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**FILE COPY**

January 7, 2005  
Gregg Zimmerman, Public Works Director  
City of Renton  
1055 South Grady Way  
Renton, WA 98055

Dear Mr. Zimmerman:

Re: I-405 / SR 167 Interchange 5% Design  
Concurrence Letter

This letter documents that the City of Renton and the Washington State Department of Transportation (WSDOT) concur with the I-405 / SR 167 interchange 5% design.

**How are I-405 Projects Defined, Funded and Phased?**

As you know, the I-405 Corridor Environmental Impact Statement was approved by the FHWA and FTA in October 2002 with a Record of Decision (ROD). The ROD identified the Selected Alternative (the I-405 **Master Plan**) which provided transportation improvements throughout the I-405 study area including a conceptual I-405 / SR 167 interchange configuration. The design detail provided in the Selected Alternative is conceptual design, or approximately one percent design. In spring 2003, the Washington State Legislature approved a Nickel Funding Package providing more than \$4 billion over 10 years for a variety of highway improvements throughout the state. One of these "Nickel Projects" is on I-405 and SR 167 in the City of Renton. The \$136 million Renton Nickel Project is the first step toward achieving the I-405 Master Plan. The NEPA Environmental Assessment (EA) for the Renton Nickel Project will begin January 2005, and project construction is scheduled to begin in 2007.

Part of the Renton Nickel Project funds work to advance the I-405 Master Plan "footprint" through the City of Renton. Footprint design ensures that the Renton Nickel Project is consistent with the Master Plan and that it does not unintentionally constrain the Master Plan Projects.

**What is the I-405 / SR 167 Interchange Design Concept?**

An I-405 / SR 167 interchange concept is provided in the I-405 ROD. To improve upon this interchange concept, WSDOT and the City participated in the I-405 / SR 167 interchange design charette May 28 through May 31, 2002. The charette team had two primary goals – to improve "system-to-system" (I-405 to SR 167) operations and to improve local traffic circulation. Another goal was to improve the City's Rainier Avenue and Grady intersection, which is the City's highest accident location. Charette Concept 2D -- a split diamond configuration with frontage roads between Lind and Talbot -- met these goals, and Concept 2D was advanced for **5% design**.

**What is the I-405 / SR 167 Interchange 5% Design?**

The 5% design is the preliminary design effort that defines the Master Plan footprint. For the I-405 / SR 167 interchange, the 5% design is based off of the best information and forecasting tools available in 2004 to predict the I-405 / SR 167 interchange operational needs in 2030. Please refer to the attached documents, "I-405 Lind-Talbot Interchange Recommendation" memo and the October 14, 2004 letter, for a detailed description of the interchange and the factors evaluated in the interchange design screening process. The project team has worked closely with City staff to examine the assumptions used to develop the interchange solution and to evaluate the results of the I-405 traffic forecasting and operational modeling software. The interchange design meets City and State standards.

The resulting I-405 / SR 167 interchange 5% design, a split diamond configuration with access at both Lind and Talbot with no by-passes, was put forth to the City's Executive/Administrators Committee in May 2004 and again November 2004. The Executive/Administrators Committee recommended the interchange concept on December 6, 2004. The concept was presented December 20, 2004 to Renton City Council for confirmation.

**The Benson Structure – Why is there a need for Footprint Certainty?**

The project team needs to understand the location of the Benson over crossing structure, which is an improvement common to both the Renton Nickel Project and the I-405 Master Plan. Funding has been authorized to construct the Benson structure as part of the Renton Nickel Project; funding to construct the Master Plan is uncertain.

Two future Master Plan components influence the location and design of the Benson structure: the I-405 mainline alignment and the proposed reconstructed I-405 / SR 167 interchange. These Master Plan components need to be understood at a footprint level to ensure that the Renton Nickel Project does not unintentionally constrain these future projects. The mainline alignment is covered in a separate concurrence letter dated January 7, 2005.

**When will we Refine the Interchange Design and Make Final Decisions?**

Once project funds are available, the project team will advance the 5% preliminary design to **15% design** and prepare a NEPA environmental document. Progressing from 5% preliminary design to 15% design is termed "design refinement". The 5% engineering work done to date will shape the 15% design examined in the NEPA document. WSDOT will work closely with City staff during design refinement to revisit the design assumptions and the design concept as the 15% design is developed.

