

**APPENDIX H**

San Juan Waterfront Master Plan Transport Assessment  
(subject to update)



# **SAN JUAN WATERFRONT MASTERPLAN**

**Transport Assessment**

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## 1. BACKGROUND

- 1.1 Colliers International has putted together a multidisciplinary group to prepare the San Juan Waterfront Masterplan on behalf of the Puerto Rico Ports Authority (PRPA). Steer Davies Gleave, as transport consultants for the Puerto Rico Highway and Transportation Authority (PRHTA), has been working with the Colliers team providing transportation advice throughout the definition and preparation of this Masterplan.

### **Purpose of this Report**

- 1.2 This report represents the Transport Assessment for the Environmental Impact Statement (EIS) for the San Juan Waterfront development project.
- 1.3 The work presented in this report is a continuation of the *San Antonio Canal Masterplan Transport Report* issued to Colliers in August 2006.

### **Site Location**

- 1.4 The Masterplan scheme will be located in Puerta de Tierra at the San Juan Isleta. This area is bounded by Muñoz Rivera Avenue to the north, Baldorioty de Castro to the east, San Antonio Canal to the south and Del Muelle Street to the west.
- 1.5 The San Juan Waterfront Masterplan covers the predominantly industrial area in the southern part of Puerta de Tierra bounded by Fernández Juncos Avenue to the north, Intersection 5 (I5) to the east, the San Antonio Canal to the south and Del Muelle Street to the west. Intersection 5 is referred to the junction area where all the access roads to the Isleta de San Juan merge. The intersection area is over the San Antonio Canal. The roads composing the Intersection 5 area: Ponce de León Avenue (PR-25), Fernández Juncos Avenue (PR-35), Baldorioty de Castro Ave (PR-26), Muñoz Rivera Avenue (PR-1), Condado Avenue<sup>1</sup>.
- 1.6 Figure 1.1 shows the location of the San Juan Waterfront Masterplan area.

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<sup>1</sup> Intersection 5 is defined in more detail in Chapter 2

FIGURE 1.1 PROJECT AREA



## 2. ASSESSMENT OF EXISTING CONDITIONS

### Current Development

- 2.1 The San Juan Waterfront Masterplan area is currently occupied predominantly by industrial premises, mostly owned by PRPA. Other varied uses are found within this area including office buildings (public, private and federal), gas stations, and a police precinct.
- 2.2 The area to the north of the Waterfront development boundaries is occupied by residential units, government buildings and small retail units.
- 2.3 Appendix A includes a series of pictures of the study area.

### Road Network

- 2.4 Whilst connections to the east and west are relatively good for the site area, connectivity in a north-south direction is less easy. Existing access to the Masterplan area is provided from the east and west by Fernández Juncos Avenue (via I5 from the east and from Old San Juan from the west). Access to the San Juan Waterfront area is provided via a series of side streets perpendicular to Fernández Juncos Avenue including San Andrés, Tadeo Rivera, Matías Ledesma and San Juan Bautista. Figure 2.1 shows the existing road network of the area.
- 2.5 PR-35 (Fernández Juncos Avenue) provides an access from the San Juan Isleta to Hato Rey passing through Miramar and Santurce. This is a two to three lanes one-way road going southbound from I5 to Hato Rey.
- 2.6 Along the Isleta Fernández Juncos Ave becomes the southern access to Old San Juan with four-lane two-way traffic from I5 to G. Concepción de Gracia Street.
- 2.7 Del Tren Street extends parallel to Fernández Juncos Avenue along the Isleta and provides two-way bus only access.
- 2.8 There are various traffic signals along Fernández Juncos Avenue and Del Tren Street (immediately north of the Masterplan area):
  - Fernández Juncos Avenue and: Valdés, San Andrés, Matías Ledesma, and Calle 3 streets.
  - Del Tren and: Valdés, Matías Ledesma, Ramon Power, and Calle 5 streets.
- 2.9 PR-1 (Muñoz Rivera Avenue) south of Intersection 5 provides a strategic highway to highway interchange connecting the Isleta the San Juan to major highways such as PR-18, PR-2, PR-26 and PR-22.
- 2.10 Along the Isleta, Muñoz Rivera Avenue provides inbound access to the north by two-lanes of traffic road westbound only. It has a counter-flow bus lane from Gerardo Dávila to San Agustín Street.

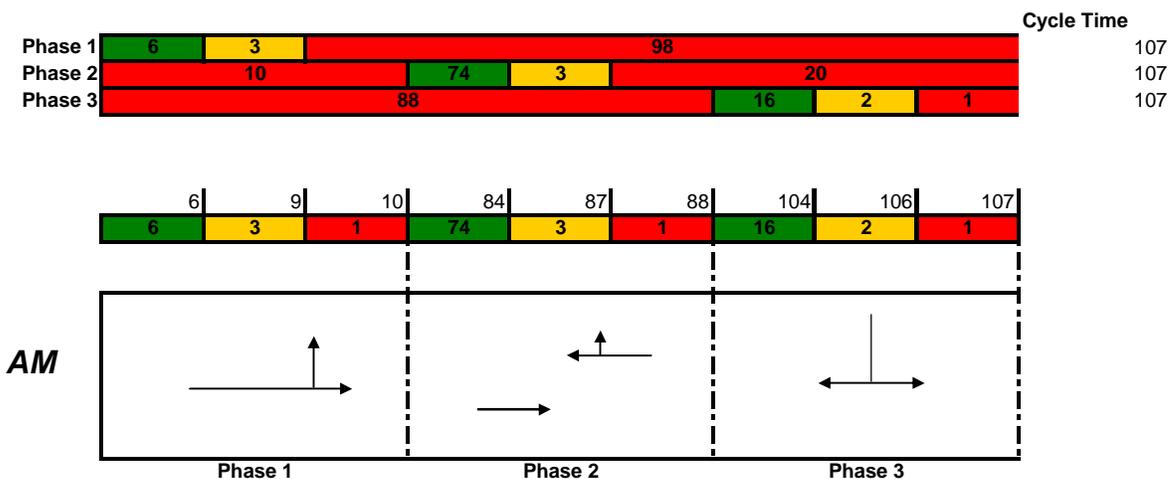
- 2.11 PR-25 [Ponce de León Avenue/Constitución Avenue (along Puerta de Tierra)] provides a link between San Juan Isleta and Río Piedras (passing by the University of Puerto Rico) via Miramar and Hato Rey (the business district of San Juan). This is a one-way, three lane road northbound from I5 to Río Piedras with a counter-flow bus lane.
- 2.12 Along the Isleta this road provides two to three lanes of traffic road eastbound. A westbound bus lane is provided along the length of this road from I5 to Gerardo Dávila Street.
- 2.13 PR-26 (Baldorioty de Castro Expressway) provides a strategic link between the San Juan Isleta and Carolina to the east of San Juan. PR-26 passes through Condado and Isla Verde by the Luis Muñoz Marín International Airport.



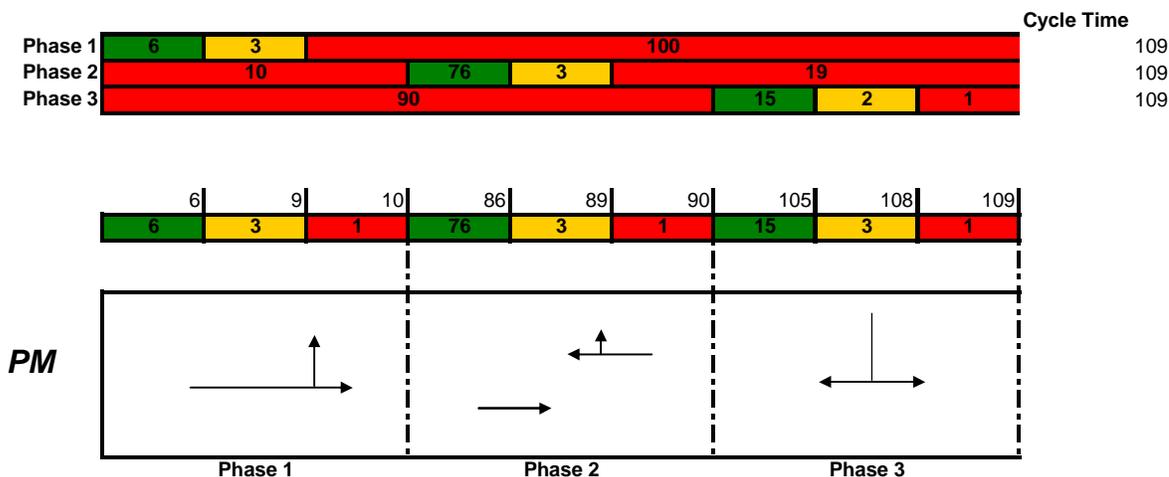
## Signals

- 2.14 Steer Davies Gleave personnel undertook signal timings surveys in June 2007 for the intersections along the Fernández Juncos Avenue. These signal timings are shown in Figure 2.2 to Figure 2.7. The signal of Fernández Juncos and Calle 3 was not surveyed since this is only activated by request and it is most of the time giving continuous green to Fernández Juncos Avenue traffic.

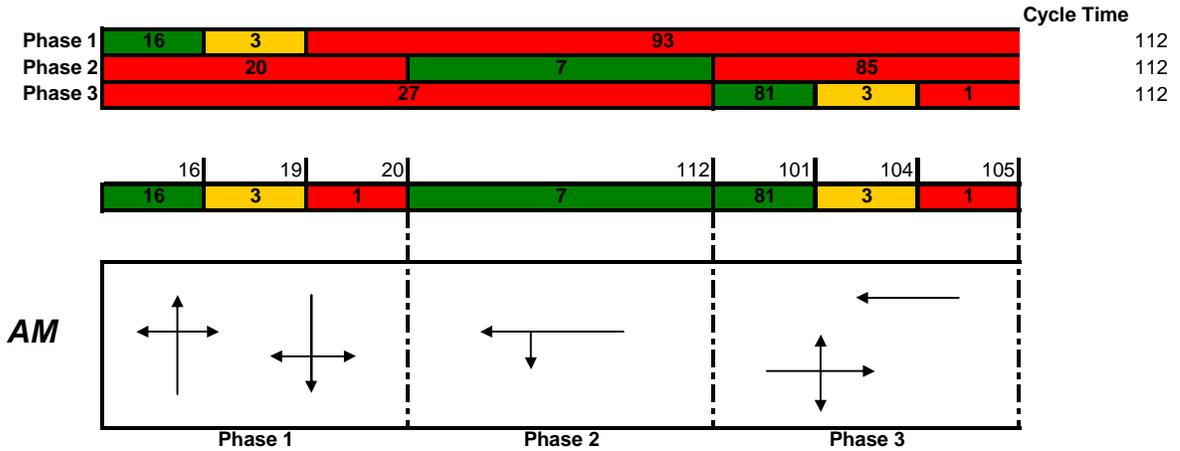
**FIGURE 2.2 FERNÁNDEZ JUNCOS AVENUE AND VALDÉS STREET INTERSECTION SIGNAL TIMINGS – AM PEAK**



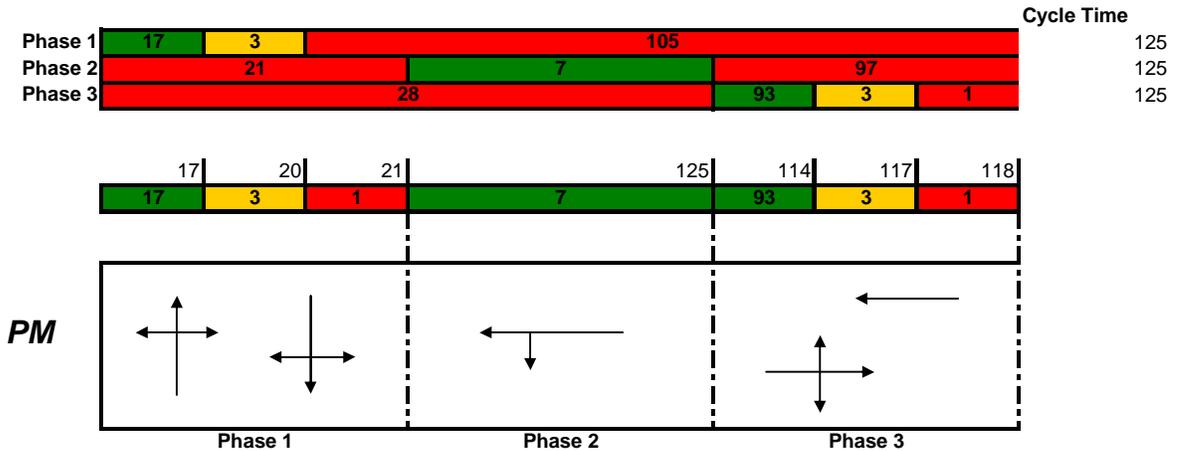
**FIGURE 2.3 FERNÁNDEZ JUNCOS AVENUE AND VALDÉS STREET INTERSECTION SIGNAL TIMINGS – PM PEAK**



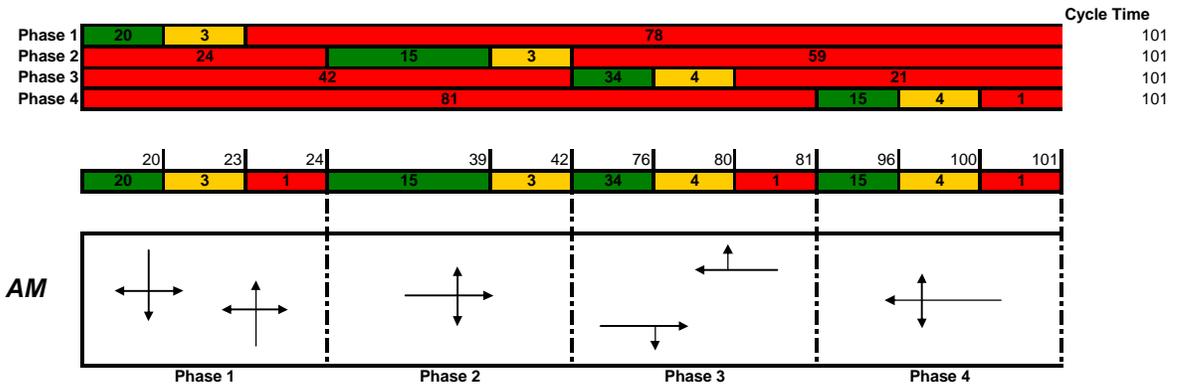
**FIGURE 2.4 FERNÁNDEZ JUNCOS AVENUE AND SAN ANDRÉS STREET INTERSECTION SIGNAL TIMINGS – AM PEAK**



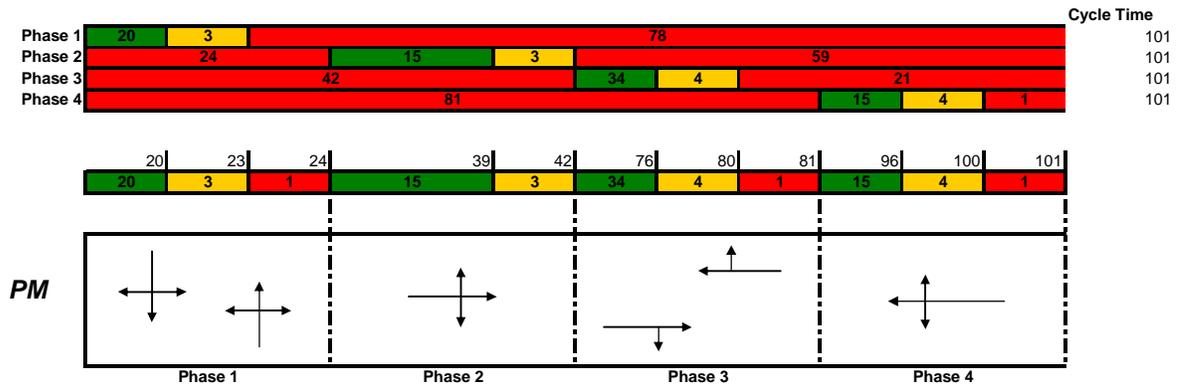
**FIGURE 2.5 FERNÁNDEZ JUNCOS AVENUE AND SAN ANDRÉS STREET INTERSECTION SIGNAL TIMINGS – PM PEAK**



**FIGURE 2.6 FERNÁNDEZ JUNCOS AVENUE AND MATIAS LEDESMA STREET INTERSECTION SIGNAL TIMINGS – AM PEAK**



**FIGURE 2.7 FERNÁNDEZ JUNCOS AVENUE AND MATÍAS LEDESMA STREET INTERSECTION SIGNAL TIMINGS – PM PEAK**



**Traffic Survey**

2.15 Automatic traffic counts (9 locations) and manual traffic counts (20 intersections) were undertaken along the San Juan Isleta from December 2006 to February 2007<sup>2</sup>: (Surveys are included in Appendix B)

**Automatic Traffic Counts:**

- Fernández Juncos Avenue east of Concepción de Gracia St.
- Del Tren Street east of Concepción de Gracia St.
- Covandonga west of Gerardo Dávila Street
- Constitución west of Gerardo Dávila Street
- Muñoz Rivera west of Gerardo Dávila Street
- Fernández Juncos east of Calle 5
- Del Tren Street east of Calle 5
- Constitución Ave. east of Calle 5
- Muñoz Rivera west of Normandie Hotel

**Manual Counts:**

- Fernández Juncos Avenue / Calle 5
- Fernández Juncos Avenue / Calle 3
- Fernández Juncos Avenue / Ramón Power Street
- Fernández Juncos Avenue / Fernández Street

<sup>2</sup> No counts were undertaken during the Christmas holidays.

- Fernández Juncos Avenue / San Juan Bautista Street
- Fernández Juncos Avenue / Matías Ledesma Street
- Fernández Juncos Avenue / San Andrés Street
- Fernández Juncos Avenue / Valdés Steet Street
- Fernández Juncos Avenue / G. Concepción de Gracia Street
- Muñoz Rivera Avenue / Normandie access
- Muñoz Rivera Avenue / Matías Ledesma Street
- Muñoz Rivera Avenue / Pelayo Street
- Muñoz Rivera Avenue / Esteves Street
- Muñoz Rivera Avenue / Reverendo Gerardo Dávila Street
- De la Constitución Avenue / Calle 5
- De la Constitución Avenue / Ramón Power Street
- De la Constitución Avenue / San Agustín Street
- De la Constitución Avenue / Matías Ledesma Street
- De la Constitución Avenue / Pelayo Street
- De la Constitución Avenue / Esteves Street

2.16 Further manual counts were undertaken in May 2007 at:

- Muñoz Rivera Avenue / San Francisco Street
- Ponce de León Avenue / Fortaleza Street
- Covadonga / J.A. Corretjer Street
- Los Veteranos Ave. / J.A. Corretjer Street

## Public Transport Network

### AMA

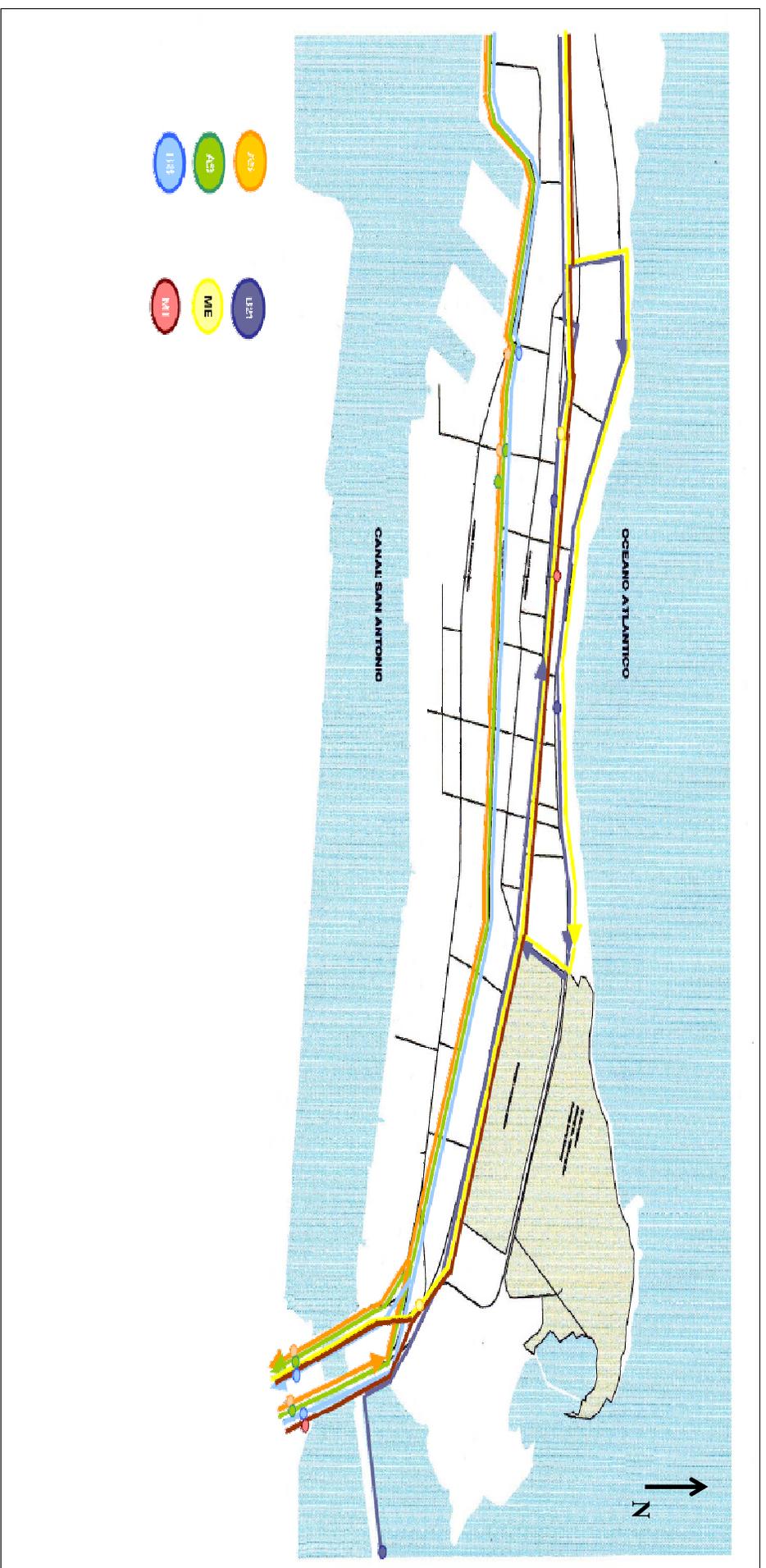
- 2.17 The San Juan Isleta is served by six bus routes of the Metropolitan Transit Authority (AMA, for its Spanish acronym). These routes have exclusive lanes along Muñoz Rivera Avenue and Ponce de León Avenue and a dedicated two-way transit corridor (Del Tren Street).
- 2.18 Figure 2.8 shows the routes of the AMA bus services through the Isleta.
- 2.19 The three bus services shown in Table 2.1 are routed into and out of the San Juan Isleta via the Del Tren Street, which runs through the center of the San Juan Isleta, immediately to the north of the Masterplan area.

**TABLE 2.1 BUS SERVICES VIA DEL TREN STREET**

Service Number	Service Route	Frequency	
		Mon-Fri (daytime)	Saturday/Sunday & Holiday
A-5	San Juan – Pda. 18 – Calle Loiza – Isla Verde – Los Ángeles - Iturregui	Every 8 minutes	Every 15/20 minutes
A-9	Río Piedras – Ave. Borinquen - Estación Sagrado Corazón – Ave. F. Juncos – Pda. 18 – San Juan	Every 9 minutes	Every 15/20 minutes
B-8	San Juan – Pda. 18 – Ave. Kennedy – San Patricio	Every 20 minutes	Every 30/20 minutes

- 2.20 The three bus services shown in Table 2.3 are routed into and out of the San Juan Isleta via Muñoz Rivera (eastbound) and De la Constitución (westbound) avenues, which run to the north of the Masterplan area.

FIGURE 2.8 AMA BUS ROUTES TO ISLETA DE SAN JUAN



**TABLE 2.2 BUS SERVICES VIA MUÑOZ RIVERA AVENUE**

Service Number	Service Route	Frequency	
		Mon-Fri (daytime)	Weekend
B-21	San Juan – Condado -Pda. 18 – Ave. F. Juncos – Estación Sagrado Corazón – Plaza Las Américas	Every 20 minutes	Every 25 minutes
M-1	San Juan – Santurce – Estación Sagrado Corazón – Estación Hato Rey – Estación Roosevelt – Estación Domenech – Río Piedras	Every 10 minutes	Every 15 minutes
M-E	San Juan – Santurce – Estación Sagrado Corazón – Estación Hato Rey – Estación Roosevelt – Estación Domenech – Río Piedras	Every 10 minutes	No service

2.21 A survey was undertaken on September 2007 to assess peak hour<sup>3</sup> bus usage on a typical weekday at the Isleta. The number of passengers using the bus service within the Isleta<sup>4</sup> was counted for Inbound and Outbound services by boarding the buses along their route in the Isleta for the peak periods. Table 2.3 summarizes the AM Peak bus usage and Table 2.4 shows the survey results for the PM Peak period. Surveys are included in Appendix B.

**TABLE 2.3 AM PEAK PERIOD BUS SERVICES USAGE AT THE SAN JUAN ISLETA**

	Inbound Bus Service						TOTAL
	A-5	A-9	B-8	B-21	M-1	M-E	
<b>Total Buses</b>	2	4	3	1	7	2	<b>19</b>
<b>Average No. Passengers</b>	11	18	5	7	38	13	<b>92</b>
<b>Bus Usage</b>	22	72	15	7	266	26	<b>408</b>
	Outbound Bus Service						TOTAL
	A-5	A-9	B-8	B-21	M-1	M-E	
<b>Total Buses</b>	3	3	2	3	9	1	<b>21</b>
<b>Average No. Passengers</b>	10	9	3	11	14	6	<b>53</b>
<b>Bus Usage</b>	30	27	6	33	126	6	<b>228</b>

<sup>3</sup> Road/traffic peak hour – AM (7:30-8:30) and PM (4:00-5:00).

<sup>4</sup> Service within the Isleta considers every bus passenger that access or egress the bus at the San Juan Isleta area, considered to be west of Intersection 5.

**TABLE 2.4 PM PEAK PERIOD BUS SERVICES USAGE AT THE SAN JUAN ISLETA**

	Inbound Bus Service						TOTAL
	A-5	A-9	B-8	B-21	M-1	M-E	
<b>Total Buses</b>	4	1	1	2	7	3	<b>18</b>
<b>Average No. Passengers</b>	19	13	7	12	18	11	<b>110</b>
<b>Bus Usage</b>	76	13	7	24	126	33	<b>279</b>
	Outbound Bus Service						TOTAL
	A-5	A-9	B-8	B-21	M-1	M-E	
<b>Total Buses</b>	4	2	4	2	6	3	<b>21</b>
<b>Average No. Passengers</b>	23	24	7	22	18	24	<b>118</b>
<b>Bus Usage</b>	92	48	28	44	108	72	<b>392</b>

**Pedestrian and Cycle Network**

2.22 Fernández Juncos Avenue which runs in the northern edge of the Masterplan area, has narrow sidewalks that are in a poor condition along both sides of the street. Pedestrian crossings are demarked at the signalized intersections along Fernández Juncos Avenue (Figure 2.9). There are no other formal pedestrian crossing facilities to cross this four-lane highway creating a degree of pedestrian severance between the southern and northern sides of the highway.

**FIGURE 2.9 PEDESTRIAN CROSSINGS AT FERNÁNDEZ JUNCOS AVENUE**



- 2.23 The Del Tren Street (exclusive AMA bus corridor, Figure 2.10) has no proper sidewalks on either side of the highway and lacks proper bus stops. The Street is lightly trafficked since it dedicated exclusively to AMA bus services. Del Tren Street has vacant building on both sides and rough neighborhood, which has resulted in it been known as a crime hotspot and a local ‘no go area’. Both of these facts have resulted in pedestrians avoiding this Street.

**FIGURE 2.10 DEL TREN STREET - EXISTING CONDITIONS**



- 2.24 All the sounding side streets leading off from Fernández Juncos Avenue have sidewalks along both sides of the street; the qualities of these facilities varies from street to street, but in general are poor.
- 2.25 No formal cycle lanes or cycle parking facilities are currently provided within the Masterplan area and the San Juan Isleta. Existing road pavement conditions along Fernández Juncos Avenue make cycling an unsafe practice. The deserted environment of Del Tren Street results in cyclists avoiding this Street.

### **Parking**

- 2.26 There are various major parking facilities in the Isleta that currently serve residents, retail outlets and offices in the area (Figure 2.11).
- 2.27 In total there are 1,885 spaces but most of these are not available for use by the general public, being exclusive for government agencies or residential buildings.

FIGURE 2.11 EXISTING MAYOR PARKING FACILITIES AT THE ISLETA



## Intersection 5

- 2.28 This intersection provides the “gateway” to the Isleta and it is one of the most heavily used intersections in Puerto Rico (Figure 2.12). It caters for a significant amount of traffic (the traffic surveys recorded around 97,700 vehicles crossing the Esteves and San Antonio bridges daily on a typical weekday).
- 2.29 The existing road network near I5 comprises a variety of highway features: over-bridges, traffic signals, on and off highway ramps, lane diverges, lane merges, weaving sections and some priority controlled movements. In addition, some movements can only be made by taking complex, circuitous routes.
- 2.30 The existing design of I5 does not encourage pedestrians and cyclists, except perhaps around the perimeter of the Intersection.
- 2.31 The existing road layout is shown in Figure 2.13. To the south, a complex series of bridges, merges and diverges provides connections to the following roads:
- San Antonio Bridge (only used by southbound traffic)
  - Esteves Bridge (only used by northbound traffic)
  - Luis Muñoz Rivera Expressway (PR-1) (provides access to Hato Rey)
  - Ponce de León Avenue (PR-25) (provides access from Hato Rey)
  - Fernández Juncos Avenue (PR-35)
  - Baldorioty de Castro Expressway (PR-26) (Provides access towards the Luis Muñoz Marín International Airport and Isla Verde)
  - Baldorioty de Castro Boulevard (provides access to the Convention Center)
- 2.32 To the northern side of the two bridges, a third bridge (Dos Hermanos Bridge) provides access to Condado. Further to the north, the two main bridges (San Antonio and Esteves) are connected together by a set of ramps, which links with two separate routes heading towards the Isleta of San Juan (Fernández Juncos Avenue and Luis Muñoz Rivera) and from the Isleta (Fernández Juncos Avenue and Ponce de León Avenue).
- 2.33 The existing design of the road network combined with the high traffic volume result in regularly experienced delays and congestion during morning and evening peak periods. The number of vehicles using I5 during these peak periods is shown in Figure 2.14 and Figure 2.15.
- 2.34 Traffic levels are expected to grow in the future due to increased economic activity and higher levels of tourism from proposed development including the San Juan Waterfront and the Convention Centre District. Convenient access to each of the areas is critical to their success.

