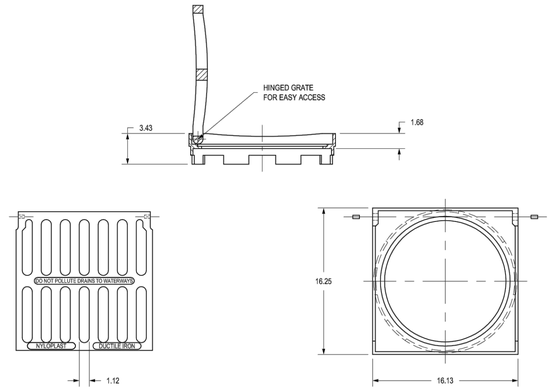

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7001-1-10-032

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DATE	03-07-06		
REVISED BY	CCA	PROJECT NO./NAME	
DATE	08-30-13		
DWG SIZE	A	SCALE 1:8	SHEET 1 OF 1

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TITLE: 15 IN STANDARD GRATE ASSEMBLY
DWG NO. 7001-110-208 REV D

2499CGS

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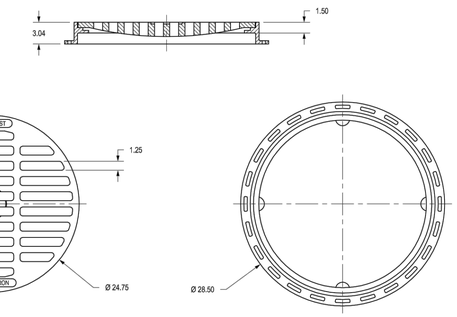

DIMENSIONS ARE FOR REFERENCE ONLY
ACTUAL DIMENSIONS MAY VARY
DIMENSIONS ARE IN INCHES
GRATE MEETS H-20 LOAD RATING
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PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT
LOCKING DEVICE AVAILABLE UPON REQUEST SEE DRAWING NO.
7001-1-10-024

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DATE	03-08-06		
REVISED BY	CCA	PROJECT NO./NAME	
DATE	08-30-13		
DWG SIZE	A	SCALE 1:10	SHEET 1 OF 1

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TITLE: 24 IN STANDARD GRATE ASSEMBLY - TYPE B
DWG NO. 7001-110-217 REV D

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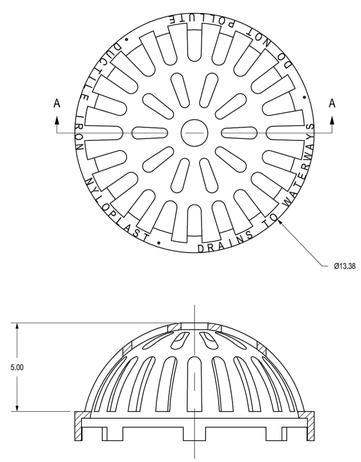

SECTION A-A

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DIMENSIONS ARE IN INCHES
QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70-50-05
PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT
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DATE	03-06-06		
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DATE	08-30-13		
DWG SIZE	A	SCALE 1:4	SHEET 1 OF 1

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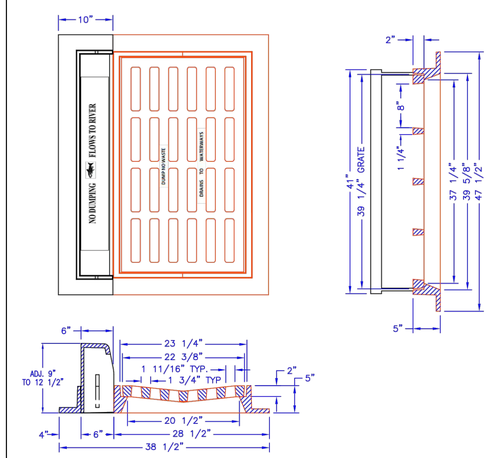


NO SCALE

NOTE:
① GRATE SHOWN IS THE DEETER-2502. SIMILAR GRATES BY OTHER MANUFACTURERS MUST BE APPROVED BY THE COUNTY PRIOR TO USE.
② REQUIRED FRAME IS NEENAH R-3362-1 (SINGLE) OR R-3363-1 (DOUBLE). SIMILAR FRAMES BY OTHER MANUFACTURERS MUST BE APPROVED BY THE COUNTY PRIOR TO USE.
③ GRATE & FRAME SHOWN FLAT FOR ILLUSTRATION PURPOSES ONLY.
④ ALSO SEE INLET BOX, TYPES 13 & 16 DETAIL

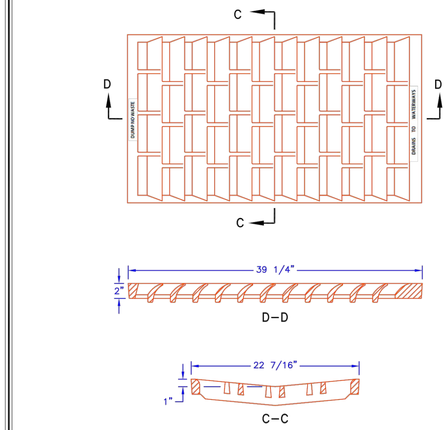
Adams County Public Works Engineering
4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601

TYPE 13 GRATE & FRAME

for Public and Private Structures

REVISION DATE: 9/15/2017 | FILE NAME: 13GRATE.DWG

Adams County Public Works Construction Insp.
4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601



NO SCALE

NOTE:
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② REQUIRED FRAME IS NEENAH R-3362-1 (SINGLE) OR R-3363-1 (DOUBLE). SIMILAR FRAMES BY OTHER MANUFACTURERS MUST BE APPROVED BY THE COUNTY PRIOR TO USE.
③ GRATE SHOWN FLAT FOR ILLUSTRATION PURPOSES ONLY.
④ ALSO SEE INLET BOX, TYPES 13 & 16 DETAIL

Adams County Public Works Engineering
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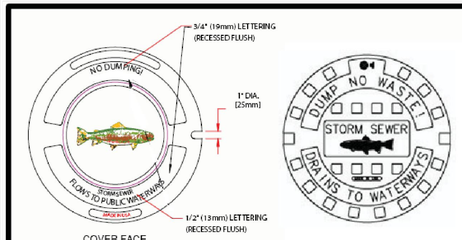
TYPE 16 GRATE

for Public and Private Structures

REVISION DATE: 9/15/2017 | FILE NAME: 16GRATE.DWG

Adams County Public Works Construction Insp.
4430 S. ADAMS COUNTY PKWY. BRIGHTON, CO 80601



COVER FACE

STORM SEWER
NO DUMPING << Fish image >> FLOWS TO RIVER

ADAMS COUNTY

PRIVATE
MANHOLE COVER
Casting Detail

Revision Date:
9/15/2017

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

DESIGNED BY:
CHECKED BY:
DRAWN BY:

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS
10-14-2022	PER CITY COMMENTS

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

THE TRUE LIFE COMPANIES

BERKELEY VILLAS
SITE DETAILS

PROJECT #: 200810
SHEET NUMBER
24
24 OF 24

FILEPATH: K:\200810\ENGINEERING\CD\CD_DETAILS.DWG LAYOUT: 22 - SITE DETAILS (2)
NO XREFs
PLOTTED: MON 10/17/22 11:43:16A BY: HUNTER THOMPSON

FINAL DRAINAGE REPORT

FOR

Berkeley Villas

June 13, 2022
Revised: October14, 2022

Prepared for:

The True Life Companies
1350 17th Street Suite 350
Denver, CO 80202
(720) 330-9211

Prepared by:

1120 Lincoln Street, Suite 1000
Denver, CO 80203
Ph: (303) 623-6300
Contact: John R. Stafford, P.E.

Harris Kocher Smith Project No. 200810

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ENGINEER CERTIFICATION

"I hereby certify this report (plan) for the Preliminary Drainage design of Berkeley Villas was prepared by me or under my direct supervision in accordance with the provisions of Adams County Storm Drainage Design and Technical Criteria for the owners thereof. I understand that Adams County does not and will not assume liability for drainage facilities designed by others."

_____ _____

John Russell Stafford, P.E. Date
State of Colorado No. 47210
On behalf of Harris Kocher Smith

OWNER CERTIFICATION

"The True Life Companies hereby certifies that the drainage facilities for Berkeley Villas shall be constructed according to the design presented in this report. I understand that Adams County does not and will not assume liability for the drainage facilities designed and/or certified by my engineer. I understand that Adams County reviews drainage plans pursuant to Colorado Revised Statues Title 30, Article 28; but cannot, on behalf of Berkeley Villas, guarantee that final drainage design review will absolve The True Life Companies and/or their successors and/or assigns the future liability for improper design. I further understand that approval of the Final Plat and/or Final Development Plan does not imply approval of my engineer's drainage design."

The True Life Companies_____
Name of Developer

_____ _____

Authorized Signature Date

I. GENERAL LOCATION AND DESCRIPTION

Location

The Berkeley Villas development (Site) is located east of Federal Boulevard, west of Clay Street, north of W. 55th Avenue and south of W. 56th Avenue. The Site is located within the Northeast Quarter of Section 17, Township 3 South, Range 68 West of the Sixth Principal Meridian, County of Adams, State of Colorado. A Vicinity Map is located in the appendices.

Description of Property

The Site is comprised of approximately 4.70 acres. The entire Site, including some area within the existing right-of-way, will be disturbed. The total area to be disturbed, including the right-of-way, will be 4.80 acres.

The Site is almost entirely covered with vegetation and trees. There are approximately three existing buildings on the Site with various smaller outbuildings. These existing buildings are single family residential buildings with various detached garages and storage sheds. The rest of the Site is undeveloped land consisting of vegetation, native grasses, and trees. The existing Site is composed of approximately 2 percent of hardscape and 98 percent of undeveloped land.

All grades slope from a high point at the southeast corner of the Site to the northwest corner of the Site at approximately 2 percent. There is approximately 25-feet of fall across the Site.

There are no known wetlands on the Site.

The Site is shown to be in a Zone X (unshaded) Flood Area, according to FIRM Map 08001C0592H County of Adams, State of Colorado, dated March 5, 2007. Zone X (unshaded), as depicted on the aforementioned Map, is described as

“Areas determined to be outside the 0.2% annual chance floodplain.” A copy of the FIRM map is included in the appendices.

At the time this report was written, the most comprehensive hydrologic soils information available was from the USDA Natural Resources Conservation Service Websoil Survey. The majority (95%) of the soil is comprised of hydrologic soil group A. The remainder of the soil, 3% and 2%, is comprised of hydrologic soil groups B and C/D, respectively. Hydrologic soil group A will be used for Rational method calculations. A copy of the soil report is included in the appendices.

Groundwater may be encountered during construction. Groundwater will be monitored for contamination throughout construction and discharged per City and State criteria as necessary. A Preliminary Geotech Investigation was conducted by CTL Thompson on December 10, 2019. Per their report, groundwater was encountered during drilling in three borings at depths of about 27 to 33 feet. A copy of this Geotech report can be found in the appendices.

The proposed project consists of 15 buildings containing a total of 82 dwelling units. All 15 buildings are composed of single-family townhomes. The development will include townhomes, alleys, active open spaces, and associated infrastructure to serve the Site. The development will increase the imperviousness of the Site from approximately 10% to 68%.

During construction, silt fence, inlet and outlet protection and vehicle tracking pads will be utilized to prevent sediment entering the storm sewer system or sediment leaving the Site. All other open space areas will be landscaped. The erosion and sediment control plan is part of the Construction Documents for this Site. All erosion and sediment control methods shall be maintained and repaired by the owner during construction and shall be inspected after each heavy precipitation event.

II. HISTORIC DRAINAGE BASINS AND SUB-BASINS

Drainage Conditions

Existing runoff from the Site drains overland by sheet flow towards W. 56th Ave, where it is collected and conveyed in concentrated flows via curb and gutter. The concentrated runoff flows west in 56th Ave. to storm sewer inlets within Federal Blvd. Other than minor swales and roof drainage serving the residential structures, the Site contains no known existing stormwater conveyance, treatment, or detention facilities. A Historical Drainage Map is included in the appendices.

Major Basin Description

According to the Mile High Flood District "General Data Viewer" the Site lies within the Clear Creek Basin. The Site is apart of the Master Plan titled Major Drainageway Planning, Phase A by Adams, Jefferson, and Denver Counties, Colorado dated February 2007 and Major Drainageway Planning, Phase B by Adams, Jefferson, and Denver Counties, Colorado dated February 2008. The Site lies within Reach 2 of the reports listed above. Site improvements will be designed in compliance with Master Plans.

Historic Drainage-Basin Description

Basin EX-A (2.79 acres) consists of rooftops, pavement, landscaping, and undeveloped land. The peak runoff from Basin EX-A is 0.69 cfs for the 5-year storm (minor storm event) and 3.94 cfs for the 100-year storm (major storm event). The runoff from this basin at the historic rate is conveyed via sheet flows across the Site to DP-1 and then conveyed along the existing curb and gutter within the right-of-way of W. 56th Avenue to an existing inlet downstream.

Basin EX-B (1.91 acres) consists of rooftops, pavement, landscaping, and undeveloped land. The peak runoff from Basin EX-B is 0.69 cfs for the minor storm event and 3.20 cfs for the major storm event. The runoff from this basin at the historic rate is conveyed via sheet flows across the Site to DP-1 and then

conveyed along the existing curb and gutter within the right-of-way of W. 56th Avenue to an existing inlet downstream.

There are historic off-site flows that are recorded as flowing onto the site from the southern property edge, but it is unclear if these flows enter the project site or are contained on the neighboring property to the south of the project site. There are two curb inlets within 55th Ave south of the site and they drain into the property directly north of the inlet. It is unclear where the flows are directed on the neighboring property and the volume of these flows is also unknown.

III. DRAINAGE DESIGN CRITERIA

Regulations

Site criteria includes Adams County Development Standards & Regulations – Chapter 9 Storm Drainage Design and Stormwater Quality Control Regulations, as amended. Standards and technical criteria not specifically addressed in the criteria mentioned above shall follow the provisions of the Mile High Flood District ("MHFD") "Urban Storm Drainage Criteria Manual" ("Manual, or referred to as Volume 1, 2, or 3), as amended. In addition, the Colorado Department of Transportation Standard Plans (M&S Standards), as amended, may be utilized for additional design details.

Post-construction best managements practices for applicable development and redevelopment sites shall meet one of the design standards listed in Section 9-04-04 Minimum Water Quality Treatment Design Standards a part of the Adams County Development Standards & Regulations – Chapter 9 Storm Drainage Design and Stormwater Quality Control Regulations. This Site will utilize the design standard as follows:

1. Water Quality Capture Volume (WQCV) Standard: The post-construction BMP shall be designed to provide treatment and/or infiltration of the WQCV and:

a. 100% of the applicable development site is captured, except the County may exclude up to 20%, not to exceed one (1) acre, of the applicable development site area when the Developer has determined that it is not practicable to capture runoff from portions of the proposed site that will not drain towards drainage facilities. In addition, the Developer must also determine the implementation of a separate post-construction BMP for the portion of the site that is not practicable.
b. Evaluation of the minimum drain time shall be based on the pollutant removal mechanism and functionality of the post-construction BMP implemented. Consideration of drain time shall include maintaining vegetation necessary for operation of the post-construction BMP.

This Site will utilize both design standards listed above. The water quality and detention facility on Site is designed to handle all flows that our development receives except up to 20%, not to exceed one (1) acre, of the applicable development Site area. Additionally, evaluation of the minimum drain time is based on the pollutant removal mechanism and functionality of the water quality and detention facility for the Site.

Low Impact Development (LID)

All construction projects shall reduce drainage impacts to the maximum extent practicable. Development and re-development projects shall incorporate the four (4)-step-design-process described on the Urban Drainage Criteria Manual, and implement practices such as:

1. On-site structural and non-structural BMPs to promote infiltration, evapotranspiration, or use of stormwater,
2. Minimization of Directly Connected Impervious Area (MSCIA),
3. Green Infrastructure (GI),
4. LID techniques,

5. Preservation of natural drainage systems that result in the infiltration, evapotranspiration, or use of stormwater in order to protect water quality and aquatic habitat.
6. Use of vegetation, soils, and roots to slow and filter stormwater runoff.
7. Management of stormwater as a resource rather than a waste product by creating functional, attractive, and environmentally friendly developments.
8. Treatment of stormwater flows as close to the impervious area as possible.
9. Other innovative measures to reduce runoff volume and protect water quality.

The LID techniques utilized on this Site will be detached sidewalks/walkways, and drainage swales with vegetation throughout the Site. Swales will be featured throughout the Site to

LID shall be designed and maintained to meet standards of this Regulation; the Mile High Flood District's Urban Storm Drainage Criteria Manual, Volume 3.

Computation Methods

The Rational Method for the 5-year and 100-year minor and major storm events will be used to determine Site runoff flows. Rational Method calculations are provided in the appendices.

The Full-Spectrum Water Quality and Detention Method was used in sizing the on-site water quality and detention facility. The MHFD Detention spreadsheet was used in sizing the on-site water quality and detention facility. Full-Spectrum calculations are included in the appendices.

Proposed storm infrastructure will be designed to accommodate the 100-year storm event.

IV. DRAINAGE FACILITY DESIGN

Drainage Concept

The general drainage concept of this Site is to capture Site runoff and route it through a proposed private storm sewer system to an on-site water quality and detention facility. The runoff will be treated for water quality, detained, and released at the maximum allowable release rate to the existing private storm sewer system west of the Site apart of the Maverik Stores existing development. Maverik Stores is expecting our flows and have confirmed that their existing storm infrastructure is sized to receive our Site's flows. Proposed storm sewer infrastructure will be sized to convey off-site flows through the detention facility; however, the water quality and detention facility is not required to accommodate off-site flows. A Final Drainage Plan and hydraulic calculations can be found in the appendices.

There are historic off-site flows are recorded as flowing onto the site from the southern property edge, but it is unclear whether these flows make it onto the project site or if they are contained on the southern neighbor's property. We are proposing a storm stub on the southern property edge where the neighbor can connect to our system to route the off-site flows into our proposed storm drainage system. Since the off-site flows are unknown at this time we are proposing an 18" stub for connection and plan on our system being able to handle the full volume of this 18" pipe at 1% slope.

The proposed water quality and detention facility will be designed with an emergency overflow spillway that discharges directly to W. 56th Avenue right-of-way as depicted in the Final Drainage Plan. The emergency spillway will be a 20-ft weir in the water quality and detention facility embankment on the north side of the facility. When the water quality and detention facility reaches capacity, flows will be routed to W. 56th Avenue via overland where it will

eventually make its way to Federal Boulevard via existing curb and gutter and storm infrastructure.

All on-site storm sewer will be privately owned and maintained by the property owner. A pond maintenance road will not be necessary here as both structures of the water quality and detention pond are maintainable by the adjacent roadway. Additionally, the southern edge of the pond footprint is open to maintenance access, incase of access within the pond is required.

Proposed Drainage-Basin Description

The proposed drainage sub-basin descriptions for the site are as follows:

The 5-year event was used for the minor storm and the 100-year event was used for the major storm.

Basin A (0.81 acres, 71.56% impervious) consists of rooftops, pavement, walks, and landscaping. The peak runoff from Basin A is 3.81 cfs for the major storm event and 1.68 cfs for the minor storm event. The basin will drain via overland and curb and gutter to a proposed type R inlet at Design Point (DP) 1. The flows from DP 1 will be routed to a type R inlet at DP 2 where it will eventually be routed to the water quality/ detention pond on-site.

Basin B (0.28 acres, 74.26% impervious) consists of rooftops, pavement, walks, and landscaping. The peak runoff from Basin B is 1.77 cfs for the major storm event and 0.79 cfs for the minor storm event. The basin will drain via overland and curb and gutter to a proposed type R inlet at DP 2. The flows from DP 2 will be combined with the flows from Basin A and conveyed in proposed storm pipe to DP 3.

Basin C (0.13 acres, 49.38% impervious) consists of rooftops, pavement, walks, and landscaping. The peak runoff from Basin C is 0.59 cfs for the major storm

event and 0.22 cfs for the minor storm event. The basin will drain via overland and landscape drains to a proposed manhole at DP 3. The flows from DP 3 will be combined with the flows from Basin A and Basin B and conveyed in proposed storm pipe to DP 7.

Basin D (0.09 acres, 90% impervious) consists of rooftops and pavement. The peak runoff from Basin D is 0.67 cfs for the major storm event and 0.33 cfs for the minor storm event. The basin will drain via overland to a proposed double type 13 valley inlet at DP 4. The flows from DP 4 will be conveyed in proposed storm pipe to DP 6.

Basin E (0.08 acres, 79% impervious) consists of rooftops and pavement. The peak runoff from Basin E is 0.53 cfs for the major storm event and 0.25 cfs for the minor storm event. The basin will drain via overland to a proposed single type 13 valley inlet at DP 5. The flows from DP 5 will be conveyed in proposed storm pipe to DP 6 where it will be combined with the flows from Basin D.

Basin F (0.75 acres, 67.47% impervious) consists of rooftops, pavement, walks, and landscaping. The peak runoff from Basin F is 3.29 cfs for the major storm event and 1.41 cfs for the minor storm event. The basin will drain via overland, curb and gutter, and landscape drains to a proposed double type R curb inlet at DP 9. The flows from DP 9 will be conveyed in proposed storm pipe to DP 10.

Basin G (0.13 acres, 81.08% impervious) consists of pavement and landscaping. The peak runoff from Basin G is 0.89 cfs for the major storm event and 0.41 cfs for the minor storm event. The basin will drain via overland and curb and gutter to a proposed type R curb inlet at DP 10. The flows from DP 10 will be conveyed in proposed storm pipe to DP 11.

Basin H (0.51 acres, 45.14% impervious) consists of rooftops, pavement, walks, and landscaping. The peak runoff from Basin H is 2.17 cfs for the major storm event and 0.77 cfs for the minor storm event. The basin will drain via landscape drains to a proposed triple type 13 valley inlet at DP 12. The flows from DP 12

will be combined with the flows from Basin J and conveyed in proposed storm pipe to DP 13.

Basin J (0.26 acres, 94.62% impervious) consists of rooftops, pavements, walks, and landscaping. The peak runoff from Basin J is 2.03 cfs for the major storm event and 0.77 cfs for the minor storm event. The basin will drain via overland and curb and gutter to a proposed triple type 13 valley inlet at DP 12. The flows from DP 12 will be combined with the flows from Basin H and conveyed in proposed storm pipe to DP 13.

Basin K (0.15 acres, 90% impervious) consists of rooftops and pavement. The peak runoff from Basin K is 1.12 cfs for the major storm event and 0.54 cfs for the minor storm event. The basin will drain via overland to a proposed type 16 inlet at DP 14. The flows from DP 14 will be conveyed in proposed storm pipe to DP 15.

Basin L (0.41 acres, 74.98% impervious) consists of rooftops, pavement, walks, and landscaping. The peak runoff from Basin L is 2.62 cfs for the major storm event and 1.18 cfs for the minor storm event. The basin will drain via overland and landscape drains to a proposed type 16 inlet at DP 14. The flows from DP 14 will be combined with the flows from Basin K and conveyed in proposed storm pipe to DP 15.

Basin M (0.50 acres, 77.72% impervious) consists of rooftops, pavement, walks, and landscaping. The peak runoff from Basin M is 3.29 cfs for the major storm event and 1.50 cfs for the minor storm event. The basin will drain via overland and curb and gutter to a proposed type R curb inlet at DP 16. The flows from DP 16 will be conveyed in the proposed storm pipe to DP 17.

Basin N (0.30 acres, 56.20% impervious) consists of pavement, walks, and landscaping. The peak runoff from Basin N is 1.49 cfs for the major storm event and 0.59 cfs for the minor storm event. The basin will drain via overland and curb and gutter to a proposed type R curb inlet at DP 17. The flows from DP 17

will be combined with the flows from Basin M and conveyed in proposed storm pipe to DP 18.

Basin O (0.13 acres, 2.00% impervious) consists of a water quality and detention pond and landscaping. The peak runoff from Basin O is 0.14 cfs for the major storm event and 0.00 cfs for the minor storm event. The basin will drain via overland to the water quality and detention pond where it will eventually be routed to the pond's outfall structure. The flows from the detention pond for the whole Site will be routed to the neighboring property's storm infrastructure to the west of the Site. This neighboring property has confirmed that they have the required capacity to handle the proposed development's flows.

Basin P (0.08 acres, 84.00% impervious) consists of pavement, walks, and landscaping. The peak runoff from Basin P is 0.56 cfs for the major storm event and 0.27 cfs for the minor storm event. The flows from Basin P will be untreated and undetained and routed off-site to the W. 56th Ave. right-of-way.

Basin Q (0.08 acres, 73.00% impervious) consists of pavement, walks, and landscaping. The peak runoff from Basin Q is 0.50 cfs for the major storm event and 0.22 cfs for the minor storm event. Flows from Basin Q will be untreated and undetained and routed off-site to the W. 56th Ave. right-of-way.

Basin R (0.01 acres, 2.00% impervious) consists of landscaping. The peak runoff from Basin R is 0.01 cfs for the major storm event and 0.00 cfs for the minor storm event. Flows from Basin R will be untreated and undetained and routed off-site to the parcel to the north of the Site.

Basin S (0.05 acres, 94.00% impervious) consists of streets and sidewalks. The peak runoff from Basin R is 0.39 cfs for the major storm event and 0.19 cfs for the minor storm event. Flows from Basin S will be untreated and undetained and routed off-site to the W. 56th Ave. right-of-way.

Basin T (0.01 acres, 2.00% impervious) consists of streets and sidewalks. The peak runoff from Basin R is 0.39 cfs for the major storm event and 0.19 cfs for the minor storm event. Flows from Basin S will be untreated and undetained and routed off-site to the W. 56th Ave. right-of-way.

Water quality and detention volume calculations are included in the appendices for reference. Flows will be released from the water quality and detention facility to existing storm infrastructure west of the Site a part of Maverik Stores property. The water quality and detention pond will release 1.28 cfs for the major storm event and 0.08 cfs for the minor storm event.

V. CONCLUSIONS

The site proposed Drainage system will properly treat and detain on-site flows and convey off-site flows without negatively affecting adjacent or downstream property. The proposed drainage was designed in accordance with Adams County Drainage Criteria and Mile High Flood District Criteria.

VII. LIST OF REFERENCES

1. Development Standards and Regulations, Adams County, Colorado, revised November 2021.

2. Urban Storm Drainage Criteria Manual, Vol. 1, Urban Drainage and Flood Control District, revised August 2018.

3. Urban Storm Drainage Criteria Manual, Vol. 2, Urban Drainage and Flood Control District, revised September 2017.

4. Urban Storm Drainage Criteria Manual, Vol. 3, Urban Drainage and Flood Control District, revised January 2021.

APPENDIX A – Vicinity Map & Flood Insurance Rate Map

Plotted: FRI 06/03/22 11:22:45A By: Susanna Marin Filepath: k:\200810\engineering\xref\vicinity map.dwg Layout: 01 - cover

HARRIS KOCHER SMITH
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HarrisKocherSmith.com

THE TRUE LIFE COMPANIES

VICINITY MAP

PROJECT #: 200810

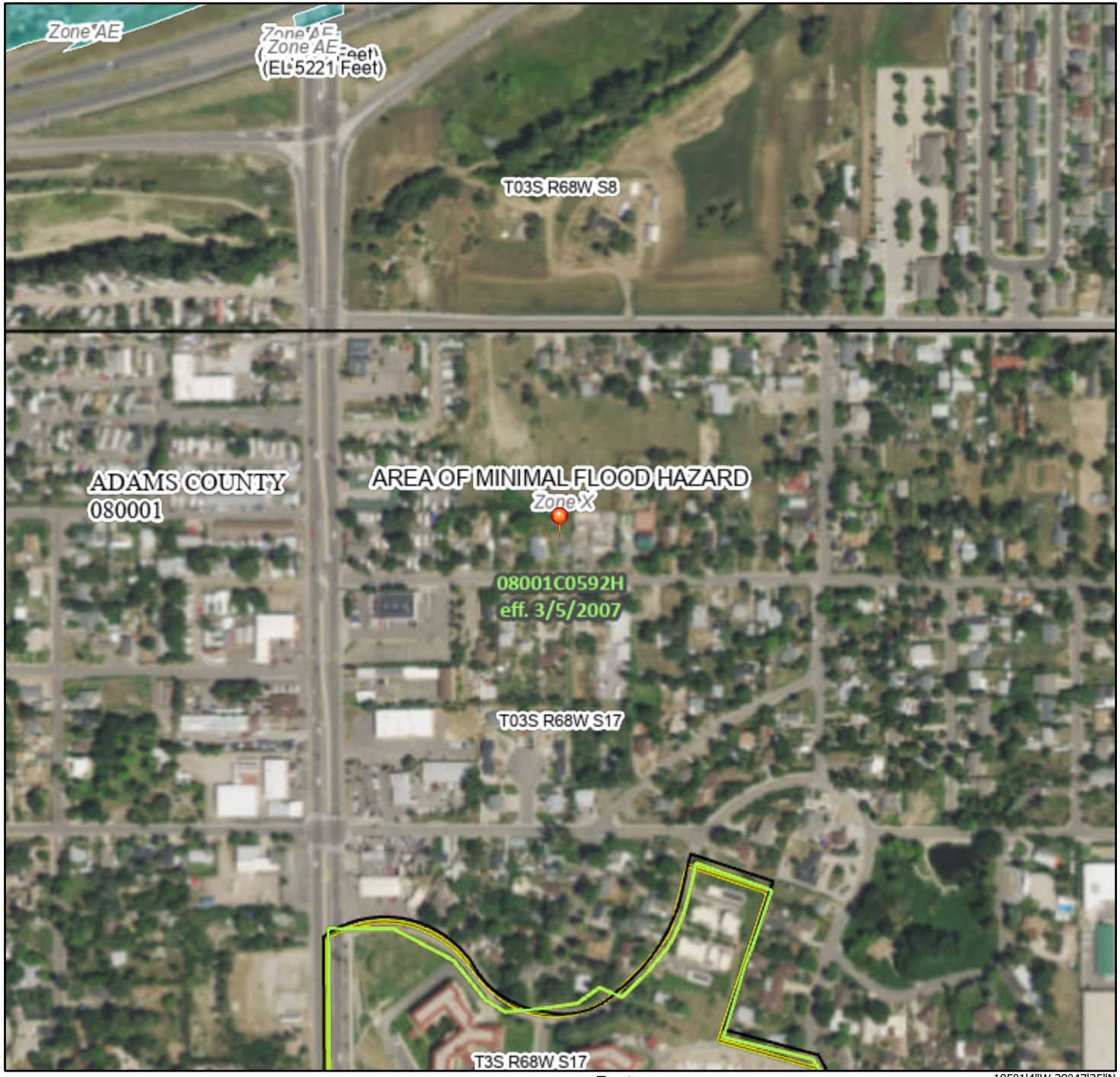
SHEET NUMBER

1

National Flood Hazard Layer FIRMette

FEMA

105°1'42"W 39°48'2"N



105°1'4"W 39°47'35"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

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

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

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

OTHER AREAS

- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES

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

OTHER FEATURES

- B 20.2 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- 8 Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS

- Digital Data Available
- No Digital Data Available
- Unmapped

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/2/2022 at 7:15 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

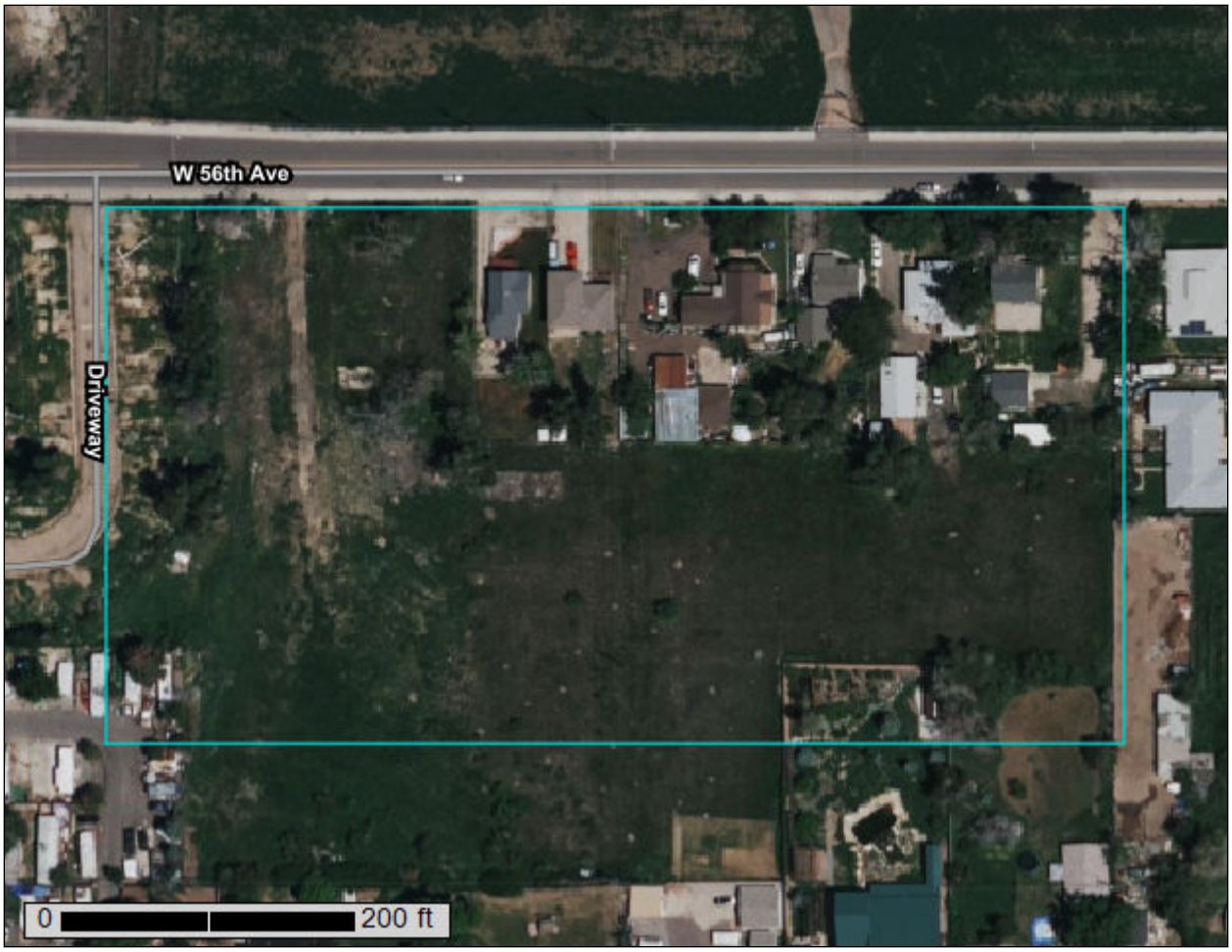
APPENDIX B – Soils Report & Geotech Report

United States Department of Agriculture

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 Adams County Area, Parts of Adams and Denver Counties, Colorado



June 2, 2022

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.

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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.

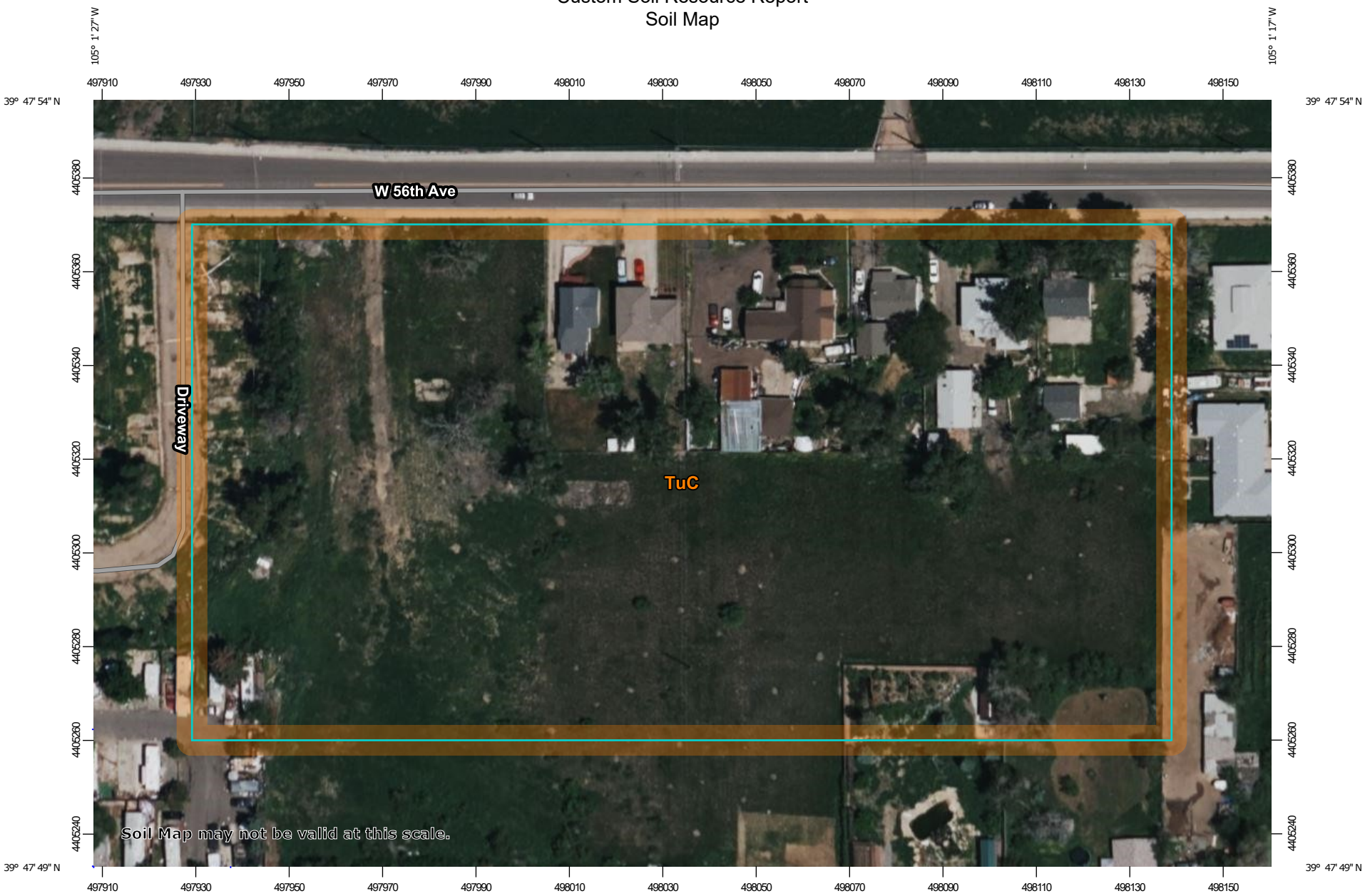
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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



Map Scale: 1:1,150 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

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: Adams County Area, Parts of Adams and Denver Counties, Colorado
Survey Area Data: Version 18, Aug 31, 2021

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

Date(s) aerial images were photographed: Jun 9, 2021—Jun 12, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
TuC	Truckton sandy loam, 3 to 5 percent slopes	5.7	100.0%
Totals for Area of Interest		**5.7**	**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.

