Final Pioneer Trail
Interchange Feasibility Study

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District Five

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1.0   Introduction

1.1   Introduction

HNTB Corporation has been retained by the Florida Department of Transportation (FDOT), District 5, to perform services for the I-95 Systems Operational Analysis Report (SOAR). This feasibility study is being provided as part of the services for this project.

1.2   Purpose

The purpose of this feasibility study is to evaluate the traffic impact to the interstate facility and within the project study area after the addition of a new interchange on I-95. The primary objective of this report is to provide technical information and data to the Florida Department of Transportation (FDOT) to determine the feasibility of developing a new interchange. This report documents the design year traffic projections and traffic operations analyses for the proposed Pioneer Trail Interchange. If an Interchange Proposal is needed the applicant will need to refer to *The Interchange Handbook* published by FDOT for requirements for a formal Interchange Justification Report.

1.3   Methodology

The scope for this feasibility study involves developing design year traffic projections and traffic operations analyses within the study area of the proposed interchange. The design year traffic projections were completed for two alternatives. The alternatives were No-Build or without the proposed interchange, and Build with the proposed interchange. In addition, as detailed in the scope of services for this study, the proposed interchange geometry will be assumed to be either a diamond or urban interchange.

The traffic operations analyses were conducted for the analysis years using the existing volumes and future traffic projections. Basic freeway segments and ramp merge/diverge were analyzed along I-95 within the area of influence. These analyses were conducted using the procedures outlined in the *Highway Capacity Manual*, Transportation Research Board, 2000 (2000 HCM). A link level of service evaluation was also performed for roadway segments within the study area. This analysis was conducted using the generalized level of service tables in the *2002 FDOT Quality/Level of Service Handbook*.

2.0   Project Information

2.1   Project Location

The proposed interchange is located along Interstate 95 south of the existing SR 421 (Dunlawton Avenue) interchange and north of the existing SR 44 (Canal Street) interchange in Volusia County, Florida. The proposed project location is shown in Figure 1.

2.2   Study Area

The study area for the proposed Pioneer Trail interchange includes I-95 from north of SR 421 (Dunlawton Avenue) to south of the existing SR 44 (Canal Street) interchange in Volusia County. It also includes the interchanges immediately north and south of the proposed interchange location. For this study, the interchange north of the proposed location is SR 421 (Dunlawton Avenue) and SR 44 (Canal Street) is the interchange immediately south of the proposed interchange. The study area is illustrated in Figure 1.

2.3   Design Characteristics

The traffic characteristics were estimated based on available historical data and planned development in the project corridor. The development of the traffic characteristics used for the feasibility study is documented in the *I-95 SOAR Design Traffic Report*.   Table 1 summarizes the traffic characteristics used for this study.

Table 1 – Traffic Characteristics

Roadway	County	Design Hour Factor (K_{30})	Directional Distribution Factor (D_{30})	Percent of Trucks in the Design Hour (T_{peak})	Peak Hour Factor (PHF)	Driver Population Factor (f_p)
I-95 Mainline and Ramps	Volusia County	10.306	57.378	7.7	0.95	1.0

Figure 1 – Project Location and Study Area Map
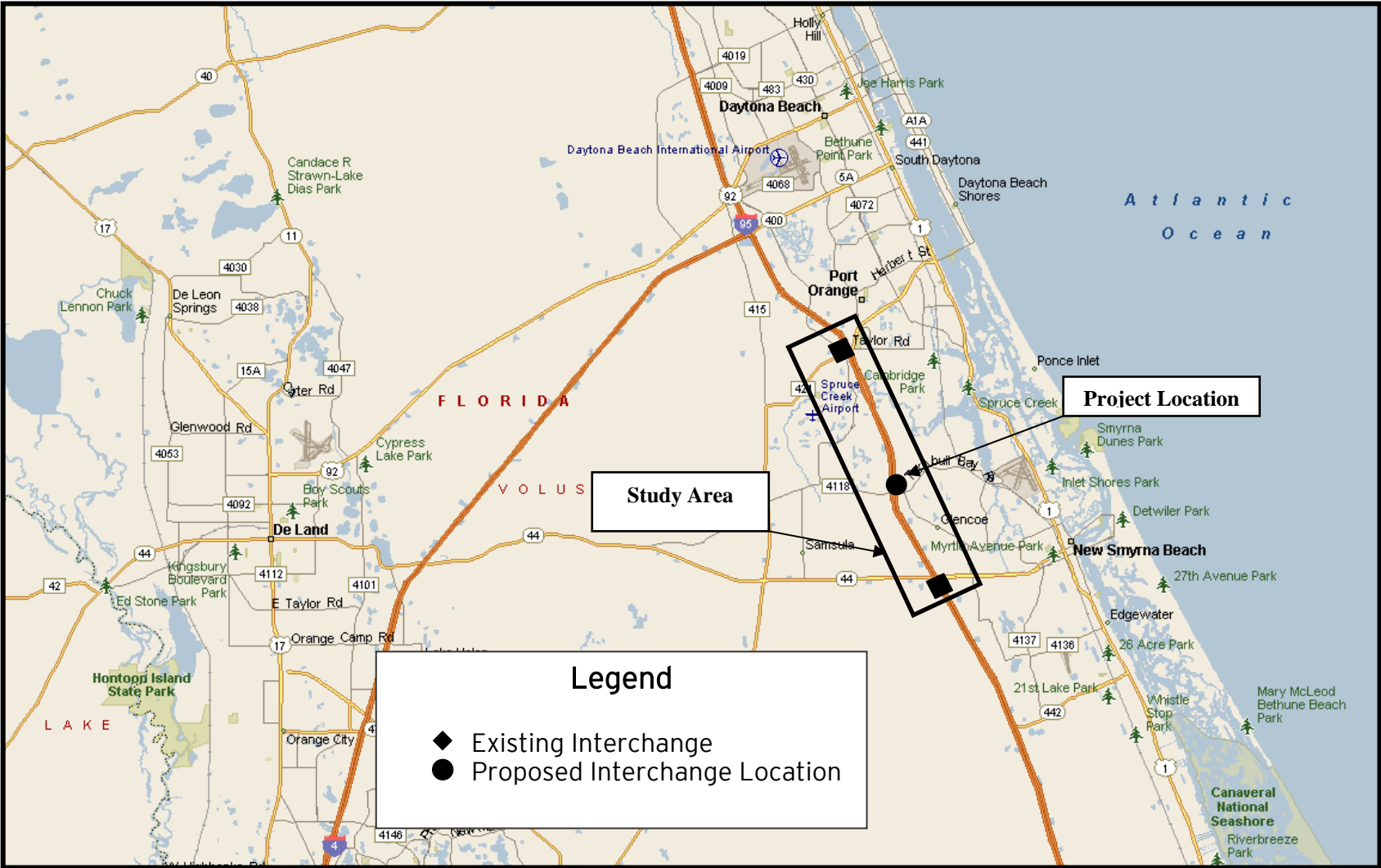
2.4   Interchange Spacing

The Florida Department of Transportation (Department) has defined minimum interchange spacing standards for new interchanges. These standards shown in Table 2 are documented in *The Interchange Handbook's Technical Resource Document* (January 2003). Based on the currently adopted Urban Area Boundaries the area type in the vicinity of the proposed interchange location is urban.

Table 2 – Interchange Spacing Standards

Area Type	Minimum Spacing [1]
CBD/CBD Fringe	1 mile
Urbanized Area	2 miles
Urban Area/Transitioning Area	3 miles
Rural Area	6 miles

1- Centerline to Centerline

As defined in *The Interchange Handbook's Technical Resource Document* the spacing between proposed interchanges is measured from centerline of the crossroads.

According to information found in the Department's *Interchange Report* (May 2005), the current location for interchanges within the study area is documented below in Table 3.

Table 3 – Existing Interchange Spacing

Location	Milepost	Proposed Spacing (miles)
SR 421 (Dunlawton Avenue)	23.247	-
Proposed Pioneer Trail Interchange	Approximately 19.796	3.478
SR 44 (Canal Street)	16.291	3.505

2.5   Analysis Years

The analysis years for the evaluation of the No-Build and Build alternatives for this project include:

- Existing Year – 2004
- Design Year- 2030

2.6   Consistency with other Plans

The proposed interchange is currently listed as a cost feasible project in the adopted Cost Feasible Volusia County MPO 2020 Long Range Transportation Plan Refinement.

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3.0   Existing Conditions

This section describes current roadway conditions in the study area and includes an evaluation of existing traffic operations.

3.1   Existing Roadway Conditions

I-95 is a north-south limited access facility along the east coast of Florida. In the study area in Volusia County I-95 is a four lane divided facility with a grassed median that varies from 150 to 200 feet. The existing I-95 corridor is classified in the project area as an urban principal arterial and the level of service (LOS) standard is LOS C.

CR 421 (Taylor Road) is a two lane divided roadway in the project study area from west of CR 415 (Tomoka Farms Road) to Williamson Boulevard /Airport Road. CR 421 (Taylor Road) is classified as an urban principal arterial in the study area and the level of service standard is LOS E.

SR 421 (Dunlawton Avenue) is a six lane divided arterial in the project study area from Williamson Boulevard/Airport Road to east of Taylor Road. The interchange with I-95 is a traditional diamond configuration. In the project study area, SR 421 (Dunlawton Avenue) is classified as an urban principal arterial and the level of service standard is LOS D.

Pioneer Trail is a two lane divided arterial in the project study area that bridges over I-95. Pioneer Trail is classified as an urban collector and the level of service standard is LOS E.

SR 44 (Canal Street) is a four lane divided arterial in the project study area. The interchange with I-95 is a traditional diamond configuration plus one southbound off loop in the southwest quadrant. SR 44 (Canal Street) is classified as a rural principal arterial from west of CR 415 (Tomoka Farms Road) to east of Samsula Drive and as an urban principal arterial from east of I-95 to east of Glencoe Road. The level of service standard for rural section is LOS B and the level of service for the urban section is LOS D.

3.2   Operational Analysis

The evaluation of the existing operating conditions consisted of an assessment of the operational analysis of the existing roadway network using the existing traffic volumes.

Operational analyses were conducted for the mainline freeway segments, ramp junctions, and intersections for the Existing Year. The capacity analysis calculations for the Existing Year conditions are included in Appendix A. The Existing Year design hour volumes and levels of service are shown in Figure 2. Table 4 lists the results of the operational analyses for the basic freeway segments and ramp merge and diverge locations within the study area for the Existing Year. There are three basic freeway segments that were analyzed. The freeway segments are divided into north of SR 421 (Dunlawton Avenue), between SR 421 (Dunlawton Avenue) and SR 44 (Canal Street), and south of SR 44 (Canal Street) operate at LOS C or better. All the freeway ramp merges and diverges operate at LOS C or better.

The intersections operating conditions for the Existing Year are shown in Table 5. The signalized intersections on SR 421 (Dunlawton Avenue) at Williamson Boulevard /Airport Road and the southbound ramp terminus operate at a LOS C and LOS D, respectively. The other signalized intersection at SR 421 (Dunlawton Avenue) and Taylor Road operates at LOS B. The SR 421 (Dunlawton Avenue) unsignalized intersection at the northbound ramp termini operates at a level of service of LOS C/F. The unsignalized intersections evaluated on SR 44 (Canal Street) are at the southbound and northbound ramp termini and Sugar Mill Road. The intersections operate at LOS A/B, LOS A/D, and LOS B/C, respectively.

Table 6 displays the results of the roadway segments level of service analysis for the Existing Year. The majority of the roadway segments are operating at or below the level of service standard.

Legend

XX,XXX	**- AADT**
(X,XXX)	**- (DDHV)**
2>	**- Number of Lanes/Traffic Direction**
☐B	**- Freeway Segment LOS**
⊙D	**- Ramp Merge/Diverge LOS**
⌐	**- Free Flow Right**
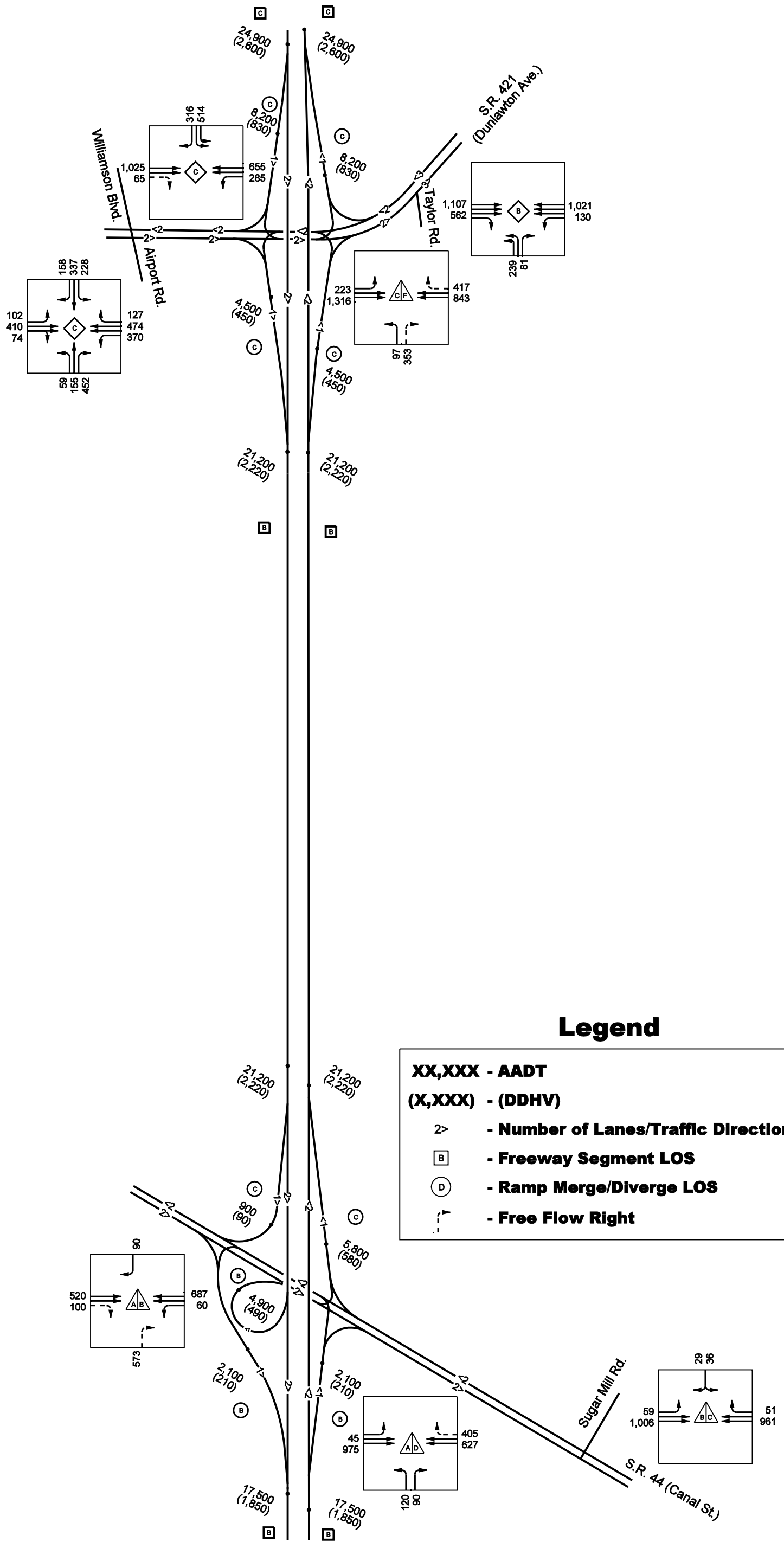
Table 4 – Existing Year (2004) Level of Service Analysis Summary

Location	Existing Year (2004)			
	Freeway		Ramp	
	Volume	LOS	Volume	LOS
North of SR 421 (Dunlawton Avenue)	2,600	C	-	-
SR 421 (Dunlawton Avenue)				
I-95 NB Off Ramp	2,220	-	450	C
I-95 NB On Ramp	1,770	-	830	C
I-95 SB Off Ramp	2,600	-	830	C
I-95 SB On Ramp	1,770	-	450	C
Between SR 421 (Dunlawton Avenue) and SR 44	2,220	B	-	-
SR 44				
I-95 NB Off Ramp	1,850	-	210	B
I-95 NB On Ramp	1,640	-	580	C
I-95 SB Off Ramp	2,220	-	90	C
I-95 SB Off Ramp (Loop)	2,130		490	B
I-95 SB On Ramp	1,640	-	210	B
South of SR 44	1,850	B	-	-

Table 5 – Existing Year (2004) Intersection Level of Service Analysis Summary

Intersection	Existing Year 2004	
	LOS	DELAY (sec/veh)
SR 421 (Dunlawton Avenue) at		
Williamson Boulevard/Airport Road	C	34.5
I-95 SB Ramps	D	39.8
I-95 NB Ramps	C/F *	532.9
Taylor Road	B	12.8
SR 44 at		
I-95 SB Ramps	A/B *	11.9
I-95 NB Ramps	A/D *	34.6
Sugar Mill Road	B/C *	23.1

* Unsignalized Intersection LOS (major/minor approach)

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Table 6 – Existing Year (2004) Link Level of Service Analysis

Roadway Segment	2004 No. of Lanes	Existing AADT	2004 Existing LOS
CR 421/SR 421 (Dunlawton Avenue)			
East of CR 415	2	7,660	C
From West of Airport Road to West of I-95	4	24,050	C
From East of I-95 to East of Taylor Road	6	34,000	B
Taylor Road			
East of SR 421	2	12,010	D
Pioneer Trail			
East of CR 415	2	3,540	C
West of Airport Road	2	3,210	C
From East of Airport Road to East of I-95	2	3,090	C
East of Turnbull Bay Road	2	2,150	C
Turnbull Bay Road			
North of Pioneer Trail	2	1,660	C
SR 44			
West of CR 415	4	8,700	A
From East of CR 415 to West of Samsula Drive	4	13,900	A
From East of Samsula Drive to West of I-95	4	14,300	A
From East of I-95 to West of Sugar Mill Road	4	23,500	B
From East of Sugar Mill Road to East of Glencoe Road	4	21,000	B
CR 415 (Tomoka Farms Road)			
North of CR 421	2	5,980	C
From South of CR 421 to North of Pioneer Trail	2	6,830	C
From South of Pioneer Trail to South of SR 44	2	6,050	C
Williamson Blvd			
North of CR 421	2	11,190	D
Airport Road			
North of Pioneer Trail	2	3,380	C
Glencoe Road			
From South of Pioneer Trail to North of SR 44	2	1,200	A
Sugar Mill Road			
North of SR 44	2	2,600	C

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4.0   Future Conditions

4.1   Future Design Traffic Characteristics /Traffic Projections

The future traffic demand for the proposed Pioneer Trail Interchange feasibility study was primarily based on the 2025 Central Florida Regional Planning Model (III) that was used for the I-95 SOAR study. A complete discussion of the future year model and resulting traffic projections is documented in the *I-95 SOAR Design Traffic Report*. Traffic forecasts were prepared for the Design Year No-Build and Build Alternatives. The future traffic volumes for this interchange are shown in Section 5.0 of this report.

