



December 22, 2017

Brenden Paradies, Planner I
City of Aurora
Planning and Development Services
15151 E. Alameda Parkway, Suite 2300
Aurora, CO 80012

RE: 096648000 – E-470 Storage – Initial Submission Framework Development Plan, Site Plan and Plat Review
Application #: DA-2115-00
Case Numbers: 2017-6054-00; 2017-7005-00; 2017-3054-00

Dear Mr. Paradies:

Thank you for the comments on November 28, 2017 for the above-mentioned project. In an effort to address your comments concisely and simplify your review of the utility plans, we have summarized your comments and our responses below.

COMMENT RESPONSE LETTER

PLANNING DEPARTMENT COMMENTS

(Brenden Paradies bparadie@auroragov.org 303-739-7266 PDF comment color is teal)

1. Community Questions Comments and Concerns
 - A. Referrals were sent to two abutting property owners as well as outside referral agencies. Please see comments at the end of this letter from E-470 Highway Authority, Colorado Department of Transportation, and Arapahoe County.
 - Response: *Acknowledged*
2. Completeness and Clarity of the Application
 - A. Refer to the FDP Manual for all required components, for each FDP Tab.
 - Response: *Acknowledged*
 - B. Include number of parking spaces on Cover Sheet in the Data Block.
 - Response: *Acknowledged*
 - C. Circulation Plan Tabulation Calculations were not included with the digital upload, only in the binder. Please upload with the Circulation Plan in Tab #9 with next online submittal. Include any park dedication calculations in the table with next submittal.
 - Response: *Acknowledged*
 - D. Include Form G in Tab 13 for the FDP with next submittal. See below for details of what is required for Form G in the FDP.
 - Response: *Acknowledged*
3. Zoning and Land Use Comments

- A. Label Self-Storage as “Future Phase”.
 - Response: *Acknowledged*
 - B. Proposed fencing is 9 ft. in the Site Plan legend but shows 6 ft. on rendering of the fence and in the descriptions in the FDP. Please clarify.
 - Response: *Acknowledged*
- 4. Traffic and Pedestrian Issues
 - A. Show circulation around the site with black arrows.
 - Response: *Acknowledged*
 - B. As stated in the FDP Narrative, “Sidewalk and curb improvements are being deferred until the development of the future self-storage property”, please confirm in the next submittal if Public Works will approve this request. Reach out to Public Works-Engineering directly, their contact information is provided to you later in this letter. This will need to be addressed in the public improvement plan.
 - Response: *Acknowledged; called to discuss with City staff and they said they'd need to talk with “senior staff” at the weekly meeting on Tuesday, 12/26. After specifying we needed it sooner due to our anticipated submittal date they said they would try to let us know sooner, but we never received a responses. This confirmation to be part of next submittal.*
 - C. Have you coordinated at all with E-470 about this project? Please include in the FDP Narrative #13.
 - Response: *Yes; the plans were sent to them as a referral and they provided comments. A summary of the correspondence has been added the #13 in the FDP Narrative (Tab #6).*
- 5. Landscape Design Issues
(Chad Giron cgiron@auroragov.org 303-739-7185 PDF comments in teal)
 - A. Refer to these comments that are on the Site Plan.
Sheet 9
 - Add a Key Map.
 - Response: *The key map has been added to the plans*
 - Add a legend.
 - Response: *Acknowledged*
 - Spread out the required detention pond landscaping.
 - Response: *Acknowledged*
 - Label detention pond and maximum depth.
 - Response: *Acknowledged*
 - Add labels for streets, easements, fencing, edging, contours, signs, adjacent property, etc.
 - Response: *Acknowledged*
 - Include more shrub diversity within the buffer landscaping.
 - Response: *Several species have been added, see updated plans.*
 - Relocate the proposed fencing so that the required buffer landscaping is on the outside of the fence per code.
 - Response: *Fence has been relocated.*

- Add label and dimension multi-use easement.
 - Response: *Acknowledged*
- Add label and dimension all landscape buffers.
 - Response: *Acknowledged*

Sheet 10

- Please do not propose to plant any shrubs directly under evergreen trees. TYP.
 - Response: *Acknowledged*
- Per code, at least 50% of the required trees within the Special Buffer shall be evergreen species.
 - Response: *More Evergreens have been added.*
- Add label and dimension multi-use easement.
 - Response: *Acknowledged*
- Show the continuation of the property line.
 - Response: *Acknowledged*
- Fix the sheet errors.
 - Response: *Acknowledged*

Sheet 11

- Remove the text under the Landscape Calculations where shown.
 - Response: *See revised calculations table.*
- Recalculate the detention pond area.
 - Response: *Pond area has been recalculated.*
- Remove or update the language used in Note 2.
 - Response: *Acknowledged*

6. Signage Issues

- A. Per Section 146-1609, proposed signage must be setback 4' from back of sidewalk or 21' from flow line and cannot be placed within the 30 foot site triangle. Please label the setback of the monument sign to confirm compliance.
 - Response: *Acknowledged; dimensions have been added to the plan to show setback distances.*

7. Addressing

(Cathryn Day cday@auroragov.org 303-739-7357)

- A. Require a preliminary digital .SHP or .DWG file for street naming, addressing and GIS mapping purposes. Include the following layers as a minimum:
 - Parcels
 - Street lines
 - Building footprints (If available)
 - Response: *Acknowledged; this has been included in the submittal.*

Please ensure that the digital file provided in a NAD 83 feet, State plane, Central Colorado projection so it will display correctly within our GIS system. Please eliminate any line work outside of the target area. Please e-mail these files to me.

Here is additional information regarding the City of Aurora's CAD submission requirements: The city has developed CAD Data Submittal Standards for internal and external use to streamline the process of importing AutoCAD information into the city's Enterprise GIS. **Please note that a digital submission meeting the CAD Data Submittal Standards is required before your final site plan mylars can be routed for signatures or recorded.** Please review the CAD Data Submittal Standards and email your Case Manager the .DWG file before submitting your final site plan mylars. Once received, the city's AutoCAD Operator will run an audit report and your Case Manager will let you know within 2-3 days whether the .DWG file meets or does not meet the city's CAD Data Submittal Standards.

REFERRAL COMMENTS FROM OTHER DEPARTMENTS

- Numerous Engineering edits requested-Civil Engineering
- Contact Real Property directly for comments-Real Property
- Site Plan edits requested-Life Safety
- Comply with PROS Provisions for Eagle Protection Act and access to PCC- PROS
- Site Plan labeling edits required for water extension lines and meter pits-Water
- Contact Traffic directly for comments related to the TIS and Site Plan- Traffic

8. Civil Engineering

(Kristin Tanabe ktanabe@auroragov.org 303-739-7306 PDF comment color is green for redlines.)

- A. See comment redlines on the Site Plan in regards to standard site plan notes that are needed, labeling the minimum 24' pavement width to connect with existing Rome Way, labeling existing drainage easements and facilities, adding contour labels, labeling proposed street lights, showing grading for all proposed roadway construction, and referring to COA standard details for labeling local roadway sections.
■ Response: *Acknowledged; plan updated.*
- B. See redline comments on the Plat in regards to including the line and curve data for ROW.
■ Response: *Acknowledged*
- C. See redline comments on the Public Improvements Plan in regards to the full section of Rome Way being required for this development, providing a narrative for the PIP, including typical sections for Rome Way, and referring to the FDP Manual for all the requirements for the Public Improvement Plan.
■ Response: *Acknowledged*
- D. Contact Kristin Tanabe directly for receiving comments related to the Drainage Report.
■ Response: *Acknowledged*

9. Parks and Open Space

(Doug Hintzman dhintzma@auroragov.org 303-739-7147 PDF comment color is green for redlines)

- A. The applicant shall provide project narrative addressing the following items. Include construction and operations schedule as needed to address The Bald Eagle and Golden Eagle Protection Act.

i. Plains Conservation Center

The subject property is located immediately adjacent to the Plains Conservation Center, a City of Aurora, Parks, Recreation and Open Space Department natural area. No encroachment shall be allowed on PCC property. No construction access shall be permitted on PCC.