Adams County Area, Parts of Adams and Denver Counties, Colorado

TuC—Truckton sandy loam, 3 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2yvrg
Elevation: 4,700 to 6,100 feet
Mean annual precipitation: 12 to 17 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 125 to 155 days
Farmland classification: Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60

Map Unit Composition

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

Description of Truckton

Setting

Landform: Hills, interfluves
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Wind re-worked alluvium derived from arkose

Typical profile

A - 0 to 6 inches: sandy loam
Bt1 - 6 to 10 inches: sandy loam
Bt2 - 10 to 16 inches: sandy loam
C - 16 to 80 inches: loamy coarse sand

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 1 percent
Maximum salinity: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Minor Components

Blakeland

Percent of map unit: 5 percent
Landform: Hills, interfluves
Landform position (two-dimensional): Shoulder, backslope, summit
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R067BY015CO - Deep Sand
Hydric soil rating: No

Vona

Percent of map unit: 5 percent
Landform: Dunes, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Ecological site: R067BY015CO - Deep Sand
Hydric soil rating: No

Bresser

Percent of map unit: 3 percent
Landform: Interfluves
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY024CO - Sandy Plains
Hydric soil rating: No

Pleasant, frequently ponded

Percent of map unit: 1 percent
Landform: Closed depressions
Down-slope shape: Concave, linear
Across-slope shape: Concave
Ecological site: R067BY010CO - Closed Upland Depression
Hydric soil rating: Yes

Urban land

Percent of map unit: 1 percent
Hydric soil rating: No

Soil Information for All Uses

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Soil Physical Properties

This folder contains a collection of tabular reports that present soil physical properties. The reports (tables) include all selected map units and components for each map unit. Soil physical properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic soil group is a group of soils having similar runoff potential under similar storm and cover conditions. The criteria for determining Hydrologic soil group is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Listing HSGs by soil map unit component and not by soil series is a new concept for the engineers. Past engineering references contained lists of HSGs by soil series. Soil series are continually being defined and redefined, and the list of soil series names changes so frequently as to make the task of maintaining a single national list virtually impossible. Therefore, the criteria is now used to calculate the HSG using the component soil properties and no such national series lists will be maintained. All such references are obsolete and their use should be discontinued. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission

rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group

index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Percentage of rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties–Adams County Area, Parts of Adams and Denver Counties, Colorado														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
TuC—Truckton sandy loam, 3 to 5 percent slopes														
Truckton	85	A	0-6	Sandy loam	SC-SM, SC, SM	A-2-4, A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	72-77-81	34-39-43	20-22-30	3-4 -9
			6-10	Sandy loam	SC-SM, SC, SM	A-2-4, A-4	0- 0- 0	0- 0- 0	100-100-100	92-100-100	66-77-81	31-39-44	19-25-30	3-7 -11
			10-16	Sandy loam	SC, SM	A-2-4, A-4	0- 0- 0	0- 0- 0	100-100-100	92-100-100	66-77-81	31-39-44	19-25-29	3-8 -11
			16-80	Sand, loamy coarse sand, coarse sandy loam, coarse sand, loamy sand, sandy loam	SC-SM, SC, SM	A-1-b, A-2-4	0- 0- 0	0- 0- 0	100-100-100	85-97-100	43-53-68	14-21-30	0-18 -26	NP-7 -10
Blakeland	5	A	0-5	Loamy sand	SM	A-2-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	76-79-82	25-31-33	0-19 -22	NP-3 -3
			5-9	Loamy coarse sand, loamy sand	SM	A-2-4	0- 0- 0	0- 0- 0	100-100-100	92-100-100	71-79-81	26-31-33	0-18 -20	NP-3 -3
			9-80	Loamy coarse sand, sand, loamy sand	SP-SM, SM	A-2-4, A-3	0- 0- 0	0- 0- 0	100-100-100	85-97-100	64-75-81	6- 9- 13	0-0 -20	NP-0 -3
Vona	5	A	0-7	Loamy sand	SC-SM, SM	A-2-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	76-80-83	25-31-33	0-18 -22	NP-3 -4
			7-14	Sandy loam, fine sandy loam	CL, SC, SM	A-2-4, A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	71-77-89	34-39-55	19-25-29	3-8 -11
			14-20	Fine sandy loam, sandy loam	SC-SM, CL, SM	A-2-4, A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	71-77-90	35-40-55	19-22-29	3-5 -11
			20-45	Fine sandy loam, sandy loam, loamy sand	SC-SM, SC, SM	A-2-4, A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	70-77-84	31-40-45	0-20 -26	NP-7 -9

Engineering Properties–Adams County Area, Parts of Adams and Denver Counties, Colorado														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
			45-80	Loamy sand, sandy loam, loamy fine sand	CL, SM	A-2-4, A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	67-80-100	24-31-61	0-0 -26	NP-0 -9
Bresser	3	B	0-5	Sandy loam	SC-SM, SC	A-2-4, A-4	0- 0- 0	0- 0- 0	100-100-100	100-100-100	72-77-81	35-39-45	21-28-31	4-8 -10
			5-9	Sandy loam, sandy clay loam	SC	A-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	74-76-82	37-39-46	29-30-37	12-12-16
			9-16	Sandy loam, sandy clay loam	CL, SC	A-6	0- 0- 0	0- 0- 0	100-100-100	92-100-100	73-86-88	38-48-50	29-37-39	12-18-19
			16-28	Sandy loam, coarse sandy loam	SC-SM, SC	A-2-4, A-4	0- 0- 0	0- 0- 0	100-100-100	92-100-100	69-77-82	35-40-45	20-22-28	4-5 -9
			28-80	Coarse sandy loam, loamy sand, loamy coarse sand	SC, SM	A-1-b, A-2-4	0- 0- 0	0- 0- 0	100-100-100	85-97-100	46-53-64	17-20-30	16-17-26	2-3 -10
Pleasant, frequently ponded	1	C/D	0-3	Silty clay loam	CL, MH	A-7-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	95-100-100	84-92-100	40-48-60	19-23-28
			3-16	Silty clay loam, silty clay	CH	A-7-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	96-100-100	90-96-100	50-55-58	27-30-32
			16-38	Silty clay, silty clay loam	CH, CL	A-7-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	95-100-100	84-92-100	39-47-54	19-25-30
			38-80	Silty clay loam, silt loam	CH, CL	A-6, A-7-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	94-100-100	83-92-100	34-38-51	15-18-28
Urban land	1	D	0-80	Variable	—	—	—	—	—	—	—	—	—	—

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Physical Soil Properties–Adams County Area, Parts of Adams and Denver Counties, Colorado														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
TuC—Truckton sandy loam, 3 to 5 percent slopes														
Truckton	0-6	57-68- 75	12-24- 30	7- 8- 15	1.49-1.54-1.59	14.11-28.23-42.34	0.11-0.12-0.13	0.6- 0.7- 1.6	1.0- 1.5-2.0	.20	.20	5	3	86
	6-10	57-67- 75	12-20- 30	7-13- 17	1.57-1.59-1.60	14.11-28.23-42.34	0.10-0.12-0.13	0.6- 1.3- 1.8	0.5- 0.8-1.3	.24	.24			
	10-16	57-67- 75	12-20- 30	7-13- 17	1.58-1.59-1.60	14.11-28.23-42.34	0.10-0.12-0.13	0.6- 1.3- 1.8	0.5- 0.8-1.0	.24	.24			
	16-80	65-83- 95	3-11- 25	2- 6- 15	1.55-1.63-1.71	14.11-91.74-282.00	0.03-0.06-0.14	0.0- 0.5- 1.5	0.0- 0.3-0.5	.15	.15			

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

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50 YEARS

FOUNDED IN 1971

PRELIMINARY GEOTECHNICAL INVESTIGATION
WEST 56TH AVENUE TOWNHOMES
SOUTHEAST OF FEDERAL BOULEVARD
AND WEST 56TH AVENUE
DENVER, COLORADO

Prepared for:

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Project No. DN50,306-115-R1

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SCOPE

This report presents the results of our Preliminary Geotechnical Investigation for the proposed townhomes at 2922 West 56th Avenue in Denver, Colorado (Fig. 1). The purpose of our investigation was to assist in your evaluation of potential development and construction measures. The report includes descriptions of soil and groundwater conditions found in our exploratory borings, and discussions of site development and construction as influenced by geotechnical considerations. The scope was described in a Service Agreement (DN19-0594) dated October 25, 2019. We performed two supplemental borings at 2880 and 2922 West 56th Avenue on April 3, 2020 and January 14, 2021 to add additional information for the expanded site. The report was revised to include data from these borings.

This report is based on subsurface conditions found in our exploratory borings, results of field and laboratory tests, engineering analysis of field and laboratory data, and our experience. The report contains discussions of geologic hazards, recommendations for site development, potential foundation and floor support alternatives, pavements, and surface drainage. The preliminary discussions of foundations, floor systems and pavements are intended for planning purposes only. Additional, site-specific investigations will be necessary to design structures and improvements. A summary of our conclusions and recommendations follows, with more detailed discussion in the report.

SUMMARY OF CONCLUSIONS

1. Strata encountered in the borings consisted of about 26 to more than 30 feet of clay, sand and gravel underlain by claystone bedrock to the maximum explored depth of 35 feet. The clay, sand and gravel were low swelling or non-expansive.

2. Groundwater was encountered during drilling in three borings at depths of about 27 or 33 feet. Water was measured in the same three borings at depths of about 26 or 31.5 feet or approximate elevations 5245 to 5251 feet after drilling on December 2, 2019. Groundwater is not expected to influence the planned construction. Groundwater may develop and rise in response to precipitation and landscape irrigation.

3. The primary geotechnical concern is expansive soil and bedrock. The potential movement is low compared to most expansive soil sites. We believe this concern can be mitigated with proper planning, engineering, design and construction. We believe there are no geotechnical constraints at this site that would preclude development.

4. Based on the subsurface conditions, we believe footings or post-tensioned slab-on-grade foundations can be used to support the buildings. Structurally supported floors should be used in all first-floor finished areas unless post-tensioned slab-on-grade foundations are used. A design level investigation should be performed after grading.

5. We anticipate pavement subgrade soils will likely consist of very sandy clay, silty to clayey sand, or similar fill derived thereof. The pavement areas may be used for automobile parking, access drives and truck lanes. For private pavements, the City of Denver requires a minimum default section of 4 inches of asphalt over 6 inches of base course. Fire lanes will require thicker sections. These sections are for planning purposes only. Mitigation of expansive soils is likely not required. A pavement thickness design is recommended.

6. Control of surface and subsurface drainage will be critical to the performance of foundations, slabs-on-grade and pavements. Overall surface drainage should be designed to provide rapid run-off of surface water away from structures, and off pavements and flatwork. Water should not be allowed to pond near the crests of slopes, near structures, or on pavements and flatwork.

SITE CONDITIONS

The site is located southwest of Federal Blvd. and West 56th Avenue in Denver, Colorado (Fig. 1 and Photo 1). It is bordered by West 56th Avenue on the

north and existing single-family residences on all other sides. Historical aerial photos indicate most of the site has been vacant since 1993. A few trucks are located on the west end of the parcel. Two of the three parcels added since our 2019 report are occupied by residence and garage structures. The site slopes gently north and west. Ground cover consists of grasses and weeds with sparse bushes and trees.

Photo 1 – Google Earth© Aerial Site Photo, September 2019

PROPOSED DEVELOPMENT

We were provided with conceptual site plans prepared by Redlands dated November 14 and November 20, 2019. We understand two site tabulations are being considered and an additional three parcels were added to the site. Three-story townhome buildings with no below grade space are planned. One plan calls for 61 townhome units and the other has 51 units. Plans were not provided for the additional parcels. A detention area/open space is planned on the northwest

corner of the site and the number of townhome units planned will determine if the detention area will boarder the west side of the site or if it will be offset about 65 feet east from the western property line. We anticipate relatively light foundation loads. Site access will be via public streets and alleys to private drives and parking areas. Grading plans were not available at the time of this investigation. We anticipate minimal grading will be necessary to achieve construction grades.

INVESTIGATION

We investigated subsurface conditions by drilling and sampling six exploratory borings on November 23, 2019, an additional boring on April 3, 2020 and another on January 14, 2021. The approximate locations of these borings are shown on Fig. 1. Boring locations and elevations were surveyed by a representative of our firm using a Leica GS18 GPS unit referencing the North American Vertical Datum of 1988 (NAVD88). Prior to drilling, we contacted the Utility Notification Center of Colorado and local sewer and water districts to clear boring locations for conflicts with buried utilities. A private locater was also used for TH-7 and TH-8. The borings were advanced to depths of 25 to 35 feet using solid stem, continuous-flight augers and a truck-mounted CME-45 drill rig. Samples of the soil and bedrock were obtained at approximate 5 feet intervals using a 2.5-inch diameter (O.D.) modified California barrel samplers driven by an automatic 140-pound hammer falling 30 inches. The drilling operations were observed by our field representative who logged the strata encountered in the borings and obtained samples. Summary logs of the borings are presented on Figs. 2 and 3.

Samples were returned to our laboratory where they were examined. Laboratory tests included dry density, moisture content, gradation, percent silt and clay-sized particles (passing the No. 200 sieve), Atterberg limits, swell-consolidation, and water-soluble sulfate concentration. Swell-consolidation tests were performed by wetting the samples under approximate existing overburden

pressures (the pressure exerted by overlying soil). Results of laboratory tests are presented in Appendix A.

SUBSURFACE CONDITIONS

Strata encountered in the borings consisted of about 26 to more than 30 feet of clay, sand and gravel underlain by claystone bedrock to the maximum explored depth of 35 feet. Engineering characteristics of the soil and bedrock are presented in the following paragraphs.

Clay, Sand and Gravel

Clay, sand and gravel were encountered at the ground surface in all borings. The clay was very stiff, the sand was loose to medium dense, and the gravel was very dense based on field penetration resistance tests. Two samples compressed 0.1 and 0.5 percent, one did not swell, and eight swelled 0.2 to 0.4 percent when wetted. Thirteen samples contained 13 to 46 percent silt and clay-sized particles and three were non-plastic to moderately plastic.

Bedrock

Medium hard to very hard claystone bedrock was encountered in three borings at depths ranging from about 26 to 29.5 feet or approximate elevations 5247 to 5250 feet. One sample contained 68 percent silt and clay-sized particles and exhibited moderate plasticity.

Groundwater

Groundwater was encountered during drilling in three borings at depths of about 27 or 33 feet. Water was measured in the same three borings at depths of

about 26 or 31.5 feet or approximate elevations 5245 to 5251 feet after drilling on December 2, 2019, April 10, 2020 and January 18, 2021. Groundwater is not expected to influence the planned development. Groundwater may develop and rise in response to precipitation and landscape irrigation.

GEOLOGIC HAZARDS

Geologic hazards at the site include expansive and compressible soil and bedrock, and the regional geologic hazard of seismicity. There are no geologic hazards that would preclude the proposed development. We believe potential hazards can be mitigated with proper engineering, design, and construction practices, as discussed in this report.

Expansive and Compressible Soil and Bedrock

Colorado is a challenging location to practice geotechnical engineering. The climate is relatively dry, and the near-surface soils are typically dry and comparatively stiff. These soils and related sedimentary bedrock formations react to changes in moisture conditions. Some of the soils swell as they increase in moisture and are referred to as expansive soils. Other soils can compress significantly upon wetting and are identified as compressible or collapsible soils. Much of the land available for development east of the Front Range is underlain by expansive clay or claystone bedrock near the surface. The soils that exhibit compressible behavior are more likely west of the Continental Divide; however, both types of soils occur throughout the state.

Covering the ground with structures, streets, irrigated landscape and changing drainage patterns, leads to an increase in subsurface moisture conditions. Thus, some soil movement due to heave or settlement is inevitable. Although expansive and compressible soils and bedrock are present at this site,

which constitutes a geologic hazard, we judge there is low risk that foundations and slab-on-grade floors will experience significant heave or settlement and subsequent damage. Engineered planning, design and construction of grading, pavements, foundations, slabs-on-grade, and drainage can mitigate, but not eliminate, the effects of expansive and compressible soils.

Seismicity

Based on available mapping, we found no active faults within or near the site. The soil is not expected to respond unusually to seismic activity. According to the 2015 International Building Code (IBC, Standard Penetration Resistance method or IBC section 1613.3.2), we judge the site classifies as Site Class D for seismic design. The City and County of Denver requires use of Site Class D unless testing is performed to justify less stringent criteria.

Other Considerations

We observed no evidence of unstable slopes. Uncontrolled and concentrated surface runoff has the potential to create damaging erosion. Erosion potential on the site is considered low due to the gentle slopes. Erosion potential will increase during construction and should return to pre-construction rates or less if proper grading practices, surface drainage design, and re-vegetation efforts are implemented.

ESTIMATED POTENTIAL GROUND HEAVE

We used the results of swell tests to evaluate potential heave of the site soils at the existing elevations for each boring location. The analysis involves dividing the soil profile into layers and modeling the heave of each layer from representative swell tests. Based on the swell-consolidation test results and our

experience, we estimate heave at the ground surface will likely be less than 1 inch based on a depth of wetting of 20 feet.

SITE DEVELOPMENT

The primary geotechnical concern that will influence site development and building performance is the presence of expansive and compressible soil. The potential movement is judged low. This concern can be mitigated with proper planning, engineering, design and construction. The following sections discuss site development recommendations.

Excavation

We believe the soils penetrated by our exploratory borings can be excavated with typical heavy-duty equipment. Contractors should be familiar with applicable local, state and federal safety regulations, including the current Occupational Safety and Health Administration (OSHA) Excavation and Trench Safety Standards. Based on our investigation and OSHA standards, we anticipate the clay may classify as Type B soil and the sand and gravel as Type C soil based on OSHA Standards governing excavations published in 29 CFR, Part 1926. Type B soil requires 1H:1V slopes (horizontal to vertical) and Type C requires 1.5H:1V for temporary excavations in dry conditions. Saturated soils may require flatter slopes or bracing. Excavation slopes specified by OSHA are dependent upon soil types and groundwater conditions encountered. The contractor's "competent person" is required to identify the soils encountered in the excavations and refer to OSHA standards to determine appropriate slopes. Stockpiles of soils and equipment should not be placed within a horizontal distance equal to one-half the excavation depth, from the edge of the excavation.

Demolition and Existing Fill

Existing residences will be demolished and removed. This should include foundation elements, pavements, curb/gutter, landscaping, utilities, and any other related features. All vegetation and debris should be removed in new construction areas. Existing fill on site from the residential construction should be completely removed before new structures and improvements are placed. Clean portions of the fill can be reused and reworked as new, moisture conditioned, compacted fill. Excavations resulting from removal should be backfilled with new moisture conditioned, well-compacted fill. If backfill is poorly compacted, improvements supported by the backfill may experience damaging settlement. The history and placement conditions of any existing fill are unknown. We do not have compaction tests for any existing fill, and we estimate some has been placed based during previous site grading and residential construction. We recommend removing and replacing this fill according to the Site Grading section below. The placement and compaction should be observed and tested by a representative of our firm during construction.

Site Grading

We believe grading can be accomplished using conventional heavy-duty construction equipment. Prior to fill placement, the ground surface in areas to be filled should be stripped of debris, vegetation/organics and other deleterious materials, scarified and moisture conditioned to between 0 and 3 percent above optimum for clay or within 2 percent of optimum for sand and gravel, and compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698). If imported fill is necessary it should ideally consist of soil which is similar to the on-site soil. Potential fill materials should be submitted to our office for approval prior to importing to the site.

The properties of fill will affect the performance of foundations, slabs-on-grade, utilities, pavements, flatwork and other improvements. The on-site soils are suitable for use as site grading fill provided they are substantially free of debris, organics and other deleterious materials. Fill should be placed in thin loose lifts, moisture conditioned and compacted prior to placement of the next lift using the criteria presented in the previous paragraph. The placement and compaction of site grading fill should be observed and density tested by a representative of our firm during construction. Guideline grading specifications are presented in Appendix B.

Our experience indicates fill and backfill can settle, even if properly compacted to criteria provided above. Factors that influence the amount of settlement are depth of fill, material type, degree of compaction, amount of wetting and time. The degree of compression of fill under its own weight will likely range from low for granular soils (½ percent or less), to moderate for clay/sand mixtures (1 to 2 percent).

Utility Installation

Water and sewer lines are usually constructed beneath pavements. Compaction of trench backfill can have a significant effect on the life and serviceability of pavements. Trench backfill should be placed in thin (8 inches or less) loose lifts and moisture conditioned to between optimum and 3 percent above optimum moisture content for clay and compacted to at least 95 percent of maximum dry density (ASTM D 698). Sand fill should be moisture conditioned to within 2 percent of optimum moisture content and compacted to at least 100 percent of maximum dry density. The placement and compaction of trench fill and backfill should be observed and tested by our firm during construction.

Our experience indicates use of a self-propelled compactor results in more reliable performance compared to backfill “compacted” by a sheepsfoot wheel attachment on a backhoe or track excavator. The upper portion of the trenches should be widened to allow the use of a self-propelled compactor. Special attention should be paid to backfill placed adjacent to manholes as we have seen instances where settlement greater than 2 percent has occurred. Any improvements placed over backfill should be designed to accommodate movement.

Pavements

We anticipate pavement subgrade soils will likely consist of very sandy clay, silty to clayey sand, or similar fill. The pavement areas may be used for automobile parking, access drives and truck lanes. The City of Denver uses the “Pavement Design Standards and Construction Speciation’s” manual prepared by Metropolitan Government Pavement Engineers Council for pavement design. Subgrade should be proof-rolled and unstable areas removed and replaced with stable soil. Preliminary minimum pavement thickness alternatives are shown in Table II below. These sections are for planning purposes only. Mitigation of expansive soils is likely not required. A pavement design is recommended.

TABLE II
PRELIMINARY/MINIMUM PAVEMENT THICKNESS ALTERNATIVES

Traffic Classification	Asphalt Concrete (AC)	Asphalt Concrete & Aggregate Base Course (AC + ABC)	Portland Cement Concrete (PCC)
Parking Areas	5.5”	4”AC + 6”ABC	5.5”
Access Drives and Truck Lanes	6.5”	4”AC + 8”ABC	6”

BUILDING CONSTRUCTION CONSIDERATIONS

The following discussions are preliminary and are not intended for design or construction. Design-level investigations should be performed on a building-specific basis.

Foundations

Based on the subsurface conditions, we judge shallow foundations such as footings designed for minimum deadload or post-tensioned slabs-on-grade will likely be suitable for the buildings.

Floor Systems

Basements are not currently planned. Structurally supported floors should be used in all finished living areas unless post-tensioned slab-on-grade foundations are used. Slab-on-grade floors may be considered for garages, if any. The performance of driveways, sidewalks and other surface flatwork may be affected by expansive soils. The following precautions can reduce the potential for damage due to movement of conventional slabs-on-grade at this site:

1. Isolation of the slabs from foundation walls, columns and other slab penetrations;
2. Where partition framing is constructed on conventional slabs, there should be at least a 2-inch void space to prevent slab movement from lifting the superstructure.
3. Proper surface grading and foundation drain installation (if crawl spaces are used) to reduce water availability to sub-slab and foundation soils.

Concrete

Concrete in contact with soil can be subject to sulfate attack. We measured water-soluble sulfate concentrations of less than 0.01 to 0.12 percent in four samples from this investigation. For this level of sulfate concentration, ACI 332-08 Code Requirements for Residential Concrete indicates concrete shall be made with ASTM C150 Type II cement, or an ASTM C595 or C1157 hydraulic cement meeting moderate sulfate-resistant hydraulic cement (MS) designation.

Superficial damage may occur to the exposed surfaces of highly permeable concrete, even though sulfate levels are relatively low. To control this risk and to resist freeze-thaw deterioration, the water-to-cementitious materials ratio should not exceed 0.50 for concrete in contact with soils that are likely to stay moist. Foundation concrete should have a total air content of 6% +/- 1.5%.

Surface Drainage

The performance of improvements will be influenced by surface drainage. When developing an overall drainage scheme, consideration should be given to drainage around each building. The ground surface around the buildings should be sloped to provide positive drainage away from the foundations. We recommend a slope of 5 percent in landscaped areas around buildings with no basements. Where possible, drainage swales should slope at least 2 percent. Roof downspouts and other water collection systems should discharge beyond the limits of backfill around structures.

Proper control of surface runoff is also important to control erosion. Sheet flow should not be directed over unprotected slopes. Water should not be allowed to pond at the crest of slopes. Permanent slopes should be prepared in such a way to reduce erosion.

Attention should be paid to compact the soils behind curb and gutter adjacent to streets and in utility trenches during the development. If surface drainage between preliminary development and construction phases is neglected, performance of the roadways, flatwork and foundations may be poor.

RECOMMENDED FUTURE INVESTIGATIONS

We recommend the following investigations and services:

1. Review of grading plans, once available;
2. Construction testing and observation during site development, building and pavement construction, including compaction testing of grading fill, utility trench backfill, and pavements;
3. Subgrade investigation and pavement design;
4. Design-level foundation investigation; and
5. Foundation installation observations.

LIMITATIONS

Our borings were widely spaced to provide a general picture of subsurface conditions for preliminary planning of development and construction. Variations from our borings should be anticipated. We believe this investigation was conducted in a manner consistent with the level of care and skill ordinarily used by geotechnical engineers practicing under similar conditions. No warranty, express or implied, is made.

If we can be of further service in discussing the contents of this report or the analysis of the influence of subsurface conditions on the design of the proposed development, please call.

CTL | THOMPSON, INC.

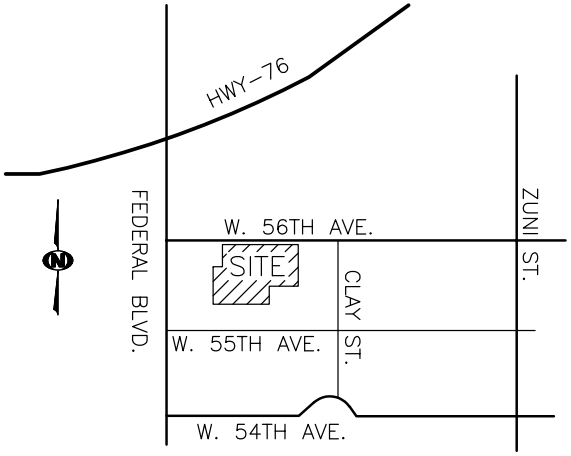
Spencer A. Hrubala
Staff Engineer

Reviewed by:

Ronald M. McOmber, P.E.
Chairman, Senior Principal

SAH:RMM/nn

Via e-mail: dclock@thetruelifecompanies.com



VICINITY MAP
NOT TO SCALE

LEGEND:

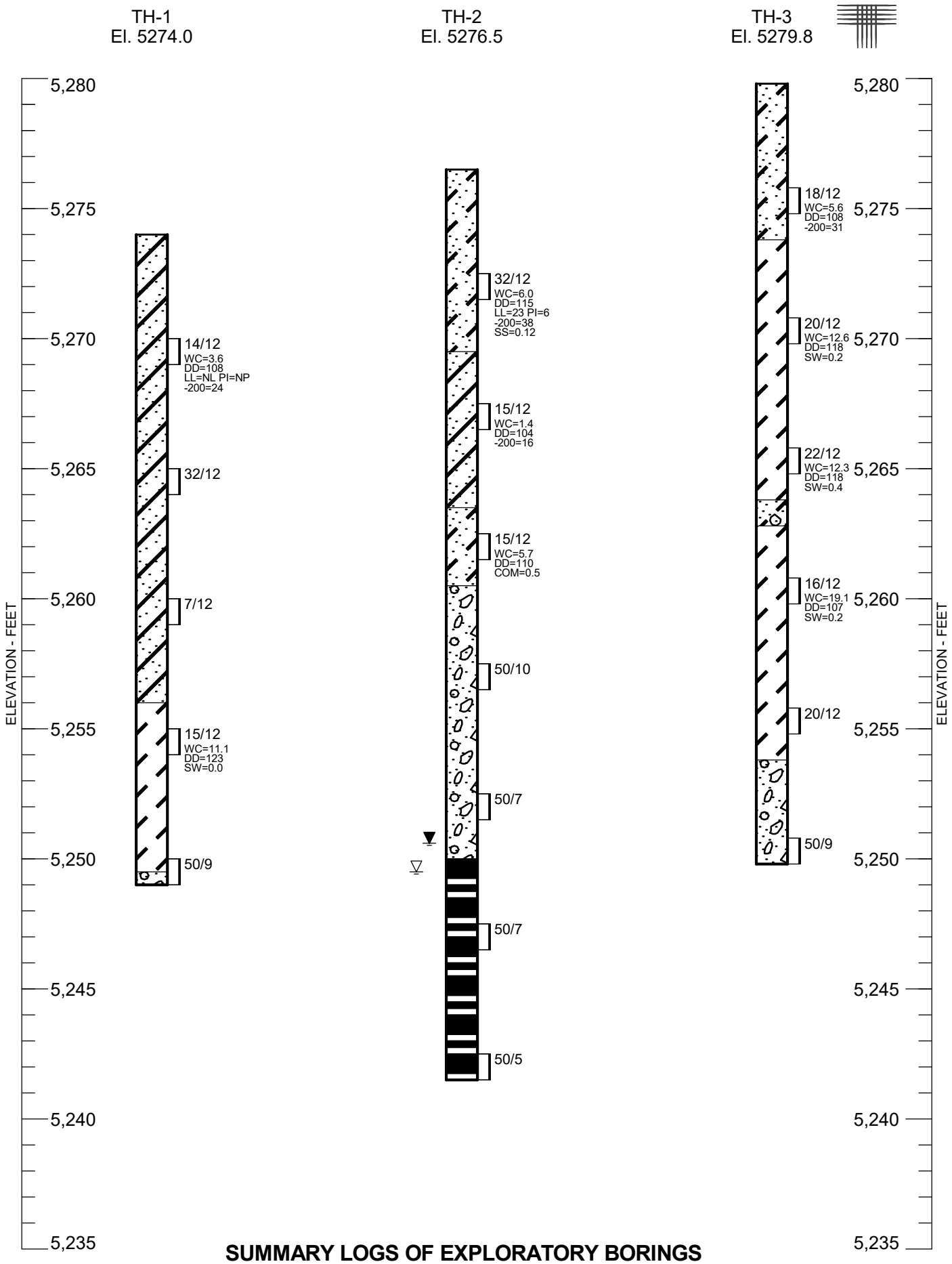
TH-1 APPROXIMATE LOCATION OF EXPLORATORY BORING

0 50 100
SCALE: 1" = 100'

TTLC MANAGEMENT, INC.
WEST 56TH AVENUE TOWNHOMES
CTL\T Project No. DN50,306-115-R1

Locations of Exploratory Borings

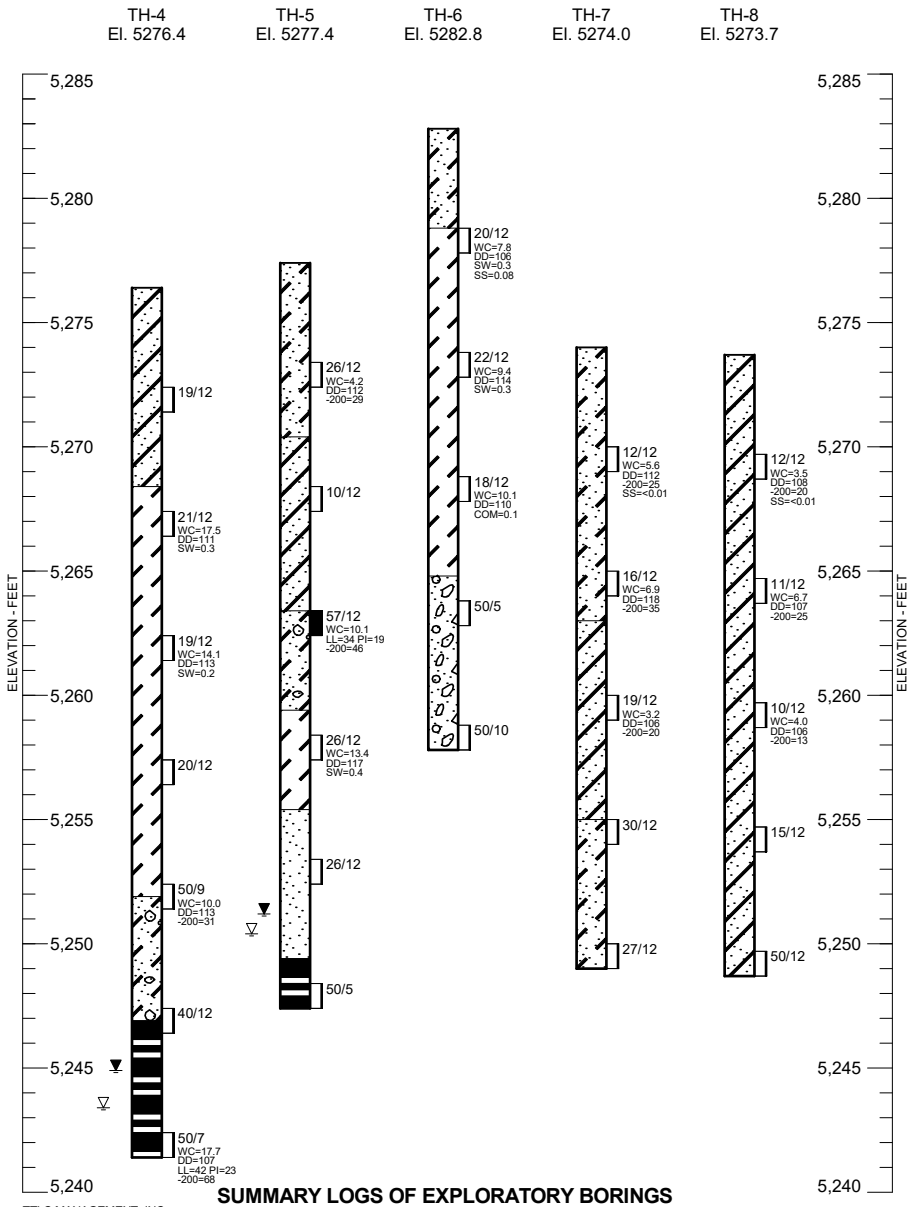
Fig. 1



SUMMARY LOGS OF EXPLORATORY BORINGS

TTLC MANAGEMENT, INC.
WEST 56TH AVENUE TOWNHOMES
CTL|T PROJECT NO. DN50,306-115-R1

FIG. 2



SUMMARY LOGS OF EXPLORATORY BORINGS

TTLC MANAGEMENT, INC.
2922 WEST 56TH AVENUE TOWNHOMES
CTL|T PROJECT NO. DN50,306-115-R1

LEGEND:

- CLAY, SANDY, VERY STIFF, SLIGHTLY MOIST TO MOIST, BROWN, TAN, WHITE (CL).
- SAND, CLAYEY, MEDIUM DENSE, SLIGHTLY MOIST TO MOIST, BROWN, TAN, GRAY, WHITE (SC).
- SAND, SILTY, LOOSE TO DENSE, SLIGHTLY MOIST TO MOIST, BROWN, TAN, GRAY, WHITE (SM).
- GRAVEL, CLAYEY, VERY DENSE, SLIGHTLY MOIST TO MOIST, BROWN, TAN, GRAY, WHITE (GC).
- GRAVEL, SLIGHTLY SILTY TO SILTY, VERY DENSE, SLIGHTLY MOIST TO MOIST, BROWN, TAN, GRAY, WHITE (GPGM, GM).
- BEDROCK, CLAYSTONE, MEDIUM HARD TO VERY HARD, MOIST, BROWN, GRAY, DARK GRAY, TAN.
- DRIVE SAMPLE. THE SYMBOL 14/12 INDICATES 14 BLOWS OF AN AUTOMATIC 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE A 2.5-INCH O.D. SAMPLER 12 INCHES.
- DRIVE SAMPLE. THE SYMBOL 57/12 INDICATES 57 BLOWS OF AN AUTOMATIC 140-POUND HAMMER FALLING 30 INCHES WERE REQUIRED TO DRIVE A 2.0-INCH O.D. SAMPLER 12 INCHES.
- WATER LEVEL MEASURED AT TIME OF DRILLING.
- WATER LEVEL MEASURED AFTER DRILLING ON DECEMBER 2, 2019.

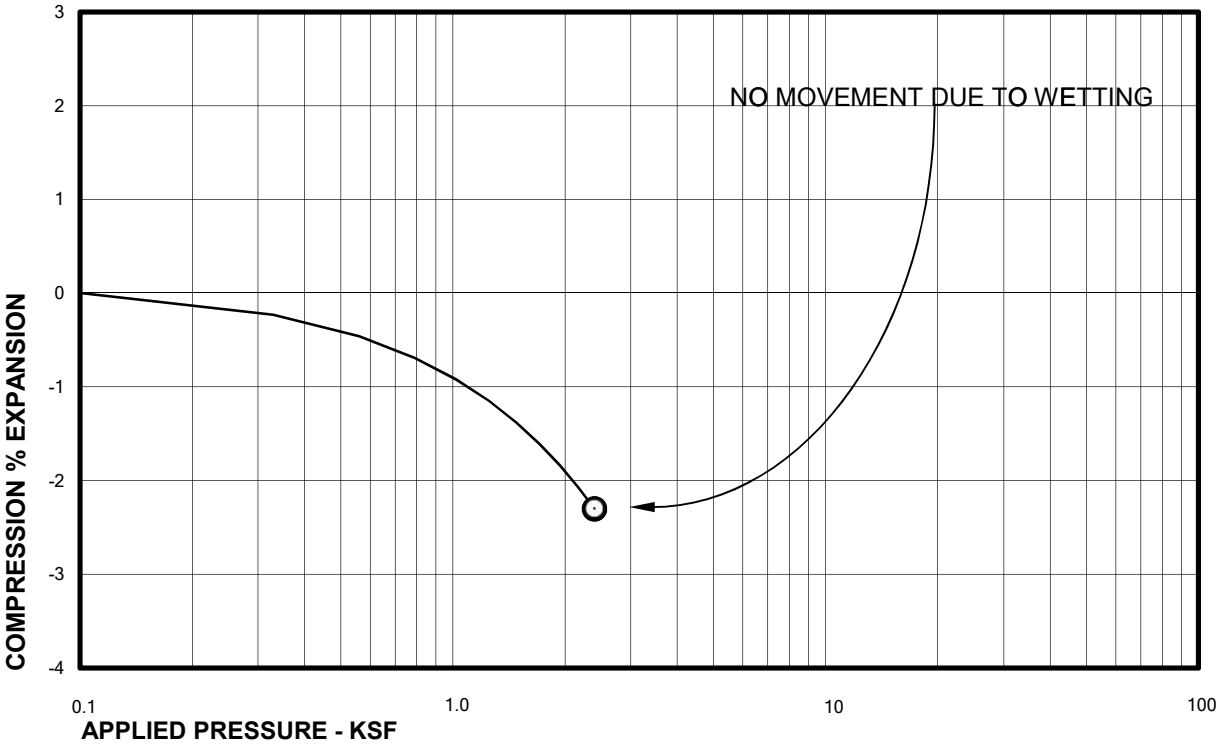
NOTES:

1. THE BORINGS WERE DRILLED ON NOVEMBER 23, 2019 AND JANUARY 14, 2021 USING 4-INCH DIAMETER, CONTINUOUS-FLIGHT SOLID-STEM AUGER AND TRUCK-MOUNTED CME-45 DRILL RIG. TH-7 WAS DRILLED ON APRIL 3, 2020 USING SIMILAR EQUIPMENT.
2. BORING LOCATIONS AND ELEVATIONS ARE APPROXIMATE AND WERE SURVEYED BY A REPRESENTATIVE OF OUR FIRM USING A LEICA GS18 GPS UNIT REFERENCING THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
3. WC - INDICATES MOISTURE CONTENT (%).
   DD - INDICATES DRY DENSITY (PCF).
   SW - INDICATES SWELL WHEN WETTED UNDER APPLIED PRESSURE (%).
   COM- INDICATES COMPRESSION WHEN WETTED UNDER APPLIED PRESSURE (%).
   LL - INDICATES LIQUID LIMIT.
   PI - INDICATES PLASTICITY INDEX.
   -200 - INDICATES PASSING NO. 200 SIEVE (%).
   SS - INDICATES WATER-SOLUBLE SULFATE CONTENT (%).
   pF - INDICATES SOIL SUCTION VALUE (pF).
4. THESE LOGS ARE SUBJECT TO THE EXPLANATIONS, LIMITATIONS AND CONCLUSIONS CONTAINED IN THIS REPORT.

