

SITE PHOTOS:

PHOTOS WERE TAKEN ON 06/28/2017, AND REFLECT SITE CONDITIONS AT THE TIME OF SURVEY



TAKEN ON NORTHEASTERLY SIDE OF THE ROAD, LOOKING SOUTHERLY AT THE CULVERT INLET (BEFORE BEING BURIED IN 2017)



TAKEN ON THE SOUTHWESTERLY SIDE OF THE ROAD, LOOKING SOUTHEASTERLY ALONG THE GABION WALL



TAKEN ON THE NORTHEASTERLY SIDE OF THE ROAD, LOOKING NORTHEASTERLY UPSTREAM AT THE ROCK AND SOIL DEPOSITS



TAKEN ON THE SOUTHWESTERLY SIDE OF THE ROAD, LOOKING NORTHEASTERLY AT THE CULVERT OUTLET

PURPOSE OF SURVEY

THE PURPOSE OF THIS SURVEY WAS TO PROVIDE TOPOGRAPHIC SURVEY AND RIGHT OF WAY RESOLUTION FOR A PORTION OF KALAMA RIVER ROAD, FOR PURPOSES OF DESIGNING NEW DRAINAGE FACILITIES.

COUNTY PROJECT NUMBER: 1317

VERTICAL DATUM

ELEVATION DATUM: NAVD 88
BENCHMARK: ADJUSTED OPUS POSITION ON CONTROL POINT #101
ELEV: 57.14' (SEE BELOW FOR CONTROL SCHEME)
ONSITE TEMPORARY BENCHMARK: CP108
LOCATION: AS SHOWN HEREON
ELEVATION: 80.81'

HORIZONTAL DATUM / BASIS OF BEARINGS / CONTROL SCHEME

WASHINGTON STATE PLANE, SOUTH ZONE (SPC 4602 WA S), UTILIZING GROUND DISTANCES, SO STATE PLANE COORDINATES ARE APPROXIMATE (APPROXIMATELY ±0.3') - SEE BELOW.

HORIZONTAL COORDINATES AND BASIS OF BEARINGS ARE BASED ON WASHINGTON STATE PLANE (SOUTH ZONE) - REFERENCE FRAME: NAD83 (2011) (EPOCH 2010.0000), US SURVEY FEET. ALL DISTANCES ARE GROUND, SO STATE PLANE COORDINATES ARE APPROXIMATE, AND WERE DETERMINED FROM NGS OPUS SOLUTIONS, WHICH WERE DERIVED FROM 2 HOUR MINIMUM GPS OBSERVATIONS, UTILIZING EXISTING NGS BASE STATIONS.

PID	DESIGNATION	LATITUDE	LONGITUDE
DG8344	P420 FANTASYFD_WA2004 CORS ARP	N46°35'18.952"	W122°51'58.733"
DH4129	P6860 MSH_SESLPEWAZ2004 CORS ARP	N46°10'24.461"	W122°09'38.141"
DH5822	P7102 MSH_ELKRCWAZ2004 CORS ARP	N46°18'00.585"	W122°20'44.272"
DJ4303	GRMD GRAND MOUND CORS ARP	N46°47'43.735"	W123°01'21.289"
DK4151	P446 KELSQ_AIR_WA2007 CORS ARP	N46°06'56.369"	W122°53'33.975"
DN2111	JIME JIM ELAM CORS ARP	N45°31'23.214"	W122°59'25.841"

ON CONTROL POINTS 101, 110, 114, AND 124 (SHOWN HEREON), WHICH WERE THEN TIED TOGETHER USING STANDARD CONVENTIONAL TRAVERSE AND RTK GPS VECTOR TECHNIQUES, THE RESULTS OF WHICH WERE ADJUSTED TOGETHER IN A WEIGHTED LEAST SQUARES ADJUSTMENT, UTILIZING STARNET SOFTWARE. AN AVERAGE PROJECT COMBINED SCALE FACTOR (0.899552098) WAS CALCULATED AND APPLIED TO THE PROJECT TO GENERATE GROUND DISTANCES. THE RESULTS WERE THEN TRANSLATED TO MATCH THE ADJUSTED TRUE STATE PLANE COORDINATES OF CONTROL POINT NUMBER 102.

