Conceptual Review Agenda

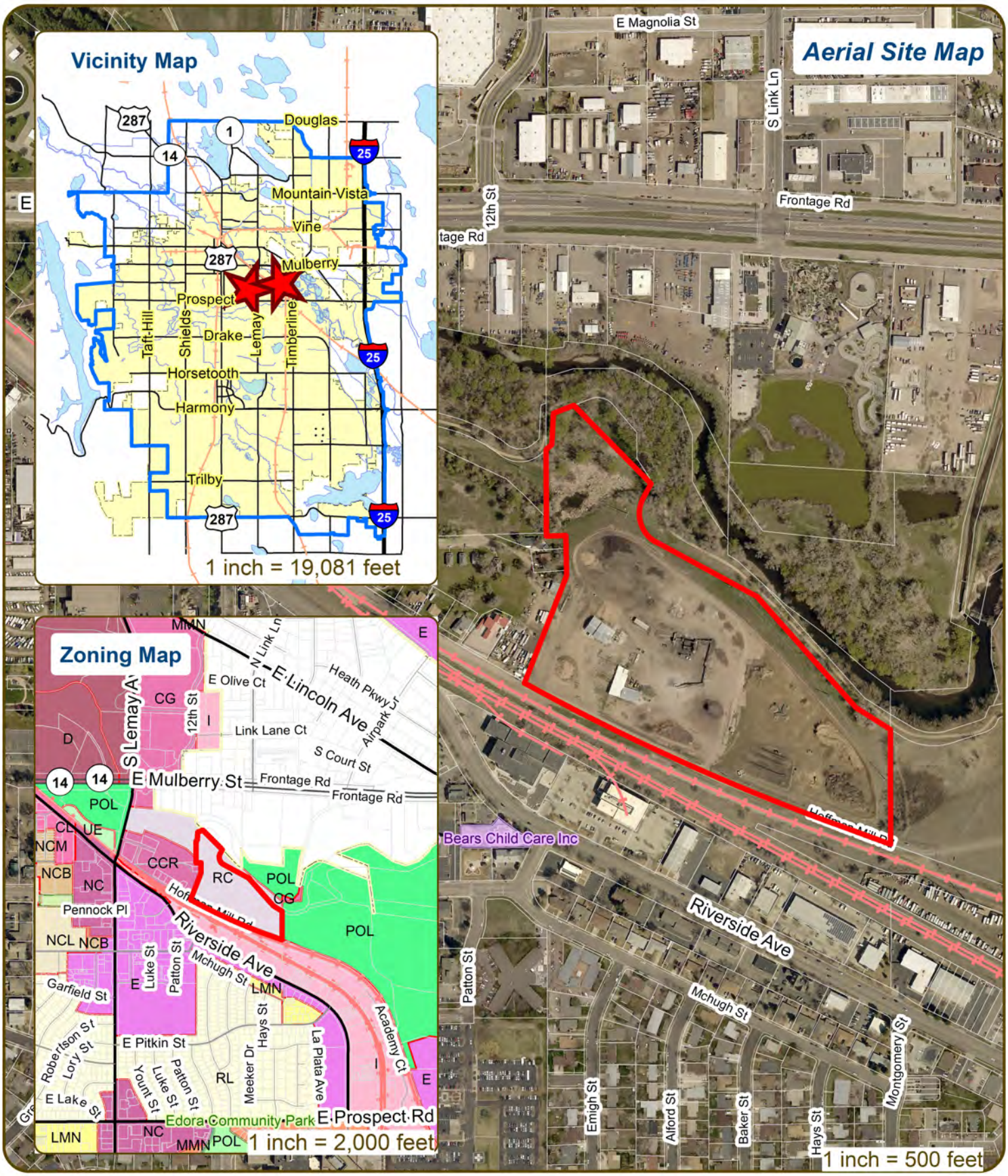
Schedule for 11/18/21

Meetings hosted via Zoom Web Conferencing

Thursday, November 18, 2021

Time	Project Name	Applicant Info	Project Description	
10:15	**Hoffman Mill Weigh Station Minor Amendment** **CDR210089**	Bill Wellborn 970-581-5900 bwellborn@fcgov.com	This is a request for a Minor Amendment to the Hoffman Mill Weigh Station located at 1300 Hoffman Mill Rd (parcel # 8718240901). The proposal is to construct a new truck scale along with other site improvements related to erosion control. Access is taken from Hoffman Mill Rd directly to the south, and Poudre River Dr to the northwest. The property is within the River Conservation (RC) zone district and the Minor Amendment is subject to a Planning & Zoning Commission (Type 2) Review since it is a City project.	Planner: Kai Kleer Engineer: Dave Betley DRC: Tenae Beane

Hoffman Mill Weigh Station
Minor Amendment



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City of Fort Collins GIS

Development Review Guide – STEP 2 of 8

CONCEPTUAL REVIEW:
APPLICATION

General Information
All proposed development projects begin with Conceptual Review. Anyone with a development idea can schedule a Conceptual Review meeting to get feedback on prospective development ideas. At this stage, the development idea does not need to be finalized or professionally presented. However, a sketch plan and this application must be submitted to City Staff prior to the Conceptual Review meeting. The more information you are able to provide, the better feedback you are likely to get from the meeting. Please be aware that any information submitted may be considered a public record, available for review by anyone who requests it, including the media. The applicant acknowledges that they are acting with the owner's consent.

Conceptual Reviews are scheduled on three Thursday mornings per month on a "first come, first served" basis and are a free service. One 45 meeting is allocated per applicant and only three conceptual reviews are done each Thursday morning. A completed application must be submitted to reserve a Conceptual Review time slot. **Complete applications and sketch plans must be submitted to City Staff on Thursday, no later than end of day, two weeks prior to the meeting date.** Application materials must be e-mailed to currentplanning@fcgov.com. If you do not have access to e-mail, other accommodations can be made upon request.

At Conceptual Review, you will meet with Staff from a number of City departments, such as Community Development and Neighborhood Services (Zoning, Current Planning, and Development Review Engineering), Light and Power, Stormwater, Water/Waste Water, Advance Planning (Long Range Planning and Transportation Planning) and Poudre Fire Authority. Comments are offered by staff to assist you in preparing the detailed components of the project application. There is no approval or denial of development proposals associated with Conceptual Review. At the meeting you will be presented with a letter from staff, summarizing comments on your proposal.

BOLDED ITEMS ARE REQUIRED *The more info provided, the more detailed your comments from staff will be.*

Contact Name(s) and Role(s) (Please identify whether Consultant or Owner, etc) William Welborn - FC Streets Dept (Owner); David Seyboldt - AECOM (Consultant)

Business Name (if applicable) FC Streets Department

Your Mailing Address 625 9th St, Fort Collins CO, 80524

Phone Number 970-581-5900 Email Address BWELBORN@FCGOV.COM

Site Address or Description (parcel # if no address) City Crushing Yard - 1500 Hoffman Mill Rd

Description of Proposal (attach additional sheets if necessary) Minor amendment proposal for already existing new weigh station.

Proposed Use Truck Weigh Station **Existing Use** Drive entrance into curshing yard

Total Building Square Footage 10x12 S.F. Number of Stories 1 Lot Dimensions NA

Age of any Existing Structures NA

Info available on Larimer County's Website: http://www.co.larimer.co.us/assessor/query/search.cfm
If any structures are 50+ years old, good quality, color photos of all sides of the structure are required for conceptual.