5.0   Evaluation of Alternatives

5.1   Description of Alternatives

The evaluation of the alternatives consisted of a comparison of a No-Build Alternative and a Build Alternative for the Design Year (2030). The No-Build Alternative for the Design Year (2030) assumes I-95 is widened to six lanes without a proposed Pioneer Trail interchange, however in the CFRPM III model Pioneer Trail is shown as an overpass over I-95. The No-Build Alternative includes the following recommended improvements from the adopted cost feasible Volusia County MPO 2020 Long Range Transportation Plan Refinement that are in the study area:

- CR 421 (Taylor Road): From CR 415 (Tomoka Farms Road) to Williamson Boulevard/Airport Road - Widen to four lanes

- Pioneer Trail: From CR 415 (Tomoka Farms Road) to Turnbull Bay Rd.- Widen to four lanes

- CR 415 (Tomoka Farms Road): From Taylor Rd to SR 44 - Widen to four lanes

- Williamson Boulevard: From Bellville Road to Taylor Road – Widen to four lanes

- Airport Road : Summer Tree Road to Pioneer Trail – Widen to four lanes

The No-Build Alternative also includes capacity projects from the Florida Department of Transportation's *2006-2010 Adopted Work Program.* The project and status is noted below for the state roadways in the study area.

- SR 421 (Dunlawton Avenue): From Williamson Boulevard to 259 ft E of the northbound I-95 off ramp- Adding an additional eastbound through lane and dual eastbound left lanes – Construction is funded in fiscal year 2006/2007.

- SR 44: From Pioneer Trail to SR 415- Widen to four lanes-Construction completed June 22, 2005.

Other documentation, provided by the Department, is shown below, includes planned improvements in the project study area.

- CR 421 (Taylor Road): Southbound off ramp redesigned to accommodate dual left turn lanes, one dedicated right turn lane, and a free flow right turn lane.

- SR 421 (Dunlawton Avenue):

  o Northbound off ramp signalized to improve the intersection and replace the northbound off ramp free flow right turn lane with two dedicated right turn lanes.

  o At Williamson Boulevard: Add a second left turn lane from eastbound SR 421 to northbound Williamson Boulevard and add an additional left turn lane from westbound SR 421 to southbound Williamson Boulevard.

- Williamson Boulevard at CR 421 (Taylor Road):

  o Northbound: Restructure the geometry to allow two left turn lanes, two through lanes, and one dedicated right turn lane.

  o Southbound: Restructure the geometry to allow two left turn lanes, one through lane, and a through/right turn lane.

The Build Alternative was developed for the feasibility study to evaluate future traffic conditions with the proposed interchange. The Build Alternative consists of the No-Build Alternative with the proposed Pioneer Trail interchange between SR 421 (Dunlawton Avenue) and SR 44 (Canal Street).

5.2   Operational Analysis

5.2.1.NO-BUILD ANALYSIS OPERATIONAL ANALYSIS

Operations analyses were conducted for the mainline freeway segments and ramp junctions, using the procedures outlined in the 2000 HCM. These analyses were conducted for the No-Build Alternative for the Design Year to determine future traffic operations. The design hour volumes and levels of service for the Design year analysis are shown in Figure 3. Table 7 lists the results of the freeway operational analyses for the basic freeway segments and ramp merge and diverge locations within the study area for the design year. The basic freeway segments north of SR 421 (Dunlawton Avenue), between SR 421 (Dunlawton Avenue) and SR 44 (Canal Street), and south of SR 44 (Canal Street) will operate at LOS B. All the freeway ramp merges and diverges are projected to operate at LOS C or better. The capacity analyses are included in Appendix A.

The intersections operating conditions for the No-Build Alternative are shown in Table 8. For the purpose of this analysis the intersection of SR 44 (Canal Street) and the northbound ramp termini was analyzed as a signalized intersection to improve the Design Year operations. The intersection evaluated on SR 421 (Dunlawton Avenue) at Taylor Road will operate at LOS D, but the other intersections on SR 421 (Dunlawton Avenue) will operate at a LOS E or worse. The SR 44 (Canal Street) intersections at the southbound ramp terminus and Sugar Mill Road will operate at a level of service of LOS F/E and LOS F/F, respectively, in the No-Build Alternative. The Sugar Mill Road intersection is over capacity, thus, the delay is so significant at the intersection that it can not be determined. The intersection of SR 44 (Canal Street) and the northbound ramp termini will operate at a LOS F.

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Table 9 displays the results of the roadway segments level of service analysis for the No-Build Alternative in the Design Year. The majority of the roadway segments are still operating at or below the level of service standard, however, there are exceptions. The segment of SR 421 (Dunlawton Avenue) from west of Airport Road to East of Taylor Road will operate at LOS F. SR 44 (Canal Street) in the project area will also operate at LOS F, below the LOS standard. CR 415 (Tomoka Farms Road)from west of CR 421 to south of Pioneer Trail and Williamson Boulevard north of CR 421 will operate below the LOS standard.
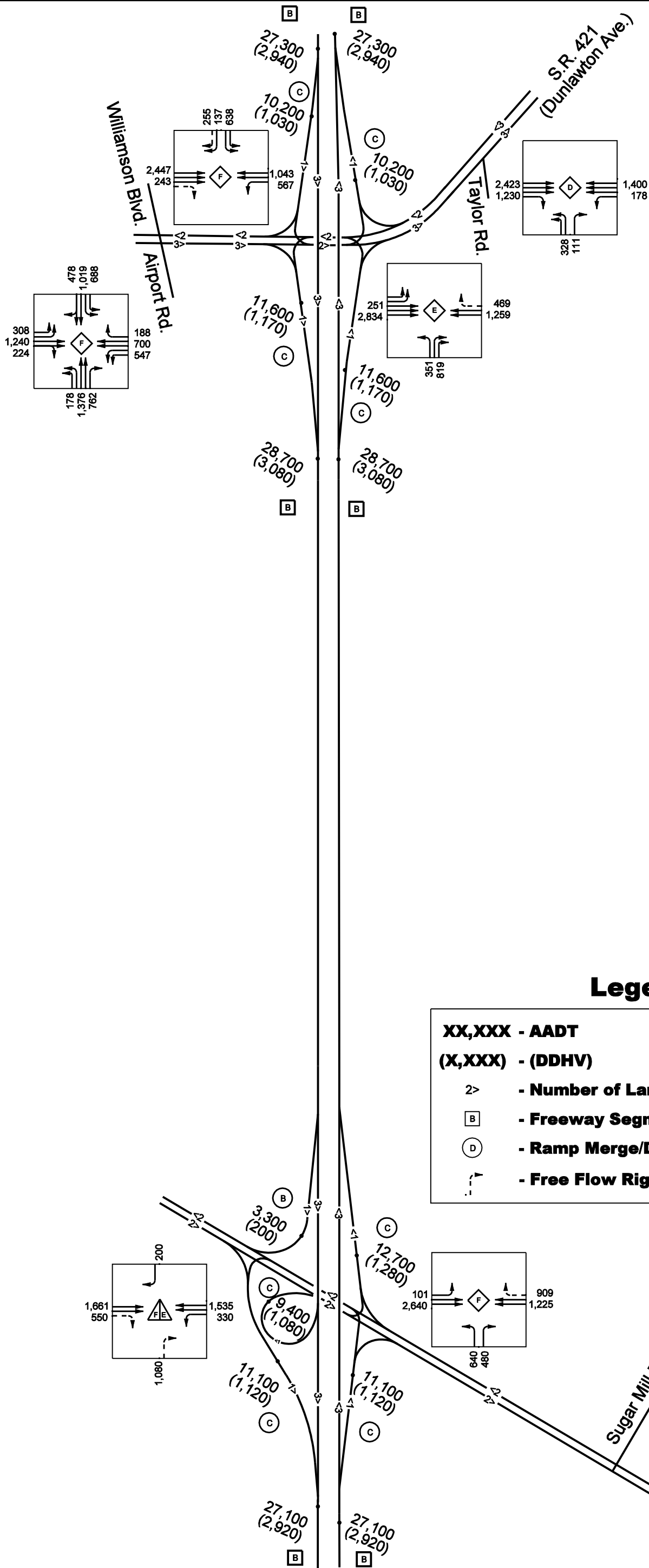
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Design Year (2030) No-Build Traffic Volumes and LOS
Pioneer Trail Interchange Feasibility Study

Legend

XX,XXX - AADT

(X,XXX) - (DDHV)

2> - **Number of Lanes/Traffic Direction**

B - **Freeway Segment LOS**

D - **Ramp Merge/Diverge LOS**

- **Free Flow Right**

Table 7 – Design Year (2030) Level of Service Analysis Summary (No-Build Alternative)

| | No Build Design Year (2030) | | | |
| | Freeway | | Ramp | |
Location	Volume	LOS	Volume	LOS
North of SR 421 (Dunlawton Avenue)	2,940	B	-	-
SR 421 (Dunlawton Avenue)				
I-95 NB Off Ramp	3,080	-	1,170	C
I-95 NB On Ramp	1,910	-	1,030	C
I-95 SB Off Ramp	2,940	-	1,030	C
I-95 SB On Ramp	1,910	-	1,170	C
Between SR 421 (Dunlawton Avenue) and SR 44	3,080	B	-	-
SR 44				
I-95 NB Off Ramp	2,920	-	1,120	C
I-95 NB On Ramp	1,800	-	1,280	C
I-95 SB Off Ramp	3,080	-	200	B
I-95 SB Off Ramp (Loop)	2,880		1,080	C
I-95 SB On Ramp	1,800	-	1,120	C
South of SR 44	2,920	B	-	-

Table 8 – Design Year (2030) Intersection Level of Service Analysis (No-Build Alternative)

| | No-Build Design Year (2030) | |
Intersection	LOS	DELAY (sec/veh)
SR 421 (Dunlawton Avenue) at		
Williamson Boulevard/Airport Road	F	303.8
I-95 SB Ramps	F	136.6
I-95 NB Ramps	E	63.8
Taylor Road	D	32.4
SR 44 at		
I-95 SB Ramps	F/E	37.4
I-95 NB Ramps	F[1]	166.8
Sugar Mill Road	F/F	OC

(1) Assumes signalized intersection; OC = Over Capacity

Table 9 – Design Year (2030) Link Level of Service Analysis (No-Build Alternative)

Roadway Segment	2030 No. of Lanes	No-Build 2030 AADT	2030 No-Build LOS
CR 421/SR 421 (Dunlawton Avenue)			
East of CR 415	4	31,600	E
From West of Airport Road to West of I-95	4	59,500	F
From East of I-95 to East of Taylor Road	6	71,500	F
Taylor Road			
East of SR 421	2	12,600	D
Pioneer Trail			
East of CR 415	4	16,900	C
West of Airport Road	4	17,800	C
From East of Airport Road to West of I-95	4	13,000	C
East of I-95	4	9,400	C
East of Turnbull Bay Road	4	6,500	C
Turnbull Bay Road			
North of Pioneer Trail	2	11,100	D
SR 44			
West of CR 415	4	43,000	D
From East of CR 415 to West of Samsula Drive	4	46,600	D
From East of Samsula Drive to West of I-95	4	52,400	F
From East of I-95 to West of Sugar Mill Road	4	46,200	F
From East of Sugar Mill Road to East of Glencoe Road	4	40,700	F
Tomoka Farms Rd (CR 415)			
North of CR 421	2	21,500	F
From South of CR 421 to North of Pioneer Trail	2	48,200	F
South of Pioneer Trail	2	45,200	F
South of SR 44	4	29,900	E
Williamson Blvd			
North of CR 421	4	35,100	F
Airport Road			
South of SR 421	2	35,700	F
North of Pioneer Trail	2	9,300	D
Glencoe Road			
From South of Pioneer Trail to North of SR 44	2	9,700	D
Sugar Mill Road			
North of SR 44	2	7,100	C

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### 5.2.2. BUILD ANALYSIS OPERATIONAL ANALYSIS

Operations analyses were conducted for the mainline freeway segments and ramp junctions, using the procedures outlined in the 2000 HCM. These analyses were conducted for the Build Alternative for the Design Year to determine future traffic operations with the proposed interchange. The design hour volumes and levels of service for Build Alternative Design Year analysis is shown in Figure 4. Table 10 lists the results of the freeway operational analyses for the basic freeway segments and ramp merge and diverge locations within the study area for the design year. All of the basic freeway segments are projected to operate at LOS B in the Design Year. All the freeway ramp merges and diverges are projected to operate at LOS C or better. The capacity analyses are included in Appendix A.

The intersections operating conditions for the Build Alternative are shown in Table 11. For the purpose of this analysis the intersection of SR 44 (Canal Street) intersection with the northbound ramp termini was analyzed as a signalized intersection. In the Build Alternative the intersection operating conditions on SR 421 (Dunlawton Avenue) at Williamson Boulevard/Airport Road and the southbound ramp termini will operate at a level service of LOS F. The other intersections on SR 421 (Dunlawton Avenue) at Taylor Road and the northbound ramp termini will operate at LOS C and LOS E, respectively. The intersections on SR 44 (Canal Street) at the southbound ramp terminus will operate at a level of service of LOS F/E and at Sugar Mill Road will operate at LOS F/F. Similar to the No-Build Alternative, the Sugar Mill Road intersection will operate over capacity, thus, the delay could not be determined.The intersection on SR 44 (Canal Street) at the northbound ramps will operate at a level of service of LOS F. The ramps with the proposed Pioneer Trail interchange will operate at LOS C at the southbound ramps and LOS B at the northbound ramps.

Table 12 displays the results of the roadway segments level of service analysis for the Build Alternative in the Design Year. The majority of the roadway segments are still operating at or below the level of service standard, however, there are exceptions. The Build Alternative roadway segment level of service analysis results in SR 421 (Dunlawton Avenue) from west of Airport Road to East of Taylor Road operating at LOS F. SR 44 (Canal Street) in the project area, CR 415 (Tomoka Farms Road) from west of CR 421 to south of Pioneer Trail, and Williamson Boulevard north of CR 421 will operate below the LOS standard.
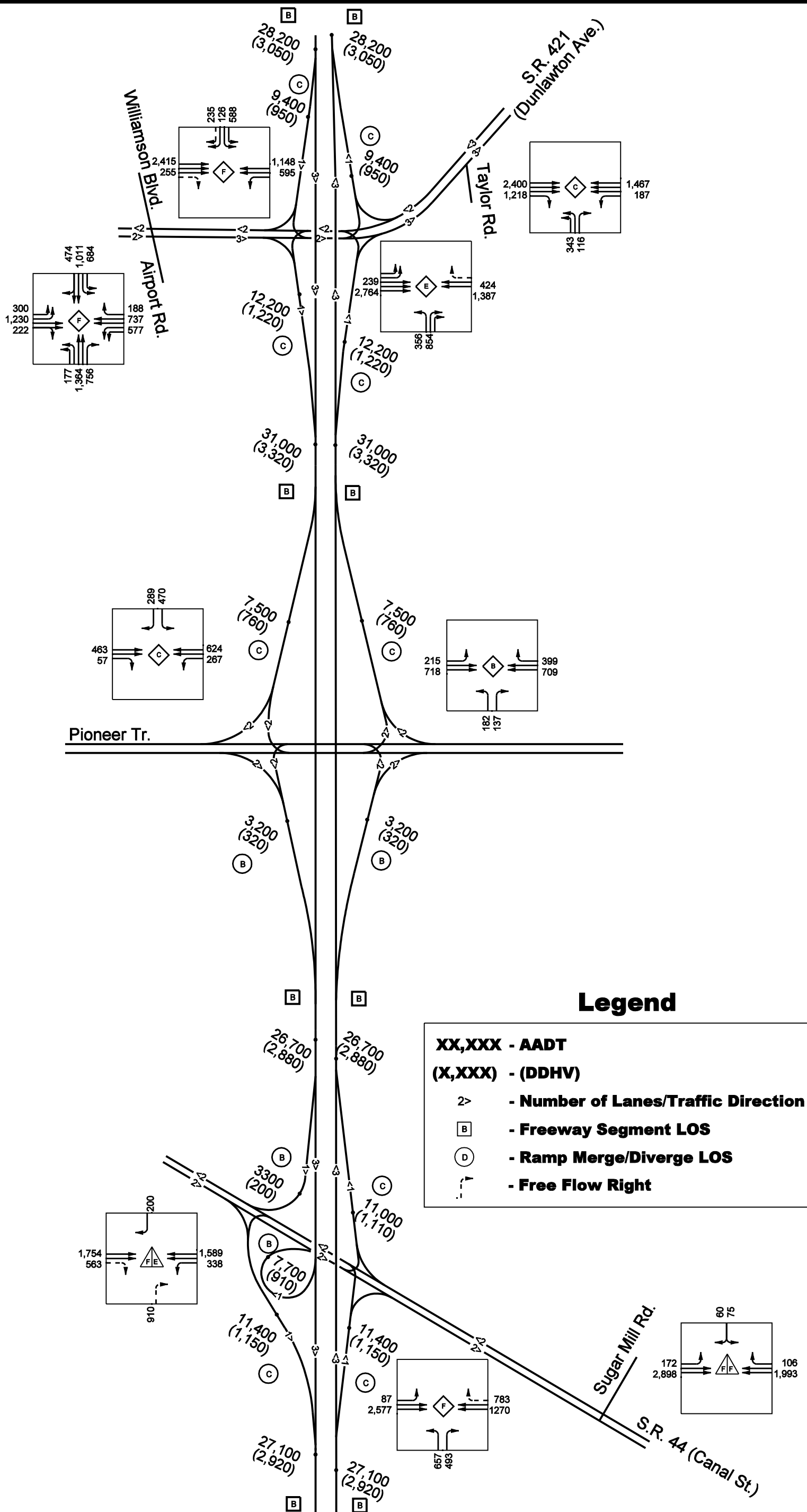
Design Year (2030) Build Traffic Volumes and LOS
Pioneer Trail Interchange Feasibility Study

Legend

XX,XXX	**- AADT**
(X,XXX)	**- (DDHV)**
2>	**- Number of Lanes/Traffic Direction**
B	**- Freeway Segment LOS**
D	**- Ramp Merge/Diverge LOS**
	- Free Flow Right

Table 10 – Design Year (2030) Level of Service Analysis Summary (Build Alternative)

