

Appendix # 3
Tree Inventory
Erickson Elementary School Site

NO.	COMMON NAME	BOTANICAL NAME	DBH	COND.	STRUC.	COMMENTS	HAZARD TREE
2298	Douglas Fir	<i>Pseudotsuga menziesii</i>	15	Good	Good		
2298.1	Douglas Fir	<i>Pseudotsuga menziesii</i>	6	Poor	Poor	Suppressed. 3' E. #2298, 5' S. #2300.	
2299	Douglas Fir	<i>Pseudotsuga menziesii</i>	20	Good	Fair	2 leaders with bark inclusion at 15' above ground.	
2300	Douglas Fir	<i>Pseudotsuga menziesii</i>	8	Poor	Poor	Broken top. Suppressed.	
2301	Douglas Fir	<i>Pseudotsuga menziesii</i>	8	Poor	Poor	Suppressed.	
2302	Douglas Fir	<i>Pseudotsuga menziesii</i>	8	Poor	Poor	Suppressed.	
2303	Douglas Fir	<i>Pseudotsuga menziesii</i>	18	Good	Good		
2304	Douglas Fir	<i>Pseudotsuga menziesii</i>	10	Poor	Poor	Broken top. Suppressed.	
2305	Douglas Fir	<i>Pseudotsuga menziesii</i>	15	Good	Good		
2306	Douglas Fir	<i>Pseudotsuga menziesii</i>	13	Poor	Fair	Broken top.	
2307	Douglas Fir	<i>Pseudotsuga menziesii</i>	11	Fair	Fair	Dogleg at 40' above ground.	
2308	Douglas Fir	<i>Pseudotsuga menziesii</i>	12	Poor	Fair	Broken top.	
2309	Douglas Fir	<i>Pseudotsuga menziesii</i>	9	Fair	Fair	Sweep in lower trunk. Croked top.	
NOTE: The grove including trees numbered 2223 through 2309 includes many suppressed and dead trees smaller than 6' diameter which							
2311	Douglas Fir	<i>Pseudotsuga menziesii</i>	31	Fair	Fair	Old brokentop with new leader.	
2312	Douglas Fir	<i>Pseudotsuga menziesii</i>	26	Fair	Fair	Old brokentop with new leader.	
2313	Douglas Fir	<i>Pseudotsuga menziesii</i>	37	Good	Good	Old brokentop with new leader.	

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NO.	COMMON NAME	BOTANICAL NAME	DBH	COND.	STRUC.	COMMENTS	HAZARD TREE
2314	Douglas Fir	<i>Pseudotsuga menziesii</i>	30	Fair	Fair	Broken top.	
2315	Douglas Fir	<i>Pseudotsuga menziesii</i>	30	Fair	Fair	Old brokentop with new leader.	
2316	Douglas Fir	<i>Pseudotsuga menziesii</i>	21	Fair	Fair	Broken top.	
2317	Douglas Fir	<i>Pseudotsuga menziesii</i>	27	Fair	Fair	Broken top.	
2318	Douglas Fir	<i>Pseudotsuga menziesii</i>	32	Poor	Fair	Broken top. Thin crown	
2319	Douglas Fir	<i>Pseudotsuga menziesii</i>	11	Fair	Poor		
2320	Red Alder	<i>Pseudotsuga menziesii</i>	14	Poor	Poor	Dead top.	
2321	Red Alder	<i>Pseudotsuga menziesii</i>	13	Poor	Poor	Dead top.	
2322	Douglas Fir	<i>Pseudotsuga menziesii</i>	30	Fair	Fair		
2323	Douglas Fir	<i>Pseudotsuga menziesii</i>	26	Fair	Fair		
2324	Douglas Fir	<i>Pseudotsuga menziesii</i>	27	Fair	Fair		
2325	Grand Fir	<i>Abies grandis</i>	15	Good	Good		
2326	Douglas Fir	<i>Pseudotsuga menziesii</i>	40	Very Poor	Fair	12"x12" cavity from ground on W. side. Tree appears to be hollow. Remove?	1
2327	Douglas Fir	<i>Pseudotsuga menziesii</i>	12	Fair	Fair		
2328	Douglas Fir	<i>Pseudotsuga menziesii</i>	30	Fair	Fair	Dogleg at 40' above ground. Old lost top.	
2329	Douglas Fir	<i>Pseudotsuga menziesii</i>	36	Very Poor	Fair	12"x48" cavity from ground on S.side. Remove.	1
2330	Red Alder	<i>Alnus rubra</i>	22	Very Poor	Good	8"x72" cavity from ground on N. side. Remove.	1
2331	English Holly	<i>Ilex aquifolium</i>	10	Good	Good		

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NO.	COMMON NAME	BOTANICAL NAME	DBH	COND.	STRUC.	COMMENTS	HAZARD TREE
2332	Douglas Fir	<i>Pseudotsuga menziesii</i>	40	Fair	Good	Old broken with new leader.	
2333	Douglas Fir	<i>Pseudotsuga menziesii</i>	34	Fair	Fair	Old broken with new leader.	
2334	Douglas Fir	<i>Pseudotsuga menziesii</i>	18	Fair	Fair	Old broken with new leader.	
2335	Douglas Fir	<i>Pseudotsuga menziesii</i>	38	Good	Good	2 stems at 9' above ground.	
2336	Douglas Fir	<i>Pseudotsuga menziesii</i>	40	Good	Good		
2337	Sweet Cherry	<i>Prunus avium</i>	10	Good	Good		
2338	Douglas Fir	<i>Pseudotsuga menziesii</i>	15	Poor	Poor	Broken top.	
2339	Douglas Fir	<i>Pseudotsuga menziesii</i>	28	Fair	Fair	Old broken with new leader.	
2340	Douglas Fir	<i>Pseudotsuga menziesii</i>	36	Fair	Fair	Old broken with new leader.	
2341	Douglas Fir	<i>Pseudotsuga menziesii</i>	24	Fair	Fair	Old broken with new leader.	
2342	Douglas Fir	<i>Pseudotsuga menziesii</i>	35	Fair	Fair	Old broken with new leader.	
2343	Douglas Fir	<i>Pseudotsuga menziesii</i>	16	Fair	Fair		
2344	Red Alder	<i>Pseudotsuga menziesii</i>	7	Good	Good		
2345	Douglas Fir	<i>Pseudotsuga menziesii</i>	36	Fair	Fair	Unusual butt swell. Needs further inspection.	
2346	Douglas Fir	<i>Pseudotsuga menziesii</i>	58	Good	Good	Old broken with new leader.	
2347	Douglas Fir	<i>Pseudotsuga menziesii</i>	36	Fair	Fair	Old broken with new leader.	
2348	Douglas Fir	<i>Pseudotsuga menziesii</i>	24	Fair	Fair	Old broken with new leader.	

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NO.	COMMON NAME	BOTANICAL NAME	DBH	COND.	STRUC.	COMMENTS	HAZARD TREE
2349	Douglas Fir	<i>Pseudotsuga menziesii</i>	12	Fair	Fair		
2350	Douglas Fir	<i>Pseudotsuga menziesii</i>	12	Poor	Poor	Lost top.	
2351	Douglas Fir	<i>Pseudotsuga menziesii</i>	24	Good	Fair		
2352	Douglas Fir	<i>Pseudotsuga menziesii</i>	16	Fair	Fair		
2353	Douglas Fir	<i>Pseudotsuga menziesii</i>	32	Good	Fair		
2354	Douglas Fir	<i>Pseudotsuga menziesii</i>	8	Fair	Fair		
2355	Douglas Fir	<i>Pseudotsuga menziesii</i>	10	Good	Fair		
2356	Red Alder	<i>Alnus rubra</i>	9	Very Poor	Poor	Dead top. Remove.	1
2357	Red Alder	<i>Alnus rubra</i>	10	Dead		Remove.	1
2359	Douglas Fir	<i>Pseudotsuga menziesii</i>	30	Fair	Fair	Lost top.	
2360	Douglas Fir	<i>Pseudotsuga menziesii</i>	30	Fair	Fair	Lost top.	
2361	Douglas Fir	<i>Pseudotsuga menziesii</i>	16	Fair	Fair	Lost top.	
2362	Douglas Fir	<i>Pseudotsuga menziesii</i>	24	Fair	Good	Lost top.	
2363	Douglas Fir	<i>Pseudotsuga menziesii</i>	20	Fair	Fair	Doglegs in	
2364	Douglas Fir	<i>Pseudotsuga menziesii</i>	23	Fair	Fair	Trunk at 20' above ground.	
2365	Douglas Fir	<i>Pseudotsuga menziesii</i>	16	Poor	Poor	Lost top.	
2366	Douglas Fir	<i>Pseudotsuga menziesii</i>	15	Poor	Poor	Lost top.	
2367	Douglas Fir	<i>Pseudotsuga menziesii</i>	15	Fair	Fair	Lost top.	

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NO.	COMMON NAME	BOTANICAL NAME	DBH	COND.	STRUC.	COMMENTS	HAZARD TREE
2368	Douglas Fir	<i>Pseudotsuga menziesii</i>	27	Fair	Fair	Lost top.	
2369	Douglas Fir	<i>Pseudotsuga menziesii</i>	32	Good	Fair	Lost top.	
2370	Willow	<i>Salix sp.</i>	17	Fair	Fair	5 stems 6,7,8,8,8	
2371	Red Alder	<i>Alnus rubra</i>	15	Good	Good		
2372	Douglas Fir	<i>Pseudotsuga menziesii</i>	38	Good	Fair	Lost top.	
2373	Red Alder	<i>Alnus rubra</i>	14	Good	Good		
2374	Red Alder	<i>Alnus rubra</i>	18	Good	Good		
2375	Oregon Ash	<i>Fraxinus latifolia</i>	8	Good	Good		
2376	Douglas Fir	<i>Pseudotsuga menziesii</i>	34	Fair	Fair	Old broken with new leader.	
2377	Oregon Ash	<i>Fraxinus latifolia</i>	9	Very Poor	Very Poor	Is a live stem on a fallen Ash.	1
2378	Oregon Ash	<i>Fraxinus latifolia</i>	24	Fair	Fair	Over mature.	
2379	Oregon Ash	<i>Fraxinus latifolia</i>	28	Very Poor	Very Poor	3 stems 12,20,16. Large cavities in 12" and 20" stems.	1
2380	English Holly	<i>Ilex aquifolium</i>	11	Good	Good	2 stems 8,8.	
2381	Common Hawthorn	<i>Crataegus monogyna</i>	16	Fair	Fair	Measured at 1' above ground.	
2382	Oregon Ash	<i>Fraxinus latifolia</i>	61	Fair	Poor	4 stems 14,30,27,22. 27" stem has 7"x40" cavity on N. side and is hollow. Remove. 14" stem has 6"x15' cavity starting at 30" above ground. Remove.	
2383	Oregon Ash	<i>Fraxinus latifolia</i>	25	Fair	Poor	2 stems 15, 20. Over mature.	
2384	Oregon White Oak	<i>Quercus garryana</i>	30	Good	Good		
2385	Willow	<i>Salix sp.</i>	22	Very Poor	Fair	5"x30" cavity from ground on S. side. Lower bole is hollow.	1
2386	Willow	<i>Salix sp.</i>	36	Very Poor	Very Poor	Severe decay in trunk. Trunk is hollow. Remove.	1
2387	Willow	<i>Salix sp.</i>	24	Very Poor	Very Poor	Main stem has failed at 6' above ground and is laying on ground.	1
2388	Willow	<i>Salix sp.</i>	8	Very Poor	Very Poor	Severe decay.	1

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NO.	COMMON NAME	BOTANICAL NAME	DBH	COND.	STRUC.	COMMENTS	HAZARD TREE
2389	Willow	<i>Salix sp.</i>	18	Very Poor	Very Poor	Severe decay.	1
2390	Willow	<i>Salix sp.</i>	11	Very Poor	Very Poor	Severe decay.	1
2391	Willow	<i>Salix sp.</i>	23	Very Poor	Very Poor	Severe decay.	1
2392	Willow	<i>Salix sp.</i>	16	Very Poor	Very Poor	Severe decay.	1
2393	Willow	<i>Salix sp.</i>	30	Very Poor	Very Poor	Severe decay. Uprotted.	1
2394	Douglas Hawthorn	<i>Crataegus douglasii</i>	20	Very Poor	Very Poor	6 stems 7,7,7,11,6,7. Severe decay. Remove.	1
2395	Douglas Fir	<i>Pseudotsuga menziesii</i>	28	Fair	Fair	Lost top.	
2396	Douglas Fir	<i>Pseudotsuga menziesii</i>	30	Fair	Fair	Dogleg at 60' above ground.	
2397	Common Hawthorn	<i>Crataegus monogyna</i>	17	Fair	Fair	Measured at 2' above ground.	
2398	Oregon Ash	<i>Fraxinus latifolia</i>	8	Poor	Fair	Dead top.	
2399	Willow	<i>Salix sp.</i>	23	Very Poor	Poor	2 stems 16, 16. Decayed. Remove.	1
2400	Douglas Fir	<i>Pseudotsuga menziesii</i>	24	Fair	Fair	Lost top.	
2402	Douglas Fir	<i>Pseudotsuga menziesii</i>	24	Fair	Fair	Broken top.	
2403	Douglas Fir	<i>Pseudotsuga menziesii</i>	18	Fair	Fair	Broken top.	
2404	Douglas Fir	<i>Pseudotsuga menziesii</i>	26	Fair	Fair	Broken top.	
2405	Douglas Fir	<i>Pseudotsuga menziesii</i>	30	Fair	Fair	Broken top.	
2406	Douglas Fir	<i>Pseudotsuga menziesii</i>	30	Dead		20' tall stub.	1
2407	Douglas Fir	<i>Pseudotsuga menziesii</i>	25	Fair	Fair	Broken top.	
2408	Douglas Fir	<i>Pseudotsuga menziesii</i>	29	Fair	Fair	Broken top.	
2409	Douglas Fir	<i>Pseudotsuga menziesii</i>	17	Fair	Fair	Broken top.	

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NO.	COMMON NAME	BOTANICAL NAME	DBH	COND.	STRUC.	COMMENTS	HAZARD TREE
2410	Douglas Fir	<i>Pseudotsuga menziesii</i>	37	Fair	Fair	Broken top.	
2411	Douglas Fir	<i>Pseudotsuga menziesii</i>	19	Poor	Poor	Broken top.	
2412	Douglas Fir	<i>Pseudotsuga menziesii</i>	24	Fair	Fair	Broken top.	
2413	Douglas Fir	<i>Pseudotsuga menziesii</i>	12	Poor	Poor	Broken top.	
2414	Douglas Fir	<i>Pseudotsuga menziesii</i>	22	Fair	Fair	Broken top.	
2415	Douglas Fir	<i>Pseudotsuga menziesii</i>	18	Good	Good		
2416	Douglas Fir	<i>Pseudotsuga menziesii</i>	30	Good	Good		
2417	Douglas Fir	<i>Pseudotsuga menziesii</i>	28	Good	Good		
2418	Douglas Fir	<i>Pseudotsuga menziesii</i>	12	Dead		Remove.	1
2419	Douglas Fir	<i>Pseudotsuga menziesii</i>	30	Good	Good		
2420	Douglas Fir	<i>Pseudotsuga menziesii</i>	24	Good	Good		
2421	Douglas Fir	<i>Pseudotsuga menziesii</i>	23	Good	Good		
2422	Douglas Fir	<i>Pseudotsuga menziesii</i>	28	Fair	Fair	Brokentop.	
2423	Douglas Fir	<i>Pseudotsuga menziesii</i>	27	Fair	Fair	Brokentop.	
2424	Douglas Fir	<i>Pseudotsuga menziesii</i>	40	Fair	Fair	Brokentop.	
2425	Willow	<i>Salix sp.</i>	24	Very Poor	Poor	Decay.	1
2426	Oregon Ash	<i>Fraxinus latifolia</i>	21	Fair	Poor	2 stems 16,14.	
2427	Willow	<i>Salix sp.</i>	11	Fair	Fair		
2428	Willow	<i>Salix sp.</i>	24	Very Poor	Very Poor	Decay.	1

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NO.	COMMON NAME	BOTANICAL NAME	DBH	COND.	STRUC.	COMMENTS	HAZARD TREE
2429	Oregon Ash	<i>Fraxinus latifolia</i>	16	Good	Good		
2430	Oregon Ash	<i>Fraxinus latifolia</i>	7	Fair	Fair		
2432	Douglas Fir	<i>Pseudotsuga menziesii</i>	22	Fair	Fair		
2433	Douglas Fir	<i>Pseudotsuga menziesii</i>	16	Fair	Fair		
2434	Douglas Fir	<i>Pseudotsuga menziesii</i>	40	Good	Good		
2435	Douglas Fir	<i>Pseudotsuga menziesii</i>	20	Good	Good		
2436	Douglas Fir	<i>Pseudotsuga menziesii</i>	26	Fair	Fair		
2437	Douglas Fir	<i>Pseudotsuga menziesii</i>	10	Dead		Remove.	1
2438	Douglas Fir	<i>Pseudotsuga menziesii</i>	19	Fair	Fair		
2439	Douglas Fir	<i>Pseudotsuga menziesii</i>	26	Good	Good		
2440	Douglas Fir	<i>Pseudotsuga menziesii</i>	17	Fair	Fair		
2441	Douglas Fir	<i>Pseudotsuga menziesii</i>	18	Very Poor	Fair	7"x48" cavity from ground on S. side. Remove.	1
2442	Douglas Fir	<i>Pseudotsuga menziesii</i>	9	Poor	Fair	Suppressed.	
2443	Douglas Fir	<i>Pseudotsuga menziesii</i>	12	Poor	Fair	Suppressed.	
2444	Douglas Fir	<i>Pseudotsuga menziesii</i>	24	Fair	Fair		
2445	Douglas Fir	<i>Pseudotsuga menziesii</i>	27	Good	Good		
2446	Douglas Fir	<i>Pseudotsuga menziesii</i>	14	Good	Good		
2446.1	Vine Maple	<i>Acer circinatum</i>	7	Good	Fair	4' N. #2446.	

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NO.	COMMON NAME	BOTANICAL NAME	DBH	COND.	STRUC.	COMMENTS	HAZARD TREE
2447	Douglas Fir	<i>Pseudotsuga menziesii</i>	24			Sweep in lower trunk. Leans N.	
2448	Douglas Fir	<i>Pseudotsuga menziesii</i>	32	Good	Good		
2449	Douglas Fir	<i>Pseudotsuga menziesii</i>	24	Poor	Poor	Broken top at 70' above ground .	
2450	Douglas Fir	<i>Pseudotsuga menziesii</i>	14	Poor	Fair	Somewhat suppressed.	
2451	Douglas Fir	<i>Pseudotsuga menziesii</i>	24	Good	Good		
2452	Douglas Fir	<i>Pseudotsuga menziesii</i>	22	Poor	Poor	Lost top.	
2453	Douglas Fir	<i>Pseudotsuga menziesii</i>	31	Good	Good		
2454	Douglas Fir	<i>Pseudotsuga menziesii</i>	40	Good	Good		
2455	Douglas Fir	<i>Pseudotsuga menziesii</i>	36	Good	Good		
2456	Douglas Fir	<i>Pseudotsuga menziesii</i>	16	Fair	Fair		
2457	Douglas Fir	<i>Pseudotsuga menziesii</i>	24	Fair	Fair		
2458	Douglas Fir	<i>Pseudotsuga menziesii</i>	11	Poor	Poor		
2459	Douglas Fir	<i>Pseudotsuga menziesii</i>	9	Poor	Poor		
2460	Douglas Fir	<i>Pseudotsuga menziesii</i>	22	Fair	Fair	Broken top.	
2461	Douglas Fir	<i>Pseudotsuga menziesii</i>	21	Fair	Fair	Broken top.	
2462	Douglas Fir	<i>Pseudotsuga menziesii</i>	18	Fair	Fair	Broken top.	
2463	Douglas Fir	<i>Pseudotsuga menziesii</i>	11	Poor	Poor	Broken top.	

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NO.	COMMON NAME	BOTANICAL NAME	DBH	COND.	STRUC.	COMMENTS	HAZARD TREE
2464	Douglas Fir	<i>Pseudotsuga menziesii</i>	25	Good	Good		
2465	Douglas Fir	<i>Pseudotsuga menziesii</i>	17	Fair	Fair	Broken top.	
2466	Douglas Fir	<i>Pseudotsuga menziesii</i>	15	Fair	Fair	Broken top.	
2467	Douglas Fir	<i>Pseudotsuga menziesii</i>	23	Fair	Fair	Broken top.	
2468	Douglas Fir	<i>Pseudotsuga menziesii</i>	20	Fair	Fair	Broken top.	
2469	Douglas Fir	<i>Pseudotsuga menziesii</i>	43	Good	Good		
2470	Douglas Fir	<i>Pseudotsuga menziesii</i>	24	Fair	Good		
2471	Douglas Fir	<i>Pseudotsuga menziesii</i>	12	Fair	Fair		
2472	Douglas Fir	<i>Pseudotsuga menziesii</i>	24	Good	Good		
2473	Douglas Fir	<i>Pseudotsuga menziesii</i>	30	Good	Good		
2474	Douglas Fir	<i>Pseudotsuga menziesii</i>	36	Fair	Good	Dogleg in top.	
2475	Douglas Fir	<i>Pseudotsuga menziesii</i>	18	Fair	Fair		
2476	Douglas Fir	<i>Pseudotsuga menziesii</i>	11	Poor	Poor	Suppressed.	
2477	Douglas Fir	<i>Pseudotsuga menziesii</i>	11	Poor	Poor	Suppressed.	
2478	Douglas Fir	<i>Pseudotsuga menziesii</i>	11	Poor	Poor	Suppressed.	
2479	Douglas Fir	<i>Pseudotsuga menziesii</i>	32	Good	Good		
2480	Douglas Fir	<i>Pseudotsuga menziesii</i>	27	Good	Good		

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2481	Douglas Fir	<i>Pseudotsuga menziesii</i>	8	Poor	Poor	Suppressed.	
2482	Douglas Fir	<i>Pseudotsuga menziesii</i>	12	Poor	Poor	Lost top.	
2535	Douglas Fir	<i>Pseudotsuga menziesii</i>	37	Fair	Fair	Old broken top.	
2536	Oregon White Oak	<i>Quercus garryana</i>	20	Fair	Good		
2537	Oregon Ash	<i>Fraxinus latifolia</i>	22/30	Dead		Hazard or habitat?	1
2820	Western Red Cedar	<i>Thuja plicata</i>	15/18	Fair	Fair	Leader broken out at 10' above ground in south stem.	
2821	English Walnut	<i>Juglans regia</i>	12	Poor	Fair	Thin crown.	
2822	English Walnut	<i>Juglans regia</i>	15	Poor	Fair	Thin crown.	
2823	English Walnut	<i>Juglans regia</i>	12	Poor	Fair	Thin crown.	
2824	English Walnut	<i>Juglans regia</i>	15	Poor	Fair	Thin crown.	
2825	English Walnut	<i>Juglans regia</i>	13	Poor	Fair	Thin crown.	
2826	English Walnut	<i>Juglans regia</i>	15	Poor	Fair	Thin crown.	
2827	Comon Hawthorn	<i>Crataegus monogyna</i>	10	Fair	Fair	5 stems 4,4,4,5,4.	
2890	European White Birch	<i>Betulus pendula</i>	16	Very Poor	Fair	Dead top. 3" dia. cavity at 10' above ground on S. side. Remove.	1
2890.1	Japanese Maple	<i>Acer palmatum</i>	8	Good	Good	8' N. #2890.	
2891	Deodar Cedar	<i>Cedrus deodara</i>	39	Good	Good		
2892	Deodar Cedar	<i>Cedrus deodara</i>	34	Good	Good		
2893	Deodar Cedar	<i>Cedrus deodara</i>	35	Good	Good		
2894	Port Orford Cedar	<i>Chamaecyparis lawsoniana</i>	12	Fair	Poor	2 leaders with bark inclusion at 10' above ground.	
2895	Giant Sequoia	<i>Sequoiadendron giganteum</i>	69	Good	Good		
3131	Willow	<i>Salix sp.</i>	10	Poor	Poor		
3132	Black Cottonwood	<i>Populus trichocarpa</i>	39	Fair	Fair	W. stem has lost top with new leaders. Base of tree has grown and around drain culvert headwall.	

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3133	Willow	<i>Salix sp.</i>	15	Poor	Fair	Lost top.	
3134	Common Hawthorn	<i>Crataegus monogyna</i>	8	Fair	Fair		
3135	Common Hawthorn	<i>Crataegus monogyna</i>	12	Fair	Fair		
3682	Douglas Fir	<i>Pseudotsuga menziesii</i>	21	Very Poor	Fair	21"x48" cavity from ground on N. side. 8" wide conk st soil line on N. side. Hazardous. Remove.	1
3683	Douglas Fir	<i>Pseudotsuga menziesii</i>	17	Fair	Fair	Old broken top with new leader. Leans E.	
3684	Douglas Fir	<i>Pseudotsuga menziesii</i>	9	Poor	Fair	Suppressed.	
3685	Douglas Fir	<i>Pseudotsuga menziesii</i>	11	Fair	Fair	Limbs from #3684 rub trunk.	
3686	Douglas Fir	<i>Pseudotsuga menziesii</i>	13	Fair	Fair		
3687	Douglas Fir	<i>Pseudotsuga menziesii</i>	10	Fair	Fair		
3688	Douglas Fir	<i>Pseudotsuga menziesii</i>	10	Very Poor	Fair	Many Phellinus pini like conks.	1
3689	Douglas Fir	<i>Pseudotsuga menziesii</i>	14	Poor	Poor	Closed wound face from 4' above ground to 9' above ground on N. side. Closed wound face from 3' above ground to 8' above ground on S. side.	
3690	Douglas Fir	<i>Pseudotsuga menziesii</i>	9	Fair	Fair		
3691	Douglas Fir	<i>Pseudotsuga menziesii</i>	10	Poor	Poor	Old broken top at 20' above ground with new leader.	
3692	Douglas Fir	<i>Pseudotsuga menziesii</i>	18	Good	Good		
3693	Oregon Ash	<i>Pseudotsuga menziesii</i>	17	Poor	Fair	1"x8' cavity from ground to 8' above ground on N. side.	
3694	Douglas Hawthorn	<i>Crataegus douglasii</i>	12	Poor	Poor		

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3721	English Walnut	<i>Juglans regia</i>	18	Poor	Fair	Thin crown.	
3722	English Walnut	<i>Juglans regia</i>	18	Poor	Fair	Thin crown.	
3723	English Walnut	<i>Juglans regia</i>	18	Poor	Fair	Thin crown.	
3724	Oregon Ash	<i>Fraxinus latifolia</i>	8	Fair	Fair		
3725	Oregon Ash	<i>Fraxinus latifolia</i>	13	Poor	Fair	Thin crown.	
3726	English Holly	<i>Ilex aquifolium</i>		Poor	Poor	Dead top.	
3917	Common Hawthorn	<i>Crataegus monogyna</i>	14	Fair	Fair	Measured at ground level.	
3918	Common Hawthorn	<i>Crataegus monogyna</i>	10	Poor	Poor	2 stems 10,10. Thin crown.	
3919	Common Hawthorn	<i>Crataegus monogyna</i>	8	Fair	Fair		
3920	Common Hawthorn	<i>Crataegus monogyna</i>	17	Poor	Poor	Measured at ground level.	
3921	Common Hawthorn	<i>Crataegus monogyna</i>	7	Fair	Fair		
3922	Common Hawthorn	<i>Crataegus monogyna</i>	20	Fair	Fair	Measured at ground level.	
3923	Common Hawthorn	<i>Crataegus monogyna</i>	28	Fair	Fair	Measured at ground level.	
3978	Oregon Ash	<i>Fraxinus latifolia</i>	5	Fair	Fair		
3979	Oregon Ash	<i>Fraxinus latifolia</i>	8	Fair	Fair		
3980	Bigleaf Maple	<i>Acer macrophyllum</i>	12	Good	Good		
3981	Bigleaf Maple	<i>Acer macrophyllum</i>	12	Fair	Fair		
3982	Oregon Ash	<i>Fraxinus latifolia</i>	14	Fair	Fair		
3983	Common Hawthorn	<i>Crataegus monogyna</i>	10	Poor	Poor	2 stems 6,8. High crown. Die back in crown.	
3984	Oregon Ash	<i>Fraxinus latifolia</i>	16	Fair	Fair	3" to 4" diameter dead limbs in crown. Mature.	
3985	Oregon Ash	<i>Fraxinus latifolia</i>	18	Fair	Fair	Mature. Some die back in canopy.	
3986	Oregon Ash	<i>Fraxinus latifolia</i>	10	Fair	Fair		
3987	Oregon Ash	<i>Fraxinus latifolia</i>	10	Dead			1

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3988	Oregon Ash	<i>Fraxinus latifolia</i>	11	Poor	Poor	Thin crown.	
3989	Oregon Ash	<i>Fraxinus latifolia</i>	13	Fair	Fair		
3990	Oregon Ash	<i>Fraxinus latifolia</i>	19	Poor	Poor	Die back in crown.	
3991	Oregon Ash	<i>Fraxinus latifolia</i>	7	Very Poor	Poor	Suppressed.	1
3992	Oregon Ash	<i>Fraxinus latifolia</i>	8	Fair	Fair		
3993	Oregon Ash	<i>Fraxinus latifolia</i>	14	Fair	Fair	5"x36" open wound face from 2' above ground to 5' above ground.	
3994	Oregon Ash	<i>Fraxinus latifolia</i>	10	Poor	Poor	Die back in crown.	
3995	Oregon Ash	<i>Fraxinus latifolia</i>	13	Poor	Poor	Die back in crown.	
3996	Oregon Ash	<i>Fraxinus latifolia</i>	18	Fair	Fair		
3997	Oregon Ash	<i>Fraxinus latifolia</i>	24	Fair	Fair	Mature. Some widely scattered 3 to 4" diameter dead limbs. Prune dead limbs. Inspect annually for hazard.	
3998	Oregon Ash	<i>Fraxinus latifolia</i>	8	Fair	Fair		
3999	Oregon Ash	<i>Fraxinus latifolia</i>	7	Fair	Fair		
4000	Oregon Ash	<i>Fraxinus latifolia</i>	6	Good	Good		
4001	Oregon White Oak	<i>Quercus garryana</i>	40	Good	Good		
4002	Oregon Ash	<i>Fraxinus latifolia</i>	54	Very Poor	Very Poor	Trunk has broken off at 20' above ground. Severe decay in trunk. Secondary leader is hazardous. Remove.	1
4003	Oregon Ash	<i>Fraxinus latifolia</i>	25	Very Poor	Poor	3 stems 10,14,19. Trunk is split. Hazardous. Remove.	1
4004	Oregon Ash	<i>Fraxinus latifolia</i>	34	Poor	Poor	2 stems 15,30. Over mature. Dead and broken limbs in crown.	
4005	Willow	<i>Salix sp.</i>	15	Fair	Fair	3 stems 7,8,11	
4006	Oregon Ash	<i>Fraxinus latifolia</i>	43	Very Poor	Fair	12"x12' cavity from ground on W. side.	1
4007	Oregon White Oak	<i>Quercus garryana</i>	26	Good	Good		
4008	Oregon White Oak	<i>Quercus garryana</i>	41	Fair	Fair	4 stems 6,18,18,25. This tree originally had 5 stems. The fifth stem has uprooted and fallen. The 25" stem has an 18"x60" limb cavity at 20' above ground.	