THE CONVERGENCE ANGLE IS -1.68240113° AT CONTROL POINT NUMBER 101.

GROUND COORDINATES THAT ARE SHOWN HEREON HAVE BEEN TRUNCATED TO ELIMINATE CONFUSION WITH TRUE STATE PLANE.

ACTUAL STATE PLANE COORDINATES (AFTER LEAST SQUARES ADJUSTMENT OF OPUS COORDINATES AND TRAVERSE) FOR GPS OBSERVED CONTROL POINTS 101, 110, 114, AND 124, AS WELL AS TRAVERSED AND COMPUTED POINT 102 ARE AS FOLLOWS:

101:	N268457.78	E1052389.85
102:	N268279.74	E1051970.89
110:	N268677.56	E1050281.90
114:	N268347.07	E1055172.65
124:	N267216.01	E1058445.68

RELATIVE VERTICAL POSITIONAL ACCURACY

THE RELATIVE VERTICAL POSITIONAL ACCURACY OF THE CONTOURS AND SPOT ELEVATIONS SHOWN HEREON MEETS THOSE STANDARDS DEFINED BY THE NATIONAL SOCIETY OF PROFESSIONAL SURVEYORS (NSPS) PER THAT CERTAIN DOCUMENT ENTITLED "NSPS MODEL STANDARDS FOR TOPOGRAPHIC SURVEYS" (LABELED AS SECTION E), APPROVED 3/12/2002. THOSE STANDARDS ARE AS FOLLOWS FOR A 1' CONTOUR MAP:

CONTOUR LINES AT 1' INTERVALS: ±0.65' VERTICAL POSITIONAL ACCURACY
SPOT ELEVATIONS FOR WELL DEFINED PLANIMETRIC FEATURES: ±0.10' VERTICAL POSITIONAL ACCURACY

METHOD OF SURVEY

FIELD SURVEYS WERE ACCOMPLISHED UTILIZING STANDARD CLOSED TRAVERSE AND RADIAL SURVEY METHODS, AS WELL AS STANDARD GLOBAL POSITIONING SYSTEM (GPS) RTK AND STATIC GPS METHODS. MEASUREMENTS WERE PERFORMED USING A TOPCON 5-SECOND TOTAL STATION AND TOPCON GR3 SURVEY GRADE GPS UNITS. THE ANGULAR CLOSURE OF TRAVERSE MEETS STANDARDS AS SET FORTH IN WAC332-130-090, LINEAR CLOSURE AFTER AZIMUTH ADJUSTMENT IS GREATER THAN 1:10000, A LEAST SQUARES ADJUSTMENT OF THE DATA WAS PERFORMED.

NARRATIVE

DUE TO ITS CLOSE PROXIMITY TO THE RIVER ON ONE SIDE, AND STEEP HILLSIDES ON THE OTHER, KALAMA RIVER ROAD IS SUBJECT TO QUITE A BIT OF SLIDE AND EROSION ACTIVITY. DUE TO THIS, THE ORIGINAL MONUMENTS SET BY THE COUNTY OVER THE YEARS FREQUENTLY GET DESTROYED. ALSO, IN THIS PARTICULAR CASE (PER CCPWFB 1946-02) NO PERMANENT MONUMENTS (IRON PIPES) WERE SET BETWEEN ORIGINAL STATIONS 56+08.5 AND 123+15.1. IN THIS SECTION, THERE WERE MOSTLY TIES TO TREES, WOOD HUBS, A TIE TO A SECTION CORNER (240' AWAY), AND A TIE TO A CENTER QUARTER CORNER (285' AWAY). AS THESE LAST TWO WERE FAR AWAY FROM THE ROAD, AND MAY HAVE BEEN DONE WITH STADIA, THEY ALSO WERE CONSIDERED UNUSABLE.