Location	Freeway Volume	Freeway LOS	Ramp Volume	Ramp LOS
North of SR 421 (Dunlawton Avenue)	3,050	B	-	-
SR 421 (Dunlawton Avenue)				
I-95 NB Off Ramp	3,320	-	1,220	C
I-95 NB On Ramp	2,100	-	950	C
I-95 SB Off Ramp	3,050	-	950	C
I-95 SB On Ramp	2,100	-	1,220	C
Between Proposed SR 421 and Proposed Pioneer Trail Interchange	3,320	B	-	-
Proposed Pioneer Trail Interchange				
I-95 NB Off Ramp	2,880	-	320	B
I-95 NB On Ramp	2,560	-	760	C
I-95 SB Off Ramp	3,320	-	760	C
I-95 SB On Ramp	2,560	-	320	B
Between Proposed Pioneer Trail Interchange and SR 44	2,880	B	-	-
SR 44				
I-95 NB Off Ramp	2,920	-	1,150	C
I-95 NB On Ramp	1,770	-	1,110	C
I-95 SB Off Ramp	2,880	-	200	B
I-95 SB Off Ramp (Loop)	2,680		910	B
I-95 SB On Ramp	1,770	-	1,150	C
South of SR 44	2,920	B	-	-

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Table 11 – Design Year (2030) Intersection Level of Service Analysis (Build Alternative)

Intersection	Build Design Year (2030)	
	LOS	DELAY (sec/veh)
SR 421 (Dunlawton Avenue) at		
Williamson Boulevard/Airport Road	F	229.8
I-95 SB Ramps	F	94.6
I-95 NB Ramps	E[1]	57.3
Taylor Road	C	31.0
Pioneer Trail at		
I-95 SB Ramps	C	23.7
I-95 NB Ramps	B	13.0
SR 44 at		
I-95 SB Ramps	F/E	41.4
I-95 NB Ramps	F[1]	161.0
Sugar Mill Road	F/F	OC

(1) Assumes signalized intersection

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Table 12 – Design Year Link Level of Service Analysis (Build Alternative)

Roadway Segment	2030 No. of Lanes	Build 2030 AADT	2030 Build LOS
CR 421/SR 421 (Dunlawton Avenue)			
East of CR 415	4	30,000	D
From West of Airport Road to West of I-95	4	57,800	F
From East of I-95 to East of Taylor Road	6	72,400	F
Taylor Road			
East of SR 421	2	13,700	D
Pioneer Trail			
East of CR 415	4	9,900	C
West of Airport Road	4	10,500	C
From East of Airport Road to West of I-95	4	10,300	C
From East of I-95 to East of Turnbull Bay Road	4	13,800	C
Turnbull Bay Road			
North of Pioneer Trail	2	13,600	D
SR 44			
West of CR 415	4	42,900	D
From East of CR 415 to West of Samsula Drive	4	50,600	D
From East of Samsula Drive to West of I-95	4	54,900	F
From East of I-95 to West of Sugar Mill Road	4	44,200	F
From East of Sugar Mill Road to East of Glencoe Road	4	40,600	F
Tomoka Farms Rd (CR 415)			
North of SR 421	2	21,600	F
From South of SR 421 to North of Pioneer Trail	2	46,400	F
South of Pioneer Trail	2	45,600	F
South of SR 44	4	31,000	E
Williamson Blvd			
North of CR 421	4	33,600	F
Airport Road			
South of SR 421	2	32,100	E
North of Pioneer Trail	4	9,700	D
Glencoe Road			
From South of Pioneer Trail to North of SR 44	2	7,300	C
Sugar Mill Road			
North of SR 44	2	3,800	C

5.3   Evaluation of Alternatives

The evaluation of alternatives consisted of a comparison of the No-Build and Build Alternative future traffic operations in the Design Year. The projected traffic operations for the No-Build Alternative were compared to the projected traffic operations for the Build Alternative for the Design Year. Table 13 lists the results of the freeway operational analyses for the basic freeway segments and ramp merge and diverge locations within the study area for each alternative. Table 13 shows that the freeway ramp merges and diverges for the No-Build and Build Alternative are projected to operate at LOS C or better in the Design Year. The freeway segment north of SR 421 (Dunlawton Avenue) in the No-Build and Build Alternative will operate at LOS B. Table 13 also shows that the freeway segment south of SR 44 (Canal Street) has the same level of service for both the No-Build and Build Alternatives. Based on this evaluation, the Build Alternative does not have a significant effect on the I-95 mainline operations.

The intersections operating conditions for the No-Build and Build Alternatives are shown in Table 14. The intersections evaluated on SR 421 (Dunlawton Avenue) will operate in both the No-Build and Build Alternatives at the same LOS except for the intersection with Taylor Road; however, the delay is reduced in the Build Alternative for all of the intersections. The intersection of SR 421 (Dunlawton Avenue) and Taylor Rd will operate at LOS C in the Build Alternative and LOS D in the No-Build Alternative. The proposed southbound ramps at Pioneer Trail will operate at LOS C and the northbound ramps will operate at LOS B. The intersections evaluated on SR 44 (Canal Street) will operate at the same level of service in the No-Build and Build Alternatives.

Table 15 compares the level of service and traffic volumes on roadway segments in the study area for the No-Build and Build Alternative. In general the level of service is the same for the No-Build and Build Alternatives; there are some roadway segments that operate better in the Build Alternative. The level of service is reduced on the following roadway segments; CR 421 east of CR 415, on Airport Road south of SR 421 (Dunlawton Avenue), and on Glencoe Road south of Pioneer Trail.

Based on the traffic patterns shown in the model, the Build Alternative does not alleviate traffic on the interchanges, but it does reduce traffic on the parallel facilities. Table 15 shows the traffic volumes in the No-Build and Build Alternatives. The traffic volumes on the parallel facilities are reduced, and in some instance a significant amount. However, on Pioneer Trail from east of I-95 to east of Turnbull Bay Rd. the traffic volumes are increased in the Build Alternative due to the vehicles desiring to use the interchange at I-95.

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Table 13 – Design Year (2030) Level of Service Analysis Comparison

I-95 Location	No Build Design Year (2030)				Build Design Year (2030)				No-Build and Build Design Year (2030) Comparison			
	Freeway		Ramp		Freeway		Ramp		Freeway		Ramp	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
North of SR 421 (Dunlawton Avenue)	2,940	B	-	-	3,050	B	-	-	110	NC		
SR 421 (Dunlawton Avenue)												
I-95 NB Off Ramp	3,080	-	1,170	C	3,320	-	1,220	C	240	-	50	NC
I-95 NB On Ramp	1,910	-	1,030	C	2,100	-	950	C	190	-	‹80›	NC
I-95 SB Off Ramp	2,940	-	1,030	C	3,050	-	950	C	110	-	‹80›	NC
I-95 SB On Ramp	1,910	-	1,170	C	2,100	-	1,220	C	190	-	50	NC
Between SR 421 and SR 44	3,080	B	-	-	-	-	-	-	-	-	-	-
Between Proposed SR 421 and Proposed Pioneer Trail Interchange	-	-	-	-	3,320	B	-	-	-	-	-	-
Proposed Pioneer Trail Interchange												
I-95 NB Off Ramp	-	-	-	-	2,880	-	320	B	-	-	-	-
I-95 NB On Ramp	-	-	-	-	2,560	-	760	C	-	-	-	-
I-95 SB Off Ramp	-	-	-	-	3,320	-	760	C	-	-	-	-
I-95 SB On Ramp	-	-	-	-	2,560	-	320	B	-	-	-	-
Between Proposed Pioneer Trail Interchange and SR 44	-	-	-	-	2,880	B	-	-	-	-	-	-
SR 44												
I-95 NB Off Ramp	2,920	-	1,120	C	2,920	-	1,150	C	0	-	30	NC
I-95 NB On Ramp	1,800	-	1,280	C	1,770	-	1,110	C	‹30›	-	‹170›	NC
I-95 SB Off Ramp	3,080	-	200	B	2,880	-	200	B	‹200›	-	0	NC
I-95 SB Off Ramp (Loop)	2,880	-	1,080	C	2,680		910	B	‹200›	-	‹170›	B
I-95 SB on Ramp	1,800	-	1,120	C	1,770	-	1,150	C	‹30›	-	30	NC
South of SR 44	2,920	B			2,920	B			0	NC		

‹ › = Reduction ; NC= No Change

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Table 14 – Design Year (2030) Intersection Level of Service Analysis Comparison

Intersection	No-Build Design Year (2030)		Build Design Year (2030)		Design Year (2030) Comparison	
	LOS	DELAY (sec/veh)	LOS	DELAY (sec/veh)	LOS	DELAY (sec/veh)
SR 421 (Dunlawton Avenue) at						
Williamson Boulevard/Airport Road	F	303.8	F	229.8	NC	‹74.0›
I-95 SB Ramps	F	136.6	F	94.6	NC	‹42.0›
I-95 NB Ramps	E[1]	63.8	E[1]	57.3	NC	‹6.5›
Taylor Road	D	32.4	C	31.0	C	‹1.4›
Pioneer Trail at						
I-95 SB Ramps	-	-	C	23.7	-	-
I-95 NB Ramps	-	-	B	13.0	-	-
SR 44 at						
I-95 SB Ramps	F/E*	37.4	F/E*	41.4	NC	4.0
I-95 NB Ramps	F[1]	166.8	F[1]	161.0	NC	‹5.8›
Sugar Mill Rd.	F/F*	OC	F/F*	OC	NC	OC

* Unsignalized Intersection LOS (major/minor approach); (1) Assumes signalized intersection; OC= Over Capacity

‹ › = Reduction

NC= No Change

Table 15 – Design Year (2030) Link Level of Service Analysis Comparison

Roadway Segment	2030 No. of Lanes	LOS Std	No-Build 2030 AADT	No-Build 2030 LOS	Build 2030 AADT	Build 2030 LOS	Comparison of No-Build and Build AADT	Comparison of No-Build and Build LOS
CR 421/SR 421 (Dunlawton Avenue)								
East of CR 415	4	E	31,600	E	30,000	D	‹1,600›	D
From West of Airport Road to West of I-95	4	E	59,500	F	57,800	F	‹1,700›	NC
From East of I-95 to East of Taylor Road	6	D	71,500	F	72,400	F	900	NC
Taylor Road								
East of SR 421	2	E	12,600	D	13,700	D	1,100	NC
Pioneer Trail								
East of CR 415	4	E	16,900	C	9,900	C	‹7,000›	NC
West of Airport Road	4	E	17,800	C	10,500	C	‹7,300›	NC
From East of Airport Road to West of I-95	4	E	13,000	C	10,300	C	‹2,700›	NC
East of I-95	4	E	9,400	C	13,800	C	4,400	NC
East of Turnbull Bay Road								
Turnbull Bay Road								
North of Pioneer Trail	4	E	11,100	C	13,600	D	2500	D
SR 44								
West of CR 415	2	E	43,000	D	50,600	D	7,600	NC
From East of CR 415 to West of Samsula Drive	4	B	46,600	D	54,900	F	8,300	
From East of Samsula Drive to West of I-95	4	B	52,400	F	44,200	F	‹8,200›	NC
From East of I-95 to West of Sugar Mill Road	4	B	46,200	F	40,600	F	‹5,600›	NC
From East of Sugar Mill Road to East of Glencoe Road	4	B	40,700	F	21,600	F	‹19,100›	NC
CR 415 (Tomoka Farms Road)								
North of CR 421	4	D	21,500	F	46,400	F	24,900	NC
From South of CR 421 to North of Pioneer Trail	4	D	48,200	F	45,600	F	‹2,600›	NC
South of Pioneer Trail	2	B	45,200	F	45,600	F	400	NC
South of SR 44	2	B	29,900	E	31,000	E	1,100	NC
Williamson Blvd								
North of CR 421	4	E	35,100	F	33,600	F	‹1,500›	NC
Airport Road	2	E	35,700	F	32,100	E	‹3,600›	E
South of SR 421	4	E	9,300	D	9,700	D	400	NC
North of Pioneer Trail								
Glencoe Road								
From South of Pioneer Trail to North of SR 44	2	E	9,700	D	7,300	C	‹2,400›	C
Sugar Mill Road								
North of SR 44	2	E	7,100	C	3,800	C	‹3,300›	NC

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6.0 **Conclusion**

The proposed interchange at Pioneer Trail and I-95 will not have an adverse impact on mainline operations and it does reduce the traffic on some of the adjacent interchange ramps. The proposed interchange will reduce delay at the intersections and reduce traffic volumes on some of the roadways in the study area.

The operation of the mainline in the Build Alternative is not degraded from the No-Build Alternative. The level of service for all of the freeway segments is the same in the No-Build and Build Alternative as LOS B.

There is a reduction in the number of vehicles at some of the ramps in the Build Alternative versus the No-Build Alternative. A summary of the ramp operation for each interchange is as follows:

- The I-95/ SR 421 (Dunlawton Avenue) northbound on and southbound off ramps have a reduction of 80 vehicles in the peak period and an increase of 50 vehicles for the northbound off and southbound on ramps in the peak period. The level of service for the ramps at I-95 and SR 421 (Dunlawton Avenue) in the No-Build and Build Alternatives will be LOS C.

- The ramps at the proposed Pioneer Trail interchange with I-95 will operate at an acceptable LOS C for the southbound ramps and LOS B for the northbound ramps.

- The SR 44 (Canal Street) ramps with I-95 projections indicate there is an increase of 30 vehicles in the peak period for the northbound off and southbound on ramps and 170 less vehicles for the northbound on and southbound off ramps. The level of service for the ramps at I-95 and SR 44 (Canal Street) in the No-Build Alternative and in the Build Alternative will be LOS C or better.

The level of service is the same for the No-Build and Build Alternatives at the intersections evaluated on SR 421 (Dunlawton Avenue) and SR 44 (Canal Street), except at SR 421 (Dunlawton Avenue) and Taylor Road. The intersection summary noted below will illustrate the differences in the level of service and delay at the intersections for the No-Build and Build Alternatives.

- The intersection on SR 421 (Dunlawton Avenue) and Taylor Road will operate at a LOS D in the No-Build Alternative and at LOS C in the Build Alternative.

- The most significant reduction in delay on SR 421 (Dunlawton Avenue) is 74.0 sec/vehicles at the intersection with the Williamson Boulevard/Airport Road.

- The intersection evaluated on SR 44 (Canal Street) with a reduction in delay is at the northbound ramp terminus which has a 5.8 sec/vehicle decrease in the Build Alternative.

- The intersection on SR 44 (Canal Street) at Sugar Mill Road will continue to operate over capacity in the No-Build and Build Alternative.

- The intersections of the northbound and southbound ramps at I-95 and Pioneer Trail are projected to operate at an acceptable level of service of LOS C or better.

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The effect of the proposed interchange on the number of vehicles on the parallel facilities to I-95 is negligible. The level of service on the majority of the roadway segments remain the same with an increase in the number of vehicles on some of the roadway segments. A summary of two segments with a reduction in the number of vehicles is as follows:

- The location on CR 415 (Tomoka Farms Road) there will be a 3,000 reduction of the number of vehicles in the Build Alternative.

- The number of vehicles on the section of Glencoe Road from south of Pioneer Trail to north of SR 44 will have a 2,400 decrease in the Build Alternative. The level of service in the No-Build Alternative is LOS D and is reduced to LOS C in the Build Alternative.

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APPENDIX A – HCS Operational Analyses

HNTB

HCS2000: Basic Freeway Segments Release 4.1d

Phone: Fax:
E-mail:

———————————————Operational Analysis———————————————

Analyst: SK
Agency or Company: HNTB
Date Performed: 08/2005
Analysis Time Period: PM Peak
Freeway/Direction: I-95/Northbound
From/To: North of SR 421
Jurisdiction:
Analysis Year: 2004 Existing
Description: Pioneer Trail Feasibility Study

———————————————Flow Inputs and Adjustments———————————————

Volume, V	2600	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	684	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1423	pc/h/ln

———————————————Speed Inputs and Adjustments———————————————

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

———————————————LOS and Performance Measures———————————————

Flow rate, vp	1423	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	69.9	mi/h
Number of lanes, N	2	
Density, D	20.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

_____Diverge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed:
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Northbound
Junction: SR 421 (Dunlawton Avenue)
Jurisdiction:
Analysis Year: Existing 2004
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Diverge
Number of lanes in freeway   2
Free-flow speed on freeway   70.0   mph
Volume on freeway   2220   vph

_____Off Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-Flow speed on ramp   35.0   mph
Volume on ramp   450   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent ramp   vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2220	450		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	584	118		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2430	493	pcph

_____Estimation of V12 Diverge Areas_____

$$L_{EQ} = \qquad \text{(Equation 25-8 or 25-9)}$$

$$P_{FD} = 1.000 \quad \text{Using Equation } 0$$

$$v_{12} = v_R + (v_F - v_R) P_{FD} = 2430 \quad pc/h$$

_____Capacity Checks_____

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2430	4800	No
v_{12}	2430	4400	No
$v_{FO} = v_F - v_R$	1937	4800	No
v_R	493	2000	No

_____Level of Service Determination (if not F)_____

Density, $\quad D_R = 4.252 + 0.0086 \ v_{12} - 0.009 \ L_D = 20.7 \quad pc/mi/ln$

Level of service for ramp-freeway junction areas of influence C

_____Speed Estimation_____

Intermediate speed variable,	$D_S = 0.472$	
Space mean speed in ramp influence area,	$S_R = 56.8$	mph
Space mean speed in outer lanes,	$S_O = N/A$	mph
Space mean speed for all vehicles,	$S = 56.8$	mph

Phone: Fax:
E-mail:

_____Merge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed:
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Northbound
Junction: SR 421 (Dunlawton Avenue)
Jurisdiction:
Analysis Year: Existing 2004
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Merge
Number of lanes in freeway   2
Free-flow speed on freeway   70.0   mph
Volume on freeway   1770   vph

_____On Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-flow speed on ramp   35.0   mph
Volume on ramp   830   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent Ramp   vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1770	830		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	466	218		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.962
Driver population factor, fP	1.00	1.00
Flow rate, vp	1938	909	pcph

_____Estimation of V12 Merge Areas_____

$$L_{EQ} = \quad \text{(Equation 25-2 or 25-3)}$$

$$P_{FM} = 1.000 \quad \text{Using Equation } 0$$

$$v_{12} = v_F (P_{FM}) = 1938 \quad pc/h$$

_____Capacity Checks_____

	Actual	Maximum	LOS F?
v_{FO}	2847	4800	No
v_{R12}	2847	4600	No

_____Level of Service Determination (if not F)_____

$$\text{Density, } D = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A = 24.1 \quad pc/mi/ln$$

Level of service for ramp-freeway junction areas of influence   C

_____Speed Estimation_____

Intermediate speed variable,	M_S = 0.353	
Space mean speed in ramp influence area,	S_R = 60.1	mph
Space mean speed in outer lanes,	S_0 = N/A	mph
Space mean speed for all vehicles,	S = 60.1	mph

Phone: Fax:
E-mail:

_____Diverge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed:
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Southbound
Junction: SR 421 (Dunlawton Avenue)
Jurisdiction:
Analysis Year: Existing 2004
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Diverge
Number of lanes in freeway   2
Free-flow speed on freeway   70.0   mph
Volume on freeway   2600   vph

_____Off Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-Flow speed on ramp   35.0   mph
Volume on ramp   830   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent ramp   vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2600	830		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	684	218		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment,  fHV        0.962      0.962
Driver population factor,  fP         1.00       1.00
Flow rate, vp                         2846       909            pcph
```

_____Estimation of V12 Diverge Areas_____

$$L_{EQ} = \qquad \text{(Equation 25-8 or 25-9)}$$

$$P_{FD} = 1.000 \quad \text{Using Equation} \quad 0$$

$$v_{12} = v_R + (v_F - v_R) P_{FD} = 2846 \quad pc/h$$

_____Capacity Checks_____

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2846	4800	No
v_{12}	2846	4400	No
$v_{FO} = v_F - v_R$	1937	4800	No
v_R	909	2000	No

_____Level of Service Determination (if not F)_____

Density, $D_R = 4.252 + 0.0086 \, v_{12} - 0.009 \, L_D = 24.2 \quad pc/mi/ln$

Level of service for ramp-freeway junction areas of influence C

_____Speed Estimation_____

Intermediate speed variable, $D_S = 0.510$

Space mean speed in ramp influence area, $S_R = 55.7$ mph

Space mean speed in outer lanes, $S_0 = N/A$ mph

Space mean speed for all vehicles, $S = 55.7$ mph

Phone: Fax:
E-mail:

_____Merge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed:
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Southbound
Junction: SR 421 (Dunlawton Avenue)
Jurisdiction:
Analysis Year: Existing 2004
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Merge
Number of lanes in freeway   2
Free-flow speed on freeway   70.0   mph
Volume on freeway   1770   vph

_____On Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-flow speed on ramp   35.0   mph
Volume on ramp   450   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent Ramp   vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1770	450		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	466	118		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV           0.962      0.962
Driver population factor, fP            1.00       1.00
Flow rate, vp                           1938       493                pcph
```

_____Estimation of V12 Merge Areas_____

$L_{EQ} =$ (Equation 25-2 or 25-3)

$P_{FM} =$ 1.000   Using Equation 0

$v_{12} = v_F (P_{FM}) =$ 1938   pc/h

_____Capacity Checks_____

	Actual	Maximum	LOS F?
v_{FO}	2431	4800	No
v_{R12}	2431	4600	No

_____Level of Service Determination (if not F)_____

Density, $D = 5.475 + 0.00734 v_R + 0.0078 v_{12} - 0.00627 L_A =$ 21.1   pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

_____Speed Estimation_____

Intermediate speed variable, M_S = 0.330

Space mean speed in ramp influence area, S_R = 60.8   mph

Space mean speed in outer lanes, S_0 = N/A   mph

Space mean speed for all vehicles, S = 60.8   mph

HCS2000: Basic Freeway Segments Release 4.1d

Phone: Fax:
E-mail:

_____Operational Analysis_____

Analyst: SK
Agency or Company: HNTB
Date Performed: 08/2005
Analysis Time Period: PM Peak
Freeway/Direction: I-95/Northbound
From/To: SR 421 to SR 44
Jurisdiction:
Analysis Year: 2004 Existing
Description: Pioneer Trail Feasibility Study

_____Flow Inputs and Adjustments_____

Volume, V	2220	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	584	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1215	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

_____LOS and Performance Measures_____

Flow rate, vp	1215	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	17.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

_____Diverge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed: 8/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Northbound
Junction: SR 44 (Canal Street)
Jurisdiction:
Analysis Year: Existing 2004
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Diverge
Number of lanes in freeway   2
Free-flow speed on freeway   70.0   mph
Volume on freeway   1850   vph

_____Off Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-Flow speed on ramp   35.0   mph
Volume on ramp   210   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent ramp   vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1850	210		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	487	55		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV          0.962      0.962
Driver population factor, fP           1.00       1.00
Flow rate, vp                          2025       230              pcph
```

_____Estimation of V12 Diverge Areas_____

$$L_{EQ} = \qquad \text{(Equation 25-8 or 25-9)}$$

$$P_{FD} = 1.000 \quad \text{Using Equation } 0$$

$$v_{12} = v_R + (v_F - v_R) P_{FD} = 2025 \quad pc/h$$

_____Capacity Checks_____

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2025	4800	No
v_{12}	2025	4400	No
$v_{FO} = v_F - v_R$	1795	4800	No
v_R	230	2000	No

_____Level of Service Determination (if not F)_____

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_{12} = 17.2 \quad pc/mi/ln$

Level of service for ramp-freeway junction areas of influence B

_____Speed Estimation_____

Intermediate speed variable, $D_S = 0.449$

Space mean speed in ramp influence area, $S_R = 57.4 \quad mph$

Space mean speed in outer lanes, $S_0 = N/A \quad mph$

Space mean speed for all vehicles, $S = 57.4 \quad mph$

SHORT REPORT

General Information		Site Information	
Analyst	KNM	Intersection	Taylor Rd @ Williamson Blvd
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	10/05	Jurisdiction	
Time Period	PM Peak	Analysis Year	Existing 2004

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Num. of Lanes	1	2	0	1	2	1	1	1	1	1	1	1
Lane group	L	TR		L	T	R	L	T	R	L	T	R
Volume (vph)	102	410	74	370	474	127	59	155	452	228	337	158
% Heavy veh	8	8	8	8	8	8	8	8	8	8	8	8
PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup lost time	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Ext. eff. green	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Arrival type	3	3		3	3	3	3	3	3	3	3	3
Unit Extension	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Ped/Bike/RTOR Volume	0		0	0		0	0		0	0		0
Lane Width	12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Parking/Grade/Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking/hr												
Bus stops/hr	0	0		0	0	0	0	0	0	0	0	0
Unit Extension	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0

Phasing	Excl. Left	EW Perm	03	04	Excl. Left	NS Perm	07	08
Timing	G = 15.0	G = 40.0	G =	G =	G = 8.0	G = 35.0	G =	G =
	Y = 5	Y = 6	Y =	Y =	Y = 5	Y = 6	Y =	Y =

Duration of Analysis (hrs) = 0.25   Cycle Length C = 120.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adj. flow rate	107	510		389	499	134	62	163	476	240	355	166
Lane group cap.	425	1091		420	1117	673	265	513	698	413	513	698
v/c ratio	0.25	0.47		0.93	0.45	0.20	0.23	0.32	0.68	0.58	0.69	0.24
Green ratio	0.50	0.33		0.50	0.33	0.45	0.40	0.29	0.47	0.40	0.29	0.47
Unif. delay d1	16.9	31.6		35.9	31.3	19.9	24.4	33.2	25.0	30.2	37.7	19.2
Delay factor k	0.11	0.11		0.44	0.11	0.11	0.11	0.11	0.25	0.17	0.26	0.11
Increm. delay d2	0.3	0.3		26.5	0.3	0.1	0.5	0.4	2.7	2.1	4.0	0.2
PF factor	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Control delay	17.2	31.9		62.4	31.6	20.1	24.8	33.5	27.8	32.3	41.7	19.4
Lane group LOS	B	C		E	C	C	C	C	C	C	D	B
Apprch. delay	29.4			41.8			28.8			33.9		
Approach LOS	C			D			C			C		
Intersec. delay	34.5			Intersection LOS						C		

SHORT REPORT

General Information		Site Information	
Analyst	KNM	Intersection	I-95 SB Ramps @ Taylor Road
Agency or Co.	HNTB		
Date Performed	10/05	Area Type	All other areas
Time Period	PM Peak	Jurisdiction	
		Analysis Year	Existing 2004

Volume and Timing Input

		EB			WB			NB			SB		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Num. of Lanes		0	2	0	1	2	0	0	0	0	2	0	0
Lane group			T		L	T						L	
Volume (vph)			1025		285	655						514	
% Heavy veh			8		8	8						8	
PHF			0.95		0.95	0.95						0.95	
Actuated (P/A)			A		A	A						A	
Startup lost time			2.0		2.0	2.0						2.0	
Ext. eff. green			2.0		2.0	2.0						2.0	
Arrival type			3		3	3						3	
Unit Extension			3.0		3.0	3.0						3.0	
Ped/Bike/RTOR Volume	0							0					
Lane Width			12.0		12.0	12.0						12.0	
Parking/Grade/Parking	N		0	N	N	0	N	N		N	N	0	N
Parking/hr													
Bus stops/hr			0		0	0						0	
Unit Extension			3.0		3.0	3.0						3.0	

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 23.0	G = 40.0	G =	G =	G = 40.0	G =	G =	G =
	Y = 5	Y = 6	Y =	Y =	Y = 6	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25   Cycle Length C = 120.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB		WB			NB			SB		
Adj. flow rate	1079		300	689					541		
Lane group cap.	1117		380	1898					1082		
v/c ratio	0.97		0.79	0.36					0.50		
Green ratio	0.33		0.57	0.57					0.33		
Unif. delay d1	39.3		33.2	14.2					32.0		
Delay factor k	0.47		0.34	0.11					0.11		
Increm. delay d2	19.2		10.7	0.1					0.4		
PF factor	1.000		1.000	1.000					1.000		
Control delay	58.5		43.9	14.3					32.4		
Lane group LOS	E		D	B					C		
Apprch. delay	58.5		23.3						32.4		
Approach LOS	E		C						C		
Intersec. delay	39.8		Intersection LOS						D		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	KNM
Agency/Co.	HNTB
Date Performed	10/05
Analysis Time Period	PM Peak

Site Information

Intersection	I-95 NB Ramps @ S.R. 421
Jurisdiction	
Analysis Year	Existing 2004

Project Description	Pioneer Trail Feasibility Study
East/West Street:	SR 421 (Dunlawton Avenue)
North/South Street:	I-95 Northbound Ramps
Intersection Orientation:	East-West
Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	223	1316	0	0	843	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	234	1385	0	0	887	0
Proportion of heavy vehicles, P_{HV}	8	--	--	0	--	--
Median type	Raised curb					
RT Channelized?			0			0
Lanes	1	2	0	0	2	0
Configuration	L	T			T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	97	0		0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	102	0	0	0	0	0
Proportion of heavy vehicles, P_{HV}	8	0	8	0	0	0
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	1	0	0	0	0	0
Configuration	L					

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L		L					
Volume, v (vph)	234		102					
Capacity, c_m (vph)	722		57					
v/c ratio	0.32		1.79					
Queue length (95%)	1.41		9.61					
Control Delay (s/veh)	12.4		532.9					
LOS	B		F					
Approach delay	--	--	532.9					

(s/veh)				
Approach LOS	--	--	F	

SHORT REPORT

General Information		Site Information	
Analyst	KNM	Intersection	Dunlawton Av @ Taylor Rd
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	10/05	Jurisdiction	
Time Period	PM Peak	Analysis Year	Existing 2004

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Num. of Lanes	0	3	1	1	3	0	2	0	1	0	0	0
Lane group		T	R	L	T		L		R			
Volume (vph)		1107	562	130	1021		239		81			
% Heavy veh		8	8	8	8		8		8			
PHF		0.95	0.95	0.95	0.95		0.95		0.95			
Actuated (P/A)		A	A	A	A		A		A			
Startup lost time		2.0	2.0	2.0	2.0		2.0		2.0			
Ext. eff. green		2.0	2.0	2.0	2.0		2.0		2.0			
Arrival type		3	3	3	3		3		3			
Unit Extension		3.0	3.0	3.0	3.0		3.0		3.0			
Ped/Bike/RTOR Volume	0		0				0		0	0		
Lane Width		12.0	12.0	12.0	12.0		12.0		12.0			
Parking/Grade/Parking	N	0	N	N	0	N	N	0	N	N		N
Parking/hr												
Bus stops/hr		0	0	0	0		0		0			
Unit Extension		3.0	3.0	3.0	3.0		3.0		3.0			

Phasing	WB Only	Thru & RT	03	04	NB Only	06	07	08
Timing	G = 10.0	G = 49.0	G =	G =	G = 15.0	G =	G =	G =
	Y = 5	Y = 6	Y =	Y =	Y = 5	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25		Cycle Length C = 90.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB		NB			SB		
Adj. flow rate	1165	592	137	1075		252		85			
Lane group cap.	2609	1163	163	3408		541		498			
v/c ratio	0.45	0.51	0.84	0.32		0.47		0.17			
Green ratio	0.54	0.78	0.11	0.71		0.17		0.33			
Unif. delay d1	12.3	3.7	39.2	4.8		33.9		21.2			
Delay factor k	0.11	0.12	0.38	0.11		0.11		0.11			
Increm. delay d2	0.1	0.4	30.6	0.1		0.6		0.2			
PF factor	1.000	1.000	1.000	1.000		1.000		1.000			
Control delay	12.5	4.1	69.9	4.9		34.5		21.4			
Lane group LOS	B	A	E	A		C		C			
Apprch. delay	9.6			12.2		31.2					
Approach LOS	A			B		C					
Intersec. delay	12.8			Intersection LOS					B		

Phone: Fax:
E-mail:

_____Merge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed: 8/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Northbound
Junction: SR 44 (Canal Street)
Jurisdiction:
Analysis Year: Existing 2004
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Merge
Number of lanes in freeway   2
Free-flow speed on freeway   70.0   mph
Volume on freeway   1640   vph

_____On Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-flow speed on ramp   35.0   mph
Volume on ramp   580   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent Ramp   vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1640	580		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	432	153		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1795	635	pcph

_____Estimation of V12 Merge Areas_____

$$L_{EQ} = \qquad \text{(Equation 25-2 or 25-3)}$$

$$P_{FM} = 1.000 \quad \text{Using Equation} \quad 0$$

$$v_{12} = v_F (P_{FM}) = 1795 \quad pc/h$$

_____Capacity Checks_____

	Actual	Maximum	LOS F?
v_{FO}	2430	4800	No
v_{R12}	2430	4600	No

_____Level of Service Determination (if not F)_____

$$\text{Density, } D = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A = 21.0 \quad pc/mi/ln$$

Level of service for ramp-freeway junction areas of influence   C

_____Speed Estimation_____

Intermediate speed variable, $M_S = 0.330$

Space mean speed in ramp influence area, $S_R = 60.8$ mph

Space mean speed in outer lanes, $S_0 = N/A$ mph

Space mean speed for all vehicles, $S = 60.8$ mph

Phone: Fax:
E-mail:

_____Diverge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed: 8/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Southbound
Junction: SR 44 (Canal Street)
Jurisdiction:
Analysis Year: Existing 2004
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Diverge
Number of lanes in freeway   2
Free-flow speed on freeway   70.0   mph
Volume on freeway   2220   vph

_____Off Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-Flow speed on ramp   35.0   mph
Volume on ramp   90   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent ramp   vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2220	90		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	584	24		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV          0.962      0.962
Driver population factor, fP           1.00       1.00
Flow rate, vp                          2430       99                    pcph
```

_____Estimation of V12 Diverge Areas_____

$$L_{EQ} = \qquad \text{(Equation 25-8 or 25-9)}$$

$$P_{FD} = 1.000 \quad \text{Using Equation} \quad 0$$

$$v_{12} = v_R + (v_F - v_R)\, P_{FD} = 2430 \quad pc/h$$

_____Capacity Checks_____

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2430	4800	No
v_{12}	2430	4400	No
$v_{FO} = v_F - v_R$	2331	4800	No
v_R	99	2000	No

_____Level of Service Determination (if not F)_____

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D = 20.7 \quad pc/mi/ln$

Level of service for ramp-freeway junction areas of influence C

_____Speed Estimation_____

Intermediate speed variable, $D_S = 0.437$

Space mean speed in ramp influence area, $S_R = 57.8 \quad mph$

Space mean speed in outer lanes, $S_0 = N/A \quad mph$

Space mean speed for all vehicles, $S = 57.8 \quad mph$

Phone: Fax:
E-mail:

_____Diverge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed: 8/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Southbound
Junction: SR 44 (Canal Street) Loop
Jurisdiction:
Analysis Year: Existing 2004
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Diverge
Number of lanes in freeway   2
Free-flow speed on freeway   70.0   mph
Volume on freeway   2130   vph

_____Off Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-Flow speed on ramp   35.0   mph
Volume on ramp   490   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent ramp   vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2130		490			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	561		129			v
Trucks and buses	8		8			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.962	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2332	536	pcph

_____Estimation of V12 Diverge Areas_____

$$L_{EQ} = \qquad \text{(Equation 25-8 or 25-9)}$$

$$P_{FD} = 1.000 \quad \text{Using Equation} \quad 0$$

$$v_{12} = v_R + (v_F - v_R) P_{FD} = 2332 \quad pc/h$$

_____Capacity Checks_____

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2332	4800	No
v_{12}	2332	4400	No
$v_{FO} = v_F - v_R$	1796	4800	No
v_R	536	2000	No

_____Level of Service Determination (if not F)_____

Density, $\qquad D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D = 19.8 \quad pc/mi/ln$

Level of service for ramp-freeway junction areas of influence B

_____Speed Estimation_____

Intermediate speed variable,	D_S	= 0.476	
Space mean speed in ramp influence area,	S_R	= 56.7	mph
Space mean speed in outer lanes,	S_0	= N/A	mph
Space mean speed for all vehicles,	S	= 56.7	mph

Phone: Fax:
E-mail:

_____Merge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed: 8/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Southbound
Junction: SR 44 (Canal Street)
Jurisdiction:
Analysis Year: Existing 2004
Description: I-95 SOAR

_____Freeway Data_____

Type of analysis   Merge
Number of lanes in freeway   2
Free-flow speed on freeway   70.0   mph
Volume on freeway   1640   vph

_____On Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-flow speed on ramp   35.0   mph
Volume on ramp   210   vph
Length of first accel/decel lane   228   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent Ramp   vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1640	210		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	432	55		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV          0.962      0.962
Driver population factor, fP           1.00       1.00
Flow rate, vp                          1795       230                    pcph
```

<div align="center">Estimation of V12 Merge Areas</div>

$$L_{EQ} = \qquad \text{(Equation 25-2 or 25-3)}$$

$$P_{FM} = 1.000 \quad \text{Using Equation} \quad 0$$

$$v_{12} = v_F (P_{FM}) = 1795 \quad pc/h$$

<div align="center">Capacity Checks</div>

	Actual	Maximum	LOS F?
v_{FO}	2025	4800	No
v_{R12}	2025	4600	No

<div align="center">Level of Service Determination (if not F)</div>

$$\text{Density, } D = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A = 19.7 \quad pc/mi/ln$$

Level of service for ramp-freeway junction areas of influence B

<div align="center">Speed Estimation</div>