FIGURE 2.12 INTERSECTION 5 LOCATION



FIGURE 2.13 CURRENT INTERSECTION 5 ROAD NETWORK

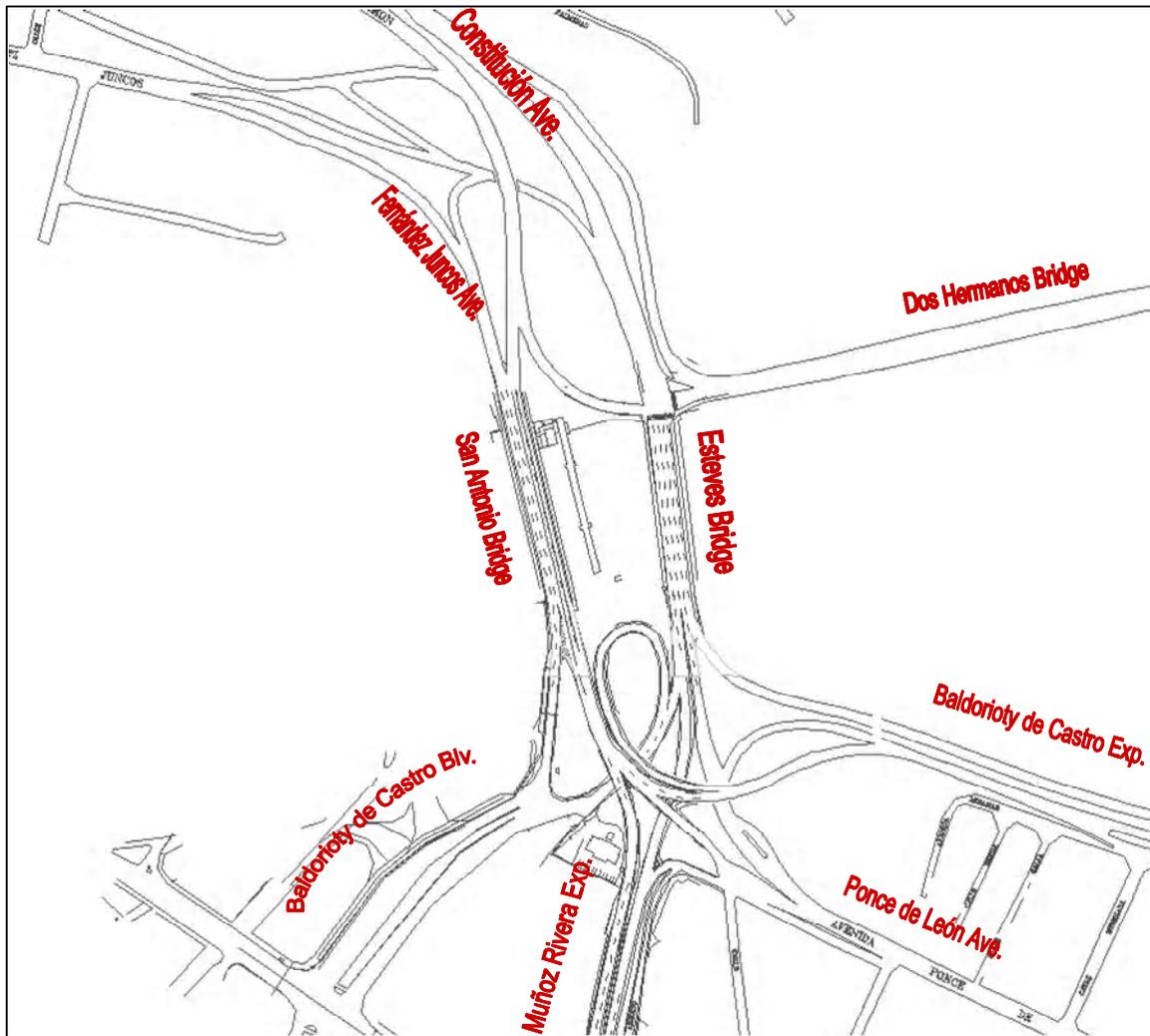


FIGURE 2.14 AM PEAK PERIOD TRAFFIC

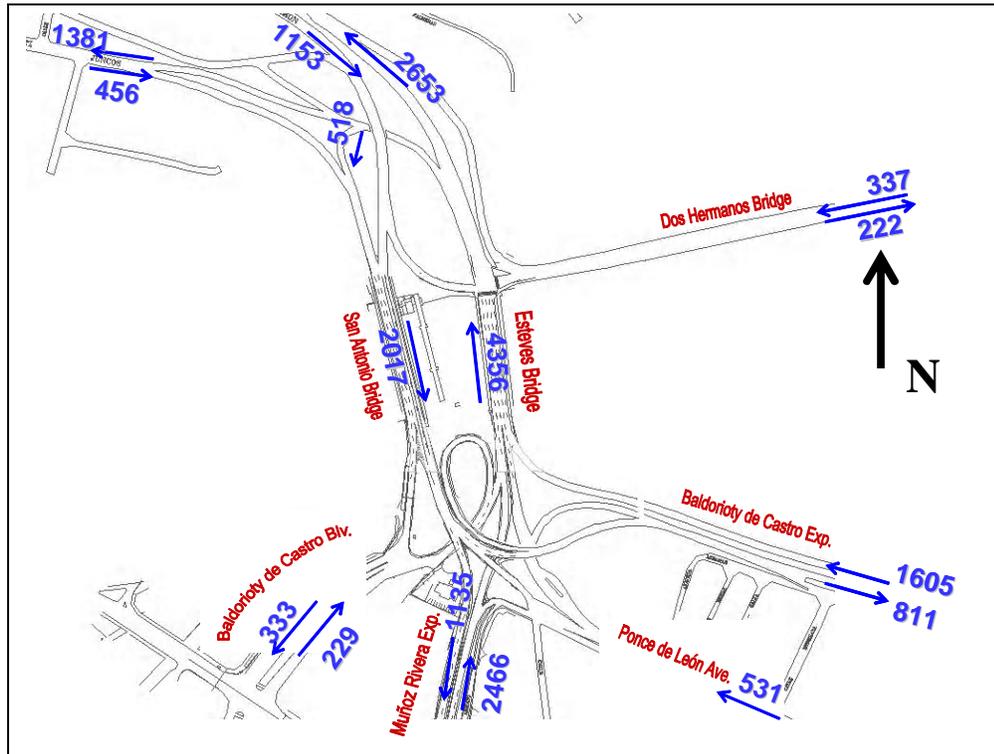
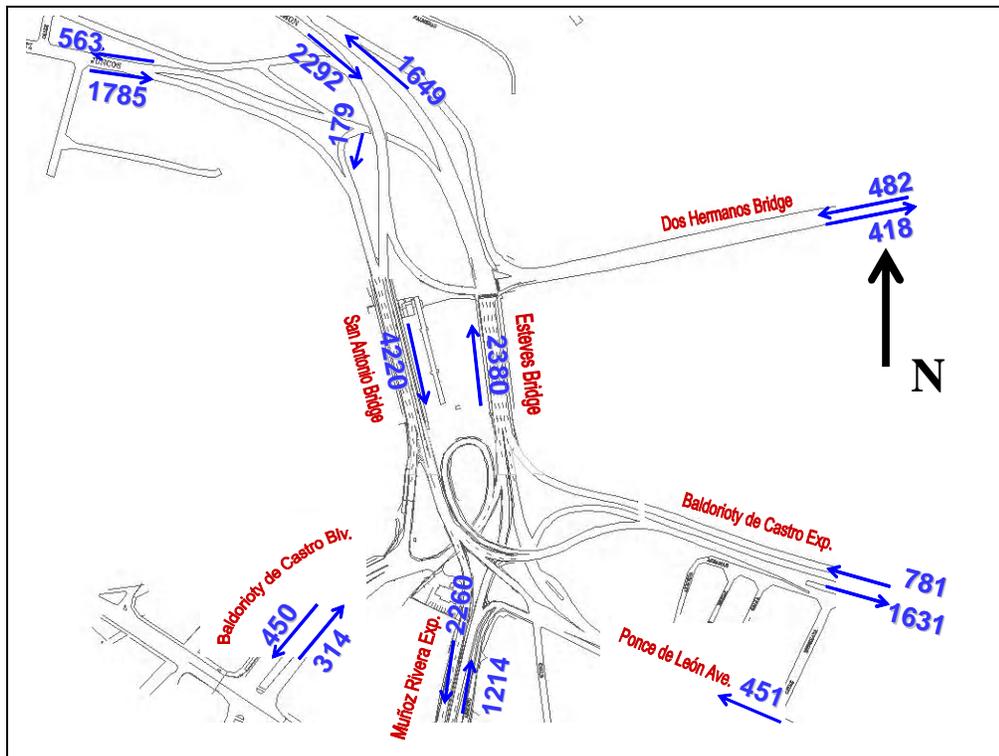


FIGURE 2.15 PM PEAK PERIOD TRAFFIC



- 2.35 Steer Davies Gleave have been working with the Puerto Rico Highway and Transportation Authority (PRHTA) since 1996 assessing a number of different schemes for I5, depending on the prevailing public policy at the moment.
- 2.36 Currently, Steer Davies Gleave helped the PRHTA study various proposed design alternatives for I5 in order to:
- Improve vehicle flow through the I5 network
  - Remove existing weaving sections and formalize weaving movements (improve safety)
  - Improve pedestrian access through I5 to connect:
    - Condado/Hotel District, the Convention Center District and the proposed development of the San Juan Waterfront
- 2.37 The conclusions of this I5 study will directly affect the assessment for the San Juan Waterfront and consequently are part of the future Waterfront roadway network assessment.

### 3. MASTERPLAN PROPOSED FUTURE CONDITIONS

#### Development Proposal; Proposed Action-Alternative 1

- 3.1 Two alternatives for proposed actions are evaluated in this study; they are referred as Proposed Action Alternative 1 and Proposed Action Alternative 2. They are similar in nature with variations on Marina and Parque de la Bahia locations. These variations in turn have some effect over the roadway network. Alternative 2 and other two alternatives consisting in variations on No-Action Alternatives are discussed on Chapter 4. This Chapter is concerned with Proposed Action Alternative 1, which is the preferred alternative.
- 3.2 The San Juan Waterfront will be a mixed-use development including residential, commercial, office, hotel and civic uses covering some 2,700,000 sq ft.
- 3.3 A land-use breakdown is divided in the eastern and western areas defined by Fernández Street (Figure 3.1). Table 3.1 and Table 3.2 below summarize the proposed development program for these two (2) areas of the San Juan Waterfront.

**TABLE 3.1 WESTERN AREA DEVELOPMENT PROGRAM: PROPOSED ACTION**

<b>Block</b>	<b>Commercial (Sq.ft.)</b>	<b>Hotel (Keys)</b>	<b>Casino (Sq.ft.)</b>	<b>Marina Facilities (Berths)</b>	<b>Residential (units)</b>	<b>Civic (Sq.ft.)</b>
<b>A+B+C</b>	27,000	270	10,000	4		
<b>D</b>	19,949				31	
<b>E1</b>	23,350				115	
<b>E2</b>	17,099	200			13	
<b>F1</b>	13,492				89	
<b>F2</b>	13,727	90			53	
<b>G</b>	24,753	160			93	
<b>H</b>	16,922	90			71	
<b>I</b>	16,558	80			68	
<b>J</b>	18,925				80	
<b>K</b>	16,700	80			68	
<b>L1</b>	17099				62	
<b>L2</b>						58,265

**TABLE 3.2 EASTERN AREA DEVELOPMENT PROGRAM: PROPOSED ACTION**

<b>Block</b>	<b>Commercial (Sq.ft.)</b>	<b>Residential (units)</b>	<b>Civic (Sq.ft.)</b>	<b>Office (Sq.ft.)</b>
<b>M</b>	5,364	109		
<b>N</b>	8,108	98		
<b>O</b>		122		
<b>P</b>		119		
<b>Q</b>	12,003	128		
<b>R</b>	12,004	127		
<b>S+T</b>	6,562		68,952	
<b>U</b>	35,677			143,206

FIGURE 3.1 PROPOSED ACTION DEVELOPMENT BLOCKS



## Road Network

### *East/West Connection*

- 3.4 Due to the increased number of vehicles trips likely to be attracted to the Waterfront as a result of the proposed development, it is important that north/south vehicle movements are rationalized to improve the flow along the Fernández Juncos Avenue corridor. The Masterplan proposes to change the existing two-way system of Fernández Juncos to a one-way eastbound (two-lane 10 feet section) system complemented by Del Tren Street by changing the existing character of this Street from a dedicated mass transit corridor to two-lanes westbound general traffic road. (Figure 3.2). This proposed change will increase traffic activity along Del Tren Street, recovering the area from an abandoned zone and generally, resulting in a more attractive environment for pedestrians.
- 3.5 A mass transport exclusive corridor is proposed along the northern edge of Fernández Juncos Ave. The proposed system is a tramway or light rail transit that will run two-way in a 22 feet section parallel to traffic<sup>5</sup>.
- 3.6 East-West movement along the San Juan Waterfront southern edge will be provided by the Paseo del Puerto. This will be a two-way, two lane road with traffic calming to reduce speeds and to discourage use as a by-pass to avoid signals along Fernández Juncos Ave.

### *North/South Connection*

- 3.7 It is important to improve the existing connectivity Fernández Juncos Avenue and Del Tren Street as these will represent the main accesses to the San Juan Waterfront area. The Masterplan proposes to improve and extend to the south existing corridors (Figure 3.2):
- Valdés Street
  - San Andrés Street
  - Matías Ledesma Street
  - San Juan Bautista Street
  - Fernández Street
  - Ramón Power Street
  - Calle 3
  - Calle 5
- 3.8 Also, new access roads are proposed connecting north-south, including:
- Marina Access
  - Pelayo Street
  - Padre Hoff Street

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<sup>5</sup> The proposed tramway is explained in more detail later on this Chapter

- SJW Access A
- SJW Access B
- SJW Access C
- SJW Access D
- SJW Access E
- SJW Access F

### **Servicing**

- 3.9 Service vehicles required to access the developments and commercial establishments within the Masterplan area will do so via the primary highway network and then into the proposed San Juan Waterfront internal road network.
- 3.10 The development proposals have been prepared to ensure that all servicing can be conducted within the back/local internal roads of the commercial properties and proposed blocks therefore avoiding service from main roads or the Paseo del Puerto.

FIGURE 3.2 PROPOSED VEHICULAR CONNECTORS



## Signals

3.11 It is proposed that key intersections through the Masterplan area along Fernández Juncos Ave, and Del Tren streets will be signalized to regulate traffic flow and allow vehicular access to these main corridors. It will also provide formal crossing facilities for pedestrians and cyclists. The introduction of a tramway along the northern edge of Fernández Juncos Ave will require the addition of traffic signal control at intersections to facilitate tramway crossing, improve safety and organize traffic flow. Figure 3.3 shows in red the proposed new signals for the Masterplan area, including:

- Fernández Juncos Avenue intersections with:
  - Pelayo St.
  - Padre Hoff St.
  - San Juan Bautista St.
  - Fernández St.
  - Ramón Power St.
  - Calle 5\*
  - Pedestrian Signal east of Calle 5\*
- Del Tren Street and Fernández St.\*

3.12 Chapter 8 details the signal need study for the first four intersections mentioned above since this are the new ones proposed by the San Juan Waterfront Masterplan.

3.13 The existing signalized intersections (shown in Figure 3.3 in blue) will be maintained:

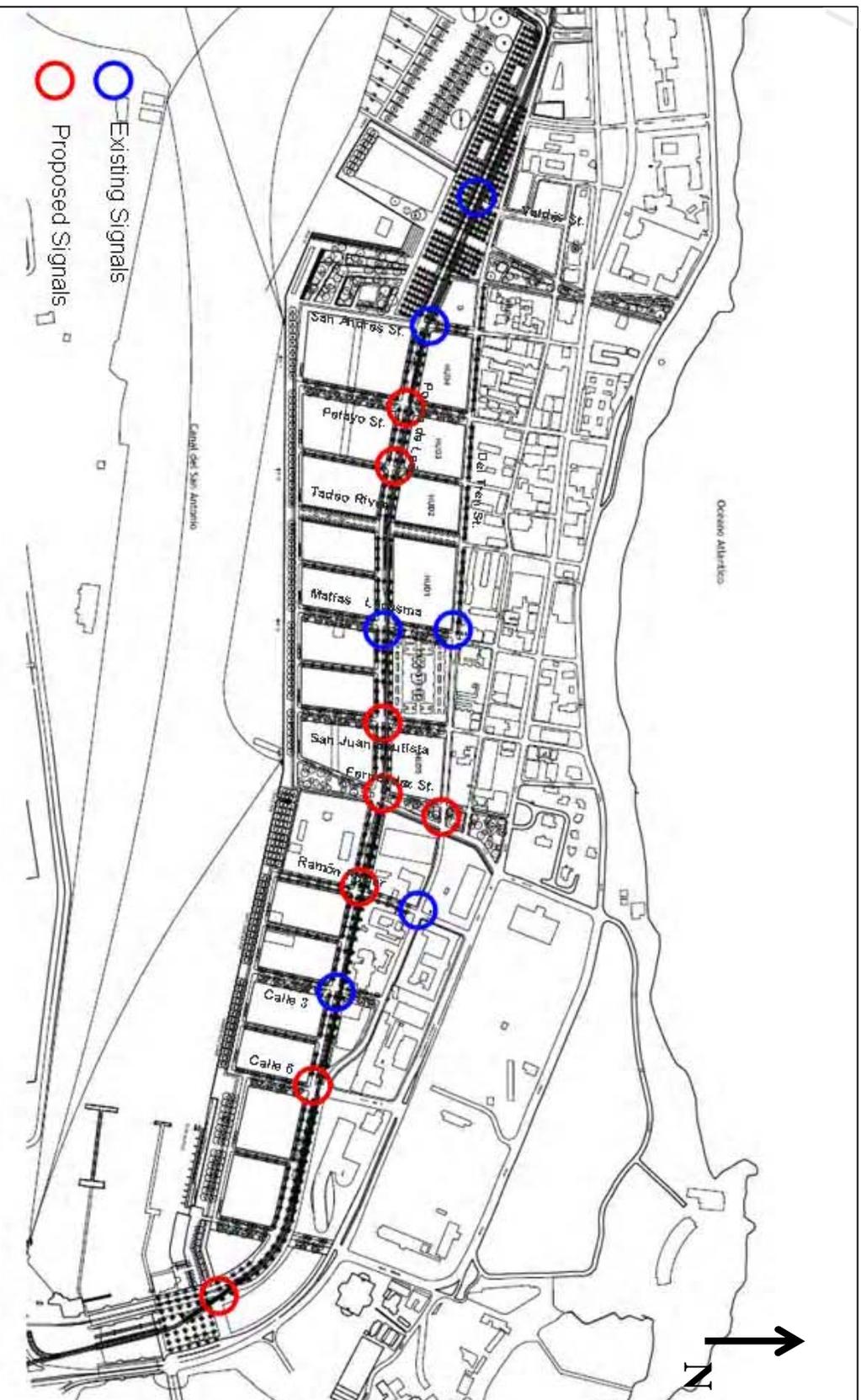
- Fernández Juncos Avenue intersections with:
  - Valdés Street
  - San Andrés Street\*\*
  - Matías Ledesma
  - Calle 3
- Del Tren Street with:
  - Matías Ledesma
  - Ramón Power\*
  - Calle 5 (this is combine with the Fernández Juncos and Calle 5 intersection)

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\* Intersections proposed as part of the Intersection 5 re-design scheme

\*\* Signalized Intersection only to avoid conflict of turning vehicles and tram

FIGURE 3.3 PROPOSED SIGNALIZATION STRATEGY



## Public Transport

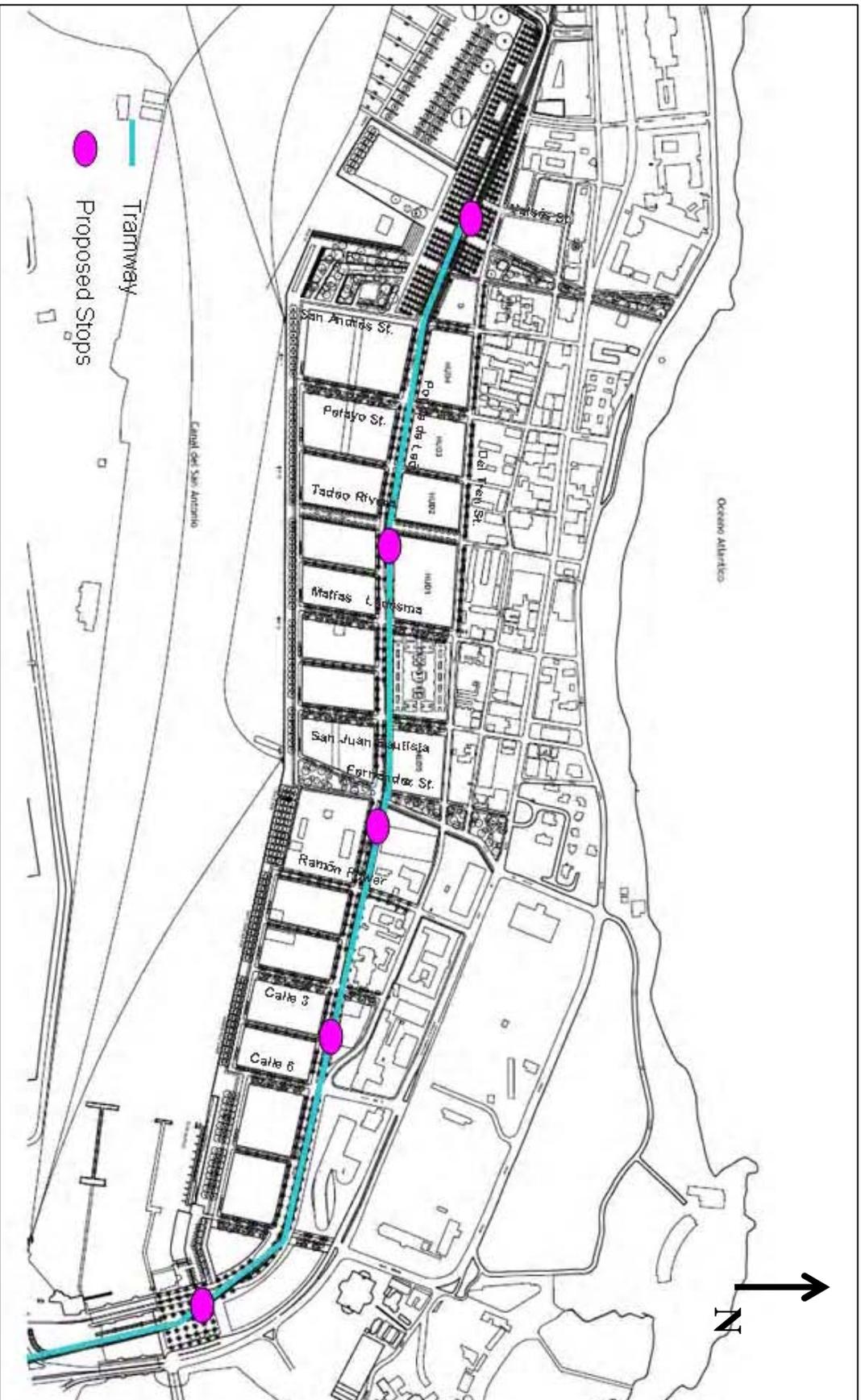
### *New Service*

- 3.14 Providing the Waterfront area with a connection to a mass transit system that could connect to the Tren Urbano is part of the San Juan Waterfront Masterplan.
- 3.15 Proposals for a light rail/tram system (Figure 3.4) to service the area from Sagrado Corazón up to Valdés St. in Puerta de Tierra have been discussed by the Municipality of San Juan. Right of way for tram line extension further west to Old San Juan will be kept as part of the San Juan Waterfront Masterplan area.
- 3.16 The San Juan Waterfront Masterplan includes a preferred alignment of this service at grade rail lines inbound and outbound of the Isleta via Fernández Juncos Avenue. The light rail line is planned to be located in the northern part of the proposed one-way Fernández Juncos Avenue. In order to cross onto the Isleta, a dedicated bridge is proposed to accommodate the light rail system between Esteves and San Antonio bridges without affecting the historic old train bridge. It is proposed that any such system would have five (5) stops along the San Juan Isleta (Figure 3.5).

**FIGURE 3.4 LIGHT RAIL EXAMPLE**



FIGURE 3.5 LIGHT RAIL PROPOSED ALIGNMENT AND STOPS ALONG THE ISLETA



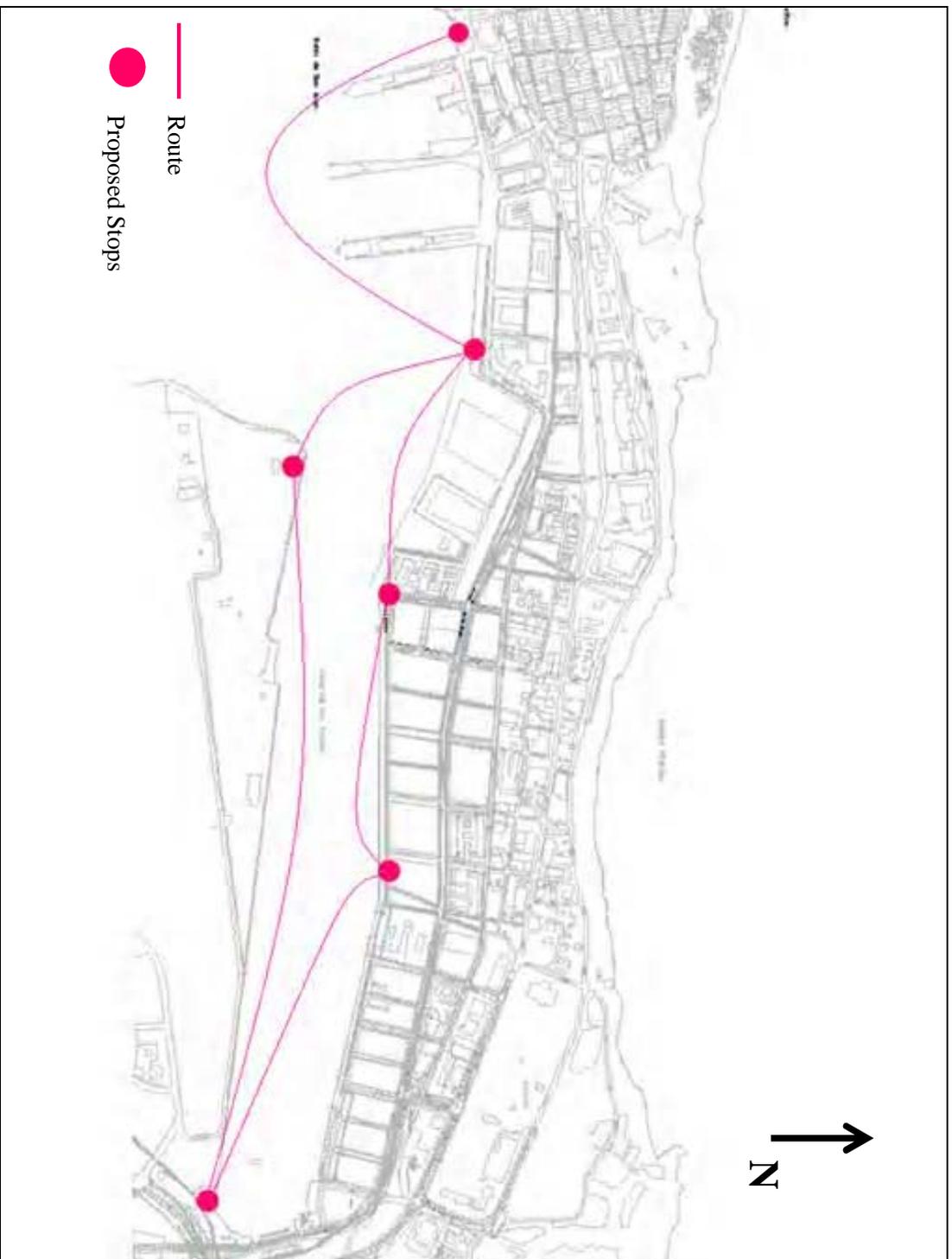
### ***AMA Services***

- 3.17 The introduction of a light rail system along Fernández Juncos Avenue would result in the need to examine the existing bus services, which currently run along Del Tren Street (A5, A9 and B8). These services can be redirected to Muñoz Rivera and Constitución Avenues or run with traffic along Fernández Juncos Avenue or Del Tren Street together with any residual and complimentary bus services to the tram.
- 3.18 The counter-flow bus lane along Muñoz Rivera Ave. will be extended east along this avenue up to the intersection with Constitución Ave. as part of the Intersection 5 improvements. This will be explained in more detail later in this Chapter.

### ***Water Transport***

- 3.19 The San Juan Waterfront Masterplan considers a multimodal approach to mobility. Therefore is allowing provision for water taxi services. Water taxi service is proposed between the San Juan Waterfront area with Pier 2 in Old San Juan, the Convention Center District and the Pan-American Pier (Figure 3.6).

FIGURE 3.6 WATER TAXIS ROUTE



### **Pedestrian and Cyclist Accessibility**

- 3.20 Given that the proposed redevelopment containing a mix of land-uses including residential and commercial, it can be expected that pedestrian footfall through the Masterplan area will increase. Improved traffic control and organization through the use of traffic signals along the main corridors will improve pedestrian and cyclist crossing gaps and safety.
- 3.21 Pedestrians and cyclists will also benefit from reduced speeds along the street adjacent to the Canal itself, where traffic-calming measures such as raised crossings or surfaced pavements and exclusive bike lanes are proposed.
- 3.22 Also, pedestrian access and safety will be greatly improved by the conversion of Fernández Juncos Avenue into a one-way street with wide sidewalks along both sides of the Avenue (9.84 ft on the south side and 16.4 ft on the north side).
- 3.23 Paseo del Puerto will be providing 16.4 feet sidewalks to the north and a 43 feet Canal walk and to the south towards the San Antonio Canal for general public enjoyment.
- 3.24 Landscape and green areas will assist pedestrian mobility and encourage people to walk along the Isleta. The north-south green connectors (called the Cross Island Parks and Rambla) will provide an enjoyable walking access from the Atlantic Ocean to the San Antonio Canal that is currently lacking such connection.
- 3.25 The proposed I5 design (explained in detail later on this Chapter) include a series of signalized intersections that will allow for safer crossings connecting pedestrian walkways from the Isleta to Condado, Miramar and the Convention Centre District. Figure 3.7 shows in red the pedestrians pathways.

FIGURE 3.7 PEDESTRIANS AND CYCLIST PATHWAYS



- 3.26 Pedestrian safety has been considered in the development of the light rail proposals (Figure 3.8). The alignment on the northern side of Fernández Juncos Avenue has incorporated a facility to permit safe crossing of multiple two directional lanes (vehicular and train traffic westbound at the southern end and train traffic eastbound at the eastern end). The proposed system provides a pedestrian friendly environment since it allows pedestrians to cross tracks safely at grade.

**FIGURE 3.8 PEDESTRIANS CROSSING LIGHT RAIL TRACKS**



- 3.27 Cyclist access and safety will be greatly improved by the creation of cycle lanes (2-way 9.8 feet wide) along Paseo del Puerto and the Cross Island Parks.
- 3.28 Traffic calming measures and landscaped areas will improve overall conditions for cyclists on the Isleta. Figure 3.7 shows in blue cycle access to the Isleta.

### **Parking**

- 3.29 Table 3.3 and Table 3.4 summarize the proposed action parking provision for the west and east areas of the San Juan Waterfront development.
- 3.30 On street parallel parking spaces are proposed along Fernández Juncos Avenue and the north-south and east-west roads along the Waterfront development area. A total of 501 on-street parking spaces are provided as part of the proposed parking plan for the west area of the San Juan Waterfront. These are included in the numbers presented in the tables below.

**TABLE 3.3 PROPOSED PARKING PER BLOCK FOR THE WEST AREA**

Use	Proposed Parking Provision
Commercial	688
Hotel	535
Casino	39
Port	39
Residential	1,665
Civic	179
<b>TOTAL</b>	<b>3,146</b>

**TABLE 3.4 PROPOSED PARKING PER BLOCK FOR THE EAST AREA**

Use	Proposed Parking Provision
Commercial	239
Residential	1,544
Office	429
Civic	207
<b>TOTAL</b>	<b>2,419</b>

*Parking Provision Analysis*

- 3.31 Using the Institute of Transport Engineers' (ITE) *Parking Generation* (3<sup>rd</sup> Ed.), projections of the maximum parking requirement were made based on each of the San Juan Waterfront proposed land uses. Table 3.5 and Table 3.6 present the results of these projections.

**TABLE 3.5 REQUIRED PARKING PER BLOCK FOR THE WEST AREA**

Use	ITE Projected Parking Requirement	Difference between proposed and required parking
Commercial	2,041	-1,352
Hotel	883	-347
Casino	58	-19
Port and Terminal	n/a	39
Residential	1,401	264
Civic	223	-44
<b>TOTAL</b>	<b>4,606</b>	<b>-1,460</b>

**TABLE 3.6 REQUIRED PARKING PER BLOCK FOR THE EAST AREA**

<b>Use</b>	<b>ITE Projected Parking Requirement</b>	<b>Difference between proposed and required parking</b>
Commercial	968	-728
Residential	1,132	412
Office	344	85
Civic	264	-57
<b>TOTAL</b>	<b>2078</b>	<b>-288</b>

- 3.32 There is a total deficit in parking provision of 1,749 spaces for the entire San Juan Waterfront development area.
- 3.33 An additional analysis was undertaken considering the possibility of providing shared parking in the San Juan Waterfront development area. Shared parking refers to a technique of allowing the same parking space to be used by multiple developments at different times of the day. An example of shared parking is a parking space being used by an office worker during the day and a restaurant goer in the evening.
- 3.34 The shared parking analysis was prepared for the west and east areas of the San Juan Waterfront. As shown in Table 3.7, there is a deficit of 315 parking spaces for the west area considering the peak accumulation period at 7:00 PM. On the eastern development area, an excess of 557 spaces is expected during the peak accumulation period at 4:00 PM as shown in Table 3.8.

**TABLE 3.7 SHARED PARKING REQUIREMENT ANALYSIS FOR THE WEST AREA;  
TYPICAL WEEKDAY**

<b>Time Period (hour starting)</b>	<b>Commercial</b>	<b>Hotel</b>	<b>Casino</b>	<b>Port</b>	<b>Residential</b>	<b>Civic</b>	<b>Total</b>
12:00 - 4:00 AM	0	0	33	0	1,401		<b>1434</b>
05:00 AM	0	0	0	0	1,345	56	<b>1401</b>
06:00 AM	0	883	0	0	1,289	105	<b>2277</b>
07:00 AM	102	839	0	0	1,037	107	<b>2085</b>
08:00 AM	367	803	0	0	897	112	<b>2179</b>
09:00 AM	776	768	0	0	0	98	<b>1642</b>
10:00 AM	1,082	724	0	0	0	112	<b>1917</b>
11:00 AM	1,755	883	33	0	0	116	<b>2786</b>
12:00 PM	2,041	865	38	0	0	123	<b>3067</b>
01:00 PM	2,000	794	38	0	0	141	<b>2973</b>
02:00 PM	1,857	724	38	0	0	172	<b>2791</b>
03:00 PM	1,755	618	37	0	0	214	<b>2624</b>
04:00 PM	1,653	618	39	0	617	223	<b>3150</b>
05:00 PM	1,163	583	42	0	827	199	<b>2814</b>
06:00 PM	1,408	644	48	0	967	154	<b>3221</b>
<b>07:00 PM</b>	<b>1,674</b>	<b>715</b>	<b>51</b>	<b>0</b>	<b>925</b>	<b>96</b>	<b>3461</b>
08:00 PM	1,429	697	56	0	1,051		<b>3233</b>
09:00 PM	857	706	58	0	1,079		<b>2701</b>
10:00 PM	204	706	54	0	1,289		<b>2254</b>
11:00 PM			38	0	1,317		<b>1356</b>
						<b>Maximum Required</b>	<b>3461</b>
						<b>Proposed</b>	<b>3146</b>
						<b>Difference</b>	<b>-315</b>

**TABLE 3.8 SHARED PARKING REQUIREMENT ANALYSIS FOR THE EAST AREA; TYPICAL WEEKDAY**

<b>Time Period (hour starting)</b>	<b>Commercial</b>	<b>Residential</b>	<b>Civic</b>	<b>Office</b>	<b>Total</b>
12:00 - 4:00 AM	0	1132	0	0	<b>1132</b>
05:00 AM	0	1087	66	0	<b>1153</b>
06:00 AM	0	1042	124	0	<b>1166</b>
07:00 AM	48	838	127	69	<b>1082</b>
08:00 AM	174	725	132	234	<b>1265</b>
09:00 AM	368	0	116	309	<b>793</b>
10:00 AM	513	0	132	330	<b>975</b>
11:00 AM	832	0	137	327	<b>1296</b>
12:00 PM	968	0	145	323	<b>1436</b>
01:00 PM	948	0	166	330	<b>1445</b>
02:00 PM	880	0	203	344	<b>1428</b>
03:00 PM	832	0	254	340	<b>1426</b>
04:00 PM	784	498	264	316	<b>1862</b>
05:00 PM	552	668	235	213	<b>1668</b>
06:00 PM	668	781	182	0	<b>1631</b>
<b>07:00 PM</b>	<b>793</b>	<b>747</b>	<b>114</b>	<b>0</b>	<b>1654</b>
08:00 PM	677	849	0	0	<b>1526</b>
09:00 PM	406	872	0	0	<b>1278</b>
10:00 PM	97	1042	0	0	<b>1138</b>
11:00 PM	0	1064	0	0	<b>1064</b>
				<b>Maximum Required</b>	<b>1862</b>
				<b>Proposed</b>	<b>2419</b>
				<b>Difference</b>	<b>557</b>

**Intersection 5**

3.35 In order to improve the access through I5, Steer Davies Gleave has studied a series of roadway alignment and configuration design alternatives on behalf of the PRHTA. The analysis has been undertaken using S-Paramics microsimulation software.