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4009	Oregon White Oak	<i>Quercus garryana</i>	26	Poor	Fair	2 stems 14, 22. Thin crown.	
4010	Bigleaf Maple	<i>Acer macrophyllum</i>	40	Poor	Fair	Lower bole appears to be hollow. Some dead 4" to 6" dead limbs in crown. History of larger limb failure.	
4011	Oregon Ash	<i>Fraxinus latifolia</i>	24	Fair	Good	1"x60" cavity in E. stem at 25' above ground to 30' above ground.	
4012	Ponderosa Pine	<i>Pinus ponderosa</i>	11	Fair	Fair		
4013	Oregon Ash	<i>Fraxinus latifolia</i>	18	Good	Fair		
4014	Willow	<i>Salix sp.</i>	21	Very Poor	Very Poor	Severe decay. Remove.	1
4015	Willow	<i>Salix sp.</i>	18	Fair	Fair	2 stems 7,17.	
4016	Common Hawthorn	<i>Crataegus monogyna</i>	7	Fair	Fair		
4017	Douglas Hawthorn	<i>Crataegus douglasii</i>	8	Very Poor	Poor	Dead top.	1
4018	Common Hawthorn	<i>Crataegus monogyna</i>	13	Fair	Fair	5,7,7,8	
4019	Common Hawthorn	<i>Crataegus monogyna</i>	11	Fair	Fair	8,8	
4020	Willow	<i>Salix sp.</i>	9	Very Poor	Very Poor	Broken top.	1
4021	Oregon Ash	<i>Fraxinus latifolia</i>	6	Poor	Poor	Broken top.	
4022	Oregon Ash	<i>Fraxinus latifolia</i>	8	Poor	Poor		
4023	Oregon Ash	<i>Fraxinus latifolia</i>	12	Fair	Fair		
4024	Oregon Ash	<i>Fraxinus latifolia</i>	13	Fair	Fair		
4025	Oregon Ash	<i>Fraxinus latifolia</i>	12	Fair	Fair		
4026	Oregon Ash	<i>Fraxinus latifolia</i>	11	Fair	Fair		
4027	Oregon Ash	<i>Fraxinus latifolia</i>	12	Fair	Fair		
4028	Oregon Ash	<i>Fraxinus latifolia</i>	12	Fair	Fair		
4029	Oregon Ash	<i>Fraxinus latifolia</i>	8	Poor	Fair	Thin crown.	
4030	Oregon Ash	<i>Fraxinus latifolia</i>	11	Fair	Fair		
4031	Oregon Ash	<i>Fraxinus latifolia</i>	10	Fair	Fair		
4032	Oregon Ash	<i>Fraxinus latifolia</i>	8	Fair	Fair		
4033	Oregon Ash	<i>Fraxinus latifolia</i>	13	Fair	Fair	2 stems 9,10	

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4034	Oregon Ash	<i>Fraxinus latifolia</i>	7	Poor	Poor	Thin crown.	
4035	Oregon Ash	<i>Fraxinus latifolia</i>	15	Fair	Fair	History of large limb loss. Inspect annually for hazard.	
4036	Oregon Ash	<i>Fraxinus latifolia</i>	27	Fair	Fair	Mature. Inspect annually for hazard.	
4037	Oregon Ash	<i>Fraxinus latifolia</i>	24	Fair	Fair	Mature. Some dead limbs. Inspect annually for hazard.	
4038	Oregon Ash	<i>Fraxinus latifolia</i>	24	Very Poor	Very Poor	Split trunk. Severe decay. Remove.	1
4040	Oregon Ash	<i>Fraxinus latifolia</i>	12	Fair	Fair		
4041	Oregon Ash	<i>Fraxinus latifolia</i>	10	Poor	Poor	Broken top.	
4042	Oregon Ash	<i>Fraxinus latifolia</i>	18	Fair	Fair	High crown with some die back. Inspect annually for hazard.	
4043	Oregon Ash	<i>Fraxinus latifolia</i>	15	Very Poor	Poor	12"x20' cavity from ground on W. side. Remove.	1
4044	Common Hawthorn	<i>Crataegus monogyna</i>	6	Fair	Fair		
4045	Oregon Ash	<i>Fraxinus latifolia</i>	10	Poor	Fair	Broken top.	
4046	Oregon Ash	<i>Fraxinus latifolia</i>	18	Poor	Fair	High thin crown.	
4047	Oregon Ash	<i>Fraxinus latifolia</i>	12	Very Poor	Fair	3"x7' cavity from ground to 7' above ground. Thin crown. Remove.	1
4048	Oregon Ash	<i>Fraxinus latifolia</i>	16	Fair	Poor	Dogleg in trunk at 40' above ground. Old broken top.	
4049	Oregon Ash	<i>Fraxinus latifolia</i>	13	Poor	Poor	3"x48" cavity from 3' above ground to 7' above ground on S. side. History of larger limb failure. Inspect annually for hazard.	
4050	Oregon Ash	<i>Fraxinus latifolia</i>	27	Fair	Fair	Mature. 48" sap flow from 3' above ground to 7' above ground on N. side.	
4051	Common Hawthorn	<i>Crataegus monogyna</i>	10	Fair	Fair		
4052	Oregon Ash	<i>Fraxinus latifolia</i>	10	Fair	Fair		
4053	Oregon Ash	<i>Fraxinus latifolia</i>	21	Very Poor	Poor	Decay column with openings from 2' above ground to 20' above ground on N. side. Hazardous Remove.	1
4054	Douglas Hawthorn	<i>Crataegus douglasii</i>	9	Very Poor	Very Poor	Broken top. Severely decayed.	1

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NO.	COMMON NAME	BOTANICAL NAME	DBH	COND.	STRUC.	COMMENTS	HAZARD TREE
4055	Oregon Ash	<i>Fraxinus latifolia</i>	11	Very Poor	Very Poor	8"x48" cavity from 8' above ground to 12' above ground. Remove.	1
4056	Oregon Ash	<i>Fraxinus latifolia</i>	26	Very Poor	Very Poor	12"x8' cavity from ground to 8' above ground on N. side. Hazardous. Remove.	1
4057	Oregon Ash	<i>Fraxinus latifolia</i>	10	Poor	Fair	Broken top.	
4058	Oregon Ash	<i>Fraxinus latifolia</i>	12	Poor	Poor	Broken top.	
4059	Oregon Ash	<i>Fraxinus latifolia</i>	18	Poor	Fair	Mature. 5"x36" limb cavity at 25' to 28' above ground on N. side. Inspect annually for hazard.	
4060	Oregon Ash	<i>Fraxinus latifolia</i>	17	Fair	Fair	Mature. History of larger limb failure. Inspect annually for hazard.	
4067	Oregon Ash	<i>Fraxinus latifolia</i>	10	Very Poor	Very Poor	1"x12" cavity from ground on E. side. Broken top with decay.	1
4068	Oregon Ash	<i>Fraxinus latifolia</i>	10	Poor	Poor	Dead top.	
4069	Oregon Ash	<i>Fraxinus latifolia</i>	12	Fair	Fair	2 stems 7,10.	
4070	Common Hawthorn	<i>Crataegus monogyna</i>	8	Fair	Fair		
4071	Oregon Ash	<i>Fraxinus latifolia</i>	26	Fair	Fair	Mature. Inspect annually for hazard. Remove dead and hanging limbs.	
4072	Oregon Ash	<i>Fraxinus latifolia</i>	10	Fair	Fair		
4073	Oregon Ash	<i>Fraxinus latifolia</i>	12	Fair	Poor	High crown.	
4074	Oregon Ash	<i>Fraxinus latifolia</i>	9	Poor	Poor	High thin crown.	
4075	Oregon Ash	<i>Fraxinus latifolia</i>	7	Poor	Poor	High thin crown.	
4076	Oregon Ash	<i>Fraxinus latifolia</i>	10	Fair	Fair	Higher crown. Inspect annually for hazard.	
4077	Oregon Ash	<i>Fraxinus latifolia</i>	27	Fair	Fair	Mature. Inspect annually for hazard. Remove dead and hanging limbs.	
4078	Oregon Ash	<i>Fraxinus latifolia</i>	18	Fair	Fair	Mature. Inspect annually for hazard.	
4079	Oregon Ash	<i>Fraxinus latifolia</i>	10	Poor	Poor	2 stems 6,8. High crown. Die back in crown.	
4080	Oregon Ash	<i>Fraxinus latifolia</i>	9	Fair	Poor	High crown.	
4081	Oregon Ash	<i>Fraxinus latifolia</i>	14	Fair	Fair	2 stems 7,12.	
4082	Oregon Ash	<i>Fraxinus latifolia</i>	28	Fair	Fair	Mature. Inspect annually for hazard.	
4083	Oregon Ash	<i>Fraxinus latifolia</i>	14	Poor	Fair	Thin crown. Die back in crown.	
4084	Oregon Ash	<i>Fraxinus latifolia</i>	12	Poor	Poor	Broken top at 25' above ground.	
4085	Oregon Ash	<i>Fraxinus latifolia</i>	7	Poor	Poor	Thin crown.	

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NO.	COMMON NAME	BOTANICAL NAME	DBH	COND.	STRUC.	COMMENTS	HAZARD TREE
4086	Oregon Ash	<i>Fraxinus latifolia</i>	12	Fair	Fair	High crown. Some dead wood.	
4087	Oregon Ash	<i>Fraxinus latifolia</i>	10	Fair	Fair	High crown.	
4088	Oregon Ash	<i>Fraxinus latifolia</i>	9	Very Poor	Poor	7"x6' cavity from 10' above ground to 16' above ground. Hazardous Remove.	1
4089	Oregon Ash	<i>Fraxinus latifolia</i>	10	Poor	Fair	Thin crown.	
4090	Oregon Ash	<i>Fraxinus latifolia</i>	11	Fair	Fair	High crown.	
4091	Oregon Ash	<i>Fraxinus latifolia</i>	14	Fair	Fair	Thinning crown.	
4092	Oregon Ash	<i>Fraxinus latifolia</i>	8	Very Poor	Very Poor	Large trunk cavity.	1
4093	Oregon Ash	<i>Fraxinus latifolia</i>	8	Very Poor	Very Poor	Die back in crown.	1
4094	Oregon Ash	<i>Fraxinus latifolia</i>	9	Fair	Fair	High crown.	
4095	Oregon Ash	<i>Fraxinus latifolia</i>	11	Poor	Fair	High thin crown.	
4096	Oregon Ash	<i>Fraxinus latifolia</i>	12	Fair	Fair	Wire fence ingrown into trunk.	
4097	Oregon Ash	<i>Fraxinus latifolia</i>	8	Fair	Fair		
4098	Oregon Ash	<i>Fraxinus latifolia</i>	13	Fair	Fair		
4099	Oregon Ash	<i>Fraxinus latifolia</i>	12	Fair	Fair	3" diameter limb cavity at 15' above ground on N. side.	
4100	Oregon Ash	<i>Fraxinus latifolia</i>	13	Fair	Fair		
4101	Oregon Ash	<i>Fraxinus latifolia</i>	14	Fair	Fair		
4102	Oregon Ash	<i>Fraxinus latifolia</i>	17	Poor	Fair	Thin crown.	
4103	Oregon Ash	<i>Fraxinus latifolia</i>	8	Fair	Fair		
4104	Oregon Ash	<i>Fraxinus latifolia</i>	7	Fair	Fair		
4105	Oregon Ash	<i>Fraxinus latifolia</i>	9	Fair	Fair		
4106	Oregon Ash	<i>Fraxinus latifolia</i>	10	Fair	Fair		
4107	Douglas Hawthorn	<i>Crataegus douglasii</i>	10	Poor	Poor	Dead top.	
4108	Oregon Ash	<i>Fraxinus latifolia</i>	11	Good	Good		
4109	Oregon Ash	<i>Fraxinus latifolia</i>	7	Good	Good		
4110	Oregon Ash	<i>Fraxinus latifolia</i>	15	Good	Good		
4111	Oregon Ash	<i>Fraxinus latifolia</i>	15	Good	Good		
4112	Oregon Ash	<i>Fraxinus latifolia</i>	14	Good	Good		
4113	Oregon Ash	<i>Fraxinus latifolia</i>	14	Good	Good		
4114	Oregon Ash	<i>Fraxinus latifolia</i>	11	Fair	Fair		
4115	Oregon Ash	<i>Fraxinus latifolia</i>	11	Fair	Fair		
4116	Oregon Ash	<i>Fraxinus latifolia</i>	18	Fair	Fair		

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NO.	COMMON NAME	BOTANICAL NAME	DBH	COND.	STRUC.	COMMENTS	HAZARD TREE
4117	Common Hawthorn	<i>Crataegus monogyna</i>	8	Fair	Fair		
4118	Oregon Ash	<i>Fraxinus latifolia</i>	14	Fair	Fair	2 stems 8,11.	
4119	Oregon Ash	<i>Fraxinus latifolia</i>	9	Very Poor	Poor	Split trunk with large cavity.	1
4120	Willow	<i>Salix sp.</i>	8	Very Poor	Very Poor	Severe decay.	1
4121	Douglas Hawthorn	<i>Crataegus douglasii</i>	7	Poor	Poor		
4122	Oregon Ash	<i>Fraxinus latifolia</i>	11	Fair	Fair		
4123	Oregon Ash	<i>Fraxinus latifolia</i>	11	Fair	Fair		
4124	Oregon Ash	<i>Fraxinus latifolia</i>	11	Good	Good		
4125	Oregon White Oak	<i>Quercus garryana</i>	14	Good	Good	2 stems 10,10.	
4126	Oregon Ash	<i>Fraxinus latifolia</i>	19	Poor	Fair		
4127	Oregon Ash	<i>Fraxinus latifolia</i>	20	Good	Good	Thin crown.	
4128	Oregon Ash	<i>Fraxinus latifolia</i>	14	Good	Good		
4129	Oregon Ash	<i>Fraxinus latifolia</i>	10	Good	Good		
4130	Oregon Ash	<i>Fraxinus latifolia</i>	11	Good	Good		
4131	Oregon Ash	<i>Fraxinus latifolia</i>	16	Good	Good		
4132	Black Hawthorne	<i>Crataegus douglasii</i>	9	Poor			
4133	Oregon Ash	<i>Fraxinus latifolia</i>	10	Good	Good		
4134	Oregon Ash	<i>Fraxinus latifolia</i>	9	Good	Good		
4135	Oregon Ash	<i>Fraxinus latifolia</i>	18	Poor	Fair	Wound seam from 1' above ground to 9' above ground on S. side. 6" limb cavity at 20' above ground on S. side. Broken Hanging limb on W. side.	
4136	Oregon Ash	<i>Fraxinus latifolia</i>	16	Poor	Poor		
4137	Common Hawthorne	<i>Crataegus monogyna</i>	14	Fair	Poor	4 stems 7,7,7,7	
4138	Oregon Ash	<i>Fraxinus latifolia</i>	17	Very Poor	Very Poor		1
4139	Oregon Ash	<i>Fraxinus latifolia</i>	15	Very Poor	Very Poor	20"x15' cavity from ground on E. side. Trunk has broken off at 15' above ground.	1
4140	Black Hawthorne	<i>Crataegus douglasii</i>	10	Poor	Poor	Dead top.	

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4140.1	Common Hawthorne	<i>Crataegus monogyna</i>	10	Very Poor	Poor	3 stems 4,6,7. Partial uproot.	1
4141	Oregon Ash	<i>Fraxinus latifolia</i>	12	Fair	Fair	10"x48" cavity from 54" above ground to 8' above ground on S. side. Crack on S. side from ground to 54" above ground. Remove.	
4142	Oregon Ash	<i>Fraxinus latifolia</i>	29	Fair	Good	4 stems 22,14,7,11. 3" dead hanging limb 20' above ground on main stem. Inspect annually for hazard.	
4143	Willow	<i>Salix sp.</i>	9	Very Poor	Poor	Broken leader, decay.	1
4144	Oregon Ash	<i>Fraxinus latifolia</i>	28	Poor	Fair	Over mature. History of large limb failure. Inspect annually for hazard.	
4144.1	Willow	<i>Salix sp.</i>	12	Very Poor	Very Poor	Very large cavity. Broken top. Decay. Remove. 7' S #41.44.	1
4145	Oregon Ash	<i>Fraxinus latifolia</i>	8	Very Poor	Poor	Broken top.	1
4146	Oregon Ash	<i>Fraxinus latifolia</i>	12	Fair	Fair	3 stems 14,11,10.	
4147	Oregon Ash	<i>Fraxinus latifolia</i>	8	Very Poor	Very Poor	Broken top. Limb cavities. Leans E. 25° from vertical. Remove.	1
4148	Oregon Ash	<i>Fraxinus latifolia</i>	14	Fair	Fair	Higher crown.	
4149	Oregon Ash	<i>Fraxinus latifolia</i>	11	Poor	Fair	Thin crown. 2 leaders at 15' above ground with bark inclusion.	
4150	Oregon Ash	<i>Fraxinus latifolia</i>	15	Fair	Fair	Mature. Inspect annually for hazard.	
4151	Oregon Ash	<i>Fraxinus latifolia</i>	11	Very Poor	Poor	Mature. Vertical crack from 25' above ground to 30' above ground. Remove	1
4152	Oregon Ash	<i>Fraxinus latifolia</i>	9	Poor	Poor	Thin crown.	
4153	Oregon Ash	<i>Fraxinus latifolia</i>	12	Poor	Poor	Thin crown.	
4154	Oregon Ash	<i>Fraxinus latifolia</i>	8	Poor	Poor	Thin crown.	
4155	Oregon Ash	<i>Fraxinus latifolia</i>	10	Fair	Poor	Leans E. 25° from vertical .	
4156	Oregon Ash	<i>Fraxinus latifolia</i>	20	Poor	Fair	3 stems 7,8,17. 5"x72" cavity from 18" above ground to 90" above ground on W. side in 8" stem. Hanging dead limb in main stem.	
4157	Oregon Ash	<i>Fraxinus latifolia</i>	7	Poor	Poor	Thin crown.	
4158	Oregon Ash	<i>Fraxinus latifolia</i>	15	Fair	Fair	2 stems 8,13.	
4159	Oregon Ash	<i>Fraxinus latifolia</i>	9	Fair	Poor	Leans S.	
4160	Oregon Ash	<i>Fraxinus latifolia</i>	11	Very Poor	Very Poor	Broken top.	1

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Tree Inventory
Erickson Elementary School Site

NO.	COMMON NAME	BOTANICAL NAME	DBH	COND.	STRUC.	COMMENTS	HAZARD TREE
4161	Oregon Ash	<i>Fraxinus latifolia</i>	11	Fair	Fair	High crown.	
4162	Oregon Ash	<i>Fraxinus latifolia</i>	11	Fair	Fair	2 stems 6,9	
4163	Oregon Ash	<i>Fraxinus latifolia</i>	9	Fair	Fair	Minor die back in crown.	
4164	Oregon Ash	<i>Fraxinus latifolia</i>	12	Very Poor	Poor	Major trunk caviyy. Remove.	1
4165	Oregon Ash	<i>Fraxinus latifolia</i>	24	Fair	Fair	Mature. Inspect annually for hazard.	
4166	Oregon Ash	<i>Fraxinus latifolia</i>	11	Fair	Fair	2"x8" cavity at 50" above ground on W. side.	
4173	Sweet Cherry	<i>Prunus avium</i>	6	Fair	Fair		
4174	Oregon Ash	<i>Fraxinus latifolia</i>	7	Fair	Fair		
4175	Common Hawthorn	<i>Crataegus monogyna</i>	11	Fair	Fair	2 stems 8,8.	
4176	Oregon Ash	<i>Fraxinus latifolia</i>	9	Good	Good		
4284			30			Not found on site plan or on the site.	
4285			8			Not found on site plan or on the site.	
4286			28			Not found on site plan or on the site.	
12538	Oregon White Oak	<i>Quercus garryana</i>	32	Fair	Good		
12538.1	Common Hawthorn	<i>Crataegus monogyna</i>	14	Fair	Fair	14' W. #12538. Measured at 2' above ground.	
12538.2	Common Hawthorn	<i>Crataegus monogyna</i>	8	Fair	Fair	3 stems 7,8,8. 17' NW #12358.	
The following trees are located on the north side of the asphalt pathway in the Southwest corner of the site.							
5001	Japanese Flowering Cherry	<i>Prunus serrulata</i>	12	Good	Good		
5002	Deodar Cedar	<i>Cedrus deodora</i>	9	Good	Good		
5003	Deodar Cedar	<i>Cedrus deodora</i>	13	Good	Good	2 stems 9,9.	
5004	Quaking Aspen	<i>Populus tremuloides</i>	3	Good	Good		
5005	Quaking Aspen	<i>Populus tremuloides</i>	3	Good	Good		
5006	Douglas Fir	<i>Populus tremuloides</i>	16	Good	Good		

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Teragan Associates, Inc.
3145 Westview Circle
Lake Oswego, OR 97034
503-697-1975

Appendix # 3
Tree Inventory
Erickson Elementary School Site

NO.	COMMON NAME	BOTANICAL NAME	DBH	COND.	STRUC.	COMMENTS	HAZARD TREE
5007	Red Oak	<i>Quercus rubra</i>	9	Good	Good		
5008	Deodar Cedar	<i>Cedrus deodora</i>	10	Good	Good		
5009	Quaking Aspen	<i>Populus tremuloides</i>	2	Good	Good		
5010	Quaking Aspen	<i>Populus tremuloides</i>	2	Good	Good		
5011	Quaking Aspen	<i>Populus tremuloides</i>	3	Good	Good		
5012	Quaking Aspen	<i>Populus tremuloides</i>	4	Good	Good		
5013	Quaking Aspen	<i>Populus tremuloides</i>	5	Good	Good		
5014	Quaking Aspen	<i>Populus tremuloides</i>	5	Good	Good		
5015	Quaking Aspen	<i>Populus tremuloides</i>	3	Good	Good		
5016	Quaking Aspen	<i>Populus tremuloides</i>	3	Good	Good		
This area also includes one 12' tall Douglas Fir in good condition.							
							82
	=invasive						
	=can't locate number on map						
	=hazard tree						
	=poor condition						
	=missing information						

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MEMORANDUM

TO: Tim Woodley, West Linn-Wilsonville School District
FROM: Reah Flisakowski, P.E.
Steven Boice, E.I.T.
DATE: July 2, 2010
SUBJECT: West Linn Primary School Roadway Signing Analysis and Plans P9031-003-000

This memorandum summarizes roadway signing recommendations for the proposed West Linn Primary School in West Linn, Oregon. The future school site is located on the east side of Rosemont Road, south of Hidden Springs Road/Wisteria Road and north of Bay Meadows Drive. The following sections present current school zone roadway signing practices, existing roadway conditions near the project frontage, and roadway signing recommendations. Preliminary roadway signing plans are attached illustrating the signing recommendations.

Current School Zone Roadway Signing Practices

Current roadway signing practices for school zones are based on the *Manual on Uniform Traffic Control Devices* (MUTCD)¹ and *Sign Policy and Guidelines* from Oregon Department of Transportation (ODOT)².

MUTCD

The MUTCD sets the national standards for traffic control devices along roadways including signing. Traffic control for school areas is covered in Part 7 of the manual. Uniform application of school signage is the best way to provide a safe school zone. Uniformity avoids confusion among road users and promotes consistent behavior. Key elements defined in the MUTCD regarding school signage include:

- School warning signs, any supplemental sign/plaques, and "school" portion of any sign shall have a fluorescent yellow-green background with black legend and border.
- A school sign (S1-1) shall be installed to identify the beginning point of designated school zone.
- Higher fines zone signs (R2-10, R2-6P) shall be installed supplemental to school sign where increased fines are imposed for traffic violations with designated school zone. An end school zone sign (S5-2) shall be installed at end of school zone when higher fines zone signs are used.
- A school speed limit sign (S5-1) shall be installed where a reduced school speed limit zone has been established.
- Reduced speed limit ahead sign shall be followed by a school speed limit sign if used.

¹ Manual on Uniform Traffic Control Devices for Streets and Highways, 2009 Edition, U.S. DOT FHWA, December 2009.

² *Sign Policy and Guidelines*, ODOT Project Development Branch Traffic Management Section, Chapter 7: School Area Signs.

ODOT

Oregon law (ORS 111.111) requires the speed limit in any school zone to be 20 miles per hour or less anytime a school speed zone sign is flashing or between 7 a.m. and 5 p.m. on school days. School speed zone signing within the state falls into two categories, which are defined as Condition A (adjacent to school grounds) and Condition B (non-adjacent to school grounds). Key elements defined in the ODOT sign policy regarding school signage include:

- New school warning signs and any supplemental plaques shall have a fluorescent yellow-green background with black legend and border.
- Use of yellow and yellow-green school warning signs along any single school zone approach is prohibited.
- Where school speed limit zones are adjacent to school grounds (Condition A), the school speed limit sign (OS5-4) supplemental rider shall indicate "SCHOOL DAYS/7AM-5PM" or "WHEN FLASHING" depending on whether a flasher is used. The school speed limit sign should be placed 100 to 200 feet from school boundary.
- Where school speed limit zones that are non-adjacent to school grounds (Condition B), the supplemental rider shall indicate "WHEN CHILDREN ARE PRESENT" or "WHEN FLASHING" depending on whether a flasher is used. The school speed limit sign should be placed 100 to 200 feet from school boundary.
- School speed limit zone signs may omit the word "limit"
- Higher fines zone signs (R2-10, R2-6P) may be installed supplemental to school signs where increased fines are imposed for traffic violations with designated school zone. An end school zone sign (S5-2) or speed limit sign (R2-1) shall be installed at the end of a school zone when higher fines zone signs are used.
- No signs, delineators, or any other permanent or temporary traffic control devices should be located in or around the school zone.
- Reduced speed school zone ahead sign (S4-5) may be used where the posted speed is 40 miles per hour or higher.

Existing Conditions

The future primary school site is located on the east side of Rosemont Road, south of Hidden Springs Road/Wisteria Road and north of Bay Meadows Drive. The site is currently undeveloped. Rosemont Road consists of two lanes (one in each direction) and is classified as an arterial roadway³. It has a posted speed of 40 miles per hour within the future school zone. An existing asphalt pathway is located on the east side of Rosemont Road with the west side unimproved (no sidewalks).

The average daily traffic along Rosemont Road is approximately 5,110 vehicles (2,490 northbound and 2,620 southbound)⁴. A speed survey conducted on Rosemont Road found the average 85th percentile speed was 46 miles per hour⁵ (44 miles per hour northbound and 48 miles per hour southbound).

³ City of West Linn Transportation System Plan, DKS Associated, December 2008, Figure 8-1.

⁴ Traffic counts conducted on January 6, 2010, Rosemont Road north of Bay Meadows Drive, All Traffic Data.

Rosemont Ridge Middle School is located approximately 1,800 feet to the south from the proposed primary school on the southwest corner of the Rosemont Road/Santa Anita Drive/Salamo Road intersection. The Rosemont Ridge school zone along Rosemont Road, Santa Anita Drive, and Salamo Road is defined by the use of 20 miles per hour school speed limit zone signs. Higher fees are imposed within the existing school zone. All existing school related signs are yellow and ground mounted. No flashers are currently used within the school zone and there is no school crossing along Rosemont Road.

School Signing Recommendations

The following section summarizes recommended school roadway signing for the proposed primary school for each nearby roadway. Illustration of the recommended signage is provided in the attached preliminary signing plan sheets. School roadway signage was prepared per the MUTCD and ODOT sign policy. These documents provide standards for roadway sign size, retro reflectivity, location, color, lettering, and spacing.

Rosemont Road

The proposed West Linn Primary School has an active frontage with access points on Rosemont Road. School speed zone signing along Rosemont Road should be provided in advance of the school zone per Condition A (adjacent to school grounds) requirements as set forth in the ODOT sign policy. Northbound and southbound approaches should consist of a series of warning signs in advance of the school zone as outlined below.

- School zone sign (S1-1) with ahead rider (W16-9)
- Fines higher sign (R2-6P) with school supplemental sign (S4-3P)
- School speed limit sign (OS5-4) with school days rider (OS4-8)

The end school zone sign (S5-2) should be provided at the end of the school zone in both travel directions. Due to the posted speed, a reduced school speed limit sign (S4-5) should be installed along the southbound school zone approach in advance of the school zone sign.

The school speed limit sign should be located approximately 200 feet in advance of the proposed school boundary and be located north of Bay Meadows Drive and south of Hidden Springs Road for the northbound and southbound approaches respectively. This ensures that turning traffic onto Rosemont Road will see the sign assembly. Signs along Rosemont Road should be spaced 200 feet apart per the posted speed.

It is recommended that the existing southbound speed sign (40 miles per hour) located along Rosemont Road opposite the school site be removed and relocated to the north prior to the proposed school zone signage. It is also recommended the existing northbound speed limit sign (40 miles per hour) located between Santa Anita Drive and Bay Meadows Drive be removed. These two signs would be located between two school zones and direct motorists to accelerate after leaving one school zone only to be directed to slow down for the approaching school zone. Removal of speed signs may require modification to the speed zones along Rosemont Road. Additionally, the adopt a road sign located just in advance of the speed limit sign opposite the school site should be removed and relocated to the south, outside of the school speed zone. The curve sign located in the southbound direction just prior to Bay Meadows Drive should be relocated to the south to provide adequate sign spacing with the end

⁵ Speed survey conducted on January 6, 2010, Rosemont Road north of Bay Meadows Drive, All Traffic Data

school zone sign. It is recommended that no other non-school related signing be located within the school zone in accordance with the ODOT sign policy.

Hidden Springs Road

School zone sign (S1-1) with arrow rider (W16-6P) and higher fines sign (R2-6P) with school supplemental sign (S4-3P) should be installed along the westbound approach to Rosemont Road. These signs are used to warn drivers turning left onto Rosemont Road that a school zone speed limit sign is ahead. Signs along Bay Meadows Drive should be spaced 100 feet apart per the posted speed.

Wisteria Road

School zone sign (S1-1) with arrow rider (W16-6P) and higher fines sign (R2-6P) with school supplemental sign (S4-3P) should be installed along the eastbound approach to Rosemont Road. These signs are used to warn drivers turning right onto Rosemont Road that a school zone speed limit sign is ahead. Signs along Wisteria Road should be spaced 100 feet apart per the posted speed.

Bay Meadows Drive

School zone sign (S1-1) with arrow rider (W16-6P) and higher fines sign (R2-6P) with school supplemental sign (S4-3P) should be installed along the westbound approach to Rosemont Road. These signs are used to warn drivers turning right onto Rosemont Road that a school zone speed limit sign is ahead. Signs along Bay Meadows Drive should be spaced 100 feet apart per the posted speed.

Primary School Access (North and South)

Stop signs (R2-1) should be provided at the intersection with Rosemont Road for both proposed school accesses.

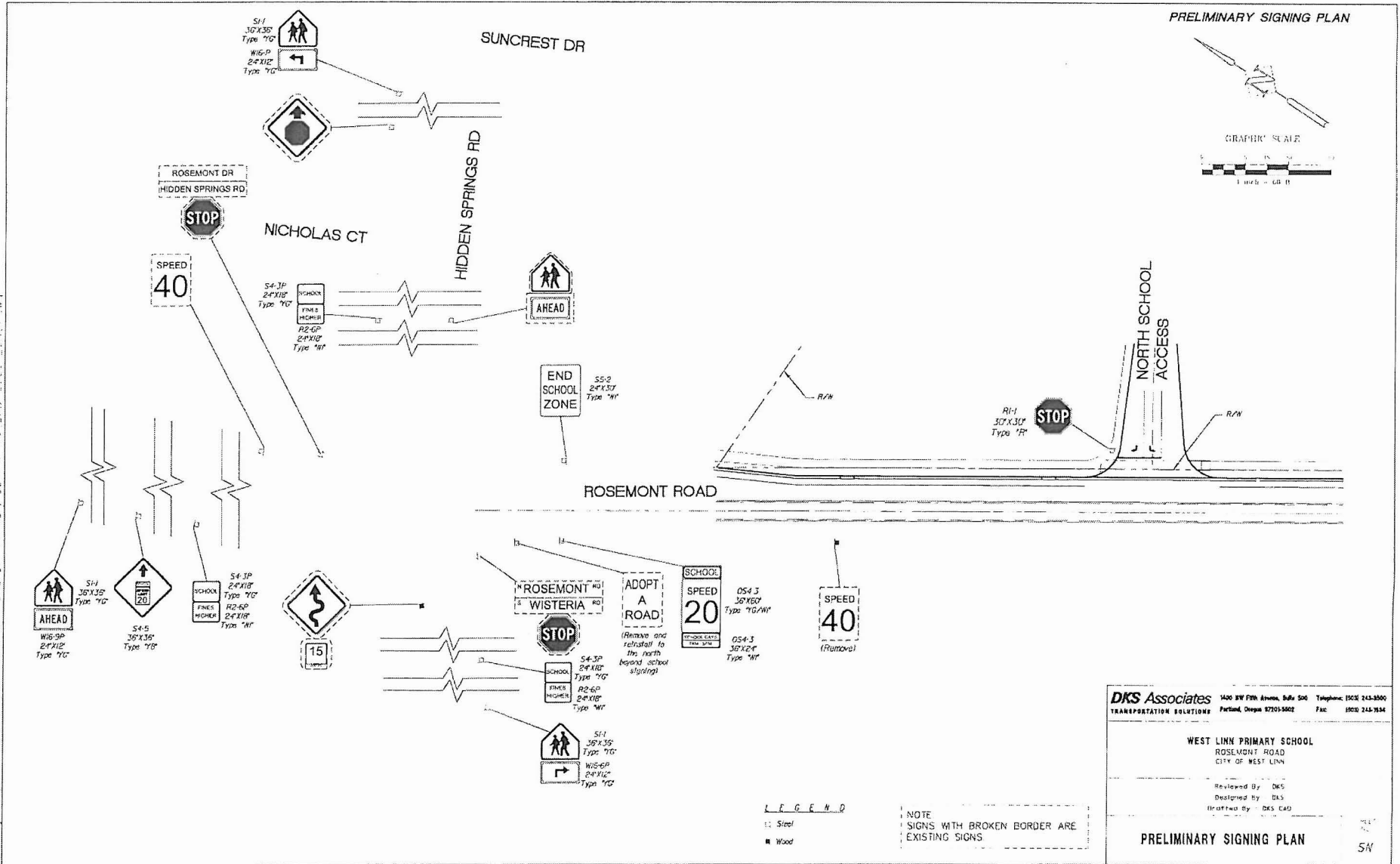
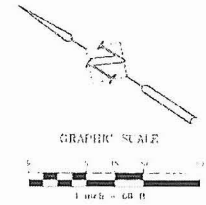
School Flasher and Nearby School Recommendations

It is recommended that flashers not be installed with the school speed zone signing (OS5-4) with the construction of the proposed primary school. This is consistent with existing school speed limit signing at the nearby Rosemont Ridge Middle School. Evaluation of flashers should be conducted after the school opens, taking into account potential development around the school (future school crossing on Rosemont Road and sidewalks), volume, and vehicle speeds within the school zone. A documented speed zone compliance issue would raise the need for a flasher.

The close proximity of Rosemont Ridge Middle School would not impact school signage for the proposed primary school. The two school zones would be located approximately 1,800 feet apart. Spacing on Rosemont Road between the first school zone sign and end of school zone sign would be approximately 1,000 feet in both directions.

Although existing school signs for the Rosemont Ridge Middle School are yellow, proposed signs for the proposed primary school should be fluorescent yellow-green. The use of different colored school signs is acceptable because school zone signing is separate for both school zones.