FIG. 3

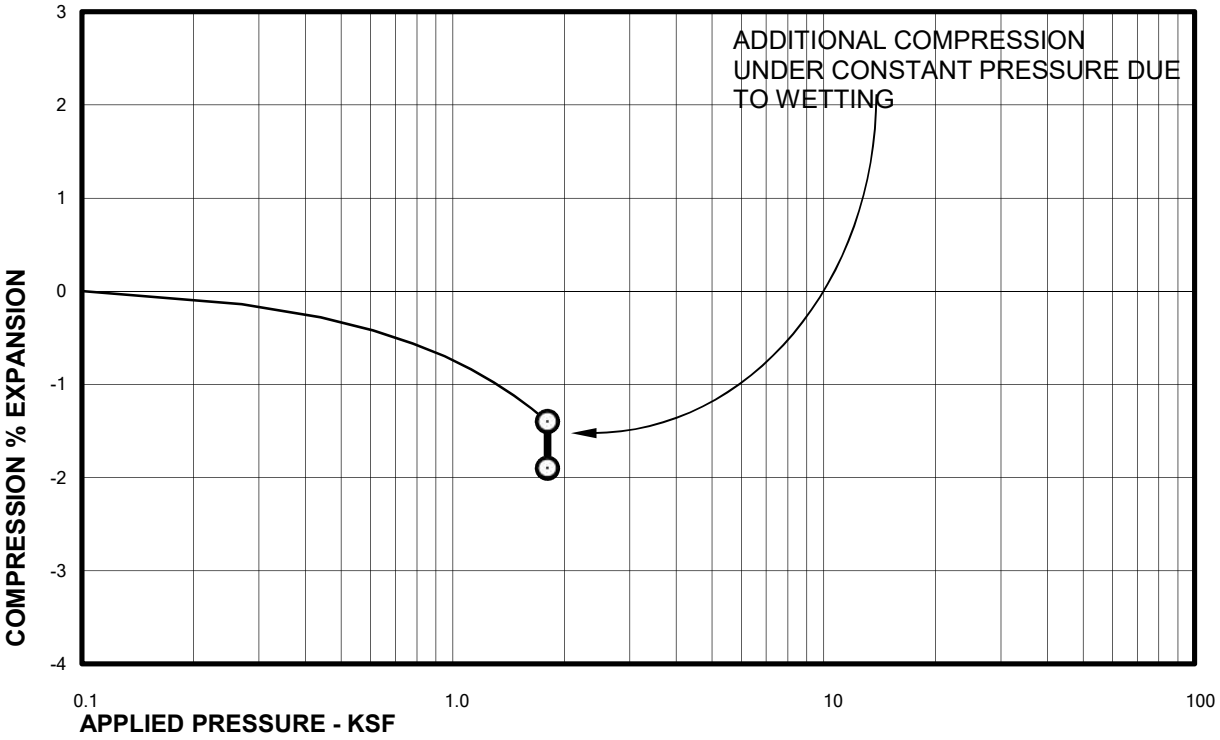
APPENDIX A

LABORATORY TEST RESULTS
TABLE A-I – SUMMARY OF LABORATORY TEST RESULTS



Sample of CLAY, SANDY (CL) DRY UNIT WEIGHT= 123 PCF

From TH-1 AT 19 FEET MOISTURE CONTENT= 11.1 %



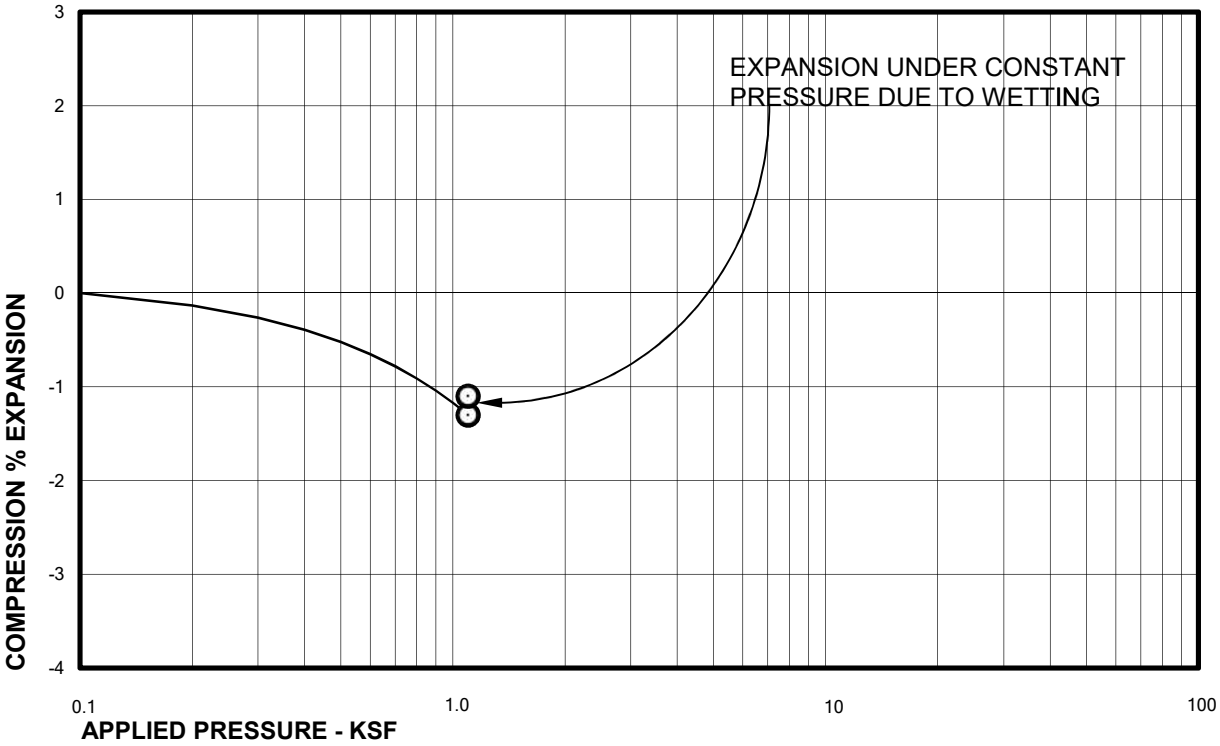
Sample of SAND, CLAYEY (SC) DRY UNIT WEIGHT= 110 PCF

From TH-2 AT 14 FEET MOISTURE CONTENT= 5.7 %

TTLC MANAGEMENT, INC.
WEST 56TH AVENUE TOWNHOMES
CTL|T PROJECT NO. DN50,306-115-R1

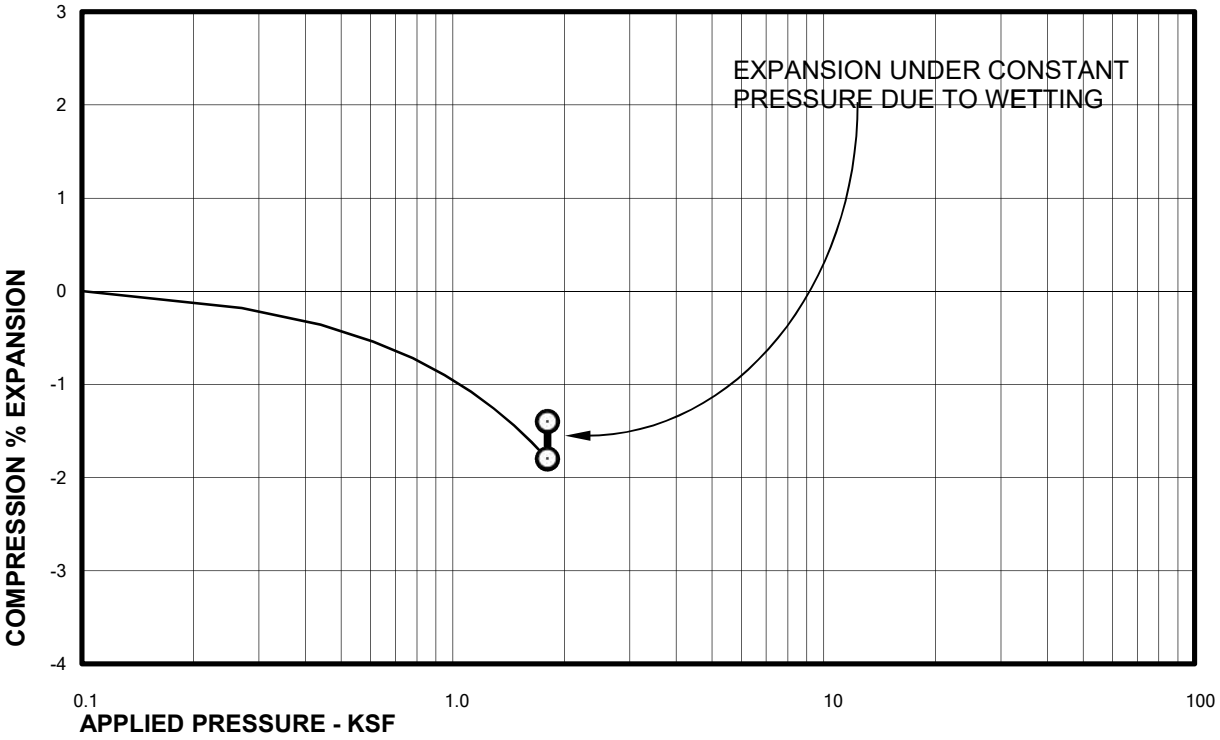
Swell Consolidation Test Results

FIG. A-1



Sample of CLAY, SANDY (CL) DRY UNIT WEIGHT= 118 PCF

From TH-3 AT 9 FEET MOISTURE CONTENT= 12.6 %



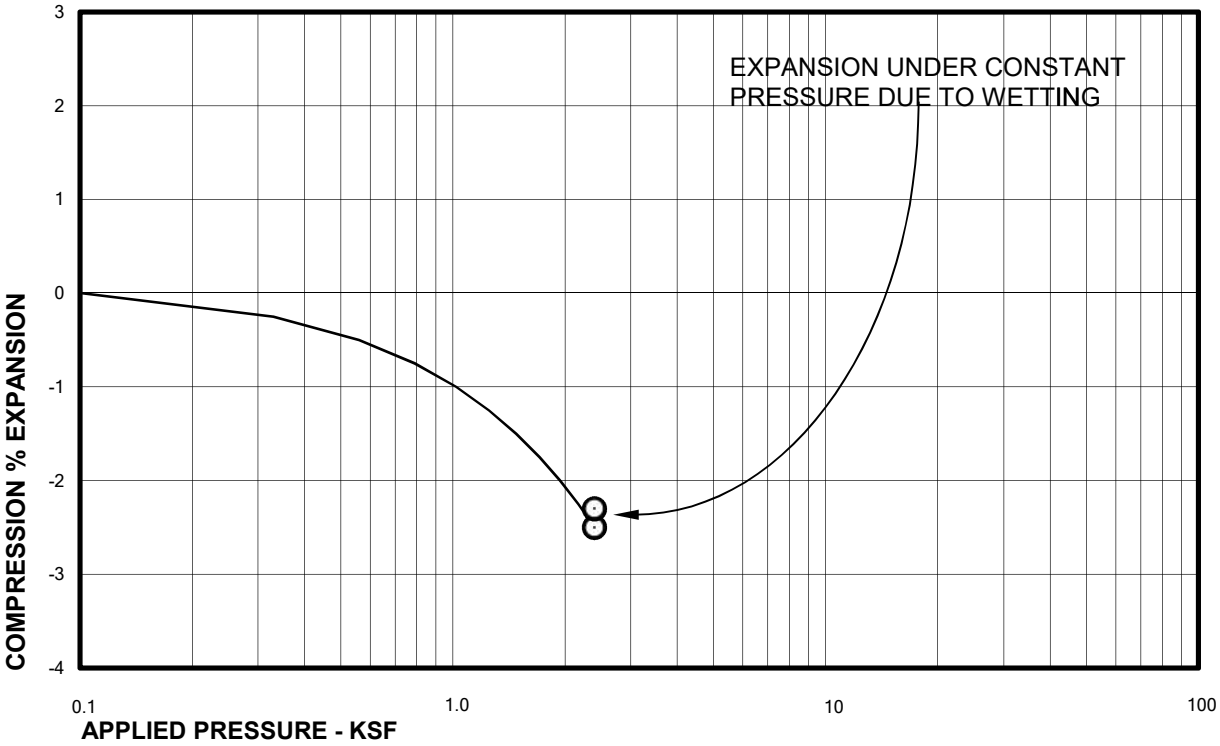
Sample of CLAY, SANDY (CL) DRY UNIT WEIGHT= 118 PCF

From TH-3 AT 14 FEET MOISTURE CONTENT= 12.3 %

TTLC MANAGEMENT, INC.
WEST 56TH AVENUE TOWNHOMES
CTL|T PROJECT NO. DN50,306-115-R1

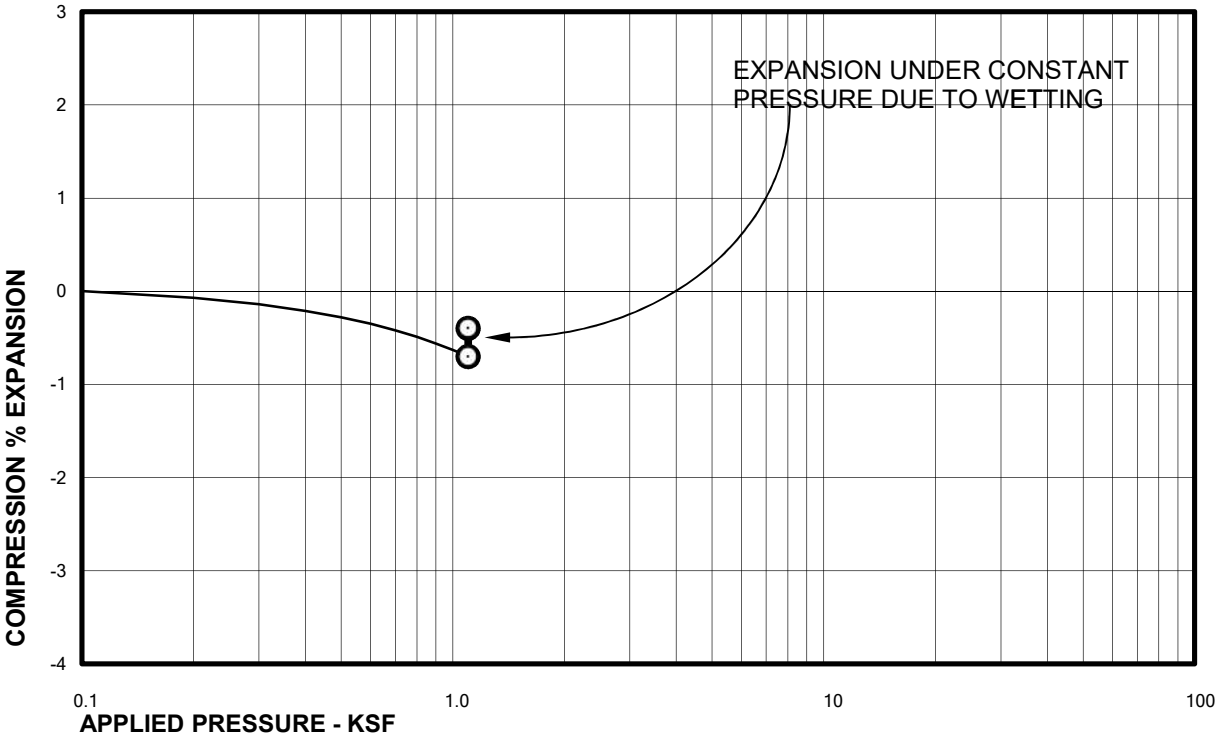
Swell Consolidation Test Results

FIG. A-2



Sample of CLAY, SANDY (CL) DRY UNIT WEIGHT= 107 PCF

From TH-3 AT 19 FEET MOISTURE CONTENT= 19.1 %



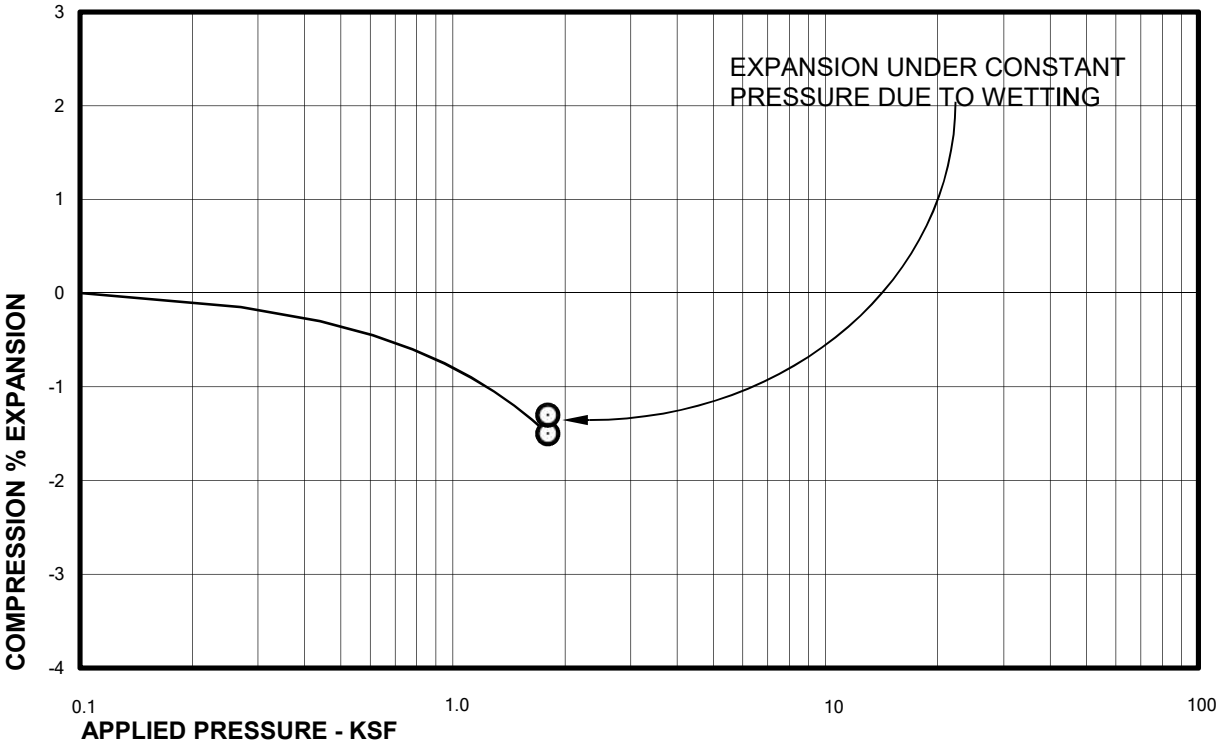
Sample of CLAY, SANDY (CL) DRY UNIT WEIGHT= 111 PCF

From TH-4 AT 9 FEET MOISTURE CONTENT= 17.5 %

TTLC MANAGEMENT, INC.
WEST 56TH AVENUE TOWNHOMES
CTL|T PROJECT NO. DN50,306-115-R1

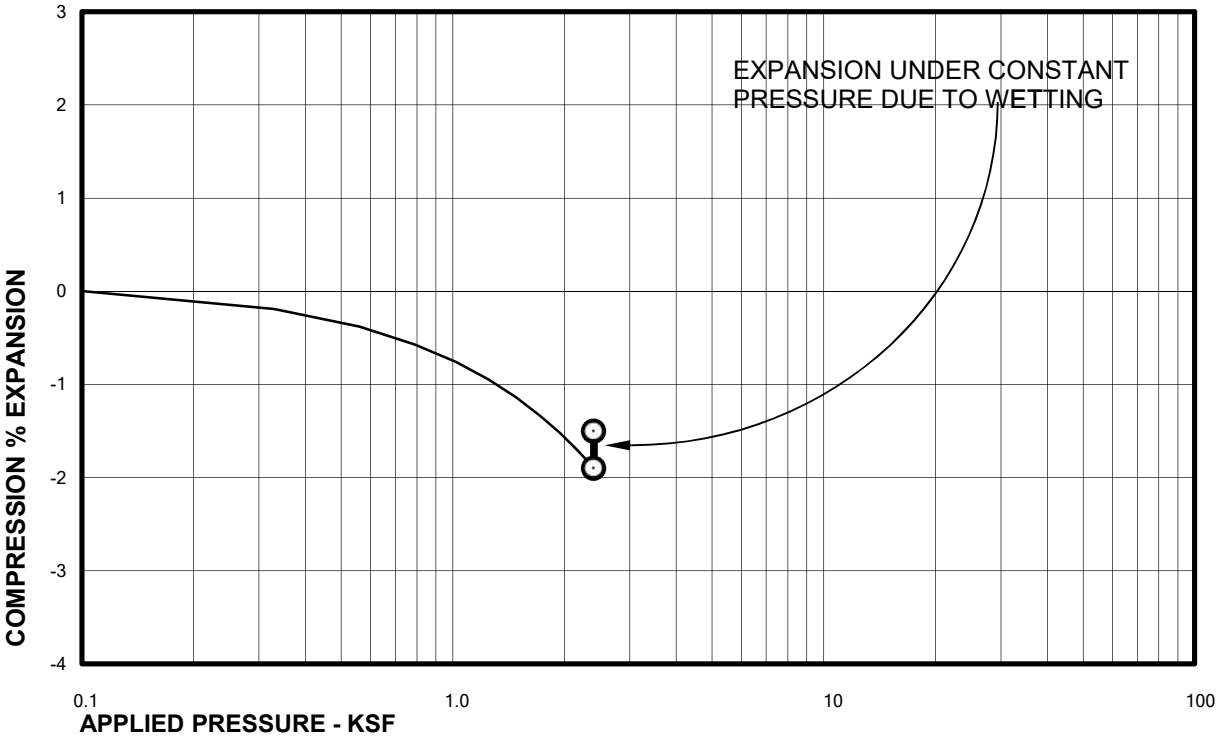
Swell Consolidation Test Results

FIG. A-3



Sample of CLAY, SANDY (CL) DRY UNIT WEIGHT= 113 PCF

From TH-4 AT 14 FEET MOISTURE CONTENT= 14.1 %



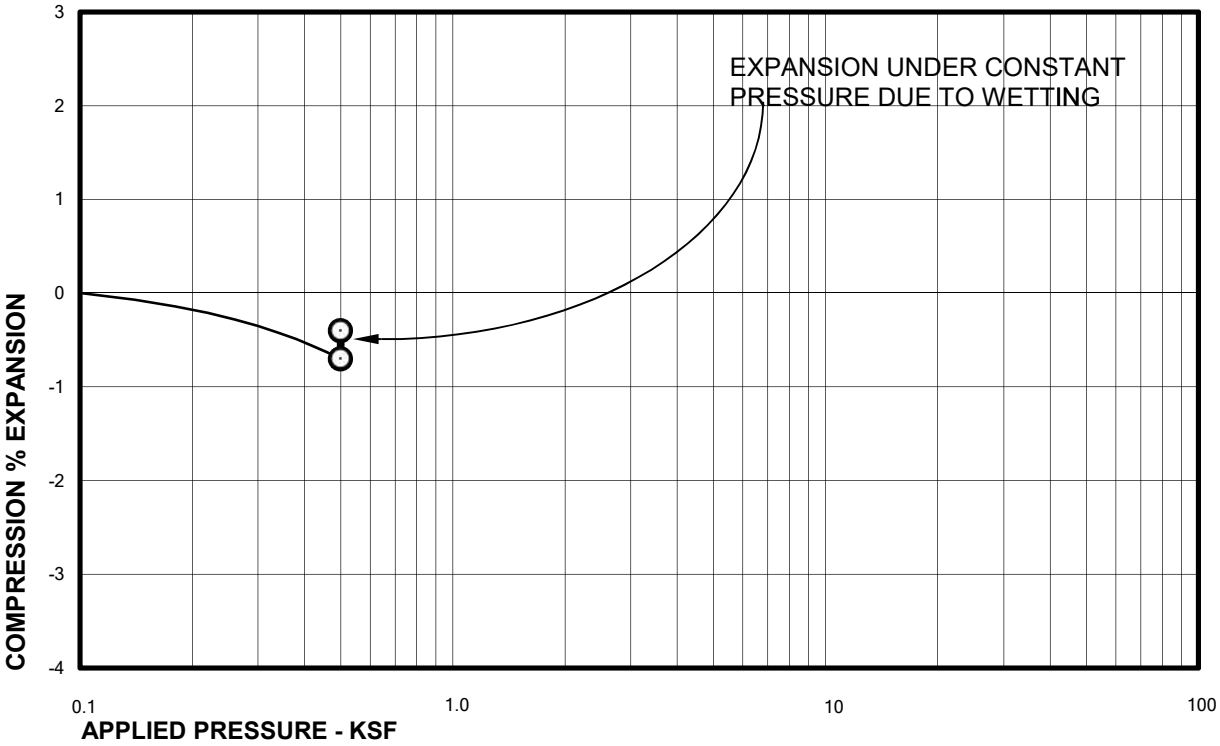
Sample of CLAY, SANDY (CL) DRY UNIT WEIGHT= 117 PCF

From TH-5 AT 19 FEET MOISTURE CONTENT= 13.4 %

TTLC MANAGEMENT, INC.
WEST 56TH AVENUE TOWNHOMES
CTL|T PROJECT NO. DN50,306-115-R1

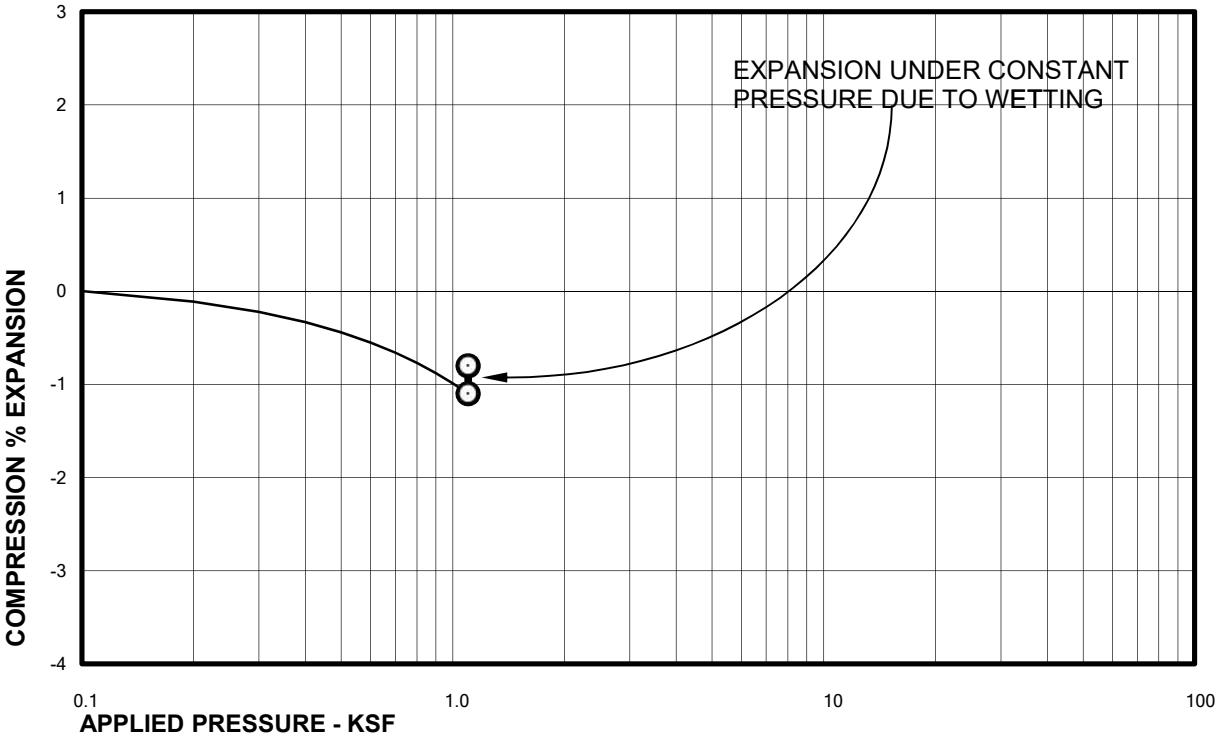
Swell Consolidation Test Results

FIG. A-4



Sample of CLAY, SANDY (CL) DRY UNIT WEIGHT= 106 PCF

From TH-6 AT 4 FEET MOISTURE CONTENT= 7.8 %



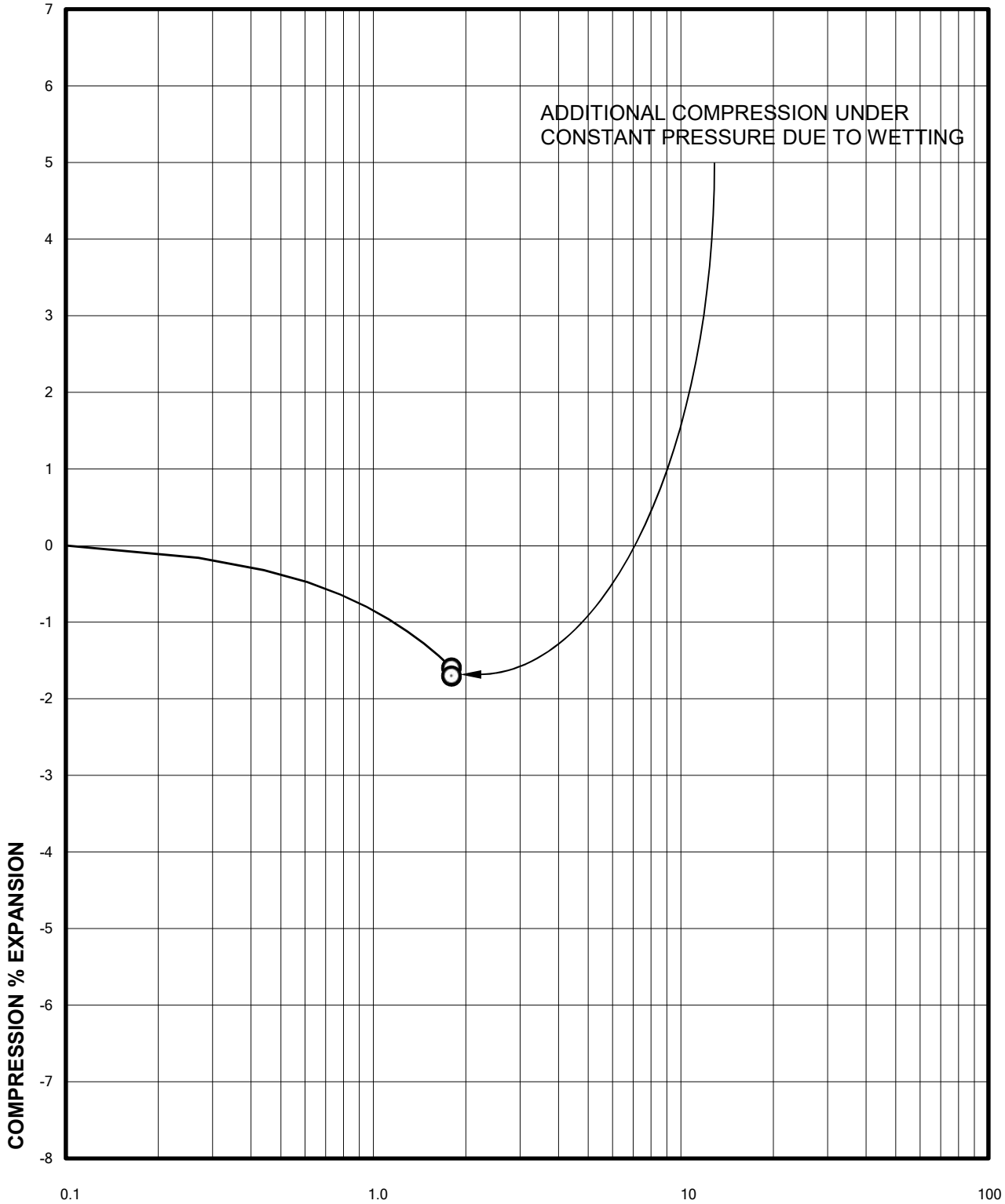
Sample of CLAY, SANDY (CL) DRY UNIT WEIGHT= 114 PCF

From TH-6 AT 9 FEET MOISTURE CONTENT= 9.4 %

TTLC MANAGEMENT, INC.
WEST 56TH AVENUE TOWNHOMES
CTL|T PROJECT NO. DN50,306-115-R1

Swell Consolidation Test Results

FIG. A-5



Sample of CLAY, SANDY (CL)

From TH-6 AT 14 FEET

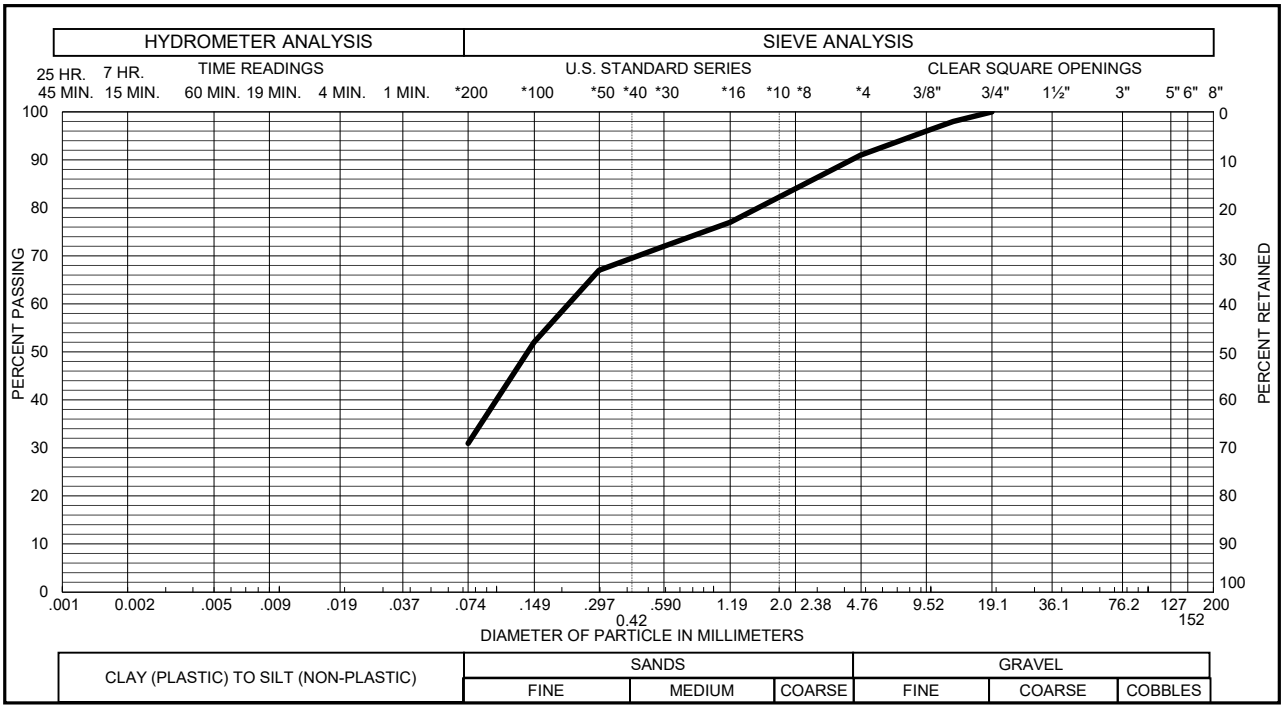
DRY UNIT WEIGHT= 110 PCF

MOISTURE CONTENT= 10.1 %

TTLC MANAGEMENT, INC.
WEST 56TH AVENUE TOWNHOMES
CTL|T PROJECT NO. DN50,306-115-R1

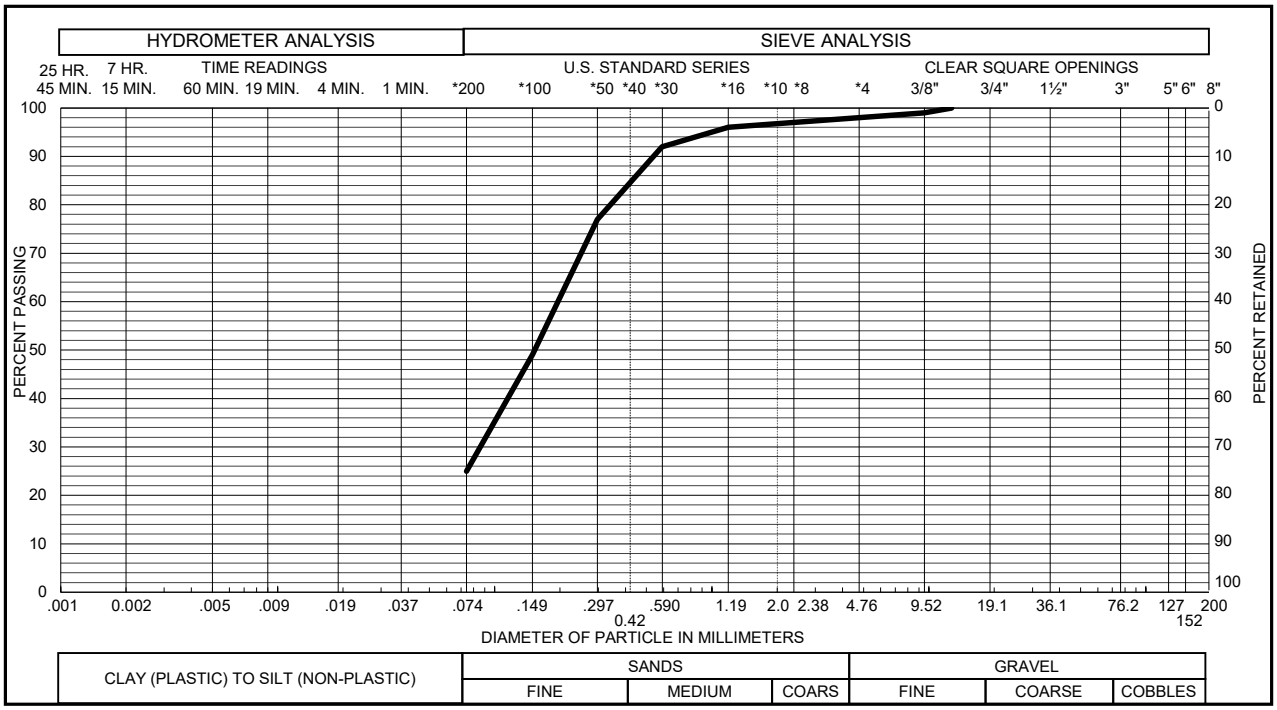
Swell Consolidation Test Results

FIG. A-6



Sample of GRAVEL, CLAYEY (GC)
From TH - 4 AT 24 FEET

GRAVEL 9 % SAND 60 %
SILT & CLAY 31 % LIQUID LIMIT
PLASTICITY INDEX



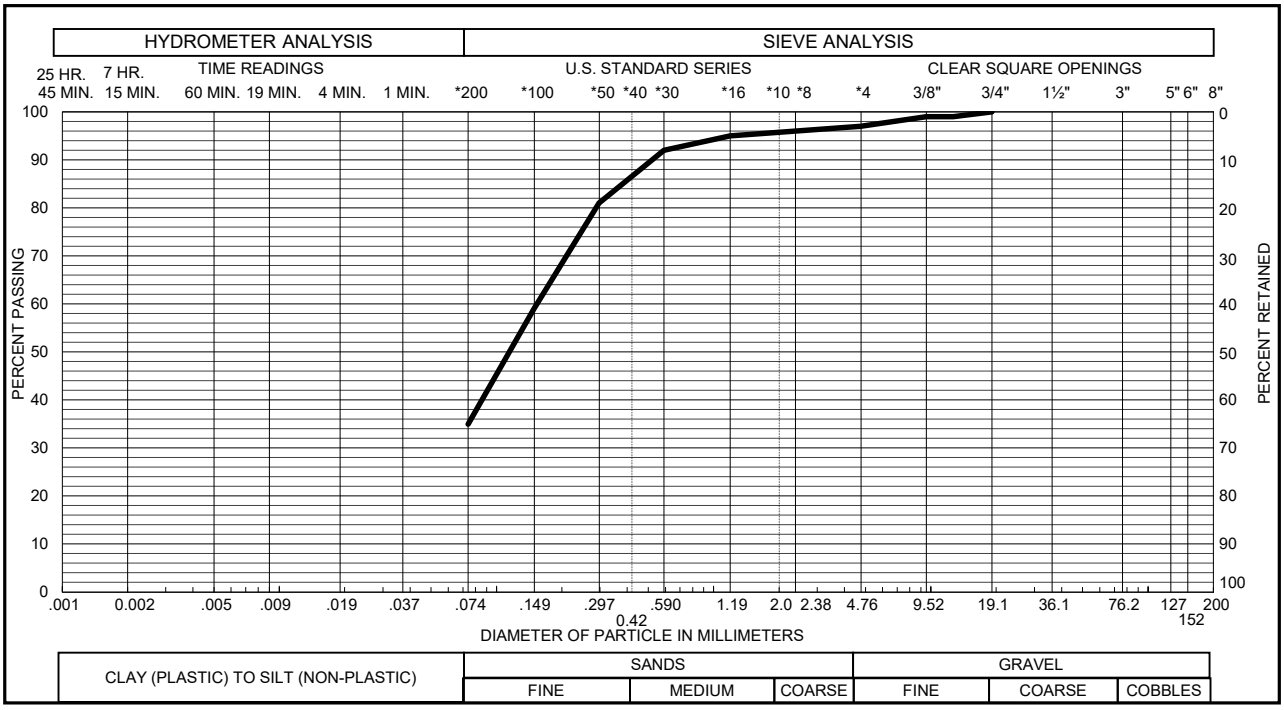
Sample of SAND, CLAYEY (SC)
From TH - 7 AT 4 FEET