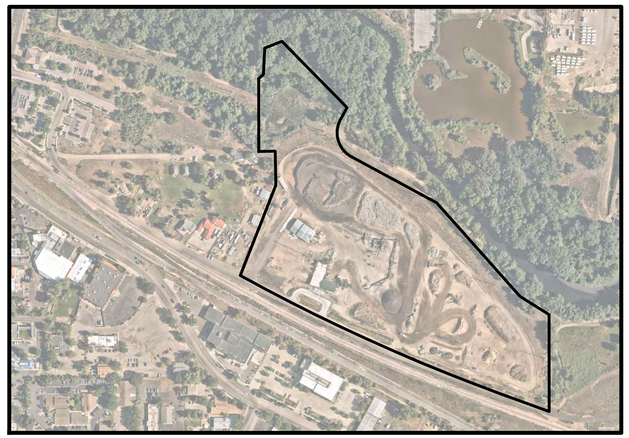
Is your property in a Flood Plain? □ Yes ■ No If yes, then at what risk is it? _____

Info available on FC Maps: http://gisweb.fcgov.com/redirect/default.aspx?layerTheme=Floodplains.

Increase in Impervious Area Approx. 12,000 S.F.
(Approximate amount of additional building, pavement, or etc. that will cover existing bare ground to be added to the site)

Suggested items for the Sketch Plan:
Property location and boundaries, surrounding land uses, proposed use(s), existing and proposed improvements (buildings, landscaping, parking/drive areas, water treatment/detention, drainage), existing natural features (water bodies, wetlands, large trees, wildlife, canals, irrigation ditches), utility line locations (if known), photographs (helpful but not required). Things to consider when making a proposal: How does the site drain now? Will it change? If so, what will change?

HOFFMAN MILL WEIGH STATION
MINOR AMENDMENT



VICINITY MAP
(NOT TO SCALE)

LOCATION ON PROPERTY
(NOT TO SCALE)

SHEET INDEX

LEGAL DESCRIPTION

A PORTION OF LOT 1, HOFFMAN MILL SUBDIVISION, A TRACT OF LAND SITUATED IN THE NORTHWEST QUARTER OF SECTION 18, TOWNSHIP 7 NORTH, RANGE 68 WEST OF THE 6TH PRINCIPAL MERIDIAN, CITY OF FORT COLLINS, COUNTY OF LARIMER, STATE OF COLORADO

PLANNING

APPROVED ON THIS_____DAY OF_____20___.

_____
TOWN MANAGER

_____
PLANNING DIRECTOR

OWNER'S CERTIFICATION

THE UNDERSIGNED DOES/DO HEREBY CERTIFY THAT I/WE ARE THE LAWFUL OWNERS OF THE REAL PROPERTY DESCRIBED IN THIS SITE PLAN AND DO HEREBY CERTIFY THAT I/WE ACCEPT THE CONDITIONS AND RESTRICTIONS SET FORTH ON SAID SITE PLAN.

_____ _____
OWNER (SIGNED) DATE

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS_____DAY OF_____20____. BY

_____
(PRINT NAME)

AS_____

MY COMMISSION EXPIRES:_____

WITNESS MY HAND AND OFFICIAL SEAL.

_____ _____
NOTARY PUBLIC ADDRESS

$PLOT_INFO$

REVISIONS:	DATE:

CITY OF FORT COLLINS, CO.
ENGINEERING DEPT.
CAPITAL PROJECTS

City of Fort Collins Engineering
fcgov.com/engineering

AECOM
TRANSPORTATION
www.aecom.com

AECOM
7595 Technology Way, Suite 200, Denver, CO 80237
T 303.228.3000 F 303.228.3001

DESIGNED BY:	DRAWN BY:
D SEYBOLDT	R MACSALKA
SCALE:	DATE:
1" = 30'	10/12/2021

☒ FOR REVIEW
☐ FOR CONSTRUCTION
☐ AS-BUILT

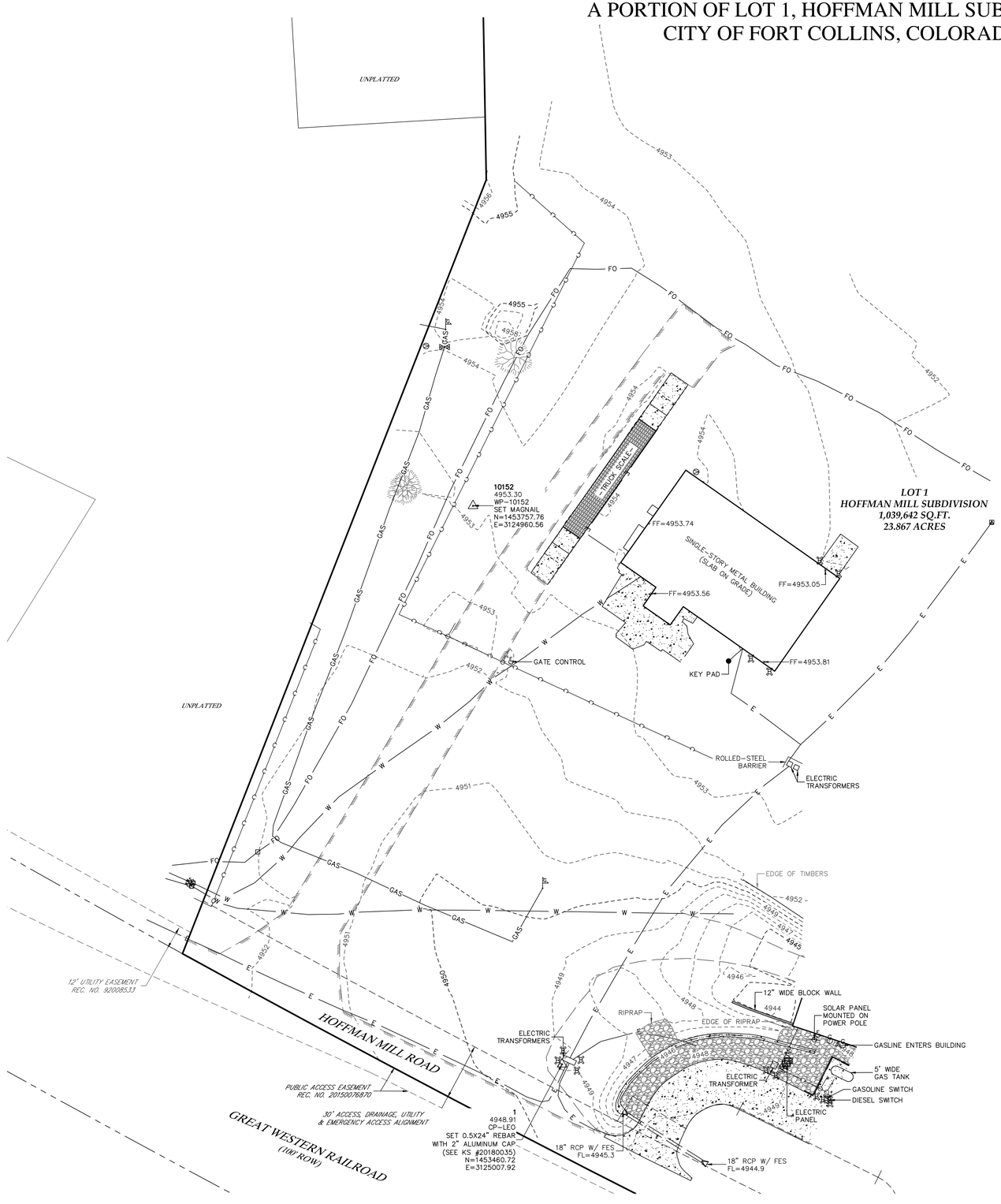
HOFFMAN MILL WEIGH STATION MINOR AMENDMENT
COVER