PRELIMINARY SIGNING PLAN



LEGEND
 □ Steel
 ■ Wood

NOTE
 SIGNS WITH BROKEN BORDER ARE EXISTING SIGNS

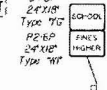
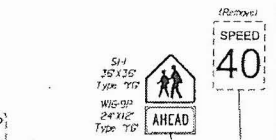
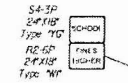
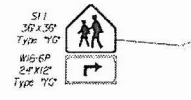
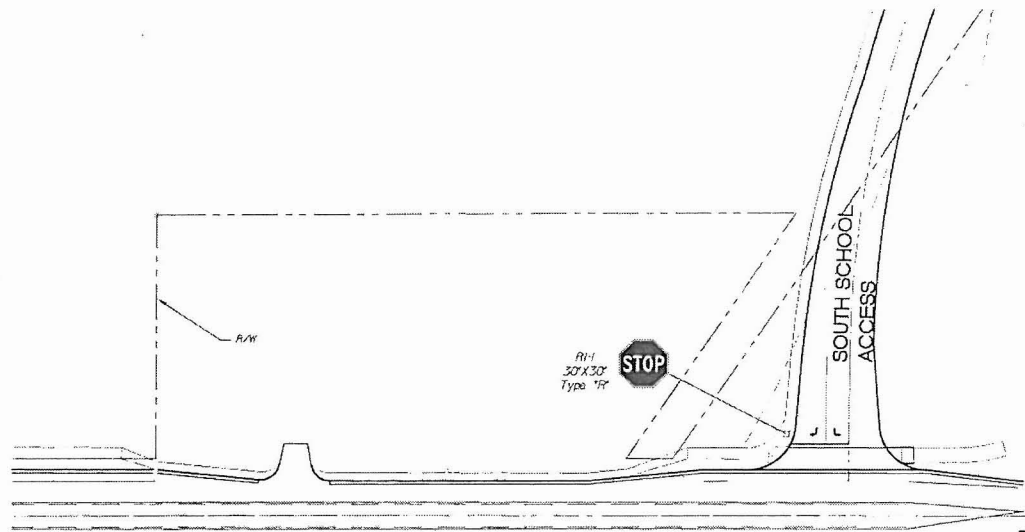
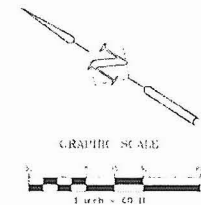
DKS Associates 1400 NW Fifth Avenue, Suite 500 Telephone: (503) 243-8000
 TRANSPORTATION SOLUTIONS Portland, Oregon 97201-5602 Fax: (503) 243-1634

WEST LINN PRIMARY SCHOOL
 ROSEMONT ROAD
 CITY OF WEST LINN

Reviewed By: DKS
 Designed By: DAS
 Drafted By: DKS CAD

PRELIMINARY SIGNING PLAN

PRELIMINARY SIGNING PLAN



ROSEMONT ROAD



DKS Associates 1400 SW 7th Avenue, Suite 500 Portland, Oregon 97201-5602 Telephone: (503) 243-3300

WEST LINN PRIMARY SCHOOL ROSEMONT ROAD CITY OF WEST LINN

Reviewed By: DKS Designed By: DKS Drafted By: DKS EAP

PRELIMINARY SIGNING PLAN

SN-02

LEGEND: □ Street, ■ Wood

NOTE: SIGNS WITH BROKEN BORDER ARE EXISTING SIGNS

New West Linn Primary School

Transportation Impact Study

June 2010

Prepared for: West Linn-Wilsonville School District

Prepared by: **DKS Associates**
TRANSPORTATION SOLUTIONS

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CHAPTER 1: INTRODUCTION AND FINDINGS

This report evaluates the transportation impacts of the proposed New West Linn Elementary School located in West Linn, Oregon. The purpose of this report is to identify mitigation measures required to accommodate potential traffic impacts from the proposed project. This chapter provides a summary of the study area, existing transportation conditions, project trip generation and distribution, future transportation conditions, and impacts identified for the proposed project.

Study Area

The study area and the proposed New West Linn Elementary School site are shown in Figure 1. The project site is located on the east side of Rosemont Road, south of Hidden Springs Road and north of Bay Meadows Drive. Based on the preliminary site plan provided by the project sponsor, the project would include two access points onto Rosemont Road.

Based on correspondence with City of West Linn staff¹, nine intersections, as well as the two proposed access points, were selected for the traffic analysis. The study intersections selected for the analysis include:

- Rosemont Road/Carriage Way
- Rosemont Road/Hidden Springs Road
- Rosemont Road/North School Access
- Rosemont Road/South Buss Access
- Rosemont Road/Bay Meadows Drive
- Rosemont Road/Salamo Road/Santa Anita Drive
- Hidden Springs Road/Suncrest Drive
- Hidden Springs Road/Santa Anita Dr
- Hidden Springs Road/Carriage Way
- Santa Anita Drive/Horton Rd/Churchill Downs Drive
- Santa Anita Drive/Pimlico Drive

Table 1 provides key characteristics of the study area and the proposed project.

Proposed Project

The proposed project would construct an elementary school (pre-kindergarten to fifth grade) with a maximum capacity for 500 students. The project site has recently been annexed within the City limits. The site will be zoned R-10 (Single-Family Residential Detached) which allows for educational land uses. The proposed school is assumed to be constructed and occupied by the beginning of the 2012 school year (September).

¹ Email correspondence from Norm Dull, Dull Olson Weekes Architects, December 15, 2009.

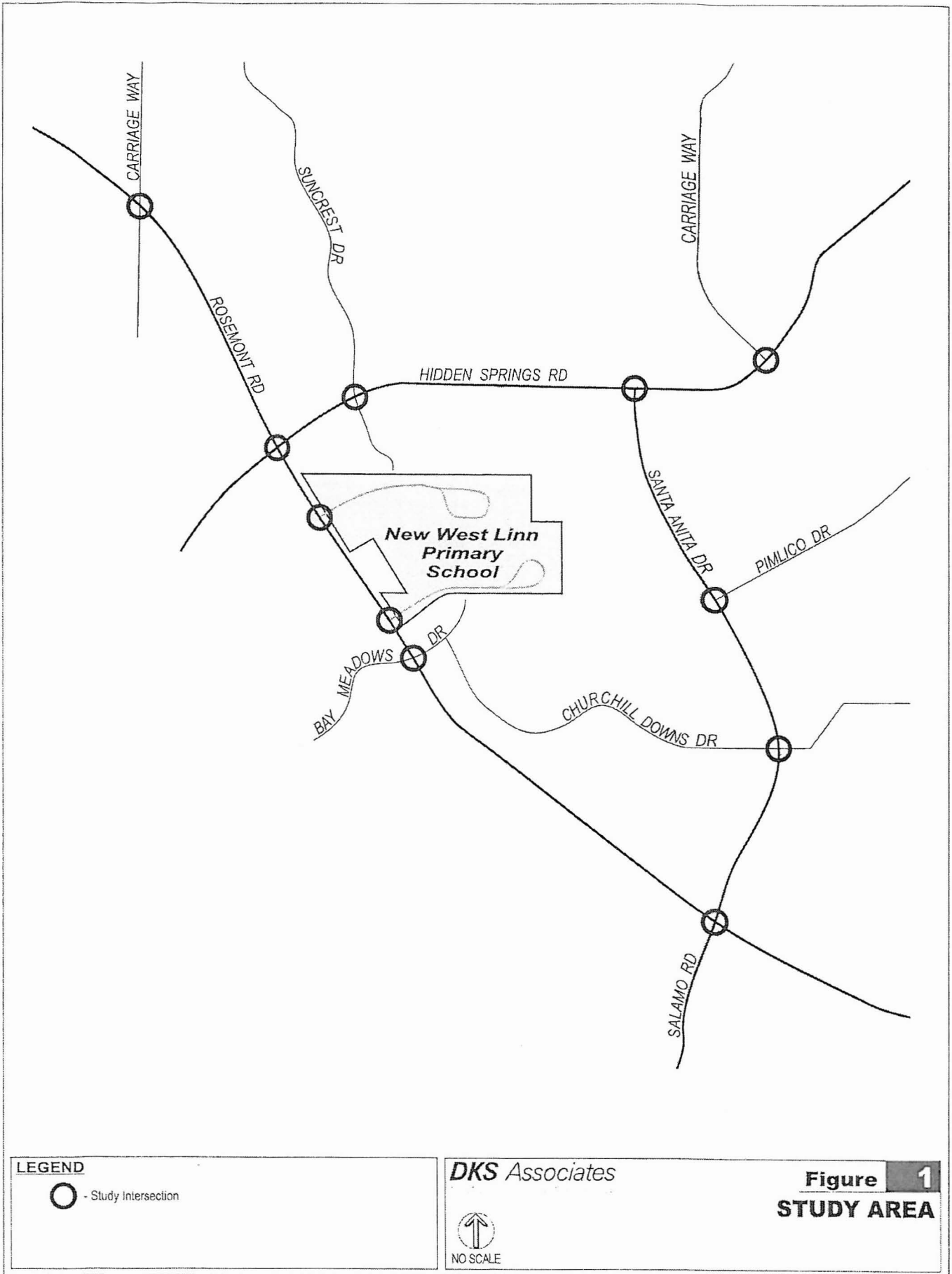


Table 1: Study Area and Proposed Project Characteristics

<u>Study Area</u>	
Number of Study Intersections	9 plus 2 site access points
Analysis Periods	AM peak hour (7 to 9 a.m.) Midday peak hour (2 to 4 p.m.) PM peak hour (4 to 6 p.m.)
<u>Nearby Alternative Mode Facilities</u>	
Pedestrian Facilities	Existing sidewalk on the east side of Rosemont Road along the project frontage
Bicycle Facilities	No dedicated bike lane and shoulder bikeways provided near the project site
Public Transit Facilities	No public transit service is provided at the project site. The nearest public transit is TriMet Route 35 on Highway 43 at Hidden Springs Road.
<u>Proposed Project Trips</u>	
AM Peak Hour Trips	280 (154 in/126 out)
Mid-day Peak Hour Trips	140 (63 in/77 out)
PM Peak Hour Trips	75 (37 in/38 out)
Proposed Vehicle Access Points	Two full access points on Rosemont Road North Access for parents and visitors South Access for school buses and employees

Traffic Impact Analysis

To determine the impacts from the proposed project at the study intersections, traffic operating conditions were analyzed at the study intersections during the AM, midday and PM peak hours for the following scenarios:

- 2010 Existing Traffic
- 2012 Background Traffic + Approved Projects
- 2012 Total (Background + Approved + Project) Traffic

The Existing traffic scenario was based on 2010 traffic counts and used as a baseline for comparison to the other two scenarios. The 2012 scenario was selected since the school is anticipated to be constructed and occupied by year 2012. The 2012 Background volumes were estimated by applying a two percent annual growth rate to 2010 traffic counts. The vehicle trips generated by approved projects were added to 2012 background volumes to develop the 2012 Background + Approved project scenario. The 2012 total volumes were estimated by adding project traffic to Background + Approved project traffic volumes.

2009 Existing Operating Conditions

The existing traffic operating conditions at the study intersections were evaluated for the AM, midday and PM peak hours based on the *2000 Highway Capacity Manual* methodology² for unsignalized intersections. The City of West Linn requires level of service D or better for all facilities except principal arterials, where level of service E is the minimum. The existing intersection performance is shown in Table 2. All of the study intersections currently meet standards during each of the three analysis periods.

Table 2: 2010 Existing Conditions Intersection Performance

Intersection	AM Peak		Midday Peak		PM Peak	
	LOS	V/C	LOS	V/C	LOS	V/C
Unsignalized						
Rosemont Rd/ Carriage Way	A/C	0.29	A/B	0.08	A/C	0.17
Rosemont Rd/ Hidden Springs Rd	A/B	0.18	A/B	0.09	A/C	0.15
Rosemont Rd/ Bay Meadows Dr	A/B	0.02	A/B	0.01	A/B	0.02
Hidden Springs Rd/Suncrest Dr	A/A	0.02	A/B	0.04	A/B	0.05
Hidden Springs Rd/ Santa Anita Dr	A/B	0.23	A/B	0.15	A/B	0.17
Hidden Springs Rd/ Carriage Way	A/B	0.03	A/B	0.03	A/B	0.03
Santa Anita Dr/Horton Rd	A/B	0.06	A/B	0.06	A/B	0.04
Santa Anita Dr/Pimlico Dr	A/B	0.08	A/B	0.10	A/B	0.11
All-Way Stop Controlled						
Rosemont Rd/Salamo Rd/Santa Anita Dr	B	0.45	B	0.48	C	0.81

Unsignalized intersections:

LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement

All-Way Stop Controlled intersections:

LOS = Level of Service of crossroads
V/C = Volume-to-Capacity Ratio of Intersection

2012 Traffic Operating Conditions

Intersection operating conditions for the 2012 background (including approved projects) and total traffic scenarios are listed in Table 3. All study intersections are expected to meet applicable City mobility standards under both scenarios (i.e., with or without the proposed project). Therefore, none of the study intersections would require off-site improvements to mitigate impacts from the proposed project traffic.

² 2000 Highway Capacity Manual, Transportation Research Board, Washington DC, 2000.

Table 3: 2012 Background and Total Traffic Intersection Performance

Intersection	AM Peak		Midday Peak		PM Peak	
	LOS	V/C	LOS	V/C	LOS	V/C
Background Traffic Operating Conditions						
Unsignalized						
Rosemont Rd/ Carriage Way	A/D	0.31	A/B	0.08	A/C	0.19
Rosemont Rd/ Hidden Springs	A/B	0.19	A/B	0.09	A/C	0.17
Rosemont Rd/ Bay Meadows Dr	A/B	0.03	A/B	0.01	A/B	0.02
Hidden Springs Rd/Suncrest Dr	A/A	0.05	A/B	0.04	A/B	0.05
Hidden Springs Rd/ Santa Anita Dr	A/B	0.24	A/B	0.15	A/B	0.18
Hidden Springs Rd/ Carriage Way	A/B	0.03	A/B	0.03	A/B	0.03
Santa Anita Dr/Horton Rd	A/B	0.07	A/B	0.06	A/B	0.04
Santa Anita Dr/Pimlico Dr	A/B	0.08	A/B	0.11	A/B	0.11
All-Way Stop Controlled						
Rosemont Rd/Salamo Rd/Santa Anita Dr	B	0.48	B	0.51	C	0.87
Total Traffic Operating Conditions						
Unsignalized						
Rosemont Rd/ Carriage Way	A/D	0.33	A/B	0.11	A/C	0.22
Rosemont Rd/ Hidden Springs	A/C	0.21	A/C	0.18	A/C	0.24
Rosemont Rd/ Bay Meadows Dr	A/B	0.04	A/B	0.02	A/B	0.02
Hidden Springs Rd/Suncrest Dr	A/B	0.05	A/B	0.04	A/B	0.05
Hidden Springs Rd/ Santa Anita Dr	A/B	0.25	A/B	0.16	A/B	0.18
Hidden Springs Rd/ Carriage Way	A/B	0.04	A/B	0.03	A/B	0.03
Santa Anita Dr/Horton Rd	A/B	0.07	A/B	0.07	A/B	0.05
Santa Anita Dr/Pimlico Dr	A/B	0.09	A/B	0.11	A/B	0.11
Rosemont Rd / North Access	A/B	0.14	A/B	0.09	A/B	0.03
Rosemont Rd / South Access	A/B	0.03	A/B	0.02	A/B	0.03
All-Way Stop Controlled						
Rosemont Rd/Salamo Rd/Santa Anita Dr	B	0.54	C	0.55	D	0.92

Unsignalized intersections:

LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement

All-Way Stop Controlled intersections:

LOS = Level of Service of crossroads
V/C = Volume-to-Capacity Ratio of Intersection

Project Site Mitigations

The study intersections are forecasted to meet City of West Linn operating standards through the year 2012 with the addition of traffic generated by the proposed project. Therefore, no off-site mitigation measures are identified for the proposed project. However, it is recommended that the following on-site improvements be provided to provide safe internal circulation and access to the site. The following project related measures would typically be required as conditions of approval if the project were approved:

Frontage Improvements

- Frontage improvements (one-half street) should be provided on Rosemont Road based on the City of West Linn standards³ for an arterial roadway. Based on the cross-section standard, an arterial in an unconstrained environment would provide a three lane roadway with a 14 foot center median/turn lane, 11 foot travel lanes, 6 foot bike lanes, 6 foot planter strips and 6 foot sidewalks. The one-half street improvements on the project frontage of Rosemont Road should include pavement, curb, gutter, landscape strip and sidewalk.

Access Spacing/Driveway Sight Distance

- The site plan shows the proposed north access and south access would be located approximately 570 feet apart (measured centerline to centerline). The proposed spacing between the site access points would meet the City's spacing standard.
- The proposed north access and south access would not meet the City Transportation System Plan's recommended access spacing standards for the adjacent residential driveways on Rosemont Road. Due to the single family nature of the nearby driveways and their expected low traffic volumes, no vehicle conflicts are anticipated with the substandard driveway spacing.
- Sight distance at the south project access is restricted looking to the north when measured 14.4 feet back from the edge of the roadway (as required by AASHTO) due to existing thick vegetation. Some of the shrubs and trees north of the south project access would require trimming and/or removal. These shrubs and trees are located on private property that is not owned by the West Linn-Wilsonville School District. The School District and the City should work with the private property owner to remove some of the vegetation. Prior to occupancy, sight distance at both proposed project access points to Rosemont Road will need to be approved by the City Engineer.

³ City of West Linn Transportation System Plan, December 2008, Figure 8-2.

CHAPTER 2: EXISTING CONDITIONS

This chapter documents existing study area conditions, including the project site, roadway network, existing traffic volumes, existing traffic operating conditions, collision history, planned improvements, and public transit service. Supporting details such as traffic counts and level of service calculations are provided in the Appendix.

Project Site

The project site being considered for the proposed New West Linn Primary School is undeveloped land located on the east side of Rosemont Road between Hidden Springs Road to the north and Santa Anita Drive/Salamo Road to the south in City of West Linn, Oregon. The site is approximately one-half mile north of Rosemont Road Middle School, which is located in the southwest quadrant of the Rosemont Rd/Santa Anita Dr/Salamo Road intersection. The project site has recently been annexed⁴ within the City limits and will be zoned R-10 (Single-Family Residential Detached). The City of West Linn allows the development of schools within R-10 zoned land.⁵

Study Area Roadway Network

The study area roadway network in the vicinity of the project site consists of numerous streets with varying access and mobility functions. To clarify its function, each street has been assigned a functional classification by the City of West Linn.⁶ The study area roadway classifications are listed in Table 4 along with other important roadway characteristics.

Table 4: Study Area Roadway Characteristics

Roadway	Functional Classification	Posted Speed (MPH)	# Lanes	On-Street Parking	Side-walks	Bike Lanes
Rosemont Rd	Arterial	25-40	2	No	Partial	No
Hidden Springs Rd	Arterial	25	2	No	Partial	No
Santa Anita Dr	Arterial	25	2	No	Partial	No
Salamo Rd	Arterial	25-40	2	No	Yes	Yes
Pimlico Dr	Collector	25	2	No	Partial	No
Carriage Way	Collector	25	2	No	Yes	No
Horton Rd	Neighborhood Rte	25	2	No	Yes	No
Bay Meadows Dr	Neighborhood Rte	-	2	No	Yes	No
Suncrest Dr	Neighborhood Rte	25	2	No	Yes	No
Churchill Downs Dr	Local Street	25	2	No	Yes	No

⁴ www.westlinnoregon.gov/citycouncil/annexation-erickson-site-rosemont-road-and-hidden-springs-road, accessed January 15, 2010.

⁵ City of West Linn Community Development Code, Section 11.060.

⁶ City of West Linn Transportation System Plan, December 2008, Figure 8-1.

Pedestrian Facilities

Pedestrian counts were conducted at all study intersections during the AM, midday and PM peak periods (two hour count). The highest pedestrian activity observed was at the Rosemont Road/Salamo Road/Santa Anita Drive intersection with over 100 pedestrians during the AM and midday peak periods and over 50 pedestrians during the PM peak period. The study intersections along Santa Anita Drive experience moderate pedestrian activity with an average of 20 pedestrians during each peak period. Observed pedestrian volumes at the Rosemont Road/Carriage Way and Hidden Springs Road/Carriage Way intersections were relatively low, with less than five pedestrians during each peak period.

The current sidewalk on the east side of Rosemont Road near the project site is an asphalt path separated from the roadway. The project frontage improvements would construct standard concrete sidewalks along the project frontage. In general, the remaining roadways in the study area have standard 5-foot concrete sidewalks on both sides of the street.

Bicycle Facilities

Bicycle counts were conducted at all study intersections during the AM, midday and PM peak periods (two hour count). Very little bicycle activity occurred at the study intersections, with three or less bicycle crossings during each of the peak periods. The low bicycle volumes are not surprising given that there are no designated bike lanes in the vicinity of the project site.

Public Transit Service

Tri- County Metropolitan Transportation District of Oregon (TriMet) provides public transportation services in West Linn. There are currently two transit routes that serve the West Linn community.

- Bus Route 35 – Travels along Highway 43 connecting the Oregon City Transit Center and downtown Portland. The route offers 10 to 30 minute headways.
- Bus Route 154 – Travels between the Oregon City Transit Center and the southwest area of West Linn.

Neither of these bus routes provides transit service near the project site. There is no public transit service available for most of the City west of Highway 43. The nearest TriMet service is Bus Route 35 which provides a bus stop on Highway 43 at Hidden Springs Road. There is one park-and-ride lot in West Linn located at Highway 43/Cedaroak Drive intersection for commuters wishing to travel north on Bus Route 35.

Planned Improvement Projects

Based on the information provided by the City staff⁷, there is currently no transportation improvement projects planned within the study area that will be constructed by the year 2012. Therefore, no transportation improvement projects were included in the traffic analysis.

Existing Traffic Volumes

Existing traffic volumes⁸ were collected at the study intersections during the AM peak period (7:00 a.m. to 9:00 a.m.), midday peak period (2:00 p.m. to 4:00 p.m.), and PM peak period (4:00 p.m. to 6:00 p.m.). The traffic data collected also counted the number of pedestrians and bicycles at the study intersections. The AM, midday and PM peak hour traffic volumes used for the analysis are shown in Figure 2. Detailed peak period traffic count data is included in the Appendix.

A 24 hour volume and speed survey⁹ was conducted on Rosemont Road north of Bay Meadows Drive. The survey found the daily traffic volume on Rosemont Road was 5,111 vehicles (2,487 northbound and 2,624 southbound). The peak hour traffic volumes of the day occurred from 5 to 6 p.m. The speed survey conducted on Rosemont Road found the average 85th percentile speed was 46 miles per hour (44 miles per hour northbound and 48 miles per hour southbound). Vehicle speeds are typically higher for the downhill travel direction. The 85th percentile speed represents the speed at which 85 percent of the vehicles are traveling at or below. The posted speed limit on Rosemont Road near the project site is 40 miles per hour.

Existing Traffic Operating Conditions

Level of service (LOS) ratings and volume-to-capacity (V/C) ratios are commonly used as measures of effectiveness for intersection operation. LOS is similar to a “report card” rating based on the average delay experienced by vehicles at the intersection¹⁰. LOS A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. LOS D and E are progressively worse operating conditions. LOS F represents conditions where average vehicle delay has become excessive and demand has exceeded capacity. This condition is typically evident in long queues and delays.

A volume-to-capacity (V/C) ratio is a decimal representation (typically between 0.00 and 1.00) of the proportion of capacity that is being used (i.e., the saturation) at a turn movement, approach leg, or overall intersection. This indicator is determined by dividing the peak hour traffic volume by the hourly capacity of a given intersection or movement. A lower ratio indicates smooth operations and minimal delays. As the ratio approaches 1.00, congestion increases and performance is reduced. If the ratio is greater than 1.00, the turn movement, approach leg, or intersection is oversaturated and usually results in excessive queues and long delays.

⁷ Email received by City Staff, Tom Soppe on January 20, 2010.

⁸ Traffic counts were taken on January 4, 2010, by All Traffic Data.

⁹ Traffic counts were taken on January 6, 2010, by All Traffic Data.

¹⁰ A description of Level of Service (LOS) is provided in the appendix and includes a list of the delay values (in seconds) that correspond to each LOS designation.

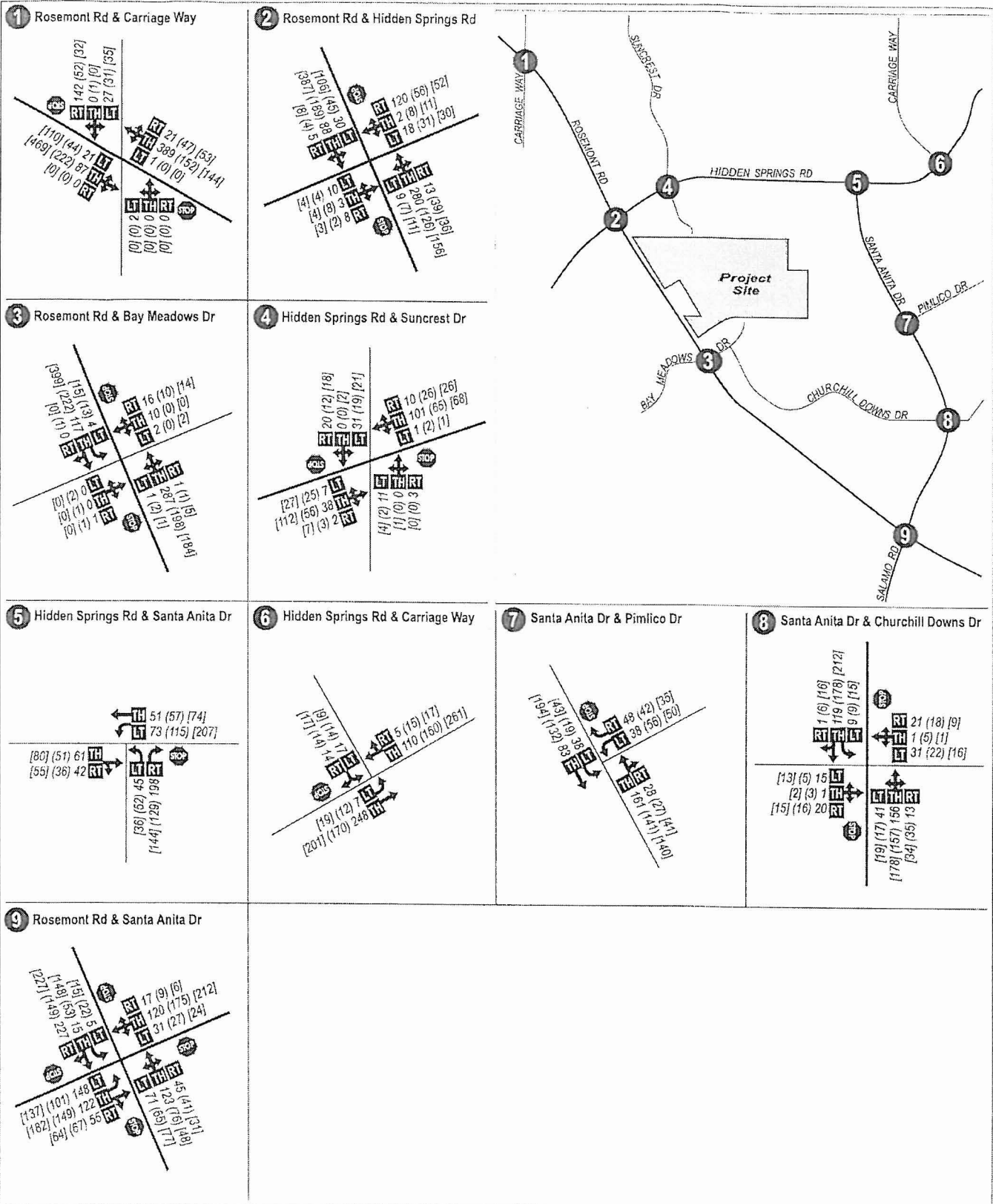


Figure 2

**2010 EXISTING
AM/MIDDAY/PM PEAK HOUR
TRAFFIC VOLUMES**

Level of service, delay and volume to capacity ratios are used as measures of effectiveness for study intersection performance. The City of West Linn requires level of service D or better for all facilities except principal arterials, where level of service E is the minimum. The existing traffic operating conditions at the study intersections were determined for the AM, midday and PM peak hours based on the 2000 Highway Capacity Manual methodology¹¹ for unsignalized intersections.

The existing operating conditions at the study intersections are shown in Table 5. Based on recent traffic counts, all of the study intersections meet the City's required standards during each of the three analysis periods. The detailed intersection operation worksheets are attached in the Appendix.

Table 5: 2010 Existing Conditions Intersection Performance

Intersection	AM Peak		Midday Peak		PM Peak	
	LOS	V/C	LOS	V/C	LOS	V/C
Unsignalized						
Rosemont Rd/ Carriage Way	A/C	0.29	A/B	0.08	A/C	0.17
Rosemont Rd/ Hidden Springs	A/B	0.18	A/B	0.09	A/C	0.15
Rosemont Rd/ Bay Meadows Dr	A/B	0.02	A/B	0.01	A/B	0.02
Hidden Springs Rd/Suncrest Dr	A/A	0.02	B/A	0.04	B/A	0.05
Hidden Springs Rd/ Santa Anita Dr	B/A	0.23	B/A	0.15	C/A	0.17
Hidden Springs Rd/ Carriage Way	A/B	0.03	A/B	0.03	A/B	0.03
Santa Anita Dr/Horton Rd	A/B	0.06	A/B	0.06	A/B	0.04
Santa Anita Dr/Pimlico Dr	A/B	0.08	A/B	0.10	A/B	0.11
All-Way Stop Controlled						
Rosemont Rd/Salamo Rd/Santa Anita Dr	B	0.45	B	0.48	C	0.81

Unsignalized intersections:

LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement

All-Way Stop Controlled intersections:

LOS = Level of Service of crossroads
V/C = Volume-to-Capacity Ratio of Intersection

Collision History

Collision data for the study intersections were obtained for 2006 through 2008 from the ODOT Crash Analysis and Reporting Unit. The collisions are categorized by severity in

Table 6. Between 2006 and 2008 there were 12 total collisions reported at study intersections with no fatalities.

Collision rates were estimated for each of the study intersections. The collision rate was calculated based on the collision data and the estimated daily traffic volumes (factored from the recent PM peak hour traffic counts). A rate greater than or equal to 1.0 collision per million entering vehicles generally indicates a higher than average collision rate and the need for further safety analysis. As listed in

¹¹ 2000 Highway Capacity Manual, Transportation Research Board, Washington DC, 2000.

Table 6, none of the study intersections have collision rates higher than 1.0. Detailed collision data is attached in the Appendix.

Table 6: Study Intersection Collision Summary (2006 through 2008)

Intersection	Collisions (by Severity)			Total	Collision Rate ^b
	PDO ^a	Injury	Fatal		
Rosemont Rd/Carriage Way	1	0	0	1	0.11
Rosemont Rd/Hidden Springs Rd	8	0	0	8	0.90
Rosemont Rd/Bay Meadows Dr	1	0	0	1	0.15
Rosemont Rd/Salamo Rd/Santa Anita Dr	1	0	0	1	0.08
Hidden Springs Rd/Suncrest Dr	0	0	0	0	0.00
Hidden Springs Rd/Santa Anita Dr	1	0	0	1	0.15
Hidden Springs Rd/Carriage Way	0	0	0	0	0.00
Santa Anita Dr/Horton Rd	0	0	0	0	0.00
Santa Anita Dr/Pimlico Dr	0	0	0	0	0.00

^a PDO = Property Damage Only

^b Collision Rate = average annual collisions per million entering vehicles (MEV); MEV estimates based on PM peak hour traffic count

The Rosemont Road/Hidden Spring Road intersection was found to have the highest number of collisions (eight in three years) and collision rate (0.90 annual collisions per million entering vehicles). Further evaluation did not find a historic trend in the collision data. The collisions at the Rosemont Road/Hidden Spring Road intersection included:

- rear end of a vehicle stopped to turn left
- passing in unsafe conditions and collision with oncoming vehicle
- left turn in front of oncoming traffic
- vehicle backing improperly into roadway
- vehicle loss of control, struck a tree

There are several factors that could be contributing to the number of collisions at the Rosemont Road/Hidden Spring Road intersection. Excessive vehicle speeds, driver behavior and limited available sight distance are the likely issues for safety. A detailed safety analysis of the Rosemont Road/Hidden Spring Road intersection would be required to provide a thorough safety investigation and identify if improvements would be recommended.

CHAPTER 3: IMPACT ANALYSIS

This chapter reviews the impact from the proposed project to the study area transportation system in West Linn. The proposed project site was analyzed for AM peak, midday, and PM peak hour impacts. The impact analysis discusses the proposed project and internal roadway network, project trip generation, trip distribution, future operating conditions of study intersections, turn lane warrant analysis, access spacing, sight distance, parking analysis, and project impacts/mitigations.

Proposed Project

The proposed project would construct a primary school, serving pre-kindergarten to fifth grade, with a maximum capacity for 500 students. The project site has recently been annexed within the City limits. The site will be zoned R-10 (Single-Family Residential Detached) which allows for educational land uses. The proposed school is assumed to be constructed and occupied by the beginning of the 2012 school year (September).

The site plan provided includes two new access points on Rosemont Road. The south project access would be restricted to school bus and school staff use only. The south access would provide a motor vehicle connection to the staff parking lot and the school bus loading/unloading area. The north access would serve general school trips. The north access would provide a motor vehicle connection to the visitor parking area and the parent pick up/drop off area.

