BLUELINE

MEMORANDUM

DATE: **July 30, 2020**

TO: **Gregg Dohrn**

FROM: **Blueline**

RE: **Water and Sewer Service - Phase 1A and Full Buildout**

Per Appendix D and Appendix E of the Development Agreement, the City is to provide sewer and water service for the first 140 ERUs constructed within City Heights.

The proposed water system for the City Heights development was modeled by HLA Engineering and Land Surveying, Inc. (HLA) using the City's hydraulic model. The model includes full buildout demand. Refer to letter prepared by HLA documenting design assumptions, exhibit prepared by Blueline showing the conceptual location of watermain for the City Heights development and the Sewer & Water Plan prepared by Blueline showing the proposed water system for Phase 1A.

The lot counts provided in the exhibit prepared by Blueline showing the conceptual location of watermain for the City Heights development can be used to determine sewer loading.

HLA
Engineering and Land Surveying, Inc.

June 17, 2020

Blueline
25 Central Way, Suite 400
Kirkland, WA 98033

Attn: Brett Pudists, PE

Re: City of Cle Elum
City Heights Water Main Sizing
HLA Project No. 20063E

Dear Brett:

On May 22, 2020 Blueline sent HLA a conceptual plan for the City Heights development for full buildout, and requested assistance determining what water main size is required and serviceability for higher elevation services.

HLA input the conceptual layout in the City's water system model and considered the following assumptions:

- Maximum Day Demand (MDD) as determined by Cle Elum's 2014 Water System Plan including Fire Flow is the active scenario.
- All parcels are assumed to be developed as single-family residential services.
- Minimum static pressure provided is 40 psi, and minimum fire flow is 1,000 gpm at 20 psi residual pressure.
- Fire suppression and equalizing storage components are depleted for the active scenario.
- Elevations assigned to nodes are based on contours on exhibit provided by Blueline.
- Only water main represented by a solid line were input in the model, with nodes at each junction with service laterals.
- PRV diameters are assumed 6-inch, and initially set to maintain a discharge at 30 psi, but were then changed to 40 psi after initial model results showed much lower fire flow than necessary.
- Zone 4 was assumed to be served by a booster pump and separated from Zone 3 with an additional PRV, after initial model results showed lower pressure than required in Zone 4.
- Pipe diameter was initially assumed to be 12-inch but was upsized to 16-inch after undesirable fire flow and pipe velocity resulted.

Results from modeling the City Heights development according to the above assumptions indicate 16-inch diameter pipe will be necessary to adequately serve the development at full buildout, and services in Zone 4 will not have sufficient pressure to be served by Zone 3 water main. The solution to serve Zone 4 represented in the model is not recommended for implementing because it satisfies the model's instantaneous demand but would not support real-life fluctuating demands over time.

Depending on the method used for serving Zone 4, water main diameter in Zone 4 and to the east may potentially be reduced to 12-inch. Services at the low end of the pressure zone they are

served from may use individual PRVs where it is more practical than extending water mains from the lower zone or installing a larger PRV station in the City's water main. If the H Pods isolated from the rest of the system are served by one or more wells, the City will regard that location either as a neighboring water system or rural residential area. The City will not operate or be responsible for the well(s) serving that area. If in the future the City extends water amins to this area, the lots may connect to City water, but must be disconnected from their previous source for potable use.

Please feel free to contact me for clarification or for further questions.

Very truly yours,

Ryan M. Young, PE

RMY/sms

Copy: City of Cle Elum

potential development of approximately 5.5 acres of pod A - assume 100-150 multi-family units for watermain sizing

interested in overall main sizing, internal loops just shown for reference

line represents zone 3 water at 30 psi

static pressure ranges from 30 psi to 40 psi for zone 3 water for units between elevation 2200' and 2230', would the City allow zone 3 water for these lots? DOH requires 30 psi min

low point ~2030'

low point ~2075'

ZONE 2 RESERVOIR 500,000 GALLONS

ZONE 1.5 RESERVOIR 500,000 GALLONS

connect to existing zone 3 water in SR 903

possible to use zone 3 water w/ individual PRV for these ERUs (6 units)? static pressure would range from 95 psi to 115 psi in this area

conceptual location of zone 3/2 PRV @ elev ~2083', 94 psi zone 3, 40 psi zone 2

refer to preliminary plat plans for current lot and water layout

connect to existing zone 2 water in sixth st

existing power access road

conceptual location of creek/ravine crossing - utilize existing power access road to get zone 3 water across creek/ravine, low point ~2010'

water easement between lots

possible to use zone 3 water w/ individual PRV for these ERUs (3 units)? static pressure would range from 95 psi to 111 psi in this area