■ Response: *Acknowledged*

ii. PROS Access to PCC

The Open Space and Natural Resources Division of the Parks, Recreation and Open Space Department currently maintains a gated access across S Rome Way for management purposes for the Plains Conservation Center. With new development at the southern end of S Rome Way, PROS-OSNR will relocate the gate along the south western end of S Rome Way. The gated access into PCC will be required by OSNR.

■ Response: *Acknowledged*

iii. The Bald Eagle and Golden Eagle Protection Act

The subject application is located within ½ mile of an active bald eagle nest along the stream corridor within the Plains Conservation Center. Follow all provisions of the act and permitting regulations as applicable to allow for no interference or impact to the eagle population's health and welfare.

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb."

"Disturb" means: "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment.

A violation of the Act can result in a fine of \$100,000 (\$200,000 for organizations), imprisonment for one year, or both, for a first offense. Penalties increase substantially for additional offenses, and a second violation of this Act is a felony.

- Response: *Acknowledged*

10. 10. Life Safety

Reviewed by: John Van Essen / jvanesse@auroragov.org 303-739-7489/ PDF comment color is blue.

A. FDP Tab 3

Sheet 1

- i. If required, a 1.75 acre land dedication for future fire station will be determined by next review.

- Response: *Acknowledged*

B. FDP Tab 8

Sheet 1

- i. This plan does not reflect future access points from adjacent roads or where the railroad easement will be crossed to provide two points of access to the proposed light industrial site.

- Response: *Discussed this comment with John on 12/13/17 and he said to ignore as this comment appears to be for a different project. We have shown the appropriate access points as coordinated with Mike Dean on 11/16/17.*

- ii. Please revise note #8 to read as: THE DEVELOPER IS RESPONSIBLE FOR CONSTRUCTION OF ALL ON-SITE AND OFF-SITE INFRASTRUCTURE NEEDED TO ESTABLISH TWO POINTS OF EMERGENCY ACCESS TO THE OVERALL SITE AND EACH INTERNAL PHASE OF CONSTRUCTION. THIS REQUIREMENT INCLUDES, BUT IS NOT LIMITED TO, THE CONSTRUCTION OF ANY EMERGENCY CROSSINGS IMPROVEMENTS, LOOPED WATER SUPPLY AND FIRE HYDRANTS AS REQUIRED BY THE ADOPTED FIRE CODE AND CITY ORDINANCES.

- Response: *Acknowledged*

- iii. ADD THE FOLLOWING NOTE:
IN AN EFFORT TO PROVIDE FOR CITY-WIDE EMERGENCY FIRE AND MEDICAL RESPONSE AS WELL AS EMERGENCY NOTIFICATION WITHIN PROPOSED DEVELOPMENTS; THE FOLLOWING ITEMS MAY BE REQUIRED AT THE SUBMITTAL OF THE FRAMEWORK DEVELOPMENT PLAN, SUBMITTAL OF A SITE PLAN, WITH A SIGNIFICANT SITE PLAN AMENDMENT OR WITH SITE PLAN RENEWAL. THESE REQUIREMENTS ARE INTENDED TO ALLOW FOR ALL INDIVIDUALS AND BUSINESSES LOCATED WITHIN THE CITY OF AURORA TIMELY EMERGENCY RESPONSE AND EMERGENCY NOTIFICATION IN A MANNER THAT STRIVES TO DISTRIBUTE SERVICES IN A COST EFFECTIVE MANNER EQUALLY THROUGHOUT THE COMMUNITY. ONE TEMPORARY FIRE STATION MAY BE REQUIRED.
ONE PERMANENT FIRE STATION SITE MAY BE REQUIRED. WHELAN WARNING SYSTEM SITES.
CRITERIA FOR REQUIRING TEMPORARY FIRE STATIONS IN DEVELOPMENTS AND/OR ANNEXED AREAS. THE CITY OF AURORA

FIRE DEPARTMENT MAY REQUIRE THAT A TEMPORARY FIRE STATION BE PROVIDED BY THE DEVELOPER AND/OR ANNEXING PARTY WHEN THE FOLLOWING CRITERIA ARE MET:
THE NUMBER OF FAMILY LIVING UNITS EXCEEDS 100 AND/OR THE AMOUNT OF COMMERCIAL/INDUSTRIAL SQUARE FOOTAGE EXCEEDS 2 MILLION SQUARE FEET IN TOTALITY FOR EITHER THE DEVELOPMENT OR THE DESIRED AVERAGE FIRE RESPONSE AREA (PROJECTED CIRCULAR RESPONSE AREA CONTAINING 7.07 SQ MILES AROUND THE GEOGRAPHIC CENTER OF THE DEVELOPMENT IN QUESTION).

(OR)

THE NUMBER OF ALARMS IN THE FIRST DUE AREA, FOR THE PROJECTED FIRE STATION, EXCEEDS 100 PER YEAR.

(AND)

THE TRAVEL TIME TO THE APPROXIMATE GEOGRAPHIC CENTER OF THE DEVELOPMENT AND/OR ANNEXATION FOR THE CLOSEST EXISTING ENGINE COMPANY WILL EXCEED 5 MINUTES AS DETERMINED THROUGH SOFTWARE MODELING OR THROUGH EVALUATION OF THE ACTUAL DRIVE TIME.

SHOULD A TEMPORARY FIRE STATION BE REQUIRED, CONTACT THE CITY OF AURORA FOR CURRENT REQUIREMENTS.

CRITERIA FOR CONSTRUCTION AND STAFFING OF A PERMANENT FIRE STATION

THE CITY OF AURORA WILL STRIVE TO BEGIN CONSTRUCTION OF A PERMANENT FIRE STATION AND PROVIDE ADEQUATE STAFFING LEVELS WHEN:

THE NUMBER OF TOTAL RESPONSES IN THE FIRST DUE AREA, FOR THE PROJECTED FIRE STATION, EXCEEDS AN ANNUAL RATE OF 400 PER YEAR.

(OR)

THE NUMBER OF SINGLE FAMILY LIVING UNITS EXCEEDS 500 OR THE AMOUNT OF COMMERCIAL/INDUSTRIAL SQUARE FOOTAGE EXCEEDS 4 MILLION SQUARE FEET IN TOTALITY FOR EITHER THE DEVELOPMENT OR THE PROJECTED AVERAGE FIRE RESPONSE AREA (PROJECTED CIRCULAR RESPONSE AREA CONTAINING 7.07 SQ MILES AROUND DEVELOPMENT IN QUESTION).

(AND)

THE DEVELOPMENT IS SUCH THAT PROVIDING FIRE SERVICE TO ANY PORTION OF THE PROPOSED DEVELOPMENT FROM ANY TEMPORARY OR PERMANENT FIRE STATION ADJACENT TO THE DEVELOPMENT MIGHT CAUSE OR CONTRIBUTE TO A NEGATIVE IMPACT IN THE CURRENT PUBLIC CLASSIFICATION OF THE CITY OF AURORA AS IDENTIFIED BY THE INSURANCE SERVICES OFFICE.