The proposed school would operate with hours similar to other primary schools in the West Linn-Wilsonville School District. Typically, classes would start between 7:50 to 8:30 a.m. and release between 2:10 and 2:55 p.m. In comparison, the nearby Rosemont Ridge Middle School starts classes at 9:15 a.m. and releases classes at 3:45 p.m. The primary school and middle school class schedules are staggered purposely to limit off-site traffic impacts. The majority of school related trips (parents, staff and buses) generated by the proposed school are not expected to travel on the local street network at the same time as Rosemont Ridge Middle School trips.

Project Trip Generation

Trip generation is the estimation of project traffic added to nearby roadways. The trip generation estimate for the proposed project was based on data provided by the Institute of Transportation Engineers (ITE) Trip Generation Manual¹² and trip survey data collected¹³ at existing primary schools in the Portland Metro area. The primary school trip generation data provided a trip rate per student to estimate the total traffic that would be generated by the project, including trips for students and faculty staff.

Based on an assessment of the available data, the local school survey data was used for the AM peak hour and the ITE data was used for the midday and PM peak hours. The peak hour trip rates for ITE and the local school surveys are summarized in Table 7, with the trip generation rates used in the traffic analysis shown in gray.

¹² *Trip Generation, 8th Edition*, Institute of Transportation Engineers, 2003.

¹³ Trip generation survey data collected at three elementary schools in Beaverton area in 2006.

Table 7: Trip Generation Rate Comparison

Data Source	Trip Rate Per Student		
	AM	Midday	PM
Local School Survey	0.56	0.29	0.12
ITE (Land Use Code 520)	0.45	0.28	0.15

Trips rates utilized for the analysis shown in gray

The proposed project would construct a primary school with a maximum enrollment of 500 students. The initial estimated peak hour trips for the proposed school are summarized in Table 8.

Table 8: Initial Proposed Project Trip Generation Summary

Land Use	Students	Peak Hour Trips		
		AM	Midday	PM
Primary School	500	280 154 in / 126 out	140 63 in / 77 out	75 37 in / 38 out

The proposed project is planned to operate ten school buses daily. For the operational analysis of the site access points, bus trips were treated to be equivalent to two auto trips, based on Highway Capacity Manual methodology¹⁴. The trip generation estimates shown in Table 8 were adjusted to account for bus trips at the site access points. Table 9 shows the number of new buses expected with the proposed project and the estimated peak hour vehicle trip generation used for the motor vehicle capacity analysis. The proposed project would add 320 vehicle trips in the AM peak hour, 180 in the midday peak hour and 75 in the PM peak hour.

Table 9: Final Proposed Project Trip Generation Summary

	Peak Hour Trips		
	AM	Midday	PM
School Bus Trips	20 10 in / 10 out	20 10 in / 10 out	0 0 in / 0 out
School Bus Trips Converted to Auto Trips	40 20 in / 20 out	40 20 in / 20 out	0 0 in / 0 out
Initial Trip Generation Estimate	280 154 in / 126 out	140 63 in / 77 out	75 37 in / 38 out
Total New Auto Trips Used for Analysis	320 174 in / 146 out	180 83 in / 97 out	75 37 in / 38 out

*Volumes are factored to equivalent auto volumes (1 bus is equivalent to 2 autos)

¹⁴ Highway Capacity manual, Chapter 16 – Signalized Intersections, Transportation Research Board, 2000

Project Trip Distribution

Trip distribution for the proposed project was estimated based on a conceptual school district boundary map¹⁵, a review of the household density within the school district boundary and Metro's base year (2005) transportation forecast model. The school district boundary for the proposed school was conceptual only, no final school boundary adjustments have been determined. The proposed primary school was assumed to draw students from the area generally bounded by Hidden Springs Road, Rosemont Road, Carriageway, Santa Anita Drive, Pimlico Drive, Horton Road, and Suncrest Drive. Figure 3 illustrates the estimated distribution of project traffic for the proposed primary school on the surrounding street network.

Future Traffic Operating Conditions

Future traffic operating conditions were analyzed at the study intersections to determine if the existing transportation network can support the additional proposed school traffic. If the City of West Linn operating standards cannot be met with the proposed project, mitigations would be required to improve network performance.

Future Analysis Scenarios

Future AM, midday and PM Peak hour traffic operations were analyzed at the study intersections for the following two scenarios:

- 2012 Background Traffic + Approved Projects
- 2012 Total (Background + Approved + Project) Traffic

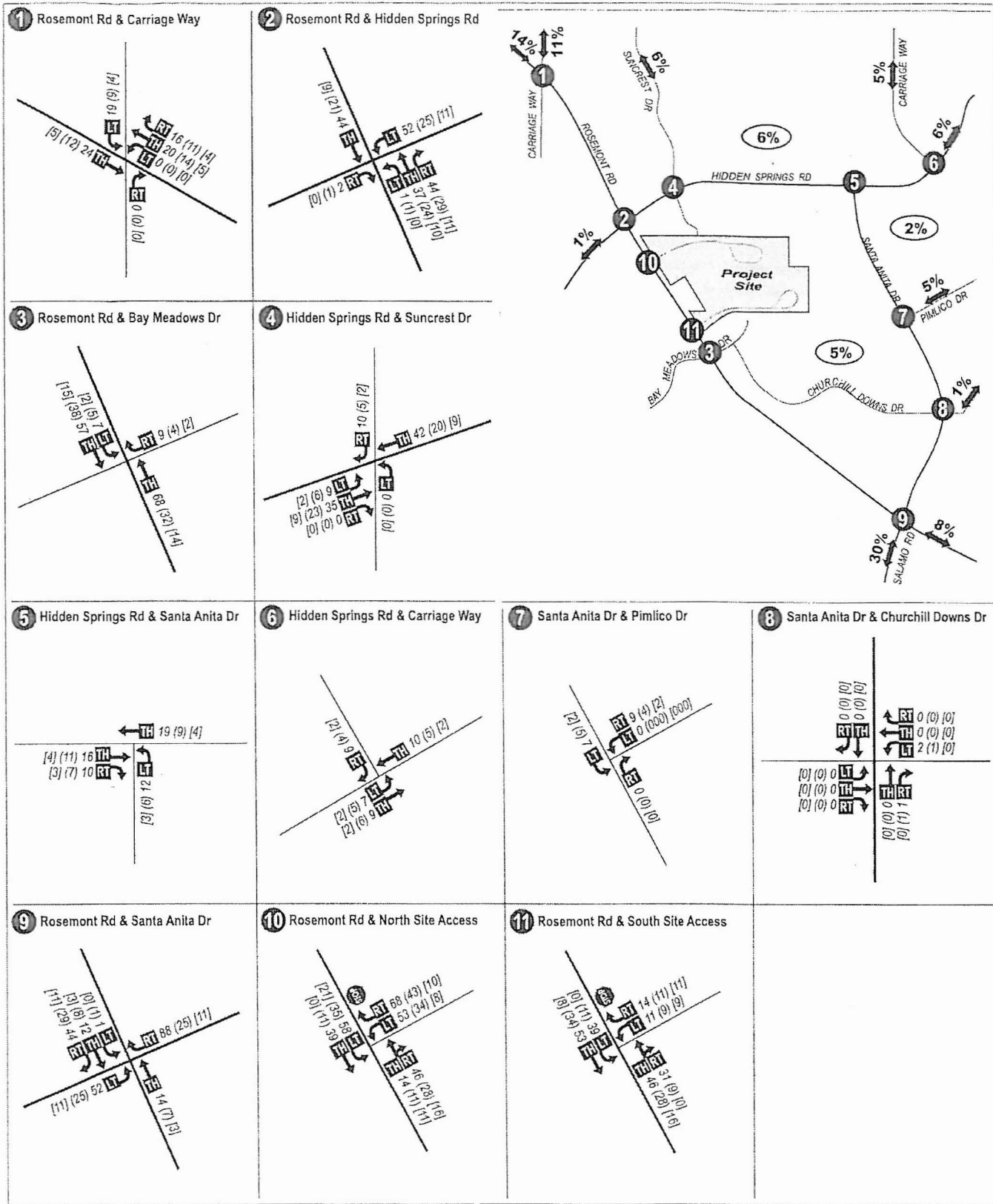
The 2012 scenario was selected since the school is anticipated to be constructed and occupied by the year 2012. The future 2012 background growth on the study area roadways was based on Metro's transportation forecast model¹⁶. For future 2012 background volumes, a two percent annual growth was applied to all study area intersections.

The City of West Linn staff provided approved but not yet constructed projects within the study area¹⁷. These projects include the Rosemont Crossing subdivision with twenty single family dwellings, and the Suncrest subdivision with six single family dwellings. Additional information regarding the approved projects is attached in the Appendix.

¹⁵ Based on information provided by Karina Ruiz, January 2010.

¹⁶ Annual growth percentage was based on the volume difference between base year 2005 and future 2030 volumes considered at several links within the study area. The determined growth percentage from different links was then averaged to have one growth percentage for all the study intersections.

¹⁷ Email sent by City Staff Tom Soppe on January 15, 2010.



LEGEND

- Study Intersection
- Lane Configuration
- 00% - Trip Distribution Percentage
- AM (Midday) [PM] - Peak Hour Traffic Volumes
- Volume Turn Movement
Left-Thru-Right

DKS Associates

Figure 3

**PROJECT TRIP DISTRIBUTION
PEAK HOUR TRIPS**

NO SCALE

MEMORANDUM

To: City of West Linn Planning Department

From: Caitilin Pope-Daum

Cc: Karina Ruiz, DOWA

Date: July 1, 2010

RE: New West Linn Primary School – Mitigation Plan

The site for the proposed New West Linn Primary School contains two water resource areas that have been identified by the West Linn Surface Water Management Plan. (See sheet LU2.01) The larger of the two runs roughly through the middle of the site, and is made up of Trillium Creek and associated wetlands. It will be referred to in this memo as the Trillium Creek WRA. The smaller water resource area lies at the southeast corner of the site, and consists of an undefined groundwater drainage ostensibly linked to a stormwater outfall at the south edge of the site. It also contains a small groundwater fed wetland (0.1 acre), also fed by the stormwater outfall. There is no channel associated with this drainage. In this memo the area will be referred to as the East Drainageway WRA.

Jurisdictional wetlands occur within each WRA. For the Trillium Creek WRA, permanent impacts have been permitted through an Army Corps of Engineers/Department of State Lands Joint Permit Application (see attached DSL Removal/Fill Permit Application). The resulting permit, DSL Permit #44165-RF is attached. Filling of the 0.1-acre wetland in the East Drainageway WRA will require a general authorization from the DSL, as indicated in the Winzler & Kelly Memo dated 6/25/2010. This approval from DSL is forthcoming.

There are a number of supporting documents which provide greater detail about proposed mitigation measures, and are referenced in this memo. They include:

- Wetland Delineation/Determination Report – WD#09-0240
- Wetlands Delineation Technical Memo by W&K, 1.18.10 – WD#10-061
- DSL Removal/Fill Permit Application #APP0044165
- Applicant's response to comments on the JPA
- DSL Permit #44165-RF
- Stormwater Report by Winzler & Kelly dated June 2010 (revised 6/17/2010)
- Assessment Area E Water Resource Area Memo by Winzler & Kelly dated June 25, 2010
- Erosion Control Plan (LU1.03)

- Planting/Irrigation Plans (LU2.04 and LU2.05)

The following is a summary of the mitigation and revegetation plan for impacts to Water Resource Areas, as required by CDC sections 32.070 and 32.080.

Trillium Creek WRA

The larger water resource area is a riparian corridor made up of Trillium Creek and its associated wetlands. The Creek and the wetlands all fall under Army Corps/Department of State Lands jurisdiction.

Mitigation, pursuant with CDC section 32.070:

- A. The alternatives analysis for impacts to the Trillium Creek WRA is contained within the DSL Removal/Fill Permit Application Section 5. Wetland impacts were avoided to the maximum extent.
- B. Required information for the mitigation plan:
 1. Adverse impacts to the Trillium Creek WRA consist of road crossings required to access the school site. A more detailed description is contained in the DSL Removal/Fill Permit Application.
 2. An explanation of how adverse impacts are avoided/mitigated is included in the DSL Permit Application. Impacts to the 50' buffer that are not included in the DSL permit will be mitigated for with 1:1 revegetation, as described below.
 3. Ultimately, the District will be responsible for all mitigation. Before commencing work in this area, the District will work with the City to identify all other parties responsible for work on the development site.
 4. Refer to sheets LU2.04 and LU2.05 (or DSL Permit) for location of mitigation activities.
 5. Initial clearing of the invasive species on the site will be done in advance of the site grading. The remainder of the mitigation plan will be implemented concurrently with the grading of the project and phased to avoid damage to mitigation areas.
 6. The District will provide the necessary bonding requirements. These will be coordinated with the City and other jurisdictions as necessary.
 7. A Joint Permit Application has been submitted and approved. See attached DSL permit #44165-RF. The compensatory mitigation plan is contained in the Permit in its entirety
- C. Within the Trillium Creek WRA, there will be permanent disturbance to the 50' buffer at the road crossings. This area will be mitigated for on a 1:1 ratio, and revegetated according to the requirements of CDC section 32.080. See sheet LU2.05 for location of these mitigation areas, and calculation of "Trillium Buffer Mitigation."
- D. The wetland mitigation program is being overseen by Nancy Olmsted, a Certified Wetland Delineator and Wetland Scientist with Winzler & Kelly. The mitigation is occurring on site.
- E. The JPA and the City of West Linn require a 5-year monitoring program of the mitigation area. The District will contract with a Certified Wetland Specialist to

conduct this monitoring program and work with the City to come to an agreement on long term protection of this area.

Revegetation, pursuant with CDC section 32.080:

Within the Trillium Creek WRA there will be revegetation along the roadways to repair construction related disturbance, and revegetation to meet mitigation requirements for permanent disturbance to both of the water resource areas. (See sheets LU2.04 and LU2.05) These areas will be revegetated to meet the standards of CDC section 32.050. All plants used for required revegetation will be found on the Metro native plant list.

- A. Revegetation within the WRA will receive temporary irrigation from June 15 through October 15 for three years following planting.
- B. All invasive non-native and noxious vegetation will be removed prior to planting.
- C. Replacement trees will be at least one-half inch caliper, and shrubs at least one-gallon container.
- D. Trees will be planted from 8 and 12 feet on-center. Shrubs will be planted between 4 and 5 feet on-center, clustered in single species groups of no more than 4 plants.
- E. Shrubs will consist of at least two different species, and where 10 or more trees are planted, no more than 50% of the trees will be of the same species.
- F. The School District will provide documentation that 80 percent survival of plants has been achieved after three years, and will provide annual reports to the Planning Director on the status of the revegetation plan during the three year period.

East Drainageway WRA

The second, smaller water resource area is an undefined groundwater drainage, ostensibly linking a stormwater outfall to a storm drain at the southeast corner of the site. In the middle of this area is a small, isolated, groundwater-fed wetland (0.1 acre) fed by the stormwater outfall. The wetland falls under the jurisdiction of the DSL, and proposed filling of this wetland will be permitted under a general authorization granted by the Oregon Department of State Lands per the Winzler & Kelly memo dated 6/25/2010.

Mitigation, pursuant with CDC section 32.070:

- A. The alternatives analysis in Section 5 of the DSL Removal/Fill Permit Application also pertains to the East Drainageway WRA. Based on this analysis, the decision was made to develop the area included in the East Drainageway WRA because it represents a lower quality water resource than the Trillium Creek WRA. For further discussion of development decisions relating to the East Drainageway WRA, refer to the narrative discussion of the variance requested under CDC section 32.090.
- B. Required information for the mitigation plan:
 - 1. Impacts - The East Drainageway WRA will be re-aligned to accommodate the proposed school playground. In place of the current undefined drainage, the water from the stormwater outfall will be directed through a defined channel, planted with native vegetation. Under the provisions of CDC 32.090, the setback for this drainage area has been reduced to 15 feet. See sheet LU2.05 for location of re-aligned drainageway and setback and typical planting. See the Stormwater Report by Winzler & Kelly for a complete description of this channel.

2. As mitigation, pursuant with CDC section 32.090(C)2, an area equal to the area lost through the reduced transition/setback will be revegetated to meet the standards of CDC 32.050 and 32.080. This revegetation will occur adjacent to the existing wetlands of the Trillium Creek WRA. See sheets LU2.04 and LU2.05 for the location of these mitigation areas and associated area calculations.
 3. Ultimately, the District will be responsible for all mitigation. Before commencing work in this area, the District will work with the City to identify all other parties responsible for work on the development site.
 4. Refer to sheets LU2.04 and LU2.05 for location of mitigation activities.
 5. The initial clearing of the invasive species on the site will be done in advance of the site grading. The remainder of the mitigation plan will be implemented concurrently with the grading of the project and phased to avoid damage to mitigation areas.
 6. The District will provide the necessary bonding requirements. These will be coordinated with the City and other jurisdictions, as necessary.
 7. In the East Drainageway WRA, there are no impacts to wetlands greater than 0.10 acres, and no Joint Permit Application is required.
- C. Permanent disturbance to the WRAs that is not wetlands will be mitigated through the creation of a mitigation area equal in size to the area being disturbed. See sheets LU2.04 and LU2.05 for location of mitigation areas, and calculations of "Drainageway Mitigation."
1. The mitigation areas occur on-site. They are located adjacent to existing wetland or DSL mitigation areas. The existing understory on these sites is dominated by Himalayan blackberry and English ivy, and thus does not meet the standard set forth in CDC section 32.050(K).
- D. The wetland mitigation program is being overseen by Nancy Olmsted, a Certified Wetland Delineator and Wetland Scientist with Winzler & Kelly. The mitigation is occurring on site.
- E. The JPA and the City of West Linn require a 5-year monitoring programming of the mitigation area. The District will contract with a Certified Wetland Specialist to conduct this monitoring program and work with the City to come to an agreement on long term protection of this area.

Revegetation, pursuant with CDC section 32.080:

Within the re-aligned drainageway of the East Drainage WRA, as well as within the designated drainageway mitigation areas, all revegetation will be done to bring the area to the standards of CDC section 32.050. At maturity, there will be a minimum of 50% canopy cover. All plants used for required revegetation will be found on the Metro native plant list.

A description of planting in the re-aligned drainageway can be found in the Stormwater Report by Winzler & Kelly. The outer edges of this Water resource area will be part of the required screening planting at the property line. The shrubs and trees in this screening planting will meet the same standards that have been described for the rest of the revegetation areas. Plant sizes and densities will be increased as necessary to meet screening requirements.

- A. Revegetation within the WRA and mitigation areas will receive temporary irrigation from June 15 through October 15 for three years following planting.
- B. All invasive non-native and noxious vegetation will be removed prior to planting.
- C. Replacement trees will be at least one-half inch caliper, and shrubs at least one-gallon container.
- D. Trees will be planted from 8 and 12 feet on-center. Shrubs will be planted between 4 and 5 feet on-center, clustered in single species groups of no more than 4 plants.
- E. Shrubs will consist of at least two different species, and where 10 or more trees are planted, no more than 50% of the trees will be of the same species.
- F. The School District will provide documentation that 80 percent survival of plants has been achieved after three years, and will provide annual reports to the Planning Director on the status of the revegetation plan during the three year period.

MEMORANDUM

TO: Tim Woodley, West Linn Wilsonville School District
 FROM: Reah Flisakowski PE, DKS Associates
 DATE: June 28, 2010
 SUBJECT: Rosemont Road-Salamo Road Intersection Traffic Operations P09031-003

This memorandum provides supplemental analysis for the New West Linn Primary School Transportation Impact Study¹ as requested by the City of West Linn². The transportation study included Rosemont Road/Salamo Road as a study intersection with traffic operating conditions based on existing traffic volumes. The City requested justification as to why the school’s transportation study and the West Linn Transportation System Plan (TSP)³ reported different existing PM peak hour traffic operating conditions for the Rosemont Road/Salamo Road intersection.

To meet the City’s request, further review of the Rosemont Road/Salamo Road intersection operations was conducted. The review found the 2006 traffic count data collected for the TSP at the subject intersection was approximately 12 percent higher than 2010 traffic count data collected for the school’s transportation study. The PM peak hour traffic volumes and operations for the Rosemont Road/Salamo Road intersection from each study are summarized in Table 1.

Table 1: Rosemont Road/Salamo Road Intersection Performance (PM Peak Hour)

Scenario	School Transportation Study		West Linn Transportation System Plan		Southbound Through-Right Turn Volume	Total Entering Volume
	LOS	V/C	LOS	V/C		
2006 Conditions			E	1.0	453	1,362
2010 Conditions	C	0.81			375	1,171

LOS – Level of Service
 V/C – Volume to Capacity Ratio for Critical Movement

At the Rosemont Road/Salamo Road intersection, the southbound shared through-right turn lane is the critical movement during the PM peak hour. The TSP found the subject intersection operated at capacity (v/c of 1.0) in 2006 based on approximately 450 vehicles in a single lane approach. The 2010 southbound shared through-right turn lane volume decreased to 375 vehicles, resulting in improved traffic operations.

¹ New West Linn Primary School Transportation Impact Study, DKS Associates, June 2010.
² Completeness Review Memorandum, Khoi Le, City of West Linn, June 4, 2010
³ West Linn Transportation System Plan, DKS Associates, December 2008.



WINZLER & KELLY

15575 SW Sequoia Pkwy, Ste. 140
Portland, OR 97224-7233

Date: 06-25-10

MEMORANDUM

Project No.: 11456-09001 Project Name: WLWSD – West Linn Primary School
To: B. Karina Ruiz, Associate Principal
From: Nancy Olmsted, Sr. Environmental Scientist
Copies To: Keith Liden, AICP; M. Wharry, P.E.; Walker-Macy
Subject: Assessment Area E Water Resource Area

This memorandum has been prepared to address the conditions of the West Linn Wilsonville School District's Primary School Site in the area designated Assessment Area E. It responds to comments received from the City of West Linn in their completeness review June 19, 2010. Item 32.050(A) Wetland consultant shall provide field test data for assessment area E below 12" storm outfall originating at Cheyenne Terrace.

Winzler & Kelly prepared a memorandum January 8, 2010 to address the conditions in the eastern portion of the school property, an area that was identified as a water resource area on the City's data base. This memorandum updates and augments the data from that initial assessment. In March and June 2010 additional observations were made of the sloped area that spans from the storm outfall originating at Cheyenne Terrace downslope to the storm drain in the north side of the property. There were several additional test pits taken near the 12" outfall in the SE corner of the site and along the centerline of the area designated water resource area by the City of West Linn.

Findings are that no channel exists, there is a high water table (within 8 – 12 inches from the surface) and some surface water ponding during and for a day or so after any precipitation event. However, the residence time of the surface and high water table diminish rapidly when there is no longer any precipitation or discharge of stormwater from the 12-inch outfall from Cheyenne Terrace. Some surface ponding persists longer in highly-compacted wheel ruts approximately 20 feet below the outfall.

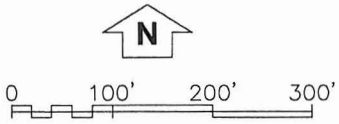
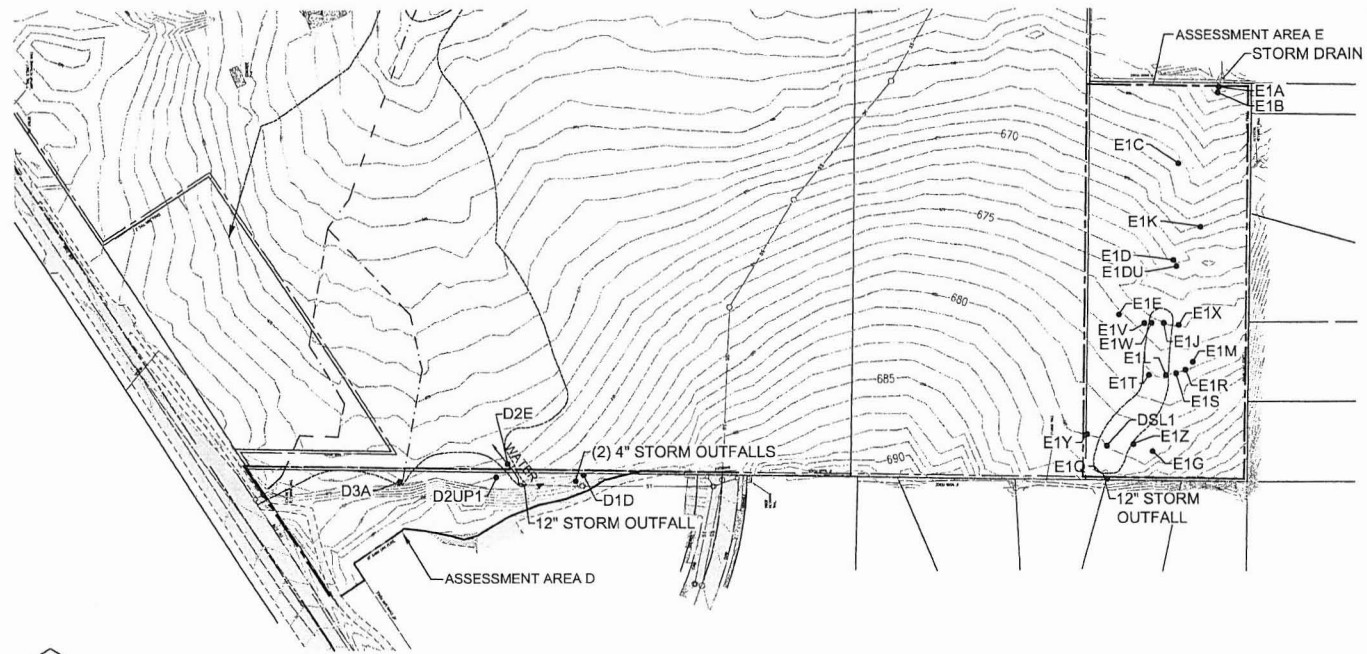
The attached map, Figure 6. Additional Sampling for Wetland Delineation Study, and associated data sheets reveal that a linear shaped area between the storm outfall and the center of the assessment area approximately 4,934 square foot (0.1-acre) contains evidence of three parameters that are necessary to qualify as a jurisdictional wetland. These three parameters are: 1) hydrophytic wetland indicator plants; 2) hydric soil characteristics; and 3) evidence of hydrology. Sample pits shown on the figure were reviewed in the field with a representative from Oregon Department of State Lands (DSL), and the center elliptical shaped polygon outlines the boundary of the area that meets the DSL definition of a jurisdictional wetland. The remainder of the area below the Cheyenne Terrace outfall was not found to have the

characteristics for a jurisdictional wetland, and it is only subject to City of West Linn requirements. DSL has reviewed this in the field and will provide the West Linn Wilsonville School District a concurrence letter on the jurisdictional wetland boundary for the record.

Since this small wetland is proposed to be filled as a part of the land development process, the DSL and the U.S. Army Corps of Engineers will need to be consulted to obtain permission. If the DSL rules for general authorization under the State or Oregon or a Nationwide Permit under the U.S. Army Corps of Engineers apply, then the permit processes can be approved within 30 days. The District will submit the Joint Removal Fill Permit Application by July 9th and then take necessary steps to conclude these approvals expeditiously.

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LEGEND
 ——— STUDY AREA BOUNDARY
 - - - - WETLAND BOUNDARY
 - - - - WATERS



WINZLER & KELLY 15575 SW SEQUOIA PKWY, SUITE 140 PORTLAND, OR 97224 PH: 503-226-3921 FAX: 503-226-3926	PROJECT WEST LINN-WILSONVILLE SCHOOL DISTRICT 3JT ERICKSON SCHOOL SITE				TITLE FIG. 6 ADDITIONAL SAMPLING FOR WETLAND DELINEATION STUDY	
	DESIGNED	DRAWN	APPROVED	DATE	PROJECT NO.	DWG NO.
	KPT	NO	12/14/09	114560900		

Q:\11456 - WLWSD (WEST LINN-WILSONVILLE SCHOOL DISTRICT)\11456-09001 WLWSD ERICKSON WETLANDS\CAD\FIG 6A WETLAND.DWG 5th Stevens 7/17/2010 3:28 PM

June 25, 2010

Dull Olson Weekes Architects
319 S.W. Washington St., Suite 200
Portland, OR 97204

Attention: Mr. Norm Dull

Re: West Linn-Wilsonville School District
Erickson Elementary School, Site Noise Review

Project 09119

Dear Mr. Dull:

This letter is written, at your request, in review of potential noise levels that might be expected to be generated in conjunction with the referenced project. This review was undertaken in support of the Conditional Use Permit application for the proposed project.

1. Introduction

- 1.1 The proposed project is an Elementary School for the West Linn-Wilsonville School District. It is to be located on the East side of Rosemont Road between Hidden Springs Road and Bay Meadows Drive in West Linn, Oregon. The project site is zoned Future Urban and the general land use surrounding the project site is Residential.

2. Sound Descriptors

- 2.1 Human response to sound is a function of the magnitude of a sound, the frequency spectrum of the sound (the pitch of the sound), the duration of the sound and the time when it occurs. It is difficult to describe a sound with a single number because of all these parameters that influence human response.
- 2.2 The A-weighting function, used in most sound measuring instruments adjusts the indicated overall sound pressure level in much the same manner that the human ear responds to sound at different frequencies. Thus the A-weighted sound level (read as "dBA") becomes a single number that defines the level of a sound with some indication as to the human response to that sound.

- 2.3 The A-weighted sound level alone is not sufficient to describe the noise environment at any given location because environmental sound levels tend to constantly change with time. Therefore, an environmental noise descriptor needs to address the length of time sound is present as well as the level of the sound. One environmental noise descriptor used widely throughout the United States is the "Statistical Sound Level". The statistical sound level is generally given in terms of "the level exceeded a percentage of time during a specified time period, and is read " L_{xx} ". For example, the L_{50} would be that level exceeded 50% of the time during a specified time period. Usually, the specified time period is one hour in most regulations and standards.
- 2.4 Another noise descriptor which addresses time duration of sound is the L_{EQ} which is the energy-equivalent, average sound pressure level for a given time period.
- 2.5 Subjectively, an increase in sound level of 1 dBA would be judged insignificant, an increase of 3 dBA would be perceptible by most people, and an increase of 10 dBA would generally be judged as twice as loud.

3. West Linn Noise Regulations

- 3.1 The City of West Linn Noise Code in Chapter 55 of the Community Development Code is defined in terms of statistical noise levels L_{01} , L_{10} and L_{50} . The regulations state that a commercial/industrial source shall not exceed the following maximum allowable statistical noise levels in any one hour during the hours of:

<u>7:00 AM - 10:00 PM</u>	<u>10:00 PM - 7:00 AM</u>
L_{50} - 55 dBA	L_{50} - 50 dBA
L_{10} - 60 dBA	L_{10} - 55 dBA
L_{01} - 75 dBA	L_{01} - 60 dBA

Where L_{50} , L_{10} , and L_{01} , means the level equaled or exceeded 50%, 10%, and 1% of an hour respectively.

- 3.2 Further, the regulation requires that, on a previously unused commercial/industrial site, site related noise levels, either directly generated or indirectly caused by that site shall not increase the existing ambient statistical noise levels L_{10} or L_{50} , by more than 5 dBA in any one hour. Indirectly caused noise includes that from site-related traffic even when off site.
- 3.3 Based on the above, four general noise sources were reviewed relative to the Conditional Use Permit application; 1) Off-Site Traffic, 2) On-Site Traffic, 3) Playground Noise, and 4) Site Associated Equipment.

4. Existing Ambient Noise Levels

- 4.1 In order to evaluate applicability of the "increase in ambient L₁₀ and L₅₀ level" portion of the West Linn regulations, sound levels were measured in residential areas surrounding the project site. Measurements were made adjacent to the project property line at each of the sites. At each site, noise level measurements were made for 5 minute intervals. The measurements were made between 10 AM and 12 AM on Thursday, February 18, 2010. Measurements were made 5 feet above ground using a sound level meter meeting American National Standards Institute (ANSI) requirements for a Type 2A sound level meter. The sound level meter was field calibrated immediately prior to the measurements.
- 4.2 The ambient sound levels were measured at four locations which are presented in the table below.

TABLE 1
MEASURED EXISTING AMBIENT SOUND LEVELS
 (Average Sound Pressure Level (L₅₀, L_{EQ}, L₁₀) in dBA re 20 micro-Pascal)

Location	Ambient Sound Levels		
	L ₅₀	L _{EQ}	L ₁₀
Martin Ct. & Suncrest Dr.	45	50	54
SW Corner of Hidden Springs Ct.	49	53	55
East End of Bay Meadows Dr	42	44	45
100' East of Rosemont Road	45	53	58

- 4.3 Based on the measured existing ambient sound levels, and the West Linn noise code, the following table shows the site specific sound level limits for on-site noise sources to residential property adjacent to the project site.

