

APPENDIX B

DKS MEMORANDUMS

June 15, 2005
April 6, 2004
January 6, 2003
February 28, 2003
August 7, 2013

MEMORANDUM

TO: Chris Neamtzu, City of Wilsonville
Sharon Zimmerman, City of Wilsonville
Mike Stone, City of Wilsonville

FROM: Ransford S. McCourt, P.E., DKS Associates 
Scott Mansur, P.E., DKS Associates 

DATE: June 15, 2005

SUBJECT: Villebois Urban Village Master Plan Amendment Transportation Summary
P02246-000-004

The purpose of the memorandum is to evaluate transportation related aspects of the revised Villebois Village Master Plan dated April 26, 2005. While we have provided comment on several documents from Villebois, this is our first formal review of the master plan. The proposed master plan revision has increased the number of housing units to 2,473, which is above the 2,400 unit count that has been previously evaluated. Additionally, the internal Villebois roadway network has changed. The evaluation will include the following:

- Trip Generation Update
- Wilsonville Road Interchange Area Trip Comparison
- Master Plan Transportation Review

Trip Generation Update

The Villebois Village Master Plan was previously estimated to generate approximately 2,240 PM peak hour trips to each of the individual land uses¹ and 1977 net new PM peak hour trips that would travel outside of the Villebois Village development². Since this previous estimation, the Villebois Village master plan has been updated and the *ITE Trip Generation Manual* has been revised from the 6th Edition to the 7th Edition that includes additional land use trip generation data. Additionally the mix of dwelling unit types has changed. Based on these changes, the proposed master plan would generate 2,177 PM peak hour trips to each of the individual land uses and 1,907 PM peak hour trips that would travel outside of the Villebois Village development. The proposed master plan would generate approximately 70 fewer net new PM peak hour trips than previously analyzed. Therefore, transportation findings as previously identified would be consistent with the current plan. The PM peak hour trip generation is summarized in Table 1.

¹ *Villebois Site Plan Review Comments*, DKS Associates, April 6, 2004.

² *Phasing of Off-Site Improvements Associated with the Villebois Development*, DKS Associates, July 19, 2004.

Table 1: Villebois Trip Generation Summary- PM Peak Hour

Transportation Study	Study Date	Unit Count	Total Land Use Trips	External Trips*
Villebois Internal Circulation Memo Approved Master Plan	January 13, 2003	2,383	2,272	2,011
Villebois Master Plan Legislative Amendment	April 6, 2004	2,400	2,240	1,977
Villebois Master Plan Second Legislative Amendment	Current Study	2,474	2,177	1,907

*Accounts for trips within Villebois separate from trips to and from points external to Villebois.

Wilsonville Road Interchange Area Trip Comparison

The Wilsonville Road interchange area is defined as any of the four existing signalized intersections on Wilsonville Road between Boones Ferry Road and Town Center Loop West. The interchange comparison assumes full buildout of the Villebois Village Master Plan as well as a series of expected roadway projects (Boeckman, Kinsman, and Barber extensions) that would change circulation patterns thus reducing the number of interchange area trips. **The proposed master plan would generate 17 fewer PM peak hour trips through the Wilsonville Road interchange area.** Table 2 compares the number of PM peak hour trips through the Wilsonville Road interchange area between the current master plan and two past master plan evaluations.

Table 2: Wilsonville Road Interchange Area Trip Comparison (PM Peak Hour)

Transportation Study	Study Date	Unit Count	Wilsonville Road Interchange Area Trips
Villebois Internal Circulation Memo Approved Master Plan	January 13, 2003	2,383	463
Villebois Master Plan Legislative Amendment	April 6, 2004	2,400	455
Villebois Master Plan Second Legislative Amendment	Current Study	2,474	438

Villebois Master Plan Internal Street Evaluation

The following section provides a detailed review and associated comments in regards to the Villebois Master Plan document related to internal circulation for pedestrians, bicycles and motor vehicles.

Chapter 3, Section 3.1, Figure 5- Parks & Open Space Plan, page 20:

The major, minor, and nature trails/pathways shown on Figure 5 show minimal linkages to and from the public and private street system. Linkages should be provided between the point where

all public and private streets terminate to the adjacent trail to enhance pedestrian and bicycle circulation to the proposed trails.

Recommendation: Language should be added to the master plan stating that linkages should be made between the point where all public and private streets terminate to adjacent trail/pathway to enhance pedestrian and bicycle access/circulation.

Chapter 3, Section 3.1, T-1 Nature Trails (PRMP Category), page 25:

The nature trails should be 6 feet in width except for short distances (less than 100 feet) when the natural environment or physical constraints precludes this width. In these cases the width could be a minimum of 4 feet.

Recommendations: Change the first bullet to read 6 feet wide. Replace first paragraph (after bullets) with the following: Nature trails will be located within two of the large natural open spaces at Villebois. These trails will be six feet wide with a soft surface. In cases where the natural environment precludes this width, a minimum of 4 feet could be used for short distances (less than 100 feet).

Chapter 3, Section 3.1, T-2 Minor Pathways (PRMP Category), page 25:

The minor pathways should be 10 feet in width except for short distances (less than 100 feet) when the natural environment or physical constraints precludes this width. In these cases the width could be a minimum of 6 feet.

Recommendations: Change the first bullet to read 10 feet wide. Add the following sentences to the end of the first paragraph (after bullets): Minor pathways should be 10 feet wide. In cases where the natural environment precludes this width, a minimum of 6 feet could be used for short distances (less than 100 feet).

Chapter 3, Section 3.1, T-3 Major Pathways (PRMP Category), page 25:

The major pathways should be 12 feet in width except for short distances (less than 100 feet) when the natural environment or physical constraints precludes this width. In these cases the width could be a minimum of 10 feet.

Recommendations: Change the first bullet to read 12 feet wide. Add the following paragraph (after bullets): Major pathways should be 12 feet wide. In cases where the natural environment precludes this width, a minimum of 6 feet could be used for short distances (less than 100 feet).

Chapter 5, Section 5.2, Figure 7- Street Plan, page 64:

The street plan was compared to the previous street plan in the approved master plan. The major changes noted with the new street plan were the addition of private woonerfs within Village Center, removing bike lanes on the Villebois Drive roadway segment between Loop Road and Barber Street, and enhancing the street connectivity within Village Center. Additional details are needed on this map that include future SMART bus stop locations and access management hatching on Boeckman Road and Tooze Road.

The woonerf street segment adjacent to the plaza that is shown connecting to Barber Street should be removed. The transition from collector street to local street should occur before encountering the woonerf. The lack of a street definition for cross streets presents an ADA crossing issue. Where public streets intersect the woonerf street section as shown on the plan, the intersection should have no vertical deflection (non-woonerf) for public street crossings. If crossings are to be elevated, they will need to be approved by Public Works and Emergency Service departments.

The Villebois Drive roadway segment between Loop Road and Barber Street should have bike lanes as previously shown in the approved master plan (street section G). This segment provides direct bicycle connectivity from Boeckman Road and the plaza/mixed use activity center of Villebois. Bicycle lanes are especially important on this segment for recreational or inexperienced bicyclists heading to the Village Center (these users are not typically comfortable merging with traffic).

Recommendation: The woonerf segment adjacent to Barber Street should be converted to a Residential-Village Center street (street type H). All public street intersections with the private woonerf's should be lowered so there is no vertical deflection for the public street crossings or shall have an ADA plan plus approval of the Public Works and Emergency Services. The Villebois Drive roadway segment between Loop Road and Barber Street should have bike lanes as previously shown in the approved master plan (street section G). The project sponsor should contact SMART (682-7790) to determine future transit needs within Villebois. Future bus stops should be identified on Figure 7 so that setbacks, right of way, and sidewalk area are preserved. Tooze Road and Boeckman Road should have access management hatch as shown on Grahams Ferry Road.

Chapter 5, Section 5.2, Figure 9B- Street and Trail Sections, page 67:

The current master plan shows cross sections for the proposed pathways, trails, and woonerf. The pathway and trails should show the cross section range as previously mentioned. The woonerf cross section N1 should have a minimum of 32 feet from face of bollard to face of bollard.

Recommendation: The major pathway (P) should show a paved surface of 12 feet with a note below that allows 10 feet in cases of documented environmental/physical constraints. The minor pathway (Q) should show a paved surface of 10 feet (6 foot option). The nature trail should show a soft range of 6 feet (4 foot option). A note should be added to the minimum side of the range for the trails and pathways stating that the minimum width is for short distances (less than 100 feet) only when the natural environment precludes the maximum width. The woonerf (N1) should be modified for 32 feet of width from face of bollard to face of bollard.

Chapter 5, Section 5.2, Roundabouts, page 68:

On-street parking allowed should not be allowed on all roundabout approaches within 100 feet to 200 feet of the roundabout.

Recommendation: *A statement should be added to this section that states there will be no on-street parking allowed on all roundabouts approaches within 100 feet to 200 feet of the roundabout.*

Chapter 5, Section 5.2, Access Control on Minor Arterials, page 69:

Grahams Ferry is the only minor arterial that is mentioned in the section. Boeckman Road and Tooze Road should also be included in the section since the master plan development fronts these roadways.

Recommendation: *Add "Tooze Road or Boeckman Road" immediately after Grahams Ferry Road in the first sentence of this section.*

Chapter 5, Section 5.2, Continuity of Streets and Trails, page 69:

Pedestrian and bicycle linkages should be provided to and from the public (including alleys) and private street system to adjacent trails and pathways. Linkages should be provided between the point where all public and private streets terminate to the adjacent trail to enhance pedestrian and bicycle circulation to the proposed trails. Pedestrian and bicycle linkages should be provided from private alleys that dead end to either the public right of way or trails and pathways as applicable. These linkages are necessary to provide good pedestrian and bicycle connectivity.

Recommendation: *Add a second paragraph to this section as follows: Pedestrian and bicycle linkages between the point where all public and private streets terminate to adjacent trail/pathways shall be provided to enhance pedestrian and bicycle circulation. This includes connections from alleys for pedestrians and bicycles to and from either the public right of way or adjacent public trails and pathways.*

Chapter 5, Section 5.2, Curb extensions, page 69:

A minimum of 20 feet (curb to curb) of approach width at local street intersections can be difficult for large service trucks and fire apparatus to negotiate turns. Additional text should be added that states that the applicant will provide AUTOturn diagrams for all intersections with 20-foot approach widths. It is not desired that curb return radii be enlarged to accommodate 20-foot streets. Additionally 20-foot street segments should be limited to less than 100 feet.

Recommendation: *Add the following sentence to the end of the first bullet: Where the minimum 20 foot approach width is provided, the applicant shall provide AUTOturn diagrams for trucks and fire district's apparatus to assure turns can be made. Revise the third bullet to state: All passenger car turning movements (including pickups, vans, SUV's) shall be able to stay within the street centerline on all streets.*

Chapter 5, Section 5.3, TSP Goal 4.1, page 70:

Safe sight distance to and from public streets will need to be verified, documented, and stamped by a registered professional Civil Engineer licensed in the State of Oregon.

Recommendation: *Add last sentence to the following section: Prior to occupancy, sight distance at all access points to public streets will need to be verified, documented, and stamped by a registered professional Civil Engineer licensed in the State of Oregon.*

Chapter 5, Section 5.2, page 70:

The following details should be added to this section in regards to future bus stop locations.

Recommendation: Add the following to the end of section 5.2:

Bus Stop Locations

Transit service is not provided in Villebois today. Future transit service will follow the TSP framework for routing. Future potential bus stops should be identified on Figure 7.

Implementation: The Villebois Village Master Plan shall identify provisions for future bus stops locations.

Chapter 5, Section 5.3, TSP Figures 4.12 through 4.22: Street Classification, Widths and Names, page 75:

On-street parking should not be allowed on Barber Street, Villebois Drive, and Loop Road where it is within the influence area of a roundabout approach (within 100 feet to 200 feet of the roundabout). Medians will be placed where it is not in conflict with left turn lane needs. A minimum of 20 feet (curb to curb) of approach width at local street intersections can be difficult for large service trucks and fire apparatus to negotiate turns. Additional text should be added that states that the applicant will provide AUTOturn diagrams for all intersections with 20-foot approach widths. It is not desired that curb return radii be enlarged to accommodate 20-foot streets. Additionally 20-foot street segments should be limited to less than 100 feet.