GRAVEL 2 % SAND 73 %
SILT & CLAY 25 % LIQUID LIMIT
PLASTICITY INDEX

Gradation Test Results

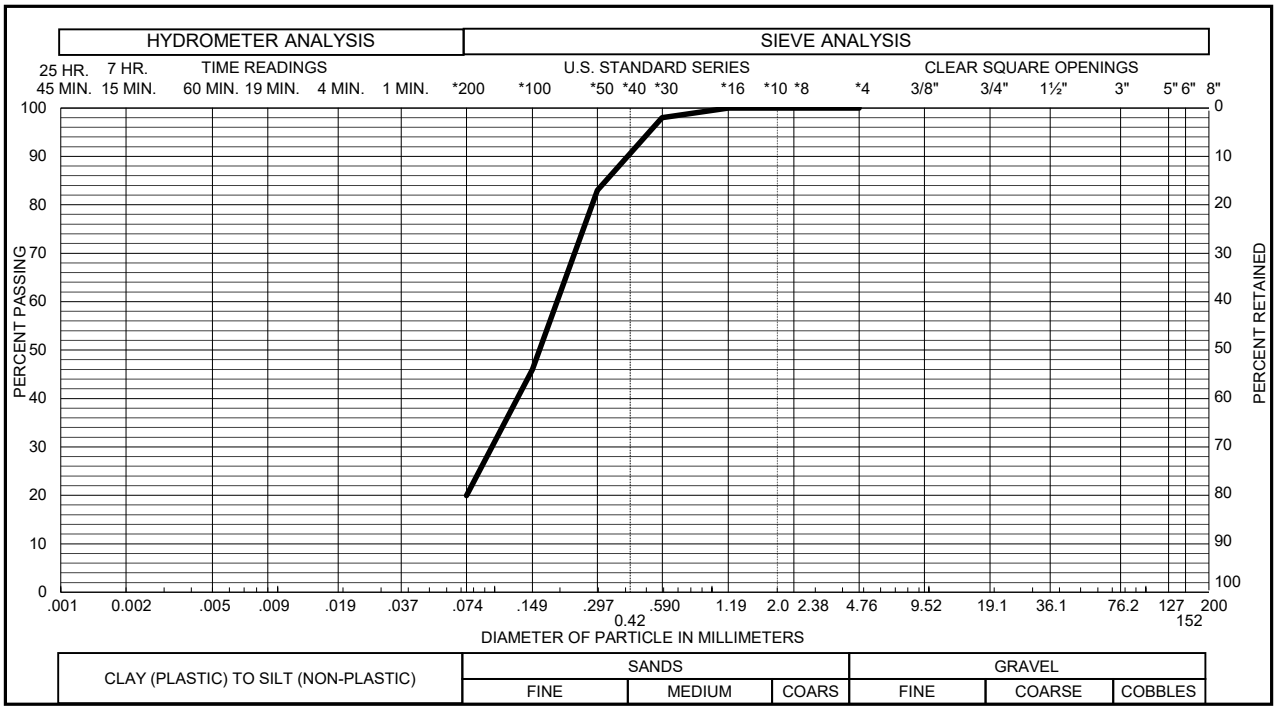
FIG. A-7

TTLC MANAGEMENT, INC.
WEST 56TH AVENUE TOWNHOMES
CTL|T PROJECT NO. DN50,306-115-R1



Sample of SAND, CLAYEY (SC)
From TH - 7 AT 9 FEET

GRAVEL 3 % SAND 62 %
SILT & CLAY 35 % LIQUID LIMIT
PLASTICITY INDEX



Sample of SAND, SILTY (SM)
From TH - 7 AT 14 FEET

GRAVEL 0 % SAND 80 %
SILT & CLAY 20 % LIQUID LIMIT
PLASTICITY INDEX

Gradation Test Results

FIG. A-8

TTLC MANAGEMENT, INC.
WEST 56TH AVENUE TOWNHOMES
CTL|T PROJECT NO. DN50,306-115-R1

TABLE A - I

SUMMARY OF LABORATORY TEST RESULTS

BORING	DEPTH (ft)	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	SWELL TEST DATA			ATTERBERG LIMITS		SOLUBLE SULFATE CONTENT (%)	PASSING NO. 200 SIEVE (%)	SOIL TYPE
				SWELL (%)	COMPRESSION (%)	APPLIED PRESSURE (psf)	LIQUID LIMIT	PLASTICITY INDEX			
TH-1	4	3.6	108				NL	NP		24	SAND, SILTY (SM)
TH-1	19	11.1	123	0.0		2,400					CLAY, SANDY (CL)
TH-2	4	6.0	115				23	6	0.12	38	SAND, CLAYEY (SC)
TH-2	9	1.4	104							16	SAND, SILTY (SM)
TH-2	14	5.7	110		0.5	1,800					SAND, CLAYEY (SC)
TH-3	4	5.6	108							31	SAND, CLAYEY (SC)
TH-3	9	12.6	118	0.2		1,100					CLAY, SANDY (CL)
TH-3	14	12.3	118	0.4		1,800					CLAY, SANDY (CL)
TH-3	19	19.1	107	0.2		2,400					CLAY, SANDY (CL)
TH-4	9	17.5	111	0.3		1,100					CLAY, SANDY (CL)
TH-4	14	14.1	113	0.2		1,800					CLAY, SANDY (CL)
TH-4	24	10.0	113							31	GRAVEL,CLAYEY (GC)
TH-4	34	17.7	107				42	23		68	CLAYSTONE
TH-5	4	4.2	112							29	SAND, CLAYEY (SC)
TH-5	14	10.1					34	19		46	GRAVEL,CLAYEY (GC)
TH-5	19	13.4	117	0.4		2,400					CLAY, SANDY (CL)
TH-6	4	7.8	106	0.3		500			0.08		CLAY, SANDY (CL)
TH-6	9	9.4	114	0.3		1,100					CLAY, SANDY (CL)
TH-6	14	10.1	110		0.1	1,800					CLAY, SANDY (CL)
TH-7	4	5.6	112						<0.01	25	SAND, CLAYEY (SC)
TH-7	9	6.9	118							35	SAND, CLAYEY (SC)
TH-7	14	3.2	106							20	SAND, SILTY (SM)
TH-8	4	3.5	108						<0.01	20	SAND, CLAYEY (SC)
TH-8	9	6.7	107							25	SAND, CLAYEY (SC)
TH-8	14	4.0	106							13	SAND, SILTY (SM)

APPENDIX B

GUIDELINE SITE GRADING SPECIFICATIONS

Denver, Colorado

GUIDELINE SITE GRADING SPECIFICATIONS

Denver, Colorado

1. DESCRIPTION

This item shall consist of the excavation, transportation, placement and compaction of materials from locations indicated on the plans, or staked by the Engineer, as necessary to achieve preliminary street and overlot grade elevations. These specifications shall also apply to compaction of excess cut materials that may be placed outside of the development boundaries.

2. GENERAL

The Soils Representative shall be the Owner's Representative. The Soils Representative shall approve fill materials, method of placement, moisture contents and percent compaction, and shall give written approval of the completed fill.

3. CLEARING JOB SITE

The Contractor shall substantially remove all debris, vegetation, organics and other deleterious materials before excavation or fill placement. The Contractor shall dispose of the cleared material to provide the Owner with a clean, neat appearing job site. Cleared material shall not be placed in areas to receive fill or where the material will support structures of any kind.

4. AREA TO BE FILLED

Debris, vegetation, organics and other deleterious materials shall be substantially removed from the ground surface upon which fill is to be placed. The surface shall then be plowed or scarified until the surface is free from ruts, hummocks or other uneven features, which would prevent uniform compaction.

After the foundation for the fill has been cleared and scarified, it shall be disc-ed or bladed until it is free from large clods, brought to the proper moisture content (optimum to 3 percent above optimum moisture content for clays and within 2 percent of optimum moisture content for sands) and compacted to at least 95 percent of maximum dry density as determined in accordance with ASTM D 698.

5. FILL MATERIALS

Fill soils shall be substantially free from debris, vegetation, organics and other deleterious materials, and shall not contain rocks or lumps having a diameter greater than six (6) inches. Claystone bedrock should be broken down to three (3) inches or smaller in size. Fill materials shall be obtained from cut areas shown on the plans or staked in the field by the Engineer.

On-site materials classifying as CL, CH, SC, SM, SW, SP, GP, GC and GM are acceptable.

6. MOISTURE CONTENT

Fill material classifying as CH, CL and SC shall be moisture conditioned to between optimum and 3 percent above optimum moisture content. Granular soils classifying as SM, SW, SP, GP, GC and GM shall be moisture conditioned to within 2 percent of optimum moisture content as determined from Proctor compaction tests. Sufficient laboratory compaction tests shall be made to determine the optimum moisture content for the various soils encountered in borrow areas.

The Contractor may be required to add moisture to the excavation materials in the borrow area if, in the opinion of the Soils Representative, it is not possible to obtain uniform moisture content by adding water on the fill surface. The Contractor may be required to rake or disc the fill soils to provide uniform moisture content through the soils.

The application of water to embankment materials shall be made with any type of watering equipment approved by the Soils Representative, which will give the desired results. Water jets from the spreader shall not be directed at the embankment with such force that fill materials are washed out.

Should too much water be added to any part of the fill, such that the material is too wet to permit the desired compaction from being obtained, rolling and all work on that section of the fill shall be delayed until the material has been allowed to dry to the required moisture content. The Contractor will be permitted to rework wet material in an approved manner to hasten its drying.

7. COMPACTION OF FILL AREAS

Selected fill material shall be placed and mixed in evenly spread layers. After each fill layer has been placed, it shall be uniformly compacted to not less than the specified percentage of maximum density. Fill shall be compacted to at least 95 percent of the maximum density as determined in accordance with ASTM D 698. At the option of the Soils Representative, soils classifying as SW, GP, GC, or GM may be compacted to 95 percent of maximum density as determined in accordance with ASTM D 1557 or 70 percent relative density for cohesionless sand soils. Fill materials shall be placed such that the thickness of loose materials does not exceed 10 inches and the compacted lift thickness does not exceed 6 inches.

Compaction as specified above, shall be obtained by the use of sheepsfoot rollers, multiple-wheel pneumatic-tired rollers, or other equipment for soils classifying as CL, CH, or SC. Granular fill shall be compacted using vibratory equipment or other approved equipment. Compaction shall be accomplished while the fill material is at the specified moisture content. Compaction of each layer shall be continuous over the entire area. Compaction equipment shall make sufficient trips to ensure that the required density is obtained.

8. COMPACTION OF SLOPES

Fill slopes shall be compacted by means of sheepsfoot rollers or other suitable equipment. Compaction operations shall be continued until slopes are stable, but not too dense for planting, and there is not appreciable amount of loose soils on the slopes. Compaction of slopes may be done progressively in increments of three to five feet (3' to 5') in height or after the fill is brought to its total height. Permanent fill slopes shall not exceed 3:1 (horizontal to vertical).

9. PLACEMENT OF FILL ON NATURAL SLOPES

Where natural slopes are steeper than 20 percent in grade and the placement of fill is required, benches shall be cut at the rate of one bench for each 5 feet in height (minimum of two benches). Benches shall be at least 10 feet in width. Larger bench widths may be required by the Engineer. Fill shall be placed on completed benches as outlined within this specification.

10. DENSITY TESTS

Field density tests shall be made by the Soils Representative at locations and depths of his choosing. Where sheepsfoot rollers are used, the soil may be disturbed to a depth of several inches. Density tests shall be taken in compacted material below the disturbed surface. When density tests indicate that the density or moisture content of any layer of fill or portion thereof is not within specification, the particular layer or portion shall be reworked until the required density or moisture content has been achieved.

11. SEASONAL LIMITS

No fill material shall be placed, spread or rolled while it is frozen, thawing, or during unfavorable weather conditions. When work is interrupted by heavy precipitation, fill operations shall not be resumed until the Soils Representative indicates that the moisture content and density of previously placed materials are as specified.

12. NOTICE REGARDING START OF GRADING

The Contractor shall submit notification to the Soils Representative and Owner advising them of the start of grading operations at least three (3) days in advance of the starting date. Notification shall also be submitted at least 3 days in advance of any resumption dates when grading operations have been stopped for any reason other than adverse weather conditions.

13. REPORTING OF FIELD DENSITY TESTS

Density tests made by the Soils Representative, as specified under "Density Tests" above, shall be submitted progressively to the Owner. Dry density, moisture content, and percentage compaction shall be reported for each test taken.

14. DECLARATION REGARDING COMPLETED FILL

The Soils Engineer shall provide a written declaration stating that the site was filled with acceptable materials, and was placed in general accordance with the specifications.

APPENDIX C – Hydrological Calculations

Project Name:	Berkeley Villas
	Composite C-Value Computations
Project No:	200810
Date:	06-06-2022
Revised:	JRS
Design by:	SM
Checked by:	JRS

Existing Rational Calcs

HARRIS KOCHER SMITH
DENVER • DALLAS/FORT WORTH

INDIVIDUAL BASINS	TOTAL AREA (ACRES)	ROOF, DRIVES & WALKS (90%)	STREETS (PAVED) (100%)	LANDSCAPE AREA (2%)	PERCENT IMPERVIOUS (%)	C_2=	C_5=	C_{10}=	C_{100}=
A	2.79	0.40	0.00	2.39	14.71%	0.07	0.07	0.08	0.22
B	1.91	0.27	0.10	1.54	19.72%	0.10	0.11	0.12	0.26
Entire Site Totals:	**4.70 (SITE AREA ONLY)**	**0.68**	**0.10**	**3.92**	**16.74%**				

UDFCD August 2018 "C" Coefficients

Input Soil Type: (A, B, CD)	**A**
TYPE A HYDRAULIC SOIL	
2 YR C_{CD}	$0.84*i^{1.302}$
5 YR C_{CD}	$0.86*i^{1.276}$
10 YR C_{CD}	$0.87*i^{1.232}$
100 YR C_{CD}	$0.78*i+0.110$
TYPE B HYDRAULIC SOIL	
2 YR C_{CD}	$0.84*i^{1.769}$
5 YR C_{CD}	$0.86*i^{1.088}$
10 YR C_{CD}	$0.81i+0.057$
100 YR C_{CD}	$0.47i+0.426$
TYPE C/D HYDRAULIC SOIL	
2 YR C_{CD}	$0.83*i^{1.122}$
5 YR C_{CD}	$0.82*i+0.035$
10 YR C_{CD}	$0.74*i+0.132$
100 YR C_{CD}	$0.41i+0.484$

Existing Rational Calcs

HARRIS KOCHER SMITH
DENVER • DALLAS/FORT WORTH

CALCULATED BY: SM
DATE: 06-06-2022
CHECKED BY: JRS

STANDARD FORM SF-2
TIME OF CONCENTRATION

JOB NO: 200810
PROJECT: **Berkeley Villas**

REVISION DATE:

SUB-BASIN DATA			INITIAL/OVERLAND TIME (T_i)			TRAVEL TIME (T_t)					Tc CHECK (URBANIZED BASINS)			FINAL	REMARKS
BASIN	AREA (AC)	C_5	LENGTH (FT)	SLOPE FL/FL	Ti (MIN)	LENGTH (FT)	SLOPE FL/FL	K	VELOCITY (FPS)	Tt (MIN)	COMPOS. Tc (MIN)	TOTAL LENGTH	(L/180) (MIN)	T_c (MIN)	
A	2.79	0.07	464	0.01	39.88	310	0.0079	20.00	1.78	2.91	42.79	774	14.30	14.30	
B	1.91	0.11	464	0.020	30.68	265	0.018	20.00	2.68	1.65	32.33	729	14.05	14.05	

*BASED ON ONE-HOUR POINT RAINFALL DEPTHS FROM Adams County, Chapter 9 - Storm Drainage and Stormwater Quality Control Regulations

Return Interval (YR)	1-hour Rainfall
WQ Storm	na
2	1
5	1.42
10	1.68
100	2.71

Existing Rational Calcs

CALCULATED BY: SM
DATE: 06-06-2022
CHECKED BY: JRS
REVISED DATE: 06-06-2022

STANDARD FORM SF-3

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

JOB NO: 200810
PROJECT: **Berkeley Villas**
DESIGN STORM: 5 YR

		DIRECT RUNOFF						TOTAL RUNOFF				STREET/INLET					STORM SEWER PIPE				TRAVEL TIME			
BASIN (s)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	T_c (min)	C x A (AC)	I (IN/HR)	DIRECT RUNOFF, Q (CFS)	T_c (MAX)	Σ(C x A) (AC)	I (IN/HR)	TOTAL RUNOFF, Q (CFS)	SLOPE (%)	STREET FLOW (CFS)	INLET DESIGN FLOW (CFS)	STREET OR INLET INTERCEPTION (CFS)	CARRYOVER (CFS)	DESIGN FLOW (CFS)	PIPE SLOPE (%)	PIPE SIZE (IN)	QFULL (CFS)	LENGTH (FT)	VELOCITY (FPS)	T_t (min)	REMARKS
A	1	2.79	0.07	14.30	0.21	3.30	0.69																	
B	2	1.91	0.11	14.05	0.21	3.32	0.69																	

CALCULATED BY: SM
DATE: 06-06-2022
CHECKED BY: JRS
REVISED DATE: 06-06-2022

STANDARD FORM SF-3

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

Existing Rational Calcs

JOB NO: 200810
PROJECT: **Berkeley Villas**
DESIGN STORM: 100 YR

		DIRECT RUNOFF						TOTAL RUNOFF				STREET/INLET					STORM SEWER PIPE				TRAVEL TIME			
BASIN (s)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	T_c (min)	C x A (AC)	I (IN/HR)	DIRECT RUNOFF, Q (CFS)	T_c (MIN)	Σ(C x A) (AC)	I (IN/HR)	TOTAL RUNOFF, Q (CFS)	SLOPE (%)	STREET FLOW (CFS)	INLET DESIGN FLOW (CFS)	STREET OR INLET INTERCEPTION (CFS)	CARRYOVER (CFS)	DESIGN FLOW (CFS)	PIPE SLOPE (%)	PIPE SIZE (IN)	QFULL (CFS)	LENGTH (FT)	VELOCITY (FPS)	T_t (min)	REMARKS
A	1	2.79	0.22	14.30	0.63	6.29	3.94																	
B	2	1.91	0.26	14.05	0.50	6.34	3.20																	

Project Name:	Berkeley Villas
	Composite C-Value Computations
Project No:	200810
Date:	06-06-2022
Revised:	JRS
Design by:	HT
Checked by:	JRS

HARRIS KOCHER SMITH
DENVER • DALLAS/FORT WORTH

INDIVIDUAL BASINS	TOTAL AREA (ACRES)	ROOF, DRIVES & WALKS (90%)	STREETS (PAVED) (100%)	LANDSCAPE AREA (2%)	PERCENT IMPERVIOUS (%)	C_2=	C_5=	C_{10}=	C_{100}=
A	0.81	0.54	0.09	0.18	71.56%	0.54	0.56	0.58	0.67
B	0.28	0.12	0.10	0.06	74.26%	0.57	0.59	0.60	0.69
C	0.13	0.07	0.00	0.06	49.38%	0.34	0.35	0.36	0.50
D	0.09	0.09	0.00	0.00	90.00%	0.73	0.75	0.76	0.81
E	0.08	0.07	0.00	0.01	79.00%	0.62	0.64	0.65	0.73
F	0.75	0.48	0.07	0.20	67.47%	0.50	0.52	0.54	0.64
G	0.13	0.05	0.06	0.02	81.08%	0.64	0.66	0.67	0.74
H	0.51	0.25	0.00	0.26	45.14%	0.30	0.31	0.33	0.46
J	0.26	0.14	0.12	0.00	94.62%	0.78	0.80	0.81	0.85
K	0.15	0.15	0.00	0.00	90.00%	0.73	0.75	0.76	0.81
L	0.41	0.34	0.00	0.07	74.98%	0.58	0.60	0.61	0.69
M	0.50	0.33	0.09	0.08	77.72%	0.60	0.62	0.64	0.72
N	0.30	0.04	0.13	0.13	56.20%	0.40	0.41	0.43	0.55
O	0.13	0.00	0.00	0.13	2.00%	0.01	0.01	0.01	0.13
P	0.08	0.03	0.04	0.01	84.00%	0.67	0.69	0.70	0.77
Q	0.08	0.02	0.04	0.02	73.00%	0.56	0.58	0.59	0.68
R	0.01	0.00	0.00	0.01	2.00%	0.01	0.01	0.01	0.13
S	0.05	0.03	0.02	0.00	94.00%	0.77	0.79	0.81	0.84
T	0.05	0.03	0.02	0.00	94.00%	0.77	0.79	0.81	0.84
Entire Site Totals:	**4.70 (SITE AREA ONLY)**	**2.72**	**0.74**	**1.24**	**68.33%**				

UDFCD August 2018 "C" Coefficients

Input Soil Type: (A, B, CD)	**A**
TYPE A HYDRAULIC SOIL	
2 YR C_{CD}	$0.84*i^{1.302}$
5 YR C_{CD}	$0.86*i^{1.276}$
10 YR C_{CD}	$0.87*i^{1.232}$
100 YR C_{CD}	$0.78*i+0.110$
TYPE B HYDRAULIC SOIL	
2 YR C_{CD}	$0.84*i^{1.169}$
5 YR C_{CD}	$0.86*i^{1.088}$
10 YR C_{CD}	$0.81i+0.057$
100 YR C_{CD}	$0.47i+0.426$
TYPE C/D HYDRAULIC SOIL	
2 YR C_{CD}	$0.83*i^{1.122}$
5 YR C_{CD}	$0.82*i+0.035$
10 YR C_{CD}	$0.74*i+0.132$
100 YR C_{CD}	$0.41i+0.484$

HARRIS KOCHER SMITH
DENVER • DALLAS/FORT WORTH

CALCULATED BY: HT
DATE: 06-06-2022
CHECKED BY: JRS

STANDARD FORM SF-2
TIME OF CONCENTRATION

JOB NO: 200810
PROJECT: **Berkeley Villas**

REVISION DATE:

SUB-BASIN DATA			INITIAL/OVERLAND TIME (T_i)			TRAVEL TIME (T_t)					Tc CHECK (URBANIZED BASINS)			FINAL	REMARKS
BASIN	AREA (AC)	C_5	LENGTH (FT)	SLOPE FL/FL	Ti (MIN)	LENGTH (FT)	SLOPE FL/FL	K	VELOCITY (FPS)	Tt (MIN)	COMPOS. Tc (MIN)	TOTAL LENGTH	(L/180) (MIN)	T_c (MIN)	
A	0.81	0.56	101	0.01	9.78	335	0.0477	20.00	4.37	1.28	11.06	436	12.42	11.06	
B	0.28	0.59	15	0.020	2.85	335	0.048	20.00	4.37	1.28	4.12	350	11.94	5.00	
C	0.13	0.35	24.5	0.500	1.84	110	0.025	20.00	3.16	0.58	2.42	135	10.75	5.00	
D	0.09	0.75	10	0.020	1.58	36	0.010	20.00	2.00	0.30	1.88	46	10.26	5.00	
E	0.08	0.64	10	0.020	2.10	40	0.020	20.00	2.83	0.24	2.34	50	10.28	5.00	
F	0.75	0.52	150	0.019	10.30	225	0.020	20.00	2.83	1.33	11.62	375	12.08	11.62	
G	0.13	0.66	15	0.020	2.46	211	0.020	20.00	2.83	1.24	3.70	226	11.26	5.00	
H	0.51	0.31	10	0.020	3.58	168	0.010	20.00	2.00	1.40	4.98	178	10.99	5.00	
J	0.26	0.80	10	0.020	1.36	168	0.010	20.00	2.00	1.40	2.76	178	10.99	5.00	
K	0.15	0.75	10	0.020	1.58	100	0.010	20.00	2.00	0.83	2.41	110	10.61	5.00	
L	0.41	0.60	10	0.020	2.29	100	0.010	20.00	2.00	0.83	3.12	110	10.61	5.00	
M	0.50	0.62	15	0.020	2.65	253	0.020	20.00	2.83	1.49	4.14	268	11.49	5.00	
N	0.30	0.41	15	0.020	3.83	253	0.020	20.00	2.83	1.49	5.32	268	11.49	5.32	
O	0.13	0.01	15	0.030	5.32	100	0.010	15.00	1.50	1.11	6.44	115	10.64	6.44	
P	0.08	0.69	15	0.200	1.07	47	0.023	20.00	3.04	0.26	1.33	62	10.34	5.00	
Q	0.08	0.58	15	0.200	1.36	47	0.023	20.00	3.04	0.26	1.62	62	10.34	5.00	
R	0.01	0.01	5	0.020	3.51	137	0.010	20.00	2.00	1.14	4.66	142	10.79	5.00	
S	0.05	0.79	5	0.020	0.98	116	0.022	20.00	2.93	0.66	1.64	121	10.67	5.00	
T	0.05	0.79	5	0.020	0.98	115	0.022	20.00	2.93	0.65	1.63	120	10.67	5.00	

*BASED ON ONE-HOUR POINT RAINFALL DEPTHS FROM Adams County, Chapter 9 - Storm Drainage and Stormwater Quality Control Regulations

Return Interval (YR)	1-hour Rainfall
WQ Storm	na
2	1
5	1.42
10	1.68
100	2.71

CALCULATED BY: HT
DATE: 06-06-2022
CHECKED BY: JRS
REVISED DATE: 06-06-2022

STANDARD FORM SF-3

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

JOB NO: 200810
PROJECT: **Berkeley Villas**
DESIGN STORM: 5 YR

		DIRECT RUNOFF						TOTAL RUNOFF				STREET/INLET					STORM SEWER PIPE				TRAVEL TIME			
BASIN (s)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	T_C (min)	C x A (AC)	I (IN/HR)	DIRECT RUNOFF, Q (CFS)	T_C (MAX)	Σ(C x A) (AC)	I (IN/HR)	TOTAL RUNOFF, Q (CFS)	SLOPE (%)	STREET FLOW (CFS)	INLET DESIGN FLOW (CFS)	STREET OR INLET INTERCEPTION (CFS)	CARRYOVER (CFS)	DESIGN FLOW (CFS)	PIPE SLOPE (%)	PIPE SIZE (IN)	QFULL (CFS)	LENGTH (FT)	VELOCITY (FPS)	T_t (min)	REMARKS
A	1	0.81	0.56	11.06	0.45	3.69	1.68																	
																	1.68	0.40	18	6.64	39.5	3.8	0.18	DP1 TO DP2
B	2	0.28	0.59	5.00	0.16	4.82	0.79																	
A+B	2							11.23	0.62	3.67	2.27													
																	2.27	0.40	18	6.64	215	3.8	0.95	DP2 TO DP3
C	3	0.13	0.35	5.00	0.05	4.82	0.22																	
A+B+C	3							12.19	0.66	3.54	2.35													
																	2.35	2.00	18	14.86	66	8.4	0.13	DP3 TO DP7
D	4	0.09	0.75	5.00	0.07	4.82	0.33																	
																	0.33	2.00	18	14.86	50	8.4	0.10	DP4 TO DP6
E	5	0.08	0.64	5.00	0.05	4.82	0.25																	
																	0.25	2.00	18	14.86	6	8.4	0.01	DP5 TO DP6
D+E	6							5.10	0.12	4.79	0.57													
																	0.57	2.00	18	14.86	42	8.4	0.08	DP6 TO DP7
A+B+C+D+E	7							12.32	0.78	3.52	2.76													
OFF-SITE FLOW	8						10.50																	
																	2.76	0.40	24	14.31	198	4.6	0.72	DP7 TO DP10
F	9	0.75	0.52	11.62	0.39	3.61	1.41																	
																	1.41	2.00	18	14.86	39	8.4	0.08	DP8 TO DP9
G	10	0.13	0.66	5.00	0.09	4.82	0.41																	
F+G+OFF-SITE	10							11.70	0.48	3.60	12.21													
																	12.21	2.00	18	14.86	8	8.4	0.02	DP9 TO DP10
A+B+C+D+E+F+G	11							13.04	1.26	3.44	4.33													
																	4.33	0.40	24	14.31	79	4.6	0.29	
H	12	0.51	0.31	5.00	0.16	4.82	0.77																	
J	12	0.26	0.80	5.00	0.21	4.82	1.00																	
H+J	12							5.00	0.37	4.82	1.77													
																	1.77	3.64	18	20.04	30	11.3	0.04	DP11 TO DP12
A+B+C+D+E+F+G+H	13							13.33	1.42	3.40	4.83													
																	4.83	0.80	24	20.23	108	6.4	0.28	DP12 TO DP14
K	14	0.15	0.75	5.00	0.11	4.82	0.54																	
L	14	0.41	0.60	5.00	0.24	4.82	1.18																	
K+L	14							5.00	0.36	4.82	1.72													
																	1.72	0.50	18	7.43	130	4.2	0.52	DP13 TO DP14
+B+C+D+E+F+G+H+	15							13.61	1.53	3.37	5.16													
																	5.16	0.80	24	20.23	54	6.4	0.14	DP14 TO DP17
M	16	0.50	0.62	5.00	0.31	4.82	1.50																	
																	1.50	0.40	18	6.64	42	3.8	0.19	DP13 TO DP14
N	17	0.30	0.41	5.32	0.12	4.74	0.59																	
																	2.03	0.40	18	6.64	64	3.8	0.28	DP13 TO DP14
M+N	17							5.60	0.44	4.67	2.03													
B+C+D+E+F+G+H+J	18							13.75	1.97	3.36	6.60													
O		0.13	0.01	6.44	0.00	4.48	0.00																	
								13.75	1.97	3.36	6.60													
P		0.08	0.69	5.00	0.06	4.82	0.27																	
Q		0.08	0.58	5.00	0.05	4.82	0.22																	
R		0.01	0.01	5.00	0.00	4.82	0.00																	
S		0.05	0.79	5.00	0.04	4.82	0.19																	
T		0.05	0.79	5.00	0.04	4.82	0.19																	
Off-Site Flows								5.00	0.18	4.82	0.87													

CALCULATED BY: HT
DATE: 06-06-2022
CHECKED BY: JRS
REVISED DATE: 06-06-2022

STANDARD FORM SF-3

STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

JOB NO: 200810
PROJECT: **Berkeley Villas**
DESIGN STORM: 100 YR

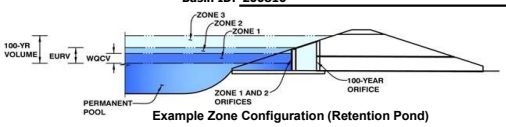
		DIRECT RUNOFF						TOTAL RUNOFF				STREET/INLET					STORM SEWER PIPE				TRAVEL TIME			
BASIN (s)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	Tc (min)	C x A (AC)	I (IN/HR)	DIRECT RUNOFF, Q (CFS)	Tc (MIN)	Σ(C x A) (AC)	I (IN/HR)	TOTAL RUNOFF, Q (CFS)	SLOPE (%)	STREET FLOW (CFS)	INLET DESIGN FLOW (CFS)	STREET OR INLET INTERCEPTION (CFS)	CARRYOVER (CFS)	DESIGN FLOW (CFS)	PIPE SLOPE (%)	PIPE SIZE (IN)	QFULL (CFS)	LENGTH (FT)	VELOCITY (FPS)	Tt (min)	REMARKS
A	1	0.81	0.67	11.06	0.54	7.04	3.81																	
B	2	0.28	0.69	5.00	0.19	9.19	1.77										3.81	0.40	18	6.64	39.5	3.8	0.18	DP1 TO DP2
A+B	2							11.23	0.73	7.00	5.14													
C	3	0.13	0.50	5.00	0.06	9.19	0.59										5.14	0.40	18	6.64	215	3.8	0.95	DP2 TO DP3
A+B+C	3							12.19	0.80	6.76	5.40													
D	4	0.09	0.81	5.00	0.07	9.19	0.67										5.40	2.00	18	14.86	66	8.4	0.13	DP3 TO DP7
E	5	0.08	0.73	5.00	0.06	9.19	0.53										0.67	2.00	18	14.86	50	8.4	0.10	DP4 TO DP6
D+E	6							5.10	0.13	9.14	1.20						0.53	2.00	18	14.86	6	8.4	0.01	DP5 TO DP6
A+B+C+D+E	7							12.32	0.93	6.73	6.25						1.20	2.00	18	14.86	42	8.4	0.08	DP6 TO DP7
F	9	0.75	0.64	11.62	0.48	6.90	3.29										6.25	0.40	24	14.31	198	4.6	0.72	DP7 TO DP10
G	10	0.13	0.74	5.00	0.10	9.19	0.89										3.29	2.00	18	14.86	39	8.4	0.08	DP8 TO DP9
F+G	10							11.70	0.57	6.88	3.94													
A+B+C+D+E+F+G	11							13.04	1.50	6.56	9.86						3.94	2.00	18	14.86	8	8.4	0.02	DP9 TO DP10
H	12	0.51	0.46	5.00	0.24	9.19	2.17										9.86	0.40	24	14.31	79	4.6	0.29	
J	12	0.26	0.85	5.00	0.22	9.19	2.03																	
H+J	12							5.00	0.46	9.19	4.19													
+B+C+D+E+F+G+H+	13							13.33	1.96	6.50	12.73						2.17	3.64	18	20.04	30	11.3	0.04	DP11 TO DP12
K	14	0.15	0.81	5.00	0.12	9.19	1.12										12.73	0.80	24	20.23	108	6.4	0.28	DP12 TO DP14
L	14	0.41	0.69	5.00	0.28	9.19	2.62																	
K+L	14							5.00	0.41	9.19	3.74													
+C+D+E+F+G+H+J+	15							13.61	2.37	6.44	15.23						1.12	0.50	18	7.43	130	4.2	0.52	DP13 TO DP14
M	16	0.50	0.72	5.00	0.36	9.19	3.29										15.23	0.80	24	20.23	54	6.4	0.14	DP14 TO DP17
N	17	0.30	0.55	5.32	0.16	9.04	1.49										3.29	0.40	18	6.64	42	3.8	0.19	DP13 TO DP14
M+N	17							5.60	0.52	8.91	4.66						4.66	0.40	18	6.64	64	3.8	0.28	DP13 TO DP14
+D+E+F+G+H+J+K+	18							13.75	2.89	6.41	18.50													
O		0.13	0.13	6.44	0.02	8.55	0.14																	
								13.75	2.91	6.41	18.61													
P		0.08	0.77	5.00	0.06	9.19	0.56																	
Q		0.08	0.68	5.00	0.05	9.19	0.50																	
R		0.01	0.13	5.00	0.00	9.19	0.01																	
S		0.05	0.84	5.00	0.04	9.19	0.39																	
T		0.05	0.84	5.00	0.04	9.19	0.39																	
Off-Site Total								5.00	0.20	9.19	1.85													

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.05 (January 2022)

Project: **Berkley**

Basin ID: **200810**



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	**EDB**	
Watershed Area =	4.69	acres
Watershed Length =	600	ft
Watershed Length to Centroid =	250	ft
Watershed Slope =	0.010	ft/ft
Watershed Imperviousness =	66.50%	percent
Percentage Hydrologic Soil Group A =	100.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths =	Denver - Capitol Building	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

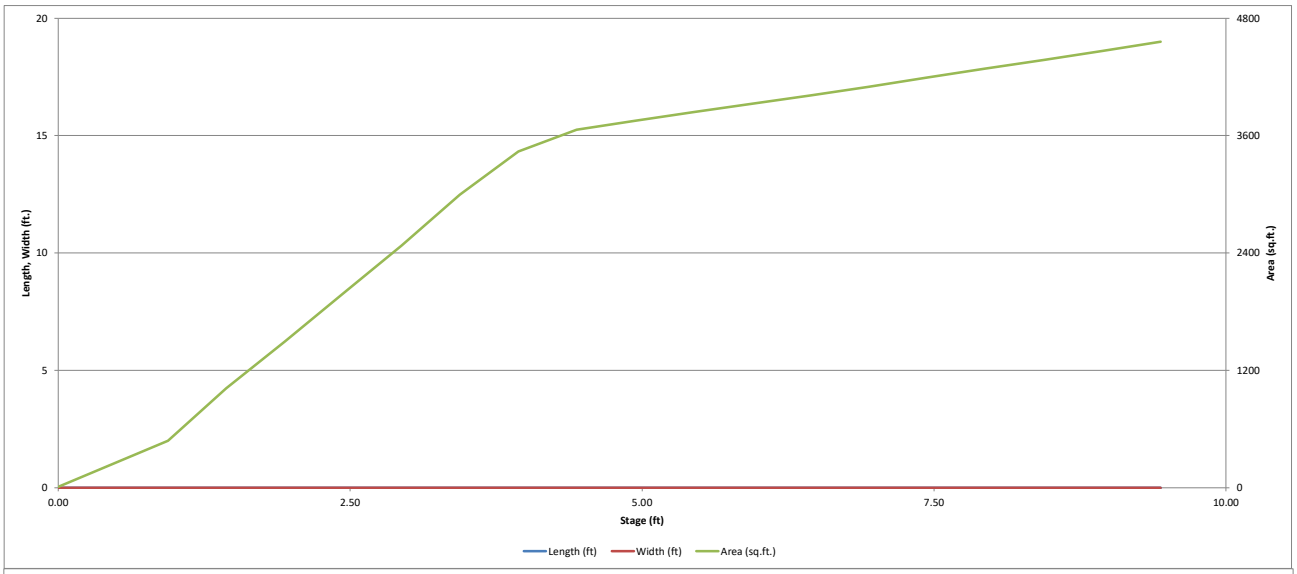
			Optional User Overrides	
Water Quality Capture Volume (WQCV) =	0.102	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.390	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 0.83 in.) =	0.182	acre-feet		inches
5-yr Runoff Volume (P1 = 1.09 in.) =	0.248	acre-feet		inches
10-yr Runoff Volume (P1 = 1.33 in.) =	0.310	acre-feet		inches
25-yr Runoff Volume (P1 = 1.69 in.) =	0.414	acre-feet		inches
50-yr Runoff Volume (P1 = 1.99 in.) =	0.510	acre-feet		inches
100-yr Runoff Volume (P1 = 2.31 in.) =	0.629	acre-feet		inches
500-yr Runoff Volume (P1 = 3.14 in.) =	0.932	acre-feet		inches
Approximate 2-yr Detention Volume =	0.176	acre-feet		
Approximate 5-yr Detention Volume =	0.241	acre-feet		
Approximate 10-yr Detention Volume =	0.303	acre-feet		
Approximate 25-yr Detention Volume =	0.405	acre-feet		
Approximate 50-yr Detention Volume =	0.467	acre-feet		
Approximate 100-yr Detention Volume =	0.529	acre-feet		

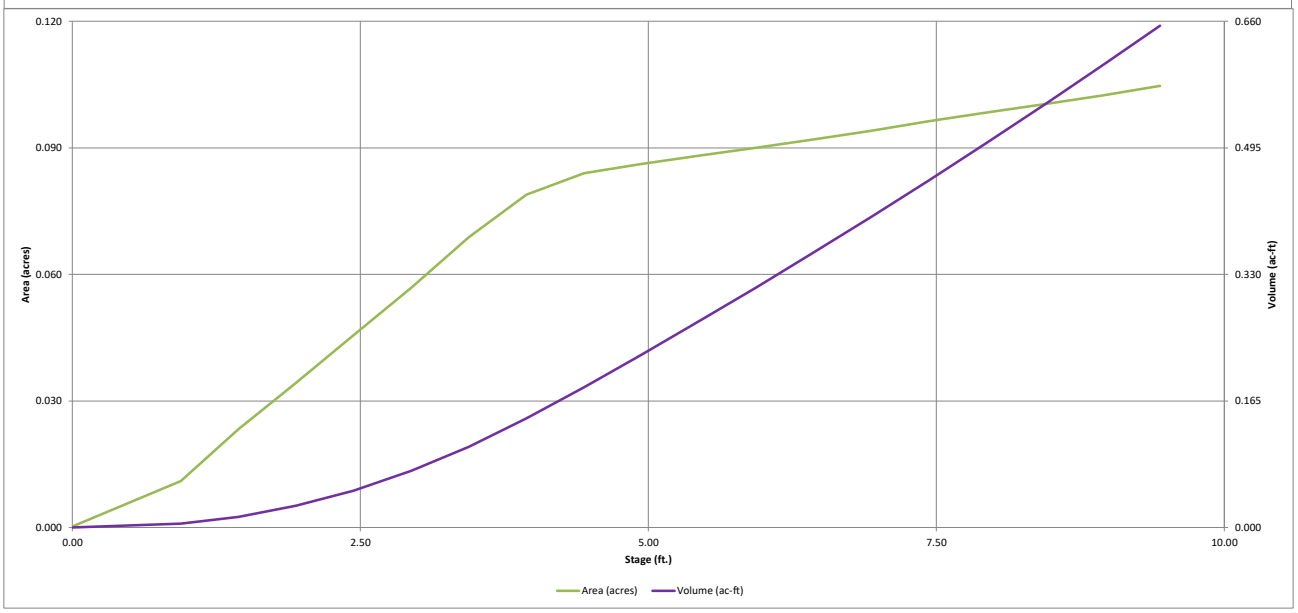
Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.102	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.288	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.140	acre-feet
Total Detention Basin Volume =	0.529	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	**user**	acre-feet

Depth Increment = 1.00 ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	10	0.000		
5262	--	0.94	--	--	--	480	0.011	230	0.005
5262.5	--	1.44	--	--	--	1,016	0.023	604	0.014
5263	--	1.94	--	--	--	1,494	0.034	1,232	0.028
5263.5	--	2.44	--	--	--	1,987	0.046	2,102	0.048
5264	--	2.94	--	--	--	2,478	0.057	3,218	0.074
5264.5	--	3.44	--	--	--	2,997	0.069	4,587	0.105
5265	--	3.94	--	--	--	3,439	0.079	6,196	0.142
5265.5	--	4.44	--	--	--	3,661	0.084	7,971	0.183
5266	--	4.94	--	--	--	3,754	0.086	9,825	0.226
5266.5	--	5.44	--	--	--	3,840	0.088	11,723	0.269
5267	--	5.94	--	--	--	3,925	0.090	13,664	0.314
5267.5	--	6.44	--	--	--	4,010	0.092	15,648	0.359
5268	--	6.94	--	--	--	4,099	0.094	17,675	0.406
5268.5	--	7.44	--	--	--	4,196	0.096	19,749	0.453
5269	--	7.94	--	--	--	4,286	0.098	21,870	0.502
5269.5	--	8.44	--	--	--	4,372	0.100	24,034	0.552
5270	--	8.94	--	--	--	4,464	0.102	26,243	0.602
5270.5	--	9.44	--	--	--	4,561	0.105	28,499	0.654


20
15
10
5
0
4800
3600
2400
1200
0
0.00
2.50
5.00
7.50
10.00
Length, Width (ft.)
Area (sq.ft.)
Stage (ft)
Length (ft)
Width (ft)
Area (sq.ft.)