Gregg Zimmerman, Public Works Director  
City of Renton  
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**Concurrence**

I am anticipating a project that will set a high standard of cooperation between the City and WSDOT. By signing below, the City and WSDOT concur with the 5% I-405 / SR 167 interchange design as we move into the Renton Nickel Project EA. The City and WSDOT commit to work together to refine the interchange as the 15% design is developed in a future NEPA environmental document once funding becomes available.

Sincerely,



Craig J. Stone, PE  
I-405 Project Director

City of Renton Concurrence:

Kathy Keolker - Wheeler 3/14/05  
Kathy Keolker - Wheeler                      Date  
Mayor, City of Renton

Attest:

Bonnie I. Walton  
Bonnie I. Walton, City Clerk

cc: Administrators Executive Committee members  
City Design Team members  
City Traffic Analysis Task Force members  
I-405 Project Files

Attachments

CJS:set



## Corridor Program

Congestion Relief & Bus Rapid Transit Projects

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### I-405 Lind-Talbot Interchange Recommendation

Presented by:

City of Renton Traffic Analysis Task Force

December 2004

#### Recommendation

This document presents Option A-2 as the I-405 Talbot / Lind interchange configuration recommended by the City of Renton Traffic Analysis Task Force. Major features of the Option A-2 include:

- Half-diamond interchange on I-405 at Lind Avenue SW
- Half-diamond interchange on I-405 at Talbot Road (SR-515)
- One-way frontage road couplet connecting the two half-diamond interchanges with signalized at-grade intersections at SW Lind and Talbot Road (no frontage road bypasses for through traffic)
- One-way S. Renton Village Place southbound connection with Talbot Road

#### Project Description (I-405/SR 167 Vicinity)

A key component of the I-405 Congestion Relief and Bus Rapid Transit Projects program is the reconstruction of the I-405 / SR-167 Interchange. Proposed improvements to the existing "clover-leaf" interchange include separating local access from "system-to-system" access as follows:

- Eliminates the existing "loop" ramps, and adds HOV and general-purpose direct-connector ramps between I-405 and the south leg of SR-167;
- Replaces the I-405 access at Rainier Avenue with two new half-diamond interchanges, one with I-405 access at Lind Avenue SW and the other with I-405 access at Talbot Road;
- Provides a one-way couplet that connects these two new I-405 half-diamond interchanges; and
- Reconnects Rainier Avenue to East Valley Road, and then to SR-167 with a new half-diamond in the vicinity of SW 23<sup>rd</sup>.

#### Description of Options

The task force considered several conceptual configurations for the I-405 Talbot / Lind interchange. Two options were considered for the west half of the interchange at SW Lind Avenue. Five (5) southbound and four (4) northbound interchange options were considered for the east half of the interchange at Talbot Road.

Lind interchange configuration design options are:

- Frontage road with no bypass for through traffic to and from Talbot
- Frontage road with bypass for through traffic to and from Talbot

Talbot interchange configuration design options are:



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### Southbound

- Option S1: Frontage road with no bypass for through traffic to Lind and no S. Renton Village Place connection with Talbot Road
- Option S2: Frontage road with no bypass for through traffic to Lind and one-way S. Renton Village Place southbound connection with Talbot Road
- Option S3: Frontage road with no bypass for through traffic to Lind and two-way S. Renton Village Place connection with Talbot Road
- Option S4: Frontage road with bypass for through traffic to Lind and no S. Renton Village Place connection with Talbot Road
- Option S5: Frontage road with bypass for through traffic to Lind and one-way S. Renton Village Place southbound connection with Talbot Road

### Northbound

- Option N1: Frontage road with no bypass for through traffic from Lind and half-diamond at Talbot Road
- Option N2: Not used.
- Option N3: Frontage road with bypass for through traffic from Lind and loop ramp with 4-legged Talbot Road intersection
- Option N4: Frontage road with bypass for through traffic from Lind and loop ramp with 5-legged Talbot Road intersection
- Option N5: Not used.
- Option N6: Frontage road with bypass for through traffic from Lind and half-diamond at Talbot Road

The above interchange options could be mixed and matched to obtain the best configuration for the Lind / Talbot interchange.

