Related RSNs:
MDR: 1501736
Filing 1 ISP PDR: 1535408

1st Review - Please contact Rifka Wine with questions.
RWine@bhinc.com

PLEASE DO NOT RESUBMIT UNTIL COMMENTS FROM OUTSIDE AGENCIES, AS LISTED BELOW, HAVE BEEN RECEIVED.

Advisory note: PDR approval is required prior to civil plan approval.

MAINTENANCE ELIGIBILITY PROGRAM (MEP)

MHFD Referral Review Comments **For Internal MHFD Use Only.**

MEP ID: 106325

Submittal ID: 10006190

MEP Phase: Referral

Date: April 30, 2021

To: **Rifka Wine**

Via Aurora Website

RE: MHFD Referral Review Comments

Project Name: Buckley Yard F2 (RSN 1535413)

Drainageway: East Toll Gate Creek

This letter is in response to the request for our comments concerning the referenced project. We have reviewed this proposal only as it relates to maintenance eligibility of major drainage features, in this case:

- Spillway and pipe outfalls from full spectrum detention ponds

We have the following comments to offer:

1) This site is within the 10,000' critical zone of Buckley Air Force Base. As such, the 100-yr flow of any ponds must drain within 40 hours. Please ensure the ponds meets this requirement.

2) The outflow for Pond A is much higher than the historic condition, increasing from approximately 26 cfs to 48 cfs. Can the existing culvert underneath E Alameda Dr accommodate these flows? Is there adequate protection downstream of this culvert in the existing condition?

3) Please evaluate the condition of the outfall paths from the proposed detention ponds. What protection will be provided for the spillway, if needed?

We appreciate the opportunity to review this proposal. Please feel free to contact me with any questions or concerns.

Sincerely,

Mark Schutte, P.E., CFM

Project Engineer, Sand Creek

Mile High Flood District

JR Response:

1. Addressed.

2. Noted. This will be analyzed at time of final design. Pipe may need to be removed, upsized, and reworked downstream to accommodate.

3. Riprap will be provided for the spillway if needed.

rt

g No. 2

is Date

	Date
Water Department	Date

is an existing 18" RCP & 24" RCP storm sewer in the Northwest corner of E. Alameda Parkway and Alameda Drive at design point OS1. The 18" RCP conveys runoff from E. Alameda Parkway delineated as basin OS1 with a tributary area of 0.45 acres as shown on the historic and proposed conditions Map. The 24" RCP conveys stormwater runoff from areas south of Alameda Parkway including South Richfield St. and the detention pond from the TRW/ Shea Center. The detention pond from the TRW site releases 3.75 cfs with a tributary area of 4.57 ac, per the approved Shea Center drainage report EDN: 201156. The 100-year runoff to the existing inlets along Richfield Street is 22.2 cfs per the Master Drainage Study for the Tollgate Village Filing No. 12 (COA# C8-2-1094). The culmination of the above discussed flows is designated as Design Point OS1 on the historic and proposed conditions map. The accumulation of the above offsite areas (5.02 acres) were used to size the water quality volume for Pond A. The existing 24" RCP that outfalls onto Buckley Yard was estimated to convey about 25.95 cfs from the total runoff, with a total pipe capacity of about 42 cfs. This flow is routed from design point OS1 north to Pond A via proposed storm pipe. The second offsite runoff location is an existing 24" RCP storm sewer on the Northwest corner of S. Quintero Way and E. Alameda Parkway as described as basin OS2 on the historic and proposed conditions map. This conveys runoff from E. Alameda Parkway. This flow is routed from design point OS1 north to Pond A via proposed storm pipe.

b. The major drainage way adjacent to the property, North and East of the site, is East Tollgate Creek, which the site is tributary. East Tollgate Creek has a drainage area of about 9 square miles with a 100-year peak discharge of 8,100 cfs at Aurora Signature Park. A slight amount of the northeast edge of the property is located within the 100-year floodplain, as defined by FIRM map number 08005C0183L revised September 4, 2020. There is a 2020 FHAD for East Toll Gate Creek.

2. Drainage Patterns Through Property

The existing grades are generally sloping down in a northerly direction. The site is split into two major basins, Basin A in the west side of the property west of East Alameda Drive, and Basin B on the east side of the site between East Alameda Drive and South Quintero Way. Runoff from each basin will be conveyed to onsite water quality and detention ponds before being released. No onsite basins are proposed to flow offsite.

Offsite runoff from East Alameda Parkway and the properties to the south of Alameda Parkway will be conveyed through the site to the propos nds will provide water quality for offsite runoff, but not detention.

JR Response: Addressed.

3. Outfalls Downstream from Property

Gate

The ultimate outfall location for the site is East Toll Creek located directly to the north of the site. Currently there are 4 outfall locations from the site to East Toll Creek. In the proposed condition there are three outfall locations, the existing culvert at the

intersection of East Alameda Drive and South Quintero Way is to be removed as it is not needed.

C. DESIGN CRITERIA

1. List References

Add Buckley Yard Master Drainage Report (RSN 1501736). MDR has not yet been approved. Please do not resubmit until the MDR is approved.

a. This report has been prepared in accordance with *Tollgate Village Filing No.14,* which encompasses the site. This was prepared by ICON Engineering, Inc.

JR Response: Addressed.

b. This report has been prepared in accordance with *Tollgate Village Filing No.14,* which encompasses the site. This was prepared by MSM Consultants, Inc. EDN: C4-2-414

c. This report has been prepared in accordance with *Bristol Commercial Center Filing Subdivision No. 6* Final Drainage Report (COA# 2001-3088). This was prepared by Innovative Land Consultants, Inc. EDN: 970218

Add Adjacent subdivision drinage report for Buckley Yard FLG #01 (RSN 1535408)

d. This report has been prepared in accordance with *Shea Center Subdivision Filing No. 1* Final Drainage Report (COA# 201156) EDN: 201156

JR Response: Addressed.

en prepared in accordance with the specifications of the MHFCD's *Urban Storm Drainage Criteria Manual* (USDCM), as well as the City of Aurora *Storm Drainage Design & Technical Criteria Manual* (Criteria Manual).

f. A very small portion of the property is located within the 100-year floodplain, while the vast majority of the site is not, as defined by FIRM map number 08005C0183L revised September 4, 2020. A copy of the FIRM can be found in Appendix 1 of this report.

2. Hydrologic Criteria

a. Rainfall intensities were determined by the equations set forth in the Criteria

JR Response: Addressed.

es were determined from the charts contained within the MHFD (typ.)

MHFCD and the City of Aurora Storm Drainage Design & Technical Criterial Manual. A P_1 value of 0.98 was used for the 2-year event and 2.66 for the 100-year event for the City of Aurora equations. A P_1 value of 1.01 was used for the 2-year event and 2.72 for the 100-year event for the MHFD equation per Figures RA-1 – RA-6 shown in Appendix D.

b. The Rational Method was utilized to determine runoff values for the site. Composite percent impervious values were calculated for the proposed basins. Water quality for the project will be provided in five onsite ponds. Calculations

Where are these? Only two are shown on drainage plan.

JR Response: Addressed. This was a mistake, there are only two ponds for this site.

y volume were preformed using the empirical formula as

discussed in City of Aurora *Storm Drainage Design & Technical Criteria Manual*.

c. The Rational Method was utilized to determine runoff values for the site. Composite percent impervious values were calculated for the proposed basins. Water quality for the project will be provided in both Pond A and Pond B. The Full Spectrum Detention Method and empirical formula were utilized to calculate proposed detention pond volumes. Calculations utilizing the drain times per the FAA method to determine pond volumes has been provided.

d. The minor storm was analyzed as the 2-year event. The major storm was analyzed as the 100-year event.

3. Hydraulic Criteria

a. The *City of Aurora Storm Drainage and Technical Criteria Manual* were referenced in the preparation of this report.

See comment on Drainage Plan.

b. All inlets and pipes will be designed for the 100-year storm. All storm sewers will be private and will be maintained by the special districts.

JR Response: Addressed. This will be analyzed at time of final design.

c. Storm drain pipe will be provided with the Final Drainage Report. The water surface profiles can be found in Appendix C.

d. East Tollgate Creek is the major drainage way located to the North and East of the site.

D. DRAINAGE PLAN

Which one? EDN 208094? Add Buckley Yard Master Drainage Report (RSN 1501736). MDR has not yet been approved.

JR Response: Addressed.

1. General Concept

a. The general d shed with the previously approved drainage report will re posed on-site grading will continue to route runoff to the r condition.

b. Runoff from the offsite locations described previously will be conveyed through the site and proposed ponds to the historic outfall location. There are no other adjacent developments that will affect the storm water design of this site.

c. Water quality and detention will be provided for the site in the form of two on-site ponds on the northern edge of the site. The proposed ponds will be designed as full spectrum water quality/detention ponds in accordance with the City of Aurora Criteria to include the required 100 year volume + ½ the EURV. Each water quality and detention pond will be private and maintained by the special districts.

Label this inlet as sump on the drainage plans. Show this emergency overflow path with an arrow on the drainage plan.

JR Response: Addressed.

