Preliminary Engineering Evaluation

Veterans Memorial Parkway and Santa Barbara Boulevard Intersection

Prepared for:
Lee County
Department of Transportation
1500 Monroe Street
Fort Myers, Florida 33901

Prepared by:
David Douglas Associates, Inc.
1821 Victoria Avenue
Fort Myers, Florida 33901

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DDAI

PROFESSIONAL ENGINEERING CERTIFICATE

I hereby certify that I am a registered professional engineer in the State of Florida practicing with David Douglas Associates, Inc., a Florida Corporation, authorized to operate as an engineering business, Certificate #7568, by the Florida Board of Professional Engineers, and that I have prepared or approved the evaluations, finding, opinions, conclusions, or technical advice hereby reported for:

Project: ***Veterans Memorial Parkway and Santa Barbara Boulevard Intersection Preliminary Engineering Evaluation***

County: ***Lee***

I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practices of transportation engineering as applied through professional judgment and experience.

Signature: _____ 3-21-12

Name: Daniel M. Craig, P.E.

P.E. Number: 38590

Date: March 21, 2012

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Preliminary Engineering Evaluation

Project Introduction

The Lee County Department of Transportation (LCDOT) is considering at-grade alternatives to the implementation of a Single Point Urban Interchange (SPUI), or overpass concept, at the intersection of Veterans Parkway and Santa Barbara Boulevard in Cape Coral, Florida. The Lee County Board of County Commissioners designated the Veterans Memorial Parkway as a limited access facility with a controlled access plan. Traffic volumes recorded indicate the intersection is experiencing poor levels of service. Projections into the future indicate the potential for substantial increases in congestion levels. This in turn will affect the operational and safety aspects of the intersection, thus the need for considering improvements for the intersection.

Three (3) additional at-grade intersection alternatives were chosen for detailed analysis. The *At-Grade Intersection Alternative Report* prepared by Atkins, dated Rev. January, 2012, determined that the following options in addition to the SPUI, were the most viable options from a traffic stand point. They are the Full Displaced Left-turn Intersection (Full), the Partial Displaced Left-turn Intersection (E-W) and the SE Quadrant Roadway Intersection (SE).

These alternatives are analyzed within this Preliminary Engineering Evaluation report along with the SPUI alternative and the No Build alternative. Each alternative has been evaluated for its potential impacts and costs to the existing corridor and key analysis data has been placed into a Decision Matrix (Matrix), attached Exhibit VI, for alternative comparison.

The No Build alternative would have no changes to the existing physical environment however, it is not considered viable from a traffic standpoint. The data which was analyzed for the four (4) build alternatives will be detailed in order to evaluate the alternatives.

Numerous categories were identified for the various alternatives analysis for this Matrix. These categories include:

- Right of Way Impacts
- Access Changes
- Parcel/Business Impacts
- Environment Impacts
- Drainage Impacts
- Project Costs
- Safety-Bike/Pedestrian
- Environmental Efficiencies
- Transit Service
- Other Parameters

Right of Way Impacts

The right of way impacts category for each alternative noted in the Matrix are the amount of additional right of way which will be required from adjacent parcels along Veterans Parkway and/or Santa Barbara Boulevard in order to construct the particular alternative. See attached Exhibits VII, VIII & IX. These impacts correlate to the number of impacted residential and/or commercial parcels for the alternative. Three (3) of the alternatives will require additional right of way for construction, with the SPUI being the only option not requiring additional right of way or having direct impact to adjacent parcels.

The proposed right of way and residential/commercial property impacts vary significantly between alternatives. The Full Displaced Left Hand Turn alternative (Full) is estimated to have a 3.63 acre right of way impact, primarily to the properties along Santa Barbara Boulevard. This alternative is proposed to impact 18 commercial parcels and four (4) residential parcels. A majority of these parcels will have a significant portion of their parking areas eliminated and will require redesign work in order to make the remaining land workable for the existing businesses. The estimated right of way costs for the Full alternative are $17,000,000.00 at current valuation.

In comparison, the Southeast Quadrant alternative (S-E) is estimated to have a 2.83 acre right of way impact to eight (8) commercial properties and six (6) residential properties along Santa Barbara Boulevard and to the residential properties to the east of the roadway. The estimated right of way costs for the S-E alternative are $4,000,000.00 at current valuation.

The East-West Displaced Left Hand Turn (E-W) alternative is estimated to have a 0.33 acre right of way impact to three (3) commercial properties along Veterans Parkway, one parcel being an existing retention pond. No residential properties are impacted with this alternative. The estimated right of way costs for the E-W alternative are $500,000.00.

The final alternative is the SPUI which will not impact adjacent residential or commercial properties along Santa Barbara Boulevard or Veterans Parkway, therefore not requiring any additional right of way or related costs.

Based upon this comparison category, the SPUI or the No-Build alternative would yield the best results.

Access Changes

Access changes address the current and proposed access a parcel may have, or propose to have, to the adjacent roadway. See attached Exhibits VII, VIII & IX.

There are no proposed changes for access to adjacent parcels along Veterans Parkway for any of the alternatives. The existing access on Veterans Parkway noted in the Matrix is for SW 2nd Place connecting to Veterans Parkway from the south side, west of the Santa Barbara intersection.

There are no proposed changes for access to adjacent parcels along Santa Barbara Boulevard with the No-Build alternative, the E-W alternative or the SPUI alternative.

With the SE alternative there are 14 parcels which currently have access to Santa Barbara Boulevard and 10 parcels that will have access with this proposed alternative. Parcels 300 thru 302 and Parcel 305 will lose current and/or proposed access. Parcel 300 is a bank located on the corner of Santa Barbara Boulevard and Kamal Parkway, Parcel 301 is a commercial shopping center, Parcel 302 is a car wash and Parcel 305 is currently vacant. Parcels 300 thru 302 will require new access locations on Santa Barbara Boulevard if this alternative is implemented.

With the Full Alternative there are 27 parcels, which currently have access to Santa Barbara Boulevard via right-in/right-out and one access via a left-in turning movement. With the proposed change, only eight (8) parcels will have access to Santa Barbara Boulevard with the left-in turning movement being eliminated due to the median closure at Santa Barbara Boulevard and Aviation Parkway.

Along the western side of Santa Barbara Boulevard, south of Veterans Parkway, four (4) of the parcels are residential and will all lose their current and/or proposed access to the adjacent roadway. Parcels 203, 205 and 206 consist of two (2) shopping centers and one vacated commercial building that will no longer have access to Santa Barbara creating the need to access the properties from the existing drive off of SW 28th Street. Alternative access for these sites will need to be determined. Along the eastern side of the roadway, two (2) commercial sites, Parcels 210 and 211 will lose their access onto Santa Barbara Boulevard. Parcel 210 is a vacant lot and Parcel 211 is the vacated fire station. Alternate access will need to be determined.

Along the eastern side of Santa Barbara Boulevard, north of Veterans Parkway, there are no residential parcels and eight (8) commercial parcels, Parcels 212 thru 219, inclusive, which will no longer have access to the adjacent roadway. These parcels are a car wash, an existing drive-thru convenience store, a shopping center, Circle K, Walgreens, bank, and two shopping center buildings. Alternate access will need to be determined for these parcels.

Along the western side of Santa Barbara Boulevard, north of Veterans Parkway, there are two adjacent bank buildings with a shared access onto Santa Barbara Boulevard, this access will be closed and alternate access will need to be determined.

Along with the proposed driveway closures there are also median and/or side road closures in conjunction with the Full and S-E alternatives.

The E-W, SPUI and No-Build alternatives have no associated median or roadways closures.

The SE alternative will require four (4) side road closures. The side road closures include SE 26th Street, SE 27th Street, SE 1st Avenue and SE Santa Barbara Boulevard. No median closures will be required with this alternative.

The Full alternative requires two (2) side road closures and one (1) median closure. The side roads include the SE 27th Street and Aviation Parkway connections to Santa Barbara Boulevard.

The median closure is located at Santa Barbara Boulevard and Aviation Parkway, which is currently a left-turn movement into the Publix/Target shopping center. The median closure will create a right in/right out access point on Santa Barbara Boulevard.

On streets where the connections will be closed, cul-de-sacs or three-point turnarounds will be implemented. These features will need to be designed to allow turnarounds for emergency vehicles, garbage services and commercial vehicles.

Alternate vehicular routes for property access are necessary for the SE and Full alternatives due to the potential side road and median closures indicated.

Based upon this comparison category, the E-W, SPUI and No-Build alternatives yield the best results.

Parcel/Business Impacts

As shown in the Matrix each of the four alternatives, in comparison to the No-Build alternative, have significantly different impacts to the surrounding residential parcels and commercial businesses. As noted, the No-Build and SPUI alternatives will have no impact to residential parcels or commercial businesses. However, the remaining three (3) alternatives will have differing impacts at varying degrees of severity.

The E-W alternative will have no impact upon residential parcels but will have slight impacts to three commercial properties. These three properties include an existing retention area, the vacant fire station property and an adjacent, vacant property. These impacts are periphery impacts and have no impact to existing buildings or businesses. See attached Exhibit VIII.

The SE alternative will have a greater impact on the surrounding properties. Six (6) residential parcels and eight (8) commercial properties will be affected. Out of the six (6) residential parcels noted, five (5) properties will require acquisition of the entire parcel. Of the eight (8) commercial properties impacted, five will have significant impacts possibly resulting in whole takes and two (2) will need proper evaluation to determine the remaining area's compliance with Cape Coral's Land Development Code (LDC) for size and dimensional compliance. Three (3) of the eight (8) impacted commercial properties are developed parcels which include a bank (Parcel 300), an existing shopping center (Parcel 301), and a car wash (Parcel 302), as noted on the attached Exhibit IX.

The Full alternative has the most extensive impacts with four (4) residential and 16 commercial parcels being impacted. All of these impacts occur along the Santa Barbara Boulevard corridor where the largest concentrations of commercial businesses are located. South of Veterans Parkway, the largest impacts will occur along the western side of Santa Barbara Boulevard and north of Veterans Parkway, the largest impacts will occur along the eastern side of Santa Barbara Boulevard.

Three (3) of the four (4) residential parcels are vacant along Santa Barbara Boulevard, on the south side of Veterans Parkway. The fourth parcel is commercially zoned with an existing

residential structure which will be impacted. This parcel will also lose its current access onto Santa Barbara Boulevard leaving it with no other public access as it is encapsulated by existing, privately owned, commercial parking areas. The existing structure will need to be removed and the remaining parcel will be left with no public access. With no means of public access for the parcel, this will necessitate a taking of the parcel.

The impacted commercial properties are all developed except one parcel, Parcel 210 located just south of the vacated fire station property. The developed parcels consist of five shopping centers, three banks, Walgreens, one convenience store w/gas pumps, one car wash, one drive through convenience store, a vacant stand-alone commercial building, a vacant fire station and an existing storm water retention area. As referenced in the R/W-Impact Exhibit VII, Parcels 203 and 212 thru 215 will have significant building impacts. Parcel 203 is a vacated commercial structure, Parcel 212 is an existing car wash, Parcel 213 is an existing drive-thru convenience store, Parcel 214 is an existing shopping center (2 of 3 existing buildings impacted) and Parcel 215 is a Circle K with gas pumps. Parcels 205, 206, 216 thru 218 will have significant impacts to their existing parking areas and cure plan evaluations will need to be conducted.