3.36 The stated goal by the PRHTA was to achieve an operational design that will improve the I5 intersection for the current traffic conditions. From the assessment, a recommended alternative was defined. In general terms, this design consists of (Refer to Figure 3.9):

- Two-way operation of San Antonio & Esteves bridges
- At grade signalised intersection south of I5 linking Baldorioty de Castro Exp. & Blvd (PR-26 with PR-16).
- Single bridge structure for Muñoz Rivera expressway over passing Baldorioty de Castro Blvd. and connecting with San Antonio Bridge.

- Southbound operation and widening of Calle 5 (signal with Fernández Juncos Ave. and Constitución Ave.)
- Two-way operation of Constitución Ave. from Muñoz Rivera Ave. to Calle 5
- Extension and widening of Fernández Street joining northbound Fernández Juncos and Constitución avenues
- Bus lane along Muñoz Rivera Ave. continues up to intersection with Constitución Avenue
- Extension of Fernández Street from Fernández Juncos Ave. to San Agustin St. and widening of the section from San Agustin St. to Constitución Avenue (signalization of Fernández Street intersections with Del Tren St. and Fernández Juncos Ave.)

3.37 The Intersection 5 design includes the recommendations of the San Juan Waterfront Masterplan to convert Del Tren Street in a one-way westbound traffic road and to turn Fernández Juncos Ave. into a one-way street eastbound.

3.38 The recommended alternative comprises the following advantages:

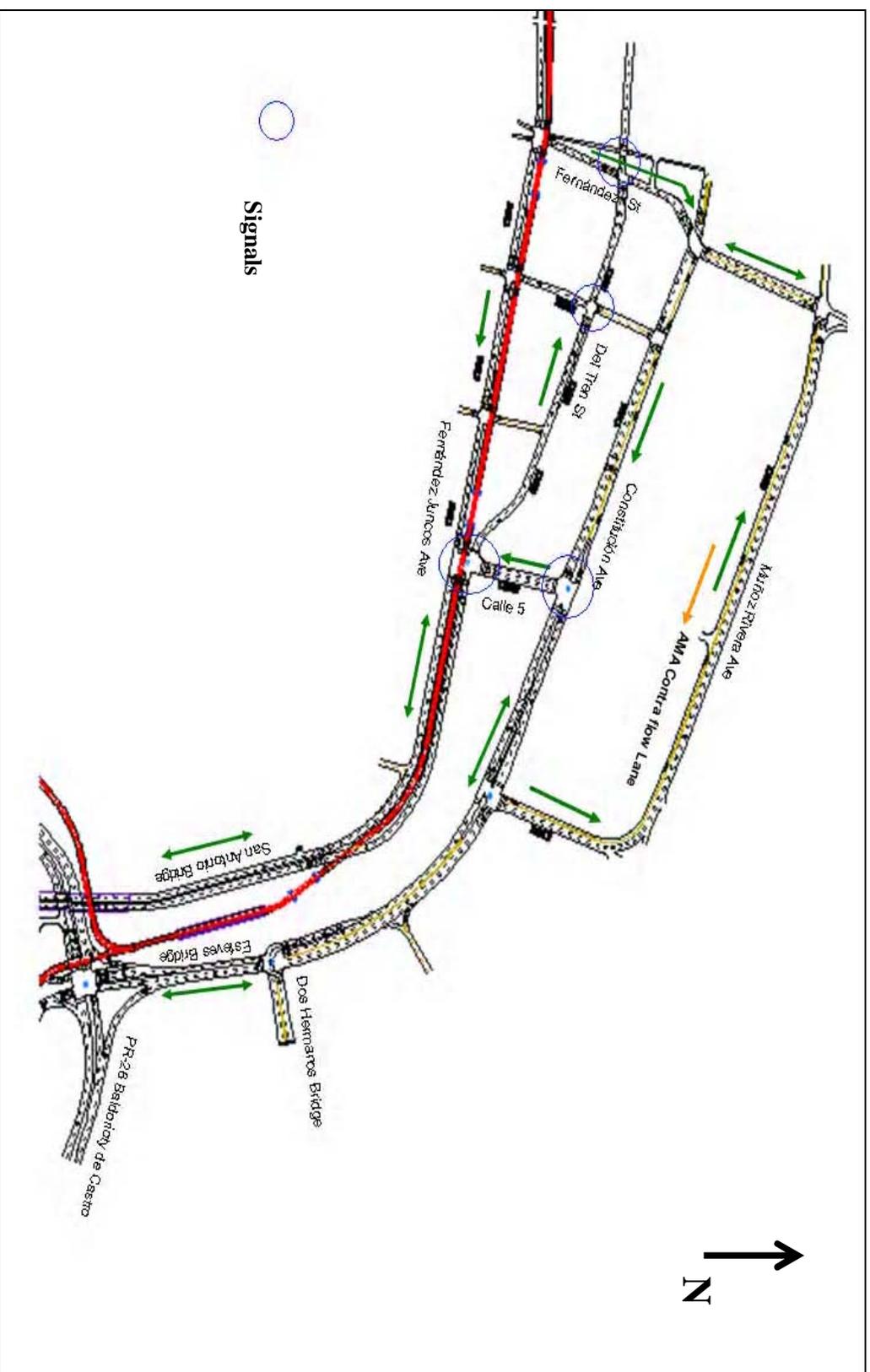
- Eliminates the weaving north of Esteves Bridge
- Eliminates redundant traffic<sup>6</sup> (reduction of volume to/from the Isleta)
- Reduces the traffic signal phasing, signals to the north have 3 phases
- Increase distance between intersections
- An expressway exit from the Isleta is maintained
- Improvement of the pedestrian access
- The special events traffic management is simplified
- Improvement of safety and disaster management
- New development parcel is created (Parcel U in the San Juan Waterfront Masterplan)

3.39 The conclusions for the I5 model analysis showed that for the 2025 traffic (Refer to Chapter 6 for more details) the model queues the main roadways that lead to I5 collapsing the model. The network is able to handle about 80% of the future traffic without major queuing. The recommendations to attend this expected congestion are to implement traffic reduction measures for the San Juan Isleta (Refer to Chapter 10 for more details).

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<sup>6</sup> Redundant traffic refers to vehicles that, due to the existing intersection design, are forced to cross to the Isleta and back out in order to reach a destination (i.e. traffic on Baldorioty Expressway westbound going to the Convention Center)

FIGURE 3.9 INTERSECTION 5 PROPOSED DESIGN



## 4. IMPACT ANALISYS ALTERNATIVES

### Introduction

4.1 As part of the traffic study for the San Juan Waterfront, other alternatives were assessed in order to determine the impact of the development against other proposed development options in the area. This Chapter discusses the Proposed Action Alternative 2, the Modified No Action and the No Action alternative.

### Development Proposal: Proposed Action Alternative 2

4.2 The San Juan Waterfront Alternative 2 presents a variation in both the Marina facilities and Parque de la Bahía locations, as it proposes filling the water docking area between Pier 9 and Pier 10. In terms of traffic, this posse a change in the west part of the road network as access to the Marina changes location up to San Andrés Street (Figure 4.1). The remaining road components will be constructed as described in the Proposed Action Alternative 1.

4.3 It is important to note that what is identify as Parcel C for this Alternative is no longer part of the San Juan Waterfront as a private developer is proposing a residential and office development in it. Chapter 5 describes this proposed development in mode detail.

4.4 The land-use breakdown for this Alternative 2 is divided in the eastern and western areas defined by Fernández Street Figure 4.1, Table 4.1 and Table 4.2 summarizes the proposed development program for these areas of the San Juan Waterfront Alt. 2.

**TABLE 4.1 WESTERN AREA DEVELOPMENT PROGRAM: ALTERNATIVE 2**

<b>Block</b>	<b><u>Commercial</u> (Sq.ft.)</b>	<b><u>Hotel</u> (Keys)</b>	<b><u>Casino</u> (Sq.ft.)</b>	<b><u>Marina</u> <u>Facilities</u> (Berths)</b>	<b><u>Residential</u> (units)</b>	<b><u>Civic</u> (Sq.ft.)</b>
<b>A+B</b>	27,000	210	10,000	11,800		
<b>D</b>	19,879				65	
<b>E1</b>	21,042				65	
<b>E2</b>	10,864	200			45	
<b>F1</b>	16,204				77	
<b>F2</b>		90			50	
<b>G1</b>	40,631				86	
<b>G2</b>	23,480	211			44	
<b>H1</b>	11,563				31	
<b>H2</b>		144			17	
<b>i1</b>	23,101				103	
<b>i2</b>	15,967	95			47	
<b>J1</b>	18,617				71	
<b>J2</b>						60,000
<b>Lebrón</b>	20,750				100	

**TABLE 4.2 EASTERN AREA DEVELOPMENT PROGRAM: ALTERNATIVE 2**

<b>Block</b>	<b><u>Commercial</u> <u>(Sq.ft.)</u></b>	<b><u>Residential</u> <u>(units)</u></b>
K	4,471	82
L	8,541	61
M		82
N		84
O		82
P		89
Q		73
R	87,000	20
S	114,000	

FIGURE 4.1 ALTERNATIVE 2 DEVELOPMENT BLOCKS



## **Parking**

- 4.5 Since the proposed development program for Alternative 2 of the San Juan Waterfront varies, the parking analysis will be affected.
- 4.6 Table 4.3 and Table 4.4 summarizes the proposed Alternative 2 parking provision for the west and east area of the San Juan Waterfront development.
- 4.7 On street parallel parking spaces are proposed along Fernández Juncos Avenue and the north-south and east-west roads along the Waterfront development area. A total of 501 on-street parking are provided as part of the proposed parking for the west area of the San Juan Waterfront and are included in the numbers presented in the tables below.

**TABLE 4.3 ALTERNATIVE 2 PARKING PER BLOCK FOR THE WEST AREA**

<b>Use</b>	<b>Proposed Parking Provision</b>
Commercial	885
Hotel	542
Casino	33
Port	35
Residential	2137
Civic	192
<b>TOTAL</b>	<b>3823</b>

**TABLE 4.4 ALTERNATIVE 2 PARKING PER BLOCK FOR THE EAST AREA**

<b>Use</b>	<b>Proposed Parking Provision</b>
Commercial	679
Residential	1389
<b>TOTAL</b>	<b>2068</b>

### *Parking Provision Analysis*

- 4.8 Using the Institute of Transport Engineers (ITE) Parking Generation 3<sup>rd</sup> Edition, projections of the maximum parking requirement were made based on each of the San Juan Waterfront proposed uses. Table 4.5 and Table 4.6 present the results of these projections.

**TABLE 4.5 REQUIRED PARKING PER BLOCK FOR THE WEST AREA; ALT2**

<b>Use</b>	<b>ITE Projected Parking Requirement</b>	<b>Difference between proposed and required parking</b>
Commercial	2219	-1334
Hotel	865	-323
Casino	58	-25
Port and Terminal	0	35
Residential	1546	590
Civic	140	-140
<b>TOTAL</b>	<b>4827</b>	<b>-1196</b>

**TABLE 4.6 REQUIRED PARKING PER BLOCK FOR THE EAST AREA; ALT2**

<b>Use</b>	<b>ITE Projected Parking Requirement</b>	<b>Difference between proposed and required parking</b>
Commercial	902	-224
Residential	1070	319
<b>TOTAL</b>	<b>1973</b>	<b>95</b>

4.9 There is deficit in parking provision of 1101 spaces for the entire San Juan Waterfront development area.

4.10 An additional analysis was undertaken considering the possibility of providing shared parking in the San Juan Waterfront development area. The shared parking analysis was prepared for the west and east areas of the San Juan Waterfront. As shown in Table 4.7, there is an excess of 172 parking spaces for the west area considering the peak accumulation period at 7:00 PM. On the eastern development area, an excess of 620 spaces is expected on a typical weekday at 7:00 PM as shown in Table 4.8.

**TABLE 4.7 SHARED PARKING REQUIREMENT ANALYSIS FOR THE WEST AREA;  
TYPICAL WEEKDAY; ALT2**

<b>Time Period</b>	<b>Commercial</b>	<b>Hotel</b>	<b>Casino</b>	<b>Residential</b>	<b>Civic</b>	<b>Total</b>
12:00 - 4:00 AM	0	0	33	1546	0	<b>1579</b>
05:00 AM	0	0	0	1484	35	<b>1519</b>
06:00 AM	0	865	0	1423	66	<b>2353</b>
07:00 AM	111	821	0	1144	67	<b>2144</b>
08:00 AM	399	787	0	990	70	<b>2246</b>
09:00 AM	843	752	0	0	62	<b>1657</b>
10:00 AM	1176	709	0	0	70	<b>1955</b>
11:00 AM	1908	865	33	0	73	<b>2878</b>
12:00 PM	2219	847	38	0	77	<b>3181</b>
01:00 PM	2174	778	38	0	88	<b>3079</b>
02:00 PM	2019	709	38	0	108	<b>2873</b>
03:00 PM	1908	605	37	0	134	<b>2685</b>
04:00 PM	1797	605	39	680	140	<b>3261</b>
05:00 PM	1265	571	42	912	125	<b>2914</b>
06:00 PM	1531	631	48	1067	97	<b>3373</b>
<b>07:00 PM</b>	<b>1819</b>	<b>700</b>	<b>51</b>	<b>1020</b>	<b>60</b>	<b>3651</b>
08:00 PM	1553	683	56	1160	0	<b>3451</b>
09:00 PM	932	692	58	1191	0	<b>2872</b>
10:00 PM	222	692	54	1423	0	<b>2390</b>
11:00 PM	0	0	38	1453	0	<b>1492</b>
					<b>Maximum Required</b>	<b>3,651</b>
					<b>Proposed</b>	<b>3,823</b>
					<b>Difference</b>	<b>172</b>

**TABLE 4.8 SHARED PARKING REQUIREMENT ANALYSIS FOR THE EAST AREA;  
TYPICAL WEEKDAY; ALT2**

<b>Time Period</b>	<b>Commercial</b>	<b>Residential</b>	<b>Total</b>
12:00 - 4:00 AM	0	1070	1070
05:00 AM	0	1028	1028
06:00 AM	0	985	985
07:00 AM	45	792	837
08:00 AM	162	685	848
09:00 AM	343	0	343
10:00 AM	478	0	479
11:00 AM	776	0	777
12:00 PM	902	0	903
01:00 PM	884	0	885
02:00 PM	821	0	822
03:00 PM	776	0	777
04:00 PM	731	471	1203
05:00 PM	514	632	1147
06:00 PM	623	739	1362
07:00 PM	740	706	1447
08:00 PM	632	803	1435
09:00 PM	379	824	1204
10:00 PM	90	985	1076
11:00 PM	0	1006	1007
		<b>Maximum Required</b>	<b>1447</b>
		<b>Proposed</b>	<b>2,068</b>
		<b>Difference</b>	<b>620</b>

### **Alternative 3 - Modified No Action**

- 4.11 The Modified No Action Alternative assumes that the San Juan Waterfront Development will not occur, but that the PRPA would repair and remediate the portions of the project area under their ownership and will develop them as currently Zoned (mostly CT3).
- 4.12 The road network is considered to undergo the changes proposed by the I5 re-design and by the introduction of the tramway. The changes will include the conversion of Fernández Juncos Ave. to one-way and the opening of Del Tren St. to westbound general traffic. The accesses to the development area will be provided through the existing accesses along:
- San Andrés St.
  - Tadeo Rivera St.
  - Matías Ledesma St.
  - San Juan Bautista St.
  - Fernández St.
- 4.13 New signals are proposed for San Juan Bautista Street and Fernández Street due to the introduction of the tramway.

### **Alternative 4 - No Action**

- 4.14 The No Action Alternative represents the existing conditions in the future. It assumes that the San Juan Waterfront development will not occur, and that the existing uses along the project area will remain and no further actions will be taken.
- 4.15 The road network is considered to undergo the changes proposed by the I5 re-design and by the introduction of the tramway. The changes will include the conversion of Fernández Juncos Ave to one-way and the opening of Del Tren St. to westbound general traffic. The accesses to the development area will be provided through the existing accesses along:
- San Andrés St.
  - Tadeo Rivera St.
  - Matías Ledesma St.
  - San Juan Bautista St.
  - Fernández St.
- 4.16 New signals are proposed for San Juan Bautista Street and Fernández Street due to the introduction of the tramway.

## 5. PARAMICS MODELING FOR ALTERNATIVES

- 5.1 In order to analyze the existing and future traffic conditions through the project area, a Paramics microsimulation model was built for the San Juan Isleta. The model prepared was an extension of the Intersection 5 (I5) model developed for the PRHTA. The San Juan Waterfront model extends from I5 west to Old San Juan up to JA Corretjer Street where the current AMA Bus station at Covadonga is located.
- 5.2 The projections of future traffic were based on proposed developments in the area. The projections did not consider annual traffic growth since the San Juan Isleta has been experiencing a decrease in traffic in the last years. The decrease in traffic is based on the Average Annual Daily Traffic (AADT) of the main road in the Isleta<sup>7</sup> (Appendix C). Projections made for the I5 model as part of the work undertaken for PRHTA found that the increment in traffic in the area will congest furthermore the roadway network and will not encourage or support increases in traffic beyond those attracted by new developments.

### Base Model

- 5.3 Using the traffic count data, the signal timings and the AMA bus surveys, the Base San Juan Waterfront model was prepared. Figure 5.1 shows the extent of the highway network. The model was prepared for the main peak daily traffic periods AM (7:30-8:30) and PM (4:00-5:00).
- 5.4 The Base model consists of 44 zones and 14 matrices with a total volume of 14,811 vehicles during the AM peak and 15,070 during the PM peak.
- 5.5 In order to validate/calibrate the base AM and PM peak models Steer Davies Gleave personnel undertook surveys to obtain peak hour journey time data for the modeled Fernández Juncos, Muñoz Rivera and Constitución avenues' corridors. The base model validated with acceptable margins against the obtained journey time data. Table 5.1 displays the journey time data results.

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<sup>7</sup> AADT data gathered on 28 June 2007 from [http://www.dtop.gov.pr/act/analisis\\_trans.htm](http://www.dtop.gov.pr/act/analisis_trans.htm)

**TABLE 5.1 JOURNEY TIME DATA VALIDATION**

	AM Peak (seconds)			
	Muñoz Rivera Ave.	Constitución Ave.	Fernández Juncos Ave.	
			Eastbound	Westbound
Journey Time Data	142	207	155	180
Base PARAMICS Model	141	206	149	167
GEH	3	1.5	0	4.7
	AM Peak (seconds)			
	Muñoz Rivera Ave.	Constitución Ave.	Fernández Juncos Ave.	
			Eastbound	Westbound
Journey Time Data	151	317	237	161
Base PARAMICS Model	138	259	209	152
GEH	5	0.5	2	6

5.6 The GEH-statistic included in the bottom of the table, is a measurement that has been derived to overcome the inability of either the absolute difference or the relative difference to cope satisfactorily over a wide range of flows. For example, an absolute difference of 100 vehicles would be considered a big difference if both flows are in the order of 100, but would be unimportant for flows in the order of several thousand. Equally, a 10% error in 100 vehicles would not be important but a 10% error in 3000 may mean the difference between requiring an extra lane or not.

5.7 *Design Manual for Roads and Bridges* (DMRB) Volume 12a includes ‘assignment validation acceptability guidelines’ for highway traffic models.

**TABLE 5.2 DMRB VALIDATION GUIDELINES**

Criteria and Measures	Acceptability Guideline
Assigned hourly flows compared with observed flows	
1. Individual flows within 100 for flows <700vph	> 85%
2. Individual flows within 15% for flows 700-2,700vph	> 85%
3. Individual flows within 400 for flows >2,700vph	> 85%
4. Total screen line flows (normally >5 links) to be within 5%	All (or nearly all) screen lines
GEH statistic:	
(i) individual flows: GEH < 5	> 85% of cases
(ii) screen line totals : GEH < 4	All (or nearly all) screen lines

- 5.8 Both the AM and PM observed traffic count data and modelled flow data meets the validation guidelines. All journey times (JT) sections through the modelled network have observed/modelled data with a GEH statistic value of <5.0 (a GEH of <5.0 is considered a good match). The only JT sections that does not meet the <5.0 criteria was the PM Fernández Juncos Ave. westbound. This difference was due mainly to the fact that the intersection with G. Concepción de Gracia had the signal off during the surveys.

FIGURE 5.1 BASE MODELLED, MODELED HIGHWAY NETWORK

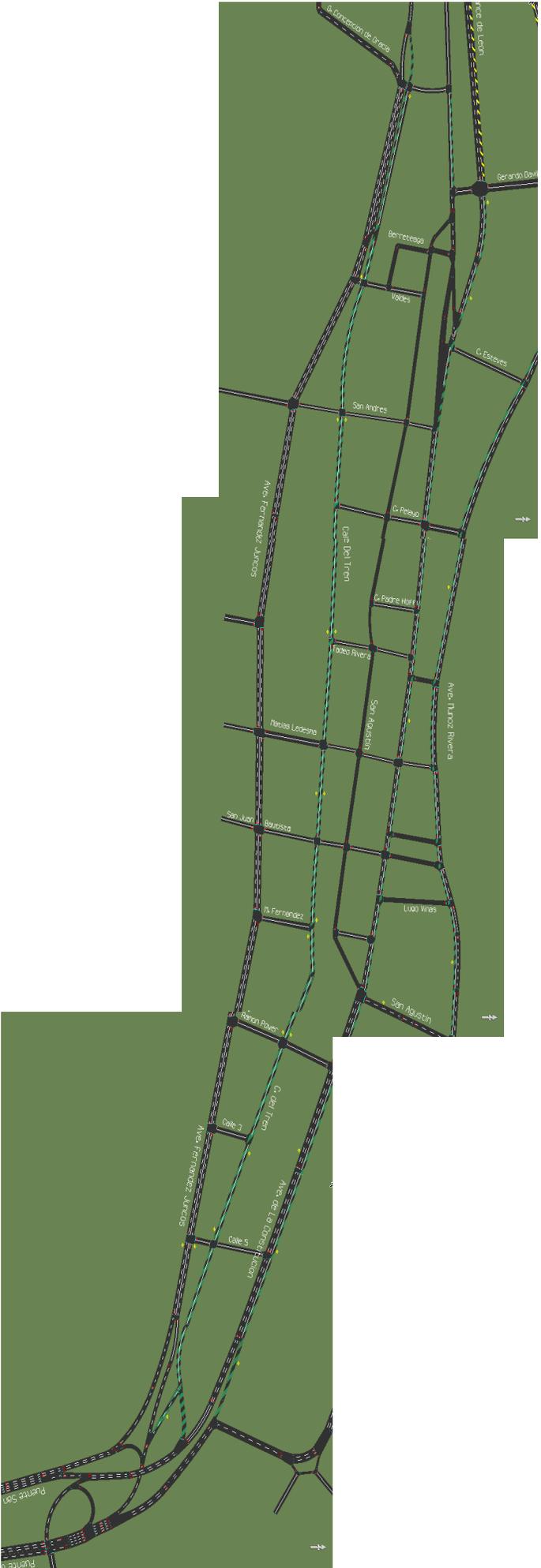


FIGURE 5.2 BASE AM TURNING MOVEMENTS; INTERSECTION 1

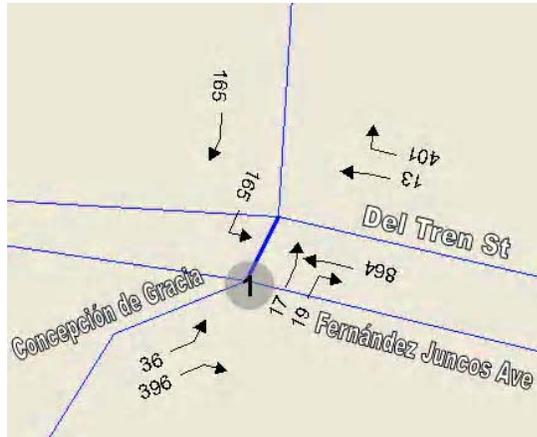


FIGURE 5.3 BASE AM TURNING MOVEMENTS; INTERSECTIONS 2

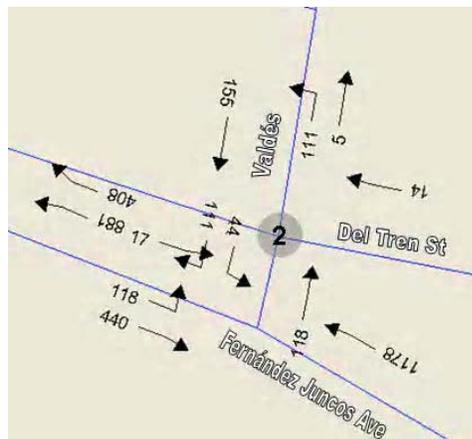
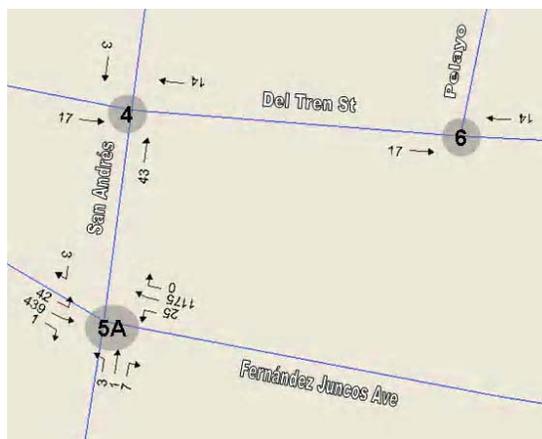


FIGURE 5.4 BASE AM TURNING MOVEMENTS; INTERSECTIONS 4, 5A<sup>8</sup>, 6



<sup>8</sup> Called Intersection 5A to avoid confusion with Intersection 5 (I5-main entrance to San Juan)

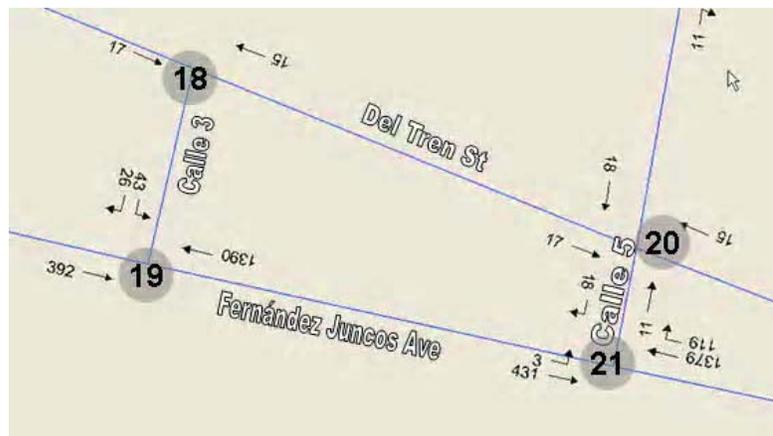
**FIGURE 5.5 BASE AM TURNING MOVEMENTS; INTERSECTIONS 8, 9, 10, 11**



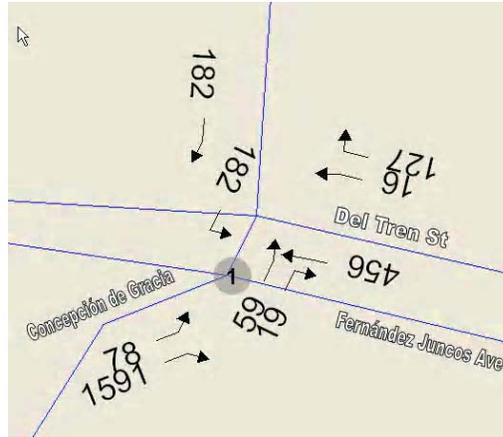
**FIGURE 5.6 BASE AM TURNING MOVEMENTS; INTERSECTIONS 12, 13, 14, 15, 16, 17**



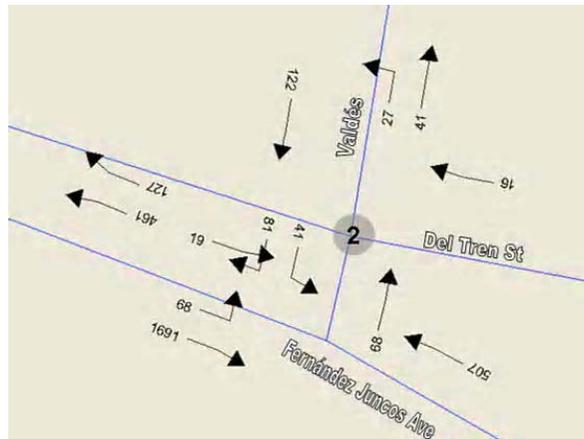
**FIGURE 5.7 BASE AM TURNING MOVEMENTS; INTERSECTIONS 18, 19, 20, 21**



**FIGURE 5.8 BASE PM TURNING MOVEMENTS; INTERSECTION 1**



**FIGURE 5.9 BASE PM TURNING MOVEMENTS; INTERSECTION 2**



**FIGURE 5.10 BASE PM TURNING MOVEMENTS; INTERSECTIONS 4, 5A, 6**



FIGURE 5.11 BASE PM TURNING MOVEMENTS; INTERSECTIONS 8, 9, 10, 11

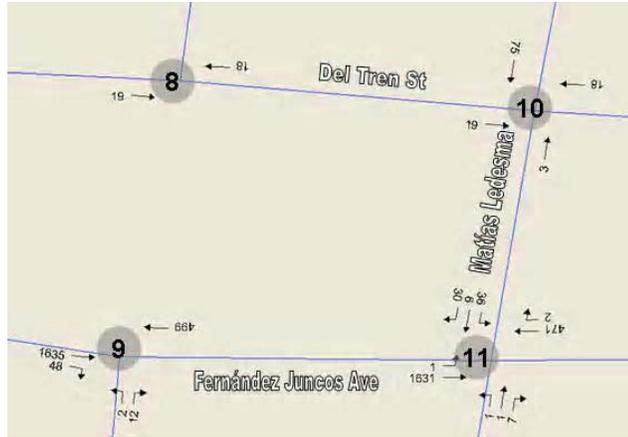


FIGURE 5.12 BASE PM TURNING MOVEMENTS; INTERSECTIONS 12, 13, 14, 15, 16, 17

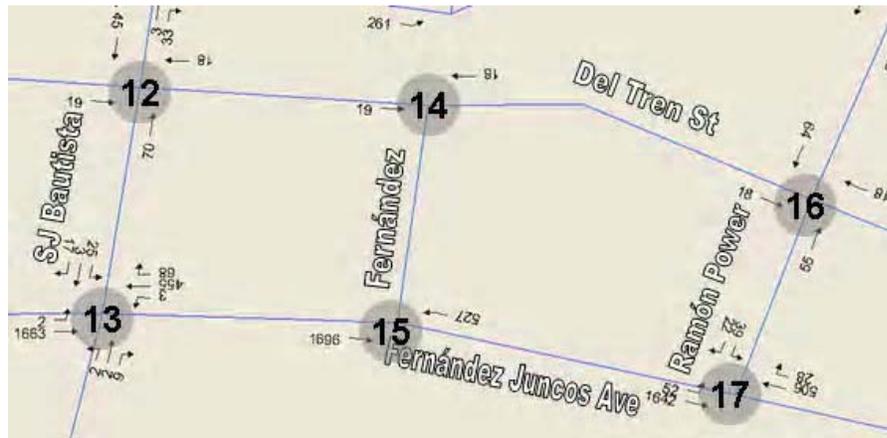
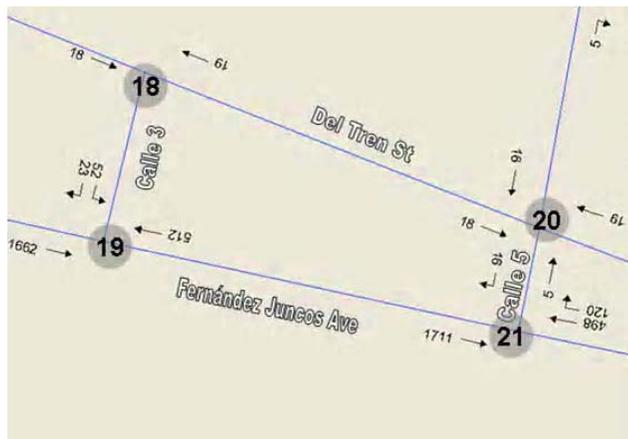


FIGURE 5.13 BASE PM TURNING MOVEMENTS; INTERSECTIONS 18, 19, 20, 21



## **Proposed Action Alternative 1**

- 5.9 The Proposed Action (PA\_Alt1) Alternative 1 model was prepared based on the proposed San Juan Waterfront Masterplan and considering a future year of 2025. This is the year when this development is expected to be fully operational. This model includes the addition of new roads, signals, proposed I5 design and tramline as explained in Chapter 3 (Figure 5.14).
- 5.10 In order to project the traffic expected in the study area for year 2025, this model includes the base traffic plus the projected traffic to be generated by the San Juan Waterfront Proposed Action development program (Chapter 6). Also, additional traffic was added from other projects that are expected to occur in the vicinity of the project site, including the completion of the Puerto Rico Convention Center District (PRCCD), and various proposed development in the San Juan Isleta and Miramar. An investigation of other proposed developments in the area was undertaken in order to determine the expected traffic volumes in the area (Refer to Chapter 6).
- 5.11 The PA\_Alt 1 model consists of 64 zones and 22 matrices with a total volume of 22,932 vehicles during the AM peak and 22,055 during the PM peak.
- 5.12 Figure 5.15 to Figure 5.28 show the turning movements on the network for the PA\_Alt 1 model along Fernández Juncos Avenue and Del Tren Street.