Basin A2 (Q_2=3.7 cfs, Q_{100}= 12.0 cfs) is 2.86 acres and 49.2 percent impervious and is comprised of multi-unit attached residential lots, alleyway, and roadway. Runoff from this basin is collected in the center alleys and drains to design point 2, a sump inlet at the north edge of the basin. Collected runoff is piped north to Pond A. The emergency overflow path of the sump inlet fills up and exits into adjacent curb and gutter heading north.

Basin A3 (Q_2=4.6 cfs, Q_{100}= 13.8 cfs) is 3.50 acres and 51.4 percent impervious and is comprised of multi-unit attached residential lots, alleyway, and roadway. Olsson Engineering is designing this north-south road; therefore the specifics of the drainage have not yet been determined. Runoff from this basin is collected in the street curb and gutter & inlets, draining to design point 15, an on grade inlet at the eastern edge of the basin. Collected runoff is piped east to Pond A.

sump?

Basin A5 (Q_2=0.6 cfs, Q_{100}= 1.8 cfs) is 0.26 acres and 77.3 percent impervious and is comprised of roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 3, an on grade inlet at the northwestern corner of the basin. Collected runoff is piped north to Pond A. The emergency overflow path of the sump inlet fills up and exits into adjacent curb and gutter heading north.

JR Response: Addressed.

Basin A6 (Q_2=0.7 cfs, Q_{100}= 2.0 cfs) is 0.34 acres and 62.9 percent impervious and is comprised of roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 7, an on grade inlet at the northwestern corner of the basin. Collected runoff is piped north to Pond A.

Basin A7 (Q_2=0.5 cfs, Q_{100}= 1.6 cfs) is 0.22 acres and 76.0 percent impervious and is comprised of roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 6, an on grade inlet at the northeastern corner of the basin. Collected runoff is piped north to Pond A.

Basin A8 (Q_2=1.7 cfs, Q_{100}= 5.7 cfs) is 1.67 acres and 38.9 percent impervious and is comprised of multi-unit attached residential lots, alleyway, 5' concrete walks, an open space park area, and a portion of South Quintero Way. Runoff from this basin is collected in the center alleys and curb and gutter then drains to design point 8, an on grade inlet at the northwestern corner of the basin. Collected runoff is piped north to Pond A.

Basin A9 (Q_2=1.4 cfs, Q_{100}= 7.5 cfs) is 1.79 acres and 46.2 percent impervious and is comprised of multi-unit attached residential lots, alleyway, and a portion of South Quintero Way. Runoff from this basin is collected in the center alleys and drains to design point 4, an on grade inlet at the northeastern corner of the basin. Collected runoff is piped north to Pond A.

Basin A10 (Q_2=2.1 cfs, Q_{100}= 6.9 cfs) is 1.60 acres and 43.7 percent impervious and is comprised of multi-unit attached residential lots, alleyway, open space, 5' walks, and a portion of South Quintero Way. Runoff from this basin is collected in the street curb and gutter and drains to design point 11, a sump inlet at the northern

Label this inlet as sump on the drainage plans. Show this emergency overtlow path with an arrow on the drainage plan.

JR Response: Addressed.

edge of the basin. Collected runoff is piped north to Pond A. The emergency overflow path of the sump inlet fills up and exits into adjacent curb and gutter heading north.

Basin A11 (Q_2=0.2 cfs, Q_{100}= 0.6 cfs) is 0.09 acres and 80.0 percent impervious and is comprised of roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 14, an on grade inlet at the northeastern corner of the basin. Collected runoff is piped north to Pond A.

Basin A12 (Q_2=0.2 cfs, Q_{100}= 0.5 cfs) is 0.07 acres and 76.1 perce and is comprised of roadway. Runoff from this basin is collected in and gutter and drains to design point 13, an on grade inlet at the corner of the basin. Collected runoff is piped north to Pond A.

JR Response: Addressed. Note - Basins A15 & A16 are now combined with Basins A11 & A12. The sump inlet is now at DP11 in Basin A10. An emergency overflow path and cross section have been provided.

Basin A13 (Q_2=1.4 cfs, Q_{100}= 4.5 cfs) is 0.81 acres and 61.0 perce and is comprised of multi-unit attached residential lots, alleyway, walks, and a portion of South Quintero Way. Runoff from this basin the street curb and gutter and drains to design point 9, an on gra northeastern corner of the basin. Collected runoff is piped north to Pond A.

Describe the emergency overflow path for this inlet in the text.

Basin A14 (Q_2=0.2 cfs, Q_{100}= 0.5 cfs) is 0.08 acres and 63.1 percent imp and is comprised of a portion of South Quintero Way. Runoff from this collected in the street curb and gutter and drains to design point 5, an on gra at the north corner of the basin. Collected runoff is piped north to Pond A.

Basin A15 (Q_2=0.6 cfs, Q_{100}= 1.7 cfs) is 0.26 acres and 71.0 percent impervious and is comprised of a portion of South Quintero Way. Runoff from this basin is collected in the street curb and gutter and drains to design point 12, a sump inlet at the northwestern corner of the basin. Collected runoff is piped north to Pond A.

Basin A16 (Q_2=0.3 cfs, Q_{100}= 0.7 cfs) is 0.11 acres and 73.2 percent impervious and is comprised of a portion of South Quintero Way. Runoff from this basin is collected in the street curb and gutter and drains to design point 10, an on grade inlet at the northeastern corner of the basin. Collected runoff is piped north to Pond A.

Basin A17 (Q_2=2.4 cfs, Q_{100}= 7.9 cfs) is 1.87 acres and 54.0 percent impervious and is comprised of multi-unit attached residential lots, alleyway, and 5' walks. Runoff from this basin is collected in the center alleys and curb and gutter then drains to design point 16, sump inlet at the northeastern corner of the basin. Collected runoff is piped south to Pond A. The emergency overflow path of the sump inlet fills up and exits into adjacent curb and gutter heading north along East Alameda Drive.

Basin A18 (Q_2=0.4 cfs, Q_{100}= 1.2 cfs) is 0.18 acres and 69.6 percent impervious and is comprised of roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 18, an on grade inlet at the northwestern corner of the basin. Collected runoff is piped east to Pond A.

Label this inlet as sump on the drainage plans. Show this emergency overflow path with an arrow on the drainage plan.

JR Response: Addressed.

sump?

JR Response: Addressed.

Ponds shall be 100% D

JR Response: Addressed. Pond % impervious is now 100%

Basin A19 (Q_2=0.4 cfs, Q_{100}= 1.3 cfs) is 0.20 acres and 67.4 percent impervious [illegible]ay. Runoff from this basin is collected in the street curb and gutter and drains to design point 19, an on grade inlet at the nort[illegible] corner of the basin. Collected runoff is piped east to Pond A.

Basin A20 (Q_2=0.2 cfs, Q_{100}= 0.7 cfs) is 0.13 acres and 56.2 percent impervious and is comprised of roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 17, an on grade inlet at the northeastern corner of the basin. Collected runoff is piped south to Pond A. The emergency overflow path of the sump inlet fills up and exits into adjacent curb a[illegible] heading north along East Alameda Drive.

Basin A21 (Q_2=2.2 cfs, Q_{100}= 6.9 cfs) is 2.85 acres and 14.9 per[illegible] and is comprised of open space area, 5' walks, a commercial rec-[illegible] A. Runoff from this basin sheet flows and drains to design point 2[illegible] northwestern corner of the basin. From the pond, treated stormwater is conveyed via existing 24" RCP under East Alameda Drive to East Toll Gate Creek. The emergency overflow of Pond A would exit onto curb and gutter along East Alameda Drive.

Basin B1 (Q_2=0.9 cfs, Q_{100}= 5.0 cfs) is 1.21 acres and 45.2 percent impervious and is comprised of multi-unit attached residential lots, alleyway, open space, and roadway. Runoff from this basin is collected in the center alleys and drains to design point 21, an on grade inlet at the northwestern corner of the basin. Collected runoff is piped northwest to Pond B.

Basin B2 (Q_2=0.9 cfs, Q_{100}= 2.4 cfs) is 0.63 acres and 37.9 percent impervious and is comprised of multi-unit detached residential lots, some open space, and roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 22, an on grade inlet at the southwestern corner of the basin. Collected runoff is piped northwest to Pond B.

Basin B3 (Q_2=0.8 cfs, Q_{100}= 2.7 cfs) is 0.69 acres and 47.2 percent impervious and is comprised of multi-unit attached residential lots, alleyway, open space, and roadway. Runoff from this basin is collected in the center alleys and drains to design point 25, an on grade inlet at the northwestern corner of the basin. Collected runoff is piped northeast to Pond B.

Basin B4 (Q_2=0.2 cfs, Q_{100}= 0.6 cfs) is 0.09 acres and 72.5 percent impervious and is comprised of roadway and alleyway. Runoff from this basin is collected in the street curb and gutter and drains to design point 26, an on grade inlet at the xxxx corner of the basin. Collected runoff is piped xxx to Pond B.