Parcel 203 is an existing commercial building which will incur impacts to the structure. The property is of constructible size and retains access onto SW 28th Street. A cure plan evaluation will need to be conducted for the building impact. Parcels 205 and 206 will lose their existing access onto Santa Barbara Boulevard. Parcel 205 has additional, existing accesses to the site, on SW 28th Street and SW Santa Barbara Place. Parcel 206 has an existing rear entrance on SW Santa Barbara Place. SW Santa Barbara Place also serves as a residential street for existing residential homes along the western side of the roadway. A cure plan evaluation for the parking area of Parcel 206 will need to be conducted and a possible access from SW 26th Lane evaluated. Parcels 208 and 209 will lose their joint access onto Santa Barbara Boulevard with remaining accesses from the internal area of the shopping center only. Parcel 219 will have an impact to one row of parking along the roadway. Parcels 210 and 211 will have their access to Santa Barbara Boulevard eliminated creating the need to find alternate access for these parcels. Parcel 210 is owned by an adjacent property with access onto Santa Barbara Boulevard. A potential shared access should be evaluated. Parcel 211 is owned by the City of Cape Coral. The are no platted vehicular ingress/egress easements to this parcel except for one alley easement behind Parcel 210 connecting to SE 27th Street. An alternate access for this parcel will need to be identified. Evaluation of these sites will be required for compliance with current codes as well as cure plans being conducted for continued operation of their facilities.

Based upon this comparison category, the SPUI and No-Build alternatives yield the best results.

Environmental Impacts

The environmental impacts to wildlife/habitat and wetlands for each alternative are considered low. Information researched for owl and/or osprey did not identify any locations within the alternative areas. Visual observations on several occasions were made of the area with no owl or osprey locations visible. The environmental impacts due to the potential for groundwater/hazardous material contamination are low for all of the alternatives except the Full. This Alternative has one (1) gas station and one (1) vacated fire station which may be associated

with potential hazardous materials. The E-W alternative also includes the vacated fire station property but it only impacts a small portion of the boundary periphery and does not impact any existing structures.

Based upon this comparison category, the SE, SPUI and No-Build alternatives yield the best results.

Drainage Impacts

The existing Veterans Parkway right of way was designed and permitted with a stormwater management system capable of treating stormwater to satisfy the requirements for water quality criteria of the South Florida Water Management District (SFWMD). With any of the proposed intersection improvements, revisions to the existing drainage system infrastructure and water quality treatment facilities will be required to maintain the same level of water quality treatment as originally permitted by the SFWMD. To begin understanding the necessary drainage improvements, the permitted design criteria of the original system must be identified and then applied to the proposed improvements in an effort to maintain the same level of water quality treatment.

Based on existing Environmental Resource Permits (ERP's), the proposed intersection improvements overlap with three permit applications. ERP No. 36-02841-S, Application No. 951002-17 is generally east of Santa Barbara Boulevard. ERP No. 36-02841-S, Application No. 971015-9 is west of Santa Barbara Boulevard. The proposed intersection improvements also overlap with ERP No. 36-02884-S, App. No. 941227-1 for Santa Barbara Boulevard. Each of these applications was approved at different times and have different sets of design criteria to be considered for the improvements. The right of way east of Santa Barbara Boulevard (App. No. 951002-17) requires a water quality volume equivalent to 1" over the right of way area, using dry detention facilities having a control elevation of 6.00 ft NGVD with outfall to the City of Cape Coral Canal System. The 951002-17 application does not require attenuation for stormwater runoff in excess of the required water quality volume since it is provided by the canal system. The right of way west of Santa Barbara Boulevard (App. No. 971015-9) requires a water quality volume equivalent to 1" over the additional right of way area, using dry detention facilities having a control elevation of 4.52 ft NGVD with outfall to the City of Cape Coral Canal System. The 971015-9 application does require attenuation for stormwater runoff in excess of the required water quality volume up to a 25 yr SFWMD design storm event. The approved permit (App. No. 941227-1) for the widening of Santa Barbara Boulevard requires a water quality for 1" over the right of way area using exfiltration trenches with ultimate outfall to the City of Cape Coral Canal system. The application also does not require attenuation for stormwater runoff in excess of the required water quality volume since it is provided by the canal system.

In light of the three permitted applications on either side of Santa Barbara Boulevard, the approved design criteria for either side of the intersection should be applied in kind for any one of the improvement options. Ideally the appropriate water quality criteria would be applied separately for each leg of the intersection and then necessary modifications to the existing stormwater management system would be made. However, the portion of Santa Barbara

Boulevard within the limits of any of the alternatives currently maximizes the use of existing right of way and thereby limits the opportunities for modification to handle potential increases in water quality treatment. Fortunately the Veterans Parkway right of way does have existing dry detention areas and open space that can be modified to increase water quality treatment. Therefore, for each of the alternatives analyzed, the existing water management facilities within the Veterans Parkway right of way will be modified as necessary and no additional water management facilities will be proposed within the Santa Barbara Boulevard right of way.

With the above water quality strategy in place, areas east and west of the intersection will be reviewed separately. On the east side of the intersection, 1" of additional water quality for any new right of way areas should be provided, but the water treatment facilities will not need to attenuate excess runoff generated from the increase in impervious area. On the west side of the intersection, 1" of additional water quality for any new right of way areas should be provided and the water treatment facilities will need to attenuate excess runoff generated from the increase in impervious area. All of the proposed improvement options will also result in impacts to existing water quality treatment areas on the east side of the Santa Barbara Boulevard intersection. Any of the alternatives will either significantly modify or remove up to +/- 0.36 ac-ft of dry detention area within the median based on existing Veterans Parkway roadway plans. These water quality volumes will need to be recreated elsewhere to maintain the permitted water quality design criteria.

The right of way provides opportunities to construct water quality treatment areas for both the impacted water quality areas to be reestablished and the additional water quality required due to construction. However, this is based on the assumption that the SFWMD will allow for compensating water quality between the east and west side of the intersection. In other words, the total water quality volume for post construction conditions could be provided, however it will not be evenly distributed. Within the current right of way, the existing dry detention facilities on the west side of the intersection could be regraded for additional water quality volume. The resulting increase would then be applied to the improvements on both the east and west side of the intersection. If the SFWMD does not allow for compensating water quality then additional right of way area will be required to create additional water management facilities and thereby maintain the water quality design criteria per the existing permit.

Summary tables have been prepared to provide estimates of increases in right of way due to improvement geometry, required water quality, stormwater runoff, and water quality impacted due to construction. See the attached Drainage System Option Comparison Tables 1 & 2.

The increase in right of way due to geometry in the attached tables measures the change in right-of-way area over the set length of roadway. The length for each intersection option within the pre vs. post comparison, has been set to coincide with the extent of the post-construction project area limits. This results in different pre-construction roadway areas shown in the following tables for each option. However, for each option, the pre and post construction roadway lengths remain the same. By following this methodology, the improvement options showed the following approximate increases in right of way area:

Alternative	Additional Right of Way
Full Displaced Left Turn	3.63 AC
South East Quadrant	2.83 AC
Partial Displaced Left Turn	0.33 AC
SPUI	0.00 AC
No-Build	0.00 AC

The required water quality estimates for both pre and post conditions are shown in the attached tables and are equivalent to 1" of stormwater over the construction right of way area. This approach to determine increases in required water quality volume and the necessary revisions to the existing water management facilities to accommodate the increases is consistent with the original design criteria of the approved permit applications. However, since the approval of the previous ERP applications, the SFWMD has increased water quality review requirements for most new applications. The SFWMD now requires additional reasonable assurances beyond the 1" criteria in order to further demonstrate that stormwater discharges from a permitted area should not degrade water quality in down stream areas. When required to provide additional reasonable assurances, the SFWMD will request a Pollutant Nutrient Loading Analysis. This analysis examines water quality from a different set of criteria that can result in different stormwater management facilities than allowed under the 1" criteria. For example dry detention facilities do not provide the water quality treatment required under the Pollutant Nutrient Loading Analysis criteria. This would mean that new stormwater management facilities, if required, could only be wet detention (wet pond) or dry retention (no outfall). It is not anticipated at the present time that a Pollutant Nutrient Loading Analysis will be required as part of the permitting for improvement options due to the existing approved system and the potential hardship from buying additional right of way. However, if the SFWMD will require the additional analysis, they will likely apply it to only increases in impervious area or increases in right of way. The water management facilities required to satisfy the additional water quality criteria will be reviewed and addressed for the alternative ultimately selected.

The following tables also include estimates of additional right of way for water management facilities should the SFWMD not allow compensating water quality. The areas were sized for a wet detention (wet pond) water management facility east and west of the Santa Barbara Boulevard intersection for each option. The area estimates assume a storage volume equivalent to 2.5 inches over the additional impervious area plus the compensating water quality volume for dry detention areas to be significantly modified or removed, and the pond provides attenuation for the additional runoff generated in the post-development condition. The pond configuration is assumed to have a maximum pond storage surface water stage of 2 feet above the water surface control elevation with 4:1 (horizontal : vertical) side slopes. The facility size estimates also meet SFWMD minimum dimensional criteria for wet detention systems and include a 20 foot maintenance easement encircling the pond with perimeter berm grading. By following this methodology, the improvement options showed the following approximate increases in right of way area:

Option	Pond Water Surface Area Increase	Add. Pond R/W
Full Displaced Left Turn	2.86 AC	4.57 AC
South East Quadrant	2.06 AC	3.50 AC
Partial Displaced Left Turn	1.08 AC	2.21 AC
SPUI	1.00 AC	2.10 AC
No-Build	0.00 AC	0.00 AC

Based on the comparison of the proposed intersection improvement options, the SPUI and No-Build alternatives require the least amount of additional right of way and do not require additional water quality volumes, in order to satisfy existing SFWMD permit requirements. The other intersection options require additional right of way and additional water quality volume. Should the SFWMD not approve of compensating water quality volumes over the project area, the SPUI option requires the least amount of additional right of way for pond sites for both sides of the Santa Barbara Boulevard intersection. For these three area comparison criteria, the intersection improvement options may be ranked as follows from least impact to greatest: SPUI and No-Build, Partial Displaced Left Turn, South East Quadrant, and Full Displaced Left Turn.

Geometric Design Parameters

Partial Displaced Left Turn Intersection Design Alternative

The Partial Displaced Left Turn (DLT) Intersection (E-W) design alternative provides displaced left turns on Veterans Parkway in the East and West travel directions only, leaving Santa Barbara Boulevard traffic to function as a typical intersection.

Design elements for the Partial DLT Intersection (E-W) are based upon the Florida Department of Transportation (FDOT) six-lane high-speed urban and suburban typical sections. This typical section, found in the FDOT Plans Preparation Manual (PPM), Figure 2.16.2, has a maximum 50 M.P.H. design speed which is consistent with the existing posted speed of Veteran's Parkway. This typical section provides six travels lanes, three in each direction, with a 6.5' shoulder area and type E curb applied to both the median and outside shoulder locations. The incorporation of shoulders with a sloping curb provides for minimum right of way requirements as a result of the closed drainage system and also provides 8' of useable shoulder area as refuge for stalled vehicles and accommodation for bicycles.