```
Intermediate speed variable,           M  = 0.335
                                        S
Space mean speed in ramp influence area, S  = 60.6    mph
                                          R
Space mean speed in outer lanes,       S  =  N/A    mph
                                        O
Space mean speed for all vehicles,     S  = 60.6    mph
```

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	KM		
Agency/Co.	HNTB		
Date Performed	8/31/2004		
Analysis Time Period	PM Peak		

Site Information

Intersection	SR 44 @ I-95 SB Ramps
Jurisdiction	
Analysis Year	Existing 2004

Project Description   I-95 SOAR

East/West Street: SR 44 (Canal Street)   North/South Street: I-95 SB Ramps

Intersection Orientation: East-West   Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	0	520	0	60	687	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	0	547	0	63	723	0
Proportion of heavy vehicles, P_{HV}	0	--	--	8	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	2	0	1	2	0
Configuration		T		L	T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	0	0	0	0	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	0	0	0	0	0	94
Proportion of heavy vehicles, P_{HV}	0	0	0	0	0	8
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	0	0	1
Configuration						R

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L						R
Volume, v (vph)		63						94
Capacity, c_m (vph)		978						618
v/c ratio		0.06						0.15
Queue length (95%)		0.21						0.53
Control Delay (s/veh)		8.9						11.9
LOS		A						B
Approach delay (s/veh)	--	--					11.9	

Approach LOS		--		--				B	

TWO-WAY STOP CONTROL SUMMARY

General Information

		## Site Information	
Analyst	SK	Intersection	SR 44 @ I-95 NB Ramps
Agency/Co.	HNTB	Jurisdiction	
Date Performed	8/30/2005	Analysis Year	Existing 2004
Analysis Time Period	PM Peak		

Project Description   I-95 SOAR

East/West Street: SR 44 (Canal Street)		North/South Street: I-95 NB Ramps	
Intersection Orientation: East-West		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	45	975	0	0	627	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	47	1026	0	0	660	0
Proportion of heavy vehicles, P_{HV}	8	--	--	0	--	--
Median type	Raised curb					
RT Channelized?			0			0
Lanes	1	2	0	0	2	0
Configuration	L	T			T	
Upstream Signal	0				0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	120	0	90	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	126	0	94	0	0	0
Proportion of heavy vehicles, P_{HV}	8	0	8	0	0	0
Percent grade (%)	0			0		
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L		L		R			
Volume, v (vph)	47		126		94			
Capacity, c_m (vph)	885		199		491			
v/c ratio	0.05		0.63		0.19			
Queue length (95%)	0.17		3.69		0.70			
Control Delay (s/veh)	9.3		49.9		14.1			
LOS	A		E		B			
Approach delay (s/veh)	--	--	34.6					

Approach LOS		--		--		D		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	SK		
Agency/Co.	HNTB		
Date Performed	8/31/2004		
Analysis Time Period	PM Peak		

Project Description   I-95 SOAR

East/West Street: SR 44 (Canal Street)

Intersection Orientation: East-West

Site Information

Intersection	SR 44 @ Sugar Mill Road
Jurisdiction	
Analysis Year	Existing 2004

North/South Street: Sugar Mill Road

Study Period (hrs):   0.25

Vehicle Volumes and Adjustments

Major Street

Movement	Eastbound			Westbound		
	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	59	1006	0	0	961	51
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	62	1058	0	0	1011	53
Proportion of heavy vehicles, P_{HV}	8	--	--	0	--	--
Median type	Raised curb					
RT Channelized?			0			0
Lanes	1	2	0	0	2	1
Configuration	L	T			T	R
Upstream Signal		0			0	

Minor Street

Movement	Northbound			Southbound		
	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	0	0	36	0	29
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	0	0	0	37	0	30
Proportion of heavy vehicles, P_{HV}	0	0	0	8	0	8
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LR	
Volume, v (vph)	62						67	
Capacity, c_m (vph)	616						265	
v/c ratio	0.10						0.25	
Queue length (95%)	0.33						0.98	
Control Delay (s/veh)	11.5						23.1	
LOS	B						C	
Approach delay (s/veh)	--	--					23.1	
Approach LOS	--	--					C	

Phone: Fax:
E-mail:

_____Operational Analysis_____

Analyst: SK
Agency or Company: HNTB
Date Performed: 08/2005
Analysis Time Period: PM Peak
Freeway/Direction: I-95/Northbound
From/To: South of SR 44
Jurisdiction:
Analysis Year: 2004 Existing
Description: Pioneer Trail Feasibility Study

_____Flow Inputs and Adjustments_____

Volume, V	1850	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	487	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1013	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	2	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	4.5	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

_____LOS and Performance Measures_____

Flow rate, vp	1013	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	2	
Density, D	14.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS2000: Basic Freeway Segments Release 4.1d

Phone: Fax:
E-mail:

_____Operational Analysis_____

Analyst: SK
Agency or Company: HNTB
Date Performed: 08/2005
Analysis Time Period: PM Peak
Freeway/Direction: I-95/Northbound
From/To: North of SR 421
Jurisdiction:
Analysis Year: 2030 No Build
Description: Pioneer Trail Feasibility Study

_____Flow Inputs and Adjustments_____

Volume, V	2940	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	774	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1073	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

_____LOS and Performance Measures_____

Flow rate, vp	1073	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	3	
Density, D	15.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

_____Diverge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed:
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Northbound
Junction: SR 421 (Dunlawton Avenue)
Jurisdiction:
Analysis Year: 2030 No Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Diverge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   3080   vph

_____Off Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-Flow speed on ramp   35.0   mph
Volume on ramp   1170   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent ramp   vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3080	1170		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	811	308		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV          0.962      0.962
Driver population factor, fP            1.00       1.00
Flow rate, vp                          3372       1281                pcph
```

_____Estimation of V12 Diverge Areas_____

$$L_{EQ} = \qquad \text{(Equation 25-8 or 25-9)}$$

$$P_{FD} = 0.617 \quad \text{Using Equation 5}$$

$$v_{12} = v_R + (v_F - v_R) P_{FD} = 2571 \quad pc/h$$

_____Capacity Checks_____

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3372	7200	No
v_{12}	2571	4400	No
$v_{FO} = v_F - v_R$	2091	7200	No
v_R	1281	2000	No

_____Level of Service Determination (if not F)_____

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D = 21.9 \quad pc/mi/ln$

Level of service for ramp-freeway junction areas of influence C

_____Speed Estimation_____

Intermediate speed variable, $D_S = 0.543$

Space mean speed in ramp influence area, $S_R = 54.8 \quad mph$

Space mean speed in outer lanes, $S_0 = 76.8 \quad mph$

Space mean speed for all vehicles, $S = 58.8 \quad mph$

Phone: Fax:
E-mail:

_____Merge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed:
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Northbound
Junction: SR 421 (Dunlawton Avenue)
Jurisdiction:
Analysis Year: 2030 No Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Merge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   1910   vph

_____On Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-flow speed on ramp   35.0   mph
Volume on ramp   1030   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent Ramp   vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1910	1030		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	503	271		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2091	1128	pcph

_____Estimation of V12 Merge Areas_____

$$L_{EQ} = \qquad \text{(Equation 25-2 or 25-3)}$$

$$P_{FM} = 0.591 \quad \text{Using Equation 1}$$

$$v_{12} = v_F (P_{FM}) = 1237 \quad pc/h$$

_____Capacity Checks_____

	Actual	Maximum	LOS F?
v_{FO}	3219	7200	No
v_{R12}	2365	4600	No

_____Level of Service Determination (if not F)_____

$$\text{Density, } D = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A = 20.3 \quad pc/mi/ln$$

Level of service for ramp-freeway junction areas of influence C

_____Speed Estimation_____

Intermediate speed variable,	M_S = 0.328	
Space mean speed in ramp influence area,	S_R = 60.8	mph
Space mean speed in outer lanes,	S_O = 68.7	mph
Space mean speed for all vehicles,	S = 62.7	mph

Phone: Fax:
E-mail:

_____Diverge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed:
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Southbound
Junction: SR 421 (Dunlawton Avenue)
Jurisdiction:
Analysis Year: 2030 No Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Diverge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   2940   vph

_____Off Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-Flow speed on ramp   35.0   mph
Volume on ramp   1030   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent ramp   vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2940	1030		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	774	271		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV          0.962       0.962
Driver population factor, fP           1.00        1.00
Flow rate, vp                          3219        1128              pcph
```

_____ Estimation of V12 Diverge Areas _____

$$L_{EQ} = \qquad \text{(Equation 25-8 or 25-9)}$$

$$P_{FD} = 0.628 \quad \text{Using Equation } 5$$

$$v_{12} = v_R + (v_F - v_R)\, P_{FD} = 2440 \quad pc/h$$

_____ Capacity Checks _____

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3219	7200	No
v_{12}	2440	4400	No
$v_{FO} = v_F - v_R$	2091	7200	No
v_R	1128	2000	No

_____ Level of Service Determination (if not F) _____

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_{12} = 20.7$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

_____ Speed Estimation _____

Intermediate speed variable, $D_S = 0.530$

Space mean speed in ramp influence area, $S_R = 55.2$ mph

Space mean speed in outer lanes, $S_0 = 76.8$ mph

Space mean speed for all vehicles, $S = 59.2$ mph

Phone: Fax:
E-mail:

_____Merge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed:
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Southbound
Junction: SR 421 (Dunlawton Avenue)
Jurisdiction:
Analysis Year: 2030 No Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Merge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   1910   vph

_____On Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-flow speed on ramp   35.0   mph
Volume on ramp   1170   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent Ramp   vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1910	1170		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	503	308		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2091	1281	pcph

_____Estimation of V12 Merge Areas_____

$$L_{EQ} = \qquad \text{(Equation 25-2 or 25-3)}$$

$$P_{FM} = 0.591 \quad \text{Using Equation } 1$$

$$v_{12} = v_F (P_{FM}) = 1237 \quad pc/h$$

_____Capacity Checks_____

	Actual	Maximum	LOS F?
v_{FO}	3372	7200	No
v_{R12}	2518	4600	No

_____Level of Service Determination (if not F)_____

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A = 21.4 \quad pc/mi/ln$

Level of service for ramp-freeway junction areas of influence   C

_____Speed Estimation_____

Intermediate speed variable,	$M_S = 0.334$	
Space mean speed in ramp influence area,	$S_R = 60.6$	mph
Space mean speed in outer lanes,	$S_0 = 68.7$	mph
Space mean speed for all vehicles,	$S = 62.5$	mph

SHORT REPORT

General Information		Site Information	
Analyst	KNM	Intersection	Taylor Rd @ Williamson Blvd
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	10/05	Jurisdiction	
Time Period	PM Peak	Analysis Year	2030 No Build

Volume and Timing Input

		EB			WB			NB			SB		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Num. of Lanes		2	2	0	2	2	1	2	2	1	2	1	0
Lane group		L	TR		L	T	R	L	T	R	L	TR	
Volume (vph)		308	1240	224	547	700	188	178	1376	762	688	1019	478
% Heavy veh		8	8	8	8	8	8	8	8	8	8	8	8
PHF		0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Actuated (P/A)		A	A	A	A	A	A	A	A	A	A	A	A
Startup lost time		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Ext. eff. green		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Arrival type		3	3		3	3	3	3	3	3	3	3	
Unit Extension		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Ped/Bike/RTOR Volume		0		0	0		0	0		0	0		0
Lane Width		12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	16.0	
Parking/Grade/Parking		N	0	N	N	0	N	N	0	N	N	0	N
Parking/hr													
Bus stops/hr		0	0		0	0	0	0	0	0	0	0	
Unit Extension		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	

Phasing	Excl. Left	Thru & RT	03	04	Excl. Left	Thru & RT	07	08
Timing	G = 9.0	G = 37.0	G =	G =	G = 23.0	G = 31.0	G =	G =
	Y = 4	Y = 6	Y =	Y =	Y = 4	Y = 6	Y =	Y =

Duration of Analysis (hrs) = 0.25 Cycle Length C = 120.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB	
Adj. flow rate	324	1541		576	737	198	187	1448	802	724	1576
Lane group cap.	243	1009		243	1033	822	622	865	573	622	824
v/c ratio	1.33	1.53		2.37	0.71	0.24	0.30	1.67	1.40	1.16	1.91
Green ratio	0.08	0.31		0.08	0.31	0.55	0.19	0.26	0.38	0.19	0.26
Unif. delay d1	55.5	41.5		55.5	36.8	14.0	41.6	44.5	37.0	48.5	44.5
Delay factor k	0.50	0.50		0.50	0.28	0.11	0.11	0.50	0.50	0.50	0.50
Increm. delay d2	175.3	242.3		629.2	2.4	0.2	0.3	308.4	190.2	90.5	415.2
PF factor	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Control delay	230.8	283.8		684.7	39.2	14.2	41.9	352.9	227.2	139.0	459.7
Lane group LOS	F	F		F	D	B	D	F	F	F	F
Apprch. delay	274.6			282.0			287.7			358.8	
Approach LOS	F			F			F			F	
Intersec. delay	303.8			Intersection LOS						F	

SHORT REPORT

General Information		Site Information	
Analyst	KNM	Intersection	I-95 SB Ramps @ Taylor Road
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	10/05	Jurisdiction	
Time Period	PM Peak	Analysis Year	2030 No Build

Volume and Timing Input

		EB			WB			NB			SB	
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Num. of Lanes	0	3	0	1	2	0	0	0	0	2	0	1
Lane group		T		L	T					L		R
Volume (vph)		2447		567	1043					638		137
% Heavy veh		8		8	8					8		8
PHF		0.95		0.95	0.95					0.95		0.95
Actuated (P/A)		A		A	A					A		A
Startup lost time		2.0		2.0	2.0					2.0		2.0
Ext. eff. green		2.0		2.0	2.0					2.0		2.0
Arrival type		3		3	3					3		3
Unit Extension		3.0		3.0	3.0					3.0		3.0
Ped/Bike/RTOR Volume	0						0			0		0
Lane Width		11.0		11.0	11.0					12.0		12.0
Parking/Grade/Parking	N	0	N	N	0	N	N		N	N	0	N
Parking/hr												
Bus stops/hr		0		0	0					0		0
Unit Extension		3.0		3.0	3.0					3.0		3.0

Phasing	WB Only	Thru Only	03	04	SB Only	06	07	08
Timing	G = 20.0	G = 53.0	G =	G =	G = 35.0	G =	G =	G =
	Y = 0	Y = 6	Y =	Y =	Y = 6	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25   Cycle Length C = 120.0

Lane Group Capacity, Control Delay, and LOS Determination

		EB			WB			NB			SB	
Adj. flow rate		2576		597	1098					672		144
Lane group cap.		2046		333	1966					947		436
v/c ratio		1.26		1.79	0.56					0.71		0.33
Green ratio		0.44		0.17	0.61					0.29		0.29
Unif. delay d1		33.5		50.0	13.9					38.0		33.3
Delay factor k		0.50		0.50	0.16					0.27		0.11
Increm. delay d2		120.7		368.6	0.4					2.5		0.4
PF factor		1.000		1.000	1.000					1.000		1.000
Control delay		154.2		418.6	14.3					40.5		33.8
Lane group LOS		F		F	B					D		C
Apprch. delay		154.2			156.7						39.3	
Approach LOS		F			F						D	
Intersec. delay		136.6			Intersection LOS						F	

SHORT REPORT

General Information		Site Information	
Analyst	KNM	Intersection	SR 421 @ I-95 NB Ramps
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	10/05	Jurisdiction	
Time Period	PM Peak	Analysis Year	2030 No Build

Volume and Timing Input

		EB			WB			NB			SB		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Num. of Lanes		2	3	0	0	2	0	1	0	2	0	0	0
Lane group		L	T			T		L		R			
Volume (vph)		251	2834			1259		351		819			
% Heavy veh		8	8			8		8		8			
PHF		0.95	0.95			0.95		0.95		0.95			
Actuated (P/A)		A	A			A		A		A			
Startup lost time		2.0	2.0			2.0		2.0		2.0			
Ext. eff. green		2.0	2.0			2.0		2.0		2.0			
Arrival type		3	3			3		3		3			
Unit Extension		3.0	3.0			3.0		3.0		3.0			
Ped/Bike/RTOR Volume					0			0		0	0		
Lane Width		11.0	11.0			12.0		12.0		12.0			
Parking/Grade/Parking		N	0	N	N	0	N	N	0	N	N		N
Parking/hr													
Bus stops/hr		0	0			0		0		0			
Unit Extension		3.0	3.0			3.0		3.0		3.0			

Phasing	EB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 20.0	G = 50.0	G =	G =	G = 40.0	G =	G =	G =
	Y = 0	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25   Cycle Length C = 120.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB		NB			SB	
Adj. flow rate	264	2983		1325		369		862		
Lane group cap.	1137	2702		1396		557		882		
v/c ratio	0.23	1.10		0.95		0.66		0.98		
Green ratio	0.58	0.58		0.42		0.33		0.33		
Unif. delay d1	19.7	25.0		33.8		34.2		39.6		
Delay factor k	0.11	0.50		0.46		0.24		0.48		
Increm. delay d2	0.1	53.0		13.8		2.9		24.8		
PF factor	1.000	1.000		1.000		1.000		1.000		
Control delay	19.8	78.0		47.6		37.2		64.3		
Lane group LOS	B	E		D		D		E		
Apprch. delay	73.3			47.6		56.2				
Approach LOS	E			D		E				
Intersec. delay	63.8			Intersection LOS					E	

SHORT REPORT

General Information		Site Information	
Analyst	KNM	Intersection	Dunlawton Av @ Taylor Rd
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	10/05	Jurisdiction	
Time Period	PM Peak	Analysis Year	2030 No Build

Volume and Timing Input

		EB			WB			NB			SB		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Num. of Lanes		0	3	1	1	3	0	2	0	1	0	0	0
Lane group			T	R	L	T		L		R			
Volume (vph)			2423	1230	178	1400		328		111			
% Heavy veh			8	8	8	8		8		8			
PHF			0.95	0.95	0.95	0.95		0.95		0.95			
Actuated (P/A)			A	A	A	A		A		A			
Startup lost time			2.0	2.0	2.0	2.0		2.0		2.0			
Ext. eff. green			2.0	2.0	2.0	2.0		2.0		2.0			
Arrival type			3	3	3	3		3		3			
Unit Extension			3.0	3.0	3.0	3.0		3.0		3.0			
Ped/Bike/RTOR Volume		0		0				0		0	0		
Lane Width			12.0	12.0	12.0	12.0		12.0		12.0			
Parking/Grade/Parking		N	0	N	N	0	N	N	0	N	N		N
Parking/hr													
Bus stops/hr			0	0	0	0		0		0			
Unit Extension			3.0	3.0	3.0	3.0		3.0		3.0			

Phasing	WB Only	Thru & RT	03	04	NB Only	06	07	08
Timing	G = 20.0	G = 70.0	G =	G =	G = 20.0	G =	G =	G =
	Y = 0	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25   Cycle Length C = 120.0

Lane Group Capacity, Control Delay, and LOS Determination

		EB			WB			NB			SB		
Adj. flow rate		2551	1295	187	1474		345		117				
Lane group cap.		2795	1184	383	5175		569		561				
v/c ratio		0.91	1.09	0.49	0.28		0.61		0.21				
Green ratio		0.58	0.79	0.17	0.75		0.17		0.38				
Unif. delay d1		22.3	12.5	45.4	4.8		46.4		25.4				
Delay factor k		0.43	0.50	0.11	0.11		0.19		0.11				
Increm. delay d2		5.1	55.6	1.0	0.0		1.9		0.2				
PF factor		1.000	1.000	1.000	1.000		1.000		1.000				
Control delay		27.4	68.1	46.3	4.8		48.2		25.6				
Lane group LOS		C	E	D	A		D		C				
Apprch. delay		41.1			9.5		42.5						
Approach LOS		D			A		D						
Intersec. delay		32.4			Intersection LOS						C		

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HCS2000: Basic Freeway Segments Release 4.1d

Phone: Fax:
E-mail:

_____Operational Analysis_____

Analyst: SK
Agency or Company: HNTB
Date Performed: 08/2005
Analysis Time Period: PM Peak
Freeway/Direction: I-95/Northbound
From/To: SR 421 to SR 44
Jurisdiction:
Analysis Year: 2030 No Build
Description: Pioneer Trail Feasibility Study

_____Flow Inputs and Adjustments_____

Volume, V   3080   veh/h
Peak-hour factor, PHF   0.95
Peak 15-min volume, v15   811   v
Trucks and buses   8   %
Recreational vehicles   0   %
Terrain type: Level
    Grade   0.00   %
    Segment length   0.00   mi
Trucks and buses PCE, ET   1.5
Recreational vehicle PCE, ER   1.2
Heavy vehicle adjustment, fHV   0.962
Driver population factor, fp   1.00
Flow rate, vp   1124   pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width   12.0   ft
Right-shoulder lateral clearance   6.0   ft
Interchange density   0.50   interchange/mi
Number of lanes, N   3
Free-flow speed: Measured
    FFS or BFFS   70.0   mi/h
Lane width adjustment, fLW   0.0   mi/h
Lateral clearance adjustment, fLC   0.0   mi/h
Interchange density adjustment, fID 0.0   mi/h
Number of lanes adjustment, fN   3.0   mi/h
Free-flow speed, FFS   70.0   mi/h
                                     Urban Freeway

_____LOS and Performance Measures_____

Flow rate, vp   1124   pc/h/ln
Free-flow speed, FFS   70.0   mi/h
Average passenger-car speed, S   70.0   mi/h
Number of lanes, N   3
Density, D   16.1   pc/mi/ln
Level of service, LOS   B

 Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

_____Diverge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed: 8/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Northbound
Junction: SR 44 (Canal Street)
Jurisdiction:
Analysis Year: 2030 No Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Diverge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   2920   vph

_____Off Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-Flow speed on ramp   35.0   mph
Volume on ramp   1120   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent ramp   vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2920	1120		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	768	295		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %		%
Length	0.00 mi	0.00 mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3197	1226	pcph

_____Estimation of V12 Diverge Areas_____

$L_{EQ} = $ (Equation 25-8 or 25-9)

$P_{FD} = 0.624$ Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD} = 2455$ pc/h

_____Capacity Checks_____

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3197	7200	No
v_{12}	2455	4400	No
$v_{FO} = v_F - v_R$	1971	7200	No
v_R	1226	2000	No

_____Level of Service Determination (if not F)_____

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D = 20.9$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

_____Speed Estimation_____

Intermediate speed variable, $D_S = 0.538$

Space mean speed in ramp influence area, $S_R = 54.9$ mph

Space mean speed in outer lanes, $S_0 = 76.8$ mph

Space mean speed for all vehicles, $S = 58.8$ mph

Phone: Fax:
E-mail:

_____Merge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed: 8/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Northbound
Junction: SR 44 (Canal Street)
Jurisdiction:
Analysis Year: 2030 No Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Merge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   1800   vph

_____On Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-flow speed on ramp   35.0   mph
Volume on ramp   1280   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent Ramp   vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1800	1280		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	474	337		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV        0.962      0.962
Driver population factor, fP         1.00       1.00
Flow rate, vp                        1971       1401                pcph
```

