ESTUDIO OPERACIONAL DE TRANSITO

El Nuevo Comandante
PR-3 Km. 16.2 @ PR-9959
Canóvanas, P.R.

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Preparado para:

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SECCION 1.0 – DESCRIPCCION DEL PROYECTO

Land Development Associates, S.E. (LDA) es la corporación propietaria de una finca de 79.22 cuerdas ubicada en la Carretera Estatal. PR-3, Barrio Pueblo del Municipio de Canóvanas. La finca colinda por el Norte con la Carretera Estatal PR-3, kilómetro 16.2; por el Este con la Quebrada Bocaforma; por el Sur, terrenos del Hipódromo El Comandante; y por el Oeste, con la calle de acceso al hipódromo. Al Este de la Quebrada Bocaforma ubica un área comercial de tipo local y un desarrollo industrial liviano. Al Oeste de la calle de acceso al hipódromo se encuentra la Urbanización Loíza Valley. Actualmente, el predio es utilizado como cantera donde se extrae material para el uso de relleno y agregado grueso. Ver Figura Núm. 1.

LDA propone llevar a cabo un desarrollo extenso en el predio el cual tendrá tres componentes: comercial, comercial mixto y residencial. El componente comercial consta de un centro comercial tipo regional de 300,000 pies cuadrados en el que habrá locales para la venta al detal, servicios, restaurantes y restaurantes de comida rápida en un lote de 32.45 cuerdas. El componente comercial mixto, 100,000 pies cuadrados, constará de varias estructuras dedicadas mayormente a espacios de oficinas, servicios y locales de venta al detal que apoyen las actividades de negocios que se establezcan en estas estructuras en un área de 12.05 cuerdas. El componente residencial consta de la construcción de 550 unidades de vivienda tipo "walk-up" de tres (3) habitaciones, con sus facilidades vecinales en un área de 26.89 cuerdas, divididas en tres desarrollos. Habrá un remanente de 7.83 cuerdas que será dedicado a mitigación y preservación. Ver Figura Núm. 2.

El predio cuenta con acceso directo de la Carretera Estatal PR-3, a la altura del kilómetro 16.2. Se propone la construcción de un nuevo acceso con la capacidad necesaria para manejar el aumento en tránsito hacia los desarrollos comerciales y residenciales propuestos. Este nuevo acceso será ubicado perpendicular a la PR-3, frente a la entrada del pueblo del Canóvanas

(Carretera PR-9959). Se realizarán las mejoras requeridas por la Autoridad de Carreteras y Transportación. Además, se propone conectar un segundo acceso a través de la calle del Hipódromo El Comandante, el cual servirá mayormente al desarrollo comercial mixto y residencial. Ver Figura Núm. 3.