While the high-speed urban and suburban typical section does allow for a reduced median width of 30', the standard 40' median width (PPM 2.2.1) is utilized on Veterans Parkway as there was ample space available and it is desirable to maintain greater separation distances in what drivers might consider unusual traffic patterns. A tangent alignment of the through lanes approaching the crossover is maintained and preferred over reverse curves a result of the larger median width. This wider median also allows for an angle of crossing for displaced left turning vehicles of 14 degrees, which helps prevent drivers from entering from the wrong direction and decreases the time for crossing the thru lanes.

The distance left turning traffic must travel from the stop bar at the DLT to the main intersection is 600' and based on recommendations derived from the traffic studies by Atkins, *Final Analysis of At Grade Intersection Alternatives Report.* The crossover length itself is 220' with a remaining 380' of DLT length beyond the crossover up to the main intersection.

Reverse curves with a 400' radius and 25' tangent between the curves were chosen to transition left turning traffic across the opposing thru traffic lanes. Superelevation was not provided, however consideration was given to turning roadway lane width requirements for the dual displaced left turns. Two 12' left turn lanes with a 4.0' shoulder area (measured from the face of the curb) and a Type E traffic separator is provided.

After crossing the opposing thru traffic lanes, the displaced left turns are separated from the thru traffic lanes by 24' consisting of 6.5' shoulders and an 8' traffic separator with Type E curb and gutter. This meets the 24' clear zone prescribed by the PPM Table 2.11.11 and also provides refuge space for pedestrians at the main intersection.

A right turn roadway is provided from Santa Barbara Boulevard onto Veteran's Parkway in the form of a free flowing right turn with an acceleration lane that allows right turn traffic to merge into the main lanes. FDOT Standard Index No. 525 provided minimum lengths required. The right turn roadway is 11' wide with 6.5' shoulder and type E curb and gutter provided on the outside. It is separated from the displaced left turning traffic by a 4' traffic separator with Type F curb and gutter. This Type F traffic separator widens out to form an island separation near the displaced left crossover. This island should provide adequate accommodations for required signal equipment and signing.

The right turn lane opposite the displaced left roadway was separated from the outside thru lane by a striped gore area. This separation provides greater visibility of the displaced left turning traffic and will discourage right turning traffic from proceeding with the thru traffic as these movements will likely be on different signal phases.

Full Displaced Left Turn Intersection Design Alternative

The Full Displaced Left Turn (DLT) Intersection Design Alternative (Full) provides displaced left turns on all four legs of the intersection of Veteran's Parkway and Santa Barbara Boulevard.

Design elements for the Full Intersection Design Alternative remain unchanged from the Partial DLT E-W Intersection Design for the displaced left turns on Veteran's Parkway, the East and West legs of the intersection. See Partial Displaced Left Turn Intersection E-W Design Alternative for a full description. However, displaced left turns have been added for the North and South legs of the intersection along Santa Barbara Boulevard.

Santa Barbara Boulevard has a 45 M.P.H. design speed and is an urban typical section with Type F curb and gutter and sidewalk, therefore slightly different design criteria are utilized compared to the other East and West legs of the intersection.

Median Width of 28' is provided on the southern leg which allows space for the displaced left turns of two 12' left turn lanes and a 4' traffic separator. The median then narrows to 9' past the DLT crossover with a 6' traffic separator between the northbound and southbound thru lanes.

With the narrower intersection footprint on the Santa Barbara legs, a reverse curve alignment of the through lanes approaching the crossover was necessary. Reverse curves with 600' radii and a 25' tangent between curves were utilized. The slightly larger radius meets superelevation requirements and turning roadway width requirements so the 11' travel lanes were maintained. Additional 3000' radius reverse curves were necessary on the north leg for the southbound thru lanes to shift these lanes, which were accommodating northbound left turns at SE 24th street into the tighter alignment required at the intersection.

The distance left turning traffic must travel from the stop bar at the DLT to the main intersection is 600' and based on recommendations derived from traffic studies by Atkins, *Final Analysis of At Grade Intersection Alternatives Report.* The crossover length itself is 220' with a remaining 380' of DLT length beyond the crossover up to the main intersection.

Separations between opposing traffic are more constrained on the north and south legs of the intersection. After crossing the opposing through traffic lanes, the displaced left turns are separated from the through traffic lanes by 17' consisting of a 6' traffic separator with Type F curb and gutter and 4.0' shoulder areas on either side.

Additional right turn roadways for traffic turning from Veteran's Parkway onto Santa Barbara Boulevard were added for this concept. It is a free-flowing right turn lane 11' in width with Type F curb and gutter on the outside to match the typical conditions found on Santa Barbara Boulevard. This right turn roadway is separated from the dual displaced lefts by a 4' traffic separator with Type F curb and gutter, which again widens out to form an island separation near the displaced left crossover. This island should provide adequate accommodations for required signal equipment and signing. Due to the close proximity of SE 24th Street on the north and Kamal Parkway on the south, these merging lanes were continued up to the noted intersections, providing a merge or right turn option then lane drops, per Index No. 526, after the intersections.

The right turn lane opposite the displaced left roadway was separated from the outside thru lane by a striped gore area. This separation provides greater visibility of the displaced left turning traffic and will discourage right turning traffic from proceeding with the through traffic as these movements will likely be on different signal phases.

Southeast Quadrant Roadway Intersection Design Alternative

The Southeast Quadrant Roadway Intersection Design Alternative (SE) provides a new roadway in the southeast corner of the intersection. This roadway connects Santa Barbara Boulevard to Veteran's Parkway prior to the main intersection.

This quadrant roadway creates two additional signalized intersections approximately 600 feet from the main intersection of Veteran's Parkway and Santa Barbara Boulevard that will

accommodate left turning traffic. Left turning movements are eliminated from the main intersection and replaced with islands designed to prohibit left turning traffic movements.

Design elements for the quadrant roadway are based on a 30 M.P.H. design speed and a typical urban roadway cross section. Two 11' through lanes are provided in each direction with a variable width median or 4' traffic separator with Type F curb and gutter depending on location, 4' bicycle lanes adjacent to the outside curb and gutter, and a 6' concrete sidewalk to accommodate pedestrian traffic.

Radii of 325' for the SE Alternative roadway were utilized for the edge of pavement curves of this alignment. It is not anticipated that superelevation will be necessary for this lower speed street.

The intersection created on Santa Barbara Boulevard, south of the main intersection provides for southbound to eastbound dual left turns and westbound to southbound dual left turns. A single right turn lane is provided both onto and off of the quadrant roadway.

The second intersection is created where the new quadrant roadway intersects Veterans Parkway. Here dual right turn lanes are provided for traffic turning from the quadrant roadway onto Veterans Parkway in the eastbound direction and dual left turns are provided for those travelers wishing to enter the quadrant roadway and eventually travel southbound on Santa Barbara. A single left turn is provided for the northbound to westbound movement at this intersection.

Single Point Urban Interchange (SPUI) (Overpass) Design Alternative

The SPUI (Overpass) Design Alternative (SPUI) provides an overpass bridge structure on Veteran's Parkway over the Veterans Parkway and Santa Barbara Boulevard at-grade intersection allowing eastbound and westbound through traffic to bypass the signalized intersection entirely. Improvements for this concept are entirely within Veterans Parkway right of way, with Santa Barbara Boulevard traffic operation remaining unchanged.

Design elements for the overpass design concept are based upon a 50 M.P.H. design speed, which is also the existing posted speed along Veterans Parkway today. The typical section approaching the overpass would remain similar to that existing today with three 11' travel lanes in each direction, Type E curb and gutter along the median and a 4' paved shoulder with open drainage on the outside. This suburban type typical section would then transition to an urban typical section within the at-grade intersection, with two 11' travel lanes on the exit and entrance ramps, 5' bicycle lane, Type F curb and gutter and a closed drainage system.

The at-grade intersection provides dual left turn lanes, a single through lane, bicycle lane, and a single right turn lane in the eastbound direction. The westbound direction is similar in nature with the exception of dual right turn lanes being provided to accommodate the heavier traffic volume identified with this movement. Median u-turn lanes (Texas u-turns) under the overpass located prior to the signalized intersection are also provided.

The overpass structure has two 11' through lanes in each direction continuing over Santa Barbara Boulevard with 10' outside shoulders, 6' inside shoulders, and barrier wall in accordance with PPM Figure 2.0.1. The structure is a three span structure totaling approximately 500' in length and accommodates u-turns underneath the structure as part of the at-grade portion of the intersection.

For the vertical design for the overpass, a critical elevation point of 25' was established as measured from the existing Santa Barbara Boulevard travel lanes to the top of the bridge deck. This allowed for maintaining the 16.5' minimum clearance required under the bridge as set forth in PPM Table 2.10.1. Vertical gradiants on the overpass are +3.493% and -3.507% which meet the maximum grade established in PPM Table 2.6.1. Vertical Curve lengths for the overpass were guided by PPM Table 2.8.5 and 2.8.6. All vertical curves were designed using the K values recommended and meet the minimum vertical curve requirements.

Project Costs

The total, current cost opinion for each Alternative including right of way and construction are:

Alternative	R/W Cost	Construction Cost	Total Cost
Full Displaced Left Turn	$17,000,000.00	$ 8,230,000.00	$25,230,000.00
Partial Displaced Left Turn	$ 500,000.00	$ 4,025,000.00	$ 4,525,000.00
Southeast Quadrant	$ 4,000,000.00	$ 3,900,000.00	$ 7,900,000.00
SPUI	$0.00	$15,200,000.00	$15,200,000.00
No-Build	$0.00	$0.00	$0.00

The estimated costs of right of way were obtained from the Lee County Division of County Lands. These numbers included considerations for real estate along with estimates for businesses and severance damages. Construction cost opinions were prepared by the David Douglas Associates, Inc. design team. Quantities were estimated for the various alternatives and prices assigned. Construction prices were based upon FDOT historical cost records along with consideration of past local project bid letting records. All costs applied were done consistently based on 2011 prices from alternative to alternative so comparisons from one alternative to the other would be valid. Costs noted are for planning purposes only and may very significantly from final project costs depending on the project timing and features ultimately incorporated.

Based upon this comparison category, the No-Build and then the E-W alternative yield the lowest cost initial projects costs in today's dollars.

Safety – Bicycle/Pedestrian

The Complete Streets resolution was considered in the design of each alternative which requires accommodation for all users including bicyclists, pedestrians, transit accessibility and safety. Each alternative changes existing conditions except the No-Build alternative. These changes include the addition of bicycle lanes and extra shoulders to each alternative, except the No-Build alternative.

The safety of the pedestrians traversing the corridor was evaluated for several different factors. The number of travel lanes a pedestrian would be required to cross from right of way to right of way both on Veterans Parkway and Santa Barbara Boulevard were noted in the Matrix as well as the longest distance a pedestrian would have between refuge islands while crossing travel lanes.

