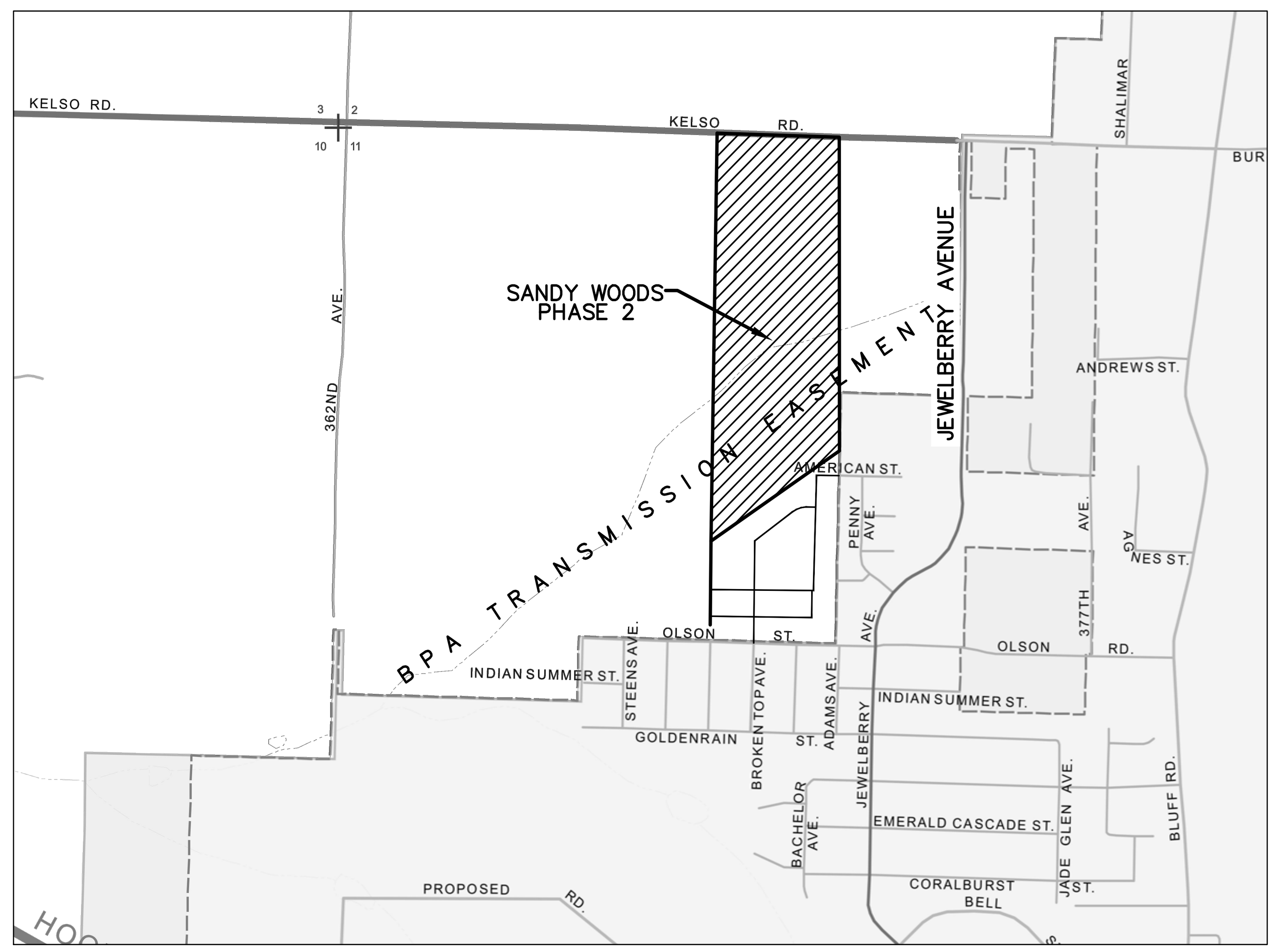
Exhibit C

TENTATIVE PLANS FOR SANDY WOODS 2

CITY OF SANDY, CLACKAMAS COUNTY, OREGON

JUNE, 2021



INDEX

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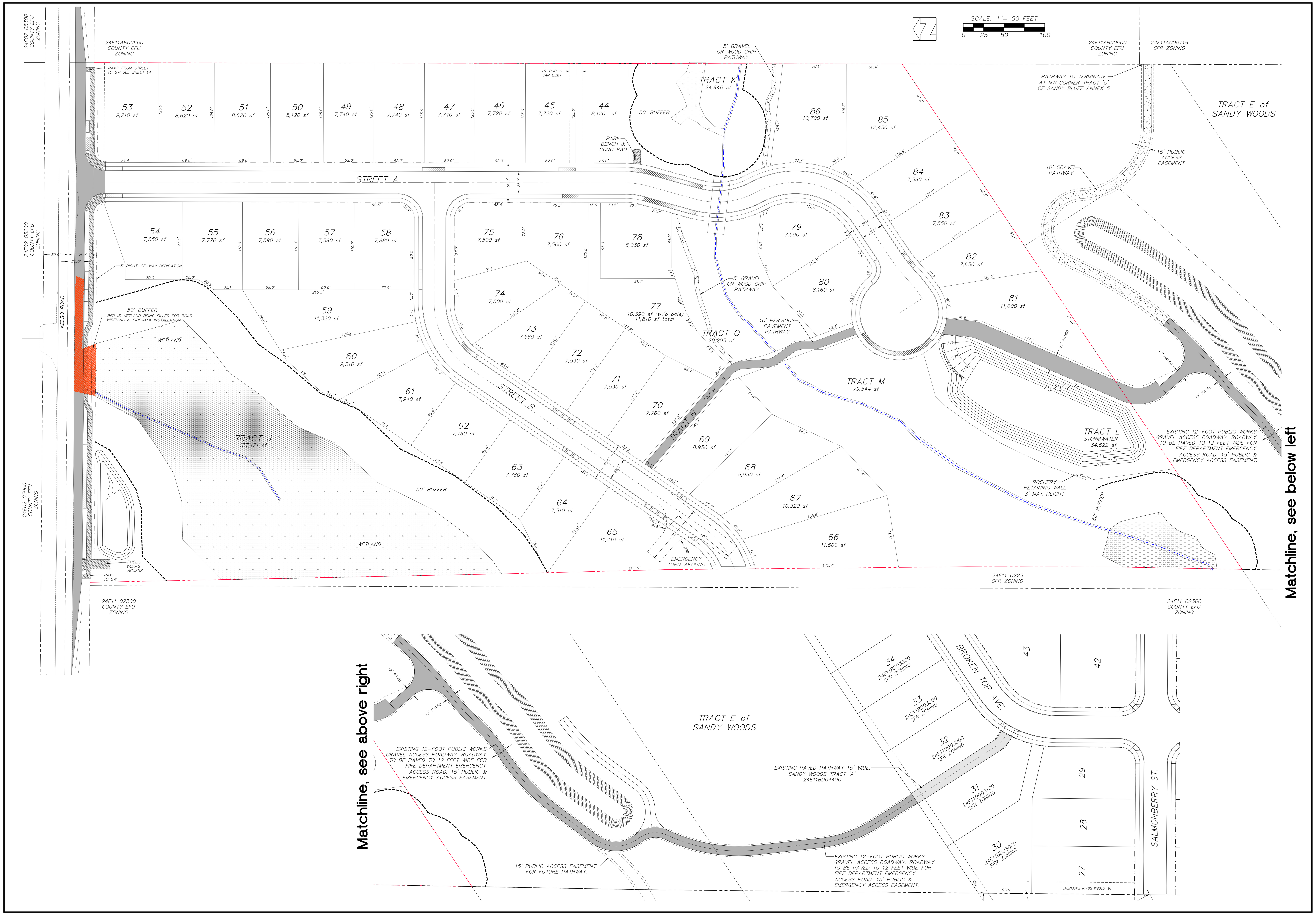
ENGINEER:

SISUL ENGINEERING

375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

MOST RECENT REVISION TO THIS SET OF PLANS:
7/29/2021



REVISIONS	BY
REVISE PER COMPLETENESS CHECK & COUNTY DESIGN MODIFICATION APPROVAL	PS 7.29.21

Sandy Woods 2
Rosemont Development

Site Plan

SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

DATE	MAY, 2021
SCALE	1" = 50'
DRAWN	PS
JOB	SGL19-042
SHEET	1
OF	15 SHEETS

REVISIONS	BY
REVISE PER COMPLETENESS CHECK & COUNTY DESIGN MODIFICATION APPROVAL	PS 7.29.21

Sandy Woods 2
Rosemont Development

Site Plan with Retention Trees, RPZ's and Building Footprints

SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

DATE	JUNE, 2021
SCALE	1" = 50'
DRAWN	PS
JOB	SGL19-042
SHEET	2
OF	15 SHEETS

REVISIONS	BY

Sandy Woods 2
Rosemont Development

Existing Conditions

SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

DATE	MAY, 2021
SCALE	1" = 50'
DRAWN	PS
JOB	SGL19-042
SHEET	3
OF 15	SHEETS

REVISIONS	BY

Sandy Woods 2
Rosemont Development
Tree Retention/Removal Plan

SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

DRAWING: Sandy Woods 2 subdivision DR current.dwg

DATE	JUNE, 2021
SCALE	1" = 50'
DRAWN	PS
JOB	SGL19-042
SHEET	4
OF	15 SHEETS

Tag	Species	DBH	Remarks	DDD	RPZ	17.102.50 Retention Tree	Undersize	Action
1312	Douglas fir	51	viable; blackberries		24	✓✓		PRESERVE
1313	western red cedar	19	size estimated due to blackberries; dead top; terminal decli	X	12	NO		PRESERVE
1314	western red cedar	45	viable		24	✓✓		PRESERVE
1315	big leaf maple	10	suppressed		8	NO	X	PRESERVE
1316	big leaf maple	8	suppressed		9	NO	X	PRESERVE
1317	sweet cherry	9	excessive lean	X	12	NO	X	PRESERVE
1318	red alder	12	viable		8	NO		REMOVE
1319	big leaf maple	7			8	NO	X	PRESERVE
1320	big leaf maple	7			8	NO	X	PRESERVE
1321	western red cedar	7			8	NO	X	PRESERVE
1322	Douglas fir	42	viable; codominant @ 50'		25	✓✓		PRESERVE
1323	Douglas fir	47	viable; trunk swoop		25	✓✓		PRESERVE
1324	Douglas fir	32	viable		22	✓✓		PRESERVE
1325	Douglas fir	30	viable		22	✓✓		PRESERVE
1326	western red cedar	10	viable		8	NO	X	PRESERVE
1327	Douglas fir	36	viable		24	✓✓		PRESERVE
1328	Douglas fir	33	viable		24	✓✓		PRESERVE
1329	sweet cherry	8	viable		8	NO	X	PRESERVE
1330	red alder	8	viable	X	8	NO	X	PRESERVE
1331	Douglas fir	16	viable		12	✓✓		PRESERVE
1332	snag	n/a	dead; approx. 19' tall; habitat	X	8	NO		PRESERVE
1333	sweet cherry	10	viable		8	NO	X	PRESERVE
1334	sweet cherry	9	viable		8	NO	X	PRESERVE
1335	sweet cherry	7	viable		8	NO	X	PRESERVE
1336	western hemlock	19	viable		14	✓✓		PRESERVE
1337	Douglas fir	44	viable		24	✓✓		PRESERVE
1338	big leaf maple	8	viable		8	NO	X	PRESERVE
1339	Douglas fir	17	suppressed		12	✓✓		PRESERVE
1340	Douglas fir	40	viable		24	✓✓		PRESERVE
1341	Douglas fir	25	viable		24	✓✓		PRESERVE
1342	Douglas fir	27	viable		16	NO		REMOVE
1343	big leaf maple	18	stem decay	X	18	NO		REMOVE
1344	Douglas fir	53	viable		24	✓✓		PRESERVE
1345	bitter cherry	9	viable		8	NO	X	PRESERVE
1346	big leaf maple	18	viable		12	✓		PRESERVE
1347	red alder	12	viable		8	✓		PRESERVE
1348	red alder	9	viable		8	NO	X	PRESERVE
1349	red alder	9	viable		8	NO	X	PRESERVE
1350	red alder	15	viable		10	✓		PRESERVE
1351	blue spruce	9	viable		8	NO	X	REMOVE
1352	Douglas fir	35	viable		24	NO		REMOVE
1353	Douglas fir	16	viable		12	NO		REMOVE
1354	Douglas fir	35	viable		24	NO		REMOVE
1355	western red cedar	43	viable		25	NO		REMOVE
1356	big leaf maple	27	viable		18	NO		REMOVE
1357	big leaf maple	9	excessive lean	X	8	NO	X	REMOVE
1358	Douglas fir	35	viable		24	NO		REMOVE
1359	red alder	9	viable		8	NO	X	REMOVE
1360	red alder	11	viable		8	NO		REMOVE
1361	red alder	7			8	NO	X	REMOVE
1362	red alder	10	viable		8	NO	X	REMOVE
1363	red alder	11	viable		8	NO		REMOVE
1364	red alder	7			8	NO	X	REMOVE
1365	red alder	6			8	NO	X	REMOVE
1366	Douglas fir	15	viable		10	NO		REMOVE
1367	red alder	6			8	NO	X	REMOVE
1368	red alder	6			8	NO	X	REMOVE
1369	red alder	7			8	NO	X	REMOVE
1370	big leaf maple	8	viable		8	NO	X	REMOVE
1371	red alder	6			8	NO	X	REMOVE
1372	big leaf maple	6			8	NO	X	REMOVE
1373	big leaf maple	8	viable		10	NO	X	REMOVE
1374	red alder	15	viable		8	NO		REMOVE
1375	big leaf maple	6			8	NO	X	REMOVE
1376	big leaf maple	6			8	NO	X	REMOVE
1377	red alder	6			8	NO	X	REMOVE
1378	red alder	7			8	NO	X	REMOVE
1379	red alder	8	viable		8	NO	X	REMOVE
1380	red alder	8	viable		8	NO	X	REMOVE
1381	red alder	7			8	NO	X	REMOVE
1382	red alder	6			8	NO	X	REMOVE
1383	red alder	11	viable		8	NO		REMOVE
1384	red alder	7			8	NO	X	REMOVE
1385	red alder	11	viable		8	NO		REMOVE
1386	red alder	7			8	NO	X	REMOVE
1387	red alder	6			8	NO	X	REMOVE
1388	red alder	9	viable		8	NO	X	REMOVE
1389	red alder	6			8	NO	X	REMOVE
1390	red alder	8	listed	X	8	NO	X	REMOVE
1391	western red cedar	56	viable		25	NO		REMOVE
1392	big leaf maple	8	suppressed		8	NO	X	REMOVE
1393	big leaf maple	5	suppressed		8	NO	X	REMOVE
1394	big leaf maple	14	viable		8	NO		REMOVE
1395	big leaf maple	6			8	NO	X	REMOVE
1396	big leaf maple	34	viable; shares stump with T1397		22	NO		REMOVE
1397	big leaf maple	43	viable; shares stump with T1396		25	NO		REMOVE
1398	Douglas fir	33	viable		22	✓✓		PRESERVE
1399	western red cedar	30	viable; grown over wire fence		20	✓✓		PRESERVE
1401	Douglas fir	46	viable		25	✓✓		PRESERVE
1402	western red cedar	45	viable; shares stump with T1403		25	✓✓		PRESERVE
1403	Douglas fir	24	viable; shares stump with T1402		18	✓✓		PRESERVE
1404	Douglas fir	29	viable		20	✓✓		PRESERVE
1405	Douglas fir	27	viable		20	✓✓		PRESERVE
1406	big leaf maple	7			8	NO	X	PRESERVE
1407	Douglas fir	30	viable		22	✓✓		PRESERVE
1440	red alder	11	viable		8	✓		PRESERVE
1441	red alder	12	viable		10	NO		REMOVE
1442	red alder	8	viable		8	NO	X	REMOVE
1443	Douglas fir	50	viable		25	✓✓		PRESERVE
1444	Douglas fir	47	trunk swoop @ 50'; re-grown top		25	NO		REMOVE
1445	red alder	7,7,6,6	clump; stump suckers	X	12	NO		REMOVE
1486	Douglas fir	43	viable		25	✓✓		PRESERVE
1487	Douglas fir	34	viable		24	✓✓		PRESERVE
1488	big leaf maple	40	stem decay; decline; broken top	X	25	NO		REMOVE
1489	big leaf maple	47	basal decay; multiple stems; inclusions	X	25	NO		REMOVE
1490	Douglas fir	35	viable		24	✓✓		PRESERVE
1491	scouler willow	17	viable		12	✓		PRESERVE
1492	Douglas fir	29	viable		22	✓✓		PRESERVE
1493	big leaf maple	8	viable		0	NO	X	PRESERVE
1494	big leaf maple	12	viable		10	✓		PRESERVE
1495	big leaf maple	14	viable		10	✓		PRESERVE
1496	Douglas fir	44	viable		24	✓✓		PRESERVE
1497	red alder	12	viable		8	✓		PRESERVE
1498	red alder	10	viable		8	NO	X	PRESERVE
1499	red alder	12	viable		8	✓		PRESERVE
1500	red alder	13	viable; same as T1501		10	✓		PRESERVE
1502	red alder	15	viable		10	✓		PRESERVE
1503	red alder	11	viable		8	✓		PRESERVE
1504	western red cedar	43	viable; shares stump with T1507 and T1506		25	✓✓		PRESERVE
1506	western red cedar	46	viable; shares stump with T1504 and T1507		25	✓✓		PRESERVE
1507	western red cedar	31	viable; shares stump with T1504 and T1506		20	✓✓		PRESERVE
1508	big leaf maple	16	viable		10	✓		PRESERVE
1509	red alder	10	viable		8	NO	X	REMOVE
1510	big leaf maple	26	viable		18	NO		REMOVE
1511	Douglas fir	39	viable		25	NO		REMOVE

Tag	Species	DBH	Remarks	DDD	RPZ	17.102.50 Retention Tree	Undersize	Action
1512	Douglas fir	43	viable		25	NO		REMOVE
1513	big leaf maple	11	viable		8	NO		REMOVE
1514	big leaf maple	30	viable		20	NO		REMOVE
1515	Douglas fir	18	suppressed		12	NO		REMOVE
1516	sweet cherry	8	viable		8	NO	X	REMOVE
1517	big leaf maple	18	viable		12	NO		REMOVE
1518	Douglas fir	36	red-ring rot	X	24	NO		REMOVE
1519	Douglas fir	12	terminal decline	X	8	NO		REMOVE
1520	big leaf maple	31	basal decay; trunk decay	X	20	NO		REMOVE
1521	Douglas fir	37	viable		24	NO		REMOVE
1522	western hemlock	22	dead	X	14	NO		REMOVE
1523	Douglas fir	29	viable		18	NO		REMOVE
1524	Douglas fir	20	viable		14	NO		REMOVE
1525	big leaf maple	19			12	NO		REMOVE
1526	Douglas fir	23	viable		16	NO		REMOVE
1527	western hemlock	20	basal decay	X	14	NO		REMOVE
1528	Douglas fir	25	viable		16	NO		REMOVE
1529	sweet cherry	10	decline	X	0	NO	X	REMOVE
1530	Douglas fir	29	viable		22	✓✓		PRESERVE
1531	western hemlock	17	grows out of old stump		12	✓✓		PRESERVE
1532	Douglas fir	25	viable		18	✓✓		PRESERVE
1533	Douglas fir	34	viable		24	✓✓		PRESERVE
1534	sweet cherry	7			8	NO	X	REMOVE
1535	sweet cherry	6			8	NO	X	REMOVE
1536	Douglas fir	35	viable		24	✓✓		PRESERVE
1537	big leaf maple	16	viable		12	✓		PRESERVE
1538	Douglas fir	n/a	dead; on ground	X	0	NO		REMOVE
1539	Douglas fir	43	viable		24	✓✓		PRESERVE
1540	Douglas fir	28	viable; grows out of nurse log		20	✓✓		PRESERVE
1541	Douglas fir	35	viable		24	✓✓		PRESERVE
1542	red alder	14	viable		10	✓		PRESERVE
1543	red alder	16	viable		12	✓		PRESERVE
1544	Douglas fir	32	viable; on bank		22	✓✓		PRESERVE
1545	red alder	10	viable; in creek		8	NO	X	PRESERVE
1546	red alder	10	viable; in creek		8	NO	X	PRESERVE
1547	red alder	9	viable; in creek		8	NO	X	PRESERVE
1548	red alder	11	viable; in creek		8	✓		PRESERVE
1549	red alder	14	viable; in creek		10	✓		PRESERVE
1550	red alder	12	viable; in creek		8	✓		PRESERVE
1551	red alder	9	viable; in creek		8	NO	X	PRESERVE
1552	red alder	14	viable; in creek		10	✓		PRESERVE
1553	red alder	18	viable; in creek		12	✓		PRESERVE
1554	red alder	16	viable		12	✓		PRESERVE
1555	red alder	11	viable		10	✓		PRESERVE
1556	red alder	14	viable		10	✓		PRESERVE
1557	red alder	19	terminal decline	X	12	NO		REMOVE
1558	red alder	10	viable		8	NO	X	PRESERVE
1559	red alder	14	viable		10	✓		PRESERVE
1560	red alder	14	viable; in creek		10	✓		PRESERVE
1561	red alder	21	viable; codominant @8'		14	✓		PRESERVE
1562	red alder	14	terminal decline	X	8	NO		REMOVE
1563	red alder	13	viable		8	✓		PRESERVE
1564	red alder	14	dead	X	8	NO		REMOVE
1565	red alder	15	trunk decay	X	10	NO		REMOVE
1566	red alder	11	viable		8	✓		PRESERVE
1567	red alder	15	viable		10	✓		PRESERVE
1568	red alder	22	dead	X	14	NO		REMOVE
1569	Douglas fir	49	trunk swoop @ 45'		24	✓✓		PRESERVE
1570	red alder	19	terminal decline	X	12	NO		REMOVE
1571	red alder	16	terminal decline	X	10	NO		REMOVE
1572	red alder	16	viable		10	✓		PRESERVE
1573	red alder	16	viable		10	✓		PRESERVE
1574	red alder	10	dead	X	8	NO	X	REMOVE
1575	red alder	16	decline	X	10	✓		PRESERVE
1576	Douglas fir	41	viable; swollen trunk		24	✓✓		PRESERVE
1577	big leaf maple	22	viable		16	✓		PRESERVE
1578	big leaf maple	21	viable		14	✓		PRESERVE
1579	big leaf maple	16	viable		0	NO		REMOVE
1580	big leaf maple	11	terminal decline	X	0	NO		REMOVE
1581	big leaf maple	11	viable		0	NO		REMOVE
1582	Douglas fir	53	viable		0	NO		REMOVE
1583	big leaf maple	8	viable		8	NO	X	PRESERVE
1584	big leaf maple	16	viable		12	✓		PRESERVE
1585	big leaf maple	18	viable		12	✓		PRESERVE
1586	big leaf maple	8	viable		8	NO	X	PRESERVE
1587	big leaf maple	8	viable		8	NO	X	PRESERVE
1588	big leaf maple	7			8	NO	X	PRESERVE
1590	red alder	15	viable; same as T1589		12	✓		PRESERVE
1591	red alder	20	viable		14	✓		PRESERVE
1592	red alder	20	viable		14	✓		PRESERVE
1593	big leaf maple	29,29,14,13	viable; multiple stems; same as T1594, T1595, and T1596		24	✓		PRESERVE
1597	red alder	21	viable; same as T1598		14	✓		PRESERVE
1599	big leaf maple	32	trunk decay; decline; broken tops	X	20	NO		REMOVE
1704	Douglas fir	58	viable; codominant @ 25'		24	✓✓		PRESERVE
1709	Douglas fir	28	crook in stem @ 30'		18	NO		REMOVE
1712	big leaf maple	6			8	NO	X	PRESERVE
1742	red alder	10	viable		8	NO	X	PRESERVE
1746	western red cedar	34	viable		22	NO		REMOVE
1751	red alder	9	viable		8	NO	X	PRESERVE
1755	Douglas fir	33	viable		22	NO		REMOVE
1769	Douglas fir	35	viable		24	NO		REMOVE
1770	Douglas fir	35	viable		24	NO		REMOVE
1771	Douglas fir	22	viable		14	NO		REMOVE
1775	red alder	18	viable		12	✓		PRESERVE
1776	big leaf maple	38	viable		25	NO		REMOVE
1777	big leaf maple	16	viable		10	NO		REMOVE
1778	big leaf maple	34	viable		24	NO		REMOVE
1779	big leaf maple	38,30,20,18,16	terminal decline	X	24	NO		REMOVE
1780	Douglas fir	34	viable; codominant @ 25'		22	NO		REMOVE
1781	Douglas fir	29	viable		20	NO		REMOVE
1782	Douglas fir	30	viable		20	NO		REMOVE
1783	Douglas fir	26	viable; ivy		16	NO		REMOVE
1785	Douglas fir	31	trunk swoop		20	NO		REMOVE
1786	western red cedar	35	viable		25	NO		REMOVE
1787	big leaf maple	26,20	basal decay; terminal decline; one dead stem	X	20	NO		REMOVE
1789	Douglas fir	40	viable		25	NO		REMOVE
1790	Douglas fir	31	viable		20	NO		REMOVE
1793	big leaf maple	38	viable		24	✓		PRESERVE
1800	red alder	15	viable		10	✓		PRESERVE
1801	red alder	11	viable		8	✓		PRESERVE
1802	Douglas fir	45	viable		24	✓✓		PRESERVE
1803	Douglas fir	37	viable		24	✓✓		PRESERVE
1805	Douglas fir	32	viable		22	✓✓		PRESERVE
1806	big leaf maple	8	viable		8	NO	X	PRESERVE
1808	Douglas fir	32	viable		20	✓✓		PRESERVE
1809	Douglas fir	34	viable		22	NO		REMOVE
1810	Douglas fir	8	viable		8	NO	X	PRESERVE
1811	big leaf maple	28,14,12	viable; 6" dead stem		20	NO		REMOVE
1812	Douglas fir	50	viable		25	NO		REMOVE
1813	Douglas fir	26	viable		16	NO		REMOVE
1814	Douglas fir	19	viable		12	NO		REMOVE
1815	Douglas fir	34	viable		22	NO		REMOVE
1816	Douglas fir	26	viable; shares stump with T1817		16	NO		REMOVE
1817	Douglas fir	29	viable; shares stump with T1816		20	NO		REMOVE
1818	Douglas fir	11	viable		8	NO		REMOVE
1819	big leaf maple	20	viable		14	NO		REMOVE

Tag	Species	DBH	Remarks	DDD	RPZ	17.102.50 Retention Tree	Undersize	Action
1820	western hemlock	18	viable		12	NO		REMOVE
1821	Douglas fir	10	viable		8	NO	X	REMOVE
1822	Douglas fir	31	viable		20	NO		REMOVE
1823	big leaf maple	36	basal decayl trunk decay; terminal decline	X	24	NO		REMOVE
1825	big leaf maple	27	basal decay; decline; same as T1824	X	18	NO		REMOVE
1826	western red cedar	10	viable		8	NO	X	PRESERVE
1827	western red cedar	21	viable		14	✓✓		PRESERVE
1828	western red cedar	16	viable		10	✓✓		PRESERVE
1829	western red cedar	66	viable; small dead top		24	✓✓		PRESERVE
1830	western red cedar	14	viable		10	✓✓		PRESERVE
1831	red alder	17	viable		12	NO		REMOVE
1832	red alder	13	dead	X	10	NO		REMOVE
1833	big leaf maple	17	viable		12	NO		REMOVE
1834	big leaf maple	14	viable		10	NO		REMOVE
1836	big leaf maple	14	multiple stems; decline; dead stem; same as T1835	X	10	NO		REMOVE
1837	big leaf maple	11	viable		8	✓		PRESERVE
1838	Douglas fir	51	viable		25	NO		REMOVE
1839	western hemlock	12	viable		8	NO		REMOVE
1840	western hemlock	8	viable; grows out of nurse stump		8	NO	X	PRESERVE
1841	red alder	15	viable; in creek		10	NO		REMOVE
1842	red alder	14	40 degree lean		10	NO		REMOVE
1843	big leaf maple	42	retrenched; large dead branches		25	NO		REMOVE
1844	red alder	13	viable; in creek		8	NO		REMOVE
1845	red alder	10	viable; in creek		8	NO	X	REMOVE
1846	red alder	13	trunk decay	X	8	NO		REMOVE
1847	red alder	16	viable; in creek		10	✓		PRESERVE
1848	red alder	14	viable; in creek		10	✓		PRESERVE
1849	red alder	11	leans over creek		8	✓		PRESERVE
1850	western hemlock	24	dead	X	16	NO		REMOVE
1851	western hemlock	19	dead	X	12	NO		REMOVE
1852	Douglas fir	28	viable		18	NO		REMOVE
1853	Douglas fir	36	viable; codominant @ 50'		24	✓✓		PRESERVE
1854	Douglas fir	24			16	✓✓		PRESERVE
1855	Douglas fir	16			10	✓✓		PRESERVE
1856	Douglas fir	35	viable		24	✓✓		PRESERVE
1857	Douglas fir	18	viable		12	NO		REMOVE
1858	Douglas fir	19	viable		12	NO		REMOVE
1859	Douglas fir	6			8	NO	X	REMOVE
1860	Douglas fir	28	viable		18	NO		REMOVE
1861	big leaf maple	18	decline	X	12	NO		REMOVE
1862	big leaf maple	30	viable		20	NO		REMOVE
1863	western hemlock	33	dead	X	22	NO		REMOVE
1864	western hemlock	29	viable; grows out of nurse stump; codominant from base		20	NO		REMOVE
1865	Douglas fir	40	viable		25	NO		REMOVE
1866	western red cedar	25	viable		16	NO		REMOVE
1867	Douglas fir	44	viable		25	NO		REMOVE
1868	big leaf maple	34	viable; soil eroded around stump		24	NO		REMOVE
1869	western hemlock	31	viable		20	NO		REMOVE
1870	Douglas fir	38	viable		25	NO		REMOVE
1871	Douglas fir	12	viable		8	✓✓		PRESERVE
1872	red alder	12	viable		8	✓		PRESERVE
1873	red alder	15	viable		10	✓		PRESERVE
1874	red alder	10	viable		8	NO	X	PRESERVE
1875	Douglas fir	41	viable		24	✓✓		PRESERVE
1876	red alder	9	viable; hard lean		8	NO	X	PRESERVE
1877	red alder	8	viable		8	NO	X	PRESERVE
1878	big leaf maple	13	basal decay; soil eroded around stump	X	8	NO		PRESERVE
1879	red alder	9	viable		8	NO	X	PRESERVE
1880	red alder	8	viable		8	NO	X	PRESERVE
1881	Douglas fir	23	viable		16	✓✓		PRESERVE
1882	Douglas fir	42	viable		24	✓✓		PRESERVE
1883	Douglas fir	6			8	NO	X	PRESERVE
1884	Douglas fir	19	dead	X	0	NO		REMOVE
1885	big leaf maple	19	viable		14	✓		PRESERVE
1886	western red cedar	11	viable; grows out of large nurse-log		8	✓✓		PRESERVE
1887	big leaf maple	25	viable; standing water; soil eroded around stump		18	✓		PRESERVE
1888	red alder	13	viable; in creek		10	✓		PRESERVE
1889	red alder	12	viable; in creek		8	✓		PRESERVE
1890	red alder	6			8	NO	X	PRESERVE
1891	red alder	12	viable		8	✓		PRESERVE
1892	red alder	16	viable		10	✓		PRESERVE
1893	red alder	9	viable		8	NO	X	PRESERVE
1894	red alder	9	viable		8	NO	X	PRESERVE
1895	red alder	15	viable		10	✓		PRESERVE
1896	red alder	12	viable		8	✓		PRESERVE
1897	red alder	11	viable		8	✓		PRESERVE
1898	red alder	10	viable		8	NO	X	PRESERVE
1899	red alder	15	viable; labled 1890 on map; Tagged 1899 in field		10	NO		PRESERVE
1900	Douglas fir	37	viable		25	NO		REMOVE
1901	big leaf maple	12	viable		8	NO		REMOVE
1903	western red cedar	21,18,9,9	viable; hedgerow; same as T1902, T1904, and T1905		24	NO		REMOVE
1906	western red cedar	8,7	viable; hedgerow; same as T1907		8	NO		REMOVE
1908	western red cedar	19	viable; hedgerow; same as T1909		12	NO		REMOVE
1910	western red cedar	7,6	viable; hedgerow; same as T1911		8	NO		REMOVE
1912	western red cedar	13,10,9	viable; hedgerow; same as T1913 and T1914		16	NO		REMOVE
1915	western red cedar	16,13	viable; hedgerow; same as T1916		16	NO		REMOVE
1917	western red cedar	17	viable; hedgerow		12	NO		REMOVE
1918	western red cedar	19	viable; hedgerow		12	NO		REMOVE
1919	western red cedar	60	basal and trunk decay; hollow; cavity @ 10'	X	25	NO		REMOVE
1920	big leaf maple	7			8	NO	X	PRESERVE
1923	big leaf maple	11	viable; same as T1922		8	✓		PRESERVE
1924	sweet cherry	9	viable		8	NO	X	PRESERVE
1925	big leaf maple	7			8	NO	X	PRESERVE
1926	dead	17	dead	X	12	NO		REMOVE
1927	plum	7			8	NO	X	REMOVE
1928	plum	7	trunk decay		8	NO	X	REMOVE
1929	Douglas fir	17	viable		12	✓✓		PRESERVE
1930	Douglas fir	10	viable		8	NO	X	PRESERVE
1931	sweet cherry	8	viable		8	NO	X	PRESERVE
1933	big leaf maple	19	viable; multiple stems; sames as T1932 and T1934		16	✓		PRESERVE
1935	Douglas fir	34	viable		24	✓✓		PRESERVE
1938	Douglas fir	30, 24, 6	viable; same as T1937, and T1936		24	✓✓		PRESERVE
1939	apple	15	terminal decline	X	10	NO		REMOVE
1940	apple	10	terminal decline	X	8	NO	X	REMOVE
1941	Douglas fir	17	viable		10	NO		REMOVE
1942	sweet cherry	7			8	NO	X	REMOVE
1943	sweet cherry	7			8	NO	X	REMOVE
1944	sweet cherry	10	viable; same as T1945		8	NO	X	REMOVE
1946	sweet cherry	6			8	NO	X	REMOVE
1947	apple	17	basal decay; cavity	X	12	NO		REMOVE
1948	apple	12	terminal decline	X	8	NO		REMOVE
1949	Douglas fir	35	viable; ivy; shares stump with T1950		24	NO		REMOVE
1950	Douglas fir	31	viable; ivy; shares stump with T1949		20	NO		REMOVE
1951	plum	12	terminal decline	X	8	NO		REMOVE
1952	plum	8	viable		8	NO	X	REMOVE
1953	big leaf maple	7	broken	X	8	NO	X	REMOVE
1954	big leaf maple	9	broken	X	8	NO	X	REMOVE
1955	big leaf maple	12	viable		8	NO		REMOVE
1956	big leaf maple	14	viable		8	NO		REMOVE
1957	big leaf maple	10	viable		8	NO	X	REMOVE
1958	big leaf maple	11	viable		8	NO		REMOVE
1959	big leaf maple	13	viable		8	NO		REMOVE
1960	big leaf maple	10	viable		8	NO	X	REMOVE
1961	western red cedar	12	viable		8	✓✓		PRESERVE
1963	western red cedar	16	viable; same as T1962		10	✓✓		PRESERVE
1964	western red cedar	11	viable		8	✓✓		PRESERVE

Tag	Species	DBH	Remarks	DDD	RPZ	17.102.50 Retention Tree	Undersize	Action
1965	western red cedar	6			8	NO	X	PRESERVE
1966	Douglas fir	12	viable		8	✓✓		PRESERVE
1967	Douglas fir	6			8	NO	X	PRESERVE
1968	western red cedar	6			8	NO	X	PRESERVE
1969	western red cedar	7			8	NO	X	PRESERVE
1970	Douglas fir	14	viable		10	✓✓		PRESERVE
1971	big leaf maple	6			8	NO	X	REMOVE
1972	cherry	14	terminal decline	X	8	NO		REMOVE
1973	Douglas fir	46	viable		24	✓✓		PRESERVE
1974	big leaf maple	13	terminal decline	X	8	NO		REMOVE
1975	big leaf maple	17	terminal decline	X	10	NO		REMOVE
1976	big leaf maple	14	broken tops	X	8	NO		REMOVE
1977	Douglas fir	8	viable		8	NO	X	PRESERVE
1978	Douglas fir	14	viable		8	✓✓		PRESERVE
1979	apple	9	terminal decline	X	8	NO	X	REMOVE
1980	big leaf maple	6			8	NO	X	REMOVE
1981	western red cedar	43	broken @ 20'	X	25	NO		REMOVE
1982	big leaf maple	8	viable		8	NO	X	REMOVE
1983	big leaf maple	13	viable		8	NO		REMOVE
1984	big leaf maple	12	broken	X	8	NO		REMOVE
1985	big leaf maple	9	viable		8	NO	X	PRESERVE
1986	western red cedar	6	viable		8	NO	X	PRESERVE
1987	Douglas fir	32	viable; codominant @ 40'		22	✓✓		PRESERVE
1988	western red cedar	6	viable		8	NO	X	PRESERVE
1989	big leaf maple	7	viable		8	NO	X	PRESERVE
1990	Douglas fir	17	viable; ivy		12	✓✓		PRESERVE
1991	big leaf maple	11	viable		8	✓		PRESERVE
1992	big leaf maple	8	viable; ivy		8	NO	X	PRESERVE
1993	Douglas fir	26	viable; ivy		18	✓✓		PRESERVE
1994	big leaf maple	6			8	NO	X	PRESERVE
1995	Douglas fir	6			8	NO	X	PRESERVE
1996	Douglas fir	10	viable		8	NO	X	PRESERVE
1997	Douglas fir	25	viable		18	✓✓		PRESERVE
1998	big leaf maple	18	viable		12	NO		REMOVE
2000	western red cedar	17	viable; same as T1999		12	NO		REMOVE
2001	Douglas fir	9	viable		8	NO	X	REMOVE
2002	Douglas fir	11	viable		8	NO		REMOVE
2003	Douglas fir	48	viable; ivy		25	NO		REMOVE
2004	Douglas fir	24	viable		16	NO		REMOVE
2005	Douglas fir	6			8	NO	X	REMOVE
2006	juniper	10,10,8,8	viable; multiple stems from base		12	NO		REMOVE
2007	big leaf maple	8	viable		8	NO	X	REMOVE
2008	Douglas fir	22	viable		14	NO		REMOVE
2009	big leaf maple	6	topped @ 10'		8	NO	X	REMOVE
2010	Douglas fir	14	viable		8	NO		REMOVE
2011	Douglas fir	36	viable		24	NO		REMOVE
2012	Douglas fir	9	viable		8	NO	X	REMOVE
2013	Douglas fir	8	viable		8	NO	X	REMOVE
2014	European birch	6	terminal decline	X	8	NO	X	REMOVE
2015	Douglas fir	17	viable		12	NO		REMOVE
2016	big leaf maple	4			8	NO	X	REMOVE
2017	big leaf maple	10	viable		8	NO	X	REMOVE
2018	Douglas fir	33	viable; ivy		24	✓✓		PRESERVE
2019	big leaf maple	37	basal decay; root disease; misplaced on map	X	24	NO		REMOVE
2020	Douglas fir	29	viable		20	NO		REMOVE
2021	western red cedar	34	viable		22	NO		REMOVE
2022	western red cedar	8	viable		8	NO	X	PRESERVE
2023	Douglas fir	29	viable		20	✓✓		PRESERVE
2024	Douglas fir	27	viable		20	✓✓		PRESERVE
2025	western red cedar	15	viable		10	✓✓		PRESERVE
2026	Douglas fir	6			8	NO	X	PRESERVE
2027	Douglas fir	22	viable		16	✓✓		PRESERVE
2028	western red cedar	8	viable		8	NO	X	PRESERVE
2029	big leaf maple	8,6	viable; same as T2036		8	NO		PRESERVE
2030	Douglas fir	8	viable		8	NO	X	PRESERVE
2031	Douglas fir	28	viable; ivy		10	✓✓		PRESERVE
2032	western red cedar	8	viable		8	NO	X	PRESERVE
2033	western red cedar	34	viable		24	✓✓		PRESERVE
2034	western red cedar	19	viable		14	✓✓		PRESERVE
2035	western red cedar	21	viable; ivy		14	✓✓		PRESERVE
2037	Douglas fir	30	viable		22	✓✓		PRESERVE
2038	Douglas fir	7			8	✓✓	X	PRESERVE
2039	Douglas fir	43	viable; ivy; near power line		24	NO		REMOVE
2042	western red cedar	22,11,11	viable; multiple stems; same as T2041 and T2040		24	NO		REMOVE
2043	Douglas fir	24	viable; near power line		16	NO		REMOVE
2044	big leaf maple	12	topped for power	X	8	NO		REMOVE
2045	big leaf maple	8	topped for power	X	8	NO	X	REMOVE
2046	big leaf maple	8	topped for power	X	8	NO	X	REMOVE
2047	western red cedar	6			8	NO	X	REMOVE
2048	big leaf maple	15	viable; near power line		10	NO		REMOVE
2049	western red cedar	6			8	NO	X	REMOVE
2050	big leaf maple	10	viable; near power line		8	NO	X	REMOVE
2051	plum	10,9,9,9	stump suckers	X	10	NO		REMOVE
2052	Douglas fir	7	offsite; ROW; topped for power		8	NO	X	REMOVE
2053	Douglas fir	19	offsite; ROW; topped for power		12	NO		REMOVE
2054	Douglas fir	8	offsite; ROW; topped for power		8	NO	X	REMOVE
2055	Douglas fir	17	offsite; ROW; topped for power		12	NO		REMOVE
2056	Douglas fir	22	offsite; ROW; topped for power		14	NO		REMOVE
2057	sweet cherry	16	broken tops	X	10	NO		PRESERVE
2058	sweet cherry	15	leans to east		10	✓		PRESERVE
2059	big leaf maple	21	offsite; ROW; topped for power		14	NO		REMOVE
2062	cottonwood	38	viable; codominant from base; 2062 and 2063 are same tree		25	NO		REMOVE
2063	cottonwood	10	viable		8	NO		REMOVE
2064	cottonwood	9	viable		8	NO	X	PRESERVE
2065	cottonwood	10	viable		8	NO	X	PRESERVE
2067	cottonwood	8	listed	X	8	NO	X	PRESERVE
2071	sweet cherry	29	mechanical damage to root flares; in pasture		25	NO		OFFSITE
2072	Douglas fir	9	viable; in creek		8	NO	X	PRESERVE
2073	cottonwood	15	viable; blackberry		10	✓		PRESERVE
2075	cottonwood	8	viable; 2075 and 2074 are the same tree		8	NO	X	PRESERVE
2076	cottonwood	8	viable		8	NO	X	PRESERVE
2077	cottonwood	7			8	NO	X	PRESERVE
2078	cottonwood	8	viable		8	NO	X	PRESERVE
2079	cottonwood	10	viable		8	NO	X	PRESERVE
2080	cottonwood	10	viable		8	NO	X	PRESERVE
2081	cottonwood	9	viable		8	NO	X	PRESERVE
2083	cottonwood	13,13,11,9,9,	multiple stems		16	NO		REMOVE
3000	red alder	6	in future roadway		8	NO	X	REMOVE
3001	red alder	6	Added by FSH district survey, April 2020		8	NO	X	PRESERVE
3002	red alder	6	Added by FSH district survey, April 2020		8	NO	X	PRESERVE
3003	cottonwood	6	Added by FSH district survey, April 2020		8	NO		PRESERVE
3004	cottonwood	6	Added by FSH district survey, April 2020		8	NO		PRESERVE
3005	cottonwood	6	Added by FSH district survey, April 2020		8	NO		PRESERVE
3006	cottonwood	6	Added by FSH district survey, April 2020		8	NO		PRESERVE
3007	Douglas fir	6	Added by FSH district survey, April 2020		8	NO		REMOVE
3008	Douglas fir	6	Added by FSH district survey, April 2020		8	NO		REMOVE
3009	Douglas fir	6	Added by FSH district survey, April 2020		8	NO		REMOVE

= Trees 11 inches or larger dbh, coniferous species. 86 total.
= Trees 11 inches or larger dbh, deciduous species. 66 total.
2 of the 3 shall be conifer species = 86 conifer trees ✓✓
3 Trees per acre. 3 x 39 acres = 117 total trees ✓
Total trees retained 11 inches or larger dbh = 152
Total trees retained between 6 inches and 11 inches dbh = 91

REVISIONS | BY

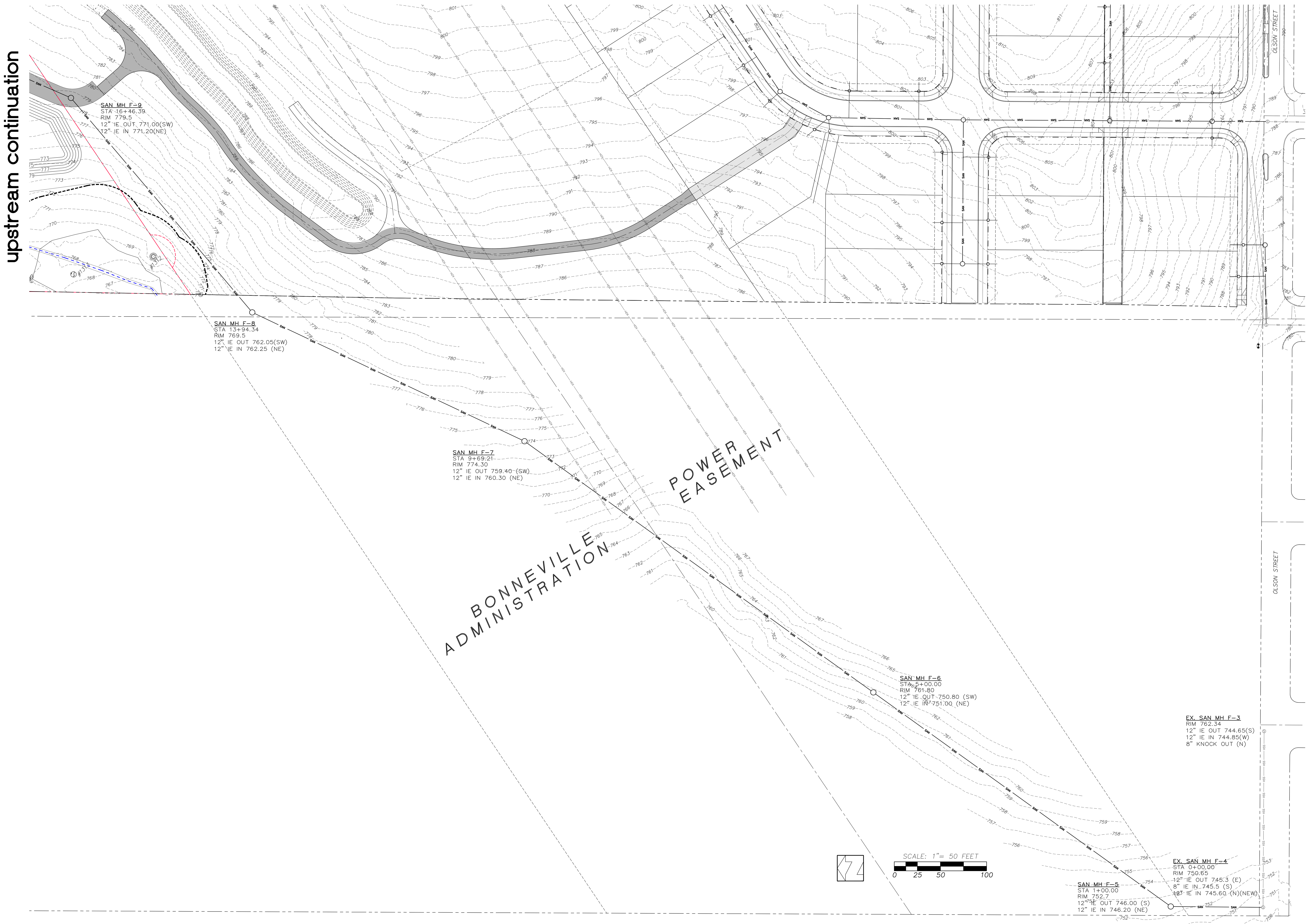
Sandy Woods 2
Rosemont Development

Tree Retention List

SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

DATE JUNE, 2021
SCALE NA
DRAWN PS
JOB SGL19-042
SHEET 5
OF 15 SHEETS

See Sheet 7 for
upstream continuation



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Sandy Woods 2
Rosemont Development

Offsite Sanitary Sewer Plan

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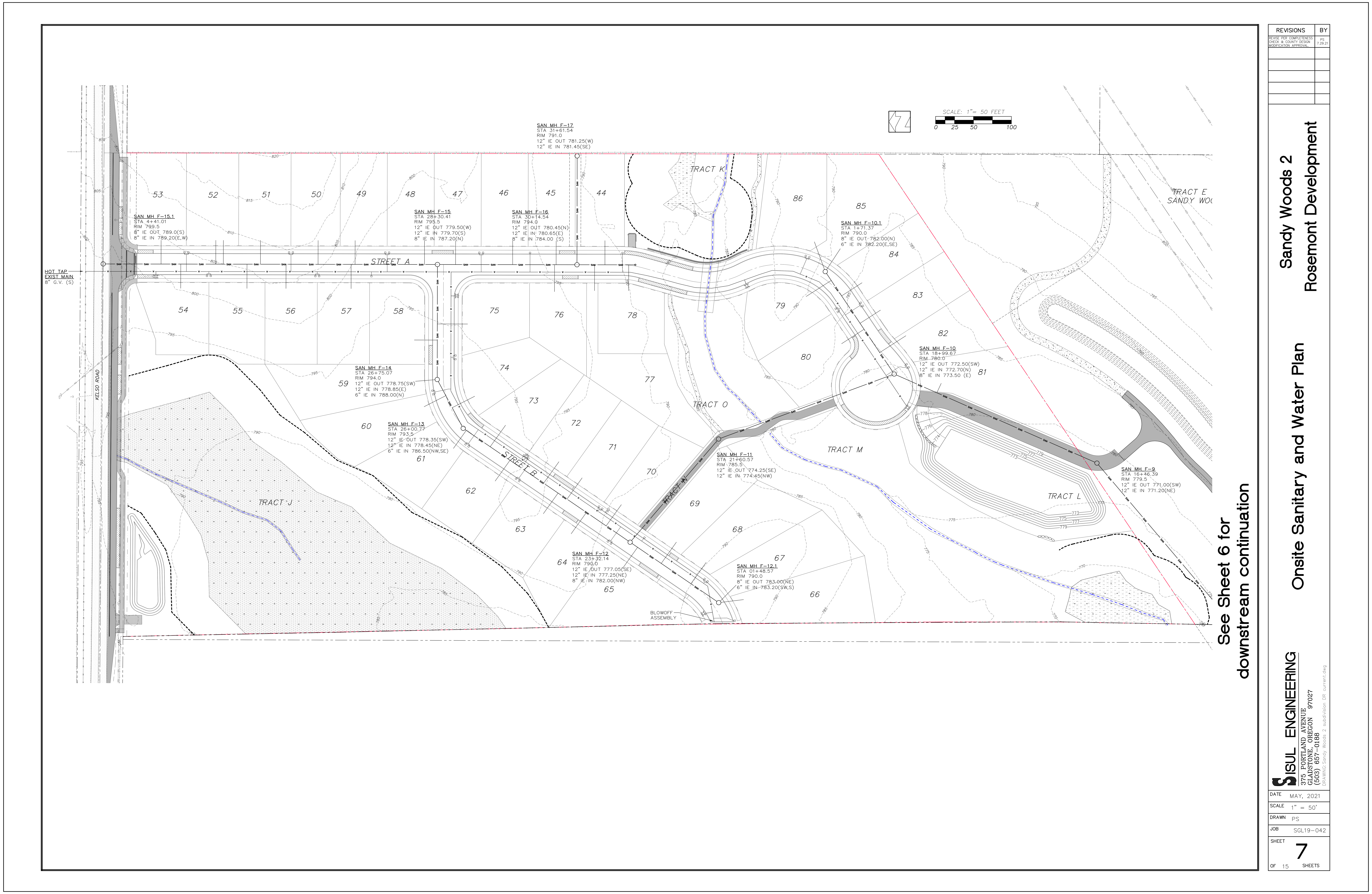
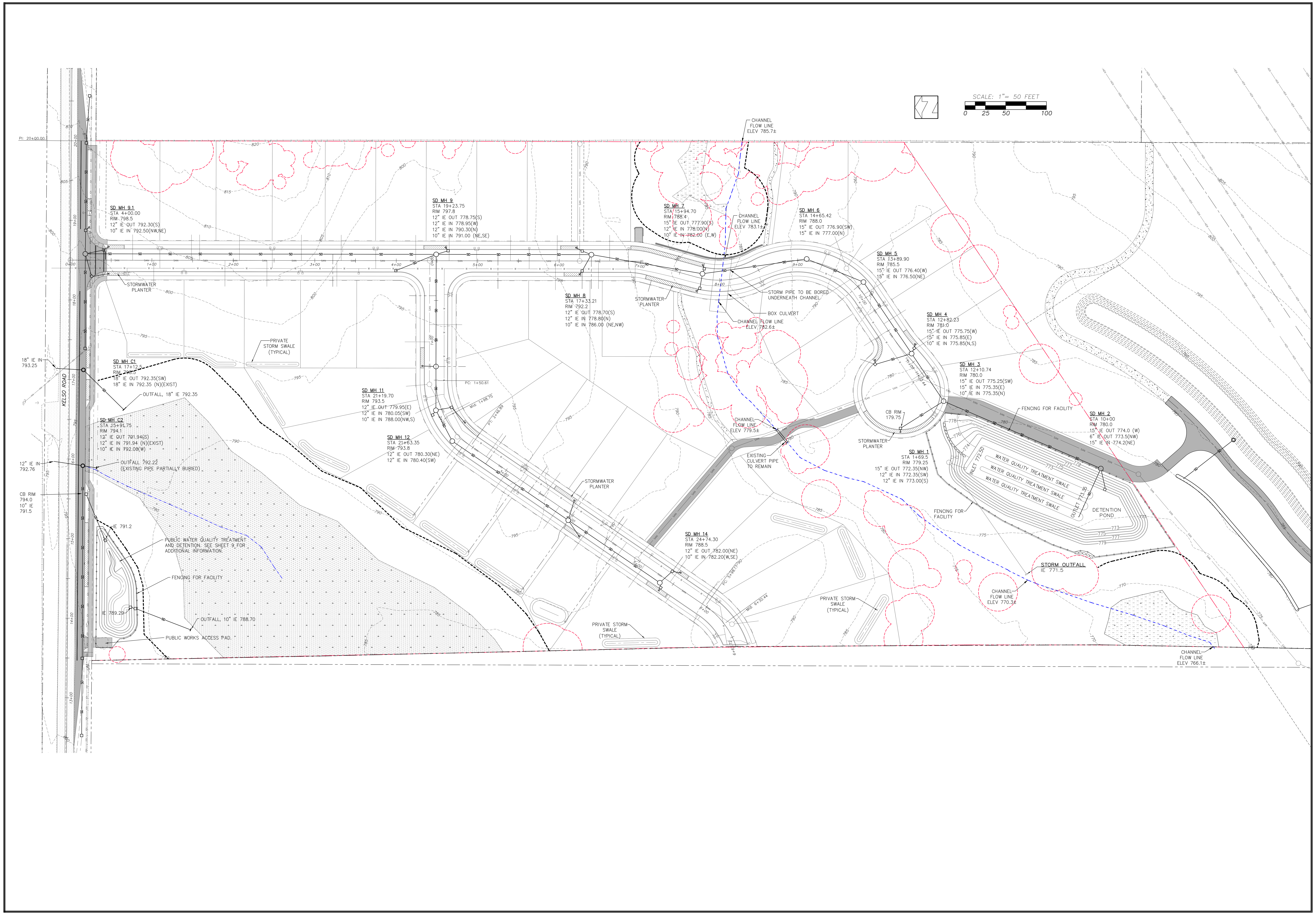
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

DRAWING: Sandy Woods 2 subdivision DR current.dwg

DATE	MAY, 2021
SCALE	1" = 50'
DRAWN	PS
JOB	SGL19-042
SHEET	6
OF	15 SHEETS



REVISIONS
BY
REVISE PER COMPLETENESS CHECK & COUNTY DESIGN MODIFICATION APPROVAL
PS 7.29.21
SCALE: 1" = 50 FEET
0 25 50 100
SAN MH F-17
STA 31+61.54
RIM 791.0
12" IE OUT 781.25(W)
12" IE IN 781.45(SE)
SAN MH F-15.1
STA 4+41.01
RIM 799.5
8" IE OUT 789.0(S)
8" IE IN 789.20(E,W)
SAN MH F-15
STA 28+30.41
RIM 795.5
12" IE OUT 779.50(W)
12" IE IN 779.70(S)
8" IE IN 787.20(N)
SAN MH F-16
STA 30+14.54
RIM 794.0
12" IE OUT 780.45(N)
12" IE IN 780.65(E)
8" IE IN 784.00 (S)
SAN MH F-10.1
STA 1+71.37
RIM 790.0
8" IE OUT 782.00(N)
6" IE IN 782.20(E,SE)
SAN MH F-10
STA 18+99.67
RIM 780.0
12" IE OUT 772.50(SW)
12" IE IN 772.70(N)
8" IE IN 773.50 (E)
SAN MH F-14
STA 26+75.07
RIM 794.0
12" IE OUT 778.75(SW)
12" IE IN 778.85(E)
6" IE IN 788.00(N)
SAN MH F-13
STA 26+00.77
RIM 793.5
12" IE OUT 778.35(SW)
12" IE IN 778.45(NE)
6" IE IN 786.50(NW,SE)
SAN MH F-11
STA 21+60.57
RIM 785.5
12" IE OUT 774.25(SE)
12" IE IN 774.45(NW)
SAN MH F-9
STA 16+46.39
RIM 779.5
12" IE OUT 771.00(SW)
12" IE IN 771.20(NE)
SAN MH F-12
STA 23+32.14
RIM 790.0
12" IE OUT 777.05(SE)
12" IE IN 777.25(NE)
8" IE IN 782.00(NW)
SAN MH F-12.1
STA 01+48.57
RIM 790.0
8" IE OUT 783.00(NE)
6" IE IN 783.20(SW,S)
HOT TAP EXIST MAIN
8" G.V. (S)
BLOWOFF ASSEMBLY
KELSO ROAD
STREET A
STREET B
TRACT K
TRACT E SANDY WOODS
TRACT O
TRACT M
TRACT L
TRACT J
TRACT N
53 52 51 50 49 48 47 46 45 44
86 85 84 83 82 81 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60 59 58 57 56 55 54
See Sheet 6 for downstream continuation
Sandy Woods 2
Rosemont Development
Onsite Sanitary and Water Plan
SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188
DATE MAY, 2021
SCALE 1" = 50'
DRAWN PS
JOB SGL19-042
SHEET 7
OF 15 SHEETS



REVISIONS	BY
REVISE PER COMPLETENESS CHECK & COUNTY DESIGN MODIFICATION APPROVAL	PS 7.29.21

Sandy Woods 2
Rosemont Development

Storm Drain Plan

SISUL ENGINEERING
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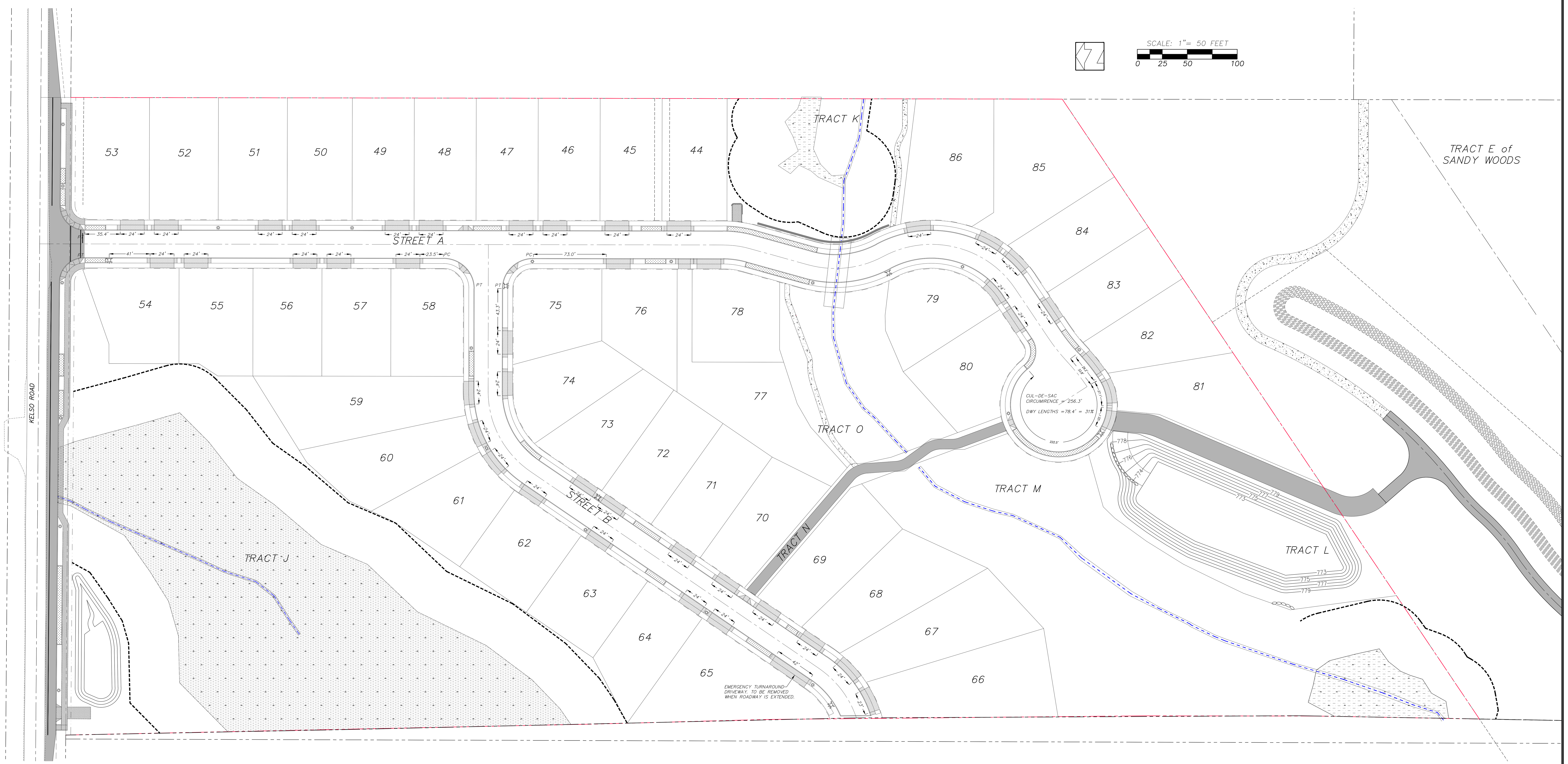
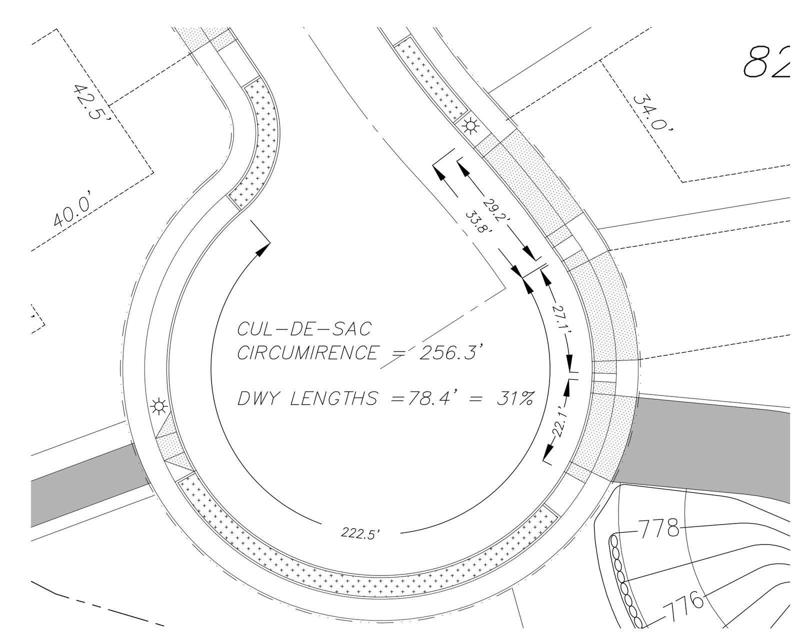
GLADSTONE, OREGON 97027
(503) 657-0188

DATE JUNE, 2021
SCALE 1" = 50'
DRAWN PS
JOB SGL19-042
SHEET 8
OF 15 SHEETS





Cul-de-sac Driveways

REVISIONS	BY
REVISE PER COMPLETENESS CHECK & COUNTY DESIGN MODIFICATION APPROVAL	PS 7.29.21

Sandy Woods 2
Rosemont Development

Driveway and Street Lighting Plan

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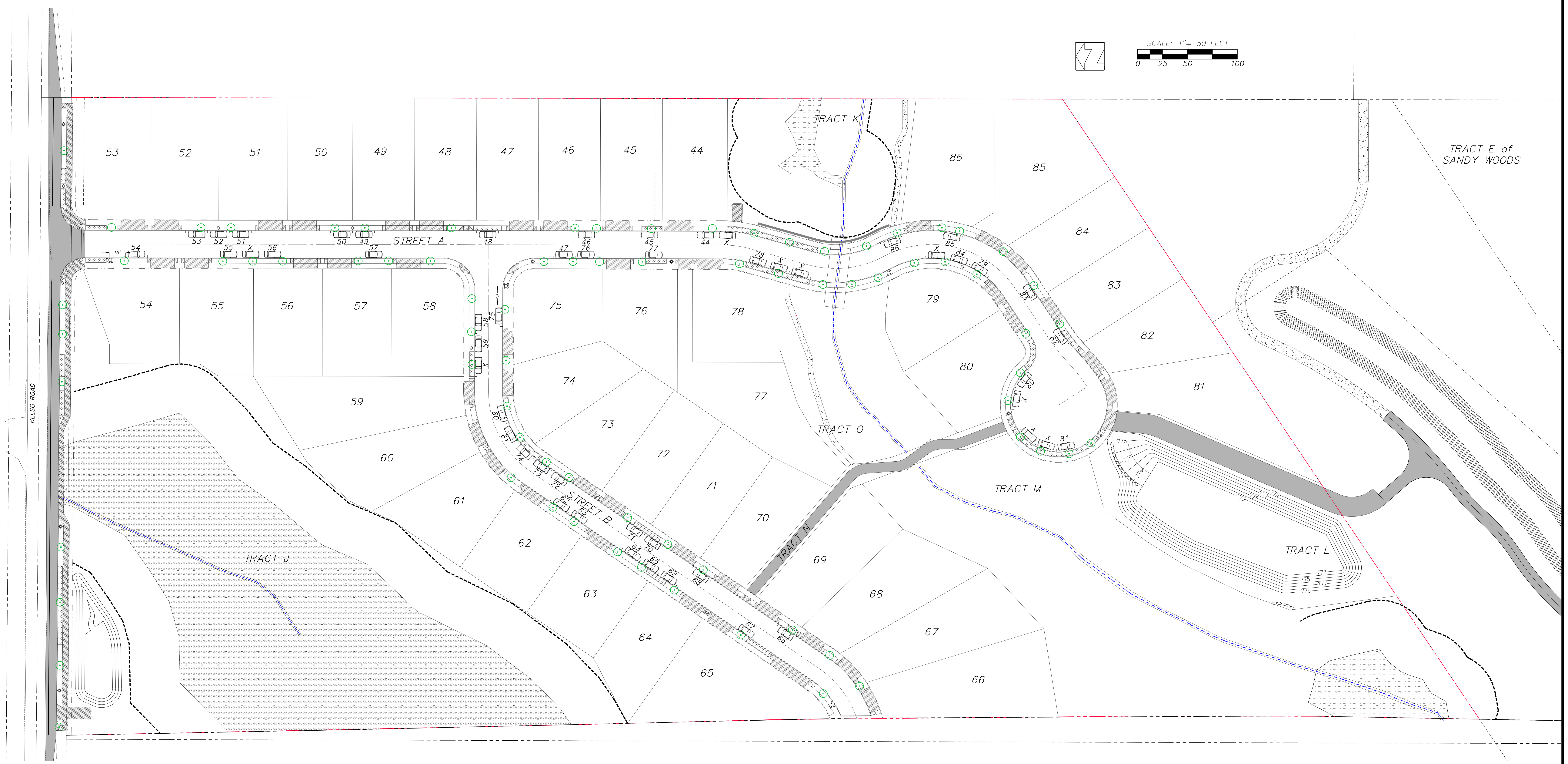
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188
DRAWING:Sandy Woods 2 subdivision DR current.dwg

DATE MAY, 2021
SCALE 1" = 50'
DRAWN PS
JOB SGL19-042
SHEET 9 OF 15 SHEETS



REVISIONS	BY
REVISE PER COMPLETENESS CHECK & COUNTY DESIGN MODIFICATION APPROVAL	PS 7.29.21

Sandy Woods 2
Rosemont Development

Residential Parking Analysis

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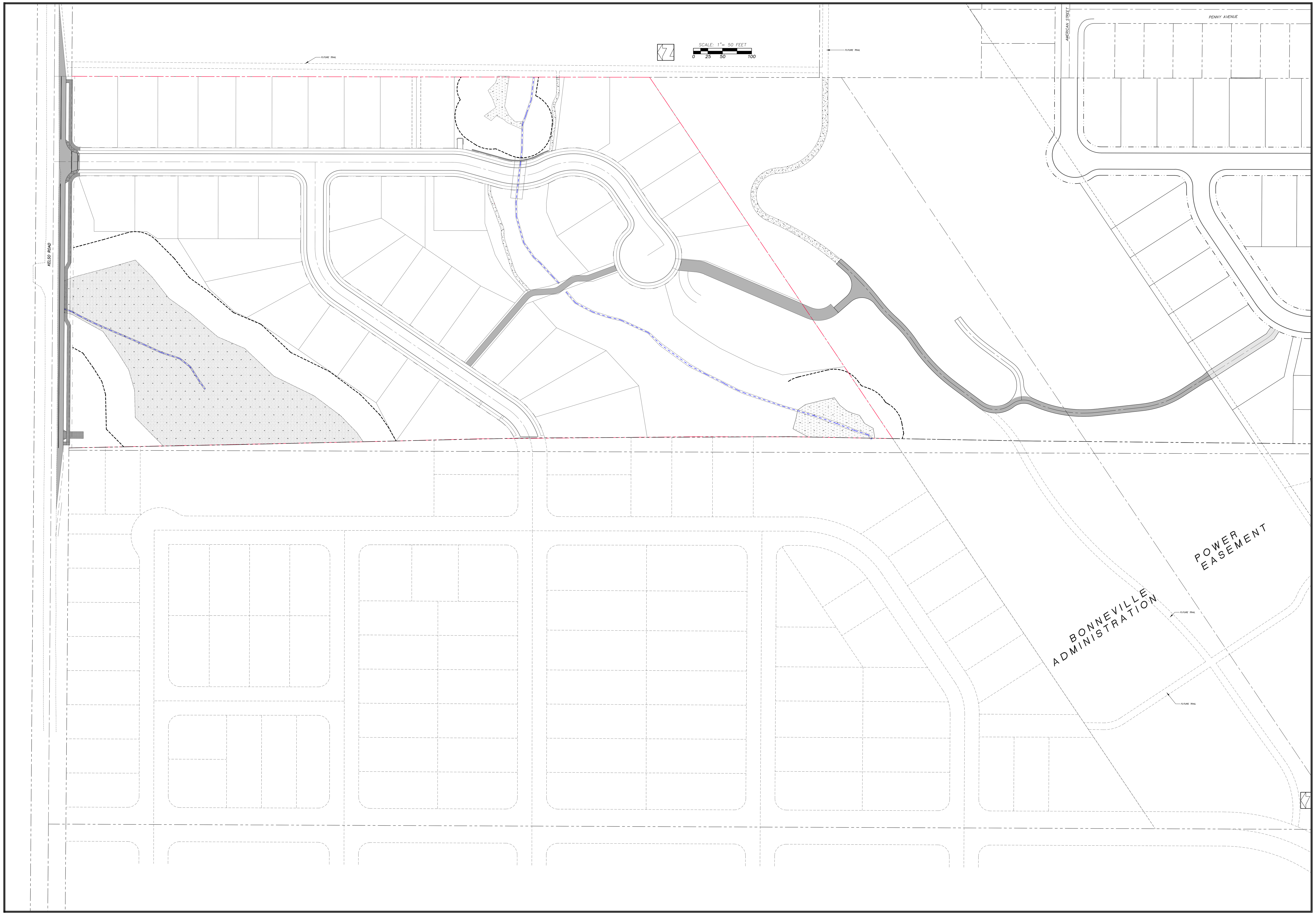
DRAWING: Sandy Woods 2 subdivision DR current.dwg

DATE	MAY, 2021
SCALE	1" = 50'
DRAWN	PS
JOB	SGL19-042
SHEET	10
OF	15 SHEETS



REVISIONS	BY
REVISE PER COMPLETENESS CHECK & COUNTY DESIGN MODIFICATION APPROVAL.	PS 7.29.21

Sandy Woods 2
Rosemont Development

Future Street Plan

SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

DRAWING: Sandy Woods 2 subdivision DR current.dwg

DATE	MAY, 2021
SCALE	1" = 70'
DRAWN	PS
JOB	SGL19-042
SHEET	11
OF 15	SHEETS

ERUSION AND SEDIMENT CONTROL LEGEND:

A	SEDIMENT FENCE ALONG 50' BUFFER LINE
B	VEGETATED BUFFER
C	SEDIMENT FENCE
D	INLET/OUTLET PROTECTION
E	GRAVEL CONSTRUCTION ENTRANCE
F	TREE PROTECTION FENCING

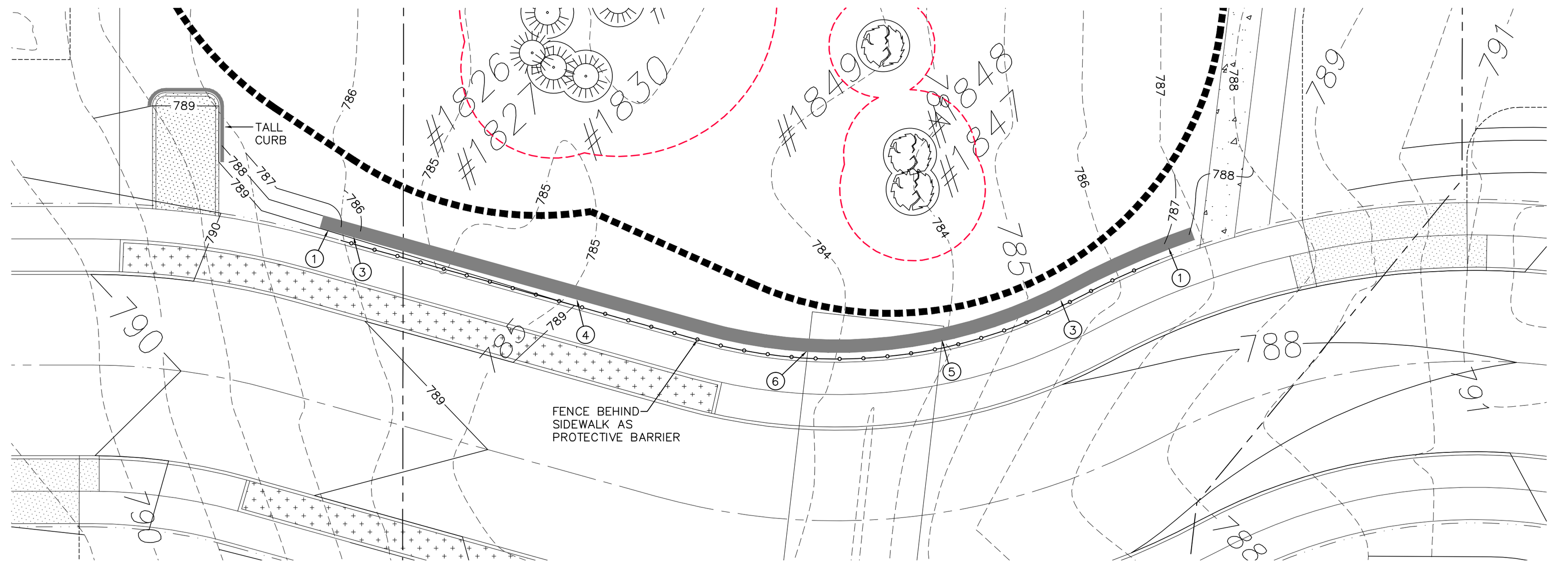
REVISIONS	BY
REVISE PER COMPLETENESS CHECK & COUNTY DESIGN MODIFICATION APPROVAL.	PS 7.29.21

Sandy Woods 2
Rosemont Development

Grading and ESC Plan

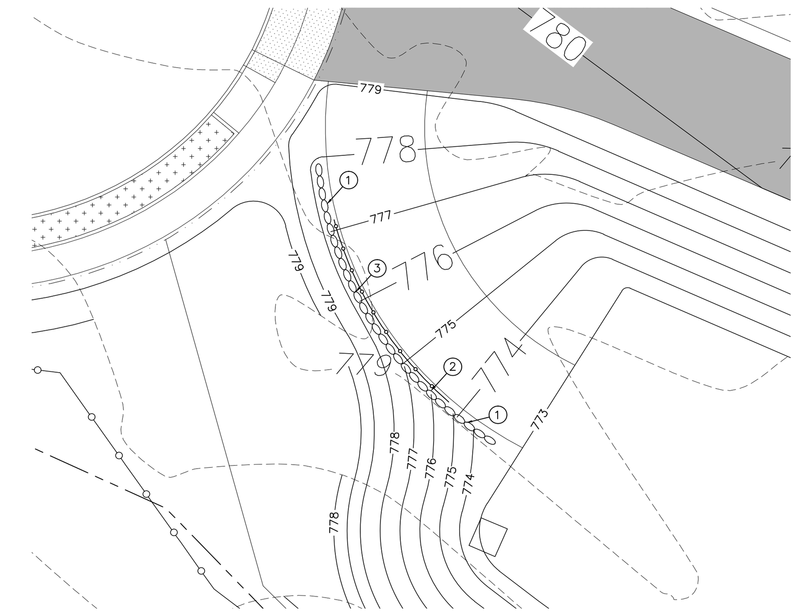
SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188
DRAWING:Sandy Woods 2 subdivision DR current.dwg

DATE	JUNE, 2021
SCALE	1" = 50'
DRAWN	PS
JOB	SGL19-042
SHEET	12
OF 15	SHEETS

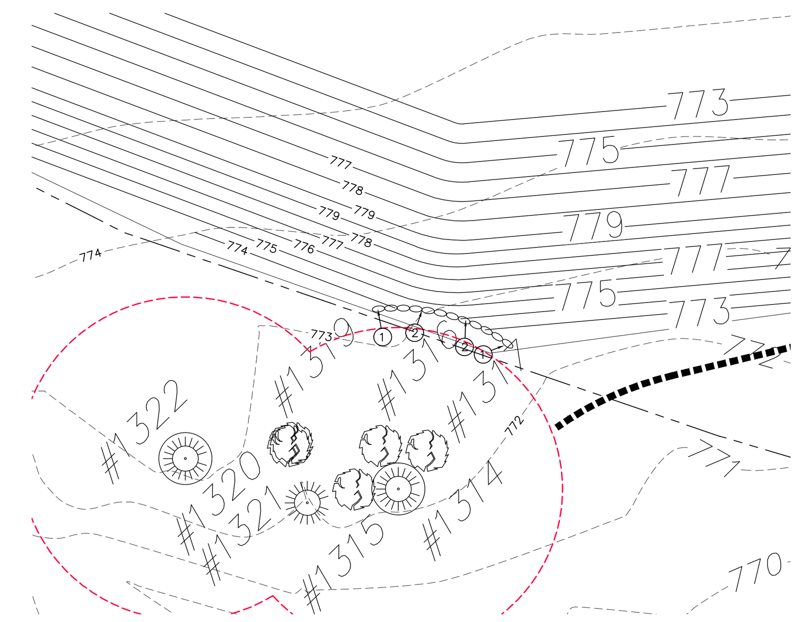


Street A: Keystone Block Wall

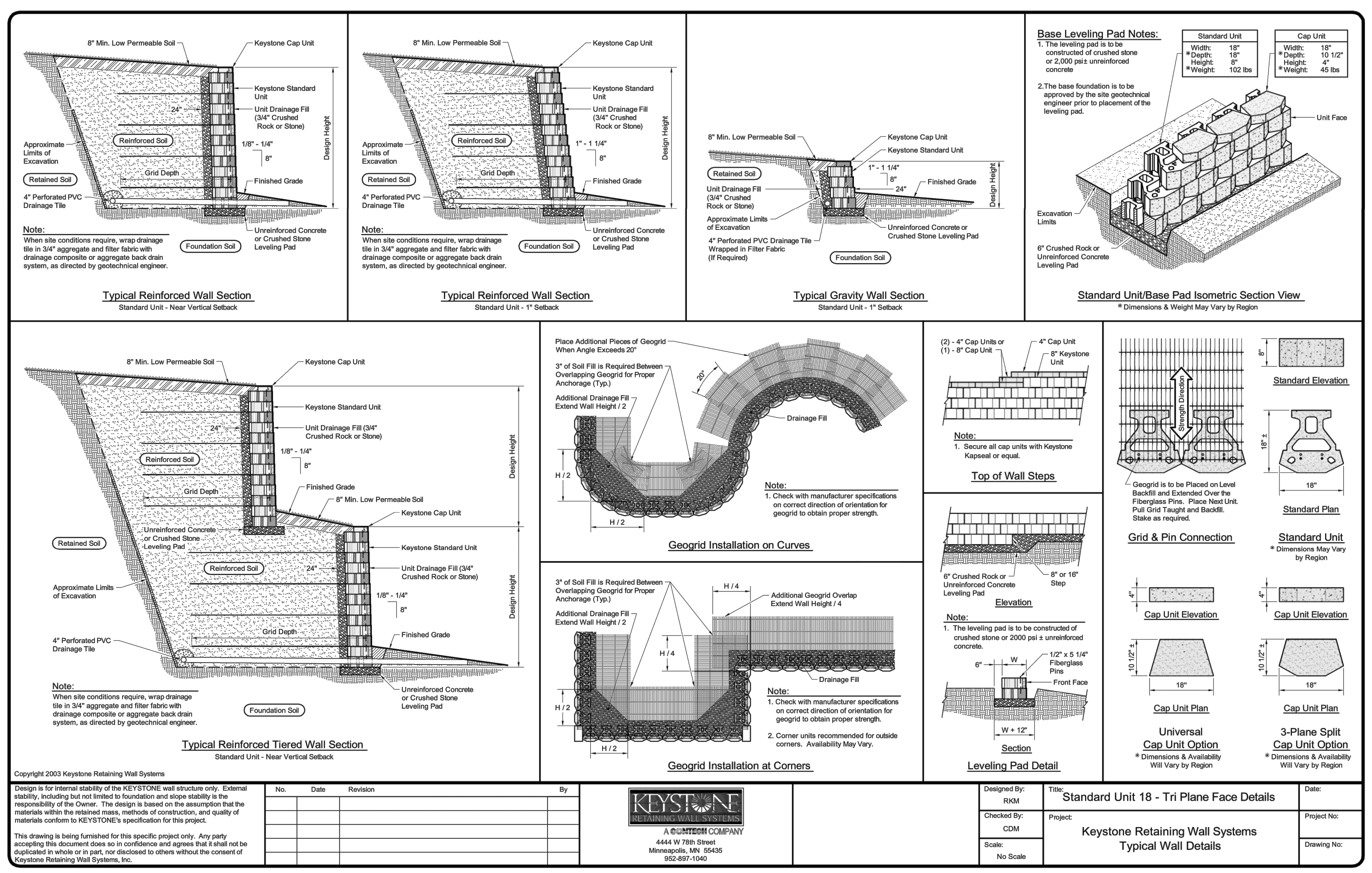
RETAINING WALL LEGEND:
② = RETAINING WALL HEIGHT
= ROCKERY WALL
= KEYSTONE BLOCK WALL

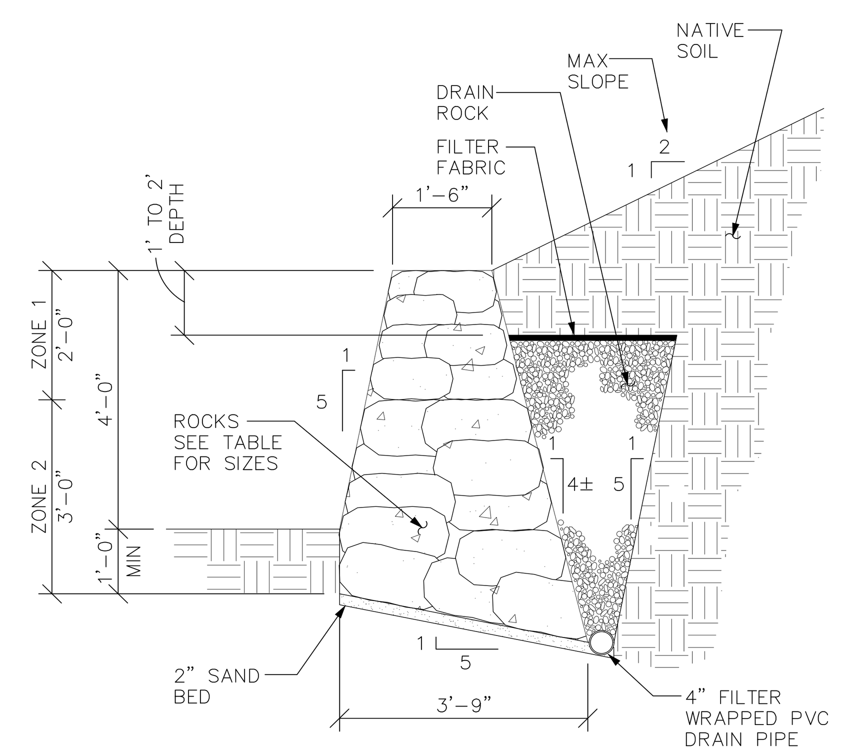


Tract L: Rockery Wall 1



Tract L: Rockery Wall 2





ROCK SIZES PER ZONE AREA				
ZONE	VOLUME (CU. FT.)	WEIGHT (Lbs.)		SIZE (IN.)
		MIN	MAX	
1	1–2	125	350	14–18
2	2–4	350	700	18–24