ZONE 4: MIN SERVICE ELEVATION 2200 FT

ZONE 3: MAX SERVICE ELEVATION 2200 FT

ZONE 2: MAX SERVICE ELEVATION 2080 FT

ZONE 3: MIN SERVICE ELEVATION 2080 FT

ZONE 2: MIN SERVICE ELEVATION 1965 FT

ZONE 1: MAX SERVICE ELEVATION 1965 FT

ZONE 4

ZONE 3

ZONE 2

ZONE 1

STATE ROUTE 903

DENNY AVE

PINE ST

PARK ST

STEINER ST

STAFFORD ST

SIXTH ST

FIFTH ST

FOURTH ST

THIRD ST

SECOND ST

FIRST ST

BILLINGS AVE

ROSLYN PLACE

RONALD

REID ST

ALPHA AVE

POWER

DAVIS PL.

DAVISA AVE

ROSSETTI WAY

RAILROAD ST

DAKES AVE

PENNSYLVANIA AVE

HARRIS AVE

WRIGHT AVE

BULLITT AVE

PEDH AVE

MONTGOMERY AVE

RANGER STATION ROAD

SOUTH CLE ELUM WAY

B.N.S.F. RAILROAD

INTERSTATE 90

YAKIMA RIVER

OLD CHANNEL

JEFFERSON

GRANT AVE

WASHINGTON ST

lot count as of 5/22/20

Lot Count by Zone	Current	Range
Zone 1	4	0-10
Zone 2	126	110-140
Zone 3	375	335-415
Zone 4	89	80-100
Total (excluding A pods)	594	

Notes

Zone 3 - 30-40 psi	77	
A pods - Estimated # of Multi-Family Units		100-150

LEGEND

- EXISTING ZONE 1 WATER SYSTEM
- EXISTING ZONE 2 WATER SYSTEM
- BOUNDARY BETWEEN ZONE 1 & ZONE 2 WATER DISTRIBUTION SYSTEM
- PRESSURE ZONE BOUNDARY LINE
- PRESSURE ZONE BOUNDARY LINE – 30 PSI (2230')

WATER ZONE INFO

ZONE 1	(1,865' – 1,965')
ZONE 2	(1,965' – 2,080')
ZONE 3	(2,080' – 2,200')
ZONE 4	(> 2,200')

UNDERGROUND UTILITY NOTE

UNDERGROUND UTILITIES ARE SHOWN IN THE APPROXIMATE LOCATION. THERE IS NO GUARANTEE THAT ALL UTILITY LINES ARE SHOWN, OR THAT THE LOCATION, SIZE AND MATERIAL IS ACCURATE. THE CONTRACTOR SHALL UNCOVER ALL INDICATED PIPING WHERE CROSSING, INTERFERENCES, OR CONNECTIONS OCCUR PRIOR TO TRENCHING OR EXCAVATION FOR ANY PIPE OR STRUCTURES. TO DETERMINE ACTUAL LOCATIONS, SIZE AND MATERIAL. THE CONTRACTOR SHALL MAKE THE APPROPRIATE PROVISION FOR PROTECTION OF SAID FACILITIES. THE CONTRACTOR SHALL NOTIFY ONE CALL AT 8-1-1 (WASHINGTON811.COM) AND ARRANGE FOR FIELD LOCATION OF EXISTING FACILITIES BEFORE CONSTRUCTION.