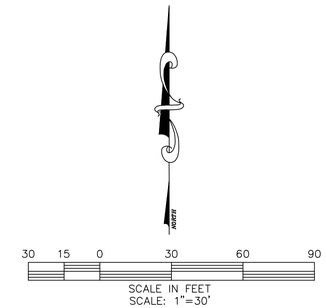
ID
COVER
SHEET
1 OF 4

TOPOGRAPHIC SURVEY

OF

A PORTION OF LOT 1, HOFFMAN MILL SUBDIVISION
CITY OF FORT COLLINS, COLORADO





LEGEND

	EDGE OF ASPHALT		CONTROL POINT
	EXISTING CONCRETE	EB	ELECTRIC BOX
	EDGE OF GRAVEL ROAD	EM	ELECTRIC METER
	EDGE OF GRAVEL ROAD		ELECTRIC SERVICE
	FLOWLINE		POWER POLE
	CHAIN LINK FENCE		GAS VALVE
X X	FENCE LINE		GAS SERVICE
	PIPE		GAS METER
FO	FIBER OPTIC LINE		GAS MARKER
GAS	GAS LINE		BOLLARD
W	WATER LINE		STEEL POST
OHE	OVERHEAD POWER LINE		TELEPHONE PEDESTAL
E	UNDERGROUND POWER LINE		SPIGOT
4876	ONE FOOT CONTOUR		WATER SHUTOFF
4835	5 FOOT CONTOUR		WATER METER

VERTICAL DATUM:
NORTH AMERICAN VERTICAL DATUM OF 1988. VERTICAL BENCHMARK IS CITY OF FORT COLLINS BENCHMARK DESIGNATION "CSU 2," ELEVATION=5006.29.

HORIZONTAL DATUM:
MODIFIED COLORADO STATE PLANE 0501 NORTH ZONE (GROUND) COORDINATES NAD 83(2011) DATUM. HORIZONTAL CONTROL BASED UPON TRIMBLE VRS NETWORK.

NOTE:
1. THIS DRAWING IS AT MODIFIED STATE PLANE. TO REDUCE TO STATE PLANE COORDINATES, SCALE AT 0.99973537 (1.00026470) ABOUT THE ORIGIN 0,0.

2. ALL PROPERTY PINS, INTERSECTION MONUMENTS, AND SECTION CORNERS DISTURBED DURING CONSTRUCTION MUST BE REFERENCED AND REPLACED UNDER THE SUPERVISION OF A LICENSED SURVEYOR.

3. THIS AUTOCAD DRAWING CONTAINS INFORMATION THAT IS NOT VISIBLE ON THE PLOTTED COPY. TO OBTAIN ALL THE INFORMATION THAT IS AVAILABLE IN THIS DRAWING, ALL THE AUTOCAD LAYERS MUST BE TURNED ON AND THAWED.

4. THE SIZE, TYPE AND LOCATION OF ALL KNOWN UNDERGROUND UTILITIES ARE APPROXIMATE WHEN SHOWN ON THESE DRAWINGS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE OF ALL UNDERGROUND UTILITIES IN THE AREA OF THE WORK BEFORE COMMENCING NEW CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES AND SHALL BE RESPONSIBLE FOR ALL UNKNOWN UNDERGROUND UTILITIES. LOCATES PROVIDED BY PRIMO UTILITY LOCATING SERVICES, LLC.

5. ALL PROJECT CONTROL LISTED HEREON IS PROVIDED AS A COURTESY. IT IS THE RESPONSIBILITY OF THE RECIPIENT TO VERIFY THE ACCURACY OF THE COORDINATES AND ELEVATIONS SHOWN PRIOR TO USING THEM FOR ANY PURPOSES.

NOTICE

ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF THE CERTIFICATION SHOWN HEREON. (13-80-105 C.R.S. 2012)

DATE: 4/30/2021
FILE NAME: 20210201TOP
SCALE: 1"=30'
DRAWN BY: AMD
CHECKED BY: BA/LK

KING SURVEYORS
650 E. Garden Drive | Windsor, Colorado 80550
phone: (970) 686-5011 | email: contact@kingsurveyors.com

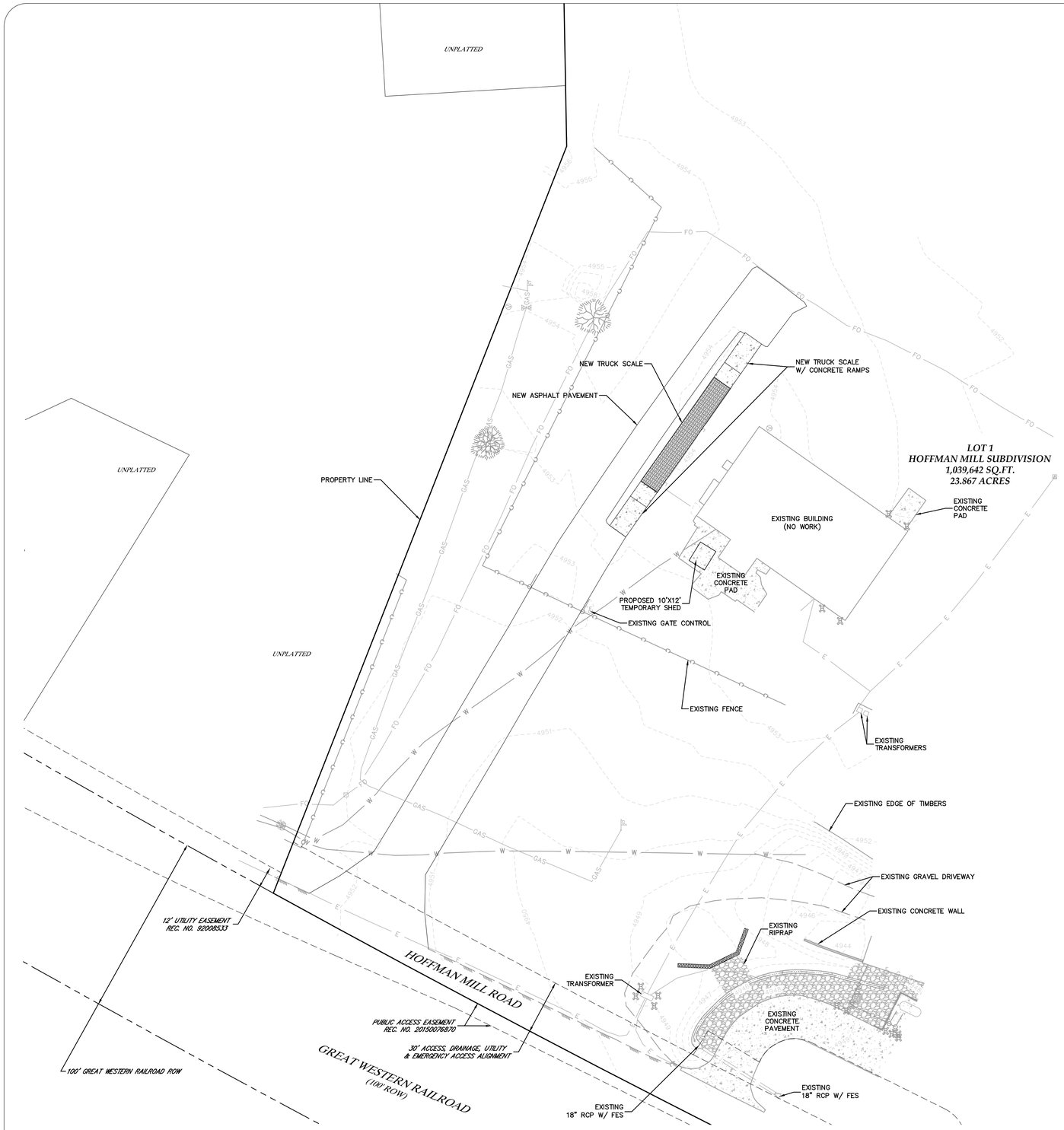
REVISIONS: DATE:

TOPOGRAPHIC SURVEY
FOR
INTERWEST CONSULTING GROUP
PO BOX 18330
BOULDER, COLORADO 80308

PROJECT #: 20210201

1

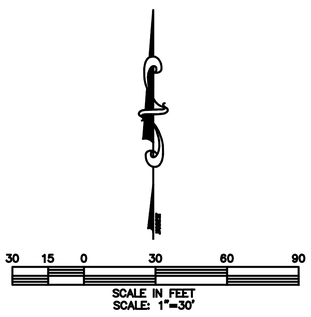
SHEET 1 OF 1



VICINITY MAP
(NOT TO SCALE)

SITE PLAN NOTES

1. THE PROJECT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE FINAL PLANS. AMENDMENTS TO THE PLANS MUST BE REVIEWED AND APPROVED BY THE CITY PRIOR TO THE IMPLEMENTATION OF ANY CHANGES TO THE PLANS.
2. REFER TO GRADING AND DRAINAGE PLAN FOR DRAINAGE IMPROVEMENTS AND CONSTRUCTION INFORMATION.
3. REFER TO TOPOGRAPHIC SURVEY FOR ADDITIONAL INFORMATION ON CONTROL POINTS, PROPERTY LINES, EASEMENTS, FLOODPLAIN, EXISTING BUILDINGS, STREETS AND OTHER SURVEY INFORMATION.
4. NO IMPROVEMENTS OR IMPACTS TO UTILITIES ARE ANTICIPATED AS PART OF THIS PROJECT. ALL UTILITIES AND UTILITY STRUCTURES SHOWN ARE EXISTING.
5. ANY DAMAGED IMPROVEMENTS, UTILITIES, OR CONTROL POINTS, DESTROYED, DAMAGED, OR REMOVED DUE TO CONSTRUCTION OF THIS PROJECT, SHALL BE REPLACED OR RESTORED TO CITY OF FORT COLLINS STANDARDS AT THE CONTRACTORS EXPENSE PRIOR TO THE ACCEPTANCE OF COMPLETED IMPROVEMENTS AND/OR PRIOR TO THE ISSUANCE OF THE CERTIFICATE OF OCCUPANCY.
6. THE WEIGH STATION SCALE AND ASPHALT DRIVE BETWEEN THE SCALE AND HOFFMAN MILL ROAD ARE ALREADY CONSTRUCTED.
7. ITEMS CALLED OUT ON THE PLANS AS 'PROPOSED' ARE TO BE CONSTRUCTED WITH THESE PLANS. ITEMS CALLED OUT AS 'NEW' ARE ALREADY CONSTRUCTED. .
8. EXISTING UTILITIES LOCATIONS SHOWN ARE APPROXIMATE AND DEPTHS ARE UNKNOWN. LOCATE UTILITIES AND VERIFY DEPTHS PRIOR TO BEGINNING CONSTRUCTION ACTIVITIES.



$PLOT_INFO$

REVISIONS:	DATE:

CITY OF FORT COLLINS, CO.
ENGINEERING DEPT.
CAPITAL PROJECTS

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fcgov.com/engineering

AECOM TRANSPORTATION
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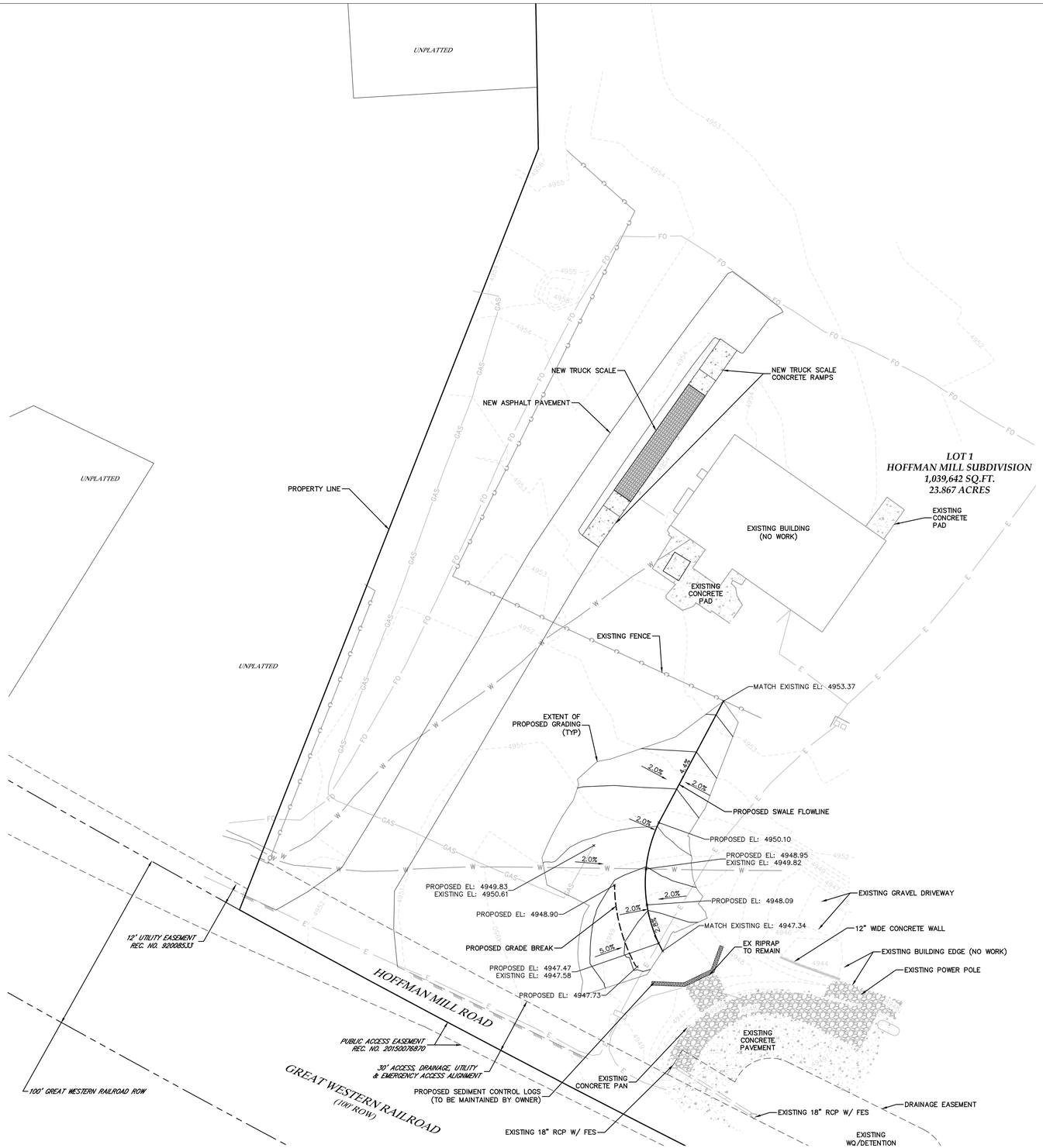
AECOM
7595 Technology Way, Suite 200, Denver, CO 80237
T 303.228.3000 F 303.228.3001

DESIGNED BY:	DRAWN BY:
D SEYBOLDT	R MACSALKA
SCALE:	DATE:
1" = 30'	10/12/2021

☒ FOR REVIEW
☐ FOR CONSTRUCTION
☐ AS-BUILT

HOFFMAN MILL WEIGH STATION MINOR AMENDMENT
PARTIAL SITE PLAN

ID
SITE PLAN
SHEET
3 OF 4



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☐ FOR CONSTRUCTION
☐ AS-BUILT

HOFFMAN MILL WEIGH STATION MINOR AMENDMENT
GRADING PLAN

ID
GRADING PLAN
SHEET
4 OF 4

AECOM
7595 Technology Way
Denver, CO 80237

T: +1 (303) 694 2770
F: +1 (303) 694 3946
aecom.com

Project name:
Hoffman Mill Minor Amendment
Weigh Station Paving

To:
Bill Welborn, City of Fort Collins

From:
David Seyboldt

CC:
File

Date:
October 12th, 2021

Technical Memo

Subject: Drainage Calculations

1. Purpose and Objectives

This memo presents the results of the drainage analysis of the Hoffman Mill Weigh Station site and assesses the compatibility of the Weigh Station site improvements with the existing drainage infrastructure located on the Fueling Site. The existing infrastructure includes a detention pond, outlet pipe, and overflow spillway and is located immediately downstream of the Weigh Station site. The constructed Weight Station site improvements include a paved driveway and weigh scales. Proposed improvements include a shallow swale graded into the parking lot to direct runoff toward the detention pond instead of into the Fueling Site building.