III. WHELAN WARNING SYSTEM REQUIREMENTS

BESIDES THE OBVIOUS NEED TO PROVIDE EMERGENCY SIREN WARNINGS TO RESIDENTIAL AREAS WITHIN THE CITY, OUTDOOR RECREATION AREAS SUCH AS SPORTS FIELDS AND GOLF COURSES, ETC. ARE IMPORTANT AREAS TO COVER WITH OUTDOOR WARNING SYSTEMS. MANY OF OUR SIRENS ARE PLACED ON SCHOOL GROUNDS BECAUSE OF THEIR LOCATION AND POPULATION. THE

NUMBER AND PLACEMENT OF ELEMENTARY SCHOOLS IN NEWLY DEVELOPED AREAS CAN ROUGHLY GAUGE POPULATION DENSITY. IT IS REASONABLE TO ASSUME THAT SOME FUTURE SITED COULD BE ON PUBLIC PROPERTY, SUCH AS FIRE STATIONS, LIBRARIES, GOLF COURSES AND OTHER CITY PROPERTY SO LONG AS THE SITE DELIVERS OPTIMUM COVERAGE AND HAS ADEQUATE ACCESS FOR INSTALLATION AND SERVICE.

SITE SELECTION CAN BE DETERMINED BY SEVERAL DIFFERENT METHODS. IN THE PAST, THE POPULATION DENSITY OF THE CORE OF AURORA DICTATED SITE SELECTION TO INSURE OVERLAPPING OR EDGE TO EDGE COVERAGE. NEW DEVELOPMENTS AND FUTURE ANNEXATIONS INTO THE CITY REQUIRES A DIFFERENT METHOD OF DETERMINING SIREN SITES DUE TO OVERLAPPING COVERAGE, OPEN SPACES BETWEEN DEVELOPING AREAS, RECREATIONAL SITES AND POPULATION DENSITIES.

THE FEMA REQUIREMENT FOR THE OUTDOOR EMERGENCY WARNING SYSTEM IS A 60-70 FOOT MONOPOLE TOWER USING AN ALERT SIREN. THE CITY USES THE WHELAN SIREN SYSTEM AND THE LAND REQUIREMENT FOR THE TOWER IS A 10' X 10' EASEMENT. EACH SIREN COVERS APPROXIMATELY 3,000 RADIAL FEET AT 70 DB AND IS TYPICALLY SPACED ONE SIREN PER SQUARE MILE. SOUND PROPAGATION FROM THE WPS-2900 SERIES OMNI-DIRECTIONAL SIREN IS 70 DB AT 3000 FEET WITH THE STANDARD 50 FOOT TOWER (THIS HEIGHT IS AN OSHA REQUIREMENT). THIS DOES NOT TAKE INTO ACCOUNT TOPOGRAPHY OR OBSTRUCTIONS SUCH AS BUILDINGS. SOME OVERLAP, OR AT LEAST EDGE TO EDGE COVERAGE, IS DESIRABLE, RESULTING IN NEW SIRENS BEING PLACED 6000 FEET OR APPROXIMATELY 1.14 MILES APART ON FLAT GROUND.

IN NEWLY ANNEXED/DEVELOPING AREAS OF THE CITY, SIRENS SHOULD BE SITED ON EVERY ½ SECTION OF GROUND (320 ACRES) OR 6000 FEET APART TO PROVIDE EDGE TO EDGE COVERAGE. THE EXACT PLACEMENT OF SIRENS WILL BE DETERMINED BY THE CITY OF AURORA'S OFFICE OF EMERGENCY MANAGEMENT TO INSURE THAT COORDINATED COVERAGE IS PROVIDED ON A SYSTEM WIDE BASIS.

■ Response: *Acknowledged*

Sheet 2

- i. Add bullet: Location of all Public Facilities, such as; fire stations, police station and substations, schools and etc. Please work with your Planning Case Manager to properly identify these areas.

■ Response: *Acknowledged; coordinated with Brenden and confirmed that this is not applicable to this project site.*

Site Plan Comments

- i. Life Safety cannot review the CSP or Plat until the FDP has been reviewed
 - Response: *Acknowledged*

ii. Plat Plan Comments

- Response: *Acknowledged*

iii. Life Safety cannot review the CSP or Plat until the FDP has been reviewed.

- Response: *Acknowledged*

11. Real Property

(Darren Akrie dakrie@auroragov.org 303-326-7331 and Maurice Brooks mbrooks@auroragov.org 303-739-7294)

- A. Contact Real Property directly for redline comments for the Plat, Title, Monument Records, Closure Sheet, and Site Plan.

- Response: *Acknowledged*

12. Traffic Engineering

(Victor Rachael vrachael@auroragov.org 303-739-7309 PDF comment color is gold for redlines)

- A. No comments submitted at this time. Please contact Victor directly for comments on the Traffic Impact Study and Site Plan.

- Response: *Acknowledged*

13. Revenue

(Diana Porter dsporter@auroragov.org 303-739-7395)

- A. Due at time of Plat:

| | | |
|-----------------------------------|---------------------------------|--------------------|
| Sewer Interceptor Development Fee | 14.475/acres x \$ 500.00/acre | = \$7,237.50 |
| Storm Drain Development Fee | 14.475/acres x \$ 2,903.00/acre | = \$42,020.92 |
| Total Due | | \$49,258.42 |

- Response: *Acknowledged*

14. Aurora Water

(Steven Dekoski sdekoski@auroragov.org 303-739- 7490)

- A. See redline comments on the Site Plan in regards to a 10 ft. pocket easement required for hydrants and water meters, the water main requires a 16 ft. utility easement, showing the proposed RV dump station, and providing estimates of sewage to be dumped at this location as part of your water and sanitary connection fees.

- Response: *Acknowledged*

15. E-470 Public Highway Authority

(Peggy Davenport pdavenport@E-470.com 303-537-3727)

- A. Occupying space for utility work, access, and any construction within the E-470 MUE and property owned in fee is subject to and will be in compliance with the E-470 Public Highway Authority Permit Manual, April 2008, as may be amended from time to time (the "Permit Manual") and will require an E-470 Construction or Access Permit. The administration fee is \$750.00, \$7,500 per acre for grading, and \$75,000 per acre for construction.

- Response: *Acknowledged*

- B. Coordinate with the City of Aurora for determining location of regional trail.

- Response: *Acknowledged*

- C. Developer may consider upsizing utilities for potential commercial development on west E-470 toll plaza.
 - Response: *Acknowledged; utilities will be installed per sizes shown on plans.*
- D. Incorporate emergency overflow near outlet structure into the E-470 MUE.
 - Response: *Acknowledged*
- E. The outlet pipe from the detention pond may need to be shortened and require channelization to account for future road widening.15F. Please submit cross sections every 100 feet along the multi-use easement to determine grading impacts.15G. Provide an existing and proposed drainage basin map to clarify there will be no impacts to offsite drainage. Clearly indicated the limits of the offsite basins.
 - Response: *Acknowledged; outlet pipe and grading adjusted per discussions with Chuck Weiss. Drainage maps and cross sections provided by separate email correspondence.*
- F. Additional comments will be provided when construction documents are submitted.
 - Response: *Acknowledged*

16. Colorado Department of Transportation
(Steve Loeffler steven.loeffler@state.co.us 303-757-9891)

- A. We have reviewed this referral and have no objections to the 470 Storage development.
 - Response: *Acknowledged*

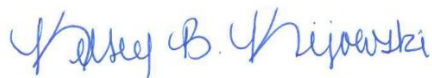
17. Arapahoe County
(Julio Iturreria jiturreria@araphoegov.com)

- A. Arapahoe County Planning has no comment on this proposal.
 - Response: *Acknowledged*

With Kimley-Horn, you should expect more and will experience better. Please contact me at (303) 228-2332 or kelsey.kijowski@kimley-horn.com should you have any questions.

Sincerely,

KIMLEY-HORN AND ASSOCIATES, INC.