## **Design Issues and Considerations**

In screening the interchange options the Task Force has considered the following project functions: local operations, freeway operations, structures, and environmental. The evaluation of these functions considered the following:

### Local Operations:

- Level of service for local roadway network,
- Queuing at intersections
- Vehicle travel time
- Access to local businesses
- Access to residential neighborhoods
- Driver's expectations.

### Freeway Operations:

- I-405 mainline operations between Maple Valley Highway (SR-169) and the Valley Highway (SR-167)
- I-405 mainline operations between West Valley Highway (SR-181) and the Valley Highway (SR-167)
- Driver's expectations.

### Structures:



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- I-405 mainline structure over Main Avenue (near City Hall)
- Southbound I-405 to Southbound SR-167 flyover incorporated

### Environmental:

- Property impacts to businesses in the SW Lind Avenue vicinity
- Property impacts to One and Two Renton Place
- Property impacts to Renton Cinema 8
- Property impacts to Berkshire Apartment complex
- Property impacts to Talbot Hill residential neighborhood

### **Local Operations**

The traffic analysis for the Lind/Talbot interchange showed that the local operations for all the considered options operated at an acceptable level of service with the year 2030 traffic forecasts.

Bypass options did provide shorter travel times for vehicles exiting or entering I-405 at Talbot Road and traveling to or from Lind Avenue, and for vehicles existing or entering I-405 at Lind and traveling to or from Talbot Road.

Access to Renton Place from Talbot Road was considered to be a critical element for local access; therefore, southbound Talbot options that did not provide this connection were less desirable than the options that provided this connectivity.

The northbound Talbot options with the “loop ramp”, both with the four-legged and five-legged intersection at Talbot, were less desirable than the northbound Talbot options with the half-diamond. The four-legged intersection option eliminated one of the primary access points into the Talbot Hill neighborhood, which could not be replaced without major impacts to the Talbot Hill neighborhood. The five-legged intersection option created another level of complication to the intersection by adding a fourth turning movement to each of the original legs of the intersection.

### **Freeway Operations**

Based on geometric limitations and the impact on freeway operations, bypass ramps northbound at Lind Avenue SW and southbound at Talbot Road are not feasible.

Both bypasses would either result in unacceptable mainline weaves with the upstream interchange or require an additional off-ramp from mainline. Neither of these options would be acceptable to FHWA or WSDOT since options without these bypasses are forecast to operate well without these additional impacts.

### **Structures**

Additional structures are required for the bypass options over options without bypasses. Wider roadways for bypasses require wider bridge structures. In addition, the southbound Talbot bypass option requires the recently completed southbound I-405 to southbound SR-167 flyover ramp to be reconstructed with higher speed geometrics, and requires the proposed southbound I-405 improvements to extend over Main Avenue in the vicinity of Renton City Hall.



## Environmental

All configurations have impacts on nearby properties to a varying degree. Bypass options have larger impacts to adjacent properties created by the larger “footprint” than the “no bypass” options.

The bypass option at the Lind interchange requires impacting either the automobile dealership located north of I-405 or large business complexes located south of SW 16<sup>th</sup> Street. Both of these areas are essentially avoided with the construction of the “no bypass” option.

The Talbot southbound bypass option, as discussed above in the Structures section, requires the proposed southbound I-405 improvements to extend over Main Avenue. The impacts, created by the close proximity of the proposed I-405 improvements and I-405 traffic to City Hall, make this option unacceptable.

Talbot northbound options all impact the Berkshire Apartment complex by removing one or two of the northernmost apartment buildings. The Talbot northbound half-diamond with bypass option impacts extend through the complex’s circulation road, requiring major changes to the configuration of the complex in order to maintain emergency response access to the facility.

## Summary

The aforementioned issues have been considered in evaluating the various proposed Lind-Talbot interchange configuration options. Based on the resulting impacts and related functions, the Task Force recommends Option A-2, a split diamond without bypasses, as the preferred interchange configuration for the new Lind-Talbot interchange. The traffic analysis completed demonstrates the proposed Lind Avenue SW and Talbot Avenue S. interchange concept operates at an acceptable level for the year 2030 conditions. Compared to a 2030 “Do Nothing” option, there is significantly less delay and more vehicles served on the surrounding street network with the recommended option. Bypass ramps are not feasible because the “no bypass” options operate well and the bypass ramps would introduce additional impacts.