In the Matrix evaluation for each alternative, the first row of numbers indicates the number of travel lanes a pedestrian would have to cross traveling from the south side of Veterans Parkway to the north on the eastern side of Santa Barbara Boulevard and then along the western side of Santa Barbara Boulevard, thus giving you the total lanes to cross N-S indicated on the Matrix. The second row of numbers indicates the number of travel lanes a pedestrian would have to cross traveling from the eastern side of Santa Barbara Boulevard to the western side of the same roadway on the northern side of Veterans Parkway and then the same direction along the southern side of Veterans Parkway crossing Santa Barbara Boulevard thus giving you the E-W indicated on the Matrix.

The Full and E-W Alternatives each have 10 crossing lanes for a pedestrian crossing the east-bound and west-bound lanes of Veterans Parkway from the north to the south sides of Santa Barbara Boulevard. The SE Alternative has 8 crossing lanes for these same routes. The SPUI Alternative has 8 crossing lanes across Veterans Parkway on the east side of Santa Barbara Boulevard and 7 crossing lanes across the west side of Santa Barbara Boulevard. The No-Build Alternative has 13 crossing lanes on the east side and 12 crossing lanes on the west side of Santa Barbara Boulevard.

The Full Alternative has 10 travel lanes for the pedestrian to cross Santa Barbara Boulevard traveling from right of way to right of way. The E-W Alternative has nine (9) travel lanes to cross in the same direction. The SE Alternative has nine (9) travel lanes to cross on the North side of Veterans Parkway and seven (7) lanes to cross on the South side of Veterans Parkway. The SPUI and No-Build Alternatives each have eleven lanes to cross on the North side of Veterans Parkway and 10 lanes to cross on the South side of Veterans Parkway.

There is a small variation in the number of crossing lanes in the alternative comparisons. The highest number of lane crossings, exists in the current condition, No-Build alternative, and the lowest number being attributed to the SE alternative.

With bicyclists and pedestrians crossing multiple lanes on an urban roadway, refuge areas are proposed at differing lengths depending on the location of the travel lanes. The longest length between refuge islands was measured for each alternative on Veterans Parkway and Santa Barbara Boulevard.

The longest length measured between pedestrian refuge areas for each alternative is noted in the Matrix.

With the absence of medians on Santa Barbara Boulevard, the length between refuge areas is notably longer than areas noted on Veterans Parkway, except on the Full alternative.

Based upon this comparison category, the SE alternative yields the best results for crossing Veterans and the No-Build yields the best results for crossing Santa Barbara Boulevard.

Also analyzed for safety considerations were the number of conflicts points for vehicles vs vehicles and pedestrian vs vehicles. Traffic conflict points occur where the path of traffic movement crosses creating a greater potential of crashes for vehicle vs vehicle and pedestrian vs vehicle movements. There were four (4) types of conflicts points utilized in determining the number of conflicts points for each alternative; diverging, merging, weaving and crossing patterns. See attached Exhibit X.

Examples of these four types of conflicts points include:
Diverging - a vehicle to leaving a through lane to enter a turn lane;
Merging - a vehicle to leaving a through lane to enter a through lane;
Weaving - indicates a criss-cross pattern; and
Crossing - an east-bound vehicle crossing the path of a south-bound vehicle at a roadway intersection.

Each vehicle, bicyclist and pedestrian movement was charted using the example given from the State of Iowa *Statewide Urban Design and Specifications Design Manual* dated 2008, Exhibit X. These charted movements evaluated the location of potential conflicts points for each alternative and are enumerated as follows:

The vehicle versus vehicle conflicts points for the Full and E-W alternatives each encountered 112 conflict points, the SE indicated 85 conflicts and the SPUI indicated 88 conflict points. A 22% to 25% reduction in vehicle vs vehicle conflicts is realized with the SPUI and SE alternatives versus the Full and E-W alternative designs. When compared with the No-Build option, there is a 31% to 33% reduction in vehicle versus vehicle conflicts for the SPUI and SE alternatives respectively.

The pedestrian vs vehicle conflicts for each of the alternatives were analyzed for potential bicycle and pedestrian encounters with a vehicle. This analysis assumed the bicyclists were utilizing the designated bike lanes and the pedestrians were utilizing the designated pedestrian lanes.

The Full Alternative resulted in 98 conflicts, the E-W 70 conflicts, the SE 107 conflicts, the SPUI 61 conflicts and the No-Build 45 conflicts. A reduction in the pedestrian versus vehicle conflicts is realized with the SPUI alternative versus all the other alternatives except for the No-Build option. Note in the No-Build option, there are no bike lanes to count so this figure is just for pedestrian conflicts, which somewhat skews the comparison with the other alternatives.

LCDOT's accounting of 2009 Intersection Crash Summary listed the Veterans Parkway and Santa Barbara Boulevard intersection having 38 reported vehicle versus vehicle crashes and the 2008 High Crash Locations indicated this intersection had 42 reported vehicle vs vehicle crashes, see attached Exhibits No. XI & XII. Additional data has been recently published for part of 2010. With these figures an intersection crash rate of 1.756 crashes per million entering vehicles

has been calculated. This value is considered high and indicates the need for safety improvements at this intersection.

Overall the SPUI alternative noted fewer conflicts than the other alternatives in the vehicle versus vehicle and the No-Build had the fewest conflicts in the pedestrian versus vehicle categories. Again, the No-Build alternative has no bike lanes to count so this skews the comparison.

Environmental Efficiencies

In conjunction with the sustainability principles, each design alternative was analyzed for the reduction in corridor green space, reduced emissions/air quality, increased fuel savings and peak hour delay reduction savings. The latter three noted are calculated based on the vehicular traffic analysis comparison with the No-Build alternative.

The reduction in green space percentages have a slight variation between the Full, E-W and SPUI alternatives; being 16%, 13% and 13%, respectively. The SE alternative has a 3% green space reduction and the No-Build alternative has no decrease in green space.

The reduction of vehicular emissions is a design goal of today's transportation projects. EPA measures carbon monoxide and nitrogen oxide in grams emitted into the air per mile driven, which is measured as part of the vehicular emission standards stipulated for car manufacturers. Each alternative's efficiency was evaluated for an increase in air quality, based upon the above, by being able to reduce the time a vehicle spends idling or accelerating. The reduction in vehicular emissions of carbon monoxide and nitrogen oxide was compared to the No-Build alternative for the peak hour traffic in 2035. The comparisons noted the E-W and SE alternatives were similar in the total gram reductions of 36,669 and 38,672 respectively. The Full alternative has a total grams reduction of 45,049 with the SPUI alternative having a 50,493 total grams reduction.

The shorter period of time a vehicle spends idling at a traffic signal or in traffic congestion, the more efficient the roadway which results in savings to the driving public. The total hours and dollars lost to a driver during this time spent in traffic are reduced by each of the alternatives in comparison to the No-Build Alternative. Based on nationwide studies performed by the Texas Transportation Institute on Urban Mobility, an average cost of $16 per hour per vehicle hour of delay was used to determine the peak hour delay reduction savings averaged over the 20 year design period. The determined savings for the SPUI alternative is $19,552,000, the Full having a savings of $18,054,400, SE having a savings of $16,390,400 and E-W having a savings of $15,974,400. These figures consider only the peak hour and not the other hours in the day. Each alternative has a significant savings to a driver utilizing this intersection. The SPUI alternative indicates an approximately $1.5 million savings over the nearest alternative for the peak hour only over the 20 year design time frame.

Concurrent with the shorter periods of time a driver will spend at an intersection is the resulting peak hour fuel savings. Compared to the No-Build alternative, the alternative with the largest peak hour total dollar fuel savings based upon a $4 per gallon averaged over the 20 year design

time frame is the SPUI alternative with a total savings of $6,292,000. This is for the peak hour only. The nearest alternative in comparison is the Full with a savings of $5,626,000, a $676,000 reduction in savings as compared to the SPUI alternative. The E-W has a savings of $4,565,600 and the SE notes a savings of $4,815,200.

Based upon this comparison category, the SPUI alternative yields the best results.

Transit Service

Lee Tran reviewed the four (4) build alternatives proposed for the Santa Barbara/Veterans intersection improvements for their impacts on transit services in the area. (See attached letter dated September 26, 2011 in Appendix.) They found no impact to their current level of service in the area for any of the alternatives. They have however, reviewed the alternatives for future anticipated modifications to their service in the area. They indicated the SPUI alternative will have no impact on their proposed modifications, the E-W alternative will have minimal adverse impacts to their systems run times and headways, the SE alternative would have an adverse impact upon their transit service as it would affect their run time schedules and cause them to miss some "meets" where patrons would transfer to a different route, and the Full alternative would have the most adverse impact on their transit service as they would not be able to traverse from their current stop on Santa Barbara Boulevard at Aviation Parkway and diverge into the left turn lane for access to eastbound Veterans Parkway.

Based upon this comparison category, the SPUI or No-Build alternatives would yield the best results.

Other

During the research and compilation of the analysis for the four (4) build alternatives, two other categories were identified as significant for the intersection and affected areas. These two categories are Visibility and Emergency Operations.

Visibility for the adjacent parcels and existing businesses in the immediate area of each alternative is only changed by the SPUI alternative.

Emergency Operations take into consideration the affect upon the intersection and adjacent roadways during a power outage in the area for each alternative. As evidenced by Hurricanes Charlie and Wilma's impact upon the area, the need for immediate assistance along roadways and at signaled intersections is crucial to emergency operations as well as the traveling public. In comparison to the No-Build alternative, which would currently require two officers to control traffic at the Santa Barbara/Veterans Parkway intersection, the same staff resources would be required for the SPUI alternative. With the remaining alternatives, the Full, E-W and the SE, the resource requirements become increasingly complicated requiring increased staff resources and generators in order to maintain operations.

Based upon this Emergency Operations comparison category, the SPUI or No-Build alternative yields the best results.

Summary

This report analyzed and compared potential impacts and costs for various intersection improvement alternatives for the existing Veterans Memorial Parkway and Santa Barbara Boulevard intersection.

A traffic study for the intersection was conducted analyzing the existing and future conditions in the defined intersection study area. This report, prepared under separate cover by DDAI's sub consultant, Atkins, *Veterans Memorial Parkway and Santa Barbara Boulevard Overpass Study Final Report*, dated Rev. January, 2012, indicates the need for substantial intersection improvements to address projected future congestion concerns. This report was performed under the premise that an overpass at the intersection would be implemented to address the traffic level of service concerns.

Direction was then provided by Lee County to identify and consider at-grade alternatives to an overpass solution. Utilizing the traffic information from the above noted report and supplementing that data, alternatives were established for consideration. The alternatives were initially screened and then thoroughly analyzed from a traffic view point in a report under separate cover by Atkins, *Final Analysis of At-Grade Intersection Alternatives Report* dated Rev. January, 2012.

Based on the traffic study, the three (3) most viable at-grade intersection alternatives are the Full Displaced Left-turn Intersection (Full), the Partial Displaced Left-turn Intersection (E-W) and the SE Quadrant Roadway Intersection (SE). The focus of this document looked at the alternatives by developing them geometrically and then analyzing them further for their physical impacts and costs if implemented. These alternatives were compared with each other and with the SPUI (Overpass) alternative and the No-Build options.

The categories in which additional analysis was performed and comparisons were made are noted below. In each category, the alternative which yielded the best results based on the analysis of the physical impacts and costs are noted in the table below. Note, the No-Build option has not been noted as providing the most favorable result even though as this option has no impacts and no additional costs. This is because the No-Build option does not address future projected traffic safety and pedestrian concerns at the intersection.