Kelsey Kijowski, P.E.
Project Manager



Tuesday – December 19, 2017

Sent Via: ☐ 1st Class ☐ FedEx
☐ Courier ☐ Hand Deliver

☒ OTHER
☐ Email to:

☐ Facsimile to:



CITY OF AURORA
Planning Department
15151 E. Alameda Parkway, Suite 2300
Aurora, CO **80012-1555**

Attention: Mr Brenden Paradies
Planner I

Recipient's Phone: (303) 739-7266

Re: 1st Review Comment Response & 2nd Submittal

E-470 STORAGE

Rome Way south of East Jewell Avenue
Aurora, Colorado

ESC JN: **1207.1**

COA Case #: **2017-6054-00; 2017-7005-00;**
2017-3054-00

Greetings Mr Paradies:

Thank you for forwarding your Team's First Replat Submittal Review Comments dated November 28, 2017. Our team has reviewed the comments and worked to revise the plat to accommodate the comments, suggestions, and recommendations provided.

This letter shall serve our 2nd Submittal Cover Letter and point-by-point Response Letter to your November 28nd Staff Review Summary letter (your team's comments are provided in black, serif font; our responses are provided in blue, serif font proceeded with "**RESPONSE:**" for ease of review).

PLANNING DEPARTMENT COMMENTS

8. Civil Engineering

8B. Include line and curve data for the ROW on the plat.

RESPONSE: Minimal dimensions are shown on the plat for reference only as the ROW will not be dedicated per plat. The ROW dedication will be done by a separate application as it is outside the plat boundary.

A. Real Property redlines

Cover Sheet

Send in the Certificate of Taxes Due for the new proposed ROW dedication.

RESPONSE: Acknowledged, please note that the ROW will be dedicated by a separate document and not on the subdivision plat.

Extend S. Rome Way and update the site location in the Vicinity Map.

RESPONSE: Acknowledged, the Vicinity Map was revised to reflect S. Rome Way in it's entirety and the correct location of the site.

Update the title work within 120 calendar days of the plat approval.

RESPONSE: Acknowledged, updated title work will be obtained prior to the plat approval/recording.

Plat Sheet

Is this the end of the ROW?

RESPONSE: No, the ROW dedication will extend to the north line of this subdivision.

Make ROW line continuous/solid.

RESPONSE: Acknowledged, all existing ROW lines was updated to reflect a solid linetype.

Send in the Certificate of Taxes Due for the new proposed ROW dedication.

RESPONSE: Acknowledged, please note that the ROW will be dedicated by a separate document and not on the subdivision plat.

14190 East Evans Avenue

Aurora, Colorado 80014-1431

P 303.337.1393 | F 303.337.7481 | T/F 1.877.273.0659
engineering-service-co.com



A. Real Property redlines (continued)

Plat Sheet

What is this line?

RESPONSE: It is the north line of the parcel of land that we are platting a portion of. Currently owned by the owner listed on the Cover Sheet of the plat.

Send Monument Record for the Center ¼ Corner of Section 25.

RESPONSE: Monument Record will be issued.

Add 10' Utility Easement around perimeter of the Lot.

RESPONSE: This easement is not being shown as requested by the civil engineer. I believe they will contact Xcel Energy to coordinate where easements will be needed.

B. City Surveyor redlines

Cover Sheet

Description not the same as title commitment.

RESPONSE: This was brought to Real Property's attention during the Plat Pre-Submittal. The direction given to us was that as long as the plat boundary was entirely within the property described in the title commitment then it was acceptable.

Input date (in Surveyor's Certification)

RESPONSE: This date will be entered once the plat monuments are set in the field.

Sign and Date (Surveyor's Seal)

RESPONSE: Cannot sign and date the plat until it is approved and going in for recordation.

Correct the title commitment number in Note 1.

RESPONSE: Acknowledged.

Plat Sheet

Typically, there should be a 10' Utility Easement around perimeter of the Lot.

RESPONSE: This easement is not being shown as requested by the civil engineer. I believe they will contact Xcel Energy to coordinate where easements will be needed.

Why do the easements not connect to the property line?

RESPONSE: The easements in question are pocket 10' Utility Easements for proposed fire hydrants and not intended for future water main expansion.

Sign and Date (Surveyor's Seal)

RESPONSE: Cannot sign and date the plat until it is approved and going in for recordation.

We trust you and your team will find the revised documents and the responses provided above acceptable and look forward to receiving your approval. If, during your review, you have questions or wish to discuss the information provided above in greater detail, please feel free to contact me (my email, and office phone contact information is provided below). Thanks – and have a **FANTASTIC** day!!

Sincerely,

ENGINEERING SERVICE COMPANY

A handwritten signature in blue ink, appearing to read "John D. Perry", is written over the company name.

John D. Perry

Sr. Engineering Technician | CAD Manager (Notary Public: Colorado)
Phone: 303.337.1393, x-103 | Fax: 303.337.7481
Email: jperry@engineeringserviceco.com

Updated

~~470 Storage~~

A parcel of land being a part of the South 1/2 of Section 25,
Township 4 South, Range 66 West of the Sixth Principal Meridian,
City of Aurora, County of Arapahoe, State of Colorado

PRELIMINARY DRAINAGE REPORT

Project:
470 Storage
Aurora, Colorado

Client:
DB Endeavors
25072 East Davies Drive
Aurora, Colorado 80016
Stephanie Beguin
(720) 244-5976

Prepared By:
Kimley-Horn and Associates, Inc.
4582 South Ulster Street, Suite 1500
Denver, CO 80237
Randall Phelps, P.E.
(303) 228-2300

October 27, 2017

| | |
|---|------|
| APPROVED FOR ONE YEAR FROM THIS DATE | |
| | |
| City Engineer | Date |
| Water Department | Date |

No buildings are shown on plan. Please confirm in text whether any are to be included.

Proposed Development

Sentence included denoting that no buildings are proposed as part of the RV Storage site

The proposed development (the project) is to consist of +/- 14.4-acres of RV Storage, with +/- 12.9-acres of future RV Storage expansion to the south and +/- 7.0-acres of future self-storage to the north. A 26-foot wide fire lane is proposed around the inside perimeter of the project site connecting to South Rome Way.

An NRCS soil study for the project area was obtained in order to determine the soil characteristics of the site. The results of this study show that the soils are silty loam in nature and 100 percent of the site is Soil Type C. The NRCS study is provided in Appendix A.

The development of this project results in an overall imperviousness of 76% percent for the site.

No variances are being requested at this time.

HISTORIC DRAINAGE

Overall Sub-Basin Description

There is a UDFCD FHAD document which City would regulate to: *Toll Gate Creek and East Toll Gate Creek (Downstream of Hampden, Major Drainageway Plan, May 2014, J3 Engineering Consultants*. There is also a FEMA map panel (08005C0211L) in "preliminary" status showing floodplain boundaries presumably based on FHAD. Please confirm, reference and include a copy of the FHAD floodplain mapping.

The Site is not part of any Master Drainage Report. Toll Gate Creek major drainageway plan has been added to appendix D

The site is located within FEMA Food Insurance Rate Map (FIRM) Number 08001C0950H, dated March 5, 2007. This project site is located in Zone X which is outside the 500-year floodplain. This map is not available to print on the FEMA website.

Existing Drainage Patterns

The project site is currently undeveloped and generally sheet flows from the southwest

No berm is evident on the drainage plan along the west side? Do you mean east? Please show the location of the 8' exis box. Is this a different E-470 culvert than the 54" described later in the text as the pond outfall? City has no mapping showing these crossings and only one is clearly visible in Google Earth. Please clarify.

Paragraph revised. We will be adding a swale in the future along the west side of S. Rome Way to direct flow to the 8' box culvert

The Site and area around the Site generally drain from west to east. A landscape berm is located along the west that will allow offsite flow to be captured by an 8' existing box culvert located south of the existing self-storage facility. These flows are captured by a drainage channel that continues northeast. The existing box culvert and drainage channel will not be affected by this development.

Outfalls Downstream from

Please label on a map the existing crossing you are referring to.

Existing culvert labeled on drainage map

Site drainage currently sheet flows to the east and northeast of the property and into an existing inlet structure that connects to an outlet structure on the east side of the E-470. Flows are prevented from discharging across the E-470 by an existing berm located along the east property boundary.