Recommendation: Add the following sentence to the first bullet: On-street parking should not be allowed on Barber Street, Villebois Drive, and Loop Road where it is within the influence area of a roundabout approach (within 100 feet to 200 feet of the roundabout). Add the following sentence to the second bullet: The medians will be placed where it is not in conflict with left turn lane needs. Add the following to the fifth bullet: Where the minimum 20 foot approach width is provided, the applicant shall provide AUTOturn diagrams for trucks and fire district's apparatus to assure turns can be made. Revise the third bullet to state: All passenger car turning movements (including pickups, vans, SUV's) shall be able to stay within the street centerline on all streets.

Chapter 5, Section 5.4, Implementing Measures #4, page 75:

Grahams Ferry is the only minor arterial that is mentioned in the section. Boeckman Road and Tooze Road should also be included in the section since the master plan development fronts both these roadways.

Recommendation: Add "Tooze Road or Boeckman Road" immediately after Grahams Ferry Road in the first sentence of this section.

Chapter 5, Section 5.4, Implementing Measures #5, page 75:

A minimum of 20 feet (curb to curb) of approach width at intersections is difficult for large service trucks and fire apparatus to negotiate turns. Additional text should be added that states

that the applicant will provide AUTOTurn diagrams for all intersections with 20-foot approach widths.

Recommendation: Add the following sentence to the end of the first bullet: Where the minimum 20 foot approach width is provided, the applicant shall provide AUTOTurn diagrams for trucks and fire district's apparatus to assure turns can be made. Revise the third bullet to state: All passenger car turning movements (including pickups, vans, SUV's) shall be able to stay within the street centerline on all streets.

RESIDENTIAL STREET WIDTHS

The proposed Villebois Village Master Plan recommends implementation of 20 feet of pavement (curb to curb) on residential streets (outside of Village Center) that do not need parking. The Master Plan references these 20-foot street standards in following locations:

Chapter 5, Section 5.2, Figure 7- Street Plan, Figure 9A- Street and Trail Sections – A, and Figure 9B- Street and Trail Sections – B, pages 64, 66-67:

These figures reference street sections J, K, and M that show 20-foot minimum cross section with no parking.

Chapter 5, Section 5.2, Curb extensions, first bullet on page 69 where it states:

“A minimum of 20-foot face-of-curb to face-of-curb street width shall be provided at all Residential street intersections, even where curb extensions are located.”

Chapter 5, Section 5.3, TSP Figures 4.12 through 4.22: Street Classification, Widths and Names, fifth bullet on page 73 where it states:

“Reduce curb-to-curb widths to 20 feet and not allow parking on Residential Streets (VVMP street sections J, K, and M).”

Chapter 5, Section 5.4, Implementing Measures #2, sixth bullet on page 75 where it states:

“Reduce curb-to-curb widths to 20 feet and not allow parking on Residential Streets (VVMP street sections J, K, and M).”

Chapter 5, Section 5.4, Implementing Measures #5, first bullet on page 76 where it states:

“A minimum of 20-foot face-of-curb to face-of-curb street width shall be provided at all Residential street intersections, even where curb extensions are located.”

These three street sections (sections J, K, and M) make up the majority of the residential streets outside of the Village Center as shown on Figure 7. A more consistent application of typical cross sections (compared to many new neighborhood designs) that we would recommend implementation for J, K, and M would be 32 feet of pavement (curb-to-curb) for parking on both sides, 28 feet for parking on one side, and 24 feet of pavement with no parking. The predominant application of J, K, and M should be 28 feet or 32 feet. We recommend that the 20-foot minimum pavement width should only be used on local street segments that are less than 100 feet in length and serve tangent movements (not required turn movements like a tee intersection). This typical cross section (24 feet) would be 4 feet shorter than the City of Wilsonville standard residential street with no parking³. The project sponsor should be required to get a City Engineer's approval to use the 20 foot minimum cross section on residential streets, using similar criteria as those noted in the Master Plan such as providing AUTOturn diagrams for trucks and fire district's apparatus to assure turns can be made.

Feel free to give Scott Mansur or me a call if you have any questions or comments.

³ City of Wilsonville Transportation System Plan, April 2002, Figure 4.14.

MEMORANDUM

TO: Eldon Johansen, City of Wilsonville
FROM: Ransford S. McCourt, P.E.
DATE: April 6, 2004
SUBJECT: Villebois Site Plan Review Comments P/A No. 02246-000

The purpose of this memorandum is to evaluate the revised Villebois site plan received from the Villebois design team on March 10, 2004. Recent modifications have been made to the site plan that was approved during the Master Plan process early in 2003. The modifications are primarily changes to street layout and relocation of land uses. The revised site plan dated March 4, 2004, is part of a proposed legislative amendment to the Villebois Master Plan.¹ This evaluation will include the following:

- Comparison of land use and trip generation between plans
- Elementary school access
- 600 foot access spacing on Grahams Ferry Road south of Tooze
- Proximity of public streets in relation to roundabouts
- Community college access (not part of the proposed legislative amendment, but a cursory review is included for the City's planning purposes)
- Left turn lane needs on Loop Road between Villebois Drive and Barber Street

Land Use and Trip Generation

This section includes a comparison of PM peak trip generation between the approved Master Plan and the proposed legislative amendment to the Master Plan. Trip generation rates for the Master Plan phase of this project were based on the 6th Edition of *ITE Trip Generation*. These rates will be used for the comparison of plans even though a new 7th Edition of *ITE Trip Generation* is now available. Tables 1 through 3 compare the PM peak trip generation based on the approved land uses for the Master Plan and the revised land uses for the amendment. The proposed elementary school location was changed however the proposed phase of construction (Phase 8) and size of the school remain the same. Residential land uses changed in type and quantity for each phase resulting in a net reduction in total trips as shown in Tables 1 through 3.

¹ Email from Stacy Connery, Alpha Engineering, on March 9, 2004.



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Table 1: Approved Master Plan – PM Peak Trips by Phase

Phase (Proposed Year)	Single-Family			Condo/ Townhouse			Apartments			Commercial/School			All
	DU	Rate	Trips	DU	Rate	Trips	DU	Rate	Trips	KSF	Rate	Trips	Trips
1 (2004)	149	1.01	150	47	0.54	25	8	0.62	5	-	-	-	180
2 (2005)	173	1.01	175	-	-	-	-	-	-	-	-	-	175
3 (2006)	127	1.01	128	38	0.54	21	202	0.62	125	-	-	-	274
4 (2007)	156	1.01	158	111	0.54	60	154	0.62	95	5.0	8.98	45	358
5 (2008)	121	1.01	122	320	0.54	173	31	0.62	19	17.5	8.98	157	471
6 (2009)	107	1.01	108	130	0.54	70	30	0.62	19	10.0	8.98	90	287
7 (2010)	81	1.01	82	81	0.54	44	10	0.62	6	2.5	8.98	22	154
8 (2011)	115	1.01	116	112	0.54	60	80	0.62	50	-	-	-	*373
*School	-	-	-	-	-	-	-	-	-	47.0	3.12	147	-
Total	1029	-	1039	839	-	453	515	-	319	35.0	-	461	2272

DU = Dwelling Unit

KSF = 1,000 Square Feet

* School is physically located in Phase 4 (2007) however it will not likely be built until Phase 8 (2011).

Table 2: Proposed Legislative Amendment to the Master Plan – PM Peak Trips by Phase

Phase (Proposed Year)	Single-Family			Condo/ Townhouse			Apartments			Commercial/School			All
	DU	Rate	Trips	DU	Rate	Trips	DU	Rate	Trips	KSF	Rate	Trips	Trips
1 (2004)	70	1.01	71	88	0.54	48	-	-	-	-	-	-	119
2 (2005)	190	1.01	192	50	0.54	27	18	0.62	11	-	-	-	230
3 (2006)	214	1.01	216	198	0.54	107	-	-	-	-	-	-	323
4 (2007)	143	1.01	144	140	0.54	76	262	0.62	162	-	-	-	449
5 (2008)	90	1.01	91	366	0.54	198	31	0.62	19	7.5	8.98	67	465
6 (2009)	74	1.01	75	214	0.54	116	30	0.62	19	17.5	8.98	157	300
7 (2010)	89	1.01	90	15	0.54	8	-	-	-	10	8.98	90	98
8 (2011)	58	1.01	59	-	-	-	80	0.62	50	-	-	-	*256
*School	-	-	-	-	-	-	-	-	-	47.0	3.12	147	-
Total	928	-	938	1071	-	580	421	-	261	-	-	461	2240

DU = Dwelling Unit

KSF = 1,000 Square Feet

* School is physically located in Phase 8 (2007).

Table 3: Comparison of PM Peak Vehicle Trips by Phase

Phase (Proposed Year)	Approved Master Plan Trips	Proposed Amendment Trips	Change in Trips from Approved Master Plan	Cumulative Change in Trips
1 (2004)	180	119	-61	-61
2 (2005)	175	230	55	-6
3 (2006)	274	323	49	43
4 (2007)	358	449	91	134
5 (2008)	471	465	-6	128
6 (2009)	287	300	13	141
7 (2010)	154	98	-56	85
8 (2011)	373	256	-117	-32
Total	2272	2240	-32	-

Because the total number of trips has changed very little, the mitigations recommended for the entire life of the development as shown in the approved Master Plan should not change. Reviewing the cumulative change in trips shows that the timing of those mitigation measures required for Villebois may change as the cumulative number of trips by Phase 4 is higher for the proposed amendment than for the approved Master Plan. Mitigations for Phases 1 through 3 should remain the same, mitigations for Phases 4 and 5 may be slightly accelerated, and by Phase 6, mitigations previously required up through Phase 7 would need to be completed. Mitigations previously required in Phase 8 would probably still remain connected to Phase 8. Further study would be required to determine more precisely the impacts of the accelerated accumulation of trips.

Elementary School Access

The previously approved location of the elementary school was on the east side of the development near Coffee Lake Drive. The proposed location is in the northwest area replacing two blocks of residential in Phase 8. There is a north-south roadway on either side of the proposed elementary school site that crosses the green space with a narrow street section. These roadways will need to be widened to accommodate additional school traffic.

Curb return radii should be designed to accommodate busses at any intersections where bus traffic might be expected. This may result in larger curb returns at many of the local street intersections, especially those in the immediate vicinity of the elementary school site. Possible school bus routes should also be considered.

The proposed location for the school would generate more left turns from Boeckman Road into Villebois during the AM peak period and more left turns from the Villebois access points onto Boeckman Road during the PM peak period. See the later section on left turn lane needs for more information.

Access Spacing

In a memorandum dated January 13, 2003, we recommended the following:

"Clackamas County classifies Grahams Ferry Road as a Collector² although its 85th percentile speeds are in the range of 50 to 55 miles per hour. Roadway volumes at Tooze Road and Barber Street are high enough to warrant left turn lanes on Grahams Ferry Road even if speeds were lower. Although left turn lanes would not be warranted by volumes at other intersections along Grahams Ferry Road, safety is a major concern on this corridor and the deceleration distances and turn lanes nearly extend into each other from Tooze Road to Barber Street, therefore a center turn lane is recommended along the length of Grahams Ferry Road adjacent to Villebois. Provision of left turn lanes requires adequate space for vehicles to decelerate and enter a left turn pocket safely. In the deceleration zone vehicles should not encounter vehicles from access points or cross street traffic that create conflicts. These left turn lane and deceleration needs would be the controlling aspect of access spacing on Grahams Ferry Road. To determine safe spacing, ODOT standards were utilized for determining deceleration and left turn lane lengths and needs. Left turn lanes of approximately 150 feet and deceleration lengths for 290 to 370 feet would be required for safe design (total distance of 590 to 670 feet)³. The proposed roadways are shown accessing Grahams Ferry Road as close as 250 feet apart. These should be relocated to no less than 600 foot spacing and should consider the position of existing access locations on the west side of Grahams Ferry Road to avoid offset intersections."

On the proposed plan, some of the seven access points shown on Grahams Ferry Road do meet the 600-foot spacing recommendation however some still do not.