A Final Storm Drainage Letter was prepared by Interwest Consulting Group (Interwest) for the Fueling Site in October 2018. The hydrologic assumptions and calculations made in that letter are maintained here where possible, as discussed further below.

2. Calculations

The Weigh Station site improvements consist of a 30-foot-wide paved driveway extending from Hoffman Mill Road north to an existing building, a distance of approximately 415 feet. Adjacent to the driveway is a truck scale. These improvements have already been constructed. There was no grading performed on the site with these improvements, so the existing drainage patterns have not changed. The drainage basins delineated with the Interwest Drainage Letter remain applicable to this analysis.

There were two primary objectives for the drainage calculations. First, to calculate the additional runoff generated on the site due to the added pavement. Second, to determine if the existing pond is adequate to capture and attenuate this flow.

The pre-development condition was assumed to include the entire area tributary to the location of the Fueling Site pond prior to the construction of Fueling Site improvements. This was used to determine the allowable release rate from the pond. The drainage basins OS1 and H1 were combined into a single basin named EX1. For the post-development condition, the additional Weigh Station pavement area was added, the Fueling Site improvements were accounted for, and the basin was named PR1. The runoff coefficient C values for individual land uses and the times of concentration for the tributary areas were taken from the Interwest letter. The weighted C value for basin PR1 was updated to account for the new impervious area of the driveway. To obtain the total time for the new basins, the

time of concentration for basin OS1 was added to the travel time from basin H1 for pre-development conditions and D1 for post-development conditions. Finally, the 100-yr peak flow rates were computed. It was assumed that the new driveway did not significantly change the time of concentration for the basin.

To analyze the existing pond capacity a storage routing table was developed to determine the maximum storage required, and then compared to the existing storage volume indicated on the Interwest letter. The maximum inflow to the pond is the 100-yr peak flow rate for the post-development condition. The maximum outflow is the 100-yr peak flow rate for the pre-developed condition. The maximum required storage was calculated to be 0.066 ac-ft; the existing pond volume is 0.073 ac-ft.

A stage storage table for the existing pond was created using the pond contours from the Fueling Site construction plans. A storage volume of 0.066 ac-ft corresponds to a water surface elevation of 4947.24. Next, a calculation was performed to analyze the existing restrictor plate on the 18” pond outlet pipe. The calculation shows that the pipe can pass the pre-developed peak flow rate at a water surface elevation of 4947.40, which is below the spillway elevation of 4947.70.

Since the outlet pipe will not convey its maximum flow until a certain headwater is reached, it is likely the pond will fill to the 4947.40 elevation and discharge at a constant rate until the water surface drops. But the storage routing calculation indicates that the volume at this elevation is greater than necessary to attenuate the peak inflow.

3. Drainage Improvements

The users of the Fueling Site have indicated that during rainfall events the runoff flows across the site from west to east and instead of discharging to the existing ditch and detention pond a substantial amount flows down the driveway into the Fueling Site building and causes flooding. To mitigate this, the site will be graded to create a minor swale which runs from north to south. The swale will intercept runoff flowing from west to east and direct the runoff into the riprap rundown which leads into the ditch and detention pond. Since the entire site is utilized for truck operations, the swale is designed to have no impact to truck movements. It will have 2% side slopes and be approximately 4 inches deep; the longitudinal slope will be between 2.8% and 4%. The Bentley Flowmaster calculations show that the swale has capacity to convey the 100-yr event runoff from the site. In the area of the proposed swale, the site is currently compacted dirt / gravel; no changes are proposed to the surface materials.

A new prefabricated 10’x12’ building will be installed on an existing concrete pad in front of the Weigh Station building. Since the concrete pad is existing it was included in the original impervious area calculations and will not affect these drainage calculations.

4. Conclusion

The calculations performed for this site maintain the calculations included with the approved Interwest Drainage Letter with regards to land use coefficients and times of concentration. The weighted runoff coefficient of the drainage basin was recalculated for this memo based on the new paved driveway. All the calculations referenced above are attached to this memo. The results indicate that the existing pond on the Fueling Site has the capacity to attenuate the increased runoff due to the pavement constructed on the Weigh Station Site. No changes to the existing pond, spillway, or outlet pipe are required due to the Weigh Station Site improvements.

Attachments:

Rational Calculations
Pond Routing Calculations
Orifice Calculation
Flowmaster Report
Fueling Site Calculations
Basin Map

Runoff Coefficients

Project:	Hoffman Mill	Calculated by	DS	Date:	9/28/2021
AECOM Project Number.:	60667912	Checked by	RM	Date:	10/1/2021

		Composite C		Hardscape: Asphalt,Concrete, Rooftops		Lawns, Sandy Soil >7% or Heavy Soil <2%	
Basin ID	Total Area (ac)	C2	C100	C	Area (acres)	C	Area (acres)
EX1	3.65	0.35	0.44	0.95	0.55	0.25	3.10
PR2	3.65	0.44	0.56	0.95	1.01	0.25	2.63

Pre Development Tributary Area entire site
Post Development Tributary Area entire site

Standard Form SF-1 . Time of Concentration

Basin ID	C_2, C_5	C_{100}	Area (ac)	From Interwest Calcs	
EX1	0.35	0.44	0.35	21.72	Tc from basin OS1 plus travel time in basin H1
PR2	0.44	0.56	0.44	21.22	Tc from basin OS1 plus travel time in basin D1

Standard Form SF-2 . Storm Drainage System Design (Rational Method Procedure)

Project: Hoffman Mill

Computed: DS Date: 9/28/2021

Checked: RM Date: 10/1/2021

Design Storm: 100-yr

				DIRECT RUNOFF							TOTAL RUNOFF				
PROJECT	STREET	DESIGN POINT	INLET RECEIVING FLOW	AREA DESIGN (name)	AREA (AC)	RUNOFF COEFF	t_c (MIN)	C.A. (AC)	I* IN / HR	Q (CFS)	t_c (MIN)	SUM (C*A) (AC)	I* IN / HR	Q (CFS)	REMARKS
	(1)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	
		Existing Offsite Flows													
				EX1	3.65	0.44	21.72	1.62	5.36	8.67					Pre Development Tributary Area entire site
				PR2	3.65	0.56	21.22	2.03	5.43	11.00					Post Development Tributary Area entire site