Category	Favorable Results
Right of Way Impacts	SPUI
Access Changes	E-W, SPUI
Parcel/Business Impacts	SPUI
Environmental Impacts	SE, SPUI
Drainage Impacts	SPUI
Project Costs:	
R/W	SPUI
Construction	SE
Total	E-W
Safety-Bicycle/Pedestrian	SPUI
Environmental Efficiencies	SPUI
Transit Service	SPUI
Other	SPUI

Of the twelve (12) categories studied, the SPUI Alternative yielded the best results in ten of the twelve categories compared per the physical and cost aspects noted in this report. Thus, based on the traffic viability results and the results in this report, the SPUI yielded the most favorable results overall.

A public involvement program was developed and implemented for the project. This included a series of workshops, public meetings and presentations. These different venues presented the different alternatives and the data generated in developing them to the public. The public was given the opportunity to express their opinions on which alternative they deemed most appropriate for the intersection. The SPUI alternative received the most support among the participants with a significant number of votes submitted for the No-Build option and a few other votes received for the other at-grade alternatives. A *Comments and Coordination Report,* dated March, 2012, for the public involvement program has been assembled under separate cover by DDAI's sub consultant, Cella Molnar Associates, Inc. This report contains and summarizes the comments received from all public workshops, meetings and presentations.

Lee County has decided, at the present time, to end the current intersection improvement efforts, allowing for a re-examination of the entire corridor through the upcoming County, City and MPO planning processes; therefore, no preferred alternative is being recommended for adoption by the Lee County Board of County Commissioners. Reconsideration of the future vision of the entire Veterans Parkway corridor including Colonial Boulevard and Burnt Store Road in regard to its functional classification and community necessity is thought to be needed.

Category	Favorable Results
Right of Way Impacts	SPUI
Access Changes	E-W, SPUI
Parcel/Business Impacts	SPUI
Environmental Impacts	SE, SPUI
Drainage Impacts	SPUI
Project Costs:	
R/W	SPUI
Construction	SE
Total	E-W
Safety-Bicycle/Pedestrian	SPUI
Environmental Efficiencies	SPUI
Transit Service	SPUI
Other	SPUI

Of the twelve (12) categories studied, the SPUI Alternative yielded the best results in ten of the twelve categories compared per the physical and cost aspects noted in this report. Thus, based on the traffic viability results and the results in this report, the SPUI yielded the most favorable results overall.

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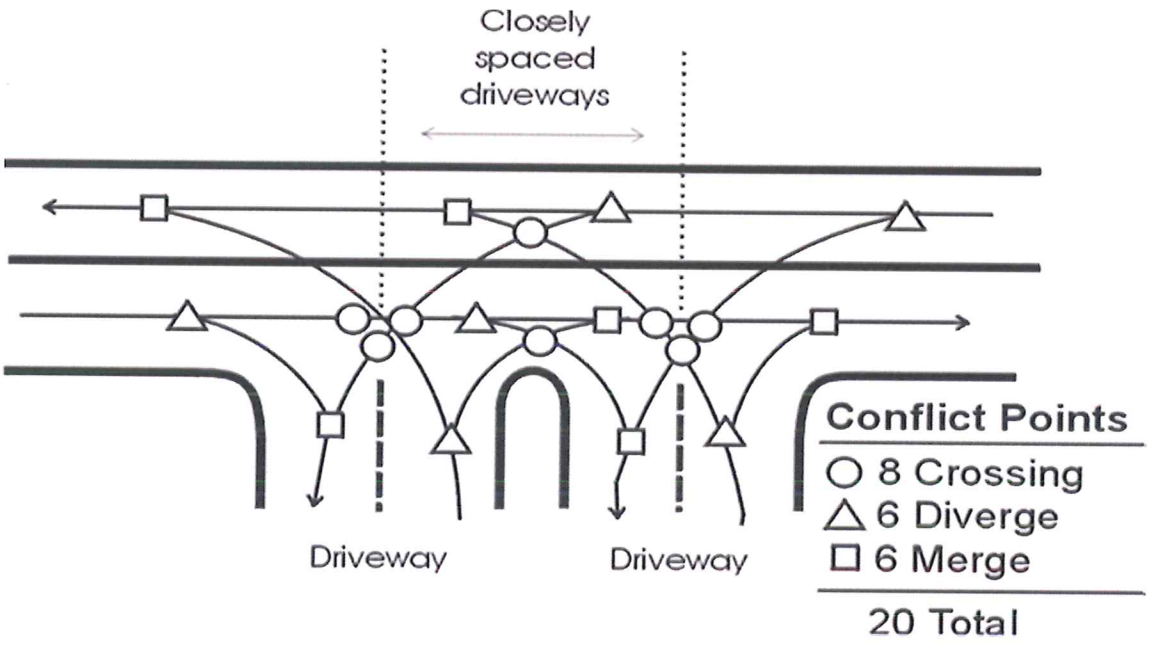
Conflict Points

Two lane undivided roadway (closely spaced entrances)



Statewide Urban Design and Specifications 5I-2 Design Manual Chapter 5 – Roadway Design 5I – Access Management (State of Iowa)

EXHIBIT X

Aerial Exhibit

VETERANS PKWY./SANTA BARBARA BLVD.
INTERSECTION IMPROVEMENTS (CN-10-03)

NO BUILD - EXHIBIT I

DDAI
DAVID DOUGLAS ASSOCIATES, INC.
1821 Victoria Ave., Suite 1, Fort Myers, Fl. 33901 Ph. (239) 337-3330

Aerial Exhibit

VETERANS PKWY./SANTA BARBARA BLVD.
INTERSECTION IMPROVEMENTS (CN-10-03)

FULL DISPLACED LEFT TURN (FULL) - EXHIBIT II

DAVID DOUGLAS ASSOCIATES, INC.
1821 Victoria Ave., Suite 1, Fort Myers, Fl. 33901 Ph. (239) 337-3330

Aerial Exhibit

VETERANS PKWY./SANTA BARBARA BLVD.
INTERSECTION IMPROVEMENTS (CN-10-03)

PARTIAL DISPLACED LEFT TURN (E/W) - EXHIBIT III

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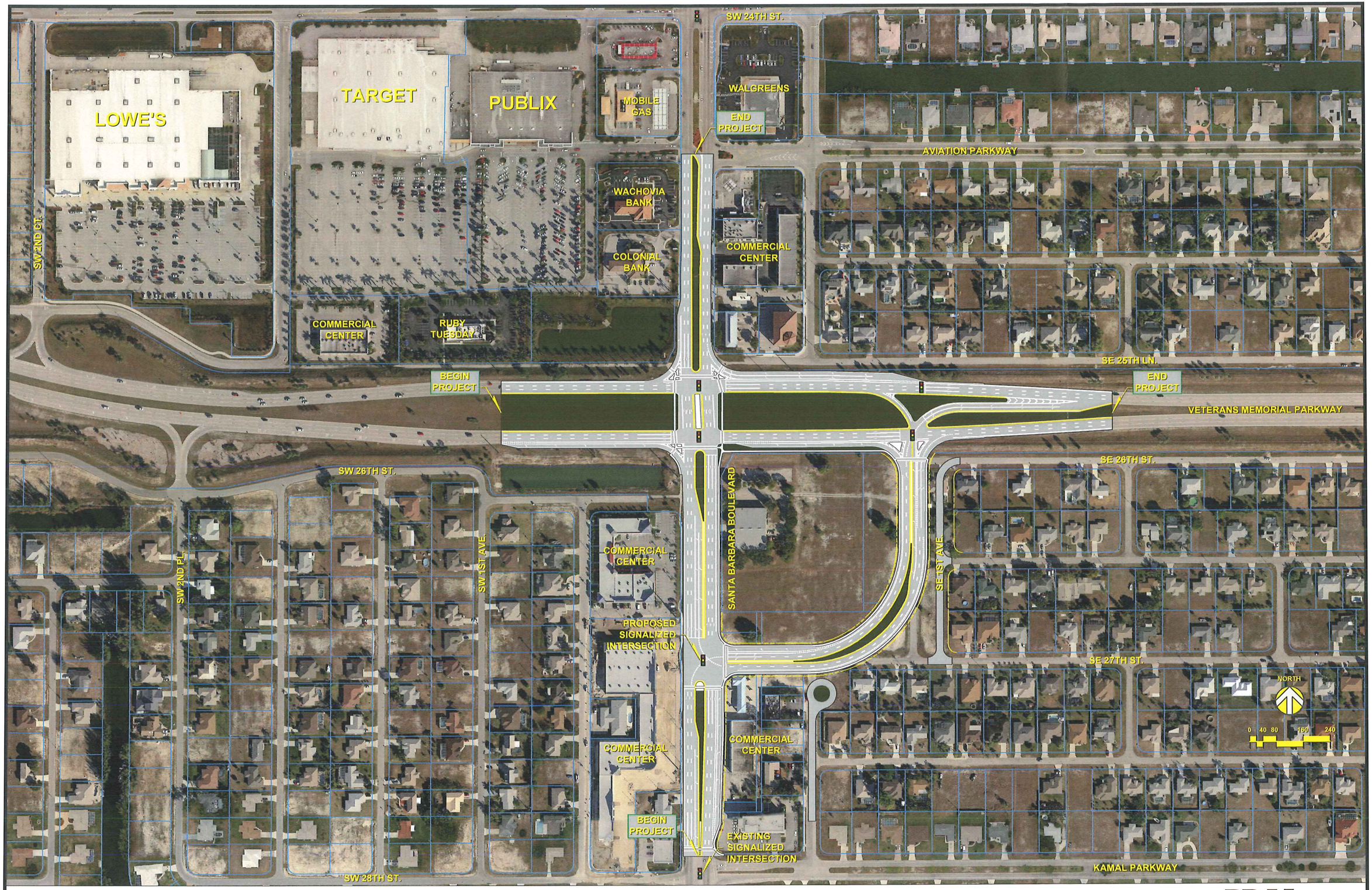


Aerial Exhibit

VETERANS PKWY./SANTA BARBARA BLVD.
INTERSECTION IMPROVEMENTS (CN-10-03)

SOUTHEAST QUADRANT (SE) - EXHIBIT IV

DAVID DOUGLAS ASSOCIATES, INC.
1821 Victoria Ave., Suite 1, Fort Myers, Fl. 33901 Ph. (239) 337-3330

Aerial Exhibit

VETERANS PKWY./SANTA BARBARA BLVD.
INTERSECTION IMPROVEMENTS (CN-10-03)