SCALE: 1" = 300'

0 150 300 600

BLUELINE

25 CENTRAL WAY, SUITE 400, KIRKLAND, WA 98033
P: 425.216.4051 F: 425.216.4052
WWW.THEBLUELINEGROUP.COM

SCALE: AS NOTED

PROJECT MANAGER: BRETT K. PUDISTS, PE

PROJECT ENGINEER: MICHELLE ROBERGE

DESIGNER: CHRIS WISCOMB

ISSUE DATE: 5/22/2020

NO	DATE	BY	REVISIONS

CONCEPTUAL WATER SYSTEMS CONNECTION

CITY HEIGHTS

PRE-APP

PODS F3 AND F4

CITY OF CLE ELUM WASHINGTON

JOB NUMBER: 19-349

SHEET NAME: PA-05

SHT 5 OF 6

24x36
May 22, 2020 - 11:56am - User dbraeer
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conceptual location of creek/ravine crossing - utilize existing power access road to get zone 3 water across creek/ravine, low point ~2010'

possible to use zone 3 water w/ individual PRV for these ERUs (4 units)? static pressure would range from 95 psi to 111 psi in this area

water easement between lots

existing power access road

possible to use zone 3 water w/ individual PRV for these ERUs (3 units)? static pressure would range from 95 psi to 111 psi in this area

possible to use zone 3 water w/ individual PRV for these ERUs (18 units)? static pressure would range from 95 psi to 111 psi in this area

these pods are isolated from the rest of the development, separated by a ravine, extending water to these lots would be costly and would result in more public main to maintain - does the City take issue with utilizing wells to provide water services here? would the City operate the well system?

connect to existing zone 1 water in columbia ave

possible to use zone 3 water w/ individual PRV for these ERUs (26 units)? static pressure would range from 95 psi to 154 psi in this area

low point ~1955'

conceptual location of zone 3/1 PRV @ elev ~1972', 142 psi zone 3, 40 psi zone 1

lot count as of 5/22/20

Lot Count by Zone	Current	Range
Zone 1	4	0-10
Zone 2	126	110-140
Zone 3	375	335-415
Zone 4	89	80-100
Total (excluding A pods)	594	

Notes

Zone 3 - 30-40 psi	77	
A pods - Estimated # of Multi-Family Units		100-150

WATER ZONE INFO

ZONE 1	(1,865' – 1,965')
ZONE 2	(1,965' – 2,080')
ZONE 3	(2,080' – 2,200')
ZONE 4	(> 2,200')

LEGEND

- EXISTING ZONE 1 WATER SYSTEM
- EXISTING ZONE 2 WATER SYSTEM
- BOUNDARY BETWEEN ZONE 1 & ZONE 2 WATER DISTRIBUTTION SYSTEM
- PRESSURE ZONE BOUNDARY LINE
- PRESSURE ZONE BOUNDARY LINE – 30 PSI (2230')