EXISTING DET POND

100 YR

C(100) 0.56 Tc (min) = 21.22

Area = 3.65 acres

Q_{out} = 8.67 cfs = Historic Release Rate

Available Pond Vol= 0.073 ac-ft

Time (min)	Intensity (in/hr)	Area (AC)	Q_{in} (cfs)	Cum. V_{in} (ac-ft)	$Q_{out\ pipe}$ (cfs)	Cum. V_{out} (ac-ft)[2]	Storage (ac-ft)[1]	Qout Overflow (cfs)	Vout Overflow (cfs)
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	9.95	0.86	4.75	0.03	4.75	0.03	0.00	0.00	0.00
6	9.31	1.03	5.33	0.04	5.33	0.04	0.00	0.00	0.00
7	8.80	1.20	5.88	0.06	5.88	0.06	0.00	0.00	0.00
8	8.38	1.38	6.40	0.07	6.40	0.07	0.00	0.00	0.00
9	8.03	1.55	6.90	0.09	6.90	0.09	0.00	0.00	0.00
10	7.72	1.72	7.37	0.10	7.37	0.10	0.00	0.00	0.00
11	7.42	1.89	7.79	0.12	7.79	0.12	0.00	0.00	0.00
12	7.16	2.06	8.20	0.14	8.20	0.14	0.00	0.00	0.00
13	6.92	2.23	8.59	0.15	8.59	0.15	0.00	0.00	0.00
14	6.71	2.41	8.97	0.17	8.67	0.17	0.01	0.00	0.00
15	6.52	2.58	9.34	0.19	8.67	0.18	0.01	0.00	0.00
16	6.30	2.75	9.62	0.21	8.67	0.19	0.02	0.00	0.00
17	6.10	2.92	9.90	0.23	8.67	0.20	0.03	0.00	0.00
18	5.92	3.09	10.17	0.25	8.67	0.21	0.04	0.00	0.00
19	5.75	3.27	10.43	0.27	8.67	0.23	0.05	0.00	0.00
20	5.60	3.44	10.69	0.29	8.67	0.24	0.06	0.00	0.00
21	5.46	3.61	10.95	0.32	8.67	0.25	0.066	0.00	0.00
22	5.32	3.65	10.78	0.33	8.67	0.26	0.06	0.00	0.00
23	5.20	3.65	10.53	0.33	8.67	0.27	0.06	0.00	0.00
24	5.09	3.65	10.31	0.34	8.67	0.29	0.05	0.00	0.00
25	4.98	3.65	10.09	0.35	8.67	0.30	0.05	0.00	0.00
26	4.87	3.65	9.87	0.35	8.67	0.31	0.04	0.00	0.00
27	4.78	3.65	9.68	0.36	8.67	0.32	0.04	0.00	0.00
28	4.69	3.65	9.50	0.37	8.67	0.33	0.03	0.00	0.00
29	4.60	3.65	9.32	0.37	8.67	0.35	0.03	0.00	0.00
30	4.52	3.65	9.16	0.38	8.67	0.36	0.02	0.00	0.00
31	4.42	3.65	8.95	0.38	8.67	0.37	0.01	0.00	0.00
32	4.33	3.65	8.77	0.39	8.67	0.38	0.00	0.00	0.00
33	4.24	3.65	8.59	0.39	8.67	0.39	0.00	0.00	0.00

This calculation shows the pond stage at the maximum storage volume while releasing at the max historic rate

ELEVATION	AREA (ft^2)	VOLUME (ft^3)	ACCUM. VOLUME (ft^3)	VOLUME (ac-ft)	ACCUM. VOLUME (ac-ft)
4944.5	50	0	0	0.00	0.00
4945.0	244	49	49	0.00	0.00
4946.0	1,127	632	681	0.01	0.02
4947.0	2,059	1,570	2,251	0.04	0.05
4948.0	3,078	2,551	4,802	0.06	0.11

Volume = 0.066 ac-ft — Max storage volume from routing table

Stage = 4947.24 — Pond stage at max storage volume

Top Berm = 4948.00

Spillway Invert Elevation = 4947.70

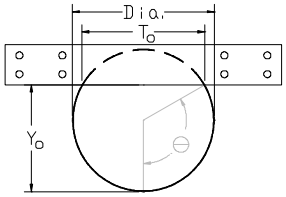
Available Pond Volume = 3164 cu. ft.

RESTRICTOR PLATE SIZING FOR CIRCULAR VERTICAL ORIFICES

Project: Existing Orifice Plate with new design flow

Basin ID:

x



This is the WSEL required to pass the peak flow through the existing orifice

		#1 Vertical Orifice	#2 Vertical Orifice	
Sizing the Restrictor Plate for Circular Vertical Orifices or Pipes (Input)				
Water Surface Elevation at Design Depth	Elev: WS =	4,947.40		feet
Pipe/Vertical Orifice Entrance Invert Elevation	Elev: Invert =	4,944.56		feet
Required Peak Flow through Orifice at Design Depth	Q =	8.67		cfs
Pipe/Vertical Orifice Diameter (inches)	Dia =	14.4		inches
Orifice Coefficient	C_o =	0.65		
Full-flow Capacity (Calculated)				
Full-flow area	Af =	1.13		sq ft
Half Central Angle in Radians	Theta =	3.14		rad
Full-flow capacity	Qf =	8.8		cfs
	Percent of Design Flow =	102%		
Calculation of Orifice Flow Condition				
Half Central Angle (0<Theta<3.1416)	Theta =	2.64		rad
Flow area	A_o =	1.10		sq ft
Top width of Orifice (inches)	T_o =	6.97		inches
Height from Invert of Orifice to Bottom of Plate (feet)	Y_o =	1.12		feet
Elevation of Bottom of Plate	Elev Plate Bottom Edge =	4,945.68		feet
Resultant Peak Flow Through Orifice at Design Depth	Q_o =	8.7		cfs
Width of Equivalent Rectangular Vertical Orifice	**Equivalent Width =**	**0.98**		**feet**

This calculation shows that the existing orifice can pass the historic flow of 8.67 cfs before the WSEL exceeds the spillway invert of 4947.70

Parking Lot Swale Grading

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.022
Channel Slope	0.028 ft/ft
Normal Depth	4.0 in
Left Side Slope	50.000 H:V
Right Side Slope	50.000 H:V

Results

Discharge	19.01 cfs
Flow Area	5.6 ft²
Wetted Perimeter	33.3 ft
Hydraulic Radius	2.0 in
Top Width	33.33 ft
Critical Depth	4.7 in
Critical Slope	0.012 ft/ft
Velocity	3.42 ft/s
Velocity Head	0.18 ft
Specific Energy	0.52 ft
Froude Number	1.478
Flow Type	Supercritical

GVF Input Data

Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data

Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	4.0 in
Critical Depth	4.7 in
Channel Slope	0.028 ft/ft
Critical Slope	0.012 ft/ft

Messages

Parking Lot Swale Grading

Messages	
Notes	This calculation shows the capacity of the swale which will be graded into the existing parking lot. Side slopes are 2% and the minimum longitudinal slope is 2.8%.

The following pages are an excerpt from the Hoffman Mill Fueling Site Final Drainage Letter prepared by Interwest Consulting Group, October 31, 2018.

Values highlighted in yellow were used unchanged for these hydrology and hydraulics calculations to analyze the existing pond and its capacity to attenuate the Weigh Station Site runoff.