Unclear what is meant by this? There appears to be a swale adjacent to E-470 which conveys flows from your site to an existing culvert crossing north of your site?

Language has been updated for clarification.

DESIGN CRITERIA

The “City of Aurora Storm Drainage Design and Technical Criteria,” revised October 2010 (The “Criteria”), and the “Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual” Volumes 1, 2, and 3 (The “Manual”), with latest revisions, were used when preparing the storm calculations.

Hydrologic Criteria

The 2-year and 100-year design storm events will be used in determining rainfall and runoff for the proposed site. Chapter 5 of the Criteria Manual was used to determine rainfall data for the storm events. Table 1 of the City of Aurora Storm Drainage Design and Technical Criteria was utilized to obtain the runoff coefficients and percent impervious for commercial development. The Manual, adopted by the City of Aurora, was used to calculate runoff using the Rational Method for sub-basins less than 160 acres in size. Figures RA-1 through RA-6, of the Manual, were used to determine the P1 values for the intensity values used. One hour rainfall depths used for the calculations at the site are 0.97 inches and 2.63 inches for the 2-year and 100-year events, respectively. All water quality and detention will be sized using the full-spectrum detention method as described in Chapter 12 of the UDFCD Criteria Manual, Volume 2.

The 54" RCP w/headwall has been called out on the Drainage Map in the Appendix.

Please show this culvert on a map. City has no mapping which shows this 54" or the 8' culvert referred to earlier in text and there is only one crossing apparent in Google Earth Mapping.

Hydraulic Criteria

The project will construct a private internal storm sewer network, including capture runoff. All inlets will be sized using UD Inlet to intercept the 100-year event. All pipes will be sized to convey the 100-year event using StormCAD for design. All calculations will be performed with the Final Drainage report.

DRAINAGE PLAN

Proposed Drainage Concept

required to be per COA Criteria, not historic which may differ.

Language updated

Stormwater generated by the project will sheet flow to the proposed drainage pans and will be captured and conveyed to a proposed detention pond by an underground storm sewer system. The proposed detention pond will release flows to an existing 54" RCP located northeast of the site at historic flow rates. The property owner will be responsible for maintenance of the on-site detention system.

Approximately 7.93 acres of runoff from the adjacent land to the north will also be captured and detained by the detention pond.

language revised to reflect offsite flows as well as onsite

Pond must be sized (100yr det and EURV) for the full tributary area including any tributary off-site areas (which it does appear exist in your case). You are not required to design your pond for future developed condition flows but do have to account for the off-site trib areas in their current undeveloped condition and include them in your calcs as such.

Report
Colorado

Detention Summary

All onsite flows will be conveyed directly to the proposed detention pond northeast of the site. **Detention and water quality will be provided for all onsite detained flows** via a forebay and trickle channel system per the Manual. Flows north of the site will sheet flow to the proposed pond. The proposed detention pond, as shown on the included drainage map, has been calculated to provide approximately 5.21 acre feet of storage as required per the Manual. Calculations are in appendix. The release rate for the proposed pond resulting in approximately 33 cfs.

Pond and its outfall do not appear to be located on your property but property lines are not clear on map - please clarify. In either case easements must be shown for pond. If not on your property please include written documentation from the property owner that the pond and easement are acceptable.

Sub-basin Descriptions

A Drainage Map has been project. Individual sub-basins imperviousness percentages are provided in Appendix B. The 2-year and 100-year peak flows for each sub-basin are also provided in Appendix B.

The pond is not on the property we are currently developing (14.4-acres), however, it is located on a portion of property that will serve the full 38-acres, all of which is owned by the same entity. The remainder of the 38-acres will be developed at a later date, but the intent is for this pond to serve the entire 38-acres. The 16' drainage easement labeled on Drainage Map in appendix.

Sub-basins A-1 through A-5

Sub-basins A-1 through A-5 have areas ranging from 2.20 – 2.66 acres and consist of asphalt paving and landscaping. Runoff will sheet flow across landscaping and drive areas to concrete pans in the parking area where it will be conveyed to inlets. The runoff coefficients for these sub-basins range from 0.74 – 0.82 and 0.80 – 0.87 for the 2-year and 100-year storm, respectively.

Sub-basin A-6

Sub-basin A-6 is located north of the asphalt paving and consists primarily of landscaping and a small amount of asphalt paving connecting the site to South Rome Way and a portion of the fire access road. Runoff will flow from south to north and flow to undeveloped basin F-2 to the north. The runoff coefficients for sub-basin A6 are 0.22 and 0.26 for the 2-year and 100-year storm, respectively.

Sub-basin B-1

Sub-basin B-1 is located northeast of the site and includes the proposed detention pond. Flows from this basin will flow into the detention pond. This sub-basin is 2.73 acres of landscaped area and has runoff coefficients of 0.13 and 0.17 for the 2-year and 100-year, respectively.

Sub-basin F-1

Sub-basin F-1 is located south of the site and consists of 12.86 acres of existing, undeveloped land with slopes that range from 2-4% draining from west to east. Runoff from this sub-basin drains west and flows north to the existing 54" flared end section. The runoff coefficients are 0.13 and 0.17 for the 2-year and 100-year, respectively.

Your calcs assume future devel of this basin (assumed 90% imperv, etc.). Text here discusses only the existing condition. Please also discuss future development assumptions in text here and state pond has been sized for future. Will a portion of the storm system also be sized for future? No pipe calcs needed but please state what will be assumed for sizing in FDR.

Language revised to discuss future development conditions. The storm system will be sized for the future development.

Calcs assume future devel of this basin (assumed 90% imperv, etc.). Text here discusses only the existing condition. Please also discuss future development assumptions in text here and state pond has been sized for future.

Language revised to discuss future development conditions. The storm system will be sized for the future development.

Sub-basin F-2 ²

Sub-basin F-¹ is located north of the site and consists of 7.93 acres of existing, undeveloped land with slopes that range from 2-5% draining from southwest to northeast. Runoff from this sub-basin drains to the proposed detention pond. This basin also has runoff from Sub-basin A-6 that also drains to the detention pond. The runoff coefficients are 0.13 and 0.17 for the 2-year and 100-year, respectively.

Sub-basin OS-1

Sub-basin OS-1 contains 1.78 acres and consists of the landscape berm east of the site. This off-site area sheet flows north to the existing 54" flared end section northeast of the site. Runoff coefficients for this sub-basin are 0.13 and 0.17 for the 2-year and 100-year storm, respectively.

Sub-basin OS-2

Sub-basin OS-2 contains 1.43 acres and consists of undeveloped land northeast of the site. This off-site area sheet flows east to the existing 54" flared end section. Runoff coefficients for this sub-basin are 0.13 and 0.17 for the 2-year and 100-year storm, respectively.

CONCLUSIONS

Compliance with Standards

The project complies with the City of Aurora criteria for storm drainage design. City of Aurora Storm Drainage Design and Technical Criteria and the Urban Drainage Flood Control District Urban Storm Drainage Criteria Manual Volumes 1, 2, and 3 have been utilized in the design of the storm sewer system as well as Best Management Practices. The ultimate storm sewer system for this site will provide for the 100-year storm event and will not surcharge the storm sewer in the minor event.

Summary of Drainage Concept

Alexandra Gulch first, then to Gun Club Cr and then Murphy Creek

revised

The project flows are tributary to Gun Club Creek and ultimately the South Platte River. Runoff generated within the site is collected using storm inlets. The flows will then be detained and treated by the forebay, trickle channel, and micropool per UDFCD requirements. The proposed detention pond releases flows at ~~historic~~ rates to an existing 54" RCP located northeast of the detention pond. The proposed pond is sized to accommodate the additional flows for developed conditions for the entire +/- 38-acre property.