3
C18
4' ROCKERY WALL WITH 2:1 SLOPE ABOVE
1/2" = 1'–0"
X005–D02

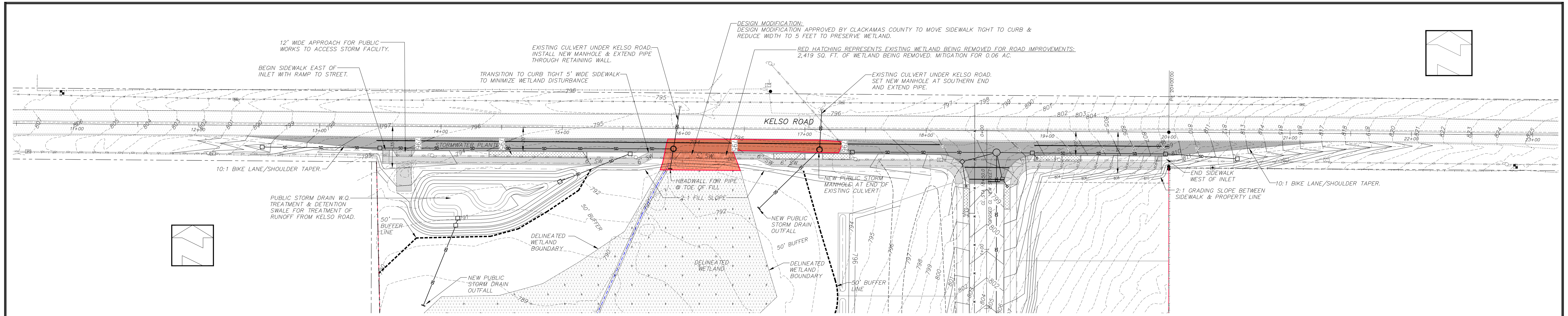
REVISIONS	BY
REVISE PER COMPLETENESS CHECK & COUNTY DESIGN MODIFICATION APPROVAL	PS 7.29.21

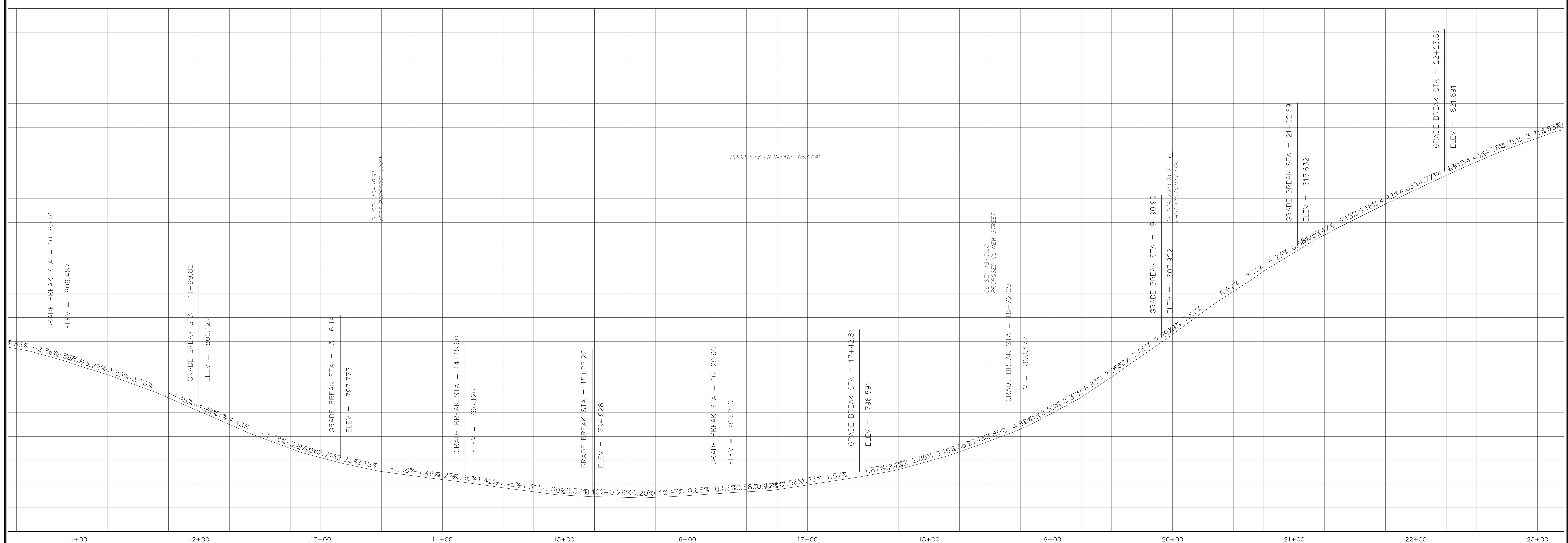
Sandy Woods 2
Rosemont Development

Retaining Walls

SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657–0188
DRAWING: Sandy Woods 2 subdivision DR current.dwg

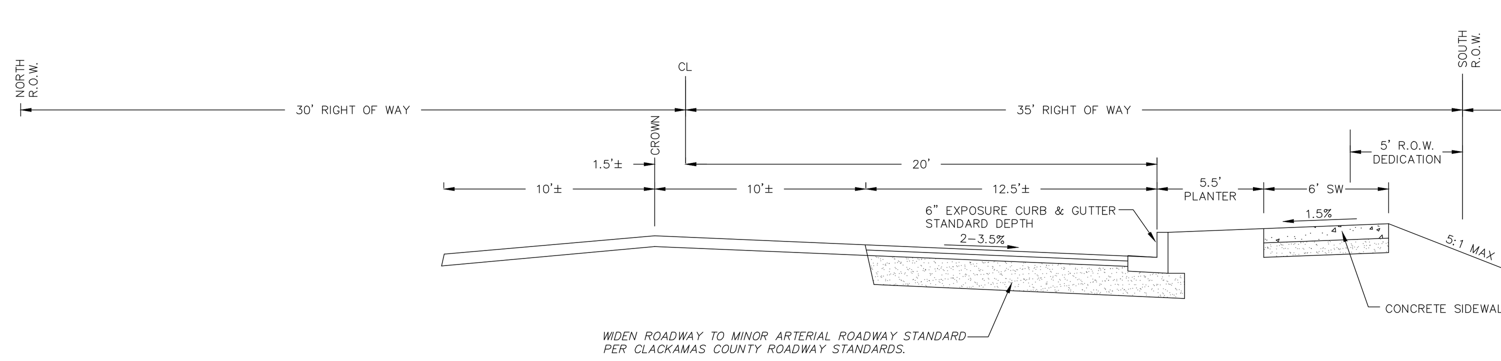
DATE JUNE, 2021
SCALE 1" = 50'
DRAWN PS
JOB SGL19–042
SHEET 13
OF 15 SHEETS





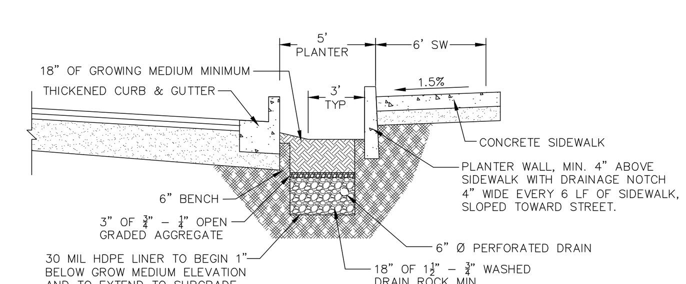
Kelso Rd Profile

HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=4'



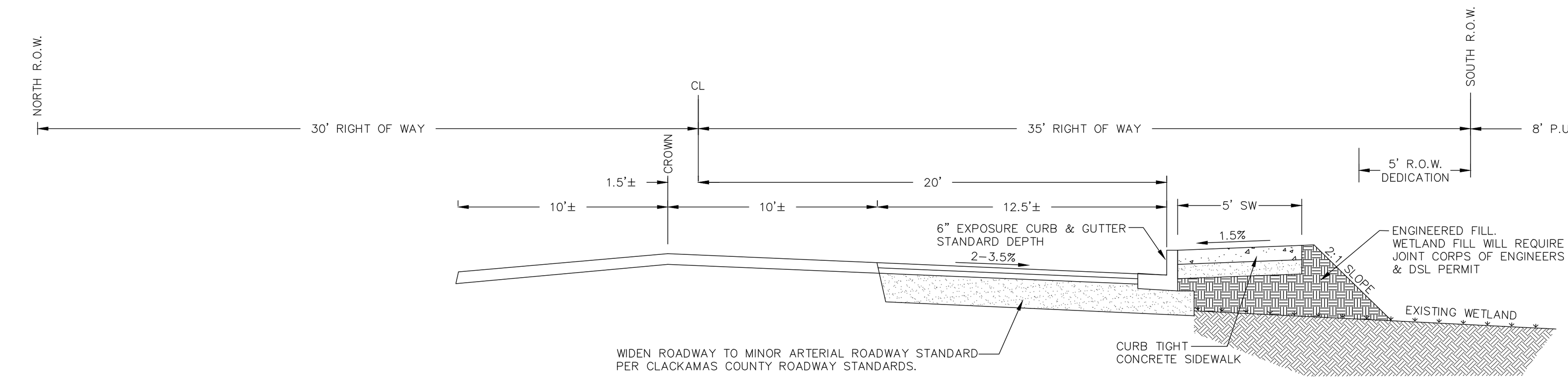
KELSO ROAD TYPICAL SECTION

NTS



STORMWATER PLANTER TYPICAL SECTION

NTS



KELSO ROAD TYPICAL SECTION AT CONSTRAINED AREA

NTS

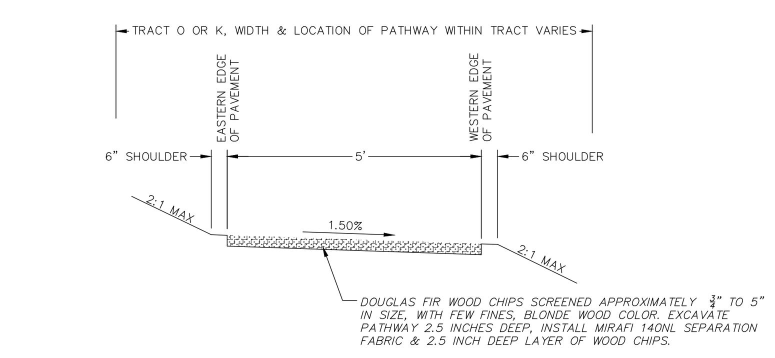
REVISIONS	BY
REVISE PER COMPLETENESS CHECK & COUNTY DESIGN MODIFICATION APPROVAL	PS 7.29.21

Sandy Woods 2
Rosemont Development

Kelso Rd. Plan and Profile

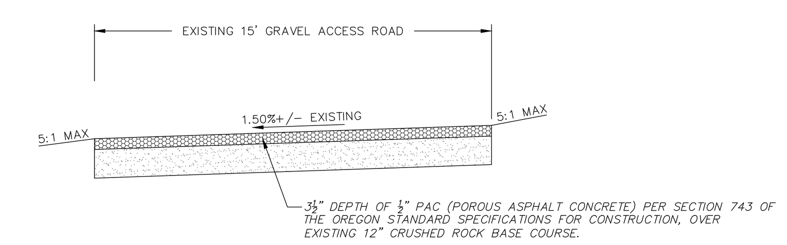
SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

DATE JUNE, 2021
SCALE H: 1" = 40' V: 1" = 4'
DRAWN PS
JOB SGL19-042
SHEET 14 OF 15 SHEETS



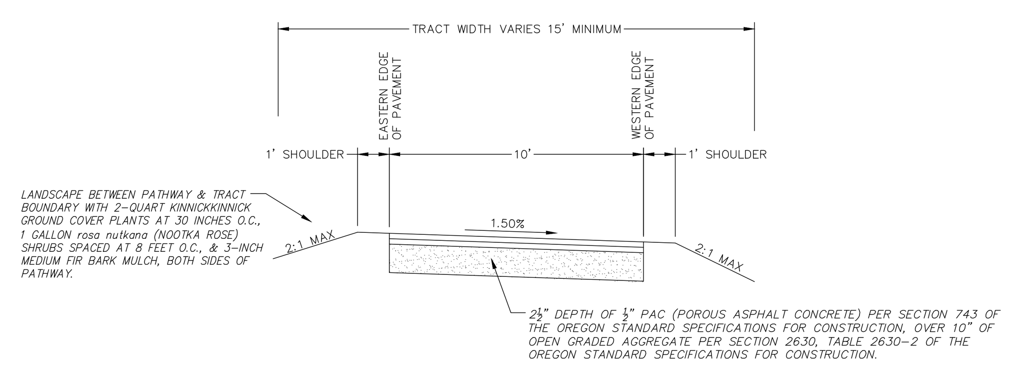
WOOD CHIP PATHWAY TYPICAL SECTION

NTS



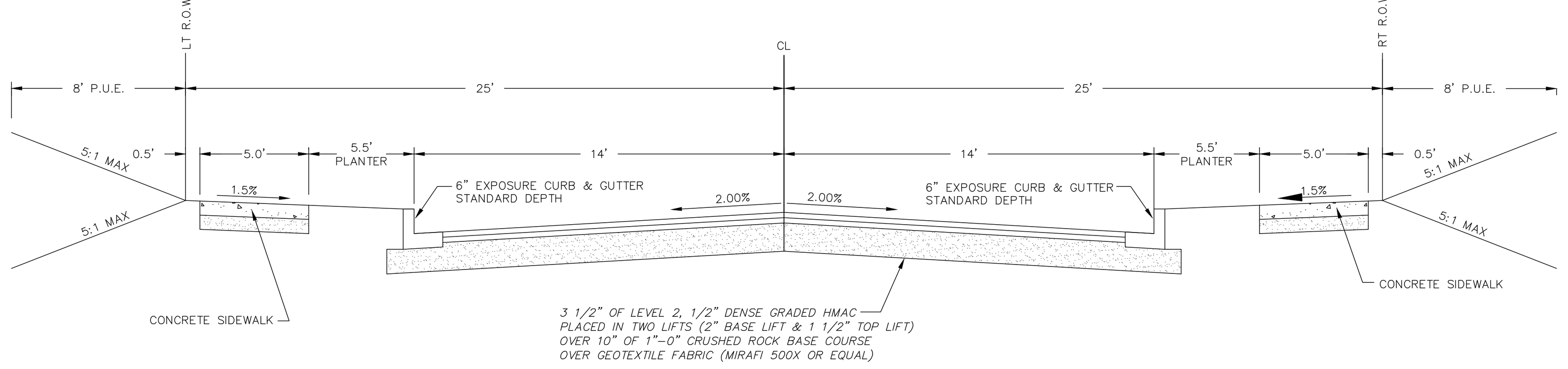
FIRE DEPT ACCESS ROAD TYPICAL SECTION

NTS



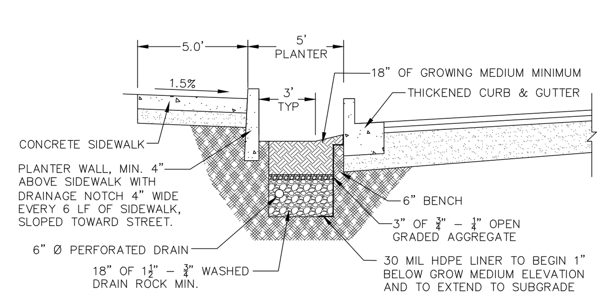
AC PATHWAY TYPICAL SECTION

NTS



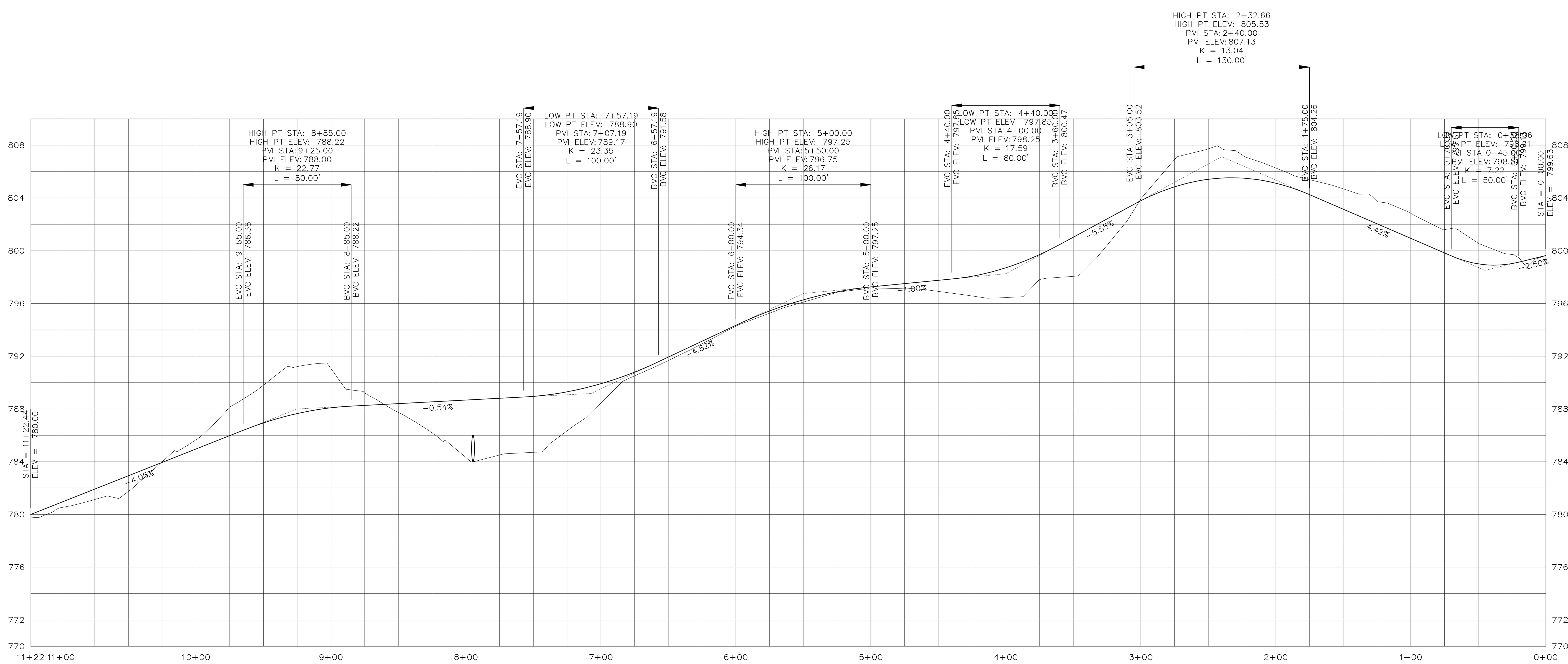
STREET A and B TYPICAL SECTION

NTS



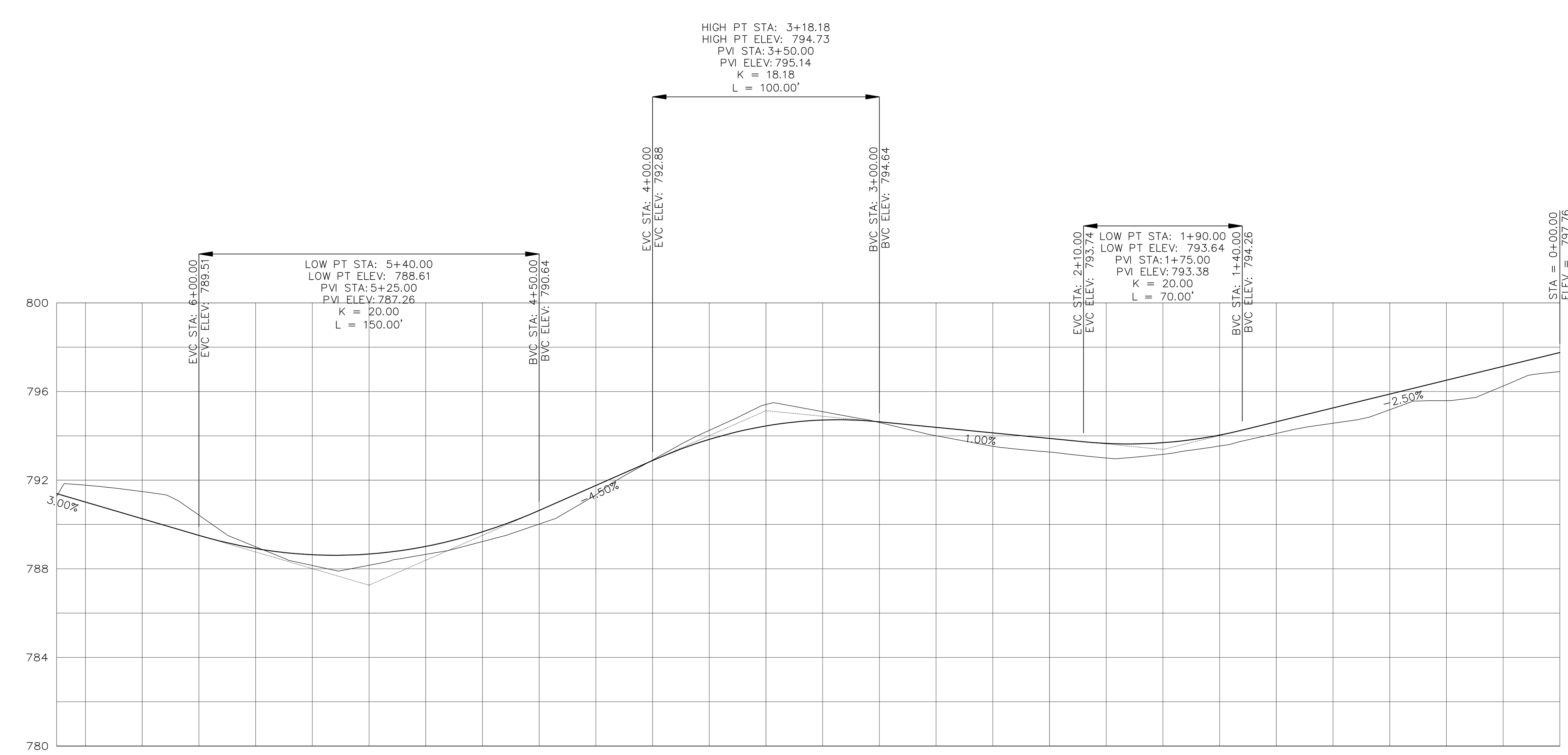
STORMWATER PLANTER TYPICAL SECTION

NTS



Street A Profile

HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=4'



Street B Profile

HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=4'

REVISIONS	BY

Sandy Woods 2
Rosemont Development

Street Profiles

SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

DATE	MAY, 2021
SCALE	H: 1" = 40' V: 1" = 4'
DRAWN	PS
JOB	SGL19-042
SHEET	15
OF 15	SHEETS

Exhibit D

STORM DRAINAGE REPORT FOR

Sandy Woods 2 Land Use Application

Silver V Construction

J.O. SGL 19-042

June 2021

REGISTERED PROFESSIONAL ENGINEER
16551
OREGON
MAY 18, 1993
PATRICK A. SISUL

EXPIRATION DATE: 6/30/2022
6/1/2021

SISUL ENGINEERING

A Division of Sisul Enterprises, Inc.

375 Portland Avenue

Gladstone, OR 97027

phone: (503) 657-0188

fax: (503) 657-5779

Table of Contents:

List of Appendices:

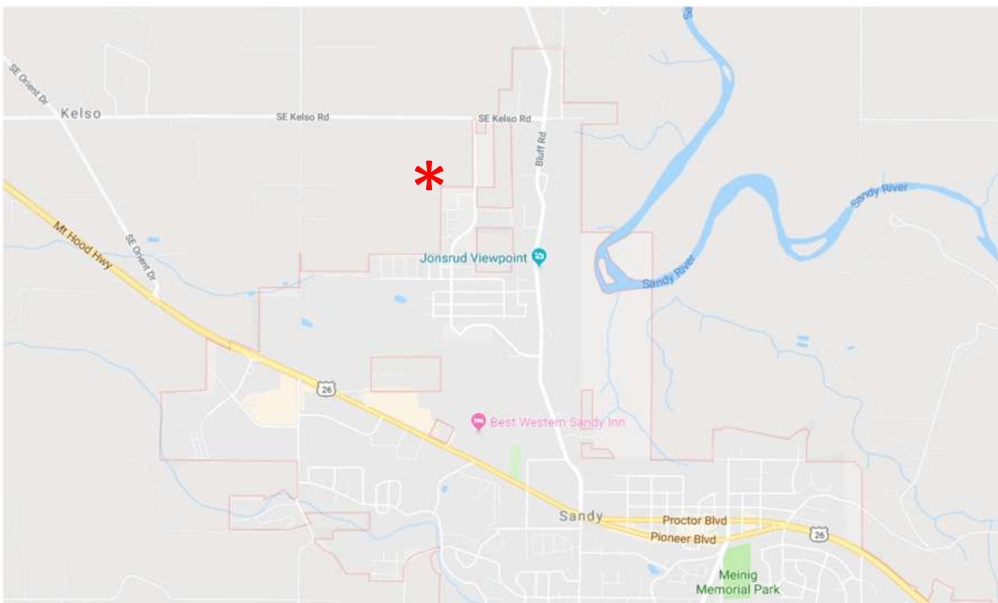
A. Pre-Development Site Drainage Map
B. Development Plans
C. Isopluvials for 24-HR Precipitation
D. Soil Testing
E. Curve Number Tables

Objective:

The goal of this stormwater calculation is to demonstrate that the residential subdivision development is meeting City of Sandy's stormwater requirements for the Sandy Woods 2 subdivision on SE Kelso Road, Sandy, OR.

Site Location & Vicinity Map:

The site has no address, although it had an address of 37090 SE Kelso Road until the existing home was removed from the property and the land was re-platted with the first phase of the subdivision. The site is in the City of Sandy, Clackamas County, Oregon and is west of Jewelberry Avenue and south of Kelso Road. Tax lots include 2202, 2203 & 2204 of Sec. 11, T2S, R4E, W.M.



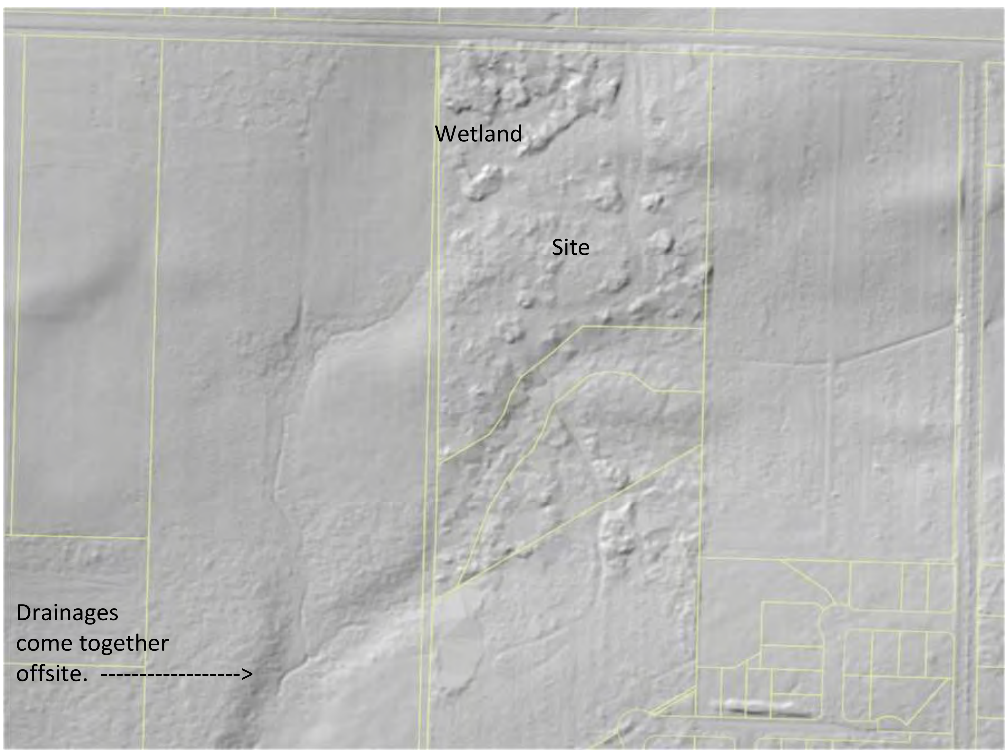
The site area is 769,848 sq. ft. which equals 17.67 acres. The center of the site is located at Latitude: 45°25'00"N, Longitude 122°16'55"W.

Local Vicinity Map:

Site Terrain & Drainageways:

Generally, the site falls from east to west. A seasonal drainageway runs from east to west across the site, leaving the site at the low point along the western property line. Much of the site drains northerly or southerly toward that seasonal drainageway. Along SE Kelso Road there are roadside ditches on the north and south sides of the roadway. The roadside ditch on the north side of Kelso Road collects runoff from the northern half of the roadway and from the agricultural properties north of the roadway. In front of this site, two culverts move the ditch runoff underneath Kelso Road and into the northwestern corner of this site. The flow spreads out into a wide wetland and flows southwesterly toward Tax Lot 2300 west of this site. The northern portion of this site also drains to that wetland in an east to west direction.

The two drainageways on this site come together on Tax Lot 2300 to the west of this site. The drainages are tributaries to Tickle Creek. The LIDAR map below shows how the two drainageways cross the site and come together on Tax Lot 2300 to the west of the site.



Rainfall Intensity:
Sandy has higher rainfall values than the rest of the Portland urban area. Below is a comparison of rainfall intensities between Portland and Sandy.

24-hour Rainfall Depth		
Reoccurrence Interval	24-hour rainfall Portland (inches)	24-hour rainfall Sandy (inches)
2	2.4	3.5
5	2.9	4.5
10	3.4	4.8
25	3.9	5.5

* Sandy rainfall depth based upon NOAA Isopluvial values listed in the Storm Drainage Master Plan Appendix A

The 10-year event in Portland is approximately equal to the 2-year event in Sandy, while the 100-year event in Portland is approximately equal to the 5-year event in Sandy. The PAC calculator does not have a storm event large enough to approximate a 10-year storm event in Sandy, nor does the WES BMP tool.

We must use HydroCAD to calculate storm drain runoff, as none of the continuous storm modeling programs can simulate Sandy's higher rainfall rates.

Pollutants of Concern:
The contributing impervious area consists of streets, sidewalks, roofs and driveways. Per the 2016 City of Portland Stormwater Management Manual the pollutants of concern are:

- Suspended Solids (sediment)
- Heavy Metals (such as lead, copper, zinc & cadmium)
- Nutrients (such as nitrogen and phosphorus)
- Bacteria & Viruses
- Organics (oil, grease, hydrocarbons, etc.)
- Floatable trash & debris

Stormwater Treatment BMP's:
Stormwater will be treated with vegetated planters, vegetated basins & swales.

According to the City of Portland 2016 Stormwater Management Manual:

Vegetation may be one of the most cost-effective and ecologically efficient means available to improve water quality. Vegetation shades water courses, which lowers water temperature; captures and absorbs water in leaves and roots, which reduces peak flows; and stabilizes soil by providing cover for disturbed soils. Vegetation also provides wildlife habitat and scenic and aesthetic benefits.

As stormwater enters a vegetated facility, the vegetation slows the water down, allowing sediments to be trapped on the surface of the facility. Typically, the surface area of the facility is designed to allow stormwater to pond and evaporate while sediments settle into a layer of mulch and then soil. The mulch prevents soil erosion and retains moisture for plant roots. It also provides a medium for biological growth and the decomposition or decay of organic matter. The soil stores water and nutrients to support plant life. Bacteria, nematodes, and other soil organisms degrade organic pollutants such as petroleum-based compounds. They also help mix organic material, increase aeration, and improve water infiltration and water-holding capacity. Bacteria and other beneficial soil microbes process most pollutants.

As described above, vegetated facilities can treat all of the pollutants of concern above through infiltration through the soil and treatment by the vegetation. Also, per the Oregon DEQ BMP table, vegetated planters (bioretention facilities) are capable of removing all of the pollutants listed above.

Existing site soils:
Onsite soils are a combination of Cazadero silty clay loam and Cottrell silty clay loam. According to the Web Soil Survey, 59.3% of the site is 15B, Cazadero silty clay loam and 40.7% of the site is Cottrell silty clay loam. Both soils are identified as being Hydrologic Soil Group C.

Infiltration rate:
Onsite soil testing was performed in June 2020 by Mia Mahedy, PE, GE of Rapid Soil Solutions, Inc. Onsite testing determined an infiltration rate of 6 inches per hour in the vicinity of future Lots 54 – 64 that back up to the wetland in the NW corner of the property, and a rate of 20 inches per hour in the vicinity of the surface water facility located south the east-west drainageway. A copy of the geotechnical testing from Rapid Soil Solutions, Inc. is contained in the Appendices.

Using Factor of Safety of 2, the design infiltration rate for the facilities located on the rear of Lots 54 - 64 will be 3 inches/hour, while the rate used for the public facility in the southern portion of the site will be 10 inches/hour:

City of Sandy Stormwater Requirements:

Water Quality Treatment:
All developments shall treat 80 percent of the average annual volume of storm water runoff for the site. This standard can be met by installing storm water quality treatment facilities to satisfy the following design criteria:

A. Detention based storm water quality control: The required design volume for detention-based control is equal to the entire runoff volume that would occur from a site with a 1.2–inch, 12-hour storm. The draw-down time for the entire volume must be greater than or equal to 48 hours. For the lower half of the detention volume, the drawdown time must be greater than 36 hours. Additional design criteria for inlet and outlet spacing and design, as well as guidelines for calculating volumes, are contained in the Public Works Department Standards.

B. Flow-through based storm water quality control: the required design flow rate for treatment is the runoff that would be produced from a rainfall intensity of 0.2 inches/hour for on-line facilities, and 0.11 inches/hour for off-line facilities. This rate must be maintainable for a minimum of three hours. Additional design criteria for flow calculation, as well as specific treatment criteria for various types of storm water facilities (e.g., infiltration and storm water filters), are contained in the Public Works Standards.

C. Combination detention based on flow-through based storm water quality control: Detention facilities may be combined with flow-through facilities. The applicant must demonstrate that the combined system could sufficiently treat storm water runoff for the runoff produced by the flow-through treatment rates of 0.2 inches/hour (on-line facilities), occurring for a three-hour period.

Detention: Detain the 2-, 5-, 10-, and 25-year, 24-hour storm events to pre-development peak release levels.

The calculations will be performed using Santa Barbra Urban Hydrograph methodology.

Pre-Development Site Conditions:

The pre-development site condition is primarily Himalayan blackberries mixed with some grass. The site also includes forest with light underbrush, wetlands, pasture, gravel/dirt driveway/roadway, and structures. The home, barn and shed were recently removed from the property. The highest point of the site is located along the eastern property line approximately 200 feet south of Kelso Road at elevation 820. The lowest point onsite is at elevation 767 along the western property line approximately 35 feet north of the SW corner.

An aerial view of the site is below:

Pre-development site areas and curve numbers are noted below. All soils are Hydrologic Soil Group C:

	Pre-Development Area	(CN)
Woods, protected from grazing 50 – 75% ground cover	235,225 sf	70
Brush-weed-grass mixture with brush as the major element	516,708 sf	70
Gravel / Dirt roadway	15,695 sf	89
Buildings – Home, Barn & Shed	2,220 sf	98
Area along Kelso Road Frontage assumed to be pervious	12,778 sf	74

Post-Developed Condition:

The developed site condition is planned as 43 Lots and multiple tracts for stormwater detention, water quality treatment, and water quality protection. 11.26 acres will be developed, and 6.41 acres will remain undeveloped.

The developed portion of the site will consist of new low-density residential lots of 7,500 square feet or larger with new residential homes. New lots are assumed to have

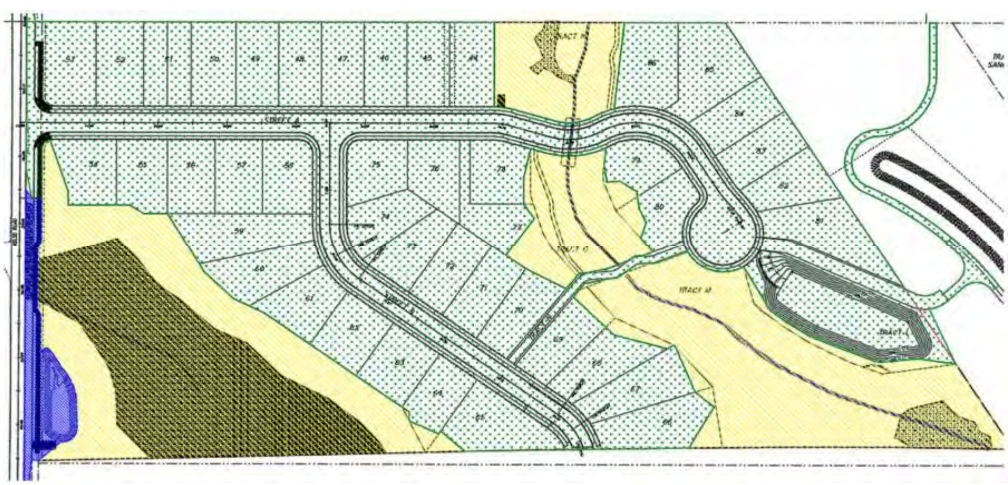
2,640 square feet of impervious area, with the remaining area landscaping in good condition. Stormwater runoff from new lots will be conveyed via piping and grading into a public storm drain in the proposed roads.

Drainage Facilities for this development site:
The Sandy Woods 2 subdivision will widen Kelso Road on the northern end of the site and will construct a subdivision south of Kelso Road. The developed site will drain to the wetland in the north and the seasonal drainageway in the central portion of the site in order to follow existing drainage patterns.

Basin 1 (green) – Basin 1 includes the area of Kelso Road that is widened as well as the curb and sidewalks adjacent to the widening immediately due west of the proposed catch basin near station 17+50. That portion of the Kelso Road improvements will be conveyed to the proposed detention pond to the northwestern corner of the site. The outflow from this facility will release to the existing wetland in the northwestern corner of the site.

Basin 2 (blue) – Basin 2 includes the area of Kelso Road that is widened as well as the curb and sidewalks adjacent to the widening immediately due east of the proposed catch basin near station 17+50. It also includes the on-site improvements consisting of roads, curbs, sidewalks, driveways, and the lot areas of the development. The runoff from the improvements will be conveyed via piping and grading to a detention pond to the south side of the site.

Basin 3 (yellow) -- The undisturbed areas around the drainageways will go directly to the drainageways undetained, yet will still be included in the calculations.



Basin Map

Developed Site Impervious & Pervious Area Breakdown:

Post-development site areas and curve numbers are noted below. All soils are Hydrologic Soil Group C.

New homes on new Lots are estimated to create an impervious area of 2,640 sf per lot, 0.061 acres. The remainder of the lot will be a combination of Landscaping with >75% grass and/or Woods, protected from grazing:

Basin 1:	Kelso Road Improvements (Off-site)		
	Impervious Area	6,172 sf	CN = 98
	Planter Strip	1,146 sf	CN = 74
Basin 2:	On-site Improvements		
	Impervious Area	201,631 sf	CN = 98
	Pervious Area	303,524 sf	CN = 74
Basin 3:	Undetained Areas	255,689 sf	CN = 74
Total Post Development Area:		768,162 sf = 17.63 Ac.	

Pre-Development Combined CN Values & Time of Concentration:

Combined CN for Pervious: Both pervious CN values have a CN of 70, CN = 70

Combined CN for Impervious: $\frac{(15{,}695\ sf)(89) + (2{,}220\ sf)(98)}{(15{,}695\ sf + 2{,}220\ sf)} = 90.1$, CN = 90.1

TIME OF CONCENTRATION: (see supporting pages)
Time of concentration for the pre-development condition will be calculated from the hydraulically most distant point in the property.

Time of Concentration:

Sheet Flow (dense grass): $T_{t1} = \frac{0.42(0.24*150')^{0.8}}{(3.50)^{0.5} * (0.0167)^{0.4}} = \underline{\textbf{\textit{20.3 min}}}$ L = 150’, S = 0.0167, n_s = 0.24

Shallow Concentrated Flow: $T_{t2} = \frac{215'}{60* 9 * (0.0256)^{0.5}} = \underline{\textbf{\textit{2.5 min}}}$ L = 215’, S = 0.0256, k_s = 9

T_{cu} = 20.3 min + 2.5 min = 22.8 min

Post-Development Combined CN Values & Time of Concentration:

BASIN 1:

TIME OF CONCENTRATION:
Due to the nature of this basin and the short distance of flow, it shall be assumed that the time of concentration for this basin is 5 minutes for the post-developed condition.

T_c = 5.0 min

BASIN 2:

TIME OF CONCENTRATION:
Time is based on the time of concentration from the hydraulically most distant point in the basin. Based on the layout of the site, lot 67's front yard will drain toward the street via sheet flow and then transition to gutter flow until it reaches the first catch basin downstream where it will become pipe flow until the release into the detention pond for this basin.

Time of Concentration:

Sheet Flow (lawn):	$T_{t1} = \dfrac{0.42(0.15*15.27')^{0.8}}{(3.50)^{0.5} * (0.072)^{0.4}}$ =	***1.25 min***	L = 15.27' S = 0.072 n_s = 0.15
Sheet Flow (sidewalk):	$T_{t1} = \dfrac{0.42(0.011*10.0')^{0.8}}{(3.50)^{0.5} * (0.015)^{0.4}}$ =	***0.21 min***	L = 10.0' S = 0.015 n_s = 0.011
Gutter Flow:	$T_{t2} = \dfrac{72.61'}{60 * 27 * (0.014)^{0.5}}$ =	***0.38 min***	L = 72.61' S = 0.014 k_s = 27
Pipe Flow:	$T_{t3} = \dfrac{1495'}{60 * 42 * (0.005)^{0.5}}$ =	***8.39 min***	L = 1495' S = 0.005 k_s = 42

**NOTE: For the purposes of the time of concentration calculations, the pipe segments will have an assumed slope of 0.0050 (0.50%).*

T_{cu} = 1.25 min + 0.21min + 0.38 min + 8.39 min = 10.23 min

Pre-Development Hydrographs:

Summary for Subcatchment 7S: Pre-Developed Conditions - Whole Site

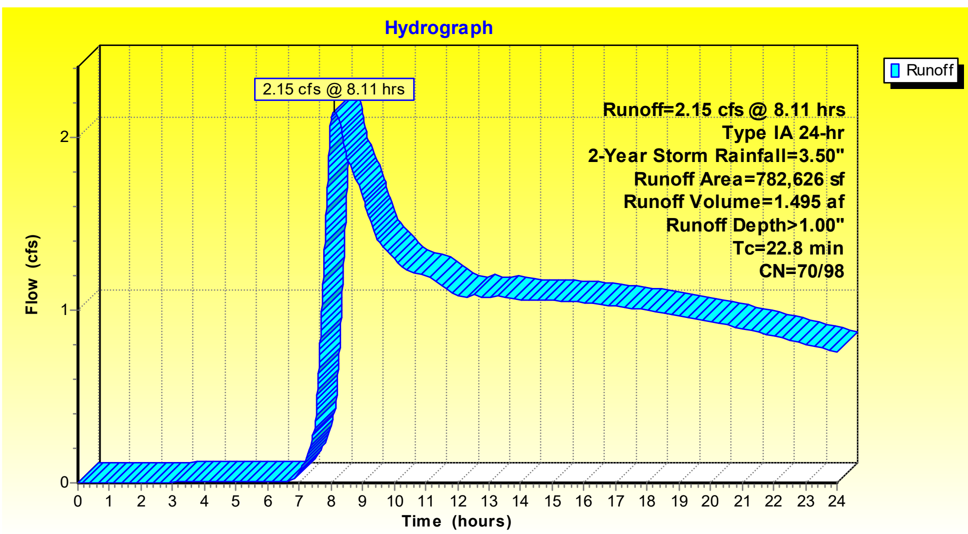
Runoff = 2.15 cfs @ 8.11 hrs, Volume= 1.495 af, Depth> 1.00"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-Year Storm Rainfall=3.50"

	Area (sf)	CN	Description
*	235,225	70	Woods, protected from grazing (50-75% ground cover)
*	516,708	70	Brush-weed-grass mixture with brush as the major element
*	15,695	89	Gravel/dirt roadway
*	2,220	98	Buildings - Home, barn, and shed
*	12,778	74	Pervious area near Kelso Road
	782,626	71	Weighted Average
	780,406	70	99.72% Pervious Area
	2,220	98	0.28% Impervious Area

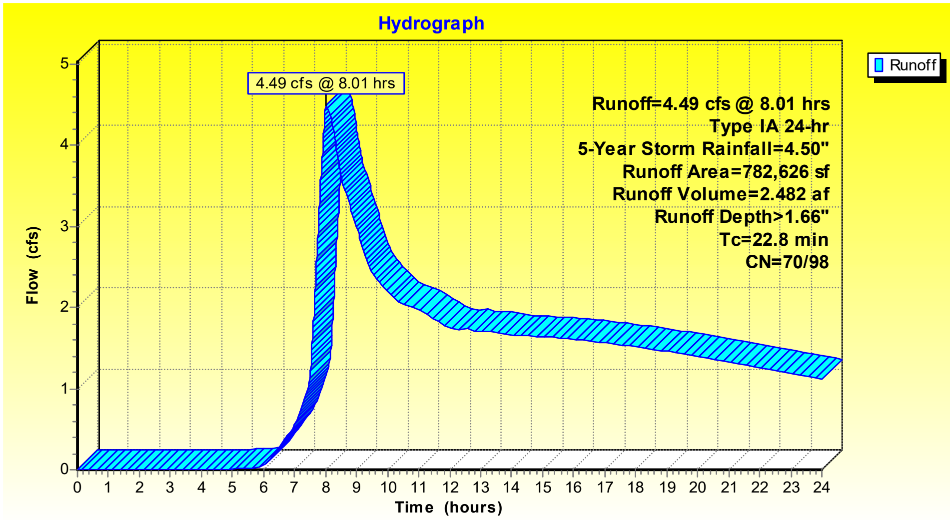
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.8					**Direct Entry, Direct Entry**

2-YEAR STORM



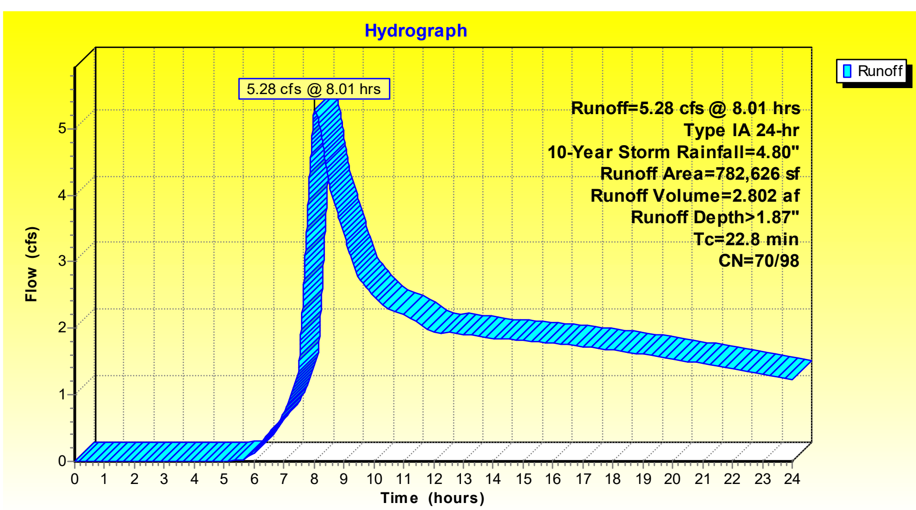
Per the above hydrograph, the runoff generated by the pre-developed conditions of the site is 2.15 cfs.

5-YEAR STORM



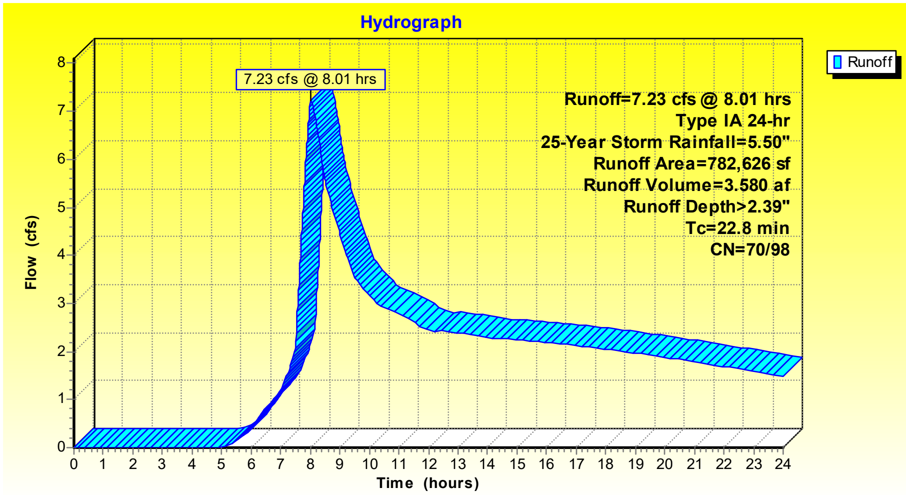
Per the above hydrograph, the runoff generated by the pre-developed conditions of the site is 4.49 cfs.

10-YEAR STORM



Per the above hydrograph, the runoff generated by the pre-developed conditions of the site is 5.28 cfs.

25-YEAR STORM



Per the above hydrograph, the runoff generated by the pre-developed conditions of the site is 7.23 cfs.

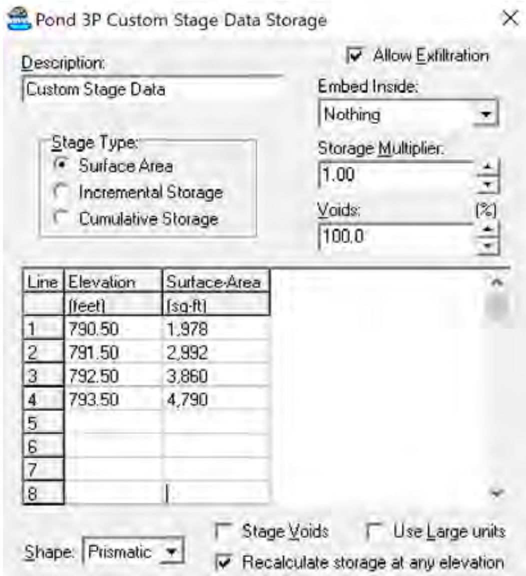
SUMMARY OF PRE-DEVELOPMENT PEAK FLOWS:

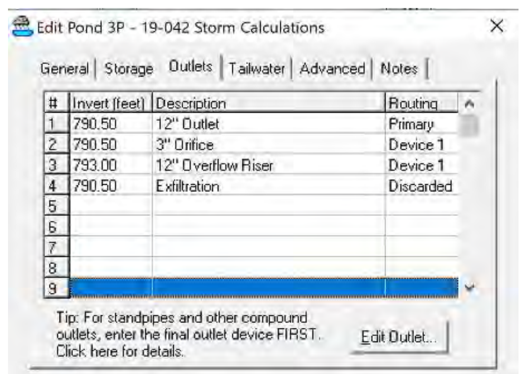
2-YEAR STORM	**Q = 2.15 cfs**
5-YEAR STORM	**Q = 4.49 cfs**
10-YEAR STORM	**Q = 5.28 cfs**
25-YEAR STORM	**Q = 7.23 cfs**

<u>Post-Development Hydrographs:</u>

<u>Basin 1:</u> The area of Kelso Road that is widened as well as the curb and sidewalks adjacent to the widening. That portion of the Kelso Road improvements will be conveyed to the proposed detention pond to the northwestern corner of the site. The outflow from this facility will release to the existing wetland in the northwestern corner of the site. Below is a design of the detention pond as modeled in HydroCAD.

Basin 1 Detention Pond Design:





2-YEAR STORM

Summary for Pond 3P: Basin 1 Detention Pond

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=738)

Inflow Area = 0.175 ac, 81.02% Impervious, Inflow Depth > 2.88" for 2-Year Storm event
Inflow = 0.12 cfs @ 7.89 hrs, Volume= 0.042 af
Outflow = 0.08 cfs @ 8.18 hrs, Volume= 0.042 af, Atten= 39%, Lag= 17.3 min
Discarded = 0.07 cfs @ 8.18 hrs, Volume= 0.042 af
Primary = 0.01 cfs @ 8.18 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 790.54' @ 8.18 hrs Surf.Area= 2,019 sf Storage= 81 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 2.5 min (679.3 - 676.8)

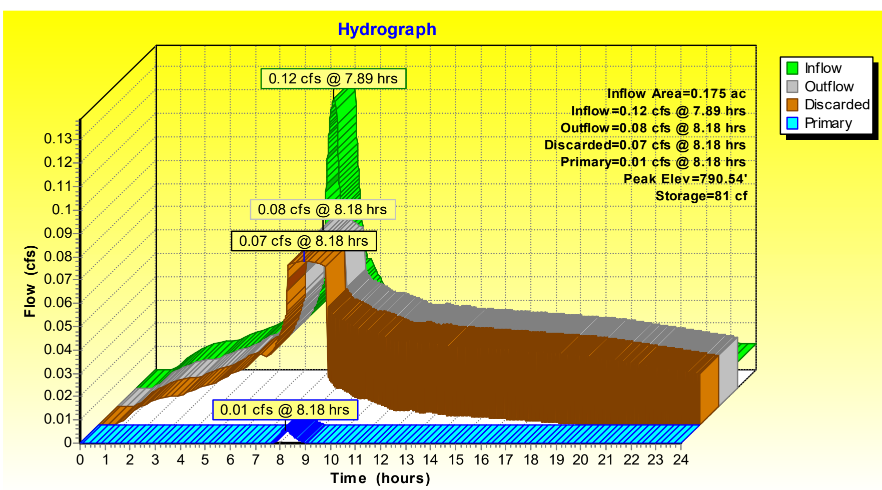
Volume	Invert	Avail.Storage	Storage Description
#1	790.50'	10,236 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
790.50	1,978	0	0
791.50	2,992	2,485	2,485
792.50	3,860	3,426	5,911
793.50	4,790	4,325	10,236

Device	Routing	Invert	Outlet Devices
#1	Primary	790.50'	**12.0" Round 12" Outlet** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 790.50' / 790.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	790.50'	**3.0" Horiz. 3" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	793.00'	**3.1' long 12" Overflow Riser** 2 End Contraction(s)
#4	Discarded	790.50'	**1.500 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.07 cfs @ 8.18 hrs HW=790.54' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.01 cfs @ 8.18 hrs HW=790.54' (Free Discharge)
└**1=12" Outlet** (Barrel Controls 0.01 cfs @ 0.84 fps)
  └**2=3" Orifice** (Passes 0.01 cfs of 0.02 cfs potential flow)
  └**3=12" Overflow Riser** (Controls 0.00 cfs)



Per the above hydrograph, the total runoff generated by the post-developed conditions of the site is 0.08 cfs. Since the brown hydrograph represents the discarded infiltration outflow which will not be released, this value will be excluded from the total release rate for the 2-year, 24-hour storm of the post-developed conditions. Therefore, the primary outflow from the structure (blue hydrograph) shall be the value for the release rate of this storm. The primary release rate is 0.01 cfs.

5-YEAR STORM

Summary for Pond 3P: Basin 1 Detention Pond

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=702)

Inflow Area =	0.175 ac, 81.02% Impervious, Inflow Depth > 3.82"		for 5-Year Storm event	
Inflow =	0.16 cfs @	7.89 hrs, Volume=	0.056 af	
Outflow =	0.09 cfs @	8.23 hrs, Volume=	0.056 af,	Atten= 44%, Lag= 20.3 min
Discarded =	0.07 cfs @	8.23 hrs, Volume=	0.054 af	
Primary =	0.02 cfs @	8.23 hrs, Volume=	0.002 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 790.57' @ 8.23 hrs Surf.Area= 2,052 sf Storage= 148 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 4.7 min (676.3 - 671.5)

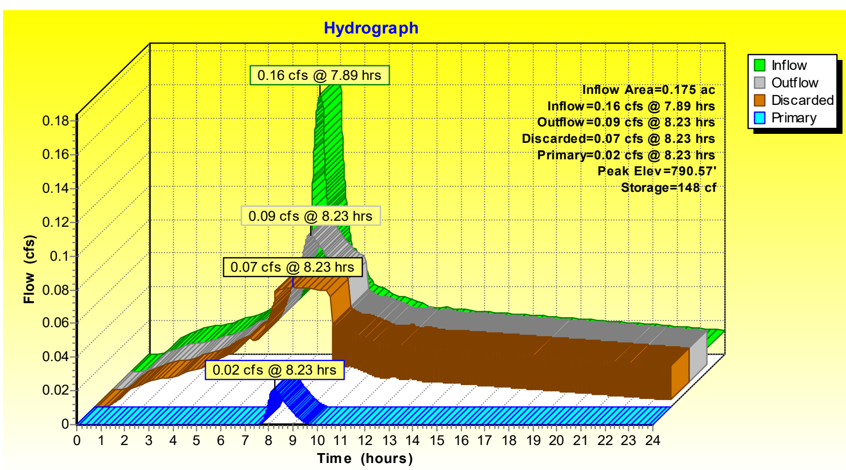
Volume	Invert	Avail.Storage	Storage Description
#1	790.50'	10,236 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
790.50	1,978	0	0
791.50	2,992	2,485	2,485
792.50	3,860	3,426	5,911
793.50	4,790	4,325	10,236

Device	Routing	Invert	Outlet Devices
#1	Primary	790.50'	**12.0" Round 12" Outlet** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 790.50' / 790.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	790.50'	**3.0" Horiz. 3" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	793.00'	**3.1' long 12" Overflow Riser** 2 End Contraction(s)
#4	Discarded	790.50'	**1.500 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.07 cfs @ 8.23 hrs HW=790.57' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.02 cfs @ 8.23 hrs HW=790.57' (Free Discharge)
└**1=12" Outlet** (Barrel Controls 0.02 cfs @ 1.23 fps)
  ├**2=3" Orifice** (Passes 0.02 cfs of 0.05 cfs potential flow)
  └**3=12" Overflow Riser** (Controls 0.00 cfs)



Per the above hydrograph, the total runoff generated by the post-developed conditions of the site is 0.09 cfs. Since the brown hydrograph represents the discarded infiltration outflow which will not be released, this value will be excluded from the total release rate for the 5-year, 24-hour storm of the post-developed conditions. Therefore, the primary outflow from the structure (blue hydrograph) shall be the value for the release rate of this storm. The primary release rate is 0.02 cfs.

10-YEAR STORM

Summary for Pond 3P: Basin 1 Detention Pond

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=691)

Inflow Area = 0.175 ac, 81.02% Impervious, Inflow Depth > 4.11" for 10-Year Storm event
Inflow = 0.18 cfs @ 7.89 hrs, Volume= 0.060 af
Outflow = 0.10 cfs @ 8.23 hrs, Volume= 0.060 af, Atten= 44%, Lag= 20.5 min
Discarded = 0.07 cfs @ 8.23 hrs, Volume= 0.058 af
Primary = 0.03 cfs @ 8.23 hrs, Volume= 0.002 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 790.58' @ 8.23 hrs Surf.Area= 2,062 sf Storage= 167 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 5.5 min (675.8 - 670.3)

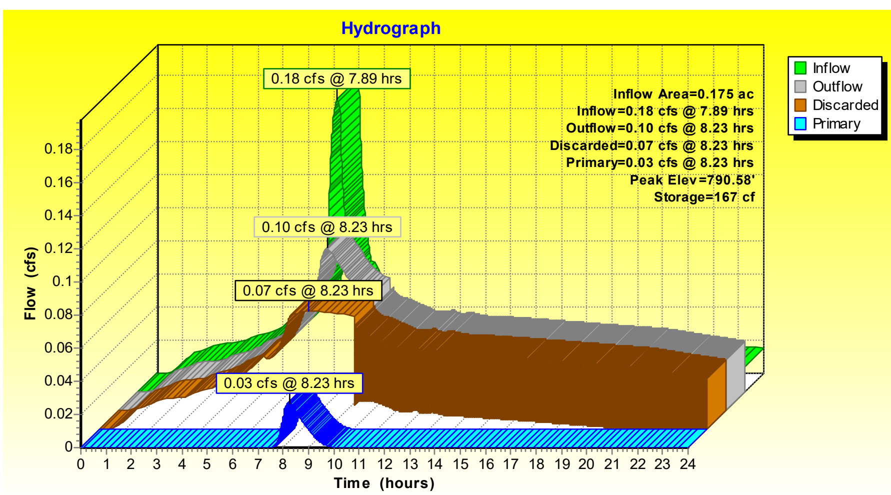
Volume	Invert	Avail.Storage	Storage Description
#1	790.50'	10,236 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
790.50	1,978	0	0
791.50	2,992	2,485	2,485
792.50	3,860	3,426	5,911
793.50	4,790	4,325	10,236

Device	Routing	Invert	Outlet Devices
#1	Primary	790.50'	**12.0" Round 12" Outlet** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 790.50' / 790.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	790.50'	**3.0" Horiz. 3" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	793.00'	**3.1' long 12" Overflow Riser** 2 End Contraction(s)
#4	Discarded	790.50'	**1.500 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.07 cfs @ 8.23 hrs HW=790.58' (Free Discharge)
└─**4=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.03 cfs @ 8.23 hrs HW=790.58' (Free Discharge)
└─**1=12" Outlet** (Barrel Controls 0.03 cfs @ 1.32 fps)
  ├─**2=3" Orifice** (Passes 0.03 cfs of 0.06 cfs potential flow)
  └─**3=12" Overflow Riser** (Controls 0.00 cfs)



Per the above hydrograph, the total runoff generated by the post-developed conditions of the site is 0.10 cfs. Since the brown hydrograph represents the discarded infiltration outflow which will not be released, this value will be excluded from the total release rate for the 10-year, 24-hour storm of the post-developed conditions. Therefore, the primary outflow from the structure (blue hydrograph) shall be the value for the release rate of this storm. The primary release rate is 0.03 cfs.

25-YEAR STORM

Summary for Pond 3P: Basin 1 Detention Pond

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=668)

Inflow Area = 0.175 ac, 81.02% Impervious, Inflow Depth > 4.78" for 25-Year Storm event
Inflow = 0.21 cfs @ 7.89 hrs, Volume= 0.070 af
Outflow = 0.12 cfs @ 8.22 hrs, Volume= 0.070 af, Atten= 44%, Lag= 20.2 min
Discarded = 0.07 cfs @ 8.22 hrs, Volume= 0.066 af
Primary = 0.04 cfs @ 8.22 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 790.60' @ 8.22 hrs Surf.Area= 2,084 sf Storage= 211 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 6.8 min (674.4 - 667.6)

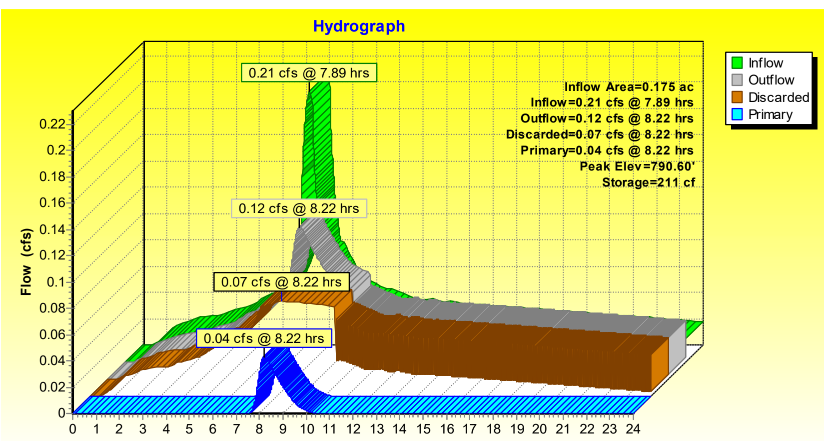
Volume	Invert	Avail.Storage	Storage Description
#1	790.50'	10,236 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
790.50	1,978	0	0
791.50	2,992	2,485	2,485
792.50	3,860	3,426	5,911
793.50	4,790	4,325	10,236

Device	Routing	Invert	Outlet Devices
#1	Primary	790.50'	**12.0" Round 12" Outlet** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 790.50' / 790.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	790.50'	**3.0" Horiz. 3" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	793.00'	**3.1' long 12" Overflow Riser** 2 End Contraction(s)
#4	Discarded	790.50'	**1.500 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.07 cfs @ 8.22 hrs HW=790.60' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 0.07 cfs)

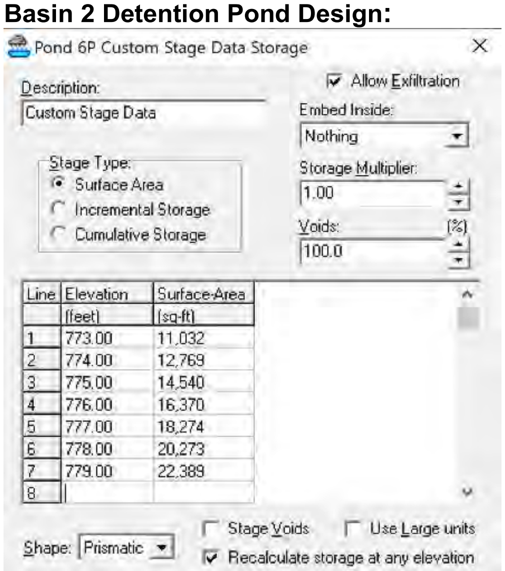
Primary OutFlow Max=0.04 cfs @ 8.22 hrs HW=790.60' (Free Discharge)
└**1=12" Outlet** (Barrel Controls 0.04 cfs @ 1.52 fps)
  ├**2=3" Orifice** (Passes 0.04 cfs of 0.08 cfs potential flow)
  └**3=12" Overflow Riser** (Controls 0.00 cfs)

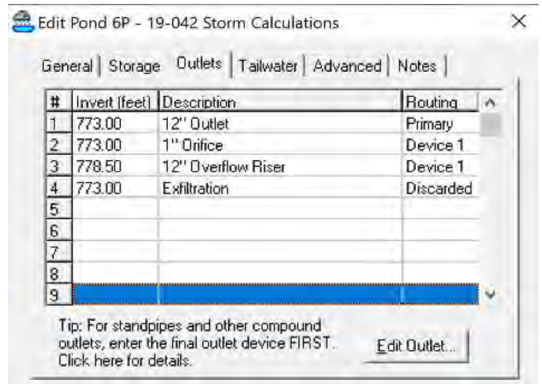


Per the above hydrograph, the total runoff generated by the post-developed conditions of the site is 0.12 cfs. Since the brown hydrograph represents the discarded infiltration outflow which will not be released, this value will be excluded from the total release rate for the 25-year, 24-hour storm of the post-developed conditions. Therefore, the primary outflow from the structure (blue hydrograph) shall be the value for the release rate of this storm. The primary release rate is 0.04 cfs.

<u>Basin 2:</u> This includes the on-site improvements consisting of roads, curbs, sidewalks, driveways, and the lot areas of the development. The runoff from the improvements will be conveyed via piping and grading to a detention pond to the south side of the site. Below is a design of the detention pond as modeled in HydroCAD.

Basin 2 Detention Pond Design:





2-YEAR STORM

Summary for Pond 6P: Basin 2 Detention Pond

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=253)

Inflow Area =	11.597 ac, 39.91% Impervious, Inflow Depth > 2.04" for 2-Year Storm event		
Inflow =	5.17 cfs @	8.00 hrs, Volume=	1.971 af
Outflow =	1.49 cfs @	9.89 hrs, Volume=	1.971 af, Atten= 71%, Lag= 113.9 min
Discarded =	1.47 cfs @	9.89 hrs, Volume=	1.953 af
Primary =	0.03 cfs @	9.89 hrs, Volume=	0.018 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 773.94' @ 9.89 hrs Surf.Area= 12,666 sf Storage= 11,147 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 53.3 min (786.5 - 733.3)

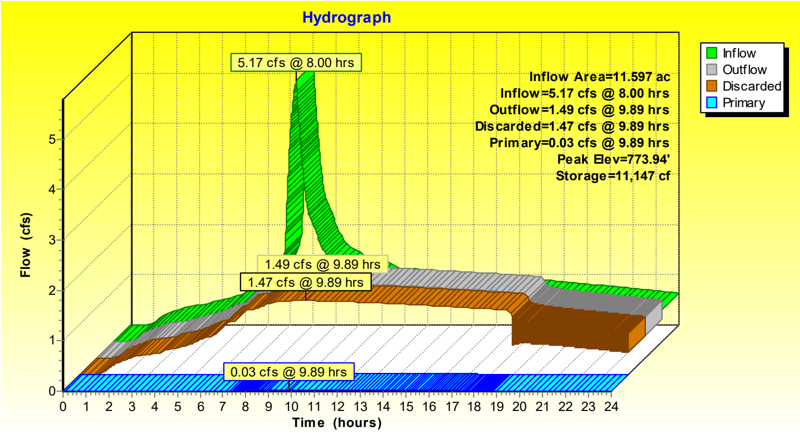
Volume	Invert	Avail.Storage	Storage Description
#1	773.00'	98,937 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
773.00	11,032	0	0
774.00	12,769	11,901	11,901
775.00	14,540	13,655	25,555
776.00	16,370	15,455	41,010
777.00	18,274	17,322	58,332
778.00	20,273	19,274	77,606
779.00	22,389	21,331	98,937

Device	Routing	Invert	Outlet Devices
#1	Primary	773.00'	**12.0" Round 12" Outlet** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 773.00' / 772.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	773.00'	**1.0" Horiz. 1" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	778.50'	**3.1' long 12" Overflow Riser** 2 End Contraction(s)
#4	Discarded	773.00'	**5.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.47 cfs @ 9.89 hrs HW=773.94' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 1.47 cfs)

Primary OutFlow Max=0.03 cfs @ 9.89 hrs HW=773.94' (Free Discharge)
└**1=12" Outlet** (Passes 0.03 cfs of 2.60 cfs potential flow)
  ├**2=1" Orifice** (Orifice Controls 0.03 cfs @ 4.67 fps)
  └**3=12" Overflow Riser** (Controls 0.00 cfs)



Per the above hydrograph, the total runoff generated by the post-developed conditions of the site is 1.49 cfs. Since the brown hydrograph represents the discarded infiltration outflow which will not be released, this value will be excluded from the total release rate for the 2-year, 24-hour storm of the post-developed conditions. Therefore, the primary outflow from the structure (blue hydrograph) shall be the value for the release rate of this storm. The primary release rate is 0.03 cfs.

5-YEAR STORM

Summary for Pond 6P: Basin 2 Detention Pond

Inflow Area = 11.597 ac, 39.91% Impervious, Inflow Depth > 2.87" for 5-Year Storm event
Inflow = 7.49 cfs @ 8.00 hrs, Volume= 2.778 af
Outflow = 1.69 cfs @ 11.45 hrs, Volume= 2.605 af, Atten= 77%, Lag= 207.4 min
Discarded = 1.65 cfs @ 11.45 hrs, Volume= 2.562 af
Primary = 0.04 cfs @ 11.45 hrs, Volume= 0.043 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 774.85' @ 11.45 hrs Surf.Area= 14,270 sf Storage= 23,358 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 106.5 min (832.7 - 726.2)

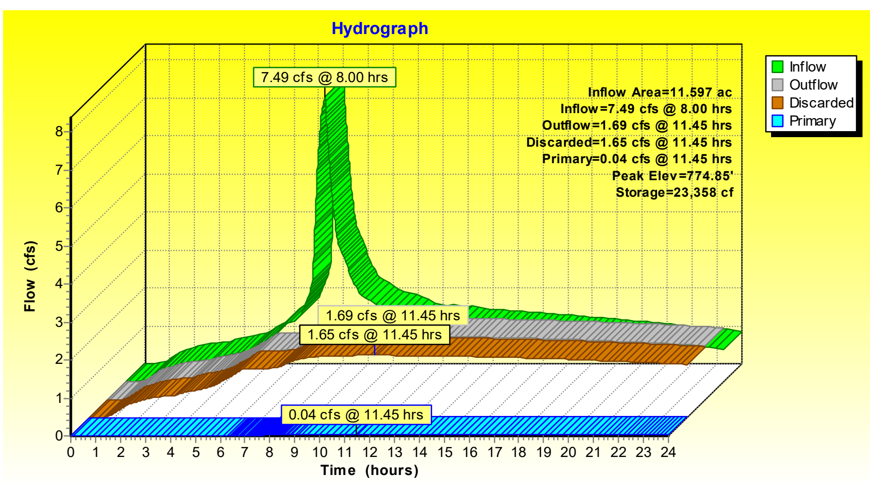
Volume	Invert	Avail.Storage	Storage Description
#1	773.00'	98,937 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
773.00	11,032	0	0
774.00	12,769	11,901	11,901
775.00	14,540	13,655	25,555
776.00	16,370	15,455	41,010
777.00	18,274	17,322	58,332
778.00	20,273	19,274	77,606
779.00	22,389	21,331	98,937

Device	Routing	Invert	Outlet Devices
#1	Primary	773.00'	**12.0" Round 12" Outlet** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 773.00' / 772.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	773.00'	**1.0" Horiz. 1" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	778.50'	**3.1' long 12" Overflow Riser** 2 End Contraction(s)
#4	Discarded	773.00'	**5.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.65 cfs @ 11.45 hrs HW=774.85' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 1.65 cfs)

Primary OutFlow Max=0.04 cfs @ 11.45 hrs HW=774.85' (Free Discharge)
└**1=12" Outlet** (Passes 0.04 cfs of 4.40 cfs potential flow)
 ├**2=1" Orifice** (Orifice Controls 0.04 cfs @ 6.54 fps)
 └**3=12" Overflow Riser** (Controls 0.00 cfs)



Per the above hydrograph, the total runoff generated by the post-developed conditions of the site is 1.69 cfs. Since the brown hydrograph represents the discarded infiltration outflow which will not be released, this value will be excluded from the total release rate for the 5-year, 24-hour storm of the post-developed conditions. Therefore, the primary outflow from the structure (blue hydrograph) shall be the value for the release rate of this storm. The primary release rate is 0.04 cfs.

10-YEAR STORM

Summary for Pond 6P: Basin 2 Detention Pond

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Inflow Area =      11.597 ac,  39.91% Impervious,  Inflow Depth >  3.13"   for  10-Year Storm event
Inflow      =       8.21 cfs @    8.00 hrs,  Volume=           3.028 af
Outflow     =       1.75 cfs @   11.66 hrs,  Volume=           2.732 af,  Atten= 79%,  Lag= 219.8 min
Discarded =         1.71 cfs @   11.66 hrs,  Volume=           2.684 af
Primary     =       0.04 cfs @   11.66 hrs,  Volume=           0.048 af
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Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 775.15' @ 11.66 hrs   Surf.Area= 14,813 sf   Storage= 27,747 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 109.2 min (833.4 - 724.2)

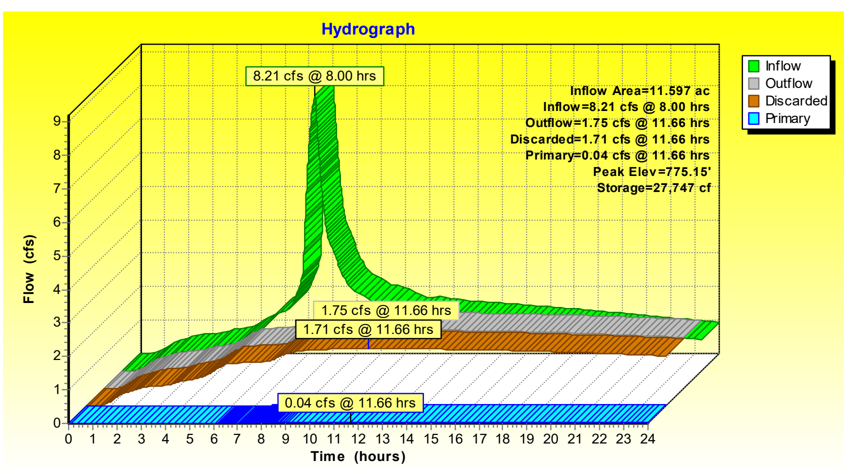
Volume	Invert	Avail.Storage	Storage Description
#1	773.00'	98,937 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
773.00	11,032	0	0
774.00	12,769	11,901	11,901
775.00	14,540	13,655	25,555
776.00	16,370	15,455	41,010
777.00	18,274	17,322	58,332
778.00	20,273	19,274	77,606
779.00	22,389	21,331	98,937

Device	Routing	Invert	Outlet Devices
#1	Primary	773.00'	**12.0" Round 12" Outlet** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 773.00' / 772.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	773.00'	**1.0" Horiz. 1" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	778.50'	**3.1' long 12" Overflow Riser** 2 End Contraction(s)
#4	Discarded	773.00'	**5.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.71 cfs @ 11.66 hrs HW=775.15' (Free Discharge)
└**4=Exfiltration** (Exfiltration Controls 1.71 cfs)

Primary OutFlow Max=0.04 cfs @ 11.66 hrs HW=775.15' (Free Discharge)
└**1=12" Outlet** (Passes 0.04 cfs of 4.86 cfs potential flow)
  ├**2=1" Orifice** (Orifice Controls 0.04 cfs @ 7.06 fps)
  └**3=12" Overflow Riser** (Controls 0.00 cfs)



Per the above hydrograph, the total runoff generated by the post-developed conditions of the site is 1.75 cfs. Since the brown hydrograph represents the discarded infiltration outflow which will not be released, this value will be excluded from the total release rate for the 10-year, 24-hour storm of the post-developed conditions. Therefore, the primary outflow from the structure (blue hydrograph) shall be the value for the release rate of this storm. The primary release rate is 0.04 cfs.

25-YEAR STORM

Summary for Pond 6P: Basin 2 Detention Pond

Inflow Area =	11.597 ac, 39.91% Impervious, Inflow Depth > 3.75" for 25-Year Storm event			
Inflow =	9.94 cfs @	8.00 hrs, Volume=	3.623 af	
Outflow =	1.91 cfs @	13.44 hrs, Volume=	3.023 af,	Atten= 81%, Lag= 326.7 min
Discarded =	1.87 cfs @	13.44 hrs, Volume=	2.965 af	
Primary =	0.04 cfs @	13.44 hrs, Volume=	0.059 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Peak Elev= 775.88' @ 13.44 hrs Surf.Area= 16,157 sf Storage= 39,115 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 115.2 min (835.1 - 719.8)

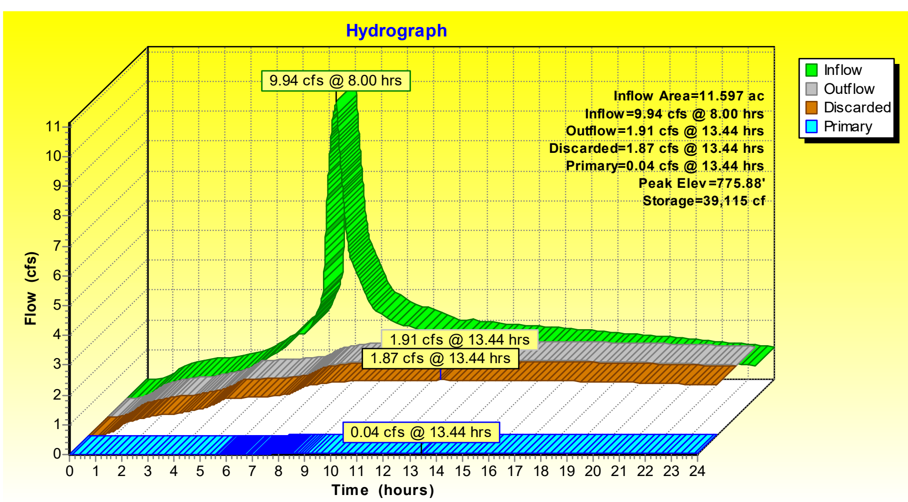
Volume	Invert	Avail.Storage	Storage Description
#1	773.00'	98,937 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
773.00	11,032	0	0
774.00	12,769	11,901	11,901
775.00	14,540	13,655	25,555
776.00	16,370	15,455	41,010
777.00	18,274	17,322	58,332
778.00	20,273	19,274	77,606
779.00	22,389	21,331	98,937

Device	Routing	Invert	Outlet Devices
#1	Primary	773.00'	**12.0" Round 12" Outlet** L= 50.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 773.00' / 772.50' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#2	Device 1	773.00'	**1.0" Horiz. 1" Orifice** C= 0.600 Limited to weir flow at low heads
#3	Device 1	778.50'	**3.1' long 12" Overflow Riser** 2 End Contraction(s)
#4	Discarded	773.00'	**5.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.87 cfs @ 13.44 hrs HW=775.88' (Free Discharge)
└─**4=Exfiltration** (Exfiltration Controls 1.87 cfs)

Primary OutFlow Max=0.04 cfs @ 13.44 hrs HW=775.88' (Free Discharge)
└─**1=12" Outlet** (Passes 0.04 cfs of 5.85 cfs potential flow)
  ├─**2=1" Orifice** (Orifice Controls 0.04 cfs @ 8.18 fps)
  └─**3=12" Overflow Riser** (Controls 0.00 cfs)



Per the above hydrograph, the total runoff generated by the post-developed conditions of the site is 1.91 cfs. Since the brown hydrograph represents the discarded infiltration outflow which will not be released, this value will be excluded from the total release rate for the 25-year, 24-hour storm of the post-developed conditions. Therefore, the primary outflow from the structure (blue hydrograph) shall be the value for the release rate of this storm. The primary release rate is 0.04 cfs.

<u>Basin 3:</u> The undisturbed areas around the drainageways will go directly to the drainageways undetained, yet will still be included in the calculations.

<u>2-YEAR STORM</u>

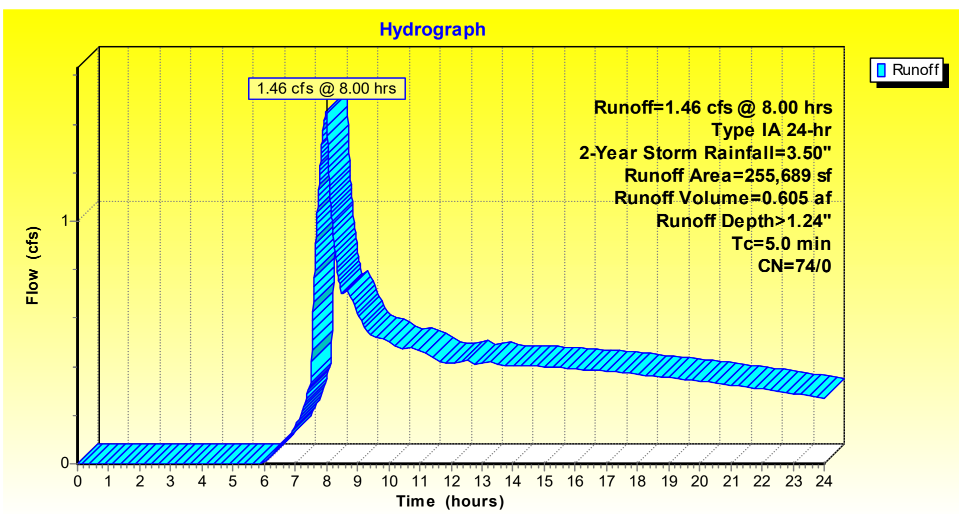
Summary for Subcatchment 5S: Post-Developed Conditions - Basin 3 (Undetained Existing Areas)

Runoff = 1.46 cfs @ 8.00 hrs, Volume= 0.605 af, Depth> 1.24"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 2-Year Storm Rainfall=3.50"

	Area (sf)	CN	Description
*	131,301	74	Undetained existing area draining to northwest drainageway
*	124,388	74	Undetained existing area draining to southerly drainageway
	255,689	74	Weighted Average
	255,689	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**



Per the above hydrograph, the total runoff generated by the pre/post-developed conditions of the undisturbed and undetained area is 1.46 cfs.

5-YEAR STORM

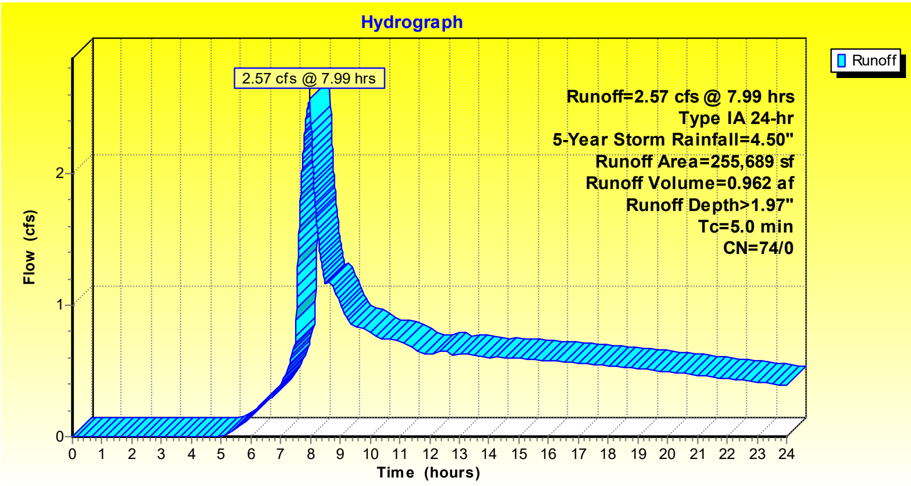
Summary for Subcatchment 5S: Post-Developed Conditions - Basin 3 (Undetained Existing Areas)

Runoff = 2.57 cfs @ 7.99 hrs, Volume= 0.962 af, Depth> 1.97"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 5-Year Storm Rainfall=4.50"

	Area (sf)	CN	Description
*	131,301	74	Undetained existing area draining to northwest drainageway
*	124,388	74	Undetained existing area draining to southerly drainageway
	255,689	74	Weighted Average
	255,689	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**



Per the above hydrograph, the total runoff generated by the pre/post-developed conditions of the undisturbed and undetained area is 2.57 cfs.