FIGURE 5.14 PROPOSED ACTION ALTERNATIVE 1; MODELED HIGHWAY NETWORK





FIGURE 5.18 PA\_ALT1 AM TURNING MOVEMENTS; INTERSECTIONS 10, 11, 12, 13, 24

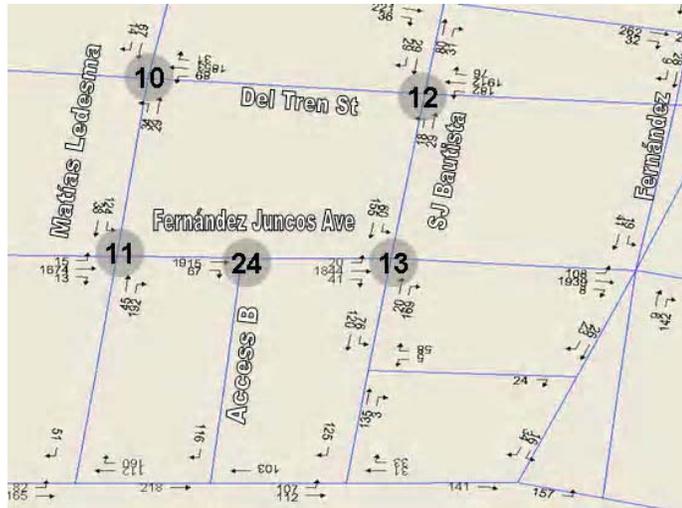


FIGURE 5.19 PA\_ALT1 AM TURNING MOVEMENTS; INTERSECTIONS 14, 15

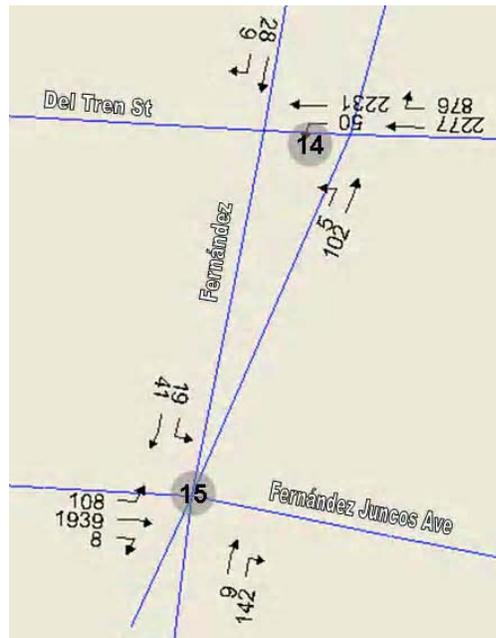


FIGURE 5.20 PA\_ALT1 AM TURNING MOVEMENTS; INTERSECTIONS 16, 17, 18, 19, 25, 26

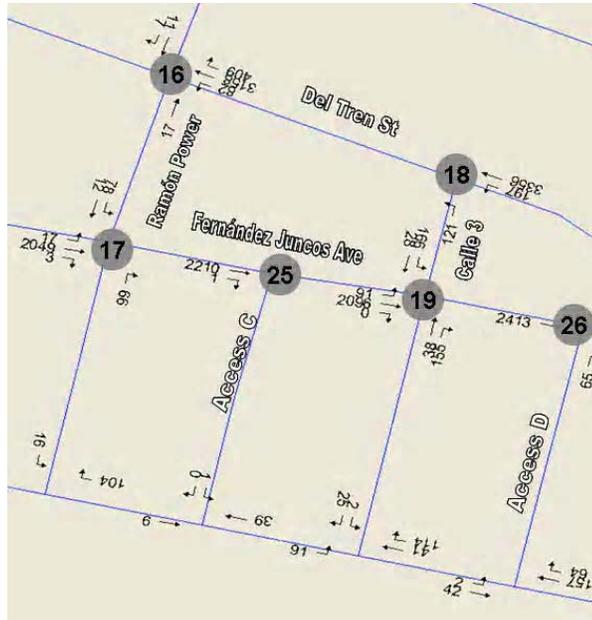


FIGURE 5.21 PA\_ALT1 AM TURNING MOVEMENTS; INTERSECTIONS 21, 27, 28

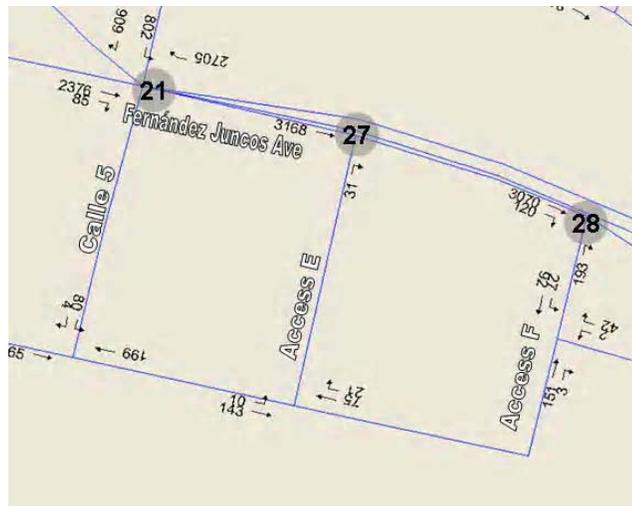


FIGURE 5.22 PA\_ALT1 PM TURNING MOVEMENTS; INTERSECTION 1

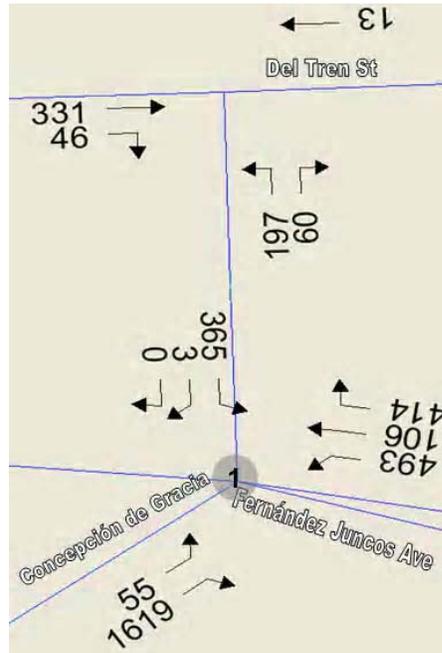
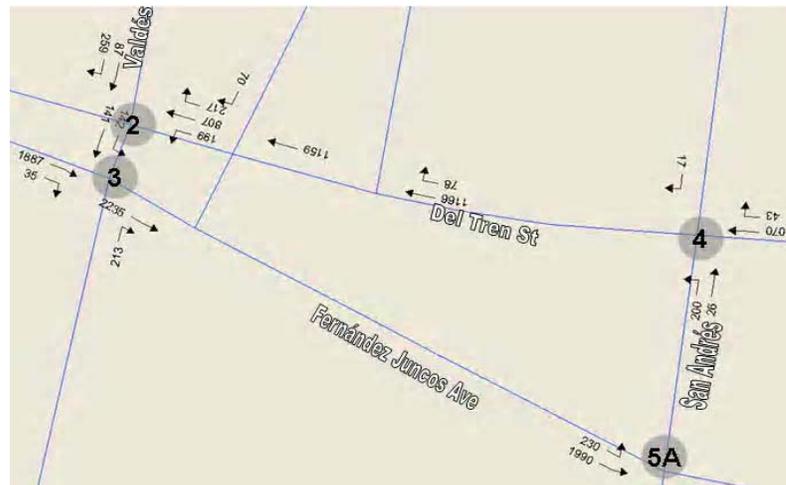


FIGURE 5.23 PA\_ALT1 PM TURNING MOVEMENTS; INTERSECTIONS 2, 3, 4, 5A



**FIGURE 5.24 PA\_ALT1 PM TURNING MOVEMENTS; INTERSECTIONS 4, 5A, 6, 7, 8, 9, 22, 23**



**FIGURE 5.25 PA\_ALT1 PM TURNING MOVEMENTS; INTERSECTIONS 10, 11, 12, 13, 24**



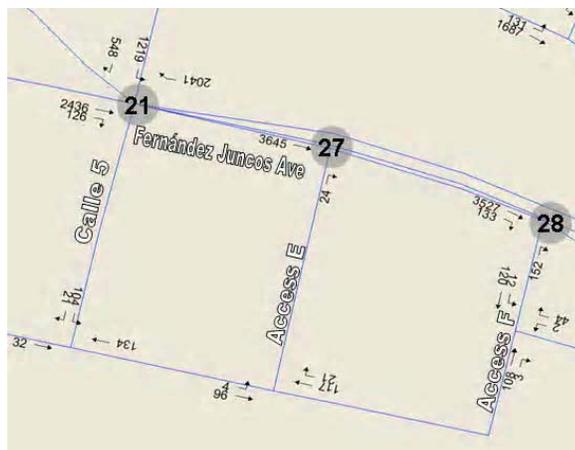
FIGURE 5.26 PA\_ALT1 PM TURNING MOVEMENTS; INTERSECTIONS 14, 15



FIGURE 5.27 PA\_ALT1 PM TURNING MOVEMENTS; INTERSECTIONS 16, 17, 18, 19, 25, 26



FIGURE 5.28 PA\_ALT1 PM TURNING MOVEMENTS; INTERSECTIONS 21, 27, 28



## **Proposed Action-Alternative 2**

- 5.13 The Proposed Action Alternative 2 (PA\_Alt2) model was prepared based on the proposed San Juan Waterfront Masterplan Alternative 2 and considering a future year of 2025. This model includes the addition of new roads, signals, proposed I5 design and tramline as explained in Chapter 3 (Figure 5.29).
- 5.14 In order to project the traffic expected in the study area for year 2025, this model includes the base traffic plus the projected traffic to be generated by the San Juan Waterfront Proposed Action Alternative 2 development program. Also, additional traffic was added from other projects that are expected to occur in the vicinity of the project site including the completion of the Puerto Rico Convention Center District, and various proposed development in the San Juan (Refer to Chapter 6).
- 5.15 The PA\_Alt2 model consists of 64 zones and 22 matrices with a total volume of 22,952 vehicles during the AM peak and 21,967 during the PM peak.
- 5.16 Figure 5.30 to Figure 5.45 show the turning movements on the network for the PA\_Alt2 model along Fernández Juncos Avenue and Del Tren Street.



FIGURE 5.30 PA\_ALT2 AM TURNING MOVEMENTS; INTERSECTION 1

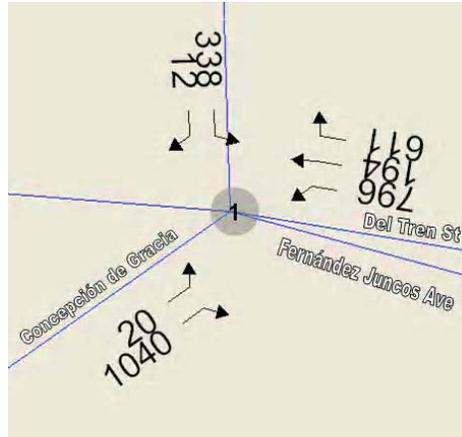


FIGURE 5.31 PA\_ALT2 AM TURNING MOVEMENTS; INTERSECTION 2

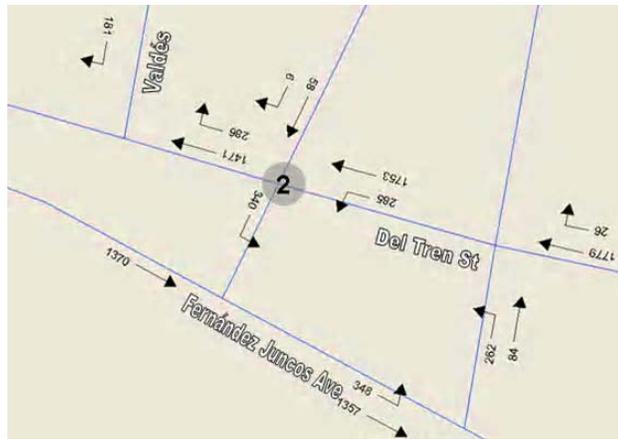


FIGURE 5.32 PA\_ALT2 AM TURNING MOVEMENTS; INTERSECTIONS 3, 4, 5A, 6, 7, 22

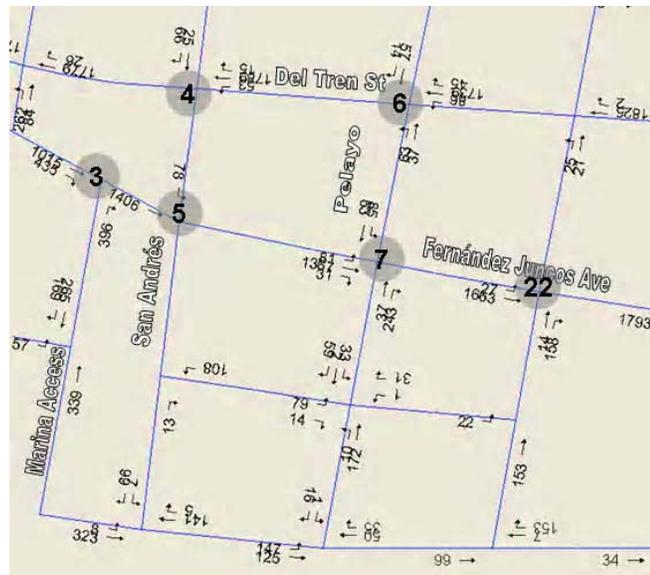


FIGURE 5.33 PA\_ALT2 AM TURNING MOVEMENTS; INTERSECTIONS 8, 9, 10, 11, 23

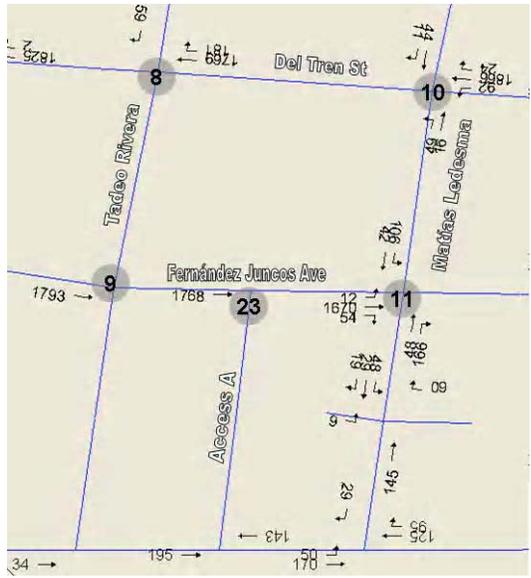


FIGURE 5.34 PA\_ALT2 AM TURNING MOVEMENTS; INTERSECTIONS 12, 13, 15



FIGURE 5.35 PA\_ALT2 AM TURNING MOVEMENTS; INTERSECTION 14

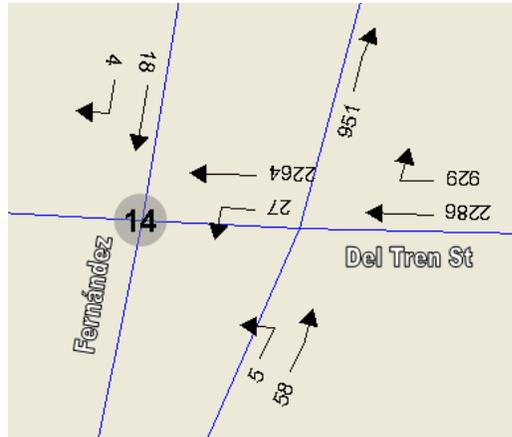


FIGURE 5.36 PA\_ALT2 AM TURNING MOVEMENTS; INTERSECTIONS 16, 17, 18, 19, 25



FIGURE 5.37 PA\_ALT2 AM TURNING MOVEMENTS; INTERSECTIONS 21, 26, 27, 28



FIGURE 5.38 PA\_ALT2 PM TURNING MOVEMENTS; INTERSECTION 1

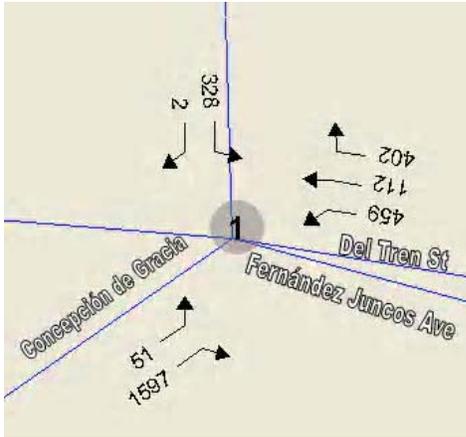


FIGURE 5.39 PA\_ALT2 PM TURNING MOVEMENTS; INTERSECTION 2

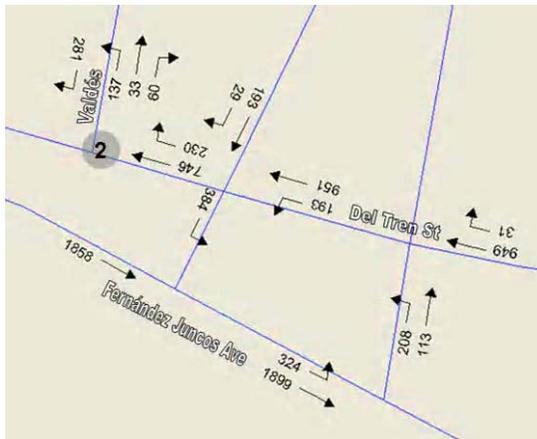


FIGURE 5.40 PA\_ALT2 PM TURNING MOVEMENTS; INTERSECTIONS 3, 4, 5A, 6, 7, 22

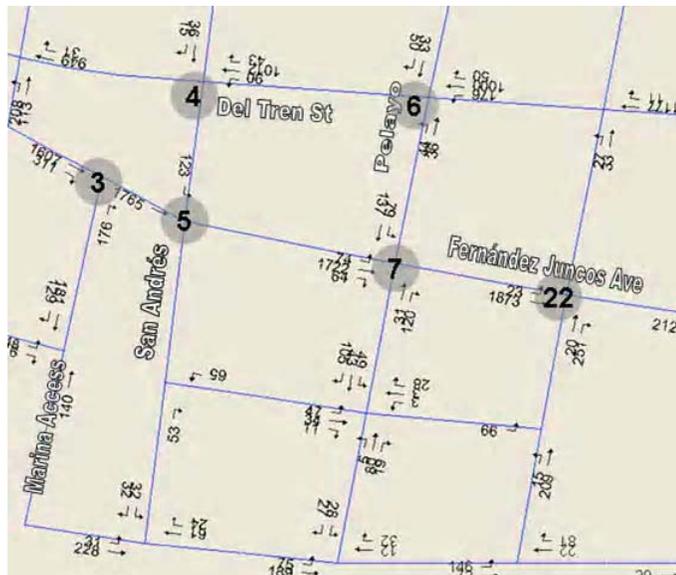


FIGURE 5.41 PA\_ALT2 PM TURNING MOVEMENTS; INTERSECTIONS 8, 9, 10, 11, 23



FIGURE 5.42 PA\_ALT2 PM TURNING MOVEMENTS; INTERSECTIONS 12, 13, 15



FIGURE 5.43 PA\_ALT2 PM TURNING MOVEMENTS; INTERSECTION 14

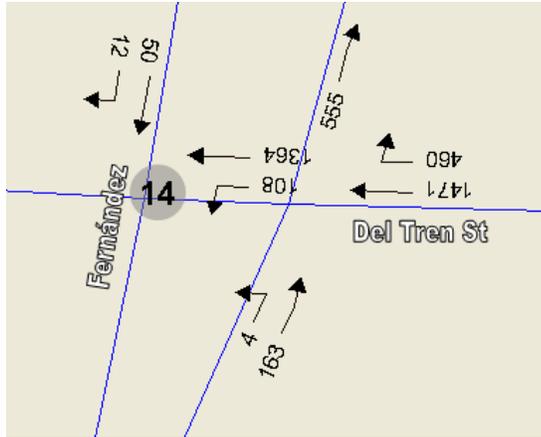


FIGURE 5.44 PA\_ALT2 PM TURNING MOVEMENTS; INTERSECTIONS 16, 17, 18, 19, 25



FIGURE 5.45 PA\_ALT2 PM TURNING MOVEMENTS; INTERSECTIONS 21, 26, 27, 28



### **Modified No Action-Alternative 3**

- 5.17 The Modified No Action (MNA\_Alt3) model was prepared based on the existing conditions model, but considering the proposed I5 design and the tramline as explained in Chapter 3 (Figure 5.46). This model was also prepared for future year 2025.
- 5.18 In order to project the traffic expected in the study area for year 2025, this model includes the base traffic plus the projected traffic to be generated by the development of the project area as currently zoned. Also, additional traffic was added from other projects that are expected to occur in the vicinity of the project site including the completion of the Puerto Rico Convention Center District, and various proposed development in the San Juan (Refer to Chapter 6 for the detail of trip generation and proposed projects).
- 5.19 The MNA\_Alt3 model consists of 47 zones and 22 matrices with a total volume of 22,815 vehicles during the AM peak and 23,226 during the PM peak.
- 5.20 Figure 5.47 to Figure 5.58 show the turning movements on the network for the MNA\_Alt3 model along Fernández Juncos Avenue and Del Tren Street.

FIGURE 5.46 MODIFIED NO ACTION AND NO ACTION (ALTERNATIVES 3 & 4), MODELED HIGHWAY NETWORK



FIGURE 5.47 MNA\_ALT3 AM TURNING MOVEMENTS; INTERSECTION 1

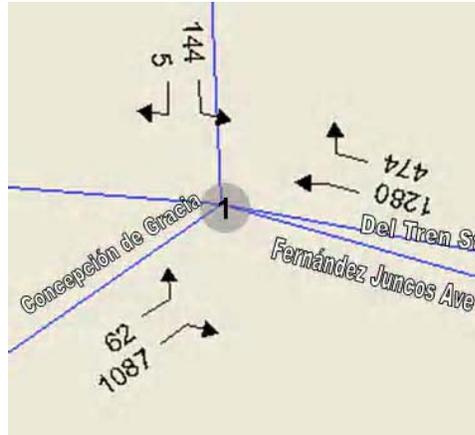


FIGURE 5.48 MNA\_ALT3 AM TURNING MOVEMENTS; INTERSECTION 2

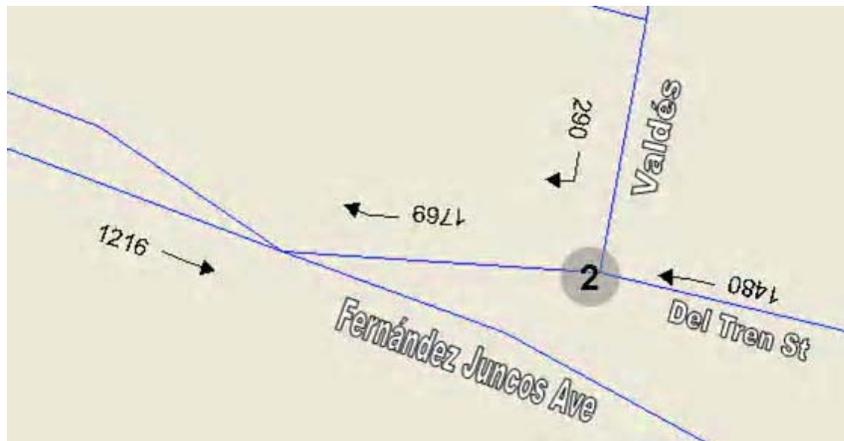


FIGURE 5.49 MNA\_ALT3 AM TURNING MOVEMENTS; INTERSECTIONS 4, 5A, 6

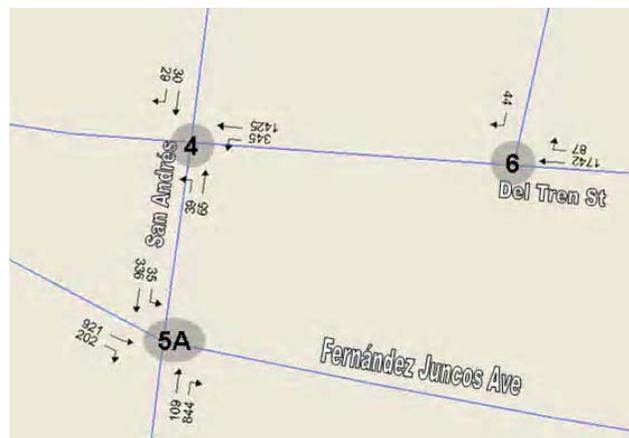


FIGURE 5.50 MNA\_ALT3 AM TURNING MOVEMENTS; INTERSECTIONS 8, 9, 10, 11



FIGURE 5.51 MNA\_ALT3 AM TURNING MOVEMENTS; INTERSECTIONS 12, 13, 14, 15, 16, 17

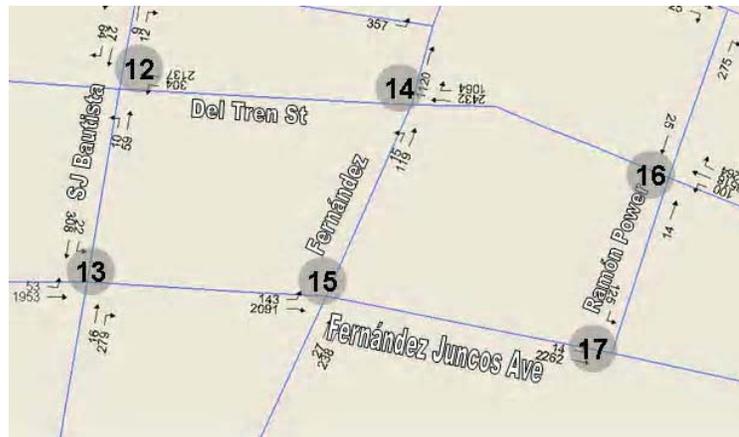


FIGURE 5.52 MNA\_ALT3 AM TURNING MOVEMENTS; INTERSECTION 18, 19, 21

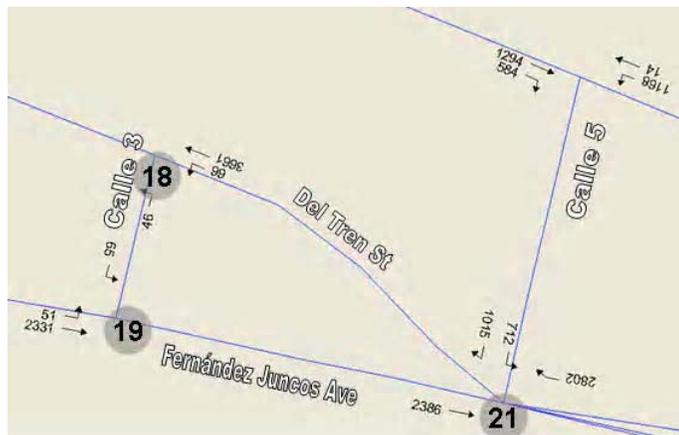


FIGURE 5.53 MNA\_ALT3 PM TURNING MOVEMENTS; INTERSECTION 1

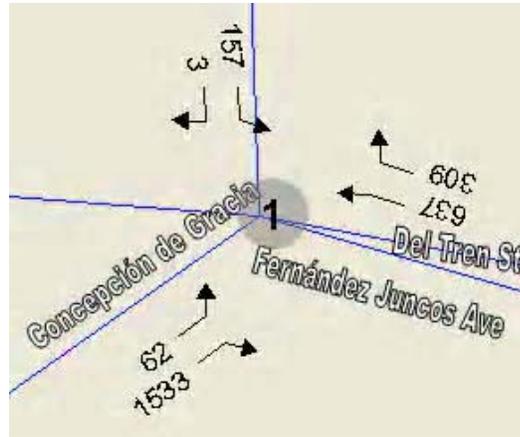


FIGURE 5.54 MNA\_ALT3 PM TURNING MOVEMENTS; INTERSECTION 2



FIGURE 5.55 MNA\_ALT3 PM TURNING MOVEMENTS; INTERSECTIONS 4, 5A, 6

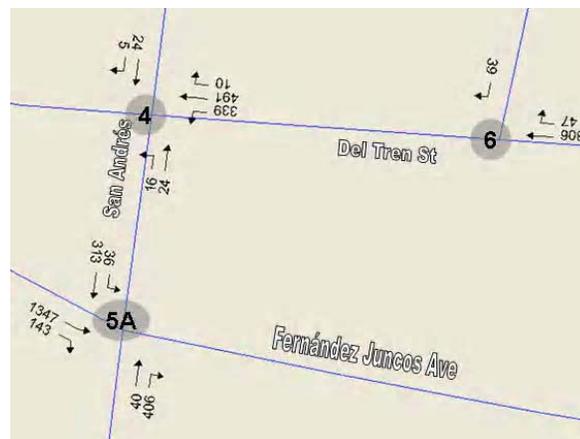


FIGURE 5.56 MNA\_ALT3 PM TURNING MOVEMENTS; INTERSECTIONS 8, 9, 10, 11



FIGURE 5.57 MNA\_ALT3 PM TURNING MOVEMENTS; INTERSECTIONS 12, 13, 14, 15, 16, 17

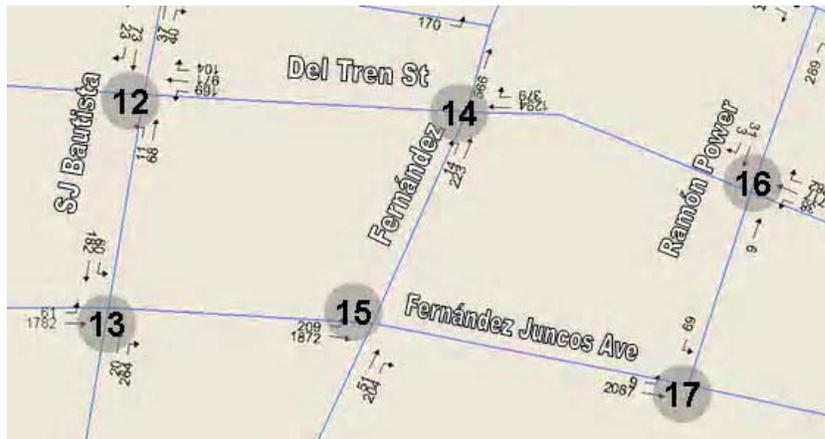
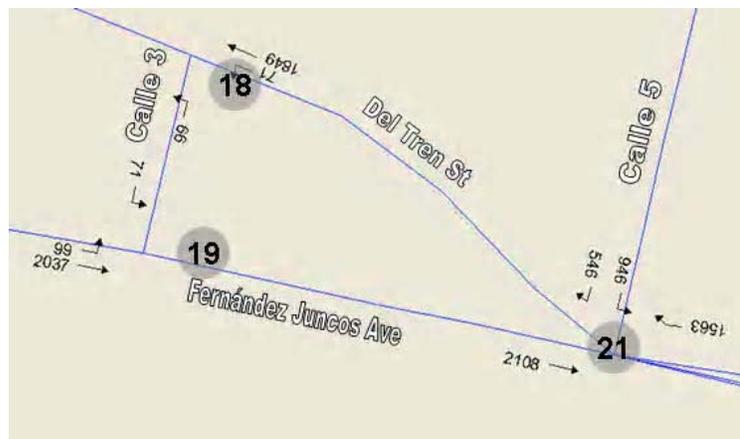


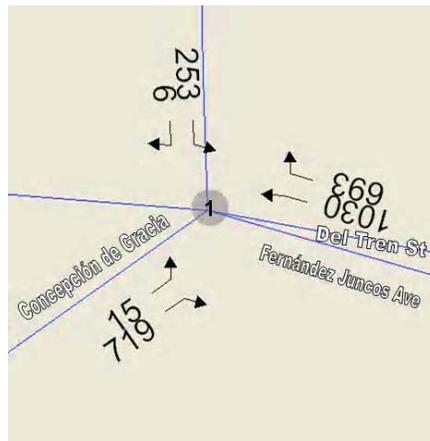
FIGURE 5.58 MNA\_ALT3 AM TURNING MOVEMENTS; INTERSECTION 18, 19, 21



#### No Action-Alternative 4

- 5.21 The No Action (NA\_Alt4) model was prepared based on the existing conditions model, but considering the proposed I5 design and the tramline as explained in Chapter 3 (Figure 5.46). This model was also prepared for future year 2025.
- 5.22 In order to project the traffic expected in the project area for year 2025, this model considers current land uses (base model), the Puerto Rico Convention Center District and other proposed developments for the San Juan area other than those from the SJW (Refer to Chapter 6).
- 5.23 The NA\_Alt4 model consists of 47 zones and 22 matrices with a total volume of 19,227 vehicles during the AM peak and 17,479 during the PM peak.
- 5.24 Figure 5.59 to Figure 5.70 show the turning movements on the network for the NA model along Fernández Juncos Avenue and Del Tren Street.