_____Estimation of V12 Merge Areas_____

$$L_{EQ} = \quad \text{(Equation 25-2 or 25-3)}$$

$$P_{FM} = \quad 0.591 \quad \text{Using Equation } 1$$

$$v_{12} = v_F (P_{FM}) = \quad 1166 \quad \text{pc/h}$$

_____Capacity Checks_____

	Actual	Maximum	LOS F?
v_{FO}	3372	7200	No
v_{R12}	2567	4600	No

_____Level of Service Determination (if not F)_____

$$\text{Density, } D = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A = \quad 21.7 \quad \text{pc/mi/ln}$$

Level of service for ramp-freeway junction areas of influence   C

_____Speed Estimation_____

Intermediate speed variable, M_S = 0.337

Space mean speed in ramp influence area, S_R = 60.6   mph

Space mean speed in outer lanes, S_O = 68.9   mph

Space mean speed for all vehicles, S = 62.4   mph

Phone: Fax:
E-mail:

_____Diverge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed: 8/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Southbound
Junction: SR 44 (Canal Street)
Jurisdiction:
Analysis Year: 2030 No Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Diverge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   3080   vph

_____Off Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-Flow speed on ramp   35.0   mph
Volume on ramp   200   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent ramp   vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3080	200		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	811	53		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3372	219	pcph

Estimation of V12 Diverge Areas

$$L_{EQ} = \qquad \text{(Equation 25-8 or 25-9)}$$

$$P_{FD} = 0.666 \quad \text{Using Equation } 5$$

$$v_{12} = v_R + (v_F - v_R)\, P_{FD} = 2318 \quad pc/h$$

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3372	7200	No
v_{12}	2318	4400	No
$v_{FO} = v_F - v_R$	3153	7200	No
v_R	219	2000	No

Level of Service Determination (if not F)

Density, $D = 4.252 + 0.0086\, v_{12} - 0.009\, L_D = 19.7 \quad pc/mi/ln$

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	$D_S = 0.448$	
Space mean speed in ramp influence area,	$S_R = 57.5$	mph
Space mean speed in outer lanes,	$S_O = 76.6$	mph
Space mean speed for all vehicles,	$S = 62.3$	mph

Phone: Fax:
E-mail:

_____Diverge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed: 8/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Southbound
Junction: SR 44 (Canal Street) Loop
Jurisdiction:
Analysis Year: 2030 No Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Diverge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   2880   vph

_____Off Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-Flow speed on ramp   35.0   mph
Volume on ramp   1080   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent ramp   vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2880	1080		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	758	284		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV          0.962      0.962
Driver population factor, fP           1.00       1.00
Flow rate, vp                          3153       1182                    pcph
```

_____Estimation of V12 Diverge Areas_____

$$L_{EQ} = \quad \text{(Equation 25-8 or 25-9)}$$

$$P_{FD} = \quad 0.627 \quad \text{Using Equation} \quad 5$$

$$v_{12} = v_R + (v_F - v_R) \, P_{FD} = 2417 \quad pc/h$$

_____Capacity Checks_____

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3153	7200	No
v_{12}	2417	4400	No
$v_{FO} = v_F - v_R$	1971	7200	No
v_R	1182	2000	No

_____Level of Service Determination (if not F)_____

Density, $D = 4.252 + 0.0086 \, v_R - 0.009 \, L_D = 20.5 \quad pc/mi/ln$

Level of service for ramp-freeway junction areas of influence C

_____Speed Estimation_____

Intermediate speed variable, $D_S = 0.534$

Space mean speed in ramp influence area, $S_R = 55.0 \quad$ mph

Space mean speed in outer lanes, $S_0 = 76.8 \quad$ mph

Space mean speed for all vehicles, $S = 58.9 \quad$ mph

Phone: Fax:
E-mail:

_____Merge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed: 8/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Southbound
Junction: SR 44 (Canal Street)
Jurisdiction:
Analysis Year: 2030 No Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Merge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   1800   vph

_____On Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-flow speed on ramp   35.0   mph
Volume on ramp   1120   vph
Length of first accel/decel lane   228   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent Ramp   vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1800	1120		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	474	295		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV          0.962      0.962
Driver population factor, fP           1.00       1.00
Flow rate, vp                          1971       1226              pcph
```

_____Estimation of V12 Merge Areas_____

$$L_{EQ} = \quad\quad\quad \text{(Equation 25-2 or 25-3)}$$

$$P_{FM} = \quad 0.584 \quad \text{Using Equation} \quad 1$$

$$v_{12} = v_F (P_{FM}) = \quad 1151 \quad pc/h$$

_____Capacity Checks_____

```
              Actual      Maximum        LOS F?
  v            3197        7200           No
   FO
  v            2377        4600           No
   R12
```

_____Level of Service Determination (if not F)_____

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A = 22.0$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

_____Speed Estimation_____

Intermediate speed variable, M_S = 0.347

Space mean speed in ramp influence area, S_R = 60.3   mph

Space mean speed in outer lanes, S_0 = 68.8   mph

Space mean speed for all vehicles, S = 62.3   mph

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	KNM
Agency/Co.	HNTB
Date Performed	10/05
Analysis Time Period	PM Peak

Site Information

Intersection	SR 44 @ I-95 SB Ramps
Jurisdiction	
Analysis Year	2030 No Build

Project Description Pioneer Trail Feasibility Study

East/West Street: SR 44 (Canal Street) North/South Street: I-95 SB Ramps

Intersection Orientation: East-West Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	0	1661	0	330	1535	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	0	1748	0	347	1615	0
Proportion of heavy vehicles, P_{HV}	0	--	--	8	--	--
Median type	Raised curb					
RT Channelized?			0			0
Lanes	0	2	0	1	2	0
Configuration		T		L	T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	0	0	0	0	200
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	0	0	0	0	0	210
Proportion of heavy vehicles, P_{HV}	0	0	0	0	0	8
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	0	0	1
Configuration						R

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L						R
Volume, v (vph)		347						210
Capacity, c_m (vph)		330						312
v/c ratio		1.05						0.67
Queue length (95%)		12.52						4.55
Control Delay (s/veh)		100.3						37.4
LOS		F						E
Approach delay (s/veh)	--	--				37.4		

SHORT REPORT

General Information		Site Information	
Analyst	KNM	Intersection	SR 44 @ I-95 NB Ramps
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	10/2005	Jurisdiction	
Time Period	PM Peak	Analysis Year	2030 No Build

Volume and Timing Input

		EB			WB			NB			SB		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Num. of Lanes		1	2	0	0	2	0	1	0	1	0	0	0
Lane group		L	T			T		L		R			
Volume (vph)		101	2640			1225		640		480			
% Heavy veh		8	8			8		8		8			
PHF		0.95	0.95			0.95		0.95		0.95			
Actuated (P/A)		A	A			A		A		A			
Startup lost time		2.0	2.0			2.0		2.0		2.0			
Ext. eff. green		2.0	2.0			2.0		2.0		2.0			
Arrival type		3	3			3		3		3			
Unit Extension		3.0	3.0			3.0		3.0		3.0			
Ped/Bike/RTOR Volume					0			0		0	0		
Lane Width		12.0	12.0			12.0		12.0		12.0			
Parking/Grade/Parking		N	0	N	N	0	N	N	0	N	N		N
Parking/hr													
Bus stops/hr		0	0			0		0		0			
Unit Extension		3.0	3.0			3.0		3.0		3.0			

Phasing	EB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 5.2	G = 87.5	G =	G =	G = 40.3	G =	G =	G =
	Y = 5	Y = 6	Y =	Y =	Y = 6	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25   Cycle Length C = 150.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB		NB			SB		
Adj. flow rate	106	2779		1289		674		505			
Lane group cap.	196	1954		1954		449		513			
v/c ratio	0.54	1.42		0.66		1.50		0.98			
Green ratio	0.65	0.58		0.58		0.27		0.34			
Unif. delay d1	16.3	31.3		21.2		54.9		48.9			
Delay factor k	0.14	0.50		0.23		0.50		0.49			
Increm. delay d2	3.0	193.0		0.8		236.9		35.6			
PF factor	1.000	1.000		1.000		1.000		1.000			
Control delay	19.3	224.3		22.0		291.8		84.4			
Lane group LOS	B	F		C		F		F			
Apprch. delay	216.8			22.0		203.0					
Approach LOS	F			C		F					
Intersec. delay	166.8			Intersection LOS					F		

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	KNM
Agency/Co.	HNTB
Date Performed	10/05
Analysis Time Period	PM Peak

Site Information

Intersection	SR 44 @ Sugar Mill Road
Jurisdiction	
Analysis Year	2030 No Build

Project Description   Pioneer Trail Feasibility Study

East/West Street: SR 44 (Canal Street)   North/South Street: Sugar Mill Road

Intersection Orientation: East-West   Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	173	2948	0	0	2071	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	182	3103	0	0	2180	0
Proportion of heavy vehicles, P_{HV}	8	--	--	0	--	--
Median type	Raised curb					
RT Channelized?			0			0
Lanes	1	2	0	0	2	0
Configuration	L	T			T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	0	0	78	0	63
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	0	0	0	82	0	66
Proportion of heavy vehicles, P_{HV}	0	0	0	8	0	8
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LR	
Volume, v (vph)	182						148	
Capacity, c_m (vph)	221						0	
v/c ratio	0.82							
Queue length (95%)	6.18							
Control Delay (s/veh)	68.8							
LOS	F						F	
Approach delay (s/veh)	--	--						

Approach LOS		--		--			

HCS2000: Basic Freeway Segments Release 4.1d

Phone: Fax:
E-mail:

_____Operational Analysis_____

Analyst: SK
Agency or Company: HNTB
Date Performed: 08/2005
Analysis Time Period: PM Peak
Freeway/Direction: I-95/Northbound
From/To: South of SR 44
Jurisdiction:
Analysis Year: 2030 No Build
Description: Pioneer Trail Feasibility Study

_____Flow Inputs and Adjustments_____

Volume, V	2920	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	768	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1066	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

_____LOS and Performance Measures_____

Flow rate, vp	1066	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	3	
Density, D	15.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS2000: Basic Freeway Segments Release 4.1d

Phone: Fax:
E-mail:

_____Operational Analysis_____

Analyst: SK
Agency or Company: HNTB
Date Performed: 08/2005
Analysis Time Period: PM Peak
Freeway/Direction: I-95/Northbound
From/To: North of SR 421
Jurisdiction:
Analysis Year: 2030 Build
Description: Pioneer Trail Feasibility Study

_____Flow Inputs and Adjustments_____

Volume, V	3050	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	803	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1113	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

_____LOS and Performance Measures_____

Flow rate, vp	1113	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	3	
Density, D	15.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

_____Diverge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed:
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Northbound
Junction: SR 421 (Dunlawton Avenue)
Jurisdiction:
Analysis Year: 2030 Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Diverge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   3320   vph

_____Off Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-Flow speed on ramp   35.0   mph
Volume on ramp   1220   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent ramp   vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3320	1220		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	874	321		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, f_{HV}	0.962	0.962	
Driver population factor, f_P	1.00	1.00	
Flow rate, v_p	3635	1336	pcph

_____Estimation of V12 Diverge Areas_____

L_{EQ} =   (Equation 25-8 or 25-9)

P_{FD} =   0.608   Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2733   pc/h

_____Capacity Checks_____

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3635	7200	No
v_{12}	2733	4400	No
$v_{FO} = v_F - v_R$	2299	7200	No
v_R	1336	2000	No

_____Level of Service Determination (if not F)_____

Density, $D = 4.252 + 0.0086 v_R - 0.009 L_D$ =   23.3   pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

_____Speed Estimation_____

Intermediate speed variable,	D_S = 0.548	
Space mean speed in ramp influence area,	S_R = 54.6	mph
Space mean speed in outer lanes,	S_0 = 76.8	mph
Space mean speed for all vehicles,	S = 58.9	mph

Phone: Fax:
E-mail:

_____Merge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed:
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Northbound
Junction: SR 421 (Dunlawton Avenue)
Jurisdiction:
Analysis Year: 2030 Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Merge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   2100   vph

_____On Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-flow speed on ramp   35.0   mph
Volume on ramp   950   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent Ramp   vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp
Volume, V (vph)	2100	950	vph
Peak-hour factor, PHF	0.95	0.95	
Peak 15-min volume, v15	553	250	v
Trucks and buses	8	8	%
Recreational vehicles	0	0	%
Terrain type:	Level	Level	
Grade	%	%	%
Length	mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5	
Recreational vehicle PCE, ER	1.2	1.2	

```
Heavy vehicle adjustment, fHV        0.962      0.962
Driver population factor, fP         1.00       1.00
Flow rate, vp                        2299       1040                 pcph
```

_____Estimation of V12 Merge Areas_____

$$L_{EQ} = \quad \text{(Equation 25-2 or 25-3)}$$

$$P_{FM} = \quad 0.591 \quad \text{Using Equation} \quad 1$$

$$v_{12} = v_F (P_{FM}) = 1360 \quad pc/h$$

_____Capacity Checks_____

	Actual	Maximum	LOS F?
v_{FO}	3339	7200	No
v_{R12}	2400	4600	No

_____Level of Service Determination (if not F)_____

$$\text{Density, } D = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A = 20.6 \quad pc/mi/ln$$

Level of service for ramp-freeway junction areas of influence   C

_____Speed Estimation_____

Intermediate speed variable, M_S = 0.329

Space mean speed in ramp influence area, S_R = 60.8   mph

Space mean speed in outer lanes, S_O = 68.4   mph

Space mean speed for all vehicles, S = 62.8   mph

Phone: Fax:
E-mail:

_____Diverge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed:
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Southbound
Junction: SR 421 (Dunlawton Avenue)
Jurisdiction:
Analysis Year: 2030 Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Diverge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   3050   vph

_____Off Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-Flow speed on ramp   35.0   mph
Volume on ramp   950   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent ramp   vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3050	950		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	803	250		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV              0.962        0.962
Driver population factor, fP               1.00         1.00
Flow rate, vp                              3339         1040                        pcph
```

_____Estimation of V12 Diverge Areas_____

L_{EQ} =   (Equation 25-8 or 25-9)

P_{FD} =   0.629   Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ =   2485   pc/h

_____Capacity Checks_____

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3339	7200	No
v_{12}	2485	4400	No
$v_{FO} = v_F - v_R$	2299	7200	No
v_R	1040	2000	No

_____Level of Service Determination (if not F)_____

Density, $D_R = 4.252 + 0.0086 v_{12} - 0.009 L_D$ =   21.1   pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

_____Speed Estimation_____

Intermediate speed variable, D_S = 0.522

Space mean speed in ramp influence area, S_R = 55.4   mph

Space mean speed in outer lanes, S_0 = 76.8   mph

Space mean speed for all vehicles, S = 59.6   mph

Phone: Fax:
E-mail:

_____Merge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed:
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Southbound
Junction: SR 421 (Dunlawton Avenue)
Jurisdiction:
Analysis Year: 2030 Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Merge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   2100   vph

_____On Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-flow speed on ramp   35.0   mph
Volume on ramp   1220   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent Ramp   vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2100	1220		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	553	321		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV          0.962      0.962
Driver population factor, fP           1.00       1.00
Flow rate, vp                          2299       1336                    pcph
```