10-YEAR STORM

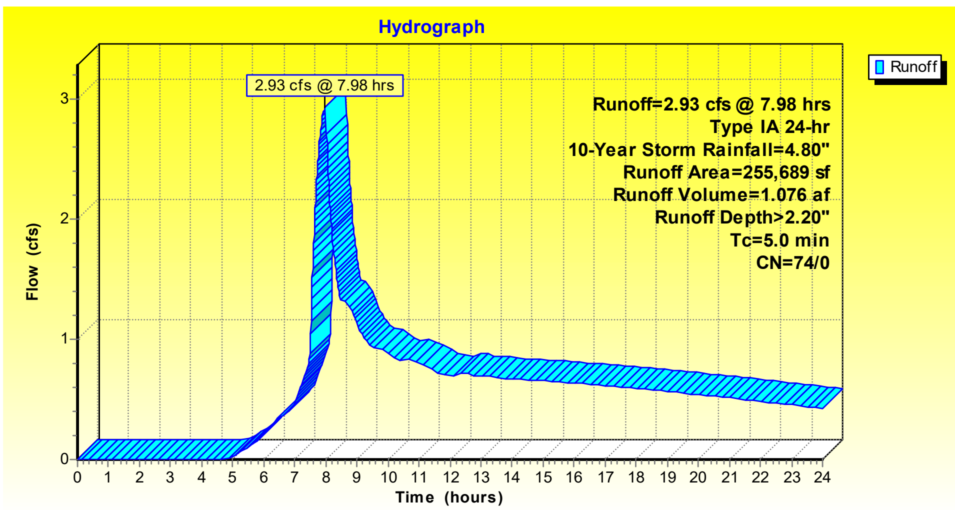
Summary for Subcatchment 5S: Post-Developed Conditions - Basin 3 (Undetained Existing Areas)

Runoff = 2.93 cfs @ 7.98 hrs, Volume= 1.076 af, Depth> 2.20"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 10-Year Storm Rainfall=4.80"

	Area (sf)	CN	Description
*	131,301	74	Undetained existing area draining to northwest drainageway
*	124,388	74	Undetained existing area draining to southerly drainageway
	255,689	74	Weighted Average
	255,689	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**



Per the above hydrograph, the total runoff generated by the pre/post-developed conditions of the undisturbed and undetained area is 2.93 cfs.

25-YEAR STORM

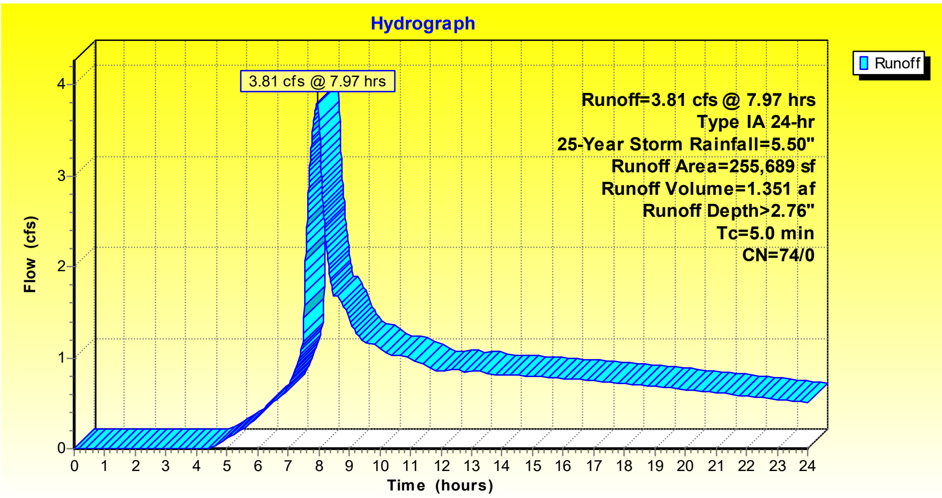
Summary for Subcatchment 5S: Post-Developed Conditions - Basin 3 (Undetained Existing Areas)

Runoff = 3.81 cfs @ 7.97 hrs, Volume= 1.351 af, Depth> 2.76"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 25-Year Storm Rainfall=5.50"

	Area (sf)	CN	Description
*	131,301	74	Undetained existing area draining to northwest drainageway
*	124,388	74	Undetained existing area draining to southerly drainageway
	255,689	74	Weighted Average
	255,689	74	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, Direct Entry**



Per the above hydrograph, the total runoff generated by the pre/post-developed conditions of the undisturbed and undetained area is 3.81 cfs.

SUMMARY OF POST-DEVELOPMENT PEAK FLOW FOR EACH BASIN:

Basin	2-YEAR	5-YEAR	10-YEAR	25-YEAR
1	0.01	0.02	0.03	0.04
2	0.03	0.04	0.04	0.04
3	1.46	2.57	2.93	3.81

SUMMARY: PRE-DEVELOPMENT PEAK FLOW vs. POST DEVELOPMENT PEAK FLOW:

STORM	PRE-DEVELOPMENT	POST-DEVELOPMENT
2-YEAR STORM	**Q = 2.15 cfs**	**Q = 1.50 cfs**
5-YEAR STORM	**Q = 4.49 cfs**	**Q = 2.63 cfs**
10-YEAR STORM	**Q = 5.28 cfs**	**Q = 3.00 cfs**
25-YEAR STORM	**Q = 7.23 cfs**	**Q = 3.89 cfs**

All Post Development peak flows are at or below pre-development peak flow rates ✓

The detention requirements for City of Sandy have been met ✓

City of Sandy Water Quality Requirements:

As mentioned earlier in this report, City of Sandy Municipal Stormwater Standards require all developments to treat 80 percent of the average annual volume of storm water runoff for the site. This standard can be met by installing storm water quality treatment facilities to satisfy the following design criteria:

A. Detention based storm water quality control: The required design volume for detention-based control is equal to the entire runoff volume that would occur from a site with a 1.2–inch, 12-hour storm. The draw-down time for the entire volume must be greater than or equal to 48 hours. For the lower half of the detention volume, the drawdown time must be greater than 36 hours. Additional design criteria for inlet and outlet spacing and design, as well as guidelines for calculating volumes, are contained in the Public Works Department Standards.
B. Flow-through based storm water quality control: the required design flow rate for treatment is the runoff that would be produced from a rainfall intensity of 0.2 inches/hour for on-line facilities, and 0.11 inches/hour for off-line facilities. This rate must be maintainable for a minimum of three hours. Additional design criteria for flow calculation, as well as specific treatment criteria for various types of storm water facilities (e.g., infiltration and storm water filters), are contained in the Public Works Standards.
C. Combination detention based on flow-through based storm water quality control: Detention facilities may be combined with flow-through facilities. The applicant must demonstrate that the combined system could sufficiently treat storm water runoff for the runoff produced by the flow-through treatment rates of 0.2 inches/hour (on-line facilities), occurring for a three-hour period.

Per City of Sandy Municipal Code standards, the following flow-through based storm water quality control design rates are to be used: The required design flow rate for treatment is the runoff that would be produced from a rainfall intensity of 0.2 inches/hour for on-line facilities, and 0.11 inches/hour for off-line facilities. This rate must be maintainable for a minimum of three hours. Additional design criteria for flow calculation, as well as specific treatment criteria for various types of storm water facilities (e.g., infiltration and storm water filters), are contained in the Public Works Standards.

Basin 1:

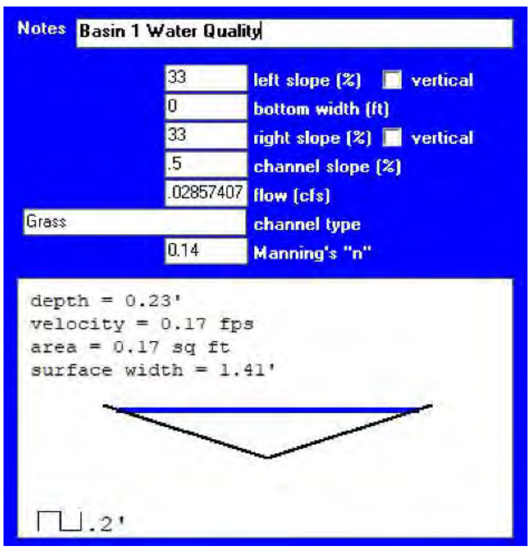
Basin 1 will utilize a water quality swale within the detention pond to the northwest corner of the site to meet the water quality requirements. The water quality swale will be a 6-foot wide x 144-foot long swale, at 0.5% slope, having 3:1 side slopes. Per ODOT hydraulics manual the Manning’s n for a depth of flow up to 0.70 feet and a fair stand of grass in a maintained channel is 0.14 maximum.

The required design flow rate for treatment is the runoff that would be produced from a rainfall intensity of 0.20 inches/hour for 3 hours.

$$\text{Water Quality Flow (cfs)} = \frac{0.60\ \text{(in.)} \times \text{Area (sq.ft.)}}{12\text{(in/ft)}(3\ \text{hr})(60\ \text{min/hr})(60\ \text{sec/min})}$$

$$\text{Water Quality Flow (cfs)} = \frac{0.60\ \text{(in)} \times (0.1417\ \text{Acres})(43{,}560\ \text{sf/Ac})}{12\text{(in/ft)}(3\ \text{hr})(60\ \text{min/hr})(60\ \text{sec/min})}$$

Water Quality Flow (cfs) = 0.03 cfs



Velocity is 0.17 feet per second. Therefore, the residence time in a 144-foot-long swale would be:

$$\frac{144\ \text{feet}}{0.17\ \text{feet/sec}} = 847\ \text{seconds} = \underline{\mathbf{14.12\ minutes}}$$

Since the City of Sandy references the City of Portland BES manual, a 9 minute residence time is the threshold for achieving water quality through a grassy swale. Therefore, the facility meets City of Sandy requirements for flow-through based storm water quality control. ✓

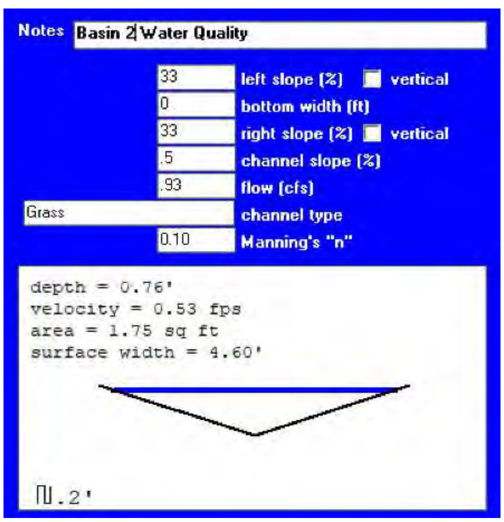
Basin 2:
Basin 2 will utilize a water quality swale within the detention pond to the southwest corner of the site to meet the water quality requirements. The water quality swale will consist of three 10-foot wide x 135-foot long swales, at 0.5% slope, having 3:1 side slopes. Per ODOT hydraulics manual the Manning's n for a depth of flow up between 0.70 feet and 1.50 feet and a fair stand of grass in a maintained channel is 0.10 maximum.

The required design flow rate for treatment is the runoff that would be produced from a rainfall intensity of 0.20 inches/hour for 3 hours.

$$\text{Water Quality Flow (cfs)} = \frac{0.60\text{ (in.) x Area (sq.ft.)}}{12\text{(in/ft)(3 hr)(60 min/hr)(60 sec/min)}}$$

$$\text{Water Quality Flow (cfs)} = \frac{0.60\text{ (in) x (4.63 Acres)(43,560 sf/Ac)}}{12\text{(in/ft)(3 hr)(60 min/hr)(60 sec/min)}}$$

Water Quality Flow (cfs) = 0.93 cfs



Velocity is 0.53 feet per second. Therefore, the residence time in a 135-foot-long swale would be:

$$\frac{135\text{ feet}}{0.53\text{ feet/sec}} = 255\text{ seconds} = 4.25\text{ minutes}$$

Since there are three, parallel swales of roughly the same dimensions, the residence time can be multiplied by three to yield a total residence time of **<u>12.75 minutes.</u>**

Since the City of Sandy references the City of Portland BES manual, a 9 minute residence time is the threshold for achieving water quality through a grassy swale. Therefore, the facility meets City of Sandy requirements for flow-through based storm water quality control. ✓

Conclusion/Summary:

This report demonstrates compliance with the storm water requirements of the City of Sandy.

Detention:
City of Sandy has detention requirements for storm events ranging from the 2-year storm through the 25-year storm.

This report has used the HydroCAD to demonstrate that all storms between the 2-year storm event and the 25-year storm event will release at or below pre-development release levels.

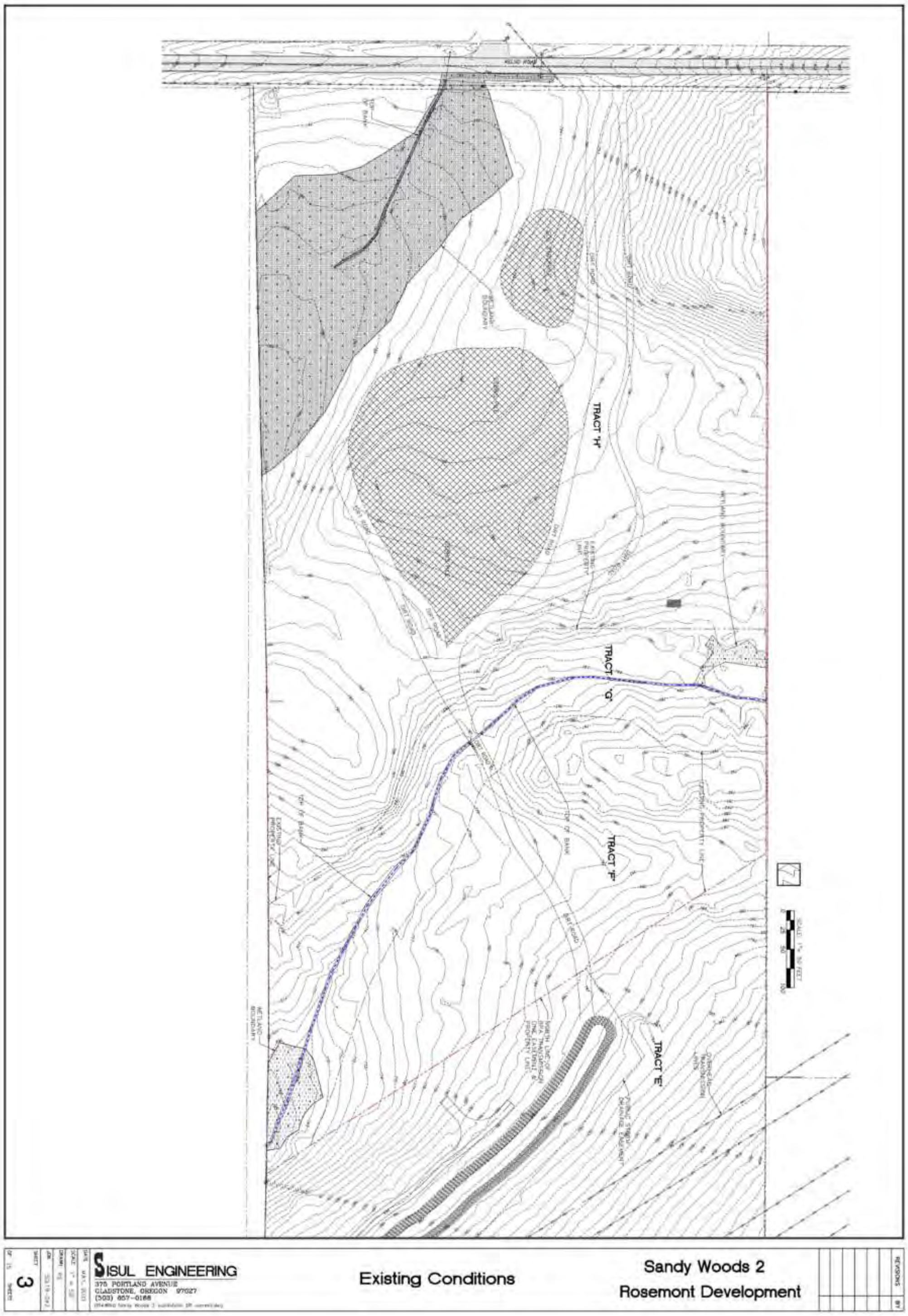
HydroCAD was used because the rainfall rates for Sandy cannot be modeled using City of Portland's PAC calculator or the Western Washington Model.

Water Quality Treatment:
The City of Sandy has detention requirements to treat 80% of total annual runoff through either a) detention based water quality treatment, b) flow through based water quality treatment, or c) a combination of detention based and flow through based water quality treatment.

This report has demonstrated that using a water quality swale in the bottom of each detention pond, the water quality treatment will meet City of Sandy's for water quality treatment.

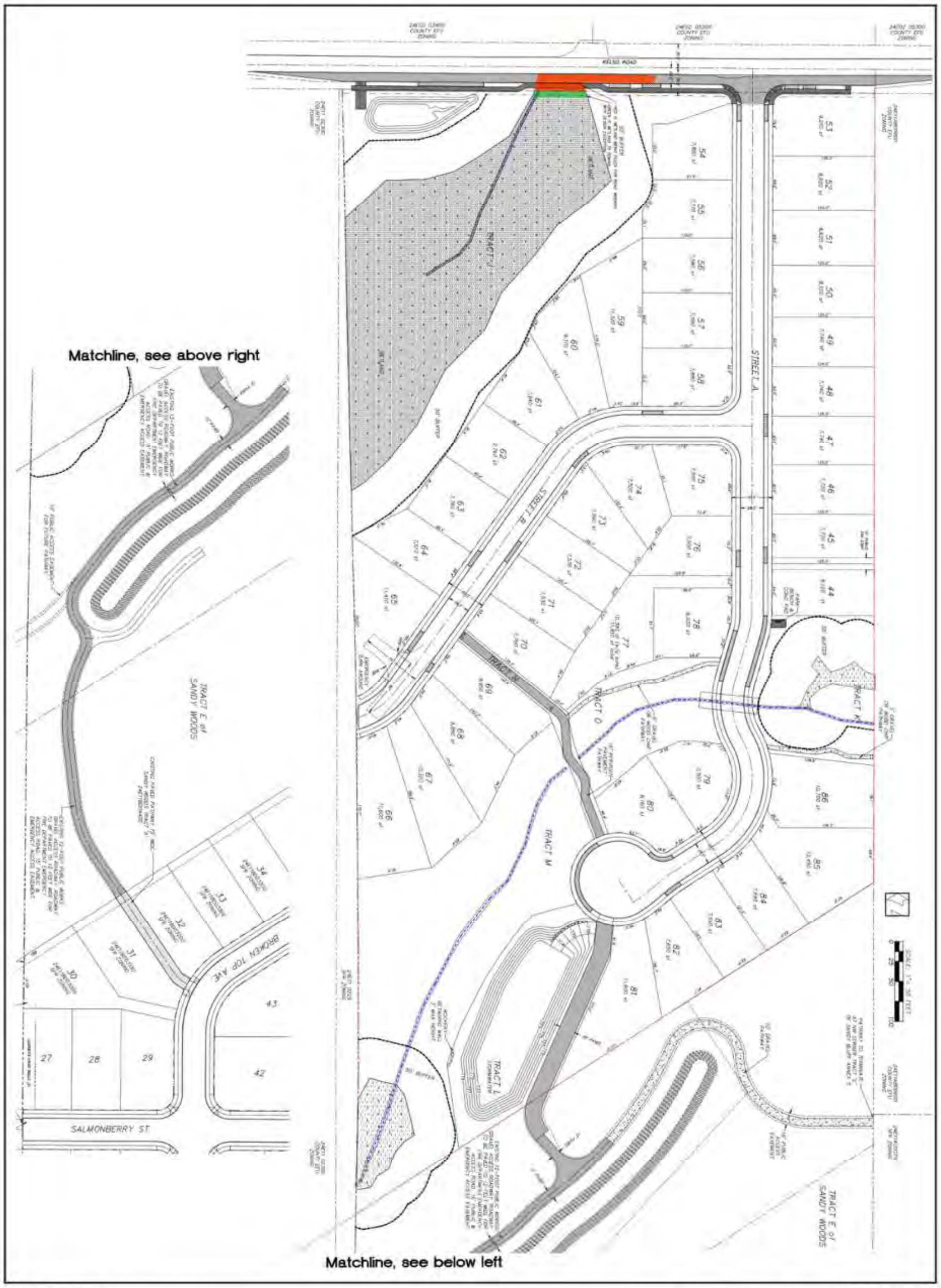
Appendix A:

Pre-Development Site Drainage Map


TRACT 'H'
TRACT 'G'
TRACT 'F'
TRACT 'E'
SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188
Existing Conditions
Sandy Woods 2
Rosemont Development
3
REVISIONS
BY

Appendix B:

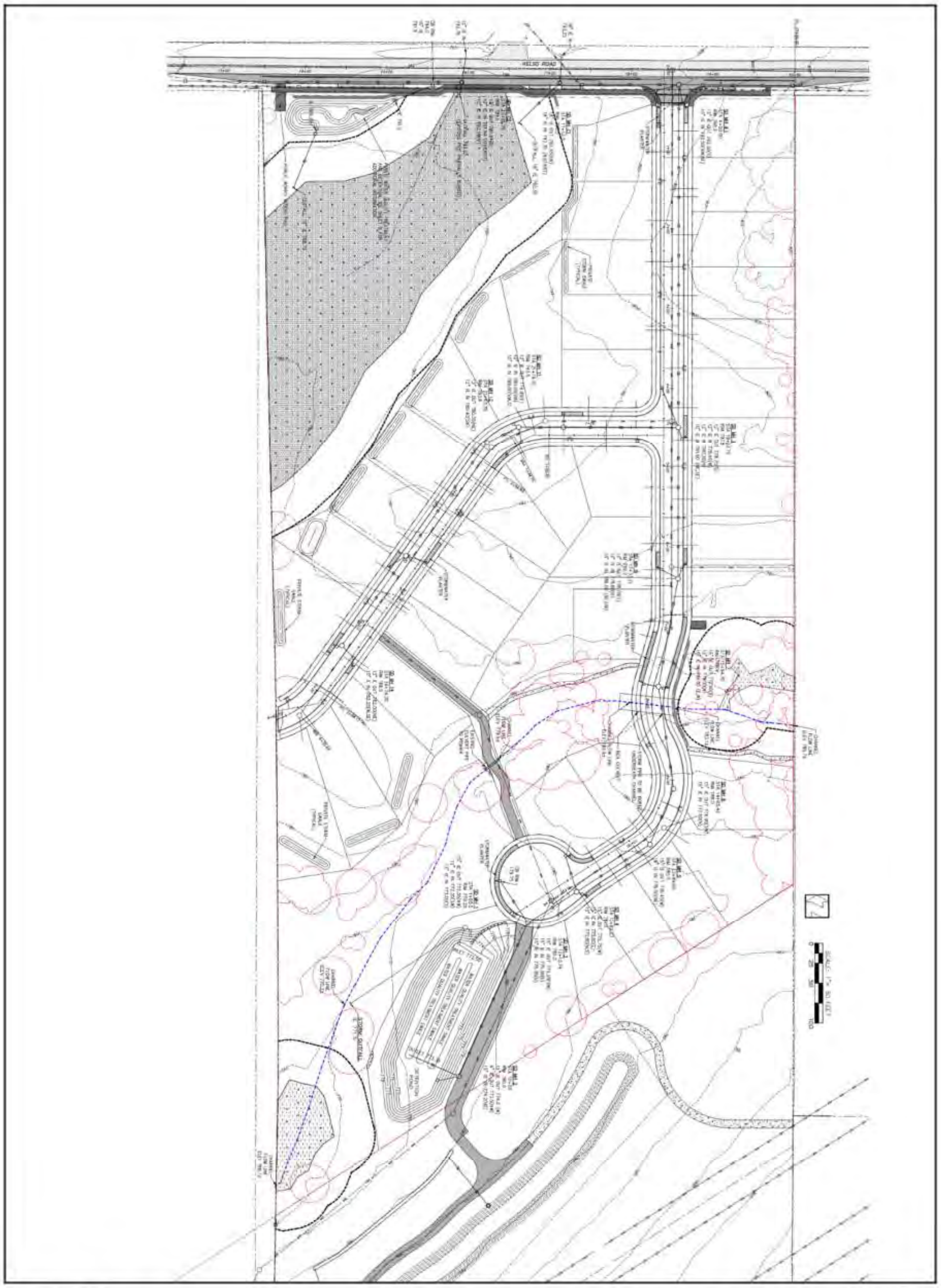
Development Plans



SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

Site Plan

Sandy Woods 2
Rosemont Development



SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

Storm Drain Plan

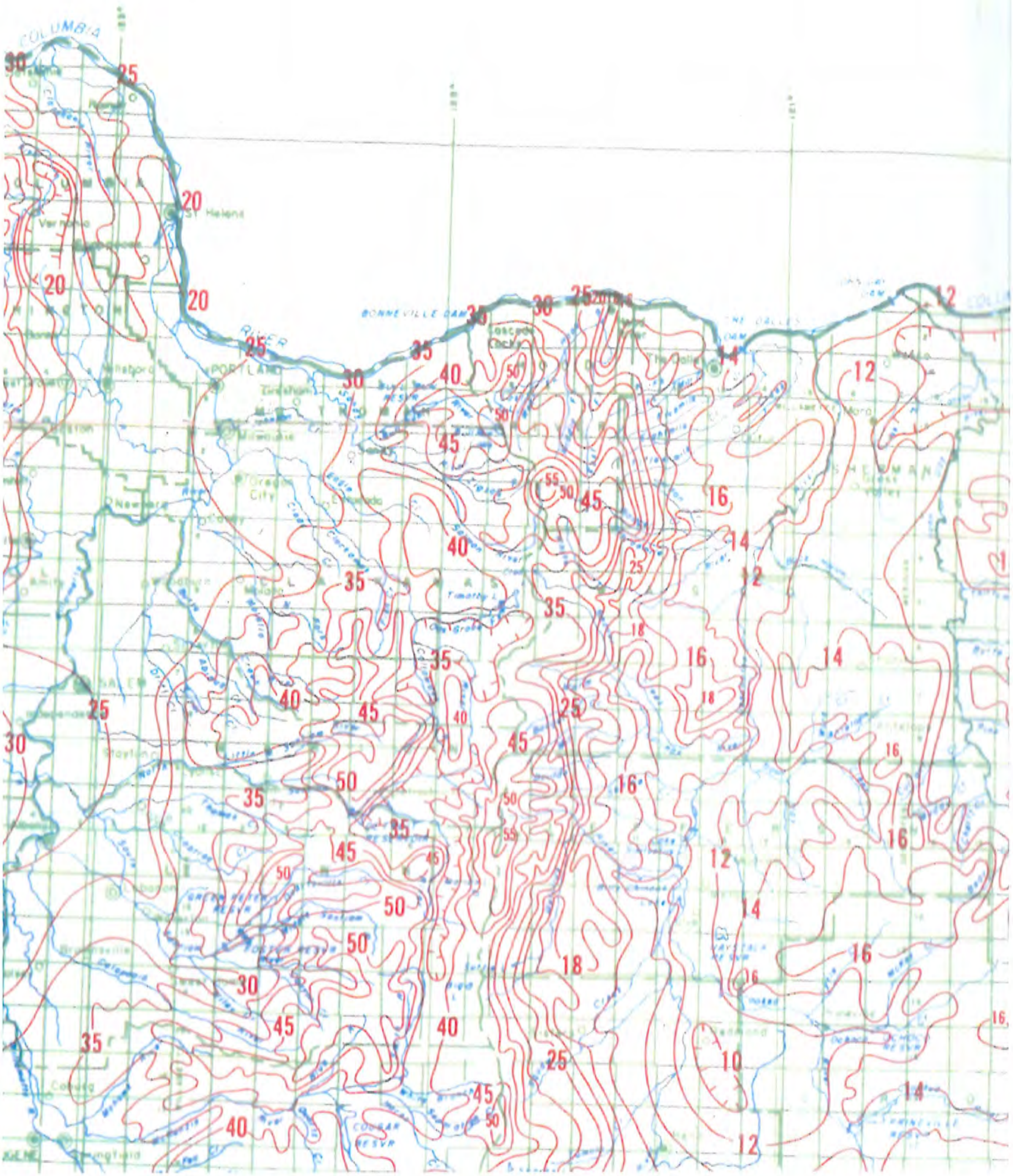
Sandy Woods 2
Rosemont Development

SHEET 8

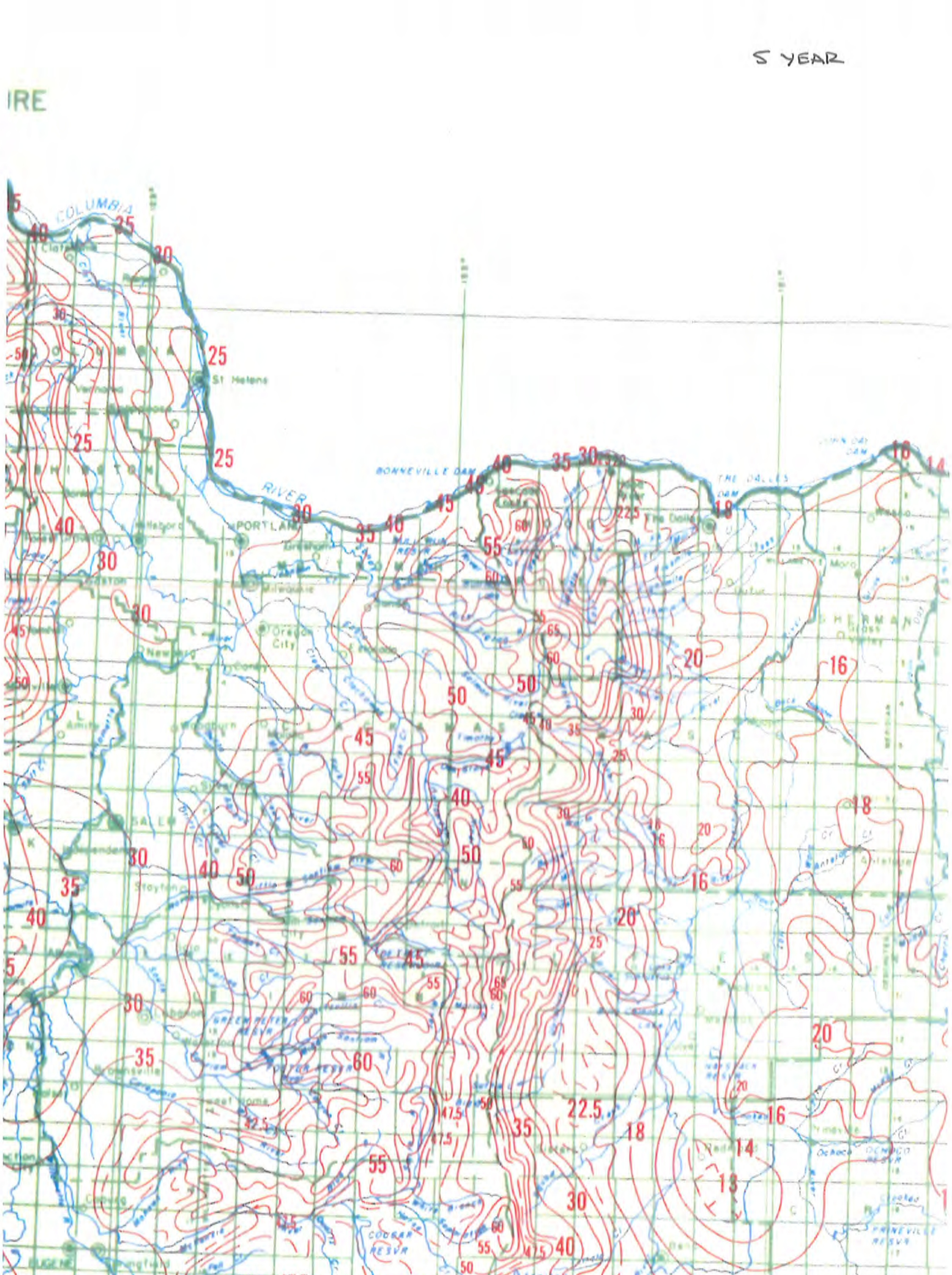
Appendix C:

Isopluvials for 24-HR Precipitation

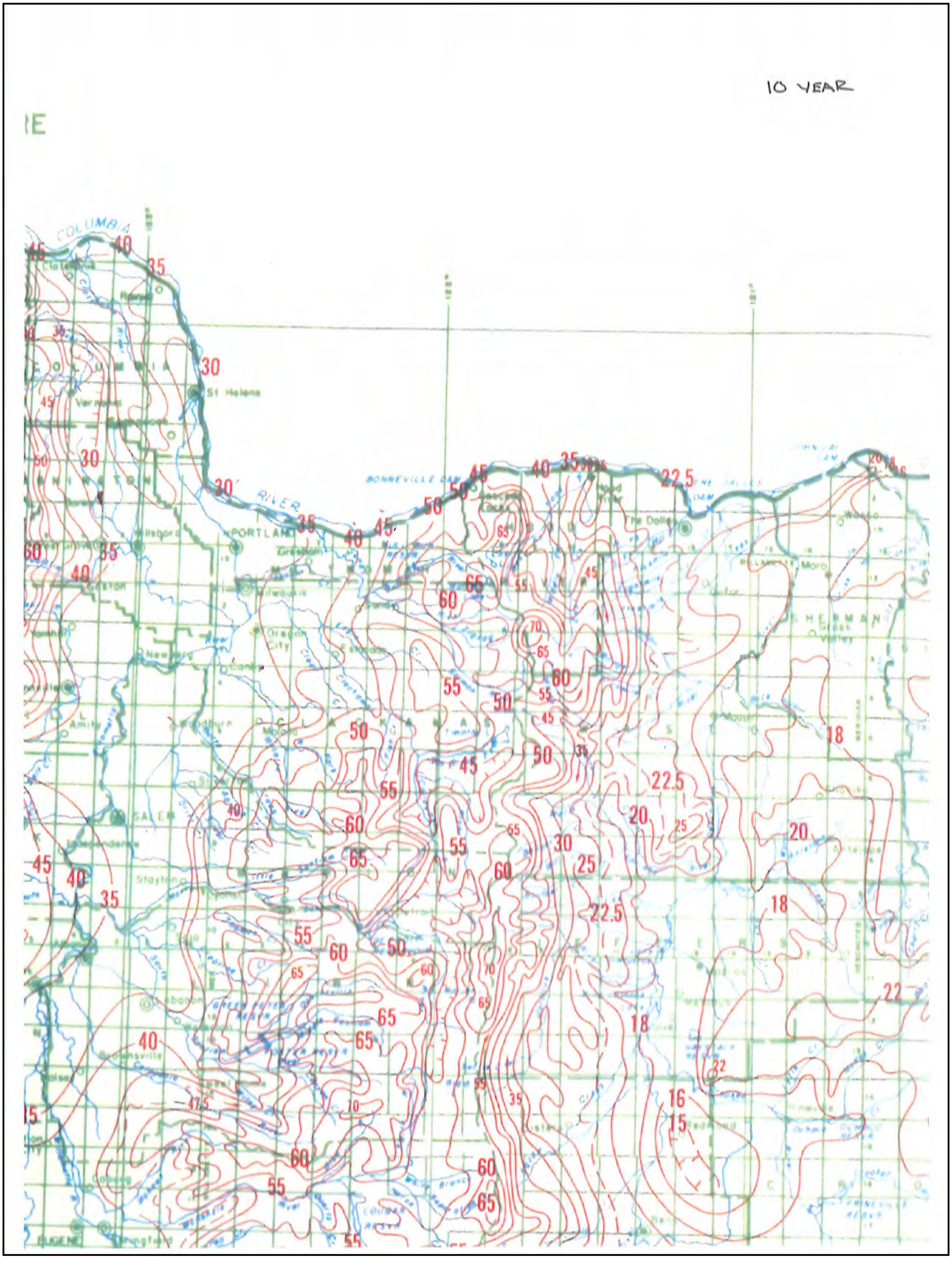
2 YEAR

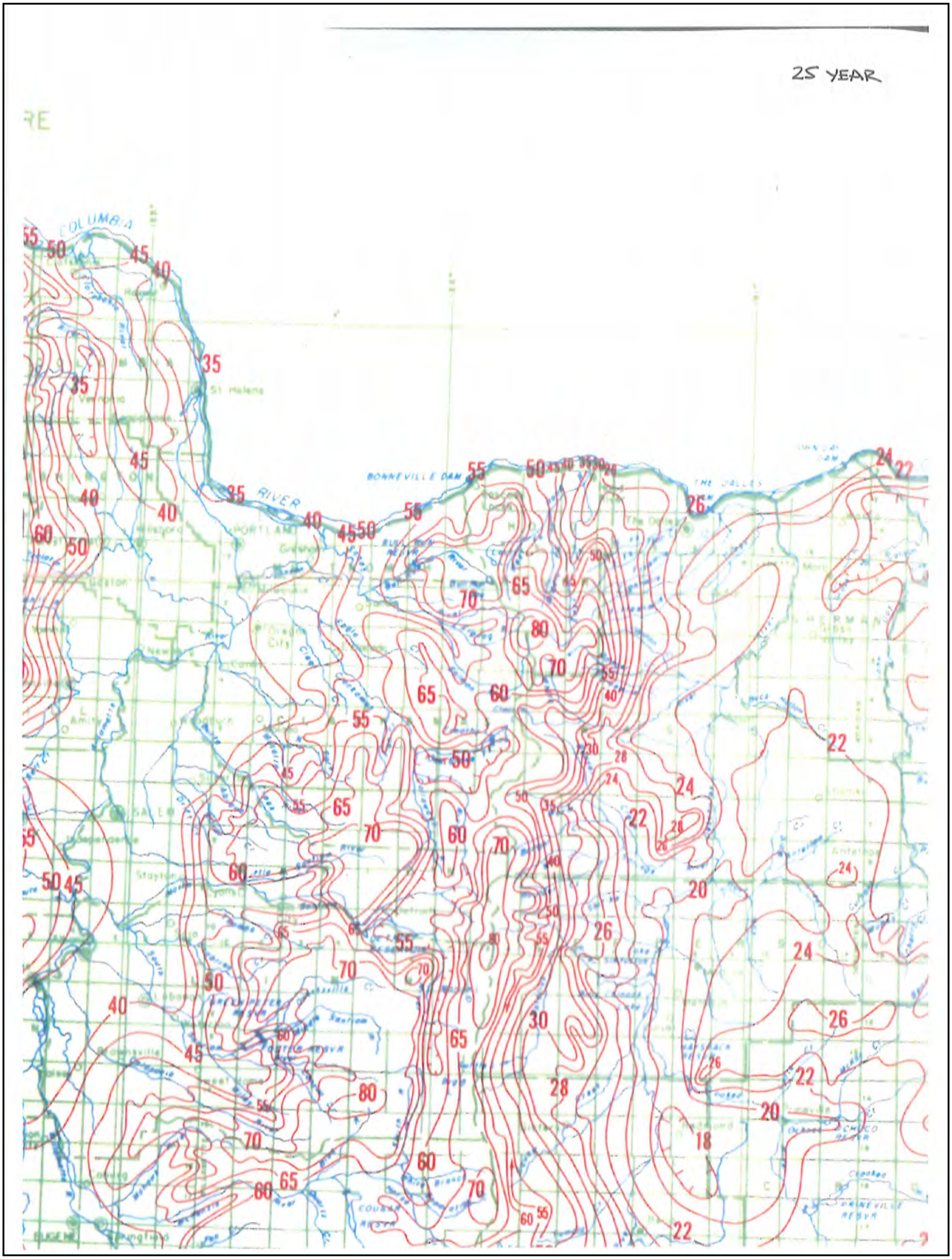

COLUMBIA
RIVER
St Helens
PORTLAND
Gresham
Milwaukie
Oregon City
BONNEVILLE DAM
Cascade Locks
The Dalles
Moro
SHERMAN
Timothy L
SALEM
Antelope
Brownsville
Springfield
COUGAR RESVR
Redmond
30
25
20
35
40
45
50
55
16
14
12
18
10

5 YEAR


IRE
COLUMBIA
RIVER
St Helens
PORTLAND
BONNEVILLE DAM
THE DALLES DAM
JOHN DAY DAM
Oregon City
SALEM
GREEN PETER RESVR
COUGAR RESVR
OCHOCO RESVR
PRINEVILLE RESVR
EUGENE

10 YEAR


COLUMBIA
RIVER
St Helens
PORTLAND
BONNEVILLE DAM
SHERMAN
SALEM
EUGENE


25 YEAR
COLUMBIA
RIVER
St Helens
BONNEVILLE DAM
PORTLAND
THE DALLES
Oregon City
SALEM
Stayton
EUGENE
COUGAR RESVR
OCHOCO RESVR
PRINEVILLE RESVR

Appendix D:

Soil Testing

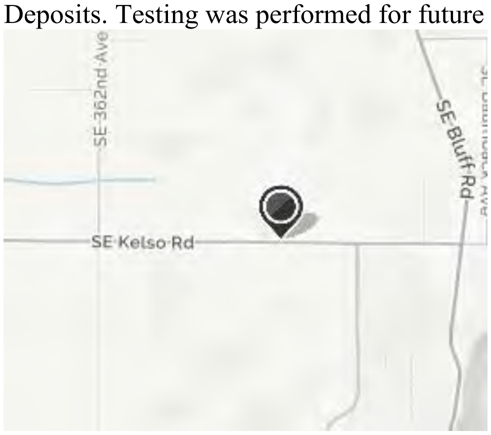
Patrick Sisul, PE
Sisul Engineering
503-657-0188
patsisul@sisulengineering.com

1 July 2020

Re: Infiltration testing at 37090 Se Kelso, Boring, OR

Dear Mr. Sisul,

Field Investigation:
Rapid Soil Solutions (RSS) has performed eight (8) infiltration tests at the above-mentioned site. Soils found on site match those in below soils map by the USGS as fine grained Missoula Flood Deposits. Testing was performed for future storm water design.



Infiltration Testing:
Infiltration testing was performed as per the Clackamas County Storm water standards. Testing took place in sleeved hand augur holes and open test pits due to the shallow depth of testing requested. The test was run a total of three times. See table below that summarizes depths and rates. See attached infiltration sheet that shows pre-soak amounts and test durations.

Hole #	Depth (ft)	Rate (in/hr)
1	0.5	3
2	1	6
3	1.5	5.5
4	0.5	3
5	1	5.5
6	1.5	6
7	3	20
8	4	20

Rapid Soil Solutions INC 503-816-3689 mia@rapidsoilsolutions.com

Depth to Ground Water
Ground water not encountered. Using the USGS maps, for depth of ground water in the Portland Metro area then depth is estimated to 20ft below grade depending on the location on the site.

Recommendations
RSS does recommend an infiltration at various depths across the site.

The analysis, conclusions and recommendations contained in this report are based on site conditions as they existed at the time of explorations. Any questions regarding this report please contact me at the below number or email.

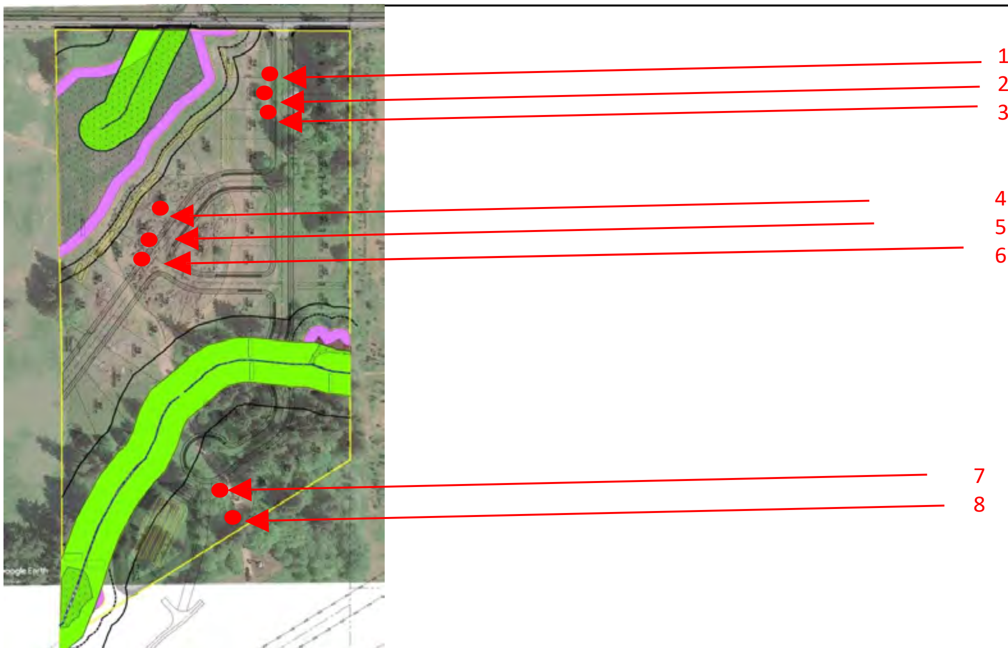
Sincerely,

REGISTERED PROFESSIONAL ENGINEER
19244PE
OREGON
JULY 15, 1997
MIA C. MAHEDY
EXPIRES: 12-31-2020

Mia Mahedy, PE GE.

Rapid Soil Solutions INC 503-816-3689 mia@rapidsoilsolutions.com

Rapid Soil Solutions Infiltration Test Results



Preliminary Information		
Location:	37090 SE Kelso Road, Boring	**Tester's Name** : Wilton A. Roberts, PE, retired, supervised by Mia Mahedy, PE, GE **Tester's Company**: Rapid Soil Solutions

HA #1

Soil Profile Detail

Depth (ft)	Description
0-0.3ft	Topsoil
0.3-0.5ft	Dry to damp, dark reddish brown, medium grained, clayey SILT
No water found	

Presaturatlon Start Time : 6/30/20 9:30 6”. Empty @11:34. Refilled to 6”. 3”@12:48. Refilled to 6”.
Presaturatlon End Time: 6/30/20 13:30, 2.5”.

Date & Time:	6/30/2020 9:30	**Instrument Used:**	4" hand auger
Weather:	Cloudy, 62 deg.	**Depth:**	6”

Time	Measurement (inches)	Level Refilled To (inches)	Rate (inches/hour)
13:30	2.5		
14:00	1.0	6.00	3.0
14:30	4.5		3.0
15:00	3.0		3.0
15:30	1.5	6.00	3.0
16:00	4.5		3.0
16:30	3.0		3.0
Infiltration rate at this test site			3.0

Rapid Soil Solutions Infiltration Test Results

HA #2			
Soil Profile Detail			
Depth (ft)	**Description**		
0-0.3ft	Topsoil		
0.3-1.2ft	Dry to damp, dark reddish brown, medium grained, clayey SILT		
No water found			
Presaturatlon Start Time : 6/30/20 9:30 12”. Empty @ 11:34. Refilled to 12”. 3.5”@12:48. Refilled to 12”. Presaturatlon End Time: 6/30/20 13:30, 5.25”.			
Date & Time:	6/30/2020 9:30	**Instrument Used:**	4" hand auger
Weather:	Cloudy, 62 deg.	**Depth:**	12”
Time	**Measurement (inches)**	**Level Refilled To (inches)**	**Rate (inches/hour)**
13:30	5.3		
14:00	1.8	12.00	7.0
14:30	9.0		6.0
15:00	5.5		7.0
15:30	2.0	12.00	7.0
16:00	8.5		7.0
16:30	5.0		7.0
Infiltration rate at this test site			6.0

HA #3			
Soil Profile Detail			
Depth (ft)	**Description**		
0-0.3ft	Topsoil		
0.3-1.5ft	Dry to damp, dark reddish brown, medium grained, clayey SILT		
No water found			
Presaturatlon Start Time : 6/30/20 9:30 12”. Empty @11:34. Refilled to 18”. 6”@12:48. Refilled to18”. Presaturatlon End Time: 6/30/20 13:30, 8”.			
Date & Time:	6/30/2020 9:30	**Instrument Used:**	4" hand auger
Weather:	Cloudy, 62 deg.	**Depth:**	18”
Time	**Measurement (inches)**	**Level Refilled To (inches)**	**Rate (inches/hour)**
13:30	8.0		
14:00	5.3	18.00	5.5
14:30	15.0		6.0
15:00	12.0		6.0
15:30	9.0		6.0
16:00	6.0	18.00	6.0
16:30	14.8		6.5
Infiltration rate at this test site			5.5

Rapid Soil Solutions Infiltration Test Results

HA #4			
Soil Profile Detail			
Depth (ft)	**Description**		
0-0.3ft	Topsoil		
0.3-0.5ft	Dry to damp, dark reddish brown, medium grained, clayey SILT		
No water found			
Presaturatlon Start Time : 6/30/20 9:30 6”. Empty @11:34. Refilled to 6”. 1”@12:42. Refilled to 6”. Presaturatlon End Time: 6/30/20 13:30 3”.			
Date & Time:	6/30/2020 9:30	**Instrument Used:**	4" hand auger
Weather:	Cloudy, 62 deg.	**Depth:**	6”
Time	**Measurement (inches)**	**Level Refilled To (inches)**	**Rate (inches/hour)**
13:30	3.0		
14:00	1.3	6.00	3.5
14:30	4.5		3.0
15:00	3.0		3.0
15:30	1.5	6.00	3.0
16:00	4.5		3.0
16:30	3.0		3.0
Infiltration rate at this test site			3.0

HA #5			
Soil Profile Detail			
Depth (ft)	**Description**		
0-0.3ft	Topsoil		
0.3-1.2ft	Dry to damp, dark reddish brown, medium grained, clayey SILT		
No water found			
Presaturatlon Start Time : 6/30/20 9:30 12”. Empty @ 11:34. Refilled to 12”. Presaturatlon End Time: 6/30/20 13:30, 4.75”.			
Date & Time:	6/30/2020 9:30	**Instrument Used:**	4" hand auger
Weather:	Cloudy, 62 deg.	**Depth:**	12”
Time	**Measurement (inches)**	**Level Refilled To (inches)**	**Rate (inches/hour)**
13:30	4.8		
14:00	2.0	12.00	5.5
14:30	8.8		6.5
15:00	6.0		5.5
15:30	3.0	12.00	6.0
16:00	8.8		6.5
16:30	5.5		6.5
Infiltration rate at this test site			5.5

503-816-3689 mia@rapidsoilsolutions.com

Rapid Soil Solutions Infiltration Test Results

HA #6			
Soil Profile Detail			
Depth (ft)	**Description**		
0-0.3ft	Topsoil		
0.3-1.5ft	Dry to damp, dark reddish brown, medium grained, clayey SILT		
No water found			
Presaturatlon Start Time : 6/30/20 9:30 12”. Empty @11:34. Refilled to 18”. Presaturatlon End Time: 6/30/20 13:30, 7.75”.			
Date & Time:	6/30/2020 9:30	**Instrument Used:**	4" hand auger
Weather:	Cloudy, 62 deg.	**Depth:**	18”
Time	**Measurement (inches)**	**Level Refilled To (inches)**	**Rate (inches/hour)**
13:30	7.8		
14:00	4.8	18.00	6.0
14:30	14.8		6.5
15:00	11.5		6.5
15:30	8.5	18.00	6.0
16:00	14.8		6.5
16:30	11.5		6.5
Infiltration rate at this test site			6.0

HA #7			
Soil Profile Detail			
Depth (ft)	**Description**		
0-0.3ft	Topsoil		
0.3-3.0ft	Dry to damp, dark reddish brown, medium grained, clayey SILT		
No water found			
Presaturatlon Start Time : 6/30/20 9:30 12”. Empty @ 11:15. Refilled to 12”. Empty @11:35. Refilled to 12”. Empty at 12:55. Presaturatlon End Time: 6/30/20 12:55 Use 20”/hr. For design.			
Date & Time:	6/30/2020 9:30	**Instrument Used:**	4" hand auger
Weather:	Cloudy, 62 deg.	**Depth:**	4’
Time	**Measurement (inches)**	**Level Refilled To (inches)**	**Rate (inches/hour)**
Infiltration rate at this test site			20.0

HA #8			
Soil Profile Detail			
Depth (ft)	**Description**		
0-0.3ft	Topsoil		
0.3-4ft	Dry to damp, dark reddish brown, medium grained, clayey SILT		
No water found			
Presaturatlon Start Time : 6/30/20 9:30 12”. Empty @ 11:15. Refilled to 12”. Empty @11:35. Refilled to 12”. Empty at 12:55. Presaturatlon End Time: 6/30/20 12:55 Use 20”/hr. For design.			
Date & Time:	6/30/2020 9:30	**Instrument Used:**	4" hand auger
Weather:	Cloudy, 62 deg.	**Depth:**	3’
Time	**Measurement (inches)**	**Level Refilled To (inches)**	**Rate (inches/hour)**
Infiltration rate at this test site			20.0

503-816-3689 mia@rapidsoilsolutions.com

Appendix E:

Curve Number Tables

Table 4B-2 Runoff curve numbers for selected agricultural, suburban, and rural areas (western Washington).

	CNs for hydrologic soil group			
Cover Type and Hydrologic Condition	A	B	C	D
Curve Numbers for Predevelopment Conditions				
Pasture, Grassland, or Range – Continuous Forage for Grazing:				
Fair condition (ground cover 50% to 75% and not heavily grazed)	49	69	79	84
Good condition (ground cover >75% and lightly or only occasionally grazed)	39	61	74	80
Woods:				
Fair (woods are grazed but not burned, and some forest litter covers the soil)	36	60	73	79
Good (woods are protected from grazing, and litter and brush adequately cover the soil)	30	55	70	77
Curve Numbers for Postdevelopment Conditions				
Open Space (lawns, parks, golf courses, cemeteries, landscaping, etc.):[1]				
Fair condition (grass cover on 50% to 75% of the area)	77	85	90	92
Good condition (grass cover on >75% of the area)	68	80	86	90
Impervious Areas:				
Open water bodies: lakes, wetlands, ponds, etc.	100	100	100	100
Paved parking lots, roofs,[2] driveways, etc. (excluding right of way)	98	98	98	98
Porous Pavers and Permeable Interlocking Concrete (assumed as 85% impervious and 15% lawn):				
Fair lawn condition (weighted average CNs)	95	96	97	97
Good lawn condition (weighted average CNs)	94	95	96	97
Paved	98	98	98	98
Gravel (including right of way)	76	85	89	91
Dirt (including right of way)	72	82	87	89
Pasture, Grassland, or Range – Continuous Forage for Grazing:				
Poor condition (ground cover <50% or heavily grazed with no mulch)	68	79	86	89
Fair condition (ground cover 50% to 75% and not heavily grazed)	49	69	79	84
Good condition (ground cover >75% and lightly or only occasionally grazed)	39	61	74	80
Woods:				
Poor (forest litter, small trees, and brush are destroyed by heavy grazing or regular burning)	45	66	77	83
Fair (woods are grazed but not burned, and some forest litter covers the soil)	36	60	73	79
Good (woods are protected from grazing, and litter and brush adequately cover the soil)	30	55	70	77

Single Family Residential:[3] Dwelling Unit/Gross Acre	Should only be used for subdivisions >50 acres	Average percent impervious area[3][4]	
1.0 DU/GA		15	Separate curve number
1.5 DU/GA		20	must be selected for
2.0 DU/GA		25	pervious & impervious
2.5 DU/GA		30	portions of the site or
3.0 DU/GA		34	basin
3.5 DU/GA		38	
4.0 DU/GA		42	
4.5 DU/GA		46	
5.0 DU/GA		48	
5.5 DU/GA		50	
6.0 DU/GA		52	
6.5 DU/GA		54	
7.0 DU/GA		56	
7.5 DU/GA		58	
PUDs, condos, apartments, commercial businesses, industrial areas, and subdivisions <50 acres	% impervious must be computed	Separate curve numbers must be selected for pervious and impervious portions of the site	

For a more detailed and complete description of land use curve numbers, refer to Chapter Two (2) of the Soil Conservation Service's Technical Release No. 55 (210-VI-TR-55, Second Ed., June 1986).

[1] Composite CNs may be computed for other combinations of open space cover type.

[2] Where roof runoff and driveway runoff are infiltrated or dispersed according to the requirements in Chapter 3, the average percent impervious area may be adjusted in accordance with the procedure described under "Flow Credit for Roof Downspout Infiltration" and "Flow Credit for Roof Downspout Dispersion."

[3] Assumes roof and driveway runoff is directed into street/storm system.

[4] All remaining pervious area (lawn) is considered to be in good condition for these curve numbers.

Table 4B-5 "n" and "k" values used in time calculations for hydrographs.

"n_s" Sheet Flow Equation Manning's Values (for the initial 300 ft. of travel)	
Manning's Values for sheet flow only; from Overton and Meadows 1976 (see TR-55, 1986)	n_s
Smooth surfaces (concrete, asphalt, gravel, or bare, hand-packed soil)	0.011
Fallow fields or loose soil surface (no residue)	0.05
Cultivated soil with residue cover ≤20%	0.06
Cultivated soil with residue cover >20%	0.17
Short prairie grass and lawns	0.15
Dense grasses	0.24
Bermuda grass	0.41
Range (natural)	0.13
Woods or forest with light underbrush	0.40
Woods or forest with dense underbrush	0.80
(210-VI-TR-55, Second Ed., June 1986)	
"k" Values Used in Travel Time/Time of Concentration Calculations	
Shallow Concentrated Flow (after the initial 300 ft. of sheet flow, R = 0.1)	k_s
1. Forest with heavy ground litter and meadows (n = 0.10)	3
2. Brushy ground with some trees (n = 0.060)	5
3. Fallow or minimum tillage cultivation (n = 0.040)	8
4. High grass (n = 0.035)	9
5. Short grass, pasture, and lawns (n = 0.030)	11
6. Nearly bare ground (n = 0.025)	13
7. Paved and gravel areas (n = 0.012)	27
Channel Flow (intermittent) (at the beginning of visible channels, R = 0.2)	k_c
1. Forested swale with heavy ground litter (n = 0.10)	5
2. Forested drainage course/ravine with defined channel bed (n = 0.050)	10
3. Rock-lined waterway (n = 0.035)	15
4. Grassed waterway (n = 0.030)	17
5. Earth-lined waterway (n = 0.025)	20
6. CMP pipe, uniform flow (n = 0.024)	21
7. Concrete pipe, uniform flow (0.012)	42
8. Other waterways and pipe	0.508/n
Channel Flow (continuous stream, R = 0.4)	k_c
9. Meandering stream with some pools (n = 0.040)	20
10. Rock-lined stream (n = 0.035)	23
11. Grass-lined stream (n = 0.030)	27
12. Other streams, manmade channels, and pipe	0.807/n

Table 4B-6 Values of the roughness coefficient, "n."

Type of Channel and Description	Manning's "n" (Normal)	Type of Channel and Description	Manning's "n" (Normal)
A. Constructed Channels		6. Sluggish reaches, weedy	
a. *Earth, straight and uniform*		deep pools	0.070
1. Clean, recently completed	0.018	7. Very weedy reaches, deep	
2. Gravel, uniform selection,	0.025	pools, or floodways with	
clean		heavy stand of timber and	
3. With short grass, few	0.027	underbrush	0.100
weeds		b. *Mountain streams, no vegetation*	
b. *Earth, winding and sluggish*		*in channel, banks usually steep,*	
1. No vegetation	0.025	*trees and brush along banks*	
2. Grass, some weeds	0.030	*submerged at high stages*	
3. Dense weeds or aquatic		1. Bottom: gravel, cobbles, and	
plants in deep channels	0.035	few boulders	0.040
4. Earth bottom and rubble		2. Bottom: cobbles with large	
sides	0.030	boulders	0.050
5. Stony bottom and weedy		B-2 Flood plains	
banks	0.035	a. *Pasture, no brush*	
6. Cobble bottom and clean		1. Short grass	0.030
sides	0.040	2. High grass	0.035
c. *Rock-lined*		b. *Cultivated areas*	
1. Smooth and uniform	0.035	1. No crop	0.030
2. Jagged and irregular	0.040	2. Mature row crops	0.035
d. *Channels not maintained,*		3. Mature field crops	0.040
weeds and brush uncut		c. *Brush*	
1. Dense weeds, high as flow		1. Scattered brush, heavy	
depth	0.080	weeds	0.050
2. Clean bottom, brush on		2. Light brush and trees	0.060
sides	0.050	3. Medium to dense brush	0.070
3. Same, highest stage of		4. Heavy, dense brush	0.100
flow	0.070	d. *Trees*	
4. Dense brush, high stage	0.100	1. Dense willows, straight	0.150
B. Natural Streams		2. Cleared land with tree	
B-1 Minor streams (top width at		stumps, no sprouts	0.040
flood stage < 100 ft.)		3. Same as above, but with	
a. *Streams on plain*		heavy growth of sprouts	0.060
1. Clean, straight, full stage,		4. Heavy stand of timber, a few	
no rifts or deep pools	0.030	downed trees, little	
2. Same as above, but more		undergrowth, flood stage	
stones and weeds	0.035	below branches	0.100
3. Clean, winding, some		5. Same as above, but with	
pools and shoals	0.040	flood stage reaching	
4. Same as above, but some		branches	0.120
weeds	0.040		
5. Same as 4, but more stones	0.050		

*Note: These "n" values are "normal" values for use in analysis of channels. For conservative design for channel capacity, the maximum values listed in other references should be considered. For channel bank stability, the minimum values should be considered.

Exhibit E

TRANSPORTATION IMPACT STUDY

FOR

SANDY WOODS PHASE 2

SOUTH OF KELSO ROAD AND WEST OF JEWELBERRY AVENUE

CITY OF SANDY, OREGON

REGISTERED PROFESSIONAL ENGINEER
15,779
David S. Kelly
OREGON
MAR. 17, 1992
DAVID S. KELLY

EXPIRES
6/30/2021

PREPARED BY

KELLY ENGINEERING

March 2021

TRANSPORTATION IMPACT STUDY

Sandy Woods Phase 2

City of Sandy, Oregon

March 3, 2021

Prepared for:

Rosemont Development
Attn: Rob Venema
10117 SE Sunnyside Rd., Suite F1178
Clackamas, OR 97015

Prepared by:

Kelly Engineering
1805 NE 94th St. No. 19
Vancouver, WA 98665
Phone: 360-433-7530
e-mail: Kellyengineer@comcast.net

Table of Contents

TRANSPORTATION IMPACT STUDY

Sandy Woods Phase 2

March 3, 2021

INTRODUCTION

A transportation impact study (TIS) for the Sandy Woods Phase 2 development was conducted to determine the potential traffic related impacts of the development to the surrounding roadway system. The site is located on the south side of SE Kelso Road and west of SE Jewelberry Avenue in the City of Sandy. Phase 1 of the development is located to the south. A tract of land and the Bonneville Power Administration (BPA) power lines separates the two phases. There will be no roadway connection between the two phases.

The development will consist of 43 single-family detached homes. The Sandy Crest Phase 2 development was based on discussions with staff from the City of Sandy and Clackamas County. SE Kelso Road is within the jurisdiction of Clackamas County.

Land uses in the vicinity of the site consist of single family homes and undeveloped land. A vicinity map, aerial photograph and site plan are shown in Figures 1a, 1b and 1c.

Roadway Characteristics

The site will have access onto SE Kelso Road. SE Kelso Road is a two lane paved roadway with a posted speed limit of 45 mph. The roadway is classified as a Minor Arterial.

The Bluff Road/SE Kelso Road intersection is controlled by stop signs on the SE Kelso Road approaches. The SE Orient Drive/SE Kelso Road intersection was recently converted to all way stop sign control. The lane configurations for the intersections are shown in Figure 2.

Traffic Volumes

The traffic counts in this report were obtained from the Sandy Bluff Annex 6 Subdivision & Future Development Transportation Impact Study. The study was prepared by Lancaster Engineering in 2017 and included an analysis of several intersections in the area. The Sandy Bluff development is located south of the Sandy Woods Phase 2 development.

The traffic counts in the Sandy Bluff Annex 6 Subdivision & Future Development transportation impact study were conducted from 7:00 to 9:00 am and 4:00 to 6:00 pm during October 2017. The AM peak hour occurred between approximately 7:00 to 8:00 am and the PM peak hour occurred between approximately 4:00 to 5:00 pm at the SE Orient Drive/SE Kelso Road intersection and 4:45 to 5:45 pm at the Bluff Road/SE Kelso Road intersection. The peak hour at the intersections is the one hour time period when traffic on the adjacent streets are the highest and congestion is most likely to occur. The existing traffic volumes for 2017 are shown in Figure 3. The raw traffic count data is shown in Appendix A.

As a result of the current service oriented facility and other required closures there has been a noticeable decline in traffic volumes on the roadway systems. Therefore, the traffic counts used in this report for 2017 were assumed to have an adjustment factor of 2.5% per year to current year. The adjustment factor was based on historical traffic counts obtained from Clackamas County. The historical traffic counts at two locations on SE Kelso Road are included in Appendix B. Data from the permanent count stations on SE Kelso Road were used to evaluate the decline in traffic volumes due to the "Stay Home, Stay Safe" orders associated with the COVID-19 pandemic. The adjusted traffic volumes are shown in Figure 4.

Trip Generation/Distribution

The Sandy Woods Phase 2 development could generate approximately 406 trips per day, ITE Trip Generation Manual, 10th edition. A trip is a one directional vehicle movement. 32 trips could occur during the AM peak hour and 43 trips could occur during the PM peak hour. The trip generation rates are shown in Table 1.

Table 1
Site Traffic Generation
Sandy Woods Phase 2

Land Use	ITE code	Dwell units	Daily Trips	AM Peak Hour Trips	PM Peak Hour Trips
Proposed Single Family Homes	210	43	406	32 (in-8, out-24)	43 (in-27, out-16)

The directional distribution of traffic generated by the development was assigned to the study area intersections. Based on the existing traffic volumes and a survey conducted along the site frontage it was assumed that 55% of the site trips will travel to and from the west on SE Kelso Road and 45% will travel to and from the east towards Bluff Road. At the SE Kelso Road/SE Orient Drive intersection 20% will travel to and from the north on SE Orient Drive and 5% will travel to and from the south. 30% will continue towards the west on SE Kelso Road towards US-26. The site traffic distribution and assignment diagram is shown in Figure 6.

Year 2023 Traffic Volumes

The assumption was made in this report that build out of the Sandy Woods Phase 2 development will occur within two years. A 2.5 percent per year compounded growth rate was used at the study area intersections for the year 2023 planning horizon.

In addition to the traffic growth rate in-process traffic from the Jewelberry Meadows Subdivision was included. In-process traffic is traffic from developments that have been approved, but are not generating full build out traffic volumes. The Jewelberry Meadows Subdivision is a 20 lot subdivision located east of SE Jewelberry Avenue and north of the Penny Street intersection. The in-process traffic was obtained from the City of Sandy's Development Activity Map and correspondence with staff from the City of Sandy.

Peak Hour Traffic Operations

The scope of the transportation impact study was based on discussions with staff from the City of Sandy and Clackamas County. Based on the discussions an analysis was conducted at the following intersections during the weekday AM and PM peak hours:

(1) SE Kelso Road & SE Orient Drive
(2) SE Kelso Road. & Bluff Road
(3) SE Kelso Road & site access

The study area intersections and were analyzed to determine existing, year 2023 without project and year 2023 with project conditions. The year 2023 traffic volumes without and with the project are shown in Figures 5 and 7.

The intersection operational analysis was conducted using the procedures in the 2010 Highway Capacity Manual. These procedures describe the operation of an intersection in terms of its level of service (LOS). The LOS criteria ranges from "A", which indicates little, if any, delay to "F", which indicates that vehicles experience very long delays. The LOS criteria with the corresponding delay in seconds per vehicle is shown in Table 2. The capacity analysis summary is shown in Table 3.

Table 2
Level of Service Criteria

Level of Service (LOS)	A	B	C	D	E	F
Unsignalized intersections Average Delay (seconds per vehicle)	≤10	>10 - 15	>15 - 25	>25 - 35	>35 - 50	>50

Table 3
Capacity Analysis Summary

	AM Peak Hour		PM Peak Hour	
	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)
SE Orient Drive & SE Kelso Road				
Existing	B	11.0	B	10.8
Year 2022 w/o Project	B	11.5	B	11.4
Year 2022 with Project	B	11.8	B	11.7
Bluff Road & SE Kelso Road				
Existing	B	13.5	B	12.6
Year 2023 w/o Project	B	14.0	B	12.9
Year 2023 with Project	B	14.3	B	13.3
SE Kelso Road & site access				
Existing	n/a			
Year 2022 w/o Project	n/a			
Year 2022 with Project	B	11.2	B	11.3

Based on the findings of this TIS the study area intersections will operate at acceptable levels with build out of the Sandy Woods Phase 2 development. The LOS computer printouts are included in Appendix E.

Pedestrian/Bicycle/Transit Considerations

No pedestrian or bicycle activities were observed within the vicinity of the site along SE Kelso Road during field observations. The site is not served by public transit service.

Sight Distance

Sight distance was measured at the proposed site access onto SE Kelso Road. The measured corner sight distance was over 500 feet when looking towards the east and west. Based on the posted speed limit of 45 mph on SE Kelso Road and the criteria in AASHTO, A Policy on Geometric Design of Highways and Streets, 2011 the sight distance requirement is met.

Turn Lanes

A left turn lane improves safety and increases the capacity of the roadway by reducing the speed differential between the through and left turn vehicles. The requirement for a left turn lane was evaluated at the study area intersections as based on ODOT guidelines (ODOT Highway Design Manual, 2012). Based on the findings a southbound left turn at the SE Orient Drive/SE Kelso Road intersection is justified as based on volumes during the PM peak hour under existing conditions. The left turn lane criterion for southbound traffic at the intersection is shown in Appendix D. However, the SE Orient Drive/SE Kelso Road intersection was recently converted to all way stop sign control and a left turn lane is no longer necessary. This issue was also addressed in the Sandy Bluff Annex 6 Subdivision & Future Development Transportation Impact Study prepared by Lancaster Engineering.

Traffic Signal Warrant Analysis

The need for a traffic signal was examined at the study area intersections. Due to the low volume of traffic on the minor and major street approaches traffic signals are not justified.

Transportation Improvements

The City of Sandy and the Oregon State Department of Transportation are currently updating the Transportation System Plan (TSP). The TSP will review community, business, visitor and stakeholder input to identify and prioritize future transportation projects and investments. The current TSP was last completed in 2011. The 2011 TSP and Transportation Capital Project List identifies no motor vehicle system projects within the vicinity of the Sandy Woods Phase 2 development.

Collision Data

Collision data was obtained from ODOT for the most recent five years of available data. The collision data is shown in Table 4 and Appendix C.

Table 4
Collision Data

Intersection	Number of Collisions	Collision Type					Rate MEV*
		Angle	Backing	Rear End	Turning Movements	Fixed Object	
SE Orient Drive/ SE Kelso Road	25	14	1	4	6		1.8
Bluff Road/ SE Kelso Road	3			1	1	1	0.4

Based on the available data 25 accidents have been reported to ODOT at the SE Orient Drive/SE Kelso Road intersection during the previous five years. The 25 accidents equate to an accident rate of 1.8 accidents per million entering vehicles (MEV). This is above the threshold of 1.0 accidents per MEV that usually identifies an intersection with a high accident rate. The majority of accidents at the intersection were angle type collisions. Angle type collisions can be caused by restricted sight distance, a large total intersection volume or a high approach speed. The sight distance at the intersection is adequate and the total entering volumes is also not excessive given the acceptable level of service. The appropriate countermeasure would be to install all way stop sign control at the intersection and this was recently done. Therefore, the accident rate should be significantly reduced.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of this transportation impact study the surrounding roadway system can adequately accommodate traffic from the Sandy Woods Phase 2 development. No off site transportation improvements or traffic control devices were identified to accommodate the development.

Adequate sight distance should be maintained at the site access onto SE Kelso Road. Obstructions by landscaping, signs or other objects should not be allowed.

FIGURE 1a

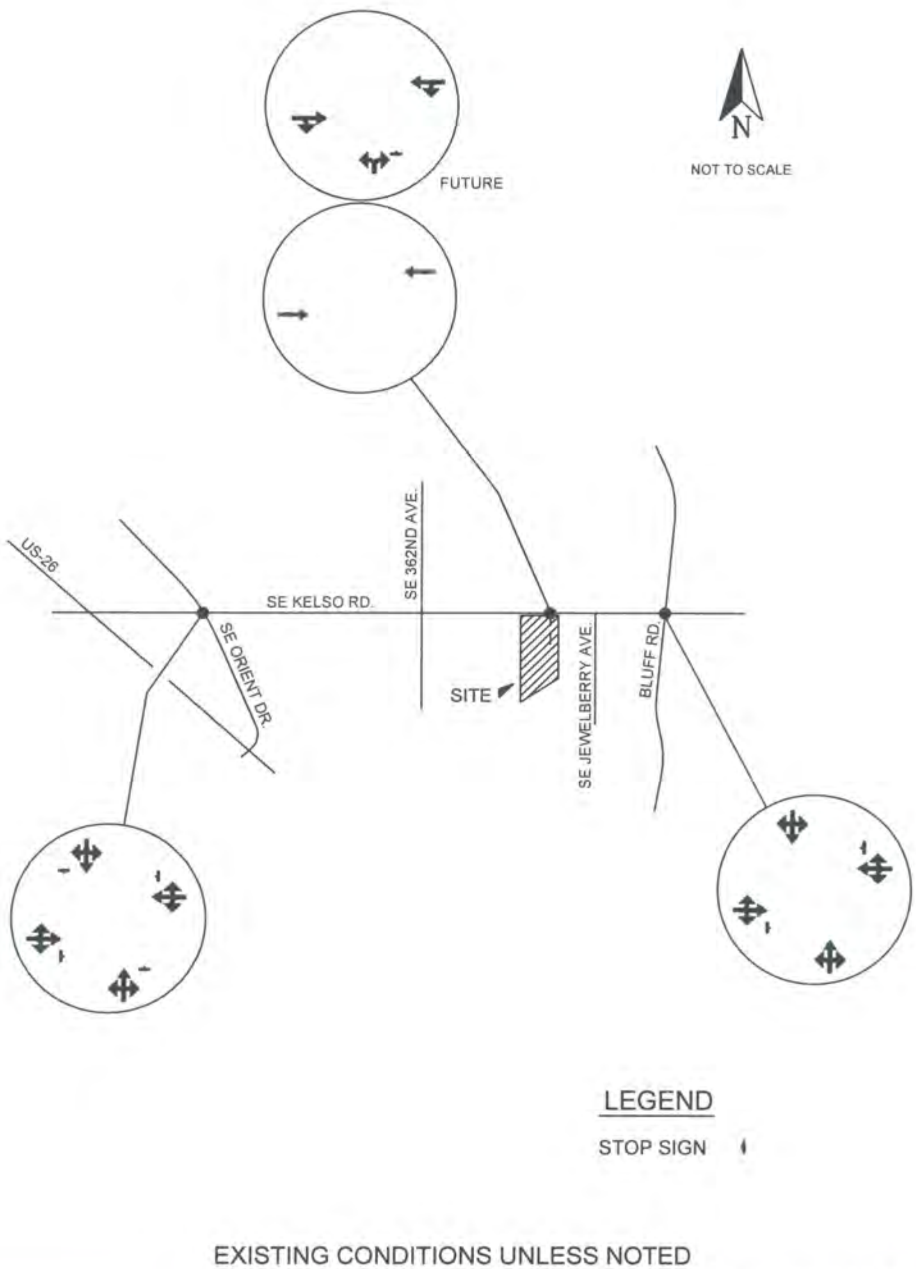
12/4/2020

FIGURE 1b

12/4/2020


SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188
Site Plan
Sandy Woods 2
Rosemont Development
STREET A
STREET B

FIGURE 1c



SANDY WOODS PHASE 2

FIGURE 2
LANE CONFIGURATIONS

KELLY ENGINEERING
1805 NE 94th St., No. 19, Vancouver, WA 98665
Phone: 360-433-7530

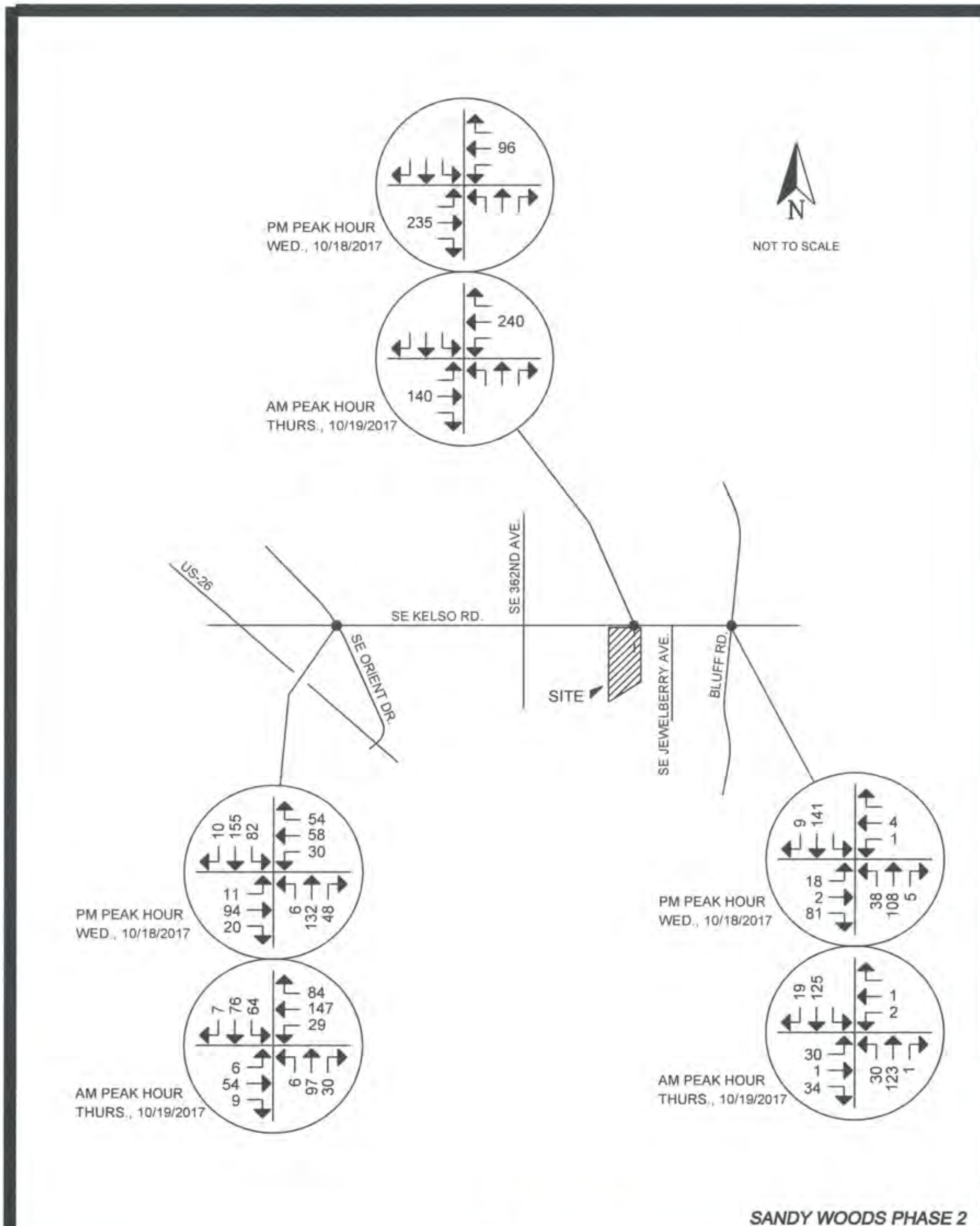


FIGURE 3
EXISTING TRAFFIC VOLUMES
YEAR 2017

KELLY ENGINEERING
1805 NE 94th St., No. 19, Vancouver, WA 98665
Phone: 360-433-7530

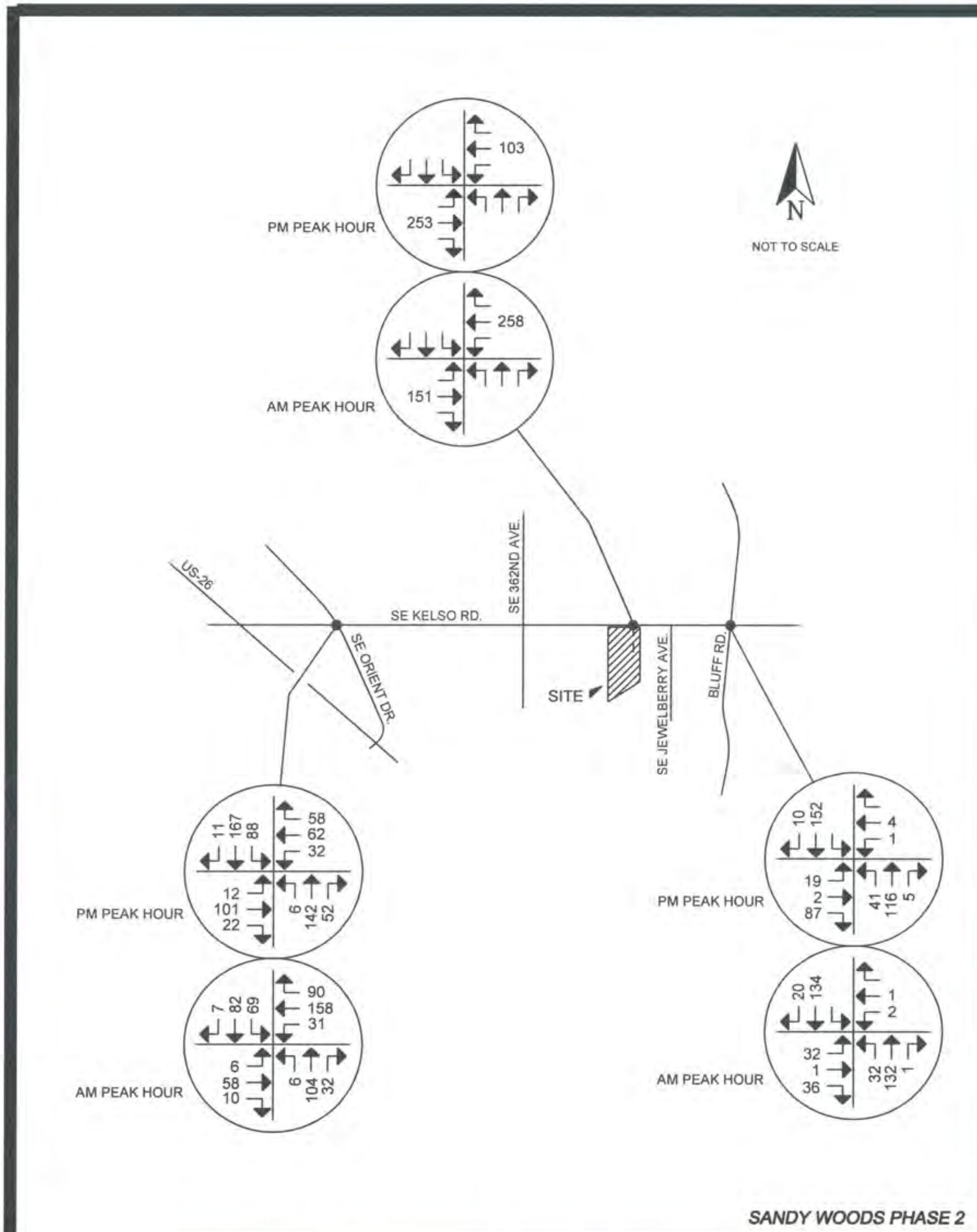


FIGURE 4
ADJUSTED TRAFFIC VOLUMES
YEAR 2021

KELLY ENGINEERING
1805 NE 94th St., No. 19, Vancouver, WA 98665
Phone: 360-433-7530