Basin B5 (Q_2=0.9 cfs, Q_{100}= 13.8 cfs) is 3.55 acres and 45.2 percent impervious and is comprised of multi-unit attached residential lots, alleyway, open space, and roadway. Runoff from this basin is collected in the center alleys and drains to design point 23, a sump inlet at the northern edge of the basin. Collected runoff is

piped northwest to Pond B. The emergency overflow path of the sump inlet fills up and exits into adjacent curb and gutter heading north.

sump?

JR Response: Addressed.

Basin B6 (Q_2=0.9 cfs, Q_{100}= 1.4 cfs) is 0.30 acres and 48.9 percent impervious and is comprised of multi-unit detached residential lots and roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 24, an on grade inlet at the southwest corner of the basin. Collected runoff is piped northwest to Pond B. The emergency overflow path of the sump inlet fills up and exits into adjacent curb and gutter heading north.

Label this inlet as sump on the drainage plans. Show this emergency overflow path with an arrow on the drainage plan.

Basin B7 (Q_2=0.9 cfs, Q_{100}= 1.8 cfs) is 0.29 acres and 66.6 percent impervious and is comprised of roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 35, an on grade inlet at the northwestern corner of the basin. Collected runoff is piped north to Pond B.

JR Response: Addressed.

Basin B8 (Q_2=0.9 cfs, Q_{100}= 3.7 cfs) is 0.82 acres and 47.7 percent impervious and is comprised of multi-unit detached residential lots and roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 34, an on grade inlet at the northwestern corner of the basin. Collected runoff is piped north to Pond B.

Basin B9 (Q_2=0.9 cfs, Q_{100}= 1.6 cfs) is 0.36 acres and 60.0 percent impervious and is comprised of a multi-unit detached residential lot and roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 27, an on grade inlet at the northeastern corner of the basin. Collected runoff is piped north to Pond B.

Basin B10 (Q_2=0.3 cfs, Q_{100}= 1.0 cfs) is 0.19 acres and 56.2 percent impervious and is comprised of a multi-unit detached residential lot and roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 28, an on grade inlet at the northwestern corner of the basin. Collected runoff is piped north to Pond B.

Basin B11 (Q_2=0.8 cfs, Q_{100}= 2.8 cfs) is 0.57 acres and 50.7 percent impervious and is comprised of multi-unit detached residential lots and roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 29, an on grade inlet at the northwestern corner of the basin. Collected runoff is piped northwest to Pond B.

Basin B12 (Q_2=0.7 cfs, Q_{100}= 2.5 cfs) is 0.53 acres and 45.1 percent impervious and is comprised of multi-unit detached residential lots and roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 30, an on grade inlet at the northeastern corner of the basin. Collected runoff is piped northwest to Pond B.

Basin B13 (Q_2=1.2 cfs, Q_{100}= 3.8 cfs) is 1.83 acres and 15.7 percent impervious and is comprised of an open space park area, multi-unit detached residential lots, and 5’ concrete walks. Runoff from this basin is sheet flows and drains to design

point 31, an on grade inlet at the northwest edge of the basin. Collected runoff is piped northwest to Pond B.

Label this inlet as sump on the drainage plans. Show this emergency overflow path with an arrow on the drainage plan.

Basin B14 (Q_2=0.4 cfs, Q_{100}= 1.1 cfs) is 0.20 acres and 62.6 percent impervious and is comprised of roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 32, a sump inlet at the northern edge of the basin. Collected runoff is piped west to Pond B. The emergency overflow path of the

JR Response: Addressed.

ts into adjacent curb and gutter heading north along South Quintero Way.

Basin B15 (Q_2=1.1 cfs, Q_{100}= 4.1 cfs) is 0.91 acres and 45.5 percent impervious and is comprised of multi-unit detached residential lots and roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 33, a sump inlet at the northeastern corner of the basin. Collected runoff is piped west to Pond B. The emergency overflow path of the sump inlet fills up and exits into adjacent curb and gutter heading north along South Quintero Way.

Basin B16 (Q_2=1.8 cfs, Q_{100}= 6.7 cfs) is 1.56 acres and 45.9 percent impervious and is comprised of multi-unit detached residential lots and roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 37, a sump inlet at the western edge of the basin. Collected runoff is piped north to Pond B. The emergency overflow path of the sump inlet fills up and exits into adjacent curb and gutter heading northwest.

sump?

JR Response: Addressed.

Basin B17 (Q_2=0.5 cfs, Q_{100}= 1.7 cfs) is 0.26 acres and 6 and is comprised of roadway. Runoff from this basin is collected in the street curb and gutter and drains to design point 36, an on grade inlet at the northern edge of the basin. Collected runoff is piped north to Pond B. The emergency overflow path of the sump inlet fills up and exits into adjacent curb and gutter heading northwest.

Basin B18 (Q_2=4.5 cfs, Q_{100}= 14.4 cfs) is 2.81 acres and 63.8 percent impervious and is comprised of multi-unit attached residential lots. Runoff from this basin is collected in the center alleys and drains to design point 38, an on grade inlet at the northern edge of the basin. Collected runoff is piped northeast to Pond B.

Basin B19 (Q_2=0.3 cfs, Q_{100}= 0.8 cfs) is 0.13 acres and 72.1 percent impervious and is comprised of roadway. Runoff from this basin is collected from the street curb and gutter and drains to design point 39, an on grade inlet at the northwestern corner of the basin. Collected runoff is piped northeast to Pond B.

Basin B20 (Q_2=0.3 cfs, Q_{100}= 0.9 cfs) is 0.15 acres and 63.1 percent impervious and is comprised of roadway. Runoff from this basin is collected from the street curb and gutter and drains to design point 40, an on grade inlet at the northeastern corner of the basin. Collected runoff is piped northeast to Pond B.

Ponds shall be 100% D

Basin B21 (Q_2=0.9 cfs, Q_{100}= 3.1 cfs) is 1.66 acres and 5.0 percent impervious and is comprised of open space and Pond B. Runoff from this ba

JR Response: Addressed. Pond % impervious is now 100%

point 41, Pond B at the northwestern corner of the basin. Fr

E. CONCLUSIONS

1. Compliance with Standards

City of Aurora *Storm Drainage Design and Technical Criteria Manual*, *Roadway Design and Construction Manual*, and *Urban Storm Drainage Criteria Manual* standards have all been complied with. All runoff up to the 100 year event will be safely conveyed through the site by storm drainage infrastructure and released to the outfall points in East Toll Gate Creek.

2. Summary of Concept

a. The proposed design has taken into account contributing 100 year flows from onsite and offsite basins. Proposed drainage patterns conform to both historic and previously approved patterns. Stormwater infrastructure will be designed to convey the 100 year storm event. Detention and water quality has been provided for via the on-site full spectrum facilities.

b. The proposed development will provide necessary inlets and water quality/detention facilities and stormwater infrastructure to provide adequate on-site drainage and enhancement to stormwater quality.

c. The proposed project site will not have any adverse effects on the adjacent upstream or downstream areas. The drainage design generally follows the historic patterns and existing conveyances have been utilized whenever possible. The net effect of this development will be an increase in imperviousness and an increase in runoff flow rates. Streets, gutters, inlets and other storm sewer appurtenances have been designed to mitigate this increase.

LIST OF REFERENCES

1. City of Aurora Storm Drainage Design and Technical Criteria Manual, September 2010.
2. City of Aurora Roadway Design & Construction Specifications, September 2010.
3. Urban Drainage and Flood Control District Criteria Manual, Volumes 1, 2, and 3 Revised August 2018, Volume 2 September 2017, and Volume 3 November 2010.
4. Shea Center Subdivision Filing No. 14 Final Drainage Report, approved October 24, 2001. EDN: 201156
5. Final Drainage Report for Bristol Commercial Center Filing Subdivision Filing No. 6 approved November 20, 2018. EDN 21820
6. Final Drainage Report Tollgate Village Filing No. 14 approved August 20, 2008. EDN: 208094