**FIGURE 5.59 NA\_ALT4 AM TURNING MOVEMENTS; INTERSECTION 1**



**FIGURE 5.60 NA\_ALT4 AM TURNING MOVEMENTS; INTERSECTION 2**



FIGURE 5.61 NA\_ALT4 AM TURNING MOVEMENTS; INTERSECTIONS 4, 5A, 6

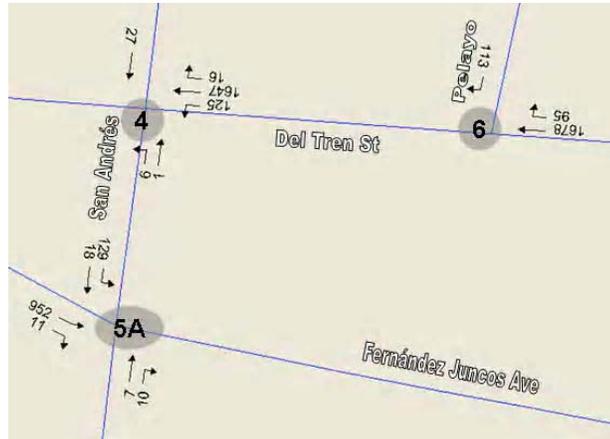


FIGURE 5.62 NA\_ALT4 AM TURNING MOVEMENTS; INTERSECTIONS 8, 9, 10, 11



FIGURE 5.63 NA\_ALT4 AM TURNING MOVEMENTS; INTERSECTIONS 12, 13, 14, 15, 16, 17



FIGURE 5.64 NA\_ALT4 AM TURNING MOVEMENTS; INTERSECTION 18, 19, 21

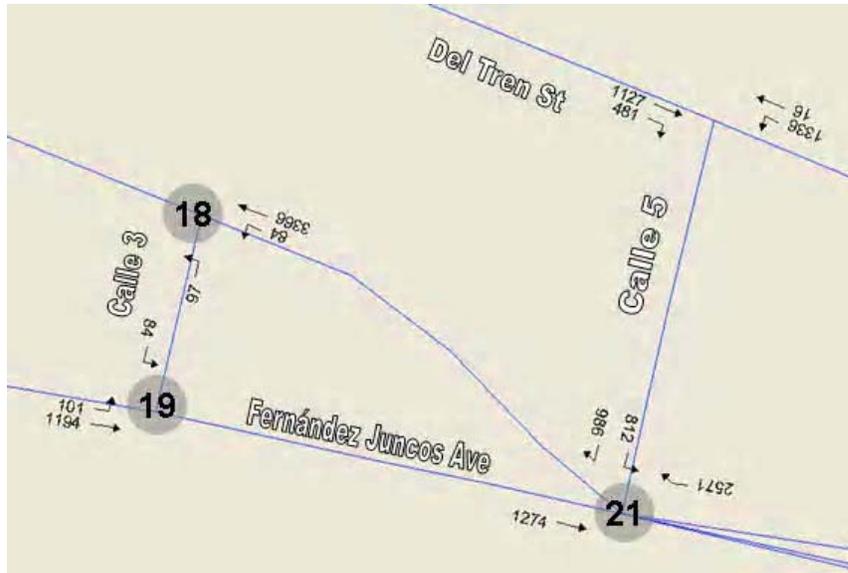


FIGURE 5.65 NA\_ALT4 PM TURNING MOVEMENTS; INTERSECTION 1

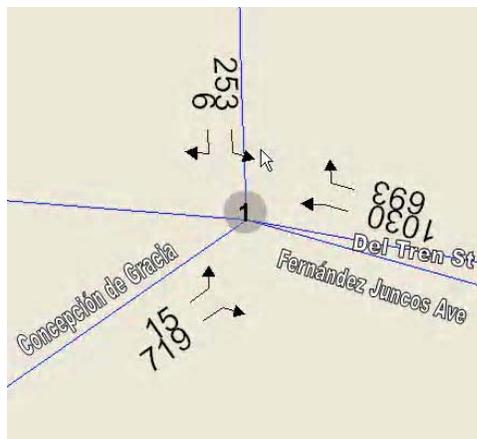


FIGURE 5.66 NA\_ALT4 PM TURNING MOVEMENTS; INTERSECTION 2

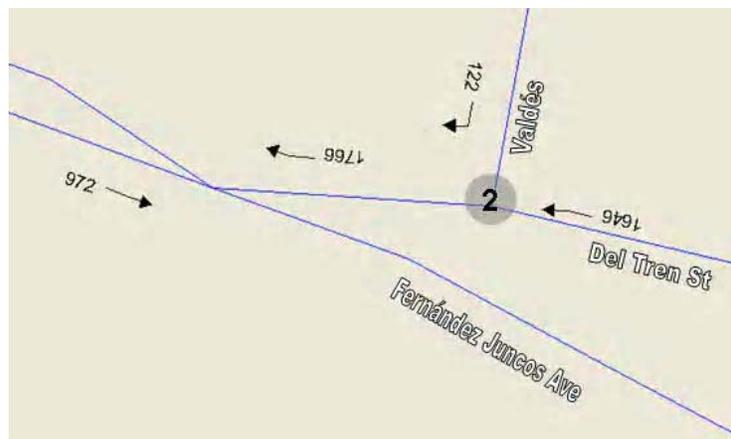


FIGURE 5.67 NA\_ALT4 PM TURNING MOVEMENTS; INTERSECTIONS 4, 5A, 6

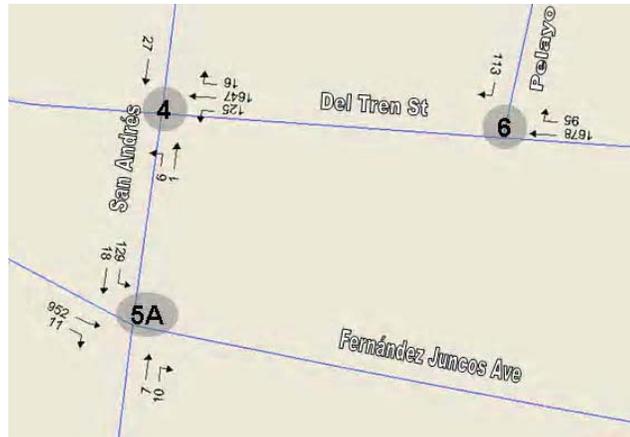


FIGURE 5.68 NA\_ALT4 PM TURNING MOVEMENTS; INTERSECTIONS 8, 9, 10, 11

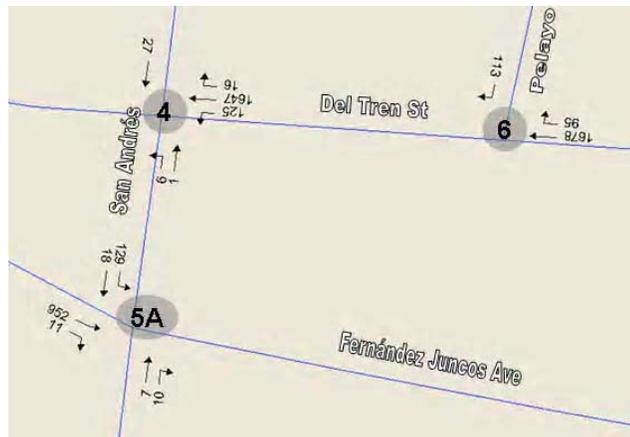
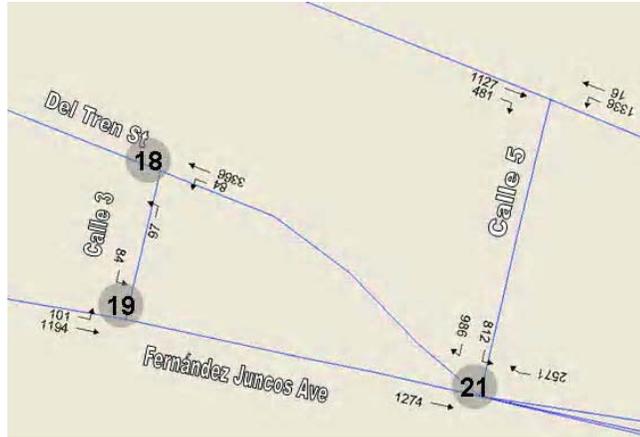


FIGURE 5.69 NA\_ALT4 PM TURNING MOVEMENTS; INTERSECTIONS 12, 13, 14, 15, 16, 17



FIGURE 5.70 NA\_ALT4 AM TURNING MOVEMENTS; INTERSECTION 18, 19, 21



## 6. TRIP GENERATION

### Introduction

- 6.1 Trip generation data is used to estimate future traffic volumes for different land uses. In this chapter the expected vehicular trip generation for the new developments affecting the San Juan Waterfront project area were calculated. Calculations are based on the United States Institute of Transportation Engineers (ITE) *Trip Generation Manual* (TGM) (7<sup>th</sup> Ed.).
- 6.2 Proportions were adjusted to better reflect the local conditions prevalent in Puerto Rico. This methodology is explained in detail in the following sections.

### Trip Generation Manual

- 6.3 The *ITE Trip Generation Manual* contains a large amount of information regarding trip generation rates for many different types of land use. This data is based on actual observations on trip generation studies undertaken across the country for similar land use development. The land description from the TGM that closest matches the land uses proposed for each development was selected. The Trip Generation Manual presents correlation formulas and/or trip rates to estimate the proposed development traffic volume production.
- 6.4 The TGM provides for making adjustments/reductions to the projected traffic for multi-use facilities. This adjustment is applicable to projects that have mixed-uses including residential, office and/or commercial. Due to the fact that some of the proposed developments are multi-use facilities, certain trips will happen within the development itself (for example resident using the commercial uses within the development).
- 6.5 Additional adjustments were made to consider reductions due to pass-by trips. These are trips made by traffic already using the adjacent road and enter the site as an intermediate stop. Therefore it is not a new trip produced due to the development.
- 6.6 Also, since the area is currently served by mass transport and a tramway is proposed in the area, adjustments for mass transit were applied when possible. Mass transport adjustment cannot be combined with multi-use adjustments.
- 6.7 Appendix D includes the trip generation spreadsheets.

### San Juan: Other Developments

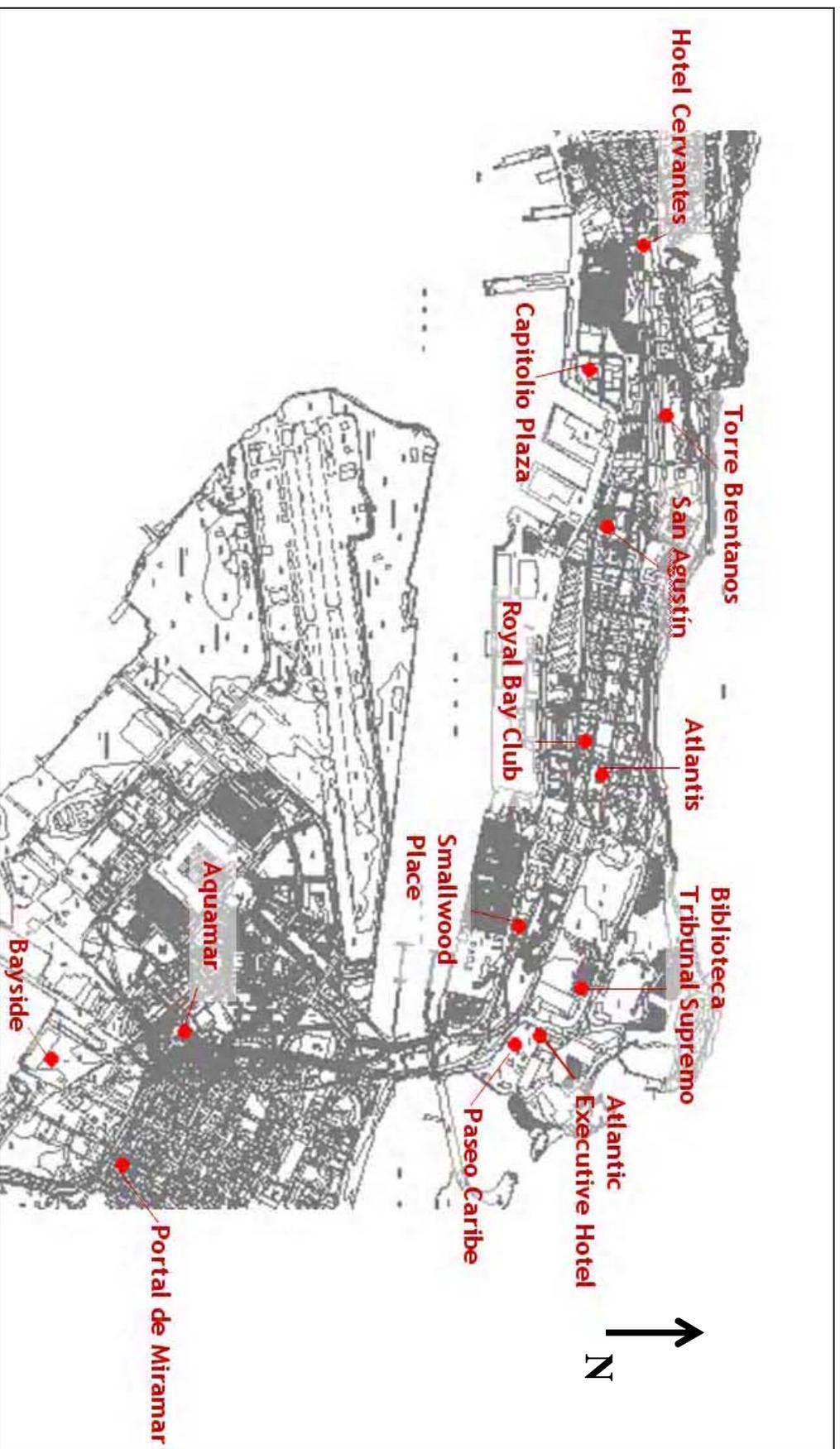
- 6.8 There are several projects planned for San Juan, besides those from the San Juan Waterfront and the Puerto Rico Convention Center District. The required information for proposed projects and/or ongoing developments was obtained by visiting the websites of the Puerto Rico Planning Board (Junta de Planificación-JP) and the Administration of Ruling and Permits (ARPE), and contacting the Municipality of San Juan Planning Office and the PRHTA Access Control Office.

6.9 A total of 13 developments were found near the influence area and are expected to generate traffic within the San Juan Isleta and/or I5. A list of these developments and their proposed development programs is shown on Table 6.1. Figure 6.1 shows their locations.

**TABLE 6.1 EXPECTED DEVELOPMENTS WITHIN THE STUDY INFLUENCE AREA**

Name of Development	Residential (units)	Commercial (Sq.ft.)	Port (Berths)	Lodging (Keys)	Office (Sq.ft.)	Restaurants (Sq.ft.)	Recreational (Sq.ft.)	Institutional (Sq.ft.)
Bayside	531	30,000	7					
Atlantis	169							
Portal de Miramar	17							
Aquamar	120							
Royal Bay Club	180							
Capitolio Plaza	153	12,000						
Hotel Cervantes				18				
Smallwood Place	52				85,474			
Atlantic Executive Hotel				28				
Torre Brentanos					106,896			
Paseo Caribe	92	99,131	337			6,000	23,384	
Biblioteca Tribunal Supremo								94,207
San Agustín 134	300				20,000			

FIGURE 6.1 LOCATIONS OF DEVELOPMENTS WITHIN THE STUDY INFLUENCE AREA



- 6.10 To estimate the traffic generation for each development, applicable trip rates are employed according to the respective land uses identified on the *ITE Trip Generation Manual* (7<sup>th</sup> Ed.).
- 6.11 Trip generation projections were prepared for AM and PM adjacent road peak hours. The applicable adjustments were applied to each development. The results are shown on Table 6.2.

**TABLE 6.2 TOTAL ADJUSTED TRIP GENERATION OF EXPECTED DEVELOPMENTS WITHIN THE STUDY INFLUENCE AREA**

Land Use	AM		PM	
	Entering	Exiting	Entering	Exiting
Bayside	182	340	200	152
Atlantis	14	59	42	26
Portal de Miramar	6	25	12	8
Aquamar	11	48	32	20
Royal Bay Club	13	56	40	25
Capitolio Plaza	58	101	48	37
Hotel Cervantes	3	2	6	5
Smallwood Place	37	157	114	70
Atlantic Executive Hotel	5	3	9	8
Torre Brentano	174	24	34	165
Paseo Caribe	267	273	361	211
Biblioteca Tribunal Supremo	86	33	27	29
San Agustín	153	95	93	175
<b>TOTAL</b>	<b>1009</b>	<b>1216</b>	<b>1018</b>	<b>931</b>

## Convention Center District (PRCCD)

6.12 Table 6.3 shows the proposed land uses and their respective proposed areas.

**TABLE 6.3 CONVENTION CENTER DISTRICT LAND USES**

Use	Total Area (sq ft)
Hotel	1,243,051
Commercial	245,000
Office	477,035
Residential	1,081,758
Aquarium	152,592
<b>TOTAL</b>	<b>3,199,436</b>

6.13 Trip generation projections were made for the AM and PM peak hours based on TGM. The uses from the TGM were selected based on their fit with the proposed development uses:

- Hotel – Use 310 “Hotel”
- Commercial – Use 814 “Specialty Retail Center”
- Office - Use 710 “General Office Building”
- Residential – Use 230 “Residential Condominium”
- Aquarium - Use 481 “Zoo”

6.14 The total adjusted trip generation for the PRCCD, considering the pass-by trips and multi-use reductions are shown on Table 6.4.

**TABLE 6.4 CONVENTION CENTER DISTRICT TOTAL ADJUSTED TRIP GENERATION**

Land Use	Entering	Exiting	Entering	Exiting
	AM	AM	PM	PM
Hotel	508	368	512	533
Commercial	586	680	199	242
Office	666	72	132	695
Residential	37	162	114	73
Aquarium	2	1	7	10
<b>TOTAL</b>	<b>1799</b>	<b>1283</b>	<b>964</b>	<b>1554</b>

## San Juan Waterfront, Proposed Alternative 1

6.15 The San Juan Waterfront proposed development area is 2,326,474 sq. ft for the west side and 1,579,737 sq. ft for the east end, resulting in a total development area of 3,906,211 sq ft. The proposed uses and areas for each use are as follows:

**TABLE 6.5 PROPOSED ALTERNATIVE 1 AREAS PER LAND USE; WEST END**

Land Use	Total Area (sq. ft.)
Commercial	225,574
Hotel	648,946
Casino	10,000
Marina Facilities	10,000
Residential	1,373,689
Civic	58,265
<b>TOTAL</b>	<b>2,326,474</b>

**TABLE 6.6 PROPOSED ALTERNATIVE 1 AREAS PER LAND USE; EAST END**

Land Use	Total Area (sq. ft.)
Commercial	79,718
Residential	1,287,861
Civic	68,952
Office	143,206
<b>TOTAL</b>	<b>1,579,737</b>

- 6.16 Trip generation projections were made for the AM and PM peak hours. The uses from the TGM were selected based on their fit with the proposed development uses:
- Commercial – Use 814 “Specialty Retail Center”
  - Residential – Use 230 “Residential Condominium”
  - Hotel – Use 310 “Hotel”
  - Casino – (*ITE Journal, May 1992, page 35*)
  - Port and Terminal – Use 010 “Waterport/ Marine Terminal”
  - Civic – Use 495 “Recreational Community Center”
  - Office – Use 710 “General Office Building”
- 6.17 Trip generation calculations were made for each parcel within the proposed scheme based on its land use.
- 6.18 Table 6.7 and Table 6.8 show the trip generation after applying the corresponding multi-use, pass by and mass transit adjustments (Appendix D) for the San Juan Waterfront Alternative 1 west and east ends.

**TABLE 6.7 PORPOSED ALTERNATIVE 1 ADJUSTED TRIP GENERATION; WEST END**

Land Use	Entering AM	Exiting AM	Entering PM	Exiting PM
Commercial	708	828	208	256
Residential	47	231	263	124
Hotel	235	152	282	246
Casino	63	52	100	72
Port and Terminal	37	44	42	30
Civic	58	37	28	68
<b>TOTAL</b>	<b>1148</b>	<b>1344</b>	<b>922</b>	<b>796</b>

**TABLE 6.8 PROPOSED ALTERNATIVE 1 ADJUSTED TRIP GENERATION; EAST END**

Land Use	Entering AM	Exiting AM	Entering PM	Exiting PM
Commercial	304	343	82	99
Residential	39	245	250	123
Civic	45	37	30	73
Office	179	20	31	171
<b>TOTAL</b>	<b>568</b>	<b>645</b>	<b>392</b>	<b>465</b>

## San Juan Waterfront, Proposed Alternative 2

6.19 The San Juan Waterfront Alternative 2 presents a variation in both the Marina facilities and Parque de la Bahía locations. The remaining components will be constructed as described in the Proposed Action Alternative 1, except for the Office Land Use, which is not included in this scheme. The total development area is of 3,734,246 sq. ft., of which 2,467,086 sq. ft. is in the west end and 1,267,160 sq. ft. in the east end. The proposed areas per land use are as follows:

**TABLE 6.9 PROPOSED ALTERNATIVE 2 AREAS PER LAND USE; WEST END**

Land Use	Total Area (sq. ft.)
Commercial	249,098
Hotel	590,680
Casino	10,000
Marina Facilities	11,800
Residential	1,545,508
Civic	60,000
<b>TOTAL</b>	<b>2,467,086</b>

**TABLE 6.10 PORPOSED ALTERNATIVE 2 AREAS PER LAND USE; EAST END**

Land Use	Total Area (sq. ft.)
Commercial	214,012
Residential	1,053,148
<b>TOTAL</b>	<b>1,267,160</b>

6.20 Traffic projections were based on the proposed land uses for each parcel within the scheme. One of these parcels (parcel C) is already being redeveloped by a private developer and therefore, it was not taken into account for the San Juan Waterfront traffic projections. The name of the project to be developed in this parcel is San Agustín 134 and it is included in the *Other Developments* section in this Chapter. The remaining land uses are:

- Commercial – Use 814 “Specialty Retail Center”
- Hotel – Use 310 “Hotel”
- Casino – (*ITE Journal, May 1992, page 35*)
- Port and Terminal – Use 010 “Waterport/ Marine Terminal”
- Residential – Use 230 “Residential Condominium”
- Civic – Use 495 “Recreational Community Center”

6.21 Trip generation for each land use was calculated and adjusted. Table 6.11 and Table

6.12.show the adjusted trip generation for the Alternative 2 San Juan Waterfront west and east ends respectively.

**TABLE 6.11 PROPOSED ALTERNATIVE 2 ADJUSTED TRIP GENERATION; WEST END**

Land Use	Entering AM	Exiting AM	Entering PM	Exiting PM
Commercial	692	750	208	265
Hotel	269	172	297	263
Casino	63	52	100	72
Marina Facilities	37	44	42	30
Residential	66	322	300	148
Civic	59	38	29	70
<b>TOTAL</b>	<b>1187</b>	<b>1378</b>	<b>976</b>	<b>848</b>

**TABLE 6.12 PROPOSED ALTERNATIVE 2 ADJUSTED TRIP GENERATION; EAST END**

Land Use	Entering AM	Exiting AM	Entering PM	Exiting PM
Commercial	429	465	157	200
Residential	45	221	206	102
<b>TOTAL</b>	<b>474</b>	<b>686</b>	<b>363</b>	<b>301</b>

### **San Juan Waterfront: CT-3 Zoning (Alternative 3)**

- 6.22 The development of the San Juan Waterfront area as a CT-3 zone was evaluated as part of the Modified No Action Alternative 3. The trip generation for this scenario was calculated based on CT-3 zoning restrictions for land use and maximum occupation area.
- 6.23 CT-3 zoning regulation allows for commercial and residential uses. Assuming buildings in the area would have a ground level floor for commercial use and two additional upper levels for residential use, the following data was obtained:

**TABLE 6.13 SAN JUAN WATERFRONT DEVELOPMENT UNDER CT-3 ZONING**

<b>Total Development Area [sq ft]</b>	<b>Gross Leasable Area (Max. Land Occupancy) [sq ft]</b>	<b>Max. No. Residential Units [Units]</b>
2,261,093	1,695,820	3,939

6.24 The maximum number of residential units was obtained based on the total project area zoned as CT3 (approximately 2,261,088 sq.ft.) and on the restriction of one residential unit per 861 sq ft. The gross leasable area for commercial use was assumed to be equal to the maximum occupation area of the lot (75%).

6.25 Table 6.14 shows the trip generation calculations for this scenario with the corresponding adjustments.

**TABLE 6.14 SAN JUAN WATERFRONT CT-3 ZONING ADJUSTED TRIP GENERATION**

<b>Land Use</b>	<b>Entering AM</b>	<b>Exiting AM</b>	<b>Entering PM</b>	<b>Exiting PM</b>
Commercial	141	688	696	343
Residential	1324	1435	1224	1558
<b>TOTAL</b>	<b>1465</b>	<b>2123</b>	<b>1876</b>	<b>1871</b>

## 7. PARAMICS MODELING RESULTS

### Introduction

- 7.1 The results from the models were obtained from an average of outputs from running each model up to 30 times. The modeling was undertaken using a dynamic routing approach where the model defines each minute into the 1 hour modeling the best route for each Origen-Destination to be loaded to the model. This approach results in a more realistic modeling since vehicles will use alternate routes when traffic queuing occurs. Appendices E and F include some input and output files of all the models.
- 7.2 The outputs from Paramics are given in form of journey times, queuing and number of vehicles. In order to comply with the *Puerto Rico Traffic Studies Guides*<sup>9</sup>, free flow operations for each model were ran in order to express the simulation results in terms of queue length (maximum number of vehicles in queue), average delay (seconds per vehicle) and Level of Service (LOS).
- 7.3 Level of Service is a quality measure that describes the traffic operational conditions in terms of speed, travel time, freedom to maneuver, traffic interruption, comfort and convenient. There are six (6) LOS defined by letters A to F, with LOS A representing the best operation and LOS F the worst. The LOS grades used for signalized and un-signalized intersections are included in Table 7.1.

TABLE 7.1 GRADES OF LEVEL OF SERVICE

LOS	Signalized Delay (sec/veh)	Unsignalized Delay (sec/veh)
A	≤10	0-10
B	> 10 – 20	> 10 – 15
C	>20 – 35	>15 – 25
D	>35 – 55	>25 – 35
E	>55 – 80	>35 – 50
F	>80	>50

<sup>9</sup> Estado Libre Asociado de Puerto Rico, Departamento de Transportación y Obras Públicas, Autoridad de Carreteras y Transportación. (22 de diciembre de 2004). *Guías para la Preparación de Estudios Operacionales de Acceso y de Tránsito para Puerto Rico; Versión 1.0;*

**Base Model**

7.4 Figure 7.1 and Figure 7.2 show the results of the AM and PM Paramics models for the Base model (2007) for the intersections with Fernández Juncos Ave. and Del Tren Street. Table 7.2 shows the average journey time (JT) and delay for Fernández Juncos Ave. and Del Tren Street.

**TABLE 7.2 TRAVEL TIMES ALONG FERNÁNDEZ JUNCOS AVE AND DEL TREN STREET; BASE MODEL**

	AM		PM	
	Journey Time (sec)	Delay (sec/veh)	Journey Time (sec)	Delay (sec/veh)
Del Tren St. Eastbound (from G. Concepción de Gracia St. to Calle 5)/MT	199	1.8	207	3.3
Del Tren St. Westbound (from Calle 5 to G. Concepción de Gracia St.)/MT	387	0.0	393	0.0
Fernández Juncos Avenue Eastbound (from G. Concepción de Gracia St. to Calle 5)	146	10.4	218	25.2
Fernández Juncos Avenue Westbound (from Calle 5 to G. Concepción de Gracia St.)	173	20.9	157	8.0

**MT-Mass Transit corridor**

**FIGURE 7.1 AM RESULTS; BASE MODEL**

<b>(Intersection 1) AM Peak - Gilberto Concepcion de Gracia and Fernandez Juncos Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Concepcion de Gracia (NB)	TR	A	0.00	2
		Calle Concepcion de Gracia (SB)	LTR	A	0.00	8
		Ave. Fernandez Juncos (WB)	TR	A	2.03	12
		Intersection	A	1.18	12	

<b>(Intersection 2) AM Peak - Valdes and Fernandez Juncos/Del Tren Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Vales (SB)	LR	A	0.13	7
		Calle Del Tren (WB)/MT	T	A	0.00	-
		Ave. Fernandez Juncos (EB)	LT	A	5.18	7
		Ave. Fernandez Juncos (WB)	TR	A	4.89	12
		Intersection	A	4.60	12	

<b>(Intersection 3) AM Peak - Marina Access and Fernandez Juncos Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base			N/A		
		Intersection				

<b>(Intersection 4) AM Peak - San Andres and Del Tren Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle San Andres (NB)	T	A	4.52	0
		Calle San Andres (SB)	T	C	28.50	0
		Calle Del Tren (EB)/MT	T	A	0.04	0
		Calle Del Tren (WB)/MT	T	A	0.00	0
		Intersection	A	3.69	-	

<b>(Intersection 5A) AM Peak - San Andres and Fernandez Juncos Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle San Andres (NB)	LTR	A	5.71	0
		Calle San Andres (SB)	LTR	A	9.17	0
		Ave. Fernandez Juncos (EB)	LTR	A	0.58	4
		Ave. Fernandez Juncos (WB)	LTR	A	9.02	18
		Intersection	A	6.60	18	

<b>(Intersection 6) AM Peak - Pelayo and Del Tren Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Pelayo (NB)	N/A	/	/	/
		Calle Pelayo (SB)	LR	A	0.00	0
		Calle Del Tren (EB)/MT	T	A	0.00	0
		Calle Del Tren (WB)/MT	T	A	0.00	0
		Intersection	A	0.00	0	

<b>(Intersection 7) AM Peak - Pelayo and Fernandez Juncos Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base			N/A		
		Intersection				

<b>(Intersection 8) AM Peak - Tadeo Rivera and Del Tren Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Tadeo Rivera (NB)	N/A	/	/	/
		Calle Tadeo Rivera (SB)	LR	A	0.00	0
		Calle Del Tren (EB)/MT	T	A	0.13	0
		Calle Del Tren (WB)/MT	T	A	0.00	0
		Intersection	A	0.04	0	

<b>(Intersection 9) AM Peak - Tadeo Rivera and Fernandez Juncos Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Tadeo Rivera (NB)	LR	A	8.70	4.20
		Calle Tadeo Rivera (SB)	N/A	/	/	/
		Ave. Fernandez Juncos (EB)	TR	A	0.10	0
		Ave. Fernandez Juncos (WB)	LT	A	0.00	0
		Intersection	A	0.05	0	

<b>(Intersection 10) AM Peak - Matias Ledesma and Del Tren Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Matias Ledesma (NB)	T	A	0.00	0
		Calle Matias Ledesma (SB)	T	C	21.47	2
		Calle Del Tren (EB)/MT	T	A	1.36	0
		Calle Del Tren (WB)/MT	T	A	0.51	0
		Intersection	A	9.88	2	

<b>(Intersection 11) AM Peak - Matias Ledesma and Fernandez Juncos Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Matias Ledesma (NB)	LTR	B	10.54	0
		Calle Matias Ledesma (SB)	LTR	B	17.92	3
		Ave. Fernandez Juncos (EB)	LTR	A	3.84	6
		Ave. Fernandez Juncos (WB)	LTR	A	4.40	10
		Intersection	A	4.46	10	

<b>(Intersection 12) AM Peak - San Juan Bautista and Del Tren Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle San Juan Bautista (NB)	T	A	0.16	0
		Calle San Juan Bautista (SB)	T	A	0.74	0
		Calle Del Tren (EB)/MT	T	A	0.01	0
		Calle Del Tren (WB)/MT	T	A	0.00	0
		Intersection	A	0.20	0	

<b>(Intersection 13) AM Peak - San Juan Bautista and Fernandez Juncos Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle San Juan Bautista (NB)	LTR	A	7.32	0
		Calle San Juan Bautista (SB)	LTR	B	13.96	0
		Ave. Fernandez Juncos (EB)	LTR	A	0.17	0
		Ave. Fernandez Juncos (WB)	LTR	A	0.33	5
		Intersection	A	0.42	5	

<b>(Intersection 14) AM Peak - M. Fernandez and Del Tren Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Fernandez (NB)	L	A	0.00	0
		Calle Fernandez (SB)	N/A	/	/	/
		Calle Del Tren (EB)/MT	T	A	0.00	0
		Calle Del Tren (WB)/MT	T	A	0.03	0
		Intersection	A	0.01	0	

<b>(Intersection 15) AM Peak - M Fernandez and Fernandez Juncos Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Fernandez (NB)	N/A	/	/	/
		Calle Fernandez (SB)	LR	A	0.00	0
		Ave. Fernandez Juncos (EB)	LT	A	0.05	0
		Ave. Fernandez Juncos (WB)	TR	A	0.02	0
		Intersection	A	0.03	0	

<b>(Intersection 16) AM Peak - Ramon Power and Del Tren Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Ramon Power (NB)	T	A	0.00	4
		Calle Ramon Power (SB)	T	A	2.54	2
		Calle Del Tren (EB)/MT	T	A	0.00	0
		Calle Del Tren (WB)/MT	T	A	0.00	0
		Intersection	A	0.26	4	

<b>(Intersection 17) AM Peak - Ramon Power and Fernandez Juncos Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Ramon Power (NB)	N/A	/	/	/
		Calle Ramon Power (SB)	LR	A	7.41	2
		Ave. Fernandez Juncos (EB)	LT	A	7.42	5
		Ave. Fernandez Juncos (WB)	TR	A	0.16	0
		Intersection	A	2.12	5	

<b>(Intersection 18) AM Peak - Calle 3 and Del Tren Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle 3 (NB)	LR	A	0.00	0
		Calle Del Tren (EB)/MT	T	A	0.00	0
		Calle Del Tren (WB)/MT	T	A	0.00	0
		Intersection	A	0.00	0	

<b>(Intersection 19) AM Peak - Calle 3 and Fernandez Juncos Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle 3 (NB)	N/A	/	/	/
		Calle 3 (SB)	LR	A	7.77	4
		Ave. Fernandez Juncos (EB)	LT	A	0.24	3
		Ave. Fernandez Juncos (WB)	TR	A	0.22	4
		Intersection	A	0.51	4	

<b>(Intersection 20) AM Peak - Calle 5 and Del Tren Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle 5 (NB)	T	A	0.00	0
		Calle 5 (SB)	T	E	57.66	2
		Calle Del Tren (EB)/MT	T	A	0.67	0
		Calle Del Tren (WB)/MT	T	A	0.48	0
		Intersection	A	6.03	2	

<b>(Intersection 21) AM Peak - Calle 5 and Fernandez Juncos Intersection</b>						
Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle 5 (SB)	TR	A	5.10	0
		Ave. Fernandez Juncos (EB)	LT	A	0.39	0
		Ave. Fernandez Juncos (WB)	TR	A	0.71	0
		Intersection	A	0.68	0	

FIGURE 7.2 PM RESULTS; BASE MODEL

**(Intersection 1) PM Peak - Gilberto Concepcion de Gracia and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Concepción de Gracia (NB)	TR	A	6.26	22
		Calle Concepción de Gracia (SB)	LTR	A	0.00	8
		Ave. Fernandez Juncos (WB)	TR	A	3.31	14
		Intersection	A	4.87	22	

**(Intersection 2) PM Peak - Valdes and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Valdes (SB)	LR	A	9.52	8
		Calle Del Tren (WB)/MT	T	A	0.00	-
		Ave. Fernandez Juncos (EB)	LT	A	2.61	20
		Ave. Fernandez Juncos (WB)	TR	A	1.56	11
		Intersection	A	2.72	20	

**(Intersection 3) PM Peak - Marina Access and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base		N/A			
Intersection						

**(Intersection 4) PM Peak - San Andres and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle San Andres (NB)	T	A	0.00	0
		Calle San Andres (SB)	T	D	47.39	0
		Calle Del Tren (EB)/MT	T	A	0.00	0
		Calle Del Tren (WB)/MT	T	A	0.00	0
		Intersection	B	14.01	-	

**(Intersection 5A) PM Peak - San Andres and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle San Andres (NB)	LTR	B	17.58	2
		Calle San Andres (SB)	LTR	B	13.88	0
		Ave. Fernandez Juncos (EB)	LTR	A	2.32	31
		Ave. Fernandez Juncos (WB)	LTR	A	0.00	0
		Intersection	A	2.66	31	

**(Intersection 6) PM Peak - Pelayo and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Pelayo (NB)	N/A	/	/	/
		Calle Pelayo (SB)	LR	A	0.00	0
		Calle Del Tren (EB)/MT	T	A	1.00	0
		Calle Del Tren (WB)/MT	T	A	0.03	0
		Intersection	A	0.03	0	

**(Intersection 7) PM Peak - Pelayo and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base		N/A			
Intersection						

**(Intersection 8) PM Peak - Tadeo Rivera and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Tadeo Rivera (NB)	N/A	/	/	0
		Calle Tadeo Rivera (SB)	LR	A	0.00	0
		Calle Del Tren (EB)/MT	T	A	0.00	0
		Calle Del Tren (WB)/MT	T	A	0.00	0
		Intersection	A	0.57	3	

**(Intersection 9) PM Peak - Tadeo Rivera and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Tadeo Rivera (NB)	LR	C	18.65	0
		Calle Tadeo Rivera (SB)	N/A	/	/	/
		Ave. Fernandez Juncos (EB)	TR	A	1.29	9
		Ave. Fernandez Juncos (WB)	LT	A	0.09	0
		Intersection	A	1.11	9	

**(Intersection 10) PM Peak - Matias Ledesma and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Matias Ledesma (NB)	T	A	0.00	0
		Calle Matias Ledesma (SB)	T	A	0.00	5
		Calle Del Tren (EB)/MT	T	A	0.81	0
		Calle Del Tren (WB)/MT	T	A	0.00	0
		Intersection	A	0.13	5	

**(Intersection 11) PM Peak - Matias Ledesma and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Matias Ledesma (NB)	LTR	B	14.00	0
		Calle Matias Ledesma (SB)	LTR	A	0.00	4
		Ave. Fernandez Juncos (EB)	LTR	B	13.18	49
		Ave. Fernandez Juncos (WB)	LTR	A	0.62	10
		Intersection	A	10.04	49	

**(Intersection 12) PM Peak - San Juan Bautista and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle San Juan Bautista (NB)	T	A	0.40	0
		Calle San Juan Bautista (SB)	T	A	1.97	0
		Calle Del Tren (EB)/MT	T	A	0.08	0
		Calle Del Tren (WB)/MT	T	A	0.06	0
		Intersection	A	0.86	0	

**(Intersection 13) PM Peak - San Juan Bautista and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle San Juan Bautista (NB)	LTR	A	7.89	0
		Calle San Juan Bautista (SB)	LTR	A	9.79	3
		Ave. Fernandez Juncos (EB)	LTR	A	0.00	0
		Ave. Fernandez Juncos (WB)	LTR	A	0.30	0
		Intersection	A	0.31	3	

**(Intersection 14) PM Peak - M. Fernandez and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Fernandez (NB)	L	A	0.00	0
		Calle Fernandez (SB)	N/A	/	/	/
		Calle Del Tren (EB)/MT	T	A	0.00	-1
		Calle Del Tren (WB)/MT	T	A	0.01	0
		Intersection	A	0.01	0	

**(Intersection 15) PM Peak - M Fernandez and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Fernandez (NB)	N/A	/	/	/
		Calle Fernandez (SB)	LR	A	0.00	0
		Ave. Fernandez Juncos (EB)	LT	A	0.00	0
		Ave. Fernandez Juncos (WB)	TR	A	0.05	1
		Intersection	A	0.01	1	

**(Intersection 16) PM Peak - RPMon Power and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Ramon Power (NB)	T	A	0.00	4
		Calle Ramon Power (SB)	T	A	0.00	4
		Calle Del Tren (EB)/MT	T	A	0.14	0
		Calle Del Tren (WB)/MT	T	A	0.00	0
		Intersection	A	0.01	4	

**(Intersection 17) PM Peak - RPMon Power and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle Ramon Power (NB)	N/A	/	/	/
		Calle Ramon Power (SB)	LR	A	3.18	2
		Ave. Fernandez Juncos (EB)	LT	A	1.62	10
		Ave. Fernandez Juncos (WB)	TR	A	0.00	0
		Intersection	A	1.73	10	

**(Intersection 18) PM Peak - Calle 3 and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle 3 (NB)	LR	A	0.00	0
		Calle Del Tren (EB)/MT	T	A	0.03	0
		Calle Del Tren (WB)/MT	T	A	0.00	0
		Intersection	A	0.02	0	

**(Intersection 19) PM Peak - Calle 3 and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle 3 (NB)	N/A	/	/	/
		Calle 3 (SB)	LR	A	1.76	5
		Ave. Fernandez Juncos (EB)	LT	A	4.34	15
		Ave. Fernandez Juncos (WB)	TR	A	0.00	0
		Intersection	A	4.23	15	

**(Intersection 20) PM Peak - Calle 5 and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle 5 (NB)	T	A	0.00	0
		Calle 5 (SB)	T	A	0.00	0
		Calle Del Tren (EB)/MT	T	A	0.33	0
		Calle Del Tren (WB)/MT	T	A	0.00	0
		Intersection	A	0.03	0.00	

**(Intersection 21) PM Peak - Calle 5 and Fernandez Juncos/Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2007	Base	Calle 5 (SB)	TR	A	0.00	0
		Ave. Fernandez Juncos (EB)	LT	A	0.00	0
		Ave. Fernandez Juncos (WB)	TR	A	0.14	0
		Intersection	A	0.04	0	

### Proposed Action-Alternative 1

- 7.5 Figure 7.3 and Figure 7.4 show the results for the AM and PM PA\_Alt 1 year 2025 models for the intersections with Fernández Juncos Ave. and Del Tren Street.
- 7.6 Table 7.3 includes the travel times recorded for Fernández Juncos Ave. and Del Tren Street for the PA Alt 1 model.