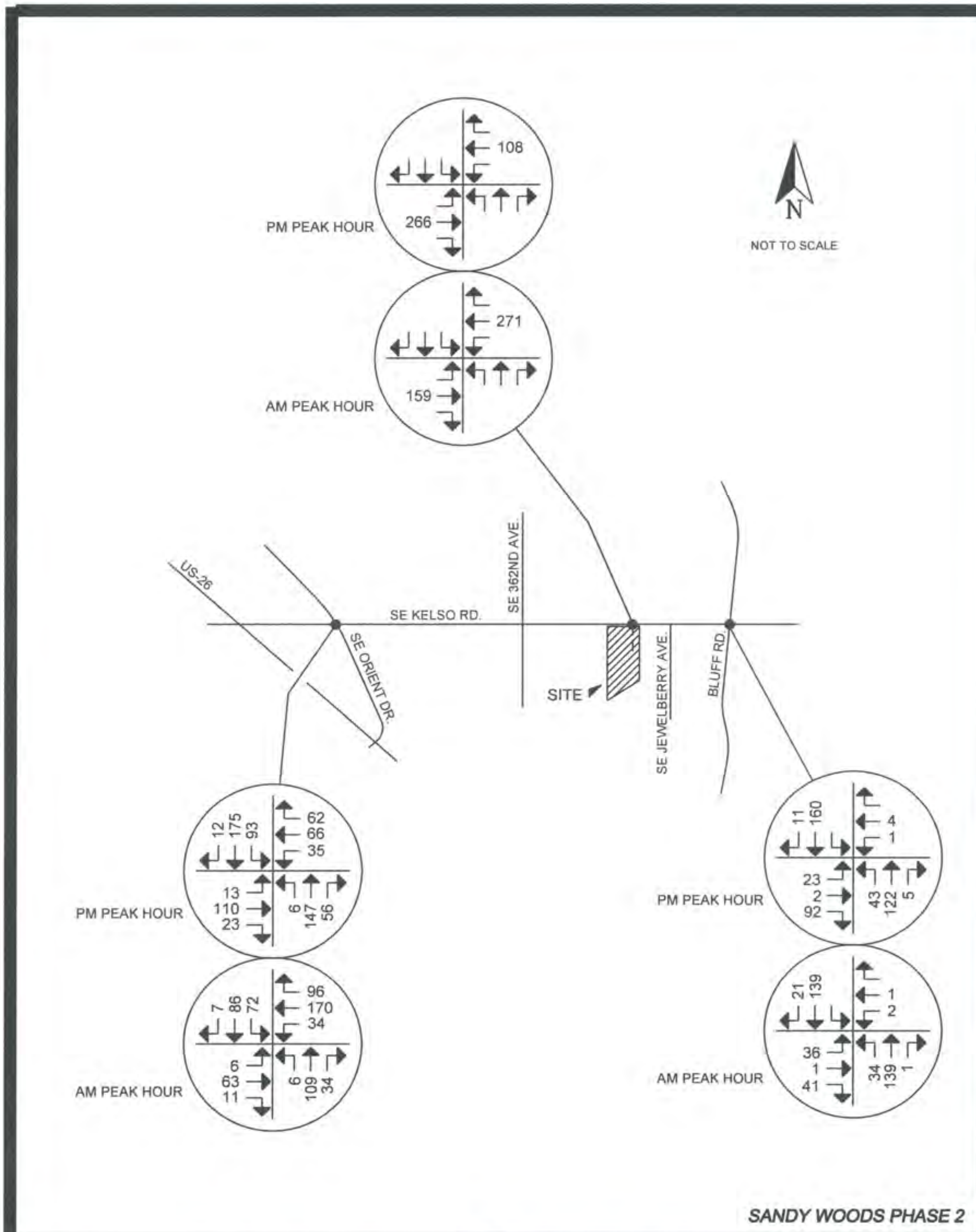
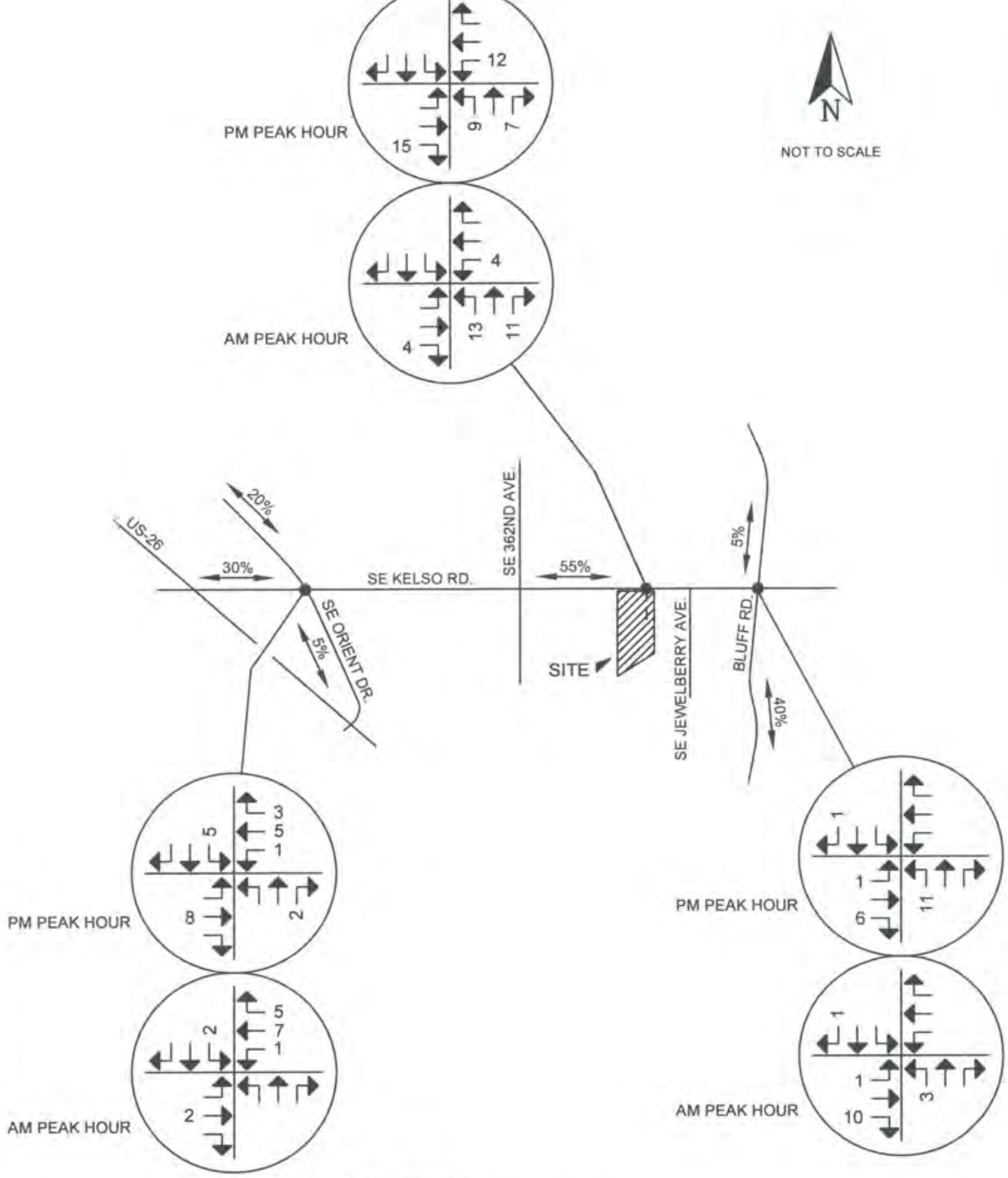


FIGURE 5
YEAR 2023 TRAFFIC VOLUMES
W/O PROJECT

KELLY ENGINEERING
1805 NE 94th St., No. 19, Vancouver, WA 98665
Phone: 360-433-7530



SITE TRIPS
PM PEAK HOUR: IN-27, OUT-16
AM PEAK HOUR: IN-8, OUT-24

SANDY WOODS PHASE 2

FIGURE 6
SITE TRAFFIC DISTRIBUTION/ ASSIGNMENT

KELLY ENGINEERING
1805 NE 94th St., No. 19, Vancouver, WA 98665
Phone: 360-433-7530

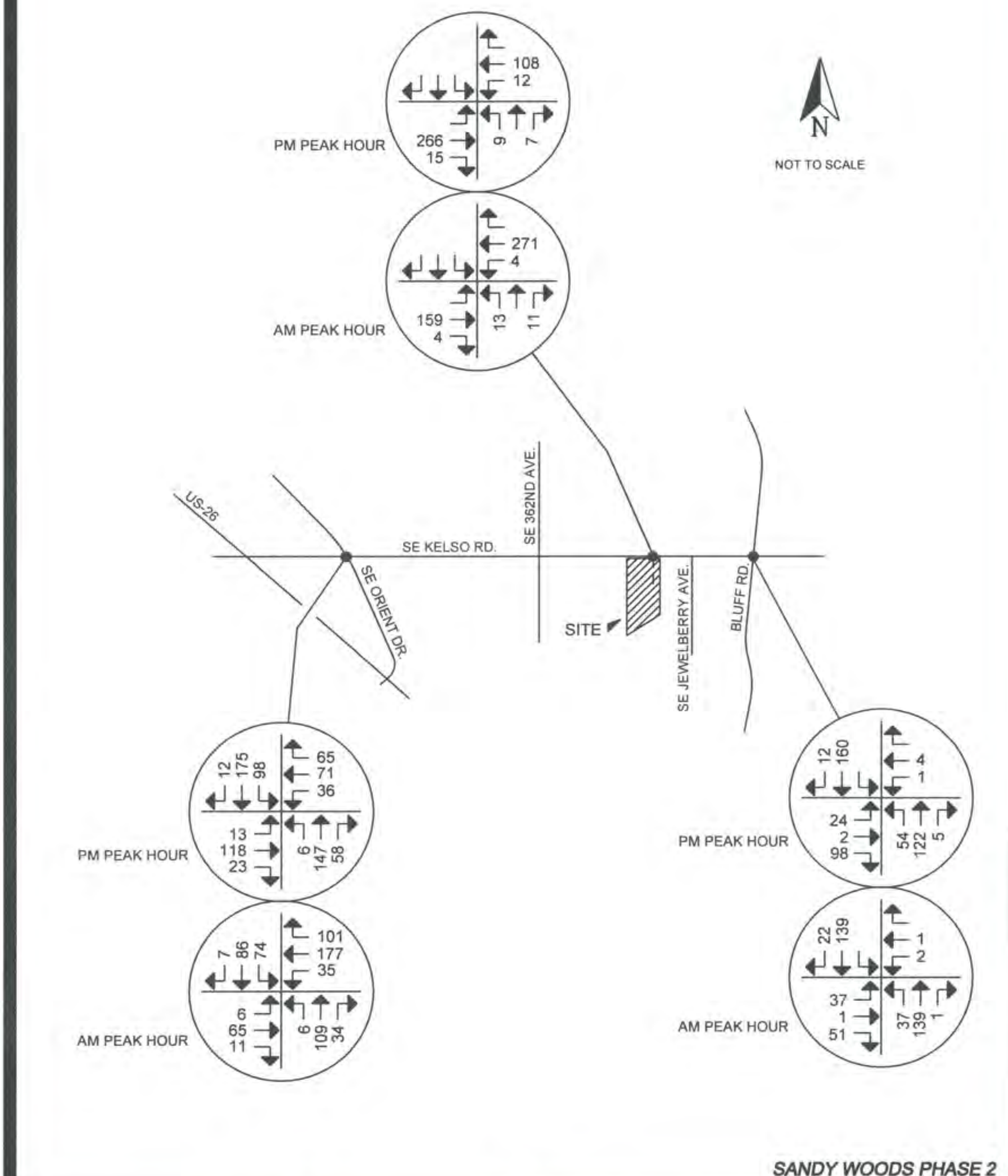


FIGURE 7
YEAR 2023 TRAFFIC VOLUMES WITH PROJECT

KELLY ENGINEERING
1805 NE 94th St., No. 19, Vancouver, WA 98665
Phone: 360-433-7530

APPENDIX A
RAW TRAFFIC COUNT DATA

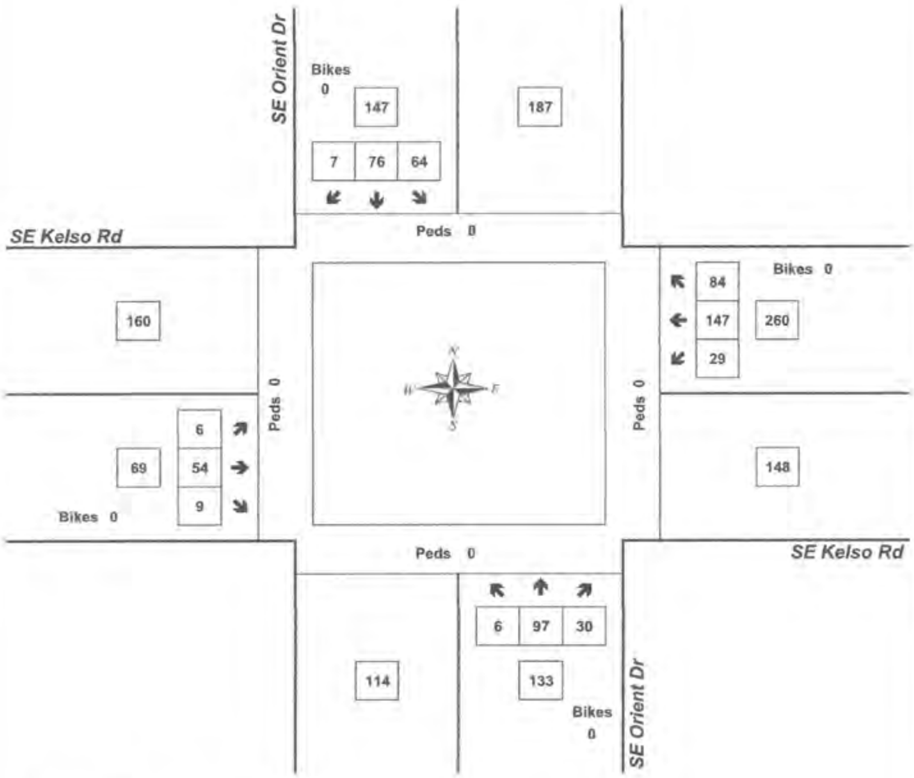
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

SE Orient Dr & SE Kelso Rd

7:00 AM to 8:00 AM
Thursday, October 19, 2017



Approach	PHF	HV%	Volume
EB	0.75	1.4%	69
WB	0.80	1.5%	260
NB	0.79	3.0%	133
SB	0.77	4.1%	147
Intersection	0.90	2.5%	609

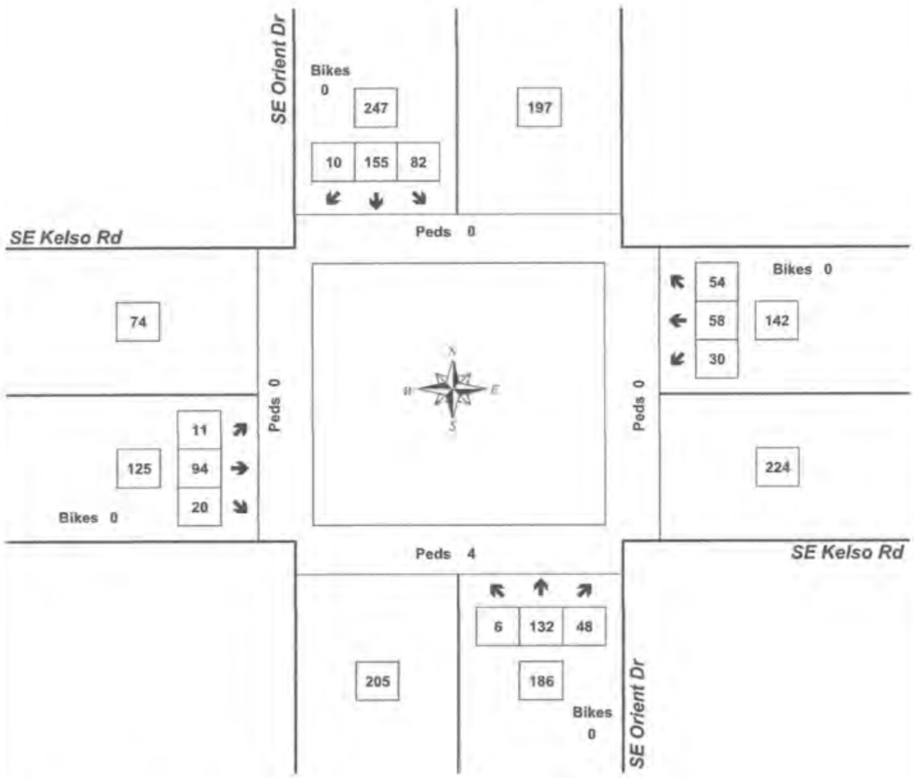
Count Period: 7:00 AM to 9:00 AM

Peak Hour Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740

SE Orient Dr & SE Kelso Rd

4:00 PM to 5:00 PM
Wednesday, October 18, 2017



Approach	PHF	HV%	Volume
EB	0.76	1.6%	125
WB	0.65	3.5%	142
NB	0.91	1.1%	186
SB	0.83	1.2%	247
Intersection	0.91	1.7%	700

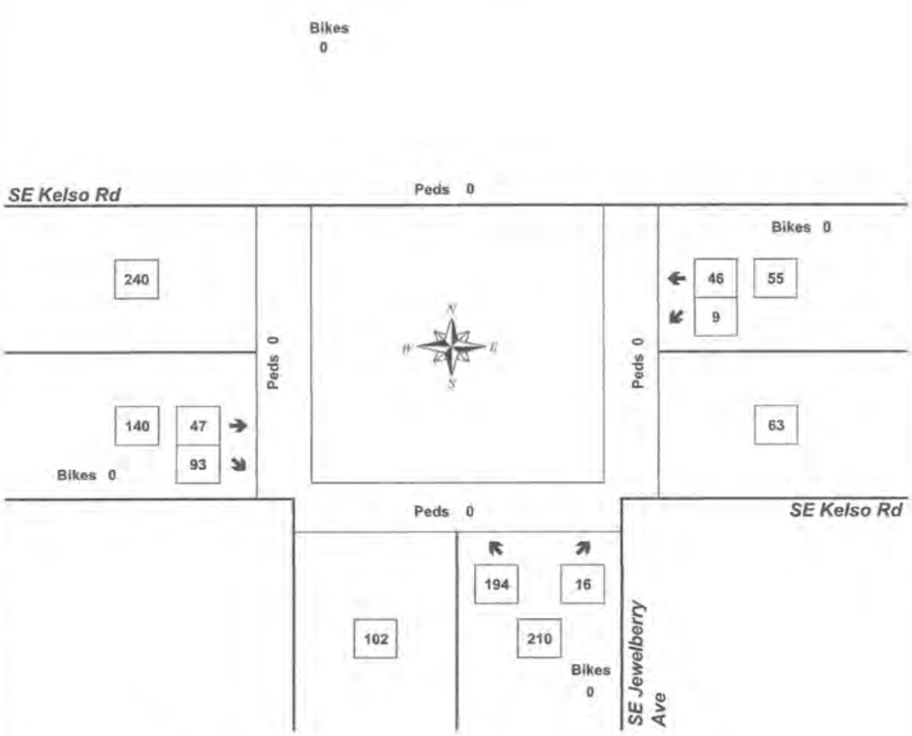
Count Period: 4:00 PM to 6:00 PM

Peak Hour Summary

All Traffic Data Services Inc
Clay Carney
(503) 833-2740

SE Jewelberry Ave & SE Kelso Rd

7:00 AM to 8:00 AM
Thursday, October 19, 2017



Approach	PHF	HV%	Volume
EB	0.63	2.1%	140
WB	0.65	3.6%	55
NB	0.77	1.9%	210
SB	0.00	0.0%	0
Intersection	0.74	2.2%	405

Count Period: 7:00 AM to 9:00 AM

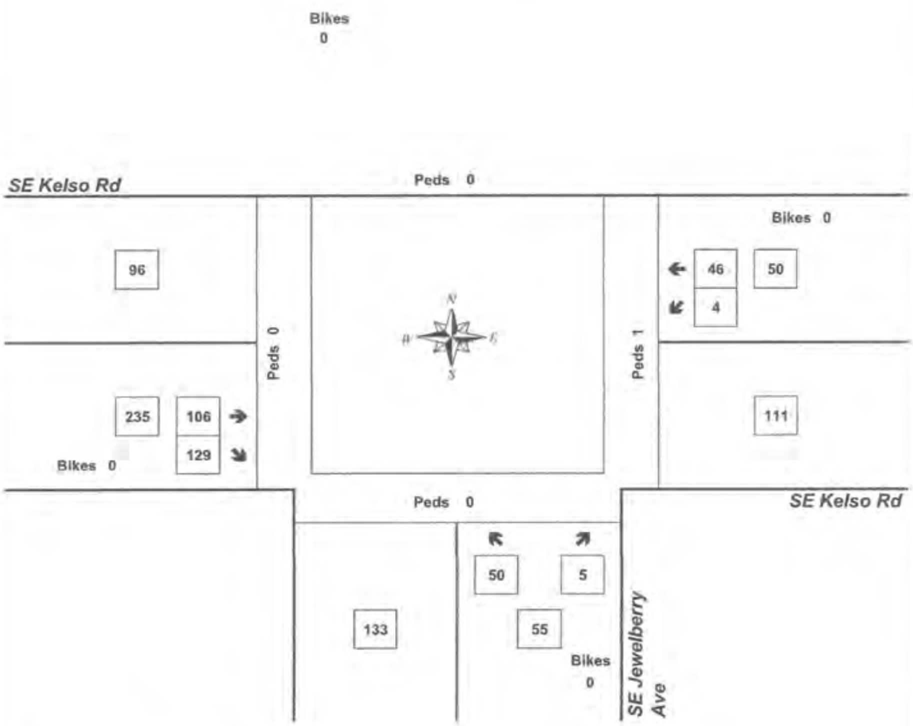
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

SE Jewelberry Ave & SE Kelso Rd

4:55 PM to 5:55 PM
Wednesday, October 18, 2017



Approach	PHF	HV%	Volume
EB	0.92	0.0%	235
WB	0.66	2.0%	50
NB	0.65	0.0%	55
SB	0.00	0.0%	0
Intersection	0.89	0.3%	340

Count Period: 4:00 PM to 6:00 PM

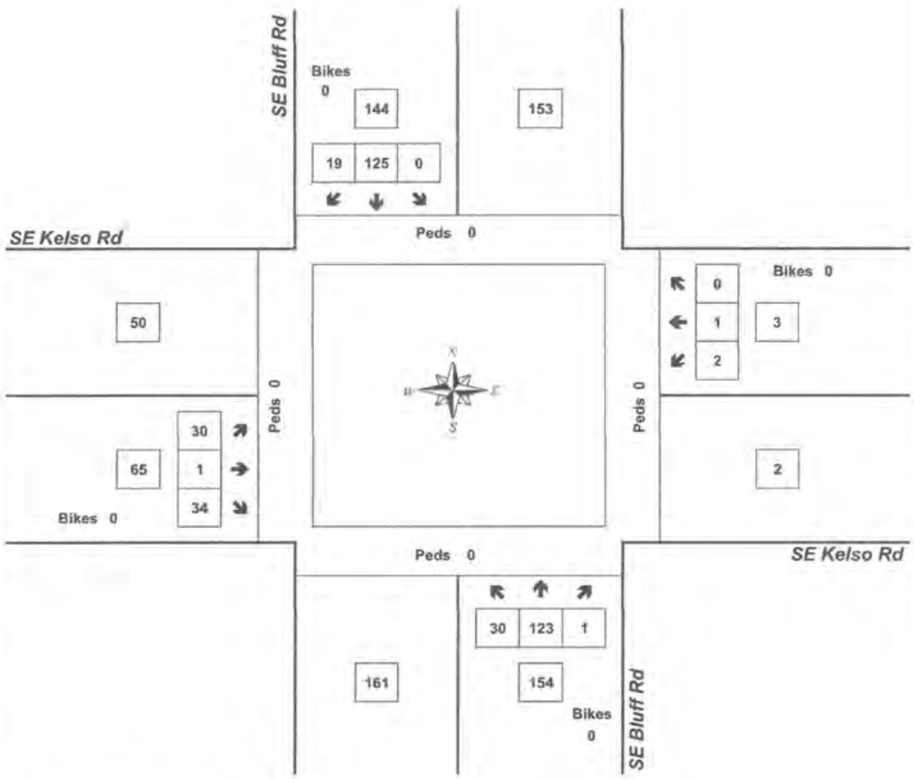
Peak Hour Summary

All Traffic Data
Services Inc

Clay Carney
(503) 833-2740

SE Bluff Rd & SE Kelso Rd

7:00 AM to 8:00 AM
Thursday, October 19, 2017



Approach	PHF	HV%	Volume
EB	0.60	3.1%	65
WB	0.38	0.0%	3
NB	0.70	3.2%	154
SB	0.59	2.8%	144
Intersection	0.67	3.0%	366

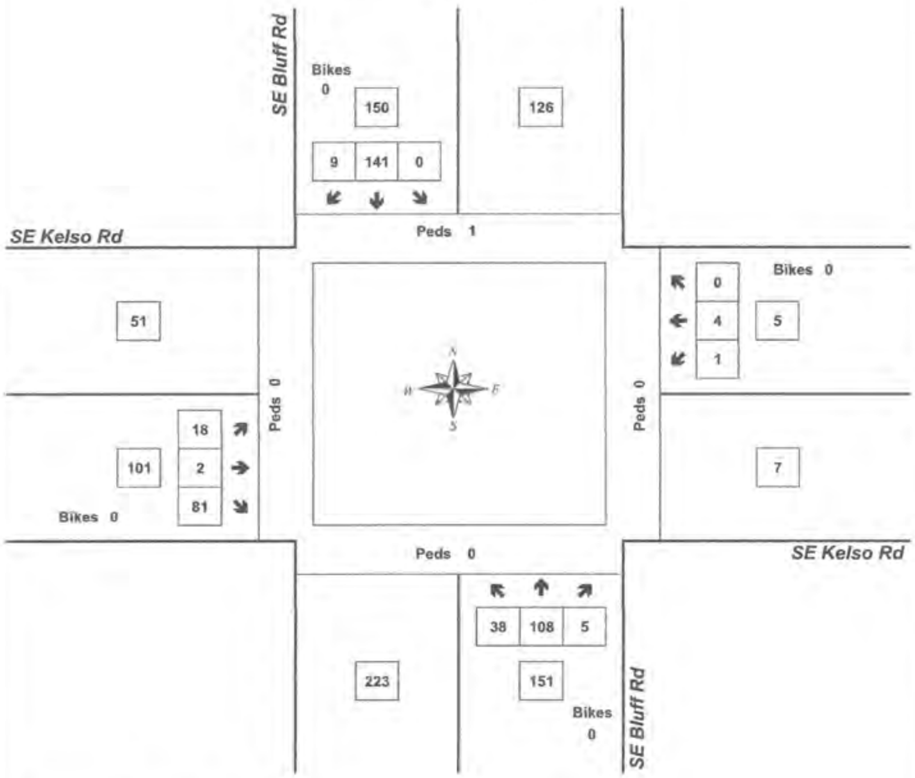
Count Period: 7:00 AM to 9:00 AM

Peak Hour Summary

All Traffic Data Services Inc
Clay Carney
(503) 833-2740

SE Bluff Rd & SE Kelso Rd

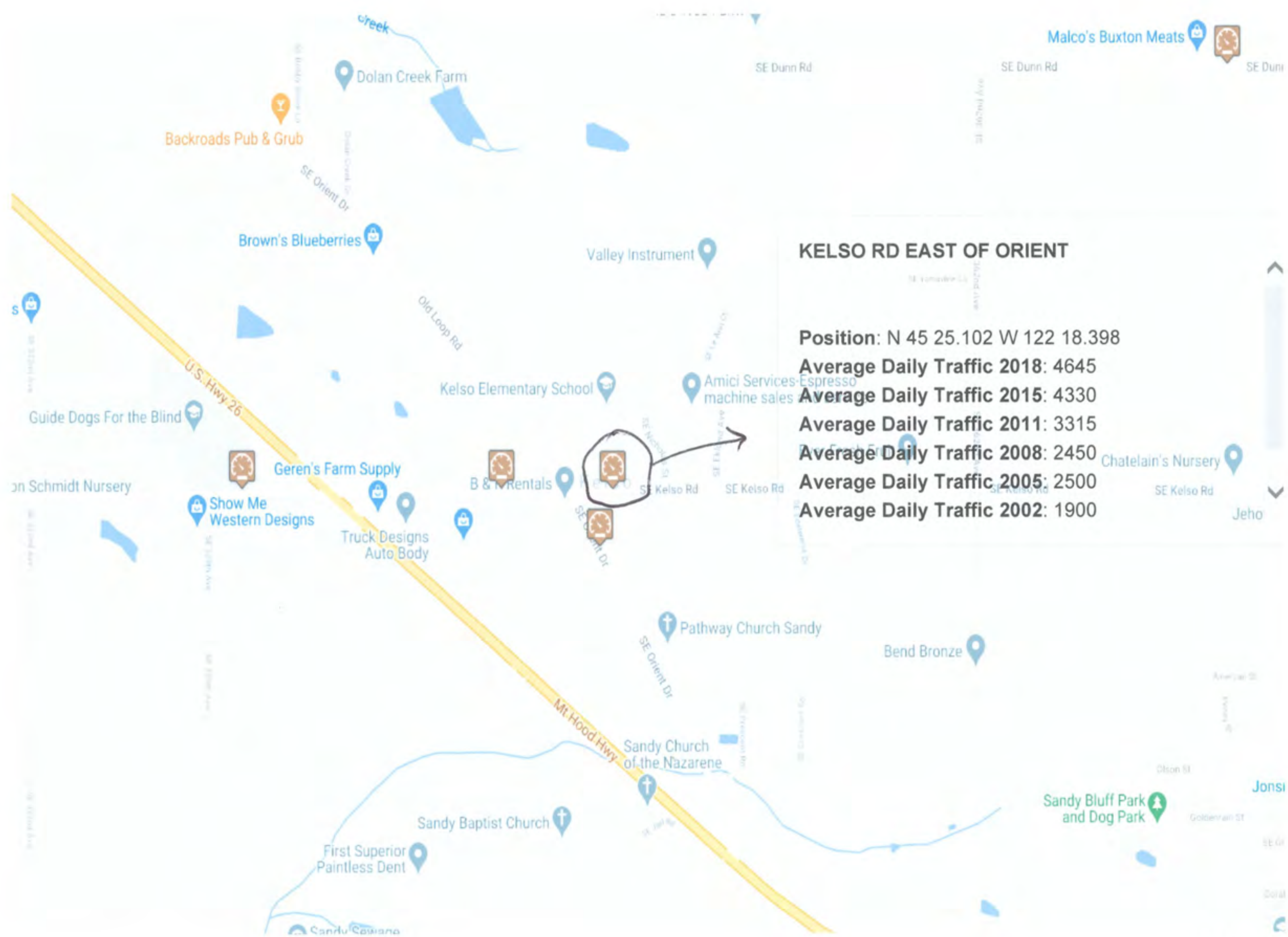
4:45 PM to 5:45 PM
Wednesday, October 18, 2017



Approach	PHF	HV%	Volume
EB	0.94	0.0%	101
WB	0.63	0.0%	5
NB	0.73	1.3%	151
SB	0.83	1.3%	150
Intersection	0.82	1.0%	407

Count Period: 4:00 PM to 6:00 PM

APPENDIX B
HISTORICAL TRAFFIC COUNTS



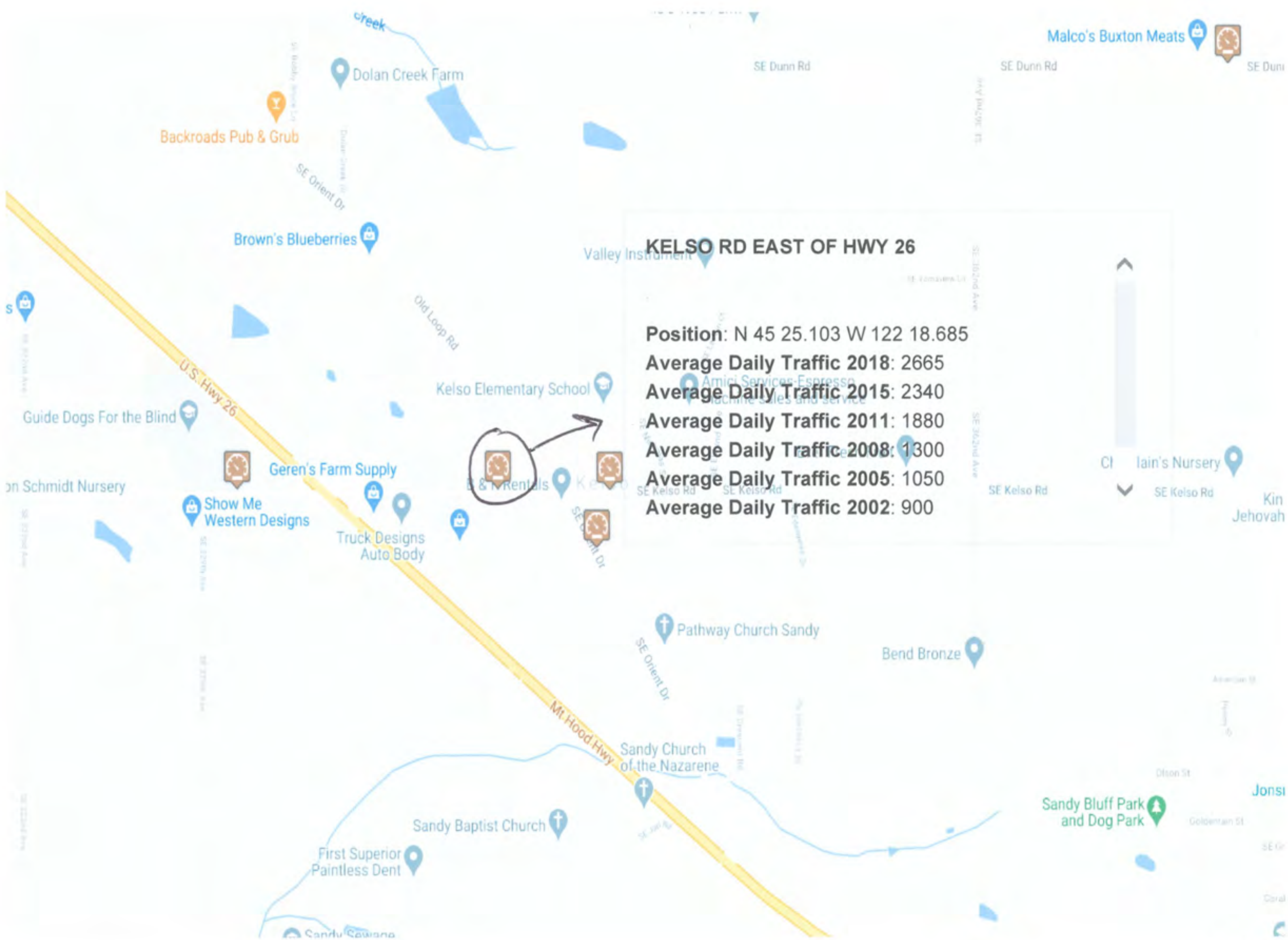
KELSO RD EAST OF ORIENT

Position: N 45 25.102 W 122 18.398
Average Daily Traffic 2018: 4645
Average Daily Traffic 2015: 4330
Average Daily Traffic 2011: 3315
Average Daily Traffic 2008: 2450
Average Daily Traffic 2005: 2500
Average Daily Traffic 2002: 1900

12/4/2020


4J's Tree Farm
Malco's Buxton Meats
SE Dunn Rd
SE Dunn Rd
SE Dunn Rd
Bluff Rd
strument
Amici Services-Espresso machine sales and service
Ever Fresh Fruit
Chatelain's Nursery
SE Kelso Rd
SE Kelso Rd
SE Kelso Rd
SE Kelso Rd
Kingdom Hall of Jehovah's Witnesses
Bluff Rd
Pathway Church Sandy
Bend Bronze
SE Orient Dr
Sandy Church of the Nazarene
Sandy Bluff Park and Dog Park
Jonsrud Viewpoint
Sandy River
Sandy River
Sandy River
Trail
KELSO RD WEST OF BLUFF
Position: N 45 25.106 W 122 16.606
Average Daily Traffic 2018: 1560
Average Daily Traffic 2015: 1405
Average Daily Traffic 2011: 1525
Average Daily Traffic 2008: 1600
Average Daily Traffic 2005: 1900
Average Daily Traffic 2002: 1150

12/4/2020


KELSO RD EAST OF HWY 26
Position: N 45 25.103 W 122 18.685
Average Daily Traffic 2018: 2665
Average Daily Traffic 2015: 2340
Average Daily Traffic 2011: 1880
Average Daily Traffic 2008: 1300
Average Daily Traffic 2005: 1050
Average Daily Traffic 2002: 900
Malco's Buxton Meats
SE Dunn Rd
Dolan Creek Farm
Backroads Pub & Grub
SE Orient Dr
Brown's Blueberries
Valley Instrument
Old Loop Rd
U.S. Hwy 26
Kelso Elementary School
Guide Dogs For the Blind
Geren's Farm Supply
Show Me Western Designs
Truck Designs Auto Body
SE Kelso Rd
Pathway Church Sandy
Bend Bronze
Mt Hood Hwy
Sandy Church of the Nazarene
Sandy Baptist Church
First Superior Paintless Dent
Sandy Bluff Park and Dog Park

12/4/2020

APPENDIX C
COLLISION DATA

OREGON DEPARTMENT OF TRANSPORTATION - POLICY, DATA AND ANALYSIS DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Intersectional Crashes at SE Kelso Rd & SE Orient Dr
January 1, 2014 through December 31, 2018

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2017														
ANGLE	0	3	1	4	0	4	0	2	2	3	1	4	0	0
BACKING	0	0	1	1	0	0	0	1	0	0	1	1	0	0
REAR-END	0	1	0	1	0	1	0	0	1	1	0	1	0	0
TURNING MOVEMENTS	0	2	1	3	0	3	0	2	1	2	1	3	0	0
2017 TOTAL	0	6	3	9	0	8	0	5	4	6	3	9	0	0
YEAR: 2016														
ANGLE	0	1	2	3	0	2	0	2	1	2	1	3	0	0
REAR-END	0	1	0	1	0	2	0	1	0	1	0	1	0	0
TURNING MOVEMENTS	0	0	1	1	0	0	0	1	0	1	0	1	0	0
2016 TOTAL	0	2	3	5	0	4	0	4	1	4	1	5	0	0
YEAR: 2015														
ANGLE	0	2	1	3	0	5	0	2	1	2	1	3	0	0
REAR-END	0	0	1	1	0	0	0	0	0	1	0	1	0	0
TURNING MOVEMENTS	0	1	0	1	0	3	0	0	1	1	0	1	0	0
2015 TOTAL	0	3	2	5	0	8	0	2	2	4	1	5	0	0
YEAR: 2014														
ANGLE	0	3	1	4	0	6	0	3	1	4	0	4	0	0
REAR-END	0	1	0	1	0	1	0	0	0	1	0	1	0	0
TURNING MOVEMENTS	0	1	0	1	0	1	0	1	0	1	0	1	0	0
2014 TOTAL	0	5	1	6	0	8	0	4	1	6	0	6	0	0
FINAL TOTAL	0	16	9	25	0	28	0	15	8	20	5	25	0	0

Disclaimers: *Effective 2016,* ***collection of "Property Damage Only" (PDO) crash data elements was reduced for vehicles and participants.*** *Age, Gender, License, Error and other elements are no longer available for PDO crash reporting. Please keep this in mind when comparing 2016 PDO crash data to prior years.*

A higher number of crashes may be reported as of 2011 compared to prior years. This does not necessarily reflect an increase in annual crashes. The higher numbers may result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics. For all disclaimers, see https://www.oregon.gov/ODOT/Data/documents/Crash_Data_Disclaimers.pdf

CDS380 12/9/2020

OREGON DEPARTMENT OF TRANSPORTATION - POLICY, DATA AND ANALYSIS DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
COUNTY ROAD CRASH LISTING

CLACKAMAS COUNTY

Intersectional Crashes at SE Kelso Rd & SE Orient Dr
January 1, 2014 through December 31, 2018

SER# / INVEST / UNLOC?	S P E E D C / A L C / D R U G / M H R / S W C O H R L K	DATE / DAY/TIME / LAT/LONG	MILEPNT / DIST FROM INTERSECT	COUNTY ROADS / FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL / TRAF- CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V# SPCL USE / TRLR QTY / OWNER	MOVE FROM TO	P# PRTC TYPE	INJ SVRTY	A G E	S E X
04136	N N N	10/4/2017	3.38	SE KELSO RD-OLD 23006	INTER	CROSS	N	N	CLR	O-1STOP	01 NONE 9	BACK				
NONE	N	Wed 6P			W		STOP SIGN	N	DRY	BACK	N/A	E W				
No	45 25	6.17 -122 18 30.46			06	0		N	DLIT	PDO	PSNGR CAR		01 DRVR	NONE	00	U
											02 NONE 9	STOP				
											N/A	W E				
											PSNGR CAR		01 DRVR	NONE	00	U
05410	N N N	12/18/2017	3.38	SE KELSO RD-OLD 23006	INTER	CROSS	N	N	RAIN	ANGL-OTH	01 NONE 0	STRGHT				
NO RPT	N	Mon 4P			CN		STOP SIGN	N	WET	TURN	PRVTE	S N				
No	45 25	6.17 -122 18 30.46			02	0		N	DUSK	INJ	PSNGR CAR		01 DRVR	NONE	20	F
											02 NONE 0	TURN-L				
											PRVTE	E S				
											PSNGR CAR		01 DRVR	NONE	17	M
													02 PSNG	INJC	17	F
05258	N N N	12/11/2017	3.38	SE KELSO RD-OLD 23006	INTER	CROSS	N	N	CLR	ANGL-OTH	01 NONE 0	STRGHT				
NONE	N	Mon 11A			CN		STOP SIGN	N	DRY	ANGL	PRVTE	N S				
No	45 25	6.17 -122 18 30.46			03	0		N	DAY	INJ	PSNGR CAR		01 DRVR	INJB	33	F
											02 NONE 0	STRGHT				
											PRVTE	W E				
											PSNGR CAR		01 DRVR	INJB	70	F
01954	N N N	5/22/2014	0.74	SE ORIENT DR	INTER	CROSS	N	N	UNK	S-1STOP	01 NONE 0	STRGHT				
NONE	N	Thu 7A			UN		STOP SIGN	N	UNK	REAR	PRVTE	UN UN				
No	45 25	6.17 -122 18 30.46			NE	0		N	DAY	INJ	PSNGR CAR		01 DRVR	NONE	00	F
											02 NONE 0	STOP				
											PRVTE	UN UN				
											PSNGR CAR		01 DRVR	INJC	38	M
05091	N N N	12/1/2015	0.74	SE ORIENT DR	INTER	CROSS	N	N	UNK	S-1STOP	01 NONE 0	STRGHT				
NONE	N	Tue 9A			SE		STOP SIGN	N	UNK	REAR	PRVTE	SE NW				
No	45 25	6.17 -122 18 30.46			06	0		N	DAY	PDO	PSNGR CAR		01 DRVR	NONE	38	M

CD8380 12/9/2020

OREGON DEPARTMENT OF TRANSPORTATION - POLICY, DATA AND ANALYSIS DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
COUNTY ROAD CRASH LISTING

CLACKAMAS COUNTY

Intersectional Crashes at SE Kelso Rd & SE Orient Dr
January 1, 2014 through December 31, 2018

SER# INVEST UNLOC?	S P E E L D / A C ... D R U G S W C O M H R J L K	DATE DAY/TIME LAT/LONG	MILEPNT DIST FROM INTERSECT	COUNTY ROADS FIRST STREET SECOND STREET INTERSECTION SEQ #	RD CHAR DIRECT LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL TRAF- CONTL	OFF-RD RNDBT DRVWY	WTHR SURF LIGHT	CRASH TYP COLL TYP SVRTY	V#	SPCL USE TRLR QTY OWNER	MOVE FROM TO	P#	PRTC TYPE	INJ SVRTY	A G E	S E X
											02	NONE 0 PRVTE PSNGR CAR	STOP SE NW	01	DRVR	NONE	38	M
02786 NONE No	N N N N 45 25	6/21/2016 Tue 1P 6.17 -122 18 30.46	0.74	SE ORIENT DR	INTER NW 06	CROSS 0	N STOP SIGN	N N N	CLR DRY DAY	S-1STOP REAR INJ	01	NONE 0 PRVTE PSNGR CAR	STRGHT NW SE	01	DRVR	NONE	18	M
											02	NONE 0 PRVTE PSNGR CAR	STOP NW SE	01	DRVR	INJC	35	F
														02	PSNG	INJC	09	F
														03	PSNG	NO<5	03	M
00613 NONE No	N N N N 45 25	2/15/2017 Wed 7A 6.17 -122 18 30.46	0.74	SE ORIENT DR	INTER NW 06	CROSS 0	N STOP SIGN	N N N	RAIN WET DAY	S-1STOP REAR INJ	01	NONE 0 PRVTE PSNGR CAR	STRGHT NW SE	01	DRVR	NONE	16	M
											02	NONE 0 PRVTE PSNGR CAR	STOP NW SE	01	DRVR	INJC	41	F
03693 NO RPT No	N N N N 45 25	9/20/2014 Sat 11A 6.17 -122 18 30.46	0.74	SE ORIENT DR	INTER CN 01	CROSS 0	N STOP SIGN	N N N	CLR DRY DAY	ANGL-OTH ANGL INJ	01	NONE 0 PRVTE PSNGR CAR	STRGHT NW SE	01	DRVR	INJC	77	F
											02	NONE 0 PRVTE PSNGR CAR	STRGHT E W	01	DRVR	NONE	36	M
														02	PSNG	INJB	05	M
														03	PSNG	INJB	09	F
														04	PSNG	NO<5	03	M
											03	NONE 0 PRVTE PSNGR CAR	STOP W E	01	DRVR	INJB	58	M

OREGON DEPARTMENT OF TRANSPORTATION - POLICY, DATA AND ANALYSIS DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
COUNTY ROAD CRASH LISTING

CLACKAMAS COUNTY

Intersectional Crashes at SE Kelso Rd & SE Orient Dr
January 1, 2014 through December 31, 2018

```
                D
                R
        S       U
        E       G S W                                 COUNTY ROADS                          INT-TYP                                              SPCL
SER#    E A / C O DATE          MILEPNT    FIRST  STREET             RD CHAR  (MEDIAN)  INT-REL    OFF-RD WTHR  CRASH TYP       USE        MOVE                      A S
INVEST  E L M H R DAY/TIME      DIST FROM  SECOND STREET             DIRECT    LEGS     TRAF-      RNDBT  SURF  COLL TYP        TRLR QTY   FROM        PRTC  INJ     G E
UNLOC?  D C J L K LAT/LONG      INTERSECT  INTERSECTION SEQ #        LOCTN    (#LANES)  CONTL      DRVWY  LIGHT SVRTY        V# OWNER      TO       P# TYPE  SVRTY  E X
-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------
04630   N N N N N 11/6/2015       0.74     SE ORIENT DR              INTER     CROSS    N            N    CLR   ANGL-OTH     01 NONE   0   STRGHT
COUNTY    N       Fri    4P                                          CN                 STOP SIGN    N    DRY   ANGL            PRVTE      NW  SE
No        45 25  6.17 -122  18 30.46                                 01          0                   N    DAY   INJ             PSNGR CAR           01 DRVR  INJA  17 M

                                                                                                                                                    02 PSNG  INJB  19 F
                                                                                                                                                    03 PSNG  INJB  13 M
                                                                                                                               02 NONE   0   STRGHT
                                                                                                                                  PRVTE      E   W
                                                                                                                                  PSNGR CAR         01 DRVR  INJA  26 F

                                                                                                                               03 NONE   0   STOP
                                                                                                                                  PRVTE      W   E
                                                                                                                                  PSNGR CAR         01 DRVR  NONE  29 M

04871   N N N N N 10/21/2016      0.74     SE ORIENT DR              INTER     CROSS    N            N    CLD   ANGL-OTH     01 NONE   9   STRGHT
COUNTY    N       Fri    1P                                          CN                 FLASHBCN-R   N    DRY   ANGL            N/A        NW  SE
No        45 25  6.17 -122  18 30.46                                 01          0                   N    DAY   PDO             PSNGR CAR           01 DRVR  NONE  00 U

                                                                                                                               02 NONE   9   STRGHT
                                                                                                                                  N/A        E   W
                                                                                                                                  PSNGR CAR         01 DRVR  NONE  00 U

04490   N N N N N 10/27/2017      0.74     SE ORIENT DR              INTER     CROSS    N            N    CLR   O-1 L-TURN   01 NONE   0   STRGHT
COUNTY    N       Fri    2P                                          CN                 FLASHBCN-A   N    DRY   TURN            PRVTE      N   S
No        45 25  6.17 -122  18 30.46                                 01          0                   N    DAY   INJ             PSNGR CAR           01 DRVR  INJB  17 F

                                                                                                                                                    02 PSNG  INJB  15 F
                                                                                                                               02 NONE   0   TURN-L
                                                                                                                                  PRVTE      S   W
                                                                                                                                  PSNGR CAR         01 DRVR  NONE  42 M

00182   N N N N N 1/14/2014       0.74     SE ORIENT DR              INTER     CROSS    N            N    CLD   ANGL-OTH     01 NONE   0   STRGHT
COUNTY    N       Tue    7A                                          CN                 STOP SIGN    N    WET   ANGL            PRVTE      SE  NW
No        45 25  6.17 -122  18 30.46                                 02          0                   N    DAY   INJ             PSNGR CAR           01 DRVR  NONE  26 F

                                                                                                                               02 NONE   0   STRGHT
                                                                                                                                  PRVTE      E   W
                                                                                                                                  PSNGR CAR         01 DRVR  INJC  19 F
```

CDS380 12/9/2020

OREGON DEPARTMENT OF TRANSPORTATION - POLICY, DATA AND ANALYSIS DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
COUNTY ROAD CRASH LISTING

CLACKAMAS COUNTY

Intersectional Crashes at SE Kelso Rd & SE Orient Dr
January 1, 2014 through December 31, 2018

SER# / INVEST / UNLOC?	S P E D / E A / L M / D C (DRUG) / G S W / C O / H R / J L K	DATE / DAY/TIME / LAT/LONG	MILEPNT / DIST FROM INTERSECT	COUNTY ROADS FIRST STREET / SECOND STREET / INTERSECTION SEQ #	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) LEGS (#LANES)	INT-REL / TRAF- / CONTL	OFF-RD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX
01030	N N N	5/20/2014	0.74	SE ORIENT DR	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT					
NONE	N	Tue 11A			CN		STOP SIGN	N	DRY	ANGL		PRVTE	NW SE					
No	45 25	6.17 -122 18	30.46		03	0		N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	60	F
											02	NONE 0	STRGHT					
												PRVTE	W E					
												PSNGR CAR		01	DRVR	NONE	25	M
00871	N N N N N	3/5/2017	0.74	SE ORIENT DR	INTER	CROSS	N	N	RAIN	ANGL-OTH	01	NONE 0	STRGHT					
COUNTY	N	Sun 5P			CN		STOP SIGN	N	WET	ANGL		PRVTE	N S					
No	45 25	6.17 -122 18	30.46		03	0		N	DUSK	INJ		PSNGR CAR		01	DRVR	NONE	65	F
											02	NONE 0	STRGHT					
												PRVTE	W E					
												PSNGR CAR		01	DRVR	INJC	51	F
04869	N N N	11/18/2017	0.74	SE ORIENT DR	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 9	STRGHT					
NONE	N	Sat 4P			CN		FLASHBCN-R	N	DRY	TURN		N/A	NW SE					
No	45 25	6.17 -122 18	30.46		03	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	U
											02	NONE 9	TURN-R					
												N/A	W SE					
												PSNGR CAR		01	DRVR	NONE	00	U
02383	N N N N N	6/21/2014	0.74	SE ORIENT DR	INTER	CROSS	N	N	CLR	ANGL-OTH	01	NONE 0	STRGHT					
COUNTY	N	Sat 1P			CN		STOP SIGN	N	DRY	ANGL		PRVTE	S N					
No	45 25	6.17 -122 18	30.46		04	0		N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	22	M
											02	NONE 0	STRGHT					
												PRVTE	W E					
												PSNGR CAR		01	DRVR	NONE	45	F
02416	N N N N N	6/24/2014	0.74	SE ORIENT DR	INTER	CROSS	N	N	CLD	ANGL-OTH	01	NONE 0	TURN-R					
COUNTY	N	Tue 11A			CN		STOP SIGN	N	DRY	TURN		PRVTE	E N					
No	45 25	6.17 -122 18	30.46		04	0		N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	47	F
											02	NONE 0	STRGHT					
												PRVTE	S N					
												PSNGR CAR		01	DRVR	INJC	47	F

OREGON DEPARTMENT OF TRANSPORTATION - POLICY, DATA AND ANALYSIS DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CRASH SUMMARIES BY YEAR BY COLLISION TYPE

Intersectional Crashes at Kelso Rd & Bluff Rd
January 1, 2014 through December 31, 2018

COLLISION TYPE	FATAL CRASHES	NON-FATAL CRASHES	PROPERTY DAMAGE ONLY	TOTAL CRASHES	PEOPLE KILLED	PEOPLE INJURED	TRUCKS	DRY SURF	WET SURF	DAY	DARK	INTER-SECTION	INTER-SECTION RELATED	OFF-ROAD
YEAR: 2016														
TURNING MOVEMENTS	0	1	0	1	0	2	0	1	0	0	1	1	0	0
2016 TOTAL	0	1	0	1	0	2	0	1	0	0	1	1	0	0
YEAR: 2014														
FIXED / OTHER OBJECT	0	1	0	1	0	1	0	0	1	1	0	1	0	1
REAR-END	0	0	1	1	0	0	0	0	1	0	1	1	0	0
2014 TOTAL	0	1	1	2	0	1	0	0	2	1	1	2	0	1
FINAL TOTAL	0	2	1	3	0	3	0	1	2	1	2	3	0	1

Disclaimers: *Effective 2016,* ***collection of "Property Damage Only" (PDO) crash data elements was reduced for vehicles and participants.*** *Age, Gender, License, Error and other elements are no longer available for PDO crash reporting. Please keep this in mind when comparing 2016 PDO crash data to prior years.*

A higher number of crashes may be reported as of 2011 compared to prior years. This does not necessarily reflect an increase in annual crashes. The higher numbers may result from a change to an internal departmental process that allows the Crash Analysis and Reporting Unit to add previously unavailable, non-fatal crash reports to the annual data file. Please be aware of this change when comparing pre-2011 crash statistics. For all disclaimers, see https://www.oregon.gov/ODOT/Data/documents/Crash_Data_Disclaimers.pdf

OREGON DEPARTMENT OF TRANSPORTATION - POLICY, DATA AND ANALYSIS DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF SANDY, CLACKAMAS COUNTY

Intersectional Crashes at Kelso Rd & Bluff Rd
January 1, 2014 through December 31, 2018

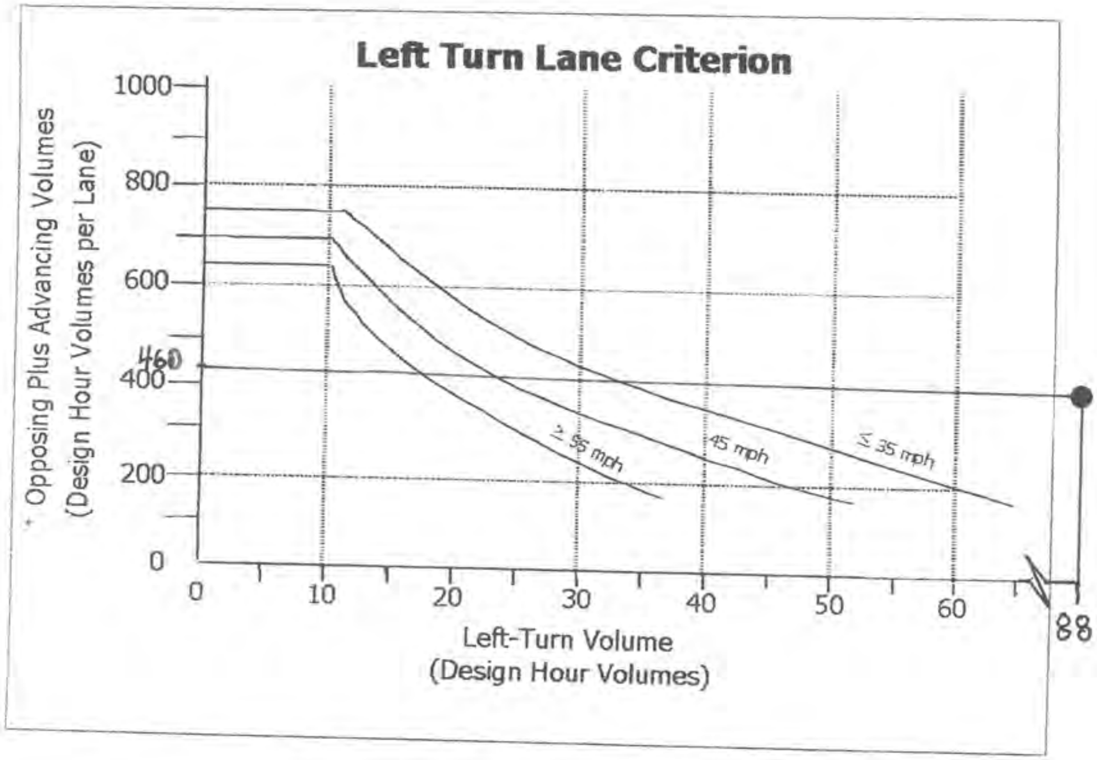
```
             D
             R
        S    U
        P    G S W                                CITY STREET                          INT-TYP                                                          SPCL
SER#    E A  / C O  DATE                          FIRST STREET              RD CHAR    (MEDIAN)  INT-REL  OFF-RD  WTHR   CRASH TYP       USE          MOVE                        A  S
INVEST  E L  M H R  DAY/TIME         FC           SECOND STREET             DIRECT     LEGS      TRAF-    RNDBT   SURF   COLL TYP        TRLR QTY     FROM           PRTC  INJ    G  E  LI(
UNLOC?  D C  J L K  LAT/LONG         DISTNC       INTERSECTION SEQ #        LOCTN      (#LANES)  CONTL    DRVWY   LIGHT  SVRTY      V#   OWNER        TO        P#   TYPE  SVRTY  E  X  RES

01794   Y N  N N N  05/10/2014       16           BLUFF RD                  INTER      CROSS     N             Y  CLD    FIX OBJ    01   NONE    0    STRGHT
CITY         N      Sat   12P        0            KELSO RD                  S                    STOP SIGN     N  WET    FIX             PRVTE        S  N
No      45 25  5.93  -122 16 23.21                1                         05         0                       N  DAY    INJ             PSNGR CAR                 01   DRVR  INJC   29 M  OR-
                                                                                                                                                                                      OR<
                                                                                                                                    02   NONE    0    PRKD-P
                                                                                                                                         PRVTE        W  E
                                                                                                                                         PSNGR CAR

04081   N N  N      10/14/2014       16           BLUFF RD                  INTER      CROSS     N             N  UNK    S-1STOP    01   NONE    0    STRGHT
NONE         N      Tue   11P        0            KELSO RD                  W                    STOP SIGN     N  WET    REAR            PRVTE        W  E
No      45 25  5.93  -122 16 23.21                1                         06         0                       N  DARK   PDO             PSNGR CAR                 01   DRVR  NONE   23 F  OR-
                                                                                                                                                                                      OR<
                                                                                                                                    02   NONE    0    STOP
                                                                                                                                         PRVTE        W  E
                                                                                                                                         PSNGR CAR                 01   DRVR  NONE   26 F  OR-
                                                                                                                                                                                      OR<

04061   N N  N      09/05/2016       16           BLUFF RD                  INTER      CROSS     N             N  CLR    O-1 L-TURN 01   NONE    0    STRGHT
NONE         N      Mon   8P         0            KELSO RD                  CN                   STOP SIGN     N  DRY    TURN            UNKN         N  S
No      45 25  5.93  -122 16 23.21                1                         01         0                       N  DLIT   INJ             PSNGR CAR                 01   DRVR  NONE   30 M  OR-
                                                                                                                                                                                      UNK
                                                                                                                                    02   NONE    0    TURN-L
                                                                                                                                         PRVTE        S  W
                                                                                                                                         PSNGR CAR                 01   DRVR  NONE   38 M  OR-
                                                                                                                                                                                      OR<
                                                                                                                                                                   02   PSNG  INJC   70 M
                                                                                                                                                                   03   PSNG  INJC   38 F
```

APPENDIX D
LEFT TURN LANE CRITERION



SE ORIENT DRIVE & SE KELSO ROAD
EXISTING CONDITIONS
PM PEAK HOUR, SB TRAFFIC

LEFT TURN LANE JUSTIFIED

APPENDIX E
LEVEL OF SERVICE COMPUTER PRINTOUTS

ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	DSK	Intersection	Kelso Road & Orient Dr.
Agency/Co.		Jurisdiction	City of Sandy
Date Performed	3/2/2021	Analysis Year	2021
Analysis Time Period	AM Peak Hour		

Project ID *Existing*

East/West Street: *Kelso Road* North/South Street: *Orient Dr.*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	6	58	10	31	158	90
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	6	104	32	69	82	7
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.90		0.90		0.90		0.90	
Flow Rate (veh/h)	81		309		156		174	
% Heavy Vehicles	1		15		3		41	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

	Eastbound L1	Eastbound L2	Westbound L1	Westbound L2	Northbound L1	Northbound L2	Southbound L1	Southbound L2
Prop. Left-Turns	0.1		0.1		0.0		0.4	
Prop. Right-Turns	0.1		0.3		0.2		0.0	
Prop. Heavy Vehicle	0.0		0.1		0.0		0.4	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		0.1		-0.1		0.8	

Departure Headway and Service Time

	Eastbound L1	Eastbound L2	Westbound L1	Westbound L2	Northbound L1	Northbound L2	Southbound L1	Southbound L2
hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.07		0.27		0.14		0.15	
hd, final value (s)	5.29		5.07		5.19		5.96	
x, final value	0.12		0.43		0.22		0.29	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	3.3		3.1		3.2		4.0	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	331		559		406		424	
Delay (s/veh)	9.00		11.91		9.68		11.35	
LOS	A		B		A		B	
Approach: Delay (s/veh)	9.00		11.91		9.68		11.35	
LOS	A		B		A		B	
Intersection Delay (s/veh)	10.96							
Intersection LOS	B							

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	DSK	Intersection	Kelso Road & Orient Dr.
Agency/Co.	Kelly Engineering	Jurisdiction	City of Sandy
Date Performed	3/2/2021	Analysis Year	2023
Analysis Time Period	AM Peak Hour		

Project ID Year 2023 w/o Project

East/West Street: Kelso Road | North/South Street: Orient Dr.

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	6	63	11	34	170	96
%Thrus Left Lane						
Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	6	109	34	72	86	7
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.90		0.90		0.90		0.90	
Flow Rate (veh/h)	88		331		164		182	
% Heavy Vehicles	1		15		3		41	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

Prop. Left-Turns	0.1		0.1		0.0		0.4	
Prop. Right-Turns	0.1		0.3		0.2		0.0	
Prop. Heavy Vehicle	0.0		0.1		0.0		0.4	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.1		0.1		-0.1		0.8	

Departure Headway and Service Time

hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.08		0.29		0.15		0.16	
hd, final value (s)	5.40		5.15		5.31		6.08	
x, final value	0.13		0.47		0.24		0.31	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	3.4		3.2		3.3		4.1	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	338		581		414		432	
Delay (s/veh)	9.23		12.70		9.99		11.76	
LOS	A		B		A		B	
Approach: Delay (s/veh)	9.23		12.70		9.99		11.76	
LOS	A		B		A		B	
Intersection Delay (s/veh)	11.50							
Intersection LOS	B							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	DSK
Agency/Co.	Kelly Engineering
Date Performed	3/2/2021
Analysis Time Period	AM Peak Hour

Site Information

Intersection	Kelso Road & Orient Dr.
Jurisdiction	City of Sandy
Analysis Year	2023

Project ID *Year 2023 with Project*

East/West Street: *Kelso Road* | North/South Street: *Orient Dr.*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	6	65	11	35	177	101
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	6	109	34	74	86	7
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.90		0.90		0.90		0.90	
Flow Rate (veh/h)	90		346		164		184	
% Heavy Vehicles	1		15		3		41	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

	Eastbound L1	Eastbound L2	Westbound L1	Westbound L2	Northbound L1	Northbound L2	Southbound L1	Southbound L2
Prop. Left-Turns	0.1		0.1		0.0		0.4	
Prop. Right-Turns	0.1		0.3		0.2		0.0	
Prop. Heavy Vehicle	0.0		0.1		0.0		0.4	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		0.1		-0.1		0.8	

Departure Headway and Service Time

	Eastbound L1	Eastbound L2	Westbound L1	Westbound L2	Northbound L1	Northbound L2	Southbound L1	Southbound L2
hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.08		0.31		0.15		0.16	
hd, final value (s)	5.45		5.17		5.37		6.14	
x, final value	0.14		0.50		0.24		0.31	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	3.5		3.2		3.4		4.1	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	340		596		414		434	
Delay (s/veh)	9.31		13.17		10.10		11.92	
LOS	A		B		B		B	
Approach: Delay (s/veh)	9.31		13.17		10.10		11.92	
LOS	A		B		B		B	
Intersection Delay (s/veh)	11.79							
Intersection LOS	B							

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	DSK	Intersection	Kelso Road & Orient Dr.
Agency/Co.	Kelly Engineering	Jurisdiction	City of Sandy
Date Performed	3/2/2021	Analysis Year	2021
Analysis Time Period	PM Peak Hour		

Project ID Existing

East/West Street: Kelso Road | North/South Street: Orient Dr.

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	12	101	22	32	62	58
%Thrus Left Lane						
Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	6	142	52	88	167	11
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.91		0.91		0.91		0.91	
Flow Rate (veh/h)	147		166		219		291	
% Heavy Vehicles	2		4		1		2	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

	EB L1	EB L2	WB L1	WB L2	NB L1	NB L2	SB L1	SB L2
Prop. Left-Turns	0.1		0.2		0.0		0.3	
Prop. Right-Turns	0.2		0.4		0.3		0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		-0.1		-0.1		0.1	

Departure Headway and Service Time

	EB L1	EB L2	WB L1	WB L2	NB L1	NB L2	SB L1	SB L2
hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.13		0.15		0.19		0.26	
hd, final value (s)	5.50		5.40		5.10		5.20	
x, final value	0.22		0.25		0.31		0.42	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	3.5		3.4		3.1		3.2	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	397		416		469		541	
Delay (s/veh)	10.09		10.18		10.39		11.90	
LOS	B		B		B		B	
Approach: Delay (s/veh)	10.09		10.18		10.39		11.90	
LOS	B		B		B		B	
Intersection Delay (s/veh)	10.83							
Intersection LOS	B							

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ALL-WAY STOP CONTROL ANALYSIS

General Information

Analyst	DSK
Agency/Co.	Kelly Engineering
Date Performed	3/2/2021
Analysis Time Period	PM Peak Hour

Site Information

Intersection	Kelso Road & Orient Dr.
Jurisdiction	City of Sandy
Analysis Year	2023

Project ID *Year 2023 w/o Project*

East/West Street: *Kelso Road* | North/South Street: *Orient Dr.*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	13	110	23	35	66	62
%Thrus Left Lane						

Approach	Northbound			Southbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	6	147	56	93	175	12
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.91		0.91		0.91		0.91	
Flow Rate (veh/h)	159		178		228		307	
% Heavy Vehicles	2		4		1		2	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

	Eastbound L1	Eastbound L2	Westbound L1	Westbound L2	Northbound L1	Northbound L2	Southbound L1	Southbound L2
Prop. Left-Turns	0.1		0.2		0.0		0.3	
Prop. Right-Turns	0.2		0.4		0.3		0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		-0.1		-0.1		0.1	

Departure Headway and Service Time

	Eastbound L1	Eastbound L2	Westbound L1	Westbound L2	Northbound L1	Northbound L2	Southbound L1	Southbound L2
hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.14		0.16		0.20		0.27	
hd, final value (s)	5.64		5.53		5.24		5.32	
x, final value	0.25		0.27		0.33		0.45	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	3.6		3.5		3.2		3.3	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	409		428		478		557	
Delay (s/veh)	10.50		10.60		10.82		12.65	
LOS	B		B		B		B	
Approach: Delay (s/veh)	10.50		10.60		10.82		12.65	
LOS	B		B		B		B	
Intersection Delay (s/veh)	11.36							
Intersection LOS	B							

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ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	DSK	Intersection	Kelso Road & Orient Dr.
Agency/Co.	Kelly Engineering	Jurisdiction	City of Sandy
Date Performed	3/2/2021	Analysis Year	2023
Analysis Time Period	PM Peak Hour		

Project ID *Year 2023 with Project*

East/West Street: *Kelso Road* — North/South Street: *Orient Dr.*

Volume Adjustments and Site Characteristics

Approach	Eastbound			Westbound		
Movement	L	T	R	L	T	R
Volume (veh/h)	13	118	23	36	71	65
%Thrus Left Lane						
Approach	**Northbound**			**Southbound**		
Movement	L	T	R	L	T	R
Volume (veh/h)	6	147	58	98	175	12
%Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.91		0.91		0.91		0.91	
Flow Rate (veh/h)	168		188		230		312	
% Heavy Vehicles	2		4		1		2	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet

	EB L1	EB L2	WB L1	WB L2	NB L1	NB L2	SB L1	SB L2
Prop. Left-Turns	0.1		0.2		0.0		0.3	
Prop. Right-Turns	0.1		0.4		0.3		0.0	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
hRT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
hHV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	-0.0		-0.1		-0.1		0.1	

Departure Headway and Service Time

	EB L1	EB L2	WB L1	WB L2	NB L1	NB L2	SB L1	SB L2
hd, initial value (s)	3.20		3.20		3.20		3.20	
x, initial	0.15		0.17		0.20		0.28	
hd, final value (s)	5.71		5.60		5.33		5.40	
x, final value	0.27		0.29		0.34		0.47	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t_s (s)	3.7		3.6		3.3		3.4	

Capacity and Level of Service

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	418		438		480		562	
Delay (s/veh)	10.78		10.90		11.05		13.07	
LOS	B		B		B		B	
Approach: Delay (s/veh)	10.78		10.90		11.05		13.07	
LOS	B		B		B		B	
Intersection Delay (s/veh)	11.67							
Intersection LOS	B							

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*Kelso Road & Bluff Road*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Sandy*
Date Performed	*3/2/2021*	Analysis Year	*2021*
Analysis Time Period	*AM Peak Hour*		

Project Description *Existing*

East/West Street: *Kelso Road*	North/South Street: *Bluff Road*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	32	132	1	0	134	20
Peak-Hour Factor, PHF	0.67	0.67	0.67	0.67	0.67	0.67
Hourly Flow Rate, HFR (veh/h)	47	197	1	0	199	29
Percent Heavy Vehicles	3	--	--	3	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	32	1	36	2	1	0
Peak-Hour Factor, PHF	0.67	0.67	0.67	0.67	0.67	0.67
Hourly Flow Rate, HFR (veh/h)	47	1	53	2	1	0
Percent Heavy Vehicles	3	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	47	0		3			101	
C (m) (veh/h)	1334	1369		427			601	
v/c	0.04	0.00		0.01			0.17	
95% queue length	0.11	0.00		0.02			0.60	
Control Delay (s/veh)	7.8	7.6		13.5			12.2	
LOS	A	A		B			B	
Approach Delay (s/veh)	--	--	13.5			12.2		
Approach LOS	--	--	B			B		

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3/2/2021

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	DSK	Intersection	Kelso Road & Bluff Road
Agency/Co.	Kelly Engineering	Jurisdiction	City of Sandy
Date Performed	3/2/2021	Analysis Year	2023
Analysis Time Period	AM Peak Hour		

Project Description: Year 2023 w/o Project	
East/West Street: Kelso Road	North/South Street: Bluff Road
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	34	139	1	0	139	21
Peak-Hour Factor, PHF	0.67	0.67	0.67	0.67	0.67	0.67
Hourly Flow Rate, HFR (veh/h)	50	207	1	0	207	31
Percent Heavy Vehicles	3	--	--	3	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	36	1	41	2	1	0
Peak-Hour Factor, PHF	0.67	0.67	0.67	0.67	0.67	0.67
Hourly Flow Rate, HFR (veh/h)	53	1	61	2	1	0
Percent Heavy Vehicles	3	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	50	0		3			115	
C (m) (veh/h)	1323	1357		405			586	
v/c	0.04	0.00		0.01			0.20	
95% queue length	0.12	0.00		0.02			0.72	
Control Delay (s/veh)	7.8	7.7		14.0			12.6	
LOS	A	A		B			B	
Approach Delay (s/veh)	--	--	14.0			12.6		
Approach LOS	--	--	B			B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	DSK	Intersection	Kelso Road & Bluff Road
Agency/Co.	Kelly Engineering	Jurisdiction	City of Sandy
Date Performed	3/2/2021	Analysis Year	2023
Analysis Time Period	AM Peak Hour		

Project Description Year 2023 with Project

East/West Street: Kelso Road	North/South Street: Bluff Road
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	37	139	1	0	139	22
Peak-Hour Factor, PHF	0.67	0.67	0.67	0.67	0.67	0.67
Hourly Flow Rate, HFR (veh/h)	55	207	1	0	207	32
Percent Heavy Vehicles	3	--	--	3	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	37	1	51	2	1	0
Peak-Hour Factor, PHF	0.67	0.67	0.67	0.67	0.67	0.67
Hourly Flow Rate, HFR (veh/h)	55	1	76	2	1	0
Percent Heavy Vehicles	3	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	55	0		3			132	
C (m) (veh/h)	1322	1357		389			595	
v/c	0.04	0.00		0.01			0.22	
95% queue length	0.13	0.00		0.02			0.84	
Control Delay (s/veh)	7.8	7.7		14.3			12.8	
LOS	A	A		B			B	
Approach Delay (s/veh)	--	--	14.3			12.8		
Approach LOS	--	--	B			B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	DSK	Intersection	Kelso Road & Bluff Road
Agency/Co.	Kelly Engineering	Jurisdiction	City of Sandy
Date Performed	3/2/2021	Analysis Year	2021
Analysis Time Period	PM Peak Hour		

Project Description	Existing		
East/West Street:	Kelso Road	North/South Street:	Bluff Road
Intersection Orientation:	North-South	Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	41	116	5	0	152	10
Peak-Hour Factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82
Hourly Flow Rate, HFR (veh/h)	50	141	6	0	185	12
Percent Heavy Vehicles	1	--	--	1	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	19	2	87	1	4	0
Peak-Hour Factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82
Hourly Flow Rate, HFR (veh/h)	23	2	106	1	4	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	50	0		5			131	
C (m) (veh/h)	1382	1441		476			759	
v/c	0.04	0.00		0.01			0.17	
95% queue length	0.11	0.00		0.03			0.62	
Control Delay (s/veh)	7.7	7.5		12.6			10.7	
LOS	A	A		B			B	
Approach Delay (s/veh)	--	--	12.6			10.7		
Approach LOS	--	--	B			B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	DSK	Intersection	Kelso Road & Bluff Road
Agency/Co.	Kelly Engineering	Jurisdiction	City of Sandy
Date Performed	3/2/2021	Analysis Year	2023
Analysis Time Period	PM Peak Hour		
Project Description	Year 2023 w/o Project		
East/West Street:	Kelso Road	North/South Street:	Bluff Road
Intersection Orientation:	North-South	Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	43	122	5	0	160	11
Peak-Hour Factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82
Hourly Flow Rate, HFR (veh/h)	52	148	6	0	195	13
Percent Heavy Vehicles	1	--	--	1	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	13	2	92	1	4	0
Peak-Hour Factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82
Hourly Flow Rate, HFR (veh/h)	15	2	112	1	4	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	52	0		5			129	
C (m) (veh/h)	1369	1433		460			772	
v/c	0.04	0.00		0.01			0.17	
95% queue length	0.12	0.00		0.03			0.60	
Control Delay (s/veh)	7.7	7.5		12.9			10.6	
LOS	A	A		B			B	
Approach Delay (s/veh)	--	--	12.9			10.6		
Approach LOS	--	--	B			B		

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3/2/2021

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	DSK	Intersection	Kelso Road & Bluff Road
Agency/Co.	Kelly Engineering	Jurisdiction	City of Sandy
Date Performed	3/2/2021	Analysis Year	2023
Analysis Time Period	PM Peak Hour		

Project Description Year 2023 with Project

East/West Street: Kelso Road	North/South Street: Bluff Road
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	54	122	5	0	160	12
Peak-Hour Factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82
Hourly Flow Rate, HFR (veh/h)	65	148	6	0	195	14
Percent Heavy Vehicles	1	--	--	1	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	14	2	98	1	4	0
Peak-Hour Factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82
Hourly Flow Rate, HFR (veh/h)	17	2	119	1	4	0
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (veh/h)	65	0		5			138	
C (m) (veh/h)	1368	1433		437			761	
v/c	0.05	0.00		0.01			0.18	
95% queue length	0.15	0.00		0.03			0.66	
Control Delay (s/veh)	7.8	7.5		13.3			10.8	
LOS	A	A		B			B	
Approach Delay (s/veh)	--	--	13.3			10.8		
Approach LOS	--	--	B			B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*DSK*	Intersection	*Kelso Road & site access*
Agency/Co.	*Kelly Engineering*	Jurisdiction	*City of Sandy*
Date Performed	*3/2/2021*	Analysis Year	*2023*
Analysis Time Period	*AM Peak Hour*		
Project Description	*Year 2023 with Project*		
East/West Street:	*Kelso Road*	North/South Street:	*site access*
Intersection Orientation:	*East-West*	Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		159	4	4	271	
Peak-Hour Factor, PHF	0.82	0.80	0.80	0.80	0.80	0.82
Hourly Flow Rate, HFR (veh/h)	0	198	4	4	338	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	13		11			
Peak-Hour Factor, PHF	0.80	0.82	0.80	0.82	0.82	0.82
Hourly Flow Rate, HFR (veh/h)	16	0	13	0	0	0
Percent Heavy Vehicles	0	0	0	1	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		4		29				
C (m) (veh/h)		1382		613				
v/c		0.00		0.05				
95% queue length		0.01		0.15				
Control Delay (s/veh)		7.6		11.2				
LOS		A		B				
Approach Delay (s/veh)	--	--	11.2					
Approach LOS	--	--	B					

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3/2/2021

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	DSK	Intersection	Kelso Road & site access
Agency/Co.	Kelly Engineering	Jurisdiction	City of Sandy
Date Performed	3/2/2021	Analysis Year	2023
Analysis Time Period	PM Peak Hour		

Project Description Year 2023 with Project

East/West Street: Kelso Road	North/South Street: site access
Intersection Orientation: East-West	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		266	15	12	108	
Peak-Hour Factor, PHF	0.82	0.80	0.80	0.80	0.80	0.82
Hourly Flow Rate, HFR (veh/h)	0	332	18	14	134	0
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration			TR	LT		
Upstream Signal		0			0	
Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	9		7			
Peak-Hour Factor, PHF	0.80	0.82	0.80	0.82	0.82	0.82
Hourly Flow Rate, HFR (veh/h)	11	0	8	0	0	0
Percent Heavy Vehicles	0	0	0	1	0	0
Percent Grade (%)		0			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration		LR				

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		LT		LR				
v (veh/h)		14		19				
C (m) (veh/h)		1220		589				
v/c		0.01		0.03				
95% queue length		0.03		0.10				
Control Delay (s/veh)		8.0		11.3				
LOS		A		B				
Approach Delay (s/veh)	--	--	11.3					
Approach LOS	--	--	B					

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APPPENDIX F
REFERENCES

References

1. Trip Generation Manual, 10th Edition, 2017, Institute of Transportation Engineers.

2. Highway Capacity Manual, 2000 and 2010, Transportation Research Board, National Research Council.

3. Discussions with staff from Clackamas County.

4. Discussions with staff from the City of Sandy.

5. The City of Sandy, Pre-Application Conference Notes, Sandy Woods Phase 2, March 11, 2020.

6. Clackamas County Memorandum, Department of Transportation and Development, March 11, 2020.

7. Sandy Bluff Annex 6 Subdivision & Future Development, Transportation Impact Study, Lancaster Engineering, 321 SW 4th Ave., Suite 400, Portland, OR 97204.

Tree Preservation Plan for Sandy Woods Phase 2

This Arborist Report pertains to a Type 2 Permit for a subdivision at 37090 SE Kelso Rd., Sandy, Oregon. There are 494 trees that are 6 inches DBH or larger listed in the attached Tree Table. Trees were tagged, measured, and evaluated for preservation potential. The site is 39 acres and 152 trees of 11-inch diameter and larger will be preserved. There are 86 conifers and 66 deciduous trees being preserved. There are also 91 trees between 6 inches DBH and 11 inches DBH being preserved. This satisfies the criteria listed in City Code below.

> 17.102.50 TREE RETENTION AND PROTECTION REQUIREMENTS
> A. Tree Retention: The landowner is responsible for retention and protection of trees required to be retained as specified below:
> 1. At least three trees 11 inches DBH or greater are to be retained for every one-acre of contiguous ownership.
> 2. Retained trees can be located anywhere on the site at the landowner's discretion before the harvest begins. Clusters of trees are encouraged.
> 3. Trees proposed for retention shall be healthy and likely to grow to maturity, and be located to minimize the potential for blow-down following the harvest.
> 4. If possible, at least two of the required trees per acre must be of conifer species.
> 5. Trees within the required protected setback areas may be counted towards the tree retention standard if they meet these requirements.

Trees being preserved have been assigned root protection zones (RPZs) and RPZ radii are listed in the Tree Table. City Code requires that RPZ radii be a minimum of 10 ft. from tree trunks. Protected trees will be cordoned off with fencing a minimum of six feet tall supported with metal posts placed no farther than ten feet apart. Root protection zones may be entered by pedestrians only for tasks like surveying, measuring and sampling.

Except as otherwise determined by the Planning Director, all tree protection measures shall be instituted prior to any development activity including, but not limited to, tree removal, clearing, grading, excavation, and demolition work. Fencing shall be removed only after completion of all construction activity. City Code requires that trees to be protected be marked with yellow flagging tape.

Tree protection measures must be inspected and approved by the City before construction activity, including tree removal, begins. Without the owner's authorization and the project arborist's supervision, none of the following is allowed within a root protection zone:
1. New buildings;
2. Grade change or cut and fill, during or after construction;
3. New impervious surfaces;
4. Utility or drainage field placement;

5. Staging or storage of materials and equipment during construction;

Portland Tree Consulting

6. Vehicle maneuvering during construction.

Any activity within a root protection zone, including adjustment of the tree protection fence, must be approved by the project arborist and the City Planning Director. It is usually feasible to build within the protected area with special construction techniques and limitations.

The goal of this tree preservation plan is to satisfy the tree preservation code, and to observe all laws, rules, and regulations. All trees to be removed should be verified and marked before any clearing begins. It is the owner's responsibility to implement this tree preservation plan and to monitor the construction process to its conclusion. Deviations can result in tree damage, liability, and violations of the City Code.

Portland Tree Consulting PO Box 19042 Portland, OR 97280
503.421.3883 info@pdxtreeconsulting.com CCB 230301

1. Client warrants any legal description provided to the Consultant is correct and titles and ownerships to property are good and marketable. Consultant shall not be responsible for incorrect information provided by Client.

2. Consultant can neither guarantee nor be responsible for the accuracy of information provided by others.

3. The Consultant shall not be required to give testimony or attend court or hearings unless subsequent contractual arrangements are made, including additional fees.

4. The report and any values expressed therein represent the opinion of the Consultant, and the Consultant's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.

5. Sketches, drawings, and photographs in the report are intended as visual aids and may not be to scale. The reproduction of information generated by others will be for coordination and ease of reference. Inclusion of such information does not warrant the sufficiency or accuracy of the information by the Consultant.

6. Unless expressed otherwise, information in the report covers only items that were examined and reflects the condition at the time of inspection. The inspection is limited to visual examination of accessible items without laboratory analysis, dissection, excavation, probing, or coring, unless otherwise stated.

7. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the plants or property in question may not arise in the future.

8. The report is the completed work product. Any additional work, including production of a site plan, addenda and revisions, construction of tree protection measures, tree work, or inspection of tree protection measures, for example, must be contracted separately. Loss or alteration of any part of the report invalidates the entire report.

9. Any action or proceeding seeking to enforce any provision of this Agreement shall be brought against any of the parties in Multnomah County Circuit Court of the State of Oregon, or, when applicable, in the United States District Court for the District of Oregon. Each party consents to the jurisdiction of such courts (and of the appropriate appellate courts) and waives any objection to such venue.