SINGLE POINT URBAN INTERCHANGE (SPUI - OVERPASS) - EXHIBIT V

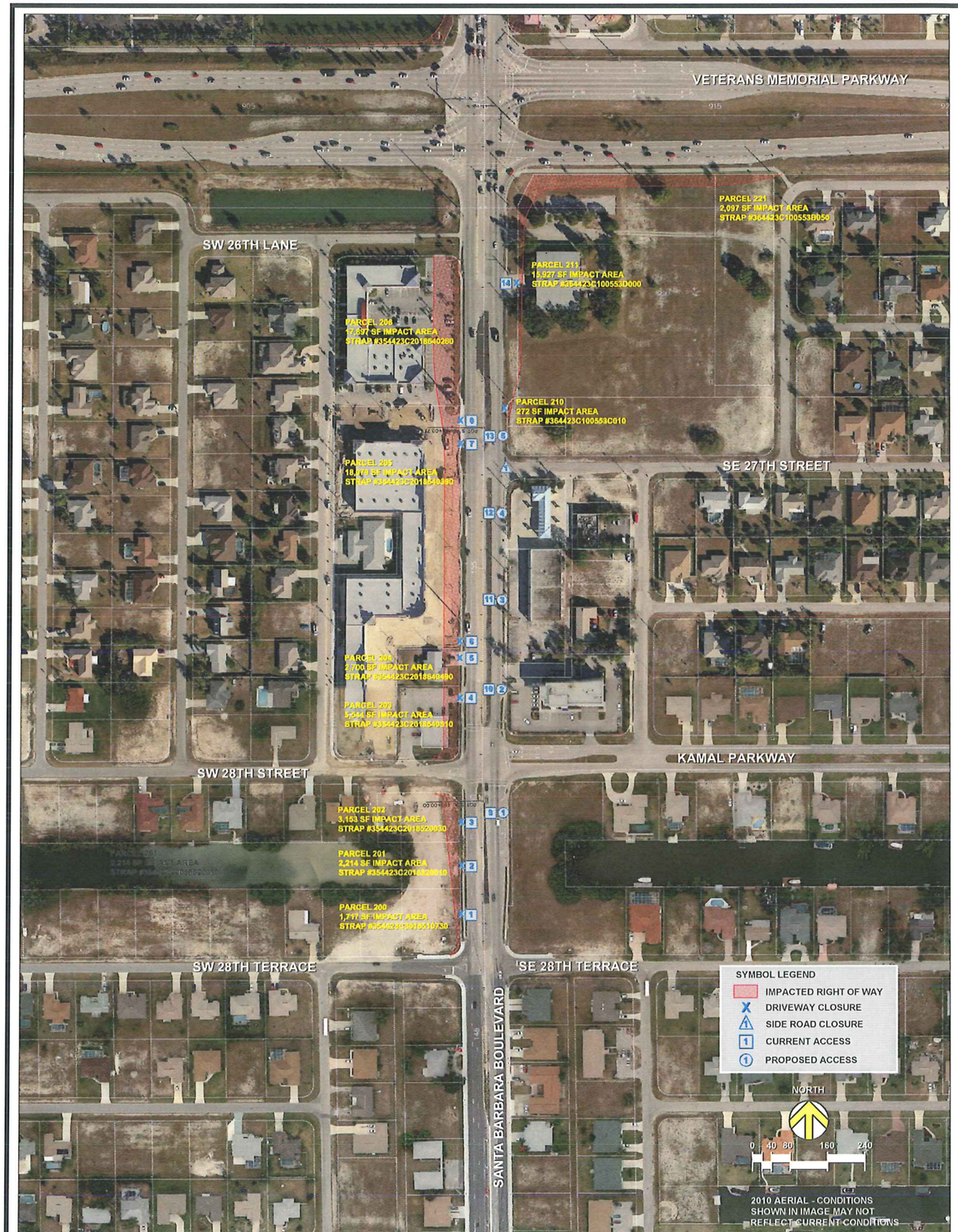
DDAI
DAVID DOUGLAS ASSOCIATES, INC.
1821 Victoria Ave., Suite 1, Fort Myers, Fl. 33901 Ph. (239) 337-3330

Veterans Parkway at Santa Barbara Boulevard
Intersection Decision Matrix

	UNITS	Full Displaced LHT Alternative	E-W Displaced LHT Alternative	SE Quadrant Alternative	SPUI - Overpass Alternative	No Build Alternative
Right of Way Impacts						
Right of Way Requirements		Yes	Yes	Yes	None	None
Roadway	Ac.	3.63	0.33	2.83	None	None
Additional R/W for Ponds [1]	Ac.	0	0	0	0	None
Total R/W Affected	Ac.	3.63	0.33	2.83	None	None
Access Changes						
Changes		Yes	No	Yes	No	No
Current Access From Veterans	Ea.	1	1	0	1	RHT in/ RHT out
Proposed Access from Veterans	Ea.	1	1	0	1	No Change
Current Access From Santa Barbara	Ea.	R-in/out-27,left in-1	None	16-R-in/out	None	No Change
Proposed Access from Santa Barbara	Ea.	R-in/out-8	None	11-R-in/out	None	No Change
Potential Side-Road Closures	Ea.	Yes-2	No Change	Yes-4	No Change	No Change
Potential Median Closures	Ea.	Yes-SB* -1	No Change	No Change	No Change	No Change
Parcel / Business Impacts						
Number of Parcels - Residential Affected	Ea.	4	0	6	0	0
Number of Parcels - Commercial Affected	Ea.	16	3	8	0	0
Environment Impacts						
Wildlife and Habitat		Low	Low	Low	Low	Low
Wetlands		Low	Low	Low	Low	Low
Contamination		Medium -2	Low-1	Low	Low	Low
Drainage Impacts						
Pre Construction Impervious	Ac.	16.93	9.46	10.78	9.34	N/A
Post Construction Impervious	Ac.	24.63	12.74	13.14	12.39	N/A
Increased Impervious	Ac.	7.70	3.28	2.36	3.05	N/A
Additional Water Quality as Wet Detention	Ac. - Ft.	0.30	0.03	0.24	0.00	N/A
Additional Water Quantity	Ac. - Ft.	3.99	0.86	2.43	0.57	N/A
Additional Pond R/W Required East Side [2]	Ac.	2.55	1.16	2.45	1.05	N/A
Additional Pond R/W Required West Side [2]	Ac.	2.02	1.05	1.05	1.05	N/A
Project Costs						
Construction Cost Estimate	$	8,230,000.00 ±	4,025,000.00 ±	3,900,000.00 ±	15,200,000.00 ±	0
Right of Way Costs Estimate	$	17,000,000.00 ±	500,000.00 ±	4,000,000.00 ±	0.00	0
Total	$	25,230,000.00 ±	4,525,000.00 ±	7,900,000.00 ±	15,200,000.00 ±	
Safety - Bike / Ped						
Changed Conditions		Yes	Yes	Yes	Yes	No
Total Lanes to Cross N-S	Ea.	10/10	10/10	8/8	8/7	13/12
Total Lanes to Cross E-W	Ea.	10/10	9/9	9/7	11/10	11/10
Longest Length between Ped Refuge Areas [3]	Feet	98'-Vet; 71'-SB	62'-Vet; 119'-SB	42'-Vet: 105'-SB	78'-Vet; 124'-SB	60'-Vet; 82'-SB
Bike Lanes		Yes	Yes	Yes	Yes	No
Extra Shoulders		Yes	Yes	Yes	Yes	No
Vehicle / Vehicle Conflict Points	Ea.	112	112	85	88	127-6
Pedestrian / Vehicle Conflict Points	Ea.	98	70	107	61	45-6
Environmental Efficiencies						
Decrease in Green Space	%	16	13	3	13	N/A
Reduced Emissions/Air Quality [4]	Grams	45,049	36,669	38,672	50,493	N/A
Peak Hour Delay Reductions Savings [5]	$	18,054,400	15,974,400	16,390,400	19,552,000	N/A
Peak Hour Fuel Savings [5]	$	5,616,000	4,565,600	4,815,200	6,292,000	N/A
Transit Service		Adverse Impact	Minimal Impact	Adverse Impact	No Impact	No Impact
Other						
Visibility		Same	Same	Same	Changed	Same
Emergency Operations		Complicated / Increased Staff / Generators	Complicated / Increased Staff / Generators	Complicated / Increased Staff / Generators	2 Officers	2 Officers

1. Additional R/W for ponds shown assumes that additional water quality, compensating water quality due to construction and excess runoff volumes can be established by modifying the existing drainage system for compensation.
2. Additional R/W required only for ponds if compensating volumes not allowed by SFWMD for ponds. Does not include additional R/W necessary for improvements.
3. Measured longest length between pedestrian refuge areas.
4. CO and NO added together.
5. Compared to No Build Alternative.
6. = Pedestrian only conflicts points counted. No existing bike lanes to count conflict points.

*SB = Santa Barbara

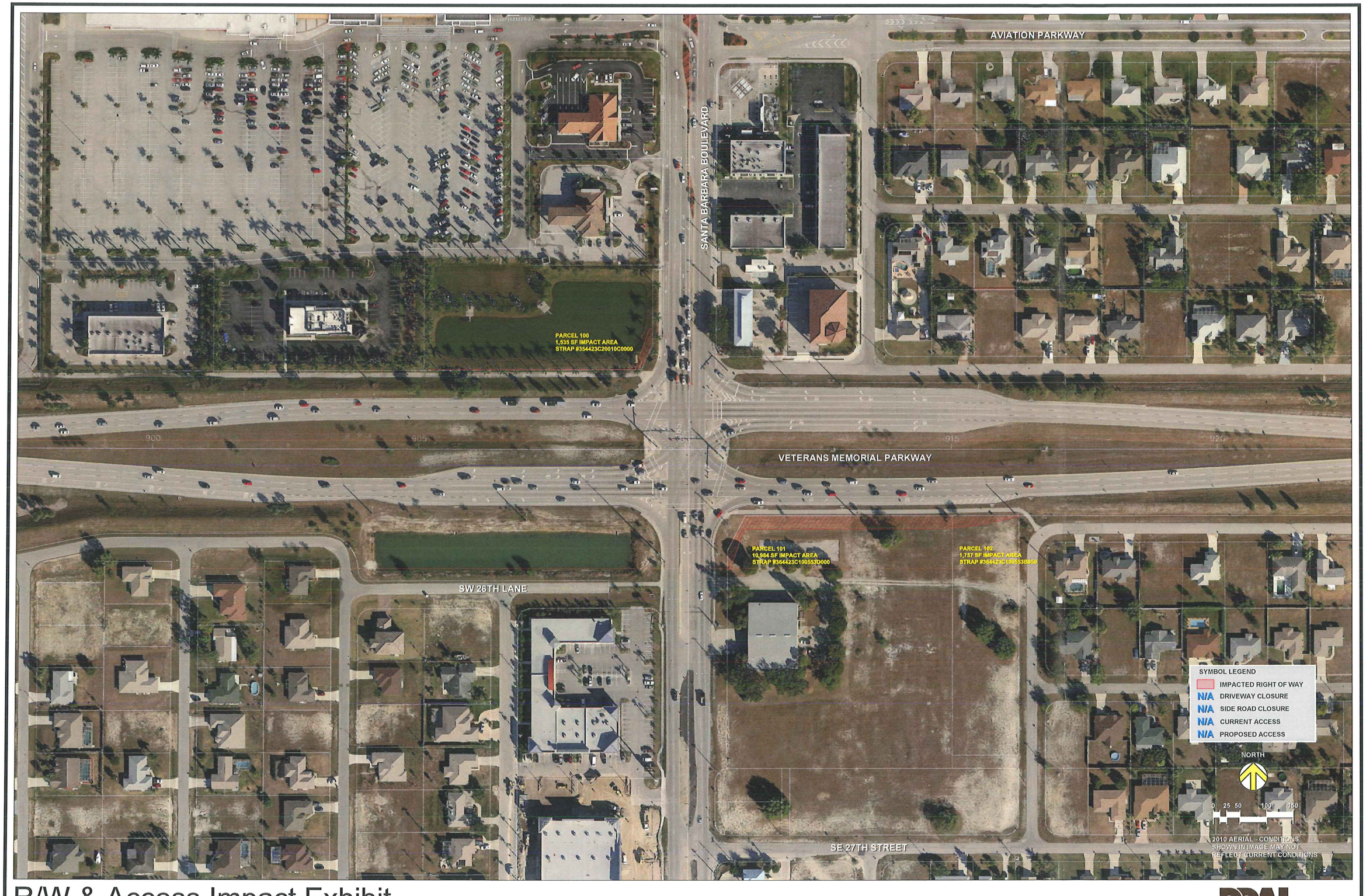


R/W & Access Impact Exhibit

VETERANS PKWY./SANTA BARBARA BLVD.
INTERSECTION IMPROVEMENTS (CN-10-03)