- The northernmost access to Grahams Ferry Road is too close to the intersection with Tooze Road. This access should be moved south. Moving this access south will place it too close to the next access point, but if any deviation is sought by the design team, it would be better to have the two more minor access points closer together than having the first access point too close to a higher volume intersection like Grahams Ferry Road/Tooze Road.
- The spacing of the four southernmost access points (the fourth is Barber Street) appears to meet the 600-foot spacing requirement. The fifth access point does not and should be eliminated. A north-south connection from this roadway to Barber Street would eliminate the need for an access to Grahams Ferry Road.
- The site plan that was provided by the Villebois design team does not show where the existing driveways are located on the west side of Grahams Ferry Road. As much as possible, the proposed access points for Villebois should line up with

² Clackamas County Comprehensive Plan, Map V-2b.

³ Oregon Department of Transportation Standard Drawing No. TM539, May 2001.

existing driveways to avoid offset intersections, especially at Moffitt Court and Moffitt Drive.

Roundabouts

Roadway and alley access points should not be located within the approaching 200 feet of the proposed roundabouts as possible to avoid conflicts between drivers turning from side streets and drivers who should be paying attention to the upcoming roundabout. The site plan shows two roadway intersections and two alley access points within a very short distance from the roundabout at Brown Road/Barber Street. At Barber Street/Loop Road, there are four alley access points in close proximity to the roundabout. There is at least one alley access point near the roundabout at Loop Road/Villebois Drive however access for three of the adjacent blocks is not shown. These blocks should not place access near the roundabout.

The roundabout design should accommodate bus and emergency service vehicles using a WB-60 truck for design purposes (as stated in the approval conditions). The outer diameter of the circle should be consistent for the roundabouts to provide drivers with a uniform expectation for operation due to the close proximity of these facilities. The one roundabout that should be at a larger diameter is the Boeckman Road roundabout due to its arterial nature (prior recommendations indicated minimum 170 feet). The radius of the central island should be set to minimize over tracking of design vehicles onto the apron area (keep apron area at maximum 5-foot width) assuming a 20 foot traveled way. Additional comments regarding roundabout design are in prior transportation studies of Villebois.

Community College

There is preliminary consideration of the Wilsonville branch of Clackamas Community College (CCC) campus being relocated to a larger campus at the village center. This is not part of the proposed legislative amendment to the Master Plan at this time; however, a cursory review of the potential impacts is included here to assist the City in planning decisions that could be impacted by this addition of CCC. Table 4 shows trip generation based on proposed CCC phasing and the PM peak trip generation rate from a 2001 study done for the existing CCC facility in Wilsonville.

Table 4: PM Peak Trips Generated by Clackamas Community College

Phase (Proposed Year)	Community College			Proposed Amendment Trips + CCC	Change in Trips from Approved Master Plan	Cumulative Change in Trips
	KSF	Rate	Trips			
1 (2004)	-	-	-	119	-61	-61
2 (2005)	-	-	-	230	55	-6
3 (2006)	60	1.77	106	429	155	149
4 (2007)	90	1.77	159	608	250	399
5 (2008)	-	-	-	465	-6	393
6 (2009)	100	1.77	177	477	190	583
7 (2010)	-	-	-	98	-36	527
8 (2011)	-	-	-	256	-117	410
Total	250	-	442	2682	410	-

KSF = 1,000 Square Feet

The proposed 250,000 square foot CCC facility would potentially generate approximately 442 vehicle trips during the PM peak hour for a net addition of 410 trips for the proposed amendment site plan with CCC. Additional mitigations would likely be needed due to the addition of these trips. By the Phase 4, mitigations would likely need to happen a phase earlier than originally determined with the Master Plan. Further study would be required to determine more precisely the impacts of the additional trips.

Because it is still unknown whether or not CCC will relocate to an expanded Villebois campus, the major point to consider at this time is whether or not the addition would impact the initial phases of Villebois that are approved for construction. The most major impacts of the additional trips would likely be felt at the intersections near the village center: Barber Street/Loop Road, Barber Street/Villebois Drive, the first intersection west of the roundabout at Villebois Drive/Loop Road, and the second intersection north of the roundabout at Villebois Drive/Loop Road. That fourth intersection would also be affected by the elementary school to the north. Depending on the exact location of CCC, another possible impact could be a greater number of left turns from Loop Road (east) between Barber Street and Villebois Drive. This could trigger the need for left turn lanes in this segment, which would result in a wider roadway section. The possible impacts listed here would not affect Phases 1 and 2, but may come into play as early as Phase 3.

Left Turn Lane Needs

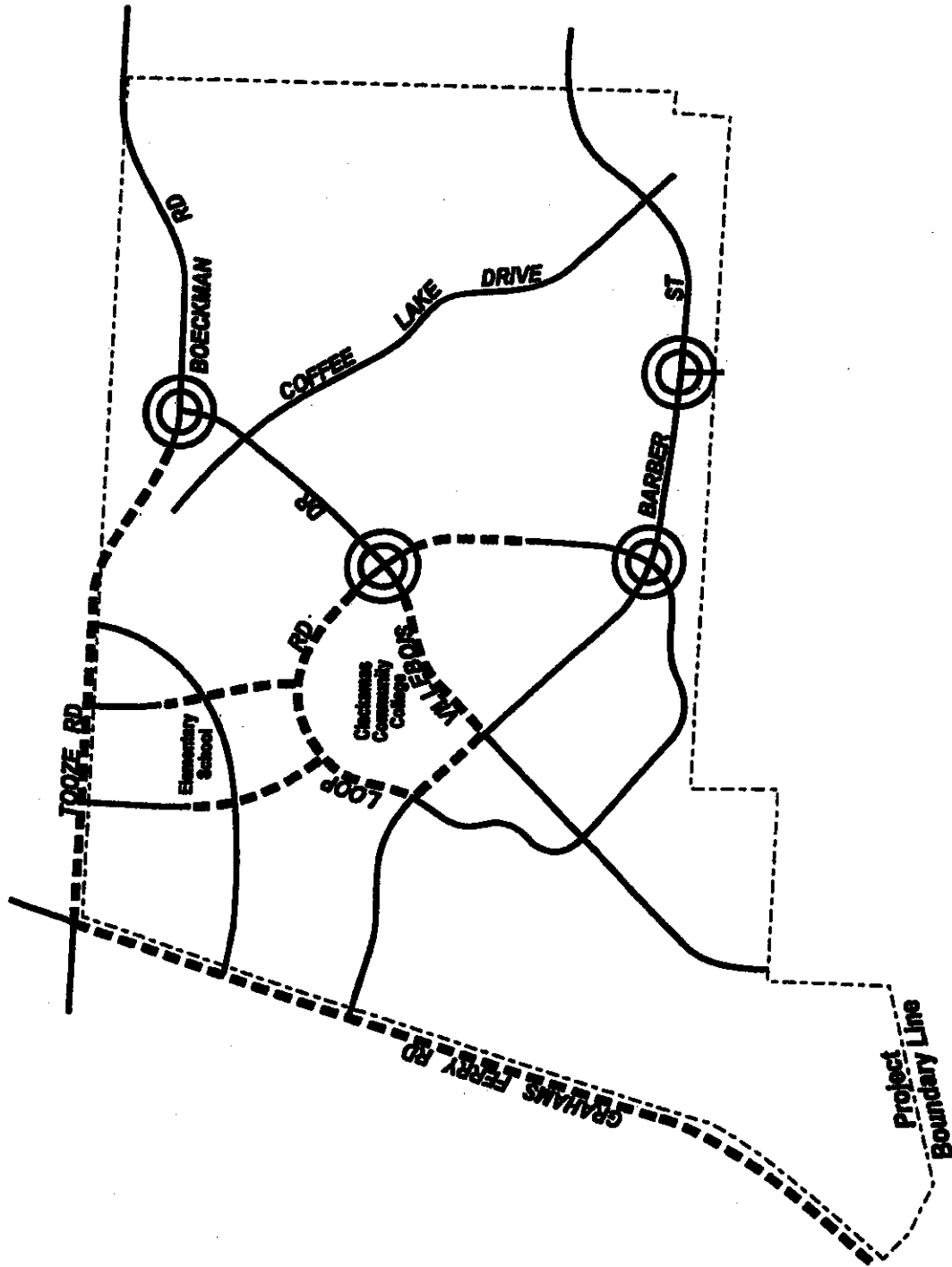
Left turn lane needs for Boeckman Road between Grahams Ferry Road and Villebois Drive and Loop Road (north and east segments) were evaluated with the new elementary school location and the addition of CCC. Locating the elementary school in the northwest corner of the site generates more turn movements to and from Boeckman Road at the intersections immediately east of Grahams Ferry Road. Warrants would be met for westbound left turn lanes at these two intersections for full build-out of Villebois with the

addition of CCC. On Loop Road and Villebois Drive, the volume of traffic would be very near the threshold for left turn lane warrants depending upon the site location of CCC. Additionally, depending upon the bus circulation route for the elementary school and on-site circulation design, turn lanes may be needed approaching and departing the school. More analysis would be needed in this area if CCC does decide to relocate to an expanded Villebois campus. The attached Figure 1 indicates the segments where left turn lanes may be necessary given the current concept location of CCC and the elementary school.

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Figure 1
Villebols Urban Village
LEFT TURN LANE NEEDS



LEGEND

- - - - - Roadways that Require Left Turn Lanes and/or Further Analysis

• No Driveways within 200' of Roundabout Edge



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MEMORANDUM

TO: Eldon Johansen, City of Wilsonville

FROM: Ransford S. McCourt, P.E.
Colette Snuffin, P.E.

DATE: November 15, 2002

SUBJECT: Villebois Urban Village Trip Generation
DRAFT

P02246

The purpose of this memorandum is to establish trip generation rates for Villebois Urban Village. Trip generation rates for the proposed development are based on ITE Trip Generation¹ and trip surveys of similar uses in Wilsonville².

Proposed Land Uses

Although the design team has not settled on densities or exact quantities of each land use, the following list of uses will likely be included in the final design.

- Single-Family Detached Housing – ITE Land Use Code 210
- Apartments – ITE Land Use Code 220
- Residential Condominium/Townhouse – ITE Land Use Code 230
- Elementary School – ITE Land Use Code 520
- Shopping Center – ITE Land Use Code 820

Research was conducted to compare vehicle trip generation of comparable land use types in Wilsonville with standard data from the Institute of Transportation Engineers (ITE). Table 1 compares both Wilsonville surveys and ITE data. Because of the close correlation with local data, ITE Trip Generation data will be utilized for Villebois.

¹ *Trip Generation Informational Report*, 6th Edition, Institute of Transportation Engineers, 1997.

² Conducted by DKS Associates for several residential land uses, September 2002.

Table 1
Comparison of Wilsonville Trip Surveys and ITE Trip Generation Rates (Trips/Unit)

Land Use	ITE Code	Unit	Wilsonville Trip Survey PM Rate (In/Out)	ITE Trip Generation PM Rate (In/Out)
Single Family	210	DU	1.03 (65%/35%)	1.01 (64%/36%)
Apartment	220	DU	0.52 (61%/39%)	0.62 (67%/33%)
Retirement Community	250	DU	0.29 (64%/36%)	0.27 (56%/44%)
Elementary School	520	student	0.27 (57%/43%)	0.26 (46%/54%)

DU-Dwelling Unit

Table 2 contains trip generation rates as reported by ITE for the land uses specifically discussed by the Villebois design team.

Table 2
ITE Trip Generation Rates (Trips/Unit)

Land Use	ITE Code	Unit	Daily Rate	AM Rate (In/Out)	PM Rate (In/Out)
Single Family	210	DU	9.57	0.75 (25%/75%)	1.01 (64%/36%)
Apartment	220	DU	6.63	0.51 (16%/84%)	0.62 (67%/33%)
Condominium/Townhouse	230	DU	5.86	0.44 (17%/83%)	0.54 (67%/33%)
Elementary School	520	student	1.02	0.29 (59%/41%)	0.26 (46%/54%)
Single-Tenant Office Building	715	KSF	11.50	1.78 (89%/11%)	1.73 (16%/84%)
Shopping Center*	820	KSF	104.80	2.60 (61%/39%)	9.50 (48%/52%)

DU-Dwelling Unit

KSF=Thousand Square Feet

* Rates for shopping centers vary with size. Rates shown are based on 30 KSF shopping center.

Other Considerations

Additional land uses mentioned as possibilities by the Villebois design team included converting the existing Dammasch building to office space, adding carriage units or units on small lots similar to Orenco Station and maybe even including some type of senior housing.