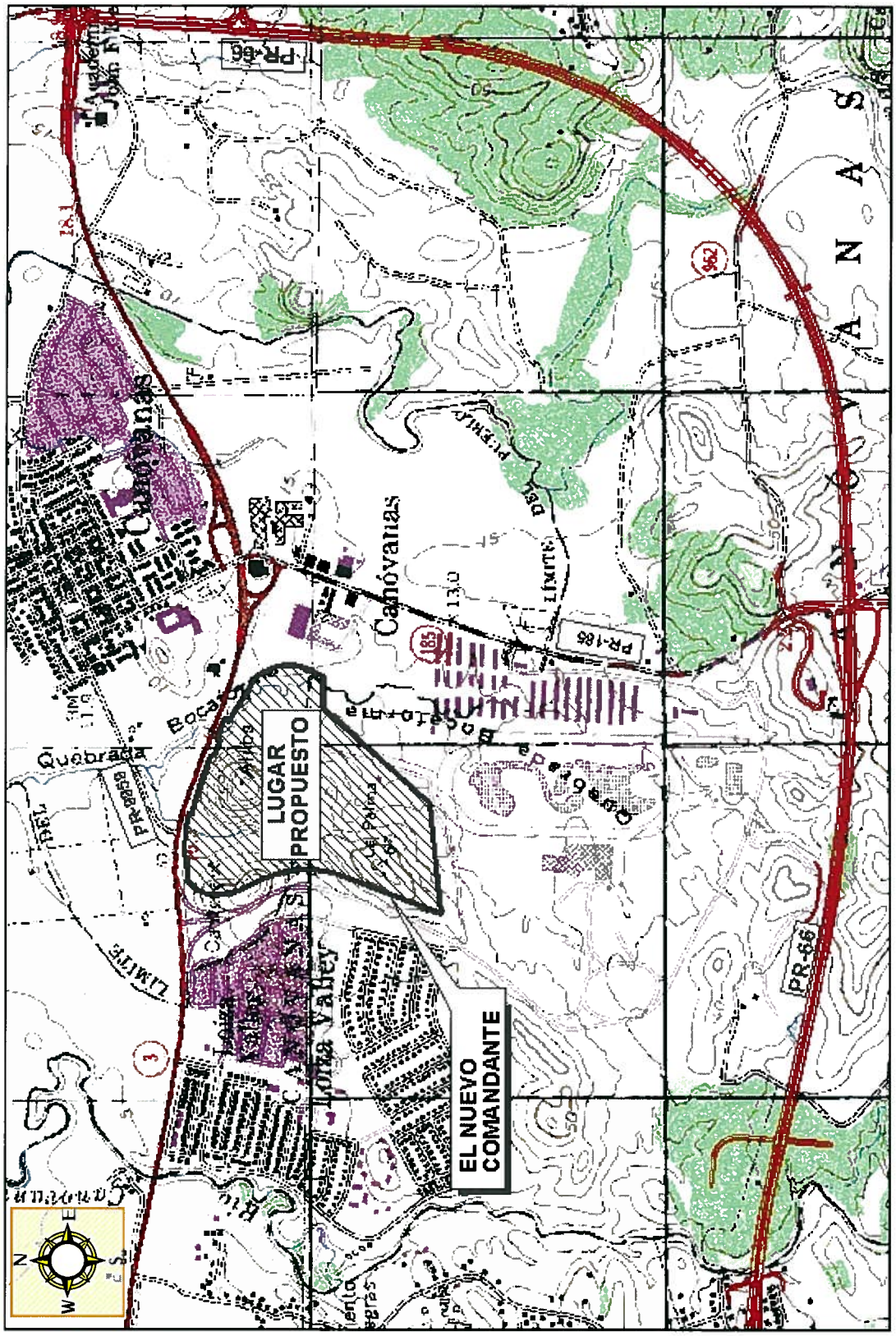


Figura 1: Segmento de cuadrángulo mostrando la localización del proyecto propuesto