Hoffman Mill Fuel Site

EXISTING IMPERVIOUS AREA CALCULATION

Design Engineer: J.Claeys
Design Firm: Interwest Consulting Group
Project Number: 1344-095-00
Date: June 6, 2018

DESIGN CRITERIA:

Urban Storm Drainage Criteria Manual by Urban Drainage and Flood Control District, June 2001 (Revised January 2016)

BASINS:

% Impervious values from Table RO-3 in the Urban Storm Drainage Criteria Manual
Runoff Coefficients and Frequency Adjustment Factors for City of Fort Collins - Storm Water Criteria Manual

Land Use	% Impervious	Runoff Coefficient C
Paved	100%	0.95
Roof	90%	0.95
Walks/RAP	90%	0.95
Gravel/Pavers	40%	0.50
Lawns (Heavy, 2-7% Slope)	0%	0.25

Return Period	Frequency Adjustment Factor (C_f)
2-year to 10-year	1.00
100-year	1.25

Sub-basin Designation	A_{total} (sq feet)	A_{total} (acres)	A_{paved} (sq feet)	A_{roof} (sq feet)	$A_{walk/RAP}$ (sq feet)	A_{pavers} (sq feet)	A_{lawn} (sq feet)	Weighted % Impervious	COMPOSITE	
									C_2 to C_{10}	C_{100}
OS1	133,035	3.054	0	8,330	9,935	0	114,770	12.4%	0.35	0.43
H1	25,833	0.593	0	2,480	3,038	0	20,315	19.2%	0.40	0.50

Hoffman Mill Fuel Site

HISTORIC TIME OF CONCENTRATION

Design Engineer: J.Claeys
Design Firm: Interwest Consulting Group
Project Number: 1344-095-00
Date: June 6, 2018

DESIGN CRITERIA:

Urban Storm Drainage Criteria Manual by Urban Drainage and Flood Control District, June 2001 (Revised January 2016)
Overland Flow Equations for City of Fort Collins - Storm Water Criteria Manual

EQUATIONS:

$t_c = t_i + t_t$ -Equation 6-2

$V = C_v S_w^{0.5}$ -Equation 6-4

$t_c = (18 - 15i) + \frac{L}{60(24i + 12)\sqrt{S}}$ -Urbanized Check Equation 6-5

$t_i = \frac{1.87(1.1 - C_x C_f)\sqrt{L}}{\sqrt[3]{S}}$ - CoFC Overland Flow

$t_t = \frac{L}{60V}$

CONSTRAINTS:

300 ft - Overland flow shall not exceed for developed condition
500 ft - Overland flow shall not exceed for undeveloped condition

Final t_c = minimum of $t_i + t_t$ and urbanized basin check
recommended minimum t_c = 5 min for urbanized basins

Time of Concentration (100-yr)

SUB-BASIN DATA					INITIAL/OVERLAND TIME (t_i)			TRAVEL TIME (t_t)						$t_c=t_i+t_t$ (min)	Urban Check		Final t_c (min)
DESIGN POINT	Sub-basin	% Impervious	C_{100}	AREA (acres)	LENGTH (ft)	SLOPE (ft/ft)	t_i (min)	LENGTH (ft)	SLOPE (ft/ft)	Table RO-2 Type of Travel Surface	Table RO-2 C_v	VELOCITY (ft/s)	t_t (min)		OVERALL SLOPE (ft/ft)	t_c (min)	
OS1	OS1	12.4%	0.43	3.054	300	0.0157	18.61	234	0.0120	Paved Areas	20	2.19	1.78	20.39	0.0141	21.16	20.39
H1	H1	19.2%	0.50	0.593	88	0.0291	7.40	154	0.0093	Paved Areas	20	1.93	1.33	8.73	0.0165	17.01	**8.73**

Hoffman Mill Fuel Site

DEVELOPED IMPERVIOUS AREA CALCULATION

Design Engineer: J.Claeys
Design Firm: Interwest Consulting Group
Project Number: 1344-095-00
Date: June 6, 2018

DESIGN CRITERIA:

Urban Storm Drainage Criteria Manual by Urban Drainage and Flood Control District, June 2001 (Revised January 2016)

BASINS:

% Impervious values from Table RO-3 in the Urban Storm Drainage Criteria Manual
Runoff Coefficients and Frequency Adjustment Factors for City of Fort Collins - Storm Water Criteria Manual

Land Use	% Impervious	Runoff Coefficient C
Paved	100%	0.95
Roof	90%	0.95
Walks	90%	0.95
Gravel/Pavers	40%	0.50
Lawns (Heavy, 2-7% Slope)	0%	0.25

Return Period	Frequency Adjustment Factor (C_f)
2-year to 10-year	1.00
100-year	1.25

Sub-basin Designation	A_{total} (sq feet)	A_{total} (acres)	A_{paved} (sq feet)	A_{roof} (sq feet)	A_{walk} (sq feet)	$A_{gravel/pavers}$ (sq feet)	A_{lawn} (sq feet)	Weighted % Impervious	COMPOSITE	
									C_2 to C_{10}	C_{100}
D1	25,836	0.59	0	2,481	10,384	0	12,971	44.8%	0.60	0.75

Hoffman Mill Fuel Site

DEVELOPED TIME OF CONCENTRATION

Design Engineer: J.Claeys
Design Firm: Interwest Consulting Group
Project Number: 1344-095-00
Date: June 6, 2018

DESIGN CRITERIA:

Urban Storm Drainage Criteria Manual by Urban Drainage and Flood Control District, June 2001 (Revised January 2016)
Overland Flow Equations for City of Fort Collins - Storm Water Criteria Manual

EQUATIONS:

$t_c = t_i + t_t$ -Equation 6-2

$V = C_v S_w^{0.5}$ -Equation 6-4

$t_c = (18 - 15i) + \frac{L}{60(24i + 12)\sqrt{S}}$ -Urbanized Check Equation 6-5

$t_i = \frac{1.87(1.1 - C_x C_f)\sqrt{L}}{\sqrt[3]{S}}$ - CoFC Overland Flow

$t_t = \frac{L}{60V}$

CONSTRAINTS:

300 ft - Overland flow shall not exceed for developed condition
500 ft - Overland flow shall not exceed for undeveloped condition

Final t_c = minimum of $t_i + t_t$ and urbanized basin check
recommended minimum t_c = 5 min for urbanized basins

Time of Concentration (2-yr to 10-yr)

SUB-BASIN DATA					INITIAL/OVERLAND TIME (t_i)			TRAVEL TIME (t_t)						$t_c=t_i+t_t$ (min)	Urban Check		Final t_c (min)
DESIGN POINT	Sub-basin	% Impervious	C_{2-10}	AREA (acres)	LENGTH (ft)	SLOPE (ft/ft)	t_i (min)	LENGTH (ft)	SLOPE (ft/ft)	Table RO-2 Type of Travel Surface	Table RO-2 C_v	VELOCITY (ft/s)	t_t (min)		OVERALL SLOPE (ft/ft)	t_c (min)	
D1	D1	44.8%	0.60	0.593	156	0.0072	13.08	150	0.0229	Paved Areas	20	3.03	0.83	13.90	0.0149	13.11	**13.11**