FULL DISPLACED LEFT TURN (FULL) - EXHIBIT VII

DDAI
DAVID DOUGLAS ASSOCIATES, INC.
1821 Victoria Ave., Suite 1, Fort Myers, Fl. 33901 Ph. (239) 337-3330



R/W & Access Impact Exhibit

VETERANS PKWY./SANTA BARBARA BLVD.
INTERSECTION IMPROVEMENTS (CN-10-03)

PARTIAL DISPLACED LEFT TURN (E-W) - EXHIBIT VIII

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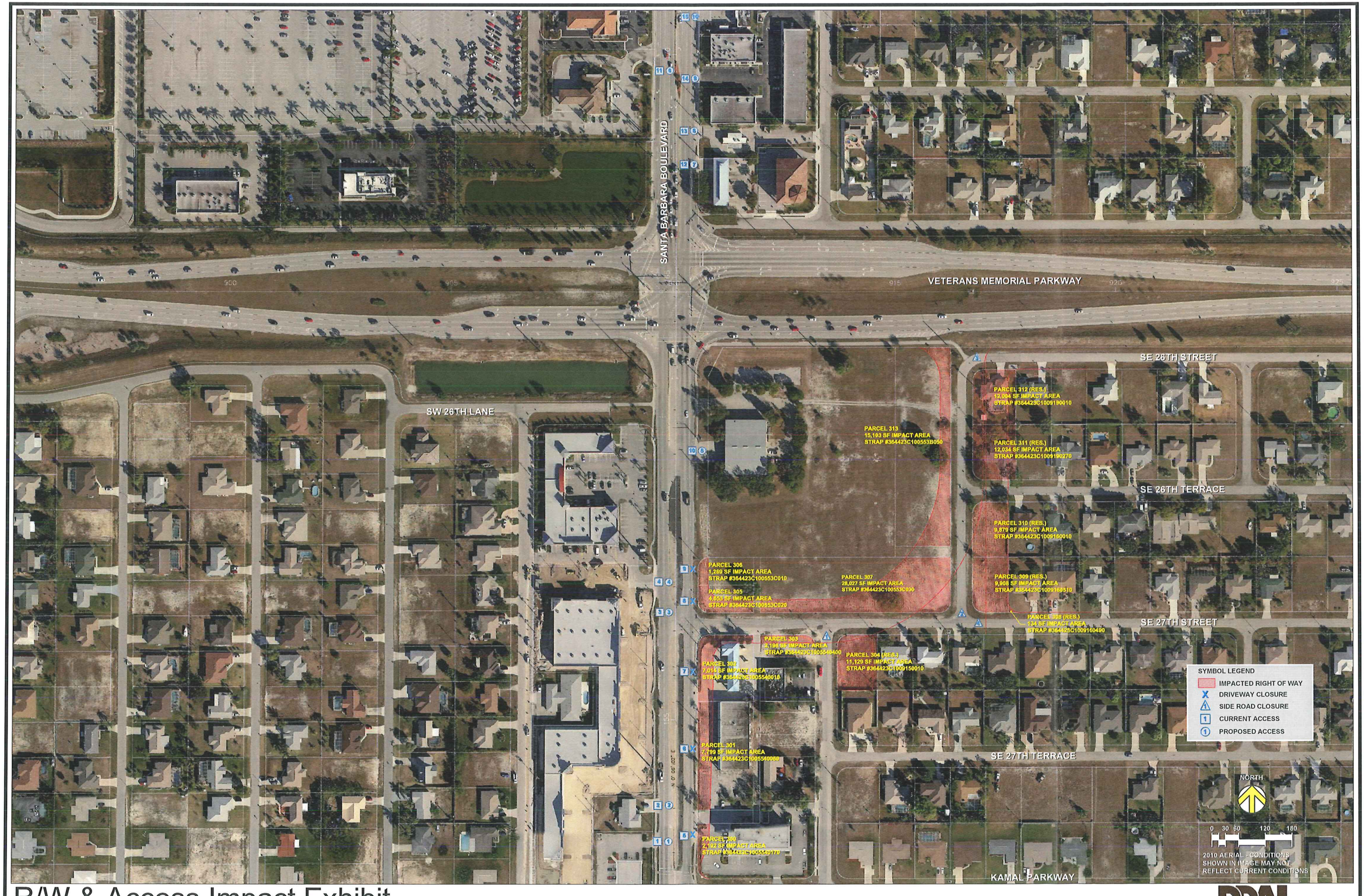
1821 Victoria Ave., Suite 1, Fort Myers, Fl. 33901 Ph. (239) 337-3330



R/W & Access Impact Exhibit

VETERANS PKWY./SANTA BARBARA BLVD.
INTERSECTION IMPROVEMENTS (CN-10-03)

SOUTHEAST QUADRANT (SE) - EXHIBIT IX

DDAI
DAVID DOUGLAS ASSOCIATES, INC.
1821 Victoria Ave., Suite 1, Fort Myers, Fl. 33901 Ph. (239) 337-3330

Table 1. High Crash Locations in Lee County

2009 Intersection Crash Summary		Crash Rate	
Street 1	Street 2	Per Million Vehicles	Number
US 41	DANIELS PKWY	2.28	82
I-75	COLONIAL BLVD		62
SR 82	COLONIAL BLVD	2.40	56
US 41	COLLEGE PKWY	1.86	53
US 41	SIX MILE CYPRESS PKWY	1.62	53
SUMMERLIN RD	COLLEGE PKWY	1.90	48
COLONIAL BLVD	SIX MILE CYPRESS PKWY	1.57	48
DEL PRADO BLVD	VETERANS PKWY	1.26	48
DANIELS PKWY	SIX MILE CYPRESS PKWY	1.44	43
US 41	PINE ISLAND RD	2.12	40
I-75	BONITA BEACH RD SE		40
DANIELS PKWY	TREELINE AVE	2.17	39
MCGREGOR BLVD	COLLEGE PKWY	1.62	39
PINE ISLAND RD	DEL PRADO BLVD	1.76	38
SUMMERLIN RD	CYPRESS LAKE DR	1.48	38
SANTA BARBARA BLVD	VETERANS PKWY	1.44	38
US 41	BONITA BEACH RD SE	1.07	38
LEE BLVD	GUNNERY RD N	2.70	37
DANIELS PKWY	METRO PKWY	1.46	36
I-75	PALM BEACH BLVD		36
US 41	ALICO RD	1.58	35
US 41	COLONIAL BLVD	1.00	35
US 41	PONDELLA RD	2.00	33
I-75	DANIELS PKWY		33
SUMMERLIN RD	WINKLER RD	1.45	32
VETERANS PKWY	COUNTRY CLUB BLVD	1.38	32
PINE ISLAND RD	NICHOLAS PKWY NW	2.19	31
PINE ISLAND RD	PONDELLA RD	2.61	29
US 41	FOWLER ST	1.31	29
COLONIAL BLVD	SUMMERLIN RD	1.18	29
DEL PRADO BLVD	HANCOCK BRIDGE BLVD	1.33	28
COLONIAL BLVD	FOWLER ST	0.96	28
I-75	CORKSCREW RD		28
DEL PRADO BLVD	SE 16TH TER	1.32	27
COLONIAL BLVD	METRO PKWY	0.96	27
COLLEGE PKWY	SOUTH POINTE BLVD	1.83	26
US 41	HANCOCK BRIDGE PKWY	1.45	26
PINE ISLAND RD	SANTA BARBARA BLVD		25

EXHIBIT XI

2008 High Crash Locations

OnStreet	CrossStreet	2008	2007	2006	2008 Rate
US 41	DANIELS PKWY	59	90	89	1.64
US 41	SIX MILE CYPRESS PKWY	51	60	76	1.55
SR 82	COLONIAL BLVD	46	69	54	1.97
DANIELS PKWY	TREELINE AVE	43	52	40	2.03
COLONIAL BLVD	SIX MILE CYPRESS PKWY	43	60	70	1.41
SANTA BARBARA BLVD	VETERANS PKWY	42	63	39	1.59
US 41	PONDELLA RD	41	53	53	2.26
DEL PRADO BLVD S	VETERANS PKWY	41	86	49	1.07
US 41	PINE ISLAND RD NW	37	53	49	1.89
US 41	COLLEGE PKWY	36	47	66	1.26
COLONIAL BLVD	METRO PKWY	36	43	36	1.16
CORKSCREW RD	THREE OAKS PKWY	34	27	33	1.93
MCGREGOR BLVD	COLLEGE PKWY	34	47	50	1.41
COLONIAL BLVD	FOWLER ST	34	36	45	1.12
SUMMERLIN RD	COLLEGE PKWY	33	42	45	1.31
DANIELS PKWY	SIX MILE CYPRESS PKWY	33	64	51	1.11
PINE ISLAND RD	DEL PRADO BLVD	32	47	24	1.48
DEL PRADO BLVD	HANCOCK BRIDGE BLVD	32	30	25	1.43
PINE ISLAND RD	SANTA BARBARA BLVD	28	35	23	4.10
COLONIAL BLVD	SUMMERLIN RD	28	44	48	1.06
US 41	FOWLER ST/BOY SCOUT	28	37	35	1.01
IMMOKALEE RD	GUNNERY RD S	27	32	40	1.53
US 41	HANCOCK BRIDGE PKWY	26	41	36	1.33
US 41	CRYSTAL DR	26	27	23	1.10
US 41	COLONIAL BLVD	26	46	49	0.68
DEL PRADO BLVD S	SE 47TH TER	25	28	18	2.06
US 41	WINKLER AVE	25	22	18	1.13
DEL PRADO BLVD	VISCAYA PKWY	25	32	34	0.90
VETERANS PKWY	COUNTRY CLUB BLVD	25	38	41	0.87
US 41	BONITA BEACH RD SE	25	30	44	0.71
LEE BLVD	GUNNERY RD N	24	51	40	1.43
US 41	CORKSCREW RD	24	44	26	1.12
PINE ISLAND RD	NICHOLAS PKWY NW	23	34	14	1.62
US 41	SANIBEL BLVD	23	30	30	1.07
BONITA BEACH RD SE	OLD 41 RD	22	21	21	1.04
DANIELS PKWY	METRO PKWY	22	40	29	0.89
SUMMERLIN RD	WINKLER RD	21	21	13	1.59
SR 82	VERONICA S SHOEMAKER BLVD	21	38	16	1.27
US 41	ALICO RD	21	53	52	0.95
COLONIAL BLVD	SHOEMAKER BLVD	21			0.89
SUMMERLIN RD	CYPRESS LAKE DR	21	32	34	0.82
BONITA BEACH RD SE	ARROYAL RD	20			1.97
ALICO RD	BEN HILL GRIFFIN PKWY	20	31	32	1.20
SUMMERLIN RD	GLADIOLUS DR	20	40	62	1.19
MCGREGOR BLVD	COLONIAL BLVD	20			1.06