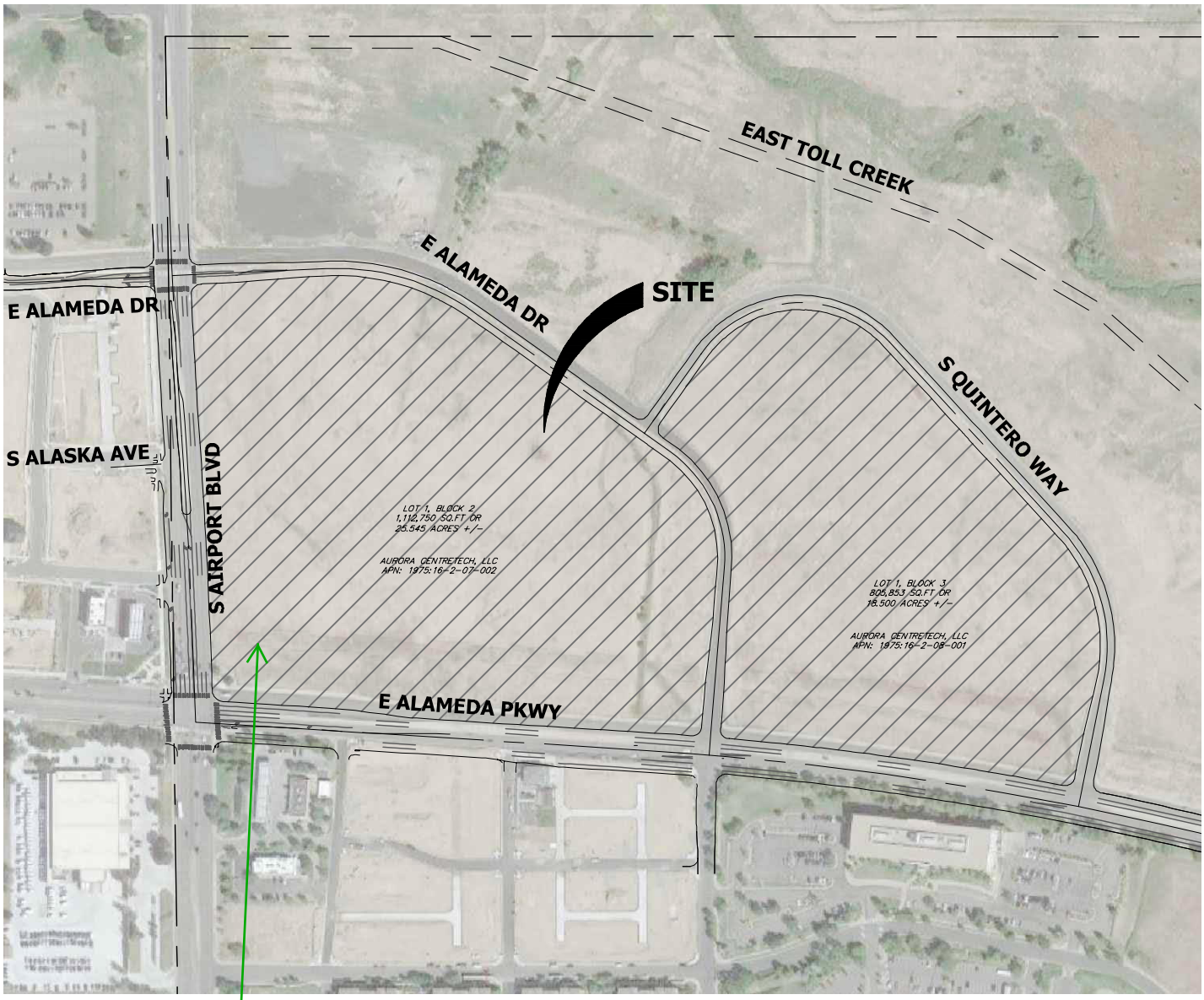
Add Buckley Yard Master Drainage Report (RSN 1501736). MDR has not yet been approved. Please do not resubmit until the MDR is approved.

JR Response: Addressed.

Add Adjacent subdivision drinage report for Buckley Yard FLG #01 (RSN 1535408)

JR Response: Addressed.

VICINITY MAP



Remove Filing 1 Area from hatching.

JR Response: Addressed.

VICINITY MAP
BUCKLEY YARD
JOB NO. 16044.00
10/23/2020
SHEET 1 OF 1

J·R ENGINEERING
A Westrian Company

Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

EXISTING
STANDARD FORM SF-2
TIME OF CONCENTRATION

Subdivision: Buckley Yard - Existing
Location: Aurora

500 max

JR Response: Addressed.

Project Name: Aurora CentreTech
Project No.: 16044.00
Calculated By: CGV
Checked By: AJH
Date: 3/26/21

SUB-BASIN DATA						INITIAL/OVERLAND (T_i)			TRAVEL TIME (T_t)					*tc* CHECK (URBANIZED BASINS)			FINAL
BASIN ID	D.A. (ac)	Hydrologic Soils Group	Impervious (%)	C_2	C_{100}	L (ft)	S_o (%)	t_i (min)	L_t (ft)	S_t (%)	K	VEL. (ft/s)	t_t (min)	COMP. t_c (min)	TOTAL LENGTH (ft)	Urbanized t_c (min)	t_c (min)
EX1	19.58	D	5%	0.18	0.22	533	1.1%	36.9	418	5.5%	10.0	2.3	3.0	39.9	951.0	15.3	15.3
EX2	18.67	D	5%	0.18	0.22	527	3.9%	24.3	91	3.3%	10.0	1.8	0.8	25.1	618.0	13.4	13.4
OS1	0.45	D	100%	0.87	0.93	133	1.1%	4.6	418	5.5%	20.0	4.7	1.5	6.1	551.0	13.1	6.1
OS2	0.40	D	100%	0.87	0.93	170	3.9%	3.4	117	3.3%	20.0	3.6	0.5	4.0	287.0	11.6	5.0

NOTES:

$$t_c = t_i + t_t \quad (5.2)$$

where t_c = time of concentration (minutes)
t_i = initial, inlet, or overland flow time (minutes)
t_t = travel time in the ditch, channel, gutter, storm sewer, etc. (minutes)

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L}}{\sqrt[3]{S}} \quad (5.3)$$

where t_i = initial or overland flow time (minutes)
C_5 = runoff coefficient for 5-year frequency
L = length of overland flow, (ft., 500 ft. max.)
S = average basin slope (ft/ft)

Use a minimum t_c value of 5 minutes for urbanized areas and a minimum t_c value of 10 minutes for areas that are not considered urban. Use minimum values even when calculations result in a lesser time of concentration.

$$I = \frac{28.5\ P_1}{(10 + T_C)^{0.786}} \quad (5.5)$$

Where:
I = rainfall intensity (inches per hour)
P_1 = one-hour rainfall depth (inches) from Figures RA-1 through RA-6 in USDCM, Volume 1
T_c = time of concentration (minutes).

$$t_c = \frac{L'}{180} + 10 \quad (5.4)$$

Where t_c = time of concentration (minutes)

L' = length of flow to first design point from the most remote point (feet)

Table 6-2. NRCS Conveyance factors, K

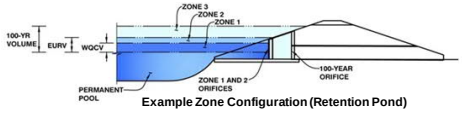
Type of Land Surface	Conveyance Factor, K
Heavy meadow	2.5
Tillage/field	5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: Aurora CentreTech

Basin ID: Pond A



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	19.70	acres
Watershed Length =	1,280	ft
Watershed Length to Centroid =	660	ft
Watershed Slope =	0.050	ft/ft
Watershed Imperviousness =	46.02%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	24.0	hours
Location for 1-hr Rainfall Depths =	User Input	

Drain Time Too Short

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) =	0.321	acre-feet	acre-feet
Excess Urban Runoff Volume (EURV) =	0.852	acre-feet	acre-feet
2-yr Runoff Volume (P1 = 1.01 in.) =	0.740	acre-feet	1.01 inches
5-yr Runoff Volume (P1 = 1.41 in.) =	1.308	acre-feet	1.41 inches
10-yr Runoff Volume (P1 = 1.66 in.) =	1.698	acre-feet	1.66 inches
25-yr Runoff Volume (P1 = 2.02 in.) =	2.345	acre-feet	2.02 inches
50-yr Runoff Volume (P1 = 2.36 in.) =	2.910	acre-feet	2.36 inches
100-yr Runoff Volume (P1 = 2.72 in.) =	3.574	acre-feet	2.72 inches
500-yr Runoff Volume (P1 = 3.14 in.) =	4.280	acre-feet	inches
Approximate 2-yr Detention Volume =	0.635	acre-feet	
Approximate 5-yr Detention Volume =	1.067	acre-feet	
Approximate 10-yr Detention Volume =	1.228	acre-feet	
Approximate 25-yr Detention Volume =	1.423	acre-feet	
Approximate 50-yr Detention Volume =	1.534	acre-feet	
Approximate 100-yr Detention Volume =	1.818	acre-feet	

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.321	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.531	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.966	acre-feet
Total Detention Basin Volume =	1.818	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_{LW}) =	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 = 0.50 ft

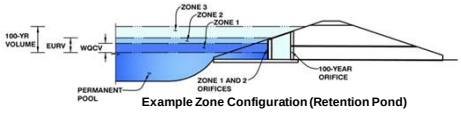
Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
Top of Micropool	--	0.00	--	--	--	50	0.001		
5473	--	0.50	--	--	--	1,826	0.042	469	0.011
5473.5	--	1.00	--	--	--	6,980	0.160	2,670	0.061
5474	--	1.50	--	--	--	11,813	0.271	7,369	0.169
5474.5	--	2.00	--	--	--	16,472	0.378	14,440	0.331
5475	--	2.50	--	--	--	21,686	0.498	23,979	0.550
5475.5	--	3.00	--	--	--	24,720	0.567	35,581	0.817
5476	--	3.50	--	--	--	26,045	0.598	48,272	1.108
5476.5	--	4.00	--	--	--	27,394	0.629	61,632	1.415
5477	--	4.50	--	--	--	28,768	0.660	75,672	1.737
5477.5	--	5.00	--	--	--	30,168	0.693	90,406	2.075
5478	--	5.50	--	--	--	31,593	0.725	105,847	2.430
5478.5	--	6.00	--	--	--	33,082	0.759	122,015	2.801

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.03 (May 2020)

Project: Aurora CentreTech

Basin ID: Pond B



Example Zone Configuration (Retention Pond)