**TABLE 7.3 TRAVEL TIMES ALONG FERNÁNDEZ JUNCOS AVE AND DEL TREN STREET; PA ALT 1 MODEL**

	AM		PM	
	Journey Time (sec)	Delay (sec/veh)	Journey Time (sec)	Delay (sec/veh)
Del Tren St. Eastbound (from G. Concepción de Gracia St. to Calle 5)	N/A	N/A	N/A	N/A
Del Tren St. Westbound (from Calle 5 to G. Concepción de Gracia St.)	210	34	233	70
Fernández Juncos Avenue Eastbound (from G. Concepción de Gracia St. to Calle 5)	212	82	232	183
Fernández Juncos Avenue Westbound (from Calle 5 to G. Concepción de Gracia St.)/MT	TRAM			

MT-Mass Transit corridor

### Proposed Action-Alternative 2

- 7.7 Figure 7.5 and Figure 7.6 show the results for the AM and PM PA\_Alt2 year 2025 models for the intersections with Fernández Juncos Ave. and Del Tren Street.
- 7.8 Table 7.4 show the average travel times for the PA\_Alt 2 along Fernández Juncos Ave. and Del Tren Street.

**TABLE 7.4 TRAVEL TIMES ALONG FERNÁNDEZ JUNCOS AVE AND DEL TREN STREET; PA\_ALT2 MODEL**

	AM		PM	
	Journey Time (sec)	Delay (sec/veh)	Journey Time (sec)	Delay (sec/veh)
Del Tren St. Eastbound (from G. Concepción de Gracia St. to Calle 5)	N/A	N/A	N/A	N/A
Del Tren St. Westbound (from Calle 5 to G. Concepción de Gracia St.)	213	26.0	225	68.6
Fernández Juncos Avenue Eastbound (from G. Concepción de Gracia St. to Calle 5)	237	108.7	305	179.5
Fernández Juncos Avenue Westbound (from Calle 5 to G. Concepción de Gracia St.)/MT	TRAM			

MT-Mass Transit corridor

FIGURE 7.3 AM RESULTS; PA\_ALT 1 MODELS

**(Intersection 1) AM Peak - Gerardo Concepcion de Gracia and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Concepcion de Gracia (NB)	TR	A	7.26	13
		Calle Concepcion de Gracia (SB)	LTR	F	214.09	12
		Ave. Fernandez Juncos (WB)	TR	B	16.59	34
		Intersection	B	14.52	34	

**(Intersection 2) AM Peak - Valdes and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Valdes (SB)	R	D	33.47	9
		Ave. Del Tren (EB)	N/A	/	/	/
		Ave. Del Tren (WB)	TR	A	6.67	9
		Intersection	A	8.76	9	

**(Intersection 3) AM Peak - Valdes, Marina Access and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Marina Access (NB)	T	B	16.51	12.40
		Valdes Street (SB)	TL	A	0.00	-
		Ave. Fernandez Juncos (EB)	TR	A	0.00	14.27
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	-
		Intersection	A	2.59	14	

**(Intersection 4) AM Peak - San Andres and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle San Andres (NB)	LT	A	7.92	14
		Calle San Andres (SB)	TR	C	20.94	4
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	3.18	16
		Intersection	A	3.95	16	

**(Intersection 5) AM Peak - San Andres and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle San Andres (NB)	N/A	/	/	/
		Calle San Andres (SB)	LT	/	/	/
		Ave. Fernandez Juncos (EB)	T	A	3.38	11
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	3.38	11	

**(Intersection 6) AM Peak - Pelayo and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Pelayo (NB)	LT	C	19.61	11
		Calle Pelayo (SB)	N/A	D	31.51	8
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	1.32	10
		Intersection	A	3.18	11	

**(Intersection 7) AM Peak - Pelayo and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Pelayo (NB)	TR	C	32.17	18
		Calle Pelayo (SB)	LT	B	11.67	19
		Ave. Fernandez Juncos (EB)	LTR	A	3.99	12
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	B	10.48	19	

**(Intersection 8) AM Peak - Tadeo Rivera and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Tadeo Rivera (NB)				Pedestrian Only
		Calle Tadeo Rivera (SB)	R	A	6.15	4
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	TR	A	1.11	5
		Intersection	A	1.25	5	

**(Intersection 9) AM Peak - Tadeo Rivera and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Tadeo Rivera (NB)				Pedestrian Only
		Calle Tadeo Rivera (SB)				Pedestrian Only
		Ave. Fernandez Juncos (EB)	T	A	0.41	5
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	0.41	5	

**(Intersection 10) AM Peak - Matias Ledesma and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Matias Ledesma (NB)	LT	A	8.22	7
		Calle Matias Ledesma (SB)	TR	C	31.18	11
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	7.69	20
		Intersection	A	8.60	20	

**(Intersection 11) AM Peak - Matias Ledesma and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Matias Ledesma (NB)	TR	A	4.56	13
		Calle Matias Ledesma (SB)	LT	B	17.05	18
		Ave. Fernandez Juncos (EB)	LTR	A	1.93	10
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	3.42	18	

**(Intersection 12) AM Peak - San Juan Bautista and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle San Juan Bautista (NB)	LT	F	79.27	14
		Calle San Juan Bautista (SB)	TR	F	65.81	10
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	3.87	12
		Intersection	A	7.01	12	

**(Intersection 13) AM Peak - San Juan Bautista and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle San Juan Bautista (NB)	TR	C	20.76	13
		Calle San Juan Bautista (SB)	LT	B	17.29	17
		Ave. Fernandez Juncos (EB)	LTR	A	4.16	14
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	6.67	17	

**(Intersection 14) AM Peak - M. Fernandez and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Fernandez (NB)	LT	F	384.96	20
		Calle Fernandez (SB)	TR	F	128.36	10
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	2.50	7
		Intersection	B	17.78	20	

**(Intersection 15) AM Peak - M. Fernandez and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Fernandez (NB)	TR	B	16.22	17
		Calle Fernandez (SB)	LT	C	34.03	13
		Ave. Fernandez Juncos (EB)	LTR	A	9.18	22
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	B	10.52	22	

**(Intersection 16) AM Peak - Ramon Power and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Ramon Power (NB)	LT	A	5.90	2
		Calle Ramon Power (SB)	TR	F	281.37	12
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	5.65	20
		Intersection	A	7.87	20	

**(Intersection 17) AM Peak - Ramon Power and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Ramon Power (NB)	TR	A	5.42	12
		Calle Ramon Power (SB)	LT	B	17.51	13
		Ave. Fernandez Juncos (EB)	LTR	B	17.24	26
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	B	16.76	26	

**(Intersection 18) AM Peak - Calle 3 and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle 3 (NB)	L	F	102.80	14
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LT	A	4.99	21
		Intersection	A	8.05	21	

**(Intersection 19) AM Peak - Calle 3 and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle 3 (NB)	TR	D	45.94	25
		Calle 3 (SB)	LT	A	3.72	13
		Ave. Fernandez Juncos (EB)	LTR	B	10.72	16
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	B	12.70	25	

**(Intersection 21) AM Peak - Calle 5 and Fernandez Juncos/Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle 5 (SB)	L	D	38.94	23
		Ave. Fernandez Juncos (EB)	T	A	2.75	16
		Ave. Fernandez Juncos (WB)	T	A	9.28	25
		Intersection	B	13.91	25	

**(Intersection 22) AM Peak - Padre Hoff Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Padre Hoff (NB)	TR	A	9.77	9
		Ave. Fernandez Juncos (EB)	LT	A	4.14	14
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	4.62	14	

**(Intersection 23) AM Peak - SJW Access A and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Ave. Fernandez Juncos (EB)	TR	A	0.13	6
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	0.13	6	

**(Intersection 24) AM Peak - SJW Access B and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Ave. Fernandez Juncos (EB)	TR	A	1.39	9
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	1.39	9	

**(Intersection 25) AM Peak - SJW Access C and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Ave. Fernandez Juncos (EB)	TR	B	11.03	16
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	B	11.03	16	

**(Intersection 26) AM Peak - SJW Access D and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Access D (NB)	R	F	75.77	10
		Ave. Fernandez Juncos (EB)	T	A	8.77	16
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection	B	11.10	16			

**(Intersection 27) AM Peak - SJW Access E and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Access E (NB)	R	D	31.53	3
		Ave. Fernandez Juncos (EB)	T	A	2.80	20
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection	A	2.80	20			

**(Intersection 28) AM Peak - SJW Access F and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Access F (NB)	R	A	9.13	4
		Ave. Fernandez Juncos (EB)	TR	A	4.28	16
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection	A	4.05	16			

FIGURE 7.4 PM RESULTS; PA\_ALT 1 MODEL

**(Intersection 1) PM Peak - Gerardo Concepcion de Gracia and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Concepcion de Gracia (NB)	TR	D	36.04	224
		Calle Concepcion de Gracia (SB)	LTR	F	152.26	17
		Ave. Fernandez Juncos (WB)	TR	C	30.95	183
		Intersection		D	35.61	224

**(Intersection 2) PM Peak - Valdes and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Valdes (SB)	R	B	12.47	13
		Ave. Del Tren (EB)	N/A	/	/	/
		Ave. Del Tren (WB)	TR	A	6.91	25
		Intersection		A	8.24	25

**(Intersection 3) PM Peak - Valdes, Marina Access and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Marina Access (NB)	T	B	10.60	22
		Valdes Street (SB)	TL	A	0.00	-
		Ave. Fernandez Juncos (EB)	TR	A	0.00	282
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	-
		Intersection		A	0.96	282

**(Intersection 4) PM Peak - San Andres and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle San Andres (NB)	LT	B	12.04	16
		Calle San Andres (SB)	TR	C	22.36	4
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	2.44	52
		Intersection		A	4.49	52

**(Intersection 5) PM Peak - San Andres and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle San Andres (NB)	N/A	/	/	/
		Calle San Andres (SB)	LT	/	/	/
		Ave. Fernandez Juncos (EB)	T	B	13.29	304
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection		B	13.29	304

**(Intersection 6) PM Peak - Pelayo and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Pelayo (NB)	LT	B	13.26	12
		Calle Pelayo (SB)	N/A	F	50.25	22
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	3.42	55
		Intersection		A	7.09	55

**(Intersection 7) PM Peak - Pelayo and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Pelayo (NB)	TR	A	2.49	14
		Calle Pelayo (SB)	LT	C	21.08	40
		Ave. Fernandez Juncos (EB)	LTR	A	6.45	140
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection		A	7.93	140

**(Intersection 8) PM Peak - Tadeo Rivera and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Tadeo Rivera (NB)				
		Calle Tadeo Rivera (SB)	R	A	5.74	6
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	TR	A	0.42	0
		Intersection		A	0.71	6

**(Intersection 9) PM Peak - Tadeo Rivera and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Tadeo Rivera (NB)				
		Calle Tadeo Rivera (SB)				
		Ave. Fernandez Juncos (EB)	T	A	6.51	73
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection		A	6.51	73

**(Intersection 10) PM Peak - Matias Ledesma and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Matias Ledesma (NB)	LT	C	23.25	10
		Calle Matias Ledesma (SB)	TR	D	37.77	21
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	5.02	0
		Intersection		A	8.02	21

**(Intersection 11) PM Peak - Matias Ledesma and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Matias Ledesma (NB)	TR	B	15.12	10
		Calle Matias Ledesma (SB)	LT	D	50.69	35
		Ave. Fernandez Juncos (EB)	LTR	B	17.05	87
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection		B	19.02	87

**(Intersection 12) PM Peak - San Juan Bautista and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle San Juan Bautista (NB)	LT	E	37.51	0
		Calle San Juan Bautista (SB)	TR	E	44.86	15
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	2.71	33
		Intersection		A	6.94	33

**(Intersection 13) PM Peak - San Juan Bautista and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle San Juan Bautista (NB)	TR	C	20.46	18
		Calle San Juan Bautista (SB)	LT	E	73.63	37
		Ave. Fernandez Juncos (EB)	LTR	B	15.62	75
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection		C	20.66	75

**(Intersection 14) PM Peak - M. Fernandez and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Fernandez (NB)	LT	A	0.00	64
		Calle Fernandez (SB)	TR	D	38.54	16
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	1.35	57
		Intersection		A	2.90	64

**(Intersection 15) PM Peak - M. Fernandez and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Fernandez (NB)	TR	E	77.43	26
		Calle Fernandez (SB)	LT	E	59.26	24
		Ave. Fernandez Juncos (EB)	LTR	C	21.44	135
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection		C	26.21	135

**(Intersection 16) PM Peak - R.PMon Power and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Ramon Power (NB)	LT	D	45.98	3
		Calle Ramon Power (SB)	TR	F	173.95	11
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	9.02	122
		Intersection		B	10.51	122

**(Intersection 17) PM Peak - R.PMon Power and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Ramon Power (NB)	TR	B	14.38	4
		Calle Ramon Power (SB)	LT	F	125.79	15
		Ave. Fernandez Juncos (EB)	LTR	C	21.27	172
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection		C	23.54	172

**(Intersection 18) PM Peak - Calle 3 and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle 3 (NB)	L	F	54.08	16
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LT	B	13.80	156
		Intersection		C	15.36	156

**(Intersection 19) PM Peak - Calle 3 and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle 3 (NB)	TR	B	11.50	9
		Calle 3 (SB)	LT	C	31.42	21
		Ave. Fernandez Juncos (EB)	LTR	B	17.19	97
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection		B	18.73	97

**(Intersection 21) PM Peak - Calle 5 and Fernandez Juncos/Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle 5 (SB)	LT	C	34.26	313
		Ave. Fernandez Juncos (EB)	T	B	10.44	78
		Ave. Fernandez Juncos (WB)/MT	T	B	10.16	124
		Intersection		B	16.66	313

**(Intersection 22) PM Peak - Padre Hoff Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Calle Padre Hoff (NB)	TR	A	5.43	23
		Ave. Fernandez Juncos (EB)	LT	B	15.28	112
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection		B	14.24	112

**(Intersection 23) PM Peak - SJW Access A and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Ave. Fernandez Juncos (EB)	TR	A	8.96	82
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection		A	8.96	82

**(Intersection 24) PM Peak - SJW Access B and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Ave. Fernandez Juncos (EB)	TR	B	10.72	50
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection		B	10.72	50

**(Intersection 25) PM Peak - SJW Access C and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Ave. Fernandez Juncos (EB)	TR	C	15.85	69
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection		C	15.85	69

**(Intersection 26) PM Peak - SJW Access D and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Access D (NB)	R	F	77.94	6
		Ave. Fernandez Juncos (EB)	T	B	11.65	61
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection		B	12.68	61		

**(Intersection 27) PM Peak - SJW Access E and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Access E (NB)	R	F	53.03	3
		Ave. Fernandez Juncos (EB)	T	A	3.36	88
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection		A	3.72	88		

**(Intersection 28) PM Peak - SJW Access F and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action	Access F (NB)	R	A	3.36	0
		Ave. Fernandez Juncos (EB)	TR	A	3.89	64
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection		A	3.76	64		

FIGURE 7.5 AM RESULTS; PA\_ALT2 MODEL

(Intersection 1) AM Peak - Gilberto Concepcion de Gracia and Fernandez Juncos Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Concepcion de Gracia (NB)	TR	A	5.10	11
		Calle Concepcion de Gracia (SB)	LTR	F	244.80	8
		Ave. Fernandez Juncos (WB)	TR	C	22.08	19
		Intersection	B	17.34	19	

(Intersection 2) AM Peak - Valdes and Del Tren Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Valdes (SB)	R	A	1.01	4
		Ave. Del Tren (EB)	N/A	/	/	/
		Ave. Del Tren (WB)	TR	A	1.84	6
		Intersection	A	7.77	6	

(Intersection 3) AM Peak - Marina Access and Fernandez Juncos Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Marina Access (NB)	R	A	5.94	11
		Ave. Fernandez Juncos (EB)	TR	A	0.05	-
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	-
		Intersection	A	1.53	11	

(Intersection 4) AM Peak - San Andres and Del Tren Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle San Andres (NB)	N/A	/	/	/
		Calle San Andres (SB)	TR	C	21.53	5
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	0.76	5
		Intersection	A	1.74	5	

(Intersection 5A) AM Peak - San Andres and Fernandez Juncos Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle San Andres (NB)	N/A	/	/	/
		Calle San Andres (SB)	LT	A	0.00	13
		Ave. Fernandez Juncos (EB)	T	A	0.00	12
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	0.00	13	

(Intersection 6) AM Peak - Pelayo and Del Tren Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Pelayo (NB)	LT	C	23.11	8
		Calle Pelayo (SB)	TR	C	22.13	9
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	0.57	3
		Intersection	A	2.69	9	

(Intersection 7) AM Peak - Pelayo and Fernandez Juncos Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Pelayo (NB)	TR	A	8.25	17
		Calle Pelayo (SB)	LT	B	19.78	18
		Ave. Fernandez Juncos (EB)	LTR	A	2.10	8
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	4.33	18	

(Intersection 8) AM Peak - Tadeo Rivera and Del Tren Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Tadeo Rivera (NB)		Pedestrian Only		
		Calle Tadeo Rivera (SB)	R	A	1.58	2
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	TR	A	1.33	3
		Intersection	A	1.35	4	

(Intersection 9) AM Peak - Tadeo Rivera and Fernandez Juncos Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Tadeo Rivera (NB)		Pedestrian Only		
		Calle Tadeo Rivera (SB)		Pedestrian Only		
		Ave. Fernandez Juncos (EB)	T	A	0.06	11
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	0.06	11	

(Intersection 10) AM Peak - Matias Ledesma and Del Tren Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Matias Ledesma (NB)	LT	B	16.77	6
		Calle Matias Ledesma (SB)	TR	A	9.51	4
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	8.22	13
		Intersection	A	8.54	13	

(Intersection 11) AM Peak - Matias Ledesma and Fernandez Juncos Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Matias Ledesma (NB)	TR	A	0.00	12
		Calle Matias Ledesma (SB)	LT	C	23.35	15
		Ave. Fernandez Juncos (EB)	LTR	A	2.78	9
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	3.69	15	

(Intersection 12) AM Peak - San Juan Bautista and Del Tren Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle San Juan Bautista (NB)	LT	F	71.57	6
		Calle San Juan Bautista (SB)	TR	E	49.85	9
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	5.44	20
		Intersection	A	7.39	20	

(Intersection 13) AM Peak - San Juan Bautista and Fernandez Juncos Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle San Juan Bautista (NB)	TR	C	25.16	13
		Calle San Juan Bautista (SB)	LT	B	16.72	15
		Ave. Fernandez Juncos (EB)	LTR	A	4.55	9
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	7.23	15	

(Intersection 14) AM Peak - M. Fernandez and Del Tren Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Fernandez (NB)	LT	F	390.71	16
		Calle Fernandez (SB)	TR	F	183.26	8
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	2.50	5
		Intersection	B	15.25	16	

(Intersection 15) AM Peak - M Fernandez and Fernandez Juncos Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Fernandez (NB)	TR	D	43.46	13
		Calle Fernandez (SB)	LT	F	106.38	11
		Ave. Fernandez Juncos (EB)	LTR	B	17.04	16
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	C	21.87	16	

(Intersection 16) AM Peak - Ramon Power and Del Tren Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Ramon Power (NB)	LT	B	10.41	2
		Calle Ramon Power (SB)	TR	F	615.38	17
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	5.39	13
		Intersection	B	13.98	17	

(Intersection 17) AM Peak - Ramon Power and Fernandez Juncos Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Ramon Power (NB)	TR	A	0.00	5
		Calle Ramon Power (SB)	LT	A	8.32	11
		Ave. Fernandez Juncos (EB)	LTR	C	23.86	16
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	C	22.25	16	

(Intersection 18) AM Peak - Calle 3 and Del Tren Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle 3 (NB)	L	F	127.73	15
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LT	A	4.58	9
		Intersection	A	8.80	15	

(Intersection 19) AM Peak - Calle 3 and Fernandez Juncos Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle 3 (NB)	TR	A	7.47	13
		Calle 3 (SB)	LT	B	14.02	13
		Ave. Fernandez Juncos (EB)	LTR	B	14.31	16
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	B	13.95	16	

(Intersection 21) AM Peak - Calle 5 and Fernandez Juncos/Del Tren Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle 5 (NB)	LT	D	42.94	13
		Ave. Fernandez Juncos (EB)	T	A	5.21	9
		Ave. Fernandez Juncos (WB)/MT	T	A	8.10	25
		Intersection	B	15.10	25	

(Intersection 22) AM Peak - Padre Hoff Fernandez Juncos Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Padre Hoff (NB)	TR	A	0.00	9
		Ave. Fernandez Juncos (EB)	LT	A	5.29	7
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	4.80	9	

(Intersection 23) AM Peak - SJW Access A and Fernandez Juncos Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Ave. Fernandez Juncos (EB)	TR	A	0.05	14
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	0.05	14	

(Intersection 24) AM Peak - SJW Access B and Fernandez Juncos Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Ave. Fernandez Juncos (EB)	TR	A	2.88	9
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	2.88	9	

(Intersection 25) AM Peak - SJW Access C and Fernandez Juncos Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Ave. Fernandez Juncos (EB)	TR	B	13.13	16
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	B	13.13	16	

(Intersection 26) AM Peak - SJW Access D and Fernandez Juncos Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Access D (NB)	R	F	50.11	3
		Ave. Fernandez Juncos (EB)	T	B	10.59	16
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	B	11.30	16	

(Intersection 27) AM Peak - SJW Access E and Fernandez Juncos Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Access E (NB)	R	D	29.21	2
		Ave. Fernandez Juncos (EB)	T	A	4.61	21
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	4.67	21	

(Intersection 28) AM Peak - SJW Access F and Fernandez Juncos Intersection

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Access E (NB)	R	A	1.12	2
		Ave. Fernandez Juncos (EB)	TR	A	5.88	10
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	5.49	10	

**FIGURE 7.6 PM RESULTS; PA\_ALT2 MODEL**

**(Intersection 1) PM Peak - Gilberto Concepcion de Gracia and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Concepcion de Gracia (NB)	TR	C	29.63	71
		Calle Concepcion de Gracia (SB)	LTR	F	129.51	12
		Ave. Fernandez Juncos (WB)	TR	D	39.66	70
		Intersection	C	34.29	71	

**(Intersection 2) PM Peak - Valdes and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Valdes (SB)	R	A	0.11	-
		Ave. Del Tren (EB)	/	/	/	/
		Ave. Del Tren (WB)	TR	A	1.25	12
		Intersection	A	1.00	12	

**(Intersection 3) PM Peak - Marina Access and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Marina Access (NB)	R	C	16.12	-
		Ave. Fernandez Juncos (EB)	TR	A	5.62	-
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	-
		Intersection	A	6.37	-	

**(Intersection 4) PM Peak - San Andres and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle San Andres (NB)	N/A	/	/	/
		Calle San Andres (SB)	TR	D	50.48	14
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	2.28	39
Intersection	A	4.27	39			

**(Intersection 5A) PM Peak - San Andres and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle San Andres (NB)	N/A	/	/	/
		Calle San Andres (SB)	LT	B	11.88	19
		Ave. Fernandez Juncos (EB)	T	C	23.00	92
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection	C	22.35	92			

**(Intersection 6) PM Peak - Pelayo and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Pelayo (NB)	LT	C	21.47	12
		Calle Pelayo (SB)	TR	D	33.67	14
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	3.25	30
Intersection	A	6.68	30			

**(Intersection 7) PM Peak - Pelayo and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Pelayo (NB)	TR	A	4.88	0
		Calle Pelayo (SB)	LT	B	13.39	0
		Ave. Fernandez Juncos (EB)	LTR	B	16.81	0
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection	B	15.96	0			

**(Intersection 8) PM Peak - Tadeo Rivera and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Tadeo Rivera (NB)			Pedestrian Only	
		Calle Tadeo Rivera (SB)	R	A	5.47	7
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	TR	A	0.39	0
Intersection	A	2.25	8			

**(Intersection 9) PM Peak - Tadeo Rivera and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Tadeo Rivera (NB)			Pedestrian Only	
		Calle Tadeo Rivera (SB)			Pedestrian Only	
		Ave. Fernandez Juncos (EB)	T	A	5.77	34
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection	A	5.77	34			

**(Intersection 10) PM Peak - Matias Ledesma and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Matias Ledesma (NB)	LT	D	41.87	10
		Calle Matias Ledesma (SB)	TR	B	16.32	14
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	4.54	0
Intersection	A	6.85	14			

**(Intersection 11) PM Peak - Matias Ledesma and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Matias Ledesma (NB)	TR	B	16.93	11
		Calle Matias Ledesma (SB)	LT	D	39.55	22
		Ave. Fernandez Juncos (EB)	LTR	B	11.02	38
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection	B	13.40	38			

**(Intersection 12) PM Peak - San Juan Bautista and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle San Juan Bautista (NB)	LT	C	18.43	6
		Calle San Juan Bautista (SB)	TR	F	61.35	11
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	2.90	26
Intersection	A	6.96	26			

**(Intersection 13) PM Peak - San Juan Bautista and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle San Juan Bautista (NB)	TR	D	37.62	13
		Calle San Juan Bautista (SB)	LT	E	84.03	22
		Ave. Fernandez Juncos (EB)	LTR	A	9.89	37
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection	B	15.44	37			

**(Intersection 14) PM Peak - M. Fernandez and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Fernandez (NB)	LT	A	0.00	27
		Calle Fernandez (SB)	TR	D	38.32	11
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	1.04	32
Intersection	A	2.59	32			

**(Intersection 15) PM Peak - M Fernandez and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Fernandez (NB)	TR	E	78.40	18
		Calle Fernandez (SB)	LT	E	59.43	18
		Ave. Fernandez Juncos (EB)	LTR	B	16.18	51
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection	C	20.94	51			

**(Intersection 16) PM Peak - RPMon Power and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Ramon Power (NB)	LT	D	47.74	3
		Calle Ramon Power (SB)	TR	F	192.29	10
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	8.06	58
Intersection	B	10.30	58			

**(Intersection 17) PM Peak - RPMon Power and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Ramon Power (NB)	TR	C	20.82	3
		Calle Ramon Power (SB)	LT	F	117.43	10
		Ave. Fernandez Juncos (EB)	LTR	B	18.40	65
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection	C	20.53	65			

**(Intersection 18) PM Peak - Calle 3 and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle 3 (NB)	L	F	52.62	13
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LT	A	6.33	58
		Intersection	A	8.21	58	

**(Intersection 19) PM Peak - Calle 3 and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle 3 (NB)	TR	A	5.61	5
		Calle 3 (SB)	LT	B	18.95	13
		Ave. Fernandez Juncos (EB)	LTR	B	14.30	42
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection	B	14.61	42			

**(Intersection 21) PM Peak - Calle 5 and Fernandez Juncos/Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle 5 (SB)	LT	C	33.68	96
		Ave. Fernandez Juncos (EB)	T	A	9.38	37
		Ave. Fernandez Juncos (WB)/MT	T	A	9.26	47
		Intersection	B	15.71	96	

**(Intersection 22) PM Peak - Padre Hoff Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Padre Hoff (NB)	TR	A	0.12	17
		Ave. Fernandez Juncos (EB)	LT	B	18.25	51
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	B	16.08	51	

**(Intersection 23) PM Peak - SJW Access A and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Ave. Fernandez Juncos (EB)	TR	A	6.98	32
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	6.98	32	

**(Intersection 24) PM Peak - SJW Access B and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Ave. Fernandez Juncos (EB)	TR	A	6.78	28
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	6.78	28	

**(Intersection 25) PM Peak - SJW Access C and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Ave. Fernandez Juncos (EB)	TR	B	13.86	31
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	B	13.86	31	

**(Intersection 26) PM Peak - SJW Access D and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Access D (NB)	R	E	44.85	3
		Ave. Fernandez Juncos (EB)	T	B	10.20	30
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	B	10.55	30	

**(Intersection 27) PM Peak - SJW Access E and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Access E (NB)	R	E	37.94	0
		Ave. Fernandez Juncos (EB)	T	A	3.33	38
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	3.43	38	

**(Intersection 28) PM Peak - SJW Access F and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Access E (NB)	R	A	0.89	0
		Ave. Fernandez Juncos (EB)	TR	A	3.91	0
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection	A	3.79	0			

### Modified No Action-Alternative 3

- 7.9 Figure 7.7 and Figure 7.8 and show the results for the AM and PM MNA\_Alt 3 year 2025 models for the intersections with Fernández Juncos Ave. and Del Tren Street.
- 7.10 Table 7.5 includes the travel times recorded for Fernández Juncos Ave and Del Tren Street for the MNA\_Alt 3 model.

**TABLE 7.5 TRAVEL TIMES ALONG FERNÁNDEZ JUNCOS AND DEL TREN STREET; MNA\_ALT 3 MODEL**

	AM		PM	
	Journey Time (sec)	Delay (sec/veh)	Journey Time (sec)	Delay (sec/veh)
Del Tren St. Eastbound (from G. Concepción de Gracia St. to Calle 5)	N/A	N/A	N/A	N/A
Del Tren St. Westbound (from Calle 5 to G. Concepción de Gracia St.)	216	54.1	246	86.8
Fernández Juncos Avenue Eastbound (from G. Concepción de Gracia St. to Calle 5)	287	136.9	489	340.4
Fernández Juncos Avenue Westbound (from Calle 5 to G. Concepción de Gracia St.)/MT	TRAM			

MT-Mass Transit corridor

### No Action-Alternative 4

- 7.11 Figure 7.9 and Figure 7.10 and show the results for the AM and PM NA\_Alt4 year 2025 models for the intersections with Fernández Juncos Ave. and Del Tren Street.
- 7.12 The travel times recorded for this option along Fernández Juncos Ave and Del Tren Street are shown in Table 7.6.