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N

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0 150 300 600

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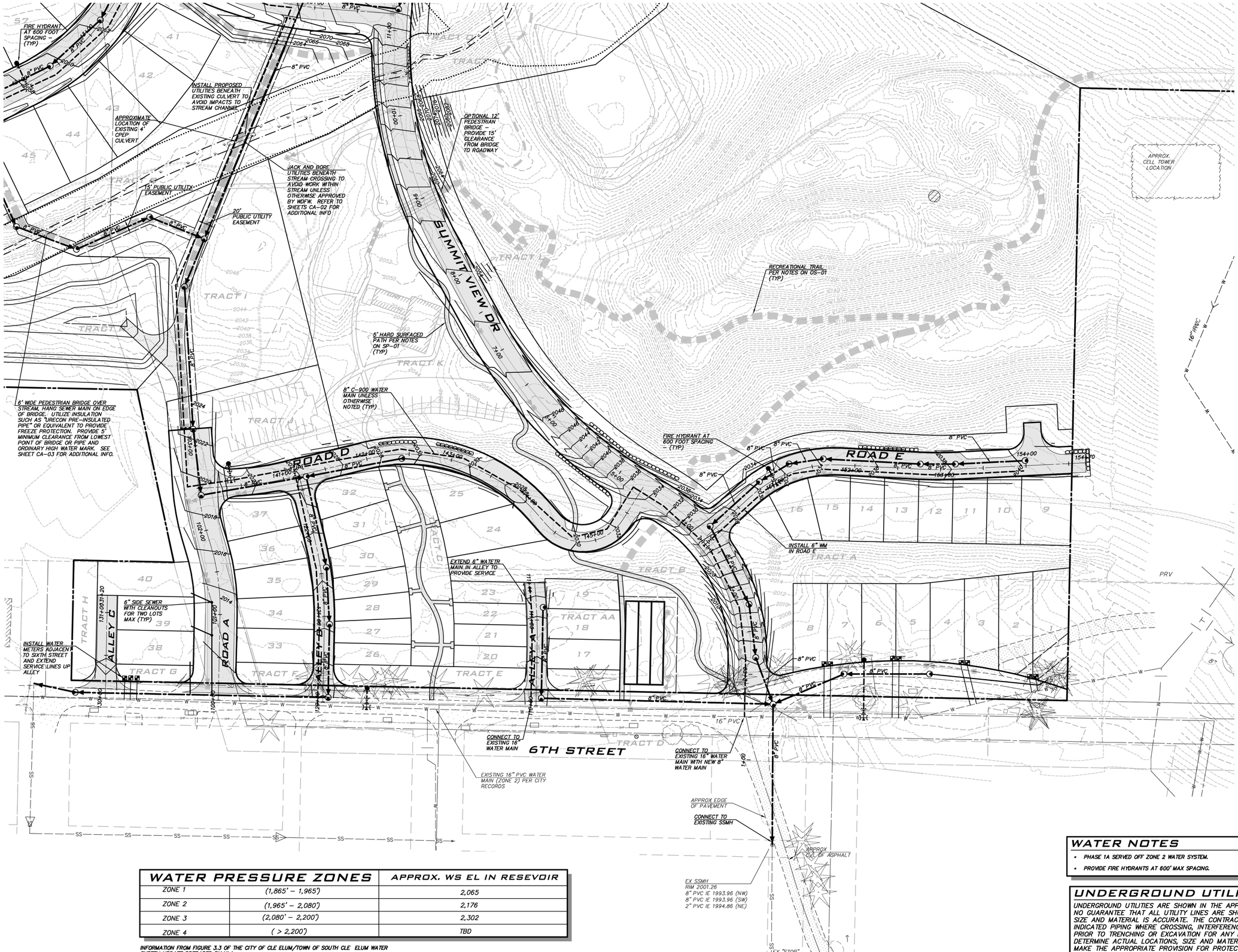
PROJECT MANAGER: BRETT K. PUDISTS, PE
PROJECT ENGINEER: MICHELLE ROBERGE
DESIGNER: CHRIS WISCOMB
ISSUE DATE: 5/22/2020

NO	DATE	BY	REVISIONS

CONCEPTUAL WATER SYSTEMS CONNECTION
CITY HEIGHTS
PRE-APP
PODS F3 AND F4
CITY OF CLE ELUM WASHINGTON

JOB NUMBER: 19-349
SHEET NAME: PA-06
SHT 6 OF 6

NE 1/4 SEC 27, TWP 20N, RGE 15E, W.M.



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SCALE: 1" = 50'
0 25 50 100

WATER PRESSURE ZONES	APPROX. WS EL IN RESEVOIR
ZONE 1 (1,865' – 1,965')	2,065
ZONE 2 (1,965' – 2,080')	2,176
ZONE 3 (2,080' – 2,200')	2,302
ZONE 4 (> 2,200')	TBD

INFORMATION FROM FIGURE 3.3 OF THE CITY OF CLE ELUM/TOWN OF SOUTH CLE ELUM WATER SYSTEM UPDATE PREPARED BY HLA.

APPROXIMATE ELEVATION RANGE IS A GENERAL ESTIMATE FOR PLANNING PURPOSES INTENDED TO SHOW ELEVATION RANGES THAT PROVIDE BETWEEN 40 AND 100 PSI. ACTUAL PRESSURES AND ELEVATION RANGES MAY VARY BASED ON SITE SPECIFIC REVIEW.

WATER NOTES

- PHASE 1A SERVED OFF ZONE 2 WATER SYSTEM.
- PROVIDE FIRE HYDRANTS AT 600' MAX SPACING.

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SCALE: AS NOTED
PROJECT MANAGER: BRETT K. PUDISTS, PE
PROJECT ENGINEER: LYNDSEY FEDAK, PE
DESIGNER: CHRIS WISCOMB
ISSUE DATE: 7/30/2020