Ryan Neumann
503.548.3119
neighborhoodtree.llc@gmail.com
ISA Certified Arborist PN-5539A TRAQ Qualified

Tag	Species	DBH	Remarks	DDDD	RPZ	17.102.50 Retention Tree	Undersize	Action
1312	Douglas fir	51	viable; blackberries		24	✓✓		PRESERVE
1313	western red ce	19	size estimated due to blackberries; dead top; terminal decline	X	12	NO		PRESERVE
1314	western red ce	45	viable		24	✓✓		PRESERVE
1315	big leaf maple	10	suppressed		8	NO	X	PRESERVE
1316	big leaf maple	8	suppressed		9	NO	X	PRESERVE
1317	sweet cherry	9	excessive lean	X	12	NO	X	PRESERVE
1318	red alder	12	viable		8	NO		REMOVE
1319	big leaf maple	7			8	NO	X	PRESERVE
1320	big leaf maple	7			8	NO	X	PRESERVE
1321	western red ce	7			8	NO	X	PRESERVE
1322	Douglas fir	42	viable; codominant @ 50'		25	✓✓		PRESERVE
1323	Douglas fir	47	viable; trunk swoop		25	✓✓		PRESERVE
1324	Douglas fir	32	viable		22	✓✓		PRESERVE
1325	Douglas fir	30	viable		22	✓✓		PRESERVE
1326	western red ce	10	viable		8	NO	X	PRESERVE
1327	Douglas fir	36	viable		24	✓✓		PRESERVE
1328	Douglas fir	33	viable		24	✓✓		PRESERVE
1329	sweet cherry	8	viable		8	NO	X	PRESERVE
1330	red alder	8	viable	X	8	NO	X	PRESERVE
1331	Douglas fir	16	viable		12	✓✓		PRESERVE
1332	snag	n/a	dead; approx. 19' tall; habitat	X	8	NO		PRESERVE
1333	sweet cherry	10	viable		8	NO	X	PRESERVE
1334	sweet cherry	9	viable		8	NO	X	PRESERVE
1335	sweet cherry	7	viable		8	NO	X	PRESERVE
1336	western hemlo	19	viable		14	✓✓		PRESERVE
1337	Douglas fir	44	viable		24	✓✓		PRESERVE
1338	big leaf maple	8	viable		8	NO	X	PRESERVE
1339	Douglas fir	17	suppressed		12	✓✓		PRESERVE
1340	Douglas fir	40	viable		24	✓✓		PRESERVE
1341	Douglas fir	25	viable		24	✓✓		PRESERVE
1342	Douglas fir	27	viable		16	NO		REMOVE
1343	big leaf maple	18	stem decay	X	18	NO		REMOVE
1344	Douglas fir	53	viable		24	✓✓		PRESERVE

Tag	Species	DBH	Remarks	DDDD	RPZ	17.102.50 Retention Tree	Undersize	Action
1345	bitter cherry	9	viable		8	NO	X	PRESERVE
1346	big leaf maple	18	viable		12	✓		PRESERVE
1347	red alder	12	viable		8	✓		PRESERVE
1348	red alder	9	viable		8	NO	X	PRESERVE
1349	red alder	9	viable		8	NO	X	PRESERVE
1350	red alder	15	viable		10	✓		PRESERVE
1351	blue spruce	9	viable		8	NO	X	REMOVE
1352	Douglas fir	35	viable		24	NO		REMOVE
1353	Douglas fir	16	viable		12	NO		REMOVE
1354	Douglas fir	35	viable		24	NO		REMOVE
1355	western red ce	43	viable		25	NO		REMOVE
1356	big leaf maple	27	viable		18	NO		REMOVE
1357	big leaf maple	9	excessive lean	X	8	NO	X	REMOVE
1358	Douglas fir	35	viable		24	NO		REMOVE
1359	red alder	9	viable		8	NO	X	REMOVE
1360	red alder	11	viable		8	NO		REMOVE
1361	red alder	7			8	NO	X	REMOVE
1362	red alder	10	viable		8	NO	X	REMOVE
1363	red alder	11	viable		8	NO		REMOVE
1364	red alder	7			8	NO	X	REMOVE
1365	red alder	6			8	NO	X	REMOVE
1366	Douglas fir	15	viable		10	NO		REMOVE
1367	red alder	6			8	NO	X	REMOVE
1368	red alder	6			8	NO	X	REMOVE
1369	red alder	7			8	NO	X	REMOVE
1370	big leaf maple	8	viable		8	NO	X	REMOVE
1371	red alder	6			8	NO	X	REMOVE
1372	big leaf maple	6			8	NO	X	REMOVE
1373	big leaf maple	8	viable		10	NO	X	REMOVE
1374	red alder	15	viable		8	NO		REMOVE
1375	big leaf maple	6			8	NO	X	REMOVE
1376	big leaf maple	6			8	NO	X	REMOVE
1377	red alder	6			8	NO	X	REMOVE

Tag	Species	DBH	Remarks	DDDD	RPZ	17.102.50 Retention Tree	Undersize	Action
1378	red alder	7			8	NO	X	REMOVE
1379	red alder	8	viable		8	NO	X	REMOVE
1380	red alder	8	viable		8	NO	X	REMOVE
1381	red alder	7			8	NO	X	REMOVE
1382	red alder	6			8	NO	X	REMOVE
1383	red alder	11	viable		8	NO		REMOVE
1384	red alder	7			8	NO	X	REMOVE
1385	red alder	11	viable		8	NO		REMOVE
1386	red alder	7			8	NO	X	REMOVE
1387	red alder	6			8	NO	X	REMOVE
1388	red alder	9	viable		8	NO	X	REMOVE
1389	red alder	6			8	NO	X	REMOVE
1390	red alder	8	listed	X	8	NO	X	REMOVE
1391	western red ce	56	viable		25	NO		REMOVE
1392	big leaf maple	8	suppressed		8	NO	X	REMOVE
1393	big leaf maple	5	suppressed		8	NO	X	REMOVE
1394	big leaf maple	14	viable		8	NO		REMOVE
1395	big leaf maple	6			8	NO	X	REMOVE
1396	big leaf maple	34	viable; shares stump with T1397		22	NO		REMOVE
1397	big leaf maple	43	viable; shares stump with T1396		25	NO		REMOVE
1398	Douglas fir	33	viable		22	✓✓		PRESERVE
1399	western red ce	30	viable; grown over wire fence		20	✓✓		PRESERVE
1401	Douglas fir	46	viable		25	✓✓		PRESERVE
1402	western red ce	45	viable; shares stump with T1403		25	✓✓		PRESERVE
1403	Douglas fir	24	viable; shares stump with T1402		18	✓✓		PRESERVE
1404	Douglas fir	29	viable		20	✓✓		PRESERVE
1405	Douglas fir	27	viable		20	✓✓		PRESERVE
1406	big leaf maple	7			8	NO	X	PRESERVE
1407	Douglas fir	30	viable		22	✓✓		PRESERVE
1440	red alder	11	viable		8	✓		PRESERVE
1441	red alder	12	viable		10	NO		REMOVE
1442	red alder	8	viable		8	NO	X	REMOVE
1443	Douglas fir	50	viable		25	✓✓		PRESERVE

Tag	Species	DBH	Remarks	DDDD	RPZ	17.102.50 Retention Tree	Undersize	Action
1444	Douglas fir	47	trunk swoop @ 50'; re-grown top		25	NO		REMOVE
1445	red alder	7,7,6,6	clump; stump suckers	X	12	NO		REMOVE
1486	Douglas fir	43	viable		25	✓✓		PRESERVE
1487	Douglas fir	34	viable		24	✓✓		PRESERVE
1488	big leaf maple	40	stem decay; decline; broken top	X	25	NO		REMOVE
1489	big leaf maple	47	basal decay; multiple stems; inclusions	X	25	NO		REMOVE
1490	Douglas fir	35	viable		24	✓✓		PRESERVE
1491	scouler willow	17	viable		12	✓		PRESERVE
1492	Douglas fir	29	viable		22	✓✓		PRESERVE
1493	big leaf maple	8	viable		0	NO	X	PRESERVE
1494	big leaf maple	12	viable		10	✓		PRESERVE
1495	big leaf maple	14	viable		10	✓		PRESERVE
1496	Douglas fir	44	viable		24	✓✓		PRESERVE
1497	red alder	12	viable		8	✓		PRESERVE
1498	red alder	10	viable		8	NO	X	PRESERVE
1499	red alder	12	viable		8	✓		PRESERVE
1500	red alder	13	viable; same as T1501		10	✓		PRESERVE
1502	red alder	15	viable		10	✓		PRESERVE
1503	red alder	11	viable		8	✓		PRESERVE
1504	western red ce	43	viable; shares stump with T1507 and T1506		25	✓✓		PRESERVE
1506	western red ce	46	viable; shares stump with T1504 and T1507		25	✓✓		PRESERVE
1507	western red ce	31	viable; shares stump with T1504 and T1506		20	✓✓		PRESERVE
1508	big leaf maple	16	viable		10	✓		PRESERVE
1509	red alder	10	viable		8	NO	X	REMOVE
1510	big leaf maple	26	viable		18	NO		REMOVE
1511	Douglas fir	39	viable		25	NO		REMOVE
1512	Douglas fir	43	viable		25	NO		REMOVE
1513	big leaf maple	11	viable		8	NO		REMOVE
1514	big leaf maple	30	viable		20	NO		REMOVE
1515	Douglas fir	18	suppressed		12	NO		REMOVE
1516	sweet cherry	8	viable		8	NO	X	REMOVE
1517	big leaf maple	18	viable		12	NO		REMOVE
1518	Douglas fir	36	red-ring rot	X	24	NO		REMOVE

Tag	Species	DBH	Remarks	DDDD	RPZ	17.102.50 Retention Tree	Undersize	Action
1519	Douglas fir	12	terminal decline	X	8	NO		REMOVE
1520	big leaf maple	31	basal decay; trunk decay	X	20	NO		REMOVE
1521	Douglas fir	37	viable		24	NO		REMOVE
1522	western hemlo	22	dead	X	14	NO		REMOVE
1523	Douglas fir	29	viable		18	NO		REMOVE
1524	Douglas fir	20	viable		14	NO		REMOVE
1525	big leaf maple	19			12	NO		REMOVE
1526	Douglas fir	23	viable		16	NO		REMOVE
1527	western hemlo	20	basal decay	X	14	NO		REMOVE
1528	Douglas fir	25	viable		16	NO		REMOVE
1529	sweet cherry	10	decline	X	0	NO	X	REMOVE
1530	Douglas fir	29	viable		22	✓✓		PRESERVE
1531	western hemlo	17	grows out of old stump		12	✓✓		PRESERVE
1532	Douglas fir	25	viable		18	✓✓		PRESERVE
1533	Douglas fir	34	viable		24	✓✓		PRESERVE
1534	sweet cherry	7			8	NO	X	REMOVE
1535	sweet cherry	6			8	NO	X	REMOVE
1536	Douglas fir	35	viable		24	✓✓		PRESERVE
1537	big leaf maple	16	viable		12	✓		PRESERVE
1538	Douglas fir	n/a	dead; on ground	X	0	NO		REMOVE
1539	Douglas fir	43	viable		24	✓✓		PRESERVE
1540	Douglas fir	28	viable; grows out of nurse log		20	✓✓		PRESERVE
1541	Douglas fir	35	viable		24	✓✓		PRESERVE
1542	red alder	14	viable		10	✓		PRESERVE
1543	red alder	16	viable		12	✓		PRESERVE
1544	Douglas fir	32	viable; on bank		22	✓✓		PRESERVE
1545	red alder	10	viable; in creek		8	NO	X	PRESERVE
1546	red alder	10	viable; in creek		8	NO	X	PRESERVE
1547	red alder	9	viable; in creek		8	NO	X	PRESERVE
1548	red alder	11	viable; in creek		8	✓		PRESERVE
1549	red alder	14	viable; in creek		10	✓		PRESERVE
1550	red alder	12	viable; in creek		8	✓		PRESERVE
1551	red alder	9	viable; in creek		8	NO	X	PRESERVE

Tag	Species	DBH	Remarks	DDDD	RPZ	17.102.50 Retention Tree	Undersize	Action
1552	red alder	14	viable; in creek		10	✓		PRESERVE
1553	red alder	18	viable; in creek		12	✓		PRESERVE
1554	red alder	16	viable		12	✓		PRESERVE
1555	red alder	11	viable		10	✓		PRESERVE
1556	red alder	14	viable		10	✓		PRESERVE
1557	red alder	19	terminal decline	X	12	NO		REMOVE
1558	red alder	10	viable		8	NO	X	PRESERVE
1559	red alder	14	viable		10	✓		PRESERVE
1560	red alder	14	viable; in creek		10	✓		PRESERVE
1561	red alder	21	viable; codominant @8'		14	✓		PRESERVE
1562	red alder	14	terminal decline	X	8	NO		REMOVE
1563	red alder	13	viable		8	✓		PRESERVE
1564	red alder	14	dead	X	8	NO		REMOVE
1565	red alder	15	trunk decay	X	10	NO		REMOVE
1566	red alder	11	viable		8	✓		PRESERVE
1567	red alder	15	viable		10	✓		PRESERVE
1568	red alder	22	dead	X	14	NO		REMOVE
1569	Douglas fir	49	trunk swoop @ 45'		24	✓✓		PRESERVE
1570	red alder	19	terminal decline	X	12	NO		REMOVE
1571	red alder	16	terminal decline	X	10	NO		REMOVE
1572	red alder	16	viable		10	✓		PRESERVE
1573	red alder	16	viable		10	✓		PRESERVE
1574	red alder	10	dead	X	8	NO	X	REMOVE
1575	red alder	16	decline	X	10	✓		PRESERVE
1576	Douglas fir	41	viable; swollen trunk		24	✓✓		PRESERVE
1577	big leaf maple	22	viable		16	✓		PRESERVE
1578	big leaf maple	21	viable		14	✓		PRESERVE
1579	big leaf maple	16	viable		0	NO		REMOVE
1580	big leaf maple	11	terminal decline	X	0	NO		REMOVE
1581	big leaf maple	11	viable		0	NO		REMOVE
1582	Douglas fir	53	viable		0	NO		REMOVE
1583	big leaf maple	8	viable		8	NO	X	PRESERVE
1584	big leaf maple	16	viable		12	✓		PRESERVE

Tag	Species	DBH	Remarks	DDDD	RPZ	17.102.50 Retention Tree	Undersize	Action
1585	big leaf maple	18	viable		12	✓		PRESERVE
1586	big leaf maple	8	viable		8	NO	X	PRESERVE
1587	big leaf maple	8	viable		8	NO	X	PRESERVE
1588	big leaf maple	7			8	NO	X	PRESERVE
1590	red alder	15	viable; same as T1589		12	✓		PRESERVE
1591	red alder	20	viable		14	✓		PRESERVE
1592	red alder	20	viable		14	✓		PRESERVE
1593	big leaf maple	29,14,13	viable; multiple stems; same as T1594, T1595, and T1596		24	✓		PRESERVE
1597	red alder	21	viable; same as T1598		14	✓		PRESERVE
1599	big leaf maple	32	trunk decay; decline; broken tops	X	20	NO		REMOVE
1704	Douglas fir	58	viable; codominant @ 25'		24	✓✓		PRESERVE
1709	Douglas fir	28	crook in stem @ 30'		18	NO		REMOVE
1712	big leaf maple	6			8	NO	X	PRESERVE
1742	red alder	10	viable		8	NO	X	PRESERVE
1746	western red ce	34	viable		22	NO		REMOVE
1751	red alder	9	viable		8	NO	X	PRESERVE
1755	Douglas fir	33	viable		22	NO		REMOVE
1769	Douglas fir	35	viable		24	NO		REMOVE
1770	Douglas fir	35	viable		24	NO		REMOVE
1771	Douglas fir	22	viable		14	NO		REMOVE
1775	red alder	18	viable		12	✓		PRESERVE
1776	big leaf maple	38	viable		25	NO		REMOVE
1777	big leaf maple	16	viable		10	NO		REMOVE
1778	big leaf maple	34	viable		24	NO		REMOVE
1779	big leaf maple	20,18,16	terminal decline	X	24	NO		REMOVE
1780	Douglas fir	34	viable; codominant @ 25'		22	NO		REMOVE
1781	Douglas fir	29	viable		20	NO		REMOVE
1782	Douglas fir	30	viable		20	NO		REMOVE
1783	Douglas fir	26	viable; ivy		16	NO		REMOVE
1785	Douglas fir	31	trunk swoop		20	NO		REMOVE
1786	western red ce	35	viable		25	NO		REMOVE
1787	big leaf maple	26,20	basal decay; terminal decline; one dead stem	X	20	NO		REMOVE
1789	Douglas fir	40	viable		25	NO		REMOVE

Tag	Species	DBH	Remarks	DDDD	RPZ	17.102.50 Retention Tree	Undersize	Action
1790	Douglas fir	31	viable		20	NO		REMOVE
1793	big leaf maple	38	viable		24	✓		PRESERVE
1800	red alder	15	viable		10	✓		PRESERVE
1801	red alder	11	viable		8	✓		PRESERVE
1802	Douglas fir	45	viable		24	✓✓		PRESERVE
1803	Douglas fir	37	viable		24	✓✓		PRESERVE
1805	Douglas fir	32	viable		22	✓✓		PRESERVE
1806	big leaf maple	8	viable		8	NO	X	PRESERVE
1808	Douglas fir	32	viable		20	✓✓		PRESERVE
1809	Douglas fir	34	viable		22	NO		REMOVE
1810	Douglas fir	8	viable		8	NO	X	PRESERVE
1811	big leaf maple	28,14,12	viable; 6" dead stem		20	NO		REMOVE
1812	Douglas fir	50	viable		25	NO		REMOVE
1813	Douglas fir	26	viable		16	NO		REMOVE
1814	Douglas fir	19	viable		12	NO		REMOVE
1815	Douglas fir	34	viable		22	NO		REMOVE
1816	Douglas fir	26	viable; shares stump with T1817		16	NO		REMOVE
1817	Douglas fir	29	viable; shares stump with T1816		20	NO		REMOVE
1818	Douglas fir	11	viable		8	NO		REMOVE
1819	big leaf maple	20	viable		14	NO		REMOVE
1820	western hemlo	18	viable		12	NO		REMOVE
1821	Douglas fir	10	viable		8	NO	X	REMOVE
1822	Douglas fir	31	viable		20	NO		REMOVE
1823	big leaf maple	36	basal decayl trunk decay; terminal decline	X	24	NO		REMOVE
1825	big leaf maple	27	basal decay; decline; same as T1824	X	18	NO		REMOVE
1826	western red ce	10	viable		8	NO	X	PRESERVE
1827	western red ce	21	viable		14	✓✓		PRESERVE
1828	western red ce	16	viable		10	✓✓		PRESERVE
1829	western red ce	66	viable; small dead top		24	✓✓		PRESERVE
1830	western red ce	14	viable		10	✓✓		PRESERVE
1831	red alder	17	viable		12	NO		REMOVE
1832	red alder	13	dead	X	10	NO		REMOVE
1833	big leaf maple	17	viable		12	NO		REMOVE

Tag	Species	DBH	Remarks	DDDD	RPZ	17.102.50 Retention Tree	Undersize	Action
1834	big leaf maple	14	viable		10	NO		REMOVE
1836	big leaf maple	14	multiple stems; decline; dead stem; same as T1835	X	10	NO		REMOVE
1837	big leaf maple	11	viable		8	✓		PRESERVE
1838	Douglas fir	51	viable		25	NO		REMOVE
1839	western hemlo	12	viable		8	NO		REMOVE
1840	western hemlo	8	viable; grows out of nurse stump		8	NO	X	PRESERVE
1841	red alder	15	viable; in creek		10	NO		REMOVE
1842	red alder	14	40 degree lean		10	NO		REMOVE
1843	big leaf maple	42	retrenched; large dead branches		25	NO		REMOVE
1844	red alder	13	viable; in creek		8	NO		REMOVE
1845	red alder	10	viable; in creek		8	NO	X	REMOVE
1846	red alder	13	trunk decay	X	8	NO		REMOVE
1847	red alder	16	viable; in creek		10	✓		PRESERVE
1848	red alder	14	viable; in creek		10	✓		PRESERVE
1849	red alder	11	leans over creek		8	✓		PRESERVE
1850	western hemlo	24	dead	X	16	NO		REMOVE
1851	western hemlo	19	dead	X	12	NO		REMOVE
1852	Douglas fir	28	viable		18	NO		REMOVE
1853	Douglas fir	36	viable; codominant @ 50'		24	✓✓		PRESERVE
1854	Douglas fir	24			16	✓✓		PRESERVE
1855	Douglas fir	16			10	✓✓		PRESERVE
1856	Douglas fir	35	viable		24	✓✓		PRESERVE
1857	Douglas fir	18	viable		12	NO		REMOVE
1858	Douglas fir	19	viable		12	NO		REMOVE
1859	Douglas fir	6			8	NO	X	REMOVE
1860	Douglas fir	28	viable		18	NO		REMOVE
1861	big leaf maple	18	decline	X	12	NO		REMOVE
1862	big leaf maple	30	viable		20	NO		REMOVE
1863	western hemlo	33	dead	X	22	NO		REMOVE
1864	western hemlo	29	viable; grows out of nurse stump; codominant from base		20	NO		REMOVE
1865	Douglas fir	40	viable		25	NO		REMOVE
1866	western red ce	25	viable		16	NO		REMOVE
1867	Douglas fir	44	viable		25	NO		REMOVE

Tag	Species	DBH	Remarks	DDDD	RPZ	17.102.50 Retention Tree	Undersize	Action
1868	big leaf maple	34	viable; soil eroded around stump		24	NO		REMOVE
1869	western hemlo	31	viable		20	NO		REMOVE
1870	Douglas fir	38	viable		25	NO		REMOVE
1871	Douglas fir	12	viable		8	✓✓		PRESERVE
1872	red alder	12	viable		8	✓		PRESERVE
1873	red alder	15	viable		10	✓		PRESERVE
1874	red alder	10	viable		8	NO	X	PRESERVE
1875	Douglas fir	41	viable		24	✓✓		PRESERVE
1876	red alder	9	viable; hard lean		8	NO	X	PRESERVE
1877	red alder	8	viable		8	NO	X	PRESERVE
1878	big leaf maple	13	basal decay; soil eroded around stump	X	8	NO		PRESERVE
1879	red alder	9	viable		8	NO	X	PRESERVE
1880	red alder	8	viable		8	NO	X	PRESERVE
1881	Douglas fir	23	viable		16	✓✓		PRESERVE
1882	Douglas fir	42	viable		24	✓✓		PRESERVE
1883	Douglas fir	6			8	NO	X	PRESERVE
1884	Douglas fir	19	dead	X	0	NO		REMOVE
1885	big leaf maple	19	viable		14	✓		PRESERVE
1886	western red ce	11	viable; grows out of large nurse-log		8	✓✓		PRESERVE
1887	big leaf maple	25	viable; standing water; soil eroded around stump		18	✓		PRESERVE
1888	red alder	13	viable; in creek		10	✓		PRESERVE
1889	red alder	12	viable; in creek		8	✓		PRESERVE
1890	red alder	6			8	NO	X	PRESERVE
1891	red alder	12	viable		8	✓		PRESERVE
1892	red alder	16	viable		10	✓		PRESERVE
1893	red alder	9	viable		8	NO	X	PRESERVE
1894	red alder	9	viable		8	NO	X	PRESERVE
1895	red alder	15	viable		10	✓		PRESERVE
1896	red alder	12	viable		8	✓		PRESERVE
1897	red alder	11	viable		8	✓		PRESERVE
1898	red alder	10	viable		8	NO	X	PRESERVE
1899	red alder	15	viable; labled 1890 on map; Tagged 1899 in field		10	NO		PRESERVE
1900	Douglas fir	37	viable		25	NO		REMOVE

Tag	Species	DBH	Remarks	DDDD	RPZ	17.102.50 Retention Tree	Undersize	Action
1901	big leaf maple	12	viable		8	NO		REMOVE
1903	western red ce	21,18,9,9	viable; hedgerow; same as T1902, T1904, and T1905		24	NO		REMOVE
1906	western red ce	8,7	viable; hedgerow; same as T1907		8	NO		REMOVE
1908	western red ce	19	viable; hedgerow; same as T1909		12	NO		REMOVE
1910	western red ce	7,6	viable; hedgerow; same as T1911		8	NO		REMOVE
1912	western red ce	13,10,9	viable; hedgerow; same as T1913 and T1914		16	NO		REMOVE
1915	western red ce	16,13	viable; hedgerow; same as T1916		16	NO		REMOVE
1917	western red ce	17	viable; hedgerow		12	NO		REMOVE
1918	western red ce	19	viable; hedgerow		12	NO		REMOVE
1919	western red ce	60	basal and trunk decay; hollow; cavity @ 10'	X	25	NO		REMOVE
1920	big leaf maple	7			8	NO	X	PRESERVE
1923	big leaf maple	11	viable; same as T1922		8	✓		PRESERVE
1924	sweet cherry	9	viable		8	NO	X	PRESERVE
1925	big leaf maple	7			8	NO	X	PRESERVE
1926	dead	17	dead	X	12	NO		REMOVE
1927	plum	7			8	NO	X	REMOVE
1928	plum	7	trunk decay		8	NO	X	REMOVE
1929	Douglas fir	17	viable		12	✓✓		PRESERVE
1930	Douglas fir	10	viable		8	NO	X	PRESERVE
1931	sweet cherry	8	viable		8	NO	X	PRESERVE
1933	big leaf maple	19	viable; multiple stems; sames as T1932 and T1934		16	✓		PRESERVE
1935	Douglas fir	34	viable		24	✓✓		PRESERVE
1938	Douglas fir	30, 24, 6	viable; same as T1937, and T1936		24	✓✓		PRESERVE
1939	apple	15	terminal decline	X	10	NO		REMOVE
1940	apple	10	terminal decline	X	8	NO	X	REMOVE
1941	Douglas fir	17	viable		10	NO		REMOVE
1942	sweet cherry	7			8	NO	X	REMOVE
1943	sweet cherry	7			8	NO	X	REMOVE
1944	sweet cherry	10	viable; same as T1945		8	NO	X	REMOVE
1946	sweet cherry	6			8	NO	X	REMOVE
1947	apple	17	basal decay; cavity	X	12	NO		REMOVE
1948	apple	12	terminal decline	X	8	NO		REMOVE
1949	Douglas fir	35	viable; ivy; shares stump with T1950		24	NO		REMOVE

Tag	Species	DBH	Remarks	DDDD	RPZ	17.102.50 Retention Tree	Undersize	Action
1950	Douglas fir	31	viable; ivy; shares stump with T1949		20	NO		REMOVE
1951	plum	12	terminal decline	X	8	NO		REMOVE
1952	plum	8	viable		8	NO	X	REMOVE
1953	big leaf maple	7	broken	X	8	NO	X	REMOVE
1954	big leaf maple	9	broken	X	8	NO	X	REMOVE
1955	big leaf maple	12	viable		8	NO		REMOVE
1956	big leaf maple	14	viable		8	NO		REMOVE
1957	big leaf maple	10	viable		8	NO	X	REMOVE
1958	big leaf maple	11	viable		8	NO		REMOVE
1959	big leaf maple	13	viable		8	NO		REMOVE
1960	big leaf maple	10	viable		8	NO	X	REMOVE
1961	western red ce	12	viable		8	✓✓		PRESERVE
1963	western red ce	16	viable; same as T1962		10	✓✓		PRESERVE
1964	western red ce	11	viable		8	✓✓		PRESERVE
1965	western red ce	6			8	NO	X	PRESERVE
1966	Douglas fir	12	viable		8	✓✓		PRESERVE
1967	Douglas fir	6			8	NO	X	PRESERVE
1968	western red ce	6			8	NO	X	PRESERVE
1969	western red ce	7			8	NO	X	PRESERVE
1970	Douglas fir	14	viable		10	✓✓		PRESERVE
1971	big leaf maple	6			8	NO	X	REMOVE
1972	cherry	14	terminal decline	X	8	NO		REMOVE
1973	Douglas fir	46	viable		24	✓✓		PRESERVE
1974	big leaf maple	13	terminal decline	X	8	NO		REMOVE
1975	big leaf maple	17	terminal decline	X	10	NO		REMOVE
1976	big leaf maple	14	broken tops	X	8	NO		REMOVE
1977	Douglas fir	8	viable		8	NO	X	PRESERVE
1978	Douglas fir	14	viable		8	✓✓		PRESERVE
1979	apple	9	terminal decline	X	8	NO	X	REMOVE
1980	big leaf maple	6			8	NO	X	REMOVE
1981	western red ce	43	broken @ 20'	X	25	NO		REMOVE
1982	big leaf maple	8	viable		8	NO	X	REMOVE
1983	big leaf maple	13	viable		8	NO		REMOVE

Tag	Species	DBH	Remarks	DDDD	RPZ	17.102.50 Retention Tree	Undersize	Action
1984	big leaf maple	12	broken	X	8	NO		REMOVE
1985	big leaf maple	9	viable		8	NO	X	PRESERVE
1986	western red ce	6	viable		8	NO	X	PRESERVE
1987	Douglas fir	32	viable; codominant @ 40'		22	✓✓		PRESERVE
1988	western red ce	6	viable		8	NO	X	PRESERVE
1989	big leaf maple	7	viable		8	NO	X	PRESERVE
1990	Douglas fir	17	viable; ivy		12	✓✓		PRESERVE
1991	big leaf maple	11	viable		8	✓		PRESERVE
1992	big leaf maple	8	viable; ivy		8	NO	X	PRESERVE
1993	Douglas fir	26	viable; ivy		18	✓✓		PRESERVE
1994	big leaf maple	6			8	NO	X	PRESERVE
1995	Douglas fir	6			8	NO	X	PRESERVE
1996	Douglas fir	10	viable		8	NO	X	PRESERVE
1997	Douglas fir	25	viable		18	✓✓		PRESERVE
1998	big leaf maple	18	viable		12	NO		REMOVE
2000	western red ce	17	viable; same as T1999		12	NO		REMOVE
2001	Douglas fir	9	viable		8	NO	X	REMOVE
2002	Douglas fir	11	viable		8	NO		REMOVE
2003	Douglas fir	48	viable; ivy		25	NO		REMOVE
2004	Douglas fir	24	viable		16	NO		REMOVE
2005	Douglas fir	6			8	NO	X	REMOVE
2006	juniper	10,10,8,8	viable; multiple stems from base		12	NO		REMOVE
2007	big leaf maple	8	viable		8	NO	X	REMOVE
2008	Douglas fir	22	viable		14	NO		REMOVE
2009	big leaf maple	6	topped @ 10'		8	NO	X	REMOVE
2010	Douglas fir	14	viable		8	NO		REMOVE
2011	Douglas fir	36	viable		24	NO		REMOVE
2012	Douglas fir	9	viable		8	NO	X	REMOVE
2013	Douglas fir	8	viable		8	NO	X	REMOVE
2014	European birch	6	terminal decline	X	8	NO	X	REMOVE
2015	Douglas fir	17	viable		12	NO		REMOVE
2016	big leaf maple	4			8	NO	X	REMOVE
2017	big leaf maple	10	viable		8	NO	X	REMOVE

Tag	Species	DBH	Remarks	DDDD	RPZ	17.102.50 Retention Tree	Undersize	Action
2018	Douglas fir	33	viable; ivy		24	✓✓		PRESERVE
2019	big leaf maple	37	basal decay; root disease; misplaced on map	X	24	NO		REMOVE
2020	Douglas fir	29	viable		20	NO		REMOVE
2021	western red ce	34	viable		22	NO		REMOVE
2022	western red ce	8	viable		8	NO	X	PRESERVE
2023	Douglas fir	29	viable		20	✓✓		PRESERVE
2024	Douglas fir	27	viable		20	✓✓		PRESERVE
2025	western red ce	15	viable		10	✓✓		PRESERVE
2026	Douglas fir	6			8	NO	X	PRESERVE
2027	Douglas fir	22	viable		16	✓✓		PRESERVE
2028	western red ce	8	viable		8	NO	X	PRESERVE
2029	big leaf maple	8,6	viable; same as T2036		8	NO		PRESERVE
2030	Douglas fir	8	viable		8	NO	X	PRESERVE
2031	Douglas fir	28	viable; ivy		10	✓✓		PRESERVE
2032	western red ce	8	viable		8	NO	X	PRESERVE
2033	western red ce	34	viable		24	✓✓		PRESERVE
2034	western red ce	19	viable		14	✓✓		PRESERVE
2035	western red ce	21	viable; ivy		14	✓✓		PRESERVE
2037	Douglas fir	30	viable		22	✓✓		PRESERVE
2038	Douglas fir	7			8	✓✓	X	PRESERVE
2039	Douglas fir	43	viable; ivy; near power line		24	NO		REMOVE
2042	western red ce	22,11,11	viable; multiple stems; same as T2041 and T2040		24	NO		REMOVE
2043	Douglas fir	24	viable; near power line		16	NO		REMOVE
2044	big leaf maple	12	topped for power	X	8	NO		REMOVE
2045	big leaf maple	8	topped for power	X	8	NO	X	REMOVE
2046	big leaf maple	8	topped for power	X	8	NO	X	REMOVE
2047	western red ce	6			8	NO	X	REMOVE
2048	big leaf maple	15	viable; near power line		10	NO		REMOVE
2049	western red ce	6			8	NO	X	REMOVE
2050	big leaf maple	10	viable; near power line		8	NO	X	REMOVE
2051	plum	10,9,9,9	stump suckers	X	10	NO		REMOVE
2052	Douglas fir	7	offsite; ROW; topped for power		8	NO	X	REMOVE
2053	Douglas fir	19	offsite; ROW; topped for power		12	NO		REMOVE

Tag	Species	DBH	Remarks	DDDD	RPZ	17.102.50 Retention Tree	Undersize	Action
2054	Douglas fir	8	offsite; ROW; topped for power		8	NO	X	REMOVE
2055	Douglas fir	17	offsite; ROW; topped for power		12	NO		REMOVE
2056	Douglas fir	22	offsite; ROW; topped for power		14	NO		REMOVE
2057	sweet cherry	16	broken tops	X	10	NO		PRESERVE
2058	sweet cherry	15	leans to east		10	✓		PRESERVE
2059	big leaf maple	21	offsite; ROW; topped for power		14	NO		REMOVE
2062	cottonwood	38	viable; codominant from base; 2062 and 2063 are same tree		25	NO		REMOVE
2063	cottonwood	10	viable		8	NO		REMOVE
2064	cottonwood	9	viable		8	NO	X	PRESERVE
2065	cottonwood	10	viable		8	NO	X	PRESERVE
2067	cottonwood	8	listed	X	8	NO	X	PRESERVE
2071	sweet cherry	29	mechanical damage to root flares; in pasture		25	NO		OFFSITE
2072	Douglas fir	9	viable; in creek		8	NO	X	PRESERVE
2073	cottonwood	15	viable; blackberry		10	✓		PRESERVE
2075	cottonwood	8	viable; 2075 and 2074 are the same tree		8	NO	X	PRESERVE
2076	cottonwood	8	viable		8	NO	X	PRESERVE
2077	cottonwood	7			8	NO	X	PRESERVE
2078	cottonwood	8	viable		8	NO	X	PRESERVE
2079	cottonwood	10	viable		8	NO	X	PRESERVE
2080	cottonwood	10	viable		8	NO	X	PRESERVE
2081	cottonwood	9	viable		8	NO	X	PRESERVE
2083	cottonwood	3,11,9,9,	multiple stems		16	NO		REMOVE
3000	red alder	6	in future roadway		8	NO	X	REMOVE
3001	red alder	6	Added by FSH district survey, April 2020		8	NO	X	PRESERVE
3002	red alder	6	Added by FSH district survey, April 2020		8	NO	X	PRESERVE
3003	cottonwood	6	Added by FSH district survey, April 2020		8	NO		PRESERVE
3004	cottonwood	6	Added by FSH district survey, April 2020		8	NO		PRESERVE
3005	cottonwood	6	Added by FSH district survey, April 2020		8	NO		PRESERVE
3006	cottonwood	6	Added by FSH district survey, April 2020		8	NO		PRESERVE
3007	Douglas fir	6	Added by FSH district survey, April 2020		8	NO		REMOVE
3008	Douglas fir	6	Added by FSH district survey, April 2020		8	NO		REMOVE
3009	Douglas fir	6	Added by FSH district survey, April 2020		8	NO		REMOVE

Tag	Species	DBH	Remarks	DDDD	RPZ	17.102.50 Retention Tree	Undersize	Action

= Trees 11 inches or larger dbh, coniferous species. 86 total.
= Trees 11 inches or larger dbh, deciduous species. 66 total.
2 of the 3 shall be conifer species = 86 conifer trees ✓✓
3 Trees per acre. 3 x 39 acres = 117 total trees ✓
Total trees retained 11 inches or larger dbh = 152
Total trees retained between 6 inches and 11 inches dbh = 91

<u>Tree Retention Requirements:</u>
Trees in this group that have been evaluated as viable may remain on site with a lesser risk of failure.
Trees in this group that have been marked in the DDDD are conidered hazardous to the existing properties.
Trees within thirty feet of the existing homes bordering the southeast corner of the property are included in the tree inventory.

Ryan Neumann PN-5539A, TRAQ
neighborhoodtree.llc@gmail.com
503.548.3119

Sandy Woods Phase 2,
21-037 SUB/VAR/TREE
Arborist responses

Exhibit G

7/13/2021

Addendum 1
Tree Preservation Plan for Sandy Woods Phase 2

The purpose of this addendum is to provide additional information in answer to the bullet points listed in an incomplete letter from the City of Sandy, file number 21-037SUB/VAR/TREE.

- Additional information from the project arborist on the definition of "viable." Are all viable trees healthy and likely to grow to maturity? Typically, an arborist's tree health/condition evaluation assesses trees as being in very good, good, fair, poor, or dead/dying condition.
- Additional information from the project arborist detailing why the standard critical root zone (CRZ) of 1 foot per 1-inch DBH is not being proposed.

For the purposes of the submitted Tree Preservation Plan and Tree Table the working definition of "viable" is a healthy tree that is in fair to very good condition and is expected to be reasonably healthy and provide benefits to the community for ten to twenty years. Additional information for individual trees is provided in the "remarks" column of the tree table.

The modified root protection zones (RPZS) listed in the Tree Table were established by an ISA Certified Arborist after evaluating the subject trees, the grading plan, and proposed layout. Critical root zones (CRZs) have been reduced based on individual basic assessments of subject trees, working knowledge of species characteristics, and working knowledge of root crown characteristics. Modified RPZs have been used on the site to protect the health and long-term viability of trees being preserved, while providing reasonable workspace and movement of equipment and personnel on the site. Tree protection fence (TPF) will be installed at the radii listed in the "RPZ" column of the tree table. All encroachments or grade disturbances within the RPZs of trees being preserved will be reviewed and supervised by the project arborist.

The project arborist will be available to monitor tree related issues during the development of the site and provide recommendations, supervision, and assistance in the preservation of the protected trees. The project arborist will document and report on site visits and will be prepared to conduct root pruning when visiting the site.

Sandy Woods Phase 2,
21-037 SUB/VAR/TREE
Arborist responses 7/13/2021

Portland Tree Consulting PO Box 19042 Portland, OR 97280
503.421.3883 info@pdxtreeconsulting.com CCB 230301

1. Client warrants any legal description provided to the Consultant is correct and titles and ownerships to property are good and marketable. Consultant shall not be responsible for incorrect information provided by Client.

2. Consultant can neither guarantee nor be responsible for the accuracy of information provided by others.

3. The Consultant shall not be required to give testimony or attend court or hearings unless subsequent contractual arrangements are made, including additional fees.

4. The report and any values expressed therein represent the opinion of the Consultant, and the Consultant's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.

5. Sketches, drawings and photographs in the report are intended as visual aids and may not be to scale. The reproduction of information generated by others will be for coordination and ease of reference. Inclusion of such information does not warrant the sufficiency or accuracy of the information by the Consultant.

6. Unless expressed otherwise, information in the report covers only items that were examined and reflects the condition at the time of inspection. The inspection is limited to visual examination of accessible items without laboratory analysis, dissection, excavation, probing, or coring, unless otherwise stated.

7. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the plants or property in question may not arise in the future.

8. The report is the completed work product. Any additional work, including production of a site plan, addenda and revisions, construction of tree protection measures, tree work, or inspection of tree protection measures, for example, must be contracted separately. Loss or alteration of any part of the report invalidates the entire report.

9. Any action or proceeding seeking to enforce any provision of this Agreement shall be brought against any of the parties in Multnomah County Circuit Court of the State of Oregon, or, when applicable, in the United States District Court for the District of Oregon. Each party consents to the jurisdiction of such courts (and of the appropriate appellate courts) and waives any objection to such venue.

Ryan Neumann
503.548.3119
neighborhoodtree.llc@gmail.com
ISA Certified Arborist PN-5539A TRAQ Qualified

WETLAND DELINEATION / DETERMINATION REPORT COVER FORM Exhibit H

This form must be included with any wetland delineation report submitted to the Department of State Lands for review and approval. A wetland delineation report submittal is not "complete" unless the fully completed and signed report cover form and the required fee are submitted. Attach this form to the front of an unbound report or include a hard copy of the completed form with a CD/DVD that includes a single PDF file of the report cover form and report (minimum 300 dpi resolution) and submit to: **Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279.** A single PDF attachment of the completed cover from and report may be e-mailed to **Wetland_Delineation@dsl.state.or.us**. For submittal of PDF files larger than 10 MB, e-mail instructions on how to access the file from your ftp or other file sharing website. Fees can be paid by check or credit card. Make the check payable to the Oregon Department of State Lands. To pay the fee by credit card, call 503-986-5200.

☒ Applicant ☐ Owner Name, Firm and Address:
Great American Development, Joe Spaziani
16287 S. Forsythe Road
Oregon City, Oregon, 97045

Business phone # **503-860-2501**
Mobile phone #
E-mail: joeandpenny@hotmail.com

☒ Authorized Legal Agent, Name and Address:
Environmental Technology Consultants
375 Portland Ave, Gladstone, OR 97027

Business phone # 360-696-4403
Mobile phone # **503-580-2465**
E-mail: JohnM@etcEnvironmental.net

I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.

Typed/Printed Name: **Joe Spaziani** Signature: ____________________
Date: **April 20, 2017** Special instructions regarding site access: **Contact owner or consultant.**

Project and Site Information (using decimal degree format for lat/long of site or start & end points of linear project)

Project Name: **37090 SE Kelso Road** | Latitude: **N 45.245314** | Longitude: **W -122.165512**

Proposed Use: **New Subdivision (Sandy Woods)**

Tax Map # 032S4E11

Project Street Address (or other descriptive location):
37090 SE Kelso Road

City: **Boring, OR** County: **Clackamas**

Township **T2S** Range **R4E** Section **2** QQ **AC**
Tax Lot(s) **24E1102200, 24E11AC00828 & 24E11AC00832**

Waterway: **No name** River Mile:
NWI Quad(s): Sandy, Oregon

Wetland Delineation Information

Wetland Consultant Name, Firm and Address:
John McConnaughey, PWS & Annakate Martin NRS
Environmental Technology Consultants
375 Portland Ave, Gladstone, OR 97027

Phone # **360-696-4403**
Mobile phone # **503-580-2465**
E-mail: **JohnM@etcEnvironmental.net**

The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.
Consultant Signature: | Date: **May, 2017 updated October 2018**

Primary Contact for report review and site access is ☒ Consultant ☐ Applicant/Owner ☐ Authorized Agent

Wetland/Waters Present? ☒ Yes ☐ No | Study Area size: **21.08 acres** | Total Wetland Acreage: **1.078 AC**

Check Box Below if Applicable: Fees: $437 (2018)

☒ R-F permit application submitted NWP2018-473
☐ Mitigation bank site
☐ Wetland restoration/enhancement project (not mitigation)
☐ Industrial Land Certification Program Site
☐ Reissuance of a recently expired delineation
Previous DSL # Expiration date _____

☒ Fee payment submitted **$437**
☐ Fee ($100) for resubmittal of rejected report
☐ No fee for request for reissuance of an expired report

Other Information:	Y	N	
Has previous delineation/application been made on parcel?	☒	☐	If known, previous DSL # WD2017-0410 & WD2000-0612
Does LWI, if any, show wetland or waters on parcel?	☒	☐	

For Office Use Only

DSL Reviewer: ____________ Fee Paid Date: ____ / ____ / ____ DSL WD #
Date Delineation Received: ___ / ___ / ___ DSL Project # ____________ DSL Site # ____________
Scanned: ☐ Final Scan: ☐ DSL WN # ____________ DSL App. # ____________

DELINEATION REPORT WD2018-0656
FOR PERMITS NWP2018-473 AND 61489-RF
37090 SE Kelso Road
Boring, OR

Evaluated by:
Annakate Martin, NRS
John McConnaughey PWS# 2009
May, 2017

SWS PCP
EDUCATION EXPERIENCE
PWS
ETHICS
JOHN McCONNAUGHEY, MSc
002009
PROFESSIONAL WETLAND SCIENTIST

Prepared for: Joe Spaziani
Great American Development
37090 SE Kelso Road
Boring, OR 97009

environmental technology Consultants
"Creating Tomorrow's Environment - Today"

Environmental Technology Consultants
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375 Portland Ave, Gladstone, OR 97027
PO Box 821185, Vancouver, WA 98682
(360) 696-4403 Fax: (503) 657-5779
WA Landscape Contractors License #: ENVIRTCO23RB
Web: www.etcEnvironmental.net
Email: etc@etcEnvironmental.net

Table of Contents

Cover Photo.

Photo of stream on property shortly after blackberries were mowed. ETC Photo 3/13/2017

INTRODUCTION

This report is to be attached to remove/fill permits NWP2018-473 and 61489-RF.

This report is in response to the Corps request for a resubmittal to WD2017-0410 which only included the south end of 37090 SE Kelso Road. However, in that request they also requested the study area boundary be increased to include a small previously delineated offsite wetland who's delineation had expired. And they also requested the North end of the lot be included in the study area as the applicant had used the north part of the lot as an access road that crossed an NWI mapped stream.

ETC prepared such a report which became numbered WD2018-0656. Reviewers requested that we remove areas described by WD2017-0410, which we have done in this resubmittal. Reviewers also found fault with data points that defined Wetland "A" in the NW corner of lot 2200. Because no impacts or activities are being considered in that area at the present time, we removed the NW corner of the lot from the study in order to obtain concurrence with the rest of the report.

Originally ETC prepared a delineation report covering the entire lot 2200 (37090 SE Kelso Road). The applicant then decided only to develop the South end of the lot, and requested that ETC remove the northern portion of the lot from the study area. We did that, and submitted a report for the South end only which was accepted and numbered WD2017-0410.

However, then the City of Sandy required that Olson Road be widened, and that widening caused impacts to both onsite and offsite wetlands. The applicant also used an old road for access, and that road entered the North end of the lot from Kelso Road. DSL then requested a delineation for the North portion of lot due to the road access, and also required updated delineations for the offsite wetlands, as the existing delineations had expired for those areas.

Study Area: This report includes the northern portions of lot 2200, except for the NW corner of the lot containing a sloped wetland area we are calling Wetland "A". The southern study boundary of this report is the northern study boundary of WD2017-0410.

Also included in this report are areas that will be impacted the widening of Olson Road, except for those areas described in WD2017-0410. That includes two wetland tracks known as Track "A", and Track "E". Track "A" is a wetland preservation track created when the original lot was partitioned for a subdivision. Track "E" is an adjoining track used for a wetland mitigation project required by the remove/fill permit 26209-FP.

There are no Tracks "B", "C", or "D" as far as we know.

The relevant previously submitted delineations and reports for the study area of this report are:

- WD2017-0414 - The south portions of lot 2200 (37090 SE Kelso Road).
- WD2000-0612 - A delineation done for a subdivision known as Sandy Bluff 3, and this delineation determined a wetland area now known as "Track A" that is East of the SE corner of lot 2200.
- Mitigation 26209-FP - A mitigation project required by Sandy Bluff 3 that created

All the field work on lot 2200 was done in March-May of 2017. Some additional field work was done in October of 2018 in Tracks "A" and "E" for the Olson Road Widening portion of the project.

This report is intended to assist the permittee, the City of Sandy, and the State of Oregon to evaluate the application and determine what environmental conditions or mitigations may be required to move this project forward.

QUALIFICATIONS OF JOHN MCCONNAUGHEY, PWS

I earned a Bachelor of Science degree from the University of Oregon in 1978 and in 1984 I earned a Masters of Fisheries Science degree from the University of Alaska at Juneau, (since renamed as the University of Alaska, Southeast). The Juneau curriculum specializes in the study of Pacific salmon. I held positions with agencies tasked with salmon research and management beginning with summer jobs in 1979 in Rogue River, the Oregon Dept of Fish and Wildlife, and then with the Alaska Department of Fish and Game in Ketchikan Alaska, in 1980. I worked on salmon projects with ADF&G in Anchorage and Juneau for 5 years before moving to American Samoa to serve as a fisheries projects leader for the Department of Marine and Wildlife Resources. Upon returning stateside, I worked for the Yakama/Klickitat Fisheries Project out of Yakima Washington for 5 years leading four research projects studying aspects of salmon supplementation projects in the Yakima River.

I have been employed with Environmental Technology Consultants since 2006. In 2010 I earned certification as a Professional Wetland Scientists, (PWS) from the Society of Wetlands Scientists, (SWS).

No part of my compensation is dependent on the outcome of my investigations or conclusions I may draw from the observed data.

QUALIFICATIONS OF ANNAKATE MARTIN

I earned a Bachelor of Science degree in Natural Resources from Washington State University in 2002. In 2002 I worked for the University of Idaho on MAP tracking steelhead and salmon on the Snake River out of Clarkston, Washington.2002-2003 I worked for Idaho Fish and Game as a field technician for identifying fish in remote streams in Idaho. In 2004 I worked for Environmental Technology Consultants conducting wetland delineations and Phase I ESA reports. From 2007-2014 I worked for 3 Kings Environmental conducting Phase I ESA reports, asbestos and lead surveys. In 2011 I started my own company primarily providing erosion control services (CESCL Certified) and Phase I ESA reports.

I have been re-employed with Environmental Technology Consultants in 2015 for wetland delineation consulting.

A) Landscape Setting and Land Use:

The subject property is a 38.95 Acre parcel in a rural residential area that is on a valley floor at approximately 787’ in elevation. It is in the Sandy River watershed. The terrain is gently rolling in the general north to south direction on the majority of the property. The property is surrounded primarily by agricultural land, and partially by roads, rural single-family residences, and single-family residences in subdivisions. The property was a mixture of mature forests, grassy fields, and had a stream cutting through it. There is an easement with powerlines running through the middle of the property running northeast and southwest, and the powerline easement is also the high point of the property.

The area is zoned EFU Exclusive Farm Use district.

B) Site Alterations:

The subject site had a single-family residence, that has been demolished, and according to the Assessors information was built in 1915. Northern portions of the property have been used for agriculture uses such as a plant nursery, and possibly a raspberry farm. The center portion of the lot is used for a BPA powerline, and vegetation has been periodically mowed to prevent interference with the power lines. The south portion of the lot was forested with large 2nd growth coniferous trees when we first observed it. In 2017 the applicant used a brush hog to mow the blackberries on most of the site in order that surveyors could gain access. Much of the property that was historically farmed now has a dense cover of blackberries.

C) Precipitation Data and Analysis:

This wet season through March has been above average which makes using hydrology somewhat helpful, except it can make wetland areas appear larger than they are. The overall rainfall was above average for the area for the wet season.

Table 1. Recent observed precipitation data compared to the Wetland Evaluation Technique (WETS) tables.

MONTH	NOAA observed monthly precipitation at PDX	WETS Precipitation averages for PDX Airport			Compared to WETS avg
		Avg (inches)	30% chance will have		
			Less than	More Than	
March 2016	4.73	3.71	2.85	4.31	Above
April 2016	1.96	2.64	1.93	3.1	Below
May 2016	1.72	2.38	1.44	2.88	Average
June 2016	1.42	1.59	0.94	1.93	Average
July 2016	0.66	0.72	0.31	0.89	Below
August 2016	0.09	0.93	0.33	1.13	Below
September 2016	1.69	1.65	0.65	2.06	Above
October 2016	8.31	2.88	1.57	3.52	Above
November 2016	6.83	5.61	3.72	6.73	Above
December 2016	4.61	5.71	3.89	6.82	Average
January 2017	4.13	5.07	2.98	6.16	Average
February 2017	10.26	3.56	0.72	10.03	Above
March 2017	7.26	3.68	1.10	7.89	Above
Past 12 Months	65	44.31	25.27	62.43	Above
Water year thru March 2017	43.09	41.01	25.86	58.35	Above
March 2017	7.26	3.68	1.10	7.89	Above
Shading represents the 2016 water year beginning October 1, 2016.					

Approximately 6.99" of rain fell at the site in the 14 days prior to our first field visit, there was 5.34" of rain fall at the site 14 days prior to the second site visit.

The table below shows the recent precipitation data using Farmlogs.com:

Table 2. Precipitation data at the site as estimated by Farmlogs.com using Doppler radar. Dates 14 days prior to the field visits are shown.

DATE	RAINFALL	YEAR-TO-DATE	Field Activities
15-Mar-17	1.03"	24.33"	
16-Mar-17	0.58"	24.91"	
17-Mar-17	0.04"	24.95"	
18-Mar-17	0.38"	25.33"	
19-Mar-17	0.80"	26.34"	
20-Mar-17	0	31.71"	
21-Mar-17	0.20"	26.34"	
22-Mar-17	0.41"	26.74"	
23-Mar-17	0.17"	26.92"	
24-Mar-17	0.88"	27.80"	

25-Mar-17	0.74”	28.55”	
26-Mar-17	0.11”	28.66”	
27-Mar-17	0.69”	29.34”	
28-Mar-17	0.23”	29.58”	
29-Mar-17	0.35”	29.93”	
30-Mar-17	0.38”	30.30”	First field day-started delineation studies, hydrology observed
31-Mar-17	0.23	30.53”	
01-Apr-17	0	30.53”	
02-Apr-17	0.09”	30.63”	
03-Apr-17	0	30.63	
04-Apr-17	0	30.63	
05-Apr-17	0.03”	30.66	
06-Apr-17	0.16”	30.82”	
07-Apr-17	0.23”	31.05”	
08-Apr-17	0.13”	31.17”	
09-Apr-17	0.20”	31.38”	
10-Apr-17	0.11”	31.49”	
11-Apr-17	0.04”	31.52”	
12-Apr-17	0.36”	31.88”	
13-Apr-17	0.32”	32.20”	
14-Apr-17	0.19”	32.39”	
15-Apr-17	0.18”	32.57”	
16-Apr-17	0	32.57”	
17-Apr-17	0.11”	32.68”	
18-Apr-17	0.60”	33.27”	
19-Apr-17	0.03”	33.30”	
20-Apr-17	0.41”	33.72”	
21-Apr-17	0.13”	33.85”	
22-Apr-17	0	33.85”	
23-Apr-17	0.13”	33.98”	
24-Apr-17	0.70”	34.68”	
25-Apr-17	0.88”	35.56”	
26-Apr-17	0.69”	36.24”	
27-Apr-17	0.94”	37.18”	
28-Apr-17	0.35”	37.54”	Second field day-continued delineation studies, hydrology was observed, wetlands and stream were flagged, site was GPSed

Deductions of Recent Weather Data: The precipitation in 2017 was above average for the site when the delineation was conducted, there were saturated soils and shallow water tables at or above levels where hydric soils were observed.

The additional field work done for the Olson Road Widening was done in October 2018 following a long dry period. The area was dry at this time. This field work used plants, soils, and topography to make inferences about wetland hydrology for Track A and for the mitigation area for 26209-FP.

D) Methods: (site-specific methods for field investigation)

Wetland determinations and delineations discussed in this report were conducted in accordance with the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual ("the manual"), including regional supplements and applicable guidance, and supporting technical or guidance documents issued by the Department of State Lands.

We traversed the site to determine upland areas and wetland areas. We determined there were four wetland areas, two streams and a road side ditch. We named the wetlands Wetland “A”, Wetland “B”, Wetland “C”, and Wetland “D” to be able to differentiate between the four.

The subject site was a mixture of abandoned agricultural areas, wetland areas, mature forested areas, and a mowed BPA right of way. There were areas that were over run by Himalayan blackberries especially in Wetland “A” and Wetland “B” which was at approximately 90%.

We dug soil test pits to a general depth of 18” bgs. The soils on this site was primarily a red parent color, about 7.5YR 3/2. We relied on hydric soils, hydrology and vegetation to make our wetland determinations.

We set wetland flags around the wetlands, Streams 1 and 2, and the drainage ditch.

E) Description of All Wetlands and Other Non-Wetland Waters:

NOTE: Descriptions for wetlands “A” and “D” and stream #1 are removed from this report as they were removed from the study areas as described above.

Offsite water comes onto this property from at least five locations, and is responsible for most of the wetland hydrology seen on the property:

1. Two culverts convey water from the North side of Kelso road to a ditch along the North end of the subject property. These are old concrete culverts.

2. Stream 2 enters the property on east side between Kelso Road and the BPA powerline easement. It appears that Stream 2 is a natural drainage way that has been substantially ditched and re-routed from its original course. It flows west and south across the property and leaves the property near the middle of the west property line.

3. Water flows through a culvert under SE Jewelberry Road and enters the study area at the East end of Track “A”. That water flows East to West across Track “A” which is contiguous with small wetland area known as “Wetland D” in WD2017-0410.

4. Stormwater from SE Jewelberry Road is piped into a reverse French drain on the East side of the mitigation area for 26209-FP, and some of the hydrology for 26209-FP is supplied by that French drain, and some of it comes from Track “A”.

5. Roofs on houses on the North side of Track “A” have been piped and discharge into Track “A”. This was done as part of a wetland enhancement project to increase the hydrology of Track “A”.

A storm drain under Olson Road drains Track “A”, Wetland “D”, and 26209-FP, and the elevation of the inlet for that drain determines the amount of ponding in the depressional wetland areas behind it.

Kelso Road Ditch, 2,439 SQFT, 0.056 Acres, 252 Feet long. Two culverts convey water under Kelso Road from the North side and bring the great majority of water that feeds this ditch. It is believed to be temporarily flooded during wet weather and for relatively short periods of time afterwards. There is little vegetation, other than blackberries, and water quality appears to be quite low. The Cowardin classification is Riverine, Intermittent, Unconsolidated Bottom, Mud, Temporarily Flooded, R4UBA.

Stream #2, 3,560 SQFT, 0.082 Acres, 1,017 Feet Long. Stream #2 is a natural drainage that has been ditched and straightened. It enters the property on the eastern boundary and flows across in a South-West direction, leaving the property on the west side. Its average width is about 3', though the upper area broadens out a bit into an area we called Wetland "B", and the lower end also broadens out into an area we called Wetland "C". The bottom is mud and debris, and a lot of blackberry mulch when we saw it. Considering its position high in the drainage, small size and low flow when we saw it during some pretty wet weather, we suspect it is has only seasonal flows and dries up in the summer. The Cowardin classification is Riverine, Intermittent, Unconsolidated Bottom, Mud, Seasonally Flooded, Partly Drained/Ditched, or R4UB3Cd.

Wetland "B", 2,225 SQFT, 0.051 Acres. Wetland "B" is a small depressional wetland next to Stream #1. Some water enters from the property to the East as part of the same basin that Stream #2 runs through. Most of the wetland appear to be caused by high groundwater tables. Although the lower end connects to Stream #1, water exchange is mostly subsurface, and from the wetland to the stream. Areas of the wetland that are inundated or saturated to the surface have little vegetation. The area is densely shaded by trees rooted both in and outside of the wetland area. The Cowardin classification is Palustrine, Unconsolidated Bottom, Mud, Seasonally flooded/saturated. HGM classification is depressional wetland.

Wetland "C", 5,669 SQFT, 0.191 Acres. Wetland "C" spans Stream #2 on both sides, it is generally sloped throughout. There are some small puddled areas on the North side that are probably old tire ruts, and holes created by trees toppling over, and some very shallow inundated areas on the South side, perhaps up to 1/2 inch deep. The hydrology appears to be supported by high ground water tables, and poor drainage.

The Cowardin classification is Palustrine, Scrub Shrub, Broad-Leaved Deciduous, Saturated, or PSS1B. The HGM classification is sloped wetland.

Track "A", 22,601 SQFT, 0.520 Acres. Track "A" is the remainder of the wetland delineated by WD2000-0612. The name is taken from the plat map of the Sandy Bluff Anex. Portions of this wetland were covered when Jewelberry Road was extended around 2001, and it's size reduced from 30,299 to it's current 22,601 SQFT. The area (22,601 SQFT) is recorded as a deed in Book 124 page 020 in Clackamas County.

A portion of Track "A" was enhanced as part of a mitigation required by permit 26209-FP, (about 5,278 SQFT). No impacts in this enhanced area are required by the Olson Road Widening project.

ETC conducted hydrology and plant monitoring studies in 2005, 2006 and 2007, and concluded that the wetland footprint was at least as large as when we delineated the area in 2000. Permit 26209-FP also provides that roof drains from the new housing development be directed to the wetland to provide additional hydrology.

Track "A" wetland is sloped in the upper northeastern part, but then becomes more of a depressional wetland its lower southwestern part due primarily to some impounding caused by the height of the outlet under Olson Road. The impound is caused by the outlet that drains under Olson Road.

The Cowardin Classification is Palustrine Forested Broadleaf Deciduous Seasonally Flooded, or PFO1C. The HGM classification ranges from sloped to depressional.

Track "E" Mitigation area for 26209-FP, 10,236 SQFT, 0.235 Acres. Track "E" is 13,882 SQFT in area, and permit 26209-FP required that 10,236 SQFT be converted to a wetland area. The name "Track "E"", is also taken from the plat map for the Sandy Bluff Anex.

A hydrology monitoring study conducted by ETC in the Spring of 2007 confirmed that at least 10,236 SQFT met the hydrology standard for being considered a wetland. We have used the 10,236 SQFT figure as the area of wetland as it is both close to reality, and because that particular figure is relevant to the remove/fill permits NWP2018-473 and 61489-FP.

Stormwater from Jewelberry Road is piped into a reverse French drain that was constructed on the east side of Track "E". The purpose of this was to deliver additional water to the mitigation area.

A small shallow horse shoe shaped pond about 4,267 SQFT in area was excavated in about the middle of Track "E", and the hydrology monitoring study conducted in 2007 found it to be flooded to a depth of about 6".

We observed this area from the roads in 2017 when performing the delineation on lot 2200, and most of the areas that were not ponded were covered by a very robust growth of blackberries. At that time we did not know we needed to survey the area for the Olson Road Widening project, and so we did not attempt to penetrate the blackberries for a closer look. The horse shoe pond was still ponded, and it was fringed with Carex and Juncus, at least from what we could tell peering through the blackberries from the road.

In October 2018 when we were told to include Track "E" in our delineation report, the blackberries and any other vegetation mixed in with them had been mowed down in preparation for the road work. The mowing was roughly a 40' strip along Olson Road that would become the new roadway, plus some additional blackberries up into Track "A". Unfortunately this mowing and that our observations were in October following a dryer than normal summer, made it difficult to delineate the exact boundaries of the wetland based on Corps criteria. In our opinion there is no reason to believe that the boundaries were any different than determined in the 2007 hydrology monitoring study. We are therefore reporting the same wetland areas as were reported then, which are also the same as those in the permit documents.

The Cowardin classification is Palustrine, Scrub Shrub, Broad-Leaved Evergreen, Saturated, (PSS3B), and Palustrine, Emergent, Persistent, Seasonally Flooded, (PEM1C). The HGM classification is depressional.

<u>**SUMMARY**</u>: The table below summarizes the wetlands within the study area boundary of this report:

Table 3. Summary of wetland areas included in this study, WD2018-0656.

Wetland or Waterway	Cowardin	Length	Area SQFT	Area Acres
Stream #2	R4UB3	1,017	3,560	0.082
Wetland "B"	PUB3E		2,225	0.051
Wetland "C"	PSS1B		8,336	0.191
Track "A" wetland	PFO1C		22,601	0.519
Track "E" wetland	PFO1C		10,236	0.235
TOTAL		1,017	46,958	1.078

F) Deviation from LWI or NWI:

The NWI map only shows Stream 2 on the map. The other streams and wetlands discussed in Section E are not shown on the NWI. We did not find a LWI for this area.

Stream 2 may have been re-routed from it's original course. We think the stream may have been moved North about 200 feet, and that it probably used to enter the east boundary of Lot 2200 about 200' South of it's current location. NWI maps also show the stream about 200' south of where it is. We have not surveyed the lot to the east, this is conjecture based on topo maps and what can be seen from the fence line. Stream 2 exits the property on the West property line probably where it always did, the exit is controlled by topography, it would have required some considerable reshaping of the terrain to change the drainage on the west side.

G) Mapping Method:

A property boundary survey and topographic survey was conducted by Tony Bolden, PLS 60377LS of Centerline Concepts. Centerline Concepts also located many of our wetland data plots and wetland boundary flags.

We used the TopCon GRS-1 GPS with a Topcon BR-1 beacon receiver for DGPS corrections for mapping some flags and plots either missed by the surveyors or added after their survey. These and other information shown in the figures were mapped as described in Section G.

H) Additional Information: (i.e., if needed to establish state jurisdiction)

None. All wetlands and waters described in this report are presumed to be jurisdictional.

I) Results and Conclusions:

Hydrology. The Hydrology on this site has been altered substantially from the historical conditions a long history of land use on this and neighboring properties, and by changes caused by road ways and their associated ditches and culverts. Stream 1 and Wetland "A" are thought to be created, or at least greatly enlarged by stormwater from higher in the drainage collected and concentrated into roadside ditches that discharge onto the Northern end of the property.

Wetland "D", and Track "A" have been altered extensively due to impounding created by Olson Road, and due to the intentional diversion of roof and road runoff to the area in order to increase the hydrology in Track "E". This has increased the wetland footprint, especially in the Wetland "D" area.

The wetlands in Track "E" are manmade, as discussed in the mitigation proposal in 26209-FP.

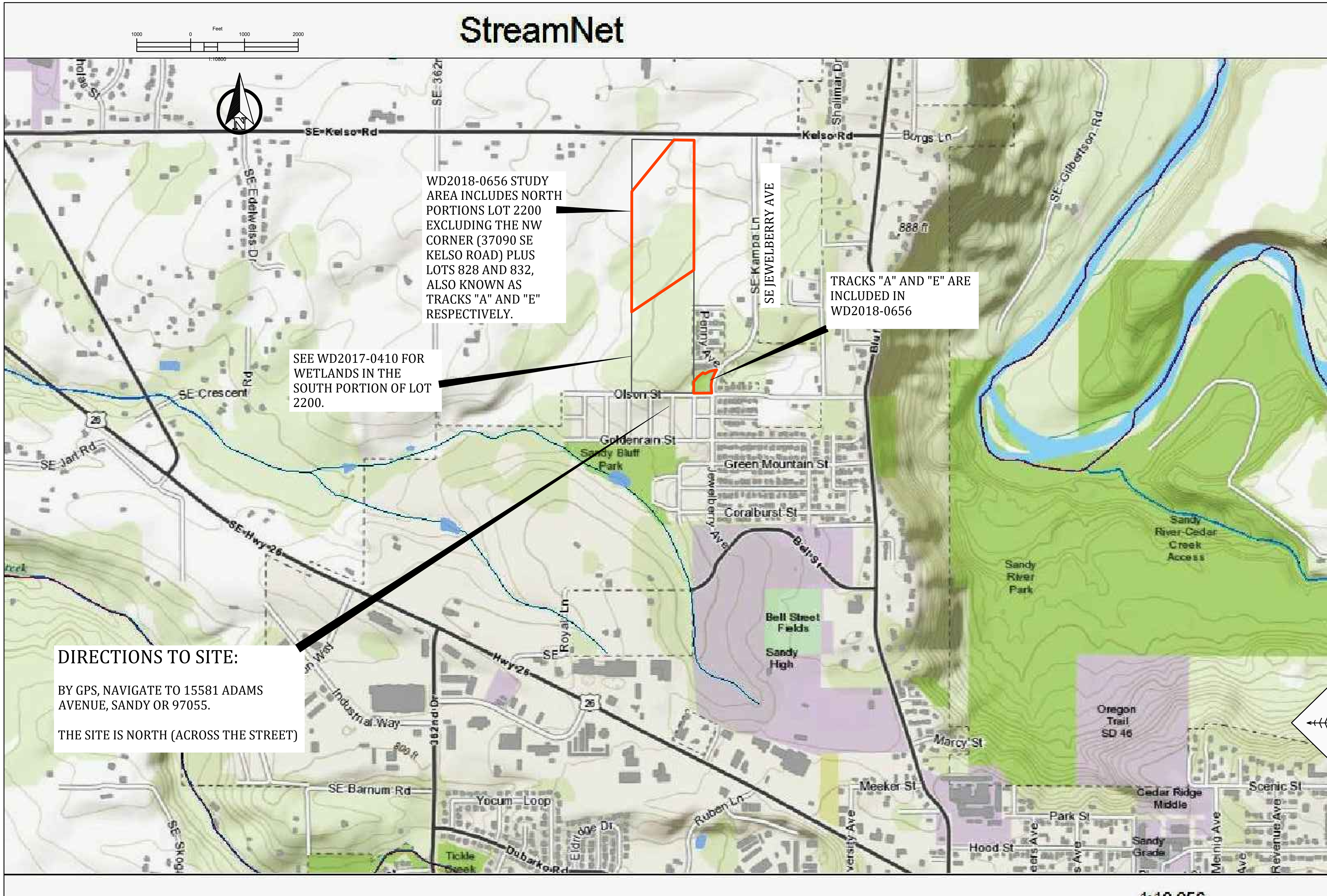
Plants. With exception of the forested areas, the plants in or near the wetlands were Blackberries with some herbaceous plants, mostly grasses, in the wettest areas. P13 represented a small wallow recently created by machinery which had water in it when we saw it. This was the only non-wetland plot determined not to be wetland based on vegetation only.

Soils. Soils in the many areas are red in color, about 5YR3/3, which tended to mask hydric soil features in the margin of the wetland. There was a presence of what appeared to be manganese. Distinct differences were apparent between the soils south of the stream which tended to be 10YR 3/2 a darker less red soil and in the disturbed pasture grasses area.

Disclaimer: OAR141-090-0035(12)(j) :

"This report documents the investigation, best professional judgment and conclusions of the investigator. It is correct and complete to the best of my knowledge. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and used at your own risk unless it has been reviewed and approved in writing by the Oregon Department of State Lands in accordance with OAR 141-090-0005 through 141-090-0055."

APPENDIX A - Maps:



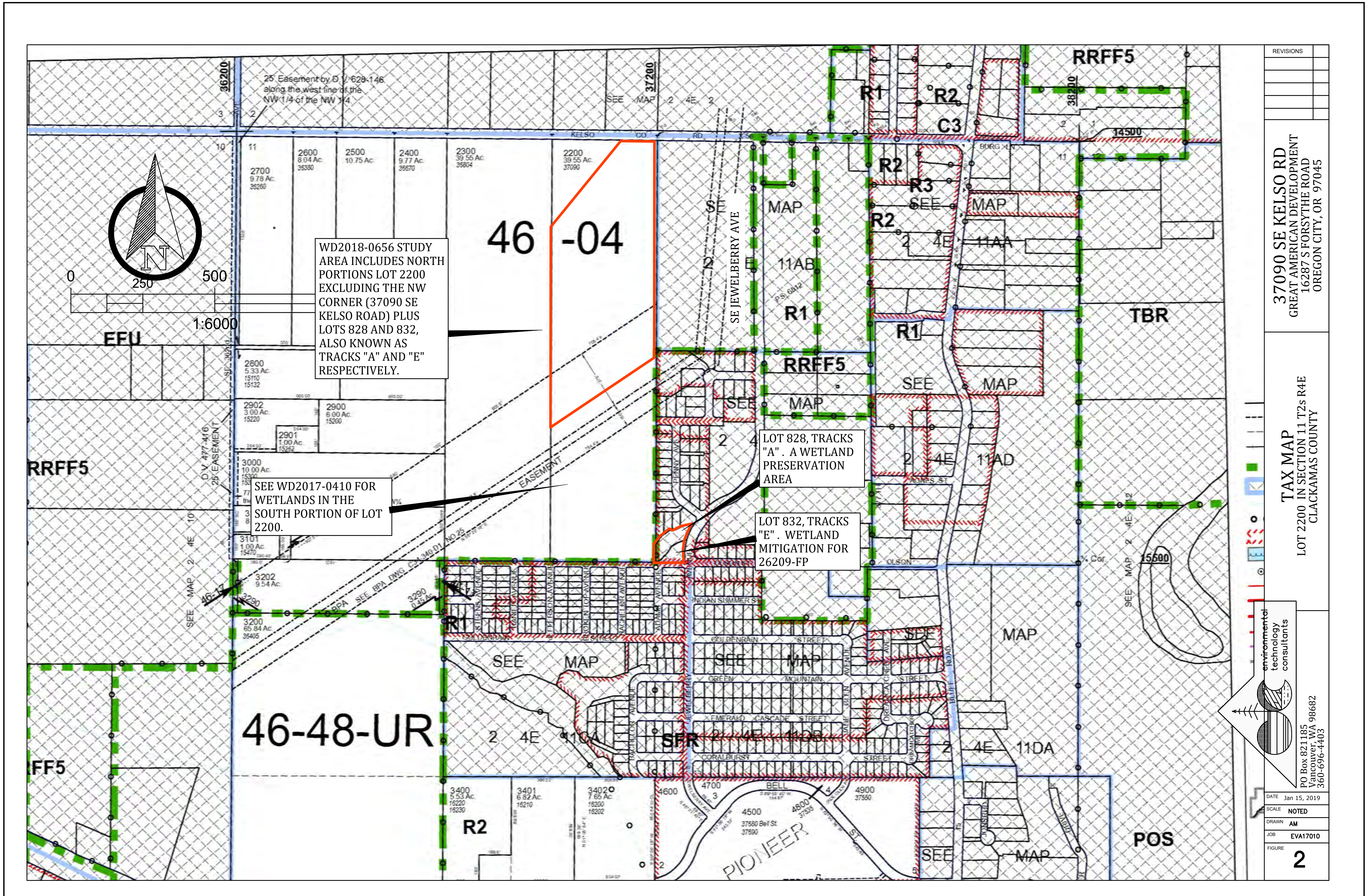
REVISIONS

37090 SE KELSO RD
GREAT AMERICAN DEVELOPMENT
16287 S FORSYTHE ROAD
OREGON CITY, OR 97045

LOCATION MAP
STREAMNET TOPO MAP USED FOR BACKGROUND

environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403

DATE	Jan 15, 2019
SCALE	NOTED
DRAWN	AM
JOB	EVA17010
FIGURE	1


WD2018-0656 STUDY AREA INCLUDES NORTH PORTIONS LOT 2200 EXCLUDING THE NW CORNER (37090 SE KELSO ROAD) PLUS LOTS 828 AND 832, ALSO KNOWN AS TRACKS "A" AND "E" RESPECTIVELY.
SEE WD2017-0410 FOR WETLANDS IN THE SOUTH PORTION OF LOT 2200.
LOT 828, TRACKS "A". A WETLAND PRESERVATION AREA
LOT 832, TRACKS "E". WETLAND MITIGATION FOR 26209-FP
46 -04
46-48-UR
1:6000
EFU
RRFF5
TBR
POS
SFR
KELSO RD
SE JEWELBERRY AVE
PIONEER
37090 SE KELSO RD
GREAT AMERICAN DEVELOPMENT
16287 S FORSYTHE ROAD
OREGON CITY, OR 97045
TAX MAP
LOT 2200 IN SECTION 11 T2s R4E
CLACKAMAS COUNTY
environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403
DATE Jan 15, 2019
SCALE NOTED
DRAWN AM
JOB EVA17010
FIGURE 2

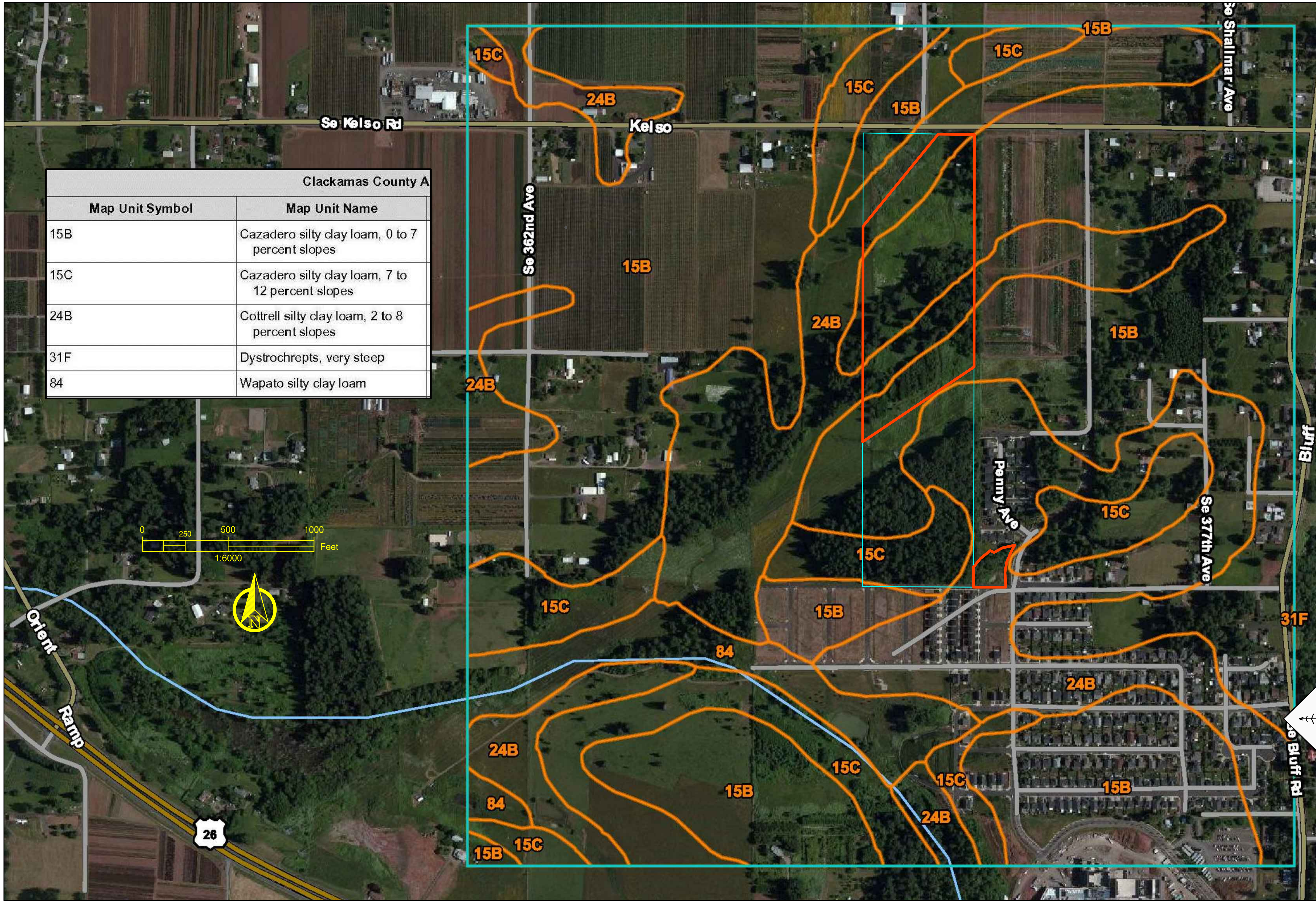
REVISIONS

37090 SE KELSO RD
GREAT AMERICAN DEVELOPMENT
16287 S FORSYTHE ROAD
OREGON CITY, OR 97045

NWI MAP
USFWS NWI MAP LAYERS IN GOOGLE EARTH

environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403

DATE	Jan 15, 2019
SCALE	NOTED
DRAWN	JHM
JOB	EVA17010
FIGURE	3



REVISIONS

37090 SE KELSO RD
GREAT AMERICAN DEVELOPMENT
16287 S FORSYTHE ROAD
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SOIL MAP
NRCS NWI MAP LAYERS IN GOOGLE EARTH

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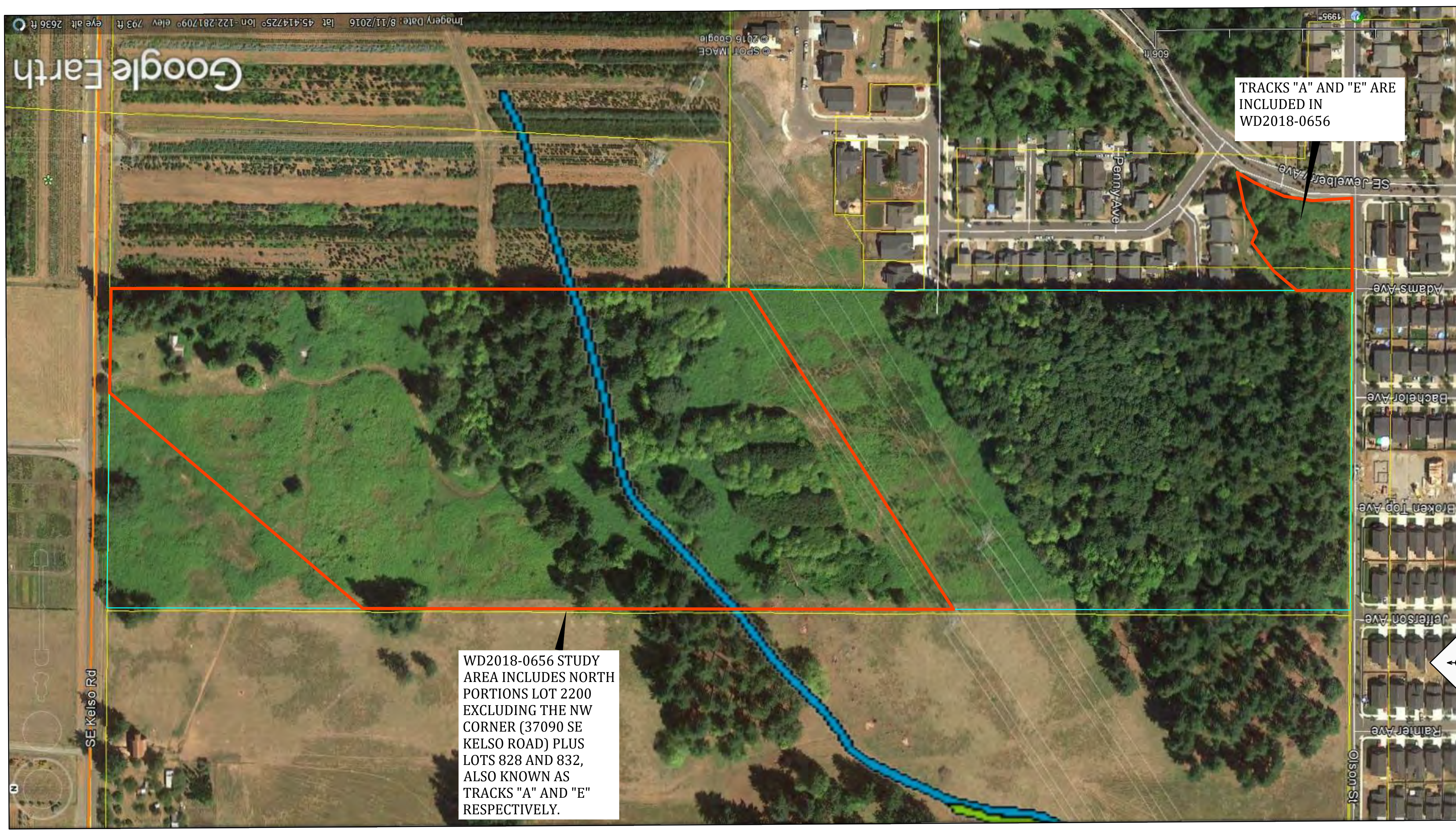
Vancouver, WA 98682
360-696-4403

DATE	Jan 15, 2019
SCALE	NOTED
DRAWN	JHM
JOB	EVA17010
FIGURE	4

Feet

200 0 200 400

1:2400



REVISIONS

37090 SE KELSO RD

GREAT AMERICAN DEVELOPMENT
16287 S FORSYTHE ROAD
OREGON CITY, OR 97045

AERIAL PHOTO

GOOGLE EARTH 8/11/2017
USFWS NWI WETLAND LAYERS
DISPLAYED.

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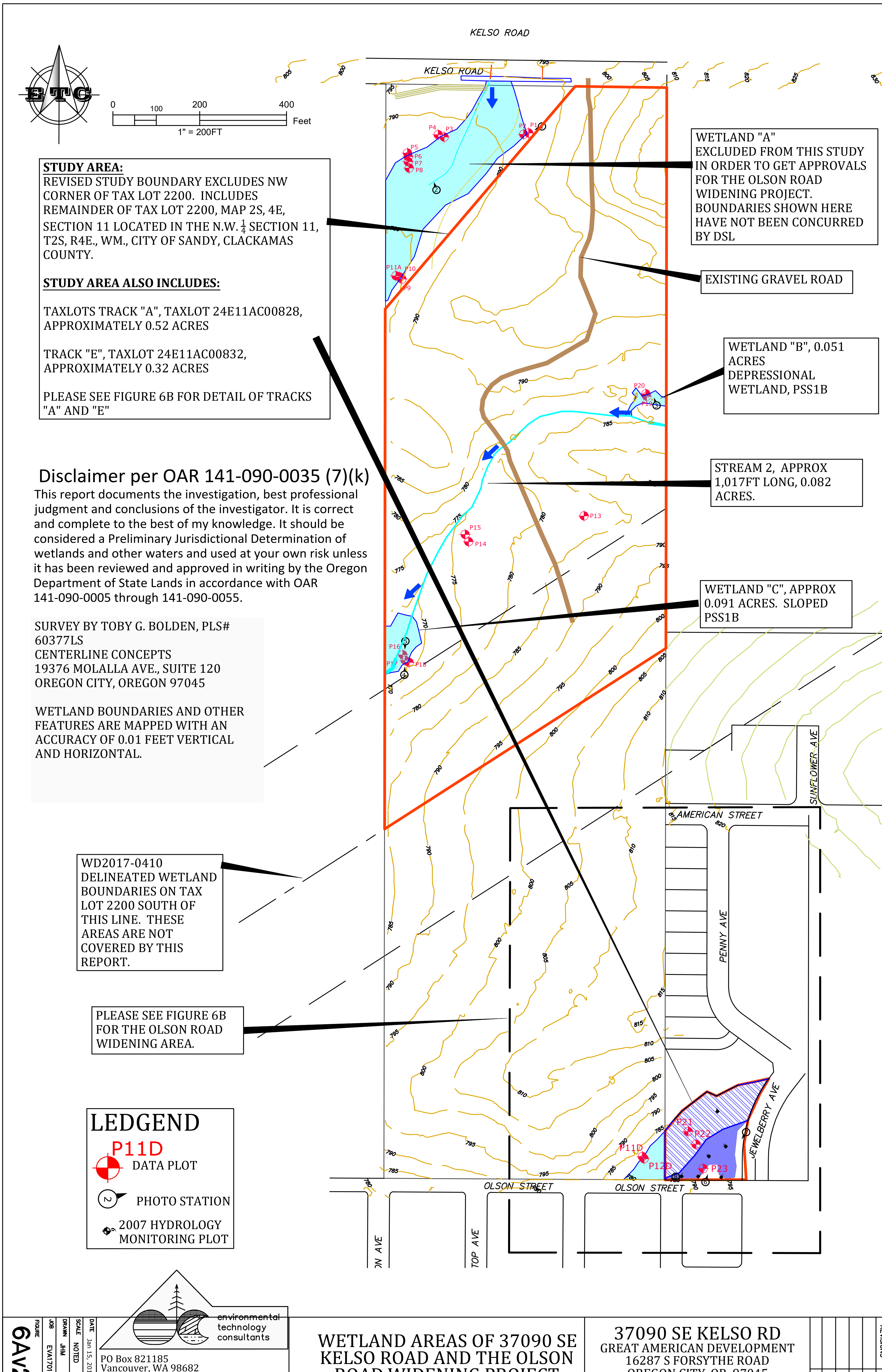
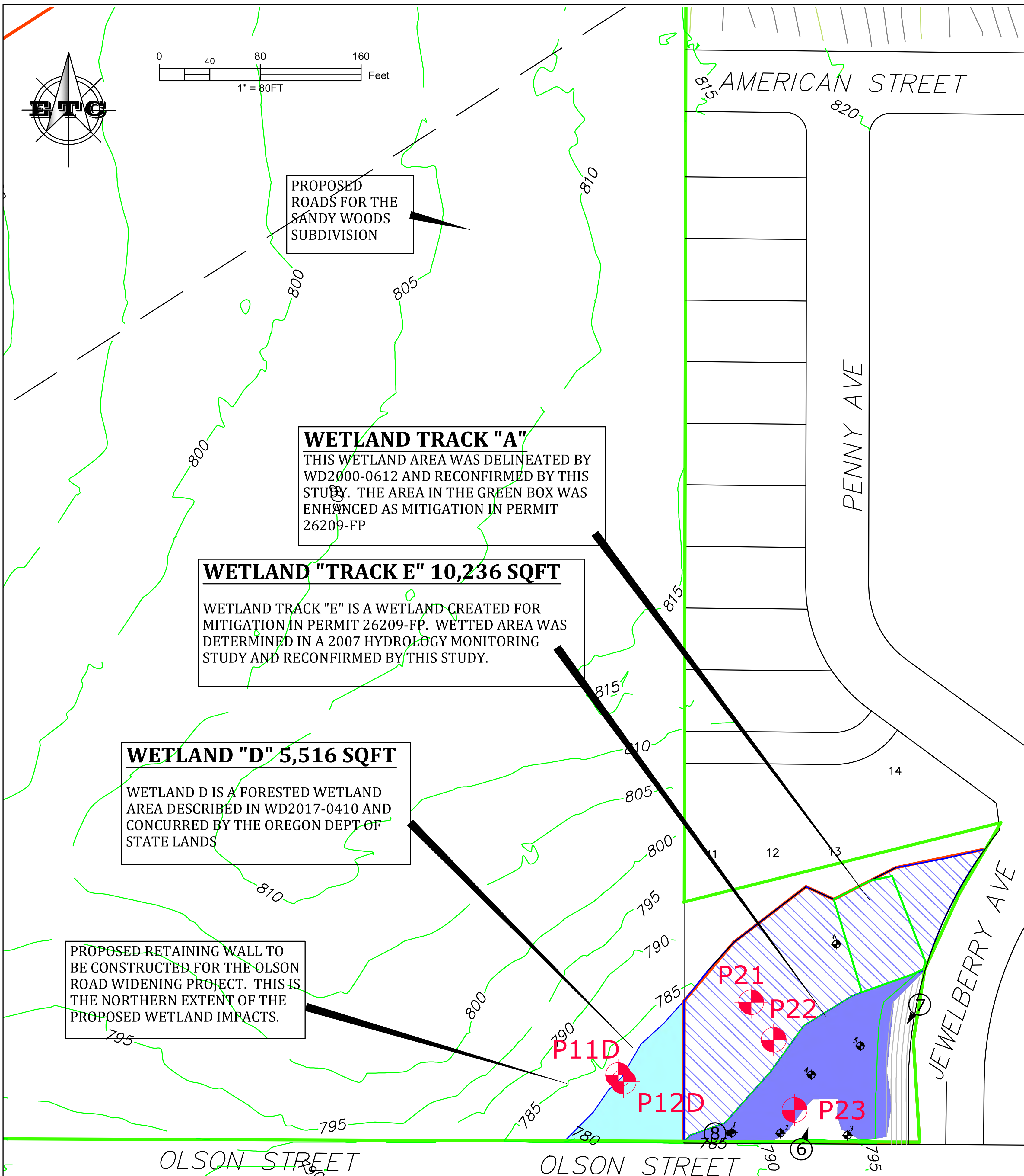
Vancouver, WA 98682
360-696-4403

DATE	Jan 15, 2019
SCALE	NOTED
DRAWN	JHM
JOB	EVA17010
FIGURE	5


KELSO ROAD
0 100 200 400 Feet
1" = 200FT
STUDY AREA:
REVISED STUDY BOUNDARY EXCLUDES NW CORNER OF TAX LOT 2200. INCLUDES REMAINDER OF TAX LOT 2200, MAP 2S, 4E, SECTION 11 LOCATED IN THE N.W. 1/4 SECTION 11, T2S, R4E., WM., CITY OF SANDY, CLACKAMAS COUNTY.
STUDY AREA ALSO INCLUDES:
TAXLOTS TRACK "A", TAXLOT 24E11AC00828, APPROXIMATELY 0.52 ACRES
TRACK "E", TAXLOT 24E11AC00832, APPROXIMATELY 0.32 ACRES
PLEASE SEE FIGURE 6B FOR DETAIL OF TRACKS "A" AND "E"
Disclaimer per OAR 141-090-0035 (7)(k)
This report documents the investigation, best professional judgment and conclusions of the investigator. It is correct and complete to the best of my knowledge. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and used at your own risk unless it has been reviewed and approved in writing by the Oregon Department of State Lands in accordance with OAR 141-090-0005 through 141-090-0055.
SURVEY BY TOBY G. BOLDEN, PLS# 60377LS
CENTERLINE CONCEPTS
19376 MOLALLA AVE., SUITE 120
OREGON CITY, OREGON 97045
WETLAND BOUNDARIES AND OTHER FEATURES ARE MAPPED WITH AN ACCURACY OF 0.01 FEET VERTICAL AND HORIZONTAL.
WD2017-0410 DELINEATED WETLAND BOUNDARIES ON TAX LOT 2200 SOUTH OF THIS LINE. THESE AREAS ARE NOT COVERED BY THIS REPORT.
PLEASE SEE FIGURE 6B FOR THE OLSON ROAD WIDENING AREA.
LEDGEND
P11D DATA PLOT
PHOTO STATION
2007 HYDROLOGY MONITORING PLOT
WETLAND "A" EXCLUDED FROM THIS STUDY IN ORDER TO GET APPROVALS FOR THE OLSON ROAD WIDENING PROJECT. BOUNDARIES SHOWN HERE HAVE NOT BEEN CONCURRED BY DSL
EXISTING GRAVEL ROAD
WETLAND "B", 0.051 ACRES DEPRESSIONAL WETLAND, PSS1B
STREAM 2, APPROX 1,017FT LONG, 0.082 ACRES.
WETLAND "C", APPROX 0.091 ACRES. SLOPED PSS1B
SUNFLOWER AVE
AMERICAN STREET
PENNY AVE
JEWELBERRY AVE
OLSON STREET
TOP AVE
environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403
WETLAND AREAS OF 37090 SE KELSO ROAD AND THE OLSON ROAD WIDENING PROJECT
37090 SE KELSO RD
GREAT AMERICAN DEVELOPMENT
16287 S FORSYTHE ROAD
OREGON CITY, OR 97045
REVISIONS
DATE Jan 15, 2019
SCALE NOTED
DRAWN JHM
JOB EVA17010
FIGURE 6Av2



SURVEY BY TOBY G. BOLDEN, PLS# 60377LS
CENTERLINE CONCEPTS
19376 MOLALLA AVE., SUITE 120
OREGON CITY, OREGON 97045

WETLAND BOUNDARIES AND OTHER FEATURES ARE MAPPED WITH AN ACCURACY OF 0.01 FEET VERTICAL AND HORIZONTAL.