Watershed Information

Selected BMP Type =	EDB	
Watershed Area =	18.74	acres
Watershed Length =	1,418	ft
Watershed Length to Centroid =	520	ft
Watershed Slope =	0.020	ft/ft
Watershed Imperviousness =	43.57%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	24.0	hours
Location for 1-hr Rainfall Depths =	User Input	

Drain Time Too Short

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) =	0.295	acre-feet		acre-feet
Excess Urban Runoff Volume (EURV) =	0.764	acre-feet		acre-feet
2-yr Runoff Volume (P1 = 1.01 in.) =	0.677	acre-feet	1.01	inches
5-yr Runoff Volume (P1 = 1.41 in.) =	1.219	acre-feet	1.41	inches
10-yr Runoff Volume (P1 = 1.66 in.) =	1.594	acre-feet	1.66	inches
25-yr Runoff Volume (P1 = 2.02 in.) =	2.221	acre-feet	2.02	inches
50-yr Runoff Volume (P1 = 2.36 in.) =	2.766	acre-feet	2.36	inches
100-yr Runoff Volume (P1 = 2.72 in.) =	3.411	acre-feet	2.72	inches
500-yr Runoff Volume (P1 = 3.14 in.) =	4.093	acre-feet		inches
Approximate 2-yr Detention Volume =	0.568	acre-feet		
Approximate 5-yr Detention Volume =	0.965	acre-feet		
Approximate 10-yr Detention Volume =	1.112	acre-feet		
Approximate 25-yr Detention Volume =	1.293	acre-feet		
Approximate 50-yr Detention Volume =	1.395	acre-feet		
Approximate 100-yr Detention Volume =	1.668	acre-feet		

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.295	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.469	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	0.904	acre-feet
Total Detention Basin Volume =	1.668	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 = 0.50 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	--	--	--	842	0.019		
5476	--	0.50	--	--	--	4,114	0.094	1,239	0.028
5476.5	--	1.00	--	--	--	9,249	0.212	4,580	0.105
5477	--	1.50	--	--	--	16,112	0.370	10,920	0.251
5477.5	--	2.00	--	--	--	17,379	0.399	19,293	0.443
5478	--	2.50	--	--	--	18,676	0.429	28,306	0.650
5478.5	--	3.00	--	--	--	20,005	0.459	37,977	0.872
5479	--	3.50	--	--	--	21,365	0.490	48,319	1.109
5479.5	--	4.00	--	--	--	22,756	0.522	59,349	1.362
5480	--	4.50	--	--	--	24,177	0.555	71,083	1.632
5480.5	--	5.00	--	--	--	25,631	0.588	83,535	1.918
5481	--	5.50	--	--	--	27,115	0.622	96,721	2.220
5481.5	--	6.00	--	--	--	28,630	0.657	110,657	2.540
5482	--	6.50	--	--	--	30,176	0.693	125,359	2.878
5482.5	--	7.00	--	--	--	31,754	0.729	140,841	3.233

Do not include sizing of orifices or restrictor plates in PDR.

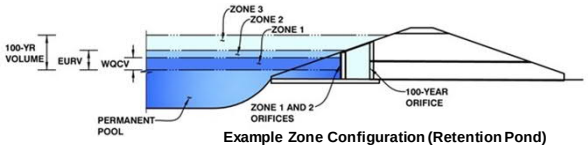
JR Response: Sheet included for emergency spillway calcs and elevation.

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.03 (May 2020)

Project: Aurora CentreTech

Basin ID: Pond A



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.98	0.321	Orifice Plate
Zone 2 (EURV)	3.07	0.531	Orifice Plate
Zone 3 (100-year)	4.63	0.966	Weir&Pipe (Restrict)
Total (all zones)		1.818	

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	ft²
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)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	2.194E-02	ft²
Depth at top of Zone using Orifice Plate =	3.36	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	13.40	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	3.16	sq. inches (diameter = 2 inches)	Elliptical Slot Area =	N/A	ft²

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	1.12	2.24					
Orifice Area (sq. inches)	3.16	3.16	3.16					

	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			Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A	ft²
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A	feet
Vertical Orifice Diameter =	N/A	N/A	inches				

Calculated Parameters for Vertical Orifice

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			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	3.36	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	4.36	N/A	feet
Overflow Weir Front Edge Length =	5.00	N/A	feet	Overflow Weir Slope Length =	4.12	N/A	feet
Overflow Weir Grate Slope =	4.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	6.64	N/A	
Horiz. Length of Weir Sides =	4.00	N/A	feet	Overflow Grate Open Area w/o Debris =	16.49	N/A	ft²
Overflow Grate Open Area % =	80%	N/A	%, grate open area/total area	Overflow Grate Open Area w/ Debris =	8.25	N/A	ft²
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

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

	Zone 3 Restrictor	Not Selected			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 Orifice Area =	2.48	N/A	ft²
Outlet Pipe Diameter =	24.00	N/A	inches	Outlet Orifice Centroid =	0.82	N/A	feet
Restrictor Plate Height Above Pipe Invert =	17.70		inches	Half-Central Angle of Restrictor Plate on Pipe =	2.07	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	4.90	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.92	feet
Spillway Crest Length =	21.00	feet	Stage at Top of Freeboard =	6.82	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	0.76	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	2.80	acre-ft

Calculated Parameters for Spillway

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	1.01	1.41	1.66	2.02	2.36	2.72	3.14
CUHP Runoff Volume (acre-ft) =	0.321	0.852	0.740	1.308	1.698	2.345	2.910	3.574	4.280
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.740	1.308	1.698	2.345	2.910	3.574	4.280
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	1.5	8.5	12.4	22.1	28.9	36.8	45.2
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.07	0.43	0.63	1.12	1.47	1.87	2.29
Peak Inflow Q (cfs) =	N/A	N/A	12.8	24.2	30.1	42.5	52.2	64.4	76.5
Peak Outflow Q (cfs) =	0.2	0.4	0.4	1.7	4.8	13.8	21.2	30.5	39.5
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.2	0.4	0.6	0.7	0.8	0.9
Structure Controlling Flow =	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Spillway
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.1	0.3	0.8	1.3	1.8	1.9
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) =	24	41	38	48	47	45	43	41	40
Time to Drain 99% of Inflow Volume (hours) =	25	43	41	51	51	50	50	49	48
Maximum Ponding Depth (ft) =	1.98	3.07	2.75	3.59	3.85	4.28	4.53	4.83	5.15
Area at Maximum Ponding Depth (acres) =	0.37	0.57	0.53	0.60	0.62	0.65	0.66	0.68	0.70
Maximum Volume Stored (acre-ft) =	0.324	0.857	0.679	1.162	1.321	1.587	1.757	1.959	2.180

Do not include sizing of orifices or restrictor plates in PDR.

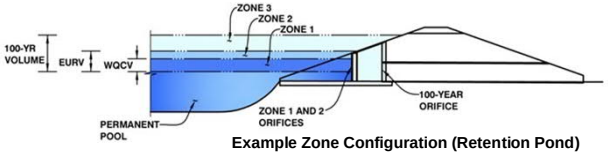
JR Response: Sheet included for emergency spillway calcs and elevation.

OUTLET STRUCTURE DESIGN

...on, Version 4.03 (May 2020)

Project: Aurora CentreTech

Basin ID: Pond B



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.62	0.295	Orifice Plate
Zone 2 (EURV)	2.77	0.469	Orifice Plate
Zone 3 (100-year)	4.57	0.904	Weir&Pipe (Restrict)
Total (all zones)		1.668	

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)

Invert of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	2.549E-02	ft^2
Depth at top of Zone using Orifice Plate =	3.36	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	13.40	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	3.67	sq. inches (use rectangular openings)	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	1.12	2.24					
Orifice Area (sq. inches)	3.67	3.67	3.67					

	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			Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A	feet
Vertical Orifice Diameter =	N/A	N/A	inches				

Calculated Parameters for Vertical Orifice

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			Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	2.78	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	3.78	N/A	feet
Overflow Weir Front Edge Length =	4.00	N/A	feet	Overflow Weir Slope Length =	4.12	N/A	feet
Overflow Weir Grate Slope =	4.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	6.47	N/A	
Horiz. Length of Weir Sides =	4.00	N/A	feet	Overflow Grate Open Area w/o Debris =	13.19	N/A	ft^2
Overflow Grate Open Area % =	80%	N/A	%, grate open area/total area	Overflow Grate Open Area w/ Debris =	6.60	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

Calculated Parameters for Overflow Weir

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

	Zone 3 Restrictor	Not Selected			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 Orifice Area =	2.04	N/A	ft^2
Outlet Pipe Diameter =	30.00	N/A	inches	Outlet Orifice Centroid =	0.63	N/A	feet
Restrictor Plate Height Above Pipe Invert =	13.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.44	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	5.50	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.90	feet
Spillway Crest Length =	18.00	feet	Stage at Top of Freeboard =	7.40	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	0.73	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	3.23	acre-ft