TABLE 2
MAXIMUM ALLOWABLE 1 HOUR STATISTICAL SOUND LEVELS
 (Average Sound Pressure Level (L₅₀, L_{EQ}, L₁₀) in dBA re 20 micro-Pascal)

Location	7:00 AM to 10:00 PM Sound Level Limits		
	L ₅₀	L ₁₀	L ₀₁
North Edge of Project Site	50	59	75
East Edge of Project Site	54	60	75
South Edge of Project Site	47	50	75
West Edge of Project Site	50	60	75

5. Off-Site Traffic Noise

- 5.1 Off Site Traffic sound levels were estimated using algorithms of the Federal Highway Administration (FHWA) Traffic Noise Prediction Model. Traffic Volumes and speeds were determined based on traffic data provided by DKS Associates, the transportation engineers preparing the Erickson Elementary School Transportation Impact Study. Traffic volumes at various intersections were provided for the 7:00-8:00 AM hour and the 3:00 to 4:00 PM hour. The traffic volumes were provided for existing traffic and future plus project conditions.
- 5.2 Although the West Linn noise regulations are listed in terms of L_{10} and L_{50} , relative to off-site traffic, the "increase" in these levels is all that is of significance for compliance. Normally, a given L_{EQ} level falls between the L_{50} and L_{10} levels. Increases in L_{50} and L_{10} levels are similar to the increase in L_{EQ} level. Therefore, estimates of the increase in traffic noise level were made based on the L_{EQ} levels.
- 5.3 Using the determined traffic volumes and speeds, traffic noise levels were estimated for a distance 50 feet from the edge of the roadways for each case. Again, although residences will not typically be located at this distance, it provides a reference from which to estimate the increase or decrease in sound level between the existing and post project conditions.

5.4 The following table lists the estimated changes in traffic noise level due to the project.

TABLE 3
ESTIMATED TRAFFIC SOUND LEVELS
50 Feet from the Road Edge
(Average Sound Pressure Level (L_{EQ}) in dBA re 20 micro-Pascal)

Roadway	AM Peak Hour			Afternoon School End Hour		
	Existing	Post-Project	Change	Existing	Post-Project	Change
Rosemont:						
(E of Carriage Way)	64	66	+2	64	65	+1
(S of Hidden Springs)	62	65	+3	64	66	+2
(N of Bay Meadows)	63	64	+1	64	65	+1
(W of Santa Anita)	64	66	+2	63	64	+1
Hidden Springs:						
(E of Suncrest)	54	57	+3	59	60	+1
(W of Santa Anita)	54	57	+3	57	58	+1
(W of Carriage Way)	59	60	+1	60	61	+1
Santa Anita:						
(S of Hidden Springs)	59	59	0	59	60	+1
(N of Rosemont)	60	60	0	63	63	0
Carriage Way:						
(N of Hidden Springs)	51	54	+3	52	53	+1

5.5 As the table above indicates, the traffic noise levels from all roadways, for both the morning peak and afternoon traffic periods, are not expected to increase more than 3 dBA in all cases and 1 dBA in most cases.

6. On-Site Traffic Noise

6.1 North Site Entrance

6.1.1 Assuming worst case, on-site traffic conditions of the peak morning hour, 225 vehicles are expected to move on or off the site through the North project entrance from Rosemont Road. The estimated worst case L_{EQ} noise level for this traffic, moving at 20 mph, at 100 feet was 47 dBA (L_{EQ}). Based on this data, the L_{50} level for on-site traffic at the North edge of the project site was estimated at 45 dBA and the L_{10} level was estimated at 50 dBA. These levels would meet the West Linn noise level limits for the L_{50} of 50 dBA and the L_{10} of 59 dBA at the nearest residential property for the hours of 7 am to 10 pm, as presented in Table 2. (Based on ambient noise levels at the North end of the project site, see item 4.3).

6.2 South Site Entrance

6.2.1 During the same peak morning hour, 50 automobiles and 10 buses are expected to move on or off the site through the South project entrance off of Rosemont Road. The closest residential property is approximately 75 feet from the vehicle circulation path. The busses and automobiles must meet the West Linn noise level limits for the L_{50} of 47 dBA and the L_{10} of 50 dBA at the nearest residential property for the hours of 7 am to 10 pm, as presented in Table 2. (Based on ambient noise levels at the South end of the project site, see item 4.3).

6.2.2 Based on measured sound levels of propane fuel busses idling and driving, the anticipated sound level of a propane bus measured at a distance of 75 feet would be 49 dBA while driving 10 mph and 42 dBA while idling. Therefore, between 7 am and 10 pm the propane busses could idle continuously without exceeding the West Linn noise limit for L_{50} of 47 dBA. The propane busses could drive on site for a cumulative time period greater than 6 minutes but less than 30 minutes and still meet the West Linn noise level limit for L_{10} of 50 dBA at the nearest residential property.

6.2.3 Based on this analysis, if the planned propane busses are used, the L_{10} limit of 50 dBA and the L_{50} limit of 47 dBA would be met at the nearest residential property, assuming the propane busses do not continuously drive on-site for longer than 29 minutes and occurs between the hours of 7 am and 10 pm. Idling of propane busses would need no restriction to meet the West Linn noise limits.

6.2.4 Delivery trucks will also enter the site through the south entrance. Based on measured sound levels of delivery trucks driving and idling, the anticipated sound level of a delivery truck measured at a distance of 75 feet would be 63 dBA while driving 10 mph and 59 dBA while idling. A single truck arriving at the site, driving to the loading dock and parking with the engine turned off, and then leaving the site would exceed 50 dBA

for approximately 2 to 3 minutes. Therefore, between 7 am and 10 pm during any one hour period, a maximum of 2 delivery trucks could arrive at the site without causing the L_{10} of 50 dBA to be exceeded at the residential properties across the south property line. This assumes that all delivery trucks are turned off immediately after parking at the loading dock.

7. Playground Noise

- 7.1 The playground for the project site is approximately 100 feet from the east property line. Assuming a crowd of approximately 100 children playing and 3 adult supervisors on the playground, noise levels were estimated at 45 dBA for the L_{50} at the east property line, and 53 dBA for the L_{10} . These levels meet the West Linn noise level limits for the L_{50} of 54 dBA and the L_{10} of 60 dBA (Based on ambient noise levels at the East end of the project site, see item 4.3).
- 7.2 Similarly, the softball diamond near the northwest corner of the project site is approximately 100 feet from the north property line. With a crowd as described above, the estimated sound level would meet the West Linn noise level limits for the L_{50} of 50 dBA and the L_{10} of 59 dBA at the nearest residential property to the north, between the hours of 7 am and 10 pm (Based on ambient noise levels at the North end of the project site, see item 4.3).

8. Site Equipment Noise

- 8.1 The physical plant noise that might have impact on local residential property includes heating, ventilating and air-conditioning (HVAC) units on the school roof, and the trash compactor, transformer and emergency generator in the equipment yard.
- 8.2 Roof-top Air-Conditioning Units
- 8.2.1 A total of eight heating and ventilating units are proposed to be mounted on the roof of the school. The nearest residential building on the closest residential property with the strictest sound level limits is located on the south property line. The mechanical units vary in distance from the south property line, from as close as 175' to as far as 280'. At this stage of design, the final choice for the HVAC unit has not been made. Currently, the mechanical engineers are expecting that seven of the eight units will have air-cooled condensers and "scroll" compressors (AAON RN series & McWuay RPS series).

8.2.2 Based on manufacturer's sound data for these units, and taking into account the horizontal distance and shielding from building elements, the estimated sound level for the residence at the south property line of the project was determined at 46 dBA. The West Linn L_{50} limit for daytime periods at the south property line is 47 dBA. In that the projected sound level is below this limit, it is expected that West Linn standards should be met by the proposed roof-top mechanical equipment. These calculations assume that the mechanical screens for RTU-301, RTU-302, RTU-303 and RTU-307 are equal in height to the units, and that the mechanical screens for the remaining rooftop RTUs are 3 feet taller than the adjacent RTU.

8.3 Emergency Generator

8.3.1 At this time sound data is not available for the tentatively selected emergency generator. When this sound data becomes available the sound levels will be reviewed, and if necessary, mitigation requirements would be implemented to meet the West Linn noise requirements.

8.4 Transformer and Trash Compactor

8.4.1 The anticipated sound levels due to the transformer and trash compactor should be less than the emergency generator and would also be expected to meet the West Linn noise requirements.

8.5 Wind Turbine

8.5.1 A single wind turbine is planned for installation near the southwest corner of the elementary school. The wind turbine would be approximately 120 feet from the nearest residential property to the south. Based on manufacture sound levels, the wind turbine is expected to produce less than 40 dBA at a distance of 60 feet at a wind speed of 15 miles per hour. Operation of the wind turbine should meet the West Linn noise requirements.

9. Conclusion

9.1 Based on the above review, the proposed increases in off-site traffic should meet the West Linn noise codes.

9.2 The proposed on-site bus and automobile circulation areas should meet the West Linn noise codes, assuming that only propane busses are used on-site. Truck deliveries on the project site should also meet the West Linn noise codes, assuming that truck deliveries occur between 7 am and 10 pm and no more than two deliveries occur in any one hour period.

9.3 No installed public address systems are provided or planned for the Athletic Field and Softball Field, therefore no noise impact is anticipated due to this type of source.

Mr. Norm Dull
June 25, 2010
Page 9

- 9.4 Noise on the playgrounds and athletic fields should meet the West Linn noise code requirements for the daytime hours of 7 AM to 7 PM. However, Crowd noises at school sponsored events are exempt from the West Linn Municipal Code.
- 9.5 Based on proposed equipment sound data, exterior mechanical equipment for the project site should meet the West Linn noise codes, assuming all mechanical screens for RTU-301, RTU-302, RTU-303, and RTU-307 are equal in height to the rooftop units, and assuming remaining mechanical screens on the southern roof area are 3 feet taller than the rooftop units.

In summary, it is expected that the proposed project will meet all West Linn noise regulations.

Sincerely,
ALTERMATT ASSOCIATES



Kent McKelvie
Staff Engineer

KM:ra



New West Linn Primary School

Transportation Impact Study

June 2010

Prepared for: West Linn-Wilsonville School District

Prepared by: **DKS Associates**
TRANSPORTATION SOLUTIONS

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CHAPTER 1: INTRODUCTION AND FINDINGS

This report evaluates the transportation impacts of the proposed New West Linn Elementary School located in West Linn, Oregon. The purpose of this report is to identify mitigation measures required to accommodate potential traffic impacts from the proposed project. This chapter provides a summary of the study area, existing transportation conditions, project trip generation and distribution, future transportation conditions, and impacts identified for the proposed project.

Study Area

The study area and the proposed New West Linn Elementary School site are shown in Figure 1. The project site is located on the east side of Rosemont Road, south of Hidden Springs Road and north of Bay Meadows Drive. Based on the preliminary site plan provided by the project sponsor, the project would include two access points onto Rosemont Road.

Based on correspondence with City of West Linn staff¹, nine intersections, as well as the two proposed access points, were selected for the traffic analysis. The study intersections selected for the analysis include:

- Rosemont Road/Carriage Way
- Rosemont Road/Hidden Springs Road
- Rosemont Road/North School Access
- Rosemont Road/South Buss Access
- Rosemont Road/Bay Meadows Drive
- Rosemont Road/Salamo Road/Santa Anita Drive
- Hidden Springs Road/Suncrest Drive
- Hidden Springs Road/Santa Anita Dr
- Hidden Springs Road/Carriage Way
- Santa Anita Drive/Horton Rd/Churchill Downs Drive
- Santa Anita Drive/Pimlico Drive

Table 1 provides key characteristics of the study area and the proposed project.

Proposed Project

The proposed project would construct an elementary school (pre-kindergarten to fifth grade) with a maximum capacity for 500 students. The project site has recently been annexed within the City limits. The site will be zoned R-10 (Single-Family Residential Detached) which allows for educational land uses. The proposed school is assumed to be constructed and occupied by the beginning of the 2012 school year (September).

¹ Email correspondence from Norm Dull, Dull Olson Weekes Architects, December 15, 2009.

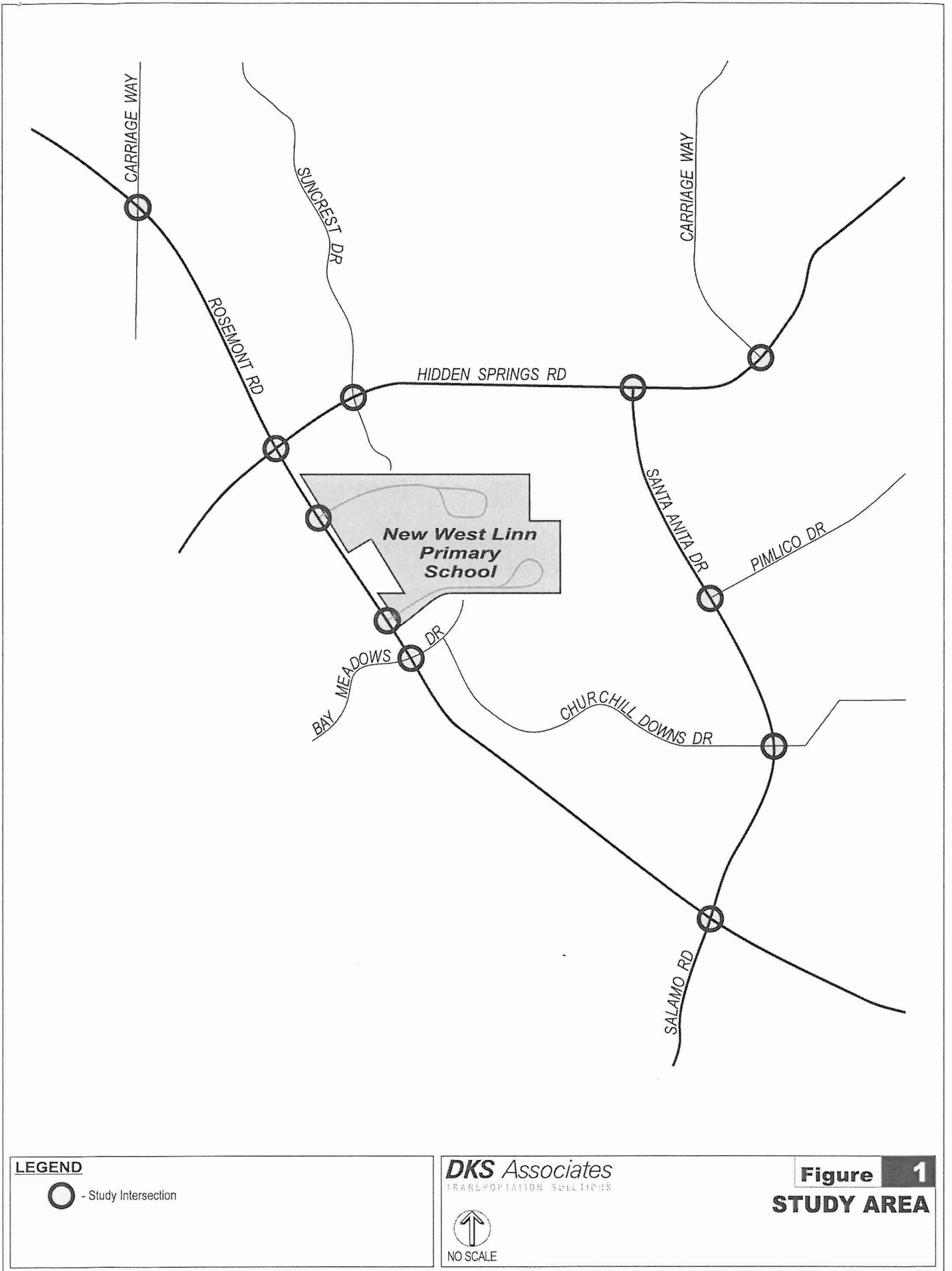


Table 1: Study Area and Proposed Project Characteristics

<u>Study Area</u>	
Number of Study Intersections	9 plus 2 site access points
Analysis Periods	AM peak hour (7 to 9 a.m.) Midday peak hour (2 to 4 p.m.) PM peak hour (4 to 6 p.m.)
<u>Nearby Alternative Mode Facilities</u>	
Pedestrian Facilities	Existing sidewalk on the east side of Rosemont Road along the project frontage
Bicycle Facilities	No dedicated bike lane and shoulder bikeways provided near the project site
Public Transit Facilities	No public transit service is provided at the project site. The nearest public transit is TriMet Route 35 on Highway 43 at Hidden Springs Road.
<u>Proposed Project Trips</u>	
AM Peak Hour Trips	280 (154 in/126 out)
Mid-day Peak Hour Trips	140 (63 in/77 out)
PM Peak Hour Trips	75 (37 in/38 out)
Proposed Vehicle Access Points	Two full access points on Rosemont Road North Access for parents and visitors South Access for school buses and employees

Traffic Impact Analysis

To determine the impacts from the proposed project at the study intersections, traffic operating conditions were analyzed at the study intersections during the AM, midday and PM peak hours for the following scenarios:

- 2010 Existing Traffic
- 2012 Background Traffic + Approved Projects
- 2012 Total (Background + Approved + Project) Traffic

The Existing traffic scenario was based on 2010 traffic counts and used as a baseline for comparison to the other two scenarios. The 2012 scenario was selected since the school is anticipated to be constructed and occupied by year 2012. The 2012 Background volumes were estimated by applying a two percent annual growth rate to 2010 traffic counts. The vehicle trips generated by approved projects were added to 2012 background volumes to develop the 2012 Background + Approved project scenario. The 2012 total volumes were estimated by adding project traffic to Background + Approved project traffic volumes.

2009 Existing Operating Conditions

The existing traffic operating conditions at the study intersections were evaluated for the AM, midday and PM peak hours based on the *2000 Highway Capacity Manual* methodology² for unsignalized intersections. The City of West Linn requires level of service D or better for all facilities except principal arterials, where level of service E is the minimum. The existing intersection performance is shown in Table 2. All of the study intersections currently meet standards during each of the three analysis periods.

Table 2: 2010 Existing Conditions Intersection Performance

Intersection	AM Peak		Midday Peak		PM Peak	
	LOS	V/C	LOS	V/C	LOS	V/C
Unsignalized						
Rosemont Rd/ Carriage Way	A/C	0.29	A/B	0.08	A/C	0.17
Rosemont Rd/ Hidden Springs Rd	A/B	0.18	A/B	0.09	A/C	0.15
Rosemont Rd/ Bay Meadows Dr	A/B	0.02	A/B	0.01	A/B	0.02
Hidden Springs Rd/Suncrest Dr	A/A	0.02	A/B	0.04	A/B	0.05
Hidden Springs Rd/ Santa Anita Dr	A/B	0.23	A/B	0.15	A/B	0.17
Hidden Springs Rd/ Carriage Way	A/B	0.03	A/B	0.03	A/B	0.03
Santa Anita Dr/Horton Rd	A/B	0.06	A/B	0.06	A/B	0.04
Santa Anita Dr/Pimlico Dr	A/B	0.08	A/B	0.10	A/B	0.11
All-Way Stop Controlled						
Rosemont Rd/Salamo Rd/Santa Anita Dr	B	0.45	B	0.48	C	0.81

Unsignalized intersections:

LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement

All-Way Stop Controlled intersections:

LOS = Level of Service of crossroads
V/C = Volume-to-Capacity Ratio of Intersection

2012 Traffic Operating Conditions

Intersection operating conditions for the 2012 background (including approved projects) and total traffic scenarios are listed in Table 3. All study intersections are expected to meet applicable City mobility standards under both scenarios (i.e., with or without the proposed project). Therefore, none of the study intersections would require off-site improvements to mitigate impacts from the proposed project traffic.

² 2000 *Highway Capacity Manual*, Transportation Research Board, Washington DC, 2000.

Table 3: 2012 Background and Total Traffic Intersection Performance

Intersection	AM Peak		Midday Peak		PM Peak	
	LOS	V/C	LOS	V/C	LOS	V/C
Background Traffic Operating Conditions						
Unsignalized						
Rosemont Rd/ Carriage Way	A/D	0.31	A/B	0.08	A/C	0.19
Rosemont Rd/ Hidden Springs	A/B	0.19	A/B	0.09	A/C	0.17
Rosemont Rd/ Bay Meadows Dr	A/B	0.03	A/B	0.01	A/B	0.02
Hidden Springs Rd/Suncrest Dr	A/A	0.05	A/B	0.04	A/B	0.05
Hidden Springs Rd/ Santa Anita Dr	A/B	0.24	A/B	0.15	A/B	0.18
Hidden Springs Rd/ Carriage Way	A/B	0.03	A/B	0.03	A/B	0.03
Santa Anita Dr/Horton Rd	A/B	0.07	A/B	0.06	A/B	0.04
Santa Anita Dr/Pimlico Dr	A/B	0.08	A/B	0.11	A/B	0.11
All-Way Stop Controlled						
Rosemont Rd/Salamo Rd/Santa Anita Dr	B	0.48	B	0.51	C	0.87
Total Traffic Operating Conditions						
Unsignalized						
Rosemont Rd/ Carriage Way	A/D	0.33	A/B	0.11	A/C	0.22
Rosemont Rd/ Hidden Springs	A/C	0.21	A/C	0.18	A/C	0.24
Rosemont Rd/ Bay Meadows Dr	A/B	0.04	A/B	0.02	A/B	0.02
Hidden Springs Rd/Suncrest Dr	A/B	0.05	A/B	0.04	A/B	0.05
Hidden Springs Rd/ Santa Anita Dr	A/B	0.25	A/B	0.16	A/B	0.18
Hidden Springs Rd/ Carriage Way	A/B	0.04	A/B	0.03	A/B	0.03
Santa Anita Dr/Horton Rd	A/B	0.07	A/B	0.07	A/B	0.05
Santa Anita Dr/Pimlico Dr	A/B	0.09	A/B	0.11	A/B	0.11
Rosemont Rd / North Access	A/B	0.14	A/B	0.09	A/B	0.03
Rosemont Rd / South Access	A/B	0.03	A/B	0.02	A/B	0.03
All-Way Stop Controlled						
Rosemont Rd/Salamo Rd/Santa Anita Dr	B	0.54	C	0.55	D	0.92

Unsignalized intersections:

LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement

All-Way Stop Controlled intersections:

LOS = Level of Service of crossroads
V/C = Volume-to-Capacity Ratio of Intersection

Project Site Mitigations

The study intersections are forecasted to meet City of West Linn operating standards through the year 2012 with the addition of traffic generated by the proposed project. Therefore, no off-site mitigation measures are identified for the proposed project. However, it is recommended that the following on-site improvements be provided to provide safe internal circulation and access to the site. The following project related measures would typically be required as conditions of approval if the project were approved:

Frontage Improvements

- Frontage improvements (one-half street) should be provided on Rosemont Road based on the City of West Linn standards³ for an arterial roadway. Based on the cross-section standard, an arterial in an unconstrained environment would provide a three lane roadway with a 14 foot center median/turn lane, 11 foot travel lanes, 6 foot bike lanes, 6 foot planter strips and 6 foot sidewalks. The one-half street improvements on the project frontage of Rosemont Road should include pavement, curb, gutter, landscape strip and sidewalk.

Access Spacing/Driveway Sight Distance

- The site plan shows the proposed north access and south access would be located approximately 570 feet apart (measured centerline to centerline). The proposed spacing between the site access points would meet the City's spacing standard.
- The proposed north access and south access would not meet the City Transportation System Plan's recommended access spacing standards for the adjacent residential driveways on Rosemont Road. Due to the single family nature of the nearby driveways and their expected low traffic volumes, no vehicle conflicts are anticipated with the substandard driveway spacing.
- Sight distance at the south project access is restricted looking to the north when measured 14.4 feet back from the edge of the roadway (as required by AASHTO) due to existing thick vegetation. Some of the shrubs and trees north of the south project access would require trimming and/or removal. These shrubs and trees are located on private property that is not owned by the West Linn-Wilsonville School District. The School District and the City should work with the private property owner to remove some of the vegetation. Prior to occupancy, sight distance at both proposed project access points to Rosemont Road will need to be approved by the City Engineer.

³ City of West Linn Transportation System Plan, December 2008, Figure 8-2.

CHAPTER 2: EXISTING CONDITIONS

This chapter documents existing study area conditions, including the project site, roadway network, existing traffic volumes, existing traffic operating conditions, collision history, planned improvements, and public transit service. Supporting details such as traffic counts and level of service calculations are provided in the Appendix.

Project Site

The project site being considered for the proposed New West Linn Primary School is undeveloped land located on the east side of Rosemont Road between Hidden Springs Road to the north and Santa Anita Drive/Salamo Road to the south in City of West Linn, Oregon. The site is approximately one-half mile north of Rosemont Road Middle School, which is located in the southwest quadrant of the Rosemont Rd/Santa Anita Dr/Salamo Road intersection. The project site has recently been annexed⁴ within the City limits and will be zoned R-10 (Single-Family Residential Detached). The City of West Linn allows the development of schools within R-10 zoned land.⁵

Study Area Roadway Network

The study area roadway network in the vicinity of the project site consists of numerous streets with varying access and mobility functions. To clarify its function, each street has been assigned a functional classification by the City of West Linn.⁶ The study area roadway classifications are listed in Table 4 along with other important roadway characteristics.

Table 4: Study Area Roadway Characteristics

Roadway	Functional Classification	Posted Speed (MPH)	# Lanes	On-Street Parking	Side-walks	Bike Lanes
Rosemont Rd	Arterial	25-40	2	No	Partial	No
Hidden Springs Rd	Arterial	25	2	No	Partial	No
Santa Anita Dr	Arterial	25	2	No	Partial	No
Salamo Rd	Arterial	25-40	2	No	Yes	Yes
Pimlico Dr	Collector	25	2	No	Partial	No
Carriage Way	Collector	25	2	No	Yes	No
Horton Rd	Neighborhood Rte	25	2	No	Yes	No
Bay Meadows Dr	Neighborhood Rte	-	2	No	Yes	No
Suncrest Dr	Neighborhood Rte	25	2	No	Yes	No
Churchill Downs Dr	Local Street	25	2	No	Yes	No

⁴ www.westlinnoregon.gov/citycouncil/annexation-erickson-site-rosemont-road-and-hidden-springs-road, accessed January 15, 2010.

⁵ City of West Linn Community Development Code, Section 11.060.

⁶ City of West Linn Transportation System Plan, December 2008, Figure 8-1.

Pedestrian Facilities

Pedestrian counts were conducted at all study intersections during the AM, midday and PM peak periods (two hour count). The highest pedestrian activity observed was at the Rosemont Road/Salamo Road/Santa Anita Drive intersection with over 100 pedestrians during the AM and midday peak periods and over 50 pedestrians during the PM peak period. The study intersections along Santa Anita Drive experience moderate pedestrian activity with an average of 20 pedestrians during each peak period. Observed pedestrian volumes at the Rosemont Road/Carriage Way and Hidden Springs Road/Carriage Way intersections were relatively low, with less than five pedestrians during each peak period.

The current sidewalk on the east side of Rosemont Road near the project site is an asphalt path separated from the roadway. The project frontage improvements would construct standard concrete sidewalks along the project frontage. In general, the remaining roadways in the study area have standard 5-foot concrete sidewalks on both sides of the street.

Bicycle Facilities

Bicycle counts were conducted at all study intersections during the AM, midday and PM peak periods (two hour count). Very little bicycle activity occurred at the study intersections, with three or less bicycle crossings during each of the peak periods. The low bicycle volumes are not surprising given that there are no designated bike lanes in the vicinity of the project site.

Public Transit Service

Tri- County Metropolitan Transportation District of Oregon (TriMet) provides public transportation services in West Linn. There are currently two transit routes that serve the West Linn community.

- Bus Route 35 – Travels along Highway 43 connecting the Oregon City Transit Center and downtown Portland. The route offers 10 to 30 minute headways.
- Bus Route 154 – Travels between the Oregon City Transit Center and the southwest area of West Linn.

Neither of these bus routes provides transit service near the project site. There is no public transit service available for most of the City west of Highway 43. The nearest TriMet service is Bus Route 35 which provides a bus stop on Highway 43 at Hidden Springs Road. There is one park-and-ride lot in West Linn located at Highway 43/CedarOak Drive intersection for commuters wishing to travel north on Bus Route 35.

Planned Improvement Projects

Based on the information provided by the City staff⁷, there is currently no transportation improvement projects planned within the study area that will be constructed by the year 2012. Therefore, no transportation improvement projects were included in the traffic analysis.

Existing Traffic Volumes

Existing traffic volumes⁸ were collected at the study intersections during the AM peak period (7:00 a.m. to 9:00 a.m.), midday peak period (2:00 p.m. to 4:00 p.m.), and PM peak period (4:00 p.m. to 6:00 p.m.). The traffic data collected also counted the number of pedestrians and bicycles at the study intersections. The AM, midday and PM peak hour traffic volumes used for the analysis are shown in Figure 2. Detailed peak period traffic count data is included in the Appendix.

A 24 hour volume and speed survey⁹ was conducted on Rosemont Road north of Bay Meadows Drive. The survey found the daily traffic volume on Rosemont Road was 5,111 vehicles (2,487 northbound and 2,624 southbound). The peak hour traffic volumes of the day occurred from 5 to 6 p.m. The speed survey conducted on Rosemont Road found the average 85th percentile speed was 46 miles per hour (44 miles per hour northbound and 48 miles per hour southbound). Vehicle speeds are typically higher for the downhill travel direction. The 85th percentile speed represents the speed at which 85 percent of the vehicles are traveling at or below. The posted speed limit on Rosemont Road near the project site is 40 miles per hour.

Existing Traffic Operating Conditions

Level of service (LOS) ratings and volume-to-capacity (V/C) ratios are commonly used as measures of effectiveness for intersection operation. LOS is similar to a “report card” rating based on the average delay experienced by vehicles at the intersection¹⁰. LOS A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. LOS D and E are progressively worse operating conditions. LOS F represents conditions where average vehicle delay has become excessive and demand has exceeded capacity. This condition is typically evident in long queues and delays.