Because the Villebois design team is considering the inclusion of office space, it is worthwhile to note general differences in trip generation by different land uses. A ten-acre site occupied by an elementary school with 400 students would generate about 10.4 PM peak vehicle trips per acre. Villebois is planned to have about 11 dwelling units per acre. At this density, a site developed with single-family housing would generate about 11.1 PM peak vehicle trips per acre. Table 5 summarizes the PM peak trip generation potential of these and two other development scenarios based on typical densities and ITE rates.

Table 5
Trip Generation Potential of Typical Development Options

Land Use	Trip Generation PM Rate (Trips/Acre)
Single Family Housing	11.1
Elementary School	10.4
General Office Building	16.2
Shopping Center	91.0

There are two specific survey sites that produce results that are of interest for planning Villebois. First, Charbonneau provides a residential mix of senior housing options that on the aggregate generates 0.29 vehicle trips per dwelling unit in the PM peak hour, substantially lower than would be the case with ITE trip data. This is likely due to the senior nature of the community and provides one example of how higher dwelling unit counts can be obtained with lower vehicle trip impacts. This is probably due in part to the fact that there are some restaurants and other facilities at the golf course, but more importantly, many residents of the area are retired and people returning from work generate many of the PM peak period trips. A second site, Canyon Creek Meadows, provides single-family homes on small lots averaging 4,150 square feet. These units appear to generate vehicle trips at lower levels than standard single family dwelling units (based on standard Wilsonville and ITE trip rates). While not as low as condominium or apartment vehicle trip rates, these units appear to generate about 20 percent fewer trips in the evening peak hour. This is likely due to the size of the units. Both of these examples provide samples of what could be done to reduce vehicle trip impacts of the proposed Villebois master plan. If the Villebois design team decides to pursue the option of small lots, additional trip surveys will be required in similar developments like Orenco Station or Sunnyside Village to validate reduced trip rates.

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MEMORANDUM

TO: Eldon Johansen, City of Wilsonville
FROM: Ransford S. McCourt, P.E.
Colette Snuffin, P.E.
DATE: January 13, 2003
SUBJECT: Villebois Urban Village Internal Circulation Evaluation

P02246

This memorandum presents findings for the initial evaluation of the Villebois internal roadway network as proposed on December 12, 2002. External capacity needs have been addressed based upon 2020 forecasts conducted for the I-5 Freeway Access Study from ODOT and the City of Wilsonville TSP. These studies identify a series of integrated transportation improvements that would be necessary to meet future demands with adequate roadway capacity in 2020 including Villebois. Those studies did not evaluate the circulation needs in west Wilsonville with the proposed Villebois street plan, but the analysis discussed in this memo does.

Methodology

The 2020 enhanced travel demand forecast model (includes significant local roadway improvements and improvements to the Wilsonville Road interchange) was used as the base model for this master plan analysis. The objective was to assess detailed circulation needs within Villebois to determine if the roadway system proposed could accommodate both Villebois and future growth needs in the area. Sensitivity analysis was also performed using the 2020 scenario that includes enhanced I-5 capacity.

The Villebois area is represented by three transportation analysis zones (TAZ) in the regional travel demand model (TAZ's 33, 71, and 73). The total vehicle trips from those zones are listed in Table 1. The vehicle trips included in the model are comparable to those generated by ITE land use rates for the number and type of units included in the Villebois plan as of December 12, 2002. The analysis is considered conservative because the number of vehicle trips has not been reduced for internal or pass-by trips.

Table 1: Evening Peak Hour Vehicle Trips

	In	Out
Metro TAZ's 33, 71, and 73	1382	865
ITE trip generation with no reductions for internal or pass-by trips	- 1375	903

For more detailed analysis, the three Metro TAZ's were disaggregated into forty zones to represent smaller pieces of Villebois that would have distinct travel patterns. The smaller zones are more representative of the detailed travel that could be expected in the future when Villebois is completed. The disaggregation allowed for trips to be assigned internally within Villebois as well as externally to other parts of Wilsonville and the region in general, providing the best representation of travel pattern in the future with full build out of Villebois. The phased development of Villebois and its impacts will be assessed in the next technical memo for this project.

Key network assumptions in the modeling were that all the Villebois streets were two lanes and 25 miles per hour speeds with two general exceptions:

- Barber Street and a north-south collector route including portions of Villebois Drive and Loop Road (acting as 110th Avenue south to Barber Street) were assumed to have speeds of 30 miles per hour and greater than two-lane capacity;
- Boeckman Road and Grahams Ferry Road were assumed to have speeds similar to existing conditions with greater than two-lane capacity¹.

In testing the internal roadway network, there were three key issues to consider:

- Do the local street operate with traffic volumes below 1,000 to 2,000 vehicles per day (which is generally the environmental capacity of a livable street)?
- Do the collector streets carry the through traffic adequately and meet the City's performance standards? Are turn lanes necessary at key intersections and how do the roundabouts function as compared to conventional intersections in terms of level of service? (Warrants were utilized to check these conditions, but typically between 5,000 and 10,000 vehicles per day roadways will commonly transition to the need for center left turn lanes.)
- Are the access spacing needs of the arterial and collector routes adequate for safety purposes?

Interior Network Findings

The major interior roadway network for Villebois as proposed on December 12, 2002, includes Barber Street as an east-west collector, Loop Road circling the mixed-use central core, and a north-south collector route created with a series of roundabouts. The north-south collector route starts at the south end on Brown Road, passes through three roundabouts (Brown Road/Barber Street, Barber Street/Loop Road, and Loop Road/Villebois Drive), and ends at a fourth roundabout at the intersection of Boeckman Road/Villebois Drive. This indirect north-south route was of particular concern for the analysis. The remainder of the internal roadway network was intended to function as local streets. The disaggregation of zones was intended to test these local streets.

Assuming that posted speeds are slightly higher on the major network roadways than on the local streets, the model shows that the proposed roadway network will function as intended. With a

¹ This means that where demand and warrants requires turn lanes, they were added to key intersections on these roadways.

few exceptions in the higher-density areas adjacent to Villebois Drive, local streets are carrying less than 80 vehicles during the PM peak hour (that would be less than 1,000 vehicles per day). Interior roadway volumes for the more major roadways are summarized in Table 2. The resulting volumes for intersection turn movements are shown in Figure 1. Two lane roads would be adequate for all of the interior local streets. The collector and arterial streets vary between the need for two and three lanes (depending upon location). Basically if roundabouts are utilized the key three lane roadways would be Grahams Ferry Road, Boeckman Road and locations on Villebois Drive to the north and Barber Street to the east of the loop road. If roundabouts are utilized, Villebois and Barber could be retained as two lane roadways (except as noted below).

Table 2: Villebois Roadway Volumes

	Approximate Average Daily Traffic
Barber Street from Grahams Ferry Road to Loop Road East	3,500 - 5,000
Barber Street from Loop Road East to Brown Road	5,000 - 6,000
Barber Street from Brown Road to Coffee Lake Drive	3,500 - 4,500
Brown Road from Wilsonville Road to Barber Street	5,500 - 7,500
Loop Road East from Barber Street to Villebois Drive	2,000 - 3,500
Villebois Drive from Loop Road to Boeckman Road	5,000 - 7,500
Tooze Road west of Grahams Ferry Road	10,000 - 11,500
Tooze Road/Boeckman Road from Grahams Ferry Road to Kinsman Road	10,000 - 15,000
Grahams Ferry Road from the Living Enrichment Center to Clutter Road	1,000 - 7,500

Intersection Performance

While analysis of traffic flows is useful in attempting to reach an understanding of the general nature of traffic in an area, traffic volume alone indicates neither the ability of the street network to carry additional traffic nor the quality of service provided by the street facilities. For this reason, the concept of level of service (LOS) has been developed to correlate traffic volume data to subjective descriptions of traffic performance at intersections. Intersections are the controlling bottlenecks of traffic flow, and the ability of a roadway system to carry traffic efficiently is nearly always diminished in their vicinity.

An intersection's level of service (LOS) is similar to a "report card" rating, based on average vehicle delay. Level of service A, B and C indicate conditions where vehicles can move freely. Level of service D and E are progressively worse. For signalized intersections, level of service F represents conditions where the average delay for all vehicles through the intersection exceeds

80 seconds per vehicle, generally indicated by long queues and delays. Level of service D is the City's minimum acceptable service level during peak periods.²

Forecasted PM peak hour operating conditions were determined based on the *2000 Highway Capacity Manual*³ methodology for signalized and unsignalized intersections. For roundabouts, operating conditions were determined based on the *1994 Highway Capacity Manual*⁴ methodology. The study intersection turn movements derived from the 2020 enhanced travel demand forecast model are shown in Figure 1.

The eight highest volume intersections within or adjacent to Villebois were analyzed. Each was first analyzed as an unsignalized intersection. Two intersections, Grahams Ferry Road/Tooze Road and Boeckman Road/Tooze Road/Villebois Drive, performed at level of service F, but the remaining intersections met the Wilsonville's standard of level of service D or better. The two arterial intersection fail due to the lack of turn lanes or adequate traffic control. Tests of conventional signalized intersections with turn lanes and roundabouts were performed.

Roundabouts are shown on the proposed Villebois plan at four intersections. In addition to the four, a fifth possible location for a roundabout was added for analysis at Grahams Ferry Road/Tooze Road. All five roundabouts performed at level of service B or better. At both Grahams Ferry Road/Tooze Road and Boeckman Road/Tooze Road/Villebois Drive, a signal would provide a comparable level of service to a roundabout. If roundabouts are considered on Boeckman Road or Grahams Ferry Road, the curb to curb diameter would need to approach 200 feet due to the arterial nature of these facilities. The interior roundabout locations may be designed with 125 to 175 foot curb to curb diameters.

In addition to level of service, turn lane needs were also assessed if roundabout was not to be installed. It should be noted that if the five roundabouts are not installed, two intersections would require signals and turn lanes and four intersections could function as unsignalized intersections with turn lanes. Installation of five roundabouts eliminates all signals and turn lanes at all but one intersection – allowing the use of medians or smaller, two lane roadway cross sections.

Intersection performance and turn lane needs are summarized in Table 3.

² *City of Wilsonville Code*, Section 4.139, p. 163

³ Transportation Research Board, *Highway Capacity Manual* 2000, Chapters 16 and 17.

⁴ Transportation Research Board, *Highway Capacity Manual* 1994, Chapter 10.

Table 3: Intersection Level of Service Summary

Intersection	Unsignalized LOS			Roundabout LOS	Signalized LOS		Turn Lane Needs without Roundabout
	AM	PM	Control		AM	PM	
Grahams Ferry Road/ Tooze Road	F	F	4-way Stop	B	B	B	Left turn lanes for all approaches
Boeckman Road/ Tooze Road/Villebois Drive	F	F	2-way Stop	B	B	B	WB left turn lane, NB left and right turn lanes
Villebois Drive/ Loop Road North	C	C	2-way Stop	A	-	-	WB right turn lane, SB left turn lane
Barber Street/Loop Road East	C	B	2-way Stop	A	-	-	WB right turn lane
Barber Street/Brown Road	C	D	2-way Stop	A	-	-	EB right turn lane, NB left and right turn lanes
Barber Street/ Grahams Ferry Road	B	B	2-way Stop	-	-	-	SB left turn lane, WB left turn lane
Barber Street/Villebois Drive	B	B	2-way Stop	-	-	-	-
Barber Street/ Coffee Lake Drive	B	B	2-way Stop	-	-	-	-

Access Spacing

Access spacing is directly related to functional classification. In the Wilsonville Transportation Master Plan (TMP), minimum access spacing is specified as 1000 feet for major arterials, 600 feet for minor arterials, 100 feet for major collectors, and 50 feet for minor collectors⁵.

For the proposed plan, Tooze Road and Boeckman Road are minor arterials. Minimum access spacing for these roadways should be 600 feet, but it falls about 50 feet short in a couple of locations at the north boundary.