Calculated Parameters for Spillway

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	1.01	1.41	1.66	2.02	2.36	2.72	3.14
CUHP Runoff Volume (acre-ft) =	0.295	0.764	0.677	1.219	1.594	2.221	2.766	3.411	4.093
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	0.677	1.219	1.594	2.221	2.766	3.411	4.093
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	1.2	6.9	10.2	18.2	23.9	30.8	37.8
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.06	0.37	0.54	0.97	1.27	1.64	2.02
Peak Inflow Q (cfs) =	N/A	N/A	10.1	19.6	24.7	35.3	43.7	53.7	64.1
Peak Outflow Q (cfs) =	0.2	0.4	0.4	3.3	7.2	16.1	23.3	25.1	26.3
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.5	0.7	0.9	1.0	0.8	0.7
Structure Controlling Flow =	Plate	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1
Max Velocity through Grate 1 (fps) =	N/A	N/A	N/A	0.2	0.5	1.2	1.7	1.8	1.9
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) =	24	39	38	42	41	39	37	35	33
Time to Drain 99% of Inflow Volume (hours) =	26	42	41	46	45	44	44	43	42
Maximum Ponding Depth (ft) =	1.62	2.77	2.43	3.20	3.46	3.85	4.09	4.64	5.31
Area at Maximum Ponding Depth (acres) =	0.38	0.45	0.42	0.47	0.49	0.51	0.53	0.56	0.61
Maximum Volume Stored (acre-ft) =	0.295	0.768	0.616	0.965	1.090	1.285	1.410	1.710	2.103

1st Review

BUCKLEY YARD SUBDIVISION FILING NO. 2

emergency overflow arrows and cross sections required for sump inlets (typ.)

JR Response: Addressed.

Pond certification will be required.

JR Response: Noted. We will work on this with Engineering Division at time of final.

Include WSEL for the 10-yr and 100-yr and WQCV, allowable release rates, maximum depth.

JR Response: Addressed

Show and label FEMA floodplain limits, Cross Sections and BFEs.

JR Response: Addressed.

Label cross pan

JR Response: Addressed.

Assess that this culvert has capacity for the pond release rate. In final drainage, riprap at downstream end of this culvert will be required to be analyzed.

COA freeboard requirement: 1' min from 100yr WSEL to spillway crest. COA considers 100yr to be 100yr +1/2EURV for full spectrum ponds. Full spectrum detention required per MD (RSN 1501736). MHFD freeboard requirement: 1' min freeboard from 100yr WSEL over emergency weir up to top of embankment. PD must include calc of 100yr WSEL over weir to determine freeboard.

JR Response: Freeboard requirement: Addressed.

100 yr + 1/2 EURV requirement: See Richard Ommert's comment on page 36 of the 4th review of the Buckley Yard Master Drainage Report/ below snip. Our understanding was that the 100 yr + 1/2 EURV was not required here.

Inlude summary of flows at design points.

JR Response: Addressed. See page 1 for Summary & Design Point tables

EX 24" RCP (PUBLIC)

EX INLET (PUBLIC)

JR Response: Noted. This will be analyzed at time of final design. Pipe may need to be removed, upsized, and reworked downstream to accomodate.

LAGE #14 (REV. MAY 2008) EDN: C4-2-14 (JULY 1980)

Show/label maintenance access to bottom of pond, forebays and to top of outlet structure (not through the bottom of the pond). Label slopes - 4:1 max side slope, 2% min. slope in pond bottom, show/label 100-yr water surface elevation, show location and direction of emergency overflow with unique arrow. Show tract for pond.

E ALAMEDA DR

WQ/DETENTION POND A REQUIRED VOL: 2.08 AC-FT

Label Buckley Yard Filing 1 (RSN 1535408)

JR Response: Addressed.

JR Response: Addressed.

30", public, to be removed.

This private drive will be constructed under Buckley Yard Filing 1 (RSN 1535408).

JR Response: Addressed.

Label retaining wall height. Preliminary section and material not required.

License agreement will be required where private storm crosses public ROW.

drainage area >2 x lot area, collect flows here to mitigate this, provide emergency overflow path, provide cross section in PD.

JR Response: Addressed. Sump inlet and swale added here to mitigate this

JR Response: Addressed.

JR Response: Noted. We will work on this with real property at time of final.

JR Response: Noted. We will work on this with real property at time of final.

License agreement will be required where private storm crosses public ROW.

EXISTING DRAINAGE DITCH

Label slopes (typ.)

JR Response: Addressed.

Inlets required.

JR Response: Addressed. See Basins A13A-A13l on Drainage Map.

ALtime of civils, show that these are not sheet flowing across sidewalk.

JR Response: Noted.

Inlets required.

JR Response: We don't believe inlets are needed ere because of the limited runoff area.

PROPOSED 36" RCP

Show offsite basins in report for areas draining to this pipe to provide 100-yr flow for this pipe. Show easements.

JR Response: Addressed. See Buckley Yard Master Drainage Report in Appendix D for offsite basins & tributary areas. This is now referenced in the plan

EX 24" RCP (PUBLIC)

EX 18" RCP (PUBLIC)

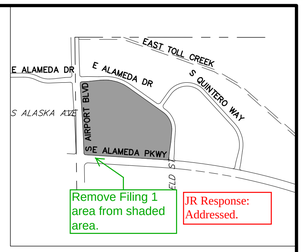
2% min required.

JR Response: Addressed.

E ALAMEDA PKWY

Show offsite basins in report for areas draining to this pipe to provide 100-yr flow for this pipe.

JR Response: Addressed. See Buckley Yard Master Drainage Report in Appendix D for offsite basins & tributary areas. This is now referenced in the plan



Remove Filing 1 area from shaded area.

JR Response: Addressed.

VICINITY MAP

1"=1000'

BASIN SUMMARY TABLE

Tributary Sub-basin	Area (acres)	Percent Impervious	C_5	C_{100}	Q_5 (cfs)	Q_{100} (cfs)
A11	0.09	80%	0.73	0.79	0.2	0.6
A12	0.07	70%	0.70	0.75	0.2	0.5
A13	0.81	61%	0.55	0.67	1.4	4.5
A14	0.08	63%	0.61	0.65	0.2	0.5
A15	0.26	71%	0.67	0.71	0.6	1.7
A16	0.11	73%	0.68	0.73	0.3	0.7
A17	1.87	54%	0.50	0.61	2.4	7.9
A18	0.18	70%	0.66	0.70	0.4	1.2
A19	0.20	68%	0.64	0.69	0.4	1.3
A20	0.13	56%	0.56	0.60	0.2	0.7
A21	2.85	15%	0.25	0.29	2.0	6.3
B1	1.21	45%	0.45	0.54	1.6	5.0
B2	0.63	38%	0.38	0.49	0.7	2.4
B3	0.69	47%	0.47	0.55	0.8	2.7
B4	0.09	73%	0.68	0.72	0.2	0.6
B5	3.55	45%	0.45	0.54	4.3	13.8
B6	0.30	49%	0.46	0.57	0.4	1.4
B7	0.29	67%	0.63	0.68	0.6	1.8
B8	0.82	48%	0.43	0.57	1.0	3.7
B9	0.36	60%	0.56	0.64	0.5	1.6
B10	0.19	56%	0.50	0.63	0.3	1.0
B11	0.57	51%	0.44	0.60	0.8	2.8
B12	0.53	45%	0.41	0.55	0.7	2.5
B13	1.83	16%	0.25	0.30	1.2	3.8
B14	0.20	63%	0.60	0.65	0.4	1.1
B15	0.91	46%	0.41	0.56	1.1	4.1
B16	1.56	46%	0.41	0.56	1.8	6.7
B17	0.26	67%	0.63	0.68	0.5	1.7
B18	2.81	64%	0.57	0.69	4.5	14.4
B19	0.13	72%	0.67	0.72	0.3	0.8
B20	0.15	63%	0.61	0.65	0.3	0.9
B21	1.66	5%	0.18	0.22	0.9	3.1
OS1*	0.45	100%	0.87	0.93	1.2	3.5
OS2*	0.40	100%	0.87	0.93	1.1	3.3
DP OS1						28.7
DP OS2						3.3

Pond B

WQCV (in):	0.208
WQCV (ac-ft):	0.427
P_{1hr}:	0.107
P_{6hr}:	0.956
V100 (ac-ft):	2.092
V10 (ac-ft):	1.093
EURV Volume from UDFCD Spreadsheet (ac-ft):	1.144
100-yr Detention Volume from UDFCD Spreadsheet (ac-ft):	2.195
Total Required Volume (100-yr+0.5EURV) (ac-ft):	2.925
Release rate 10-yr (cfs)	1.851
Release rate 100-yr (cfs)	19.580
Max Release rate including offsite 100-yr (cfs)	48.230

Pond C

WQCV (in):	0.207
WQCV (ac-ft):	0.329
P_{1hr}:	0.101
P_{6hr}:	0.952
V100 (ac-ft):	1.882

Due to the proximity to the airport the 1/2 EURV can be included within the 100-year storage volume. typical.

JR Response: Addressed. The Total Required Volume (100-yr+0.5EURV) row has been removed. 1/2 EURV volume is included within the 100 yr storage volume.

JR Response: Addressed.

(ac-ft)

JR Response: Addressed.