COA criteria manual rates required

revised

Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|------------------------------------|--|--------------|----------------|
| FoC | Fondis-Colby silt loams, 3 to 5 percent slopes | 43.8 | 100.0% |
| Totals for Area of Interest | | 43.8 | 100.0% |

Please include printout showing the hydrologic soil classification.

RAINFALL INTENSITY

$$I = \frac{28.5 P_1}{(10 + T_C)^{0.786}}$$

Where:

I = rainfall intensity (inches per hour)

P₁ = one-hour rainfall depth (inches) from figures RA1-RA-6
in USDCM, Volume 1

T_C = time of concentration (minutes)

$$P_1 = \begin{matrix} \text{2-yr} & \text{5-yr} & \text{10-yr} & \text{100-yr} \\ \text{0.97} & \text{1.39} & \text{1.63} & \text{2.63} \end{matrix}$$

Time Intensity Frequency Tabulation

| TIME | 2 YR | 5 YR | 10 YR | 100 YR |
|------|------|------|-------|--------|
| 5 | 3.29 | 4.71 | 5.53 | 8.92 |
| 10 | 2.62 | 3.76 | 4.41 | 7.12 |
| 15 | 2.20 | 3.16 | 3.70 | 5.97 |
| 20 | 1.91 | 2.73 | 3.21 | 5.17 |
| 25 | 1.69 | 2.42 | 2.84 | 4.58 |
| 30 | 1.52 | 2.18 | 2.56 | 4.13 |
| 40 | 1.28 | 1.83 | 2.15 | 3.46 |
| 50 | 1.11 | 1.59 | 1.86 | 3.00 |
| 60 | 0.98 | 1.40 | 1.65 | 2.66 |
| 120 | 0.60 | 0.86 | 1.01 | 1.63 |

Please include copies of the RA figures for point rainfall depth with the site location labeled on the figures.

included in this appendix

Revise landscape values to reflect Type C/D soils

acknowledged

470 Storage
Aurora, CO

10/17/2017

BASIN IMPERVIOUSNESS AND RUNOFF COEFFICIENT

| | Imp. | C2 | C5 | C10 | C100 |
|------------------|------|------|------|------|------|
| Landscape | 2% | 0.13 | 0.14 | 0.15 | 0.17 |
| Light Industrial | 80% | 0.71 | 0.72 | 0.76 | 0.82 |
| Roof | 90% | 0.80 | 0.85 | 0.90 | 0.90 |
| Concrete | 96% | 0.87 | 0.87 | 0.88 | 0.89 |
| Street - Paved | 100% | 0.87 | 0.88 | 0.90 | 0.93 |

ON-SITE BASINS

| Basin ID | Roof (SF) | Landscape (SF) | Concrete (SF) | Street - Paved (SF) | Total Basin Area (SF) | Total Basin Area (Acres) | Basin Imperviousness | C2 | C5 | C100 |
|----------|-----------|----------------|---------------|---------------------|-----------------------|--------------------------|----------------------|------|------|------|
| A-1 | 0 | 16739 | 0 | 79181 | 95920 | 2.20 | 0.83 | 0.74 | 0.75 | 0.80 |
| A-2 | 0 | 8195 | 0 | 102372 | 110567 | 2.54 | 0.93 | 0.82 | 0.83 | 0.87 |
| A-3 | 0 | 8369 | 0 | 105009 | 113379 | 2.60 | 0.93 | 0.82 | 0.83 | 0.87 |
| A-4 | 0 | 8387 | 0 | 107381 | 115768 | 2.66 | 0.93 | 0.82 | 0.83 | 0.87 |
| A-5 | 0 | 10444 | 0 | 85584 | 96028 | 2.20 | 0.89 | 0.79 | 0.80 | 0.85 |
| A-6 | 0 | 17436 | 0 | 2431 | 19866 | 0.46 | 0.14 | 0.22 | 0.23 | 0.26 |
| B-1 | 0 | 118909 | 0 | 0 | 118909 | 2.73 | 0.02 | 0.13 | 0.14 | 0.17 |
| F-1 | 0 | 59975 | 0 | 500000 | 559975 | 12.86 | 0.90 | 0.79 | 0.80 | 0.85 |
| F-2 | 0 | 35449 | 0 | 310000 | 345449 | 7.93 | 0.90 | 0.79 | 0.80 | 0.85 |
| Total | 0 | 283903 | 0 | 1291958 | 1575861 | 36.18 | 0.82 | 0.74 | 0.75 | 0.79 |

OFF-SITE BASINS

| | | | | | | | | | | |
|--------------------------|---|--------|---|---------|---------|-------|------|------|------|------|
| OS-1 | 0 | 77701 | 0 | 0 | 77701 | 1.78 | 0.02 | 0.13 | 0.14 | 0.17 |
| OS-2 | 0 | 62258 | 0 | 0 | 62258 | 1.43 | 0.02 | 0.13 | 0.14 | 0.17 |
| Total | 0 | 139959 | 0 | 1837 | 139959 | 3.21 | 0.03 | 0.14 | 0.15 | 0.18 |
| | | | | | | | | | | |
| Total Onsite and Offsite | 0 | 423862 | 0 | 1293795 | 1715821 | 39.39 | 0.76 | 0.69 | 0.70 | 0.74 |

TIME OF CONCENTRATION

| Watercourse Coefficient | | | | | | | | | | | | | | | | |
|-------------------------|-------------|--------------|----------|------|-----------------------|-------------|----------|-----------------------------|-------------|--------|-----------------------------|-----------|--------------------|--------------|----------|-------|
| | | | | | Forest & Meadow | | 2.50 | Short Grass Pasture & Lawns | | 7.00 | Grassed Waterway | | | | | 15.00 |
| | | | | | Fallow or Cultivation | | 5.00 | Nearly Bare Ground | | 10.00 | Paved Area & Shallow Gutter | | | | | 20.00 |
| SUB-BASIN | | | | | INITIAL / OVERLAND | | | TRAVEL TIME | | | | | T(c) CHECK | | | FINAL |
| DATA | | | | | T(i) | | | T(t) | | | | | (URBANIZED BASINS) | | | T(c) |
| DESIGN POINT | DRAIN BASIN | AREA sq. ft. | AREA ac. | C(5) | Length ft. | Slope ft/ft | T(i) min | Length ft. | Slope ft/ft | Coeff. | Velocity fps | T(t) min. | COMP. T(c) | TOTAL LENGTH | L/180+10 | min. |
| A-1 | A-1 | 95,920 | 2.20 | 0.75 | 130 | 0.04 | 4.7 | 445 | 0.030 | 20 | 3.5 | 2.1 | 6.8 | 575 | 13.2 | 6.8 |
| A-2 | A-2 | 110,567 | 2.54 | 0.83 | 150 | 0.03 | 4.2 | 445 | 0.030 | 20 | 3.5 | 2.1 | 6.3 | 595 | 13.3 | 6.3 |
| A-3 | A-3 | 113,379 | 2.60 | 0.83 | 145 | 0.04 | 3.8 | 470 | 0.030 | 20 | 3.5 | 2.3 | 6.1 | 615 | 13.4 | 6.1 |
| A-4 | A-4 | 115,768 | 2.66 | 0.83 | 140 | 0.05 | 3.5 | 485 | 0.030 | 20 | 3.5 | 2.3 | 5.8 | 625 | 13.5 | 5.8 |
| A-5 | A-5 | 96,028 | 2.20 | 0.80 | 140 | 0.03 | 4.4 | 500 | 0.030 | 20 | 3.5 | 2.4 | 6.8 | 640 | 13.6 | 6.8 |
| A-6 | A-6 | 19,866 | 0.46 | 0.23 | 70 | 0.04 | 8.2 | 0 | 0.000 | 20 | 0.0 | 0.0 | 8.2 | 70 | 10.4 | 8.2 |
| B-1 | B-1 | 118,909 | 2.73 | 0.14 | 170 | 0.07 | 12.3 | 403 | 0.005 | 7 | 0.5 | 13.6 | 25.9 | 573 | 13.2 | 13.2 |
| F-1 | F-1 | 559,975 | 12.86 | 0.80 | 300 | 0.03 | 6.6 | 433 | 0.030 | 7 | 1.2 | 6.0 | 12.6 | 733 | 14.1 | 12.6 |
| F-2 | F-2 | 345,449 | 7.93 | 0.80 | 300 | 0.03 | 6.5 | 336 | 0.030 | 7 | 1.2 | 4.6 | 11.1 | 636 | 13.5 | 11.1 |
| | | | | | | | | | | | | | | | | |
| OS-1 | OS-1 | 77,701 | 1.78 | 0.14 | 75 | 0.07 | 8.0 | 55 | 0.030 | 7 | 1.2 | 0.8 | 8.8 | 130 | 10.7 | 8.8 |
| OS-2 | OS-2 | 62,258 | 1.43 | 0.14 | 250 | 0.05 | 16.3 | 127 | 0.040 | 7 | 1.4 | 1.5 | 17.8 | 377 | 12.1 | 12.1 |