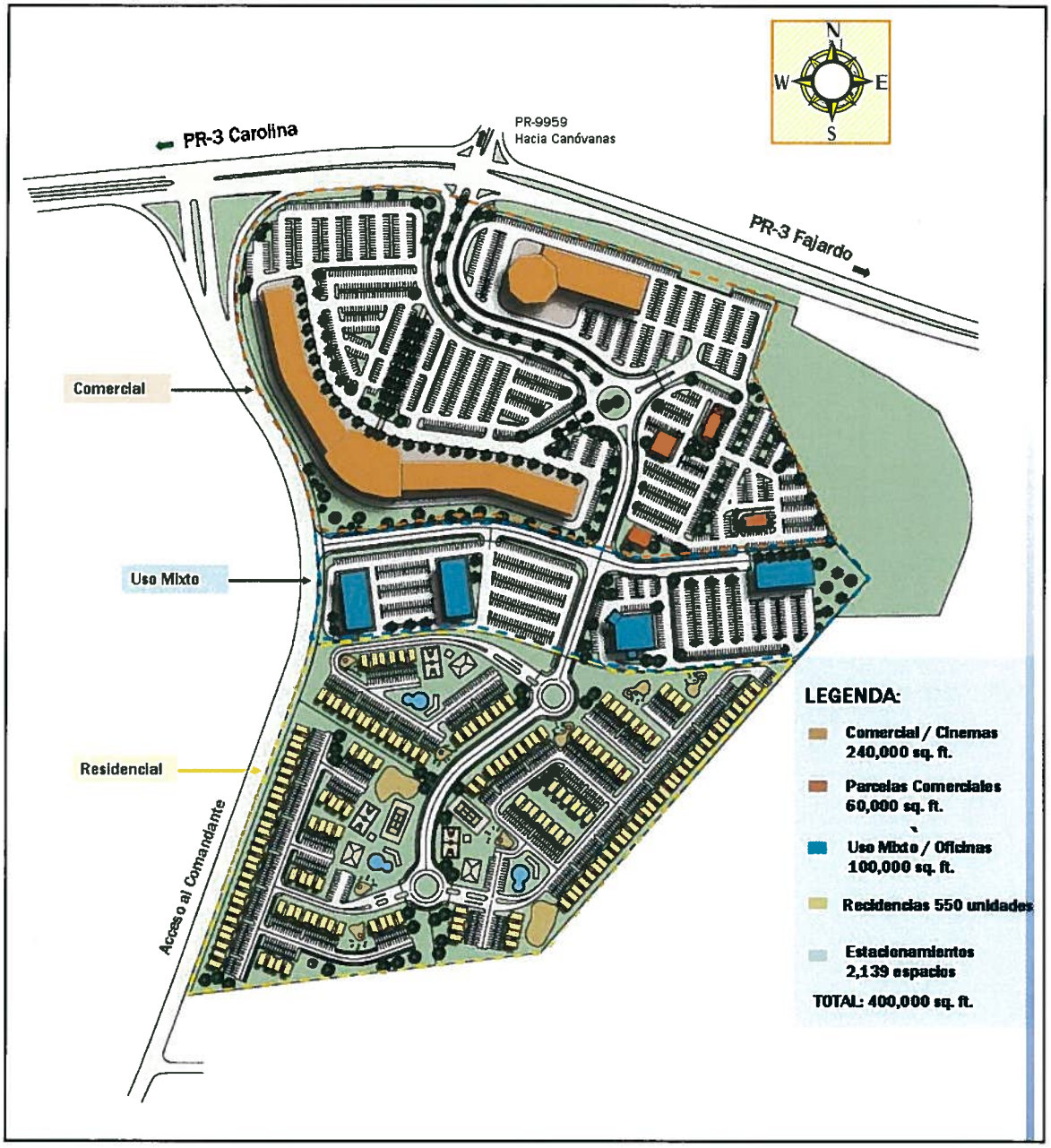


Figura 2: Diseño conceptual del proyecto propuesto en el El Nuevo Comandante, Canóvanas, P.R.

Los objetivos de este estudio son determinar el impacto que tendrá el proyecto propuesto en las vías circundantes al sector de influencia del proyecto. Identificar si existe la necesidad de llevar a cabo mejoras adicionales para aliviar el impacto en el flujo vehicular provocado por el nuevo proyecto y, de ser necesario, formular las medidas de mitigación necesarias para mantener las vías en unos niveles de servicio aceptables para los usuarios de las mismas.

Para lograr el objetivo arriba indicado se llevan a cabo las siguientes actividades:

- Determinación del flujo vehicular en el año base 2006 mediante conteos de tráfico.
- Análisis de capacidad de la red vial sin el proyecto en el año base utilizando un modelo de tráfico computarizado.
- Proyección del flujo vehicular para años futuros tomando en cuenta el año en que se estima el proyecto esté terminado y en operación completa (2011) reflejando las tendencias históricas del crecimiento vehicular propio de la zona.
- Análisis de capacidad de la red vial al año futuro utilizando un modelo de tráfico computarizado.
- Proyección del flujo vehicular a 10 años desde donde se estima que el proyecto esté terminado y en operación completa (2021) y análisis de capacidad.
- Comparación de los distintos escenarios y discusión de los resultados obtenidos.
- Formulación de mejoras a la red vial, de ser necesario.
- Conclusiones y recomendaciones