DETENTION POND SUMMARY TABLE

	Tributary Area	WQCV (ac-ft)	EURV	V_{100} (ac-ft)	100 YR + 1/2 EURV	Q_{100IN} plus offsite	Q_{100out} plus offsite	Pond Volume Provided
Pond A	19.66	0.34	0.85	1.64	2.24	108.84	48.31	2.08
Pond B	5.65	0.43	1.14	2.09	2.05	79.21	22.04	2.54

Please update numbers in this table to match drainage report

JR Response: Addressed.

* SEE HISTORIC DRAINAGE CALCS IN

LEGEND:

- PROPOSED STORM SEWER
- 5000 PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- 5000 EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- DRAINAGE BASIN
- A = BASIN DESIGNATION; B = AREA IN ACRES; C = 2-YR RUNOFF COEFFICIENT; D = 100-YR RUNOFF COEFFICIENT
- 1 DESIGN POINT
- HP HIGH POINT
- LP LOW POINT
- DRAINAGE ARROW
- EXISTING DRAINAGE ARROW
- POND EMERGENCY OUTFLOW
- PROPOSED DRAINAGE SWALE
- 100 YR 100 YR FLOODPLAIN
- 500 YR 500 YR FLOODPLAIN
- 54XX BASE FLOOD ELEVATION
- FEMA FLOODWAY

EXISTING 5100 PROPOSED 5100

This is not clearly shown in plan view.

JR Response: Addressed.

BENCHMARK

ELEVATIONS ARE BASED OFF OF CITY OF AURORA CONTROL BENCHMARK NO. 04S6616NW002 A 3" DIAM. BRASS CAP ON THE EAST SIDE OF A CURB OPENING INLET STRUCTURE BEING AT THE EAST PCR AT THE S.E. CORNER OF ALAMEDA PARKWAY AND S. BUCKLEY RD. SAID CAP BEING 3.0 FT. S. OF THE FLOWLINE. LOOPED TO AKA 11-053
BENCHMARK #0456616NW002
AURORA DATUM = 5503.43.
NAVD 1988

NOTES:

1. FEMA FLOODPLAIN INFORMATION OBTAINED FROM FIRM MAP NUMBER 08005C0183L EFFECTIVE 9/4/2020.
2. ALL STORM INFRASTRUCTURE WILL BE PRIVATE AND WILL BE MAINTAINED BY THE SPECIAL DISTRICTS.
3. ALL STORM INFRASTRUCTURE WILL BE PRIVATE AND SIZED FOR THE 100YR EVENT.

ENGINEER'S STATEMENT

THIS REPRODUCIBLE SEPIA IS A FACSIMILE OF A SIGNED AND SEALED PRINT TRANSMITTED TO THE CITY OF AURORA, ENGINEERING DEPARTMENT.

PREPARED UNDER MY SUPERVISION

(KURTIS WILLIAMS), P.E.
COLORADO P.E. 34270
FOR AND ON BEHALF OF JR ENGINEERING, LLC.

COLORADO REGISTERED KURTIS W. WILLIAMS 34270 DATE PROFESSIONAL ENGINEER

Remove stamp until signature set is regnested

JR Response: Addressed.

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 THE 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.

Approved For One Year From This Date	
City Engineer	Date
Water Department	Date

1"=30' required for multi-family

JR Response: Addressed.

60 30 0 60 120

ORIGINAL SCALE: 1" = 60'

PROPOSED CONDITIONS MAP
BUCKLEY YARD
JOB NO. 16044.00
04/12/21
SHEET 1 OF 2

J·R ENGINEERING
A Westrian Company

Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com

RD SUBDIVISION FILING NO. 2

JR Response: Noted. The permit will be processed at the time of final design. Finished floor elevation will be a minimum of 2' above the BFE and lots will be a minimum of 1' above the BFE.

Floodplain Development Permit will be required. Show setbacks and FFEs for lots adjacent to floodplain. LFEs required to be 2 ft min above BFE. Lots required to be 1 ft min above BFE. Elevation certificates will be required at the time of civil plans for lots adjacent to pond.

24", label as public, assess that this culvert has capacity for the pond release rate. In final drainage, riprap at downstream end of this culvert will be required to be analyzed. Backflow preventer device may be required. Use Toll Gate 100-yr BFE as tailwater for pond outfall.

Pond certification will be required.

JR Response: Noted. We will work on this with Engineering Division at time of final.

Include 10-yr and 100-yr volumes (including WQCV), WSEL for the 10-yr and 100-yr and WQCV, allowable release rates, maximum depth.

JR Response: Addressed.

Show and label FEMA floodplain limits, Cross Sections and BFEs.

JR Response: Addressed.

COA freeboard requirement: 1' min from 100yr WSEL to spillway crest. COA considers 100yr to be 100yr +1/2EURV for full spectrum ponds. Full spectrum detention required per MD (RSN 1501736). MHFD freeboard requirement: 1' min freeboard from 100yr WSEL over emergency weir up to top of embankment. PD must include calc of 100yr WSEL over weir to determine freeboard.

JR Response: See page 1 response.

Label BFEs and FEMA XSECs

JR Response: Addressed.

Label retaining wall height. Preliminary section and material not required. At time of civils, be advised to submit a structural report for these walls that takes into account saturated soil conditions, potentially global stability analysis depending on spacing of walls and height of walls.

JR Response: Noted. We will work on this at time of final design.

JR Response: Noted.

Show/label maintenance access to bottom of pond, forebays, and to top of outlet structure (not through the bottom of the pond). Label slopes - 4:1 max side slope, 2% min. slope in pond bottom, show/label 100-yr water surface elevation, show location and direction of emergency overflow with unique arrow. Show tract for pond.

JR Response: Addressed.

Show flow direction arrows

JR Response: Addressed.

Show, dimension, and label ROW, existing and proposed easements (drainage, utility, fire land, etc.), and tract dimensions.

JR Response: Addressed.

emergency overflows required for sump inlets (provide cross section and flow arrow, show that it can overtop high point in street, place top of foundation above that)

JR Response: Addressed. See Appendix C sump inlet overflow cross sections.

Use higher of BFE and 100-yr pond elevation for tailwater for HGL analysis. Please include HGL analysis in this PDR far enough upstream to demonstrate that discharging into Toll Gate Creek is not going to flood any of the lots, due to the tailwater concerns from the Toll Gate Creek BFE.

emergency overflow arrows and cross sections required for sump inlets (typ.)

JR Response: HGL analysis will be co,pleted at the time of final design.

JR Response: HGL analysis will be co,pleted at the time of final design.

Advisory note: storm drain in alley, potential utility conflicts. How will manholes work in valley gutter, provide details at time of civils.

JR Response: Noted.

More flow arrows and slope labels are needed in this area.

JR Response: Addressed.

At time of civils, show that it is not sheet flowing across sidewalk.

JR Response: Noted.

emergency overflow arrows and cross sections required for sump inlets (typ.)

JR Response: Addressed.

Garage slabs must be 0.5' above 100-yr, finished floor 1' above 100-yr WSE in alley.

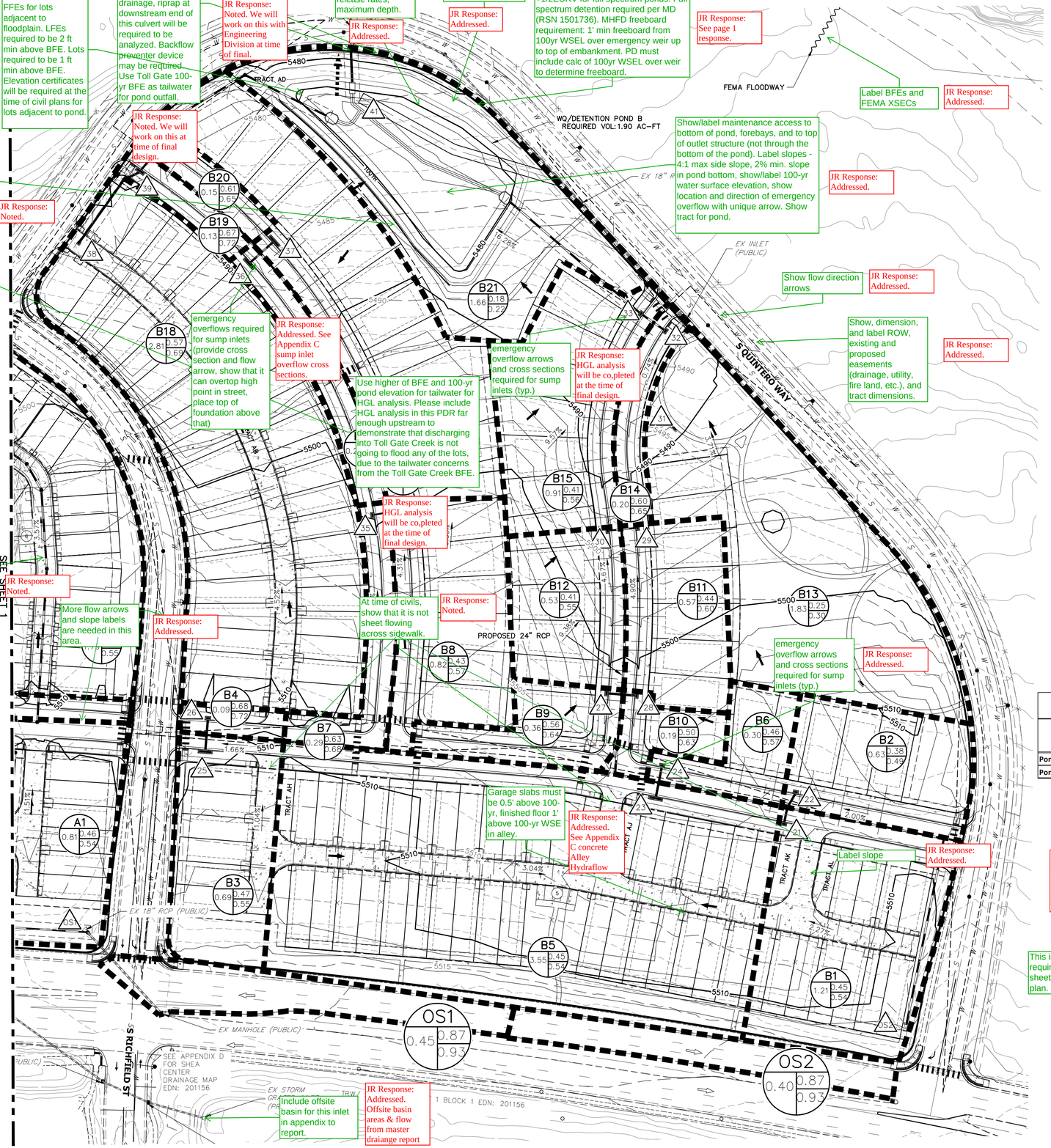
JR Response: Addressed. See Appendix C concrete Alley Hydraflow