These reflect undeveloped rather than developed conditions.

revised for developed condition

RUNOFF CALCULATIONS

| Design Storm 100 Year | | | | | | | | | | | | |
|-----------------------|-------------|----------|--------------|---------------|-------|---------|-------|--------------|-----------|---------|-------|----------------|
| BASIN INFORMATON | | | | DIRECT RUNOFF | | | | TOTAL RUNOFF | | | | REMARKS |
| DESIGN POINT | DRAIN BASIN | AREA ac. | RUNOFF COEFF | T(c) min | C x A | I in/hr | Q cfs | T(c) min | SUM C x A | I in/hr | Q cfs | |
| A-1 | A-1 | 2.20 | 0.80 | 6.8 | 1.76 | 8.26 | 14.5 | | | | | |
| A-2 | A-2 | 2.54 | 0.87 | 6.3 | 2.22 | 8.44 | 18.7 | 6.8 | 3.97 | 8.26 | 32.8 | A1+A2 |
| A-3 | A-3 | 2.60 | 0.87 | 6.1 | 2.27 | 8.54 | 19.4 | 6.8 | 6.25 | 8.26 | 51.6 | A1+A2+A3 |
| A-4 | A-4 | 2.66 | 0.87 | 5.8 | 2.33 | 8.62 | 20.0 | 6.8 | 8.57 | 8.26 | 70.8 | A1+A2+A3+A4 |
| A-5 | A-5 | 2.20 | 0.85 | 6.8 | 1.87 | 8.27 | 15.4 | 6.8 | 10.44 | 8.26 | 86.2 | A1+A2+A3+A4+A5 |
| A-6 | A-6 | 0.46 | 0.26 | 8.2 | 0.12 | 7.77 | 0.9 | | | | | |
| B-1 | B-1 | 2.73 | 0.17 | 13.2 | 0.46 | 6.38 | 3.0 | | | | | |
| F-1 | F-1 | 12.86 | 0.85 | 12.6 | 10.91 | 6.53 | 71.2 | | | | | |
| F-2 | F-2 | 7.93 | 0.85 | 11.1 | 6.76 | 6.86 | 46.3 | | | | | |
| | | | | | | | | | | | | |
| OS-1 | OS-1 | 1.78 | 0.17 | 8.8 | 0.30 | 7.56 | 2.3 | | | | | |
| OS-2 | OS-2 | 1.43 | 0.17 | 12.1 | 0.24 | 6.63 | 1.6 | | | | | |
| OUTFALL | | | | | | | | | | | 222.2 | ALL BASINS |

Unclear how this value arrived at?
No calc shown and simple addition gives 211.5? Is this value needed for anything since flow to E-470 culvert will be attenuated by pond? Same question on 2yr calc.

Spreadsheet updated.
See spreadsheet for equation.

100yr inflow to pond needed.

Spreadsheet updated.
See spreadsheet for equation.

Acknowledged; the most current version of the UDFCD spreadsheet is being used.

Trib area to pond is 36.18 ac and 82% imperv.

revised

COA requirement for this site is EURV (not just WQ) and 100yr. Most current UDFCD spreadsheet for detention design sizes separate orifice(s) for draining WQ in 40 hr and then EURV by 72 hr. You are allowed to use this approach but COA only requires that you size outlet controls for EURV and 100yr.

Project: 470 Storage
Basin ID: Detention Pond
UD-Detention, Version 3.07 (February 2017)

Example 3 Configuration (Retention Pond)

Required Volume Calculation

| | | |
|--|--------|---------|
| Selected BMP Type = | Grass | acres |
| Watershed Area = | 38.50 | acres |
| Watershed Length = | 1,770 | ft |
| Watershed Slope = | 0.030 | ft/ft |
| Watershed Imperviousness = | 90.00% | percent |
| Percentage Hydrologic Soil Group A = | 0.0% | percent |
| Percentage Hydrologic Soil Group B = | 0.0% | percent |
| Percentage Hydrologic Soil Group C/D = | 100.0% | percent |
| Desired WQCV Drain Time = | 40.0 | hours |

Location for 1-hr Rainfall Depths = Aurora Reservoir

Water Quality Capture Volume (WQCV) = 1.288 acre-feet

Excess Urban Runoff Volume (EURV) = 3.436 acre-feet

Optional User Override 1-hr Precipitation

| | | |
|--------------------------------------|--------|-----------|
| 1-hr Runoff Volume (P1 = 0.84 in.) | 2.362 | acre-feet |
| 5-yr Runoff Volume (P1 = 1.13 in.) | 3.341 | acre-feet |
| 10-yr Runoff Volume (P1 = 1.39 in.) | 4.158 | acre-feet |
| 25-yr Runoff Volume (P1 = 1.77 in.) | 5.503 | acre-feet |
| 50-yr Runoff Volume (P1 = 2.08 in.) | 6.502 | acre-feet |
| 100-yr Runoff Volume (P1 = 2.42 in.) | 7.733 | acre-feet |
| 500-yr Runoff Volume (P1 = 3.0 in.) | 10.787 | acre-feet |
| Approximate 2-yr Detention Volume | 2.218 | acre-feet |
| Approximate 5-yr Detention Volume | 3.145 | acre-feet |
| Approximate 10-yr Detention Volume | 3.924 | acre-feet |
| Approximate 25-yr Detention Volume | 4.530 | acre-feet |
| Approximate 50-yr Detention Volume | 4.831 | acre-feet |
| Approximate 100-yr Detention Volume | 5.205 | acre-feet |

Stage-Storage Calculation

| | | |
|---|-------|-----------------|
| Zone 1 Volume (WQCV) = | 1.288 | acre-feet |
| Zone 2 Volume (100-yr - Zone 1) = | 1.288 | acre-feet |
| Zone 3 Volume (100-yr - Zone 2) = | 1.361 | acre-feet |
| Total Detention Basin Volume = | 5.205 | acre-feet |
| Initial Surcharge Volume (SV) = | user | ft ³ |
| Initial Surcharge Depth (SD) = | 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 _{mb}) = | user | H:V |
| Basin Length-to-Width Ratio (R _{mb}) = | user | |
| Initial Surcharge Area (A _{sv}) = | user | ft ² |
| Surcharge Volume Length (L _{sv}) = | user | ft |
| Surcharge Volume Width (W _{sv}) = | user | ft |
| Depth of Basin Floor (H _{bf}) = | user | ft |
| Length of Basin Floor (L _{bf}) = | user | ft |
| Width of Basin Floor (W _{bf}) = | user | ft |
| Area of Basin Floor (A _{bf}) = | user | ft ² |
| Volume of Basin Floor (V _{bf}) = | user | ft ³ |
| Depth of Main Basin (H _{mb}) = | user | ft |
| Length of Main Basin (L _{mb}) = | user | ft |
| Width of Main Basin (W _{mb}) = | user | ft |
| Area of Main Basin (A _{mb}) = | user | ft ² |
| Volume of Main Basin (V _{mb}) = | user | ft ³ |
| Calculated Total Basin Volume (V _{total}) = | user | acre-feet |