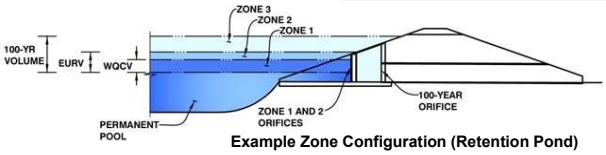

0.120
0.090
0.060
0.030
0.000
0.660
0.495
0.330
0.165
0.000
0.00
2.50
5.00
7.50
10.00
Area (acres)
Volume (ac-ft)
Stage (ft.)
Area (acres)
Volume (ac-ft)

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.05 (January 2022)

Project: **Berkley**

Basin ID: **200810**



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.39	0.102	Orifice Plate
Zone 2 (EURV)	6.77	0.288	Orifice Plate
Zone 3 (100-year)	8.22	0.140	Weir&Pipe (Restrict)
Total (all zones)		0.529	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	3.542E-03	ft^2
Depth at top of Zone using Orifice Plate =	6.77	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	19.30	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	0.51	sq. inches (diameter = 13/16 inch)	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	2.26	4.51					
Orifice Area (sq. inches)	0.51	0.51	0.51					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	N/A	N/A	inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =	N/A	N/A	ft^2
Vertical Orifice Centroid =	N/A	N/A	feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	6.77	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	2.92	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V
Horiz. Length of Weir Sides =	2.92	N/A	feet
Overflow Grate Type =	Type C Grate	N/A	
Debris Clogging % =	0%	N/A	%

Calculated Parameters for Overflow Weir

	Zone 3 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	6.77	N/A	feet
Overflow Weir Slope Length =	2.92	N/A	feet
Grate Open Area / 100-yr Orifice Area =	71.14	N/A	
Overflow Grate Open Area w/o Debris =	5.93	N/A	ft^2
Overflow Grate Open Area w/ Debris =	5.93	N/A	ft^2

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	2.50	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	15.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	1.80		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 3 Restrictor	Not Selected	
Outlet Orifice Area =	0.08	N/A	ft^2
Outlet Orifice Centroid =	0.09	N/A	feet
Half-Central Angle of Restrictor Plate on Pipe =	0.71	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	9.67	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	20.00	feet
Spillway End Slopes =	0.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

Spillway Design Flow Depth=	0.32	feet
Stage at Top of Freeboard =	10.99	feet
Basin Area at Top of Freeboard =	0.10	acres
Basin Volume at Top of Freeboard =	0.65	acre-ft

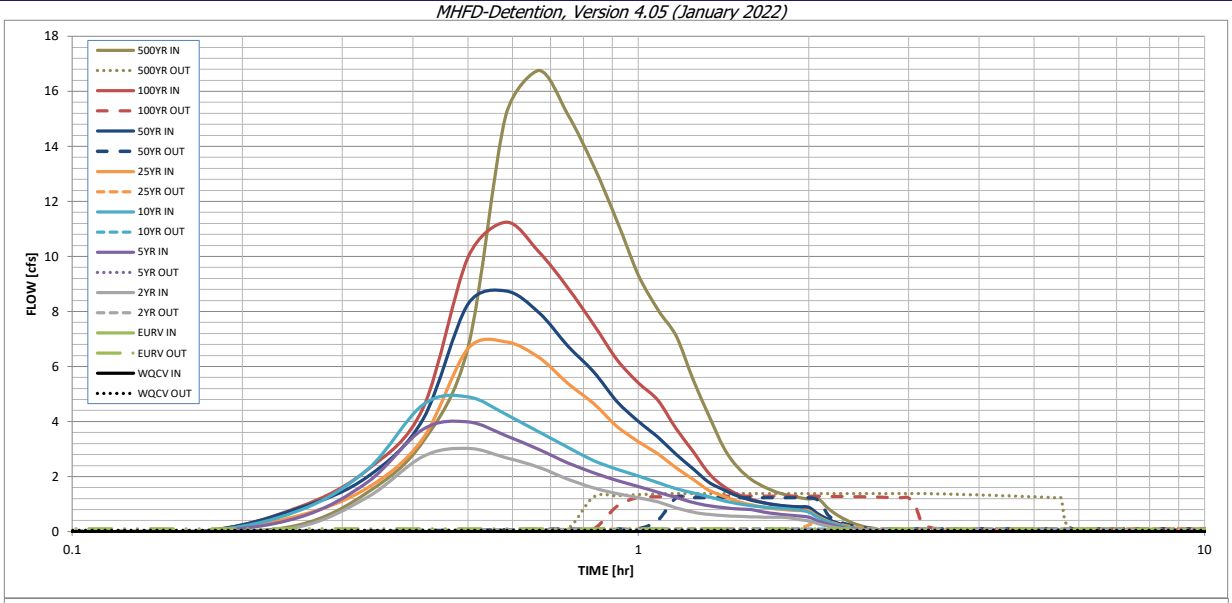
Routed Hydrograph Results

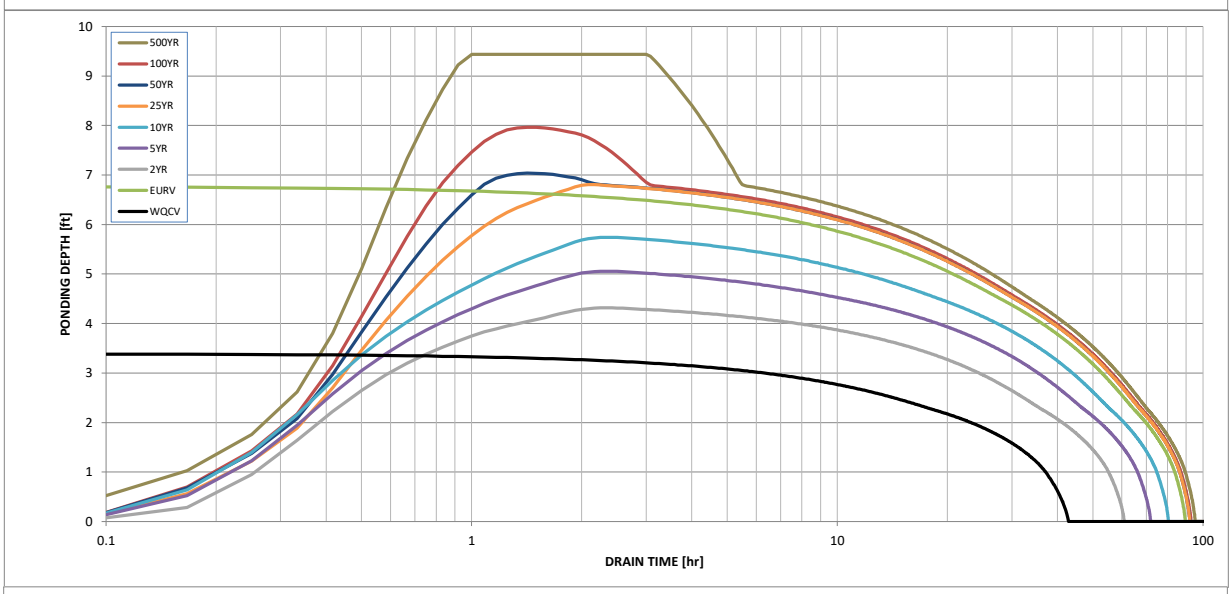
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

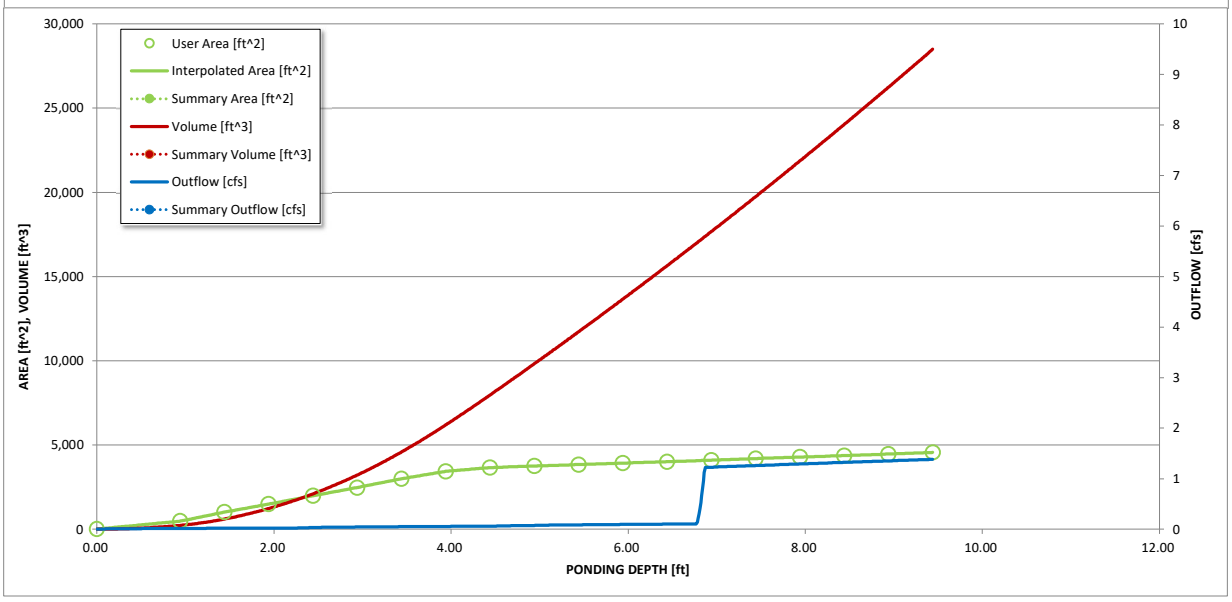
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.83	1.09	1.33	1.69	1.99	2.31	3.14
CUHP Runoff Volume (acre-ft) =	0.102	0.390	0.182	0.248	0.310	0.414	0.510	0.629	0.932
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.182	0.248	0.310	0.414	0.510	0.629	0.932
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.0	0.0	0.0	0.1	0.8	2.1	5.1
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.00	0.00	0.01	0.02	0.18	0.45	1.09
Peak Inflow Q (cfs) =	N/A	N/A	3.0	4.0	4.9	6.9	8.7	11.2	16.8
Peak Outflow Q (cfs) =	0.0	0.1	0.1	0.0795	0.1	0.3	1.2	1.2937	1.4
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	4.4	2.1	3.2	1.5	0.6	0.3
Structure Controlling Flow =	Plate	Overflow Weir 1	Plate	Plate	Plate	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	N/A
Max Velocity through Grate 1 (fps) =	N/A	0.01	N/A	N/A	N/A	0.0	0.2	0.2	0.2
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	39	80	56	65	73	82	81	79	77
Time to Drain 99% of Inflow Volume (hours) =	**41**	85	59	69	77	88	87	87	87
Maximum Ponding Depth (ft) =	3.40	6.78	4.32	5.06	5.74	6.80	7.04	7.96	9.44
Area at Maximum Ponding Depth (acres) =	0.07	0.09	0.08	0.09	0.09	0.09	0.09	0.10	0.10
Maximum Volume Stored (acre-ft) =	0.103	0.391	0.172	0.235	0.296	0.393	0.414	0.504	0.654

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.05 (January 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23
	0:15:00	0.00	0.00	0.16	0.50	0.74	0.57	0.83	0.87	1.44
	0:20:00	0.00	0.00	1.27	1.82	2.28	1.60	2.01	2.26	3.27
	0:25:00	0.00	0.00	2.74	3.72	4.62	3.39	4.09	4.50	6.68
	0:30:00	0.00	0.00	3.03	3.98	4.90	6.65	8.27	9.96	15.12
	0:35:00	0.00	0.00	2.69	3.49	4.26	6.90	8.75	11.25	16.75
	0:40:00	0.00	0.00	2.34	2.98	3.63	6.33	7.97	10.17	15.18
	0:45:00	0.00	0.00	1.91	2.50	3.07	5.40	6.76	8.87	13.31
	0:50:00	0.00	0.00	1.59	2.14	2.58	4.66	5.81	7.54	11.30
	0:55:00	0.00	0.00	1.39	1.86	2.27	3.83	4.73	6.25	9.33
	1:00:00	0.00	0.00	1.23	1.64	2.02	3.27	4.01	5.41	8.06
	1:05:00	0.00	0.00	1.07	1.43	1.78	2.82	3.43	4.76	7.10
	1:10:00	0.00	0.00	0.86	1.24	1.56	2.32	2.80	3.74	5.51
	1:15:00	0.00	0.00	0.70	1.06	1.40	1.90	2.28	2.90	4.21
	1:20:00	0.00	0.00	0.62	0.94	1.26	1.50	1.79	2.11	3.04
	1:25:00	0.00	0.00	0.58	0.87	1.12	1.28	1.51	1.63	2.33
	1:30:00	0.00	0.00	0.55	0.83	1.01	1.09	1.29	1.35	1.90
	1:35:00	0.00	0.00	0.54	0.80	0.94	0.97	1.14	1.17	1.63
	1:40:00	0.00	0.00	0.53	0.71	0.89	0.88	1.04	1.05	1.45
	1:45:00	0.00	0.00	0.52	0.65	0.85	0.83	0.98	0.97	1.32
	1:50:00	0.00	0.00	0.51	0.60	0.83	0.79	0.93	0.91	1.24
	1:55:00	0.00	0.00	0.44	0.57	0.78	0.76	0.90	0.88	1.19
	2:00:00	0.00	0.00	0.39	0.53	0.71	0.75	0.88	0.86	1.17
	2:05:00	0.00	0.00	0.28	0.38	0.50	0.53	0.63	0.62	0.84
	2:10:00	0.00	0.00	0.19	0.26	0.35	0.38	0.44	0.44	0.59
	2:15:00	0.00	0.00	0.13	0.18	0.25	0.26	0.31	0.30	0.41
	2:20:00	0.00	0.00	0.09	0.12	0.17	0.18	0.21	0.21	0.28
	2:25:00	0.00	0.00	0.06	0.08	0.11	0.12	0.14	0.14	0.18
	2:30:00	0.00	0.00	0.04	0.05	0.07	0.08	0.09	0.09	0.12
	2:35:00	0.00	0.00	0.02	0.03	0.04	0.05	0.05	0.05	0.07
	2:40:00	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.03	0.03
	2:45:00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
	2:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.05 (January 2022)

Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.
The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

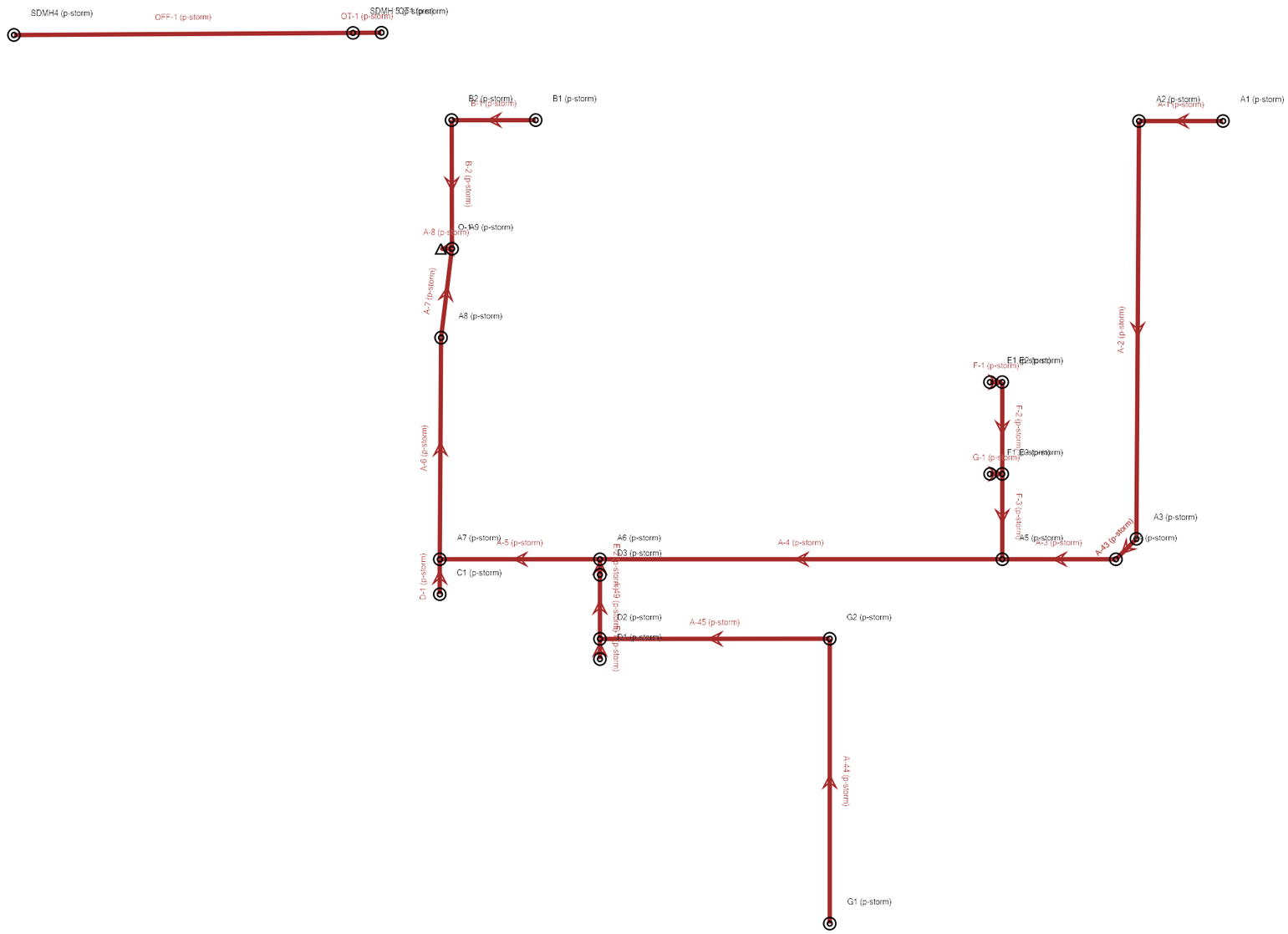
Stage - Storage Description	Stage [ft]	Area [ft^2]	Area [acres]	Volume [ft^3]	Volume [ac-ft]	Total Outflow [cfs]

For best results, include the stages of all grade slope changes (e.g. ISV and Floor) from the S-A-V table on Sheet 'Basin'.

Also include the inverts of all outlets (e.g. vertical orifice, overflow grate, and spillway, where applicable).

APPENDIX D – Hydraulic Calculations

Scenario: 100 YR



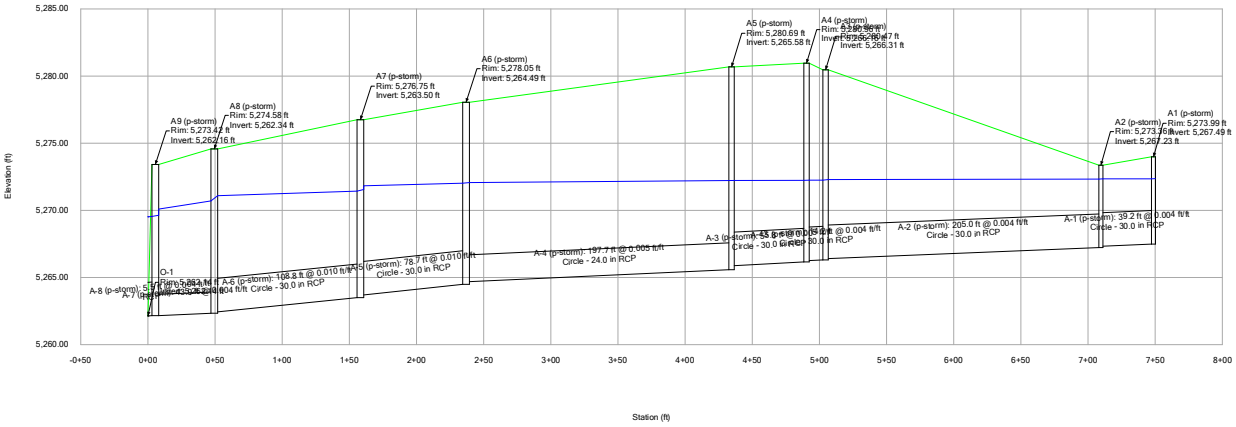
FlexTable: Conduit Table

Label	Start Node	Stop Node	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Length (Scaled) (ft)	Rise (Unified) (ft)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Manning's n	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
A-43 (p-storm)	A3 (p-storm)	A4 (p-storm)	5,272.25	5,272.25	14.2	2.50	5,266.31	5,266.26	0.004	0.013	5.40	24.35	1.10	5,272.27	5,272.27
A-3 (p-storm)	A4 (p-storm)	A5 (p-storm)	5,272.24	5,272.23	55.8	2.50	5,266.16	5,265.88	0.005	0.013	5.40	29.05	1.10	5,272.25	5,272.25
A-44 (p-storm)	G1 (p-storm)	G2 (p-storm)	5,276.07	5,274.47	139.7	2.00	5,274.91	5,273.51	0.010	0.013	10.50	22.62	7.07	5,276.55	5,275.24
A-4 (p-storm)	A5 (p-storm)	A6 (p-storm)	5,272.22	5,272.07	197.7	2.00	5,265.58	5,264.69	0.005	0.013	6.25	15.18	1.99	5,272.28	5,272.13
F-3 (p-storm)	E3 (p-storm)	A5 (p-storm)	5,272.44	5,272.44	41.9	1.50	5,268.09	5,267.12	0.023	0.013	1.20	16.01	0.68	5,272.45	5,272.44
A-2 (p-storm)	A2 (p-storm)	A3 (p-storm)	5,272.33	5,272.29	205.0	2.50	5,267.23	5,266.41	0.004	0.013	5.14	25.94	1.05	5,272.34	5,272.31
F-2 (p-storm)	E2 (p-storm)	E3 (p-storm)	5,272.44	5,272.44	45.1	1.50	5,269.10	5,268.19	0.020	0.013	0.67	14.85	0.38	5,272.45	5,272.44
G-1 (p-storm)	F1 (p-storm)	E3 (p-storm)	5,272.45	5,272.45	6.0	1.50	5,270.78	5,269.28	0.249	0.013	0.53	52.42	0.30	5,272.45	5,272.45
A-45 (p-storm)	G2 (p-storm)	D2 (p-storm)	5,274.47	5,273.35	112.9	2.00	5,273.31	5,272.18	0.010	0.013	10.50	22.62	7.07	5,274.95	5,273.82
F-1 (p-storm)	E1 (p-storm)	E2 (p-storm)	5,272.45	5,272.45	6.0	1.50	5,269.33	5,269.21	0.020	0.013	0.67	14.85	0.38	5,272.45	5,272.45
A-5 (p-storm)	A6 (p-storm)	A7 (p-storm)	5,272.02	5,271.83	78.7	2.50	5,264.49	5,263.70	0.010	0.013	20.36	41.10	4.15	5,272.29	5,272.10
E-2 (p-storm)	D3 (p-storm)	A6 (p-storm)	5,272.40	5,272.38	7.6	2.00	5,267.45	5,265.69	0.288	0.013	14.44	121.40	4.60	5,272.73	5,272.71
A-49 (p-storm)	D2 (p-storm)	D3 (p-storm)	5,273.32	5,272.83	31.4	2.00	5,271.98	5,271.66	0.010	0.013	13.79	22.62	7.55	5,273.91	5,273.65
E-1 (p-storm)	D1 (p-storm)	D2 (p-storm)	5,273.33	5,273.33	9.9	2.00	5,272.26	5,272.18	0.010	0.013	3.29	22.62	5.13	5,273.38	5,273.38
A-6 (p-storm)	A7 (p-storm)	A8 (p-storm)	5,271.43	5,271.09	108.8	2.50	5,263.50	5,262.44	0.010	0.013	22.88	40.48	4.66	5,271.77	5,271.43
D-1 (p-storm)	C1 (p-storm)	A7 (p-storm)	5,271.58	5,271.55	17.1	1.50	5,264.63	5,263.70	0.054	0.013	3.70	24.44	2.09	5,271.64	5,271.62
A-7 (p-storm)	A8 (p-storm)	A9 (p-storm)	5,270.70	5,270.10	43.9	1.58	5,262.34	5,262.16	0.004	0.013	25.38	13.79	8.16	5,271.74	5,271.13
A-1 (p-storm)	A1 (p-storm)	A2 (p-storm)	5,272.35	5,272.35	41.3	2.50	5,267.49	5,267.33	0.004	0.013	3.81	26.22	0.78	5,272.36	5,272.36
B-2 (p-storm)	B2 (p-storm)	A9 (p-storm)	5,269.76	5,269.63	63.1	1.50	5,262.51	5,262.26	0.004	0.013	4.66	6.64	2.64	5,269.87	5,269.74
A-8 (p-storm)	A9 (p-storm)	O-1	5,269.55	5,269.52	5.5	2.50	5,262.16	5,262.14	0.004	0.013	29.00	25.94	5.91	5,270.09	5,270.06
B-1 (p-storm)	B1 (p-storm)	B2 (p-storm)	5,270.65	5,270.61	41.3	1.17	5,262.78	5,262.61	0.004	0.013	3.29	6.41	1.87	5,270.71	5,270.67
OT-1 (p-storm)	OT1 (p-storm)	SDMH 5 (p-storm)	(N/A)	(N/A)	14.0	1.25	5,260.74	5,260.41	0.024	0.013	(N/A)	9.92	(N/A)	(N/A)	(N/A)
OFF-1 (p-storm)	SDMH 5 (p-storm)	SDMH4 (p-storm)	(N/A)	(N/A)	166.6	1.25	5,260.01	5,253.51	0.039	0.013	(N/A)	12.75	(N/A)	(N/A)	(N/A)

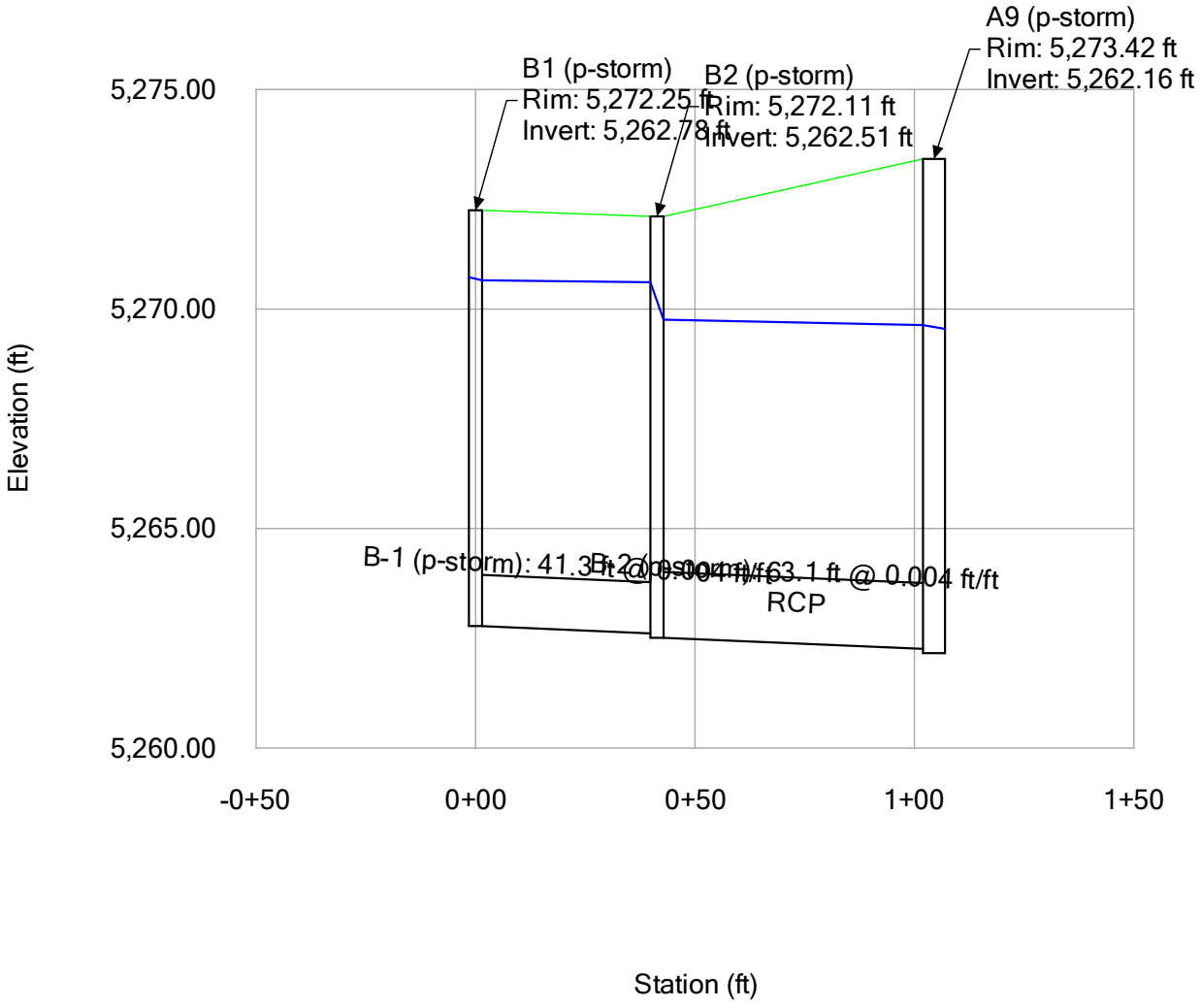
FlexTable: Manhole Table

ID	Label	Notes	Elevation (Ground) (ft)	X (ft)	Y (ft)	Elevation (Rim) (ft)	Elevation (Invert in 1) (ft)	Elevation (Invert) (ft)	Depth (Out) (ft)	Flow (Total Out) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Headloss Method
48	A1 (p-storm)	Inlet Type R 10'	5,273.99	135,019.94	716,368.10	5,273.99	(N/A)	5,267.49	4.86	3.81	5,272.36	5,272.35	Standard
50	A2 (p-storm)	Inlet Type R 10'	5,273.36	134,978.62	716,368.09	5,273.36	5,267.33	5,267.23	5.10	5.14	5,272.35	5,272.33	HEC-22 Energy (Second Edition)
35	A3 (p-storm)	4'Ø Manhole	5,280.47	134,977.35	716,163.11	5,280.47	5,266.41	5,266.31	5.94	5.40	5,272.29	5,272.25	HEC-22 Energy (Second Edition)
32	A4 (p-storm)	4'Ø Manhole	5,280.96	134,967.29	716,153.11	5,280.96	5,266.26	5,266.16	6.08	5.40	5,272.25	5,272.24	HEC-22 Energy (Second Edition)
34	A5 (p-storm)	4'Ø Manhole	5,280.69	134,911.47	716,153.11	5,280.69	5,265.88	5,265.58	6.64	6.25	5,272.23	5,272.22	HEC-22 Energy (Second Edition)
41	A6 (p-storm)	5'Ø Manhole	5,278.05	134,713.78	716,153.12	5,278.05	5,264.69	5,264.49	7.53	20.36	5,272.07	5,272.02	HEC-22 Energy (Second Edition)
45	A7 (p-storm)	5'Ø Manhole	5,276.75	134,635.10	716,153.10	5,276.75	5,263.70	5,263.50	7.93	22.88	5,271.55	5,271.43	HEC-22 Energy (Second Edition)
47	A8 (p-storm)	5'Ø Manhole	5,274.58	134,635.75	716,261.85	5,274.58	5,262.44	5,262.34	8.37	25.38	5,271.09	5,270.70	HEC-22 Energy (Second Edition)
49	A9 (p-storm)	5'Ø Manhole	5,273.42	134,641.09	716,305.45	5,273.42	5,262.16	5,262.16	7.39	29.00	5,269.63	5,269.55	HEC-22 Energy (Second Edition)
51	B1 (p-storm)	Inlet Type R 10'	5,272.25	134,682.23	716,368.57	5,272.25	(N/A)	5,262.78	7.88	3.29	5,270.72	5,270.65	Standard
52	B2 (p-storm)	Inlet Type R 5'	5,272.11	134,640.89	716,368.57	5,272.11	5,262.61	5,262.51	7.25	4.66	5,270.61	5,269.76	HEC-22 Energy (Second Edition)
46	C1 (p-storm)	Inlet Type 13 TPL	5,276.50	134,635.10	716,135.95	5,276.50	(N/A)	5,264.43	7.15	3.70	5,271.66	5,271.58	Standard
43	D1 (p-storm)	Inlet Type R 10'	5,277.76	134,713.79	716,104.16	5,277.76	(N/A)	5,272.26	1.07	3.29	5,273.40	5,273.33	Standard
44	D2 (p-storm)	5'Ø Manhole	5,277.51	134,713.79	716,114.08	5,277.51	5,272.18	5,271.98	1.34	13.79	5,273.33	5,273.32	HEC-22 Energy (Second Edition)
42	D3 (p-storm)	Inlet Type R 5'	5,277.90	134,713.78	716,145.50	5,277.90	5,271.66	5,267.45	4.95	14.44	5,272.47	5,272.40	HEC-22 Energy (Second Edition)
40	E1 (p-storm)	Inlet Type 13 Dbl	5,278.88	134,905.45	716,240.02	5,278.88	(N/A)	5,269.33	3.12	0.67	5,272.45	5,272.45	Standard
39	E2 (p-storm)	4'Ø Manhole	5,279.00	134,911.45	716,240.02	5,279.00	5,269.21	5,269.10	3.35	0.67	5,272.45	5,272.44	HEC-22 Energy (Second Edition)
36	E3 (p-storm)	4'Ø Manhole	5,279.91	134,911.46	716,194.96	5,279.91	5,268.19	5,268.09	4.35	1.20	5,272.44	5,272.44	HEC-22 Energy (Second Edition)
38	F1 (p-storm)	Inlet Type 13	5,279.79	134,905.46	716,194.96	5,279.79	(N/A)	5,271.18	1.27	0.53	5,272.45	5,272.45	Standard
33	G1 (p-storm)	Inlet Type C	5,280.87	134,826.69	715,974.40	5,280.87	(N/A)	5,274.91	1.16	10.50	5,276.07	5,276.07	HEC-22 Energy (Second Edition)
37	G2 (p-storm)	5'Ø Manhole	5,279.81	134,826.66	716,114.11	5,279.81	5,273.51	5,273.31	1.16	10.50	5,274.51	5,274.47	HEC-22 Energy (Second Edition)
55	OT1 (p-storm)	Inlet Type C	5,262.84	134,606.44	716,411.48	5,262.84	5,260.74	5,260.74	(N/A)	0.00	(N/A)	(N/A)	Standard
53	SDMH 5 (p-storm)	4'Ø Manhole BYOT	5,270.03	134,592.46	716,411.35	5,270.03	5,260.41	5,260.01	(N/A)	0.00	(N/A)	(N/A)	Standard
56	SDMH4 (p-storm)	4'Ø Manhole BYOT	5,255.45	134,425.85	716,410.32	5,255.45	5,253.51	5,253.51	(N/A)	0.00	(N/A)	(N/A)	Standard

Profile Report
Engineering Profile - Line A (Berkeley VIllas StormCAD.stsw)

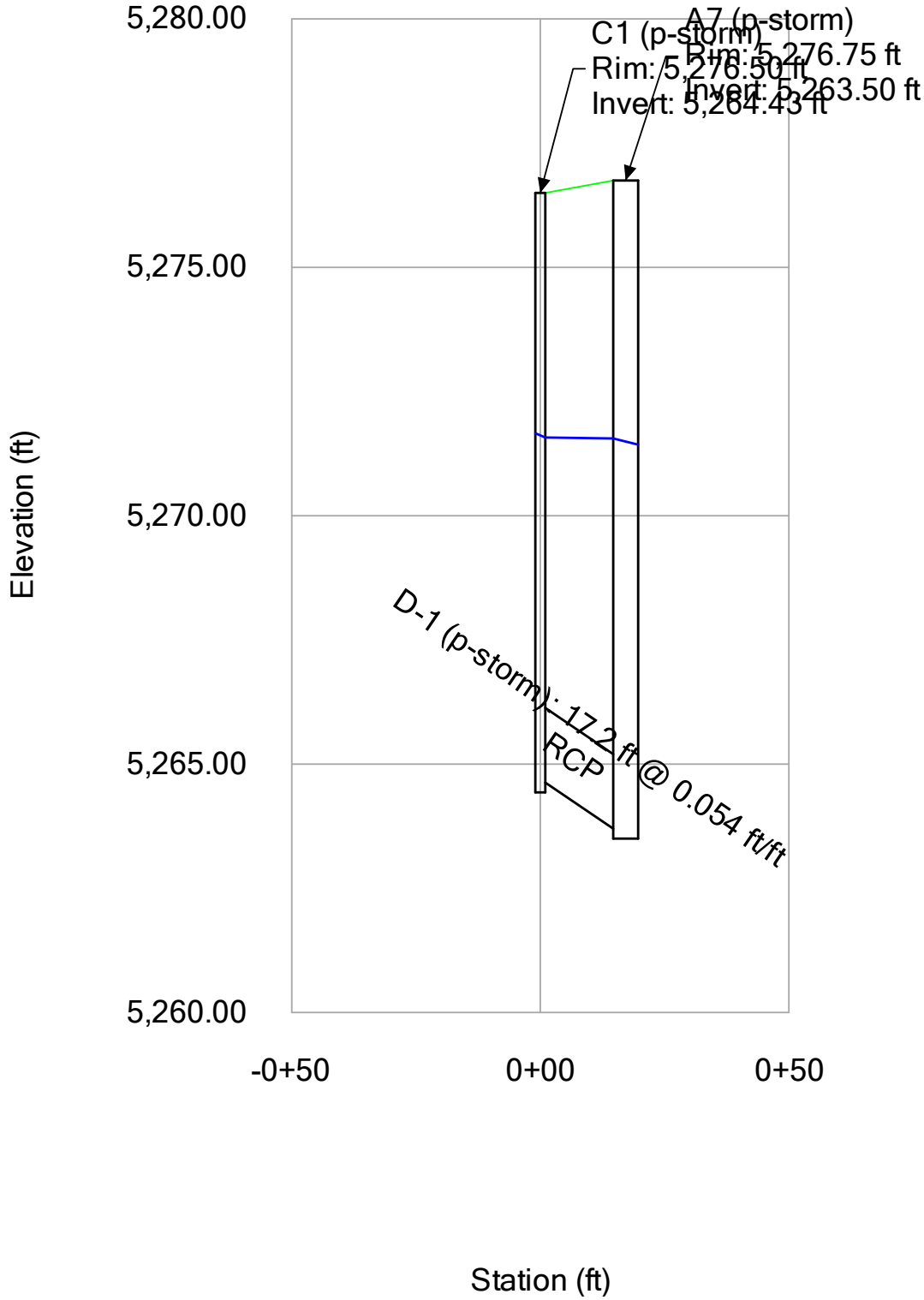


Profile Report
Engineering Profile - Line B (Berkeley VIllas StormCAD.stsw)