Clackamas County classifies Grahams Ferry Road as a Collector⁶ although its 85th percentile speeds are in the range of 50 to 55 miles per hour. Roadway volumes at Tooze Road and Barber Street are high enough to warrant left turn lanes on Grahams Ferry Road even if speeds were lower. Although left turn lanes would not be warranted by volumes at other intersections along Grahams Ferry Road, safety is a major concern on this corridor and the deceleration distances and turn lanes nearly extend into each other from Tooze Road to Barber Street, therefore a center turn lane is recommended along the length of Grahams Ferry Road adjacent to Villebois. Provision of left turn lanes requires adequate space for vehicles to decelerate and enter a left turn pocket safely – in this area vehicles should not encounter conflicts from cross street traffic that may reduce safety. These left turn lane and deceleration needs would be the controlling aspect of access spacing on Grahams Ferry Road. To determine safe spacing, ODOT standards were utilized for determining deceleration and left turn lane lengths and needs. Left turn lanes of approximately 150 feet and deceleration lengths for 290 to 370 feet would be required for safe design (total distance of 590 to 670 feet)⁷. The proposed roadways are shown accessing Grahams Ferry Road as close as 250 feet apart. These should be relocated to no less than 600

⁵ Transportation Master Plan, City of Wilsonville, July 12, 1991, Table 6.

⁶ Clackamas County Comprehensive Plan, Map V-2b.

⁷ Oregon Department of Transportation Standard Drawing No. TM539, May 2001.

foot spacing and should consider the position of existing access locations on the west side of Grahams Ferry Road to avoid offset intersections.

Single-family residential driveways should not access Tooze Road, Grahams Ferry Road, Villebois Drive (north), Loop Road (east), or Barber Street (east). If driveways cannot be avoided on the interior collectors, care should be taken to place them as far from roadway intersections as possible and to minimize vehicular access. Pedestrian access to the public sidewalks is appropriate, but not vehicle driveways and backing maneuvers.

Figure 2 summarizes access recommendations.

Parking

Auto parking for Villebois can be accommodated with a combination of on-street and off-street spaces. On-street parking is proposed for all roadways except Grahams Ferry Road, Tooze Road/Boeckman Road, Barber Street east of Coffee Lake Drive, some short local streets that cross park areas and private lanes. For the roadways that create the north-south collector route (Villebois Drive and Loop Road between roundabouts) as well as Barber Street east of the Loop Road roundabout, on-street parking should not be allowed. Higher volumes and speeds combined with the presence of bike lanes and parking maneuvers will create a safety issue. Lots in these areas should limit auto access to the rear only. The remaining parking is permissible as shown. Figure 2 shows access and parking recommendations.

The total number of auto parking spaces that should be provided for residential component of Villebois is summarized in Table 4 (approximately 5,000 spaces). Commercial requirements will need to be evaluated separately once more detailed site plans are available.

Table 4: Parking Recommendations

	Autos per Household*	Number of Proposed Households	Total Autos
Owned Household	1.9	1,871	3,555
Rented Household	1.4	515	721
Visitor	0.2	2,386	477
Total Parking (On-street and Off-street)			4,753

* Based on Wilsonville Auto Census 2000 for owned and rented households. Visitor parking recommendation based on allowing one space per five households.

Bicycle Lanes

Bike lanes are proposed on Grahams Ferry Road, Tooze Road/Boeckman Road, Barber Street, Brown Road, Loop Road, and Villebois Drive north of Barber Street. Especially on higher volume and speed segments, the routes with bicycle lanes should have minimal on-street parking to avoid conflicts with cyclists. This is discussed in greater detail in the previous section. Figure 3 shows the proposed bike lane routes as well as recommendations for additional linkages and crossing treatments.

Pedestrian Linkages

A good system of pedestrian facilities, including sidewalks and pathways, are proposed throughout the interior of Villebois. The interface between existing and possible future neighborhoods should be considered. For example, the Montebello Drive⁸ roadway connection is important for pedestrian/bicycle circulation between Villebois and the existing neighborhood to the south, but it is unnecessary for vehicular circulation. If the roadway is removed, provisions should be made for a pedestrian/bicycle path.

A shared-use path is proposed to circulate through the park and greenway areas within Villebois. It is shown crossing Tooze Road approximately 800 feet west of Villebois Drive. At this location, average daily traffic is likely to be in the range of 10,000 to 11,000 with a posted speed of 35 miles per hour. Under these conditions on a three-lane roadway, a pedestrian crossing can be problematic. An enhanced crossing, including a marked crosswalk with signs and an in-roadway lighting system, should be considered.⁹ Other crossings should be located at intersections wherever possible. Figure 3 shows recommendations for additional linkages and some crossing treatments.

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⁸ It should be noted that the traffic analysis was conducted with Montebello Drive connected to Barber Street.

⁹ "Standards for Pedestrian Treatments at Unsignalized Crossings", a memorandum by DKS Associates issued to the City of Wilsonville, November 13, 2002.

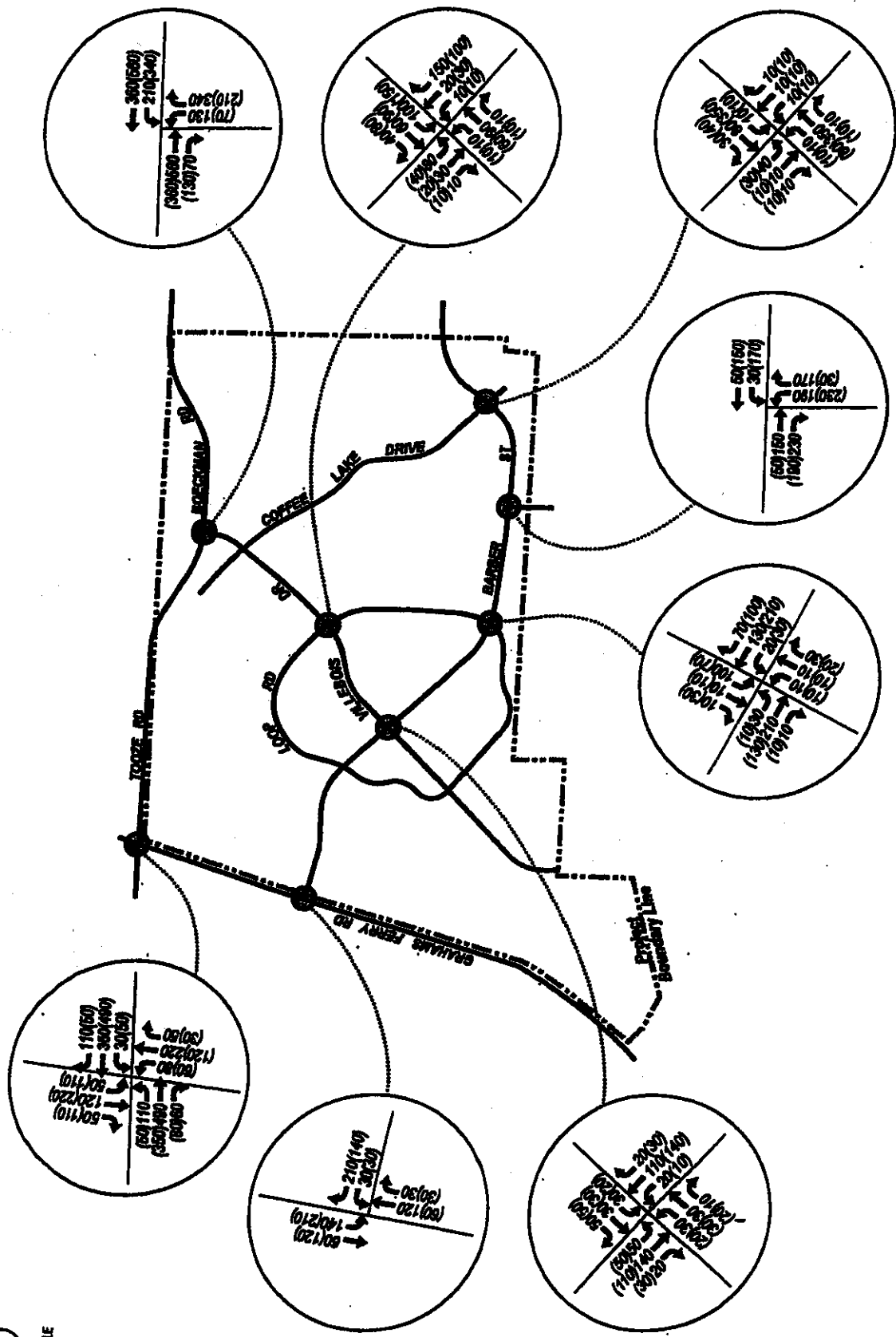
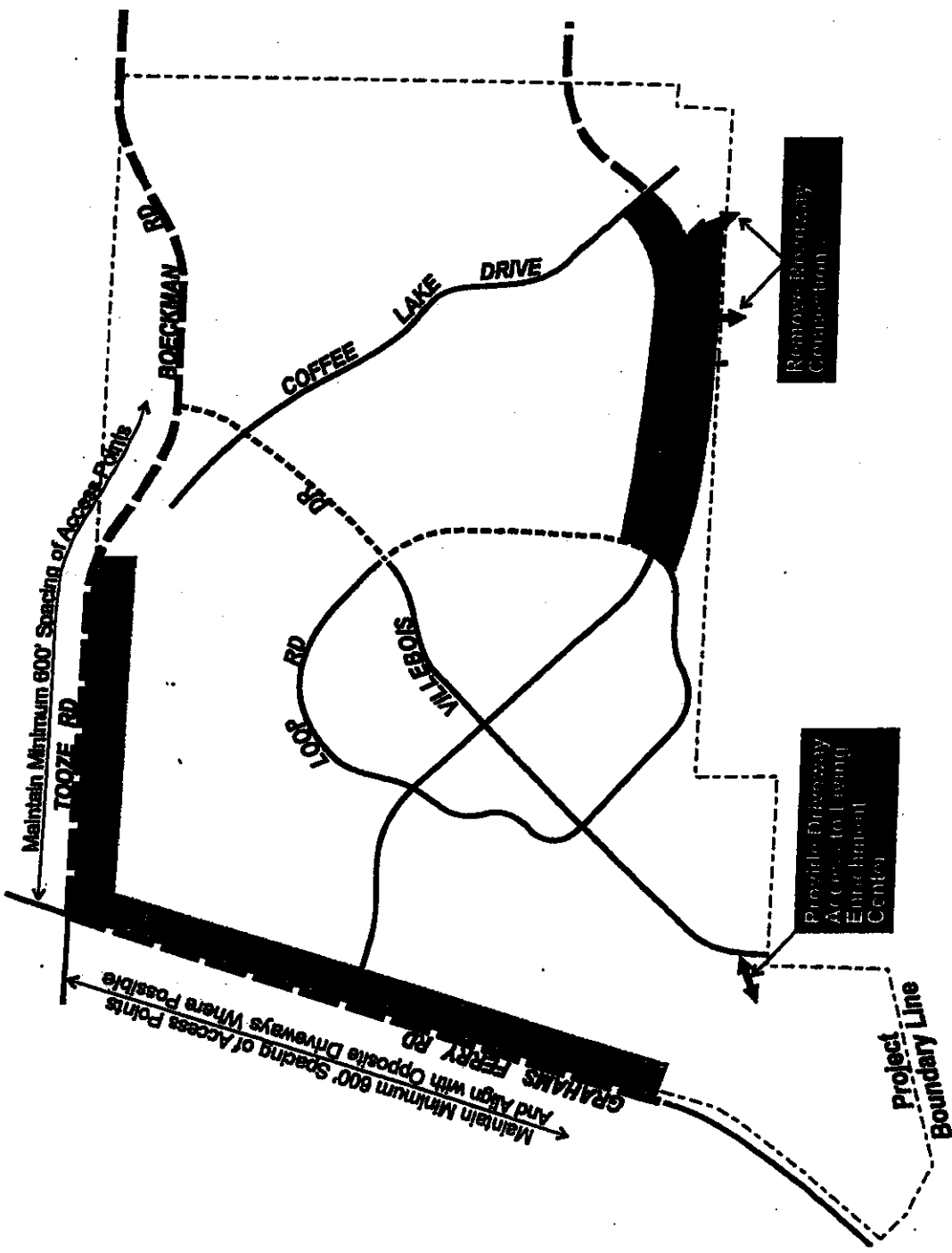