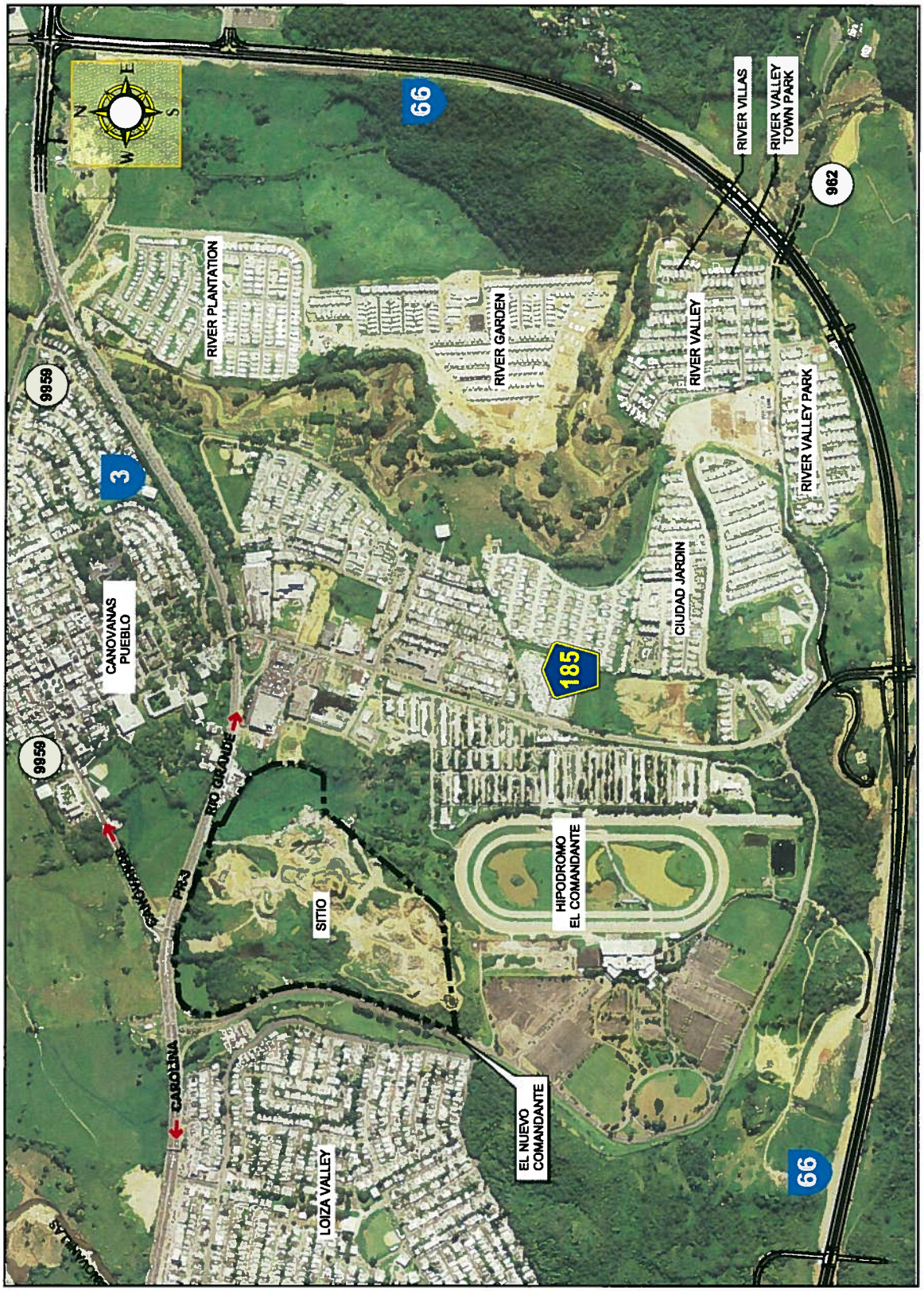


Figura 3: Foto aérea del sitio donde se ubicará el proyecto propuesto y su red vial inmediata en Canóvanas, PR.

Este informe fue realizado a tenor con los requisitos de las siguientes publicaciones:

1. "GUIAS PARA LA PREPARACION DE ESTUDIOS OPERACIONALES DE ACCESOS Y DE TRANSITO PARA PUERTO RICO" Versión 1.0, preparado por la Autoridad de Carreteras y Transportación y el Departamento de Transportación y Obras Públicas, Diciembre 2004.

2. "Manual of Transportation Engineering Studies" publicado por el "Institute of Transportation Engineers" en el año 2000.

3. "Highway Capacity Manual 2000" publicado por el "Transportation Research Board" en el año 2000.