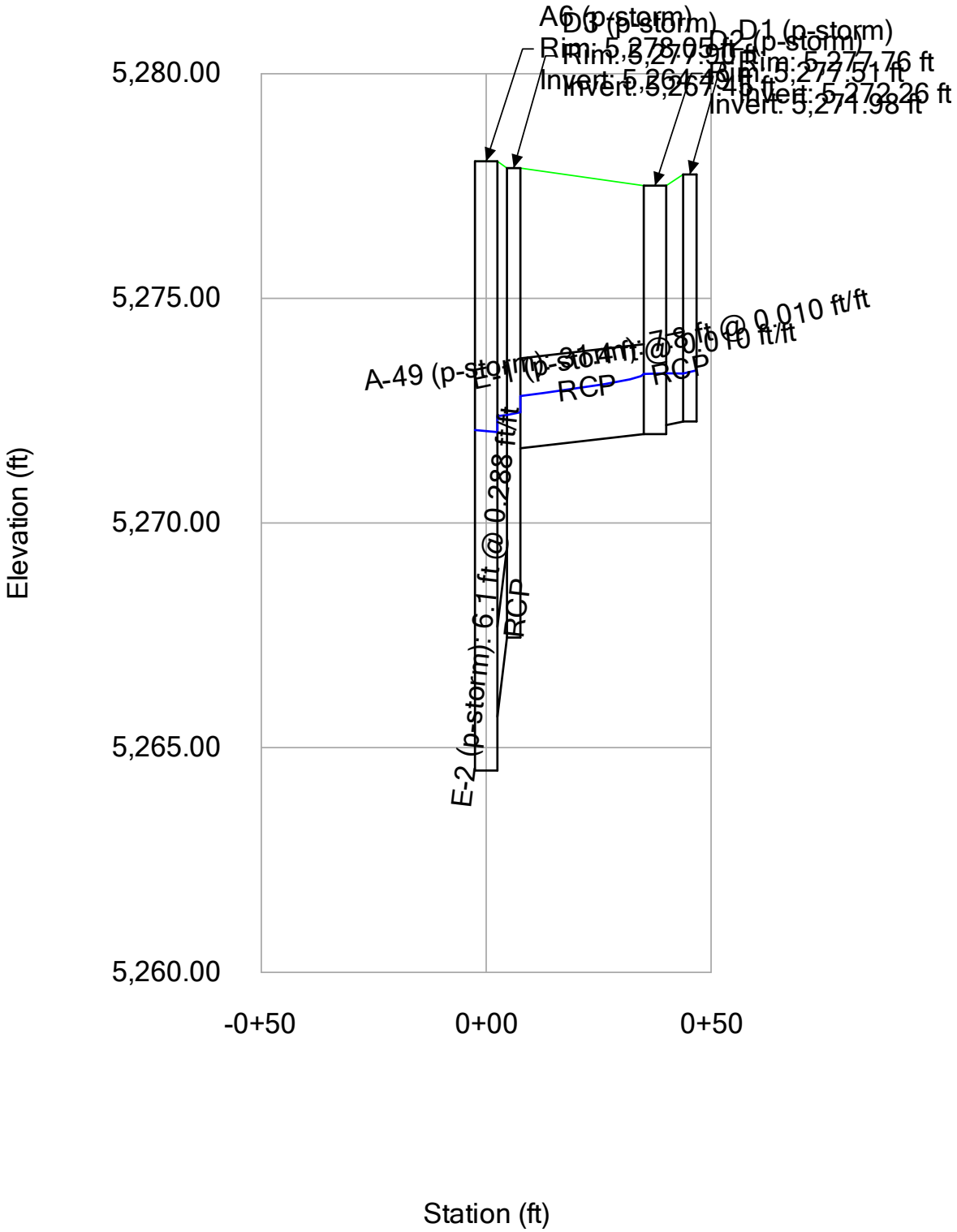
Profile Report

Engineering Profile - Line C (Berkeley VIllas StormCAD.stsw)

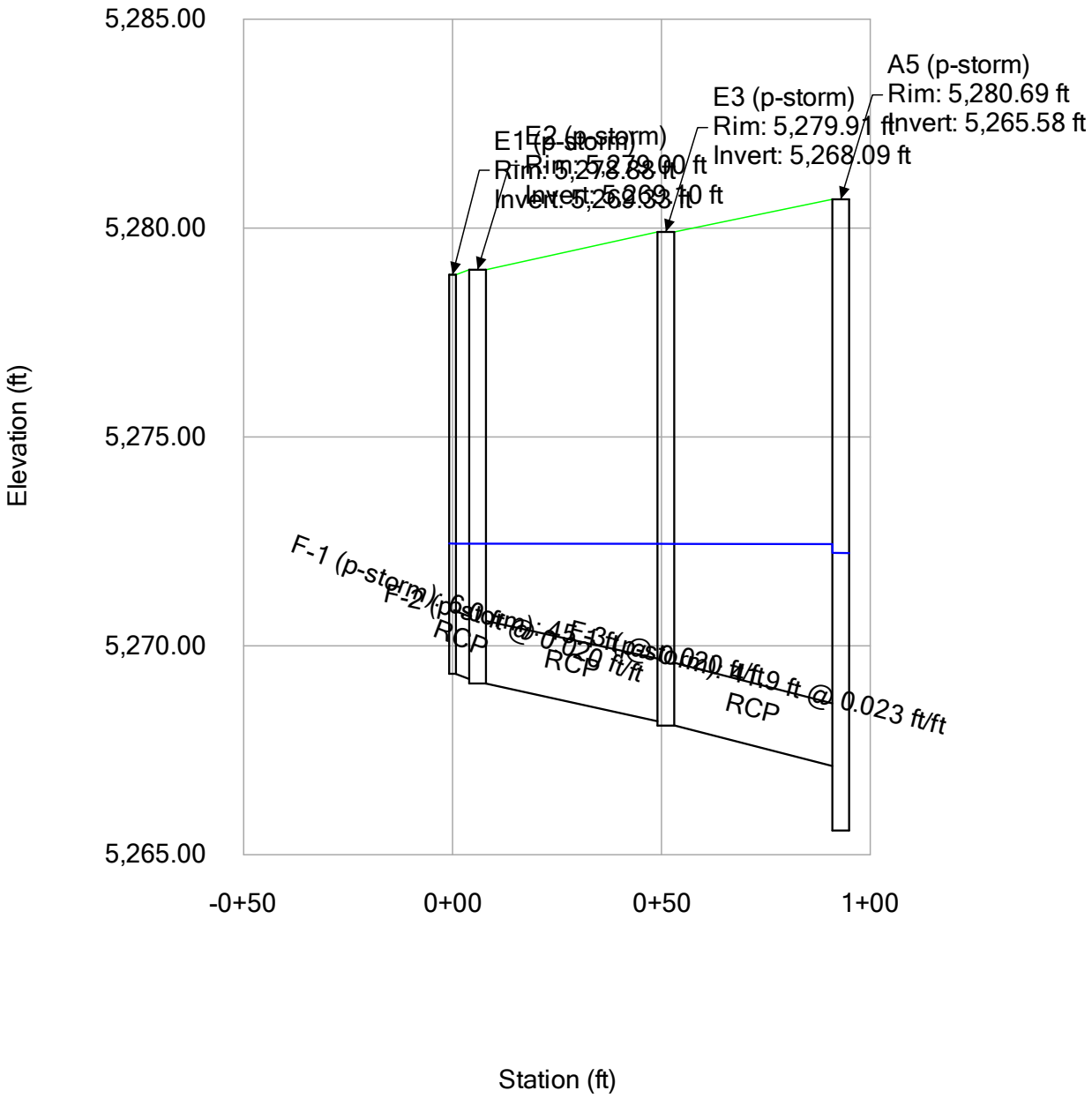


Profile Report

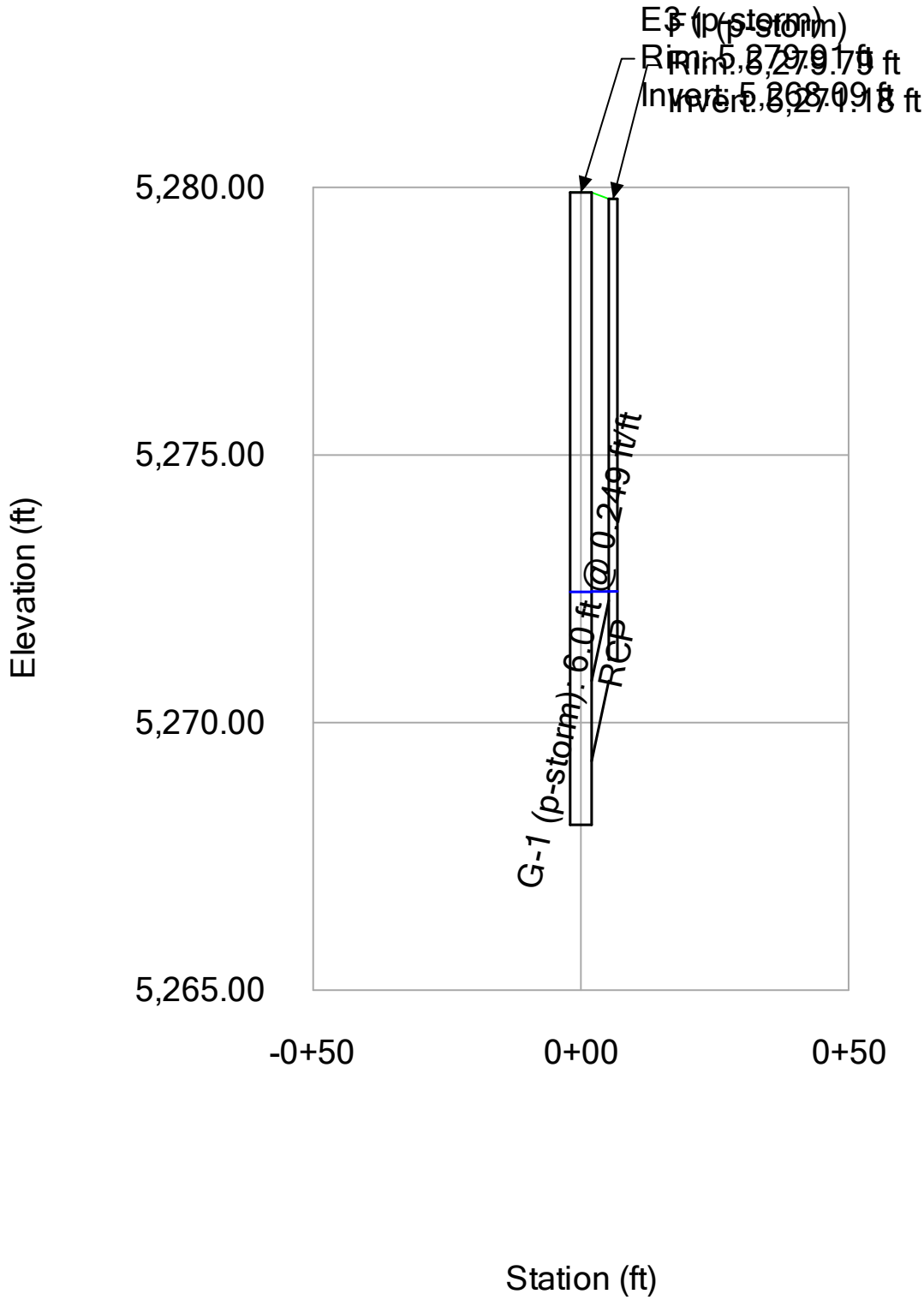
Engineering Profile - Line D (Berkeley VIllas StormCAD.stsw)



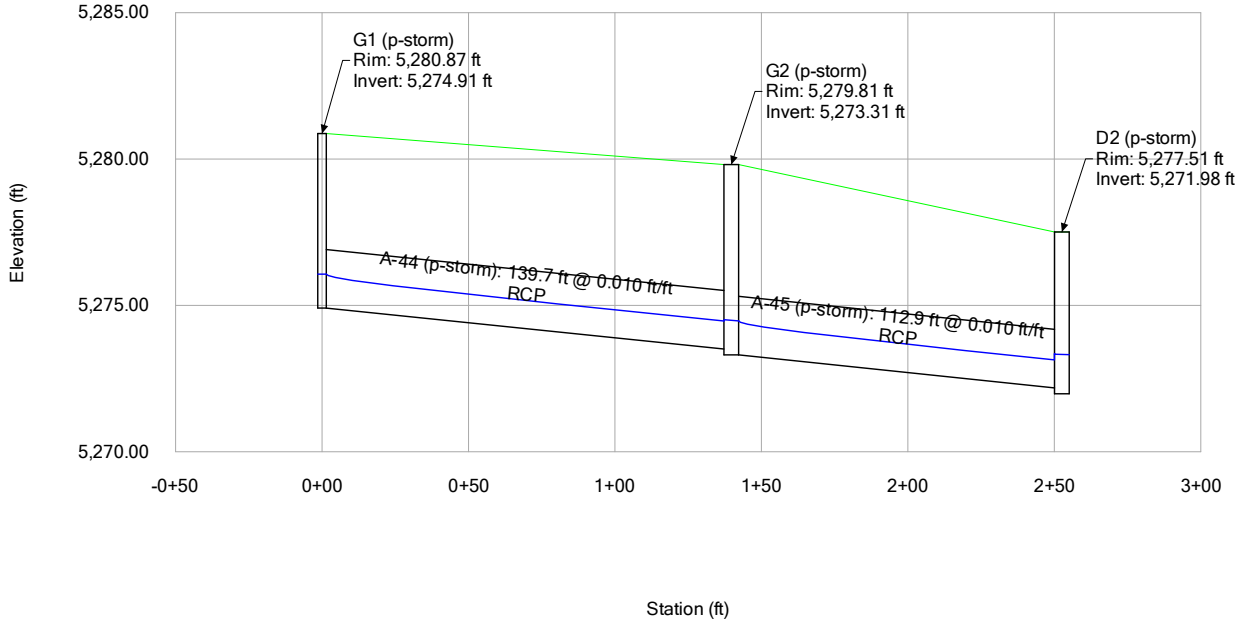
Profile Report
Engineering Profile - Line E (Berkeley VIllas StormCAD.stsw)



Profile Report
Engineering Profile - Line F (Berkeley VIllas StormCAD.stsw)



Profile Report
Engineering Profile - Line G (Berkeley VIllas StormCAD.stsw)



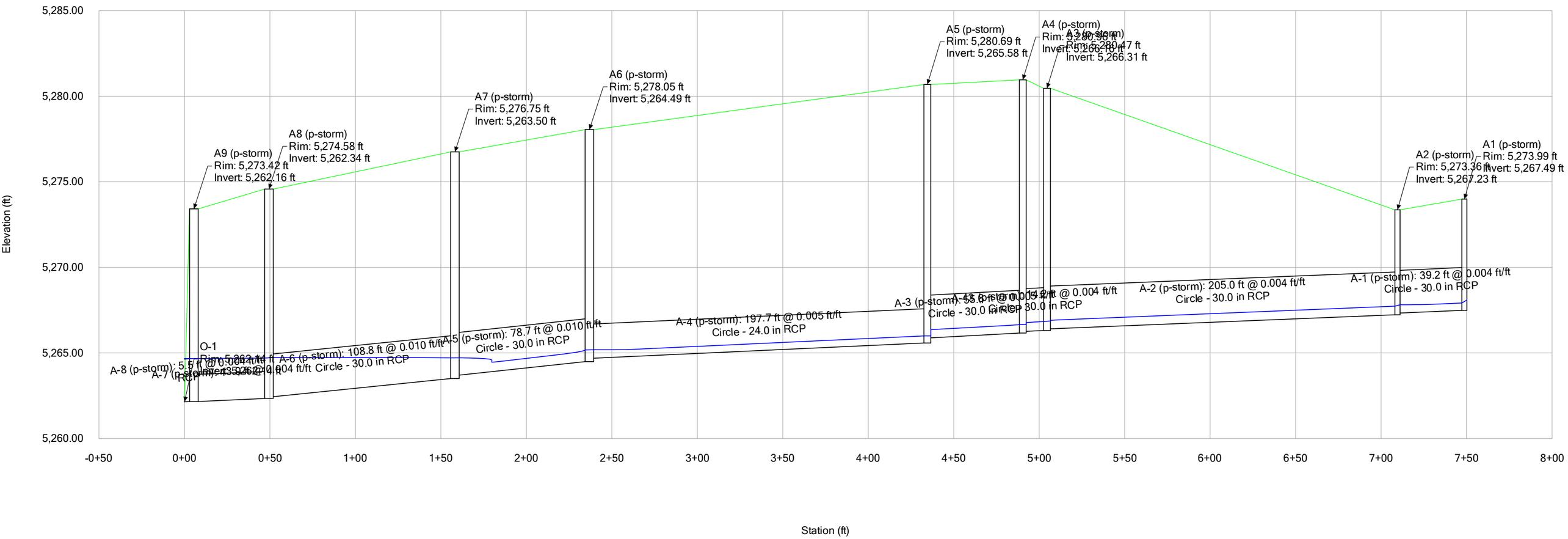
FlexTable: Conduit Table

Label	Start Node	Stop Node	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Length (Scaled) (ft)	Rise (Unified) (ft)	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Manning's n	Flow (cfs)	Capacity (Full Flow) (cfs)	Velocity (ft/s)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)
A-43 (p-storm)	A3 (p-storm)	A4 (p-storm)	5,266.83	5,266.76	14.2	2.50	5,266.31	5,266.26	0.004	0.013	2.35	24.35	3.14	5,266.99	5,266.94
A-3 (p-storm)	A4 (p-storm)	A5 (p-storm)	5,266.66	5,266.36	55.8	2.50	5,266.16	5,265.88	0.005	0.013	2.35	29.05	3.56	5,266.84	5,266.56
A-44 (p-storm)	G1 (p-storm)	G2 (p-storm)	5,274.91	5,273.51	139.7	2.00	5,274.91	5,273.51	0.010	0.013	0.00	22.62	0.00	5,274.91	5,273.51
A-4 (p-storm)	A5 (p-storm)	A6 (p-storm)	5,265.99	5,265.18	197.7	2.00	5,265.58	5,264.69	0.005	0.013	1.41	15.18	3.02	5,266.13	5,265.27
F-3 (p-storm)	E3 (p-storm)	A5 (p-storm)	5,268.37	5,267.32	41.9	1.50	5,268.09	5,267.12	0.023	0.013	0.57	16.01	4.27	5,268.47	5,267.60
A-2 (p-storm)	A2 (p-storm)	A3 (p-storm)	5,267.73	5,266.90	205.0	2.50	5,267.23	5,266.41	0.004	0.013	2.27	25.94	3.25	5,267.89	5,267.07
F-2 (p-storm)	E2 (p-storm)	E3 (p-storm)	5,269.31	5,268.35	45.1	1.50	5,269.10	5,268.19	0.020	0.013	0.33	14.85	3.43	5,269.38	5,268.53
G-1 (p-storm)	F1 (p-storm)	E3 (p-storm)	5,270.96	5,269.36	6.0	1.50	5,270.78	5,269.28	0.249	0.013	0.25	52.42	7.60	5,271.03	5,270.22
A-45 (p-storm)	G2 (p-storm)	D2 (p-storm)	5,273.31	5,272.39	112.9	2.00	5,273.31	5,272.18	0.010	0.013	0.00	22.62	0.00	5,273.31	5,272.39
F-1 (p-storm)	E1 (p-storm)	E2 (p-storm)	5,269.54	5,269.37	6.0	1.50	5,269.33	5,269.21	0.020	0.013	0.33	14.85	3.43	5,269.61	5,269.53
A-5 (p-storm)	A6 (p-storm)	A7 (p-storm)	5,265.17	5,264.72	78.7	2.50	5,264.49	5,263.70	0.010	0.013	4.33	41.10	5.44	5,265.42	5,264.80
E-2 (p-storm)	D3 (p-storm)	A6 (p-storm)	5,267.90	5,265.89	7.6	2.00	5,267.45	5,265.69	0.288	0.013	1.71	121.40	13.75	5,268.06	5,267.62
A-49 (p-storm)	D2 (p-storm)	D3 (p-storm)	5,272.39	5,272.00	31.4	2.00	5,271.98	5,271.66	0.010	0.013	1.41	22.62	4.01	5,272.53	5,272.25
E-1 (p-storm)	D1 (p-storm)	D2 (p-storm)	5,272.67	5,272.53	9.9	2.00	5,272.26	5,272.18	0.010	0.013	1.41	22.62	4.01	5,272.81	5,272.75
A-6 (p-storm)	A7 (p-storm)	A8 (p-storm)	5,264.71	5,264.73	108.8	2.50	5,263.50	5,262.44	0.010	0.013	4.82	40.48	5.55	5,264.78	5,264.75
D-1 (p-storm)	C1 (p-storm)	A7 (p-storm)	5,265.06	5,264.71	17.1	1.50	5,264.63	5,263.70	0.054	0.013	1.35	24.44	7.42	5,265.22	5,264.73
A-7 (p-storm)	A8 (p-storm)	A9 (p-storm)	5,264.70	5,264.67	43.9	1.58	5,262.34	5,262.16	0.004	0.013	5.16	13.79	1.66	5,264.74	5,264.72
A-1 (p-storm)	A1 (p-storm)	A2 (p-storm)	5,267.92	5,267.81	41.3	2.50	5,267.49	5,267.33	0.004	0.013	1.68	26.22	3.00	5,268.06	5,267.91
B-2 (p-storm)	B2 (p-storm)	A9 (p-storm)	5,264.70	5,264.67	63.1	1.50	5,262.51	5,262.26	0.004	0.013	2.03	6.64	1.15	5,264.72	5,264.69
A-8 (p-storm)	A9 (p-storm)	O-1	5,264.67	5,264.67	5.5	2.50	5,262.16	5,262.14	0.004	0.013	6.60	25.94	1.34	5,264.70	5,264.70
B-1 (p-storm)	B1 (p-storm)	B2 (p-storm)	5,264.83	5,264.83	41.3	1.17	5,262.78	5,262.61	0.004	0.013	0.59	6.41	0.34	5,264.83	5,264.83
OT-1 (p-storm)	OT1 (p-storm)	SDMH 5 (p-storm)	(N/A)	(N/A)	14.0	1.25	5,260.74	5,260.41	0.024	0.013	(N/A)	9.92	(N/A)	(N/A)	(N/A)
OFF-1 (p-storm)	SDMH 5 (p-storm)	SDMH4 (p-storm)	(N/A)	(N/A)	166.6	1.25	5,260.01	5,253.51	0.039	0.013	(N/A)	12.75	(N/A)	(N/A)	(N/A)

FlexTable: Manhole Table

ID	Label	Notes	Elevation (Ground) (ft)	X (ft)	Y (ft)	Elevation (Rim) (ft)	Elevation (Invert in 1) (ft)	Elevation (Invert) (ft)	Depth (Out) (ft)	Flow (Total Out) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Headloss Method
48	A1 (p-storm)	Inlet Type R 10'	5,273.99	135,019.94	716,368.10	5,273.99	(N/A)	5,267.49	0.43	1.68	5,268.09	5,267.92	Standard
50	A2 (p-storm)	Inlet Type R 10'	5,273.36	134,978.62	716,368.09	5,273.36	5,267.33	5,267.23	0.50	2.27	5,267.81	5,267.73	HEC-22 Energy (Second Edition)
35	A3 (p-storm)	4'Ø Manhole	5,280.47	134,977.35	716,163.11	5,280.47	5,266.41	5,266.31	0.52	2.35	5,266.86	5,266.83	HEC-22 Energy (Second Edition)
32	A4 (p-storm)	4'Ø Manhole	5,280.96	134,967.29	716,153.11	5,280.96	5,266.26	5,266.16	0.50	2.35	5,266.67	5,266.66	HEC-22 Energy (Second Edition)
34	A5 (p-storm)	4'Ø Manhole	5,280.69	134,911.47	716,153.11	5,280.69	5,265.88	5,265.58	0.41	1.41	5,265.99	5,265.99	HEC-22 Energy (Second Edition)
41	A6 (p-storm)	5'Ø Manhole	5,278.05	134,713.78	716,153.12	5,278.05	5,264.69	5,264.49	0.68	4.33	5,265.18	5,265.17	HEC-22 Energy (Second Edition)
45	A7 (p-storm)	5'Ø Manhole	5,276.75	134,635.10	716,153.10	5,276.75	5,263.70	5,263.50	1.21	4.82	5,264.71	5,264.71	HEC-22 Energy (Second Edition)
47	A8 (p-storm)	5'Ø Manhole	5,274.58	134,635.75	716,261.85	5,274.58	5,262.44	5,262.34	2.36	5.16	5,264.73	5,264.70	HEC-22 Energy (Second Edition)
49	A9 (p-storm)	5'Ø Manhole	5,273.42	134,641.09	716,305.45	5,273.42	5,262.16	5,262.16	2.51	6.60	5,264.67	5,264.67	HEC-22 Energy (Second Edition)
51	B1 (p-storm)	Inlet Type R 10'	5,272.25	134,682.23	716,368.57	5,272.25	(N/A)	5,262.78	2.05	0.59	5,264.83	5,264.83	Standard
52	B2 (p-storm)	Inlet Type R 5'	5,272.11	134,640.89	716,368.57	5,272.11	5,262.61	5,262.51	2.19	2.03	5,264.83	5,264.70	HEC-22 Energy (Second Edition)
46	C1 (p-storm)	Inlet Type 13 TPL	5,276.50	134,635.10	716,135.95	5,276.50	(N/A)	5,264.43	0.64	1.35	5,265.26	5,265.06	Standard
43	D1 (p-storm)	Inlet Type R 10'	5,277.76	134,713.79	716,104.16	5,277.76	(N/A)	5,272.26	0.41	1.41	5,272.85	5,272.67	Standard
44	D2 (p-storm)	5'Ø Manhole	5,277.51	134,713.79	716,114.08	5,277.51	5,272.18	5,271.98	0.41	1.41	5,272.39	5,272.39	HEC-22 Energy (Second Edition)
42	D3 (p-storm)	Inlet Type R 5'	5,277.90	134,713.78	716,145.50	5,277.90	5,271.66	5,267.45	0.45	1.71	5,267.91	5,267.90	HEC-22 Energy (Second Edition)
40	E1 (p-storm)	Inlet Type 13 Dbl	5,278.88	134,905.45	716,240.02	5,278.88	(N/A)	5,269.33	0.21	0.33	5,269.63	5,269.54	Standard
39	E2 (p-storm)	4'Ø Manhole	5,279.00	134,911.45	716,240.02	5,279.00	5,269.21	5,269.10	0.21	0.33	5,269.31	5,269.31	HEC-22 Energy (Second Edition)
36	E3 (p-storm)	4'Ø Manhole	5,279.91	134,911.46	716,194.96	5,279.91	5,268.19	5,268.09	0.28	0.57	5,268.38	5,268.37	HEC-22 Energy (Second Edition)
38	F1 (p-storm)	Inlet Type 13	5,279.79	134,905.46	716,194.96	5,279.79	(N/A)	5,271.18	-0.22	0.25	5,271.04	5,270.96	Standard
33	G1 (p-storm)	Inlet Type C	5,280.87	134,826.69	715,974.40	5,280.87	(N/A)	5,274.91	0.00	0.00	5,274.91	5,274.91	HEC-22 Energy (Second Edition)
37	G2 (p-storm)	5'Ø Manhole	5,279.81	134,826.66	716,114.11	5,279.81	5,273.51	5,273.31	0.00	0.00	5,273.31	5,273.31	HEC-22 Energy (Second Edition)
55	OT1 (p-storm)	Inlet Type C	5,262.84	134,606.44	716,411.48	5,262.84	5,260.74	5,260.74	(N/A)	0.00	(N/A)	(N/A)	Standard
53	SDMH 5 (p-storm)	4'Ø Manhole BYOT	5,270.03	134,592.46	716,411.35	5,270.03	5,260.41	5,260.01	(N/A)	0.00	(N/A)	(N/A)	Standard
56	SDMH4 (p-storm)	4'Ø Manhole BYOT	5,255.45	134,425.85	716,410.32	5,255.45	5,253.51	5,253.51	(N/A)	0.00	(N/A)	(N/A)	Standard

Profile Report
Engineering Profile - Line A (Berkeley VIllas StormCAD.stsw)



Profile Report

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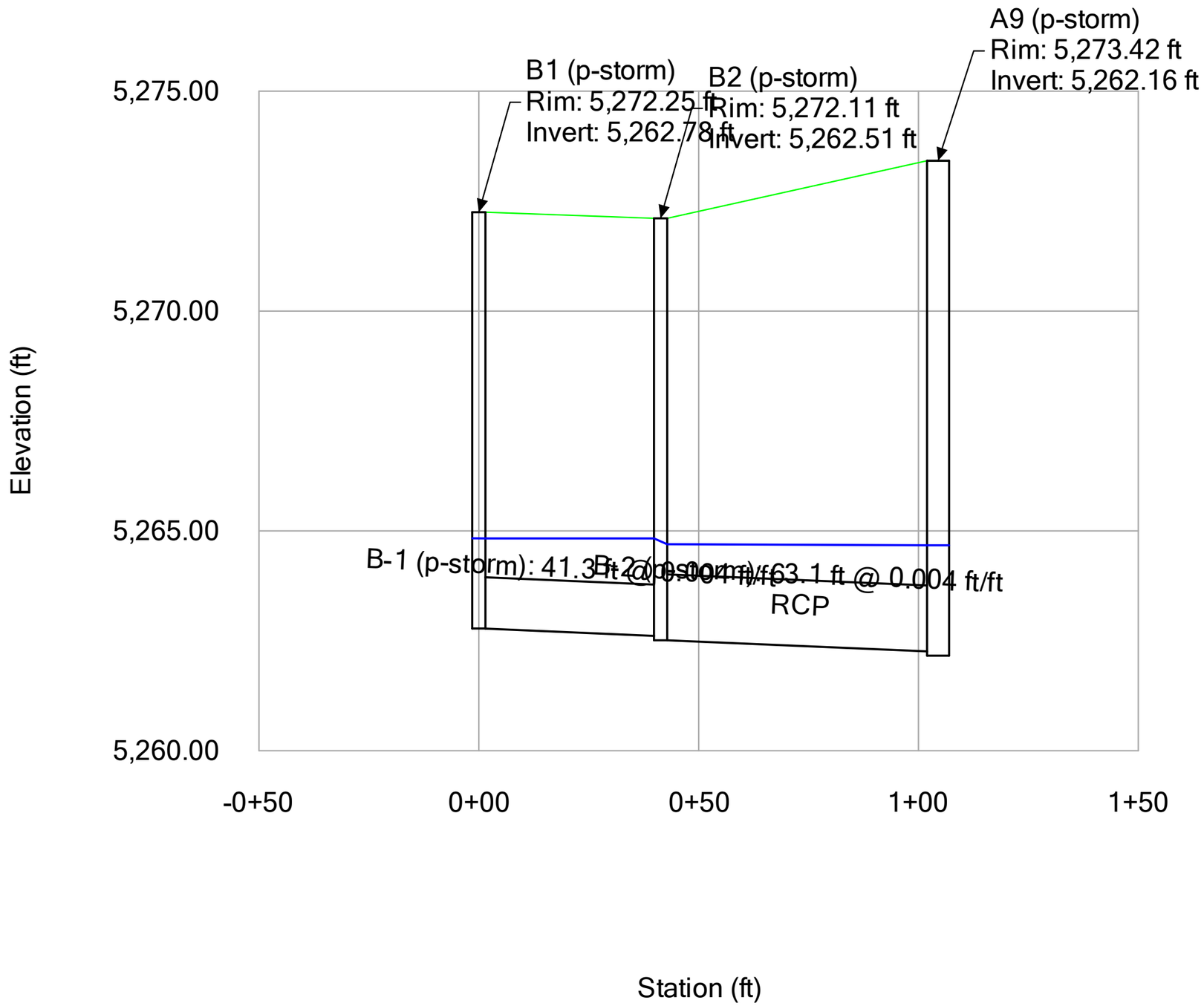

Profile Report

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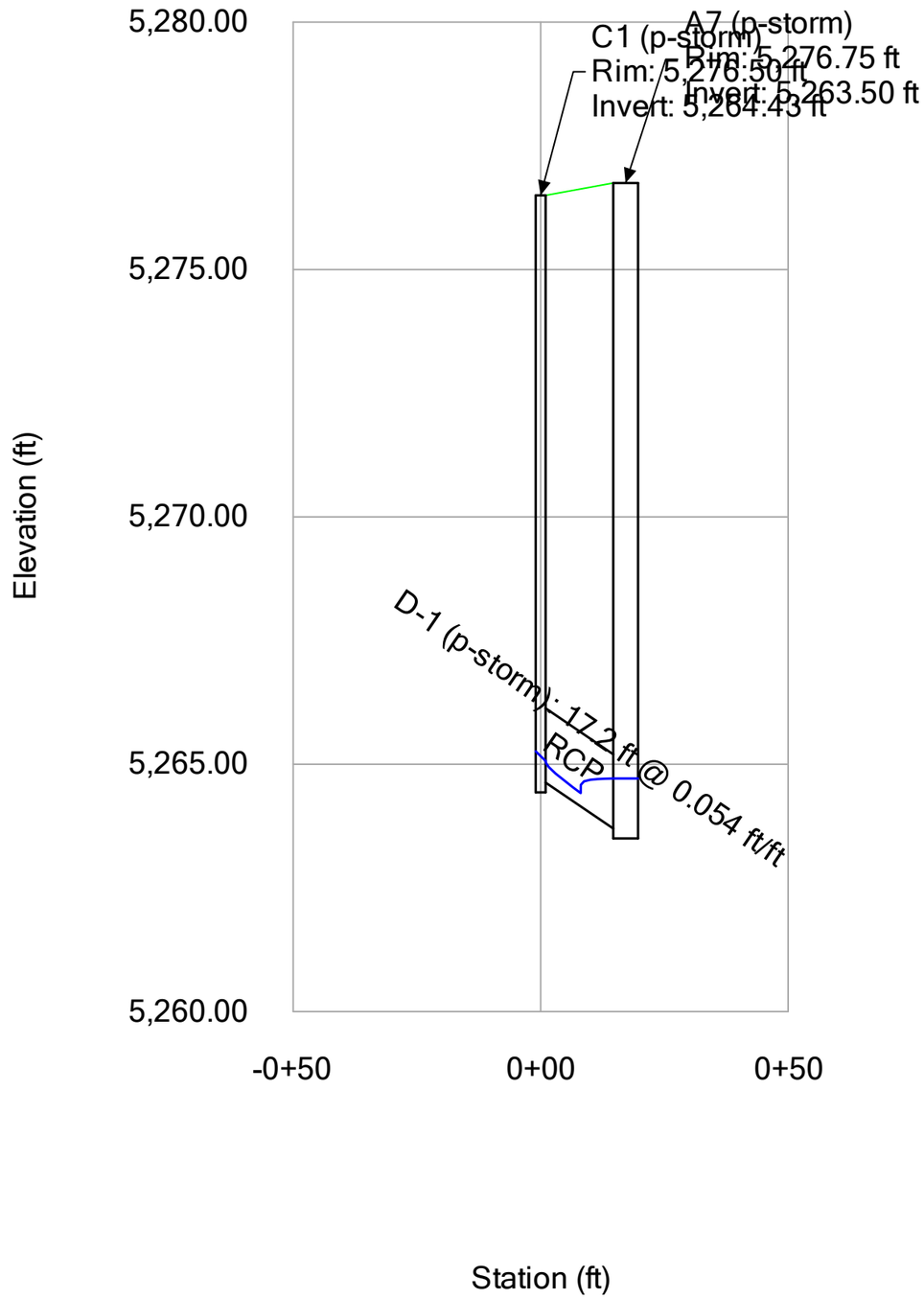

Profile Report

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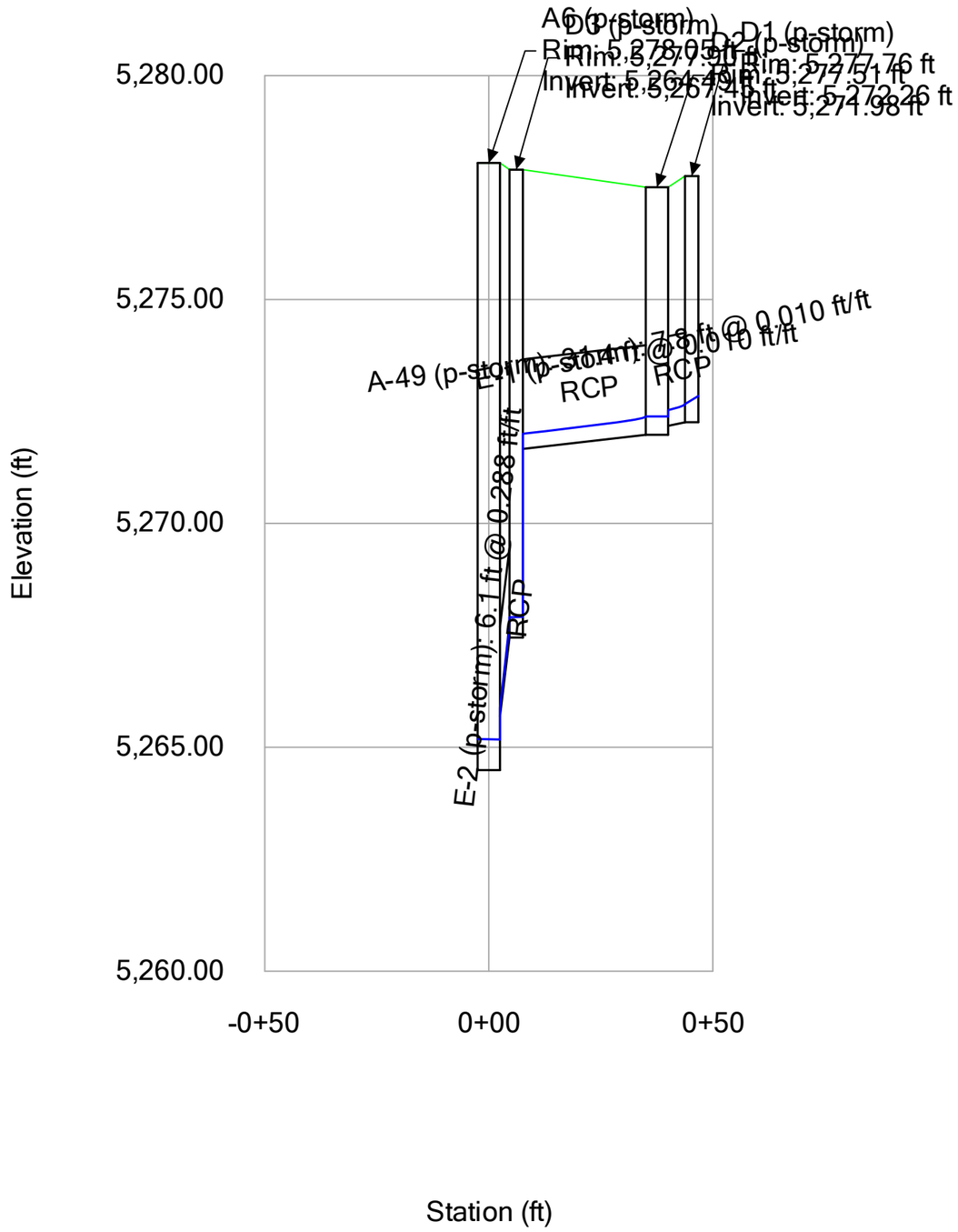