Disclaimer per OAR 141-090-0035 (7)(k)

This report documents the investigation, best professional judgment and conclusions of the investigator. It is correct and complete to the best of my knowledge. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and used at your own risk unless it has been reviewed and approved in writing by the Oregon Department of State Lands in accordance with OAR 141-090-0005 through 141-090-0055.

LEDGEND

- P11D DATA PLOT
- PHOTO STATION
- 2007 HYDROLOGY MONITORING PLOT

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360-696-4403

DETAIL OF AREA IMPACTED BY THE OLSON ROAD WIDENING PROJECT IN SE CORNER

37090 SE KELSO RD
GREAT AMERICAN DEVELOPMENT
16287 S FORSYTHE ROAD
OREGON CITY, OR 97045

DATE	Jan 15, 2019
SCALE	NOTED
DRAWN	JHM
JOB	EVA17010
FIGURE	6B

REVISIONS

APPENDIX B - Data Forms

Plots:

P13-Upland
P14-Upland
P15-Upland
P16-Wetland
P17-Wetland
P18-Upland
P19-Wetland
P20-Upland
P21-Wetland by Best Professional Judgement (BPJ)
P22-Wetland
P23-Wetland

NOTE: Plots 1 through 12 describe the boundaries of wetlands "A" and "D", which have been removed from this study.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 4/28/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P13

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): Broad swale Local relief (concave, convex, none): Concave Slope (%): 9%

Subregion (LRR): LRR-A Lat: 45.24934 Long: -122.16889 Datum: ____

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation ____, Soil YES, or Hydrology YES significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐ No ☒	Is the Sampled Area within a Wetland? Yes ☐ No ☒
Hydric Soil Present?	Yes ☒ No ☐	
Wetland Hydrology Present?	Yes ☒ No ☐	

Remarks: A small depression in a forested areas where large machinery has basically created a wallow that now exhibits wetland hydrology and soils. In our opinion this was not a wetland until the machinery removed some of the topsoil exposing the hydric soils and a rather large tire rut that filled with water.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' cir)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer macrophylum	25	Y	FACU
2. Thuja plicata	20	Y	FAC
3.			
4.			
	45	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30' cir)			
1. Sambucus racemosa	30	Y	FACU
2. Corylus cornuta	15	Y	FACU
3. Rubus idaeus	2	N	FACU
4.			
5.			
	47	= Total Cover	
Herb Stratum (Plot size: 30' cir)			
1. Streptopus amplexifolius	20	Y	FACU
2. Symphoricarpos albus	30	Y	FACU
3. Rubus armeniacus	10	Y	FAC
4. Rubus spectabilis	10	Y	FAC
5. Polystichum munitum	10	Y	FACU
6. Adiantum aleuticum	5	N	FAC
7. Juncus sp	3	N	FAC
8.			
	88	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	180	= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: P13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR3/3	100					Silt loam	
6-10	7.5YR2.5/2	100					silty clay loam	
10-18	7.5YR4/4	80	7.5YR2.5/2	20	C	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ☒ No ☐

Remarks: Sampled in standing water making it hard to read colors

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☒ No ☐ Depth (inches): 0

Water Table Present? Yes ☒ No ☐ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches):

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 4/28/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P14

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): Broad swale Local relief (concave, convex, none): Concave Slope (%): 9%

Subregion (LRR): LRR-A Lat: 45.24927 Long: -122.16948 Datum: ____

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland? Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒	
Wetland Hydrology Present?	Yes ☒ No ☐	

Remarks: Above average rainfall in March and April. Area is gently sloped toward Stream "B". When we observed it, it had recently been brushed with a hydro-ax to clear the blackberries for surveyors. The machinery left many tire ruts now filled with water in this wet weather.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' S semi-cir)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer macrophylum	15	Y	FACU
2. Thuja plicata	10	Y	FAC
3.			
4.			
	25 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30' S semi-cir)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 30' S semi-cir)			
1. Rubus armeniacus	80	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	80 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	105 = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: Blackberries recently mowed, origionally they were at least 80% cover.

SOIL

Sampling Point: P14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-7	7.5YR3/2	100					Silt loam	Lot's of roots
7-12	7.5YR3/3	100					Silty loam	
12-18	7.5YR3/3	95	5YR4/4	5	C	M	Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks: In area not as disturbed by machinery. Lot's of tree roots.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): ____

Water Table Present? Yes ☒ No ☐ Depth (inches): 12"

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): 12"

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: In our opinion this area does not normally have a water table within 12" of the surface.

WETLAND DETERMINATION DATA FORM

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 4/28/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P15

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 1%

Subregion (LRR): LRR-A Lat: 45.24927 Long: -122.16948 Datum: ______

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒	
Wetland Hydrology Present?	Yes ☒ No ☐	

Remarks: Above average rainfall in March and April. Wallow made by brush hog working in wet weather when he should have been waiting for dryer weather.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' cir)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 30' cir)			
1. Rubus armeniacus	100	Y	FAC
2.			
3.			
4.			
5.			
	100	= Total Cover	
Herb Stratum (Plot size: 30' S semi-cir)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
		= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	100	= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	0 (A)		0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks: Data plots 14 & 15 are located where we could find relatively undistrubed soils, that's why they aer so far apart

US Army Corps of Engineers

SOIL

Sampling Point: P15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR2.5/3	100					Silt loam	Lot's of roots
8-13	7.5YR2.5/3	100					Silt loam	
13-18	7.5YR3/4	99	2.5N	1	C	M	Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ☐ **No** ☒

Remarks: Mowing of blackberries has disturbed this area leaving it more or less denuded with lots of tire ruts.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☒	No ☐	Depth (inches): 0
Water Table Present?	Yes ☒	No ☐	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches):

Wetland Hydrology Present? Yes ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Wallow created by brush hog, no algal mat (B4, no B9, No B5)

Remarks:

US Army Corps of Engineers

WETLAND DETERMINATION DATA FORM

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 4/28/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P16

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): Toe slope Slope (%): 3%

Subregion (LRR): LRR-A Lat: 45.24877 Long: -122.16980 Datum: ____

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐	
Wetland Hydrology Present?	Yes ☒ No ☐	

Remarks: Above average rainfall in March and April. Brush hog went through and chopped down veg. south of stream

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' NW)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	10	Y	FAC
2.			
3.			
4.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: 10' NW)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 30' S semi-cir)			
1. Rubus armeniacus	60	Y	FAC
2. Polystichum munitum	5	N	FACU
3. Adiantum aleuticum	5	N	FAC
4.			
5.			
6.			
7.			
8.			
	70 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	80 = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: Brush hog mowed down vegetation

SOIL

Sampling Point: P16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR2.5/3	100					Silt loam	Lot's of roots
5-11	7.5YR2.5/1	97	7.5YR4/10	3	C	M	Clay	Restrictive layer
11-18	7.5YR2.5/2	90	5YR3/4	10	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Clay

Depth (inches): 5

Hydric Soil Present? Yes ☒ No ☐

Remarks: Wet soil

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): 0
Water Table Present?	Yes ☒	No ☐	Depth (inches): 0.5"
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 0.5"

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Wallow created by brush hog, no algal mat (B4, no B9, No B5)

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 4/28/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P17

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 7%

Subregion (LRR): LRR-A Lat: 45.24878 Long: -122.16978 Datum: ____

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation Y, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐		
Wetland Hydrology Present?	Yes ☒ No ☐		

Remarks: Above average rainfall in March and April. small wetland next to stream

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10' NW)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	10	Y	FAC
2.			
3.			
4.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: 10' NW)			
1. Rubus armeniacus	100	Y	FAC
2.			
3.			
4.			
5.			
	100 = Total Cover		
Herb Stratum (Plot size: 30' S semi-cir)			
1. herb	3	N	NOL
2. Carex dewyana	1	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	4 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	114 = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: Brush hog mowed down vegetation

SOIL

Sampling Point: P17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR2.5/2	100					Silt loam	Lot's of roots
6-9	5YR3/3	100					Clay	odd mix of dark and red colors
9-18	5YR3/4	90	5YR2.5/2	10			Clay	depleted along root channels

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Clay

Depth (inches): 5

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Wet soil

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): 0
Water Table Present?	Yes ☒	No ☐	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): "

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys & Coast

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 4/28/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P18

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 9%

Subregion (LRR): LRR-A Lat: 45.24871 Long: -122.16977 Datum: ______

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation Y, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐ No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒	
Wetland Hydrology Present?	Yes ☐ No ☒	

Remarks: Above average rainfall in March and April. Upland to Plot 17

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' S semi-cir)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pseudotsuga menziesii	30	Y	FACU
2.			
3.			
4.			
	30 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30' S semi-cir)			
1. Prunus laurocerasus	30	Y	NOL
2. Rubus armeniacus	30	Y	FAC
3.			
4.			
5.			
	60 = Total Cover		
Herb Stratum (Plot size: 30' S semi-cir)			
1.			
2. Polystichum munitum	20	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	50 = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	140 = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: Laurel on edge of plot, thick hedge to the south

US Army Corps of Engineers

SOIL

Sampling Point: P18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-7	7.5YR3/2	100					Silt loam	
7-12	7.5YR3/3	100					Clay	
12-18	5YR4/4	95	5YR4/6	5	C	M	Clay	Restrictive layer

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Clay

Depth (inches): 12

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): 0
Water Table Present?	Yes ☒	No ☐	Depth (inches): 13"
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 13"

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: No indicators

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys & Coast

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 4/28/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P19

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 2%

Subregion (LRR): LRR-A Lat: 45.24980 Long: -122.16851 Datum: ______

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: PUB3E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland? Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐	
Wetland Hydrology Present?	Yes ☒ No ☐	

Remarks: Wetland "B". A small depressional wetland next to Stream #2. Above average rainfall in March and April. Bare spot in vegetation, off stream to north in a depression. This is clearly a small depressional wetland, although the soils do not fit nicely into one of the accepted hydric soil catagories.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15' cir)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	20	Y	FAC
2.			
3.			
4.			
	20 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15' cir)			
1. Rubus spectabilis **	30	Y	FAC
2. Rosa nutkana	15	Y	FAC
3.			
4.			
5.			
	45 = Total Cover		
Herb Stratum (Plot size: 15' cir)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	____ = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 35 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: ** Much of the Salmonberry in the lowest parts of the wetland are dead, probably died last year (?).

US Army Corps of Engineers

SOIL

Sampling Point: P19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR2.5/1	100					Silt loam	
6-12	7.5YR4/6	100					Clay	
12-18	2.5YR4/6	90	2.5YR4/1	10	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: clay

Depth (inches): 12

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Hard to get a good observation because the soil was so saturated

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☒ No ☐ Depth (inches): 0

Water Table Present? Yes ☒ No ☐ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches):

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Algal mat (B4), Sparsely veg concave surface (B8), Water-stained leaves (B9), Stunted/stressed plants (D1)

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys & Coast

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 4/28/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P20

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 12%

Subregion (LRR): LRR-A Lat: 45.24978 Long: -122.16853 Datum: ______

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐ No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒	
Wetland Hydrology Present?	Yes ☐ No ☒	

Remarks: Above average rainfall in March and April. upland plot to P19. Shovel refusal 12" due to big roots.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' N)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	15	Y	FAC
2. Acer macrophylum	30	Y	FACU
3.			
4.			
	45	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30' N)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 30' N)			
1. Rubus spectabilis	90	Y	FAC
2. Polystichum munitum	20	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	110	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	155	= Total Cover	

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: P20

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR2.5/3	100					Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Roots

Depth (inches): 12"

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks: Shovel refusal at 12" due to large tree roots.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): 0
Water Table Present?	Yes ☐	No ☒	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (inches):

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: No indicators

Remarks:

WETLAND DETERMINATION DATA FORM – WESTERN MOUNTAINS VALLEYS & COAST

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 10/10/2018

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P14/P21

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 1%

Subregion (LRR): LRR-A Lat: 45.411500 Long: -122.280760 Datum: ____

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ BY BPJ
Hydric Soil Present?	Yes ☐ No ☒	
Wetland Hydrology Present?	Yes ☐ No ☒	

Remarks: In Track "A" on fringe of graded area. In the field put as P14 but realized that we had already used that number so changed it to P21. This area was determined to be a wetland in WD2000-0612. P21 is outside of the disturbed area for the Olson Road Widening project. Although the absence of hydrology and soil indicators, and the presence of Beaked Hazelnut which is usually associated with upland conditions, we decided to map it as wetland as the surrounding area and previous studies support this conclusion.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: /4/30' N)			
1. Corylus cornuta	10	Y	FACU
2.			
3.			
4.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30' N)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 10' N)			
1. Rubus armeniacus	30	Y	FAC
2. Rosa gymnocarpa	15	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	45 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks: vegetation has been cut down.

SOIL

Sampling Point: P21

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR3/3	100					Silt loam	
4-12	7.5YR3/3	95	5YR4/6	5	C	M		
12-16	7.5YR3/2	90	5YR4/6	10	C	M	Silt clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ☐ **No** ☒

Remarks: The 4-12 inch layer had redox concentrations, however the matrix was not a chroma 2 or lower, and so does not meet the standard for a depleted matrix.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): ____
Water Table Present?	Yes ☐	No ☒	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (inches): ____

Wetland Hydrology Present? Yes ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: no primary of secondary indicators

Remarks:

WETLAND DETERMINATION DATA FORM – WESTERN MOUNTAINS, VALLEYS & COAST

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 10/10/2018

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P22 (was P15)

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 2%

Subregion (LRR): LRR-A Lat: 45.4115490 Long: -122.280750 Datum: ______

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐	Determined wetland by BPJ in spite of weak vegetation and hydrology indicators.
Wetland Hydrology Present?	Yes ☐ No ☒	

Remarks: In the wetland mitigation area. Lath was labeled "P15", but we renumbered the plot as P22 when we realized P15 was already used. Appears as P22 on the maps. Vegetation was disturbed by brush hog when we observed it, and at the end of the dry season. This delineation is problematic, but we are calling it a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' N)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	15	Y	FAC
2. Acer macrophylum	15	Y	FACU
3.			
4.			
	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30' N)			
1. Rubus americanus	80	Y	FAC
2. Rosa gymnocarpa	15	N	FACU
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 10' N)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	95	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	125	= Total Cover	

% Bare Ground in Herb Stratum _______ % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species		x 3 =
FACU species		x 4 =
UPL species	0	x 5 = 0
Column Totals:	(A)	(B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: vegetation has been cut in some areas.

SOIL

Sampling Point: P22

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR2/2	100					Silt loam	
6-10	7.5YR3/2	95	5YR4/6	5	C	M		
10-16	7.5YR4/4	60						
	7.5YR3/2	40					Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Mixed matrix below 10", redox 6-10

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): ______

Water Table Present? Yes ☐ No ☒ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): ______

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Observation was at the end of the dry season.

US Army Corps of Engineers

WETLAND DETERMINATION DATA FORM – WESTERN MOUNTAINS, VALLEYS & COAST

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 10/10/2018

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P23

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 4%

Subregion (LRR): LRR-A Lat: 45.24978 Long: -122.16853 Datum: ____

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: ____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐	
Wetland Hydrology Present?	Yes ☒ No ☐	

Remarks: A constructed shallow pond area for a wetland mitigation project.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30' N)			
1. Alnus rubra	15	Y	FAC
2.			
3.			
4.			
	15 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30' N)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 30' N)			
1.			
2. Juncus effusus	50	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	65% = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	50 = Total Cover		

% Bare Ground in Herb Stratum 50% % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: Alnus rubra on the fringe of ponded wetland.

US Army Corps of Engineers

SOIL

Sampling Point: P23

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
UNABLE TO COLLECT SOIL SAMPLE DUE TO INUNDATION OVER MUDDY SOILS.								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☒ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present? **Yes** ☒ **No** ☐

Remarks: Water was 4" deep and soil samples were difficult to get due to the muddiness of the soil. Soil presumed to be hydric.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☒ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☒	No ☐	Depth (inches): 4"
Water Table Present?	Yes ☐	No ☐	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ☐	No ☐	Depth (inches): ____

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: In pond

APPENDIX C - Ground Level Color Photographs:

Photos of Wetland “A” and areas covered by WD2017-0410 are removed from this revision.

Photo 1. REMOVED Wetland “A” data plots P1 Upland (left), and P2 Wetland (right). The blackberries had been recently mowed to give surveyors access. The wetland determination was based on soils and hydrology. ETC Photo 4/28/2017.

Photo 2. REMOVED Lower portion of Wetland “A” showing excessive algal growth due to fertilizers washed down from farms and nurseries upslope. ETC Photo 4/28/2017

Photo 3. Wetland “B”, a small depressional wetland in a forested area adjacent to Stream 2 in a forested area near where Stream 2 enters the subject property on the East border. ETC Photo 4/28/2017

Photo 4, (left) and 5 (right). Wetland “C”. Photo 4 looks down toward the stream, and 5 looks up from the stream. P18 had dry non-hydric soils, and saturated hydric soils were found at P17 which is slightly lower and closer to the stream.

Photo 6. The wetland creation area in Track “E”, as seen from Olson Road. ETC Photo 3/30/2017.

Photo 7 Track “E” mitigation area in April 2007. Olson Road had not been constructed, it would be later be built along the far side of the pond. ETC Photo 4/4/2007.

Photo 8 Track "E" after Blackberry clearing along Olson Road in preparation for the road widening. Photo looks East toward Jewelberry Road. ETC Photo 10/30/2018.

Photo 9 - Access road decommissioned January 2018, and erosion control measures complete.

APPENDIX D - Sensitive Area Certification:

Fish Presence:

No fish are thought to be present on the subject property, nor would they be expected.

Endangered Species:

No endangered species of plants or animals were observed or reported.

Critical Habitat Features:

The property was surveyed for the following critical habitat features. Not all of these features are considered rare or critical by the City Sandy:

Talus slopes – none
Caves, cliffs, crevasses, rock outcrops – none
Large oak trees, or oak groves or oak savanna – none
Snags – Several in the South forested area.
Large woody debris – Several large downed trees and logs, particularly in the forested area near Stream 2. The forested area in the South part of the lot had a few fallen trees and logs, but constant with 2nd growth timber areas there were far fewer downed trees than older stands of trees.
Springs, seeps - None.
Deep water habitat – None
Vernal pool wetlands – None
Old growth forest – None.
Wetlands – Described above.
Fish spawning or rearing habitat – none. It is believed that there is no fish access to this property.

APPENDIX E - WD2000-0612

8 PAGES FOLLOW THIS PAGE

APPENDIX E

Oregon

John A. Kitzhaber, M.D., Governor

Division of State Lands
775 Summer Street NE, Suite 100
Salem, OR 97301-1279
(503) 378-3805
FAX (503) 378-4844
http://statelands.dsl.state.or.us

State Land Board

John A. Kitzhaber
Governor

Bill Bradbury
Secretary of State

Randall Edwards
State Treasurer

August 14, 2001

Joe Spaziano
Great American Development
16500 SE Forsythe Road
Oregon City, OR 97045

Re: Wetland Delineation Report for Sandy Bluff 3 Subdivision, Sandy Clackamas County; T2S R4E Sec.11 Tax Lot 800; Det. #00-0612

Dear Mr. Spaziano:

I have reviewed the wetland delineation report prepared by David Waterman of ETC consultants for the project referenced above. Based on the information presented in the report, I concur with the wetland and waterway boundaries as mapped in Figure 1 of the report. These wetlands and waterways are subject to the permit requirements of the state Removal-Fill Law. A state permit is required for fill or excavation of 50 cubic yards or more in a wetland area or below the top of bank of a waterway.

This concurrence is for purposes of the state Removal-Fill Law only. Federal or local permit requirements may apply as well. The Army Corps of Engineers will review the report and make a determination of jurisdiction for purposes of the Clean Water Act at the time that a permit application is submitted. We recommend that you attach a copy of this concurrence letter to both copies of any subsequent joint permit application to speed application review.

In evaluating a permit application, our agency will first consider whether there is an analysis of alternatives that avoid or minimize wetland or waterway impacts. State law establishes a preference for avoidance of wetland impacts. Because measures to avoid and minimize wetland impacts may include reconfiguring parcel layout and size or development design, we recommend that you work with Division staff on appropriate site design before completing the city or county land use approval process.

This concurrence is based on information provided to the agency. Should additional information be brought to our attention or should site conditions change, we would consider the new information and re-evaluate the site and our jurisdictional determination as needed. Thank you for your report. I apologize for the delay in reviewing it.

K:\wetlands\dana\detletters\00-0612.doc

APPENDIX E

Site TCD on the City of Sandy Local Wetland Inventory should now be revised or annotated to show these more accurate wetland boundaries.

Sincerely,

Dana Field

Dana Field
Wetlands Planner

Approved by John Lilly
John E. Lilly
Assistant Director

cc: David Waterman, E.T.C.
City of Sandy Planning Department
Jim Goudzwaard, Corps of Engineers
Steve Moser, DSL

k:\wetlands\dana\detletters\00-0612.doc

APPENDIX E

WETLAND DF 'NEATION / DETERMINATION RE⌐⌐RT COVER FORM

(This form must be attached to reports submitted to the Divi..on for review and approval)

Oregon Division of State Lands
Attn.: Wetlands Program Leader
775 Summer Street NE, Suite 100
Salem, Oregon 97301-1279
(503) 378 - 3805

☒ Applicant ☐ Owner Name, Firm and Address:
Great American Development
16500 SE Forsythe Road
Oregon City, OR 97045

Business phone # (503) 655-6494
Home phone # (optional)
FAX #

☐ Authorized Agent:
Name and Address:
Joe Spaziano

Business Phone #
Home Phone #
FAX #

The information contained in the attached report is true and accurate to the best of my knowledge. My signature below authorizes the Division to conduct a site visit to confirm the information provided in the report.

Landowner: [signature] or Authorized Agent:
Date: 12-13-00 Date:

Project Location

Project Name: Sandy Bluff 3	Latitude: 45°24'41" Longitude: 122°16'47"
Proposed Use: ~32 lot single family residential subdivision	Tax Map # Tax Lot # 800
Project Street Address (or other descriptive location): ~1/4 mile west of Bluff Road at Olson Street	Township 2S Range 4E Section 11 QQ AC
City: ~~near~~ Sandy County: Clackamas	Waterway: None River Mile: N/A

Wetland Delineation Information

Wetland Consultant Name, Firm, and Address:
Richard S. Bublitz, Environmental Technology Consultants
2400 Broadway
Vancouver, WA 98663-3229

Phone # (360) 696 - 4403
FAX # (360) 696 - 4089
E-mail address: etc@teleport.com

Primary Contact for report review is ☒ Consultant ☐ Applicant/Owner ☐ Authorized Agent

Date of Delineation Report:	Wetland/Waters Present?	Total Site Acreage: 6.67 ac.
11/20/00	☒ Yes ☐ No	Total Wetland Acreage: 0.70 ac.

Other Information

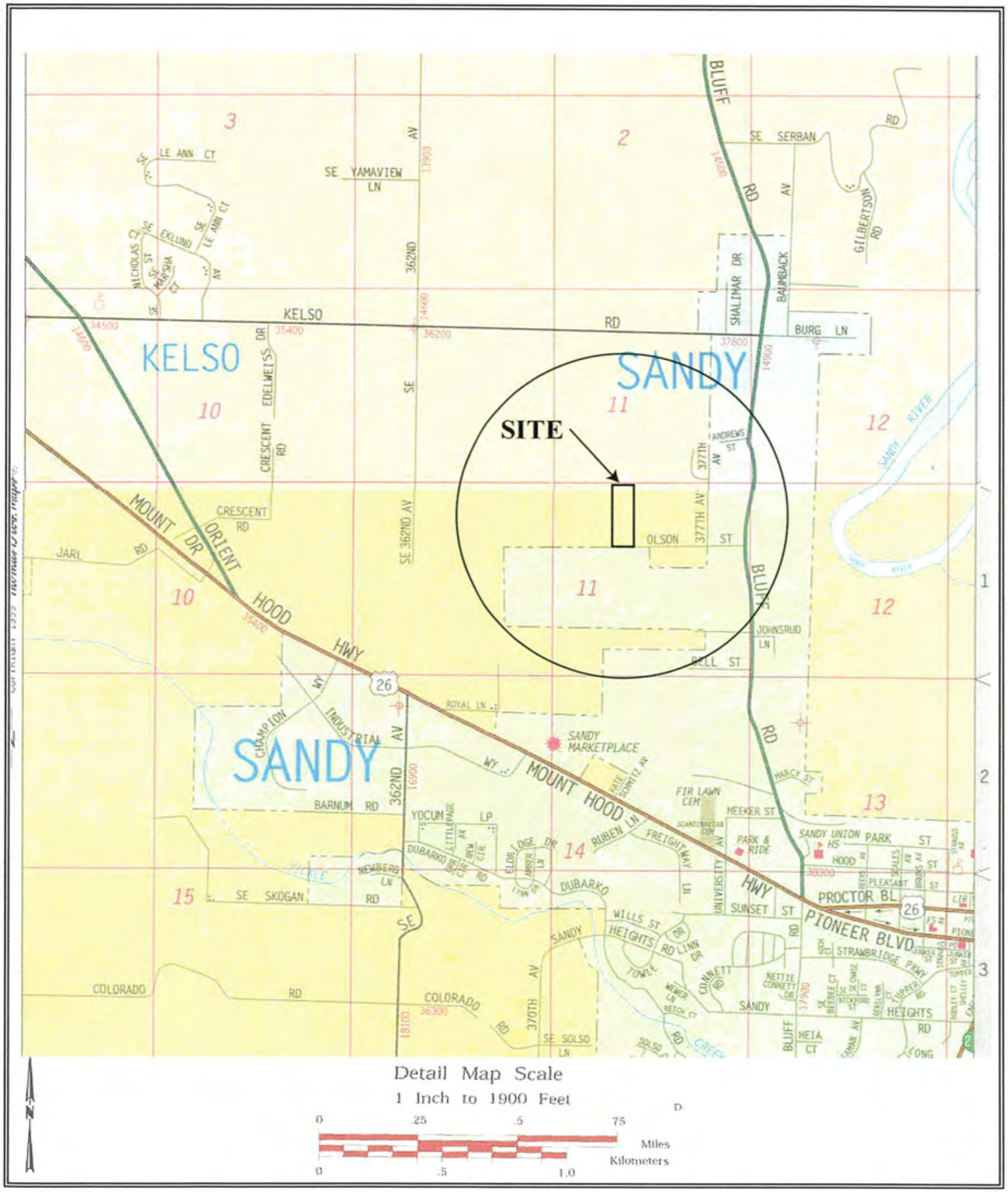
	Yes	No	Unknown
Is any of the property crop land?	☐	☒	☐
If yes, is applicant /Owner a USDA Program Participant?	☐	☒	☐
If yes, has a NRCS Form 026 been completed for the site?	☐	☒	☐
Is the site zoned Exclusive Farm Use?	☐	☒	☐
Does site show as wetland on Local Wetlands Inventory?	☐	☒	☐
Has a previous Delineation/Application been made for property?	☐	☒	☐

If yes, Division of State Lands # ______
NWI Quad Name(s): Sandy
Site Zoning: Residential, 10,000 sq ft

For Office Use Only

Corps Project Mgr.: ______ DSL Wetland Mgr.: ER DF DSL WD # 2000 - 0612
Date Delineation Received: __/__/__ DSL Project # ______ Corps # ______
Date Review Completed: __/__/__ Related Case Number(s): ______

APPENDIX E



environmental technology consultants

SITE VICINITY MAP

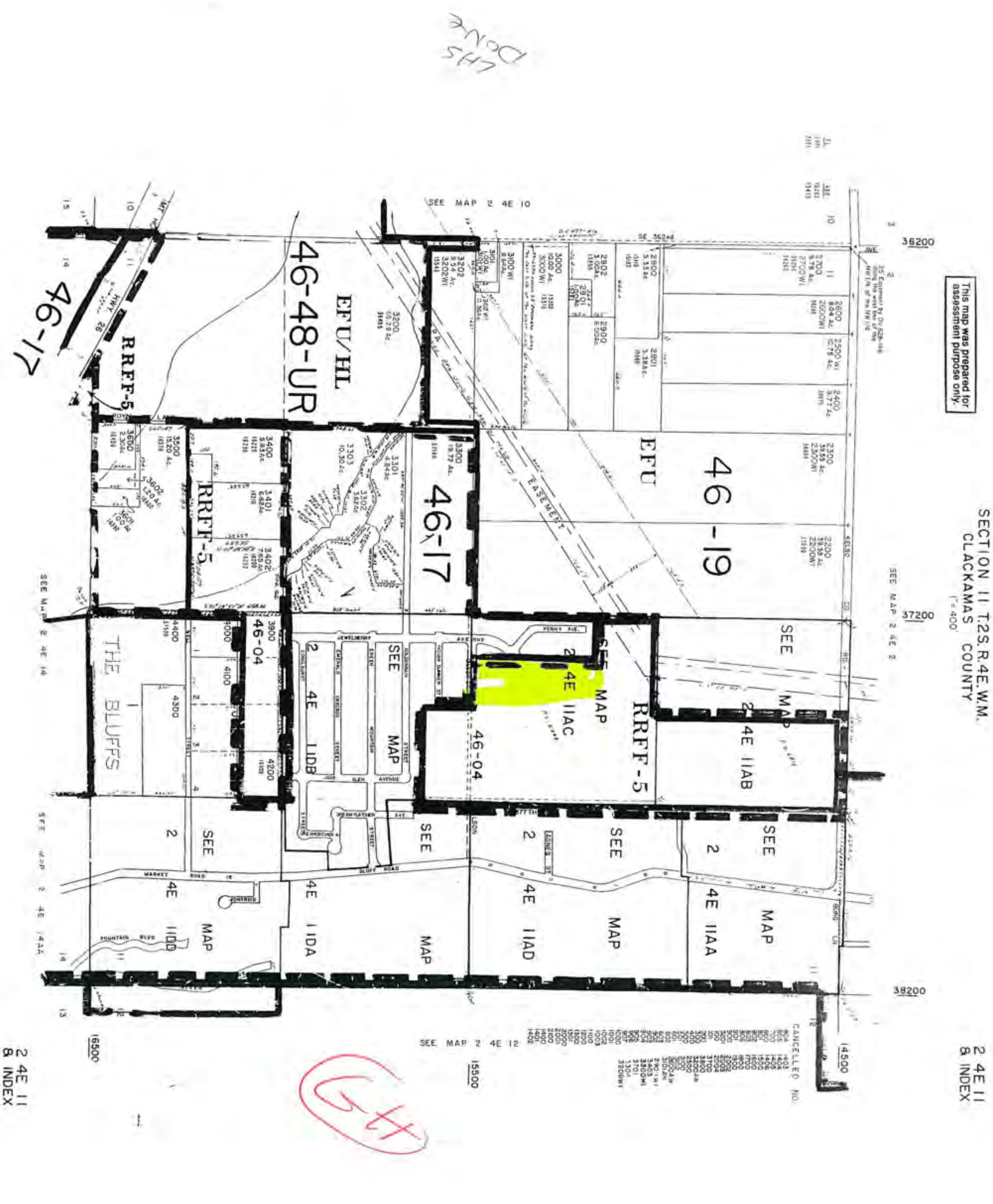
Source: Thomas Brothers, 1999

Subject Property:
Proposed Sandy Bluff 3
Sandy, Oregon

APPENDIX E

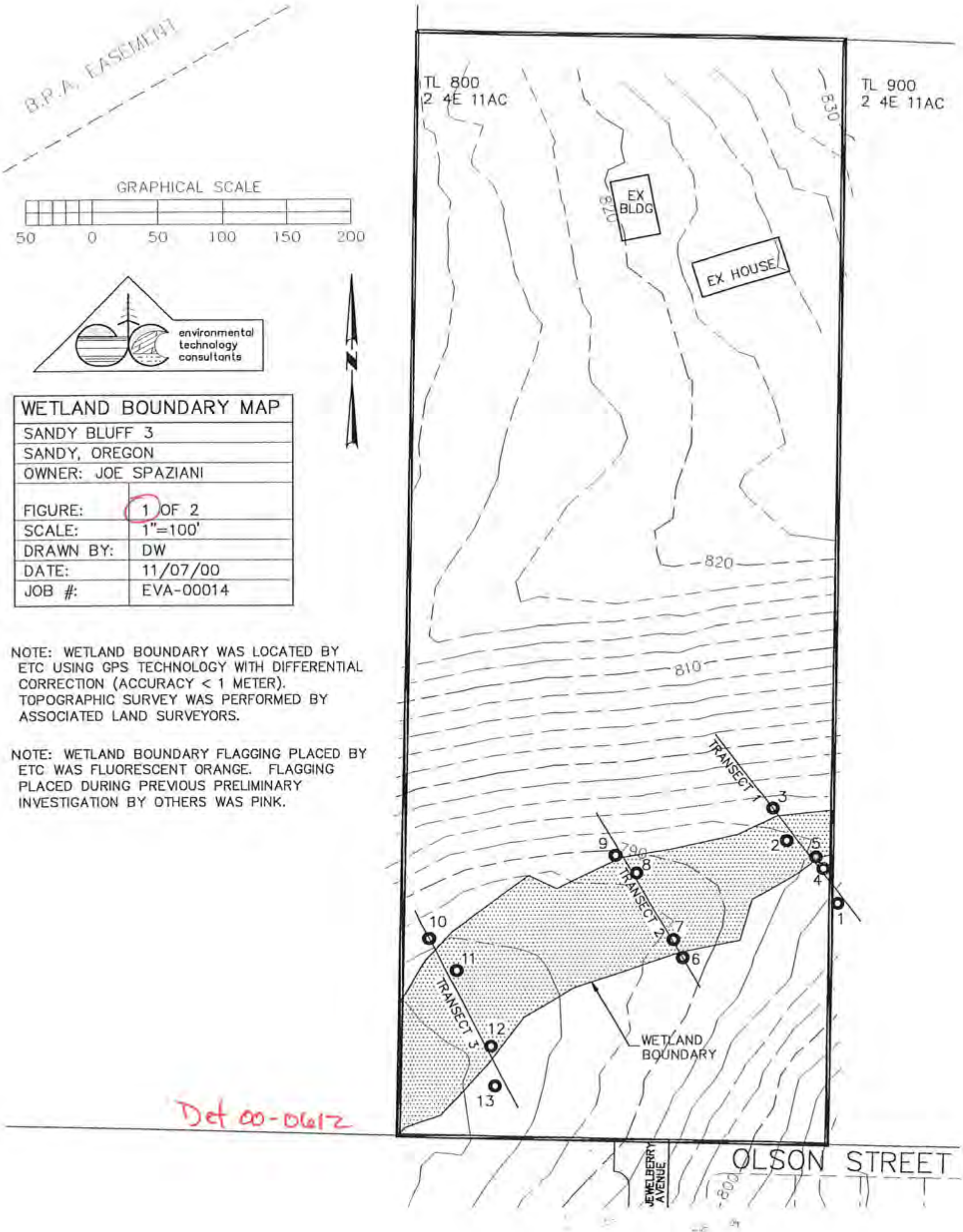

SEE MAP 2 4E 11
B.P.A.
EASEMENT
37200
This map was prepared for assessment purpose only.
PENNY AVE.
JEWELBERRY AVE.
OLSON STREET
46-17
46-04
R.R.F.F.-5
SW1/4 NE1/4 SEC.11 T.2S. R.4E. W.M.
CLACKAMAS COUNTY
SEE MAP 2 4E 11AB
SEE MAP 2 4E 11B
SEE MAP 2 4E 11A
SEE MAP 2 4E 11AD
377TH PVT AVE
37700
15600
15200
15000
2 4E 11AC

APPENDIX E



SECTION 11 T.2S. R.4E. W.M.
CLACKAMAS COUNTY
1"=400'
This map was prepared for assessment purpose only.
SEE MAP 2 4E 10
46-19
EFU
EFU/HL
46-48-UR
46-17
RRFF-5
46-04
EASEMENT
THE BLUFFS
SEE MAP 2 4E 11AC
SEE MAP 2 4E 11AB
SEE MAP 2 4E 11DB
SEE MAP 2 4E 11AD
SEE MAP 2 4E 11AA
SEE MAP 2 4E 11DA
SEE MAP 2 4E 11DD
SEE MAP 2 4E 12
SEE MAP 2 4E 14
2 4E 11
B INDEX

APPENDIX E



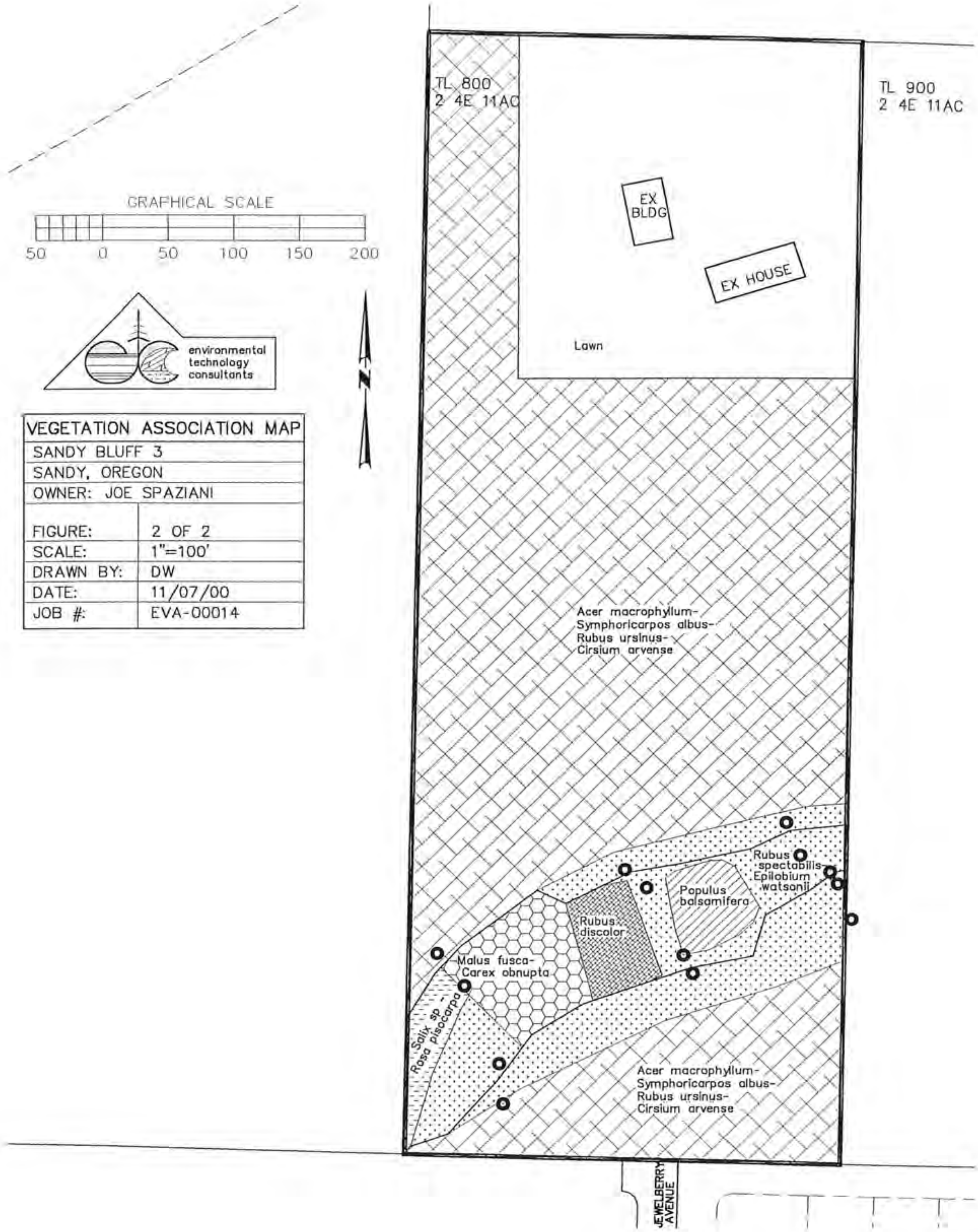
WETLAND BOUNDARY MAP	
SANDY BLUFF 3	
SANDY, OREGON	
OWNER: JOE SPAZIANI	
FIGURE:	1 OF 2
SCALE:	1"=100'
DRAWN BY:	DW
DATE:	11/07/00
JOB #:	EVA-00014

NOTE: WETLAND BOUNDARY WAS LOCATED BY ETC USING GPS TECHNOLOGY WITH DIFFERENTIAL CORRECTION (ACCURACY < 1 METER). TOPOGRAPHIC SURVEY WAS PERFORMED BY ASSOCIATED LAND SURVEYORS.

NOTE: WETLAND BOUNDARY FLAGGING PLACED BY ETC WAS FLUORESCENT ORANGE. FLAGGING PLACED DURING PREVIOUS PRELIMINARY INVESTIGATION BY OTHERS WAS PINK.

Det 00-0612

APPENDIX E


TL 800
2 4E 11AC
TL 900
2 4E 11AC
GRAPHICAL SCALE
50 0 50 100 150 200
environmental
technology
consultants
N
VEGETATION ASSOCIATION MAP
SANDY BLUFF 3
SANDY, OREGON
OWNER: JOE SPAZIANI
FIGURE: 2 OF 2
SCALE: 1"=100'
DRAWN BY: DW
DATE: 11/07/00
JOB #: EVA-00014
EX BLDG
EX HOUSE
Lawn
Acer macrophyllum-
Symphoricarpos albus-
Rubus ursinus-
Cirsium arvense
Rubus spectabilis-
Epilobium watsonii
Populus balsamifera
Rubus discolor
Malus fusca-
Carex obnupta
Salix sp.-
Rosa pisocarpa
Acer macrophyllum-
Symphoricarpos albus-
Rubus ursinus-
Cirsium arvense
JEWELBERRY AVENUE

APPENDIX F - WD2017-0410

7 PAGES FOLLOW THIS PAGE

APPENDIX F

Oregon
Kate Brown, Governor

Department of State Lands
775 Summer Street NE, Suite 100
Salem, OR 97301-1279
(503) 986-5200
FAX (503) 378-4844
www.oregon.gov/dsl

State Land Board

Kate Brown
Governor

Dennis Richardson
Secretary of State

Tobias Read
State Treasurer

December 4, 2017

Great American Development
Attn: Joe Spaziani
16287 S. Forsythe Road
Oregon City, OR 97045

Re: WD #2017-0410 Wetland Delineation Report for a Proposed Subdivision Development, Clackamas County; T 2S R 4E S 11 Portion of TL 2200;

Dear Mr. Spaziani:

The Department of State Lands has reviewed the wetland delineation report prepared by Environmental Technology Consultants for the site referenced above. Please note that the study area includes only a portion of the tax lot described above (see the attached maps). Based upon the information presented in the report and additional information submitted upon request, we concur with the wetland boundary as mapped in Figures 6A and 6B of the report. Within the study area, one wetland was identified, totaling approximately 0.127 acres. The wetland is subject to the permit requirements of the state Removal-Fill Law. Under current regulations, a state permit is required for cumulative fill or annual excavation of 50 cubic yards or more in wetlands.

This concurrence is for purposes of the state Removal-Fill Law only. Federal or local permit requirements may apply as well. The Army Corps of Engineers will review the report and make a determination of jurisdiction for purposes of the Clean Water Act at the time that a permit application is submitted. We recommend that you attach a copy of this concurrence letter to both copies of any subsequent joint permit application to speed application review.

Please be advised that state law establishes a preference for avoidance of wetland impacts. Because measures to avoid and minimize wetland impacts may include reconfiguring parcel layout and size or development design, we recommend that you work with Department staff on appropriate site design before completing the city or county land use approval process.

This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the date of this letter unless new information necessitates a revision. Circumstances under which the Department may change a determination are found in OAR 141-090-0045 (available on our web site or upon request). In addition, laws enacted by the legislature and/or rules adopted by the Department may result in a change in jurisdiction; individuals and applicants are subject to the regulations that are in effect at the time of the removal-fill activity or complete

APPENDIX F

permit application. The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months of the date of this letter.

Thank you for having the site evaluated. Please phone me at 503-986-5232 if you have any questions.

Sincerely,

Peter Ryan, PWS
Jurisdiction Coordinator

Approved by
Kathy Verble, CPSS
Aquatic Resource Specialist

Enclosures

ec: John McConnaughey, Environmental Technology Consultants
Clackamas County Planning Department
Dominic Yballe, Corps of Engineers
Anita Huffman, DSL

APPENDIX F

WETLAND DELINEATION / DETERMINATION REPORT COVER FORM

This form must be included with any wetland delineation report submitted to the Department of State Lands for review and approval. A wetland delineation report submittal is not "complete" unless the fully completed and signed report cover form and the required fee are submitted. Attach this form to the front of an unbound report or include a hard copy of the completed form with a CD/DVD that includes a single PDF file of the report cover form and report (minimum 300 dpi resolution) and submit to: **Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279.** A single PDF attachment of the completed cover from and report may be e-mailed to **Wetland_Delineation@dsl.state.or.us**. For submittal of PDF files larger than 10 MB, e-mail instructions on how to access the file from your ftp or other file sharing website. Fees can be paid by check or credit card. Make the check payable to the Oregon Department of State Lands. To pay the fee by credit card, call 503-986-5200.

☒ Applicant ☐ Owner Name, Firm and Address:
Great American Development, Joe Spaziani
16287 S. Forsythe Road
Oregon City, Oregon, 97045

Business phone # **503-860-2501**
Mobile phone #
E-mail: joeandpenny@hotmail.com

☒ Authorized Legal Agent, Name and Address:
Environmental Technology Consultants
375 Portland Ave, Gladstone, OR 97027

Business phone # 360-696-4403
Mobile phone # **503-580-2465**
E-mail: JohnM@etcEnvironmental.net

I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.
Typed/Printed Name: **Joe Spaziani** Signature: [signature]
Date: **April 20, 2017** Special instructions regarding site access: **Contact owner or consultant.**

Project and Site Information (using decimal degree format for lat/long of site or start & end points of linear project)

Project Name: **37090 SE Kelso Road**	Latitude: N ~~45.245314~~ Longitude: W ~~-122.165512~~
Proposed Use: **New Subdivision**	Tax Map # **24E1102200** ✓ 45.411972 -122.282009
Project Street Address (or other descriptive location): **37090 SE Kelso Road**	Township **T2S** Range **R4E** Section ~~2~~ 11 QQ **AC** Tax Lot(s) ~~00653705~~ 2200 portion
City: **Boring, OR** County: **Clackamas**	Waterway: NONE River Mile: NWI Quad(s):

Wetland Delineation Information

Wetland Consultant Name, Firm and Address:
John McConnaughey, PWS & Annakate Martin NRS
Environmental Technology Consultants
375 Portland Ave, Gladstone, OR 97027

Phone # **360-696-4403**
Mobile phone # **503-580-2465**
E-mail: **JohnM@etcEnvironmental.net**

The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.
Consultant Signature: [signature] Date: **September, 2017**

Primary Contact for report review and site access is ☒ Consultant ☐ Applicant/Owner ☐ Authorized Agent

Wetland/Waters Present? ☒ Yes ☐ No Study Area size: **15.428 acres** Total Wetland Acreage: **0.127 acres**

Check Box Below if Applicable: Fees: $419 (2017)

☐ R-F permit application submitted
☐ Mitigation bank site
☐ Wetland restoration/enhancement project (not mitigation)
☐ Industrial Land Certification Program Site
☐ Reissuance of a recently expired delineation
Previous DSL # Expiration date _____

☒ Fee payment submitted **$419**
☐ Fee ($100) for resubmittal of rejected report
☐ No fee for request for reissuance of an expired report

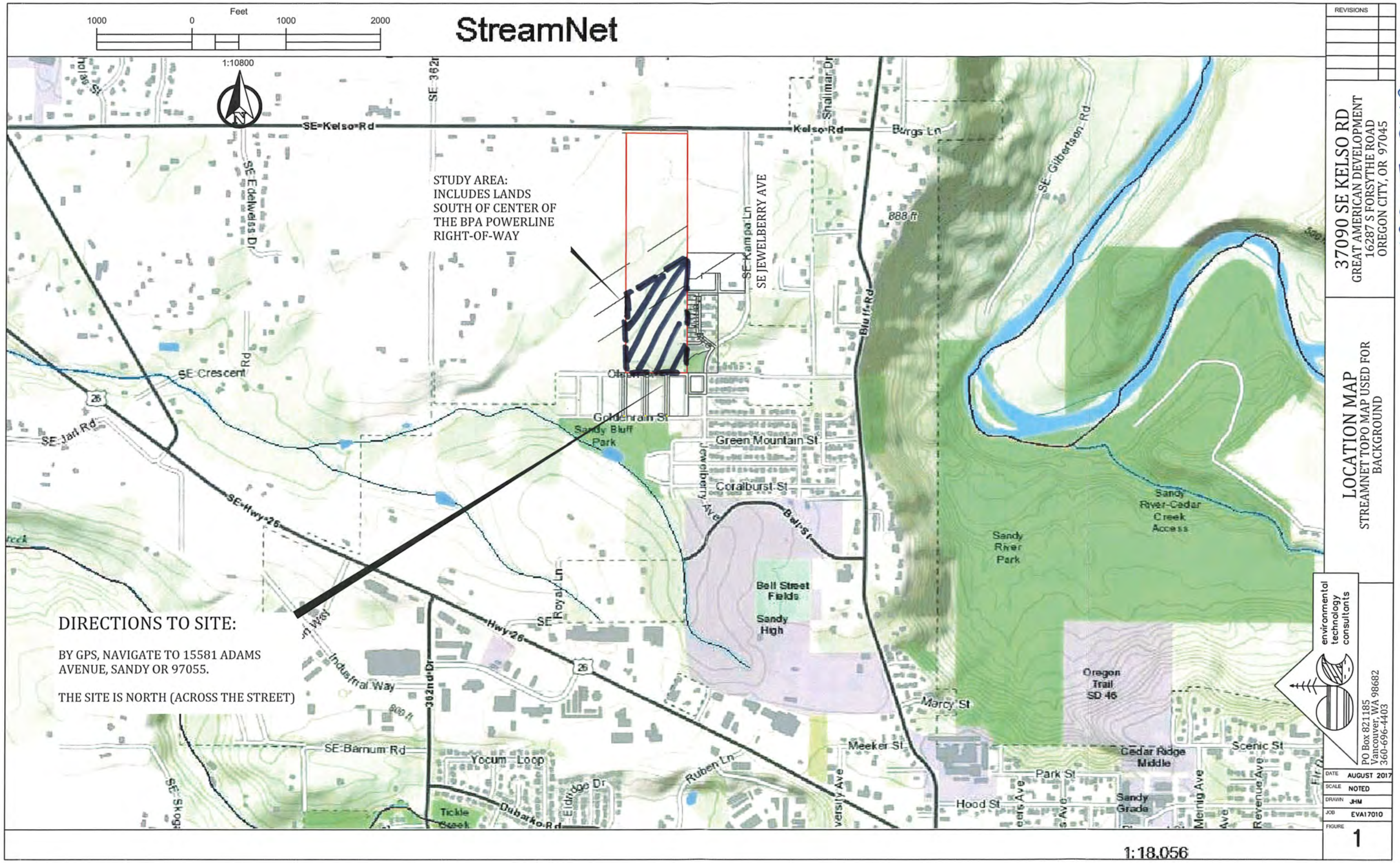
Other Information:	Y	N	
Has previous delineation/application been made on parcel?	☐	☒	If known, previous DSL #
Does LWI, if any, show wetland or waters on parcel?	☒	☐	

For Office Use Only

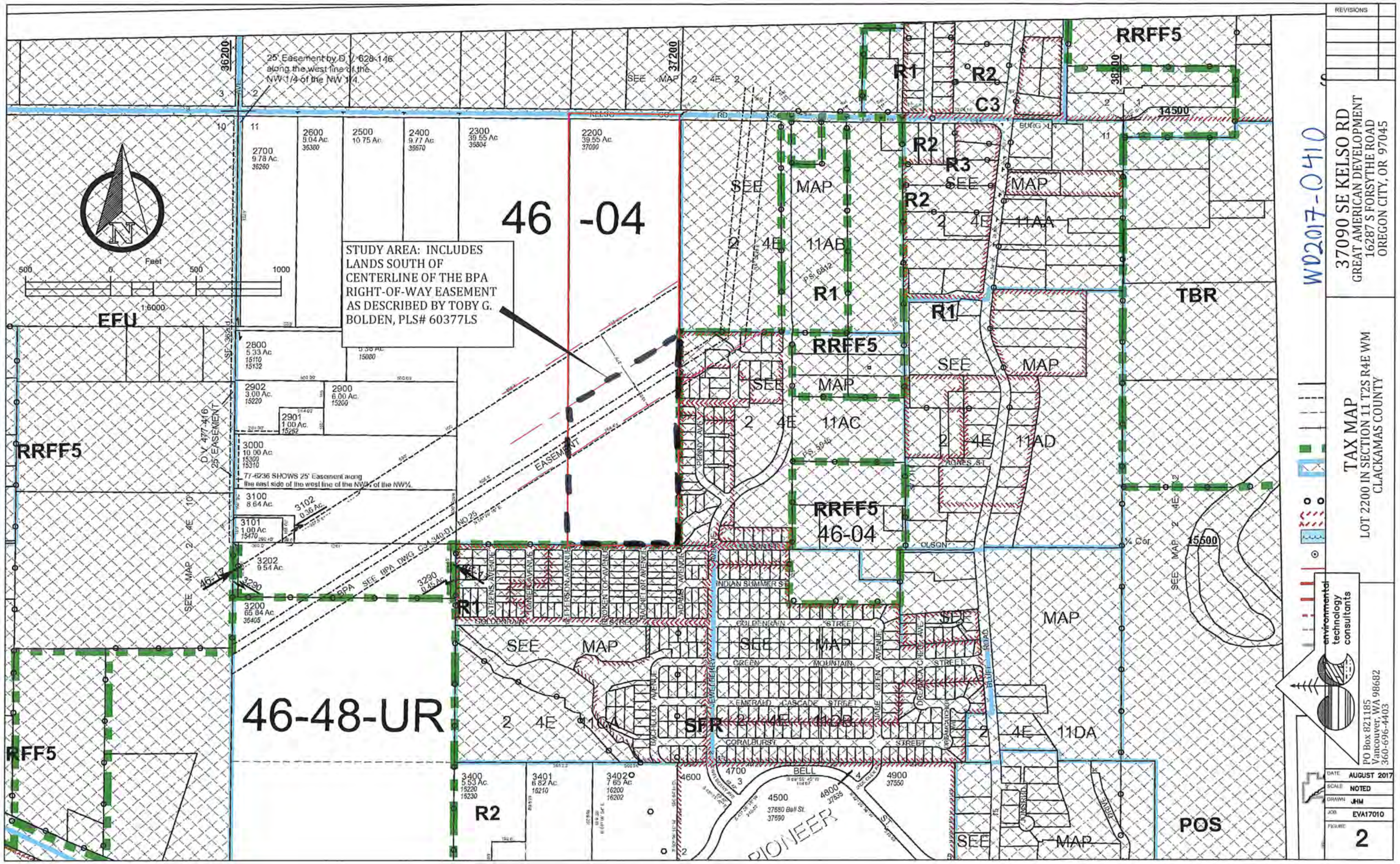
DSL Reviewer: PR Fee Paid Date: 10 / 3 / 17 DSL WD # 2017-0410
Date Delineation Received: 9 / 27 / 17 DSL Project # ________ DSL Site # ________
Scanned: ☒ Final Scan: ☐ DSL WN # ________ DSL App. # ________

Electronic Submittal

APPENDIX F

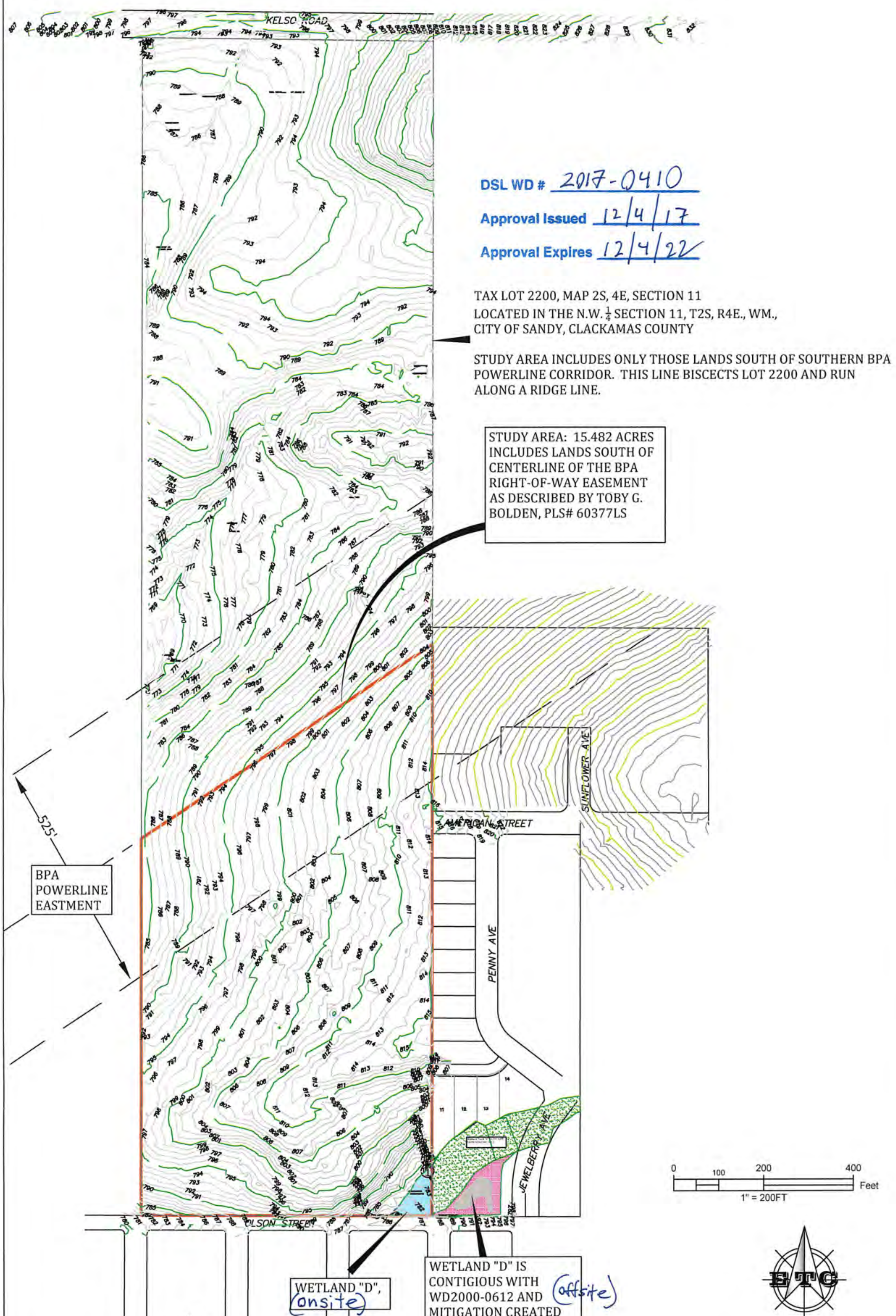

StreamNet
Feet
1000 0 1000 2000
1:10800
STUDY AREA:
INCLUDES LANDS
SOUTH OF CENTER OF
THE BPA POWERLINE
RIGHT-OF-WAY
DIRECTIONS TO SITE:
BY GPS, NAVIGATE TO 15581 ADAMS
AVENUE, SANDY OR 97055.
THE SITE IS NORTH (ACROSS THE STREET)
SE Kelso Rd
Kelso Rd
SE Edelweiss Dr
SE JEWELBERRY AVE
SE Kampa Ln
Bluff Rd
SE Gilbertson Rd
Burgs Ln
SE Crescent Rd
SE Jarl Rd
SE Hwy 26
Hwy 26
Goldenrain St
Sandy Bluff Park
Green Mountain St
Coralburst St
Bell St
Bell Street Fields
Sandy High
Sandy River Park
Sandy River-Cedar Creek Access
Oregon Trail SD 46
Cedar Ridge Middle
Sandy Grade
Marcy St
Meeker St
Park St
Hood St
Scenic St
Industrial Way
362nd Dr
SE Barnum Rd
Yocum Loop
Eldridge Dr
Dubarko Rd
Ruben Ln
Tickle Creek
888 ft
1:18,056
REVISIONS
37090 SE KELSO RD
GREAT AMERICAN DEVELOPMENT
16287 S FORSYTHE ROAD
OREGON CITY, OR 97045
LOCATION MAP
STREAMNET TOPO MAP USED FOR BACKGROUND
environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403
DATE AUGUST 2017
SCALE NOTED
DRAWN JHM
JOB EVA17010
FIGURE 1
WD2017-0410

APPENDIX F



STUDY AREA: INCLUDES LANDS SOUTH OF CENTERLINE OF THE BPA RIGHT-OF-WAY EASEMENT AS DESCRIBED BY TOBY G. BOLDEN, PLS# 60377LS
46 -04
46-48-UR
EFU
RRFF5
RFF5
R1
R2
R3
C3
TBR
SFR
POS
1:6000
25' Easement by D.V. 628-146 along the west line of the NW 1/4 of the NW 1/4
77-4236 SHOWS 25' Easement along the east side of the west line of the NW¼ of the NW¼
EASEMENT
BPA SEE BPA DWG
2200 39.55 Ac. 37090
2300 39.55 Ac.
2400 9.77 Ac.
2500 10.75 Ac.
2600 9.04 Ac.
2700 9.78 Ac.
2800 5.33 Ac.
2900 6.00 Ac.
2902 3.00 Ac.
2901 1.00 Ac.
3000 10.00 Ac.
3100 8.64 Ac.
3101 1.00 Ac.
3102
3200 65.84 Ac.
3202 9.54 Ac.
3400 5.53 Ac.
3401 6.82 Ac.
3402 7.65 Ac.
4500
4600
4700
4800
4900
14500
15500
2 4E 11AB
2 4E 11AC
2 4E 11AD
2 4E 11AA
2 4E 11DA
2 4E 11DB
2 4E 11CA
SEE MAP
KELSO RD
INDIAN SUMMER ST
GREEN MOUNTAIN STREET
EMERALD CASCADE STREET
CORALBURST STREET
BELL
PIONEER
OLSON
AGNES ST
REVISIONS
37090 SE KELSO RD
GREAT AMERICAN DEVELOPMENT
16287 S FORSYTHE ROAD
OREGON CITY, OR 97045
WD2017-0410
TAX MAP
LOT 2200 IN SECTION 11 T2S R4E WM
CLACKAMAS COUNTY
environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403
DATE AUGUST 2017
SCALE NOTED
DRAWN JHM
JOB EVA17010
FIGURE 2

APPENDIX F



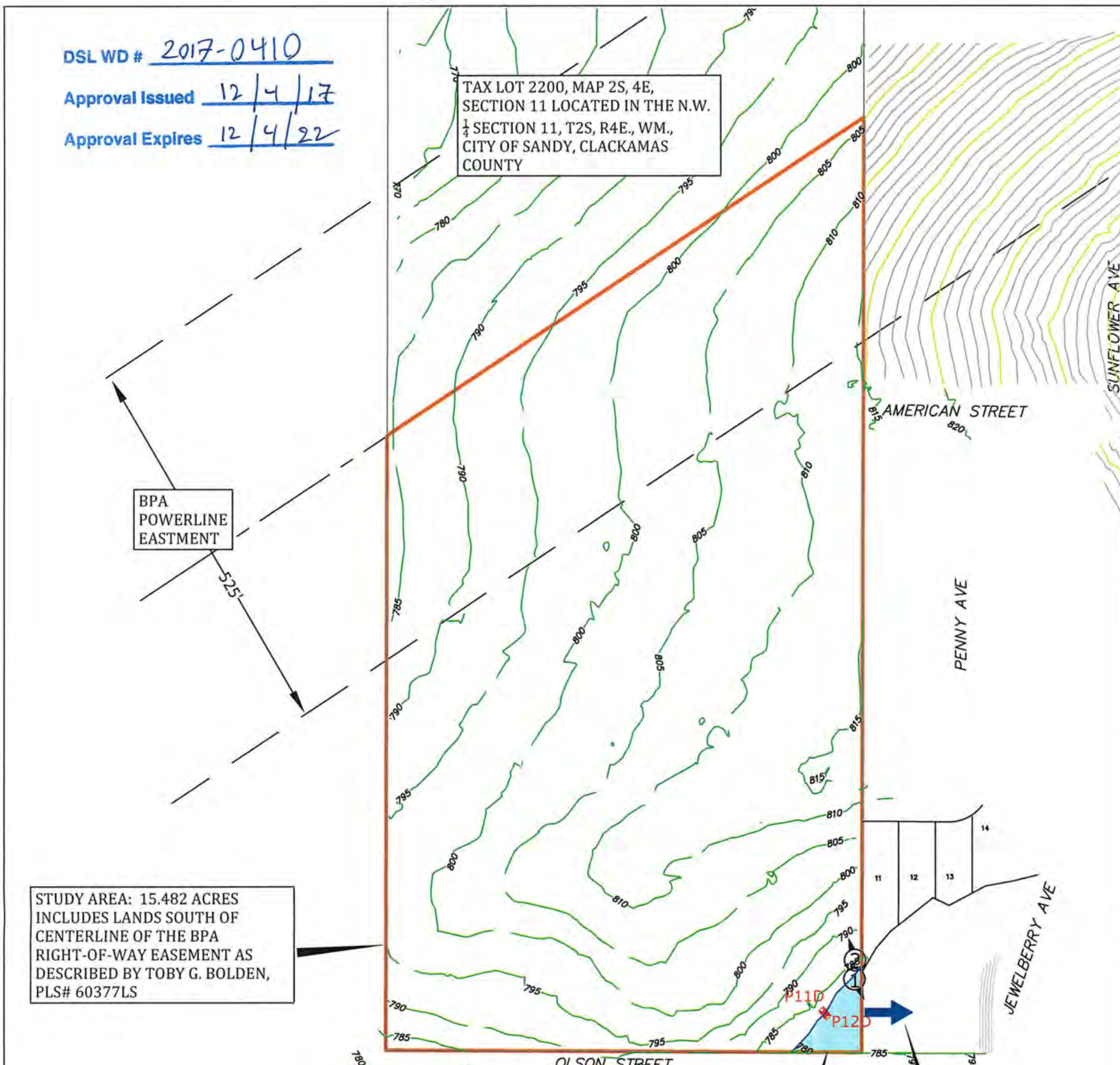
DATE AUGUST 2017 SCALE NOTED DRAWN JHM JOB EVA17010 FIGURE 6A	environmental technology consultants PO Box 821185 Vancouver, WA 98682 360-696-4403	**INDEX MAP** FOR STUDY AREA OF THIS DELINEATION REPORT WD2017-0410.
37090 SE KELSO RD GREAT AMERICAN DEVELOPMENT 16287 S FORSYTHE ROAD OREGON CITY, OR 97045	REVISIONS	

APPENDIX F

DSL WD # 2017-0410

Approval Issued 12/4/17

Approval Expires 12/4/22



TAX LOT 2200, MAP 2S, 4E, SECTION 11 LOCATED IN THE N.W. ¼ SECTION 11, T2S, R4E., WM., CITY OF SANDY, CLACKAMAS COUNTY

STUDY AREA: 15.482 ACRES INCLUDES LANDS SOUTH OF CENTERLINE OF THE BPA RIGHT-OF-WAY EASEMENT AS DESCRIBED BY TOBY G. BOLDEN, PLS# 60377LS

WETLAND "D" 5,516 SQFT

WETLAND D IS A FORESTED WETLAND AREA CONTIGUOUS WITH A WETLAND DESCRIBED BY WD#2000-0612. THE COWARDIN CLASSIFICATION OF THE WETLAND AREA ON THE SUBJECT PROPERTY IS PALUSTRINE, FORESTED, DECIDUOUS, ARTIFICIALLY FLOODED, OR PFO1B TO PFO1F.

WETLAND D IS CONTIGUOUS WITH WETLANDS IN TRACK "A" TO THE EAST OF LOT 2200

0 75 150 300 Feet

1" = 150FT FORMATTED FOR 11 X 17 PAPER

SURVEY BY TOBY G. BOLDEN, PLS# 60377LS
CENTERLINE CONCEPTS
19376 MOLALLA AVE., SUITE 120
OREGON CITY, OREGON 97045

WETLAND BOUNDARIES AND OTHER FEATURES ARE MAPPED WITH AN ACCURACY OF 0.01 FEET VERTICAL AND HORIZONTAL.

Disclaimer per OAR 141-090-0035 (7)(k)

This report documents the investigation, best professional judgment and conclusions of the investigator. It is correct and complete to the best of my knowledge. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and used at your own risk unless it has been reviewed and approved in writing by the Oregon Department of State Lands in accordance with OAR 141-090-0005 through 141-090-0055.

LEDGEND

P11D DATA PLOT

1 PHOTO STATION

environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403

DELINEATION FOR WETLANDS IN THE SOUTH PORTION OF LOT 1200

37090 SE KELSO RD
GREAT AMERICAN DEVELOPMENT
16287 S FORSYTHE ROAD
OREGON CITY, OR 97045

DATE	AUGUST 2017
SCALE	NOTED
DRAWN	JHM
JOB	EVA17010
FIGURE	6B

REVISIONS

WETLAND DELINEATION / DETERMINATION REPORT COVER FORM **Exhibit I**

This form must be included with any wetland delineation report submitted to the Department of State Lands for review and approval. A wetland delineation report submittal is not "complete" unless the fully completed and signed report cover form and the required fee are submitted. Attach this form to the front of an unbound report or include a hard copy of the completed form with a CD/DVD that includes a single PDF file of the report cover form and report (minimum 300 dpi resolution) and submit to: **Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279.** A single PDF attachment of the completed cover from and report may be e-mailed to **Wetland_Delineation@dsl.state.or.us**. For submittal of PDF files larger than 10 MB, e-mail instructions on how to access the file from your ftp or other file sharing website. Fees can be paid by check or credit card. Make the check payable to the Oregon Department of State Lands. To pay the fee by credit card, call 503-986-5200.

☒ Applicant ☐ Owner Name, Firm and Address:
Rosemont Development
10117 SE Sunnyside Road
Clackamas, Oregon, 97015

Business phone # **503-351-4747**
Mobile phone #
E-mail: rosemontdevelopment@gmail.com

☒ Authorized Legal Agent, Name and Address:
Environmental Technology Consultants
375 Portland Ave, Gladstone, OR 97027

Business phone # 360-696-4403
Mobile phone # **360-984-8767**
E-mail: AnnakateM@etcEnvironmental.net

I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.

Typed/Printed Name: Annakate Martin Signature: Annakate Martin

Date: **August 2020** Special instructions regarding site access: **Contact owner or consultant.**

Project and Site Information (using decimal degree format for lat/long of site or start & end points of linear project)

Project Name: **37090 SE Kelso Road**	Latitude: **N 45.417907** Longitude: **W -122.2831**
Proposed Use: SUBDIVISION, SINGLE FAMILY HOMES	Tax Map # 24E11 Lot 24E11 02204 Parcel Number 05034843
Project Street Address (or other descriptive location): **No Situs Address** **(Formally known as 37090 SE Kelso Road)**	Township **T2S** Range **R4E** Section **11** QQ Tax Lot(s) **24E1102204**
City: **Sandy, OR** County: **Clackamas**	Waterway: **No name** River Mile: NWI Quad(s): Sandy, Oregon

Wetland Delineation Information

Wetland Consultant Name, Firm and Address:
John McConnaughey, PWS & Annakate Martin NRS
Environmental Technology Consultants
375 Portland Ave, Gladstone, OR 97027

Phone # **360-696-4403**
Mobile phone # **360-984-8767**
E-mail: **AnnakateM@etcEnvironmental.net**
JohnM@etcEnvironmental.net

The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.

Consultant Signature: Annakate Martin Date: **May, 2017 updated April 2020**

Primary Contact for report review and site access is ☒ Consultant ☐ Applicant/Owner ☐ Authorized Agent

Wetland/Waters Present? ☒ Yes ☐ No | Study Area size: **2.69 acres** Total Wetland Acreage: **1.69 AC**

Check Box Below if Applicable: Fees: $466 (2020)

☐ R-F permit application
☐ Mitigation bank site
☐ Wetland restoration/enhancement project (not mitigation)
☐ Industrial Land Certification Program Site
☐ Reissuance of a recently expired delineation
Previous DSL # Expiration date ____

☒ Fee payment submitted **$466**
☐ Fee ($100) for resubmittal of rejected report
☐ No fee for request for reissuance of an expired report

Other Information:

	Y	N	
Has previous delineation/application been made on parcel?	☒	☐	If known, previous WD2018-0656
Does LWI, if any, show wetland or waters on parcel?	☐	☒	

For Office Use Only

DSL Reviewer: ________ Fee Paid Date: ___ / ___ / ___ DSL WD #

Date Delineation Received: ___ / ___ / ___ DSL Project # ________ DSL Site # ________

Scanned: ☐ Final Scan: ☐ DSL WN # ________ DSL App. # ________

WETLAND DELINEATION REPORT
Tax Lot 24E11 02204
Formally 37090 SE Kelso Road
Sandy, OR

SWS PCP PWS EDUCATION EXPERIENCE ETHICS JOHN McCONNAUGHEY, MSc 002009 PROFESSIONAL WETLAND SCIENTIST

Evaluated by:
Annakate Martin, NRS
John McConnaughey PWS# 2009
May, 2017 and August 2020

Annakate Martin

Prepared for: Rosemont Development
Rob Venema
10117 SE Sunnyside Road
Clackamas, OR 97015

environmental technology Consultants
"Creating Tomorrow's Environment - Today"

Environmental Technology Consultants
A Division of Sisul Enterprises, Inc.
375 Portland Ave, Gladstone, OR 97027
PO Box 821185, Vancouver, WA 98682
(360) 696-4403 Fax: (503) 657-5779
WA Landscape Contractors License #: ENVIRTCO23RB
Web: www.etcEnvironmental.net
Email: etc@etcEnvironmental.net

Table of Contents

Cover Photo.

Photo of Wetland A shortly after blackberries were mowed, looking west at the first wetland investigation.
ETC Photo 3/13/2017

INTRODUCTION

This report delineates the wetlands and waterways of lot 24E11 02204. There used to be a house on this lot with the address of 37090 SE Kelso Road, Sandy Oregon. The house and address no longer exist. Lot 2204 is the northern portion of a larger piece of property known as lot 2200 that was subdivided in the process of building the Sandy Woods subdivision.

Originally ETC prepared a delineation report covering the entire lot 2200 (37090 SE Kelso Road). The applicant then decided only to develop the southern portion of the property and requested that ETC remove the North portion of the property from the study area. Accordingly, ETC authored and submitted a report for areas South of the BPA powerline ROW which bisected lot 2200. That delineation was numbered WD2017-0410 and was concurred with by DSL for Joe Spaziani.

In the process of permitting the Sandy Woods subdivision, the City of Sandy required the applicant to widen Olson Road, and this necessitated fills to a wetland area known as Track “A” and Track “E”. DSL also required the applicant to delineate the remainder of the property due to the usage of an access road coming in from Kelso Road. Accordingly, ETC authored and submitted a report numbered WD2018-0656 that included the remainder of lot 2200 and Tracks “A” and “E”. In the course of reviewing WD2018-0656, DSL determined that there may be errors in the wetland boundary plots that defined what we are calling Wetland “A” of lot 2200, (not to be confused the wetland in Track “A” next to Olson Road). Because the project at that time did not impact Wetland “A”, we elected to remove the area from the study boundary of WD2018-0656. The report was subsequently concurred with by DSL.

The applicant sold the property to Rosemont development and now is planning a subdivision development for the areas North of the BPA Powerline on lots 2204 and 2202. Lot 2203 is a conservation track for a stream and small wetland. Lots 2202 and 2203 were included in WD2018-0656.

The study area of WD2018-0656 included the upland portions of lot 2204, which included the former house and some farmed areas.

In conversations with DSL, ETC requested guidance on defining the study boundary for this report. We requested that it include the entire lot 2204 in order to make a clean report with a study boundary defined by lot lines. DSL disagreed and instructed ETC to include only those portions of lot 2204 that were not previously delineated by WD2018-0656. This is the reason the study boundary in this report bisects lot 2204 close to the Wetland “A” boundary.

Lot 2205 is a sliver of land between the old western boundary of the original lot 2200, and a fence separating lot 2200 and lot 2300. Rather than move the fence or argue with the owner of lot 2300 over this land, the applicant has deeded lot 2205 to the owner of lot 2300. For this reason, lot 2205 is not included in any of the delineation studies mentioned in this report.

The ditches of Kelso Road that are in the Kelso Road ROW are not included in this report. Water from these ditches is the primary source of water that creates wetland “A”.

Study Area: This report includes only those portions of lot 2204 not previously delineated by WD2018-0656, basically an area containing a sloped wetland area we are calling Wetland “A”. Some of the field work was done in 2017 and revisited in 2020 for this report.

The relevant previously submitted delineations and reports for the original lot 2200 and Tracks “A” and “E” are:

- WD2017-0410 - The south portions of the parent parcel Tax Lot 2200 (37090 SE Kelso Road), which has since been subdivided. The wetland study included the entire tax lot 2200, however in the process of developing the subdivision submittals the applicant decided to remove the North half of lot 2200 from the study boundary.

- WD2018-0656- This report included northern portions of tax lot 2200 (except Wetland “A”). The reason for removing Wetland “A” from the study boundary is discussed above.

The timing of site visits and writing of this report was affected by shutdowns in response to the COVID-19 pandemic. The shutdowns delayed the production of this report.

This report is intended to assist the permittee, the City of Sandy, and the State of Oregon to evaluate the application and determine what environmental conditions or mitigations may be required to move this project forward.

QUALIFICATIONS OF JOHN MCCONNAUGHEY, PWS

I earned a Bachelor of Science degree from the University of Oregon in 1978 and in 1984 I earned a Masters of Fisheries Science degree from the University of Alaska at Juneau, (since renamed as the University of Alaska, Southeast). The Juneau curriculum specializes in the study of Pacific salmon. I held positions with agencies tasked with salmon research and management beginning with summer jobs in 1979 in Rogue River, the Oregon Dept of Fish and Wildlife, and then with the Alaska Department of Fish and Game in Ketchikan Alaska, in 1980. I worked on salmon projects with ADF&G in Anchorage and Juneau for 5 years before moving to American Samoa to serve as a fisheries project’s leader for the Department of Marine and Wildlife Resources. Upon returning stateside, I worked for the Yakama/Klickitat Fisheries Project out of Yakima Washington for 5 years leading four research projects studying aspects of salmon supplementation projects in the Yakima River.

I have been employed with Environmental Technology Consultants since 2006. In 2010 I earned certification as a Professional Wetland Scientists, (PWS) from the Society of Wetlands Scientists, (SWS).

No part of my compensation is dependent on the outcome of my investigations or conclusions I may draw from the observed data.

QUALIFICATIONS OF ANNAKATE MARTIN

I earned a Bachelor of Science degree in Natural Resources from Washington State University in 2002. In 2002 I worked for the University of Idaho on MAP tracking steelhead and salmon on the Snake River out of Clarkston, Washington.2002-2003 I worked for Idaho Fish and Game as a field technician for identifying fish in remote streams in Idaho. In 2004 I worked for Environmental Technology Consultants conducting wetland delineations and Phase I ESA reports. From 2007-2014 I worked for 3 Kings Environmental conducting Phase I ESA reports, asbestos and lead surveys. In 2011 I started my own company primarily providing erosion control services (CESCL Certified) and Phase I ESA reports. I worked for Clark Public Utilities as a Restoration Specialist Supervisor and decided to return to ETC.

I have been re-employed with Environmental Technology Consultants in 2015 for wetland delineation consulting.

A) Landscape Setting and Land Use:

The subject property is a 11.88 Acre parcel in a rural residential area. that is on a hillslope at approximately 787’ in elevation. It is in the Clackamas River watershed. The terrain is gently rolling in the general north to south direction on the majority of the property. The property is surrounded primarily by agricultural land, and partially by roads, rural single-family residences, and single-family residences in subdivisions. The property was a sloped area that had a 100% cover of Himalayan Blackberry.

The area is zoned SFR.

B) Site Alterations:

The subject site had a single-family residence, that has been demolished, and according to the Assessors information was built in 1915. Portions of the property have been used for agriculture uses such as a plant nursery, and possibly a raspberry farm. In 2017 the applicant used a brush hog to mow the blackberries on most of the site in order that surveyors could gain access. Much of the property that was historically farmed now has a dense cover of blackberries. The property was divided up into different tax lots in 2019, the portion containing Wetland "A" is now tax lot 2204 and 11.88 acres in size. The site was revisited April 15,2020 to re-delineate Wetland "A".

C) Precipitation Data and Analysis:

This wet season was above average in January 2020, but below average in February and March. The table below shows the precipitation from the WETS table:

Table 1. Wetland Evaluation Technique (WETS) comparison of 2018 and 2019 precipitation to WETS average precipitation at the Portland International Airport.

WETS Station: PORTLAND INTL AIRPORT, OR	Observed Precip				Avg Precip 1971-2000	30% chance precip less than	30% chance precip more than	Observed Compared to WETS Average		
Month	2017	2018	2019	2020				2018	2019	2020
Jan		5.36	2.79	9.83	5.07	2.98	6.15	Avg	Below	Above
Feb		1.86	4.10	2.45	4.18	2.84	4.98	Below	Avg	Below
Mar		2.50	1.54	2.75	3.71	2.85	4.31	Below	Below	Below
Apr		3.34	2.98		2.64	1.93	3.10	Above	Avg	
May		0.17	1.51		2.38	1.44	2.88	Below	Avg	
Jun		1.03	0.45		1.59	0.94	1.93	Avg	Below	
Jul		0.02	0.80		0.72	0.33	0.86	Below	Avg	
Aug		0.06	1.23		0.93	0.35	1.09	Below	Above	
Sep		1.59	3.85		1.65	0.72	1.93	Avg	Above	
Oct		3.43	1.51		2.88	1.57	3.52	Avg	Below	
Nov		2.86	1.52		5.61	3.72	6.73	Below	Below	
Dec		5.08	4.39		5.71	3.89	6.82	Avg	Avg	
TOTAL		27.30	26.67		37.07	32.85	40.58	Below	Below	

Deductions of Recent Weather Data: The precipitation in 2017 was above average for the site when the delineation was first conducted, there were saturated soils and shallow water tables at or above levels where hydric soils were observed. In Spring 2020 we made two visits, January 10 when conditions were wet, and April 15 when conditions were fairly dry. On the April 15 visit the precipitation was below average and the area was dry, no water in the stream and no water in the soil pits. On all other visits Kelso Road ditches were flooded and water was seen flowing through Wetland "A".