UNFORTUNATELY, WE WERE UNABLE TO LOCATE ANY ORIGINAL MONUMENTS FOR THE ROADWAY IN THIS AREA. THE CLOSEST TIED ONES ARE ABOUT HALF A MILE EAST, AND ABOUT ONE MILE WEST OF THIS PROJECT. THEREFORE, I UTILIZED A BEST-FIT LOCATION OF THE ORIGINAL ALIGNMENT, WITH THE AS-TRAVELED CENTERLINE OF KALAMA RIVER ROAD, BASICALLY, 1/4" TIE THE EDGE OF PAVEMENT ON BOTH SIDES FOR APPROXIMATELY TWO MILES TOTAL, THEN HELD THE NEAREST FOUND, ORIGINAL MONUMENTS (ABOUT HALF A MILE TO THE EAST) AND ROTATED THE RECORD CENTERLINE TO THE TANGENT SECTIONS OF ROAD. THIS SOLUTION FOLLOWED THE AS-TRAVELED CENTERLINE FAIRLY WELL. OBVIOUSLY, MOST OF THE CURVES HAD GOTTEN FLATTER OVER THE YEARS. DUE TO GRADING AND MAINTENANCE, AND THE PORTIONS SUBJECT TO EROSION BY EITHER THE RIVER OR LAND SLIDES, WERE NO LONGER IN THE CENTER OF THE ROAD, BUT IT FIT PRETTY GOOD OTHERWISE.

SEE MY PRELIMINARY RECORD OF SURVEY (AVAILABLE IN THE OFFICE OF THE COUNTY ENGINEER, UNTIL IT IS COMPLETED AND RECORDED AT THE AUDITOR'S OFFICE). IT INCLUDES A MUCH LARGER SECTION OF ROAD THAN THAT SHOWN HEREON, AND WILL THEREFORE TAKE CONSIDERABLY LONGER TO COMPLETE TO STANDARDS OF PRACTICE FOR RECORDS OF SURVEY. IT WILL ALSO HAVE CONSIDERABLY MORE DETAIL THAN SHOWN HEREON.

MONUMENT LEGEND:

- △ ELEV: TEMPORARY CONTROL POINT
DESC:
● - FOUND MONUMENT AS NOTED. HELD UNLESS OTHERWISE NOTED

NOTES:

- ALL PIPE DIAMETERS ARE INSIDE DIMENSION, UNLESS NOTED OTHERWISE.
- THE TERM "IRON ROD" REFERS TO REINFORCING BAR. SMOOTH RODS (IF ANY) ARE NOTED AS SUCH.
- ALL FOUND MONUMENTS WERE VISITED AND TIED DURING THIS SURVEY (06/28/2017).

ABBREVIATIONS:

AFN = AUDITOR'S FILE NUMBER
CCPWFB = COWLITZ COUNTY PUBLIC WORKS FIELD BOOK
CMP = CORRUGATED METAL PIPE
CONC = CONCRETE PIPE
CPP = CORRUGATED PLASTIC PIPE
FD = FOUND
IE = INVERT ELEVATION
YPC = YELLOW PLASTIC CAP