Hoffman Mill Fueling Site

Critical Pond Elevations

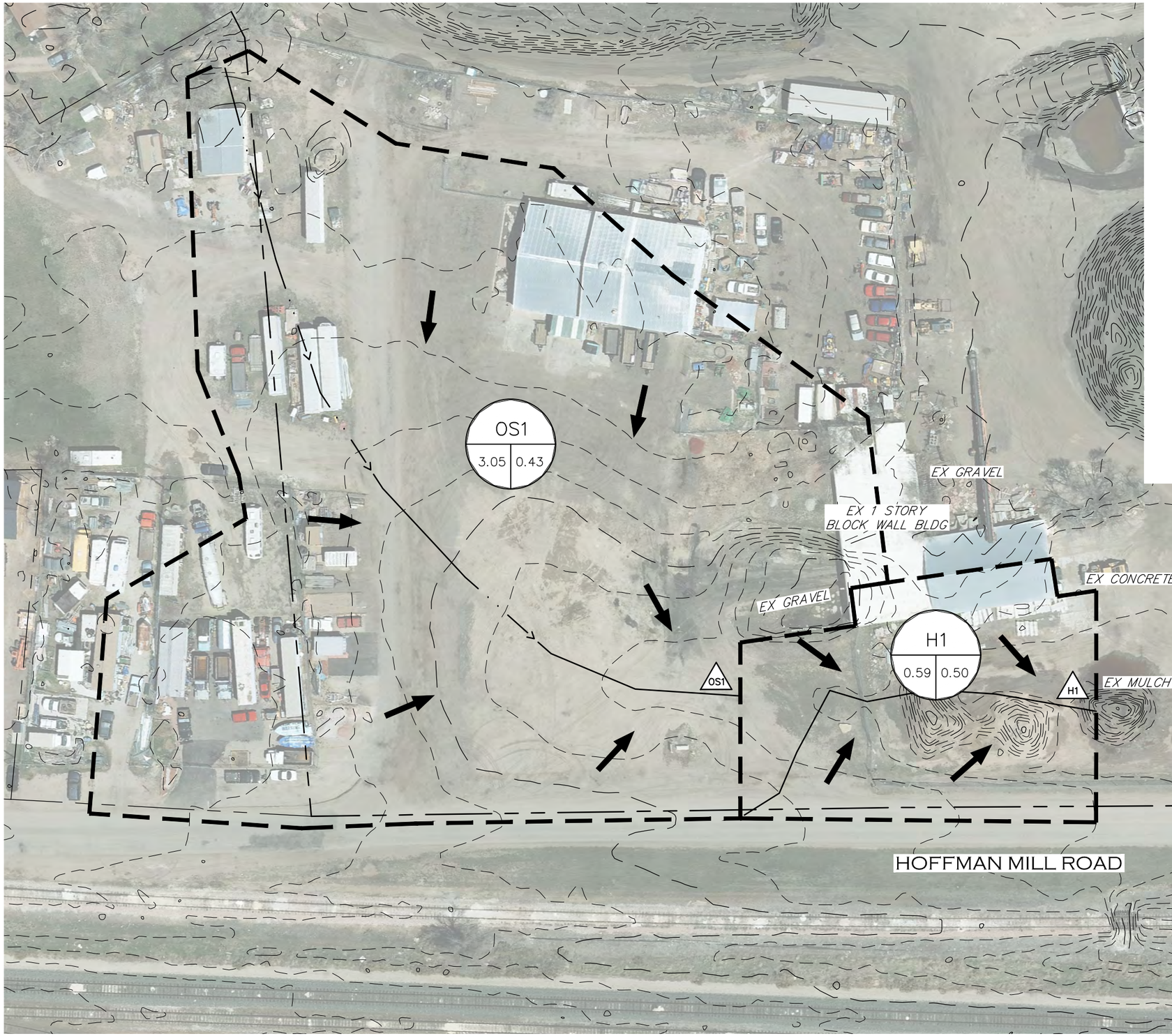
Design Engineer:	J.Claeys
Design Firm:	Interwest Consulting Group
Project Number:	1344-095-00
Date:	September 25, 2018

DESIGN CRITERIA

Urban Storm Drainage Criteria Manual, Urban Drainage and Flood Control District, June 2001 (Revised April 2008)
Volume obtained utilizing 2018 AutoCAD Civil3D

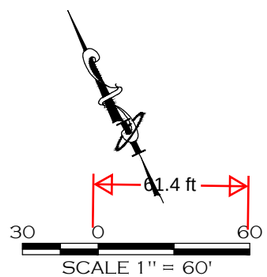
Storage Summary

Sand Filter Invert Elevation	4947.00 ft
Required Water Qualtiy Capture Volume (WQCV)	283 cu-ft
WQCV Provided	290 cu-ft
WQCV Water Surface Elevation (WSE)	4947.70 ft
Require 100-yr Detention Volume	2,788 cu-ft
Combined Required 100-yr Detention & WQCV	3,071 cu-ft
Pond Invert Elevation	4944.56 ft
Total Detention Volume Provided	3,164 cu-ft
100-yr WSE	4946.90 ft



LEGEND

- D01 / 1.25 | 0.50 — BASIN DESIGNATION; BASIN COEFFICIENT (100-YR); BASIN AREA
- D01 — DESIGN POINT
- DRAINAGE FLOW ARROW
- DRAINAGE BASIN BOUNDARY
- DRAINAGE BASIN FLOW PATH



INTERWEST CONSULTING GROUP
1218 W. Ash, Suite A
Windsor, Colorado 80550
Phone: (970) 674-3300
Fax: (970) 674-3303

PREPARED FOR

PROJECT NAME
HOFFMAN MILL FUELING SITE

HISTORIC DRAINAGE BASINS

DATE:	06/06/18
SCALE (H):	1" = 60'
SCALE (V):	N/A
DESIGNED BY:	JTC
CHECKED BY:	JTC

PROJ. NO. 1344-095-00

1 OF 1

X:\INTERWEST PROJECTS\2017 PROJECTS\1344-095-00 (HOFFMAN MILL FUEL STATION)\03 DESIGN DOCUMENTS\DRAINAGE\EXHIBITS\1344-095-00 HISTORIC DRAINAGE.DWG, 6/5/2018 4:45 PM

Hoffman Mill Weigh Station - Minor Amendment and Building Permit Coordination

Tuesday, May 19, 2020
1:00 PM

Attendees:
- Larry Schneider - Streets
- Jeff Johnston - Streets
- Ken Mannon - Ops Services
- Brian Hergott - Ops Services
- Blake Visser - Ops Services
- Rich Anderson - Building Services
- Noah Beals - Development Review/Zoning
- Jesse Schlam - Erosion Control
- Dave Betley - Engineering
- Aaron Reed - Natural Areas
- Rebecca Everette - Development Review

On-Site Conditions:
- Rain event recently washed out a berm, caused an erosion control issue
- Think that it could be mitigated with some additional berming/adjustments to that feature
- Water coming into storm channel at too fast a rate
- Weigh station causing additional runoff and erosion, concern that stormwater is not being adequately handled
- Once vegetation and seeding has established, will be a better situation

Fueling Station:
- Pond was designed to accept some additional storm drainage from the Hoffman Mill site as a whole (~6 acres?)
- Bob Amirall, Interwest - consulting Engineer

Weigh Station:
- Current scale is over 20 yrs old - structural rust problems, failure is imminent
- Streets is highly dependent on scale
- Paving was there originally, repaved over existing - took out some existing concrete out for the scale, there was gravel/dirt over the asphalt

Development Review & Building Processes:
- Property is already platted
- Minor Amendment needed for site improvements, erosion control and to account for change in drainage patterns
    - Minor Amendment would need to go to the Planning & Zoning Board for review, since it's a City project
- Don't think any Engineering permits would be needed (e.g., excavation permit, development construction permit)
- Building permit needed for scale, with a U occupancy

    - Rich can do a cursory review concurrent with Minor Amendment process, but couldn't approve anything until Minor Amendment is complete
- Building permit needed for the new small shed building as well

Roles:

- Ops Services will be the lead, in coordination with Streets
    - Blake Visser will be the project manager
- Can use an on-call civil engineer to complete engineering work
- Budget - Larry to work with Ken on costs

Timeframe:

- Not an urgent priority for Streets, but there is a risk of failure of existing scale

Submittal requirements:

- Need to survey existing conditions and the improvements that already occurred
- Erosion Control
    - Disturbance has been over 10,000 sf, which triggers erosion control requirements
    - This area plus fueling site may constitute a larger common plan area, which would trigger the need for a state erosion control permit
        - Will need to be clear that these are two separate projects that have happened in a similar time period, but not overlapping; needs to be clearly described in a letter from project manager
    - Will need a separate erosion control plan for just this portion of the site
    - Escrow would be waived, since it's a City project
    - Erosion control requirements can be found at www.fcgov.com/erosion for the design engineer there is also a check sheet there to help them design this.
- Stormwater
    - Shane Boyle will be main point of contact for Stormwater
    - Grading plan required
    - Drainage memo required, but not a full drainage report
    - Requirements will be based on net impervious area (increase of less than 1000 sf does not trigger requirements)
    - May need to design something that mitigates impacts to fueling station detention and water quality features
- Zoning
    - Combined site/landscape plan
    - Elevations for any new buildings/structures
- Building
    - Full building permit package needed