4. "Traffic Engineering Handbook 5th" publicado por el "Institute of Transportation Engineers" en el año 1999.

SECCION 2.0 – PARAMETROS DEL ANALISIS

- **Área de Estudio**

  El análisis operacional de tránsito se realizó en la red vial que comprenden las carreteras estatales PR-3, PR-9959 y la Avenida El Comandante en el Municipio de Canóvanas. El análisis se enfocó principalmente en la evaluación de las intersecciones existentes en la PR-3 entre la PR-9959 y la Avenida El Comandante.

  Se realizaron conteos manuales de doce (12) horas el jueves 21 de septiembre de 2006 en las siguientes intersecciones semaforizadas:

  1. PR-3 y PR-9959
  2. PR-3 y Avenida El Comandante

- **Escenarios evaluados**

  Para este informe se evaluó la red vial existente desde la intersección de la PR-3 y PR-9959 hasta la intersección de la PR-3 y la Avenida El Comandante.

  Además se evaluaron los escenarios futuros (2011 y 2021) y sus intersecciones con la PR-3 y la Avenida El Comandante.

- **Día típico**

  Los conteos manuales se realizaron el jueves 21 de septiembre de 2006 debido a que se consideró un día típico en la semana laboral. Las actividades cotidianas a la fecha fueron normales. No se identificaron actividades extraordinarias que afectarán los patrones de flujo en el sector de influencia del estudio.

- **Horas Pico A.M. y P.M.**

  El jueves 21 de septiembre de 2006 los conteos comenzaron a las 6:00 A.M. y se extendieron hasta las 6:00 P.M. Después de 12 horas de conteos las horas pico para el periodo matutino y vespertino fueron: 7:15 A.M. a 8:15 A.M. y 5:00 P.M. a 6:00 P.M., respectivamente, en la carretera estatal PR-3.

SECCION 3.0 – MATRIZ DEL ESTUDIO

En las siguientes tablas se incluyen los nombres de los archivos electrónicos en forma tabulada que incluyen la modelación de los escenarios y sus respectivos resultados. (Ver Apéndice C)

Tabla 1: Matriz del Estudio – Intersecciones (aaSIDRA) – Año 2006

Intersección	Hora Pico AM	Hora Pico PM
1. PR-3 @ PR-9959	2006PR3PR9959AM	2006PR3PR9959PM
2. PR-3@ Avenida El Comandante	2006PR3COMANDANTEAM	2006PR3COMANDANTEPM

Tabla 2: Matriz del Estudio – Intersecciones (aaSIDRA) – Año 2011

Intersección	Hora Pico AM	Hora Pico PM
1. PR-3 @ PR-9959	2011PR3PR9959AM	2011PR3PR9959PM
2. PR-3@ Avenida El Comandante	2011PR3COMANDANTEAM	2011PR3COMANDANTEPM

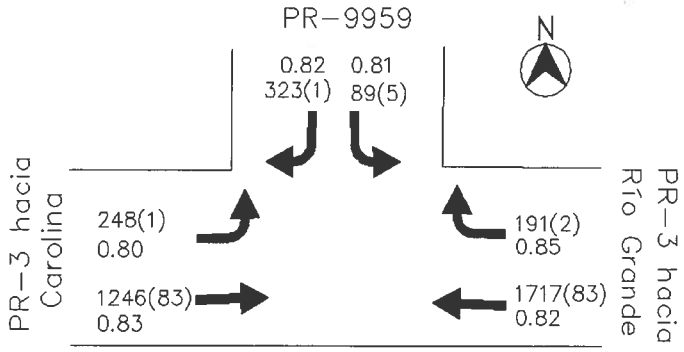
Tabla 3: Matriz del Estudio – Intersecciones (aaSIDRA) – Año 2021

Intersección	Hora Pico AM	Hora Pico PM
1. PR-3 @ PR-9959	2021PR3PR9959AM	2021PR3PR9959PM
2. PR-3@ Avenida El Comandante	2021PR3COMANDANTEAM	2021PR3COMANDANTEPM