CONTROL AND FOUND MONUMENT TABLE

POINT	NORTHING	EASTING	DESCRIPTION	ORIGIN
101	68457.7896	52389.8715	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	THIS SURVEY
102	68279.7413	51970.9867	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	THIS SURVEY
103	68601.9991	52809.1232	MAGNETIC NAIL	THIS SURVEY
104	68606.6827	53077.9687	MAGNETIC NAIL W/WASHER MARKED "OBEC CONTROL"	UNKNOWN
105	68718.3174	53326.5664	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	THIS SURVEY
106	68075.4744	51707.8153	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	THIS SURVEY
107	67920.5876	51102.0971	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	THIS SURVEY
108	68133.2888	50837.7329	5/8" IRON ROD WYPC MARKED "GERMUNSON"	UNKNOWN
109	68419.2570	50602.1272	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	THIS SURVEY
110	68577.5765	50281.8272	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	COUNTY JOB#5306 (CP#4)
111	69054.8598	49345.7408	COWLITZ COUNTY BRASS DISK MARKED "F003"	COUNTY JOB#5306 (CP#2)
112	69230.3956	54269.2955	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	THIS SURVEY
113	68709.9224	54895.2488	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	THIS SURVEY
114	68347.0753	55172.7966	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	THIS SURVEY
115	68550.9843	52273.2955	HUB AND TACK	THIS SURVEY
116	68223.7102	50875.8900	HUB AND TACK	THIS SURVEY
117	68183.7660	55735.6430	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	THIS SURVEY
118	68232.6062	56073.8830	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	THIS SURVEY
119	68095.2552	56636.0992	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	THIS SURVEY
120	67801.5667	57029.2166	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	THIS SURVEY
121	67223.8286	57296.5477	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	THIS SURVEY
122	66801.6386	58000.2910	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	THIS SURVEY
123	66892.6392	58201.7551	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	THIS SURVEY
124	67215.9628	58445.9730	5/8" IRON ROD WRPC MARKED "COWLITZ CNTY CONTROL POINT"	THIS SURVEY
200	68522.4406	52630.3970	3" BRASS DISK IN CONCRETE MARKED "WASHINGTON DEPT..."	1970 DEPT. OF GAME SUR.
201	68660.1158	53264.1631	1" IRON PIPE	CCPWFB 1946-02
202	68391.1068	52365.4687	1/2" REBAR MARKED "K BLJHM 29269" - RESET OF 12/ROS/84?	UNKNOWN - 16/ROS/112?
203	68679.5452	53338.7785	1-1/4" IRON PIPE (UP 2.0'), BENT, TIED AT BEND	UNKNOWN
204	68914.7636	53379.3846	1-1/4" IRON PIPE (DOWN 1.5' IN SHOULDER)	CCPWFB 1946-02
205	69256.8163	53980.9077	1-1/4" IRON PIPE IN SHOULDER, BENT, TIED AT BEND	CCPWFB 1946-02
206	67245.4146	57235.5738	1" IRON PIPE W/PLUS & TACK MARKED "COWLITZ COUNTY"	CCPWFB 1946-02
207	67110.4095	57434.1629	2" IRON PIPE	CCPWFB 1946-02
208	66792.5916	58001.5936	2" IRON PIPE, BENT, TIED AT BEND	UNKNOWN
209	66795.6681	58015.9820	1" IRON PIPE WYPC MARKED "COWLITZ COUNTY"	CCPWFB 1946-02

UTILITY STATEMENT:

THE UNDERGROUND UTILITIES SHOWN HAVE BEEN LOCATED FROM UTILITY PAINT MARKINGS PROVIDED BY OTHERS, THAT WERE AVAILABLE DURING THE FIELD SURVEY. AS-BUILT MAPS WERE REQUESTED FROM THE NOTIFIED UTILITIES - NONE WERE RECEIVED.

THIS SURVEY MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE OF ALL SUCH UTILITIES IN THE AREA. THE UNDERGROUND UTILITIES SHOWN MAY NOT BE IN THE EXACT LOCATION AS NOTED ON THIS SURVEY, AND ARE LOCATED FROM THE INFORMATION PROVIDED. MANHOLES OTHER THAN SANITARY AND STORM SEWER WERE IDENTIFIED BY MANHOLE LIDS AND MAY NOT BE LABELED CORRECTLY.

UTILITY LOCATIONS MUST BE VERIFIED BY THE STATE UTILITY NOTIFICATION CENTER IMMEDIATELY PRIOR TO ANY EXCAVATION.

UTILITY LOCATES WERE REQUESTED 5/23/17 UNDER TICKET NUMBER 17179842

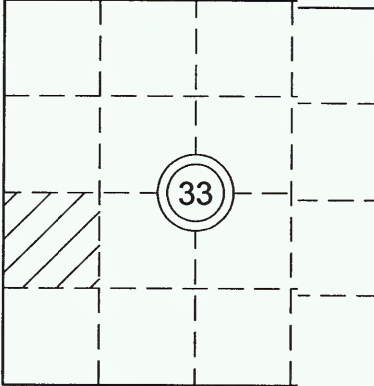
FOLLOWING IS A LIST OF UTILITY PROVIDERS NOTIFIED:

COMPUID03	COWLITZ COUNTY PUD	(360)577-7546
KALAMA01	CITY OF KALAMA	(360)673-3706
KALTEL01	KALAMA TELEPHONE CO.	(360)673-2755
WGPWA10	WILLIAMS NW PIPELINE	(800)972-7733

* - DENOTES ASBUILT MAPS RECEIVED

INDEX LOCATION

T7N, R#1W, V.M.