EXHIBIT XII

Tables

DRAINAGE SYSTEM
OPTION COMPARISON TABLE 1

Pre and Post Option Data		1 Pre E/W	1 Post E/W	2 Pre Full	2 Post Full	3 Pre SE Quad	3 Post SE Quad	4 Pre Overpass	4 Post Overpass
Site Area for Water Quality	Acres	23.41	23.74	31.86	35.49	18.63	21.46	23.51	23.51
Impervious Area	Acres	9.46	12.74	16.93	24.63	10.78	13.14	9.34	12.39
Percent Impervious	%	40.41%	53.66%	53.14%	69.42%	57.86%	61.23%	39.73%	52.70%
1" of Runoff Over Watershed	ac-ft	1.95	1.98	2.66	2.96	1.55	1.79	1.96	1.96
SFWMD 25 yr 3 day Rainfall	inches	10.87	10.87	10.87	10.87	10.87	10.87	10.87	10.87
Construction East of Santa Barbra Blvd.	Approximate %	41%	42%	45%	46%	62%	67%	42%	42%
Construction West of Santa Barbra Blvd.	Approximate %	59%	58%	55%	54%	38%	33%	58%	58%
Estimated Construction East of Santa Barbra Blvd.	Acres	9.67	9.96	14.13	16.31	11.55	14.38	9.87	9.87
Estimated Construction West of Santa Barbra Blvd.	Acres	13.74	13.78	17.73	19.18	7.08	7.08	13.64	13.64
East Estimated Curve Number (CN)		87.20	89.70	89.70	92.50	90.40	91.00	87.20	89.50
East Soil Storage (S)	inches	1.47	1.15	1.15	0.81	1.06	0.99	1.47	1.17
East Estimated Runoff	inches	9.29	9.60	9.60	9.95	9.69	9.77	9.29	9.58
East Estimated Runoff Volume	ac-ft	7.48	7.97	11.30	13.52	9.33	11.71	7.64	7.88
West Estimated Curve Number (CN)		87.30	89.70	89.50	92.50	90.40	91.00	87.20	89.50
West Soil Storage (S)	inches	1.45	1.15	1.18	0.81	1.06	0.99	1.47	1.17
West Estimated Runoff	inches	9.30	9.60	9.57	9.95	9.69	9.77	9.29	9.58
West Estimated Runoff Volume	ac-ft	10.65	11.02	14.14	15.91	5.72	5.77	10.56	10.89

DRAINAGE SYSTEM
OPTION COMPARISON TABLE 2

Pre vs. Post Change in Data		1 Δ E/W	2 Δ Full	3 Δ SE Quad	4 Δ Overpass
Increase in Site Area	Acres	0.33	3.63	2.83	0.00
Increase in Impervious Area for Water Quality	Acres	3.28	7.70	2.36	3.05
Increase in Percent Impervious	%	13%	16%	3%	13%
1" of Runoff Over Watershed Increase	ac-ft	0.03	0.30	0.24	0.00
East Side Only					
Estimated Curve Number (CN)		2.50	2.80	0.60	2.30
Estimated Runoff Volume	ac-ft	0.49	2.22	2.38	0.24
Additional Right-of-way Required	**Acres**	**0.29**	**2.18**	**2.83**	**0.00**
Additional Water Quality Required?		YES	YES	YES	NO
1" of Runoff Over Additional ROW	ac-ft	0.02	0.18	0.24	0.00
Compensating WQ due to construction necessary?		YES	YES	YES	YES
Is compensating WQ possible within existing ROW?		YES	YES	YES	YES
Potential Dry Detention Area to Compensate	ac-ft	0.36	0.36	0.36	0.36
Potential WQ Compensation converted to a Wet Detention volume	ac-ft	0.48	0.48	0.48	0.48
Additional R/W Estimated. Pond Size if compensating volume method is not allowed by SFWMD:	Acres	1.16	2.55	2.45	1.05
Wet Pond Area at Control Elevation	Acres	0.58	1.64	1.56	0.50
West Side Only					
Estimated Curve Number (CN)		2.40	3.00	0.60	2.30
Estimated Runoff Volume	ac-ft	0.37	1.77	0.05	0.33
Additional Right-of-way Required	**Acres**	**0.04**	**1.45**	**0.00**	**0.00**
Additional Water Quality Required?		YES	YES	NO	NO
1" of Runoff Over Additional ROW	ac-ft	0.01	0.12	0.00	0.00
Compensating WQ due to construction necessary?		NO	NO	NO	NO
Is compensating WQ possible within existing ROW?		YES	YES	YES	YES
Additional R/W Estimated. Pond Size if compensating volume method is not allowed by SFWMD:	Acres	1.05	2.02	1.05	1.05
Wet Pond Area at Control Elevation	Acres	0.50	1.22	0.50	0.50

GENERAL NOTES FOR TABLES 1 & 2:

1 The Site Area was determined using the approximate beginning and end stationing for the limits of post-development construction for each option. The same limits were then applied to the pre-development condition.
2 The pre-development impervious area is based upon the Santa Barbra Blvd. Road Widening Phase III plans as developed by Avalon Engineering Inc.
3 ERP No. 36-02841-S, App No. 951002-17 is generally east of Santa Barbra Boulevard.
4 ERP No. 36-02841-S, App No. 971015-9 is west of Santa Barbra Boulevard.
5 ERP No. 36-02841-S, App No. 951002-17 Water Quality stated as 1" over the site. However the calculations use the value calculated using 2.5" x the % Impervious. The value determined using the 2.5" criteria is greater and results in 3.3 ac-ft of dry detention rather than 2.84 ac-ft when using the 1" criteria.
6 ERP No. 36-02841-S, App No. 971015-9 Water Quality determined as 1" over new right-of-way area.
7 ERP No. 36-02841-S, App No. 951002-17 excess runoff is not attenuated and no controlling discharges have been set.
8 ERP No. 36-02841-S, App No. 971015-9 excess runoff is attenuated and controlling discharges have been set.
9 ERP No. 36-02841-S, App No. 951002-17 was permitted as having more impervious area than actually constructed (+/-3.7 ac).
10 ERP No. 36-02841-S, App No. 971015-9 was permitted without designating a specific impervious area allowed per basin.
11 The post development calculations do not take credits for existing impervious area within the new right-of-way areas.
12 Wet Detention Water Quality Volumes are converted to Dry Detention Volumes using a factor of 0.75 as prescribed by the SFWMD.
13 The 25 yr 3 day rainfall value was the maximum design year rainfall volume between App No. 951002-17 and 971015-9.
14 The percentage given for the amount of construction either west or east of Santa Barbra Blvd. was estimated from the amount of project area either west or east of the roadway centerline for Santa Barbra Blvd. The percentages were then applied to the total impervious/pervious areas for each option for calculations to either side of the Santa Barbra Boulevard centerline.
15 The given CN is a composite value where impervious areas have a CN of 98 and pervious areas have a value of 80.
16 The Estimated Runoff Volume is calculated utilizing the Curve Number method as described in Urban Hydrology for Small Watersheds published by the USDA. 1986
17 The construction of the alternatives will either significantly modify or remove up to +/- 0.36 ac-ft of dry detention water quality volume associated with App No. 951002-17.
18 Both ERP No. 36-02841-S, App No. 951002-17 and 971015-9 require 1" of water quality for additional right-of-way area. App. No. 971015-9 is explicit in the 1" requirement, whereas the 1" requirement can be inferred from App. No. 951002-17 since it required 1" over the entire right-of-way area. Therefore, if the right-of-way area increases over the area permitted under App. No. 951002-17, then the 1" water quality criteria should be applied to the increase in area.
19 Sub-Basins N1, N3, P10, P11, P12, P22, & P29 constructed under App. No. 971015-9 could be excavated down to elevation 5.6 ft to increase water quality and attenuation volume up to +/- 2.5 ac-ft.
20 Compensating water quality will require approval from the SFWMD. In general compensating water quality volumes can be created within the existing right-of-way limits.
21 The estimated pond sizes are based on a dry detention area having 2 ft of vertical storage from toe of slope to top of bank, 4:1 side slopes, provide water quality for 2.5 inches over the additional impervious area, compensating water quality for dry detention areas to be significantly modified or removed, and provide attenuation for the additional runoff generated in the post-development condition.

Appendix

LEE COUNTY
SOUTHWEST FLORIDA
BOARD OF COUNTY COMMISSIONERS

John E. Manning
District One

Brian Bigelow
District Two

Ray Judah
District Three

Tammy Hall
District Four

Frank Mann
District Five

Karen B. Hawes
County Manager

Michael D. Hunt
County Attorney

Diane M. Parker
County Hearing Examiner

Mr. Dan Craig, PE
David Douglas Associates, Inc.
1821 Victoria Ave.
Fort Myers, Florida 33901

September 26, 2011

Dear Mr. Craig:

Per your request, the LeeTran planning staff has reviewed the various designs for the Veterans Parkway and Santa Barbara Boulevard intersection improvements to determine what impacts each of the designs has on transit services in the area. While none of the designs has an impact on existing services, we are in the early stages of making some route modifications in Cape Coral. Under this modification, our transit buses would need to make a left off of Santa Barbara (Southbound direction) onto Veterans Parkway Eastbound. The implications of these potential changes for each of the proposed designs are discussed below:

- Overpass Design – Our last Southbound stop on Santa Barbara would be at Aviation Parkway. Because the width of Santa Barbara Boulevard is not affected and the required left turn would not be relocated, we find no adverse impact on transit service with this design
- Southeast Quad Design – This design moves the left turn movement to a point further South (roughly SE 27th Street) and then a loop back northbound to intersect with Veterans Parkway. While the distance is short, our run time schedules would be affected and our transit service would miss some "meets" where patrons would transfer to a different route. Because of the difficulty in making our meets, we find this configuration to have an adverse impact on transit service.
- Design Three – As with the overpass design, there is no widening of Santa Barbara and left turns would remain the same. However, queuing at the proposed new traffic signal on Veterans Parkway may impact run times and headways. We find this option to have only a minimal potential adverse impact.
- Design Five – This design makes significant changes to lanes on Santa Barbara. Our current bus stop location at Aviation Parkway and the change of the location for the left hand turn lane to a point near Aviation Parkway would make a left hand turn onto Veterans Parkway a nearly impossible feat at most times of day and certainly impossible during peak periods. Because of this, we find Design Five to have the most adverse impact on transit of all of the interchange improvement options.

Thank you for the opportunity to review and comment on the proposed intersection designs. Should you need any additional documentation or have any further questions, please do not hesitate to contact me via e-mail or by telephone at 533-0333.

Sincerely,

Daniel Rudge
Principal Planner