**TABLE 7.6 TRAVEL TIMES ALONG FERNÁNDEZ JUNCOS AND DEL TREN STREET; NA\_ALT 4 MODEL**

	AM		PM	
	Journey Time(sec)	Delay (sec/veh)	Journey Time (sec)	Delay (sec/veh)
Del Tren St. Eastbound (from G. Concepción de Gracia St. to Calle 5)	N/A	N/A	N/A	N/A
Del Tren St. Westbound (from Calle 5 to G. Concepción de Gracia St.)	131	0.0	118	0.0
Fernández Juncos Avenue Eastbound (from G. Concepción de Gracia St. to Calle 5)	132	9.6	169	42.5
Fernández Juncos Avenue Westbound (from Calle 5 to G. Concepción de Gracia St.)/MT	TRAM			

MT-Mass Transit corridor

FIGURE 7.7 AM RESULTS; MNA\_ALT 3 MODEL

**(Intersection 1) AM Peak - Gilberto Concepcion de Gracia and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Concepcion de Gracia (NB)	TR	A	5.10	11
		Calle Concepcion de Gracia (SB)	LTR	F	244.80	8
		Ave. Fernandez Juncos (WB)	TR	C	22.08	19
		Intersection	B	17.34	19	

**(Intersection 2) AM Peak - Valdes and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Valdes (SB)	R	A	1.01	4
		Ave. Del Tren (EB)	N/A	/	/	/
		Ave. Del Tren (WB)	TR	A	1.84	6
		Intersection	A	4.77	6	

**(Intersection 3) AM Peak - Marina Access and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Marina Access (NB)	R	A	5.94	11
		Ave. Fernandez Juncos (EB)	TR	A	0.05	-
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	-
		Intersection	A	1.53	11	

**(Intersection 4) AM Peak - San Andres and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle San Andres (NB)	N/A	/	/	/
		Calle San Andres (SB)	TR	C	21.53	5
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	0.76	5
		Intersection	A	1.74	5	

**(Intersection 5A) AM Peak - San Andres and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle San Andres (NB)	N/A	/	/	/
		Calle San Andres (SB)	LT	A	0.00	13
		Ave. Fernandez Juncos (EB)	T	A	0.00	12
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	0.00	13	

**(Intersection 6) AM Peak - Pelayo and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Pelayo (NB)	LT	C	23.11	8
		Calle Pelayo (SB)	TR	C	22.13	9
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	0.57	3
		Intersection	A	2.69	9	

**(Intersection 7) AM Peak - Pelayo and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Pelayo (NB)	TR	A	3.25	17
		Calle Pelayo (SB)	LT	B	19.78	18
		Ave. Fernandez Juncos (EB)	LTR	A	2.10	8
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	4.33	18	

**(Intersection 8) AM Peak - Tadeo Rivera and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Tadeo Rivera (NB)	Pedestrian Only			
		Calle Tadeo Rivera (SB)	R	A	1.58	2
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	TR	A	1.33	3
		Intersection	A	1.35	4	

**(Intersection 9) AM Peak - Tadeo Rivera and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Tadeo Rivera (NB)	Pedestrian Only			
		Calle Tadeo Rivera (SB)	Pedestrian Only			
		Ave. Fernandez Juncos (EB)	T	A	0.06	11
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	0.06	11	

**(Intersection 10) AM Peak - Matias Ledesma and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Matias Ledesma (NB)	LT	B	16.77	6
		Calle Matias Ledesma (SB)	TR	A	9.51	4
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	8.22	13
		Intersection	A	8.54	13	

**(Intersection 11) AM Peak - Matias Ledesma and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Matias Ledesma (NB)	TR	A	0.00	12
		Calle Matias Ledesma (SB)	LT	C	23.35	15
		Ave. Fernandez Juncos (EB)	LTR	A	2.78	9
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	3.69	15	

**(Intersection 12) AM Peak - San Juan Bautista and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle San Juan Bautista (NB)	LT	F	71.57	6
		Calle San Juan Bautista (SB)	TR	E	49.85	9
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	5.44	20
		Intersection	A	7.39	20	

**(Intersection 13) AM Peak - San Juan Bautista and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle San Juan Bautista (NB)	TR	C	25.16	13
		Calle San Juan Bautista (SB)	LT	B	16.72	15
		Ave. Fernandez Juncos (EB)	LTR	A	4.55	9
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	7.23	15	

**(Intersection 14) AM Peak - M. Fernandez and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Fernandez (NB)	LT	F	390.71	16
		Calle Fernandez (SB)	TR	F	183.26	8
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	2.50	5
		Intersection	B	15.25	16	

**(Intersection 15) AM Peak - M Fernandez and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Fernandez (NB)	TR	D	43.46	13
		Calle Fernandez (SB)	LT	F	106.38	11
		Ave. Fernandez Juncos (EB)	LTR	B	17.04	16
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	C	21.87	16	

**(Intersection 16) AM Peak - Ramon Power and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Ramon Power (NB)	LT	B	10.41	2
		Calle Ramon Power (SB)	TR	F	615.38	17
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	5.39	13
		Intersection	B	13.98	17	

**(Intersection 17) AM Peak - Ramon Power and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Ramon Power (NB)	TR	A	0.00	5
		Calle Ramon Power (SB)	LT	A	8.32	11
		Ave. Fernandez Juncos (EB)	LTR	C	23.86	16
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	C	22.25	16	

**(Intersection 18) AM Peak - Calle 3 and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle 3 (NB)	L	F	127.73	15
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LT	A	4.58	9
		Intersection	A	8.80	15	

**(Intersection 19) AM Peak - Calle 3 and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle 3 (NB)	TR	A	7.47	13
		Calle 3 (SB)	LT	B	14.02	13
		Ave. Fernandez Juncos (EB)	LTR	B	14.31	16
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	B	13.95	16	

**(Intersection 21) AM Peak - Calle 5 and Fernandez Juncos/Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle 5 (SB)	LT	D	42.94	13
		Ave. Fernandez Juncos (EB)	T	A	5.21	9
		Ave. Fernandez Juncos (WB)/MT	T	A	8.10	25
		Intersection	B	15.10	25	

**(Intersection 22) AM Peak - Padre Hoff Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Calle Padre Hoff (NB)	TR	A	0.00	9
		Ave. Fernandez Juncos (EB)	LT	A	5.29	7
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	4.80	9	

**(Intersection 23) AM Peak - SJW Access A and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Ave. Fernandez Juncos (EB)	TR	A	0.05	14
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	0.05	14	

**(Intersection 24) AM Peak - SJW Access B and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Ave. Fernandez Juncos (EB)	TR	A	2.88	9
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	2.88	9	

**(Intersection 25) AM Peak - SJW Access C and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Ave. Fernandez Juncos (EB)	TR	B	13.13	16
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	B	13.13	16	

**(Intersection 26) AM Peak - SJW Access D and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Access D (NB)	R	F	50.11	3
		Ave. Fernandez Juncos (EB)	T	B	10.59	16
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	B	11.30	16	

**(Intersection 27) AM Peak - SJW Access E and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Access E (NB)	R	D	29.21	2
		Ave. Fernandez Juncos (EB)	T	A	4.61	21
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	4.67	21	

**(Intersection 28) AM Peak - SJW Access F and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Proposed Action A12	Access E (NB)	R	A	1.12	2
		Ave. Fernandez Juncos (EB)	TR	A	5.88	10
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	5.43	10	

**FIGURE 7.8 PM RESULTS; MNA\_ALT 3 MODEL**

**(Intersection 1) PM Peak - Gilberto Concepcion de Gracia and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle Concepcion de Gracia (NB)	TR	E	57.90	75
		Calle Concepcion de Gracia (SB)	LTR	E	55.50	14
		Ave. Fernandez Juncos (WB)	TR	A	0.00	35
		Intersection	E	57.89	75	

**(Intersection 2) PM Peak - Valdes and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle Valdes (SB)	R	B	11.16	8
		Ave. Del Tren (EB)	N/A	/	/	/
		Ave. Del Tren (WB)	TR	A	0.00	-
		Intersection	A	4.64	8	

**(Intersection 3) PM Peak - Marina Access and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action			N/A		
Intersection						

**(Intersection 4) PM Peak - San Andres and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle San Andres (NB)		E	66.54	0
		Calle San Andres (SB)	TR	F	311.26	23
		Calle Del Tren (EB)		/	/	/
		Calle Del Tren (WB)	LTR	E	68.96	52
		Intersection	E	77.36	52	

**(Intersection 5A) PM Peak - San Andres and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle San Andres (NB)	N/A	F	122.62	38
		Calle San Andres (SB)	LT	D	36.68	17
		Ave. Fernandez Juncos (EB)	T	D	47.66	64
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	E	60.73	64	

**(Intersection 6) PM Peak - Pelayo and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle Pelayo (NB)	LT	/	/	/
		Calle Pelayo (SB)	TR	C	16.07	2
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	D	25.87	28
		Intersection	D	25.70	28	

**(Intersection 7) PM Peak - Pelayo and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action			N/A		
Intersection						

**(Intersection 8) PM Peak - Tadeo Rivera and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle Tadeo Rivera (NB)	N/A	/	/	0
		Calle Tadeo Rivera (SB)	R	B	12.40	0
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	TR	A	0.00	0
		Intersection	A	0.47	0	

**(Intersection 9) PM Peak - Tadeo Rivera and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle Tadeo Rivera (NB)	R	F	140.11	0.00
		Calle Tadeo Rivera (SB)	N/A	/	/	/
		Ave. Fernandez Juncos (EB)	TR	F	96.39	139.00
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0.00
		Intersection	F	100.78	139.00	

**(Intersection 10) PM Peak - Matias Ledesma and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle Matias Ledesma (NB)	LT	D	40.71	23
		Calle Matias Ledesma (SB)	TR	F	92.91	13
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	B	17.02	60
		Intersection	C	25.28	60	

**(Intersection 11) PM Peak - Matias Ledesma and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle Matias Ledesma (NB)	TR	F	91.35	0
		Calle Matias Ledesma (SB)	LT	E	59.42	23
		Ave. Fernandez Juncos (EB)	LTR	C	32.46	41
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	D	41.13	41	

**(Intersection 12) PM Peak - San Juan Bautista and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle San Juan Bautista (NB)	LT	F	163.70	19
		Calle San Juan Bautista (SB)	TR	F	114.77	18
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	C	16.32	32
		Intersection	D	31.22	32	

**(Intersection 13) PM Peak - San Juan Bautista and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle San Juan Bautista (NB)	TR	D	47.14	0
		Calle San Juan Bautista (SB)	LT	F	90.98	25
		Ave. Fernandez Juncos (EB)	LTR	C	35.45	39
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	D	35.26	39	

**(Intersection 14) PM Peak - M. Fernandez and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle Fernandez (NB)	LT	F	132.47	47
		Calle Fernandez (SB)	TR	/	/	/
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	B	14.73	36
		Intersection	C	26.49	47	

**(Intersection 15) PM Peak - M Fernandez and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle Fernandez (NB)	TR	D	48.47	0
		Calle Fernandez (SB)	LT	/	/	/
		Ave. Fernandez Juncos (EB)	LTR	C	28.30	57
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	C	30.30	57	

**(Intersection 16) PM Peak - Ramon Power and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle Ramon Power (NB)	LT	A	0.00	2
		Calle Ramon Power (SB)	TR	F	699.56	18
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	C	20.17	64
		Intersection	C	32.63	64	

**(Intersection 17) PM Peak - Ramon Power and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle Ramon Power (NB)	TR	/	/	/
		Calle Ramon Power (SB)	LT	F	166.36	14
		Ave. Fernandez Juncos (EB)	LTR	C	22.88	66
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	C	28.27	66	

**(Intersection 18) PM Peak - Calle 3 and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle 3 (NB)	L	F	153.45	14
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LT	C	18.75	80
		Intersection	D	25.35	80	

**(Intersection 19) PM Peak - Calle 3 and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle 3 (NB)	TR	/	/	/
		Calle 3 (SB)	LT	E	59.52	7
		Ave. Fernandez Juncos (EB)	LTR	C	23.52	48
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	C	24.57	48	

**(Intersection 21) PM Peak - Calle 5 and Fernandez Juncos/Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle 5 (SB)	LT	D	44.47	102
		Ave. Fernandez Juncos (EB)	T	A	8.34	33
		Ave. Fernandez Juncos (WB)/MT	T	B	17.26	51
		Intersection	C	21.78	102	

**(Intersection 22) PM Peak - Padre Hoff Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Calle Padre Hoff (NB)	TR	/	/	/
		Ave. Fernandez Juncos (EB)	LT	A	6.92	15
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	6.92	15	

**(Intersection 23) PM Peak - SJW Access A and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Ave. Fernandez Juncos (EB)	TR	D	26.76	32
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	D	26.76	32	

**(Intersection 24) PM Peak - SJW Access B and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Ave. Fernandez Juncos (EB)	TR	C	18.30	28
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	C	18.30	28	

**(Intersection 25) PM Peak - SJW Access C and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Ave. Fernandez Juncos (EB)	TR	C	15.92	33
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	C	15.92	33	

**(Intersection 26) PM Peak - SJW Access D and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Access D (NB)	R	/	/	/
		Ave. Fernandez Juncos (EB)	T	A	5.58	32
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	5.58	32	

**(Intersection 27) PM Peak - SJW Access E and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Access E (NB)	R	/	/	/
		Ave. Fernandez Juncos (EB)	T	A	2.24	42
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	2.24	42	

**(Intersection 28) PM Peak - SJW Access F and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	Modified No Action	Access E (NB)	R	/	/	/
		Ave. Fernandez Juncos (EB)	TR	A	2.94	36
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	2.94	36	

FIGURE 7.9 AM RESULTS; NA\_ALT 4 MODEL

**(Intersection 1) AM Peak - Gilberto Concepcion de Gracia and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Concepcion de Gracia (NB)	TR	A	2.20	9
		Calle Concepcion de Gracia (SB)	LTR	C	28.39	4
		Ave. Fernandez Juncos (WB)	TR	A	0.00	16
		Intersection	A	5.47	16	

**(Intersection 2) AM Peak - Valdes and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Valdes (SB)	R	C	18.66	4
		Ave. Del Tren (EB)	N/A	/	/	/
		Ave. Del Tren (WB)	TR	A	0.00	11
		Intersection	A	1.27	11	

**(Intersection 3) AM Peak - Marina Access and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action		N/A			
Intersection						

**(Intersection 4) AM Peak - San Andres and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle San Andres (NB)	LT	B	18.00	2
		Calle San Andres (SB)	TR	C	25.54	5
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	0.18	2
		Intersection	A	0.74	5	

**(Intersection 5A) AM Peak - San Andres and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle San Andres (NB)	TR	B	19.20	2
		Calle San Andres (SB)	LT	D	35.17	16
		Ave. Fernandez Juncos (EB)	LTR	A	0.00	11
		Ave. Fernandez Juncos (WB)MT	T	A	0.00	0
		Intersection	A	4.11	16	

**(Intersection 6) AM Peak - Pelayo and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Pelayo (NB)	N/A	/	/	/
		Calle Pelayo (SB)	R	A	5.56	4
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	TR	A	0.47	2
		Intersection	A	0.73	4	

**(Intersection 7) AM Peak - Pelayo and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action		N/A			
Intersection						

**(Intersection 8) AM Peak - Tadeo Rivera and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Tadeo Rivera (NB)	N/A	/	/	/
		Calle Tadeo Rivera (SB)	R	A	3.89	0
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	TR	A	0.01	2
		Intersection	A	0.03	2	

**(Intersection 9) AM Peak - Tadeo Rivera and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Tadeo Rivera (NB)	R	A	0.00	0.00
		Calle Tadeo Rivera (SB)	N/A	/	/	/
		Ave. Fernandez Juncos (EB)	TR	A	0.38	2.00
		Ave. Fernandez Juncos (WB)MT	T	A	0.00	0.00
		Intersection	A	0.38	2.00	

**(Intersection 10) AM Peak - Matias Ledesma and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Matias Ledesma (NB)	LT	A	0.00	0
		Calle Matias Ledesma (SB)	TR	D	41.64	12
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	0.00	8
		Intersection	A	2.07	12	

**(Intersection 11) AM Peak - Matias Ledesma and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Matias Ledesma (NB)	TR	A	0.00	0
		Calle Matias Ledesma (SB)	LT	B	19.98	21
		Ave. Fernandez Juncos (EB)	LTR	A	0.00	7
		Ave. Fernandez Juncos (WB)MT	T	A	0.00	0
		Intersection	A	2.66	21	

**(Intersection 12) AM Peak - San Juan Bautista and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle San Juan Bautista (NB)	LT	F	95.72	6
		Calle San Juan Bautista (SB)	TR	E	42.50	12
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	2.46	13
		Intersection	A	6.97	13	

**(Intersection 13) AM Peak - San Juan Bautista and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle San Juan Bautista (NB)	TR	A	0.00	0
		Calle San Juan Bautista (SB)	LT	A	4.62	9
		Ave. Fernandez Juncos (EB)	LTR	A	1.46	6
		Ave. Fernandez Juncos (WB)MT	T	A	0.00	0
		Intersection	A	1.73	9	

**(Intersection 14) AM Peak - M. Fernandez and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Fernandez (NB)	LT	E	68.77	6
		Calle Fernandez (SB)	N/A	/	/	/
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	TR	A	2.70	6
		Intersection	A	3.88	6	

**(Intersection 15) AM Peak - M Fernandez and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Fernandez (NB)	TR	B	19.65	0
		Calle Fernandez (SB)	N/A	/	/	/
		Ave. Fernandez Juncos (EB)	LT	A	0.00	5
		Ave. Fernandez Juncos (WB)MT	T	A	0.00	0
		Intersection	A	0.08	5	

**(Intersection 16) AM Peak - Ramon Power and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Ramon Power (NB)MT	LT	A	0.00	2
		Calle Ramon Power (SB)	TR	F	224.43	17
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	5.68	17
		Intersection	A	8.01	17	

**(Intersection 17) AM Peak - Ramon Power and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Ramon Power (NB)	N/A	/	/	/
		Calle Ramon Power (SB)	L	C	34.86	8
		Ave. Fernandez Juncos (EB)	LT	A	1.28	14
		Ave. Fernandez Juncos (WB)MT	T	A	0.00	0
		Intersection	A	5.44	14	

**(Intersection 18) AM Peak - Calle 3 and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle 3 (NB)	L	F	70.54	11
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LT	A	2.38	7
		Intersection	A	4.25	11	

**(Intersection 19) AM Peak - Calle 3 and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle 3 (NB)	N/A	/	/	/
		Calle 3 (SB)	L	C	20.59	5
		Ave. Fernandez Juncos (EB)	LT	A	2.50	6
		Ave. Fernandez Juncos (WB)MT	T	A	0.00	0
		Intersection	A	3.50	6	

**(Intersection 21) AM Peak - Calle 5 and Fernandez Juncos/Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle 5 (SB)	LT	C	32.55	12
		Ave. Fernandez Juncos (EB)	T	A	5.28	7
		Ave. Fernandez Juncos (WB)	T	A	9.86	24
		Intersection	B	15.84	24	

**(Intersection 22) AM Peak - Padre Hoff Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Padre Hoff (NB)	N/A	/	/	/
		Ave. Fernandez Juncos (EB)	T	A	0.35	5
		Ave. Fernandez Juncos (WB)MT	T	A	0.00	0
		Intersection	A	0.35	5	

**(Intersection 23) AM Peak - SJW Access A and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Ave. Fernandez Juncos (EB)	TR	A	0.09	0
		Ave. Fernandez Juncos (WB)MT	T	A	0.00	0
		Intersection	A	0.09	0	

**(Intersection 24) AM Peak - SJW Access B and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Ave. Fernandez Juncos (EB)	TR	A	0.48	0
		Ave. Fernandez Juncos (WB)MT	T	A	0.00	0
		Intersection	A	0.48	0	

**(Intersection 25) AM Peak - SJW Access C and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Ave. Fernandez Juncos (EB)	TR	A	0.82	0
		Ave. Fernandez Juncos (WB)MT	T	A	0.00	0
		Intersection	A	0.82	0	

**(Intersection 26) AM Peak - SJW Access D and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Access D (NB)	N/A	/	/	/
		Ave. Fernandez Juncos (EB)	T	A	3.31	10
		Ave. Fernandez Juncos (WB)MT	T	A	0.00	0
		Intersection	A	3.31	10	

**(Intersection 27) AM Peak - SJW Access E and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Access E (NB)	N/A	/	/	/
		Ave. Fernandez Juncos (EB)	T	A	0.14	0
		Ave. Fernandez Juncos (WB)MT	T	A	0.00	0
		Intersection	A	0.14	0	

**(Intersection 28) AM Peak - SJW Access F and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Access E (NB)	N/A	/	/	/
		Ave. Fernandez Juncos (EB)	T	A	0.85	8
		Ave. Fernandez Juncos (WB)MT	T	A	0.00	0
		Intersection	A	0.85	8	

FIGURE 7.10 PM RESULTS; NA\_ALT 4 MODEL

**(Intersection 1) PM Peak - Gilberto Concepcion de Gracia and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Concepcion de Gracia (NB)	TR	C	32.26	62
		Calle Concepcion de Gracia (SB)	LTR	E	75.26	9
		Ave. Fernandez Juncos (WB)	TR	A	0.00	33
		Intersection	C	33.85	62	

**(Intersection 2) PM Peak - Valdes and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Valdes (SB)	R	B	12.35	9
		Ave. Del Tren (EB)	N/A	/	/	/
		Ave. Del Tren (WB)	TR	A	0.00	-
		Intersection	A	4.55	9	

**(Intersection 3) PM Peak - Marina Access and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action		N/A			
Intersection						

**(Intersection 4) PM Peak - San Andres and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle San Andres (NB)	N/A	A	0.52	0
		Calle San Andres (SB)	TR	F	106.72	17
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	C	20.56	33
		Intersection	C	29.64	33	

**(Intersection 5A) PM Peak - San Andres and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle San Andres (NB)	N/A	A	0.00	2
		Calle San Andres (SB)	LT	D	43.09	20
		Ave. Fernandez Juncos (EB)	T	B	10.78	27
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	B	14.17	27	

**(Intersection 6) PM Peak - Pelayo and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Pelayo (NB)	LT	/	/	/
		Calle Pelayo (SB)	TR	C	16.70	3
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	0.80	2
		Intersection	A	3.61	3	

**(Intersection 7) PM Peak - Pelayo and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action		N/A			
Intersection						

**(Intersection 8) PM Peak - Tadeo Rivera and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Tadeo Rivera (NB)	N/A	/	/	0
		Calle Tadeo Rivera (SB)	R	B	10.33	2
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	TR	A	0.00	0
		Intersection	A	0.52	2	

**(Intersection 9) PM Peak - Tadeo Rivera and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Tadeo Rivera (NB)	R	A	8.93	0.00
		Calle Tadeo Rivera (SB)	N/A	/	/	/
		Ave. Fernandez Juncos (EB)	TR	A	2.74	2.00
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0.00
		Intersection	A	2.77	2.00	

**(Intersection 10) PM Peak - Matias Ledesma and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Matias Ledesma (NB)	LT	C	25.41	10
		Calle Matias Ledesma (SB)	TR	F	88.75	14
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	0.00	52
		Intersection	B	14.60	52	

**(Intersection 11) PM Peak - Matias Ledesma and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Matias Ledesma (NB)	TR	A	0.00	0
		Calle Matias Ledesma (SB)	LT	B	15.77	23
		Ave. Fernandez Juncos (EB)	LTR	A	4.66	35
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	5.64	35	

**(Intersection 12) PM Peak - San Juan Bautista and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle San Juan Bautista (NB)	LT	A	9.74	3
		Calle San Juan Bautista (SB)	TR	D	28.09	11
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	0.61	3
		Intersection	A	6.24	11	

**(Intersection 13) PM Peak - San Juan Bautista and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle San Juan Bautista (NB)	TR	A	1.71	0
		Calle San Juan Bautista (SB)	LT	E	76.47	23
		Ave. Fernandez Juncos (EB)	LTR	A	0.00	30
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	3.58	30	

**(Intersection 14) PM Peak - M. Fernandez and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Fernandez (NB)	LT	A	3.01	12
		Calle Fernandez (SB)	TR	/	/	/
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	1.33	31
		Intersection	A	1.39	31	

**(Intersection 15) PM Peak - M Fernandez and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Fernandez (NB)	TR	C	31.06	0
		Calle Fernandez (SB)	LT	/	/	/
		Ave. Fernandez Juncos (EB)	LTR	A	0.00	39
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	0.14	39	

**(Intersection 16) PM Peak - RPMon Power and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Ramon Power (NB)	LT	A	0.00	3
		Calle Ramon Power (SB)	TR	B	439.97	18
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LTR	A	7.08	42
		Intersection	B	14.46	42	

**(Intersection 17) PM Peak - RPMon Power and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Ramon Power (NB)	TR	/	/	/
		Calle Ramon Power (SB)	LT	E	72.62	11
		Ave. Fernandez Juncos (EB)	LTR	A	0.00	41
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	2.60	41	

**(Intersection 18) PM Peak - Calle 3 and Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle 3 (NB)	L	C	18.41	14
		Calle Del Tren (EB)	N/A	/	/	/
		Calle Del Tren (WB)	LT	A	1.75	26
		Intersection	A	3.09	26	

**(Intersection 19) PM Peak - Calle 3 and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle 3 (NB)	TR	/	/	/
		Calle 3 (SB)	LT	D	52.55	7
		Ave. Fernandez Juncos (EB)	LTR	A	0.00	49
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	1.56	49	

**(Intersection 21) PM Peak - Calle 5 and Fernandez Juncos/Del Tren Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle 5 (SB)	LT	D	35.61	78
		Ave. Fernandez Juncos (EB)	T	A	5.98	29
		Ave. Fernandez Juncos (WB)/MT	T	A	3.86	38
		Intersection	B	14.50	78	

**(Intersection 22) PM Peak - Padre Hoff Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Calle Padre Hoff (NB)	TR	/	/	/
		Ave. Fernandez Juncos (EB)	LT	A	9.60	23
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	9.60	23	

**(Intersection 23) PM Peak - SJW Access A and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Ave. Fernandez Juncos (EB)	TR	A	1.99	15
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	1.99	15	

**(Intersection 24) PM Peak - SJW Access B and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Ave. Fernandez Juncos (EB)	TR	A	1.04	21
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	1.04	21	

**(Intersection 25) PM Peak - SJW Access C and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Ave. Fernandez Juncos (EB)	TR	A	1.05	28
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
		Intersection	A	1.05	28	

**(Intersection 26) PM Peak - SJW Access D and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Access D (NB)	R	/	/	/
		Ave. Fernandez Juncos (EB)	T	A	4.09	28
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection						

**(Intersection 27) PM Peak - SJW Access E and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Access E (NB)	R	/	/	/
		Ave. Fernandez Juncos (EB)	T	A	2.06	39
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection						

**(Intersection 28) PM Peak - SJW Access F and Fernandez Juncos Intersection**

Year	Scenario	Access	Movement	Level of Service (LOS)	Delay (sec/veh)	Queue Length (no. of veh)
2025	No Action	Access F (NB)	R	/	/	/
		Ave. Fernandez Juncos (EB)	TR	A	3.39	35
		Ave. Fernandez Juncos (WB)/MT	T	A	0.00	0
Intersection						

## Results Analysis

- 7.13 As mentioned in Chapter 5 the results shown in the tables above were prepared based on the journey time and vehicle count outputs from the Paramics models. This was prepared by creating a path in Paramics<sup>10</sup> for each access to the main intersections. The overall intersection analysis presented in the results tables, is based on the individual accesses results. The delay calculation for the overall intersection was determined by multiplying the number of vehicles per approach by its corresponding average delay. The addition of this was then divided by the total number of vehicles accessing the intersection and the intersection delay was obtained. The delay results were used to determine the intersection LOS using the parameters displayed in Table 7.1.
- 7.14 For the intersection analysis, the maximum link queue is used as required by the PRHTA's *Traffic Study Guides*<sup>11</sup>.

### **Base Model (2007)**

- 7.15 The base model shows an overall free flowing operation along Fernández Juncos Ave and Del Tren Street. The highest average delay is 25.2 seconds per vehicle in the PM Peak period eastbound. All intersections have LOS A for the AM model and a LOS B is observed in the PM model at intersection of San Andrés St. and Del Tren St... The worst approach with LOS E is observed in the AM Peak model for Calle 5 southbound traffic towards Del Tren St.
- 7.16 The overall microsimulation modeling of the Fernández Juncos Avenue corridor shows that during both the AM and PM peak periods traffic flows through the corridor in a near free flow condition.
- 7.17 It should be noted that this corridor currently operates in a near free flow state due to the minimal number of vehicle movements into and out of side streets along Fernández Juncos Avenue. Any increase in the number of these vehicle movements would result in an increase in vehicle interactions (i.e. increased vehicle conflicts), which could result in a break down of free flow conditions and an increase in queuing and journey times through the corridor.

### **Proposed Action-Alternative 1 Model (2025)**

- 7.18 As expected, conditions worsen for the PA\_Alt 1 model. Delays of a maximum of 385 seconds are observed during the AM Peak period for traffic along Fernández Street northbound on its intersection with Del Tren Street. The highest delay along the east-west corridor is of 31 seconds, observed at Fernández Juncos westbound at the intersection with Gerardo Concepción de Gracia.

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<sup>10</sup> Paths are the identification of the links for which outputs are required

<sup>11</sup> Estado Libre Asociado de Puerto Rico, Departamento de Transportación y Obras Públicas, Autoridad de Carreteras y Transportación. (22 de diciembre de 2004). *Guías para la Preparación de Estudios Operacionales de Acceso y de Tránsito para Puerto Rico; Versión 1.0*;

- 7.19 The LOS during the morning period are between LOS A and B for all intersections. Access LOS C, D and F are only observed on some north and south approaches to Del Tren St. and Fernández Juncos Avenues; LOS A and B are always observed for the east-west roads.
- 7.20 The LOS during the morning period are between LOS A and C for all intersections, except for intersection of G. Concepción de Gracia St with Fernández Juncos Ave. (main southern egress point in the northern part of the Isleta) which has an overall LOS D. This is caused by the high volumes of traffic trying to exit the Isleta during the end of the working day. Access LOS D, E and F are only observed on some north and south approaches to Del Tren St. and Fernández Juncos Avenues; LOS A, B and C are always observed for the east-west roads.

***Proposed Action-Alternative 2 Model (2025)***

- 7.21 The maximum delay observed in this alternative is approximately 180 seconds per vehicles for the PM traffic eastbound. The morning peak period results are very similar in terms that the worst overall intersection LOS observed is C. Also, LOS D, E and F are only observed on the minor road approaches and LOS A, B and C on Del Tren St. and Fernández Juncos Ave.
- 7.22 This overall operation of LOS C or better for the main roads is maintained during the PM Peak period.

***Modified No Action-Alternative 3 Model (2025)***

- 7.23 The maximum delay observed on the MNA\_Alt 3 is higher than for any other model, 340 sec/veh for the afternoon peak eastbound.
- 7.24 The operation of the intersections on the AM model maintain the same pattern as the PA\_Alt 1 and PA\_Alt 2 models with LOS C or better for the overall intersection. The PM situation presents a marked decrease in the network operation since LOS D, E and F are obtained for 10 of the analysed intersections:

- G. Concepción de Gracia St. at Fernández Juncos Ave LOS E
- San Andrés St at Del Tren St LOS E
- San Andrés St at Fernández Juncos Ave. LOS E
- Pelayo St at Del Tren St. LOS D
- Tadeo Rivera at Fernández Juncos Ave LOS F
- Matías Ledesma at Fernández Juncos Ave LOS D
- San Juan Bautista St at Del Tren St LOS D
- San Juan Bautista St at Fernández Juncos Ave LOS D
- Calle 3 at Del Tren St. LOS D
- AJW Access Driveway at Fernández Juncos Ave. LOS D

### **No Action – Alternative 4 Model (2025)**

- 7.25 This model presents the best operational condition. The travel time for vehicles in the westbound and eastbound direction is reduced and is lower than for the Base Model. However, this does not mean that the roadway operation is better than in the Base Model. The Free Flow Journey Times for the No Action model are lower than the Free Flow Journey Times for the Base Models due to different roadway networks.
- 7.26 The roadway capacity and transport network considers the road improvements due to Intersection 5, the introduction of a tramway and the rearrangement of traffic in the southern part of the Isleta (Del Tren St. westbound and Fernández Juncos Ave. eastbound traffic), but no additional development in the project area.
- 7.27 The results are derived from the comparisons of each model's free flow Journey Times against its own development scenario during the peak traffic travel times. The peak traffic conditions could generate long travel times, however since the roadway network are different in each model, the free flow journey time will be shorter under the condition with higher roadway capacity (more traffic improvements).
- 7.28 The difference between free flow journey times to peak traffic journey time is not comparable across models since the conditions (roadway capacity) are different in each one.
- 7.29 With this clarified, the analysis of the results for the NA\_Alt. 4 model included in Figure 7.9 and Figure 7.10 can be retaken. The results show that the maximum delay is of 42.5 sec/veh for the outbound PM Peak.. LOS for the intersections are A and B for the morning peak and up to C in the afternoon. The LOS on the minor roads may go up to F in some cases during both the AM and PM peak periods.

## 8. SIGNAL NEED STUDY

### Introduction

8.1 This section describes the conditions that justify the introduction of four additional traffic signals along the Fernández Juncos Avenue. As part of the PA\_Alt 1 and PA\_Alt2, the proposed new traffic signals will be located at:

- Pelayo St.
- Padre Hoff St.
- San Juan Bautista St
- Fernández St. (under the proposed new alignment)

8.2 Fernández Juncos Avenue will support a tram or light rail transit (LRT) system alignment consisting of semi-exclusive right of way in the area under consideration. The semi-exclusive right of way implies that at grade crossing by pedestrians and other vehicles is expected to occur at designated areas, such as street intersections or marked pedestrian crossings.

### Manual of Uniform Traffic Control Devices

8.3 The Federal Highway Administration (FHWA) publishes the *Manual of Uniform Traffic Control Devices* (MUTCD), which contains all approved designs, standards and, guidance for traffic control devices. The purpose of the MUTCD is to provide uniformity of these devices among all jurisdictions.

8.4 The MUTCD is adopted by reference in accordance with Title 23, United States Code, Section 109(d) and Title 23, Code of Federal Regulations, Part 655.603, and is approved as the national standard for designing, applying, and planning traffic control devices.

8.5 As provided in Title 23 of the Code of Federal Regulations, Part 655.603 states that the MUTCD is the national standard for all traffic control devices installed on any street, highway, or bicycle trail open to public travel. The MUTCD has been formally adopted as the standard for Puerto Rico by the Department of Transportation and Public Works (DTOP).

### Traffic Signal Warrants

8.6 The MUTCD contains eight warrants to evaluate the need for a traffic signal (Part IV of the MUTCD). The warrants are based mostly on issues relating to vehicular and pedestrian volumes. Five of the eight warrants are volume-related while the remaining are for past crash experience and system optimization.