_____Estimation of V12 Merge Areas_____

$$L_{EQ} = \qquad\qquad \text{(Equation 25-2 or 25-3)}$$

$$P_{FM} = 0.591 \quad \text{Using Equation } 1$$

$$v_{12} = v_F (P_{FM}) = 1360 \quad pc/h$$

_____Capacity Checks_____

	Actual	Maximum	LOS F?
v_{FO}	3635	7200	No
v_{R12}	2696	4600	No

_____Level of Service Determination (if not F)_____

$$\text{Density, } D = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A = 22.8 \quad pc/mi/ln$$

Level of service for ramp-freeway junction areas of influence   C

_____Speed Estimation_____

```
Intermediate speed variable,           M  = 0.344
                                        S
Space mean speed in ramp influence area,  S  = 60.4     mph
                                           R
Space mean speed in outer lanes,       S  = 68.4     mph
                                        O
Space mean speed for all vehicles,     S  = 62.3     mph
```

SHORT REPORT

General Information

Analyst	KNM
Agency or Co.	HNTB
Date Performed	10/05
Time Period	PM Peak

Site Information

Intersection	Taylor Rd @ Williamson Blvd
Area Type	All other areas
Jurisdiction	
Analysis Year	2030 Build

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Num. of Lanes	2	2	0	2	2	1	2	2	1	2	1	0
Lane group	L	TR		L	T	R	L	T	R	L	TR	
Volume (vph)	308	1240	222	577	737	188	177	1364	756	684	1011	474
% Heavy veh	8	8	8	8	8	8	8	8	8	8	8	8
PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Actuated (P/A)	A	A	A	A	A	A	A	A	A	A	A	A
Startup lost time	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Ext. eff. green	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Arrival type	3	3		3	3	3	3	3	3	3	3	
Unit Extension	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Ped/Bike/RTOR Volume	0		0	0		0	0		0	0		0
Lane Width	12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	16.0	
Parking/Grade/Parking	N	0	N	N	0	N	N	0	N	N	0	N
Parking/hr												
Bus stops/hr	0	0		0	0	0	0	0	0	0	0	
Unit Extension	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	

Phasing	Excl. Left	Thru & RT	03	04		Excl. Left	Thru & RT	07	08
Timing	G = 20.0	G = 40.0	G =	G =		G = 19.0	G = 51.0	G =	G =
	Y = 4	Y = 6	Y =	Y =		Y = 4	Y = 6	Y =	Y =

Duration of Analysis (hrs) = 0.25 Cycle Length C = 150.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adj. flow rate	324	1539		607	776	198	186	1436	796	720	1563	
Lane group cap.	433	873		433	893	648	411	1139	767	411	1085	
v/c ratio	0.75	1.76		1.40	0.87	0.31	0.45	1.26	1.04	1.75	1.44	
Green ratio	0.13	0.27		0.13	0.27	0.43	0.13	0.34	0.51	0.13	0.34	
Unif. delay d1	62.6	55.0		65.0	52.5	27.8	60.7	49.5	36.5	65.5	49.5	
Delay factor k	0.30	0.50		0.50	0.40	0.11	0.11	0.50	0.50	0.50	0.50	
Increm. delay d2	7.1	348.0		194.3	9.2	0.3	0.8	124.5	42.7	348.2	203.5	
PF factor	1.000	1.000		1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Control delay	69.6	403.0		259.3	61.7	28.0	61.5	174.0	79.2	413.7	253.0	
Lane group LOS	E	F		F	E	C	E	F	E	F	F	
Apprch. delay	345.0			133.4			134.2			303.7		
Approach LOS	F			F			F			F		
Intersec. delay	229.8			Intersection LOS						F		

SHORT REPORT

General Information		Site Information	
Analyst	KNM	Intersection	I-95 SB Ramps @ Taylor Road
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	10/05	Jurisdiction	
Time Period	PM Peak	Analysis Year	2030 Build

Volume and Timing Input

		EB			WB			NB			SB		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Num. of Lanes		0	3	0	1	2	0	0	0	0	2	0	1
Lane group			T		L	T					L		R
Volume (vph)			2415		595	1148					588		126
% Heavy veh			8		8	8					8		8
PHF			0.95		0.95	0.95					0.95		0.95
Actuated (P/A)			A		A	A					A		A
Startup lost time			2.0		2.0	2.0					2.0		2.0
Ext. eff. green			2.0		2.0	2.0					2.0		2.0
Arrival type			3		3	3					3		3
Unit Extension			3.0		3.0	3.0					3.0		3.0
Ped/Bike/RTOR Volume		0						0			0		0
Lane Width			11.0		11.0	11.0					12.0		12.0
Parking/Grade/Parking		N	0	N	N	0	N	N		N	N	0	N
Parking/hr													
Bus stops/hr			0		0	0					0		0
Unit Extension			3.0		3.0	3.0					3.0		3.0

Phasing	WB Only	Thru Only	03	04	SB Only	06	07	08
Timing	G = 25.0	G = 58.0	G =	G =	G = 25.0	G =	G =	G =
	Y = 0	Y = 6	Y =	Y =	Y = 6	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25   Cycle Length C = 120.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB		WB		NB		SB		
Adj. flow rate	2542		626	1208			619		133
Lane group cap.	2239		416	2235			676		311
v/c ratio	1.14		1.50	0.54			0.92		0.43
Green ratio	0.48		0.21	0.69			0.21		0.21
Unif. delay d1	31.0		47.5	9.1			46.5		41.3
Delay factor k	0.50		0.50	0.14			0.43		0.11
Increm. delay d2	67.0		239.4	0.3			17.3		0.9
PF factor	1.000		1.000	1.000			1.000		1.000
Control delay	98.0		286.9	9.4			63.7		42.2
Lane group LOS	F		F	A			E		D
Apprch. delay	98.0		104.1				59.9		
Approach LOS	F		F				E		
Intersec. delay	94.6		Intersection LOS				F		

SHORT REPORT

General Information		Site Information	
Analyst	KNM	Intersection	SR 421 @ I-95 NB Ramps
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	10/05	Jurisdiction	
Time Period	PM Peak	Analysis Year	2030 Build

Volume and Timing Input

		EB			WB			NB			SB		
		LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Num. of Lanes		2	3	0	0	2	0	1	0	2	0	0	0
Lane group		L	T			T		L		R			
Volume (vph)		239	2764			1387		356		854			
% Heavy veh		8	8			8		8		8			
PHF		0.95	0.95			0.95		0.95		0.95			
Actuated (P/A)		A	A			A		A		A			
Startup lost time		2.0	2.0			2.0		2.0		2.0			
Ext. eff. green		2.0	2.0			2.0		2.0		2.0			
Arrival type		3	3			3		3		3			
Unit Extension		3.0	3.0			3.0		3.0		3.0			
Ped/Bike/RTOR Volume					0			0		0	0		
Lane Width		11.0	11.0			12.0		12.0		12.0			
Parking/Grade/Parking		N	0	N	N	0	N	N	0	N	N		N
Parking/hr													
Bus stops/hr		0	0			0		0		0			
Unit Extension		3.0	3.0			3.0		3.0		3.0			

Phasing	EB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 20.0	G = 50.0	G =	G =	G = 40.0	G =	G =	G =
	Y = 0	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25   Cycle Length C = 120.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB		NB			SB	
Adj. flow rate	252	2909		1460		375		899		
Lane group cap.	1188	2702		1396		557		1434		
v/c ratio	0.21	1.08		1.05		0.67		0.63		
Green ratio	0.58	0.58		0.42		0.33		0.54		
Unif. delay d1	20.3	25.0		35.0		34.4		19.1		
Delay factor k	0.11	0.50		0.50		0.25		0.21		
Increm. delay d2	0.1	42.1		37.0		3.2		0.9		
PF factor	1.000	1.000		1.000		1.000		1.000		
Control delay	20.3	67.1		72.0		37.6		20.0		
Lane group LOS	C	E		E		D		B		
Apprch. delay	63.4			72.0		25.1				
Approach LOS	E			E		C				
Intersec. delay	57.3			Intersection LOS					E	

SHORT REPORT

General Information		Site Information	
Analyst	KNM	Intersection	Dunlawton Av @ Taylor Rd
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	10/05	Jurisdiction	
Time Period	PM Peak	Analysis Year	2030 Build

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Num. of Lanes	0	3	1	1	3	0	2	0	1	0	0	0
Lane group		T	R	L	T		L		R			
Volume (vph)		2400	1218	187	1467		343		116			
% Heavy veh		8	8	8	8		8		8			
PHF		0.95	0.95	0.95	0.95		0.95		0.95			
Actuated (P/A)		A	A	A	A		A		A			
Startup lost time		2.0	2.0	2.0	2.0		2.0		2.0			
Ext. eff. green		2.0	2.0	2.0	2.0		2.0		2.0			
Arrival type		3	3	3	3		3		3			
Unit Extension		3.0	3.0	3.0	3.0		3.0		3.0			
Ped/Bike/RTOR Volume	0		0				0		0	0		
Lane Width		12.0	12.0	12.0	12.0		12.0		12.0			
Parking/Grade/Parking	N	0	N	N	0	N	N	0	N	N		N
Parking/hr												
Bus stops/hr		0	0	0	0		0		0			
Unit Extension		3.0	3.0	3.0	3.0		3.0		3.0			

Phasing	WB Only	Thru & RT	03	04	NB Only	06	07	08
Timing	G = 20.0	G = 70.0	G =	G =	G = 20.0	G =	G =	G =
	Y = 0	Y = 5	Y =	Y =	Y = 5	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25   Cycle Length C = 120.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB			NB			SB		
Adj. flow rate	2526	1282	197	1544		361		122				
Lane group cap.	2795	1184	383	5175		569		561				
v/c ratio	0.90	1.08	0.51	0.30		0.63		0.22				
Green ratio	0.58	0.79	0.17	0.75		0.17		0.38				
Unif. delay d1	22.0	12.5	45.6	4.8		46.6		25.5				
Delay factor k	0.42	0.50	0.12	0.11		0.21		0.11				
Increm. delay d2	4.6	51.6	1.2	0.0		2.3		0.2				
PF factor	1.000	1.000	1.000	1.000		1.000		1.000				
Control delay	26.7	64.1	46.8	4.9		48.9		25.7				
Lane group LOS	C	E	D	A		D		C				
Apprch. delay	39.3			9.6			43.1					
Approach LOS	D			A			D					
Intersec. delay	31.0			Intersection LOS						C		

Phone: Fax:
E-mail:

_____Operational Analysis_____

Analyst: SK
Agency or Company: HNTB
Date Performed: 08/2005
Analysis Time Period: PM Peak
Freeway/Direction: I-95/Northbound
From/To: Pioneer Trail to SR 421
Jurisdiction:
Analysis Year: 2030 Build
Description: Pioneer Trail Feasibility Study

_____Flow Inputs and Adjustments_____

Volume, V   3320   veh/h
Peak-hour factor, PHF   0.95
Peak 15-min volume, v15   874   v
Trucks and buses   8   %
Recreational vehicles   0   %
Terrain type: Level
      Grade   0.00   %
      Segment length   0.00   mi
Trucks and buses PCE, ET   1.5
Recreational vehicle PCE, ER   1.2
Heavy vehicle adjustment, fHV   0.962
Driver population factor, fp   1.00
Flow rate, vp   1212   pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width   12.0   ft
Right-shoulder lateral clearance   6.0   ft
Interchange density   0.50   interchange/mi
Number of lanes, N   3
Free-flow speed: Measured
      FFS or BFFS   70.0   mi/h
Lane width adjustment, fLW   0.0   mi/h
Lateral clearance adjustment, fLC   0.0   mi/h
Interchange density adjustment, fID 0.0   mi/h
Number of lanes adjustment, fN   3.0   mi/h
Free-flow speed, FFS   70.0   mi/h
                                     Urban Freeway

_____LOS and Performance Measures_____

Flow rate, vp   1212   pc/h/ln
Free-flow speed, FFS   70.0   mi/h
Average passenger-car speed, S   70.0   mi/h
Number of lanes, N   3
Density, D   17.3   pc/mi/ln
Level of service, LOS   B

   Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

_____Diverge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed: 8/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Northbound
Junction: Pioneer Trail
Jurisdiction:
Analysis Year: 2030 Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Diverge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   2880   vph

_____Off Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-Flow speed on ramp   35.0   mph
Volume on ramp   320   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent ramp   vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2880	320		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	758	84		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3153	350	pcph

_____Estimation of V12 Diverge Areas_____

$$L_{EQ} = \quad \text{(Equation 25-8 or 25-9)}$$

$$P_{FD} = 0.665 \quad \text{Using Equation } 5$$

$$v_{12} = v_R + (v_F - v_R) P_{FD} = 2214 \quad pc/h$$

_____Capacity Checks_____

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3153	7200	No
v_{12}	2214	4400	No
$v_{FO} = v_F - v_R$	2803	7200	No
v_R	350	2000	No

_____Level of Service Determination (if not F)_____

Density, $\quad D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D = 18.8 \quad pc/mi/ln$

Level of service for ramp-freeway junction areas of influence B

_____Speed Estimation_____

Intermediate speed variable, $\quad D_S = 0.460$

Space mean speed in ramp influence area, $\quad S_R = 57.1 \quad mph$

Space mean speed in outer lanes, $\quad S_0 = 76.8 \quad mph$

Space mean speed for all vehicles, $\quad S = 61.8 \quad mph$

Phone: Fax:
E-mail:

_____Merge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed: 8/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Northbound
Junction: Pioneer Trail
Jurisdiction:
Analysis Year: 2030 Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Merge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   2560   vph

_____On Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-flow speed on ramp   35.0   mph
Volume on ramp   760   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent Ramp   vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2560	760		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	674	200		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV          0.962      0.962
Driver population factor, fP           1.00       1.00
Flow rate, vp                          2803       832                    pcph
```

_____Estimation of V12 Merge Areas_____

$L_{EQ} =$ (Equation 25-2 or 25-3)

$P_{FM} =$ 0.591   Using Equation 1

$v_{12} = v_F (P_{FM}) =$ 1658   pc/h

_____Capacity Checks_____

	Actual	Maximum	LOS F?
v_{FO}	3635	7200	No
v_{R12}	2490	4600	No

_____Level of Service Determination (if not F)_____

Density, $D = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 21.4   pc/mi/ln

Level of service for ramp-freeway junction areas of influence   C

_____Speed Estimation_____

Intermediate speed variable, M_S = 0.333

Space mean speed in ramp influence area, S_R = 60.7   mph

Space mean speed in outer lanes, S_0 = 67.7   mph

Space mean speed for all vehicles, S = 62.7   mph

Phone: Fax:
E-mail:

_____Diverge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed: 8/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Southbound
Junction: Pioneer Trail
Jurisdiction:
Analysis Year: 2030 Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Diverge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   3320   vph

_____Off Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-Flow speed on ramp   35.0   mph
Volume on ramp   760   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent ramp   vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3320	760		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	874	200		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV          0.962      0.962
Driver population factor, fP           1.00       1.00
Flow rate, vp                          3635       832                    pcph
```

_____Estimation of V12 Diverge Areas_____

$$L_{EQ} = \qquad\qquad \text{(Equation 25-8 or 25-9)}$$

$$P_{FD} = 0.631 \quad \text{Using Equation } 5$$

$$v_{12} = v_R + (v_F - v_R) P_{FD} = 2600 \quad pc/h$$

_____Capacity Checks_____

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3635	7200	No
v_{12}	2600	4400	No
$v_{FO} = v_F - v_R$	2803	7200	No
v_R	832	2000	No

_____Level of Service Determination (if not F)_____

Density, $D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D = 22.1$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

_____Speed Estimation_____

Intermediate speed variable, $D_S = 0.503$

Space mean speed in ramp influence area, $S_R = 55.9$ mph

Space mean speed in outer lanes, $S_O = 76.7$ mph

Space mean speed for all vehicles, $S = 60.6$ mph

Phone: Fax:
E-mail:

_____Merge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed: 8/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Southbound
Junction: Pioneer Trail
Jurisdiction:
Analysis Year: 2030 Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Merge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   2560   vph