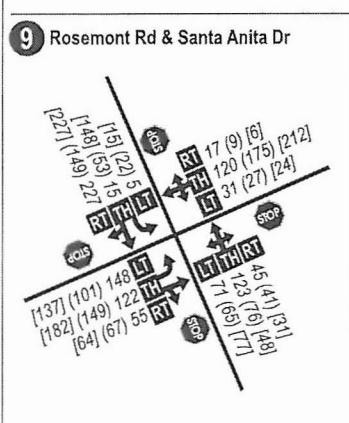
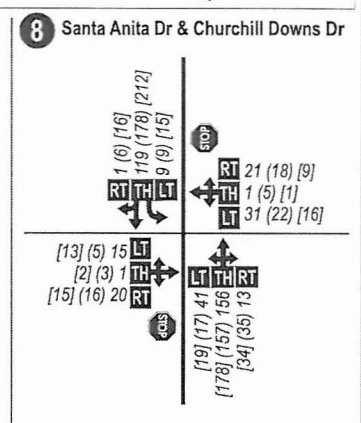
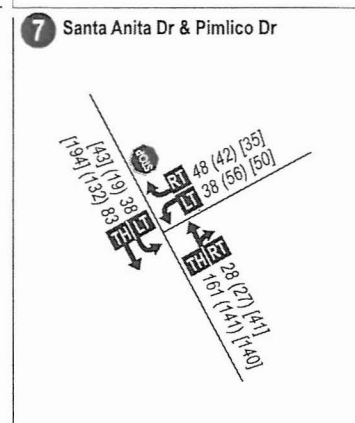
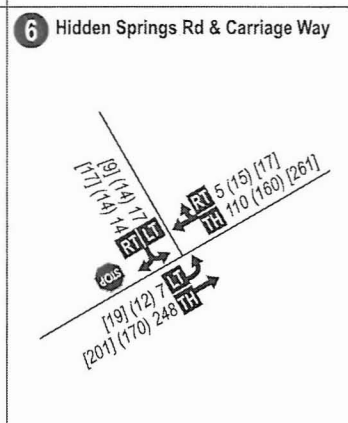
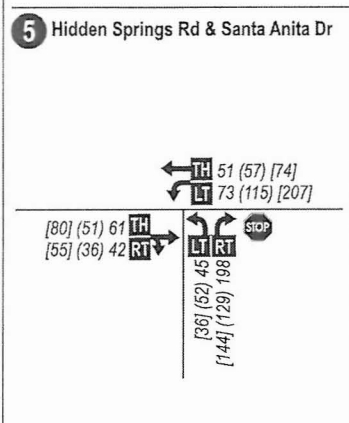
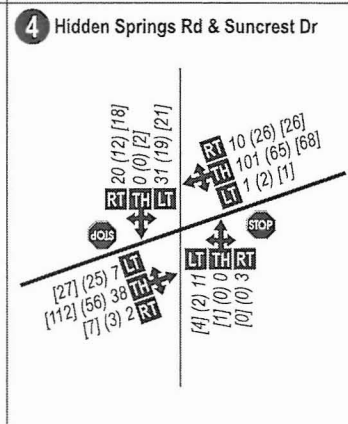
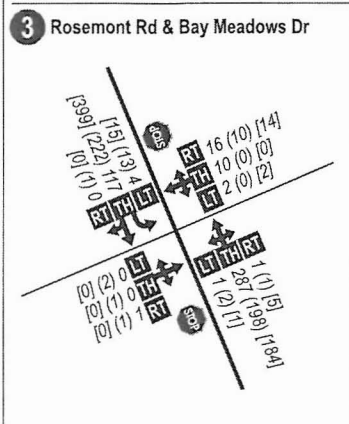
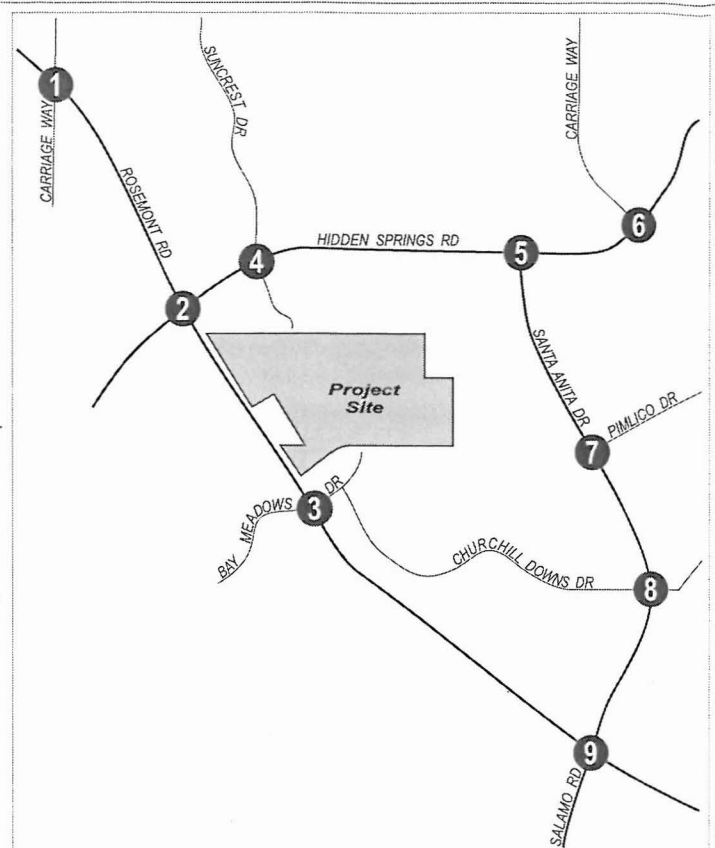
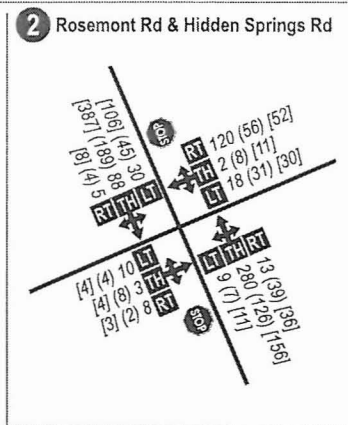
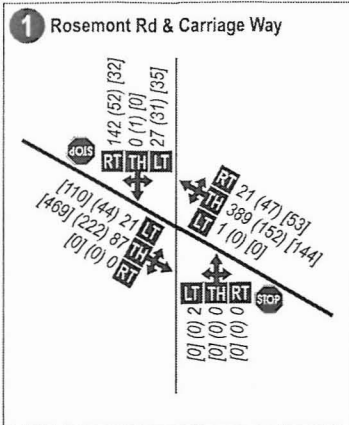
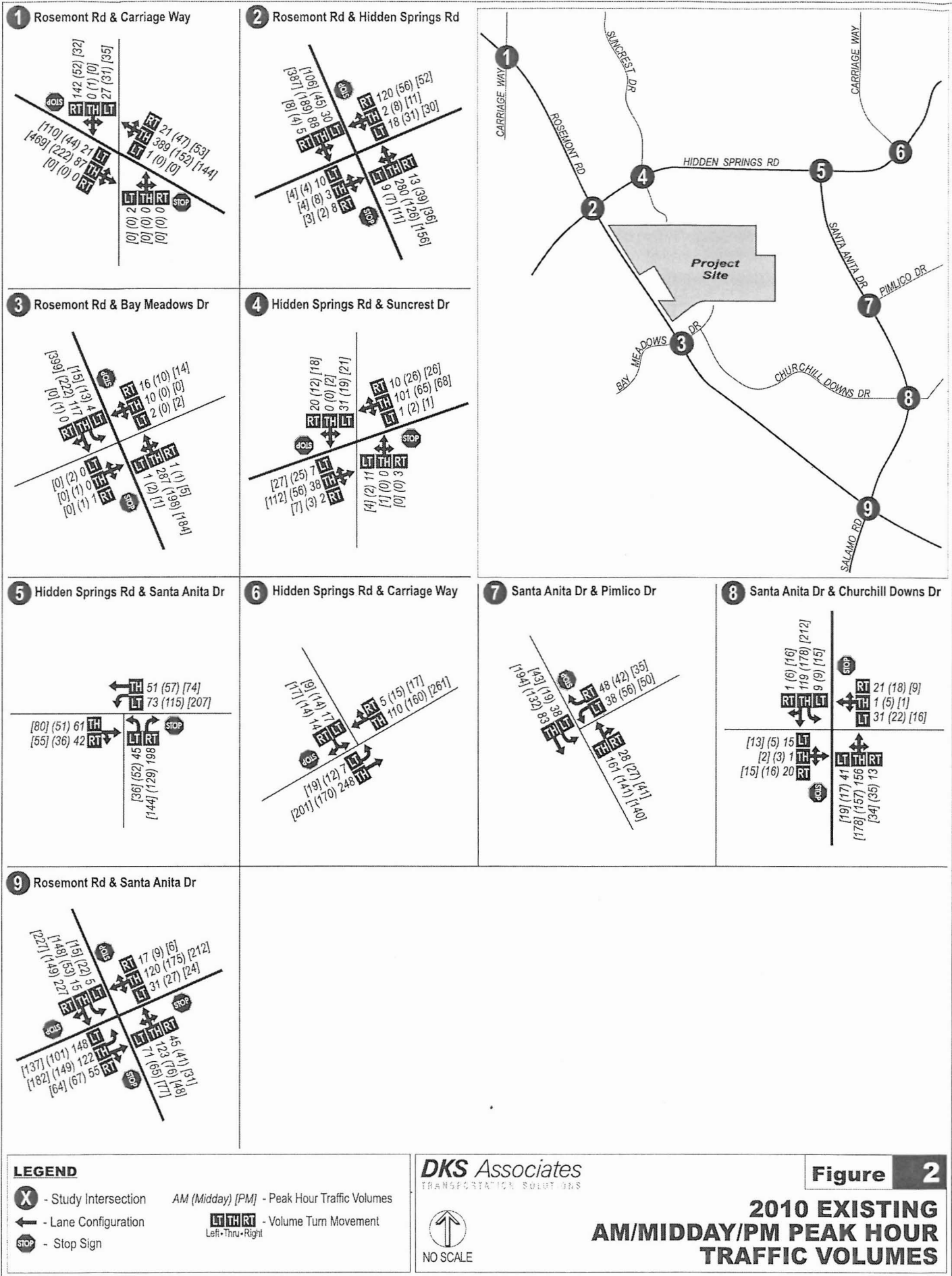
A volume-to-capacity (V/C) ratio is a decimal representation (typically between 0.00 and 1.00) of the proportion of capacity that is being used (i.e., the saturation) at a turn movement, approach leg, or overall intersection. This indicator is determined by dividing the peak hour traffic volume by the hourly capacity of a given intersection or movement. A lower ratio indicates smooth operations and minimal delays. As the ratio approaches 1.00, congestion increases and performance is reduced. If the ratio is greater than 1.00, the turn movement, approach leg, or intersection is oversaturated and usually results in excessive queues and long delays.

⁷ Email received by City Staff, Tom Soppe on January 20, 2010.

⁸ Traffic counts were taken on January 4, 2010, by All Traffic Data.

⁹ Traffic counts were taken on January 6, 2010, by All Traffic Data.

¹⁰ A description of Level of Service (LOS) is provided in the appendix and includes a list of the delay values (in seconds) that correspond to each LOS designation.



Level of service, delay and volume to capacity ratios are used as measures of effectiveness for study intersection performance. The City of West Linn requires level of service D or better for all facilities except principal arterials, where level of service E is the minimum. The existing traffic operating conditions at the study intersections were determined for the AM, midday and PM peak hours based on the *2000 Highway Capacity Manual* methodology¹¹ for unsignalized intersections.

The existing operating conditions at the study intersections are shown in Table 5. Based on recent traffic counts, all of the study intersections meet the City's required standards during each of the three analysis periods. The detailed intersection operation worksheets are attached in the Appendix.

Table 5: 2010 Existing Conditions Intersection Performance

Intersection	AM Peak		Midday Peak		PM Peak	
	LOS	V/C	LOS	V/C	LOS	V/C
Unsignalized						
Rosemont Rd/ Carriage Way	A/C	0.29	A/B	0.08	A/C	0.17
Rosemont Rd/ Hidden Springs	A/B	0.18	A/B	0.09	A/C	0.15
Rosemont Rd/ Bay Meadows Dr	A/B	0.02	A/B	0.01	A/B	0.02
Hidden Springs Rd/Suncrest Dr	A/A	0.02	B/A	0.04	B/A	0.05
Hidden Springs Rd/ Santa Anita Dr	B/A	0.23	B/A	0.15	C/A	0.17
Hidden Springs Rd/ Carriage Way	A/B	0.03	A/B	0.03	A/B	0.03
Santa Anita Dr/Horton Rd	A/B	0.06	A/B	0.06	A/B	0.04
Santa Anita Dr/Pimlico Dr	A/B	0.08	A/B	0.10	A/B	0.11
All-Way Stop Controlled						
Rosemont Rd/Salamo Rd/Santa Anita Dr	B	0.45	B	0.48	C	0.81

Unsignalized intersections:

LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement

All-Way Stop Controlled intersections:

LOS = Level of Service of crossroads
V/C = Volume-to-Capacity Ratio of Intersection

Collision History

Collision data for the study intersections were obtained for 2006 through 2008 from the ODOT Crash Analysis and Reporting Unit. The collisions are categorized by severity in

Table 6. Between 2006 and 2008 there were 12 total collisions reported at study intersections with no fatalities.

Collision rates were estimated for each of the study intersections. The collision rate was calculated based on the collision data and the estimated daily traffic volumes (factored from the recent PM peak hour traffic counts). A rate greater than or equal to 1.0 collision per million entering vehicles generally indicates a higher than average collision rate and the need for further safety analysis. As listed in

¹¹ *2000 Highway Capacity Manual*, Transportation Research Board, Washington DC, 2000.

Table 6, none of the study intersections have collision rates higher than 1.0. Detailed collision data is attached in the Appendix.

Table 6: Study Intersection Collision Summary (2006 through 2008)

Intersection	Collisions (by Severity)			Total	Collision Rate ^b
	PDO ^a	Injury	Fatal		
Rosemont Rd/Carriage Way	1	0	0	1	0.11
Rosemont Rd/Hidden Springs Rd	8	0	0	8	0.90
Rosemont Rd/Bay Meadows Dr	1	0	0	1	0.15
Rosemont Rd/Salamo Rd/Santa Anita Dr	1	0	0	1	0.08
Hidden Springs Rd/Suncrest Dr	0	0	0	0	0.00
Hidden Springs Rd/Santa Anita Dr	1	0	0	1	0.15
Hidden Springs Rd/Carriage Way	0	0	0	0	0.00
Santa Anita Dr/Horton Rd	0	0	0	0	0.00
Santa Anita Dr/Pimlico Dr	0	0	0	0	0.00

^a PDO = Property Damage Only

^b Collision Rate = average annual collisions per million entering vehicles (MEV); MEV estimates based on PM peak hour traffic count

The Rosemont Road/Hidden Spring Road intersection was found to have the highest number of collisions (eight in three years) and collision rate (0.90 annual collisions per million entering vehicles). Further evaluation did not find a historic trend in the collision data. The collisions at the Rosemont Road/Hidden Spring Road intersection included:

- rear end of a vehicle stopped to turn left
- passing in unsafe conditions and collision with oncoming vehicle
- left turn in front of oncoming traffic
- vehicle backing improperly into roadway
- vehicle loss of control, struck a tree

There are several factors that could be contributing to the number of collisions at the Rosemont Road/Hidden Spring Road intersection. Excessive vehicle speeds, driver behavior and limited available sight distance are the likely issues for safety. A detailed safety analysis of the Rosemont Road/Hidden Spring Road intersection would be required to provide a thorough safety investigation and identify if improvements would be recommended.

CHAPTER 3: IMPACT ANALYSIS

This chapter reviews the impact from the proposed project to the study area transportation system in West Linn. The proposed project site was analyzed for AM peak, midday, and PM peak hour impacts. The impact analysis discusses the proposed project and internal roadway network, project trip generation, trip distribution, future operating conditions of study intersections, turn lane warrant analysis, access spacing, sight distance, parking analysis, and project impacts/mitigations.

Proposed Project

The proposed project would construct a primary school, serving pre-kindergarten to fifth grade, with a maximum capacity for 500 students. The project site has recently been annexed within the City limits. The site will be zoned R-10 (Single-Family Residential Detached) which allows for educational land uses. The proposed school is assumed to be constructed and occupied by the beginning of the 2012 school year (September).

The site plan provided includes two new access points on Rosemont Road. The south project access would be restricted to school bus and school staff use only. The south access would provide a motor vehicle connection to the staff parking lot and the school bus loading/unloading area. The north access would serve general school trips. The north access would provide a motor vehicle connection to the visitor parking area and the parent pick up/drop off area.

The proposed school would operate with hours similar to other primary schools in the West Linn-Wilsonville School District. Typically, classes would start between 7:50 to 8:30 a.m. and release between 2:10 and 2:55 p.m. In comparison, the nearby Rosemont Ridge Middle School starts classes at 9:15 a.m. and releases classes at 3:45 p.m. The primary school and middle school class schedules are staggered purposely to limit off-site traffic impacts. The majority of school related trips (parents, staff and buses) generated by the proposed school are not expected to travel on the local street network at the same time as Rosemont Ridge Middle School trips.

Project Trip Generation

Trip generation is the estimation of project traffic added to nearby roadways. The trip generation estimate for the proposed project was based on data provided by the Institute of Transportation Engineers (ITE) Trip Generation Manual¹² and trip survey data collected¹³ at existing primary schools in the Portland Metro area. The primary school trip generation data provided a trip rate per student to estimate the total traffic that would be generated by the project, including trips for students and faculty staff.

Based on an assessment of the available data, the local school survey data was used for the AM peak hour and the ITE data was used for the midday and PM peak hours. The peak hour trip rates for ITE and the local school surveys are summarized in Table 7, with the trip generation rates used in the traffic analysis shown in gray.

¹² *Trip Generation, 8th Edition*, Institute of Transportation Engineers, 2003.

¹³ Trip generation survey data collected at three elementary schools in Beaverton area in 2006.

Table 7: Trip Generation Rate Comparison

Data Source	Trip Rate Per Student		
	AM	Midday	PM
Local School Survey	0.56	0.29	0.12
ITE (Land Use Code 520)	0.45	0.28	0.15

Trips rates utilized for the analysis shown in gray

The proposed project would construct a primary school with a maximum enrollment of 500 students. The initial estimated peak hour trips for the proposed school are summarized in Table 8.

Table 8: Initial Proposed Project Trip Generation Summary

Land Use	Students	Peak Hour Trips		
		AM	Midday	PM
Primary School	500	280 154 in / 126 out	140 63 in / 77 out	75 37 in / 38 out

The proposed project is planned to operate ten school buses daily. For the operational analysis of the site access points, bus trips were treated to be equivalent to two auto trips, based on Highway Capacity Manual methodology¹⁴. The trip generation estimates shown in Table 8 were adjusted to account for bus trips at the site access points. Table 9 shows the number of new buses expected with the proposed project and the estimated peak hour vehicle trip generation used for the motor vehicle capacity analysis. The proposed project would add 320 vehicle trips in the AM peak hour, 180 in the midday peak hour and 75 in the PM peak hour.

Table 9: Final Proposed Project Trip Generation Summary

	Peak Hour Trips		
	AM	Midday	PM
School Bus Trips	20 10 in / 10 out	20 10 in / 10 out	0 0 in / 0 out
School Bus Trips Converted to Auto Trips	40 20 in / 20 out	40 20 in / 20 out	0 0 in / 0 out
Initial Trip Generation Estimate	280 154 in / 126 out	140 63 in / 77 out	75 37 in / 38 out
Total New Auto Trips Used for Analysis	320 174 in / 146 out	180 83 in / 97 out	75 37 in / 38 out

*Volumes are factored to equivalent auto volumes (1 bus is equivalent to 2 autos)

¹⁴ Highway Capacity manual, Chapter 16 – Signalized Intersections, Transportation Research Board, 2000

Project Trip Distribution

Trip distribution for the proposed project was estimated based on a conceptual school district boundary map¹⁵, a review of the household density within the school district boundary and Metro's base year (2005) transportation forecast model. The school district boundary for the proposed school was conceptual only, no final school boundary adjustments have been determined. The proposed primary school was assumed to draw students from the area generally bounded by Hidden Springs Road, Rosemont Road, Carriageway, Santa Anita Drive, Pimlico Drive, Horton Road, and Suncrest Drive. Figure 3 illustrates the estimated distribution of project traffic for the proposed primary school on the surrounding street network.

Future Traffic Operating Conditions

Future traffic operating conditions were analyzed at the study intersections to determine if the existing transportation network can support the additional proposed school traffic. If the City of West Linn operating standards cannot be met with the proposed project, mitigations would be required to improve network performance.

Future Analysis Scenarios

Future AM, midday and PM Peak hour traffic operations were analyzed at the study intersections for the following two scenarios:

- 2012 Background Traffic + Approved Projects
- 2012 Total (Background + Approved + Project) Traffic

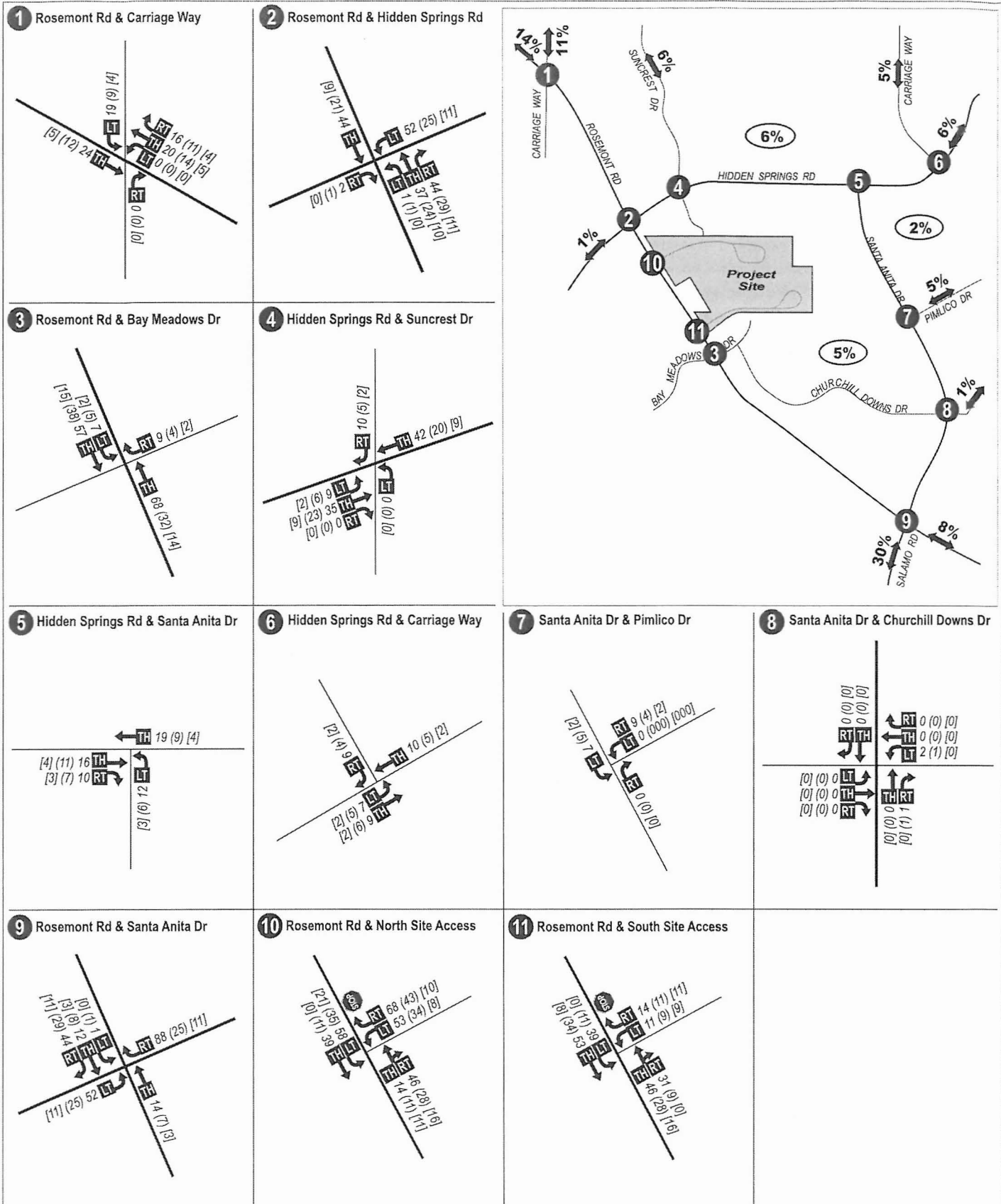
The 2012 scenario was selected since the school is anticipated to be constructed and occupied by the year 2012. The future 2012 background growth on the study area roadways was based on Metro's transportation forecast model¹⁶. For future 2012 background volumes, a two percent annual growth was applied to all study area intersections.

The City of West Linn staff provided approved but not yet constructed projects within the study area¹⁷. These projects include the Rosemont Crossing subdivision with twenty single family dwellings, and the Suncrest subdivision with six single family dwellings. Additional information regarding the approved projects is attached in the Appendix.

¹⁵ Based on information provided by Karina Ruiz, January 2010.

¹⁶ Annual growth percentage was based on the volume difference between base year 2005 and future 2030 volumes considered at several links within the study area. The determined growth percentage from different links was then averaged to have one growth percentage for all the study intersections.

¹⁷ Email sent by City Staff Tom Soppe on January 15, 2010.



LEGEND

- Study Intersection
- Lane Configuration
- Trip Distribution Percentage
- AM (Midday) [PM] - Peak Hour Traffic Volumes
- Volume Turn Movement
Left-Thru-Right

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Figure 3

**PROJECT TRIP DISTRIBUTION
PEAK HOUR TRIPS**

2012 Background + Approved Projects Traffic Volumes

The 2012 background plus approved projects traffic volumes were developed by combining existing traffic counts with background growth and approved projects trips. The 2012 background plus approved projects traffic volumes during the AM, midday and PM peak hour are shown in Figure 4.

2012 Total (Background + Approved + Project) Traffic Volumes

The 2012 total traffic volumes were developed by combining the 2012 background plus approved projects traffic volumes with the proposed school peak hour project trips. The 2012 total traffic volumes during the AM, midday and PM peak hour are shown in Figure 5.

2012 Background + Approved Projects Traffic Operating Conditions

Intersection operating conditions for the 2012 background plus approved projects traffic scenario is listed in Table 10. All the study area intersections are expected to meet applicable City mobility standards. The highest congestion would occur at the Rosemont Road/Salamo Road/Santa Anita Drive intersection during the PM peak hour with LOS C and a volume to capacity ratio of 0.87. During the PM peak hour, the Rosemont Road/Salamo Road/Santa Anita Drive intersection would experience vehicle queues extending up to 125 feet (five cars) in the southbound through lane.

The remaining study intersections would operate with little vehicle delay during the peak hours. Based on the operating conditions, none of the study intersections would require improvements to mitigate impacts from the background traffic and approved projects.

Table 10: 2012 Background + Approved Projects Traffic Intersection Performance

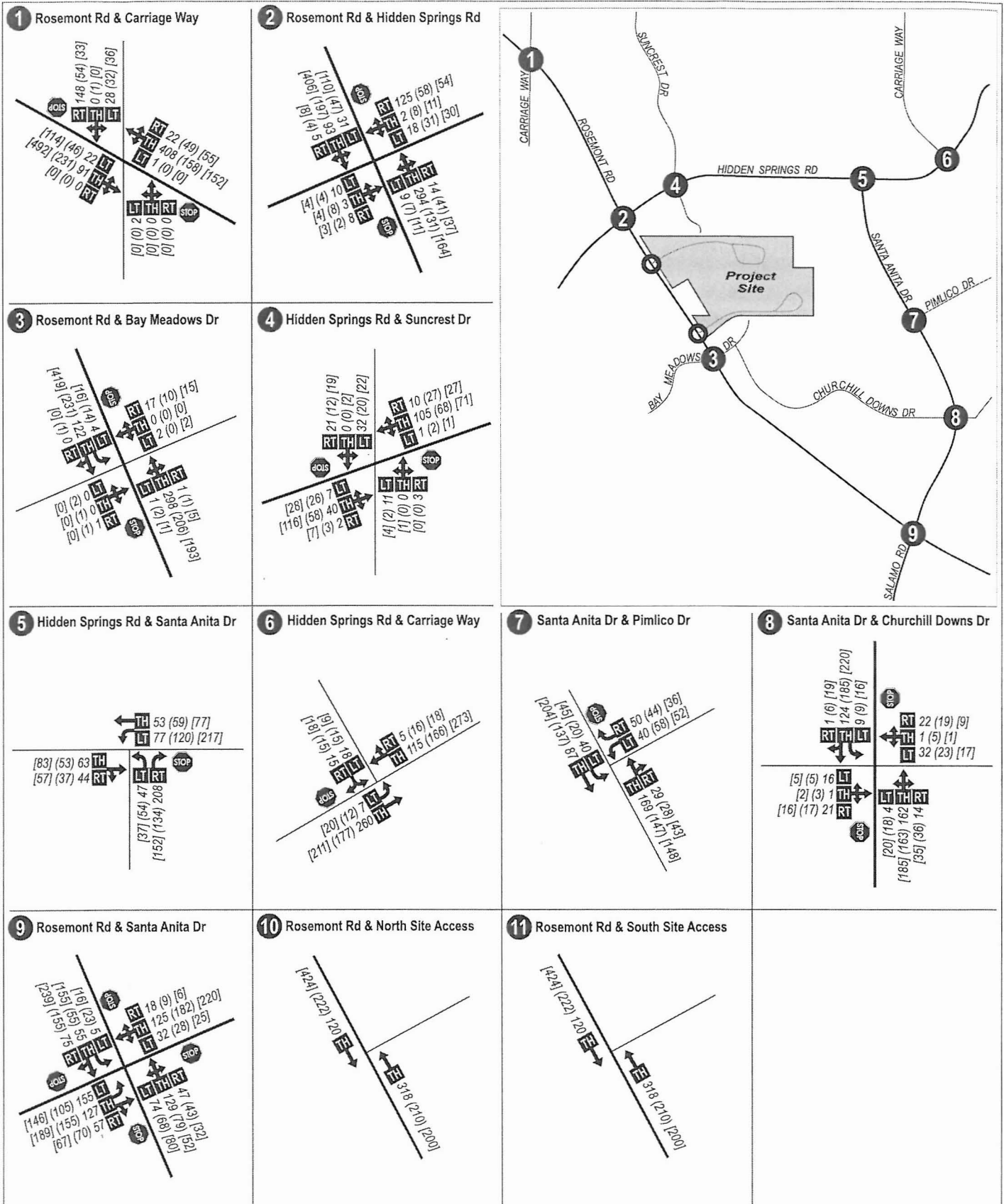
Intersection	AM Peak		Midday Peak		PM Peak	
	LOS	V/C	LOS	V/C	LOS	V/C
Unsignalized						
Rosemont Rd/ Carriage Way	A/D	0.31	A/B	0.08	A/C	0.19
Rosemont Rd/ Hidden Springs	A/B	0.19	A/B	0.09	A/C	0.17
Rosemont Rd/ Bay Meadows Dr	A/B	0.03	A/B	0.01	A/B	0.02
Hidden Springs Rd/Suncrest Dr	A/A	0.05	A/B	0.04	A/B	0.05
Hidden Springs Rd/ Santa Anita Dr	A/B	0.24	A/B	0.15	A/B	0.18
Hidden Springs Rd/ Carriage Way	A/B	0.03	A/B	0.03	A/B	0.03
Santa Anita Dr/Horton Rd	A/B	0.07	A/B	0.06	A/B	0.04
Santa Anita Dr/Pimlico Dr	A/B	0.08	A/B	0.11	A/B	0.11
All-Way Stop Controlled						
Rosemont Rd/Salamo Rd/Santa Anita Dr	B	0.48	B	0.51	C	0.87

Unsignalized intersections:

LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement

All-Way Stop Controlled intersections:

LOS = Level of Service of crossroads
V/C = Volume-to-Capacity Ratio of Intersection



LEGEND

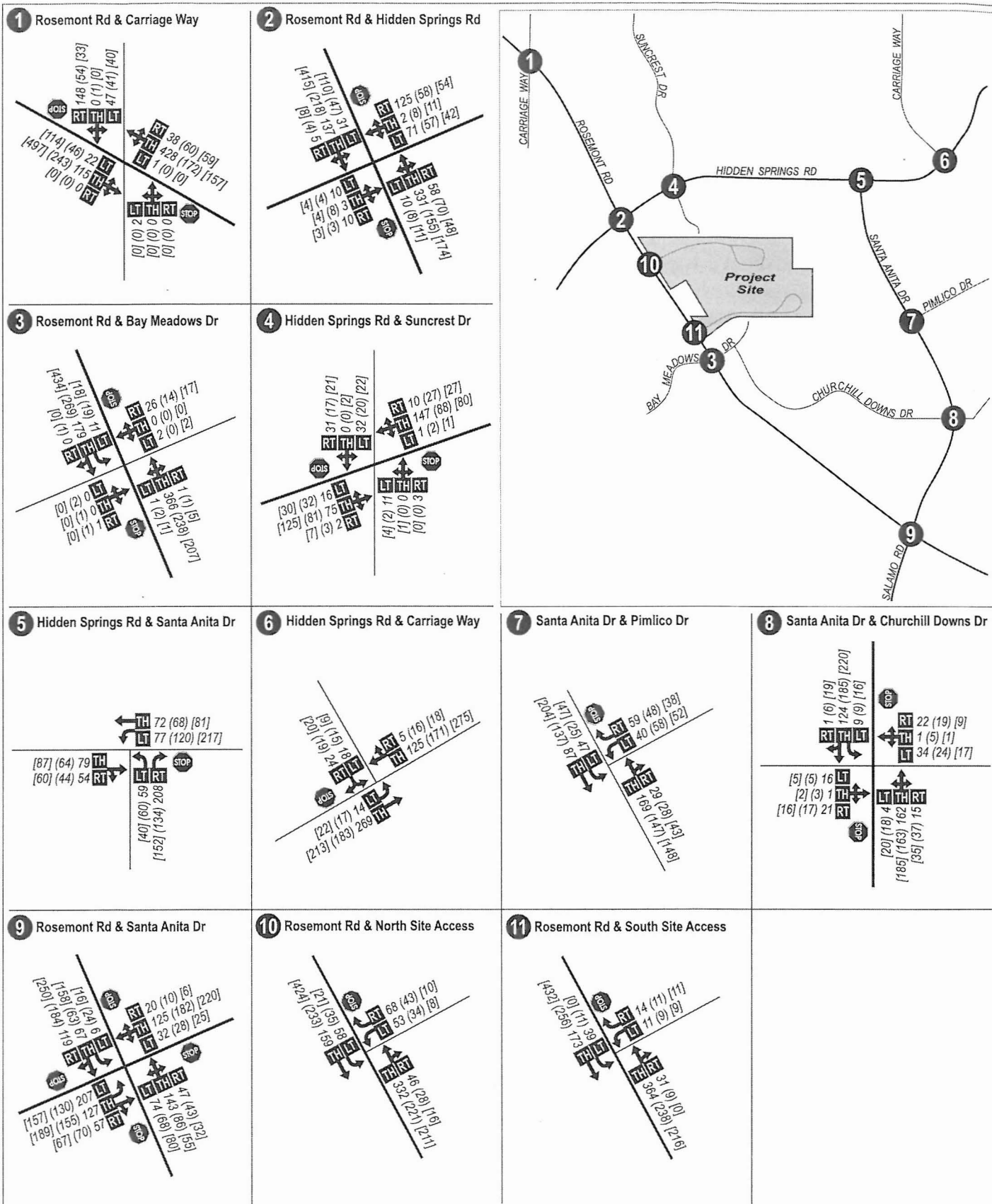
- X** - Study Intersection
- ←** - Lane Configuration
- STOP** - Stop Sign
- AM (Midday) [PM] - Peak Hour Traffic Volumes
- LT|TH|RT** - Volume Turn Movement
Left-Thru-Right

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Figure 4

2012 BACKGROUND & APPROVED PROJECTS AM/MIDDAY/PM PEAK HOUR TRAFFIC VOLUMES



LEGEND

- X - Study Intersection
- ← - Lane Configuration
- STOP - Stop Sign
- AM (Midday) [PM] - Peak Hour Traffic Volumes
- LT|TH|RT - Volume Turn Movement (Left-Thru-Right)

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NO SCALE

Figure 5

2012 TOTAL AM/MIDDAY/PM PEAK HOUR TRAFFIC VOLUMES

2012 Total Traffic Operating Conditions

The 2012 Total Traffic scenario included the addition of the proposed site access points onto Rosemont Road as study intersections. The planned geometry at each site access point included:

- a center turn lane on Rosemont Road to accommodate a southbound left turn movement into the site
- two exiting lanes at the school driveway at Rosemont Road to provide separate left and right turn lanes

Intersection operating conditions for the 2012 total traffic scenario are listed in Table 11. All the study area intersections would continue to meet City mobility standards with the addition of project traffic. The highest congestion would occur at the Rosemont Road/Salamo Road/Santa Anita Drive intersection during the PM peak hour with LOS D and a volume to capacity ratio of 0.92. During the PM peak hour, the Rosemont Road/Salamo Road/Santa Anita Drive intersection would continue to experience southbound vehicle queues extending up to 125 feet (five cars) in the southbound through lane. The proposed project would have minimal impact on the intersection vehicle queues, adding approximately 14 vehicles to the southbound approach during the PM peak hour.

The remaining study intersections would operate with little vehicle delay during the peak hours. Based on the operating conditions, none of the study intersections would require improvements in order to mitigate impacts from the proposed project traffic.