Figure 1
Villebols Urban Village
INTERNAL CIRCULATION

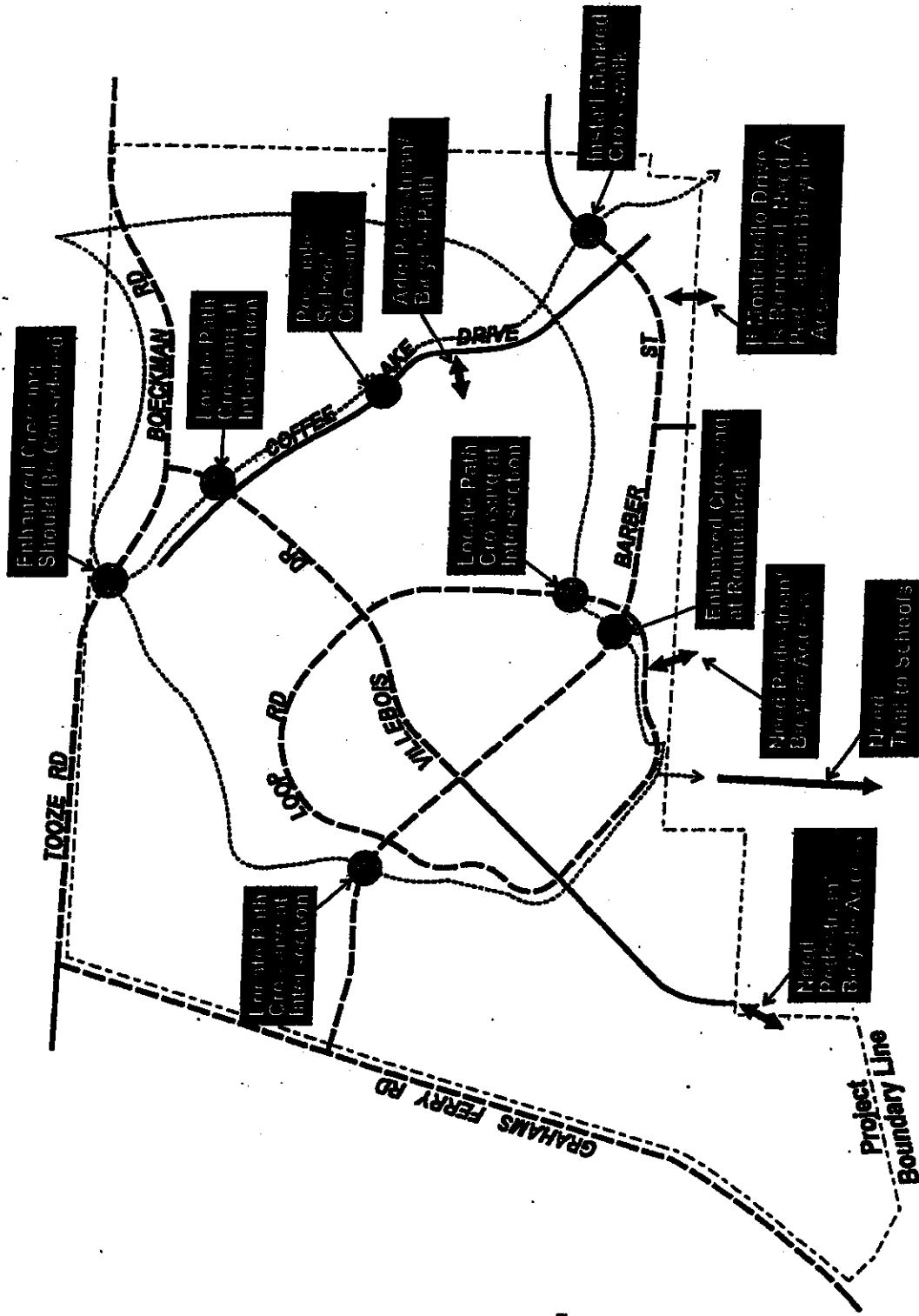
LEGEND
 ● - Study Intersection
 ← AMPM - Peak Hour Traffic Volumes



LEGEND

- - - No Parking
- - - Limited Parking
- █ No Driveway Access on Barber Street, Grahams Ferry Road or Tootze Road

Figure 2
Villebols Urban Village
ACCESS AND PARKING



LEGEND

- - - Bike Lanes
- - - Shared-Use Path

Figure 3
Villebois Urban Village
PEDESTRIAN/BICYCLE

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MEMORANDUM

TO: Eldon Johansen, City of Wilsonville

FROM: Ransford S. McCourt, P.E.
Colette Snuffin, P.E.

DATE: February 28, 2003

SUBJECT: Villebois Urban Village Transportation Off-Site Mitigation
Phasing Analysis

P02246

This memorandum presents findings for the phasing analysis of future Villebois traffic based upon the site plan and phasing scheme of December 12, 2002 provided by the development sponsors. This memo focuses on the off-site transportation mitigation needs for the motor vehicle system. The on-site circulation and access needs have been evaluated as part of a separate memorandum dated January 13, 2003. Roadway network deficiencies and appropriate mitigations are identified as each phase of Villebois is added incrementally. A separate analysis of deficiencies and mitigations including Villebois with background growth is also covered.

There are a total of twenty-two study intersections considered for this analysis. Eleven off-site study intersections were selected for analysis in consultation with City of Wilsonville staff. Eight study intersections were included in the analysis of the internal circulation of Villebois dated January 13, 2003. Two intersections on Bell Road were added because of concerns about adding traffic to rural intersections, one of which has an approach at an severe angle. One additional intersection was included in this study as it became apparent that it could be adversely impacted by Villebois trips. The twenty-two study intersections fall under jurisdiction of at least one of several jurisdictions that include Oregon Department of Transportation (ODOT), City of Wilsonville, Clackamas County, and Washington County. The study intersections are shown in Figure 1.

Table 1: Study Intersections and Jurisdictions

Number	Intersection	ODOT	City	Clackamas County	Washington County
1	Brown Road/Wilsonville Road		✓		
2	Kinsman Road/Wilsonville Road		✓		
3	Boones Ferry Road/Wilsonville Road		✓		
4	I-5 SB Ramps/Wilsonville Road	✓	✓		
5	I-5 NB Ramps/Wilsonville Road	✓	✓		
6	Barber Street/Grahams Ferry Road			✓	
7	Barber Street/Villebois Drive		✓		
8	Barber Street/Loop Road East		✓		
9	Brown Road/Barber Street		✓		
10	Barber Street/Coffee Lake Drive		✓		
11	Loop Road North/Villebois Drive		✓		
12	Grahams Ferry Road/Tooze Road			✓	
13	Boeckman Road/Tooze Road/ Villebois Drive		✓		
14	95 th Avenue/Boeckman Road		✓		
15	Boberg Road/Boeckman Road		✓		
16	Boeckman Road/Parkway Avenue		✓		
17	Grahams Ferry Road/Clutter Road				✓
18	95 th Avenue/Ridder Road		✓		
19	Grahams Ferry Road/Day Road				✓
20	95 th Avenue/Elligsen Road		✓		
21	Bell Road/Grahams Ferry Road			✓	
22	Bell Road/Wilsonville Road			✓	

Methodology

The consideration of motor vehicle improvements with the proposed Villebois project was done two different ways. First a separate analysis of added Villebois traffic (by itself) was conducted adding the proposed development traffic by each phase incrementally on top of a base condition of existing traffic plus other Stage II approvals. Existing plus Project plus Stage II is the common scenario evaluated for traffic impact studies in the City of Wilsonville. This scenario indicates mitigations that are likely triggered by a particular development.

A second analysis was conducted that evaluated the phasing of the proposed Villebois traffic impacts with forecasted estimates of background traffic growth (beyond the existing plus approved Stage II scenario). Because this project spans several years, it is important to also evaluate deficiencies and mitigations when background growth is added to determine the timing of necessary mitigations as well as additional mitigations that will be triggered by other development.

To conduct the analysis of proposed Villebois phasing and background growth requires the use of the City of Wilsonville's travel demand forecast model. This travel model was cooperatively developed by the City of Wilsonville, Metro, and ODOT to be used for the City's Transportation System Plan and the I-5 Freeway Access Study. Background growth rates were determined by corridor and are consistent with overall growth by 2020 as forecasted by the Metro regional travel demand model. It should be noted that growth has been added incrementally which prorates the effects of the introduction of a large traffic generator such as Fred Meyer. Future

development of this size might generate 500 to 1,000 vehicles in the peak hour, but the analysis methodology has spread this growth over 20 years since the exact year of opening cannot be pinpointed. If the larger developments that are included in growth between 2000 and 2020 models happen earlier or later, some of the recommended mitigations may also need to happen earlier or later than predicted by this study.

Trip Generation

Trip generation based on the Villebois phasing and land use information provided on December 12, 2002, and ITE rates as documented in the memorandum dated November 15, 2002.

Table 2: PM Peak Vehicle Trips Generated by Phase

Phase (Proposed Year)	Single-Family			Condo/ Townhouse			Apartments			Commercial/School			All
	DU	Rate	Trips	DU	Rate	Trips	DU	Rate	Trips	KSF	Rate	Trips	
1 (2004)	149	1.01	150	47	0.54	25	8	0.62	5	-	-	-	189
2 (2005)	173	1.01	175	-	-	-	-	-	-	-	-	-	175
3 (2006)	127	1.01	128	38	0.54	21	202	0.62	125	-	-	-	274
4 (2007)	156	1.01	158	111	0.54	60	154	0.62	95	5.0	8.98	45	358
5 (2008)	121	1.01	122	320	0.54	173	31	0.62	19	17.5	8.98	157	471
6 (2009)	107	1.01	108	130	0.54	70	30	0.62	19	10.0	8.98	90	287
7 (2010)	81	1.01	82	81	0.54	44	10	0.62	6	2.5	8.98	22	154
8 (2011)	115	1.01	116	112	0.54	60	80	0.62	50	-	-	-	226
*School	-	-	-	-	-	-	-	-	-	47.0	3.12	147	147
Total	1029	-	1039	839	-	453	515	-	319	35.0	-	461	2272

DU = Dwelling Unit

KSF = 1,000 Square Feet

* School is physically located in Phase 4 (2007) however it will not likely be built until Phase 8 (2011). According to Jerry Palmer at Alpha Engineering, the school district will not be interested in discussing the additional school until the area is developed and occupied.

A mixed-use development like Villebois provides opportunities for trip reductions due to internal trips. Some trips will impact only the internal roadways and not the surrounding roadway network. For example, a person may leave their home, pick up their children from school, and stop at the shopping center before returning home, all without leaving the development.

The ITE Trip Generation Handbook includes a method of calculating trip generation and internal capture rates for multi-use development.¹ Based on these calculations, internal trip reductions for residential, commercial, and school are 7, 13 and 66 percent, respectively. Table 3 includes these trip reductions and the resulting external trips.

¹ *Trip Generation Handbook*, Chapter 7, Institute of Transportation Engineers, October 1998.

Table 3: PM Peak Vehicle Trips Generated by Phase after Reductions for Internal Trips

Phase (Proposed Year)	Single-Family			Condo/ Townhouse			Apartments			Commercial/School			All Trips
	DU	Rate	Trips	DU	Rate	Trips	DU	Rate	Trips	KSF	Rate	Trips	
1 (2004)	149	0.94	140	47	0.50	24	8	0.58	5	-	-	-	169
2 (2005)	173	0.94	163	-	-	-	-	-	-	-	-	-	163
3 (2006)	127	0.94	119	38	0.50	19	202	0.58	117	-	-	-	255
4 (2007)	156	0.94	147	111	0.50	56	154	0.58	89	5.0	7.81	39	331
5 (2008)	121	0.94	114	320	0.50	160	31	0.58	18	17.5	7.81	137	429
6 (2009)	107	0.94	108	130	0.50	65	30	0.58	17	10.0	7.81	78	261
7 (2010)	81	0.94	76	81	0.50	41	10	0.58	6	2.5	7.81	20	143
8 (2011)	115	0.94	108	112	0.50	56	80	0.58	46	-	-	-	210
*School	-	-	-	-	-	-	-	-	-	47.0	1.06	50	50
Total	1029	-	968	839	-	421	515	-	298	35.0	-	324	2011

DU = Dwelling Unit

KSF = 1,000 Square Feet

* School is physically located in Phase 4 (2007) however it will not likely be built until Phase 8 (2011). According to Jerry Palmer at Alpha Engineering, the school district will not be interested in discussing the additional school until the area is developed and occupied.

Trip Distribution

Trip distribution was based on Wilsonville's regional travel demand model. Figure 2 shows the assumed distribution of external project trips on the existing street network.