_____On Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-flow speed on ramp   35.0   mph
Volume on ramp   320   vph
Length of first accel/decel lane   228   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent Ramp   vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2560	320		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	674	84		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV          0.962      0.962
Driver population factor, fP           1.00       1.00
Flow rate, vp                          2803       350                    pcph
```

―――――――――――――――――――――Estimation of V12 Merge Areas――――――――――――――――――――

$$L_{EQ} = \qquad \text{(Equation 25-2 or 25-3)}$$

$$P_{FM} = \quad 0.584 \quad \text{Using Equation 1}$$

$$v_{12} = v_F (P_{FM}) = \quad 1637 \quad pc/h$$

―――――――――――――――――――――――Capacity Checks――――――――――――――――――――――――

	Actual	Maximum	LOS F?
v_{FO}	3153	7200	No
v_{R12}	1987	4600	No

――――――――――――――――――Level of Service Determination (if not F)――――――――――――――――――

$$\text{Density, } D = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A = \quad 19.4 \quad pc/mi/ln$$

Level of service for ramp-freeway junction areas of influence   B

―――――――――――――――――――――――Speed Estimation―――――――――――――――――――――――――

Intermediate speed variable, M_S = 0.333

Space mean speed in ramp influence area, S_R = 60.7   mph

Space mean speed in outer lanes, S_O = 67.6   mph

Space mean speed for all vehicles, S = 63.1   mph

SHORT REPORT

General Information		Site Information	
Analyst	KNM	Intersection	I-95 SB Ramps @ Pioneer Trail
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	10/05	Jurisdiction	
Time Period	PM Peak	Analysis Year	2030 Build

Volume and Timing Input

		EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Num. of Lanes	0	2	1	1	2	0	0	0	0	1	0	1
Lane group		T	R	L	T					L		R
Volume (vph)		463	57	267	624					470		289
% Heavy veh		8	8	8	8					8		8
PHF		0.95	0.95	0.95	0.95					0.95		0.95
Actuated (P/A)		A	A	A	A					A		A
Startup lost time		2.0	2.0	2.0	2.0					2.0		2.0
Ext. eff. green		2.0	2.0	2.0	2.0					2.0		2.0
Arrival type		3	3	3	3					3		3
Unit Extension		3.0	3.0	3.0	3.0					3.0		3.0
Ped/Bike/RTOR Volume	0		0				0			0		0
Lane Width		12.0	12.0	12.0	12.0					12.0		12.0
Parking/Grade/Parking	N	0	N	N	0	N	N		N	N	0	N
Parking/hr												
Bus stops/hr		0	0	0	0					0		0
Unit Extension		3.0	3.0	3.0	3.0					3.0		3.0

Phasing	WB Only	EW Perm	03	04	SB Only	06	07	08
Timing	G = 10.0	G = 25.0	G =	G =	G = 38.0	G =	G =	G =
	Y = 5	Y = 6	Y =	Y =	Y = 6	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25	Cycle Length C = 90.0

Lane Group Capacity, Control Delay, and LOS Determination

		EB			WB			NB			SB		
Adj. flow rate		487	60	281	657					495		304
Lane group cap.		931	415	365	1489					706		631
v/c ratio		0.52	0.14	0.77	0.44					0.70		0.48
Green ratio		0.28	0.28	0.44	0.44					0.42		0.42
Unif. delay d1		27.5	24.5	23.9	17.3					21.3		18.9
Delay factor k		0.13	0.11	0.32	0.11					0.27		0.11
Increm. delay d2		0.5	0.2	9.7	0.2					3.1		0.6
PF factor		1.000	1.000	1.000	1.000					1.000		1.000
Control delay		28.0	24.6	33.6	17.5					24.5		19.4
Lane group LOS		C	C	C	B					C		B
Apprch. delay		27.6			22.3						22.5	
Approach LOS		C			C						C	
Intersec. delay		23.7			Intersection LOS						C	

SHORT REPORT

General Information		Site Information	
Analyst	KNM	Intersection	I-95 NB Ramps @ Pioneer Trail
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	10/05	Jurisdiction	
Time Period	PM Peak	Analysis Year	2030 Build

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Num. of Lanes	1	2	0	0	2	1	1	0	1	0	0	0
Lane group	L	T			T	R	L		R			
Volume (vph)	215	718			709	399	182		137			
% Heavy veh	8	8			8	8	8		8			
PHF	0.95	0.95			0.95	0.95	0.95		0.95			
Actuated (P/A)	A	A			A	A	A		A			
Startup lost time	2.0	2.0			2.0	2.0	2.0		2.0			
Ext. eff. green	2.0	2.0			2.0	2.0	2.0		2.0			
Arrival type	3	3			3	3	3		3			
Unit Extension	3.0	3.0			3.0	3.0	3.0		3.0			
Ped/Bike/RTOR Volume				0		0	0		0	0		
Lane Width	12.0	12.0			12.0	12.0	12.0		12.0			
Parking/Grade/Parking	N	0	N	N	0	N	N	0	N	N		N
Parking/hr												
Bus stops/hr	0	0			0	0	0		0			
Unit Extension	3.0	3.0			3.0	3.0	3.0		3.0			

Phasing	EW Perm	02	03	04	NB Only	06	07	08
Timing	G = 53.0	G =	G =	G =	G = 25.0	G =	G =	G =
	Y = 6	Y =	Y =	Y =	Y = 6	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25   Cycle Length C = 90.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB		NB			SB		
Adj. flow rate	226	756		746	420	192		144			
Lane group cap.	352	1973		1973	880	464		415			
v/c ratio	0.64	0.38		0.38	0.48	0.41		0.35			
Green ratio	0.59	0.59		0.59	0.59	0.28		0.28			
Unif. delay d1	12.2	9.8		9.8	10.6	26.5		26.0			
Delay factor k	0.22	0.11		0.11	0.11	0.11		0.11			
Increm. delay d2	4.0	0.1		0.1	0.4	0.6		0.5			
PF factor	1.000	1.000		1.000	1.000	1.000		1.000			
Control delay	16.2	9.9		9.9	11.0	27.1		26.5			
Lane group LOS	B	A		A	B	C		C			
Apprch. delay	11.4			10.3		26.8					
Approach LOS	B			B		C					
Intersec. delay	13.0			Intersection LOS					B		

HCS2000: Basic Freeway Segments Release 4.1d

Phone: Fax:
E-mail:

_____Operational Analysis_____

Analyst: SK
Agency or Company: HNTB
Date Performed: 08/2005
Analysis Time Period: PM Peak
Freeway/Direction: I-95/Northbound
From/To: SR 44 to Pioneer Trail
Jurisdiction:
Analysis Year: 2030 Build
Description: Pioneer Trail Feasibility Study

_____Flow Inputs and Adjustments_____

Volume, V	2880	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	758	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1051	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

_____LOS and Performance Measures_____

Flow rate, vp	1051	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	3	
Density, D	15.0	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

_____Diverge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed: 8/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Northbound
Junction: SR 44 (Canal Street)
Jurisdiction:
Analysis Year: 2030 Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Diverge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   2920   vph

_____Off Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-Flow speed on ramp   35.0   mph
Volume on ramp   1150   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent ramp   vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2920	1150		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	768	303		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV          0.962      0.962
Driver population factor, fP           1.00       1.00
Flow rate, vp                          3197       1259              pcph
```

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Estimation of V12 Diverge Areas

$$L_{EQ} = \qquad \text{(Equation 25-8 or 25-9)}$$

$$P_{FD} = 0.622 \quad \text{Using Equation } 5$$

$$v_{12} = v_R + (v_F - v_R) P_{FD} = 2465 \quad pc/h$$

<hr/>

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3197	7200	No
v_{12}	2465	4400	No
$v_{FO} = v_F - v_R$	1938	7200	No
v_R	1259	2000	No

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Level of Service Determination (if not F)

Density, $\qquad D_R = 4.252 + 0.0086\ v_{12} - 0.009\ L_D = 21.0 \quad pc/mi/ln$

Level of service for ramp-freeway junction areas of influence C

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Speed Estimation

Intermediate speed variable,	$D_S = 0.541$	
Space mean speed in ramp influence area,	$S_R = 54.8$	mph
Space mean speed in outer lanes,	$S_0 = 76.8$	mph
Space mean speed for all vehicles,	$S = 58.7$	mph

Phone: Fax:
E-mail:

_____Merge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed: 8/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Northbound
Junction: SR 44 (Canal Street)
Jurisdiction:
Analysis Year: 2030 Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Merge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   1770   vph

_____On Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-flow speed on ramp   35.0   mph
Volume on ramp   1110   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent Ramp   vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1770	1110		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	466	292		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV          0.962      0.962
Driver population factor, fP           1.00       1.00
Flow rate, vp                          1938       1215                   pcph
```

_____Estimation of V12 Merge Areas_____

$$L_{EQ} = \qquad \text{(Equation 25-2 or 25-3)}$$

$$P_{FM} = \quad 0.591 \quad \text{Using Equation } 1$$

$$v_{12} = v_F(P_{FM}) = 1146 \quad pc/h$$

_____Capacity Checks_____

```
                     Actual       Maximum          LOS F?
     v               3153         7200             No
      FO
     v               2361         4600             No
      R12
```

_____Level of Service Determination (if not F)_____

$$\text{Density, } D = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A = 20.2 \quad pc/mi/ln$$

Level of service for ramp-freeway junction areas of influence   C

_____Speed Estimation_____

```
Intermediate speed variable,            M  = 0.327
                                         S
Space mean speed in ramp influence area, S = 60.8    mph
                                          R
Space mean speed in outer lanes,        S  = 68.9    mph
                                         O
Space mean speed for all vehicles,      S  = 62.7    mph
```

Phone: Fax:
E-mail:

_____Diverge Analysis_____

Analyst: KM
Agency/Co.:   HNTB
Date performed: 10/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Southbound
Junction: SR 44 (Canal Street)
Jurisdiction:
Analysis Year: 2030 Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Diverge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   2880   vph

_____Off Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-Flow speed on ramp   35.0   mph
Volume on ramp   200   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent ramp   vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2880	200		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	758	53		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV           0.962       0.962
Driver population factor, fP            1.00        1.00
Flow rate, vp                           3153        219                    pcph
```

_____Estimation of V12 Diverge Areas_____

$$L_{EQ} = \qquad \text{(Equation 25-8 or 25-9)}$$

$$P_{FD} = \quad 0.671 \quad \text{Using Equation } 5$$

$$v_{12} = v_R + (v_F - v_R)\, P_{FD} = \quad 2188 \quad pc/h$$

_____Capacity Checks_____

```
                         Actual        Maximum        LOS F?
v   = v                  3153          7200           No
 Fi   F
v                        2188          4400           No
 12
v   = v - v              2934          7200           No
 FO   F   R
v                        219           2000           No
 R
```

_____Level of Service Determination (if not F)_____

Density, $D = 4.252 + 0.0086\, v_R - 0.009\, L_{12} = \quad 18.6 \quad pc/mi/ln$ at D

Level of service for ramp-freeway junction areas of influence B

_____Speed Estimation_____

Intermediate speed variable, $D_S = 0.448$

Space mean speed in ramp influence area, $S_R = 57.5 \quad mph$

Space mean speed in outer lanes, $S_0 = 76.8 \quad mph$

Space mean speed for all vehicles, $S = 62.3 \quad mph$

Phone: Fax:
E-mail:

_____Diverge Analysis_____

Analyst: KM
Agency/Co.:   HNTB
Date performed: 10/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Southbound
Junction: SR 44 (Canal Street) Loop
Jurisdiction:
Analysis Year: 2030 Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Diverge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   2680   vph

_____Off Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-Flow speed on ramp   35.0   mph
Volume on ramp   910   vph
Length of first accel/decel lane   500   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent ramp   vph
Position of adjacent ramp
Type of adjacent ramp
Distance to adjacent ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2680	910		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	705	239		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	0.00 %	0.00 %	%	
Length	0.00 mi	0.00 mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2934	996	pcph

_____Estimation of V12 Diverge Areas_____

L_{EQ} =   (Equation 25-8 or 25-9)

P_{FD} =   0.641   Using Equation 5

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2238   pc/h

_____Capacity Checks_____

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2934	7200	No
v_{12}	2238	4400	No
$v_{FO} = v_F - v_R$	1938	7200	No
v_R	996	2000	No

_____Level of Service Determination (if not F)_____

Density, $D = 4.252 + 0.0086\ v_{12} - 0.009\ L_D$ =   19.0   pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

_____Speed Estimation_____

Intermediate speed variable, D_S = 0.518

Space mean speed in ramp influence area, S_R = 55.5   mph

Space mean speed in outer lanes, S_O = 76.8   mph

Space mean speed for all vehicles, S = 59.4   mph

Phone: Fax:
E-mail:

_____Merge Analysis_____

Analyst: SK
Agency/Co.:   HNTB
Date performed: 8/05
Analysis time period: PM Peak
Freeway/Dir of Travel: I-95 Southbound
Junction: SR 44 (Canal Street)
Jurisdiction:
Analysis Year: 2030 Build
Description: Pioneer Trail Feasibility Study

_____Freeway Data_____

Type of analysis   Merge
Number of lanes in freeway   3
Free-flow speed on freeway   70.0   mph
Volume on freeway   1770   vph

_____On Ramp Data_____

Side of freeway   Right
Number of lanes in ramp   1
Free-flow speed on ramp   35.0   mph
Volume on ramp   1150   vph
Length of first accel/decel lane   228   ft
Length of second accel/decel lane   ft

_____Adjacent Ramp Data (if one exists)_____

Does adjacent ramp exist?   No
Volume on adjacent Ramp   vph
Position of adjacent Ramp
Type of adjacent Ramp
Distance to adjacent Ramp   ft

_____Conversion to pc/h Under Base Conditions_____

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1770	1150		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	466	303		v
Trucks and buses	8	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade		%	%	%
Length		mi	mi	mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

```
Heavy vehicle adjustment, fHV          0.962     0.962
Driver population factor, fP           1.00      1.00
Flow rate, vp                          1938      1259                    pcph
```

_____Estimation of V12 Merge Areas_____

$$L_{EQ} = \qquad \text{(Equation 25-2 or 25-3)}$$

$$P_{FM} = 0.584 \quad \text{Using Equation } 1$$

$$v_{12} = v_F (P_{FM}) = 1132 \quad \text{pc/h}$$

_____Capacity Checks_____

```
                    Actual      Maximum         LOS F?
 v                  3197        7200            No
  FO
 v                  2391        4600            No
  R12
```

_____Level of Service Determination (if not F)_____

$$\text{Density, } D = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A = 22.1 \quad \text{pc/mi/ln}$$

Level of service for ramp-freeway junction areas of influence   C

_____Speed Estimation_____

Intermediate speed variable, M_S = 0.348

Space mean speed in ramp influence area, S_R = 60.3   mph

Space mean speed in outer lanes, S_0 = 68.9   mph

Space mean speed for all vehicles, S = 62.2   mph

TWO-WAY STOP CONTROL SUMMARY

General Information

		Site Information	
Analyst	KM	Intersection	SR 44 @ I-95 SB Ramps
Agency/Co.	HNTB	Jurisdiction	
Date Performed	10/2005	Analysis Year	2030 Build
Analysis Time Period	PM Peak		

Project Description   Pioneer Trail Feasibility Study

East/West Street: SR 44 (Canal Street)   North/South Street: I-95 SB Ramps

Intersection Orientation: East-West   Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	0	1754	0	338	1589	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	0	1846	0	355	1672	0
Proportion of heavy vehicles, P_{HV}	0	--	--	8	--	--
Median type	Raised curb					
RT Channelized?			0			0
Lanes	0	2	0	1	2	0
Configuration		T		L	T	
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	0	0	0	0	200
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	0	0	0	0	0	210
Proportion of heavy vehicles, P_{HV}	0	0	0	0	0	8
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	0	0	1
Configuration						R

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		L						R
Volume, v (vph)		355						210
Capacity, c_m (vph)		301						298
v/c ratio		1.18						0.70
Queue length (95%)		15.40						4.94
Control Delay (s/veh)		146.6						41.4
LOS		F						E
Approach delay (s/veh)	--	--				41.4		

Approach LOS	--	--			E

SHORT REPORT

General Information		Site Information	
Analyst	KNM	Intersection	SR 44 @ I-95 NB Ramps
Agency or Co.	HNTB	Area Type	All other areas
Date Performed	10/2005	Jurisdiction	
Time Period	PM Peak	Analysis Year	2030 Build

Volume and Timing Input

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Num. of Lanes	1	2	0	0	2	0	1	0	1	0	0	0
Lane group	L	T			T		L		R			
Volume (vph)	87	2577			1270		657		493			
% Heavy veh	8	8			8		8		8			
PHF	0.95	0.95			0.95		0.95		0.95			
Actuated (P/A)	A	A			A		A		A			
Startup lost time	2.0	2.0			2.0		2.0		2.0			
Ext. eff. green	2.0	2.0			2.0		2.0		2.0			
Arrival type	3	3			3		3		3			
Unit Extension	3.0	3.0			3.0		3.0		3.0			
Ped/Bike/RTOR Volume				0			0		0	0		
Lane Width	12.0	12.0			12.0		12.0		12.0			
Parking/Grade/Parking	N	0	N	N	0	N	N	0	N	N		N
Parking/hr												
Bus stops/hr	0	0			0		0		0			
Unit Extension	3.0	3.0			3.0		3.0		3.0			

Phasing	EB Only	EW Perm	03	04	NB Only	06	07	08
Timing	G = 5.2	G = 87.5	G =	G =	G = 40.3	G =	G =	G =
	Y = 5	Y = 6	Y =	Y =	Y = 6	Y =	Y =	Y =

Duration of Analysis (hrs) = 0.25   Cycle Length C = 150.0

Lane Group Capacity, Control Delay, and LOS Determination

	EB			WB		NB			SB		
Adj. flow rate	92	2713		1337		692		519			
Lane group cap.	184	1954		1954		449		513			
v/c ratio	0.50	1.39		0.68		1.54		1.01			
Green ratio	0.65	0.58		0.58		0.27		0.34			
Unif. delay d1	16.8	31.3		21.7		54.9		49.3			
Delay factor k	0.11	0.50		0.25		0.50		0.50			
Increm. delay d2	2.1	178.0		1.0		254.5		42.7			
PF factor	1.000	1.000		1.000		1.000		1.000			
Control delay	18.9	209.3		22.7		309.3		91.9			
Lane group LOS	B	F		C		F		F			
Apprch. delay	203.0			22.7		216.2					
Approach LOS	F			C		F					
Intersec. delay	161.0			Intersection LOS					F		

HCS2000™   Version 4.1e

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	KM		
Agency/Co.	HNTB		
Date Performed	10/2005		
Analysis Time Period	PM Peak		

Site Information

Intersection	SR 44 @ Sugar Mill Road
Jurisdiction	
Analysis Year	2030 Build

Project Description   Pioneer Trail Feasibility Study

East/West Street:	SR 44 (Canal Street)	North/South Street:	Sugar Mill Road
Intersection Orientation:	East-West	Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	172	2898	0	0	1993	106
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	181	3050	0	0	2097	111
Proportion of heavy vehicles, P_{HV}	8	--	--	0	--	--
Median type	Raised curb					
RT Channelized?			0			0
Lanes	1	2	0	0	2	1
Configuration	L	T			T	R
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	0	0	75	0	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate (veh/h)	0	0	0	78	0	63
Proportion of heavy vehicles, P_{HV}	0	0	0	8	0	8
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	L						LR	
Volume, v (vph)	181						141	
Capacity, c_m (vph)	215						0	
v/c ratio	0.84							
Queue length (95%)	6.38							
Control Delay (s/veh)	73.4							
LOS	F						F	
Approach delay (s/veh)	--	--						

| Approach LOS | | --- | | --- | | | | |

HCS2000: Basic Freeway Segments Release 4.1d

Phone: Fax:
E-mail:

_____Operational Analysis_____

Analyst: SK
Agency or Company: HNTB
Date Performed: 08/2005
Analysis Time Period: PM Peak
Freeway/Direction: I-95/Northbound
From/To: South of SR 44
Jurisdiction:
Analysis Year: 2030 Build
Description: Pioneer Trail Feasibility Study

_____Flow Inputs and Adjustments_____

Volume, V	2920	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	768	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	0.00	%
Segment length	0.00	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1066	pc/h/ln

_____Speed Inputs and Adjustments_____

Lane width	12.0	ft
Right-shoulder lateral clearance	6.0	ft
Interchange density	0.50	interchange/mi
Number of lanes, N	3	
Free-flow speed:	Measured	
FFS or BFFS	70.0	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
Interchange density adjustment, fID	0.0	mi/h
Number of lanes adjustment, fN	3.0	mi/h
Free-flow speed, FFS	70.0	mi/h
	Urban Freeway	

_____LOS and Performance Measures_____

Flow rate, vp	1066	pc/h/ln
Free-flow speed, FFS	70.0	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	3	
Density, D	15.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.