Table 11: 2012 Total Traffic Intersection Performance

Intersection	AM Peak		Midday Peak		PM Peak	
	LOS	V/C	LOS	V/C	LOS	V/C
Unsignalized						
Rosemont Rd/ Carriage Way	A/D	0.34	A/B	0.11	A/C	0.22
Rosemont Rd/ Hidden Springs	A/D	0.37	A/C	0.18	A/C	0.24
Rosemont Rd/ Bay Meadows Dr	A/B	0.06	A/B	0.02	A/B	0.02
Hidden Springs Rd/Suncrest Dr	A/B	0.06	A/B	0.04	A/B	0.05
Hidden Springs Rd/ Santa Anita Dr	A/B	0.25	A/B	0.16	A/B	0.18
Hidden Springs Rd/ Carriage Way	A/B	0.04	A/B	0.03	A/B	0.03
Santa Anita Dr/Horton Rd	A/B	0.07	A/B	0.07	A/B	0.05
Santa Anita Dr/Pimlico Dr	A/B	0.10	A/B	0.11	A/B	0.11
Rosemont Rd / North Access	A/B	0.14	A/B	0.09	A/B	0.03
Rosemont Rd / South Access	A/B	0.03	A/B	0.02	A/B	0.03
All-Way Stop Controlled						
Rosemont Rd/Salamo Rd/Santa Anita Dr	C	0.58	C	0.55	D	0.92

Unsignalized intersections:

LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement

All-Way Stop Controlled intersections:

LOS = Level of Service of crossroads
V/C = Volume-to-Capacity Ratio of Intersection

Turn Lane Warrant Analysis

A center left turn lane is planned on Rosemont Road along the project frontage. Therefore, a left-turn lane warrant analysis was not evaluated at the proposed access points. A right-turn lane warrant analysis was evaluated at the proposed project accesses for the 2012 Total Traffic scenario utilizing the National Cooperative Highway Research Program (NCHRP) methodologies. The analysis found a right-turn lane would not be warranted at either site access point during any of the peak hours analyzed. The right-turn lane warrant results and associated worksheets are attached in the Appendix.

Although the right turn lane warrant was not met at the site access points at Rosemont Road during the AM, midday or PM peak hour, the addition of a right turn lane would have benefits. Turn lane warrant analyses are based on average hourly traffic demands and do not take into consideration shorter peak demands that typically occur at school sites. The north site access would be expected to experience a 10 to 15 minute peak traffic demand just before classroom hours begin and just after classroom hours end resulting from parents dropping off and picking up students.

The south site access would also likely experience shorter peak traffic demand associated with employees work schedule. The school would also host various after hour events (such as sports, family events and community meetings) that would result in shorter peak traffic demands. The addition of a separate right turn lane at each site access point would allow for traffic to more easily access Rosemont Road and reduce overall vehicle delay.

Traffic Signal Warrant Analysis

A signal warrant analysis was performed for the Rosemont Road/Salamo Road/Santa Anita Drive intersection to determine if 2012 total traffic volumes would be high enough to warrant the installation of a traffic signal. For this analysis, the Manual on Uniform Traffic Control Devices¹⁸ signal Warrant #3 (peak hour warrant) was assessed using the 2012 total traffic PM peak hour volumes. The analysis found the Rosemont Road/Salamo Road/Santa Anita Drive intersection would not warrant the installation of a traffic signal. The major street (eastbound and westbound approaches combined) would have 665 vehicles and the minor street (southbound approach) would have 424 vehicles during the PM peak hour. Based on the major street volume, the threshold to meet the peak hour warrant would be 550 vehicles on the minor street. The traffic signal warrant results are attached in the Appendix.

Access Spacing

There are two proposed site access points onto Rosemont Road. Rosemont Road is classified as an arterial by the City of West Linn. The City access spacing standards¹⁹ require a minimum of 300 feet of spacing between private driveways and 600 feet between public intersections on an arterial. The proposed school access points would serve as private driveways, and require 300 feet of spacing. The site plan shows the proposed north access and south access would be located approximately 570 feet apart (measured centerline to centerline). The proposed spacing between the site access points would meet the City's spacing standard.

¹⁸ Manual on Uniform Traffic Control Devices 2003 Ed., Federal Highway Administration, November 2004.

¹⁹ City of West Linn Transportation System Plan, October 2008, Prepared by DKS Associates.

There are few driveways currently located on Rosemont Road near the project site, as the area to the west is outside the urban growth boundary and vehicle access to the east is generally provided by public streets. There are currently three single family driveways on Rosemont Road between Bay Meadows Drive and Hidden Springs Road (approximate distance of 1,300 feet). Two driveways are located on the east side of Rosemont Road. A single family driveway is located on the west side of Rosemont Road approximately 600 feet north of Bay Meadows Drive and would be located between the two proposed site access points (approximately 275 feet spacing from each site access).

The north access and south access would not meet the City Transportation System Plan's recommended access spacing standards for the adjacent residential driveways on Rosemont Road. Due to the single family nature of the nearby driveways on Rosemont Road and their expected low traffic volumes, no vehicle conflicts are anticipated with the substandard driveway spacing. The available sight distance is maximized at the proposed site access locations. If either site access point were to shift to the north or south, the sight distance may not be adequate. Also, it is preferred that the project site operate with two access points separating bus trips and parent/visitor trips to maximize safety and efficiency.

Sight Distance Evaluation

Preliminary sight distance was measured at the proposed site access points along Rosemont Road. AASHTO requires sight distance to be measured at a point 14.4 feet from the edge of the traveled way with a driver's eye height of 3.5 feet and an object height of 3.5 feet. The speed survey conducted on Rosemont Road found the average 85th percentile speed was 46 miles per hour. Based on AASHTO standards for a 45 mile per hour vehicle speed, the required sight distance for a stopped passenger car to turn left and right from the project access onto Rosemont Road is 500 feet and 430 feet respectively.

Sight distance measurements indicate that the proposed north project access has adequate sight distance in both the north and south direction. Sight distance at the south project access is restricted looking to the north when measured 14.4 feet back from the edge of the roadway (as required) due to existing thick vegetation. Therefore, some of the shrubs and trees north of the south project access would require trimming and/or removal in order to provide adequate sight distance. These shrubs and trees are located on private property that is not owned by the West Linn-Wilsonville School District. The School District and the City should work with the private property owner to remove some of the vegetation and improve the available sight distance. Prior to occupancy, sight distance at both proposed project access points to Rosemont Road will need to be approved by the City Engineer. The detailed sight distance analysis is provided in the Appendix.

Site Plan Review

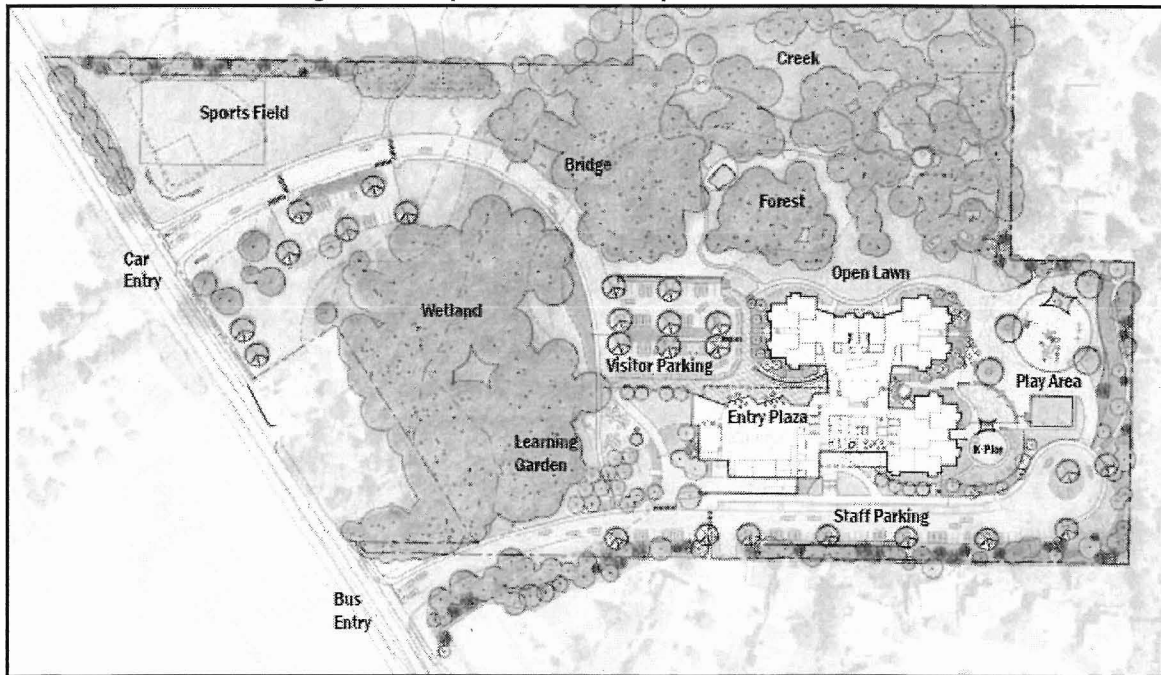
The proposed site plan was reviewed for connectivity and accessibility for both auto and non-auto modes including pedestrians and bicycles, both on-site and with the adjacent neighborhoods. The site plan was also evaluated to determine if bus and parent drop off/pick up areas would be sufficient. The findings of the site plan review are summarized below.

- The school's entry plaza and staff entrance would be connected to the planned sidewalks on Rosemont Road by continuous sidewalks along at least one side of the north site access roadway and south site access roadway. The school's secondary entrances (located on the

back and sides of the building) and key outdoor uses (such as the play area, learning garden, and open spaces) would be connected by continuous pedestrian facilities.

- The site plan would provide several pedestrian and bicycle connections to the adjacent neighborhood. A path would be provided between the north site access roadway and Suncrest Drive. A path would also be provided between the end of the south site access roadway and Hidden Springs Court.
- The layout of the south site access roadway network would allow for adequate circulation to the staff parking area and the school bus loading/unloading area. The school bus loading/unloading area would provide curb storage for ten buses which should limit impacts to vehicle circulation.
- The layout of the north site access roadway network would provide adequate circulation to the visitor parking area and the parent drop off/pick up area. The parent drop off/pick up area would provide curb storage for 13 parents which should alleviate potential impacts to vehicle circulation.
- A gated emergency vehicle connection would be provided between the south access roadway and Bay Meadows Drive.
- A gated on-site motor vehicle connection would be provided between the north and south internal roadways for use during events to alleviate imbalanced exiting traffic demands at the site access points.

Figure 6: Proposed Site Transportation Network



Source: Dull Olson Weekes Architects and Walker Macy

Parking Analysis

The City of West Linn requires a minimum of one parking space²⁰ per employee plus one parking space per 1,000 square feet of floor area at a primary school. The proposed school could have up to 50 faculty members and 70,000 square feet of floor area²¹. Based on the City's requirements, the proposed project should provide a minimum of 120 parking spaces. Table 12 summarizes the amount of parking proposed for the school as well as the City's minimum requirements. Based on this analysis, the proposed 120 parking spaces at the primary school would meet the minimum City requirements.

Table 12: Proposed Project Parking Analysis

Development	Size	Parking Supply Code Requirement	Required Parking Supply	Proposed Parking
Primary School	50 employees	One space per employee	50 spaces	50 spaces
	70,000 SF	One space per 1,000 SF	70 spaces	70 spaces
TOTAL			120 spaces	120 spaces

Note: SF – square feet

²⁰ City of West Linn Community Development Code, Section 46.130


²¹ Phone conversation with Karina Ruiz

Chicago Title Insurance Co.

472509476255-45

1097

After Recording Return To:
Robert J. Sullivan, PC
1 SW Columbia Street, Suite 1600
Portland, Oregon 97258

Clackamas County Official Records		2010-037258
Sherry Hall, County Clerk		
		\$92.00
01411285201000372580100107		06/22/2010 02:32:56 PM
D-E	Cnt=1	Stn#6 KARLYNWUN
\$50.00	\$16.00	\$18.00 \$10.00

EASEMENT

In consideration of \$25,000 and the promises contained herein, Hidden Springs Ranch Recreation Association ("Grantor") grants to West Linn-Wilsonville School District ("Grantee"), an easement on the terms and conditions described below:

1. **The Property.** Grantor is the owner in fee simple of the improved real estate described on attached Exhibit A (the "Property"). The legal description of the Easement is described on the attached Exhibit B (the "Easement"). The Grantee's real property on which it intends to build a primary school and to which the Easement attaches is described on the attached Exhibit C ("Grantee's property" or "Grantee's real property"). Grantee agrees to cause a survey of Grantee's real property to be performed and recorded prior to the opening of the primary school, and this Easement will then be re-recorded with the surveyed legal description attached as replacement Exhibit C.

2. **Condition of Easement.** Grantee agrees that the Easement granted by this document is in its "as is" condition.

3. **Encroachment.** Grantee acknowledges that there is a path across the Property that encroaches on Grantee's property approximately five (5) feet just west of Bay Meadows Drive. Grantee agrees to leave the path as built or to restore the path to its current condition if disturbed by Grantee.

4. **Purpose.** The purpose of the Easement is for an access road to the new primary school for use by school staff, school busses, service, emergency, and maintenance vehicles, and for special events, but not for general public access.

5. **Construction.** Grantee intends to build an access road on the Easement and agrees to give Grantor thirty (30) days prior written notice of intent to proceed with construction of any improvements upon the Easement, to install a construction fence prior to any work on the

Easement or the Property and to implement and follow reasonable safety precautions during construction or maintenance.

6. Signage. Grantee agrees to post signage prominently on the access road upon the Easement giving notice that the access road is for "School Bus and School Staff Access Only." Grantee agrees to use reasonable efforts so that the access road is not used for general public access.

7. Improvements. As additional consideration for the grant of the Easement, the Grantee agrees to undertake the following improvements to that portion of the Property in the immediate area of the Easement and the adjoining tennis court and basketball court, which work will be completed on or before September 1, 2012; however, the Grantee may extend the time to finish the improvements for up to one year by giving Grantor prior written notice of the new completion date:

A. Upgrades/Repairs.

- (i) relocate and replace the bench next to the basketball court and install a bench in the tennis court,
- (ii) place a garbage can near the tennis/basketball courts and arrange for periodic trash removal,
- (iii) replace and/or resurface the tennis and basketball courts,
- (iv) remove and decommission the non-operable lights and equipment at the tennis court,
- (v) add a wind screen to the northern side of the tennis court,
- (vi) replace the existing basketball hoop, pole and backboard, and
- (vii) create, replace or repair the paths, including a connection to the new sidewalk on Rosemont Road.

B. Easement Landscaping.

- (i) consult and confer with Grantor in the design of the landscaping for the Easement and the Property,
- (ii) use/relocate as many of the existing mature trees (e.g. Japanese maples will remain the property of Grantor and will be used in the landscape) as possible in the landscaping,
- (iii) after construction of the Easement repair or replace the landscaping, and
- (iv) obtain the prior approval of Grantor for final landscaping which provides the buffer between the Grantee's school and the Property.

8. Alterations on the Easement. Without giving advance notice to the Grantor, the Grantee may undertake ordinary maintenance of the access road and landscaping located on the Easement or the Property in order to comply with Grantee's school district standards. However, except with the prior consent of Grantor or as otherwise expressly provided herein, Grantee shall

not substantially alter, remodel, or replace the access road or landscaping on the Easement or damage the Property, nor may Grantee perform any acts which would adversely affect the appearance of the Property. The restrictions described above shall include, but shall not be limited to any repairs, renovation, rehabilitation, reconstruction, alterations, expansion or demolition which would adversely affect the appearance or the integrity of the Property.

9. Maintenance. Grantee agrees to annually maintain the Easement and that portion of the Property in the immediate area of the Easement by removing/spraying with herbicide the weeds, trimming the trees and shrubs and disposing of the debris each spring. This maintenance includes the immediately adjoining paths and landscaping. Grantee's obligation to clean and maintain the landscaping pending construction of the improvements begins upon execution of this Easement. Notwithstanding the foregoing, the Grantee shall have the right, upon giving not less than ninety (90) days advance written notice to the Grantor, to discontinue maintenance of any portion of the Property not within the Easement after twenty-five (25) years from the date that this Easement is recorded.

10. Standard for Landscaping, Repairs and Maintenance. Grantee agrees that all work performed on the Property shall conform to Grantee's school district standards of good workmanship. The Easement area will be landscaped according to Grantee's school district standards, generally as shown on the attached Exhibit D. Grantee will require all contractors performing work on the Easement or the Property carry liability insurance against all losses which identifies Grantor as an additional insured.

11. Consent Procedure. The written consent of Grantor, as required by this Easement, may be requested by Grantee by submitting a reasonably detailed written proposal to Grantor. If the proposal is not accepted or rejected within sixty (60) days of its submission, Grantee may proceed with the proposed alteration. If Grantee reasonably believes that an emergency exists and the written proposal specifically states that an emergency exists, the reply period shall be forty-eight (48) hours. If the emergency threatens to damage any portion of the Property or the Easement, any action necessary to prevent such damage may be taken without first obtaining written consent if notice is immediately given to Grantor that the work is being performed. All work performed pursuant to the previous sentence shall be consistent with the character of the Property and the Easement.

12. Term. The term of this Easement shall be perpetual. This Easement shall be binding upon Grantee and the Grantor and is transferable by either party only with the advance written consent of the other party, which consent shall not be unreasonably withheld. This Easement terminates automatically in the event that Grantor's property (Exhibit C) ceases for a period of twenty-four (24) consecutive months to be used as a public school, in which event all interest under the Easement reverts to Grantor, without any action by Grantor.

13. **Enforcement.** The parties agree to attempt to resolve any disagreements or disputes regarding this Easement or their obligations hereunder with the minimum expenditure to funds and time. If the parties are unable to resolve any such disagreements or disputes, they agree to submit to binding arbitration by a single arbitrator. If the parties fail to agree upon an arbitrator, the arbitrator will be appointed by the Presiding Judge of Clackamas County Circuit Court. The prevailing party will pay the arbitrator's fee, but parties will be responsible for payment of their own attorney fees. However, if the arbitrator finds that the party not prevailing failed to exercise good faith regarding the disagreement or dispute at issue prior to or during the arbitration, then the prevailing party will be entitled to recover its reasonable attorney fees and costs incurred.

14. **Taxes, Assessments, Liens and Expenses.** Grantor agrees to pay all taxes, if any, imposed upon that portion of the Property included in the Easement. Grantee agrees to pay any assessments, liens and expenses imposed or incurred for the benefit of the Easement.

15. **Notice.** Any notice required or permitted to be given under the terms of this Easement, shall be either hand delivered or certified mailed to Grantor or Grantee at their respective addresses as follows:

GRANTOR:

Hidden Springs Ranch Recreation Association
Attn: President
P O Box 444
West Linn, Oregon 97068

GRANTEE:

West Linn-Wilsonville School District
Attn: Superintendent
P O Box 35
West Linn, Oregon 97068

or at such other address designated in writing by Grantor or Grantee from time to time. Except as expressly provided herein to the contrary, any such notice shall be deemed effective when actually received by the addressee or two (2) business days from the date of mailing, whichever first occurs.

16. **Liability.** To the extent permitted by law, Grantee agrees to indemnify and hold Grantor harmless for any liability, damages, or claims that may arise out of Grantee's ownership, operation, or use of the Property or the Easement or Grantee's maintenance activities as described in paragraph 9 hereof. Grantee will carry insurance in accordance with Grantee's school district policies covering the liabilities, damages, or claims mentioned above on the Easement and the Property against all losses which identifies Grantor as an additional insured, but such insurance will cover Grantor only to the limits of the Oregon Tort Claims Act in effect at the time of any loss and will not cover Grantee for its own negligence or other wrongful conduct.

17. **Recording.** The parties agree that this Easement shall be recorded in the records of Clackamas County.

DATED: 5/28, 2010.

GRANTOR:

Hidden Springs Ranch Recreation Association,

By: Janet M. Freiling
Its: Treasurer

STATE OF OREGON)
) ss.
County of _____)

This instrument was acknowledged before me on May 28, 2010 by Janet Freiling As the Treasurer of Hidden Springs Ranch Recreation Association

L J Aanderud
Notary Public for Oregon



The foregoing Easement is acknowledged and accepted by West Linn-Wilsonville School District this 26th day of May, 2010.

GRANTEE:

West Linn-Wilsonville School District

By: Roger J. Woehl
Its: Superintendent

STATE OF OREGON)
) ss.
County of Clackamas)

This instrument was acknowledged before me on 5/26, 2010 by Roger Woehl
as the Superintendent of West Linn-Wilsonville School District



Notary Public for Oregon
Tara DuBois

EXHIBIT A

LEGAL DESCRIPTION OF GRANTOR'S PROPERTY

That certain property conveyed to Grantor by deed from Hidden Springs Ranch #8, Owners Association, recorded on October 23, 1987, Recorder's No. 87-048492, and described in said deed as follows:

"Tract A, HIDDEN SPRINGS RANCH #8, PHASE 3"

EXHIBIT B
Page 1

LEGAL DESCRIPTION
ACCESS EASEMENT
ERICKSON PROPERTY
WEST LINN WILSONVILLE SCHOOL DISTRICT

JOB NO. 6667
4/21/10 MAR

A TRACT OF LAND LOCATED IN THE NORTHEAST ONE-QUARTER OF SECTION 26, TOWNSHIP 2 SOUTH, RANGE 1 EAST, WILLAMETTE MERIDIAN, CITY OF WEST LINN, CLACKAMAS COUNTY, OREGON, BEING A PORTION OF TRACT "A", "HIDDEN SPRINGS RANCH NO. 8 - PHASE III" PLAT NO. 2728, CLACKAMAS COUNTY PLAT RECORDS, SAID TRACT BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF TRACT "A", "HIDDEN SPRINGS RANCH NO. 8 - PHASE III", BEING ON THE NORTHEASTERLY RIGHT-OF-WAY LINE OF ROSEMONT ROAD (COUNTY ROAD NO. 82)(30.00 FEET FROM CENTERLINE); THENCE ALONG THE NORTH LINE THEREOF, S89°12'48"E, 240.43 FEET; THENCE 128.45 FEET ALONG THE ARC OF A 400.00 FOOT RADIUS, NON-TANGENT CURVE TO THE LEFT, THROUGH A CENTRAL ANGLE OF 18°23'56" (THE LONG CHORD BEARS S66°14'10"W, 127.90 FEET); THENCE S57°02'12"W, 73.66 FEET TO THE NORTHEASTERLY RIGHT-OF-WAY LINE OF ROSEMONT ROAD (30.00 FEET FROM CENTERLINE); THENCE ALONG SAID RIGHT-OF-WAY LINE, N32°57'48"W, 113.13 FEET TO THE POINT-OF-BEGINNING, CONTAINING 10116 SQUARE FEET, MORE OR LESS.

REGISTERED
PROFESSIONAL
LAND SURVEYOR

Michael A. Rademacher

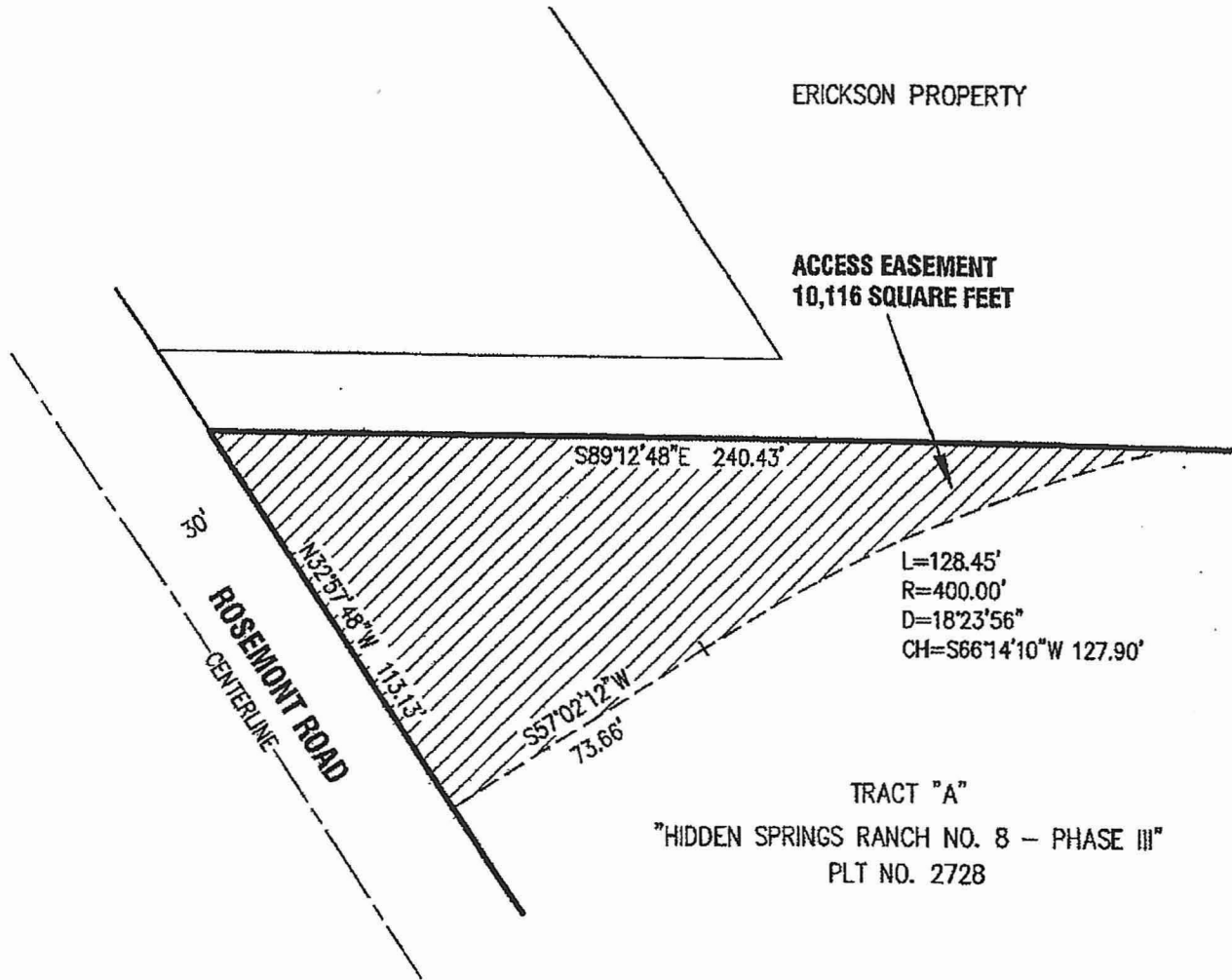
OREGON
JULY 18, 1987
MICHAEL A. RADEMACHER
2303

DATE OF SIGNATURE: 4-21-10

EXPIRES: 12/31/2010

ERICKSON PROPERTY

ACCESS EASEMENT
10,116 SQUARE FEET



L=128.45'
R=400.00'
D=18°23'56\"/>
CH=S66°14'10\"W 127.90'

TRACT "A"
"HIDDEN SPRINGS RANCH NO. 8 - PHASE III"
PLT NO. 2728

REGISTERED
PROFESSIONAL
LAND SURVEYOR

OREGON
JULY 16, 1987
MICHAEL A. RADEMACHER
2303



DATE OF SIGNATURE: 4-21-10
EXPIRES: 12/31/2010

Scale: 1" = 40'

6657 Exh.dwg



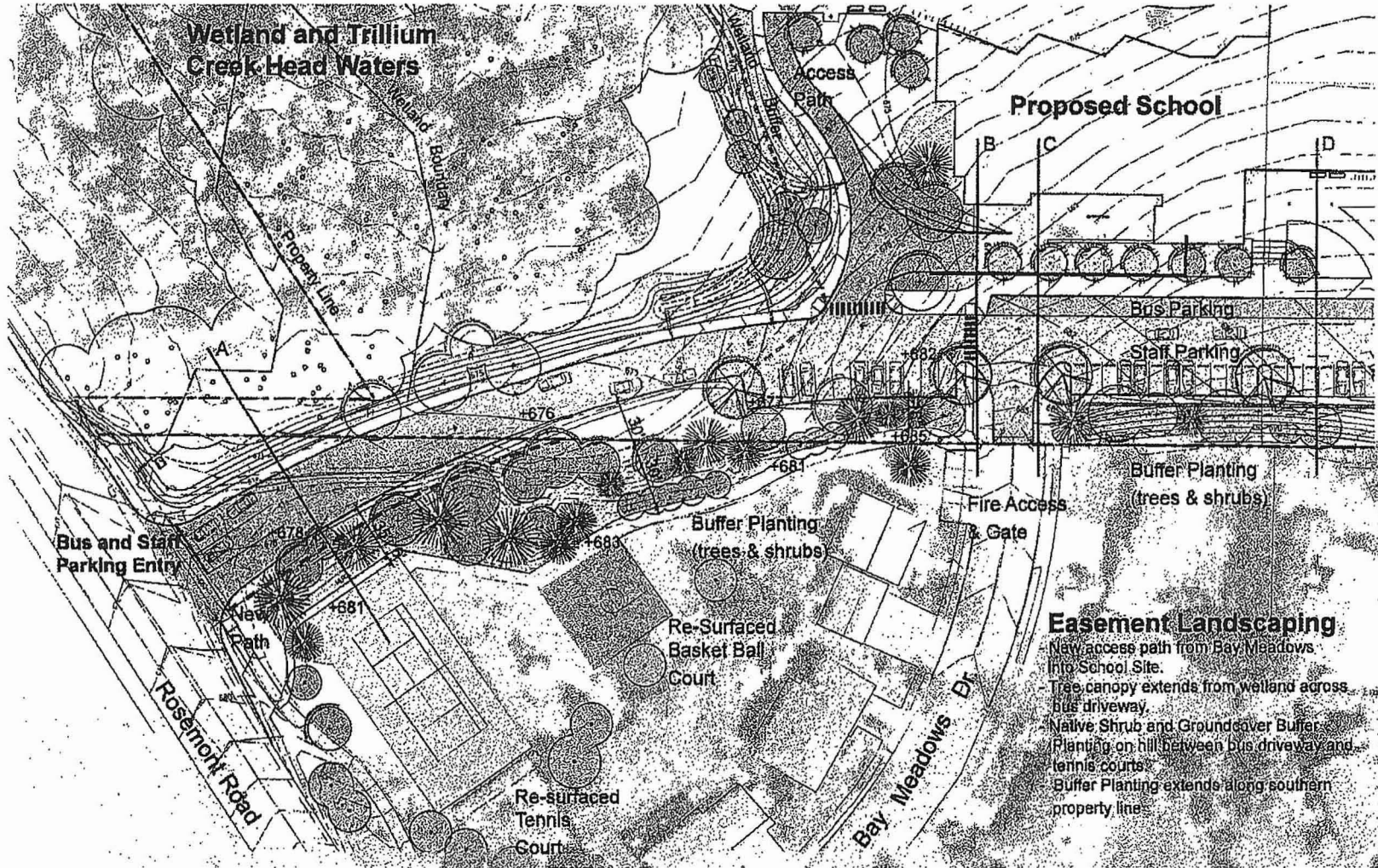
COMPASS ENGINEERING
ENGINEERING SURVEYING PLANNING
4105 S.E. INTERNATIONAL WAY, SUITE 501
MILWAUKIE, OREGON 503.653.9093

TAX LOT 5500, LOCATED IN THE S.W. 1/4 OF THE
N.E. 1/4 OF SECTION 26, T.2S., R.1E., W.M., CITY
OF WEST LINN, CLACKAMAS COUNTY, OREGON

EXHIBIT C

DESCRIPTION OF GRANTEE'S PROPERTY

The Grantee's real property on which it intends to build a primary school and to which the Easement attaches consists of the following: that certain property conveyed to Grantee by deed recorded on December 28, 1989, Recorder's No. 89-058018, and also Parcel II and Parcel III of that certain property conveyed to Grantee on December 28, 1989, Recorder's No. 89-058017.



Easement Landscaping
 New access path from Bay Meadows into School Site.
 Tree canopy extends from wetland across bus driveway.
 Native Shrub and Groundcover Buffer Planting on hill between bus driveway and tennis courts.
 Buffer Planting extends along southern property line.

Enlarged Plan
 Scale: 1" = 20'-0"

New West Linn Primary School

Duff Olson Woakes Architects | Walker Macy

West Linn Wilsonville School District | April 21, 2010

**PRELIMINARY
STORMWATER MANAGEMENT
REPORT FOR
NEW WEST LINN PRIMARY SCHOOL**

**West Linn Wilsonville School District
22210 SW Stafford Road
West Linn, OR**



**15575 SW Sequoia Parkway, Suite 140
Portland, Oregon 97224**

**June 2010
(Revised 6/17/2010)**

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1.0 INTRODUCTION

1.1 Purpose of Study

The West Linn Wilsonville School District (WLWSD) is proposing a new primary school in the City of West Linn. A preliminary study was performed to evaluate the impacts of the proposed construction on existing stormwater characteristics, and to analyze the measures proposed to mitigate those impacts. This report presents the information, methods, and results generated from that study.

1.2 Project Location and Site Description

The proposed project is located in Clackamas County, Oregon in the City of West Linn. The site is located at 1025 Rosemont Road.

The site consists of approximately 16 acres of undeveloped land. It encompasses the headwaters of Trillium Creek, which runs through the property generally from the southwest to the northeast corner of the site. A wetland and wooded areas are located on both sides of the creek. Open areas are located in the northwest and southeast areas of the site, on either side of the wetland and wooded areas. The property generally slopes toward the creek and to the northeast.