D) Methods: (site-specific methods for field investigation)

Wetland determinations and delineations discussed in this report were conducted in accordance with the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual ("the manual"), including regional supplements and applicable guidance, and supporting technical or guidance documents issued by the Department of State Lands.

In 2017 our investigations followed the mowing of the blackberries, and we were able to observe and traverse the site with ease. In 2020 the blackberries were again removed and the vegetation more or less the same as 2017 - recently mowed blackberries in the Wetland “A” area.

We dug soil test pits to a general depth of 16”-18” bgs. The soils in the area of Wetland “A” are often very reddish in color, particularly in the Northern end. However, we were able to discern hydric features in the soil.

We set wetland flags around the Wetland “A”.

E) Description of All Wetlands and Other Non-Wetland Waters:

Wetland "A", 75,839 SQFT, 1.741 Acres. Wetland "A" starts at the Kelso Road Ditch and extends downslope and widens in a South West direction until crossing the West property boundary. As it is fed mainly by ditch flows, and is high up in its drainage, it probably dries out early in the summer.

The middle of the wetland has some shallow ponding created by the shallow ditch that runs through the center of the wetland becoming clogged with blackberry rubble and tire ruts from the mowing of the blackberries. In these puddles we observed bright green bubbly algae, the vigorous growth of which suggested fertilizer enrichment, probably fertilizer runoff from the nursery on the North side of SE Kelso Road.

West of the subject property, the wetland broadens out considerably, and flows onto lot 2300, where it is utilized as a horse pasture. About 1,000 feet to the south in Lot 2300, it connects with the stream that flows through lot 2203. The dominant vegetation in the upper portion is blackberries, and this transitions to pasture grasses in the lower section.

The Cowardin classification is Palustrine, Scrub Shrub, broad-leaved deciduous, Saturated, to Palustrine, Emergent, Persistent, Saturated, PSS1B to PEM1B. The HGM classification is sloped wetland.

F) Deviation from LWI or NWI:

The NWI map does not show any wetlands or waterways on lot 2204.

G) Mapping Method:

A property boundary survey and topographic survey was conducted by Toby Bolden, PLS 60377LS of Centerline Concepts. Centerline Concepts also located many of our wetland data plots and wetland boundary flags.

We used the TopCon GRS-1 GPS with a Topcon BR-1 beacon receiver for DGPS corrections for mapping some flags and plots either missed by the surveyors or added after their survey. These and other information shown in the figures were mapped as described in Section G.

H) Additional Information: (i.e., if needed to establish state jurisdiction)

None. All wetlands and waters described in this report are presumed to be jurisdictional.

I) Results and Conclusions:

Hydrology. The Hydrology on this site has been altered substantially from the historical conditions a long history of land use on this and neighboring properties, and by changes caused by roadways and their associated ditches and culverts. Wetland “A” is thought to be created, or at least greatly enlarged by stormwater from higher in the drainage collected and concentrated into roadside ditches that discharge onto the Northern end of the property from the Kelso Road ditch.

Plants. Wetland “A” had Blackberries with some herbaceous plants, mostly grasses, in the wettest areas. There is also some mixed aged cottonwood and alder trees in the North part of the wetland.

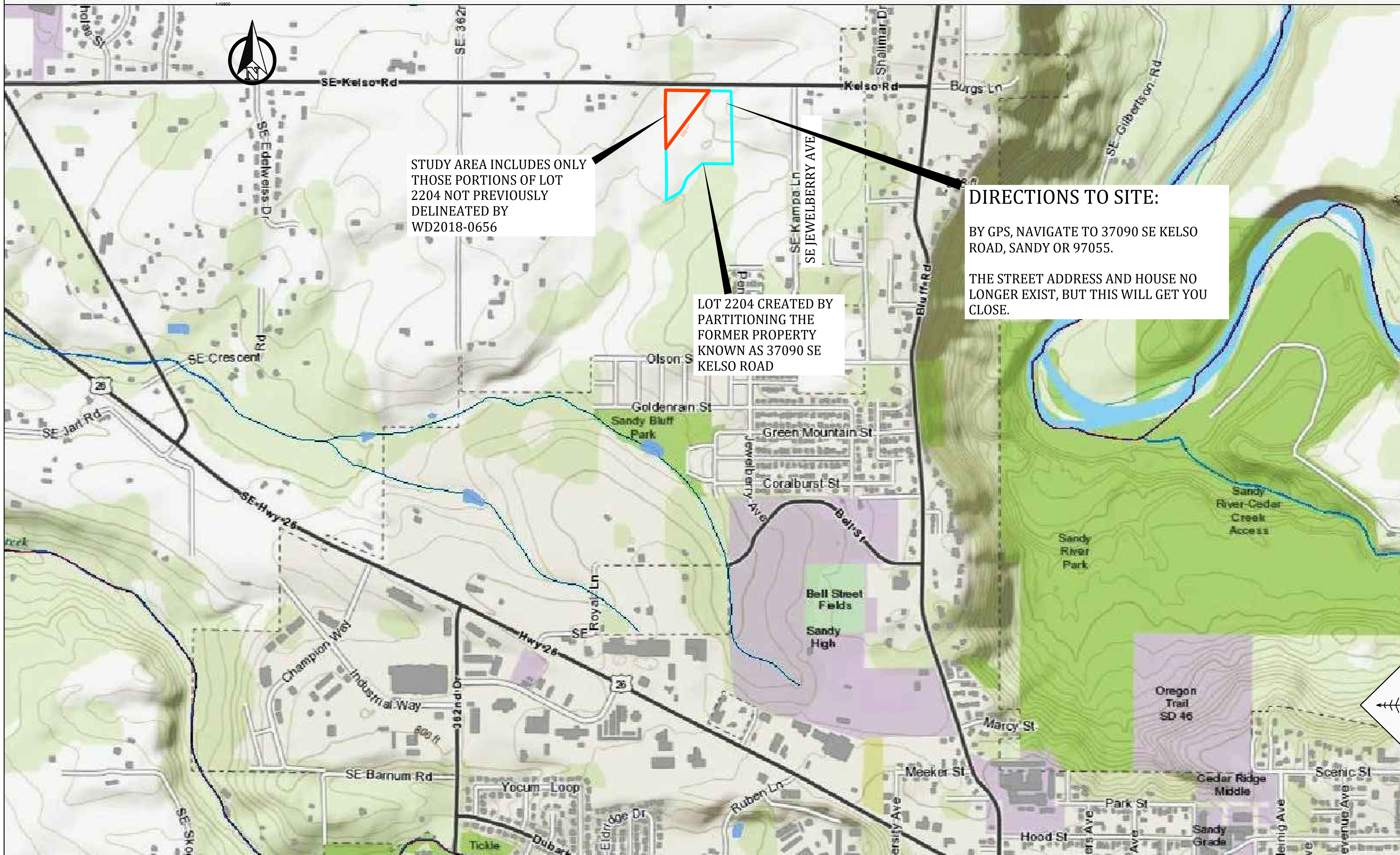
Soils. Soils in the many areas are red in color, about 5YR3/3, which tended to mask hydric soil features in the margin of the wetland. There was a presence of what appeared to be manganese. Distinct differences were apparent between the soils south of the stream which tended to be 10YR 3/2 a darker less red soil and in the disturbed pasture grasses area.

Disclaimer: OAR141-090-0035(12)(j) :

"This report documents the investigation, best professional judgment and conclusions of the investigator. It is correct and complete to the best of my knowledge. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and used at your own risk unless it has been reviewed and approved in writing by the Oregon Department of State Lands in accordance with OAR 141-090-0005 through 141-090-0055."

APPENDIX A - Maps:

StreamNet



1:18,056

LOT 2204, SE KELSO RD

Rosemont Development
10117 SE Sunnyside Rd
Clackamas, OR 97015

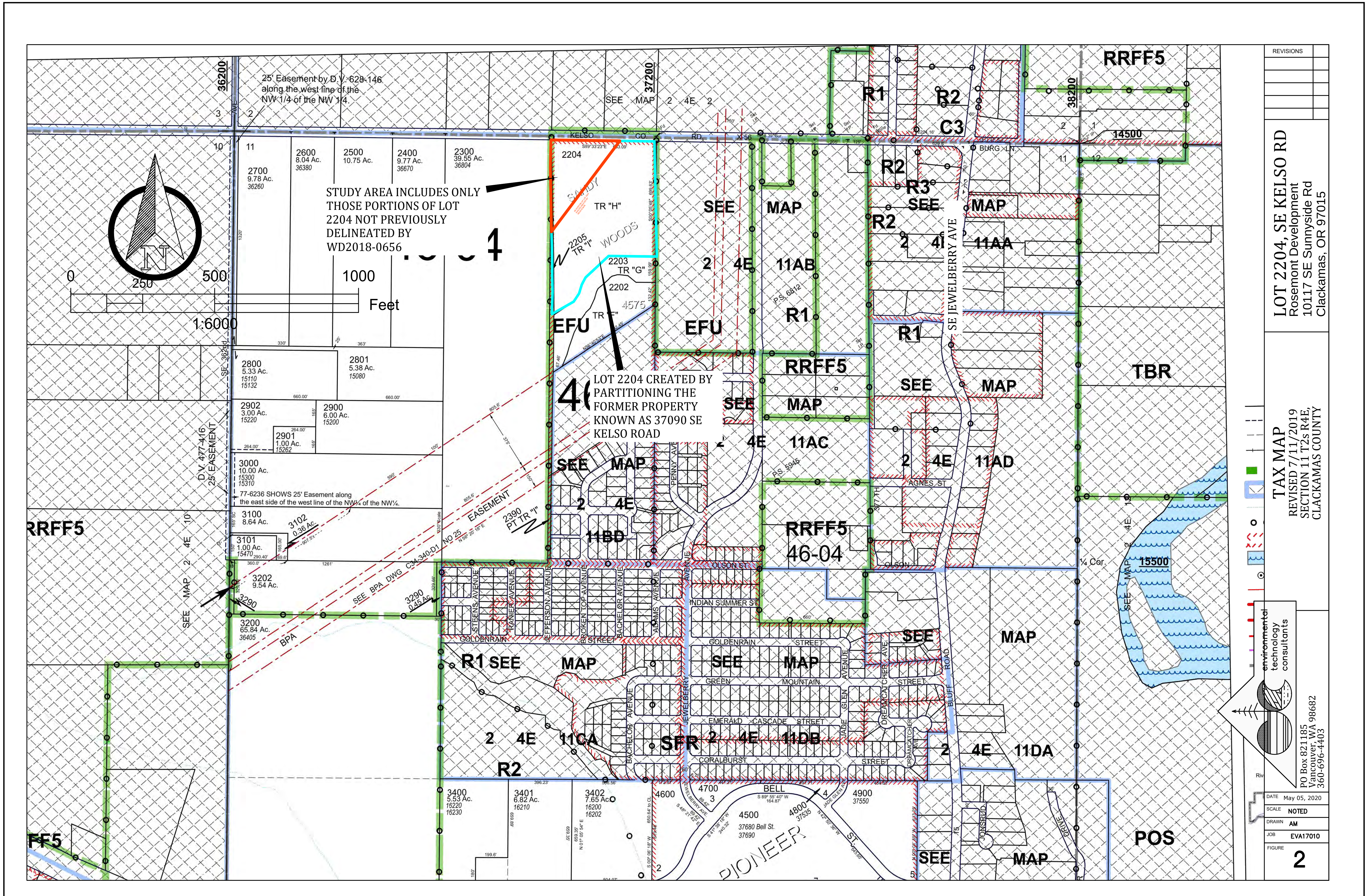
LOCATION MAP

STREAMNET TOPO MAP USED FOR BACKGROUND

environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403

DATE	May 05, 2020
SCALE	NOTED
DRAWN	AM
JOB	EVA17010
FIGURE	1

REVISIONS


STUDY AREA INCLUDES ONLY THOSE PORTIONS OF LOT 2204 NOT PREVIOUSLY DELINEATED BY WD2018-0656
LOT 2204 CREATED BY PARTITIONING THE FORMER PROPERTY KNOWN AS 37090 SE KELSO ROAD
25' Easement by D.V. 628-146 along the west line of the NW 1/4 of the NW 1/4.
KELSO RD
SE JEWELBERRY AVE
0 250 500 1000 Feet
1:6000
RRFF5
EFU
TBR
POS
SFR
LOT 2204, SE KELSO RD
Rosemont Development
10117 SE Sunnyside Rd
Clackamas, OR 97015
TAX MAP
REVISED 7/11/2019
SECTION 11 T2s R4E,
CLACKAMAS COUNTY
environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403
REVISIONS
DATE May 05, 2020
SCALE NOTED
DRAWN AM
JOB EVA17010
FIGURE 2

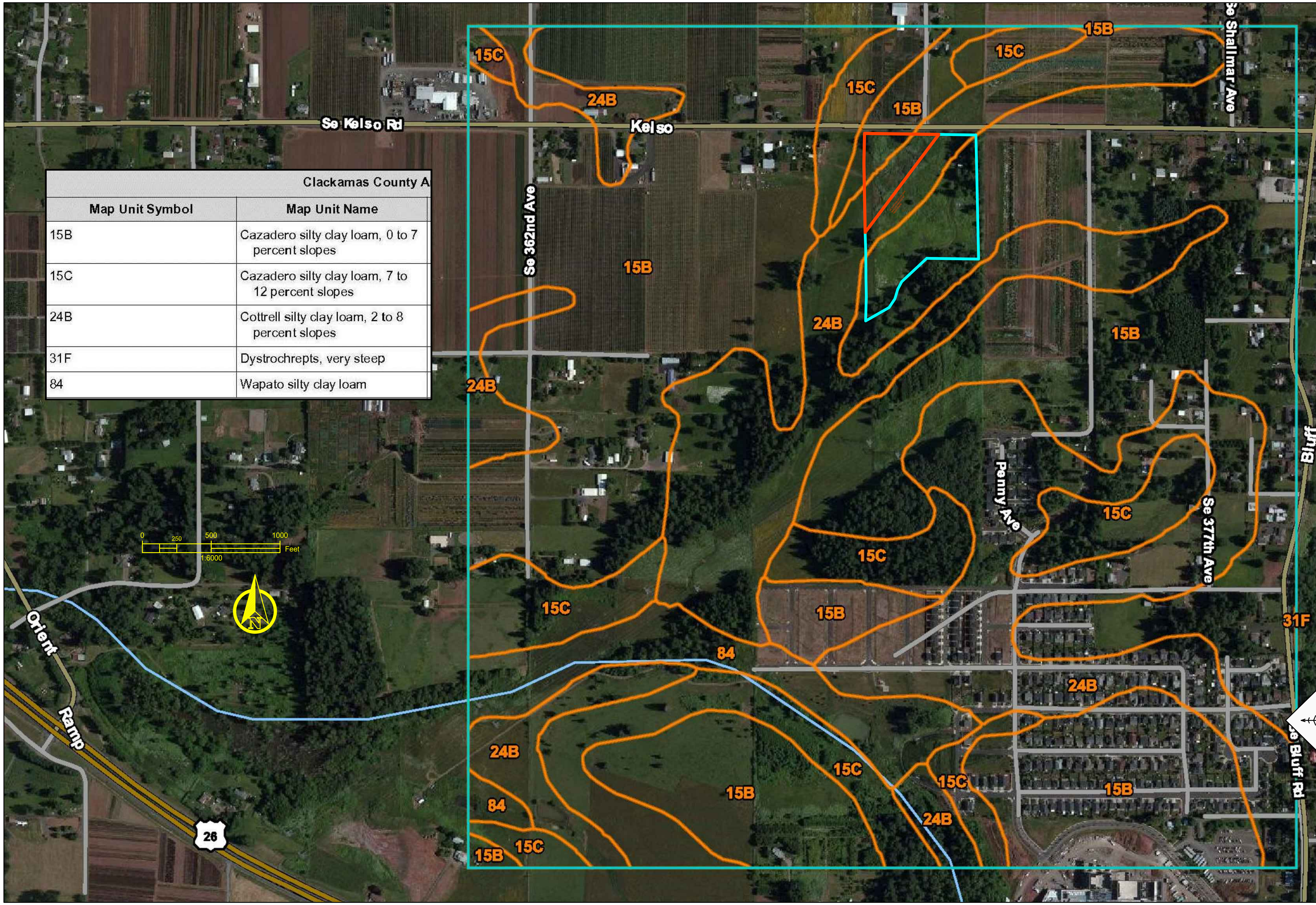
REVISIONS

LOT 2204, SE KELSO RD
Rosemont Development
10117 SE Sunnyside Rd
Clackamas, OR 97015

NWI MAP
USFWS NWI MAP LAYERS
IN GOOGLE EARTH

environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403

DATE	May 05, 2020
SCALE	NOTED
DRAWN	JHM
JOB	EVA17010
FIGURE	3



Clackamas County A	
Map Unit Symbol	Map Unit Name
15B	Cazadero silty clay loam, 0 to 7 percent slopes
15C	Cazadero silty clay loam, 7 to 12 percent slopes
24B	Cottrell silty clay loam, 2 to 8 percent slopes
31F	Dystrochrepts, very steep
84	Wapato silty clay loam

REVISIONS

LOT 2204, SE KELSO RD

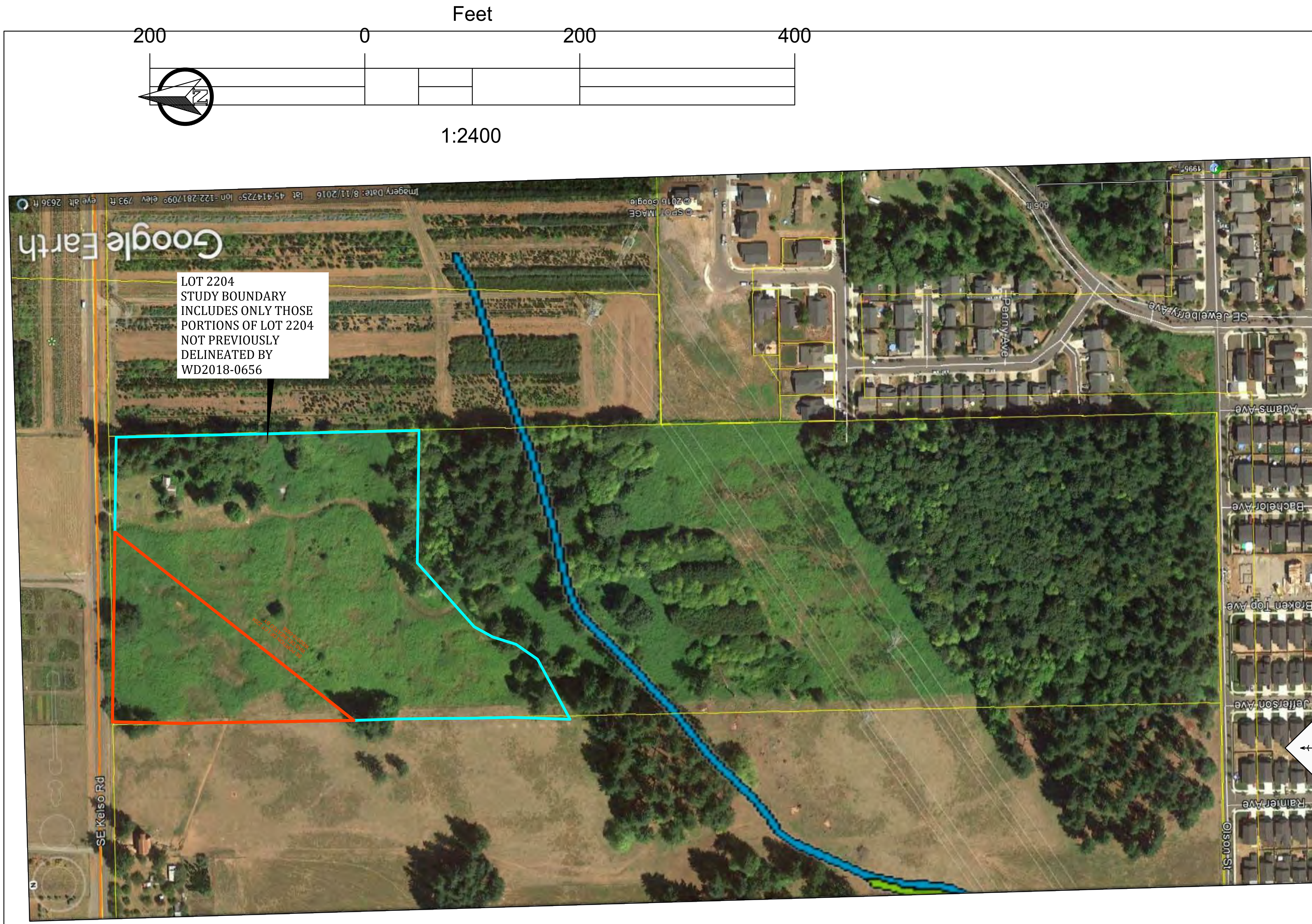
Rosemont Development
10117 SE Sunnyside Rd
Clackamas, OR 97015

SOIL MAP

NRCS NWI MAP LAYERS IN GOOGLE EARTH

environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403

DATE May 05, 2020
SCALE NOTED
DRAWN JHM
JOB EVA17010
FIGURE 4



REVISIONS

LOT 2204, SE KELSO RD

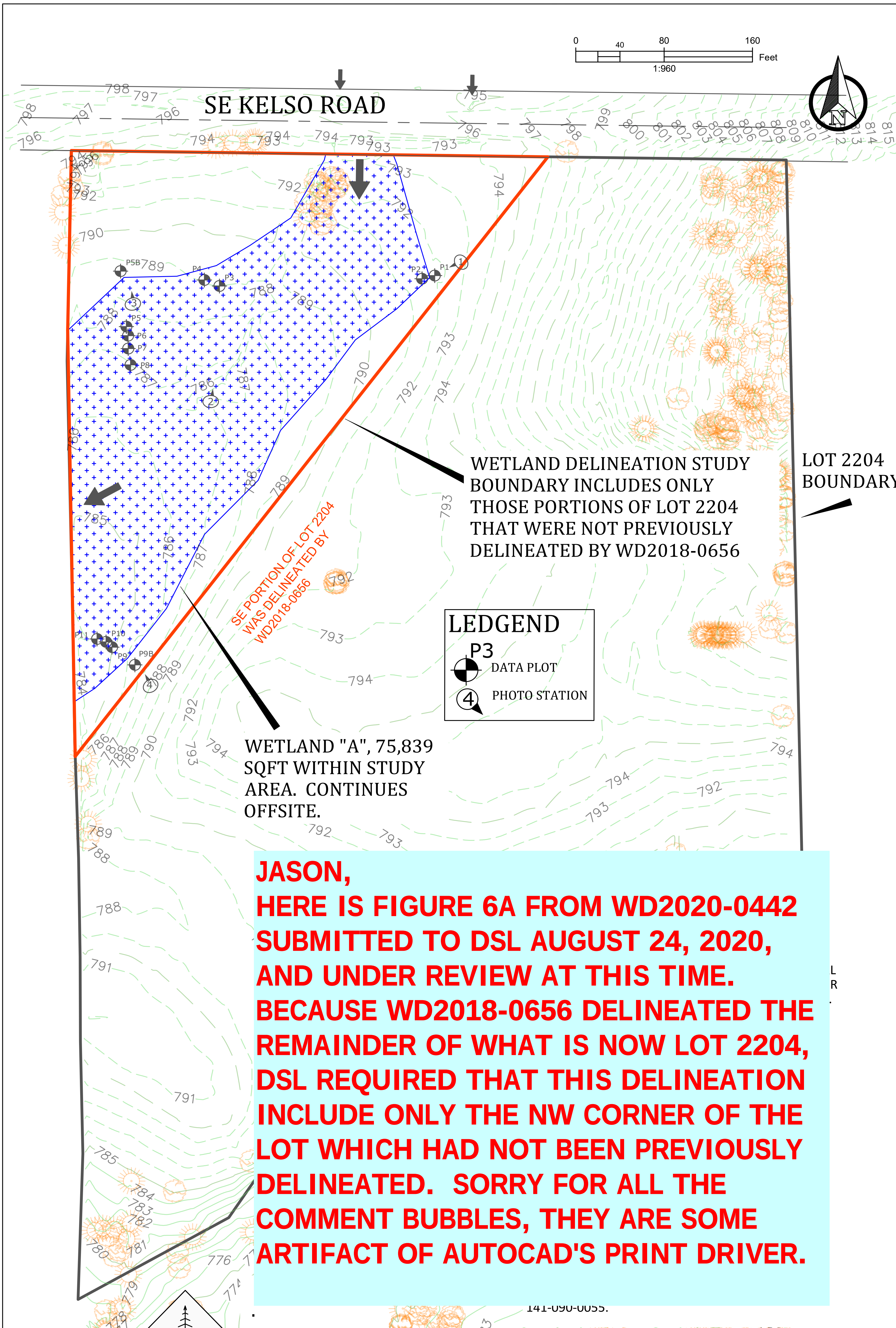
Rosemont Development
10117 SE Sunnyside Rd
Clackamas, OR 97015

AERIAL PHOTO

GOOGLE EARTH 8/11/2017
USFWS NWI WETLAND LAYERS
DISPLAYED.

environmental
technology
consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403

DATE	May 05, 2020
SCALE	NOTED
DRAWN	JHM
JOB	EVA17010
FIGURE	5



JASON,
HERE IS FIGURE 6A FROM WD2020-0442 SUBMITTED TO DSL AUGUST 24, 2020, AND UNDER REVIEW AT THIS TIME. BECAUSE WD2018-0656 DELINEATED THE REMAINDER OF WHAT IS NOW LOT 2204, DSL REQUIRED THAT THIS DELINEATION INCLUDE ONLY THE NW CORNER OF THE LOT WHICH HAD NOT BEEN PREVIOUSLY DELINEATED. SORRY FOR ALL THE COMMENT BUBBLES, THEY ARE SOME ARTIFACT OF AUTOCAD'S PRINT DRIVER.

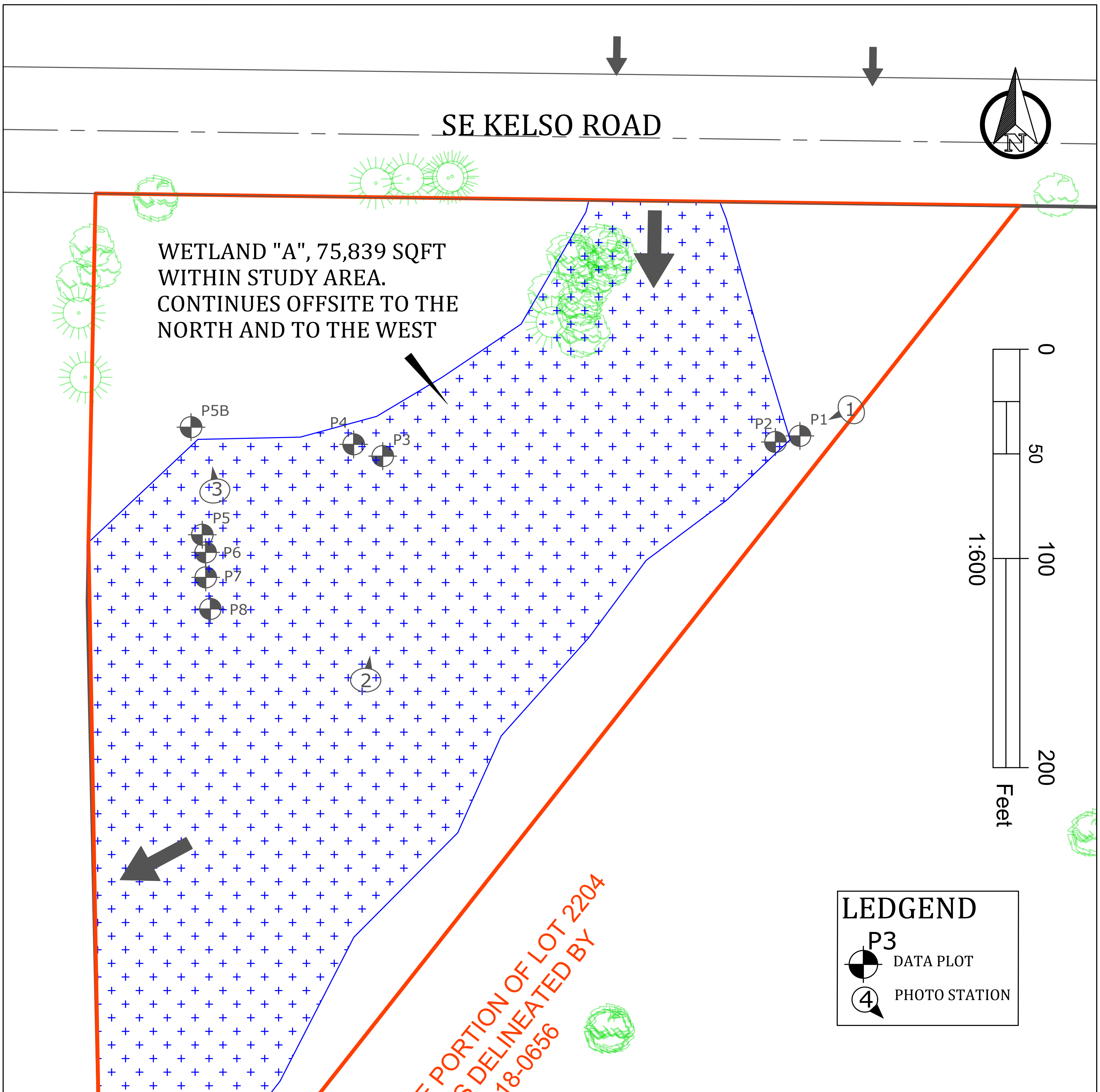
environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403

WETLAND "A"
GOOGLE EARTH 8/11/2017
USFWS NWI WETLAND LAYERS DISPLAYED.

LOT 2204, SE KELSO RD
Rosemont Development
10117 SE Sunnyside Rd
Clackamas, OR 97015

REVISIONS

DATE	May 05, 2020
SCALE	NOTED
DRAWN	JHM
JOB	EVA17010
FIGURE	6A



Disclaimer per OAR 141-090-0035 (7)(k)

This report documents the investigation, best professional judgment and conclusions of the investigator. It is correct and complete to the best of my knowledge. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and used at your own risk unless it has been reviewed and approved in writing by the Oregon Department of State Lands in accordance with OAR 141-090-0005 through 141-090-0055.

GPS MAPPING:

TOPCON GRS-1 RECEIVER USED WITH EXTERNAL ANTENNA, AND TOPCON BR1 BEACON RECEIVER USED FOR REAL TIME DGPS DATA CORRECTION.
ACCURACY = ±3FT HORIZONTAL
EXPORT USING
PROJECTION = SPC83-OREGON (NORTH) ,
DATUM = NAD83
GEOID = G2009U01
COORD TYPE = GRID

environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403

WETLAND "A"
GOOGLE EARTH 8/11/2017
USFWS NWI WETLAND LAYERS DISPLAYED.

LOT 2204, SE KELSO RD
Rosemont Development
10117 SE Sunnyside Rd
Clackamas, OR 97015

REVISIONS

DATE	May 05, 2020
SCALE	NOTED
DRAWN	JHM
JOB	EVA17010
FIGURE	6B

APPENDIX B - Data Forms

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys & Coast

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 3/30/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P1

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): Flat Slope (%): 1%

Subregion (LRR): LRR-A Lat: 45.25078 Long: -122.16916 Datum: ______

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation YES, Soil _____, or Hydrology YES significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒

Are Vegetation YES, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒	
Wetland Hydrology Present?	Yes ☒ No ☐	

Remarks: Above average rainfall in March and April. This plot is in a mowed down blackberry field with hydrology coming in from drainage ditch along Kelso Road.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30' East)			
1.			
2. NO TREES			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 30' East)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: _____)			
1. Rubus Armeniacus	100	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
= Total Cover	100		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: minimal vegetation for identification because field was mowed.

SOIL

Sampling Point: P1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR3/2	100					Silt loam	Lot's of roots
5-10	7.5YR4/4	90	7.5YR4/3	10	C	M	Silty clay loam	
10-18	7.5YR4/4	75	7.5YR4/3	25	C	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Clay

Depth (inches): 10

Hydric Soil Present? Yes ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches):
Water Table Present?	Yes ☒	No ☐	Depth (inches): 10"
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 10"

Wetland Hydrology Present? Yes ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: 4/17/17 no water, 5/1/17 12" bgs water table.

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys & Coast

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 3/30/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P2

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): Flat Slope (%): 6%

Subregion (LRR): LRR-A Lat: 45.41800 Long: -122.28202 Datum: ______

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: No

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation YES, Soil _____, or Hydrology YES significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒

Are Vegetation YES, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐	
Wetland Hydrology Present?	Yes ☒ No ☐	

Remarks: Above average rainfall in March and April. This plot is in a mowed down blackberry field, hydrology changed due to drainage ditch along Kelso Road.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30')			
1.			
2. NO TREES			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 30')			
1. Rubus Armeniacus	100	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
= Total Cover	100		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks: minimal vegetation for identification because field was mowed.

SOIL

Sampling Point: P2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR3/2	100					Silt loam	
4-11	7.5YR3/2	95	5YR4/6	4	C	M	Silty clay loam	
			2.5n	1	C	M	Silty clay loam	
11-18	5YR2.5/1	95	5YR4/6	5	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☒ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☒ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Clay

Depth (inches): 10

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): ______

Water Table Present? Yes ☒ No ☐ Depth (inches): 7"

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): 7"

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: 4/17/17 no water, 5/1/17 10" bgs water table.

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys & Coast

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 3/30/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P3

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): Flat Slope (%): 4%

Subregion (LRR): LRR-A Lat: 45.25079 Long: -122.16961 Datum: ____

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation YES, Soil _____, or Hydrology YES significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒

Are Vegetation YES, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland? Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐	
Wetland Hydrology Present?	Yes ☒ No ☐	

Remarks: Above average rainfall in March and April. This plot is in a mowed down blackberry field, hydrology altered by roadside ditch.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30' East)			
1.			
2. NO TREES			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 30' East)			
1. Rubus Armeniacus (recently mowed)	100	Y	FAC
2.			
3.			
4.			
5.			
= Total Cover	100		
Herb Stratum (Plot size: _____)			
1			
2. Polystichum munitum	3	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	3		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: minimal vegetation for identification because field was mowed.

SOIL

Sampling Point: P3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR3/2	100					Silt loam	
5-8	7.5YR3/2	97	5YR4/6	3	C	M	Silty clay loam	
			2.5n	1	C	M	Silty clay loam	
8-18	5YR2.3/3	90	5YR4/6	5	C	M	Clay	
			5YR2.5/1	5	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☒ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Clay

Depth (inches): 10

Hydric Soil Present? Yes ☒ No ☐

Remarks: Soil is brittle

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☒ No ☐ Depth (inches): 6"

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): 6"

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: 4/17/17 no water, 5/1/17 9" bgs water table.

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys & Coast Region

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 3/30/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P4

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): Flat Slope (%): 3%

Subregion (LRR): LRR-A Lat: 45.41796 Long: -122.20262 Datum: ____

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation YES, Soil ____, or Hydrology YES significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒

Are Vegetation YES, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐	
Wetland Hydrology Present?	Yes ☒ No ☐	

Remarks: Above average rainfall in March and April. This plot is in a mowed down blackberry fied, hydology altered by roadside ditch draining water onto property. This was to be a boundary plot in the 2017 delineation, but we are now considering it just a wetland plot.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. NO TREES			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 30')			
1. Rubus Armeniacus (recently mowed)	100	Y	FAC
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	103		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: minimal vegetation for identification because field was mowed.

SOIL

Sampling Point: P4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR3/2	100					Silt loam	
5-11	7.5YR3/2	97	5YR4/6	3	C	M	Silty clay loam	
			2.5n	1	C	M	Silty clay loam	
11-18	5YR2.4/4	50	7.5YR3/2	50			Clay	Mixed matrix

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Clay

Depth (inches): 11

Hydric Soil Present? Yes ☒ No ☐

Remarks: The F6 indicator is not met with 3% redox features

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches):
Water Table Present?	Yes ☒	No ☐	Depth (inches): 9"
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 9"

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: 4/17/17 no water, 5/1/17 13" bgs water table.

Remarks: The observed water table on 3/30/2017 may be above normal conditions. It lacked wetland hydrology on 2 other observations.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys & Coast Region

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 3/30/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P5

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): Flat Slope (%): 4%

Subregion (LRR): LRR-A Lat: 45.25073 Long: -122.16980 Datum: ______

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation YES, Soil _____, or Hydrology YES significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒

Are Vegetation YES, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒	
Wetland Hydrology Present?	Yes ☐ No ☒	

Remarks: Above average rainfall in March and April. This plot is in a mowed down blackberry field, hydrology altered by roadside ditch along Kelso Road that drains onto property.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' north)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. NO TREES			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 30' north)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 30' north)			
1. Rubus Armeniacus	95	Y	FAC
2. Poa sp.	5	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	103		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ☒ **No** ☐

Remarks: minimal vegetation for identification because field was mowed.

SOIL

Sampling Point: P5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR3/2	100					Silt loam	
4-10	7.5YR3/2	96	5YR4/6	3	C	M	Silty clay loam	
10-18	5YR2.3/3	60	10YR3/1	40			Clay	Mixed matrix

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Clay

Depth (inches): 10

Hydric Soil Present? Yes ☒ **No** ☐

Remarks: The F6 indicator is not met with 3% redox features

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches):
Water Table Present?	Yes ☒	No ☐	Depth (inches): 9"
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 9"

Wetland Hydrology Present? Yes ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: 4/17/17 no water, 5/1/17 12" bgs water table.

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys & Coast Region

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 4/15/20

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P5B

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): Flat Slope (%): 4%

Subregion (LRR): LRR-A Lat: 45.25073 Long: -122.16980 Datum: ______

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation YES, Soil _____, or Hydrology YES significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒

Are Vegetation YES, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland?	Yes ☐ No ☒
Hydric Soil Present?	Yes ☒ No ☐		
Wetland Hydrology Present?	Yes ☐ No ☒		

Remarks: Moved upland plot approximately 10' up the hillslope from plot 5. We have observed this area 4 times now since 2017 and concluded each time that wetland hydrology is absent.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30' north)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. NO TREES			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 30' north)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 30' north)			
1. Rubus Armeniacus	25	Y	FAC
2. Poa sp.	20	Y	FAC
3. Cirsium arvense	25	Y	FAC
4. Agrostis sp	20	Y	FAC
5. Plantain lanceolata	15	N	FACU
6.			
7.			
8.			
= Total Cover	105		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: minimal vegetation for identification because field was mowed.

SOIL

Sampling Point: P5B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR3/3	97	7.5YR4/6	3	C	M	Silt loam	
7-16	10YR3/3	90	7.5YR4/6	10	C	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:______

Depth (inches):______

Hydric Soil Present? Yes ☒ No ☐

Remarks: These soils may be relic, perhaps reflecting hydrological conditions that existed when the road and ditches upslope were in some other configuration.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches): ______
Water Table Present?	Yes ☐	No ☒	Depth (inches):____
Saturation Present? (includes capillary fringe)	Yes ☐	No ☒	Depth (inches):____

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: No indicators

Remarks: No water table or saturation observed to 16". This is the same what we observed in 2017 in this area, we conclude that this sloped area above the wetland lacks wetland hydrology.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 3/30/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P6

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): Flat Slope (%): 4%

Subregion (LRR): LRR-A Lat: 45.41796 Long: -122.20262 Datum: ______

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology YES significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☐ No ☒		
Wetland Hydrology Present?	Yes ☒ No ☐		

Remarks: Above average rainfall in March and April. Vegetated patch not mowed, hydrology fed by roadside ditch

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 3' cir)			
1.			
2. NO TREES			
3.			
4.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 3' cir)			
1. Rubus Armeniacus	30	Y	FAC
2.			
3.			
4.			
5.			
	30	= Total Cover	
Herb Stratum (Plot size: 3' cir)			
1. Agrostis sp	40	Y	FAC
2. Poa sp.	40	Y	FAC
3. Moss	80		
4. Galium aparine	2	N	FACU
5. Herb 1	2	N	NA
6. Herb 2	2	N	NA
7.			
8.			
	86	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	116	= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: P6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR3/2	100					Silt loam	
8-11	7.5YR3/2	95	5YR4/6	5	C	M	Silty clay loam	
11-18	7.5YR3/2	50					clay	
	5YR4/6	50						Mixed matrix

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Clay

Depth (inches): 11

Hydric Soil Present? Yes ☒ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) **(Riverine)**
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches):
Water Table Present?	Yes ☒	No ☐	Depth (inches): 7"
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 7"

Wetland Hydrology Present? Yes ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: 4/17/17 no water, 5/1/17 9" bgs water table.

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 3/30/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P7

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): Flat Slope (%): 2%

Subregion (LRR): LRR-A Lat: 45.25066 Long: -122.16981 Datum: ____

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology YES significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland? Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐	
Wetland Hydrology Present?	Yes ☒ No ☐	

Remarks: Above average rainfall in March and April. Vegetated patch not mowed, hydrology fed by roadside ditch along Kelso Road.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30' East)			
1.			
2. NO TREES			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 30' East)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ____)			
1. Agrostis sp	25	Y	FAC
2. Anthoxanthum odoratum	55	Y	FACU
3. Rubus armeniacus	5	N	FAC
4. Taraxacum officinale	20	Y	FACU
5. Hieracium albiflorum	5	N	NA
6. Galium aparine	5	N	FACU
7.			
8.			
= Total Cover	103		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	30	x 3 = 90
FACU species	80	x 4 = 320
UPL species	0	x 5 = 0
Column Totals:	110 (A)	410 (B)

Prevalence Index = B/A = 3.7

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: Prevalence test is 3.6 and 33% for Dominance test therefore not hydrophytic vegetation.Anthoxanthum odoratum is a problematic aggressive invasive.

SOIL

Sampling Point: P7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-9	7.5YR3/2	100					Silt loam	
9-11	7.5YR3/1	90	5YR4/6	10	C	M	Silty clay loam	
11-18	7.5YR2.5/2	95	5YR4/6	5	C	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☒ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Clay

Depth (inches): 11

Hydric Soil Present? Yes ☒ **No** ☐

Remarks: Extremely wet. Hard to see indicators

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches):
Water Table Present?	Yes ☒	No ☐	Depth (inches): 5"
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 5"

Wetland Hydrology Present? Yes ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: 4/17/17 no water, 5/1/17 8" bgs water table.

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 3/30/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P8

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): Flat Slope (%): 3%

Subregion (LRR): LRR-A Lat: 45.25067 Long: -122.16979 Datum: ______

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation YES, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation YES, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐ No ☒	Is the Sampled Area within a Wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐		
Wetland Hydrology Present?	Yes ☒ No ☐		

Remarks: Above average rainfall in March and April. Vegetated patch not mowed, hydrology altered by roadside ditch along Kelso Road

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5'cir)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. NO TREES			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 5'cir)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 5' cir)			
1. Agrostis sp	40	Y	FAC
2. Anthoxanthum odoratum	58	Y	FACU
3. Holcus lanatus	5	N	FAC
4. Taraxacum officinale	10	N	FACU
5. Hypochaeris radicata	15	N	FACU
6.			
7.			
8.			
= Total Cover	128		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	45	x 3 = 135
FACU species	83	x 4 = 332
UPL species	0	x 5 = 0
Column Totals:	128 (A)	467 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:

☐ Dominance Test is >50%

☒ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☒ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks: Prevalence Index test is 3.6 and Dominance is 50% (not greater) so not hydrophytic vegetation. Anthoxanthum is an problematic aggressive invasive.

SOIL

Sampling Point: P8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR5/3	100					Silt loam	
8-12	7.5YR2.5/1	100					Silty clay loam	
12-18	5YR3/4	100					Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☒ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Clay

Depth (inches): 12

Hydric Soil Present? Yes ☒ No ☐

Remarks: Extremely wet. Hard to see indicators

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☒	No ☐	Depth (inches): 1/4"
Water Table Present?	Yes ☒	No ☐	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches):

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: 4/17/17 no water, 5/1/17 1/4"standing water

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 3/30/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P9

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): slope Slope (%): 2%

Subregion (LRR): LRR-A Lat: 45.25023 Long: -122.16985 Datum: ____

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation YES, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation YES, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	Is the Sampled Area within a Wetland? Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐	
Wetland Hydrology Present?	Yes ☒ No ☐	

Remarks: Above average rainfall in March and April 2017. Mowed down vegetation. This is a fringe plot on the side of upland. The hydrophytic vegetation is problematic invasive and can be argued that they are found in uplands. The observed hydrology between three different days was upland, this plot was taken at 12" but with the amount of rainfall the week of the survey it was higher than normal.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30'ese)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pseudotsuga menziesii	5	N	FACU
2.			
3.			
4.			
	5 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30' ese)			
1. Rubus armeniacus (mowed, probably was higher %)	25	Y	FAC
2.			
3.			
4.			
5.			
	25 = Total Cover		
Herb Stratum (Plot size: 30' ese)			
1.			
2. Anthoxanthum odoratum	20	Y	FACU
3. Agrostis sp.	30	Y	FAC
4. Cirsium arvense	15	Y	FAC
5.			
6.			
7.			
8.			
	65 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	95 = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: P9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR3/2	100					Silt loam	
5-12	7.5YR3/2	90	5YR4/6	10	C	M	Silty clay loam	
12-18	7.5YR3/2	97	5YR4/6	3	C	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Clay

Depth (inches): 12

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☒ No ☐ Depth (inches): 12"

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches):

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: 4/17/17 no water, 5/1/17 15" bgs

Remarks: Due to the other dates observations being below 12" or not there at all and the high waterfall the week of the survey we believe the observed hydrology represents wetter and normal conditions. This is a fringe plot on the side of upland

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 4/15/20

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P9B

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): slope Slope (%): 2%

Subregion (LRR): LRR-A Lat: 45.25023 Long: -122.16985 Datum: ____

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation YES, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation YES, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐ No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒	
Wetland Hydrology Present?	Yes ☐ No ☒	

Remarks: 15' north of plot 9

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30'ese)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pseudotsuga menziesii	5	Y	FACU
2.			
3.			
4.			
	5 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30' ese)			
1. Rubus armeniacus	100	Y	FAC
2.			
3.			
4.			
5.			
	100 = Total Cover		
Herb Stratum (Plot size: 30' ese)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	105 = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

☐ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: P9B

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR3/2	70					Silt loam	Mixed matrix
	7.5YR4/6	30						
9-11	7.5YR4/6	96	10YR3/2	4	C	M	Clay layer	
11-16	10YR3/2	50						Mixed matrix
	7.5YR4/6	50						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Clay

Depth (inches): 12

Hydric Soil Present? Yes ☐ No ☒

Remarks: Soil appeared to be a mixed matrix through out except when i got to the clay layer which was a 2" solid reddish color. We speculate this unusual soil is a result of soils sloughing down from upslope, and many years of cultivation when the area was farmed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):

Water Table Present? Yes ☐ No ☒ Depth (inches): > 16"

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 37090 Kelso RD City/County: Sandy/Clackamas Sampling Date: 3/30/2017

Applicant/Owner: Joe Spaziani State: OR Sampling Point: P10

Investigator(s): John McConnaughey, PWS# 2009 Section, Township, Range: T2S R4E S11

Landform (hillslope, terrace, etc.): Valley Floor Local relief (concave, convex, none): slope Slope (%): 3%

Subregion (LRR): LRR-A Lat: 45.41777 Long: -122.28298 Datum: ____

Soil Map Unit Name: Cazado silt loam, Cottrell silty clay loam NWI classification: Not mapped

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐
Hydric Soil Present?	Yes ☐ No ☒	
Wetland Hydrology Present?	Yes ☒ No ☐	

Remarks: Above average rainfall in March and April.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5' cir)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 5' cir)			
1. Rubus armeniacus	40	Y	FAC
2.			
3.			
4.			
5.			
= Total Cover	40		
Herb Stratum (Plot size: 30' ese)			
1. Poa sp.	40	Y	FAC
2. moss	80	Y	NA
3. Agrostis sp.	20	Y	FAC
4. Cirsium arvense	10	N	FAC
5. Herb 1	10	N	NA
6.			
7.			
8.			
= Total Cover	80		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover	120		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	0	x 5 = 0
Column Totals:	0 (A)	0 (B)

Prevalence Index = B/A = 0

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL

Sampling Point: P10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR3/3	100					Silt loam	
6-13	7.5YR3/2	100					Silty clay loam	
13-18	7.5YR3/4	100					Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☒ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Clay

Depth (inches): 13

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☒ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Non riverine**)
- ☐ Sediment Deposits (B2) (**Non riverine**)
- ☐ Drift Deposits (B3) (**Non riverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ☐	No ☒	Depth (inches):
Water Table Present?	Yes ☒	No ☐	Depth (inches): 8"
Saturation Present? (includes capillary fringe)	Yes ☒	No ☐	Depth (inches): 8"

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: 4/17/17 no water, 5/1/17 11" bgs

Remarks:

APPENDIX C - Ground Level Color Photographs:

Photos of Wetland "A" are from the 2017 wetland delineation and new photos from the 2020 delineation.

Photo 1. Wetland "A" data plots P1 Upland (left), and P2 Wetland (right). The blackberries had bee recently mowed to give surveyors access. The wetland determination was based on soils and hydrology. ETC Photo 4/28/2017.

Photo 2. Lower portion of Wetland "A" showing excessive algal growth due to fertilizers washed down from farms and nurseries upslope. ETC Photo 4/28/2017

Photo 3. New P5B upland plot, photo looking into upland to the southeast. ETC Photo 4/15/2020

Photo 4:.Looking the south at P5B into Wetland “A”. ETC Photo 4/15/2020

APPENDIX D - Sensitive Area Certification:

Fish Presence:

No fish are thought to be present on the subject property, nor would they be expected.

Endangered Species:

No endangered species of plants or animals were observed or reported.

Critical Habitat Features:

The property was surveyed for the following critical habitat features. Not all of these features are considered rare or critical by the City Sandy:

Talus slopes – none
Caves, cliffs, crevasses, rock outcrops – none
Large oak trees, or oak groves or oak savanna – none
Snags – none
Large woody debris – none
Springs, seeps - None.
Deep water habitat – None
Vernal pool wetlands – None
Old growth forest – None.
Wetlands – Described above.
Fish spawning or rearing habitat – none. It is believed that there is no fish access to this property.

Exhibit J

Oregon

Kate Brown, Governor

Department of State Lands
775 Summer Street NE, Suite 100
Salem, OR 97301-1279
(503) 986-5200
FAX (503) 378-4844
www.oregon.gov/dsl

January 29, 2019

Great American Development
Attn: Joe Spaziani
16287 S. Forsythe Road
Oregon City, OR 97045

Re: WD #2018-0656 Wetland Delineation Report for 37090 SE Kelso Road, Clackamas County;
T 2S R 4E S 11 portion of TL 2200; S 11AC TL 828 & 832;

Dear Mr. Spaziani:

The Department of State Lands has reviewed the wetland delineation report prepared by Environmental Technology Consultants for the site referenced above. Please note that the two study areas include only a portion of the tax lots described above (see the attached maps). Based upon the information presented in the report, and additional information submitted upon request, we concur with the wetland and waterway boundaries as mapped in revised Figures 6A and 6B of the report. Please replace all copies of the preliminary wetland maps with these final Department-approved maps.

Within the two study areas, four wetlands (Wetland B, C, Wetland Track A and Wetland Tract E) totaling approximately 0.997 acres, and Stream 2 were identified. All features are subject to the permit requirements of the state Removal-Fill Law. Under current regulations, a state permit is required for cumulative fill or annual excavation of 50 cubic yards or more in Wetlands B and C or below the ordinary high-water line (OHWL) of the waterway (or the 2-year recurrence interval flood elevation if OHWL cannot be determined). However, Wetland Tract A and Wetland Tract E are part of a mitigation site. Therefore, any impact to these wetlands may require a permit.

This concurrence is for purposes of the state Removal-Fill Law only. Federal or local permit requirements may apply as well. The Army Corps of Engineers will determine jurisdiction for purposes of the Clean Water Act. We recommend that you attach a copy of this concurrence letter to both copies of any subsequent joint permit application to speed application review.

Please be advised that state law establishes a preference for avoidance of wetland impacts. Because measures to avoid and minimize wetland impacts may include reconfiguring parcel layout and size or development design, we recommend that you work with Department staff on appropriate site design before completing the city or county land use approval process.

This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the date of this letter unless new information necessitates a revision. Circumstances under which the Department may change a determination are found in OAR 141-090-0045 (available on our web site or upon request). In addition, laws enacted by the legislature and/or rules adopted by the Department may result in a change in jurisdiction; individuals and applicants are subject to the regulations that are in effect at the time of the removal-fill activity or complete permit application. The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months of the date of this letter.

Thank you for having the site evaluated. Please phone me at 503-986-5246 if you have any questions.

Sincerely,

Chris Stevenson
Jurisdiction Coordinator

Approved by ____________________
Peter Ryan, PWS
Aquatic Resource Specialist

Enclosures

ec: John McConnaughey, PWS Environmental Technology Consultants
Annakate Martin, NRS Environmental Technology Consultants
Clackamas County Planning Department (Maps enclosed for updating LWI)
Jessica Menichino, Corps of Engineers
Anita Huffman, DSL

WETLAND DELINEATION / DETERMINATION REPORT COVER FORM

This form must be included with any wetland delineation report submitted to the Department of State Lands for review and approval. A wetland delineation report submittal is not "complete" unless the fully completed and signed report cover form and the required fee are submitted. Attach this form to the front of an unbound report or include a hard copy of the completed form with a CD/DVD that includes a single PDF file of the report cover form and report (minimum 300 dpi resolution) and submit to: **Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279.** A single PDF attachment of the completed cover from and report may be e-mailed to **Wetland_Delineation@dsl.state.or.us**. For submittal of PDF files larger than 10 MB, e-mail instructions on how to access the file from your ftp or other file sharing website. Fees can be paid by check or credit card. Make the check payable to the Oregon Department of State Lands. To pay the fee by credit card, call 503-986-5200.

☒ Applicant ☐ Owner Name, Firm and Address: **Great American Development, Joe Spaziani** **16287 S. Forsythe Road** **Oregon City, Oregon, 97045**	Business phone # **503-860-2501** Mobile phone # E-mail: joeandpenny@hotmail.com
☒ Authorized Legal Agent, Name and Address: **Environmental Technology Consultants** **375 Portland Ave, Gladstone, OR 97027**	Business phone # 360-696-4403 Mobile phone # **503-580-2465** E-mail: JohnM@etcEnvironmental.net

I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.
Typed/Printed Name: **Joe Spaziani** Signature:
Date: **April 20, 2017** Special instructions regarding site access: **Contact owner or consultant.**

Project and Site Information (using decimal degree format for lat/long of site or start & end points of linear project)

Project Name: **37090 SE Kelso Road**	Latitude: N 45.~~245314~~ 416894 Longitude: W -122.~~165512~~ 282396
Proposed Use: **New Subdivision (Sandy Woods)**	Tax Map # 032S4E11
Project Street Address (or other descriptive location): **37090 SE Kelso Road**	Township **T2S** Range **R4E** ok Section **2** QQ **AC** Tax Lot(s) **24E1102200, ~~24E11AC00828~~ & ~~24E11AC00832~~** 3 ok
City: **Boring, OR** County: **Clackamas**	Waterway: **No name** River Mile: NWI Quad(s): Sandy, Oregon

Wetland Delineation Information

Wetland Consultant Name, Firm and Address: **John McConnaughey, PWS & Annakate Martin NRS** Environmental Technology Consultants 375 Portland Ave, Gladstone, OR 97027	Phone # **360-696-4403** Mobile phone # **503-580-2465** E-mail: **JohnM@etcEnvironmental.net**

The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.
Consultant Signature: Date: **May, 2017 updated October 2018**

Primary Contact for report review and site access is ☒ Consultant ☐ Applicant/Owner ☐ Authorized Agent
Wetland/Waters Present? ☒ Yes ☐ No Study Area size: **39.79 acres** Total Wetland Acreage: **2.700 AC**

Check Box Below if Applicable: Fees: $437 (2018)

☒ R-F permit application submitted NWP2018-473	☒ Fee payment submitted **$437**
☐ Mitigation bank site	☐ Fee ($100) for resubmittal of rejected report
☐ Wetland restoration/enhancement project (not mitigation)	☐ No fee for request for reissuance of an expired report
☐ Industrial Land Certification Program Site	
☐ Reissuance of a recently expired delineation Previous DSL # Expiration date _____	

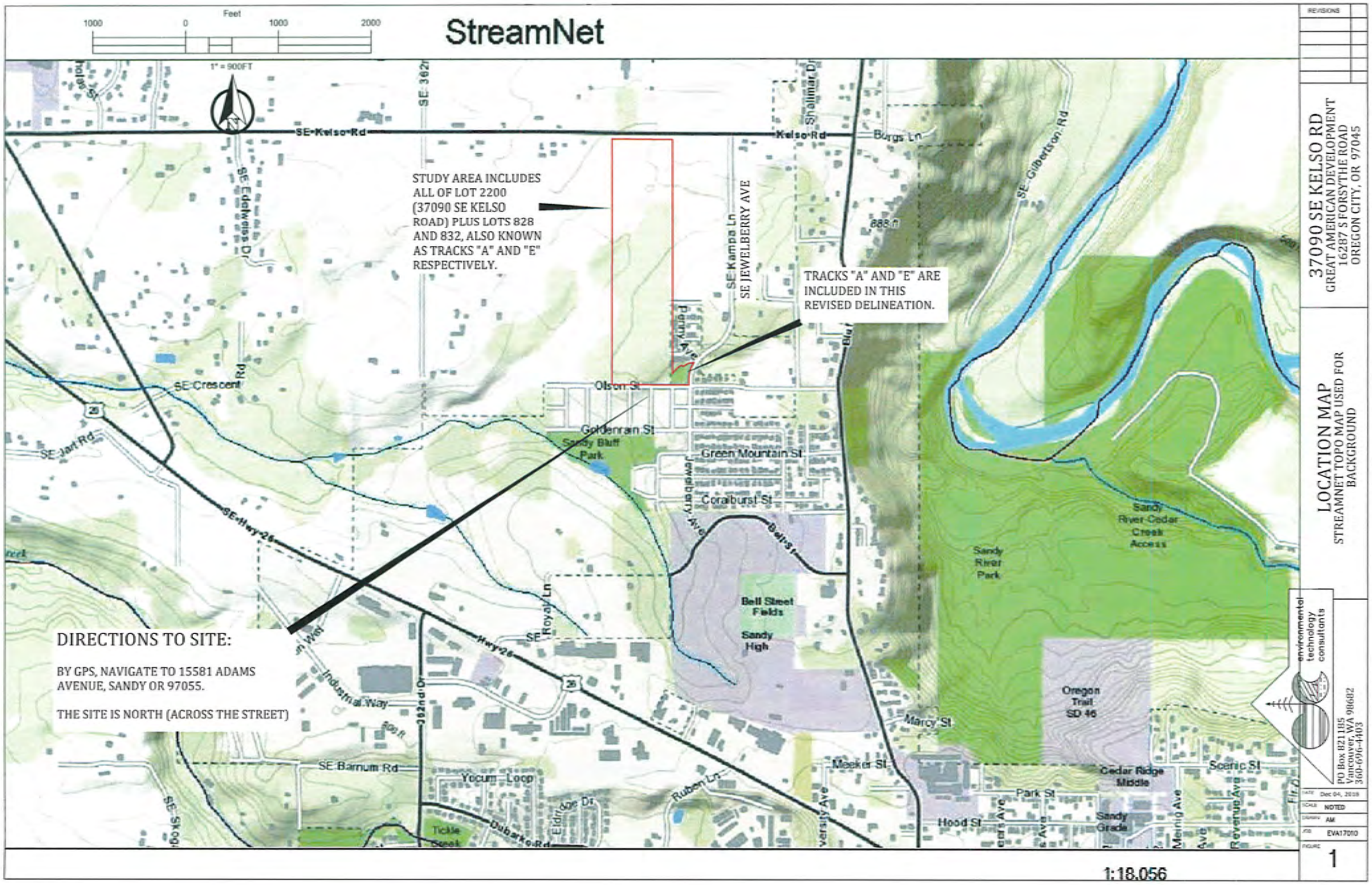
Other Information:

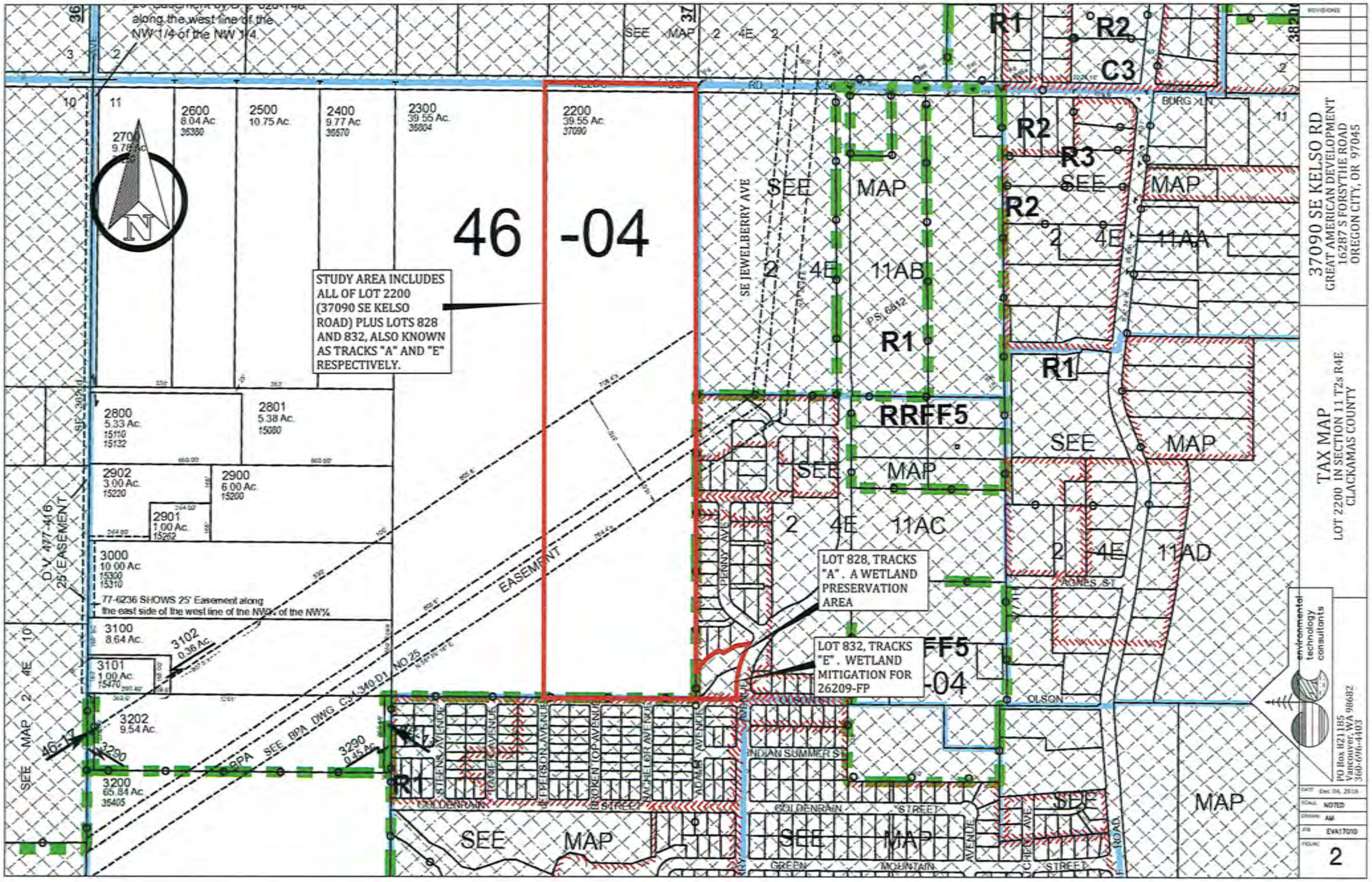
	Y	N	
Has previous delineation/application been made on parcel?	☒	☐	If known, previous DSL # WD2017-0410 & WD2000-0612
Does LWI, if any, show wetland or waters on parcel?	☒	☐	

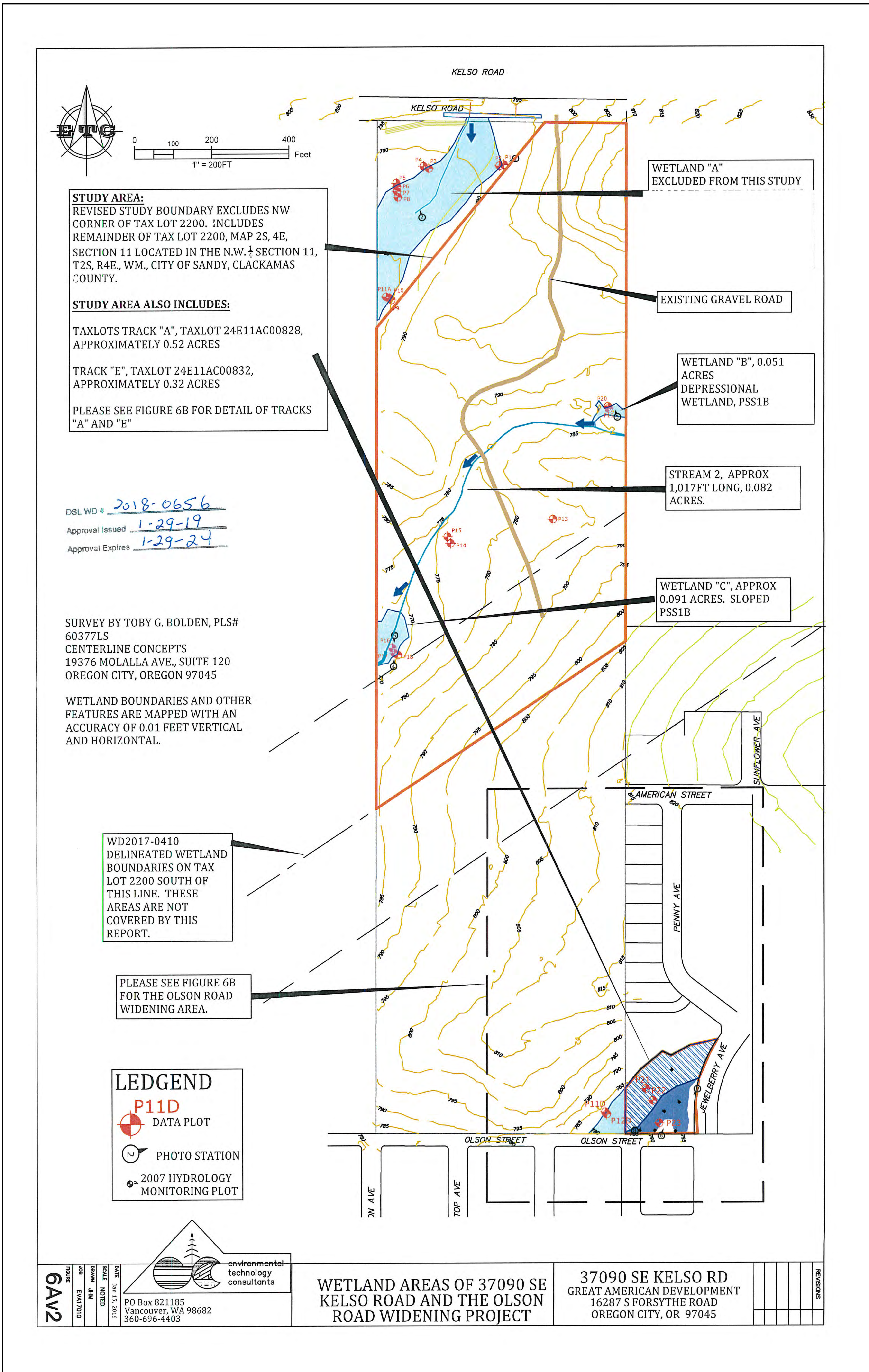
For Office Use Only

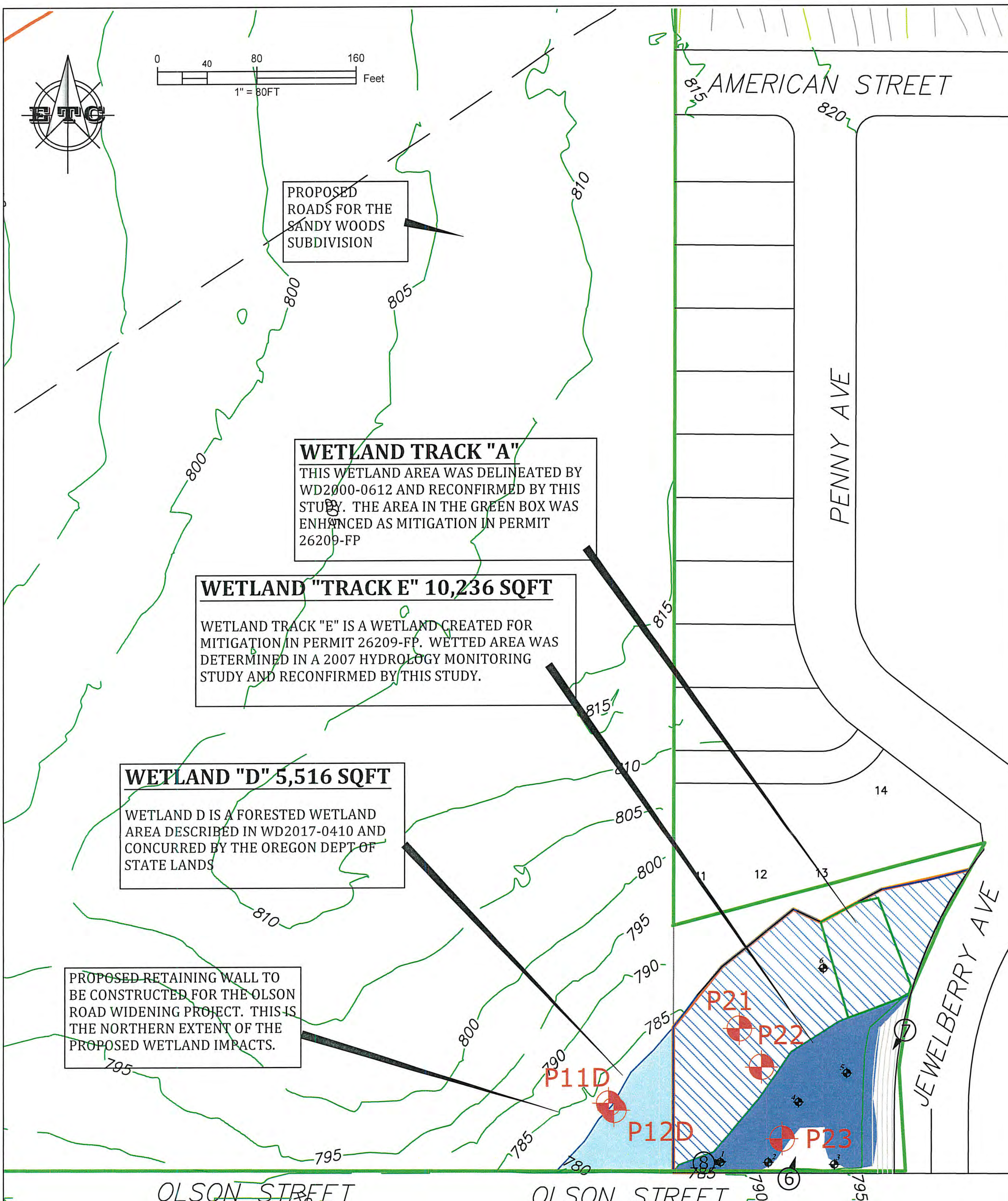
DSL Reviewer: CS	Fee Paid Date: __ / __ / __	DSL WD # 2018-0656
Date Delineation Received: 12 / 7 / 18	DSL Project # 39715	DSL Site # 106896
Scanned: ☒ Final Scan: ☐	DSL WN #	DSL App. # 61489

Electronic Submittal


StreamNet
Feet
1000 0 1000 2000
1" = 900FT
SE Kelso Rd
Kelso Rd
Burgs Ln
STUDY AREA INCLUDES ALL OF LOT 2200 (37090 SE KELSO ROAD) PLUS LOTS 828 AND 832, ALSO KNOWN AS TRACKS "A" AND "E" RESPECTIVELY.
TRACKS "A" AND "E" ARE INCLUDED IN THIS REVISED DELINEATION.
SE Kampa Ln
SE JEWELBERRY AVE
Olson St
Goldenrain St
Sandy Bluff Park
Green Mountain St
Coralburst St
Bell St
Bell Street Fields
Sandy High
SE Crescent Rd
SE Jart Rd
SE Hwy 26
Hwy 26
SE Royal Ln
Industrial Way
362nd Dr
SE Barnum Rd
Yocum Loop
Ruben Ln
Meeker St
Marcy St
Hood St
Park St
Sandy River Park
Sandy River-Cedar Creek Access
Oregon Trail SD 46
Cedar Ridge Middle
Sandy Grade
Scenic St
DIRECTIONS TO SITE:
BY GPS, NAVIGATE TO 15581 ADAMS AVENUE, SANDY OR 97055.
THE SITE IS NORTH (ACROSS THE STREET)
1:18,056
REVISIONS
37090 SE KELSO RD
GREAT AMERICAN DEVELOPMENT
16287 S FORSYTHE ROAD
OREGON CITY, OR 97045
LOCATION MAP
STREAMNET TOPO MAP USED FOR BACKGROUND
environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403
DATE Dec 04, 2018
SCALE NOTED
DRAWN AM
JOB EVA17010
FIGURE 1


STUDY AREA INCLUDES ALL OF LOT 2200 (37090 SE KELSO ROAD) PLUS LOTS 828 AND 832, ALSO KNOWN AS TRACKS "A" AND "E" RESPECTIVELY.
LOT 828, TRACKS "A". A WETLAND PRESERVATION AREA
LOT 832, TRACKS "E". WETLAND MITIGATION FOR 26209-FP
46 -04
2200 39.55 Ac. 37090
2300 39.55 Ac.
2400 9.77 Ac.
2500 10.75 Ac.
2600 8.04 Ac.
2800 5.33 Ac.
2801 5.38 Ac.
2902 3.00 Ac.
2900 6.00 Ac.
2901 1.00 Ac.
3000 10.00 Ac.
3100 8.64 Ac.
3101 1.00 Ac.
3102 0.36 Ac.
3202 9.54 Ac.
3200 65.84 Ac.
D.V. 477-416 25' EASEMENT
77-6236 SHOWS 25' Easement along the east side of the west line of the NW¼ of the NW¼
EASEMENT
SE JEWELBERRY AVE
RRFF5
R1
R2
R3
C3
2 4E 11AB
2 4E 11AC
2 4E 11AD
2 4E 11AA
SEE MAP
INDIAN SUMMER ST
GOLDENRAIN STREET
GREEN MOUNTAIN STREET
OLSON
BURG LN
37090 SE KELSO RD
GREAT AMERICAN DEVELOPMENT
16287 S FORSYTHE ROAD
OREGON CITY, OR 97045
TAX MAP
LOT 2200 IN SECTION 11 T2s R4E
CLACKAMAS COUNTY
environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403
2


KELSO ROAD
1" = 200FT
Feet
0
100
200
400
STUDY AREA:
REVISED STUDY BOUNDARY EXCLUDES NW CORNER OF TAX LOT 2200. INCLUDES REMAINDER OF TAX LOT 2200, MAP 2S, 4E, SECTION 11 LOCATED IN THE N.W.¼ SECTION 11, T2S, R4E., WM., CITY OF SANDY, CLACKAMAS COUNTY.
STUDY AREA ALSO INCLUDES:
TAXLOTS TRACK "A", TAXLOT 24E11AC00828, APPROXIMATELY 0.52 ACRES
TRACK "E", TAXLOT 24E11AC00832, APPROXIMATELY 0.32 ACRES
PLEASE SEE FIGURE 6B FOR DETAIL OF TRACKS "A" AND "E"
WETLAND "A" EXCLUDED FROM THIS STUDY
EXISTING GRAVEL ROAD
WETLAND "B", 0.051 ACRES DEPRESSIONAL WETLAND, PSS1B
STREAM 2, APPROX 1,017FT LONG, 0.082 ACRES.
WETLAND "C", APPROX 0.091 ACRES. SLOPED PSS1B
DSL WD # 2018-0656
Approval Issued 1-29-19
Approval Expires 1-29-24
SURVEY BY TOBY G. BOLDEN, PLS# 60377LS
CENTERLINE CONCEPTS
19376 MOLALLA AVE., SUITE 120
OREGON CITY, OREGON 97045
WETLAND BOUNDARIES AND OTHER FEATURES ARE MAPPED WITH AN ACCURACY OF 0.01 FEET VERTICAL AND HORIZONTAL.
WD2017-0410 DELINEATED WETLAND BOUNDARIES ON TAX LOT 2200 SOUTH OF THIS LINE. THESE AREAS ARE NOT COVERED BY THIS REPORT.
PLEASE SEE FIGURE 6B FOR THE OLSON ROAD WIDENING AREA.
AMERICAN STREET
SUNFLOWER AVE
PENNY AVE
JEWELBERRY AVE
OLSON STREET
OLSON STREET
LEDGEND
P11D
DATA PLOT
PHOTO STATION
2007 HYDROLOGY MONITORING PLOT
environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403
FIGURE 6Av2
JOB EVA17010
DRAWN JHM
SCALE NOTED
DATE Jan 15, 2019
WETLAND AREAS OF 37090 SE KELSO ROAD AND THE OLSON ROAD WIDENING PROJECT
37090 SE KELSO RD
GREAT AMERICAN DEVELOPMENT
16287 S FORSYTHE ROAD
OREGON CITY, OR 97045
REVISIONS



SURVEY BY TOBY G. BOLDEN, PLS# 60377LS
CENTERLINE CONCEPTS
19376 MOLALLA AVE., SUITE 120
OREGON CITY, OREGON 97045

WETLAND BOUNDARIES AND OTHER FEATURES ARE MAPPED WITH AN ACCURACY OF 0.01 FEET VERTICAL AND HORIZONTAL.

DSL WD # 2018-0656
Approval Issued 1-29-19
Approval Expires 1-29-24

Disclaimer per OAR 141-090-0035 (7)(k)

This report documents the investigation, best professional judgment and conclusions of the investigator. It is correct and complete to the best of my knowledge. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and used at your own risk unless it has been reviewed and approved in writing by the Oregon Department of State Lands in accordance with OAR 141-090-0005 through 141-090-0055.

LEDGEND
P11D DATA PLOT
PHOTO STATION
2007 HYDROLOGY MONITORING PLOT

environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403

FIGURE 6B | JOB EVA17010 | DRAWN JHM | SCALE NOTED | DATE Jan 15, 2019

DETAIL OF AREA IMPACTED BY THE OLSON ROAD WIDENING PROJECT IN SE CORNER

37090 SE KELSO RD
GREAT AMERICAN DEVELOPMENT
16287 S FORSYTHE ROAD
OREGON CITY, OR 97045

REVISIONS

Exhibit K

Oregon
Kate Brown, Governor

Department of State Lands
775 Summer Street NE, Suite 100
Salem, OR 97301-1279
(503) 986-5200
FAX (503) 378-4844
www.oregon.gov/dsl

October 29, 2020

Rosemont Development
Attn: Rob Venema
10117 SE Sunnyside Road
Clackamas, OR 97015

Re: WD # 2020-0442 **Approved**
Wetland Delineation Report for 37090 SE Kelso Road
Clackamas County; 2S 4E S11 TL2204 (Portion)

Dear Mr. Venema:

The Department of State Lands has reviewed the wetland delineation report prepared by Environmental Technology Consultants for the site referenced above. Please note that the study area includes only a portion of the tax lot described above (see the attached maps). Based upon the information presented in the report, we concur with the wetland boundary as mapped in Figure 6A of the report. Please replace all copies of the preliminary wetland map with this final Department-approved map.

Within the study area, one wetland was identified, totaling approximately 1.74 acres. This wetland is subject to the permit requirements of the state Removal-Fill Law. Under current regulations, a state permit is required for cumulative fill or annual excavation of 50 cubic yards or more in wetlands or below the ordinary high-water line (OHWL) of the waterway (or the 2-year recurrence interval flood elevation if OHWL cannot be determined).

This concurrence is for purposes of the state Removal-Fill Law only. We recommend that you attach a copy of this concurrence letter to any subsequent state permit application to speed application review. Federal or local permit requirements may apply as well. The U.S. Army Corps of Engineers will determine jurisdiction under the Clean Water Act, which may require submittal of a complete Wetland Delineation Report.

Please be advised that state law establishes a preference for avoidance of wetland impacts. Since measures to avoid and minimize wetland impacts may include reconfiguring parcel layout and size or development design, we recommend that you work with Department staff on appropriate site design before completing the city or county land use approval process.

This concurrence is based on information provided to the agency. The jurisdictional determination is valid for five years from the date of this letter unless new information necessitates a revision. Circumstances under which the Department may change a determination are found in OAR 141-090-0045 (available on our web site or upon request). In addition, laws enacted by the legislature and/or rules adopted by the Department may result in a change in jurisdiction. Individuals and applicants are subject to the regulations that are in effect at the time of the removal-fill activity or complete permit application. The applicant, landowner, or agent may submit a request for reconsideration of this determination in writing within six months of the date of this letter.

Thank you for having the site evaluated. If you have any questions, please contact Chris Stevenson, the Jurisdictional Coordinator for Clackamas County at (503) 986-5246.

Sincerely,

Peter Ryan

Peter Ryan, SPWS
Aquatic Resource Specialist

Enclosures

ec: AnnaKate Martin, Environmental Technology Consultants
Clackamas County Planning Department
Robert Fraley, Corps of Engineers
Anita Huffman, DSL

WETLAND DELINEATION / DETERMINATION REPORT COVER FORM

This form must be included with any wetland delineation report submitted to the Department of State Lands for review and approval. A wetland delineation report submittal is not "complete" unless the fully completed and signed report cover form and the required fee are submitted. Attach this form to the front of an unbound report or include a hard copy of the completed form with a CD/DVD that includes a single PDF file of the report cover form and report (minimum 300 dpi resolution) and submit to: **Oregon Department of State Lands, 775 Summer Street NE, Suite 100, Salem, OR 97301-1279.** A single PDF attachment of the completed cover from and report may be e-mailed to **Wetland_Delineation@dsl.state.or.us**. For submittal of PDF files larger than 10 MB, e-mail instructions on how to access the file from your ftp or other file sharing website. Fees can be paid by check or credit card. Make the check payable to the Oregon Department of State Lands. To pay the fee by credit card, call 503-986-5200.

☒ Applicant ☐ Owner Name, Firm and Address:
Rosemont Development
10117 SE Sunnyside Road
Clackamas, Oregon, 97015
Rob Venema

Business phone # **503-351-4747**
Mobile phone #
E-mail: rosemontdevelopment@gmail.com

RECEIVED
AUG 24 2020

☒ Authorized Legal Agent, Name and Address:
Environmental Technology Consultants
375 Portland Ave, Gladstone, OR 97027

RECEIVED $ 466.00
DEPARTMENT OF STATE LANDS
#5382

Business phone # 360-696-4403
Mobile phone # **360-984-8767**
E-mail: AnnakateM@etcEnvironmental.net

I either own the property described below or I have legal authority to allow access to the property. I authorize the Department to access the property for the purpose of confirming the information in the report, after prior notification to the primary contact.