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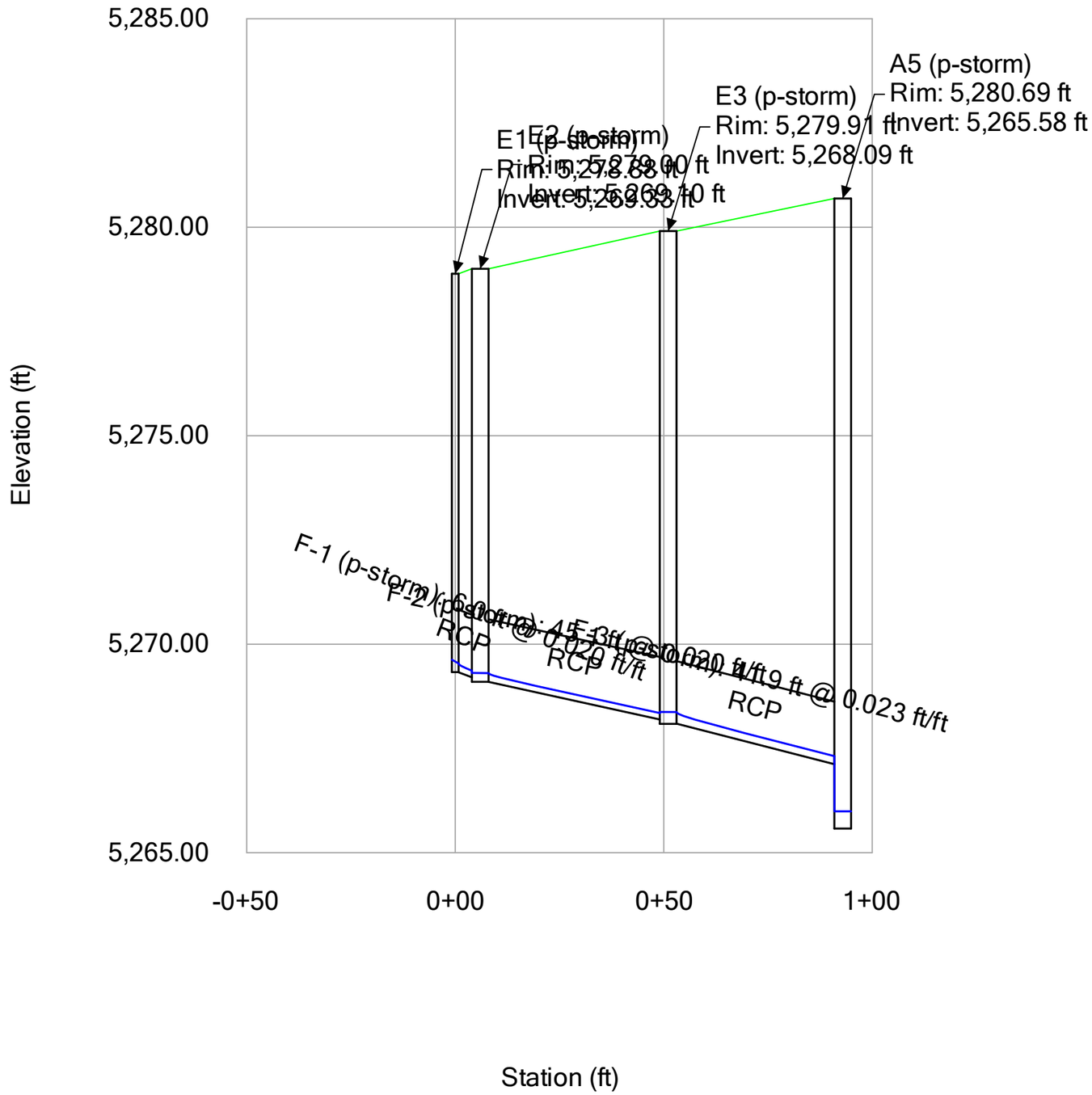

Profile Report

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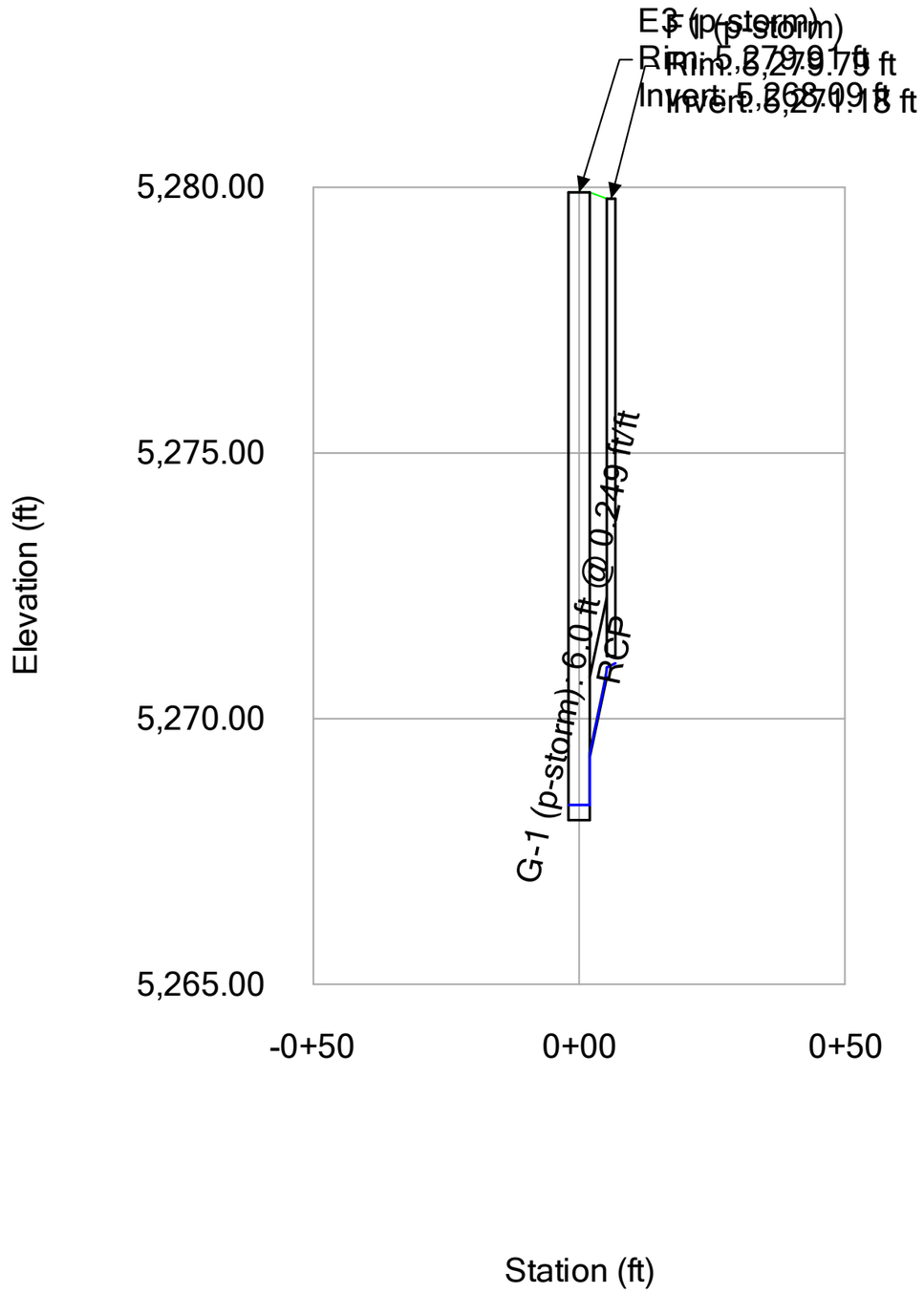
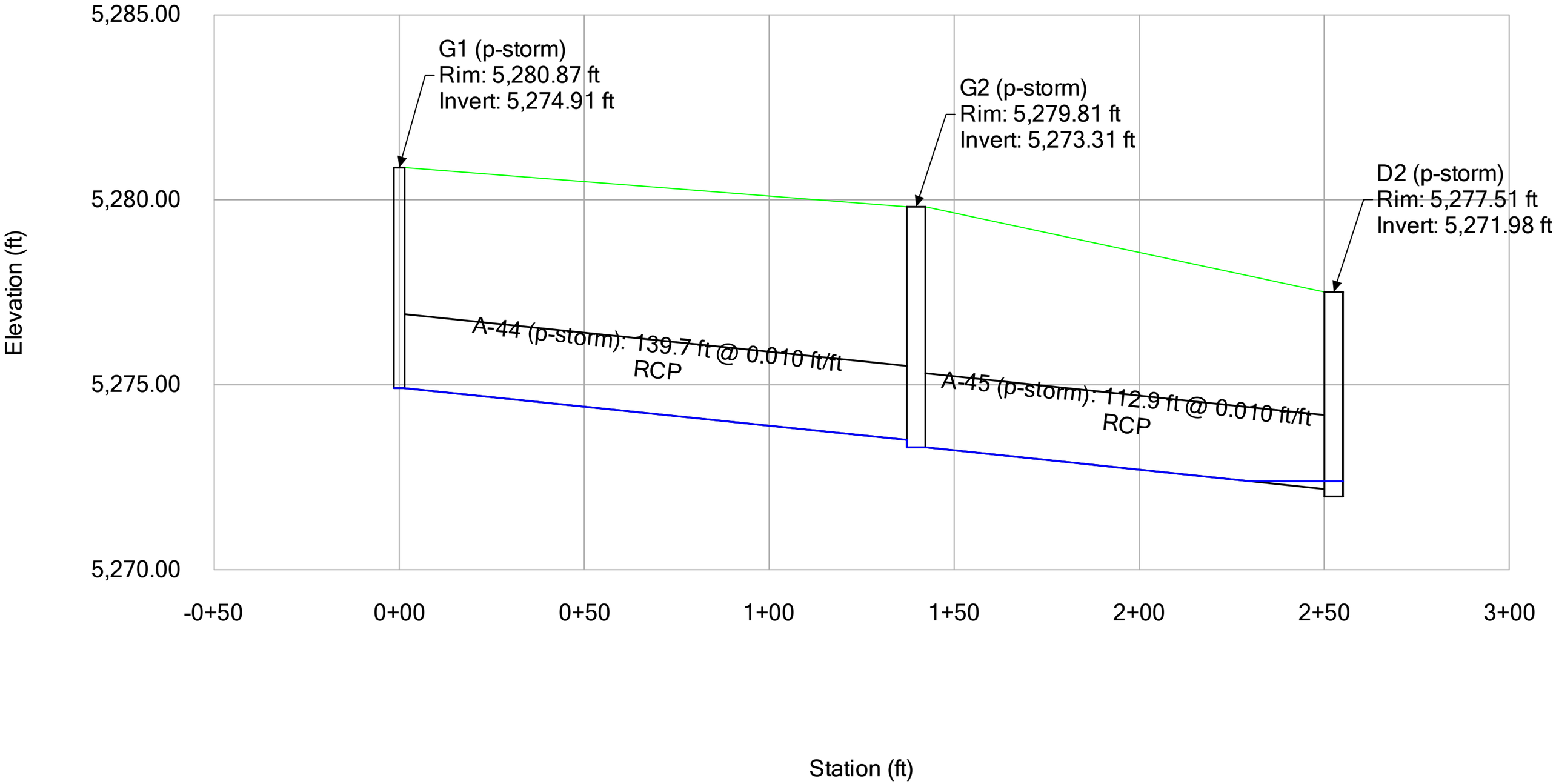
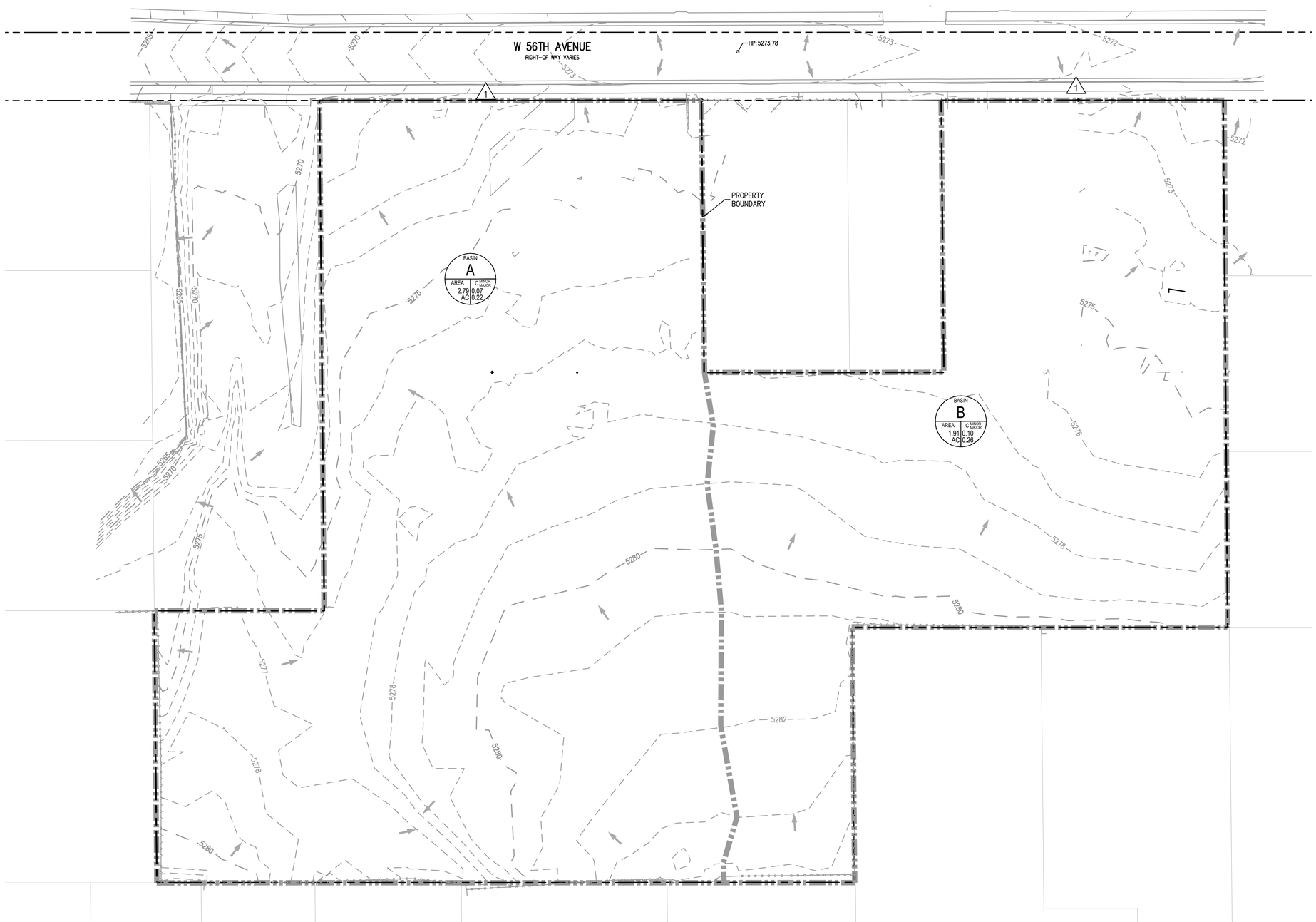


Profile Report
Engineering Profile - Line G (Berkeley VIllas StormCAD.stsw)



APPENDIX E – Historical Drainage Map & Final Drainage Plan



LEGEND:

- PROPERTY BOUNDARY
- BASIN DELINEATION LINE
- EX CONTOURS (5175, 5170)
- EX STORM SEWER (ST)
- EX FLOW ARROW

BASIN DESIGNATION — BASIN OS 1 — 5-YR RATIONAL C COEFFICIENT
BASIN SIZE IN ACRES — AREA 1.23 AC — C MINOR 0.45 MAJOR 0.67 — 100-YR RATIONAL C COEFFICIENT
1 BASIN DESIGN POINT

DIRECT RUNOFF SUMMARY				
BASIN	DESIGN POINT	AREA (AC)	Q_5 (CFS)	Q_{100} (CFS)
A	1	2.79	0.69	3.94
B	2	1.91	0.69	3.20

Know what's below. Call before you dig.

30 0 30 60
SCALE: 1" = 30'

DESIGNED BY: SM
CHECKED BY: JRS
DRAWN BY: SM

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

THE TRUE LIFE COMPANIES

BERKELEY VILLAS
EXISTING DRAINAGE MAP

PROJECT #: 200810
SHEET NUMBER
1
1 OF 1

FILEPATH: K:\200810\ENGINEERING\DRAINAGE\EXISTING DRAINAGE MAP.DWG LAYOUT: LAYOUT1
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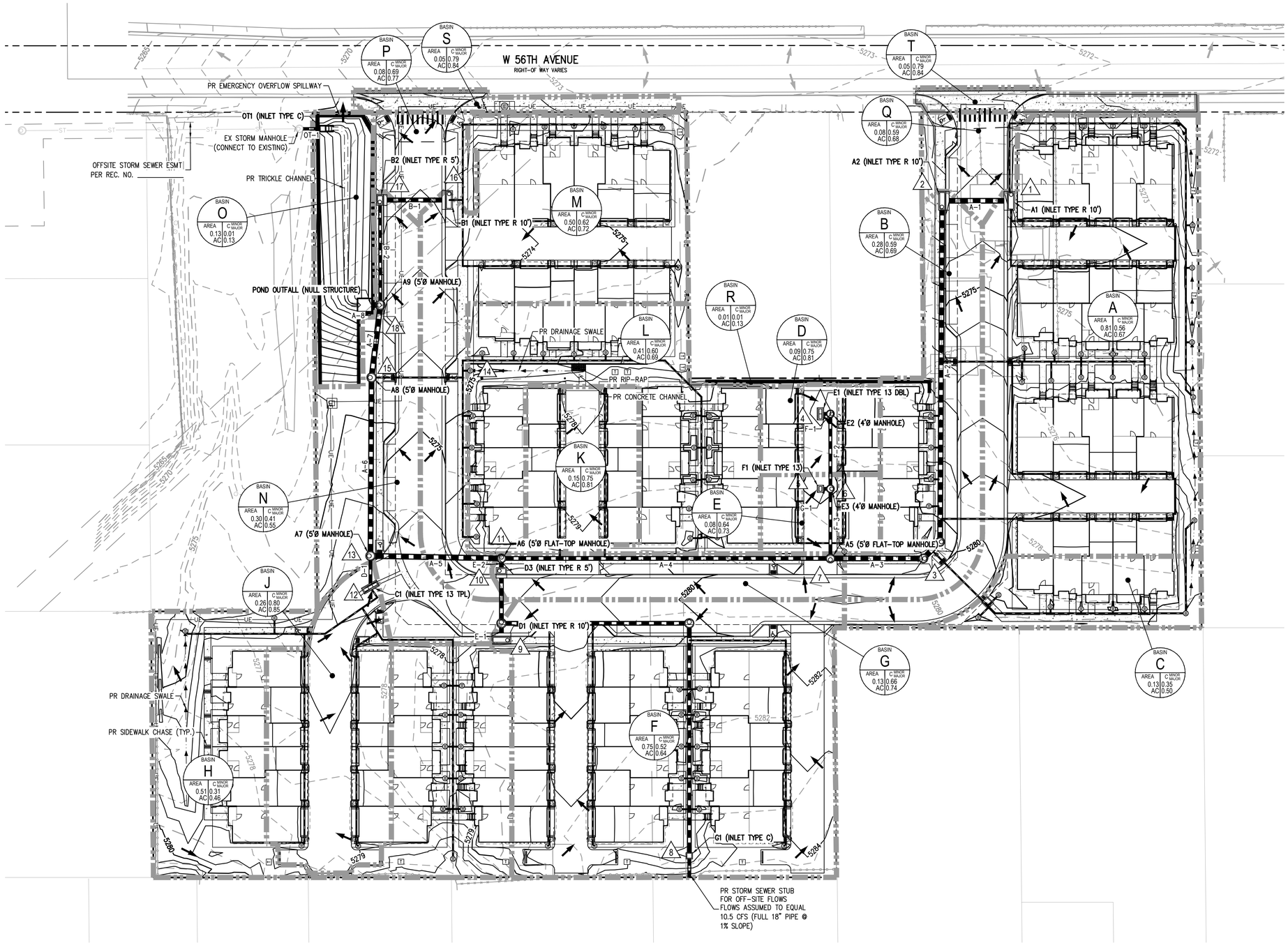

LEGEND:

- PROPERTY BOUNDARY
- BASIN DELINEATION LINE
- 5264 / 5265 — PR CONTOURS
- 5170 — EX CONTOURS
- PR STORM SEWER
- ST — EX STORM SEWER
- PR FLOW ARROW
- EX FLOW ARROW

BASIN DESIGNATION — BASIN OS 1 — 5-YR RATIONAL C COEFFICIENT
BASIN SIZE IN ACRES — AREA 1.23 — C MINOR 0.45 — C MAJOR 0.67 — 100-YR RATIONAL C COEFFICIENT
1 BASIN DESIGN POINT

DIRECT RUNOFF SUMMARY

BASIN	DESIGN POINT	AREA (AC)	Q_5 (CFS)	Q_{100} (CFS)
A	1	0.81	1.68	3.81
B	2	0.28	0.79	1.77
A+B	2		2.27	5.14
C	3	0.13	0.22	0.59
A+B+C	3		2.35	5.40
D	4	0.09	0.33	0.67
E	5	0.08	0.25	0.53
E+D	6		0.57	1.20
A+B+C+D+E	7		2.76	6.25
F	8	0.75	1.41	3.29
G	9	0.13	0.41	0.89
F+G	9		1.71	3.94
A+B+C+D+E+F+G	10		4.33	9.86
H	11	0.52	0.76	2.18
J	11	0.31	0.59	1.52
H+J	11		1.35	3.70
A+B+C+D+E+F+G+H+J	12		4.82	12.38
K	13	0.15	0.54	1.12
L	13	0.41	1.18	2.62
K+L	13		1.72	3.74
A+B+C+D+E+F+G+H+J+K+L	14		5.16	14.88
M	15	0.50	1.50	3.29
N	16	0.27	0.59	1.49
M+N	16		2.03	4.66
A+B+C+D+E+F+G+H+J+K+L+M+N	17		6.60	18.50
O		0.13	0.00	0.14
ON-SITE TOTAL			6.60	18.61
P		0.08	0.27	0.56
Q		0.08	0.22	0.50
R		0.01	0.00	0.01
S		0.05	0.19	0.39
T		5.00	0.19	0.39

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PLOTTED: MON 10/17/22 10:23:41A BY: HUNTER THOMPSON

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

30 0 30 60
SCALE: 1" = 30'

DESIGNED BY: SM
CHECKED BY: JRS
DRAWN BY: SM

ISSUE DATE: 06-13-2022

DATE	REVISION COMMENTS

HARRIS KOCHER SMITH
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HarrisKocherSmith.com

THE TRUE LIFE COMPANIES

BERKELEY VILLAS
FINAL DRAINAGE MAP

PROJECT #: 200810
SHEET NUMBER
1
1 OF 1

Operations and Maintenance Manual

FOR

Berkeley Villas

Broomfield CO 80021
Situated in the NE ¼ of Section 17, T3S, R68W,
County of Adams, State of Colorado

Prepared: October 14, 2022

for:

THE TRUE LIFE COMPANIES
1601 19th St. Suite 550
Denver, CO 80202

by:

HARRIS KOCHER SMITH

1120 Lincoln Street, Suite 1000
Denver, CO 80203
303-623-6300

HKS Project No. 180510

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1. Brief Introduction

This Operations & Maintenance Manual is intended to guide property owners and their maintenance personnel about common pollutants, with recommend prevention, inspection, and maintenance activities and frequencies for properly functioning Water Quality (WQ) and Detention facilities. A copy of this document and approved Construction Plans (Plans) for the facilities should be kept on site and/or at the property management office. Any changes to the facilities over time should be noted on the Plans.

Please also refer to Volume 3, Chapter 6 BMP Maintenance of the Urban Drainage and Flood Control District (UDFCD, now known as the Mile High Flood District [MHFD]) *Urban Storm Drainage Criteria Manual* (USDCM). Sections of Volume 3, Chapter 6 of the USDCM that are relevant to facilities of this include but are not limited to: 7.0 Extended Detention Basins (EDBs); 12.0 Underground BMPs.

2. Location and Access

The facilities are located near Federal Boulevard and 56th Avenue, in Adams County, Colorado. The Site is described as a resubdivision of lots 4, 5, 6, 7 and 19 of the Westmoorland Subdivision Plat and Lot 8A of the Re-Subdivision of Westmoorland Plat Correction number 2 being in the Northeast Quarter of Section 17, Township 3 South, Range 68 West of the 6th Principal Meridian. The facilities is a WQ and Detention pond. The pond is encompassed by a drainage easement.

The Pond, located in the northeast corner of the Site, discharges to a storm sewer system on the adjacent property to the east. The storm structures in the pond can be accessed via the adjacent roadways and the pond bottom can be accessed by the ramp on the south end of the pond.

.

3. Purpose of the Facilities

The purpose of the facilities is water quality treatment and attenuation of stormwater runoff up to and including the 100-year storm event. The facilities allow for water quality treatment utilizing controlled release. Peak runoff rates will be substantially reduced.

4. General Facility Description

The on-site pond includes a forebay, an outlet structure with a micropool and release controls (WQ orifices, an EURV grate, a 100-year restrictor plate, and an outlet pipe that discharges to the existing public storm sewer system. An emergency spillway is also incorporated into the pond, constructed in the walls. Refer to the approved Plans for details.

5. Ownership

The facilities are owned by the Site property owner and are to be maintained by the Site property owner, Homeowners' Association designated manager. The current property owner is under contract by The True Life Companies.

contact: Zell Cantrell 303-437-4948

6. Project History

The Site was vacant prior to this development. The facilities are to be constructed in conjunction with this development. The Contracting Officer is _____ _____. The Engineer of Record for the Construction Plans and associated Final Drainage Report is John Stafford, CO PE #47210, on behalf of Harris Kocher Smith.

7. Project Data

<u>Pond A</u>

Tributary area:	4.70 acres
Imperviousness:	68.33%
Storage volume, total required:	0.529 Ac-ft (23,043 CF)
Water Quality orifices:	3 holes in plate: $^{13}/_{16}$" dia each
EURV control:	angled grate on top of outlet structure
EURV design release rate:	0.1 CFS
100-year control:	restrictor plate over outlet pipe
100-year design release rate:	1.29 CFS

8. Normal Operation

After operational, and when vegetation is established, the facilities should generally remain dry, except during precipitation events and until stormwater drains. Based on design computations, the pond should drain within 87 hours after a 100-year event. The micropool may have static water up to a depth of 2.5 feet between precipitation events.

9. Emergency Action Plan

If, in the event that extreme weather conditions beyond the 100-year event or structural failure of a facility causes runoff to exceed the volume of a pond, overflows are expected to safely release over its emergency spillway. Inspect each facility after such event, and maintain as needed. In case of emergency, please call 911.

10. Maintenance Plan

A. Preventive Measures to Reduce Maintenance Costs

The most effective way to ensure proper performance of this type of facility is to prevent pollutants from ever entering the facility. Some common pollutants include sediment, trash and debris, animal waste, oil and grease, and chemicals (e.g. antifreeze, paints, cleaners, solvents, pesticides, fertilizers, detergents), and illicit discharges. Some measures recommended to minimize maintenance costs follow:

- Keep the tributary area, clean and free from pollutants such as those noted above.
- Keep the pond area and inlet/outlet area clean and free from pollutants such as those noted above.
- Maintain vegetative stabilization.
- Plan landscape maintenance to minimize the use of chemicals (e.g. fertilizers and pesticides).
- Be aware of vehicles and equipment leaking fluids. Use absorbents such as cat litter to soak up drippings.
- Any materials that need to be stored outdoors should be properly protected from stormwater runoff.
- Properly dispose of all pollutants.

B. Field Inspection Procedures and Equipment

All stormwater management facilities shall be inspected by a qualified individual. Inspections shall follow safe and proper procedures.

To ensure safety, the inspector should:

- Wear protective clothing, boots, safety vest, hard hat.
- Avoid walking on top of retaining walls or other structures that have a significant vertical drop – greater than 48” in height
- Never enter a confined space (e.g. outlet structure, manhole, etc.) without proper training and equipment. A confined space should never be entered without at least one additional person present.
- Notify the maintenance supervisor of any hazardous conditions or materials found during inspection. If any hazard is encountered, the Broomfield

Sheriff's office must be notified immediately for response by the Hazardous Materials Unit. The emergency contact number is 911.

Below is a list of equipment that may be necessary or useful to perform inspections of the facilities:

- Communication device/equipment.
- Clipboard.
- Documents and forms (copy of this approved O&M Manual, copy of approved Plans for the facilities, inspection forms (see attached).
- Tape measure.
- Shovel.
- Manhole lid remover.
- Waste receptacle.
- Gloves.
- First aid kit.
- Camera and light source.

Below are some basic guidelines for inspections:

- Be aware of all components of the facilities, as indicated on the approved Plans.
- Complete the appropriate form(s), and keep them filed with related information.
- Be aware of mosquitos and algae around the facilities.
- Notify the maintenance supervisor of any hazardous conditions or materials found during inspection.
- Notify the maintenance supervisor if/when any damage is observed in the pond area or inlet/outlet works to schedule and complete repairs.

C. Regularly Scheduled Inspection, Routine and Periodic

- During construction of the facilities, ensure that all temporary BMPs (erosion control devices) are properly maintained.
- Once installation of the facilities is complete, inspect inlet and outlet works monthly until vegetation is established.

- Twice per year, at a minimum, inspect the pond area and inlet/outlet works for pollutants previously noted.

D. Monitored Inspection

After each significant storm event, inspect the inlet and outlet works for obstructions or damage, and maintain as needed.

E. Maintenance Activities

At a minimum, routine maintenance should include the following activities:

- Remove debris/trash from pond area and around outlet structure; keep well screen free from debris.
- Remove sediment from the micropools when the depth of the sediment has reached approximately 12 inches, causing the depth of the water to be reduced to approximately 18 inches.
- Provide proper weed control. Anytime noxious weeds are detected, notify the maintenance supervisor to have them properly removed or treated.
- Remove vegetation adjacent to the inlet/outlet works that may interfere with operation.
- Mow pond areas as often as needed to maintain healthy grass with height of 4-6 inches. Remove clippings/trimmings from pond area and dispose of offsite or in contained on-site trash bin.
- Clean debris from inlet/outlet works including well screen.
- Treat for mosquitos or algae if/as needed. Use only EPA approved chemicals/materials.
- Dispose of all sediment/debris/trash properly, away from the facilities.

F. Maintenance Equipment

Use appropriate equipment and tools; the types will vary depending on the task at hand. Below is a list of suggested tools, equipment, and material(s) that may be necessary to perform various maintenance on the facilities.

- Loppers/tree trimming tools.
- Mowing tractors.
- Trimmers, with extra trimmer line.
- Shovels, rakes.

- All surface vehicle (ASVs).
- Skid steer.
- Back hoe.
- Track hoe / long reach excavator.
- Dump truck.
- Jet-vac machine.
- Engineer's (laser) level.
- Riprap (per Plans).
- Filter fabric.
- Erosion control blanket(s).
- Seed mix (per approved Landscape Plans).
- Illicit discharge cleanup kits.
- Trash bags/receptacle.
- Hand tools (wrenches, screw drivers, hammers, etc).
- Chain saw.
- Confined space entry equipment (for trained personnel).
- Approved copy of Operation and Maintenance Manual for these facilities.

G. Unscheduled Maintenance

If unexpected deficiencies occur, repair/rehabilitate affected parts/areas as needed, in a timely manner, per manufacturers' recommendations.

Nonroutine maintenance activities may be needed from time to time, based on inspections. Major maintenance activities may require larger and more specialized equipment, and potentially surveying to ensure design grades and volumes are achieved. Major activities may include:

- Structural repair – repair of damaged structures. These structures, some of which are constructed of concrete with steel reinforcement, can degrade or be damaged and may need to be repaired or re-constructed from time to time. These structures may include items like inlet/outlet works, micropools, emergency spillways, and other features. In-house operations staff can perform some of the minor structural repairs. Major repairs to structures may require input from a structural engineer and specialized contractors.

Consultation with Broomfield Engineering Staff should take place prior to all structural repairs.

- Major sediment removal – removal of large quantities of sediment. Special care shall be given in vegetated areas to ensure design volumes and grades are preserved.
- Major erosion repair – filling and/or revegetating areas of sever erosion. Determining the cause of the erosion as well as correcting the condition that caused the erosion should also be part of the erosion repair. Care should be given to ensure design grades and volumes are preserved
- Emergency spillway repair – realigning displaced materials. Care should be given to ensure design grades and volumes are preserved.

11. References

- SEMSWA *Maintaining Detention Ponds* https://www.semswa.org/uploads/files/Detention%20pond%20maintenance%20.pdf.
- UDFCD *Urban Storm Drainage Criteria Manual Volume 3* https://udfcd.org/wp-content/uploads/uploads/vol3%20criteria%20manual/01_USDCM%20Volume%203.pdf.

ATTACHMENTS

Inspection Form

Maintenance Form

Annual Inspection & Maintenance Form

WATER QUALITY AND DETENTION FACILITY MAINTENANCE CHECKLIST/REPORT

Facility Location: Berkeley Villas, Adams County, CO Completion Date: _____

Maintenance supervisor (name and contact info): _____

Type of maintenance: ☐ Routine ☐ Restoration ☐ Rehabilitation (check all that apply)

Routine Maintenance Activities Performed:

☐ Trash/debris removal

☐ Outlet works cleaning (WQ orifices, well screen)

☐ Mosquito treatment

☐ Proper disposal of all sediment/debris/trash

☐ Mowing

☐ Weed control (mechanical removal, herbicide application)

☐ Algae treatment

Comments: _____

Periodic/Restoration Activities Performed:

Minor sediment removal:

☐ Micropool

Erosion repair:

☐ WQ pond bottom / sides

☐ Emergency spillway

Vegetation removal/thinning:

☐ WQ pond bottom

☐ WQ pond sides

Revegetation:

☐ WQ pond bottom

☐ WQ pond sides

Jet-vac / clearing drains:

☐ Outlet works

☐ Connecting pipes

Rehabilitation Work Performed:

Major sediment removal:

☐ WQ pond bottom / swale

☐ Micropool

Erosion repair:

☐ WQ pond bottom / swale

☐ Emergency spillway

Structural repair:

☐ Outlet works

☐ Micropool

☐ Connecting pipes

☐ Emergency spillway

☐ Other: _____

Estimated Total Manhours: _____ **Equipment/Tools/Materials Used:** _____

_____

_____

_____

Additional Comments/Information: _____

_____

_____

_____

_____

_____

This form shall be kept for a minimum of three (3) years and made available to Adams County upon request.

WATER QUALITY AND DETENTION FACILITY INSPECTION CHECKLIST/REPORT

Facility Location: Berkeley Villas, Adams County, CO Date: _____

Weather: _____ Inspected by: _____

Type of Inspection: ☐ Routine ☐ Periodic ☐ Precipitation event, # days since event: _____ ☐ Other: _____

General Observations:

Is water flowing? ☐ Yes ☐ No Standing water? ☐ Yes ☐ No Depth: ____ Comments: _____

Any evidence of obstructions or erosion in vicinity of the Facility that could affect performance? ☐ Yes ☐ No _____

Facility Conditions:

Is there accumulation of sediment in or around the Facility? ☐ Yes ☐ No _____

Any evidence of animal burrowing or other activity that could contribute to instability or increased erosion? ☐ Yes ☐ No _____

Any evidence of encroachment into the Facility or improper use of the Facility? ☐ Yes ☐ No _____

Do vegetated areas need mowing? ☐ Yes ☐ No Are there areas that need to be re-vegetated? ☐ Yes ☐ No _____

☐ Mowed today ☐ Will schedule mowing ☐ Will schedule re-vegetation activities

Do vegetated areas need weed control? ☐ Yes ☐ No ☐ Weeded today ☐ Will schedule weed removal _____

Is there accumulation of trash, debris and/or litter to be removed? ☐ Yes ☐ No ☐ Removed today ☐ Will schedule removal

Any sign of any public hazard? ☐ Yes ☐ No _____

Any sign of vandalism or other activity that could affect performance of the Facility? ☐ Yes ☐ No _____

Any visible pollution in or near micropool? ☐ Yes ☐ No _____ Erosion at high water mark? ☐ Yes ☐ No _____

Abnormally high water level? ☐ Yes ☐ No _____
(May indicate obstruction at orifice, or trash rack; verify outlet structure operating properly)

Unusual Algae blooms? ☐ Yes ☐ No _____
(May signal too many nutrients in runoff; identify dog activity and clippings management; will need monitoring)

Structural Components:

Do any of the Facility's components show signs of settling, cracking, sloughing or other problems? ☐ Yes ☐ No _____

Are any of the pipes/inlets going into or out of the Facility clogged or obstructed? ☐ Yes ☐ No _____

Is the inflow swale functioning properly? ☐ Yes ☐ No _____

Are any of the orifices, trash rack, or grate obstructed or not secure? ☐ Yes ☐ No _____

Are the outlet works (orifice, weir), structure, frames, and covers associated with the detention outlet in appropriate condition and functioning appropriately? ☐ Yes ☐ No _____

Is the outfall pipe from the outlet structure to the public system in need of repair? ☐ Yes ☐ No _____

Do any (applicable) safety features, such as grates, fences, gates or locks need repair or replacement? ☐ Yes ☐ No _____

Is the emergency spillway in need of repair? ☐ Yes ☐ No _____

Plan of Action:

If answered **YES** to any of the above, the following is an anticipated *Maintenance Needs Action List:*

Total # of concerns (Yes answers): _____

_____ Need(s) more monitoring (Anticipated schedule to re-visit; identify what will trigger action)
_____ Need(s) routine repair (Approximate schedule for repairs; date of follow-up to re-inspect)
_____ Need(s) immediate repair (Take action if correct equipment on site; or contact supervisor)

Inspection Summary / Additional Comments: _____

_____

_____

_____

_____

ANNUAL INSPECTION AND MAINTENANCE CERTIFICATION FOR THE WATER QUALITY AND DETENTION FACILITY

(This form shall be made available to Adams County upon request.)

Date: _____

Submit to: Adams County
Berkeley Villas
Attention: _____

Re: Certification of Inspection and Maintenance

Property/Subdivision Name: Berkeley Villas

Owner/Responsible Party*: _____

* If new owner/responsible party since last report, please check box here ☐

I verify that the required stormwater facility inspections and required maintenance have been completed in accordance with the approved Operations and Maintenance Manual associated with the above referenced property.

The required Stormwater Facility Inspection and Maintenance forms are complete.

_____	_____
Name of Party Responsible for Inspection & Maintenance	Property Owner
_____	_____
Authorized Signature	Signature

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH

Case Number
PLT2022-00026

BERKELEY VILLAS SUBDIVISION PLAT

A RESUBDIVISION OF LOTS 4, 5, 6, 7, AND 19 OF THE WESTMOORLAND SUBDIVISION PLAT AND LOT 8A OF RE-SUBDIVISION OF WESTMOORLAND PLAT CORRECTION NUMBER 2 BEING IN THE NORTHEAST QUARTER OF SECTION 17, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH PRINCIPAL MERDIAN
COUNTY OF ADAMS, STATE OF COLORADO

FINAL PLAT

SHEET 1 OF 5

DEDICATION AND OWNERSHIP:

KNOW ALL MEN BY THESE PRESENTS THAT TTLC MANAGEMENT, INC., AN ARIZONA CORPORATION, AS THE OWNER, OF THE FOLLOWING DESCRIBED TRACT OF LAND:

A PARCEL OF LAND BEING ALL OF PLOT 4, PORTION OF PLOTS 5 THROUGH 7, AND A PORTION OF LOT 19, RE-SUBDIVISION OF WESTMOORLAND, AND ALL OF LOT 8A, RE-SUBDIVISION OF WESTMOORLAND PLAT CORRECTION NO. 2, SITUATED IN THE NORTHEAST QUARTER OF SECTION 17, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH/ PRINCIPAL MERIDIAN, COUNTY OF ADAMS, STATE OF COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF SAID PLOT 4;
THENCE SOUTH 00°29'37" EAST ALONG THE EAST LINE OF SAID PLOT 4, A DISTANCE OF 310.01 FEET TO THE SOUTHEAST CORNER OF SAID PLOT 4;
THENCE SOUTH 89°59'11" WEST ALONG THE SOUTH LINES OF SAID PLOTS 4 AND 5, A DISTANCE OF 220.78 FEET TO THE NORTHEAST CORNER OF SAID PLOT 19;
THENCE SOUTH 00°33'42" EAST ALONG THE EAST LINE OF SAID PLOT 19, A DISTANCE OF 150.01 FEET TO THE SOUTHEAST CORNER OF THE NORTH 150 FEET OF SAID PLOT 19;
THENCE SOUTH 89°59'11" WEST ALONG THE SOUTH LINE OF THE NORTH 150 FEET OF SAID PLOT 19, THE SOUTH LINE OF SAID PLOT 7, AND THE SOUTH LINE OF SAID LOT 8A, A DISTANCE OF 410.39 FEET TO THE SOUTHWEST CORNER OF SAID LOT 8A;
THENCE ALONG THE PERIMETER OF SAID LOT 8A THE FOLLOWING THREE (3) COURSES:
1) NORTH 00°32'42" WEST, A DISTANCE OF 160.00 FEET;
2) NORTH 89°59'27" EAST, A DISTANCE OF 100.00 FEET;
3) NORTH 00°32'42" WEST, A DISTANCE OF 300.03 FEET TO A POINT ON THE SOUTH RIGHT OF WAY LINE OF WEST 56TH/ AVENUE;
THENCE NORTH 89°59'11" EAST ALONG SAID SOUTH LINE, A DISTANCE OF 224.66 FEET TO THE NORTHWEST CORNER OF THAT PARCEL DESCRIBED AT RECEPTION NO. 2015000102887;
THENCE SOUTH 00°32'42" EAST ALONG THE WEST LINE OF SAID PARCEL, A DISTANCE OF 160.01 FEET TO THE SOUTHWEST CORNER OF SAID PARCEL
THENCE NORTH 89°59'12" EAST ALONG THE SOUTH LINE OF SAID PARCEL AND ALONG THE SOUTH LINE OF A PARCEL DESCRIBED AT RECEPTION NO. 2012000092509, A DISTANCE OF 140.99 FEET TO THE SOUTHEAST CORNER OF SAID PARCEL DESCRIBED AT RECEPTION NO. 2012000092509;
THENCE NORTH 00°33'42" WEST ALONG THE EAST LINE OF SAID PARCEL, A DISTANCE OF 160.01 FEET TO A POINT ON THE SOUTH RIGHT OF WAY LINE OF WEST 56TH/ AVENUE;
THENCE NORTH 89°59'11" EAST ALONG SAID SOUTH LINE, A DISTANCE OF 165.80 FEET TO THE POINT OF BEGINNING.