Intersection Performance

While analysis of traffic flows is useful in attempting to reach an understanding of the general nature of traffic in an area, traffic volume alone indicates neither the ability of the street network to carry additional traffic nor the quality of service provided by the street facilities. For this reason, the concept of level of service (LOS) has been developed to correlate traffic volume data to subjective descriptions of traffic performance at intersections. Intersections are the controlling bottlenecks of traffic flow, and the ability of a roadway system to carry traffic efficiently is nearly always diminished in their vicinity.

An intersection's level of service (LOS) is similar to a "report card" rating, based on average vehicle delay. Level of service A, B and C indicate conditions where vehicles can move freely. Level of service D and E are progressively worse. For signalized intersections, level of service F represents conditions where the average delay for all vehicles through the intersection exceeds 80 seconds per vehicle, generally indicated by long queues and delays. Level of service D is the City's minimum acceptable service level during peak periods.² The ODOT performance standard is volume-to-capacity ratio of 0.99.

Forecasted PM peak hour operating conditions were determined based on the *2000 Highway Capacity Manual*³ methodology for signalized and unsignalized intersections.

² *City of Wilsonville Code*, Section 4.140, p. 167 as revised by Ordinance No. 538 Exhibit A.

³ Transportation Research Board, *Highway Capacity Manual* 2000, Chapters 16 and 17.

Results

The I-5 ramp intersections at Wilsonville Road exceed both ODOT and City of Wilsonville standards prior to adding additional proposed Villebois traffic to the Existing Conditions plus Stage II scenario. Because these intersections are already failing, specific improvements are needed at the outset of the phasing plan and were documented as being part of Phase 1 (2004).

Mitigations were chosen primarily from the list of roadway improvements that were recommended in the Transportation System Plan and the Freeway Access Study for the scenario that does not include the Boeckman Interchange. The analysis uses as a base the existing roadway network and local access streets as needed to build each phase. Roadway extensions were added to the network as needed to mitigate deficiencies for each phase. Numerous combinations of improvements were tested to determine the following phasing plan.

Existing Conditions plus Project plus Stage II

The resulting deficiencies and mitigations for this scenario are listed in Table 4. In Table 5 the performance of the mitigation measure in resolving the capacity deficiency is noted. Other measures were evaluated along off-site study area roadways such as turn lane warrants and traffic signal warrants.

Table 4: Deficiencies and Mitigations by Phase for Existing plus Project plus Stage II

Phase (Year)	Deficiencies (Code)	Mitigations
1 (2004)	I-5 SB Ramps/Wilsonville Road (A) I-5 NB Ramps/Wilsonville Road (B)	Boeckman Road extension: From 95 th Ave west to Tooze Road Kinsman Road extension: Barber Street to Boeckman Road Parkway Avenue/Boeckman Road: Add EB right turn lane
2 (2005)	I-5 SB Ramps/Wilsonville Road (C)	Add second WB left turn lane
3 (2006)	-	-
4 (2007)	-	-
5 (2008)	I-5 NB Ramps/Wilsonville Road (D) 95 th Avenue/Boeckman Road (E)	Add off-ramp lanes and lengthen ramps (NB and SB) Add WB right turn lane and traffic signal
6 (2009)	Brown Road/Wilsonville Road (F) Clutter Road/Grahams Ferry Road Boberg Road/Boeckman Road (G)	Barber Street extension: From Villebois east to Kinsman Road Add SB left turn lane (based on turn lane warrants) Restrict Boberg Road to right-in/right-out with a median on Boeckman Road (or alternative solutions) ⁴
7 (2010)	Parkway Avenue/Boeckman Road (H)	Add SB right turn lane
8 (2011)	Clutter Road/Grahams Ferry Road (I)	Add WB left turn lane

Table 5: Level of Service Before and After Mitigation by Phase for Existing plus Project plus Stage II

Phase (Year)	Deficiencies	Before Mitigation		Mitigation Code	After Mitigation	
		LOS	V/C		LOS	V/C
1 (2004)	I-5 SB Ramps/Wilsonville Road	F	1.13	A	E*	1.12*
	I-5 NB Ramps/Wilsonville Road	E	1.13	B	E*	1.10*
2 (2005)	I-5 SB Ramps/Wilsonville Road	F	1.13	C	D	0.94
3 (2006)	-	-	-	-	-	-
4 (2007)	-	-	-	-	-	-
5 (2008)	I-5 NB Ramps/Wilsonville Road	F	1.13	D	D	0.95
	95 th Avenue/Boeckman Road	F	-	E	B	0.44
6 (2009)	Brown Road/Wilsonville Road	E	1.05	F	D	0.95
	Boberg Road/Boeckman Road	E	-	G	B	-
7 (2010)	Parkway Avenue/Boeckman Road	E	0.96	H	D	0.82
8 (2011)	Clutter Road/Grahams Ferry Road	E	-	I	D	-

* Mitigations return intersections to pre-project level of service.

Existing Conditions plus Project plus Stage II plus Background Growth

⁴ Deficiencies at Boberg Road/Boeckman Road could be mitigated by eliminating the north leg of the intersection that is part of the Stage II approval for the Wilsonville Business Center. This intersection operates at an acceptable level of service through all phases of Villebois as a T-intersection. If the north leg is constructed, the level of service is deficient in Phase 5 (2008) and can be mitigated with the addition of a median on Boeckman Road that limits Boberg Road to right-in/right-out access. Another alternative solution would involve the design of the proposed Commuter Rail station and parking lot adjacent to Boberg Road. If a roadway from the south entrance of the Commuter Rail lot crossed the tracks and extended to Kinsman Road (utilizing the existing private crossing), circulation in the area would be improved and there would be less need for vehicles to utilize the intersection at Boberg Road/Boeckman Road reducing the negative impacts of future growth.

A separate analysis was conducted comparing motor vehicle performance with growth in background traffic beyond Villebois and Stage II approvals. The resulting deficiencies and mitigations for this scenario are listed in Table X.

Table 6: Deficiencies and Mitigations by Phase for Existing plus Project plus Stage II plus Background Growth

Phase (Year)	Deficiencies	Mitigations
1 (2004)	I-5 SB Ramps/Wilsonville Road (A) I-5 NB Ramps/Wilsonville Road (B)	Boeckman Road extension: From 95 th Ave west to Tooze Road Kinsman Road extension: Barber Street to Boeckman Road Parkway Avenue/Boeckman Road: Add EB right turn lane I-5 SB Ramps/Wilsonville Road: Add second WB left turn lane
2 (2005)	I-5 NB Ramps/Wilsonville Road (C)	Add off-ramp lanes and lengthen ramps (NB and SB)
3 (2006)	-	-
4 (2007)	95 th Avenue/Boeckman Road (D)	Add WB right turn lane
5 (2008)	Brown Road/Wilsonville Road (E)	Barber Street extension: From Villebois east to Kinsman Road
6 (2009)	95 th Avenue/Boeckman Road (F) Parkway Avenue/Boeckman Road (G) Clutter Road/Grahams Ferry Road Boberg Road/Boeckman Road (H)	Add traffic signal Add SB right turn lane Add SB left turn lane (based on turn lane warrants) Restrict Boberg Road to right-in/right-out with a median on Boeckman Road (or alternative solutions) ⁵
7 (2010)	Clutter Road/Grahams Ferry Road (I)	Add WB left turn lane
8 (2011)	-	-

⁵ Deficiencies at Boberg Road/Boeckman Road could be mitigated by eliminating the north leg of the intersection that is part of the Stage II approval for the Wilsonville Business Center. This intersection operates at an acceptable level of service though all phases of Villebois as a T-intersection. If the north leg is constructed, the level of service is deficient in Phase 5 (2008) and can be mitigated with the addition of a median on Boeckman Road that limits Boberg Road to right-in/right-out access. Another alternative solution would involve the design of the proposed Commuter Rail station and parking lot adjacent to Boberg Road. If a roadway from the south entrance of the Commuter Rail lot crossed the tracks and extended to Kinsman Road (utilizing the existing private crossing), circulation in the area would be improved and there would be less need for vehicles to utilize the intersection at Boberg Road/Boeckman Road reducing the negative impacts of future growth.

Table 7: Level of Service Before and After Mitigation by Phase for Existing plus Project plus Stage II plus Background Growth

Phase (Year)	Deficiencies	Before Mitigation		Mitigation Code	After Mitigation	
		LOS	V/C		LOS	V/C
1 (2004)	I-5 SB Ramps/Wilsonville Road	F	1.14	A	D	0.94
	I-5 NB Ramps/Wilsonville Road	F	1.14	B	E*	1.11*
2 (2005)	I-5 NB Ramps/Wilsonville Road	F	1.13	C	D	0.95
3 (2006)	-	-	-	-	-	-
4 (2007)	95 th Avenue/Boeckman Road	E	-	D	C	-
5 (2008)	Brown Road/Wilsonville Road	E	1.04	E	D	0.94
6 (2009)	95 th Avenue/Boeckman Road	F	-	F	B	0.49
	Parkway Avenue/Boeckman Road	E	0.98	G	D	0.83
	Boberg Road/Boeckman Road	E	-	-	B	-
7 (2010)	Clutter Road/Grahams Ferry Road	E	-	H	C	-
8 (2011)	-	-	-	-	-	-

* Mitigations return intersection to pre-project level of service.

Table 8: Summary of Mitigations Triggered during Villebois Development (2004 – 2011)

Mitigation	Phase (Year) Mitigation Required	
	Without Background Growth	With Background Growth
Boeckman Road extension: From 95 th Ave west to Tooze Road	1 (2004)	1 (2004)
Kinsman Road extension: Barber Street to Boeckman Road	1 (2004)	1 (2004)
Parkway Avenue/Boeckman Road: Add EB right turn lane	1 (2004)	1 (2004)
I-5 SB Ramps/Wilsonville Road: Add second WB left turn lane	2 (2005)	1 (2004)
I-5 NB and SB Ramps/Wilsonville Road: Add off-ramp lanes and lengthen ramps	5 (2005)	2 (2005)
95 th Avenue/Boeckman Road: Add WB right turn lane	5 (2008)	4 (2007)
95 th Avenue/Boeckman Road: Add traffic signal	5 (2008)	6 (2009)
Barber Street extension: From Villebois east to Kinsman Road	6 (2009)	5 (2008)
Restrict Boberg Road to right-in/right-out with a median on Boeckman Road	6 (2009)	6 (2009)
Clutter Road/Grahams Ferry Road: Add SB left turn lane	6 (2009)	6 (2009)
Parkway Avenue/Boeckman Road: Add SB right turn lane	7 (2010)	6 (2009)
Clutter Road/Grahams Ferry Road: Add WB left turn lane	8 (2011)	7 (2010)

Other Off-Site Issues

The timing of future improvements between 2011 and 2020 has also been evaluated within the study area. As with the previous recommendations for improvements, this evaluation is based on the assumption of linear growth. The addition of large traffic generators may cause shifting in the estimated timing of projects.

Major improvements for the Wilsonville Interchange were recommended in the I-5 Freeway Access Study, including side-by-side double left turn lanes, setback of the abutment walls, and upgrading the vertical geometry of Wilsonville Road. It is estimated that the final phase of recommended improvements at Wilsonville Interchange would be needed between 2012 and 2015.

As part of the improvements recommended by the I-5 Freeway Access Study, intersection turn lane additions were identified at Boones Ferry Road/Wilsonville Road. These improvements would likely be triggered the day of opening for a large new traffic generator in the Old Town area south of the intersection. It is difficult to determine timing without knowing when such a development might occur, but due to construction phasing needs it would be reasonable to time the improvement with the I-5 interchange work on Wilsonville Road (noted above).

Other improvements recommended by the I-5 Freeway Access Study include improvements to the intersections at Brown Road/Wilsonville Road (left turn lanes on all approaches) and 95th Avenue/Elligsen Road (second NB left turn lane). The estimated timing for Brown Road/Wilsonville Road improvements is between 2012 and 2015. Improvements for 95th Avenue/Elligsen Road are likely to be needed between 2014 and 2017.