SYMBOL LEGEND

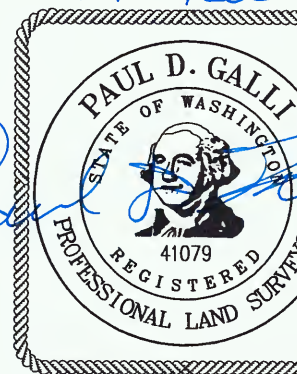
SYMBOL	DESCRIPTION
○	MANHOLE - EXISTING
○	SANITARY SEWER CLEANOUT - EXISTING
○	FENCE GATE POST - EXISTING
□	MAIL BOX
■	SHRUB
☼	CONIFER TREE*
○	DECIDUOUS TREE*
○	DECIDUOUS TREE CLUMP*
○	WATER WELL
○	SIGN
○	BORE HOLE
○	INCLINOMETER
○	MONITOR WELL
○	PIEZOMETER
○	MARKER
○	CABLE TV PEDESTAL
○	NATURAL GAS METER
○	NATURAL GAS VENT
○	NATURAL GAS VALVE
○	PETROLEUM VENT
○	GUY ANCHOR
○	GUY POLE
○	LIGHT STANDARD
○	ELECTRICAL POWER METER
○	UTILITY POLE
○	SERVICE POLE
○	TELEPHONE PEDESTAL
○	FIRE HYDRANT
○	WATER METER
○	WATER VALVE

LINETYPE LEGEND

LINETYPE	DESCRIPTION
---	DRAINAGE CULVERT
---	DRAINAGE / ROAD DITCH
X X X X	FENCE, TYPE AS NOTED
---	EDGE OF WATER
---	EDGE OF WETLAND
---	ORDINARY HIGH WATER LINE
---	RAILROAD TRACKS
---	EDGE OF CONCRETE
---	EDGE OF PAVEMENT
---	EDGE OF GRAVEL
---	EDGE OF DIRT
---	OVERHEAD WIRE
---	SANITARY SEWER LINE
---	STORM SEWER LINE
---	WATER LINE
---	GAS LINE
---	FIBER OPTIC LINE
---	TELEPHONE LINE
---	TELEVISION LINE
---	ELECTRIC LINE
---	LINEAR AC PATCH (UTILITY?)
---	UTILITY LINE PAINT ENDS HERE, CONNECTION NOT LOCATED OR UNKNOWN
---	GUARD RAIL
---	BUILDING LINE
---	FLOWLINE
---	MAJOR CONTOUR - SPACED AT 5' INTERVALS
---	MINOR CONTOUR - SPACED AT 1' INTERVALS

* NOTE THAT APPROXIMATE TREE DIAMETERS WERE COLLECTED, BUT NOT SHOWN HEREON DUE TO CLARITY ISSUES. PLEASE REQUEST THIS INFORMATION IF NECESSARY.

10/27/2020



RM PROJECT MANAGER	N/A DATE	HORIZ. SCALE: 1" = 20' VERT. SCALE: 1' CONTOURS	DEPARTMENT OF PUBLIC WORKS	LOCATED IN THE SW ONE-QUARTER OF SECTION 33, TOWNSHIP 7 NORTH, RANGE 1 WEST, WILLAMETTE MERIDIAN COWLITZ COUNTY, WASHINGTON ORIGINAL FIELD WORK DATE: JUNE 28, 2017 UPDATED TOPO: OCT 19, 2020	KALAMA RIVER ROAD MILEPOST 2.04 TOPOGRAPHIC SURVEY CROSS CULVERT REPLACEMENT	SHEET 1 OF 1
CB/PG DRAWN BY	10/27/2020 DATE	PROJECT ID: 1317 ROAD NO.: 40000	1600 13TH AVENUE SOUTH KELSO, WASHINGTON 98626			
CB/PG CHECKED BY	10/27/2020 DATE	COMPUTER FILE: 1317-1337-KRR-MP 2.04-2.37-TOPO 2020.dwg FIELD BOOK(S): 2017-01, PAGES 68-76 2017-02, PAGES 1-15				