Although the interchange configuration has been determined by the Task Force, City staff expressed some reservation with the interchange configuration at Lind. The distance between three of the Lind intersections in the vicinity of the proposed interchange, the two ramp termini and SW 16<sup>th</sup> Street, is relatively short. This restricts the roadway channelization and limits the room available for vehicle queuing between traffic signal cycles. Because of this expressed reservation, a plan was developed to identify potential solutions if for some reason the intersections do not operate at an acceptable level. Identified means for improving interchange traffic operations, in the order they should be applied, are as follows:

- Improve intersection layouts with additional lanes for turning and/or queuing
- City street network improvements, i.e. extending Strander Blvd. to E. Valley Road will “pull” traffic away from Lind Avenue at I-405 crossing
- Reconstruct SW 16<sup>th</sup> and Lind/16<sup>th</sup> intersection to the south to create more queuing area between the northbound ramp intersections and the 16<sup>th</sup> Street intersection

While these options are available, they are not expected to be needed. The traffic analysis indicates that the Lind interchange operates at an acceptable level with all intersections, as indicated by the control delay, operating at LOS



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C or better in 2030 peak conditions. This LOS is better than the LOS D/E, which is usually considered acceptable for intersection operations. Also, the analysis was performed using conservative input in many cases. For example, minimum green time for pedestrian movements was assumed on every cycle, 100% queue was used while traditional engineering practice evaluates the 95<sup>th</sup> percentile queue. When a decision is made to fund this major transportation improvement to the I-405/SR-167 interchange, traffic operations will be reviewed as part of the environmental process. At this time, one or more of the above operations improvements options may be implemented if determined to be needed at that time.

In addition to the above, the following observations are also noted:

- The preliminary findings for routing the Bus Rapid Transit (BRT) in the City of Renton vicinity, as developed through the I-405 South Corridor BRT study, include a north-south crossing of I-405 between Rainier Avenue (SR-167) and the western Renton city limits. This cross-route was originally anticipated to utilize Lind Avenue, but could easily be routed to Oakesdale Avenue to avoid any conflicts with Lind traffic if needed to avoid the traffic entering or exiting I-405 at Lind.
- The City of Renton has agreements with the Washington State Department of Transportation which allows the City to operate the traffic signals at the ramp termini intersections. Once the project is funded, The City and WSDOT will develop agreements that will provide the City the authority to adjust the operations of the signal so they are coordinated with other City operated signalized intersections.

**Project Team**

Congestion Relief &amp; Bus Rapid Transit Projects

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October 14, 2004

Mr. Nick Afzali  
Planning and Programming Manager  
City of Renton  
1055 South Grady Way  
Renton, Washington 98055

Dear Mr. Afzali:

This letter is to follow up on the I-405 Corridor meeting held October 11, 2004. In that meeting, the I-405 team presented information the City of Renton requested regarding the traffic forecasts and design options associated with the proposed Lind Avenue SW. and Talbot Road S. interchange. Attached are electronic files of the Synchro results as well as Corsim animation based on the analysis we have completed.

**Traffic Volumes**

As we presented in the meeting, the I-405 team has reassigned future traffic volumes in this area to allow local traffic to use the frontage roads in the interchange. We also have increased the southbound I-405 off-ramp and on-ramp volume by 200 vehicles during the P.M. peak hour. We feel our previous numbers are valid; however we increased the volume to provide the City with an analysis of how traffic would operate with the higher volume.

**Traffic Analysis**

The traffic analysis conducted by the I-405 team used the Corsim analysis software. Initial signal timing, phasing and offset information was generated using the Synchro analysis software and used as input to the Corsim analysis.

For year 2014 and 2030 conditions, the following parameters were used in the Corsim analysis:

- 0.92 Peak Hour Factor
- 2% truck on all movements
- Grade values of 4-6% on sections of Lind Avenue SW.
- Minimum green time to allow pedestrian movements every cycle
- 110 second AM cycle length
- 120 second PM cycle length

Because these are future conditions, the analysis used the Highway Capacity Manual recommended Peak Hour Factor of 0.92. We feel the truck percentage is conservative by applying 2% to all movements in the study area. Truck percentages may be higher during off-peak conditions, but we feel these values are appropriate for peak conditions. The future traffic signals in the study area will likely have pedestrian call buttons but not be activated every cycle. To be conservative however, this analysis assumed enough minimum green time for pedestrian movements on every cycle.