DETENTION BASIN STAGE-STORAGE TABLE BUILD

| 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 (acre-ft) |
|-----------------------------|------------|------------------------------|-------------|------------|-------------------------|---|-------------|---------------------------|------------------|
| Top of Micropool | -- | 0.00 | -- | -- | -- | 48,511 | 1.114 | 11,785 | 0.271 |
| | -- | 0.25 | -- | -- | -- | 49,747 | 1.142 | 11,785 | 0.271 |
| | -- | 0.50 | -- | -- | -- | 50,990 | 1.171 | 24,365 | 0.562 |
| | -- | 0.75 | -- | -- | -- | 52,240 | 1.199 | 37,256 | 0.863 |
| | -- | 1.00 | -- | -- | -- | 53,495 | 1.228 | 50,460 | 1.154 |
| | -- | 1.25 | -- | -- | -- | 54,757 | 1.257 | 63,979 | 1.465 |
| | -- | 1.50 | -- | -- | -- | 56,025 | 1.286 | 77,814 | 1.776 |
| | -- | 1.75 | -- | -- | -- | 57,299 | 1.315 | 91,967 | 2.087 |
| | -- | 2.00 | -- | -- | -- | 58,580 | 1.345 | 106,439 | 2.398 |
| | -- | 2.25 | -- | -- | -- | 59,867 | 1.374 | 121,831 | 2.709 |
| | -- | 2.50 | -- | -- | -- | 61,160 | 1.404 | 136,959 | 3.144 |
| | -- | 2.75 | -- | -- | -- | 62,459 | 1.434 | 152,411 | 3.499 |
| | -- | 3.00 | -- | -- | -- | 63,765 | 1.464 | 168,189 | 3.861 |
| | -- | 3.25 | -- | -- | -- | 65,077 | 1.494 | 184,295 | 4.231 |
| | -- | 3.50 | -- | -- | -- | 66,395 | 1.524 | 200,729 | 4.608 |
| | -- | 3.75 | -- | -- | -- | 67,720 | 1.555 | 217,493 | 4.993 |
| | -- | 4.00 | -- | -- | -- | 69,051 | 1.585 | 234,589 | 5.385 |
| | -- | 4.25 | -- | -- | -- | 70,388 | 1.616 | 252,019 | 5.786 |
| | -- | 4.50 | -- | -- | -- | 71,731 | 1.647 | 269,784 | 6.193 |
| | -- | 4.75 | -- | -- | -- | 73,081 | 1.678 | 287,886 | 6.609 |
| | -- | 5.00 | -- | -- | -- | 74,437 | 1.709 | 306,325 | 7.032 |
| | -- | 5.25 | -- | -- | -- | 75,799 | 1.740 | 325,105 | 7.463 |
| | -- | 5.50 | -- | -- | -- | 77,168 | 1.772 | 344,226 | 7.902 |
| | -- | 5.75 | -- | -- | -- | 78,542 | 1.803 | 363,689 | 8.349 |
| | -- | 6.00 | -- | -- | -- | 79,923 | 1.835 | 383,498 | 8.804 |

These UDFCD storm volumes cannot be used for detention sizing. You are required to use the COA Manual V=KA method. Please X out this portion of the UDFCD spreadsheet calcs and include V=KA calcs.

V=KA calculations included in appendix

Label values for EURV, 100yr+1/2 EURV and elevation of emerg weir crest.

Elevations provided

Provided 100-Year detention volume

Show elevations not just depths so that stage storage can be verified against grading for pond shown on drainage plan.

Elevations provided

Additional detention basin calcs required:

1) V=KA calc for 100yr volume in pond.

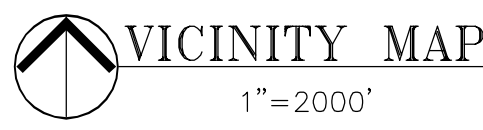
Response: Additional calculations shown in appendix.

2) Show total design pond volume as 100yr + 1/2 EURV and show elevation for this volume. Response: Acknowledged; see additional calculations in appendix and stage storage

3) Show elevation of emergency weir crest. COA requirement is minimum of 1 ft above 100yr + 1/2 EURV. Response: Acknowledged; shown on Drainage Map and in Stage Storage on this sheet.

4) Do emergency weir calc with Q100 and determine WSEL of flow over weir. UDFCD requirement is top of embankment to be 1 ft min above this WSEL. Compute and state the freeboard you propose to provide. Response: Acknowledged; information to be provided as part of Final Drainage Report.

5) Computation of 100yr release rate per COA criteria. Note that release rate should reflect only the area trib to the pond (if you include OS-1 and OS-2 in pond release rate calc then you are essentially double releasing for these areas. Response: Acknowledged.



LEGEND

| | |
|--|---------------------------|
| | PROPERTY LINE |
| | EXISTING EASEMENT |
| | PROPOSED EASEMENT |
| | SETBACK LINE |
| | DRAINAGE BOUNDARY |
| | EXISTING CONTOURS |
| | PROPOSED CONTOURS |
| | EXISTING STORM SEWER PIPE |
| | PROPOSED STORM SEWER PIPE |

A - DRAINAGE BASIN
 B - BASIN ACREAGE
 C - 2-YEAR RUNOFF COEFF.
 D - 100-YEAR RUNOFF COEF.

DESIGN POINT

FLOW ARROW

| | | Direct Flows | | Cumulative Flows | | |
|--------------|-------------|--------------|--------------------|---------------------|--------------------|---------------------|
| DESIGN POINT | DRAIN BASIN | AREA AC | Q ₁ CFS | Q ₁₀ CFS | Q ₁ CFS | Q ₁₀ CFS |
| A-1 | A-1 | 2.20 | 5.0 | 14.5 | 4.97 | 14.5 |
| A-2 | A-2 | 2.54 | 6.4 | 18.7 | 11.27 | 32.8 |
| A-3 | A-3 | 2.66 | 6.7 | 19.4 | 17.73 | 51.6 |
| A-4 | A-4 | 2.60 | 6.9 | 20.0 | 24.34 | 70.8 |
| A-5 | A-5 | 2.20 | 5.3 | 15.4 | 29.64 | 86.2 |
| A-6 | A-6 | 0.46 | 0.3 | 0.9 | 0.29 | 0.5 |
| B-1 | B-1 | 2.73 | 0.8 | 3.0 | 0.84 | 3.5 |
| F-1 | F-1 | 12.86 | 24.5 | 71.2 | 24.49 | 71.2 |
| F-2 | F-2 | 7.93 | 15.9 | 46.3 | 15.93 | 46.3 |
| OS-1 | OS-1 | 1.78 | 0.6 | 2.3 | 0.6 | 2.3 |
| OS-2 | OS-2 | 1.43 | 0.5 | 1.6 | 0.5 | 1.6 |
| OUTFALL | | | | | 77.2 | 232.2 |

- NOTES:
1. PROPOSED STORM SEWER IS TO BE PRIVATELY OWNED AND MAINTAINED.
 2. CITY OF AURORA PLAN REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH CITY OF AURORA DESIGN CRITERIA AND THE CITY CODE. THE CITY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF DESIGN, OF DIMENSIONS AND ELEVATIONS WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE. THE CITY OF AURORA, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY FOR THE COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT

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4582 South Ulster Street, Suite 1500
Denver, Colorado 80237 (303) 228-2300

DESIGNED BY: KBK
DRAWN BY: BKM
CHECKED BY: RJP
DATE: XX/XX/2017

~~470 STORAGE~~
AURORA, COLORADO
CONSTRUCTION DOCUMENTS
DRAINAGE MAP

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