The FEMA Flood Insurance Rate Maps Numbers 41005C0019D and 41005C0257D (Appendix A) show that the project site is located within Other Areas - Zone X, which is described as "areas determined to be outside the 0.2% annual chance floodplain".

1.3 Project Description

The project consists of the construction of a new 500 student primary school, including approximately 120 new parking areas and a bus loop for approximately 10 busses. Additional on-site improvements include new impervious and pervious play areas and a new grass play field.

Public improvements associated with the project include half street improvements along the project frontage on Rosemont Road that include a center turn lane, traffic lane, bike lane, and sidewalk.

Two on-site stormwater detention facilities are proposed which consist of underground storage chambers and drain rock. On-site stormwater treatment will be provided by water quality bioswales. In addition, infrastructure is proposed for harvesting roof runoff to be reused to flush toilets in the building.

Stormwater management facilities are also proposed for the public runoff from Rosemont Road, and include a pollution control manhole and treatment/detention pond to be located at the northwest corner of the site adjacent to Rosemont Road.

1.4 Methodologies and Assumptions

The methodologies used in conducting the hydrologic and hydraulic analyses were generated from a variety of sources including existing maps, field data, nomographs, charts, computer programs, standards, and reference manuals.

The hydrologic analysis was performed in accordance with City of West Linn Design Standards using the Santa Barbara Urban Hydrograph method with an 24-hour NRCS Type IA synthetic rainfall distribution. The calculations were executed with the computer program Bentley PondPack 10.0. This method was used to generate site runoff hydrographs, determine peak flows, and perform pond routing analysis.

1.5 Agency Stormwater Criteria

This project lies within the jurisdiction of the City of West Linn, which has the following policy regarding stormwater management for new construction.

Quantity Control: The City of West Linn Design Standards (Section Two) defines the criteria for stormwater quantity management. Onsite detention is required to provide quantity control for surface runoff to account for the increase in runoff due to land use changes associated with development. It is required that detention facilities be designed to provide storage for up to the 25-year storm event with the safe overflow conveyance of the 100-year storm event. Allowable post-development peak discharge rates for the 2, 5, 10, and 25-year events are limited to that of the pre-development discharge rates.

The 24-hour rainfall depths used in this study were obtained from the City of Portland Stormwater Management Manual and are summarized in Table 1 below.

Design Storm	24-Hour Rainfall
2-Year	2.4"
5-Year	2.9"
10-Year	3.4"
25-Year	3.9"
100-Year	4.4"

Table 1: 24-Hour Rainfall Depths (Source: City of Portland Stormwater Management Manual)

Quality Control: The City of West Linn uses the City of Portland Stormwater Management Manual for stormwater quality criteria, which defines the water quality design storm as a NRCS Type 1A rainfall distribution with 0.83" of rainfall over a 24 hour period.

2.0 EXISTING DRAINAGE CONDITIONS

2.1 Description of Existing Drainage Conditions

The site generally drains from the southwest towards the northeast. The major drainage feature on the site is Trillium Creek. From the west, runoff from a portion of the agricultural land and approximately 1200' of Rosemont Road drains onto the property. Runoff from the existing residential development to the south, Cheyenne Terrace, is discharged onto the site at two different locations from piped storm drainage systems. It appears that runoff from a small portion of the existing residential development to the east drains onto the site. The north edge of the property is either bordered by Trillium Creek, or runoff drains away from the property onto the adjacent residential development to the north.

2.2 Hydrologic Analysis of Existing Conditions

Hydrologic analyses of portions of the site in the existing condition were performed as part of this study to establish the allowable peak flows out of the proposed detention systems. The calculations are contained in Appendix B. The limits of the areas considered as part of this study are shown on Figure 1. A runoff curve number (CN) of 74 was determined to be appropriate for the pre-developed site based on a Hydrologic Soil Group of C (Appendix A) and a grassland cover type in good hydrologic condition (NRCS TR-55, June 1986, see Appendix B). The runoff hydrographs for the various design storms are shown in Appendix B.

3.0 PROPOSED DRAINAGE CONDITIONS

3.1 Description of Proposed Drainage Conditions

The proposed drainage design includes curbs, drains, and piping to collect and convey the runoff from the impervious areas to the proposed treatment and detention systems. Three onsite underground detention systems are proposed that will consist of arched chambers and crushed stone. The flow out of the detention systems will be controlled by orifice and riser combination outlet structures. The onsite detention systems will discharge to Trillium Creek at three separate locations. The proposed outfall structures consist of a subsurface infiltration trench with multiple overflow ditch inlets that will be set at ground level (Figure 4). The intent of the outfall structures is to distribute the flow and dissipate the energy of the discharge in order to minimize the potential for erosive concentrated flow.

A public detention pond is proposed to treat and detain the runoff associated with the public improvements on Rosemont Road. This pond will detain runoff to current peak discharge rates. The flow out of the detention pond will be controlled by an orifice and riser combination outlet structure. The pond will discharge to the public storm drainage system in Rosemont Road.

A water quality swale is proposed to treat and convey the runoff from the existing residential development to the south that discharges near the southeast corner of the site.

3.2 Hydrologic Analysis of Proposed Conditions

Hydrologic analyses of portions of the site in the proposed condition were performed as part of this study; the calculations are contained in Appendix C. The limits of the areas considered as part of this study are shown on Figure 2. A runoff curve number (CN) of 74 was determined to be appropriate for the landscaped areas based on a Hydrologic Soil Group of C (Appendix A) and a grassland cover type in good hydrologic condition (NRCS TR-55, June 1986, see Appendix B). The runoff hydrographs for the various design storms are shown in Appendix B.

3.3 Stormwater Quality Management

Stormwater treatment is proposed for the majority of the proposed onsite impervious area (Figure 3). Treatment of onsite runoff will be provided by bioswales. The bioswale have been designed in accordance with the City of Portland Stormwater Management Manual using the Presumptive Approach Calculator Ver 1.1 provided by the City of Portland Bureau of Environmental Services (BES). The calculations for the bioswale sizing are included in Appendix D.

Treatment of the runoff from Rosemont Road is proposed to be provided by a pollution control manhole and extended detention combined with water quality plantings in the pond.

4.0 CHEYENNE TERRACE DISCHARGE

Runoff from the existing sub-division to the south, Cheyenne Terrace, is collected by catch basins in the street and piped to a discharge point near the southeast corner of the new school site property. This runoff flows overland to the north to an existing catch basin that is located along the north property line near the northeast corner of the site. Based on an infiltration test performed by Geocon, the infiltration in the area where the discharge currently flows overland is negligible, so it is assumed that the peak flows that are discharged onto the site are completely conveyed across the site to the existing catch basin.

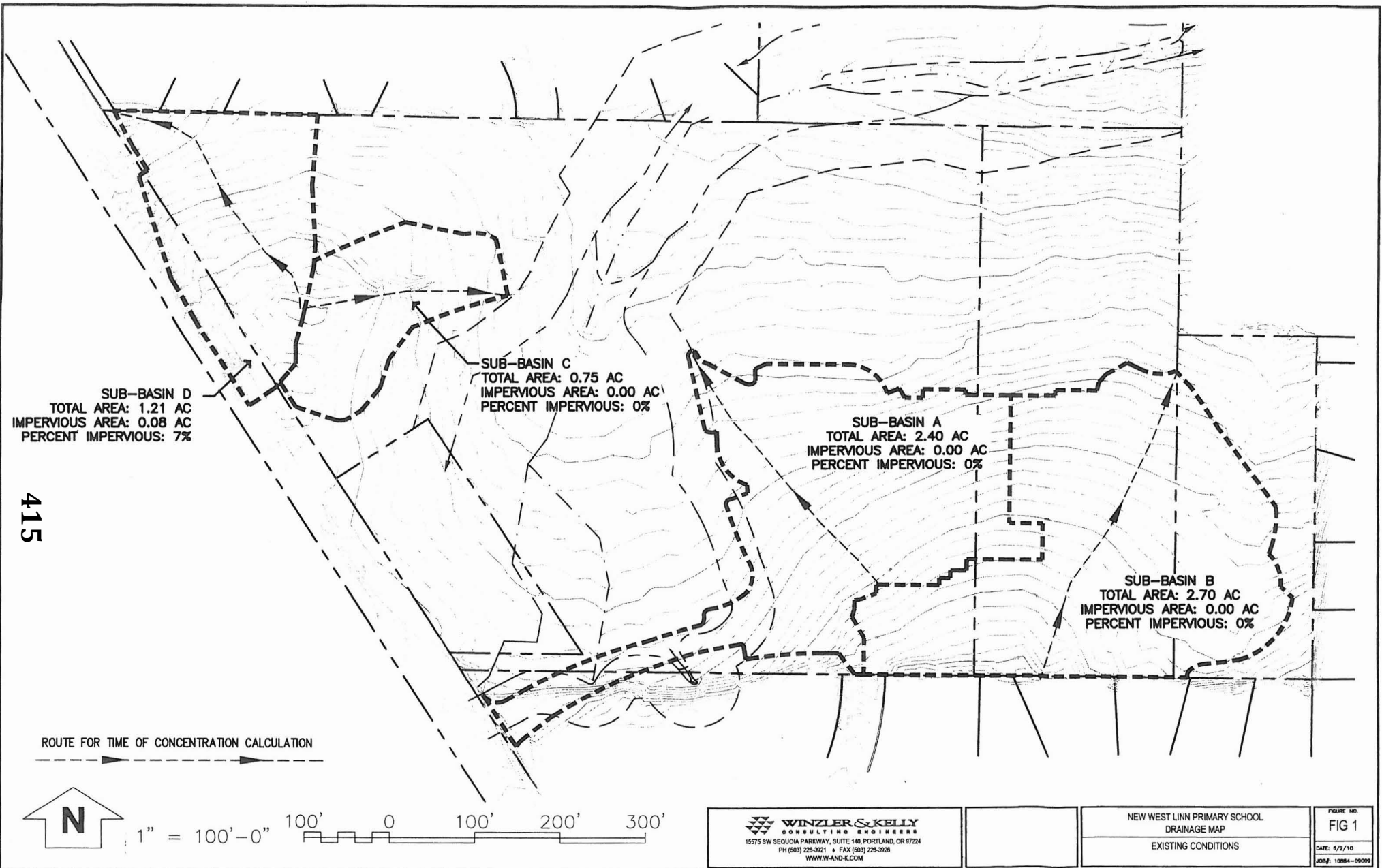
A swale is proposed to accept and provide treatment and conveyance of the discharge from Cheyenne Terrace. The calculations in Appendix E demonstrate that the travel times from the point of discharge to the existing catch basin to the north for both the existing

conditions and the proposed conditions differ by only 0.2 minutes, which is considered negligible with respect to the 24-hour duration of the design storm.

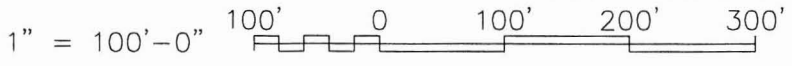
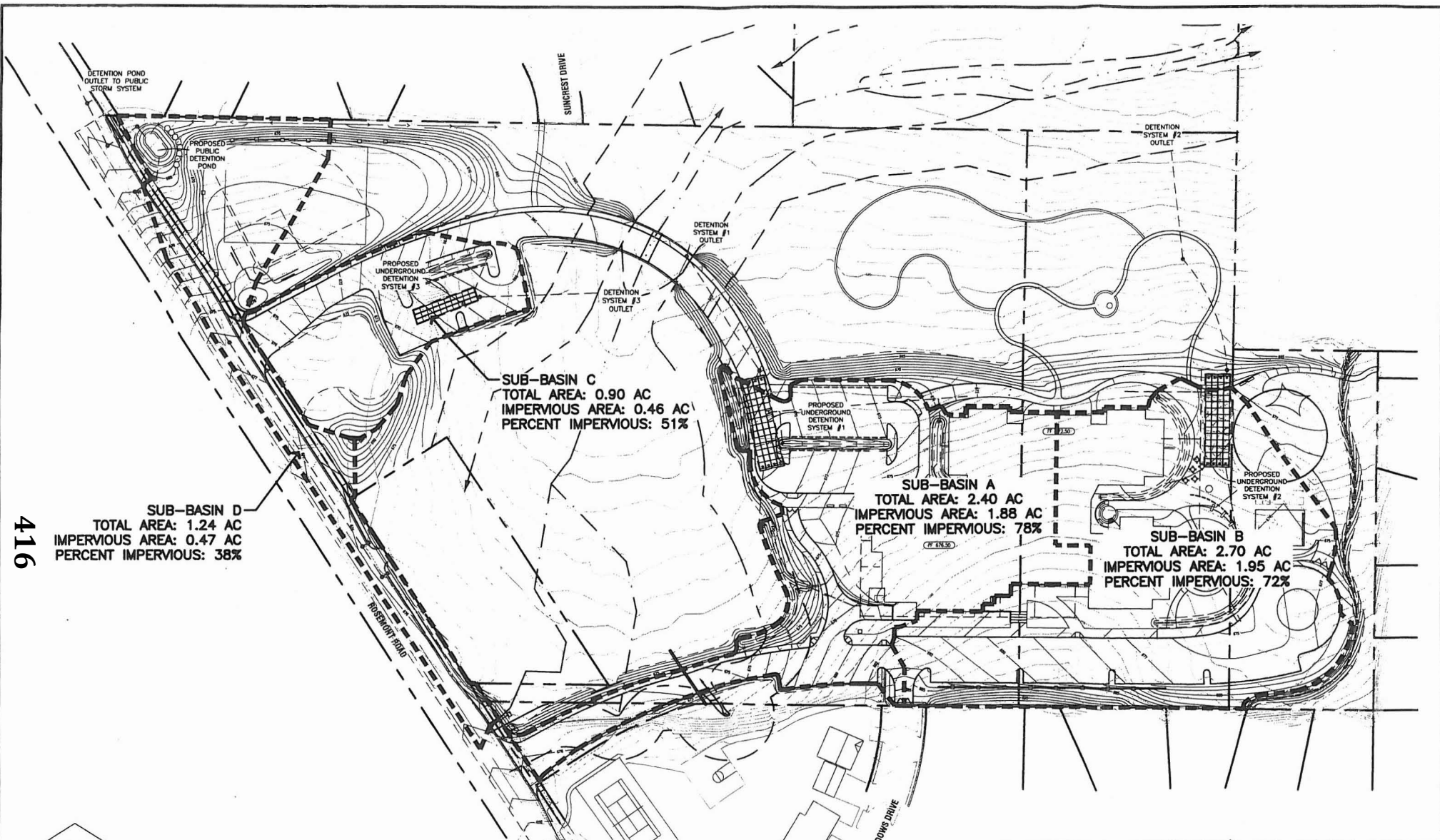
The proposed swale will also provide treatment of the runoff through the use of check dams and water quality plantings. The calculations contained in Appendix E show an expected residence time of over 16 minutes in the proposed swale for the peak flow from the water quality design storm event.

5.0 SUMMARY

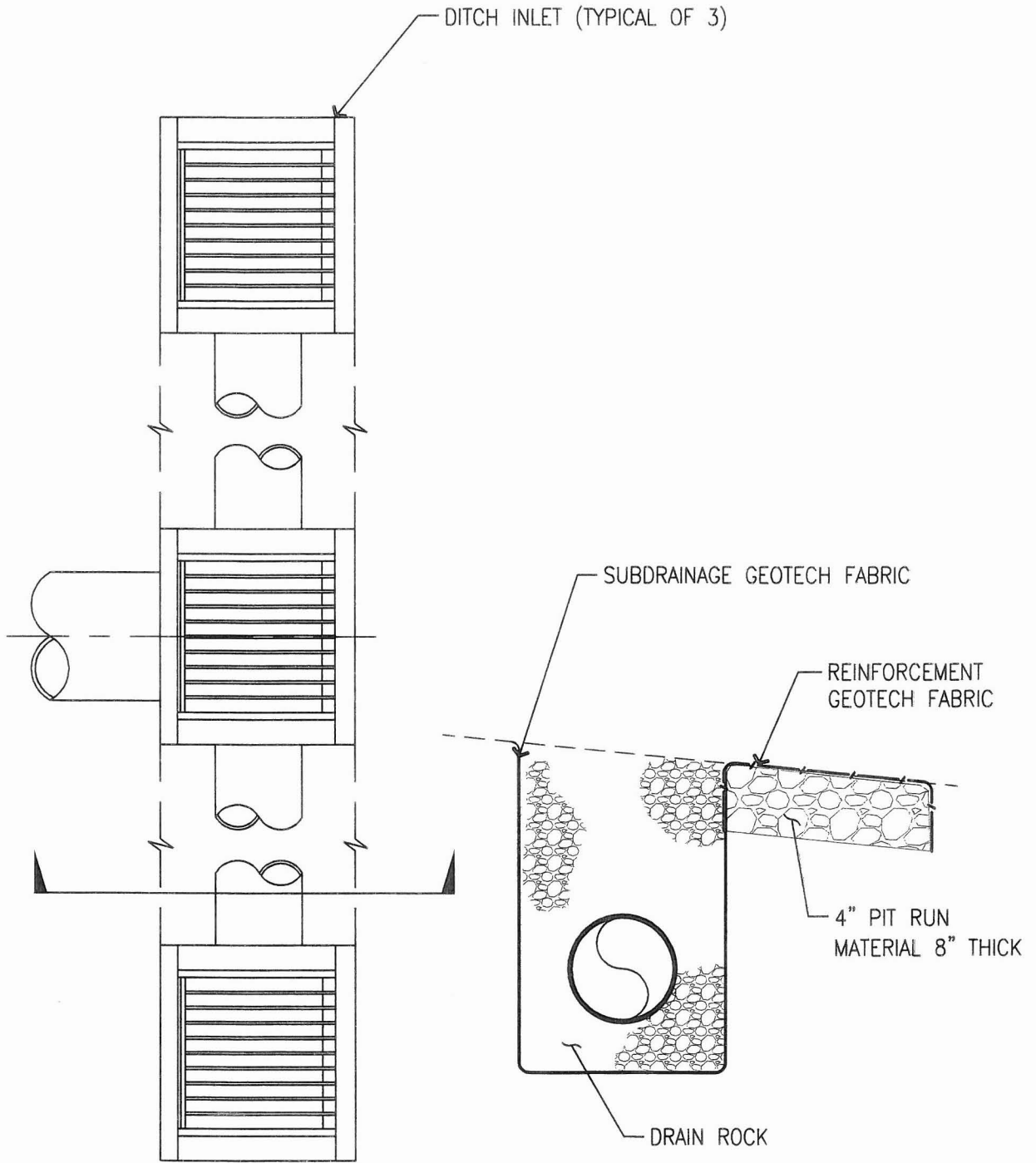
The increase in stormwater runoff due to the modifications in land use from the existing condition to the proposed condition will be managed by detention systems and outlet structures that will restrict the peak rate at which runoff from the proposed site will be discharged. In addition, runoff from the majority of the proposed new impervious area will be treated prior to being discharged.



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<p>WINZLER & KELLY CONSULTING ENGINEERS 15575 SW SEQUOIA PARKWAY, SUITE 140, PORTLAND, OR 97224 PH (503) 228-3921 • FAX (503) 228-3928 WWW.W-AND-K.COM</p>		<p>NEW WEST LINN PRIMARY SCHOOL DRAINAGE MAP PROPOSED CONDITIONS</p>	<p>FIGURE NO. FIG 2 DATE: 5/2/10 JOB#: 10884-09009</p>
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 15575 SW SEQUOIA PKWY, SUITE 140
 PORTLAND, OR 97224
 PH: 503-226-3921 FAX: 503-226-3926

PROJECT		NEW WEST LINN PRIMARY SCHOOL				
TITLE		STORMWATER OUTFALL STRUCTURE				
DESIGNED	DRAWN	APPROVED	DATE	PROJECT NO.	DWG NO.	
STS	STS	-	6/18/10	10884-09009	FIG 4	

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WATER QUALITY POND
IMPERVIOUS AREA: 0.47 AC

SUNCREST DRIVE

BIOSWALE #1
IMPERVIOUS AREA: 0.46 AC

BIOSWALE #2
IMPERVIOUS AREA: 0.29 AC

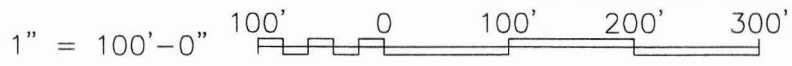
BIOSWALE #3
IMPERVIOUS AREA: 0.35 AC

BIOSWALE #5
IMPERVIOUS AREA: 0.51 AC

BIOSWALE #4
IMPERVIOUS AREA: 0.80 AC

BIOSWALE #7
IMPERVIOUS AREA: 1.05 AC

BIOSWALE #6
IMPERVIOUS AREA: 0.85 AC



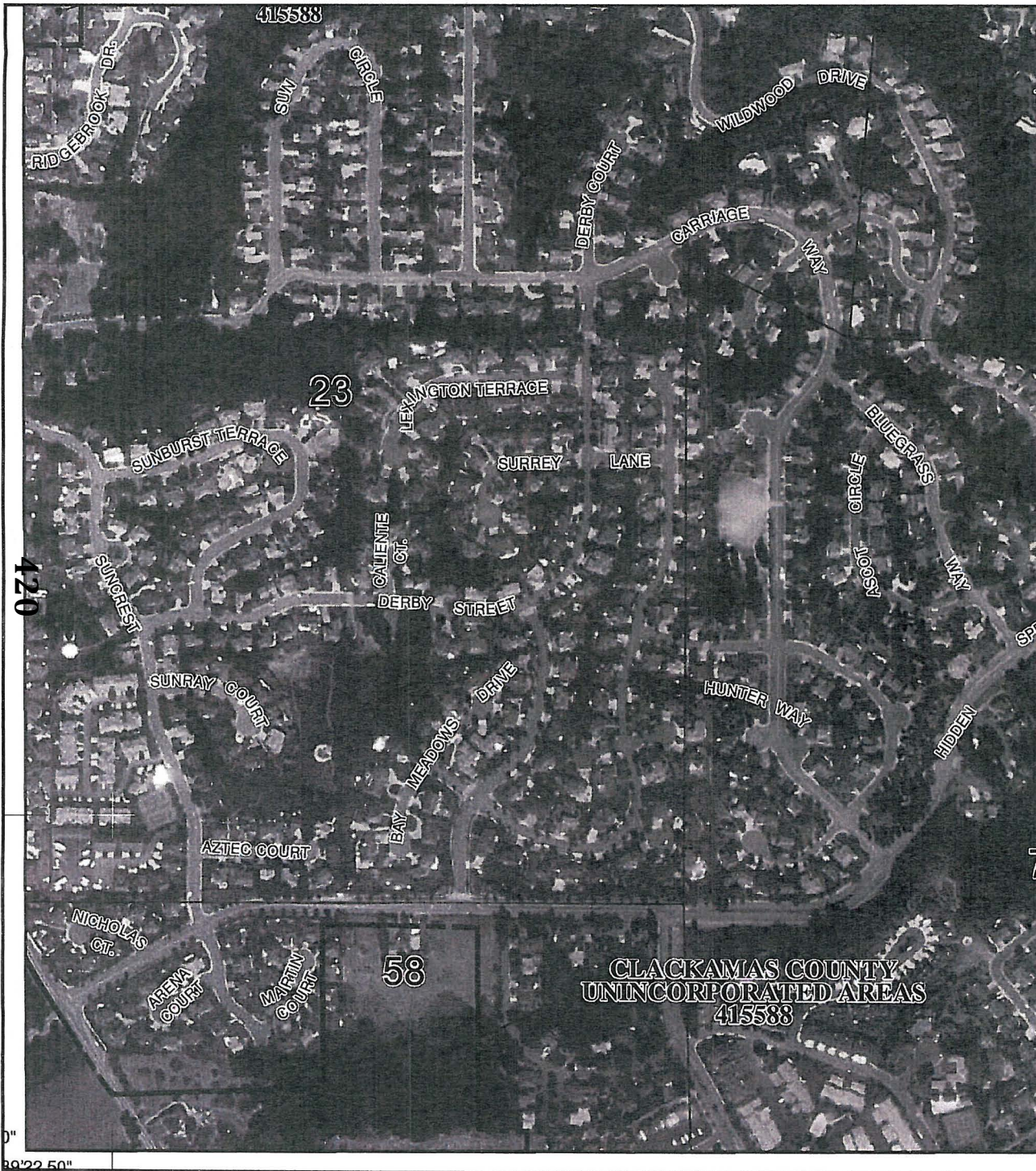
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CONSULTING ENGINEERS
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NEW WEST LINN PRIMARY SCHOOL
DRAINAGE MAP
PROPOSED CONDITIONS
TREATMENT AREAS

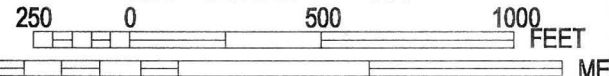
FIGURE NO.
FIG 3
DATE: 8/2/10
JOB#: 10884-09009

Appendix A

FEMA Flood Insurance Rate Maps/
NRCS Hydrologic Soil Group Information



MAP SCALE 1" = 500'



NFIP

PANEL 0019D

FIRM
FLOOD INSURANCE RATE MAP
CLACKAMAS COUNTY,
OREGON
AND INCORPORATED AREAS

PANEL 19 OF 1175
 (SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLACKAMAS COUNTY	415588	0019	D
LAKE OSWEGO, CITY OF	410018	0019	D
WEST LINN, CITY OF	410024	0019	D

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER
41005C0019D
EFFECTIVE DATE
JUNE 17, 2008

Federal Emergency Management Agency

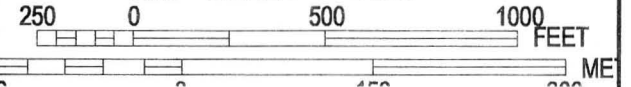
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



**CLACKAMAS COUNTY
UNINCORPORATED AREAS
415588**



MAP SCALE 1" = 500'



**NFP
NATIONAL FLOOD INSURANCE PROGRAM**

PANEL 0257D

**FIRM
FLOOD INSURANCE RATE MAP
CLACKAMAS COUNTY,
OREGON
AND INCORPORATED AREAS**

PANEL 257 OF 1175
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
CLACKAMAS COUNTY	415588	0257	D
OREGON CITY, CITY OF	410021	0257	D
WEST LINN, CITY OF	410024	0257	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.



**MAP NUMBER
41005C0257D**

**EFFECTIVE DATE
JUNE 17, 2008**

Federal Emergency Management Agency

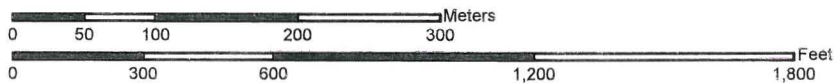
This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Hydrologic Soil Group—Clackamas County Area, Oregon
(Erickson Primary School)

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Map Scale: 1:5,530 if printed on A size (8.5" x 11") sheet.



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Units

Soil Ratings

 A

 A/D

 B

 B/D

 C

 C/D

 D

Not rated or not available

Political Features

 Cities

Water Features

 Oceans

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

MAP INFORMATION

Map Scale: 1:5,530 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: UTM Zone 10N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 5, Aug 12, 2009

Date(s) aerial images were photographed: 8/3/2005

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

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Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Clackamas County Area, Oregon				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
13C	Cascade silt loam, 8 to 15 percent slopes	C	16.5	13.5%
23B	Cornelius silt loam, 3 to 8 percent slopes	C	8.2	6.7%
23C	Cornelius silt loam, 8 to 15 percent slopes	C	54.5	44.4%
36B	Hardscrabble silt loam, 2 to 7 percent slopes	D	17.7	14.5%
78C	Saum silt loam, 8 to 15 percent slopes	B	24.2	19.7%
78D	Saum silt loam, 15 to 30 percent slopes	B	1.5	1.3%
Totals for Area of Interest			122.6	100.0%

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

TABLE 13.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	G/cm ³	In/hr	In/in	pH				Pct
1A, 1B----- Aloha	0-8	15-20	1.35-1.55	0.6-2.0	0.19-0.21	5.6-6.0	Low-----	0.43	5	2-3
	8-35	18-27	1.40-1.55	0.2-0.6	0.19-0.21	5.6-6.5	Low-----	0.55		
	35-60	10-25	1.45-1.60	0.2-0.6	0.16-0.21	5.6-6.5	Low-----	0.55		
2B, 2C, 2D, 2E--- Alspaugh	0-14	27-35	1.00-1.20	0.6-2.0	0.16-0.21	5.6-6.0	Moderate----	0.24	5	5-7
	14-43	35-45	1.20-1.40	0.2-0.6	0.08-0.16	4.5-5.5	Moderate----	0.24		
	43-60	35-45	1.10-1.30	0.2-0.6	0.06-0.10	4.5-5.5	Moderate----	0.10		
3----- Amity	0-22	15-25	1.20-1.45	0.6-2.0	0.19-0.21	5.6-6.0	Low-----	0.32	5	3-5
	22-60	27-35	1.20-1.40	0.2-0.6	0.19-0.21	5.6-6.5	Moderate----	0.49		
4E, 4F. Andic Cryaquepts										
5D, 5E----- Aschoff	0-17	7-10	0.85-0.95	0.6-2.0	0.07-0.10	5.1-6.5	Low-----	0.10	5	7-12
	17-60	10-18	0.85-0.95	0.6-2.0	0.07-0.10	5.6-6.5	Low-----	0.10		
6F*:										
Aschoff-----	0-17	7-10	0.85-0.95	0.6-2.0	0.07-0.10	5.1-6.5	Low-----	0.10	5	7-12
	17-60	10-18	0.85-0.95	0.6-2.0	0.07-0.10	5.6-6.5	Low-----	0.10		
Brightwood-----	0-4	10-18	1.00-1.20	2.0-6.0	0.06-0.12	5.6-6.5	Low-----	0.10	2	4-8
	4-34	10-15	1.00-1.20	2.0-6.0	0.04-0.12	5.6-6.5	Low-----	0.10		
	34	---	---	---	---	---	---	---		
7B----- Borges	0-18	27-35	1.20-1.40	0.2-0.6	0.19-0.21	5.1-6.0	Moderate----	0.32	5	2-4
	18-45	45-60	1.20-1.40	<0.06	0.15-0.17	5.6-6.0	High-----	0.32		
	45-60	27-45	1.30-1.40	0.2-0.6	0.12-0.21	5.6-6.0	Moderate----	0.32		
8B, 8C, 8D----- Bornstedt	0-8	20-27	1.30-1.50	0.6-2.0	0.15-0.17	5.1-6.0	Low-----	0.32	5	3-4
	8-33	27-35	1.40-1.60	0.6-2.0	0.13-0.17	5.1-6.0	Low-----	0.37		
	33-60	40-50	1.30-1.50	0.06-0.2	0.12-0.15	4.5-5.5	Low-----	0.32		
9B, 9D, 9E----- Bull Run	0-19	12-20	0.70-0.75	0.6-2.0	0.18-0.24	5.1-6.0	Low-----	0.32	5	6-10
	19-60	12-18	0.70-0.85	0.6-2.0	0.24-0.26	5.1-6.0	Low-----	0.49		
10C----- Bull Run Variant	0-14	10-20	0.70-0.85	0.6-2.0	0.18-0.24	5.1-6.0	Low-----	0.28	5	6-8
	14-48	10-20	0.75-0.85	0.6-2.0	0.20-0.24	5.1-6.0	Low-----	0.43		
	48-60	30-45	1.00-1.40	0.2-0.6	0.19-0.21	5.1-6.0	Moderate----	0.37		
11----- Camas	0-17	5-10	1.30-1.50	2.0-6.0	0.07-0.09	5.6-7.3	Low-----	0.10	2	1-3
	17-60	0-5	1.40-1.60	>20	0.03-0.05	5.6-6.5	Low-----	0.10		
12A, 12B----- Canderly	0-7	10-18	1.00-1.20	2.0-6.0	0.11-0.13	5.6-6.5	Low-----	0.10	5	4-6
	7-46	10-18	1.00-1.20	2.0-6.0	0.11-0.13	5.6-6.5	Low-----	0.10		
	46-60	5-10	1.10-1.30	2.0-6.0	0.04-0.08	5.6-6.5	Low-----	0.17		
13B, 13C, 13D, 13E----- Cascade	0-11	15-19	1.10-1.20	0.6-2.0	0.17-0.21	5.1-6.0	Low-----	0.24	5	4-7
	11-21	18-30	1.30-1.40	0.6-2.0	0.17-0.21	5.1-6.0	Low-----	0.28		
	21-60	17-28	1.40-1.55	0.06-0.2	0.03-0.05	5.1-6.0	Low-----	0.20		
14C, 14D, 14E---- Cascade	0-24	18-25	1.20-1.30	0.6-2.0	0.17-0.21	5.1-6.0	Low-----	0.24	5	4-6
	24-32	20-30	1.60-1.85	0.06-0.2	0.03-0.05	5.1-6.0	Low-----	0.20		
	32-60	27-40	1.20-1.40	0.2-0.6	0.11-0.15	5.1-6.0	Moderate----	0.10		
15B, 15C, 15D---- Cazadero	0-21	25-40	1.20-1.40	0.6-2.0	0.15-0.17	5.1-6.0	Low-----	0.24	5	3-4
	21-60	45-60	1.30-1.50	0.2-0.6	0.11-0.13	5.1-6.0	Moderate----	0.28		
16----- Chehalis	0-7	15-25	1.10-1.30	0.6-2.0	0.19-0.21	5.6-6.5	Low-----	0.32	5	5-10
	7-44	25-35	1.20-1.30	0.6-2.0	0.17-0.21	5.6-7.3	Moderate----	0.28		
	44-60	15-35	1.10-1.30	0.6-2.0	0.17-0.21	5.6-7.3	Moderate----	0.28		

See footnote at end of table.