Typed/Printed Name: Annakate Martin Signature: Annakate Martin
Date: **August 2020** Special instructions regarding site access: **Contact owner or consultant.**

Project and Site Information (using decimal degree format for lat/long of site or start & end points of linear project)

Project Name: **37090 SE Kelso Road**	Latitude: **N 45.417907** Longitude: **W -122.2831**
Proposed Use: SUBDIVISION, SINGLE FAMILY HOMES	Tax Map # 24E11 Lot 24E11 02204 Parcel Number 05034843
Project Street Address (or other descriptive location): **No Situs Address** **(Formally known as 37090 SE Kelso Road)**	Township **T2S** Range **R4E** Section **11** QQ Tax Lot(s) **24E1102204**
City: **Sandy, OR** County: **Clackamas**	Waterway: **No name** River Mile: NWI Quad(s): Sandy, Oregon

Wetland Delineation Information

Wetland Consultant Name, Firm and Address:
John McConnaughey, PWS & Annakate Martin NRS
Environmental Technology Consultants
375 Portland Ave, Gladstone, OR 97027

Phone # **360-696-4403**
Mobile phone # **360-984-8767**
E-mail: **AnnakateM@etcEnvironmental.net**
JohnM@etcEnvironmental.net

The information and conclusions on this form and in the attached report are true and correct to the best of my knowledge.
Consultant Signature: Annakate Martin Date: **May, 2017 updated April 2020**

Primary Contact for report review and site access is ☒ Consultant ☐ Applicant/Owner ☐ Authorized Agent
Wetland/Waters Present? ☒ Yes ☐ No Study Area size: **2.69 acres** Total Wetland Acreage: **1.74 AC**

Check Box Below if Applicable: Fees: $466 (2020)

☐ R-F permit application
☐ Mitigation bank site
☐ Wetland restoration/enhancement project (not mitigation)
☐ Industrial Land Certification Program Site
☐ Reissuance of a recently expired delineation
Previous DSL # Expiration date ____

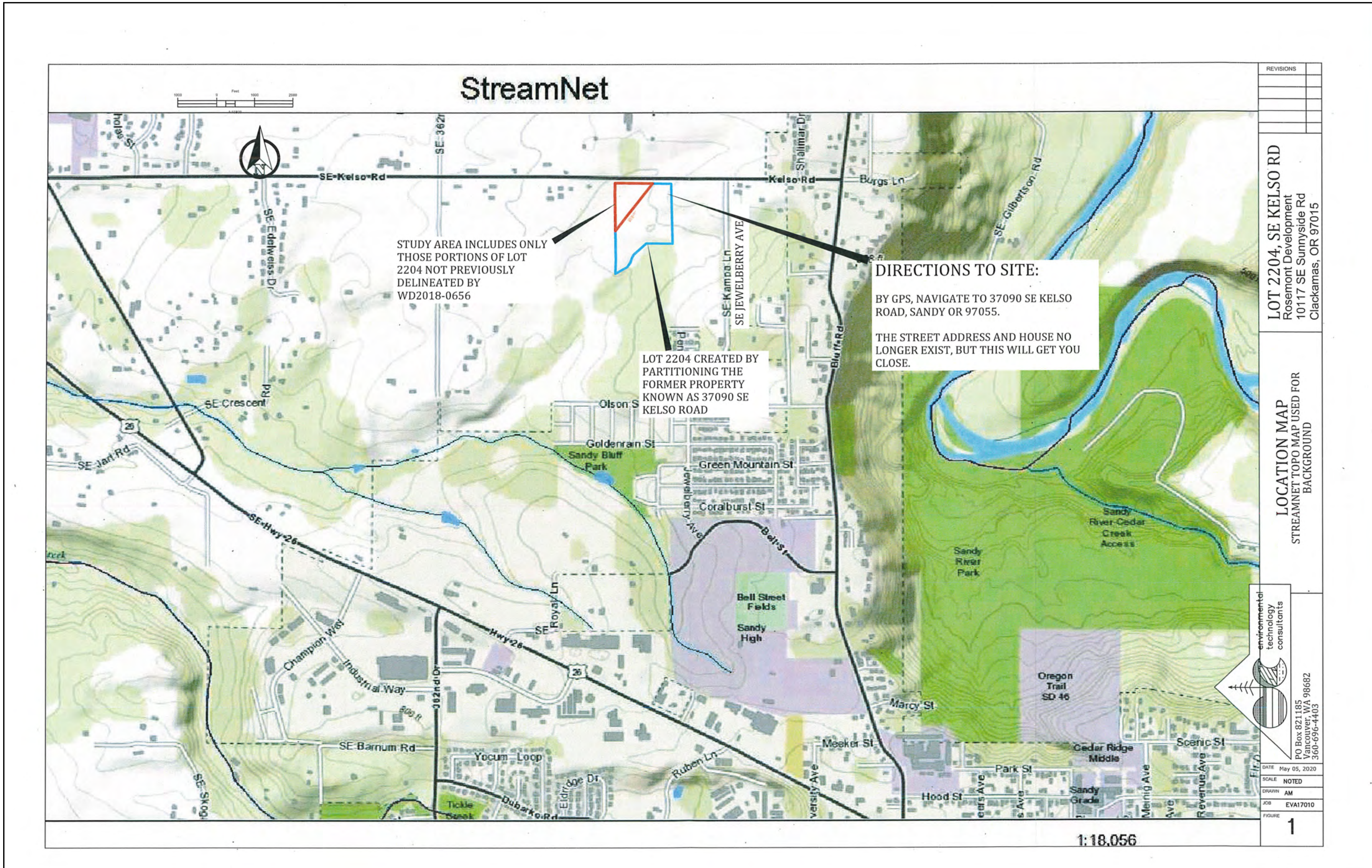
☒ Fee payment submitted **$466**
☐ Fee ($100) for resubmittal of rejected report
☐ No fee for request for reissuance of an expired report

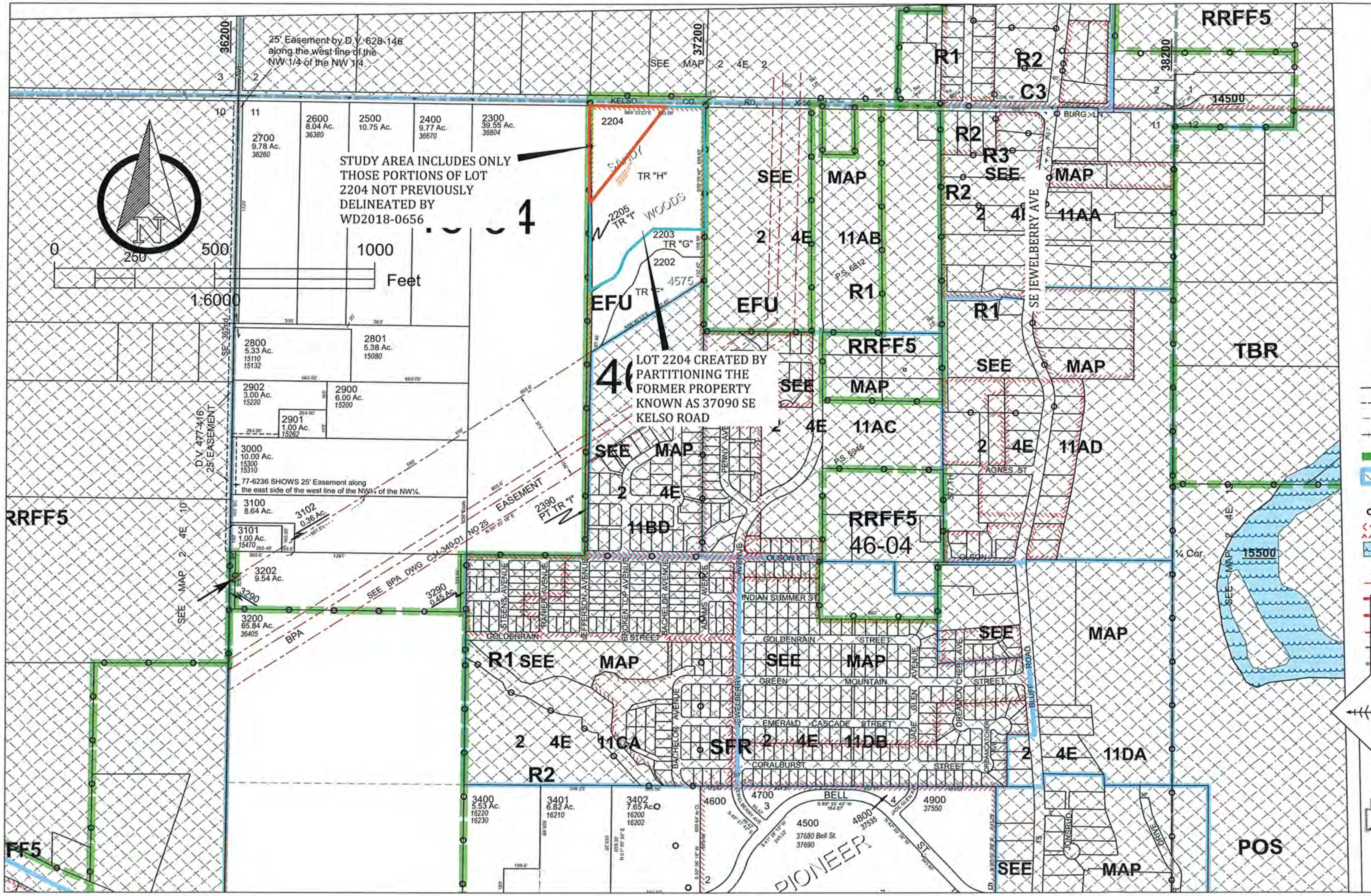
Other Information:

	Y	N	
Has previous delineation/application been made on parcel?	☒	☐	If known, previous WD2018-0656
Does LWI, if any, show wetland or waters on parcel?	☐	☒	

For Office Use Only

DSL Reviewer: CS Fee Paid Date: 8 / 24 / 20 DSL WD # 2020-0442
Date Delineation Received: 8 / 24 / 20 DSL Project # 39715 DSL Site # ____
Scanned: ☐ Final Scan: ☐ DSL WN # ____ DSL App. # ____


StreamNet
DIRECTIONS TO SITE:
BY GPS, NAVIGATE TO 37090 SE KELSO ROAD, SANDY OR 97055.
THE STREET ADDRESS AND HOUSE NO LONGER EXIST, BUT THIS WILL GET YOU CLOSE.
STUDY AREA INCLUDES ONLY THOSE PORTIONS OF LOT 2204 NOT PREVIOUSLY DELINEATED BY WD2018-0656
LOT 2204 CREATED BY PARTITIONING THE FORMER PROPERTY KNOWN AS 37090 SE KELSO ROAD
SE Kelso Rd
Kelso Rd
Burgs Ln
SE Gilbertson Rd
SE Edelweiss Dr
SE 362nd
Shalimar Dr
SE Kampa Ln
SE JEWELBERRY AVE
Bluff Rd
SE Crescent Rd
SE Jarl Rd
Olson St
Goldenrain St
Sandy Bluff Park
Green Mountain St
Jewelberry Ave
Coralburst St
Bell St
SE Hwy 26
Hwy 26
26
SE Royal Ln
Bell Street Fields
Sandy High
Champion Way
Industrial Way
362nd Dr
Marcy St
Meeker St
Park St
Hood St
SE Barnum Rd
Yocum Loop
Eldridge Dr
Ruben Ln
Dubarko Rd
Tickle Creek
Sandy River Park
Sandy River-Cedar Creek Access
Oregon Trail SD 46
Cedar Ridge Middle
Sandy Grade
Scenic St
Meinig Ave
Revenue Ave
1:18,056
REVISIONS
LOT 2204, SE KELSO RD
Rosemont Development
10117 SE Sunnyside Rd
Clackamas, OR 97015
LOCATION MAP
STREAMNET TOPO MAP USED FOR BACKGROUND
environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403
DATE May 05, 2020
SCALE NOTED
DRAWN AM
JOB EVA17010
FIGURE 1

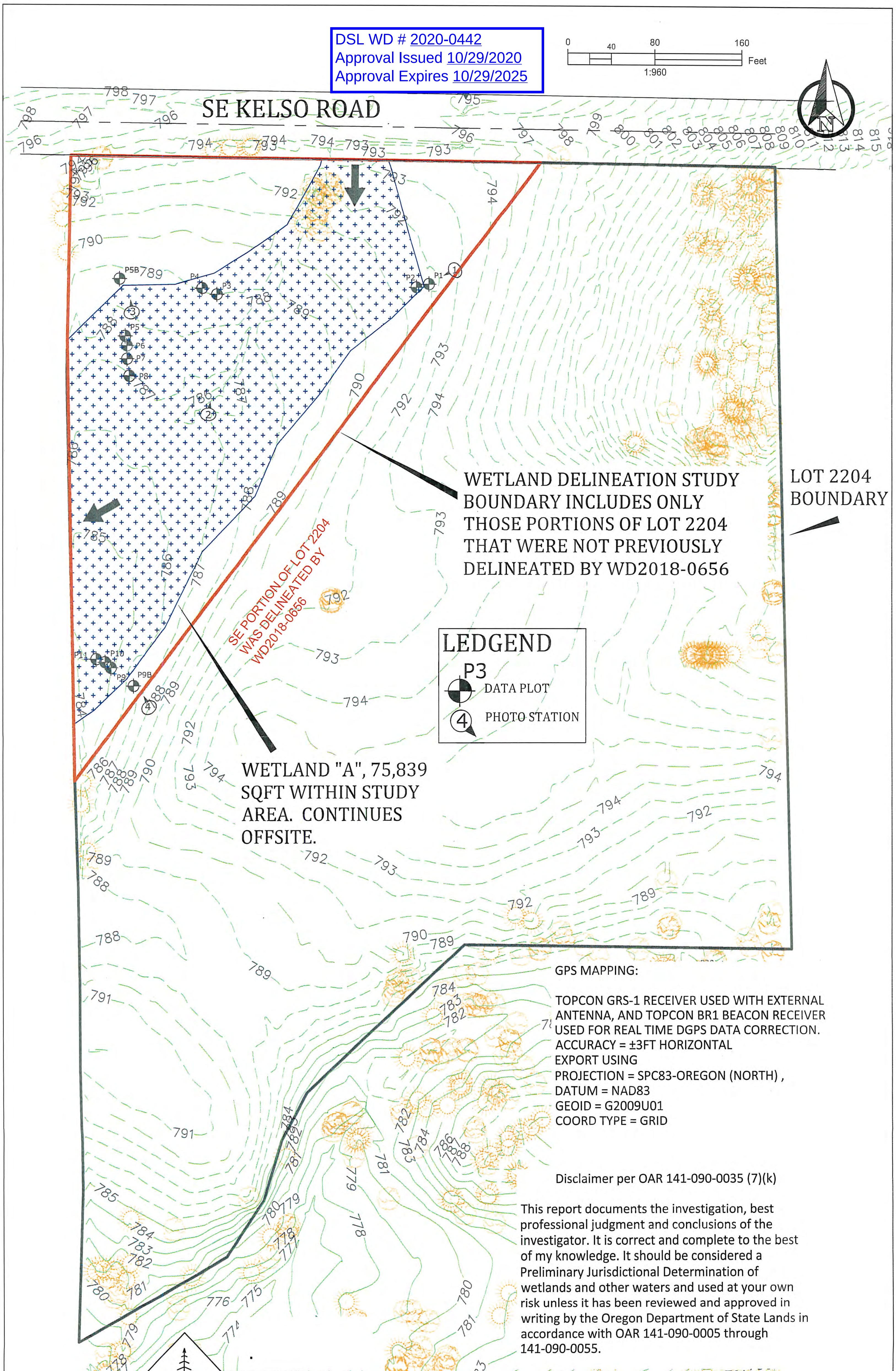


LOT 2204, SE KELSO RD
Rosemont Development
10117 SE Sunnyside Rd
Clackamas, OR 97015

TAX MAP
REVISED 7/11/2019
SECTION 11 T2s R4E,
CLACKAMAS COUNTY

environmental technology consultants
PO Box 821185
Vancouver, WA 98682
360-696-4403

DATE	May 05, 2020
SCALE	NOTED
DRAWN	AM
JOB	EVA17010
FIGURE	2



GPS MAPPING:

TOPCON GRS-1 RECEIVER USED WITH EXTERNAL ANTENNA, AND TOPCON BR1 BEACON RECEIVER USED FOR REAL TIME DGPS DATA CORRECTION.
ACCURACY = ±3FT HORIZONTAL
EXPORT USING
PROJECTION = SPC83-OREGON (NORTH) ,
DATUM = NAD83
GEOID = G2009U01
COORD TYPE = GRID

Disclaimer per OAR 141-090-0035 (7)(k)

This report documents the investigation, best professional judgment and conclusions of the investigator. It is correct and complete to the best of my knowledge. It should be considered a Preliminary Jurisdictional Determination of wetlands and other waters and used at your own risk unless it has been reviewed and approved in writing by the Oregon Department of State Lands in accordance with OAR 141-090-0005 through 141-090-0055.

FIGURE 6A	JOB EVA17010	DRAWN JHM	SCALE NOTED	DATE May 05, 2020	environmental technology consultants PO Box 821185 Vancouver, WA 98682 360-696-4403	WETLAND "A" GOOGLE EARTH 8/11/2017 USFWS NWI WETLAND LAYERS DISPLAYED.	LOT 2204, SE KELSO RD Rosemont Development 10117 SE Sunnyside Rd Clackamas, OR 97015	REVISIONS

Design Modification Request

Per Roadway Standards: Section 170

Exhibit L

Internal use only
Case# 2021-14

Todays date: **Type 1 - $500 Type 2 - $400:**

PROJECT INFORMATION
Project name: Sandy Woods Subdivision Phase 2; SE Kelso Road
Nearest address or intersection: South of 37117 SE Kelso Road; west of Jewelberry Ave, Sandy
Functional classification of road: Minor Arterial
Posted speed: 45 mph
Applicable roadway standard: Cross section, including planter strip, sidewalk width, & retaining wall within the ROW.
Description of modification & reason for request: Due to jurisdictional wetlands south of the existing roadway three cross section elements area proposed to be modified as noted on the attached sheet.
Supporting documentation: See attached
Mitigation for modification: See attached
Public Benefit: See attached
APPLICANT
Name: Patrick Sisul, PE, Sisul Engineering
Day phone: (503)657-0188
Email: patsisul@sisulengineering.com
PROPERTY OWNER
Name: Silver "V" Construction, Inc., Rob Venema
Address: 10117 SE Sunnyside Road, F1178
City: Clackamas **State:** OR **ZIP Code:** 97015
Phone: (503)351-4747
Email: rosemontdevelopment@gmail.com

COUNTY ENGINEERING STAFF USE ONLY	
Effects on modified standards:	
Land use decision issued? ☐ YES ☐ NO	**Related to condition of approval?** ☐ YES ☐ NO
Traffic impact and speed study? ☐ YES ☐ NO	**Submitted?**
Average Daily Traffic:	**Calculated at (N S E W) of cross steet:**
Crash history of potential:	
Staff discussion:	
Decision: ☒ Partial Approval ☐ **Denial**	**Approved by:**
Conditions:	
Type I	**Type II**
▪ **Geometric design (horizontal, vertical curve design)** ▪ **Alteration of roadway cross section element**	**Sight distance, clear zone, acccess spacing, number of access points, intersection angle**

Clackamas County Engineering Division 150 S Beavercreek Road, Oregon City, OR 97045
Phone (503) 742-4691 www.clackamas.us

Form #0040-00
Rev. 01-21-21

Design Modification Request, SE Kelso Rd:

Description of Modification:

Modify the roadway cross sectional element of Standard Drawing C140 requiring the planter strip and a 6-foot-wide sidewalk for a portion of the site frontage. The applicant is requesting to eliminate the planter strip and reduce the width of the public sidewalk to 5-feet over a 120-foot-long area between Kelso Road stations 15+55 and 16+75. In addition, modify roadway standard 5 c) regarding locating a retaining wall on private property when feasible. The applicant is requesting to place a retaining wall within the public right of way over a 210-foot-long section between Kelso Road stations 14+95 and 17+05, as indicated on the attached plan.

Reason for the Request:

Existing jurisdictional wetlands are located within the southern portion of the SE Kelso right-of-way and immediately south of the right-of-way on Tax Lot 24E11 02204. Oregon Department of State Lands (DSL) has approved wetland delineation studies prepared for the SE Kelso Road right-of-way and for Tax Lot 24E11 02204, which is part of the Sandy Woods 2 site. The wetlands in the right-of-way and on Tax Lot 24E11 02204 are part of larger jurisdictional wetland that extends southwest of the Sandy Woods 2 site and north of Kelso Road. Eliminating the planter strip, reducing the sidewalk width, and minimizing grading by building a retaining wall within the public right-of-way will reduce the impacts to the wetland by 523 sq. ft. Reduction in impacts to wetlands is a priority of the Oregon Department of State Lands.

Supporting Documentation:

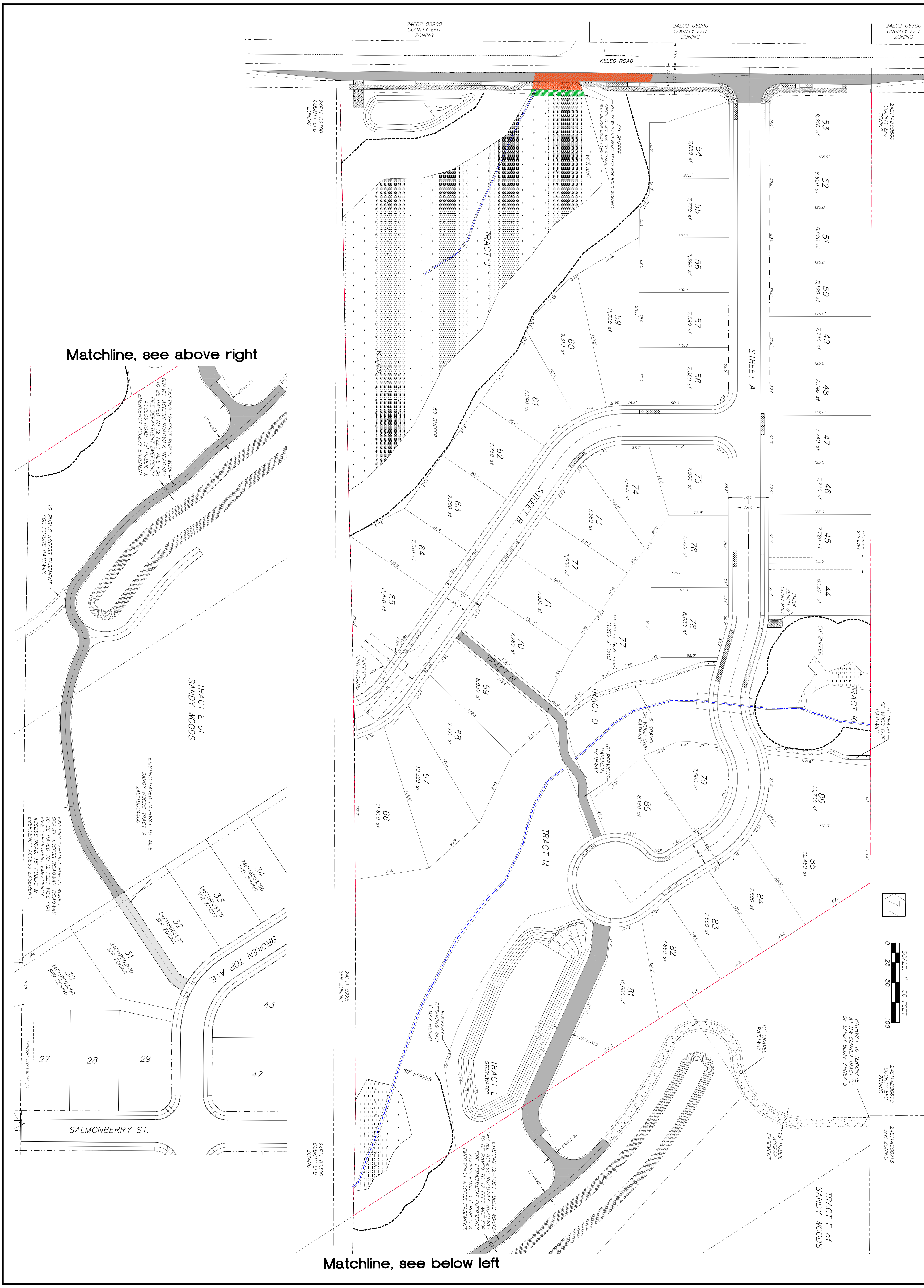
Portions of two wetland determinations approved by the Department of State Lands are attached. WD #2020-0272, approved July 2020, is the wetland delineation approved for the wetland in the Kelso Road right-of-way. WD #2020-0442, approved October 2020 is the wetland delineation approved for the NW corner of Tax Lot 24E11 02204 south of Kelso Road. Also attached is a plan showing the relationship of the existing wetlands to the Kelso Road right-of-way and the proposed improvements.

Mitigation for Modification:

The proposed modifications would eliminate the planter strip and reduce the sidewalk width to 5 feet along a 120-foot-long section of SE Kelso Road and would place a retaining wall within the right-of-way over a 210-foot distance. Existing trees and vegetation remaining within the wetland would mitigate the for the loss of the vegetation between the curb and sidewalk. To mitigate for the retaining wall being within the right-of-way and the vertical drop behind the sidewalk, a protective guard, compliant with Section 1015 of the Oregon Structural Specialty Code, would be placed along the rear of the sidewalk. Both the retaining wall and the protective guard would be owned and maintained by the Sandy Woods 2 Homeowners Association. Having the retaining wall and the protective guard owned and maintained by the HOA would relieve Clackamas County Roadway Department from any maintenance expense associated with the wall or guard and would mitigate for the retaining wall and protective guard being within the public right-of-way.

Public Benefit:

Widening the roadway and providing improvements for alternative transportation modes such as bicycles and pedestrians benefits the local community in that the roadway system will support a multi-modal transportation system. Preservation of the existing wetlands will provide benefits such as natural water quality improvement, erosion protection, fish and wildlife habitat, and flood storage. Finding a way to do both, without compromising safety or requiring more work or expense to the County Roadway Department creates a win-win scenario benefitting the nature, the local neighborhood, and the community. The wetlands on this site are existing habitat for insects and birds and are part of a larger wetland extending north and south of SE Kelso Road. Five hundred twenty-three sq. ft. of existing wetland could be preserved with the proposed design modifications. The wetlands that would be preserved would be natural and would not require irrigation as opposed to a new street side planter strip that would require irrigation, frequent mowing, and weed control. Reduction of expenses associated with irrigation and maintenance of the planter strip could also be seen as a minor benefit to the homeowners within the Sandy Woods 2 subdivision who will pay for maintenance of the Kelso Road planter strip through an HOA.



SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188
DRAWING: Sandy Woods 2 subdivision DR current.dwg

DATE MAY, 2021
SCALE 1" = 50'
DRAWN PS
JOB SQL19-042
SHEET 1 OF 15 SHEETS

Site Plan

Sandy Woods 2
Rosemont Development

REVISIONS BY

CLACKAMAS COUNTY

DAN JOHNSON
DIRECTOR

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
DEVELOPMENT SERVICES BUILDING
150 BEAVERCREEK ROAD OREGON CITY, OR 97045

7/28/2021

From: Jonny Gish, Engineering Technician 4

To: Pat Sisul, PE Sisul Engineering

RE: Sandy Woods Design Modification SC004521

The applicant has applied for a three-part design modification for a subdivision along SE Kelso Rd, which is classified as an urban minor arterial. The adjacent parcel with frontage along the south side of SE Kelso Rd has been annexed into the City of Sandy, therefore this subdivision application will be processed thru the City of Sandy Planning Department.

The applicant is requesting a modification of standard detail C140 to allow for a 5-foot curb-tight sidewalk along SE Kelso Rd for approximately 120-foot duration from station 15+55 to 16+75. Staff has reviewed the application and found that the allowance of the 5-foot curb-tight sidewalk along the delineated wetland would be in the best interest of the public with minimal disturbance of the adjacent delineated wetland and therefore approved.

In addition to the sidewalk the applicant has requested the allowance of a retaining wall within the county right-of-way at two locations. The first location would from station 14+95 to 17+05 and the second would be at station 19+95. Chapter 5 of the Clackamas County Roadway Standards states that retaining wall should be located on private property and easements shall be provided as necessary. Staff has determined that the allowance of the retaining wall within the county right-of-way is <u>not</u> in the best interest of the public and both retaining walls can be constructed and maintained within the adjacent private property and within an easement. Therefore, the applicant's request for the retaining walls to be located within the county right-of-way is <u>not</u> approved. All private structures, including supporting devices, shall be located within the public utility, sidewalk and slope easement and completely outside the county right-of-way. Increased width of the public easements may also be required if deemed necessary.

Subsequently due to the existing grading for half-street improvements and right-of-way dedication requirements, the applicant has requested to allow the sidewalk to end approximately 5-feet short of the easterly property line. This allowance would allow grading to occur within existing county right-of-way without slope easements or grading on adjacent properties. This design modification is approved.

P. 503.742.4400 F. 503.742.4272 WWW.CLACKAMAS.US

As a whole, this design modification is partially approved for sidewalk width and length and not approved for private structures within the county right-of-way.

Please feel free to contact me if you have any questions

Sincerely,

Jonny Gish
Clackamas County Department of Transportation and Development
150 Beavercreek Rd
Oregon City, OR 97045
503-753-2009
jgish@clackamas.us

Exhibit M

Date: August 3, 2021
To: City of Sandy
Attn: Emily Meharg
RE: 21-037 SUB/VAR/TREE

To whom it may concern,

An incomplete letter was received from the City of Sandy for File No. 21-037 SUB/VAR/TREE. This letter includes responses and additional information regarding the items mentioned in said letter. Included with this resubmittal for completeness check are: a revised plan set, revised Project Narrative (revised sections highlighted, revised to match the correct acreages), Partial Approval for a Design Modification from Clackamas County, Arborist Report Addendum, and the additional check requested.

- Additional information from the project arborist on the definition of "viable." Are all viable trees healthy and likely to grow to maturity? Typically, an arborist's tree health/condition evaluation assesses trees as being in very good, good, fair, poor, or dead/dying condition.

  RESPONSE: Please refer to the addendum prepared by the arborist further explaining this.

- Additional information from the project arborist detailing why the standard critical root zone (CRZ) of 1 foot per 1 inch DBH is not being proposed.

  RESPONSE: Please refer to the addendum prepared by the arborist further explaining this.

- Plan Set sheet that details building footprints, retention trees, and standard critical root zone (1 foot per 1 inch DBH) around all proposed retention trees.

  RESPONSE: Building footprints have been added on the plans. Please refer to the revised plans.

- Revise Sheet 11, future street plan, to detail trail connections to the east.

  RESPONSE: Detail trail connections have been added on the plans. Please refer to the revised plans.

- $1,250 third party review fee for review of arborist report and tree retention plan. You submitted $250; however, given the size of the project and proposed deviations from the industry standards, paying the full $1,500 third party review fee is necessary.

  RESPONSE: Check included with resubmittal.

- Clarification on the dashed lines and sidewalk proposal along Kelso Road detailed on Sheet 1. Are you proposing right-of-way dedication along Kelso Road? The sidewalk will need to extend to the furthest extent of the property.

  RESPONSE: The applicant has collaborated extensively with Clackamas County on the desired sidewalk design. A design modification partial approval has been issued by Clackamas County and included with this resubmittal. Please refer to this document for more detail. The sidewalk design has been revised with the County's guidance to stop the sidewalk 5' short of each property line and having a 2:1 graded slope within the ROW. This is only one panel short of the property line and will not be a significant burden should neighboring development occurs.

- Clarification on the proposed retaining wall along Tract K on Street A. The wall is located in the front yard along Street A so the maximum height is 4 feet. A 6 foot tall wall would require a variance or special variance. Is the wall at grade or sunken? Will it require a fence on top?

  RESPONSE: The additional information on the retaining wall along Tract K on Street A has been included in the revised plan set. Please refer to the plan set for these additional details. Regarding the height of the wall, per the City's definition for Front Yard refers to a building and there is no building on Tract K. This tract is reserved for open space, a perennial stream, wetland and buffers. Therefore the wall height does not apply as there is no building on this parcel.

- Clarification on the area of the tracts and the net site area calculation. Is Tract P in the table on page 1 of the narrative supposed to be Tract M? Are Tracts K and L labeled correctly in the table on page 1? The areas listed for the tracts in the table do not add up to the total tract area listed in the project narrative. Does the right-of-way dedication in the project narrative include a right-of-way dedication along Kelso Road?

  RESPONSE: Please refer to the updated table below with the correct tract assignments and square footage. The ROW dedication to the City is 95,180 and County is 3,265. Total is 98,445.

Tract	Size (square feet)	Use
J	137,121	Open Space, Wetland & Buffer, Stormwater Easement
L	34,622	Public Storm Drain Facility
M	79,544	Open Space, Perennial Stream, Wetland & Buffer
N	5,306	Public Walkway and Sanitary Sewer Tract/Easement
O	20,205	Perennial Stream & Buffer
K	24,940	Open Space, Perennial Stream, Wetland, and Buffers

Exhibit N

REPLINGER & ASSOCIATES LLC
TRANSPORTATION ENGINEERING

October 14, 2021

Ms. Emily Meharg
City of Sandy
39250 Pioneer Blvd.
Sandy, OR 97055

SUBJECT: REVIEW OF TRANSPORTATION IMPACT STUDY – SANDY WOODS 2 SUBDIVISION

Dear Emily:

In response to your request, I have reviewed materials submitted in support of the Sandy Woods 2 Subdivision in the northwest part of Sandy. The Transportation Impact Study (TIS), dated March 3, 2021, was prepared under the direction of David Kelly, PE of Kelly Engineering. A tentative plan set, dated 7/29/2021, was also provided.

The site is located south of SE Kelso Road and west of SE Jewelberry Avenue. Sandy Woods Phase 1 is located to the south. The two phases are separated by a powerline corridor; there will be no street connection between them. The proposal involves development of a 43-lot residential subdivision.

Overall

I find the TIS addresses the city's requirements and provides an adequate basis to evaluate impacts of the proposed development.

Comments

1. ***Study Area.*** The study addresses the appropriate intersections. It includes analyses of:

    - SE Kelso Road and SE Orient Drive;
    - SE Kelso Road and SE Bluff Road; and
    - SE Kelso Road and proposed site access.

    Because the subdivision does not propose connections to any existing local streets, the TIA does not evaluate the impact on local streets.

2. ***Traffic Counts.*** The engineer used counts conducted for the Sandy Bluff Annex 6 Subdivision from October 2107 as the basis for his analysis. The engineer correctly points out that reductions in travel have occurred due to the COVID-19 pandemic. He used the 2017 AM and PM peak hour traffic counts as the base and adjusted them upward by 2.5 percent per year to account for regional traffic growth and to offset the effect of the pandemic. The adjusted counts appear reasonable.

3. ***Trip Generation.*** The TIS uses trip generation for single-family dwellings (land use code 210) from the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*. The engineer calculates that the subdivision would produce 32 total AM peak hour trips; 43 total PM peak hour trips; and 406 total daily trips. The calculation of trips generated by the development appears reasonable.

4. ***Trip Distribution.*** The TIS provided information about trip distribution from the site. The engineer assumed 55 percent of site trips would travel to and from the west on Kelso Road while 45 percent would travel to and from the east on Kelso Road toward Bluff Road. The trip distribution seems reasonable.

5. ***Traffic Growth.*** The TIS uses a 2.5 percent annual growth rate for two years to account for regional growth. In addition, the TIS accounts for background traffic growth by including traffic from the nearby Jewelberry Meadows Subdivision. These assumptions account for future traffic and appear reasonable.

6. ***Analysis.*** Traffic volumes were calculated for the intersections cited in #1, above. Intersection level-of-service (LOS) was calculated for all intersections. The intersection of Kelso Road and Orient Drive is all-way stop-controlled; the other two intersections are stop-controlled with stop signs on the minor street approaches. The analyses were conducted for existing 2021 conditions, 2023 background conditions, and 2023 with the development.

   The engineer calculates that the intersection of Kelso Road with Orient Drive and the intersection of Kelso Road and Bluff Road operate at LOS B under existing conditions and will operate at LOS B under 2023 conditions with or without the development. The new proposed access and Kelso Road is calculated to operate at LOS B under 2023 conditions with the subdivision. All three intersections are calculated to meet the city's LOS D operational standard with the development of the subdivision.

7. ***Crash Information.*** The TIA provides information from ODOT on crashes for the five-year period from 2014 through 2018. There were three reported crashes at the intersection of Kelso Road and Bluff Road. The crash rate is low with no evident patterns.

   The intersection of Kelso Road and Orient Drive has a high historical crash rate with 25 reported crashes in the five-year period. The engineer notes that the intersection has recently been changed to all-way stop-control. He predicts a reduction in the crash rate. He does not recommend any other mitigation for safety issues.

8. ***Site Plan and Access.*** The site plan provides for one new access on Kelso Road and a stub street to the adjacent property to the west. No vehicular connection to the earlier phase of the subdivision to the south is proposed. The locations proposed for access appear appropriate.

9. ***Sight Distance.*** The engineer analyzed sight distance at the proposed access to Kelso Road. Based on the posted speed of 45 mph, sight distance of 500 feet is required. The engineer states that sight distance in both directions exceeds 500 feet and that sight distance is adequate.

10. ***Left-Turn Lane and Signal Warrants.*** The engineer also evaluated the need for turn lanes and addressed traffic signal warrants.

    The engineer's analysis indicates turn lane warrants and traffic signal warrants are not met for the subject intersections.

11. ***Conclusions and Recommendations.*** The engineer concludes that the study area intersections are projected to operate acceptably per City of Sandy standards through 2023 either with or without the addition of site trips from the proposed development.

    He notes that the intersection of Kelso Road and Orient Drive has a high crash rate but that it has recently been converted to all-way stop-control. He concludes that sight distance is adequate for the new access to Kelso Road. He recommends no mitigation but cautions that obstructions such as signs and landscaping should not be permitted to interfere with adequate sight distance.

    .

Ms. Emily Meharg
October 14, 2021
Page 4

Conclusion and Recommendations

Based on the information provided by the applicant, I find the TIS meets City requirements. The engineer uses appropriate data and methods in his analysis and makes reasonable conclusions and recommendations.

The TIS indicates that the study area intersections will meet applicable city operational standards. No safety mitigation is proposed. Sight distance is adequate.

If you have any questions or need any further information concerning this review, please contact me at replinger-associates@comcast.net.

Sincerely,

John Replinger

John Replinger, PE
Principal

SandyWoods2TIS101421

Exhibit O

SANDY FIRE DISTRICT NO. 72
Fire Prevention Division

E-mail Memorandum

To: Emily Meharg

From: Gary Boyles

Date: October 26, 2021

Re: Fire District Comments for Sandy Woods Phase II – 43 Lot Subdivision

---

Review and comments are based upon the current version of the Oregon Fire Code (OFC) as adopted by the Oregon Office of State Fire Marshal. The scope of this review is typically limited to fire apparatus access and water supply, although the applicant shall comply with all applicable OFC requirements. When buildings are completely protected with an approved automatic fire sprinkler system, the requirements for fire apparatus access and water supply may be modified as approved by the fire code official. References, unless otherwise specified, include provisions found in the Metro Code Committee's Fire Code Applications Guide, OFC Chapter 5 and appendices B, C and D.

COMMENTS:

General

1. Construction documents detailing compliance with fire apparatus access and fire protection water supply requirements shall be provided to Sandy Fire District for review and approval upon building permit submittal.

2. Approved fire apparatus access roadways and an approved water supply for fire protection, either temporary or permanent, shall be installed and operational prior to any combustible construction or storage of combustible materials on site in accordance with OFC Chapter 33.

3. Buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property.

Fire Apparatus Access

FIRE APPARATUS ACCESS ROAD (as defined by the OFC). A road that provides fire apparatus access from a fire station to a facility, building or portion thereof. This is a general term inclusive of all other terms such as *fire lane*, public street, private street, parking lot lane and access roadway.

1. Fire apparatus access roads shall be within 150 feet of all portions of the exterior wall of the first story of any building as measured by an approved route around the exterior of the building. An approved turnaround will be required if the remaining distance to an approved intersecting roadway, as measured along the fire apparatus access road, is greater than 150 feet.

2. Fire apparatus access roads shall have an unobstructed driving surface width of not less than 20 feet and an unobstructed vertical clearance of 13 feet 6 inches.

3. Facilities, buildings, or portions of buildings hereafter constructed shall be accessible to fire department apparatus by way of an approved fire apparatus access road with an asphalt, concrete or other approved driving surface capable of supporting the imposed load of fire apparatus weighing up to 75,000 pounds (gross vehicle weight). Documentation from a registered engineer that the final construction is in accordance with approved plans, or the requirements of the OFC may be requested.

4. The inside turning radius and outside turning radius for fire apparatus access roads shall be not less than 28 feet and 48 feet respectively, measured from the same center point.

5. Streets and roads shall be identified with approved signs. Temporary signs shall be installed at each street intersection when construction of new roadways allows passage by vehicles.

6. Where fire apparatus roadways are not of sufficient width to accommodate parked vehicles and 20 feet of unobstructed driving surface, "NO PARKING-FIRE LANE" signs shall be placed on one or both sides of the roadway and in turnarounds as needed.

Firefighting Water Supplies

1. The minimum available fire flow for one- and two-family dwellings served by a municipal water supply shall be 1,000 gpm at 20 psi residual provided the fire area of the dwelling(s) does not exceed 3,600 square feet. For dwellings that exceed 3,600 square feet, the required fire-flow shall be determined in accordance with OFC Appendix B, Table B105.1(2).

2. **Fire flow testing will be required to determine available fire flow. Testing will be the responsibility of the applicant. Applicant to contact the City of Sandy Public Works for testing information and requirements and notify the Fire Marshal prior to fire flow testing.**

3. For one- and two-family dwellings served by a municipal water system, all portions of the dwellings shall be located within 600 feet from a fire hydrant on a fire apparatus access road, as measured in an approved route that is approved by the fire code official (The intent is that not more than 600 feet of hose will have to be laid out to reach all portions of the exterior grade level of a structure).

4. Prior to the start of combustible construction, required fire hydrants shall be operational and accessible.

5. **Fire hydrants installed within the Sandy Fire District shall comply with the following requirements:**
   a. Flow requirements and location of fire hydrants will be reviewed and approved by Sandy Fire upon building permit submittal.
   b. **Each new fire hydrant installed shall be ordered in an OSHA safety red finish and have a 4-inch non-threaded metal faced hydrant connection with cap installed on the steamer port.** If a new building, structure, or dwelling is already served by an existing hydrant, the existing hydrant shall also be OSHA safety red and have a 4-inch non-threaded metal faced hydrant connection with cap installed.

6. The minimum number and distribution of fire hydrants shall be in accordance with City of Sandy requirements and OFC Appendix C.

NOTE:

Sandy Fire District comments may not be all inclusive based on information provided. A more detailed review may be needed for future development to proceed.

Please do not hesitate to contact Fire Marshal Gary Boyles at 503-891-7042 or fmboyles.sandyfire@gmail.com should you have any questions or concerns.

Exhibit P

Staff Report
City of Sandy
39250 Pioneer Blvd.,
Sandy, OR 97055

To: Planning Commission

Date: October 27, 2021

From: Sarah Richardson, Staff Liaison Parks and Trails Advisory Board

Subject: Sandy Woods Phase II

Attachments: None

I am sending this communication on behalf of the Sandy Parks and Trails Advisory Board.

The board met on August 11th, 2021 and reviewed the proposed Sandy Woods Phase II development proposal.

The 2021 Parks and Trails Master Plan states as a goal that *"Residential areas should be served by the ¼-mile service area of a mini park or the ½- mile service area of a neighborhood park".*

In their discussion the board noted that Sandy Woods Phase II is close to the ½ mile goal in its proximity to Sandy Bluff Park, which meets the criteria for a neighborhood park.

The board strongly endorses the requirement to provide pedestrian access connecting Phases I and II as it will result in a safe and direct route to Sandy Bluff Park for residents of the proposed development.

As a result of their discussion the board recommends accepting a Fee in Lieu of land dedication for the Sandy Woods Phase II development.

The board's formal recommendation, unanimously passed, reads as follows:

Motion to accept a Fee in Lieu of land dedication for the Sandy Woods Phase II proposed development. Includes the support for the requirement of the access points connecting Phase 1 and Phase II which provides direct access to Bluff Park and future trail connections.

We thank you for your consideration in this matter.

Staff Contact:
Sarah Richardson
503-489-2150
srichardson@cityofsandy.com

Exhibit Q

M E M O R A D U M

TO: EMILY MEHARG, SENIOR PLANNER
FROM: MIKE WALKER, DIRECTOR OF PUBLIC WORKS
RE: PUBLIC WORKS COMMENTS - FILE NO. 21-037 SUB/VAR TREE
DATE: OCTOBER 29, 2021

The following are Public Works' comments on the above-referenced application.

Transportation
The sole access to and from the site is via the intersection of Kelso Rd and proposed Street A. Kelso Rd. is a Clackamas County facility, the County's design standards apply to improvements adjacent to and within Kelso Rd.

The applicant's traffic impact analysis has been reviewed by the City's traffic engineer, Replinger and Associates.

The Applicant submitted a design modification request to Clackamas County to reduce sidewalk and planter strip width to minimize impacts to existing delineated wetlands on the Kelso Rd. frontage of the site west of proposed street A. The County approved the design modification to allow a five-foot-wide curb tight sidewalk adjacent to the wetland. The County also approved a design modification allowing the Kelso Rd. frontage sidewalk to terminate short of the east of the site boundary adjacent to proposed lot 53.

The County's narrative response to the design modification request indicates that the applicant requested that the sidewalk improvements on Kelso Rd. terminate five feet from the eastern property line of the site due to grading required to construct the sidewalk. The County approved this modification even though there is no mention of the sidewalk terminating short of the site boundary in the design modification request or the land use application narrative submitted by the applicant. The site plan submitted with the application shows the Kelso Rd. sidewalk improvements terminating approximately 30 feet from the eastern boundary of the site and about 10 feet from the western boundary of the site. Based on the contours shown on the existing conditions plan it does not appear that any slope easement or grading on adjacent property would be necessary to allow Kelso Rd. street frontage improvements to extend to the east boundary of the site per the requirements in section 17.84.60 Sandy Municipal Code. It does however appear that retaining walls or grading outside the right-of-way would be required to extend the Kelso Rd. sidewalk to the west boundary of the site.

The applicant shall clarify if a request to terminate the Kelso Rd. sidewalk improvements was included with the design modification request submitted to the County and if so clarify whether it was for the east or west end of the development site.

Modifications proposed to the existing pedestrian path and stormwater facility maintenance roadway in the adjacent Sandy Woods development include placing asphalt pavement over the existing crushed rock surfacing to provide a 12-foot-wide emergency vehicle access route for Sandy Woods 2.

The existing pedestrian path and stormwater facility maintenance roadway includes locked bollards at the intersection of the path with Broken Top Ave to prevent unauthorized vehicle access. The applicant shall submit a proposal to secure the new pedestrian path/stormwater maintenance and emergency vehicle access roadway from unauthorized vehicle use while still allowing emergency vehicle access.

The proposed pedestrian path/stormwater maintenance and emergency vehicle access roadway will be more than 1,000 feet long between Broken Top Ave. and the cul-de-sac bulb of proposed street A. There is pedestrian-scale lighting on the portion of the path between existing lots 30 and 31 in Sandy Woods but no illumination on the rest of the proposed route. The applicant shall submit a design for City and Fire District review to mitigate risks to pedestrians and emergency vehicles due to the lack of illumination along the route. Possible mitigation steps include reflective pavement edge striping and/or delineators; curve and chevron signage to define changes in horizontal alignment or illumination.

The pedestrian path/stormwater maintenance and emergency vehicle access roadway design shall comply with Clackamas County Interagency Fire Code Access Guide standards for width, grade, vertical clearance, load capacity, turning radii and gates. The applicant shall submit turning template diagrams for the intersection of the existing pedestrian path/stormwater maintenance roadway and Broken Top Ave. and the proposed pedestrian path/stormwater maintenance and emergency vehicle access roadway and Street A to demonstrate that the existing driveway approach at Broken Top is wide enough and to define any No Parking zones that would need to be posted to allow emergency and service vehicle access.

Utilities
The development site is proposed to be served by a single 8” diameter dead-end water line connected to the existing 12” water line in Kelso Rd. The applicant shall submit calculations demonstrating that the proposed water line will be able to furnish the required fire and domestic flows for the development.

The proposed sanitary sewer extension between Tract L and the existing sanitary sewer in Olson St. is over 1,600 feet long and includes four manholes. There is no all-weather access to the proposed sewer line. The applicant shall construct a 12-foot-wide crushed rock access roadway over the existing and proposed sewer easement between Tract L and manhole F-8 and between Olson St. and manhole F-6 to provide maintenance access for the off-site sewer line.

The stormwater management plan depicts fourteen separate flow-through planters in the proposed City right-of-way adjacent to lots 44, 45, 47, 53, 54, 63, 64, 65, 71 through 74, 76, 78, 80, 82, 83 and Tracts K, M and O. The street frontage of these lots shall include Vehicle Non-Access Reserve (VNAR) strips coincident with the flow-through planter locations to prevent the construction of driveway approaches over these areas upon development of the lots.

The stormwater detention pond in Tract L shall be fenced per the requirements in the City of Portland SWMM.

Plans for public and private sewer collection and conveyance facilities shall be submitted to the Oregon Department of Environmental Quality for review and approval per ORS Chapters 454, 468 and 4868B and OAR 340-052 and in particular OAR 340-052-0040(2).

Public utility and street plans for land use applications are submitted to comply with the requirements in 17.100.60 SMC. Land use approval does not connote approval of utility or street construction plans which are subject to a separate submittal and review process.

General
Tract L shall be dedicated to the City for stormwater management, emergency vehicle and pedestrian access. Tracts J, K, M and O shall be dedicated to the City as open space and pedestrian easements.

SANDY OREGON

Exhibit R

Rebecca Casey <rcasey@ci.sandy.or.us>

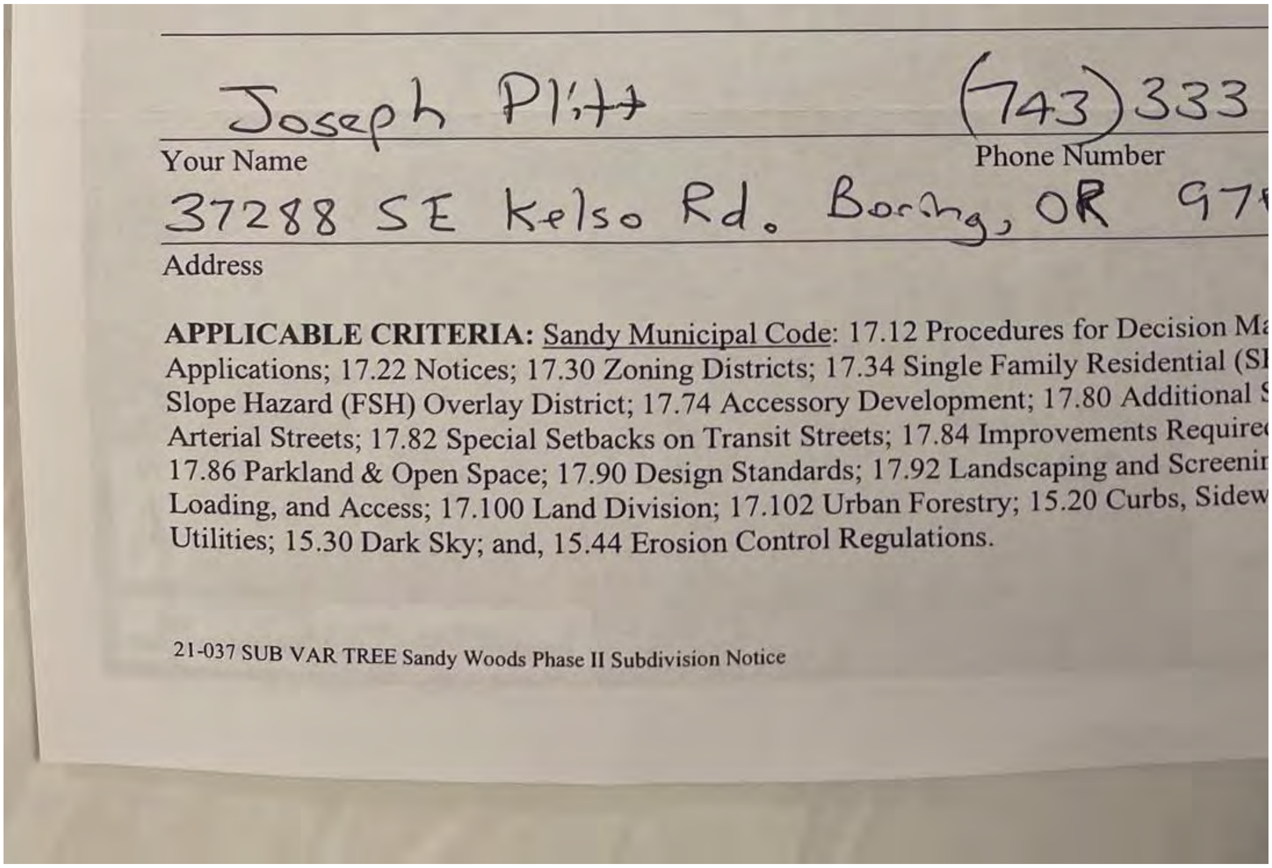
21-037 SUB/VAR/TREE
2 messages

Joseph Plitt <jlandscaping@live.com>
To: "planning@ci.sandy.or.us" <planning@ci.sandy.or.us>

COMMENT SHEET for File No. 21-037 SUB/VAR/TREE:

RE: approve with conditions.

In looking over the proposed devel
I am in favor of approving the ap
as long as the developer can insur
that new property owners will not
danger if children or other persons
to enter my property and potentiall
play with or climb or tamper wit
existing power lines. I would like
planning dept of Sandy to require
privacy fence to be installed alon
entire property line that touches
property to the East. Thank you
much. - Joseph.



Joseph Plitt (743)333

Your Name Phone Number

37288 SE Kelso Rd. Boring, OR 97

Address

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision Ma
Applications; 17.22 Notices; 17.30 Zoning Districts; 17.34 Single Family Residential (SI
Slope Hazard (FSH) Overlay District; 17.74 Accessory Development; 17.80 Additional S
Arterial Streets; 17.82 Special Setbacks on Transit Streets; 17.84 Improvements Require
17.86 Parkland & Open Space; 17.90 Design Standards; 17.92 Landscaping and Screenir
Loading, and Access; 17.100 Land Division; 17.102 Urban Forestry; 15.20 Curbs, Sidew
Utilities; 15.30 Dark Sky; and, 15.44 Erosion Control Regulations.

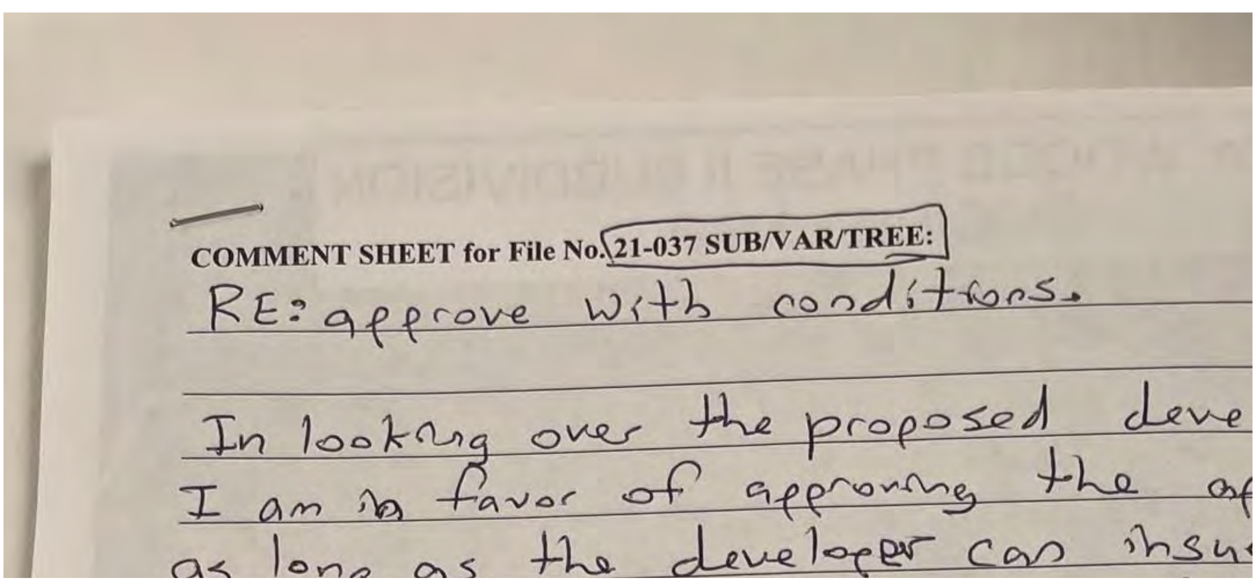
21-037 SUB VAR TREE Sandy Woods Phase II Subdivision Notice

Sent from my iPhone

Rebecca Casey <rcasey@ci.sandy.or.us>
To: Joseph Plitt <jlandscaping@live.com>
Cc: "planning@ci.sandy.or.us" <planning@ci.sandy.or.us>

Received. I'll get your comment added to the record. Thanks Joseph

On Thu, Nov 4, 2021 at 10:18 PM Joseph Plitt <jlandscaping@live.com> wrote:



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planning dept of Sandy to require
privacy fence to be installed alo
entire property line that touches
property to the East. Thank you
much. - Joseph.

Joseph Plitt (743) 333

Your Name Phone Number

37288 SE Kelso Rd. Boring, OR 97

Address

APPLICABLE CRITERIA: Sandy Municipal Code: 17.12 Procedures for Decision M
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17.86 Parkland & Open Space; 17.90 Design Standards; 17.92 Landscaping and Screen
Loading, and Access; 17.100 Land Division; 17.102 Urban Forestry; 15.20 Curbs, Side
Utilities; 15.30 Dark Sky; and, 15.44 Erosion Control Regulations.

21-037 SUB VAR TREE Sandy Woods Phase II Subdivision Notice

Sent from my iPhone

--
Rebecca Casey
Administrative Assistant

City of Sandy
Development Services Department
39250 Pioneer Blvd
Sandy, OR 97055
503-489-2160 (Direct)
rcasey@ci.sandy.or.us
Office Hours: Tuesday - Friday 9am - 4pm

Exhibit S

TERAGAN & ASSOCIATES, INC.
ARBORICULTURAL CONSULTANTS

MEMORANDUM

DATE: October 16, 2021

TO: Emily Meharg (City of Sandy)

FROM: Todd Prager, RCA #597, ISA Board Certified Master Arborist

RE: Tree Preservation and Removal Review for Sandy Woods Phase 2

This memorandum is a summary of my review of the tree preservation and removal plan for the Sandy Woods Phase 2 project.

The City of Sandy requested a third-party review of the tree preservation and removal plan for the Sandy Woods Phase 2 project to address the following items:

- Adequacy of the proposed tree protection zones; and
- General conditions of the trees to be retained.

My review is based on the excerpted plan set dated July 29, 2021 in Attachment 1 as well as the June 3 and July 13, 2021 arborist reports for the project. While I completed a site visit on October 13, 2021 to generally assess the site and trees, I did not complete a detailed assessment of individual trees at the site.

Adequacy of Proposed Tree Protection Zones
The tree protection requirements in the City of Sandy Code range from ***at least*** 10 feet from the trunks of retained trees (SDC 17.102.50.B.1) to five feet beyond the driplines (SDC 17.92.10.C).

The City of Sandy's administrative practice is to limit construction disturbances to no closer than a radius from a tree of .5 feet per inch of trunk diameter (DBH) if no more than 25 percent of the critical root protection zone area (estimated at one foot radius per inch of DBH) is impacted. Figure 1 illustrates this concept. This tree protection zone is widely accepted in the Willamette Valley to provide adequate tree protection.

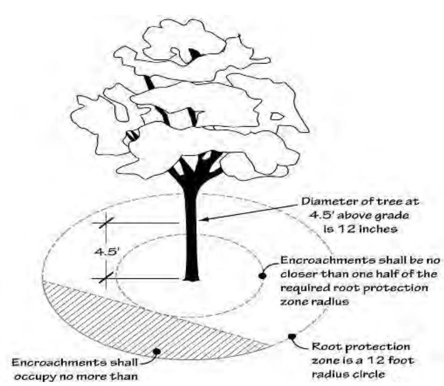


Figure 1: Typical minimum protection zone

Teragan & Associates, Inc.
3145 Westview Circle • Lake Oswego, OR 97034
Phone: 971.295.4835 • Fax: 503.697.1976
Email: todd@teragan.com • Website: teragan.com

Many of the trees to be retained do not meet the City's administrative tree protection zone shown Figure 1. However, it appears that the trees to be retained can be protected using this standard while allowing for the proposed development of the site by placing tree protection fencing in the locations shown on the plan sheets in Attachment 1.

I recommend that the applicant review the feasibility of the proposed tree protection fencing, and substantively implement the protection zones in accordance with Figure 1. The following items should be addressed if a revised tree protection plan is required:

- Will the stumps of trees to be removed that are within the tree protection zones be left in place or carefully stump ground to protect the root systems of the adjacent trees to be retained?
- Evaluate if there is adequate space for excavation of the house foundations and construction access between the proposed houses and tree protection fences on lots 47, 48, 49, 52, 53, 66, 68, 71, 82, 83, 84, and 85 as noted in Attachment 1.
- If there is not adequate space, can building envelopes be reduced to accommodate the tree protection zones? Alternatively, can the tree protection zones be modified to allow for adequate space while providing the minimum protection zones in accordance with Figure 1?
- The proposed grading appears to conflict with the protection zone of tree 2057. Can the grading be adjusted using retaining walls or other strategies to protect the tree in accordance with Figure 1?
- Evaluate if there is space for sewer line and path construction between trees 1504 and 1542 as noted in Attachment 1. If there is not space, can strategies such as boring and/or reduction of pathway width and associated grading be implemented to protect the trees in accordance with Figure 1?

Conditions of the Trees to be Retained
Section 17.102.50.A.3 of the City of Sandy Code requires:

3. Trees proposed for retention shall be healthy and likely to grow to maturity, and be located to minimize the potential for blow-down following the harvest.

The City of Sandy's administrative practice has been to require retention trees to be in "good" or "very good" health condition on a scale of very good, good, fair, poor, or dead/dying.

The tree plan rates trees as either "viable" or not viable, and the July 13, 2021 arborist report defines viable trees as "…in fair to very good condition…" However, the City's administrative practice has been to exclude trees in fair condition from eligibility as retention trees. Based on my general review of the trees during my site visit, I observed trees in less than good health condition that would not meet the City's typical preservation tree standards. In particular, there are red alders (*Alnus*

Teragan & Associates, Inc.
3145 Westview Circle • Lake Oswego, OR 97034
Phone: 971.295.4835 • Fax: 503.697.1976
Email: todd@teragan.com • Website: teragan.com

rubra) and other species that have struggled with extreme weather events that may have occurred following the initial tree assessment for the project.

Therefore, the City may require a reassessment of the tree conditions to ensure there are at least 117 retention trees that are in good condition. If a reassessment of tree conditions is required, I recommend focusing the reassessment on the trees to be retained of the edges of the lots to be occupied by houses. In addition to a health assessment, I recommend including an assessment of the structural conditions of the trees to evaluate their stability considering adjacent tree removals and potential increased wind exposure.

Conclusion

Based on my review of the proposed tree plan for the Sandy Woods Phase 2 project, I recommend the following:

- Provide a revised tree protection plan that meet's the City's typical tree protection zone requirements in Figure 1; and
- Reassess the health and structural conditions of the trees to be retained adjacent to the proposed lots to be developed to ensure there are at least 117 retention trees in good health condition that are structurally sound.

Please contact me if you have questions, concerns, or need any additional information.

Sincerely,

Todd Prager

Todd Prager
ASCA Registered Consulting Arborist
ISA Board Certified Master Arborist, WE-6723B
ISA Qualified Tree Risk Assessor
AICP, American Planning Association

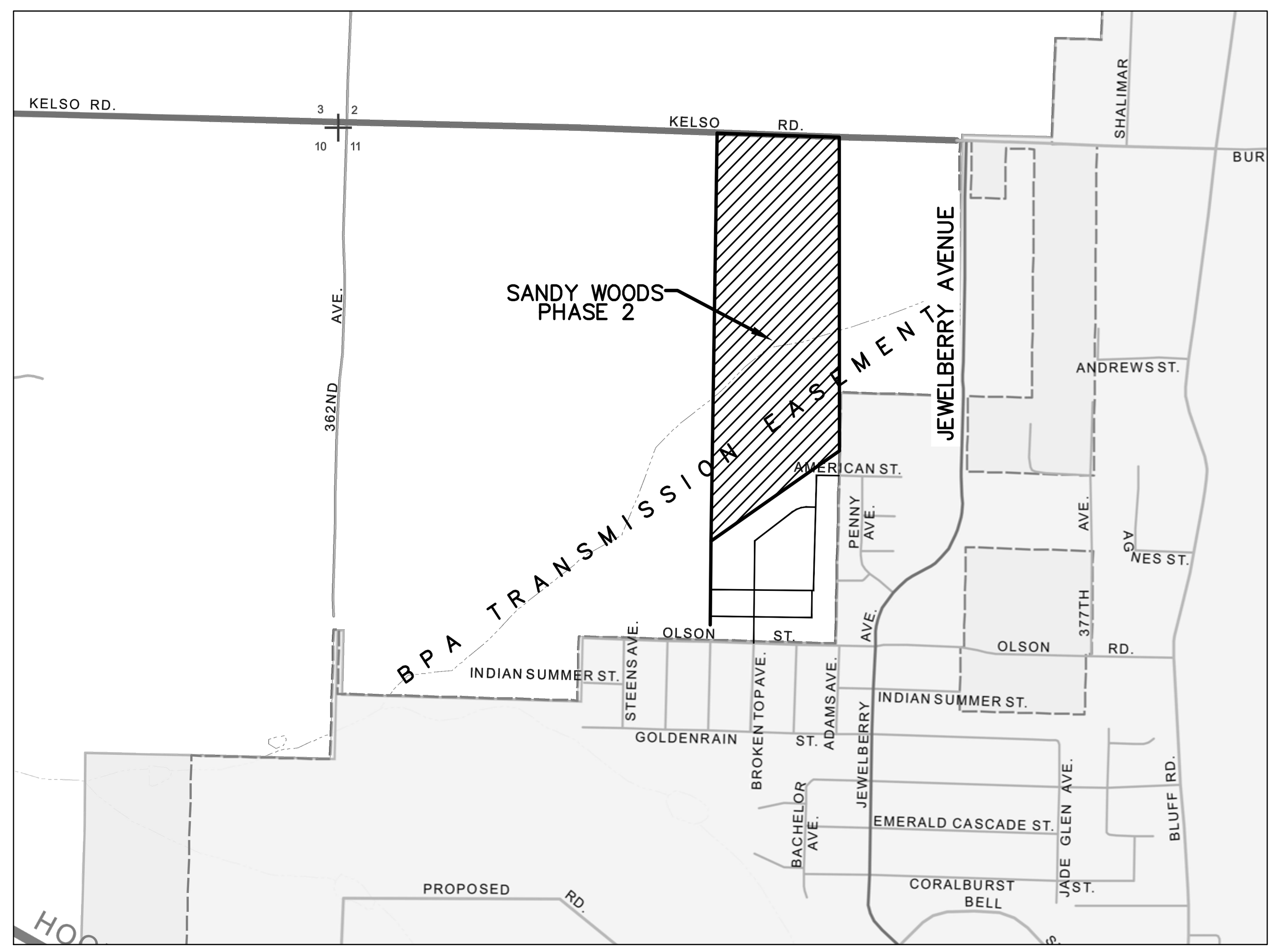
Attachment 1 – Excerpted Site Plans with Redlines

Attachment 1

TENTATIVE PLANS FOR SANDY WOODS 2

CITY OF SANDY, CLACKAMAS COUNTY, OREGON

JUNE, 2021



INDEX

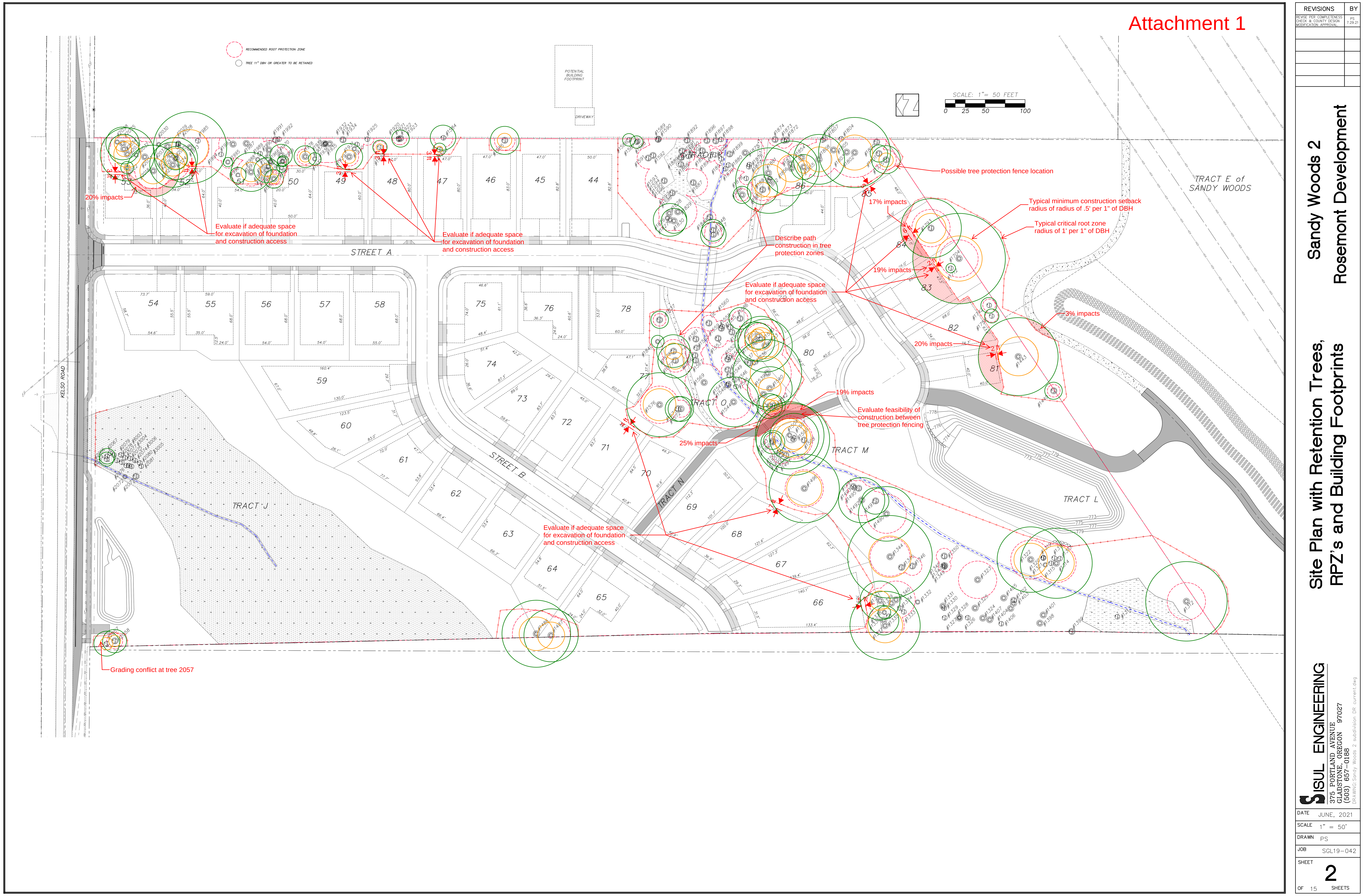
OWNER:

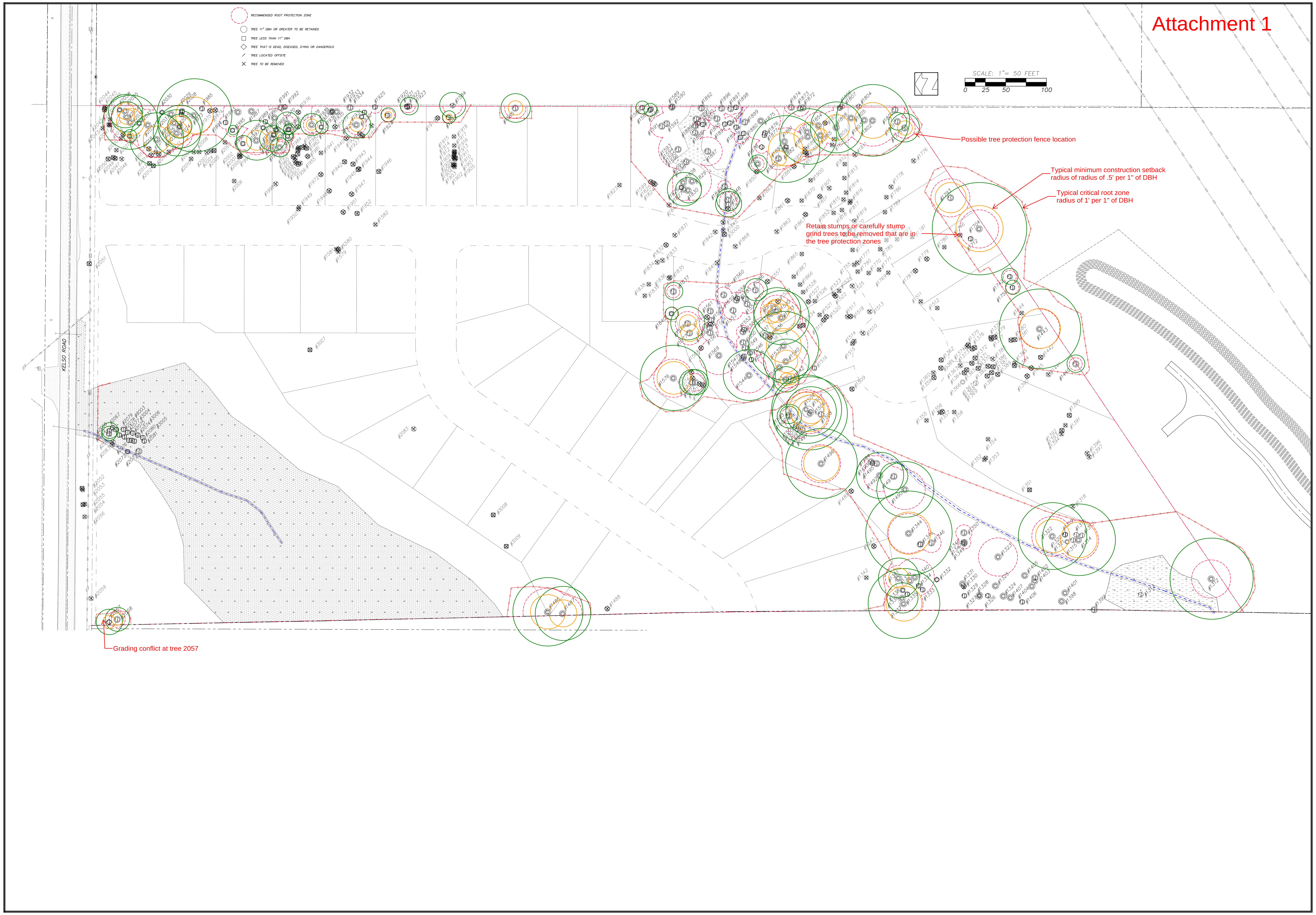
Silver V Construction
10117 SE SUNNYSIDE RD, SUITE F1178
CLACKAMAS, OR 97015
EMAIL: rosemontdevelopment@gmail.com
PHONE: 503-351-4747

ENGINEER:

SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

MOST RECENT REVISION TO THIS SET OF PLANS:
7/29/2021


Attachment 1
REVISIONS
BY
Sandy Woods 2
Rosemont Development
Site Plan with Retention Trees, RPZ's and Building Footprints
SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188
DATE JUNE, 2021
SCALE 1" = 50'
DRAWN PS
JOB SGL19-042
SHEET 2
OF 15 SHEETS
SCALE: 1" = 50 FEET
0 25 50 100
STREET A
STREET B
KELSO ROAD
TRACT J
TRACT L
TRACT M
TRACT N
TRACT O
TRACT E of SANDY WOODS
20% impacts
Evaluate if adequate space for excavation of foundation and construction access
Possible tree protection fence location
17% impacts
Typical minimum construction setback radius of radius of .5' per 1" of DBH
Typical critical root zone radius of 1' per 1" of DBH
Describe path construction in tree protection zones
19% impacts
3% impacts
Evaluate feasibility of construction between tree protection fencing
25% impacts
Grading conflict at tree 2057



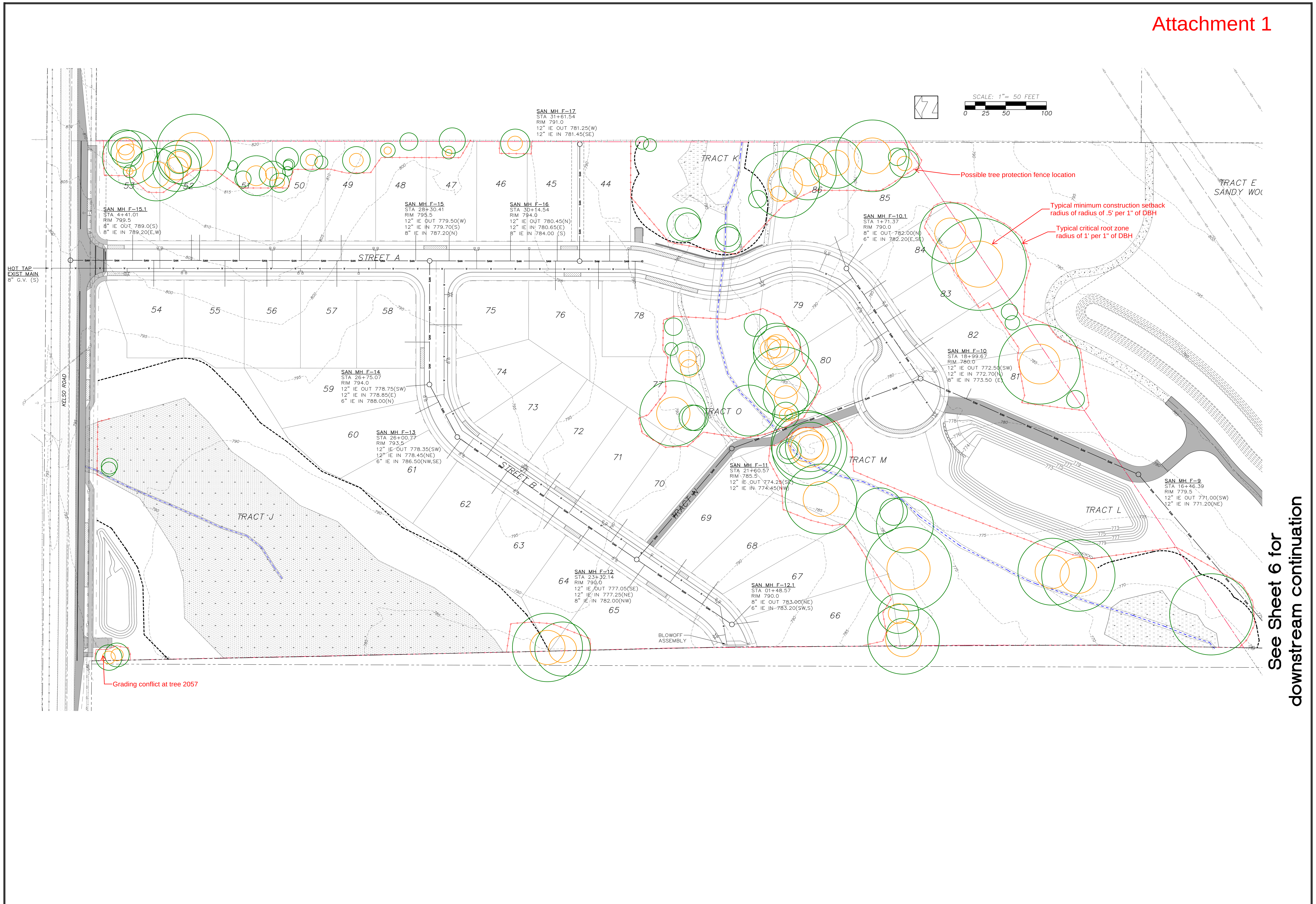
REVISIONS	BY

Sandy Woods 2
Rosemont Development

Tree Retention/Removal Plan

SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

DATE	JUNE, 2021
SCALE	1" = 50'
DRAWN	PS
JOB	SGL19-042
SHEET	4
OF 15	SHEETS



See Sheet 6 for downstream continuation

REVISIONS	BY
REVISE PER COMPLETENESS CHECK & COUNTY DESIGN MODIFICATION APPROVAL	PS 7.29.21

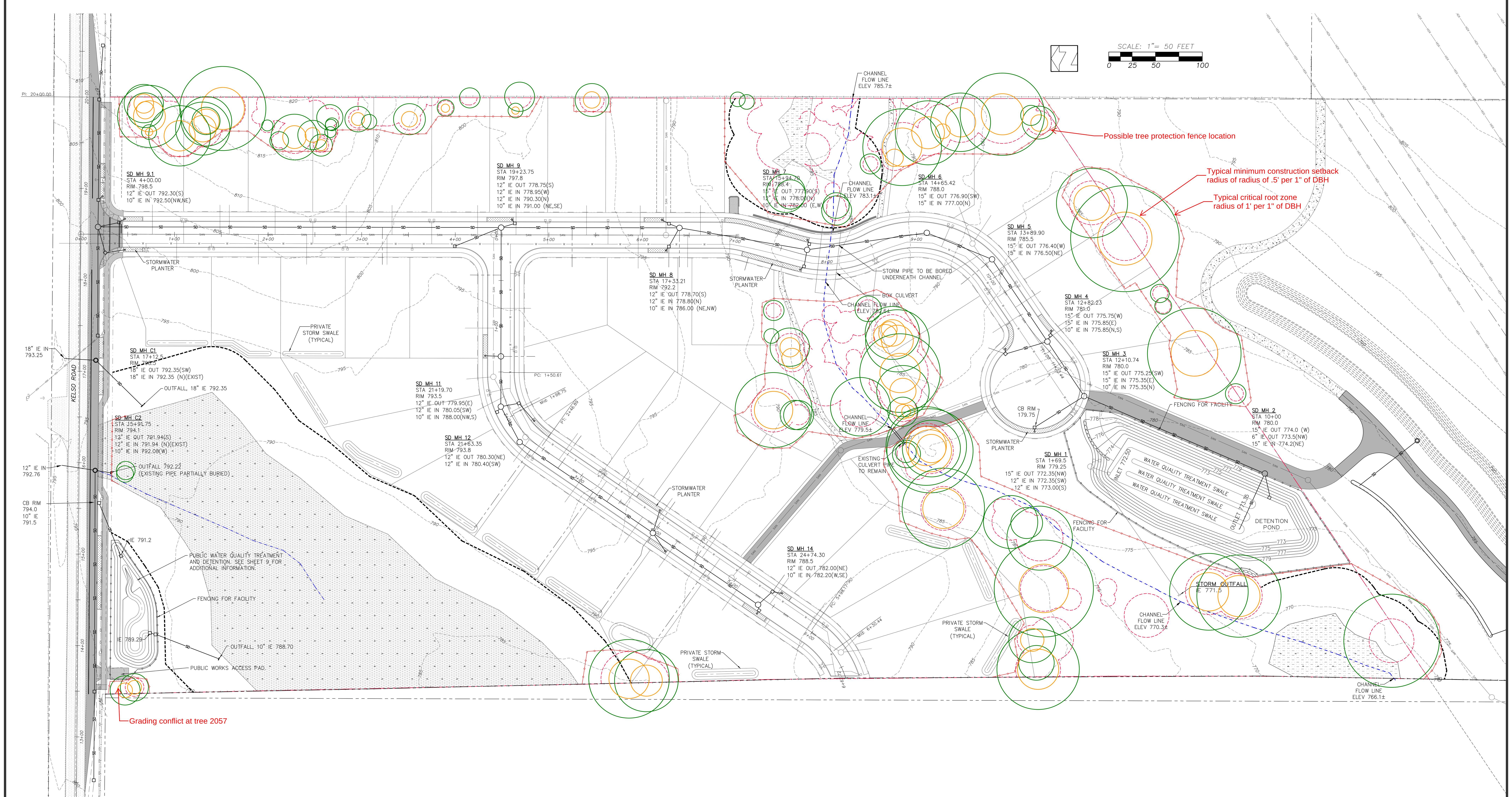
Sandy Woods 2
Rosemont Development

Onsite Sanitary and Water Plan

SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

DATE MAY, 2021
SCALE 1" = 50'
DRAWN PS
JOB SGL19-042
SHEET 7
OF 15 SHEETS

Attachment 1



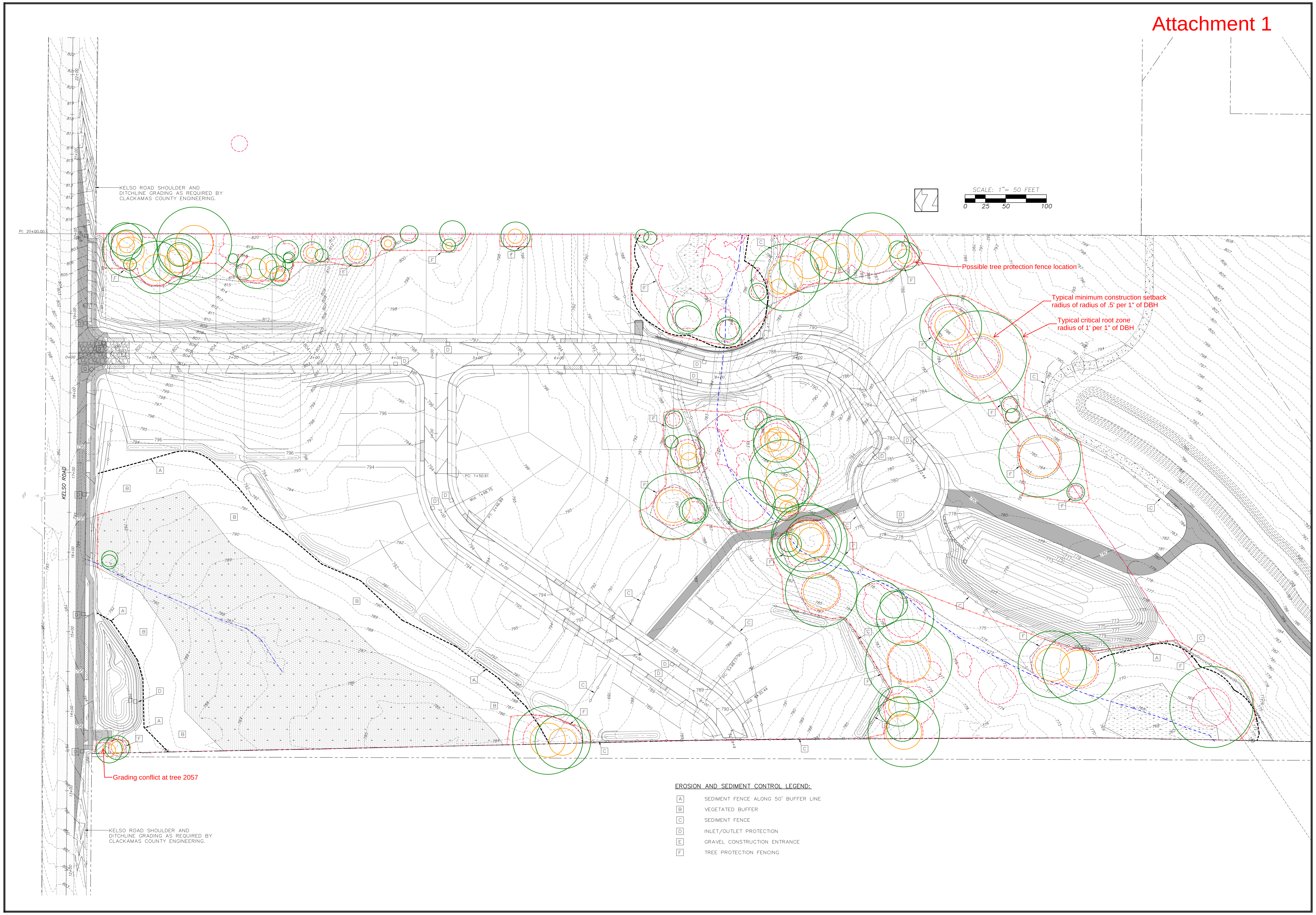
REVISIONS	BY
REVISE PER COMPLETENESS CHECK & COUNTY DESIGN MODIFICATION APPROVAL	PS 7.29.21

Sandy Woods 2 Rosemont Development

Storm Drain Plan

SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

DATE	JUNE, 2021
SCALE	1" = 50'
DRAWN	PS
JOB	SGL19-042
SHEET	8
OF 15	SHEETS



REVISIONS	BY
REVISE PER COMPLETENESS CHECK & COUNTY DESIGN MODIFICATION APPROVAL	PS 7.29.21

Sandy Woods 2
Rosemont Development

Grading and ESC Plan

SISUL ENGINEERING
375 PORTLAND AVENUE
GLADSTONE, OREGON 97027
(503) 657-0188

DATE JUNE, 2021
SCALE 1" = 50'
DRAWN PS
JOB SGL19-042
SHEET 12
OF 15 SHEETS