NO	DATE	BY	REVISIONS

SEWER & WATER PLAN

CITY HEIGHTS
PHASE 1A (PODS B7 & C)
(PRELIMINARY SITE PLAN & ENGINEERING)
CITY OF CLE ELUM WASHINGTON

BRETT K. PUDISTS
STATE OF WASHINGTON
37925
REGISTERED
PROFESSIONAL ENGINEER

7/29/20

JOB NUMBER: 19-349
SHEET NAME: SW-01
SHT 13 OF 22

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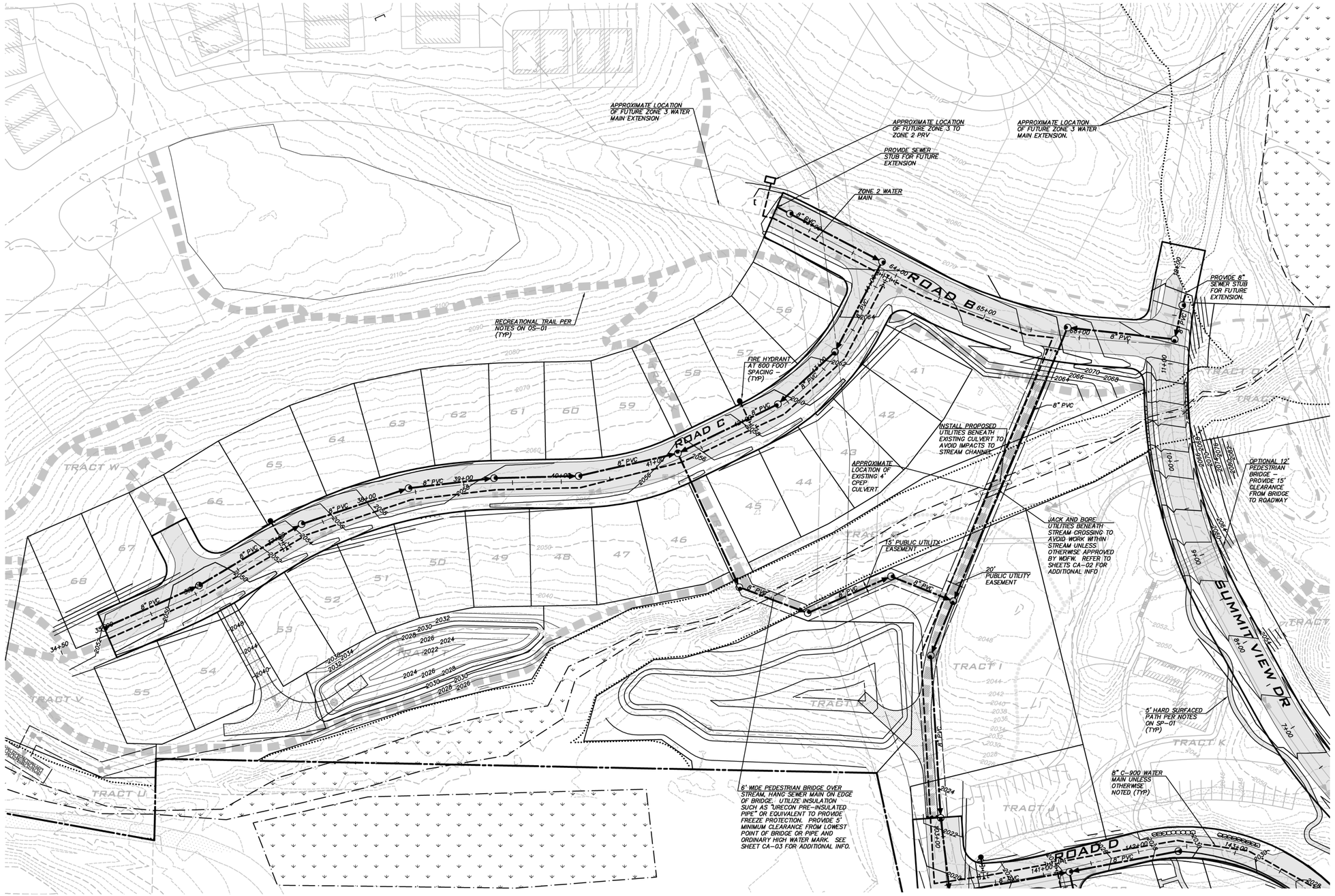

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CITY HEIGHTS
PHASE 1A (PODS B7 & C)
(PRELIMINARY SITE PLAN & ENGINEERING)
CITY OF CLE ELUM WASHINGTON

BRETT K. PUDISTS
STATE OF WASHINGTON
37925
REGISTERED PROFESSIONAL ENGINEER

7/29/20

JOB NUMBER: 19-349
SHEET NAME: SW-02
SHT 14 OF 22

24-36
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