8.7 These eight warrants do not properly consider the conflicts arising of the interaction of transit, in particular Light Rail Transit, with other vehicle movements. Part X of the MUTCD: TRAFFIC CONTROLS FOR HIGHWAY-LIGHT RAIL TRANSIT GRADE CROSSINGS specifically addresses traffic control devices at grade crossings of highway traffic and light rail transit vehicles. Particularly Section 10B.01 states the following

standard: **“Highway-light rail transit grade crossings in semi exclusive alignments shall be equipped with a combination of automatic gates and flashing-light signals, or flashing-light signals only, or traffic control signals, unless an engineering study indicates that the use of STOP, YIELD, or advance warning signs alone would be adequate.”**

- 8.8 Under this standard all four intersections under consideration will require a traffic signal unless further studies can demonstrate adequate operations without the traffic signal.
- 8.9 Moreover, the introduction of an LRT along the corridor will require traffic signal coordination in order to provide signal progression, priority or even preemption at the intersections. Signal progression is obtained when platooning vehicles cross multiple signalized intersections under a green signal that progresses with the platoon. Signal priority is a method utilized to extend the green signal time in order to allow an incoming transit vehicle to cross the intersection with the current green signal. Signal preemption terminates the current indication and turn to green in order to allow specialty vehicles (emergency or transit) to cross the intersection on green signal. The basic difference between signal priority and signal preemption is that the latter interrupts the signal phasing while signal priority uses the existing phasing to allow vehicle passage. This coordinated signal systems falls within the criteria for Warrant 6 for traffic signals of the MUTCD. In the case of the LRT, the progressive movement of the train will be better managed with a traffic control signal at the selected locations.
- 8.10 The traffic volume projected for the San Juan Waterfront is creating areas of high occupancy vehicle facilities. The morning and afternoon peak periods traffic is studied to establish traffic volume justification for a traffic signal installation. This is cover under Warrant 3, Peak Hour of the MUTCD. This particular volume warrant is selected as the data is readily available.
- 8.11 Table 8.1 shows the traffic volumes for the morning and afternoon peak periods for the streets under consideration.

**TABLE 8.1 AM AND PM TRAFFIC VOLUMES FOR THE PROPOSED ACTION**

<b>AM Period</b>	<b>Minor Crossing Street Period Volume (one direction only)</b>	<b>Fernández Juncos Ave. Peak Period Volume (only thru traffic considered)</b>
Pelayo St.	404	1170
Padre Hoff St.	140	1595
San Juan Bautista St.	215	1844
Fernández St.	151	1939
<b>PM Period</b>		
Pelayo St.	294	1764
Padre Hoff St.	249	1894
San Juan Bautista St.	166	2155
Fernández St.	162	2137

- 8.12 According to Figure 4C-3 of the MUTCD, a minimum of 100 vehicles in the peak hour for the minor crossing street is required on a one lane approach for 1500 vehicles per hour or more on the major street (Fernández Juncos Ave). Under the conditions in the morning and afternoon peak periods shown in Table 8.1, traffic signals will be justified even without the presence of a light rail transit vehicle.
- 8.13 Steer Davies Gleave collected crash data from the Police Command Station in Puerta de Tierra<sup>12</sup> on October 25, 2007 in order to evaluate Warrant 7, Crash Experience for a traffic signal justification. This Command Station has jurisdiction over crashes occurring in Fernández Juncos Ave.
- 8.14 The crash data revealed 263 Property Damage and Injury incidents from November 2006 to October 2007 (Appendix G). The police filing system did not classified the information in enough detail to determined if the types of crashes reported were susceptible to correction by a traffic control signal. This is a requirement under Section 4C.08 (B) for signal installation due to crash experience.
- 8.15 Informal reports from police officers interviewed stated that most crashes are due to roadway conditions and vehicles entering Fernández Juncos Ave. from driveways. The latter may be an indication that there are not enough acceptable gaps for vehicles to enter Fernández Juncos Ave. The inclusion of a traffic signal along the corridor will generate consistent breaks in the traffic flow (the gaps) that could reduce crashes due to vehicles entering Fernández Juncos Ave for driveways and minor streets.

<sup>12</sup> Information provided by Agent Irizarry.

## 9. CONSTRUCTION PHASES

### Introduction

- 9.1 The San Juan Waterfront project proposes major changes to the roadway network in the area. These changes will have to be built while maintaining traffic operations in Fernández Juncos Ave. The construction phases will limit the existing capacity of the roads.
- 9.2 As part of this study, the traffic impact of construction phases needed for the Fernández Juncos Avenue reconstruction, as part of the San Juan Waterfront development, are presented in this chapter. Generally two main construction phases will be needed to implement the changes in the roadway network. The construction phases are intended as a feasibility analysis on the main action required to achieve the work rather than to produce a detailed maintenance of traffic plan.

### Construction Phase 1

- 9.3 The first construction phase will consist on the works required in the western end of Fernández Juncos Avenue from G. Concepción de Gracia Street to Fernández Street. During this phase, only two lanes of traffic will be available to traffic (one on each direction). This phase is expected to occur on 2011.
- 9.4 Figure 9.1 shows the Paramics model prepared to analyze Construction Phase 1. The model traffic volumes represent the base traffic plus the projected traffic to be generated by the following San Juan developments expected to be fully operational on 2011 (Refer to Chapter 6):
- Capitolio Plaza
  - Atlantis
  - Hotel Cervantes
  - Bayside
  - Biblioteca del Tribunal Supremo
  - Paseo Caribe
- 9.5 Also, some of the proposed Puerto Rico Convention District Center developments are expected to be completed by 2011 including:
- 500 room hotel – 4<sup>th</sup> quarter 2009
  - Parcel C - 90 unit residential – 1<sup>st</sup> quarter 2007
  - 216,000 sq.ft. office – mid 2011
  - Parcel D – 170 unit residential – 4<sup>th</sup> quarter 2011

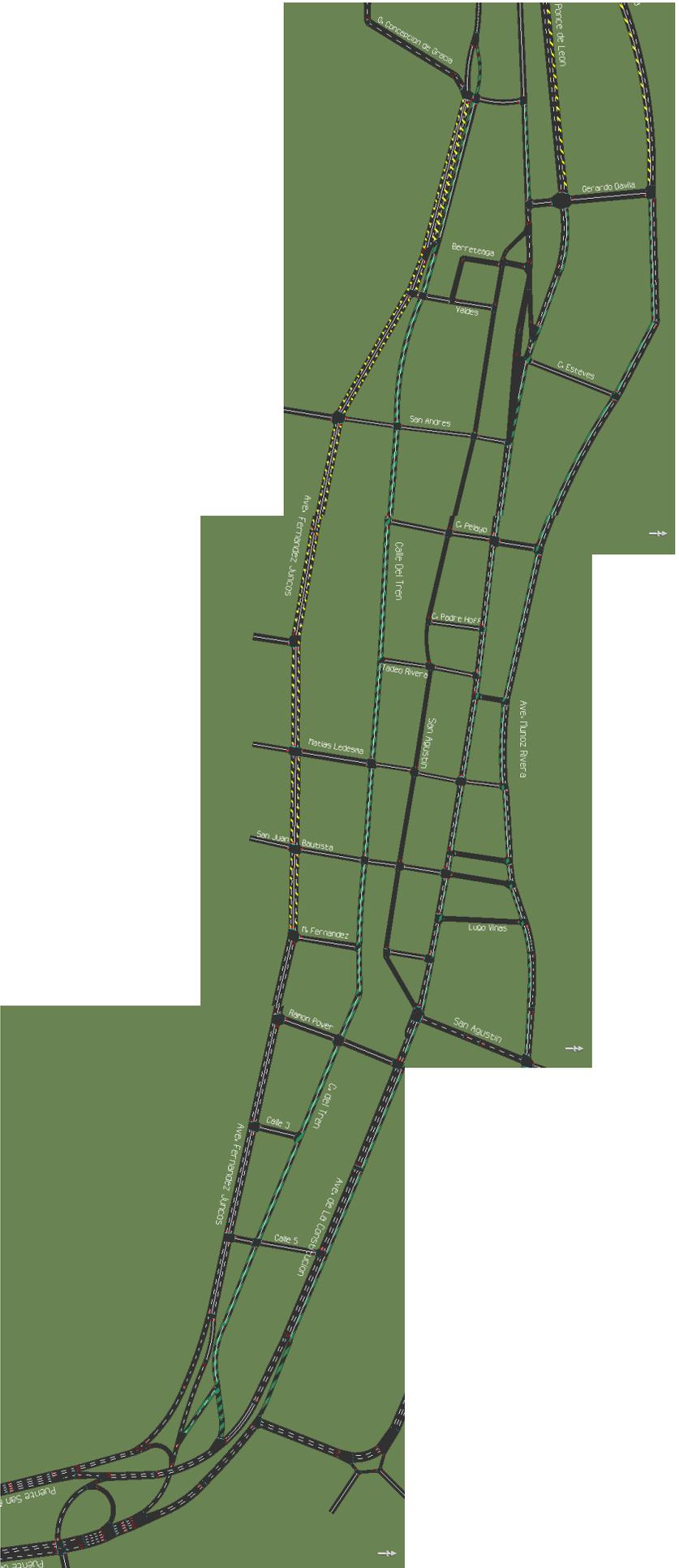
9.6 Table 9.1 show the trips to be generated by these developments.

**TABLE 9.1 TRIP GENERATION FOR THE PRCCD BY 2011**

<b>AM</b>		<b>PM</b>	
Entering	Exiting	Entering	Exiting
<b>853</b>	<b>611</b>	<b>366</b>	<b>620</b>

9.7 The Construction Phase 1 model consists of 47 zones and 22 matrices with a total volume of 16,849 vehicles during the AM peak and 17,164 during the PM peak.

FIGURE 9.1 CONSTRUCTION PHASE 1: MODELED HIGHWAY NETWORK



## Results

- 9.8 When modeling construction phase 1, it was evident that the traffic queues will be so long that traffic exiting the Isleta will not be able to enter the study area during the peak hour period.
- 9.9 Table 9.2 shows the travel times for the AM and PM models.

**TABLE 9.2 TRAVEL TIMES FOR FERNÁNDEZ JUNCOS DURING CONSTRUCTION PHASE 1**

	AM		PM	
	Journey Time(sec)	Delay (sec/veh)	Journey Time (sec)	Delay (sec/veh)
Del Tren St. Eastbound (from G. Concepción de Gracia St to Calle 5)/MT	240	0.0	217	0.0
Del Tren St. Westbound (from Calle 5 to G. Concepción de Gracia St)/MT	428	0.0	387	0.0
Fernández Juncos Avenue Eastbound (from G. Concepción de Gracia St to Calle 5)	284	134.6	370	180.6
Fernández Juncos Avenue Westbound (from Calle 5 to G. Concepción de Gracia St.)	512	310.0	259	77.1

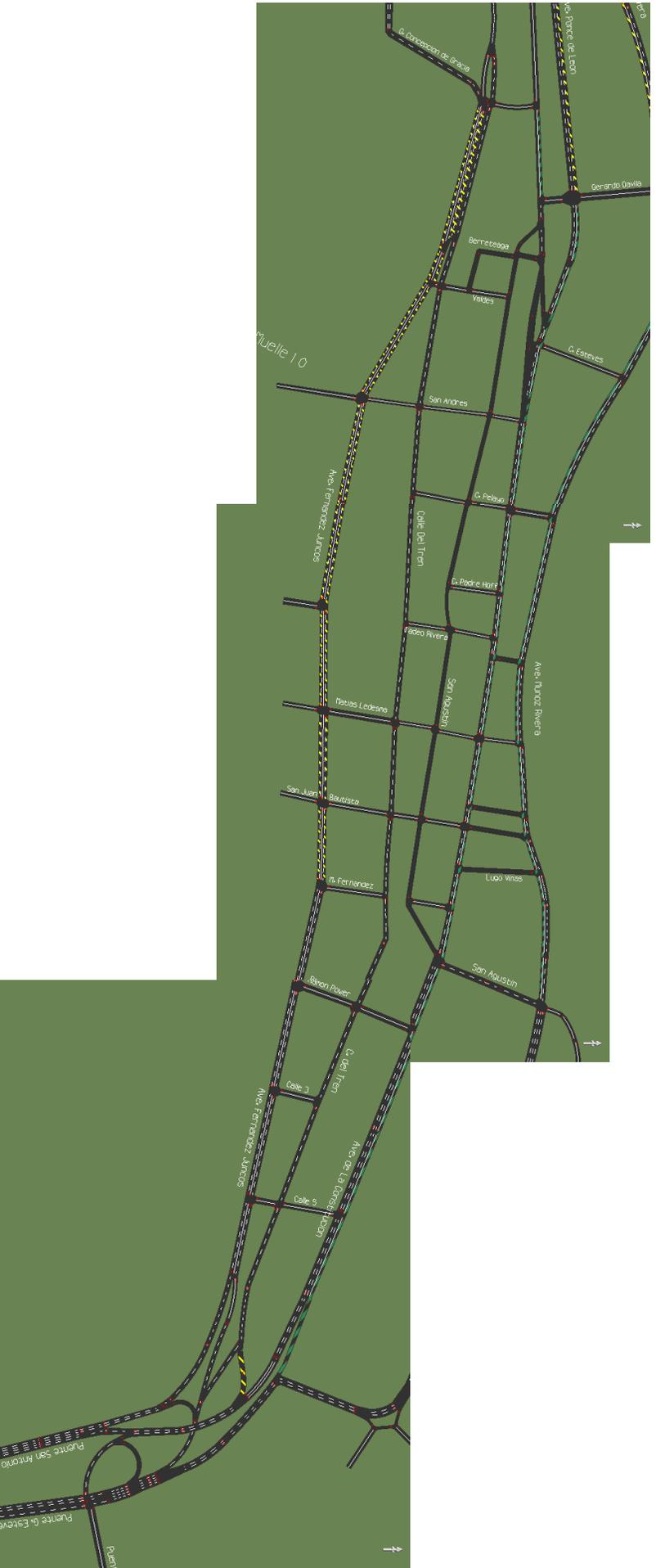
**MT-Mass Transit corridor**

- 9.10 In order to cater for this and the delays observed in this model (up to 310 seconds), an additional model was prepared (Version 2) considering the use of Del Tren Street as a traffic road westbound during the AM Peak and eastbound during the PM Peak. This will require the addition of a signal at the exit point of Del Tren Street to Constitución Avenue towards the San Antonio Bridge for the morning period.
- 9.11 Figure 9.2 shows the Paramics model road network for this option.
- 9.12 The traffic flow dramatically improved with this change as shown in the table below. This alternative reduces the Journey Times on the main traffic direction (westbound in the AM and eastbound in the PM). Nevertheless some delays may be experienced in the westbound traffic in the afternoon

**TABLE 9.3 TRAVEL TIME ALONG FERNÁNDEZ JUNCOS FOR THE CONSTRUCTION PHASE V2 MODELS**

	AM		PM	
	Journey Time(sec)	Delay (sec/veh)	Journey Time (sec)	Delay (sec/veh)
Del Tren St. Eastbound (from G. Concepción de Gracia St. to Calle 5)	N/A	N/A	216	15
Del Tren St. Westbound (from Calle 5 to G. Concepción de Gracia St.)	286	0	N/A	N/A
Fernández Juncos Avenue Eastbound (from G. Concepción de Gracia St. to Calle 5)	227	70	244	29
Fernández Juncos Avenue Westbound (from Calle 5 to G. Concepción de Gracia St.)	257	33	579	285

FIGURE 9.2 CONSTRUCTION PHASE 1 VERSION 2: MODELED HIGHWAY NETWORK



## Construction Phase 2

- 9.13 The second construction phase will consist on the works required in the eastern end of Fernández Juncos Avenue from Fernández Street up to the east edge of the development area. During this phase is expected to happen on 2015, only two lanes of traffic will be opened along this stretch of Fernández Juncos Ave. (both eastbound since the tramway right of way is expected to be in place).
- 9.14 At this stage it is expected that I5 will be completed and the tramway right of way will be available for mass transit. Also it is expected that the Marina Access, San Andrés Street and Pelayo Street extensions will be built.
- 9.15 Figure 9.3 shows the Paramics model prepared to analyze Construction Phase 2. The model traffic volumes represent the base traffic plus the projected traffic to be generated by all of the San Juan developments expected to be operational by 2015 (Refer to Chapter 6):
- 9.16 Also, some additional proposed Puerto Rico Convention Center District developments are expected to be completed by 2015 additional to the 2011 developments mentioned earlier including:
- Parcel B2 – 300 room hotel – late 2012, early 2013
  - Parcel B3 – 200,000 SF office – early 2014

- 9.17 Table 9.4 shows the trips to be generated by these developments.

**TABLE 9.4 TRIP GENERATION FOR THE PRCCD BY 2015**

AM		PM	
Entering	Exiting	Entering	Exiting
1227	708	504	962

- 9.18 The San Juan Waterfront Masterplan parcels A+B+C, D and E will also be completed. The traffic expected to be generated by these development blocks is shown in Table 9.5.

**TABLE 9.5 TRIP GENERATION FOR THE SAN JUAN WATERFRONT BY 2015**

AM		PM	
Entering	Exiting	Entering	Exiting
489	522	412	343

- 9.19 The Construction Phase 2 model consists of 47 zones and 22 matrices with a total volume of 19,103 vehicles during the AM peak and 19,186 during the PM peak.

## Results

9.20 Table 9.6 shows the travel times for the AM and PM models.

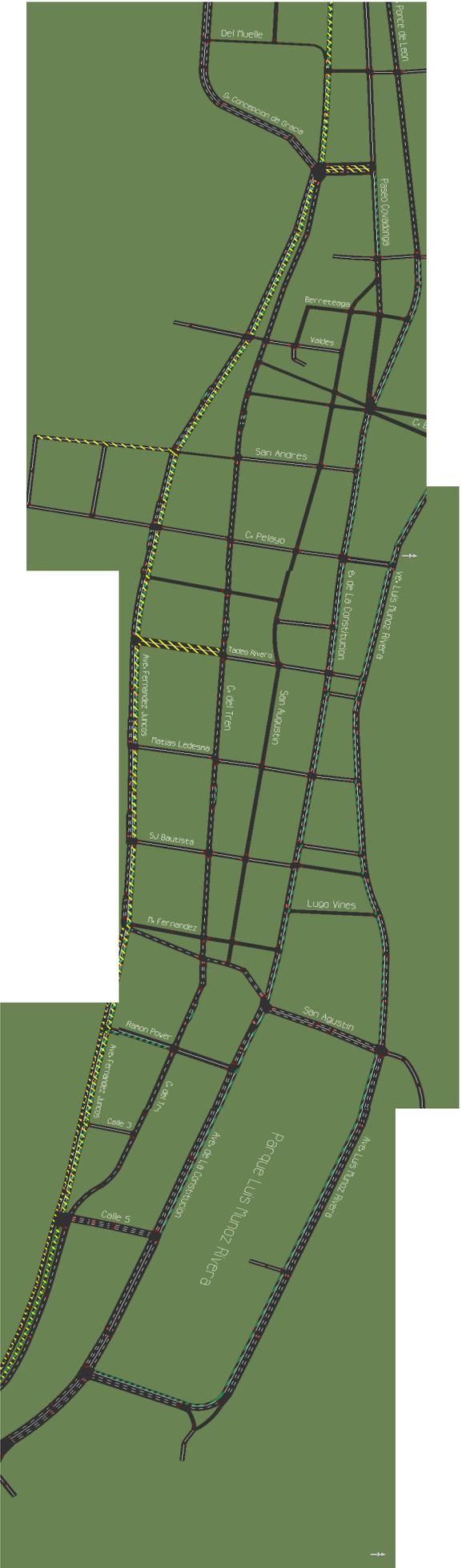
**TABLE 9.6 TRAVEL TIMES FOR FERNÁNDEZ JUNCOS DURING CONSTRUCTION PHASE 2**

	AM		PM	
	Journey Time(sec)	Delay (sec/veh)	Journey Time (sec)	Delay (sec/veh)
Del Tren St. Eastbound (from G. Concepción de Gracia St to Calle 5)	N/A	N/A	N/A	N/A
Del Tren St. Westbound (from Calle 5 to G. Concepción de Gracia St)	319	169	266	98
Fernández Juncos Avenue Eastbound (from G. Concepción de Gracia St. to Calle 5)	425	288	731	601
Fernández Juncos Avenue Westbound (from Calle 5 to G. Concepción de Gracia St)/MT	TRAM			

### MT-Mass Transit corridor

9.21 Delays of up to 601 seconds are observed during the afternoon eastbound traffic during the PM period. Traffic works during Phase 2 should be undertaken during off peak traffic conditions especially in the afternoon.

FIGURE 9.3 CONSTRUCTION PHASE 2: MODELED HIGHWAY NETWORK



## 10. CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

#### *Models*

10.1 From the extensive analysis undertaken for the four Alternatives analyzed as part of the San Juan Waterfront Masterplan Transport Assessment, it can be concluded that:

- The current traffic operation along Fernández Juncos Avenue and Del Tren Street is near free flow conditions even during peak hours.
- Any development in the area will affect the operation of this corridors, specially if the project area, immediately south of Fernández Juncos Avenue, is developed.
- The proposed development alternatives of the San Juan Waterfront (Alternative 1 and Alternative 2) will have a lesser impact on traffic than the Modified No Action Alternative which considers a full development of the project area based on the existing zoning.
- The main impact of the additional traffic in the Isleta is observed in the afternoon on G. Concepción de Gracia Street where all the southern traffic through and from the Old San Juan merges. The San Juan Waterfront attraction zones are located east of this intersection. This indicates that the queuing is caused by the high volume of future trips from and towards Old San Juan and the additional north-south traffic occurring further east of the Isleta.
- The introduction of a tramline and the change of the operation of Fernández Juncos Avenue and Del Tren Street are positive to the overall operation.

#### *Other Conclusions*

10.2 Other important conclusions can be reached by the analysis of the overall traffic scheme proposed as part of the San Juan Waterfront:

- Parking analysis showed a deficiency in parking provision for the San Juan Waterfront. A shared parking strategy will improve these deficiencies. However this could further support the use of a tramline.
- There is a need for the proposed new signals along Fernández Juncos due to the inclusion of a tramline both for safety and operational benefits and, the high traffic volume in the main corridor as compared to the minor streets delays.
- Additional capacity, westbound in the morning and eastbound in the afternoon, will be required during the Construction Phase 1.
- The construction phases will create delays in the peak periods, specially the afternoon.

#### **Recommendations**

10.3 The San Juan Isleta is a highly attractive area as a tourist and work destination. This is an area very attractive for future developments directed to tourism, leisure and residence. Due to limited land area of the Isleta and consequently lack of available additional road development, traffic problems will occur as the area develops.

10.4 The Intersection 5 traffic operations modelled showed that main access to the Isleta will create extensive traffic queues along the main roads accessing this area (Muñoz Rivera Ave, Ponce de León Ave., Baldorioty de Castro Ave and Baldorioty Boulevard) with or without the

development of the San Juan Waterfront.

10.5 Traffic reduction measures are necessary in order to ensure the proper development of this area while reducing the number of vehicles usage. The introduction of a mass transport system will be a good step towards this goal. Water taxis are also a traffic reduction alternative. Given the complexity of this problem other measures will be required, a multi prong approach is recommended:

- Behavioral Change Program – this include personal travel plans<sup>13</sup>
- Public Policy/Enforcement:
  - Only resident vehicles and taxi services allowed at the Isleta – Mass transport required for visitors and employees
  - Increase in parking charges
  - Limit parking time duration
- Organization of taxi service specially during massive tourist movement such as cruise ships
- Congestion Charging could be a market based approach to reduce vehicles entering the Isleta.
- Include Intelligent Transport Systems (ITS) in order to manage the frequent special events in the area, the construction phases and, to maintain and recover to normal traffic conditions during unexpected incidents.

10.6 It is also recommended to build I5 proposed scenario and to make the operational changes to Ponce de León Ave. and Del Tren Street.

10.7 A parking sharing strategy approach is proposed for the eastern and western areas of the San Juan Waterfront. No further parking is recommended. In order to maximise the use of existing parking facilities, a parking management program could be implemented for the San Juan Waterfront parking facilities and other nearby parking structures. The management program should keep track of available parking spaces and convey this information to drivers. This program could improve the efficiency of parking usage and reduce the vehicles-miles travelled while looking for a parking space.

10.8 During Construction Phase 1 it is proposed to open Del Tren Steet to inbound traffic to Old San Juan in the morning and outbound in the afternoon. Also during both construction phases it is proposed to undertake the construction work during off-peak traffic periods, possibly night work.

10.9 The eastern most access to the Waterfront (Access F) is located in a curve. There are two safety factors that concur at this intersection that need proper sight distance design: one is the vehicle approaching from Fernández Juncos Avenue having limited visibility of the intersecting access; and the second is the visibility constrains of vehicles entering Fernández Juncos Ave. in the curve itself. On both instances it is important to ensure pedestrian safety considering the location of a signalized crossing immediately east of this access. In order to attend this issue, an acceleration lane is provided at this intersection for vehicles leaving the

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<sup>13</sup> Steer Davies Gleave has successfully completed a number of Behavioral Change Project achieving up to a 11% of car usage reduction

Waterfront. This lane only addresses the vehicular conflict issues. The pedestrian crossing must be actuated<sup>14</sup> to guarantee dedicated pedestrian crossing time.

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<sup>14</sup> Pedestrian push bottom to request a protected signal phase.

**APPENDIX A**  
**STUDY AREA PHOTOS**

**APPENDIX B**  
**TRAFFIC COUNTS, BUS AND JOURNEY TIME SURVEYS**

**APPENDIX C**  
**AVERAGE ANNUAL DAILY TRAFFIC ON THE PROJECT AREA**

**APPENDIX D**  
**TRIP GENERATION SPREADSHEETS**

**APPENDIX E**  
**PARAMICS DEMAND INPUTS**

**APPENDIX F**  
**PARAMICS OUTPUTS**

**APPENDIX G**  
**ACCIDENT DATA FOR THE SAN JUAN ISLETA**

## CONTROL SHEET

Project/Proposal Name: SAN JUAN WATERFRONT MASTERPLAN

Document Title: Transport Assessment

Client Contract/Project Number:

SDG Project/Proposal Number: 22002201

### ISSUE HISTORY

Issue No.	Date	Details
1	November 29	Final Draft
2	December 3	Final Draft_2
3	December 17	Final Draft_3
4	February 7	Final Draft_3 review
5	June 25	Final Draft_4
6	November 14	Final Report_5

### REVIEW

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Other Contributors: MDR, ACM

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### DISTRIBUTION

Clients: 1 Digital

Steer Davies Gleave: PR Office/Jonny

**APPENDIX A**  
**STUDY AREA PHOTOS**



Berreteaga - from North



C5 (between Del Tren and P.de Leon) S-N



C5 (between FJ and P.de Leon) S-N



C.de Gracia 2 (between FJ and Covadonga) S-N



C.de Gracia 3 (between FJ and Covadonga) S-N



C.de Gracia (between FJ and Covadonga) S-N



C.de Gracia (Capitolio Plaza) W-E



C.de Gracia (exit to Del Muelle) S-N



C.de Gracia (Hacienda) E-W



C.de Gracia (Pier 8) E-W



C.de Gracia (Pier 8) W-E



Calle 5 (between P.de Leon and FJ) - from North



Covadonga (Capitolio) - from east



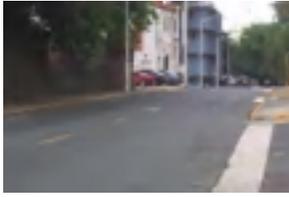
Covadonga (Corretjer int) 2 E-W



Covadonga (Corretjer int) 3 E-W



Covadonga (Corretjer int) E-W



Covadonga (Corretjer int) W-E



Covadonga (int. Tapia) E-W



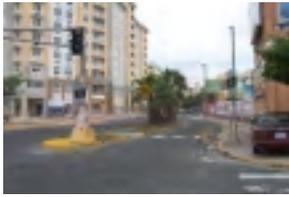
Covadonga (int. Tapia) W-E



Covadonga (marginal) - from West



Covadonga exits to P.de Leon - from West



Del Muelle (after FJ int.) E-W



Del Muelle E-W



Del Muelle N-S



Del Tren (from Valdes) E-W



East of Teatro Tapia - from North



Escambron exit to MR-San Agustin - from east



Esteves - from south



Esteves N-S



FJ E-W (before C5)



FJ (int C5) W-E



FJ and Del Tren 2 (after Valdes int.) E-W



FJ and Del Tren (after Valdes int.) E-W



FJ and Del Tren (at Valdes int.) E-W



FJ and Del Tren (C.de Gracia int.)



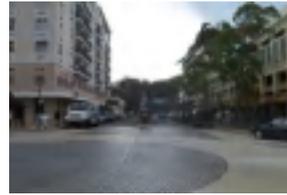
FJ and Valdes int. (from FJ) E-W



Gerardo Davila - from east



Gerardo Davila N-S



J.A. Corretjer S-N



Matias Ledesma 2 (between FJ and piers) N-S



Matias Ledesma - from east



Matias Ledesma (between FJ and P.de Leon) S-N



Matias Ledesma (between FJ and piers) N-S



Matias Ledesma (between P.de Leon and FJ) 2 - fro...



Matias Ledesma (between P.de Leon and FJ) - from...



Matias Ledesma (between P.de Leon and MR) - from...



Matias Ledesma (entre P. de Leon y FJ) - from North



Matias Ledesma (N-S view)



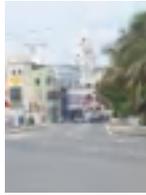
MR 3 lanes (San Cristobal) 2 - from west



MR 3 lanes (San Cristobal) 3 - from east



MR 3 lanes (San Cristobal) - from east



MR - from east



MR (East of Plaza Colon) S-N



MR (parque) - from west



MR access to Escambron - from west



MR approaching Plaza Colon 2 - from East



MR approaching Plaza Colon - from East



MR east of Plaza Colon 3 - from North



MR east of Plaza Colon 2 - from North



MR east of Plaza Colon - from East



MR int. Esteves - from East



MR int. Gerardo Davila - from East



MR int. San Agustin - from East



MR north of Plaza Colon - from East



MR U turn to P.de Leon 2 - from West



MR U turn to P.de Leon 3 - from North



MR U turn to P.de Leon - from West



MR-Casa Espana 1 - from West



MR-Casa Espana 2 - from East



P.de Leon 2 - from West



P.de Leon 3 - from West



P.de Leon - approaching Gerardo Davila int. - from...



P.de Leon - Covadonga - from West



P.de Leon - from east



P.de Leon - from West



P.de Leon - South of Plaza Colon - from east



P.de Leon (after Plaza Colon) 2 - from West



P.de Leon (after Plaza Colon) 3 - from West



P.de Leon (after Plaza Colon) - from West



P.de Leon (Capitolio) - from West



P.de Leon (parque) 2 - from west



P.de Leon (parque) 3 - from west



P.de Leon (parque) - from west



P.de Leon (South of Plaza Colon) W-E



P.de Leon access to MR-2 - from West



P.de Leon access to MR - from West



P.de Leon after Gerardo Davila - from West



P.de Leon approaching Covadonga - from West



P.de Leon int. Gerardo Davila 2 - from West



P.de Leon int. Gerardo Davila - from West



P.de Leon U turn to MR 2 - from North



P.de Leon U turn to MR - from East



P.de Leon union con marginal Covadonga - from...



P.de Leon, union con Covadonga - from west



Pelayo - from East



Pelayo (between P.de Leon and MR) - from south



Pelayo (between P.de Leon and S. Agustin) - from North



Pelayo N-S



Pelayo N-S 2



Ramon Power (between FJ and P.de Leon) S-N



Ramon Power (between P.de Leon and FJ) 2 - fro...



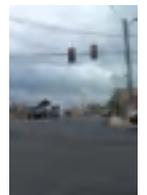
Ramon Power (between P.de Leon and FJ) - from...



S. Agustin (between MR and P.de Leon) - from south



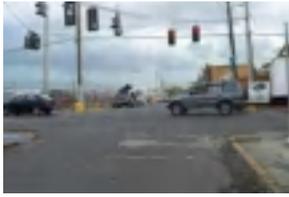
S. Agustin (between MR and P.de Leon) - from south 2



S. Andres (between FJ and pier 10) N-S



S. Andres (from FJ) S-N



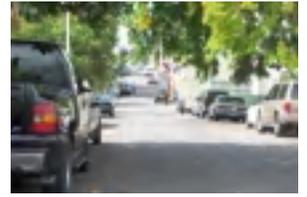
S. Andres and FJ int. (from S. Andres) N-S



S.J. Bautista (entre MR y P. de Leon) - N-S



San Agustin (between MR and P.de Leon) N-S



SJ Bautista 2 (between FJ and S. Agustin) S-N



SJ Bautista (between FJ and piers) N-S



SJ Bautista (between FJ and S. Agustin) S-N



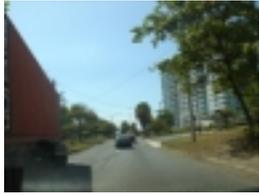
Valdes (int. FJ and Del Tren) S-N



Valdes S-N



Access from Calle 5 to Fernandez Juncos Ave



Access to AMA Exclusive Lane



Access to Del Tren Street



Access to Del Tren\_AMA Exclusive Lane



Access to San Juan



Access to San Juan\_3



Access to San Juan Bautista Street



Access to San Juan\_2



Access to Valdes St



Access to Valdes Street



Almacen Capitolio - Sign



Almacenes Superintendencia Capitolio



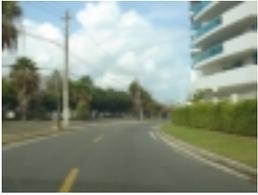
AMA Exclusive Del Tren Street



AMA Exclusive Del Tren Street\_2



AMA Exclusive Del Tren Street\_3



AMA Exclusive Del Tren Street\_4



AMA Exclusive Del Tren Street\_5



AMA Exclusive Del Tren Street\_6\_Int Calle 5



AMA Exclusive Del Tren Street\_7



AMA Exclusive Del Tren Street\_8



AMA Exclusive Del Tren Street\_9



AMA Exclusive Del Tren Street\_10



AMA Exclusive Del Tren Street\_11\_Int Ramon Power



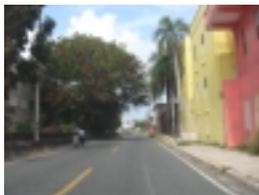
AMA Exclusive Del Tren Street\_12



AMA Exclusive Del Tren Street\_13



AMA Exclusive Del Tren Street\_14



AMA Exclusive Del Tren Street\_15



AMA Exclusive Del Tren Street\_16\_Int Matias Ledesma



AMA Exclusive Del Tren Street\_17



AMA Exclusive Del Tren Street\_18



AMA Exclusive Del Tren Street\_19



AMA Exclusive Del Tren Street\_20



AMA Exclusive Del Tren Street\_21



AMA Exclusive Del Tren Street\_22



AMA Exclusive Del Tren Street\_23\_Int Calle Valdes