The potential need for a center left turn lane on Grahams Ferry Road north of the Villebois site was evaluated. The need for the center turn lane could be created by increased advancing traffic generated by Villebois and background growth (noted in the PM peak hour). The reason for the lane is to avoid safety implications of obstructed traffic caused by stopped or slowing left-turning vehicles (potential rear end collisions and conflicts). At lower volumes of traffic on Grahams Ferry Road, the turn lane would not be warranted (future advancing volume of about 700 vehicles per hour and opposing volume of about 400 vehicles per hour). Most driveways on Grahams Ferry Road would generate less than five turns during the PM peak hour. At this level, a center left turn lane would not be warranted even in 2020. It would either take through volumes increased to 800 vehicles during the peak hour or left turn volumes increased to ten during the peak hour to warrant a left turn lane. Malloy Way and Wheatland Drive are two locations that may potentially generate ten left turns during the peak hour. Should volumes increase more than forecasted, this segment of Grahams Ferry Road should be evaluated for future needs. Alternatives to a three-lane Grahams Ferry Road improvement would involve substantial right-of-way impacts and capacity deficiencies along 95th Avenue, Kinsman Road extension north from Boeckman Road to Ridder Road or a new extension of 110th Avenue north to Grahams Ferry Road from Boeckman Road. Since the travel forecasts indicated the impact on Grahams Ferry Road, this analysis addressed the mitigation on Grahams Ferry Road.

The intersections of Bell Road/Grahams Ferry Road and Bell Road/Wilsonville Road were evaluated because of their rural character and concerns about adding traffic to these small intersections. Because the volumes are quite low and the additional traffic is in the range of 20 to 40 vehicles during the peak hour, these intersections will continue to operate at an acceptable level of service. The intersection of Bell Road/Grahams Ferry Road has one approach at a severe angle, but as long as the volumes remain low, there should not be significant impacts. Grade and alignment refinements may be necessary for background traffic.



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MEMORANDUM

DATE: August 7, 2013

TO: Steve Adams, P.E., City of Wilsonville
Chris Neamtzu, City of Wilsonville
Dan Pauly, City of Wilsonville



FROM: Scott Mansur, P.E., PTOE *Sm*

SUBJECT: Villebois Urban Village Master Plan Amendment Transportation Summary P13003-013

The purpose of the memorandum is to evaluate transportation related aspects of the revised Villebois Village Master Plan dated August, 2010 as they relate to integrating the Polygon Northwest Proposal to include the 42.8 acres of the former Living Enrichment Center (LEC) that was previously considered as a "Future Study Area". The transportation review addresses the following items:

- Street connectivity
- Nature trail connectivity
- Street and trail section update
- Parking adjacent to SROZ areas
- North/south connectivity
- Enhanced pedestrian crossings

The following section provides a detailed review and associated comments in regards to the Villebois Master Plan document as they relate to the LEC expansion.

Street Connectivity [Chapter 5, page 69, Continuity of Streets and Trails and Figure 7]

Street connections are of utmost importance when considering future connectivity to the LEC property for all modes of travel. The current adopted Street Plan Figure 7 identified Villebois Drive as the access road to the LEC property and showed a street stub off of it in the southwest corner of Villebois. The applicant shows this connection on their site plan via SW Amalfi Lane as well as their revised Villebois Master Plan Figure 7 dated July 26, 2013. This street connection will be critical to provide connectivity between Villebois Village and the LEC property for all modes. The City's adopted Transportation System Plan identified the need for Local Street spacing of 300 to 500 feet.



Recommendation: *Figure 7 should be updated to show the planned connectivity as identified by the applicant. Add a second paragraph to the Continuity of Streets and Trails subsection in Chapter 5 as follows:*

Provide local/residential street connections within Villebois every 300' to 500' to improve access between neighborhoods to encourage use of all modes of travel.

Nature Trail Connectivity [Chapter 5, page 69, Continuity of Streets and Trails and Figure 5]

Nature trail connection stubs from SW Grenoble Street and SW San Remo Court were shown on the currently adopted Parks and Open Space Plan (Figure 5) that are located north of the LEC property. The applicant shows these nature trail connections in their revised Figure 5 dated July 26, 2013. This revised plan also shows east and south connections from the internal Villebois nature trail to the Coyote Way Trail that is adjacent to the LEC property which is appropriate. We recommend one additional connection of the Villebois nature trail to the sidewalk on SW Normandy Lane. This additional connection is shown in the Appendix.

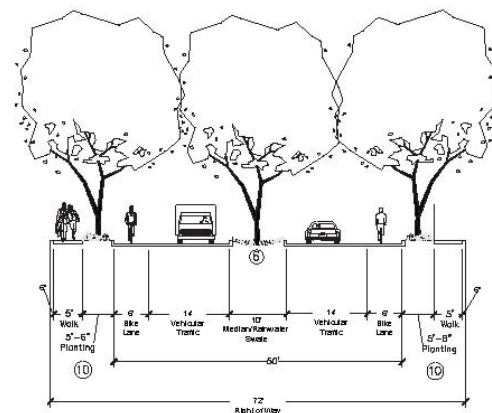
Recommendation: *Figure 5 should be updated to show the planned nature trail connectivity as identified by the applicant with the addition of a trail connection to SW Normandy Lane. Add a third paragraph to the Continuity of Streets and Trails subsection in Chapter 5 as follows:*

Provide nature trail connections between the LEC property and SW San Remo Court, SW Grenoble Street, and Normandy Lane. Also provide east and south trail connections from the LEC property to the Coyote Way Trail within Grahams Oak Nature Park.

Street and Trail Section- Residential Median Street "T" [Chapter 5, Figure 9B]

The applicant has recommended the addition of a Residential Median Street "T" that would include a 10' center median, 14' travel lanes and six foot bike lanes. DKS has reviewed this street section as shown and finds it acceptable. The 20' of pavement between median and curb (14' travel lane plus six foot bike lane) would meet the Uniform Fire Code requirements.

Recommendation: *Figure 9B should be updated as identified by the applicant to include Residential Median*



T. Residential - Median

Not To Scale

Recommended Residential Street "T"



Street "T".

Parking Adjacent to Significant Resource Overlay Zones (SROZ) [Chapter 5, Section 3]

In order to protect visibility of the adjacent natural open spaces, on-street parking should be restricted on a portion of the public street that is directly adjacent to SROZ areas. For example, parking is not currently allowed on the south side of SW Normandy Lane that is directly adjacent to the Grahams Oak Nature Park. Parking is allowed on the north side that is adjacent to residential houses.

Recommendation: *Add an additional bullet on page 73 of Section 5.3 as follows:*

- *In order to protect visibility of open spaces, on-street parking should not be allowed on the side of public streets that are directly adjacent to SROZ areas. For example, parking would not be allowed on the south side of SW Normandy Lane since it is directly adjacent to the Grahams Oak Nature Park.*

Villebois Drive North/South Connectivity [Chapter 5, Compliance Analysis]

Villebois Drive is a key roadway that provides neighborhood connectivity between southwest and northeast Villebois. The Villebois street network was planned in a way to minimize traffic volumes on Villebois Drive (by providing parallel alternative routes) while still maintaining north/south and east/west neighborhood connectivity. This roadway should be operated and maintained in a manner to encourage north/south neighborhood travel. Any design treatments that would discourage neighborhood connectivity should not be considered.

Recommendations: *Add an additional bullet to the METHODOLOGY section on page 63 and add additional section to the end of the Compliance Analysis subsection on page 70 as follows:*

Methodology (add bullet to end of page 63)

- Provides adequate north/south through connectivity for local traffic with Villebois Drive and the Loop Road

North/South Neighborhood Connectivity (page 70)

Villebois Drive is a key roadway that provides neighborhood connectivity between southwest and northeast Villebois. This roadway should be operated and maintained in a manner to encourage north/south neighborhood travel. Any design modifications that would discourage north/south neighborhood connectivity should not be considered.

Enhanced Pedestrian and Bicycle Crossings [Chapter 5, Compliance Analysis]

Where trails and pathways cross public streets, street crossings can create barriers in the transportation system for pedestrians and bicycles. Enhanced pedestrian crossings (medians, curb extensions, raised pedestrian crossing, signing and markings) should be considered where applicable to facilitate safe bicycle and pedestrian movements.

Recommendation: *Add the following to the COMPLIANCE ANALYSIS section after the Continuity of Streets and Trails subsection in Chapter 5 as follows:*

Enhanced Pedestrian and Bicycle Crossings

Provide enhanced pedestrian and bicycle crossings for high use pedestrian crossings (i.e. trails and pathway). Enhanced crossings can include but are not limited to medians, curb extensions, raised pedestrian crossings, signing and markings.

Implementation: Placement of enhanced pedestrian crossings shall be reviewed and approved by City staff through the Specific Area Plan (SAP) and Preliminary Development Plan (PDP) approval process. Enhanced crossing locations should follow ODOT and FHWA guidelines to maintain consistency with state and national and practices.



Enhanced Pedestrian and Bicycle Crossing Example



APPENDIX:

Figure 5



Legend

- Neighborhood Commons
- Pocket Park
- Linear Green
- Urban Plaza
- Village Proposed Major Pathways
- Village Proposed Minor Pathways
- Village Proposed Nature Trails
- Wetland Delineation
- Tentative 100 Year Flood Line (pending approval of MT2 application to update mapping for the upper portion of Coffee Lake Creek, Seely Ditch, and Bassett Creek, prepared by HDR on October 26, 2005)
- Significant Resource Overlay Zone (SRQZ) with 25' buffer
- Elementary School Site, includes minimum 3 acre Community Park

Tree Rating

- Important
- Good
- Moderate
- Poor
- Tree Canopy Unspecified

NOTE: The project is conceptual and not to be reviewed with appropriate S&P application. The project is conceptual and not to be reviewed with appropriate S&P application. The project is conceptual and not to be reviewed with appropriate S&P application.

Notes

The Village's Village Master Plan shall comply with the City of Wilsonville SRQZ regulations. Encroachments within the SRQZ and flood plain are shown for illustrative purposes only, and will be reviewed for compliance or exemption as more detailed information is provided that will affect the SRQZ areas. Adjustments in plan, street alignments, and intersections as well as rainwater facilities and pathways will be made to comply with SRQZ regulations. Flood Insurance Rate Map 410025-0004-C dated February 19, 1987 shows the northern limit of the detailed study area having an elevation of 143 (ft. NGVD). This elevation has been used to approximate the flood plain limits within the project limits. Development in and around wetlands will be done per all applicable federal, state and local wetland regulations.

Trail Connectivity Line to Grahams Oaks Natural Area

Study Area

Neighborhood Parks - 21.83 acres

- East Neighborhood Park - 1.80 acre
- Cedar Park - 1.30 acre
- Oak Park - 1.51 acre
- FF Park - 1.10 acre
- (UP)Village Center Plaza - 0.52 acre
- Hilltop Park - 2.30 acre
- West Neighborhood Park - 1.10 acre
- (PP)Pocket Parks - 5.00 acre
- (LG)Linear Greens with Pathways - 4.69 acre
- (UG)Village Center Promenade - 0.89 acre
- Elementary Parks - minimum 3.00 Acres
- Elementary School
- Museum - 3 acres of site area associated with school location

Regional Parks - 39.45 acres

- Village Greenway - 2.25 acres
- Village Lake Natural Area - 12.55 acres

Open Spaces - 100.89 acres

- Forested Wetland Preserve - 5.07 acre
- Forested Wetland Preserve (4 acre Study Area) - 22.14 acres
- Upland Forest Preserve - 10.86 acre
- Coffee Lake Natural Area - 12.55 acres

Total amount of Parks - 89.28 acres

Total amount of Parks & Open Space - 159.94 acres

Trails and Pathways - 50.38 miles

Nature Trail - 1.85 miles

- Major Path - 1.20 miles
- Minor Path - 0.65 miles
- (T)Tongue Trail/Village Loop Trail
- (C)Coffee Lake/Wood Trail
- (B)Bike Lane - 0.80 miles
- Sidewalks - 21.53 miles

Park Legend

- City ownership; HOA maintenance for 5 years, then city maintenance except for Special Features (Note: NP-4 and NP-6 may be in this category if restrooms and parking are provided for the community in addition to the park area shown. If not they will be owned and maintained by the HOA with public access)
- Owned and maintained by HOA with public access
- Coffee Lake Open Space - To be publicly owned and maintained, with more specific responsibilities to be detailed at the time of specific O&M Agreement for the appropriate development phase(s)



Parks and Open Space Plan

JULY 26, 2013