Label slope

JR Response: Addressed.

Include offsite basin for this inlet in appendix to report.

JR Response: Addressed. Offsite basin areas & flow from master draiange report



BASIN SUMMARY TABLE

Tributary Sub-basin	Area (acres)	Percent Impervious	C_2	C_{100}	Q_2 (cfs)	Q_{100} (cfs)
A1	0.81	46%	0.46	0.54	1.0	3.1
A2	2.86	49%	0.47	0.57	3.7	12.0
A3	3.46	59%	0.56	0.63	4.6	13.8
A5	0.26	78%	0.71	0.76	0.6	1.8
A6	0.34	63%	0.61	0.65	0.7	2.0
A7	0.22	76%	0.70	0.75	0.5	1.6
A8	1.67	39%	0.40	0.49	1.7	5.7
A9	1.79	46%	0.45	0.55	2.3	7.5
A10	1.60	44%	0.44	0.53	2.1	6.9
A11	0.09	80%	0.73	0.78	0.2	0.6
A12	0.07	76%	0.70	0.75	0.2	0.5
A13	0.81	61%	0.55	0.67	1.4	4.5
A14	0.08	63%	0.61	0.65	0.2	0.5
A15	0.26	71%	0.67	0.71	0.6	1.7
A16	0.11	73%	0.68	0.73	0.3	0.7
A17	1.87	54%	0.50	0.61	2.4	7.9
A18	0.18	70%	0.66	0.70	0.4	1.2
A19	0.20	68%	0.64	0.69	0.4	1.3
A20	0.13	56%	0.56	0.60	0.2	0.7
A21	2.85	15%	0.25	0.29	2.0	6.3
B1	1.21	45%	0.45	0.54	1.6	5.0
B2	0.63	38%	0.38	0.49	0.7	2.4
B3	0.69	47%	0.47	0.55	0.8	2.7
B4	0.09	73%	0.68	0.72	0.2	0.6
B5	3.55	45%	0.45	0.54	4.3	13.8
B6	0.30	49%	0.46	0.57	0.4	1.4
B7	0.29	67%	0.63	0.68	0.6	1.8
B8	0.82	48%	0.43	0.57	1.0	3.7
B9	0.36	60%	0.56	0.64	0.5	1.6
B10	0.19	56%	0.50	0.63	0.3	1.0
B11	0.57	51%	0.44	0.60	0.8	2.8
B12	0.53	45%	0.41	0.55	0.7	2.5
B13	1.83	16%	0.25	0.30	1.2	3.8
B14	0.20	63%	0.60	0.65	0.4	1.1
B15	0.91	46%	0.41	0.56	1.1	4.1
B16	1.56	46%	0.41	0.56	1.8	6.7
B17	0.26	67%	0.63	0.68	0.5	1.7
B18	2.81	64%	0.57	0.69	4.5	14.4
B19	0.13	72%	0.67	0.72	0.3	0.8
B20	0.15	63%	0.61	0.65	0.3	0.9
B21	1.66	5%	0.18	0.22	0.9	3.1
OS1*	0.45	100%	0.87	0.93	1.2	3.5
OS2*	0.40	100%	0.87	0.93	1.1	3.3
DP OS1						28.7
DP OS2						3.3

(ac-ft)

JR Response: Addressed.

DETENTION POND SUMMARY TABLE

	Tribuatry Area	WQCV (ac-ft)	EURV	V_{100} (ac-ft)	100 YR + 1/2 EURV	Q_{100IN} plus offsite	Q_{100out} plus offsite	Pond Volume Provided
Pond A	19.66	0.34	0.53	1.82	2.08	108.84	48.31	2.08
Pond B	18.74	0.04	0.47	1.67	1.90	79.21	22.04	2.54

must treat for offsite areas (I calculate 0.29 ac-ft)

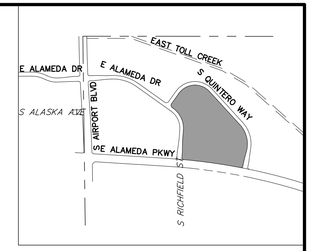
I calculate 0.85 for Pond B

Please update numbers in this table to match drainage report

JR Response: Addressed. WQCV calculated to be 0.276 ac-ft using 18.74 ac of Basin B & 0.4 ac of offsite area.

JR Response: Addressed. EURV is 0.781 ac-ft per Pond B MHFD spreadsheet.

JR Response: Addressed.



VICINITY MAP
1"=1000'

LEGEND:

- PROPOSED STORM SEWER
- 5000 PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- 5000 EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- DRAINAGE BASIN
- A = BASIN DESIGNATION; B = AREA IN ACRES; C = 2-YR RUNOFF COEFFICIENT; D = 100-YR RUNOFF COEFFICIENT
- 1 DESIGN POINT
- HP HIGH POINT
- LP LOW POINT
- DRAINAGE ARROW
- EXISTING DRAINAGE ARROW
- POND EMERGENCY OUTFLOW
- PROPOSED DRAINAGE SWALE
- 100 YR 100 YR FLOODPLAIN
- 500 YR 500 YR FLOODPLAIN
- 54XX BASE FLOOD ELEVATION
- FEMA FLOODWAY
- EXISTING 5100
- PROPOSED 5100

BENCHMARK

ELEVATIONS ARE BASED OFF OF CITY OF AURORA CONTROL BENCHMARK NO. 04S6616NW002 A 3" DIAM. BRASS CAP ON THE EAST SIDE OF A CURB OPENING INLET STRUCTURE BEING AT THE EAST PCR AT THE S.E. CORNER OF ALAMEDA PARKWAY AND S. BUCKLEY RD. SAID CAP BEING 3.0 FT. S. OF THE FLOWLINE. LOOPED TO AKA 11-053
BENCHMARK #0456616NW002
AURORA DATUM = 5503.43.
NAVD 1988

NOTES:

1. FEMA FLOODPLAIN INFORMATION OBTAINED FROM FIRM MAP NUMBER 08005C0183L EFFECTIVE 9/4/2020.
2. ALL STORM INFRASTRUCTURE WILL BE PRIVATE AND WILL BE MAINTAINED BY THE SPECIAL DISTRICTS.
3. ALL STORM INFRASTRUCTURE WILL BE PRIVATE AND SIZED FOR THE 100YR EVENT.

ENGINEER'S STATEMENT

THIS REPRODUCIBLE SEPIA IS A FACSIMILE OF A SIGNED AND SEALED PRINT TRANSMITTED TO THE CITY OF AURORA, ENGINEERING DEPARTMENT.

PREPARED UNDER MY SUPERVISION

(KURTIS WILLIAMS), P.E.
COLORADO P.E. 34270
FOR AND ON BEHALF OF JR ENGINEERING, LLC.

DATE

COLORADO REGISTERED KURTIS W. WILLIAMS 34270 PROFESSIONAL ENGINEER

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 THE 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.

Remove stamp until signature set is reqnested

JR Response: Addressed.

This is only required on first sheet of drainage plan.

JR Response: Addressed.

Approved For One Year From This Date

City Engineer Date

Water Department Date

1"=30' required for multi-family

JR Response: Addressed.

ORIGINAL SCALE: 1" = 60'

PROPOSED CONDITIONS MAP
BUCKLEY YARD
JOB NO. 16044.00
04/12/21
SHEET 2 OF 2

J·R ENGINEERING
A Westrian Company

Centennial 303-740-9393 • Colorado Springs 719-593-2593
Fort Collins 970-491-9888 • www.jrengineering.com