SAID PARCEL CONTAINS 204,691 SQUARE FEET OR 4.70 ACRES, MORE OR LESS.

HAVE BY THESE PRESENTS LAID OUT, PLATTED AND SUBDIVIDED THE SAME INTO BLOCKS, LOTS,TRACTS, STREETS AND EASEMENTS AS SHOWN ON THIS PLAT UNDER THE NAME AND STYLE OF BERKELEY VILLAS SUBDIVISION PLAT. THE UNDERSIGNED DOES HEREBY DEDICATE, GRANT AND CONVEY TO ADAMS COUNTY TRACT A AS SHOWN ON THE PLAT; AND FURTHER RESTRICTS THE USE OF ALL PUBLIC EASEMENTS TO ADAMS COUNTY AND/OR ITS ASSIGNS, PROVIDED HOWEVER, THAT THE SOLE RIGHT AND AUTHORITY TO RELEASE OR QUITCLAIM ALL OR ANY SUCH PUBLIC EASEMENTS SHALL REMAIN EXCLUSIVELY VESTED IN ADAMS COUNTY.

EXECUTED THIS _____ DAY OF _____, 2022

TTLC MANAGEMENT, INC., AN ARIZONA CORPORATION

BY: _____ AS: EXECUTIVE VICE PRESIDENT DATE: _____
SCOTT A. MENARD

ACKNOWLEDGMENT:

STATE OF _____)
)SS.
COUNTY OF _____)

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS ____ DAY OF _____ AD 20____,
BY SCOTT A. MENARD AS EXECUTIVE VICE PRESIDENT.

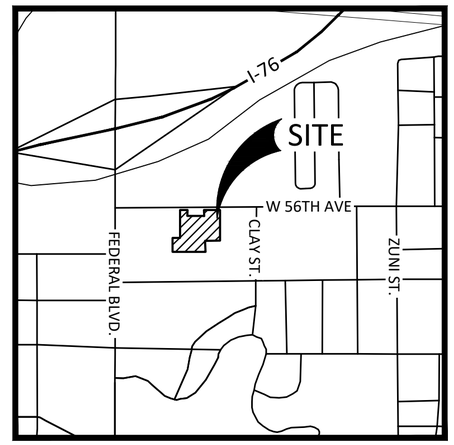
WITNESS MY HAND AND OFFICIAL SEAL.
MY COMMISSION EXPIRES:_____

_____
NOTARY PUBLIC

_____
ADDRESS

DEVELOPER
THE TRUE LIFE COMPANIES
1250 17TH STREET, SUITE 350
DENVER, CO 80202
720-330-9211

CIVIL ENGINEER
HARRIS KOCHER SMITH
1120 LINCOLN STREET, SUITE 1000
DENVER, CO 80203
303-623-6300



VICINITY MAP
SCALE: 1" = 1000'

TRACT SUMMARY TABLE

TRACT	PURPOSE/DESCRIPTION	TO BE OWNED	TO BE MAINTAINED	AREA (ACRE)	PAGE
A	DRAINAGE	HOA	HOA	0.12	3
B	ROADWAY, LANDSCAPE, UTILITY	HOA	HOA	1.62	3,4,5
C	LANDSCAPE	HOA	HOA	0.30	3,5
D	LANDSCAPE	HOA	HOA	0.06	5
E	LANDSCAPE	HOA	HOA	0.13	3,4
F	LANDSCAPE	HOA	HOA	0.28	4,5

NOTES AND RESTRICTIONS:

1. RIGHT-OF-WAY FOR INGRESS AND EGRESS FOR EMERGENCY VEHICLES IS GRANTED OVER, ACROSS, ON AND THROUGH ANY AND ALL PRIVATE ROADS, DRIVES AND ALLEYS.
2. ALL PRIVATE ROADS, ALLEYS AND DRIVES ARE HEREBY DESIGNATED AS FIRE LANES. WHEN REQUIRED, ALL FIRE LANES SHALL BE POSTED "NO PARKING-FIRE LANE". ALL FIRE LANES SHALL BE INCLUDED INTO THE ADAMS COUNTY PROGRAM FOR ENFORCEMENT OF PRIVATE PROPERTY PARKING.
3. ALL INTERNAL ROADS AND DRAINAGE FACILITY CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE FINAL PUD, STREET CONSTRUCTION PLANS, PAVEMENT DESIGN, GRADING & EROSION CONTROL PLAN, AND A FINAL DRAINAGE PLAN SUBMITTED TO AND APPROVED BY ADAMS COUNTY. PRIOR TO ISSUANCE OF BUILDING PERMITS FOR HOMES WITHIN THE SUBDIVISION, ALL COUNTY IMPROVEMENTS REQUIRED IN ACCORDANCE WITH APPROVED PLANS BY ADAMS COUNTY, SHALL HAVE RECEIVED PRELIMINARY ACCEPTANCE OF CONSTRUCTION BY THE DEPARTMENT OF PUBLIC WORKS.
4. NOTICE IS GIVEN THAT THIS SUBDIVISION WILL BE SUBJECT TO RECORDED DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS. ADAMS COUNTY IS NOT RESPONSIBLE FOR ENFORCEMENT OF THESE RECORDED COVENANTS, CONDITIONS AND RESTRICTIONS THAT SHALL BE FILED AGAINST THIS SUBDIVISION PLAT.
5. THE POLICY OF THE COUNTY REQUIRES THAT MAINTENANCE ACCESS SHALL BE PROVIDED TO ALL STORM DRAINAGE FACILITIES TO ASSURE CONTINUOUS OPERATIONAL CAPABILITY OF THE SYSTEM. THE PROPERTY OWNERS SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL DRAINAGE FACILITIES INCLUDING INLETS, PIPES, CULVERTS, CHANNELS, DITCHES, HYDRAULIC STRUCTURES, AND DETENTION BASINS LOCATED ON THEIR LAND UNLESS MODIFIED BY THE SUBDIVISION DEVELOPMENT AGREEMENT. SHOULD THE OWNER FAIL TO MAINTAIN SAID FACILITIES, THE COUNTY SHALL HAVE THE RIGHT TO ENTER SAID LAND FOR THE SOLE PURPOSE OF OPERATIONS AND MAINTENANCE. ALL SUCH MAINTENANCE COST WILL BE ASSESSED TO THE PROPERTY OWNERS.
6. MAINTENANCE OF ALL PROPOSED PRIVATE DRAINAGE IMPROVEMENTS IS A CONTINUING OBLIGATION OF THE LAND OWNER, ITS SUCCESSORS, AND ASSIGNS, TO ENSURE THE STORM SEWER FACILITIES FUNCTION AS DESIGNED AND CONTINUE SERVING THE INTENDED FUNCTIONS IN PERPETUITY.

CLOSURE STATEMENT:

THE MATHEMATICAL CLOSURE ERROR OF THE DIMENSIONS OF THE SURVEYED PROPERTY IS LESS THAN 1:50,000 (SECOND ORDER).

STATEMENT RESTRICTING ACCESS:

PUBLIC ACCESS ACROSS RIGHT-OF-WAY LINES, INCLUDING 56TH AVENUE, IS RESTRICTED.

FLOODPLAIN

THE SURVEYED PROPERTY FALLS WITHIN ZONE X OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY FLOOD INSURANCE RATE MAP NO. 08001C0592H, DATED MARCH 5, 2007. ZONE X IS DEFINED AS AREAS DETERMINED TO BE OUTSIDE THE 0.2-PERCENT ANNUAL CHANCE FLOODPLAIN.

SURVEYOR'S CERTIFICATION:

I, AARON MURPHY, A LICENSED LAND SURVEYOR IN THE STATE OF COLORADO, DO HEREBY CERTIFY THAT THE SURVEY FOR TTLC DENVER - BERKELEY VILLAS SUBDIVISION PLAT WAS MADE UNDER MY SUPERVISION AND THE ACCOMPANYING PLAN ACCURATELY AND PROPERLY SHOWS SAID SURVEY.

_____
AARON MURPHY, PLS 38162
FOR AND ON BEHALF OF
HARRIS KOCHER SMITH

BOARD OF COUNTY COMMISSIONERS' APPROVAL:

APPROVED BY THE ADAMS COUNTY BOARD OF COUNTY COMMISSIONERS THIS ____ DAY OF _____ A.D. 202_

_____
CHAIR

ADAMS COUNTY ATTORNEY:

_____
APPROVED AS TO FORM

THIS PLAT WAS FILED FOR RECORD IN THE OFFICE OF ADAMS COUNTY CLERK AND RECORDER, IN THE STATE OF COLORADO, AT_____ AM/PM. ON THE __ DAY OF_____ A.D.____

COUNTY CLERK AND RECORDER:_____

BY DEPUTY :_____

PROJECT #: 200810

REVISION DATE:10-5-2022 ISSUE DATE:6-7-2022 SHEET 1 OF 5

Filepath: K:\200810\SURVEY\PLAT COVER_200810.DWG Layout: COVER
1 XREF: vicinity map
Plotted: WED 10/05/22 12:05:06P By: Aaron Murphy

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH

BERKELEY VILLAS SUBDIVISION PLAT

Case Number
PLT2022-00026

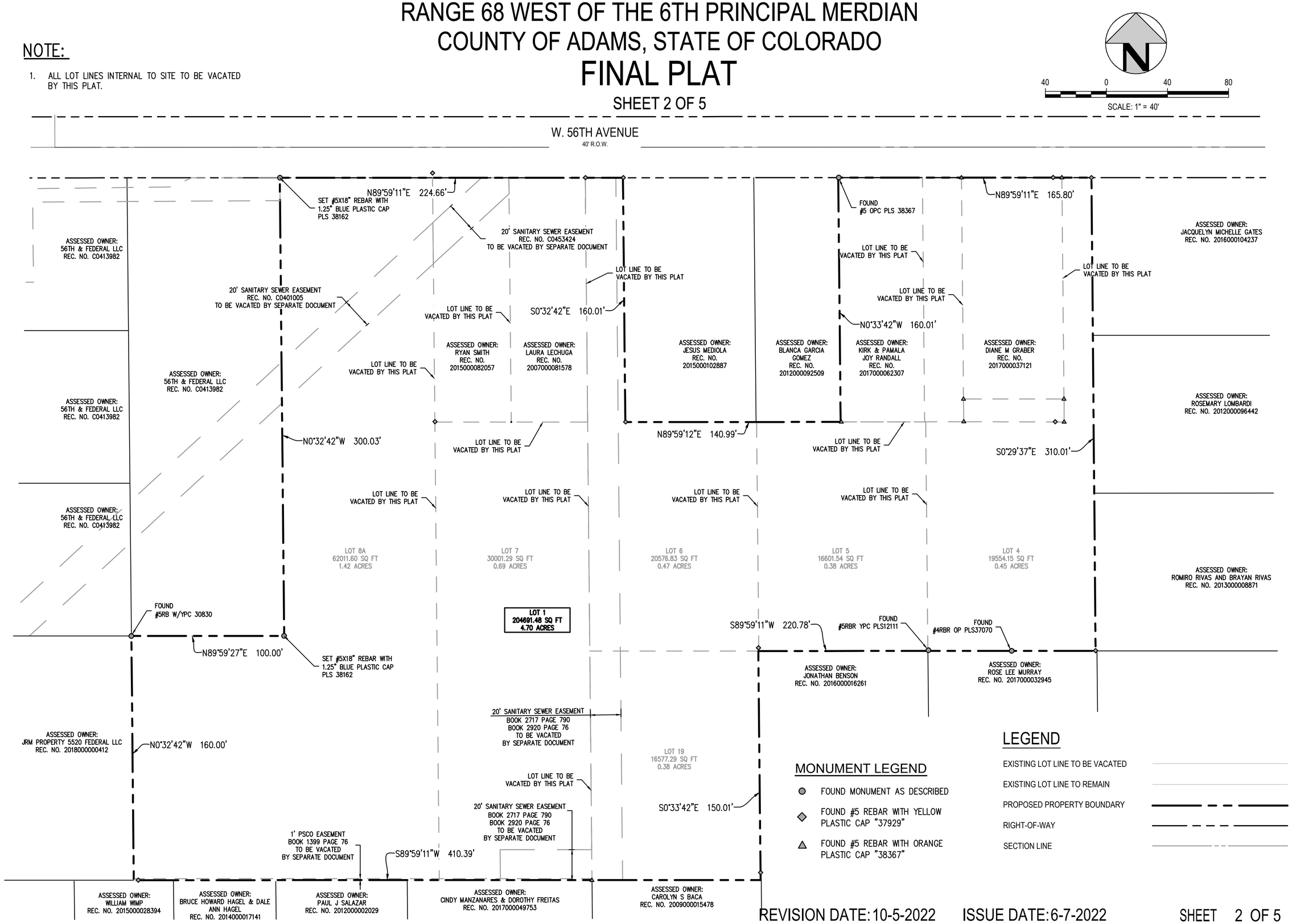
A RESUBDIVISION OF LOTS 4, 5, 6, 7, AND 19 OF THE WESTMOORLAND SUBDIVISION PLAT AND LOT 8A OF RE-SUBDIVISION OF WESTMOORLAND PLAT CORRECTION NUMBER 2 BEING IN THE NORTHEAST QUARTER OF SECTION 17, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH PRINCIPAL MERDIAN
COUNTY OF ADAMS, STATE OF COLORADO

FINAL PLAT

SHEET 2 OF 5

NOTE:

1. ALL LOT LINES INTERNAL TO SITE TO BE VACATED BY THIS PLAT.



REVISION DATE: 10-5-2022 ISSUE DATE: 6-7-2022 SHEET 2 OF 5

PROJECT #: 200810

Filepath: K:\200810\SURVEY\PLAT BNDY SHEET.DWG Layout: BOUNDARY DETAIL
3 XREFs: e-base[U], e-legal, e-util[U]
Plotted: WED 10/05/22 12:05:14P By: Aaron Murphy

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.

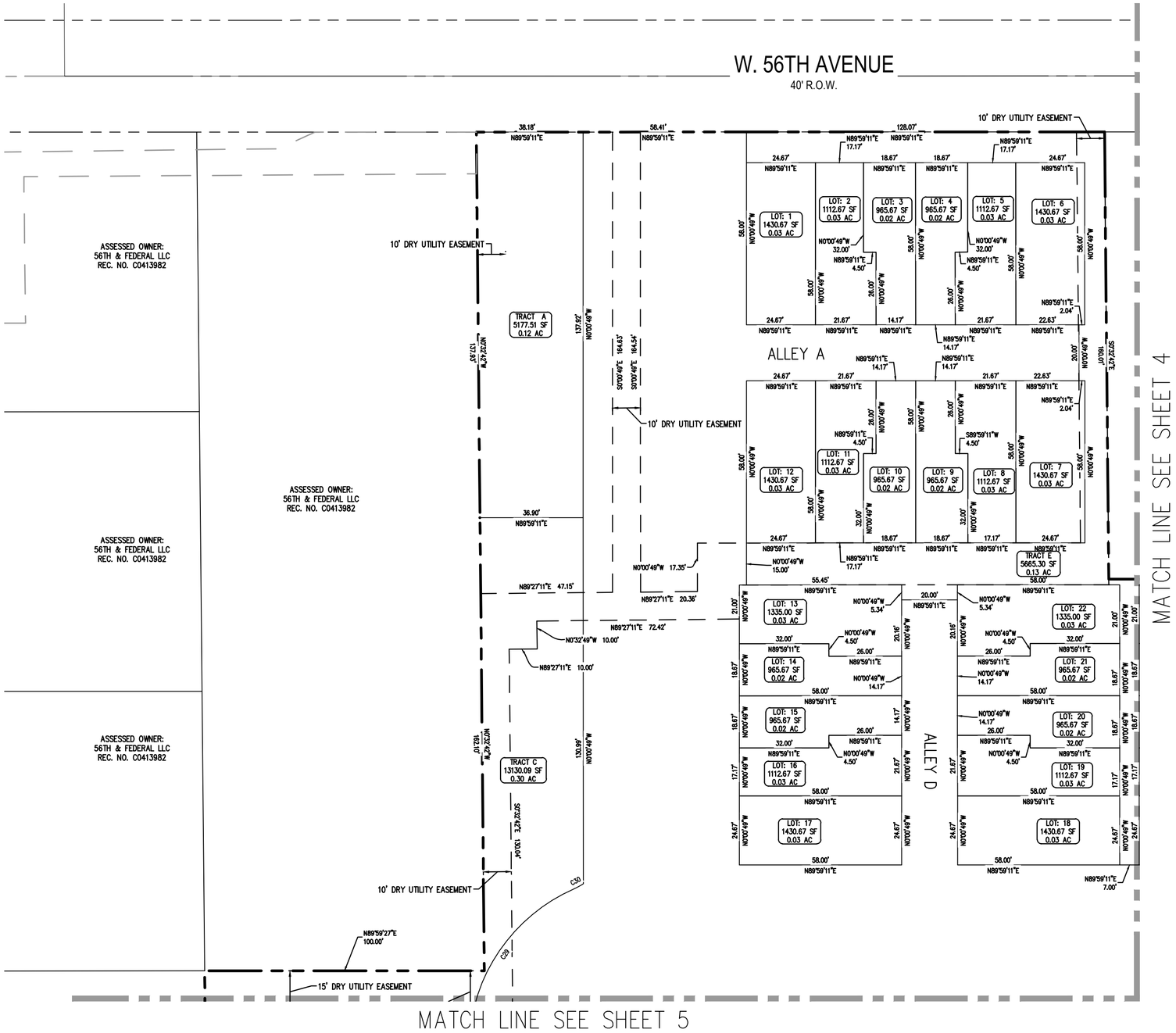
Case Number
PLT2022-00026

BERKELEY VILLAS SUBDIVISION PLAT

A RESUBDIVISION OF LOTS 4, 5, 6, 7, AND 19 OF THE WESTMOORLAND SUBDIVISION PLAT AND LOT 8A OF RE-SUBDIVISION OF WESTMOORLAND PLAT CORRECTION NUMBER 2 BEING IN THE NORTHEAST QUARTER OF SECTION 17, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH PRINCIPAL MERDIAN
COUNTY OF ADAMS, STATE OF COLORADO

FINAL PLAT

SHEET 3 OF 5



LEGEND:

PROPERTY BOUNDARY
RIGHT-OF-WAY
LOT LINE
SECTION LINE

30 0 30 60
SCALE: 1" = 30'

PROJECT #: 200810

Filepath: K:\200810\SURVEY\PLAT_200810.DWG Layout: WEST
3 XREF's: e-legal, keymap(U), p-legal
Plotted: WED 10/05/22 12:05:21P By: Aaron Murphy

REVISION DATE: 10-5-2022 ISSUE DATE: 6-7-2022 SHEET 3 OF 5

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.

Case Number
PLT2022-00026

BERKELEY VILLAS SUBDIVISION PLAT

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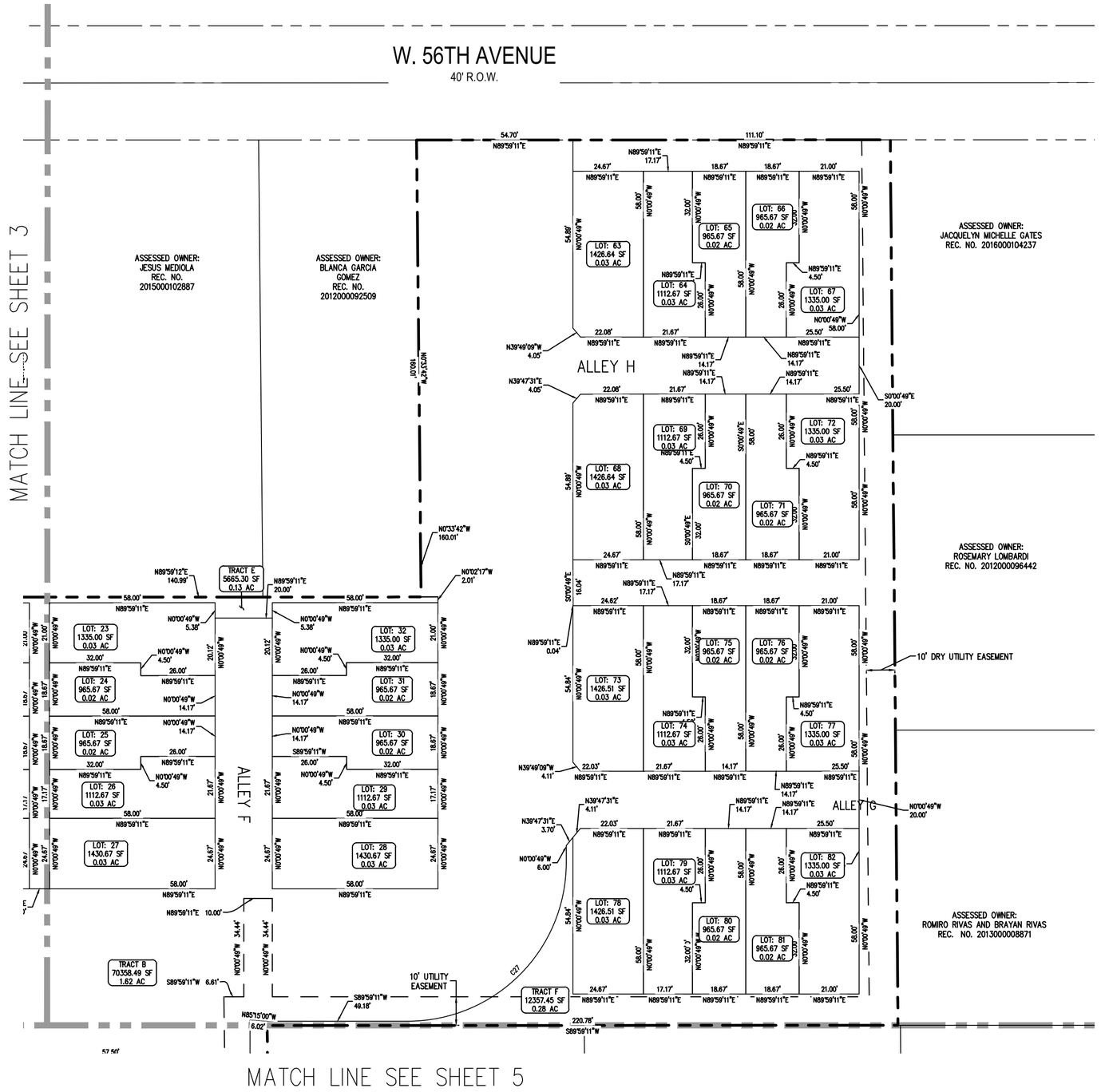
COUNTY OF ADAMS, STATE OF COLORADO

FINAL PLAT

SHEET 4 OF 5



PROJECT #: 200810

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3 XREFs: e-legal, keymap(U), p-legal
Plotted: WED 10/05/22 12:05:28P By: Aaron Murphy

REVISION DATE: 10-5-2022 ISSUE DATE: 6-7-2022 SHEET 4 OF 5

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.

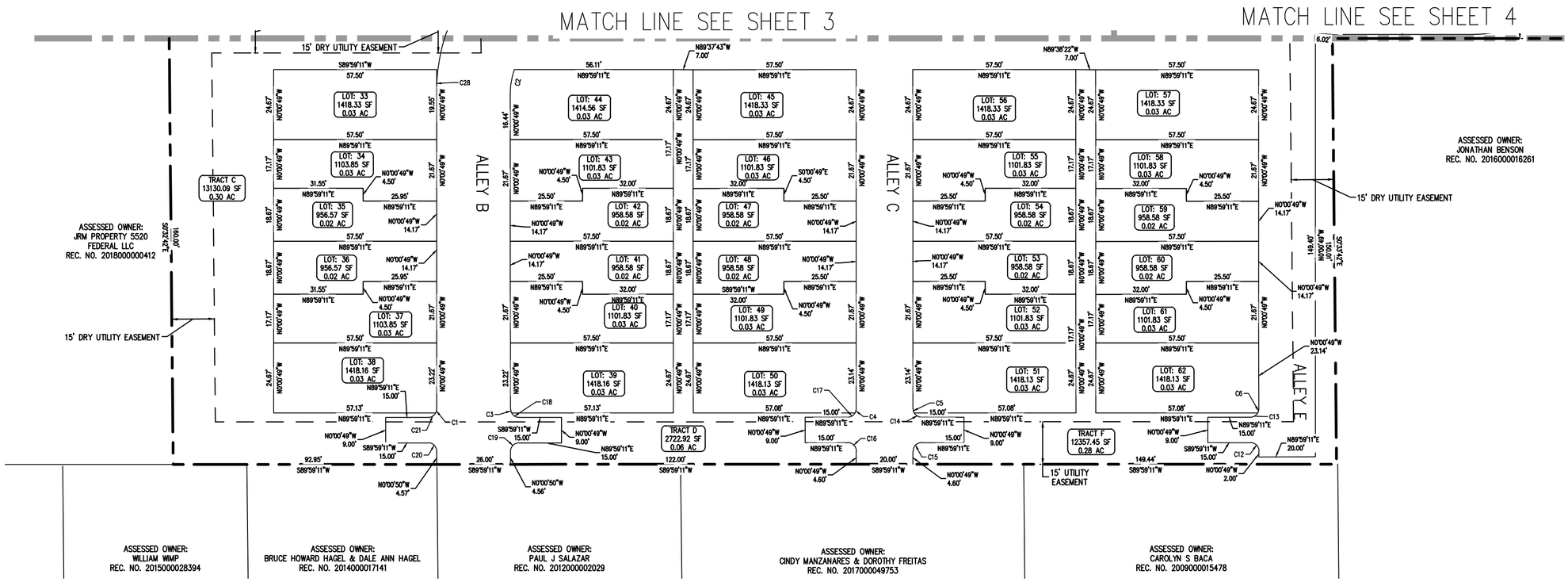
Case Number
PLT2022-00026

BERKELEY VILLAS SUBDIVISION PLAT

A RESUBDIVISION OF LOTS 4, 5, 6, 7, AND 19 OF THE WESTMOORLAND SUBDIVISION PLAT AND LOT 8A OF RE-SUBDIVISION OF WESTMOORLAND PLAT CORRECTION NUMBER 2 BEING IN THE NORTHEAST QUARTER OF SECTION 17, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH PRINCIPAL MERDIAN
COUNTY OF ADAMS, STATE OF COLORADO

FINAL PLAT

SHEET 5 OF 5



CURVE TABLE					
CURVE #	LENGTH	RADIUS	DELTA	CHORD DIRECTION	CHORD LENGTH
C1	1.51'	3.00'	28.83°	N14° 24' 01"E	1.49'
C2	8.38'	25.00'	19.21°	S9° 35' 22"W	8.34'
C3	1.51'	3.00'	28.83°	N14° 25' 40"W	1.49'
C4	1.60'	3.00'	30.55°	N15° 15' 49"E	1.58'
C5	1.60'	3.00'	30.55°	S15° 17' 27"E	1.58'
C6	1.61'	3.00'	30.70°	N15° 20' 06"E	1.59'
C12	4.71'	3.00'	89.99°	N45° 00' 25"W	4.24'
C13	3.11'	3.00'	59.30°	N60° 20' 06"E	2.97'
C14	3.11'	3.00'	59.45°	S60° 17' 27"E	2.97'
C15	4.71'	3.00'	90.00°	S44° 59' 11"W	4.24'
C16	4.71'	3.00'	89.99°	N45° 00' 25"W	4.24'
C17	3.11'	3.00'	59.45°	N60° 15' 49"E	2.97'
C18	3.20'	3.00'	61.17°	S59° 25' 40"E	3.05'
C19	4.72'	3.01'	89.88°	S44° 55' 29"W	4.25'
C20	4.71'	3.00'	90.00°	N45° 00' 49"W	4.24'
C21	3.20'	3.00'	61.17°	N59° 24' 01"E	3.05'
C27	87.18'	55.50'	90.00°	N44° 59' 15"E	78.49'
C28	0.47'	2.50'	10.69°	S7° 55' 17"W	0.47'
C29	69.92'	63.00'	63.59°	S34° 22' 13"W	66.39'
C30	3.87'	25.00'	8.86°	N61° 44' 02"E	3.86'

LEGEND:

PROPERTY BOUNDARY
RIGHT-OF-WAY
LOT LINE
SECTION LINE

30 0 30 60
SCALE: 1" = 30'

PROJECT #: 200810

REVISION DATE: 10-5-2022 ISSUE DATE: 6-7-2022 SHEET 5 OF 5

Filepath: K:\200810\SURVEY\PLAT_200810.DWG Layout: SOUTH
3 XREF's: e-legal, keymap(U), p-legal
Plotted: WED 10/05/22 12:05:35P By: Aaron Murphy

~~BLANK~~ BERKELEY VILLAS
SUBDIVISION
Case No. ~~XXX~~PLT2022-00026

SUBDIVISION IMPROVEMENTS AGREEMENT

_____THIS AGREEMENT is made and entered into this ___ day of _____, 20__, between 56th & Federal, LLC, a Colorado corporation eligible to conduct business in the State of Colorado whose address is 1350 17th St., Suite 350, Denver, CO 80202, Ryan Smith whose address is 2902 West 56th Avenue, Denver, CO 80221, Diane Graber whose address is 2860 West 56th Avenue, Denver, CO 80221, Bill Stolar whose address is 2922 West 56th Avenue, Denver, CO 80221, and Laura Lechuga whose address is 2898 West 56th Avenue, Denver, CO 80221~~, Ryan Smith whose address is 2902 West 56th Avenue, Denver, CO 80221, and _____, TTLC Management, Inc56th & Federal, LLCa _____ corporation eligible to conduct business in the State of Colorado ("Developer"), whose address is , Denver, CO~~, collectively the ("Developer"), _____ and the Board of County Commissioners of the County of Adams, State of Colorado ("County"), whose address is 4430 S. Adams County Parkway, Brighton, CO 80601.

WITNESSETH:

WHEREAS, Developer is the owner of real property in the County of Adams, State of Colorado, as described in Exhibit "A" attached hereto, and by this reference made a part hereof.

WHEREAS, it is provided by resolution of the Board of County Commissioners, County of Adams, State of Colorado, that where designated the Developer shall have entered into a written agreement with the County to install public and/or private improvements, and to deed land for public purposes or right-of-way.

NOW, THEREFORE, in consideration of the foregoing, the parties hereto promise, covenant, and agree as follows:

1. **Engineering Services**. Developer shall furnish, at its own expense, all engineering and other services in connection with the design and construction of the improvements described and detailed on Exhibit "B" attached hereto, and by this reference made a part hereof ("Improvements").

2. **Drawings and Estimates**. The Developer shall furnish drawings and cost estimates for all improvements described and detailed on Exhibit "B" for approval by the County. Upon request, the Developer shall furnish one set of reproducible "as built" drawings and a final statement of construction costs to the County.

3. **Construction**. Developer shall furnish and construct, at its own expense and in accordance with drawings and materials approved by the County, the Improvements described and detailed on Exhibit "B".

4. **Time for Completion**. Improvements shall be completed according to the terms of this agreement within "construction completion date" appearing in Exhibit "B". The Director of Community and Economic Development Department may for good cause grant extension of time for completion of any part or all of Improvements appearing on said Exhibit "B". Any extension greater than 180 days may be approved only by the Board of County Commissioners. All extensions of time shall be in written form only.

5. **Warranties of Developer.** Developer warrants that the Improvements shall be installed in good workmanlike manner and in substantial compliance with the plans and requirements of this Agreement and shall be substantially free of defects in materials and workmanship. These warranties of Developer shall remain in effect until Preliminary Acceptance of the improvements by the County.

6. **Guarantee of Compliance**. Developer shall furnish to the County a cash escrow deposit or other acceptable collateral, releasable only by the County, to guarantee compliance with this agreement. Said collateral shall be in the amount of $<~~XXXXX~~ >, including twenty percent (20%) to cover administration and five percent (5%) per year for the term of the

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Agreement to cover inflation. Upon approval of the final plat, completion of said Improvements constructed according to the terms of this Agreement, and Preliminary Acceptance by the Director of Public Works in accordance with section 5-02-05-01 of the County's Development Standards and Regulations, the collateral shall be released. Completion of said Improvements shall be determined solely by the County and a reasonable part of said collateral, up to 20%, may be retained to guarantee maintenance of public Improvements for a period of one year from the date of Preliminary Acceptance.

No building permits shall be issued: (1) until said collateral is furnished in the amount required and in a form acceptable to the Board of County Commissioners, (2) until the final plat has been approved, and (3) the Improvements described in Paragraph 7 have been completed. No certificates of occupancy shall be issued until all improvements described in Exhibit "B" have been Preliminarily Accepted by the Department of Public Works.

7. **Required Improvements Prior to Building Permit Issuance.** The following improvements shall be completed prior to the issuance of Building Permits.

   A. Sanitary Sewer. The Developer shall provide for and construct adequate lines and stubs to each lot in accordance with the County's Development Standards and Regulations.

   B. Water Mains. The Developer shall provide for and construct adequate mains and stubs to each lot in accordance with the County's Development Standards and Regulation.

   C. Utilities (including communications, electric power, gas, water, sewer). The Developer shall provide for and construct all utilities needed to serve the subdivision in accordance with the County's Development Standards and Regulations.

8. **Acceptance and Maintenance of Public Improvements**. All Improvements designated "public" on Exhibit "B" shall be public facilities and become the property of the County or other public agencies upon acceptance. During the period of one year from and after the acceptance of public improvements, the Developer shall, at its own expense, make all needed repairs or replacement due to defective materials or workmanship which, in the opinion of the County, becomes necessary.

9. **Successors and Assigns**. This agreement shall be binding upon the heirs, executors, personal representatives, successors, and assigns of the Developer, and shall be deemed a covenant running with the real property as described in Exhibit "A" attached hereto.

10. **Improvements and Dedication**. The undersigned Developer hereby agrees to provide the following Improvements and to dedicate described property.:

A. **Improvements**. [Designate separately each public and private improvement.]

Public Improvements:

(General description of construction.) Public improvements to 56th Ave include an expansion of the sidewalk, handicap ramps, curb and gutter for the proposed curb returns, and cross pans at each curb return. See Exhibit "B" for description, estimated quantities and estimated construction costs.

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The improvements shall be constructed in accordance with all County requirements, standards, and specifications in accordance with the approved plans and time schedule as indicated in Exhibit "B.".

B. **Public dedication of land for right-of-way purposes or other public purpose**. Upon approval of this agreement by the Board of County Commissioners, the Developer hereby agrees to convey by warranty deed to the County of Adams State of Colorado the following described land for right-of-way or other public purposes:

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~~(General description of right-of-way).~~

11. **Off-Site Drainage Improvements.** The Property is subject to that certain Utility Easement Agreement between Maverik, Inc. ("Maverik") and TTLC Denver-56th and Federal, LLC dated [ ] and recorded in the Adams County real property records, Reception #[ ] ("Easement"). The Easement provides that Maverik will construct a stormwater pipeline and manhole which will serve the Property and connect to the stormwater facilities within the Property. If Maverik defaults on their obligations contained within the Easement, TTLC Denver-56th and Federal, LLC has a right to self-cure and construct the stormwater pipeline and manhole necessary to serve the Property.

~~11~~12. **Default by Developer.** A default by the Developer shall exist if: (a) Developer fails to construct the Improvements in substantial compliance with the Plans and the other requirements of this Agreement; (b) Developer fails to complete construction of the Improvements by the Completion Date provided herein as the same may be extended; (c) Developer fails to cure any noncompliance specified in any written notice of noncompliance within a reasonable time after receipt of the notice of noncompliance; or (d) Developer otherwise breaches or fails to comply with any obligation of Developer under this Agreement.

A. **Remedies of County**. If the County, after written notice, determines that a default by Developer exists and if Developer fails to cure such default within the time specified by the County the County shall be entitled to: (a) make a draw on the collateral for the amount reasonably determined by the County to be necessary to cure the default in a manner consistent with the approved Plans up to the face amount of the Collateral; and (b) sue the Developer for recovery of any amount necessary to cure the default over and above the amount available in the Collateral provided.

B. **County Right to Completion of Subdivision Improvements.** The right of the County to complete or cause completion of the Improvements as herein provided shall include the following rights:

a. The County shall have the right to complete the Improvements, in substantial accordance with the plans, the estimated costs, and other requirements of this Agreement, either itself or by contract with a third party or by assignment of its rights to a successor developer who has acquired the Property by purchase, foreclosure, or otherwise.

b. The County, any contractor under the County, or any such successor developer, their agents, subcontractors and employees shall have the non-exclusive right to enter upon the streets and easements shown on the final plat of the Subdivision and upon any part of the Subdivision owned by Developer for the purpose of completing the Improvements.

C. **Use of Funds by County.** Any funds obtained by the County through Collateral, or recovered by the County from Developer by suit or otherwise, shall be used by the County to pay the costs of completion of the Improvements substantially in accordance with the Plans and the other requirements of this Agreement and to pay the reasonable costs and expenses of the County in connection with the default by Developer, including reasonable attorneys' fees.

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Name~~/~~s
Developer

By: _____
56th & Federal, LLC, Owner

The foregoing instrument was acknowledged before me this _____ day of _____, 20__, by _____.

My commission expires: _____

Address: _____
Notary Public

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By: _____
RYAN SMITH, Owner Name56TH & FEDERAL, LLC, TitleOwner NameRYAN SMITH, TitleOwner

The foregoing instrument was acknowledged before me this _____ day of _____, 20__, by _____.

My commission expires: _____

Address: _____
_____ Notary Public

By: _____

By: _____
BILL STOLAR, Owner

The foregoing instrument was acknowledged before me this _____ day of _____, 20__, by _____.

My commission expires: _____

Address: _____
_____ Notary Public

By: _____
LAURA LECHUGA, Owner

The foregoing instrument was acknowledged before me this _____ day of _____, 20__, by _____.

My commission expires: _____

Address: _____
_____ Notary Public

By: _____
DIANE GRABER, Owner

The foregoing instrument was acknowledged before me this _____ day of _____,

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20__, by _____.

My commission expires:_____

Address: _____
_____ Notary Public

The foregoing instrument was acknowledged before me this _____ day of _____, 20__, by _____.

My commission expires: _____

Address: _____
_____ Notary Public

The foregoing instrument was acknowledged before me this _____ day of _____, 20__, by _____.

My commission expires: _____

Address: _____
_____ Notary Public

The foregoing instrument was acknowledged before me this _____ day of _____, 20__, by _____.

My commission expires: _____

Address: _____
_____ Notary Public

The foregoing instrument was acknowledged before me this _____ day of _____, 20__, by _____.

My commission expires: _____

Address: _____

~~Development Agreement~~
~~Name~~
~~BLANK~~ BERKELY VILLAS
~~S~~SUBDIVISION
Case No. ~~XXX~~PLT2022-00026

~~Notary Public~~

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APPROVED BY resolution at the meeting of _____, 20__.

Collateral to guarantee compliance with this agreement and construction of public improvements shall be required in the amount of _____. No building permits shall be issued until said collateral is furnished in the amount required and in a form acceptable to the Board of County Commissioners.

ATTEST:

BOARD OF COUNTY COMMISSIONERS
ADAMS COUNTY, COLORADO

_____
Clerk of the Board

_____
Chair

Approved as to form

_____
County Attorney

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EXHIBIT A

Legal Description: ~~BLANK~~ BERKELY VILLAS SUBDIVISION

~~Development Agreement Name~~

~~BLANK~~ BERKELY VILLAS

~~S~~SUBDIVISION

Case No. ~~XXX~~PLT2022-00026

EXHIBIT B

Public Improvements: ~~Street Name~~56th Ave.~~/s~~

Description	Est. Quantity	Est. Unit Cost	Est. Construct. Cost

[Insert cost estimate from HKS]

Construction Completion Date:

Initials or signature of Developer:_____

_____

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