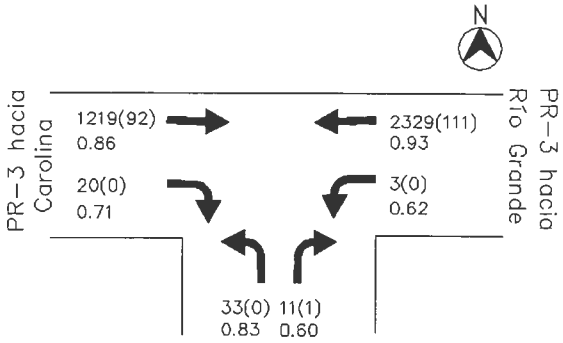
SECCION 4.0 – ANALISIS DE CONDICION EXISTENTE - AÑO 2006

a. Volúmenes Tabulados - Año 2006- a continuación se incluyen los volúmenes tabulados en forma de gráfica por hora pico (AM/PM) y movimiento para el escenario presente Año 2006:

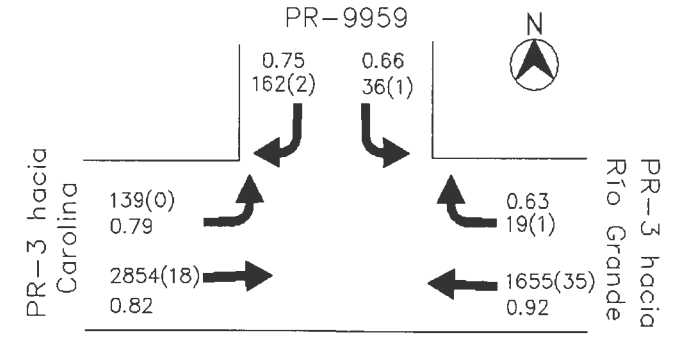
Figura 4: Volúmenes para las horas pico AM (7:15-8:15) y PM (5:00-6:00) y factores de hora pico (PHF, "Peak Hour Factor") por movimiento



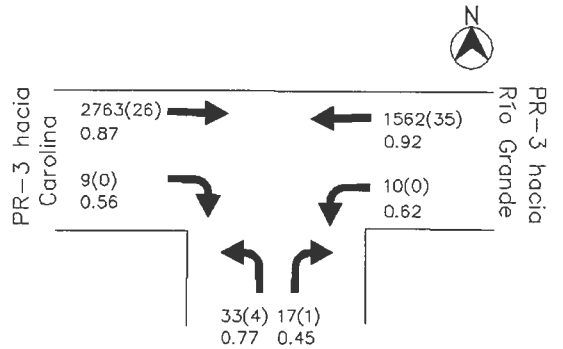
Intersección Núm. 1, AM



Ave. El Comandante
Intersección Núm. 2, AM



Intersección Núm. 1, PM



Ave. El Comandante
Intersección Núm. 2, PM

b. Geometría de las Intersecciones Analizadas – a continuación se presenta en forma gráfica la geometría existente de las intersecciones analizadas incluyendo los siguientes parámetros: número y ancho de carriles, largo de carriles SOLO (aceleración y deceleración), existencia de estacionamientos paralelos, pendientes (%) y velocidad reglamentaria:

Figura 5: Geometría de la Intersección PR-3 con la carretera PR-9959 en Canóvanas (Intersección Núm. 1)