The following table identifies the 2030 peak hour intersection control delay, Level of Service (LOS), storage and maximum queue lengths for the Lind Avenue SW. and Talbot Road S. interchange intersections. Traditional traffic

engineering practice evaluates 95<sup>th</sup> percentile queue, but we have used the 100% queue to again provide a conservative assessment of traffic operations.

2030 AM and PM Peak Hour Intersection Delay, LOS, and Queues

Intersection		Control Delay	LOS	Northbound Queue			Eastbound Queue			Southbound Queue			Westbound Queue		
				Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lind Ave./I-405 SB Frontage Rd.	AM	17	B	120'	140'					90'	150'	100'	340'	340'	
	PM	18	B	200'	300'					70'	80'	100'	320'	280'	
	Storage*				200'	300'					150'	150'	250'	350'	350'
Lind Ave./I-405 NB Frontage Rd.	AM	21	C		130'	110'	250'	260'		130'	290'				
	PM	26	C		160'	160'	200'	320'		140'	150'				
	Storage*					160'	160'	500'	500'		200'	300'			
Lind Ave./SW 16th	AM	14	B	70'	90'		150'	60'		100'	160'		30'	180'	90'
	PM	31	C	160'	270'		260'	130'		100'	160'		50'	150'	290'
	Storage*				200'			300'			100'	160'		150'	400'
Talbot Rd./I-405 SB Frontage Rd.	AM	25	C	280'	380'						250'	230'	160'	190'	120'
	PM	27	C	260'	360'						450'	160'	240'	230'	80'
	Storage*				300'							230'	300'		300'
Talbot Rd./I-405 NB Frontage Rd.	AM	21	C		530'	180'		210'	250'	140'	200'				
	PM	26	C		290'	110'		290'	300'	210'	500'				
	Storage*						300'		300'	300'	300'				
Talbot Rd./Puget Dr.	AM	29	C	40'	450'		120'	50'		250'	180'			120'	350'
	PM	25	C	60'	340'		80'	90'		370'	510'			90'	210'
	Storage*				220'			120'			400'				350'

\* Storage for thru movements is shown for short segments only.

As the table indicates, some of the intersections have 100% queue values equal to the storage length. In the animation files you will see that these queues clear every cycle and do not result in adverse operations over time. Additionally, as the control delay indicates, all intersections operate at LOS C or better in 2030 peak conditions.

In the Corsim animations files, you may observe vehicles queuing on the frontage road as it tapers from two lanes to one. The inability to model a mainline taper is a known limitation of Corsim. With the projected volumes we feel that this taper will operate well and not result in queuing.

Finally, design details such as pocket length, detailed lane channelization, will be refined as the design process proceeds. We do however feel that the proposed concept will operate at an acceptable level with the year 2030 traffic forecasts. Compared to a 2030 Do Nothing alternative, there is significantly less delay and more vehicles served on the surrounding street network with this concept.

### Bypass Options

Based on geometric limitations and the impact on mainline freeway operations, bypass ramps northbound at Lind Avenue SW and southbound at Talbot Road S. are not feasible.

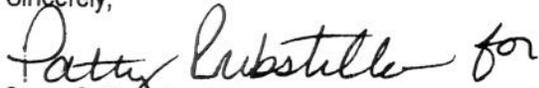
Both bypasses would either result in an unacceptable mainline weaves with the upstream interchange or require an additional off-ramp from mainline. Neither of these options would be acceptable to FHWA or WSDOT since the current option is forecasted to operate well without these additional impacts.

**Summary**

We feel that the traffic analysis completed by the I-405 team demonstrates the proposed Lind Avenue SW. and Talbot Avenue S. interchange concept operates at an acceptable level for year 2030 conditions. Bypass ramps are not feasible options because the current concept operates well and the bypass ramps would introduce additional impacts.

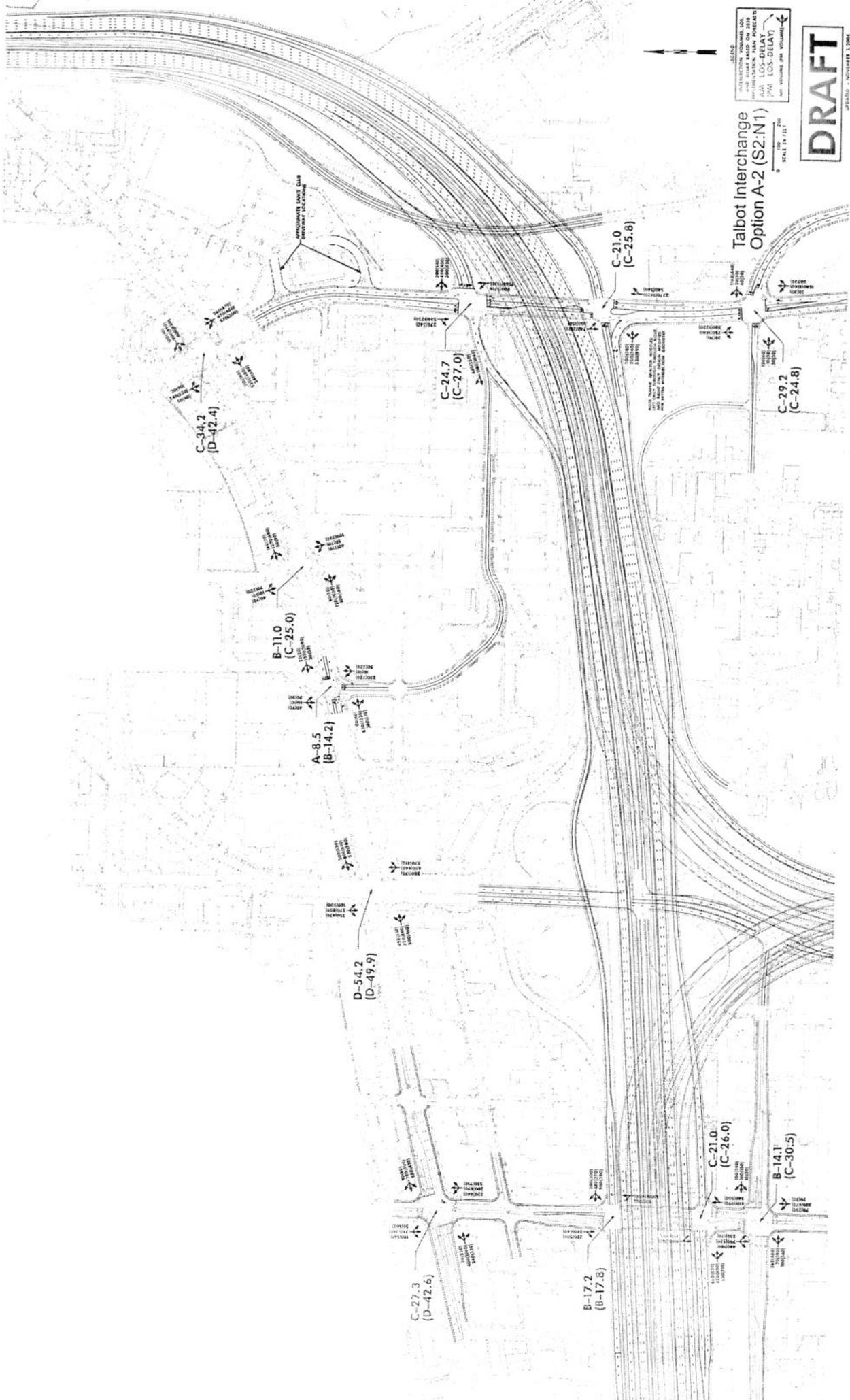
If you have any questions regarding this, please contact Patty Rubstello or myself.

Sincerely,



Stacy C. Trussler, P.E.  
I-405 Segment Manager

Attachments:   Synchro Electronic Files  
                  Corsim Animation Files



SECTION  
 PROJECTION VOLUME 10A  
 THIS DRAWING MADE ON 2018  
 DATE 10/11/18  
 AAA LOS-DELAZ  
 (PM) LOS-DELAZ  
 BY VOLUME 10A VOLUME 10A

Talbot Interchange  
 Option A-2 (S2:N1)  
 SCALE 1/8" = 1'-0"

**DRAFT**

DATE: 10/11/18