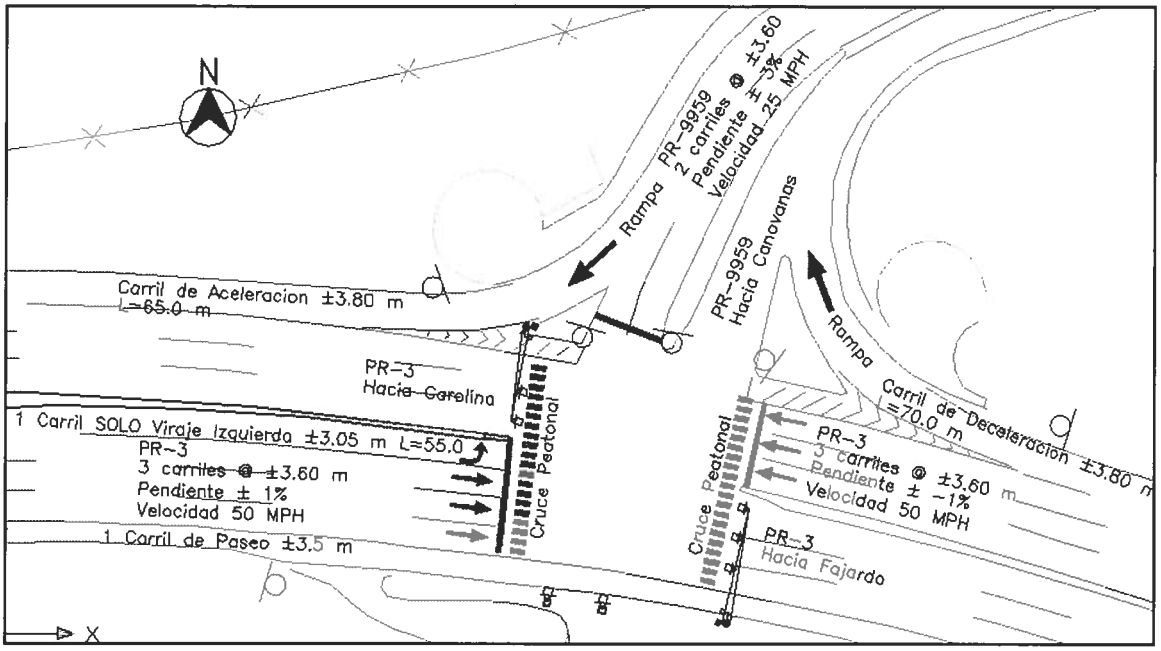
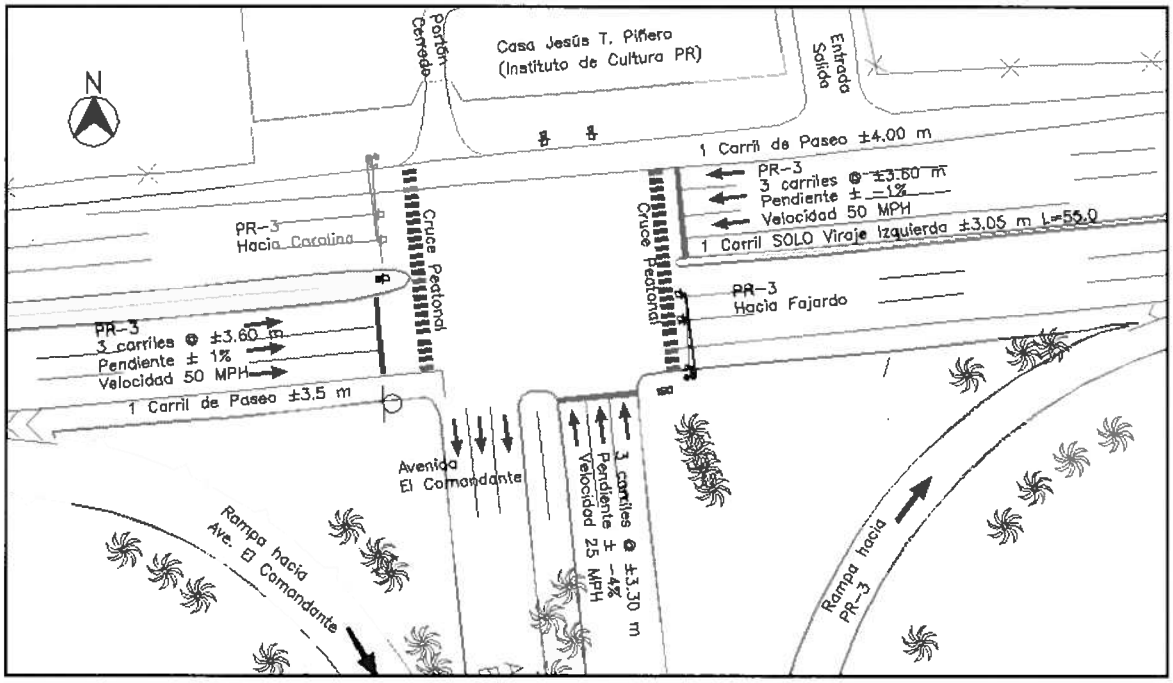
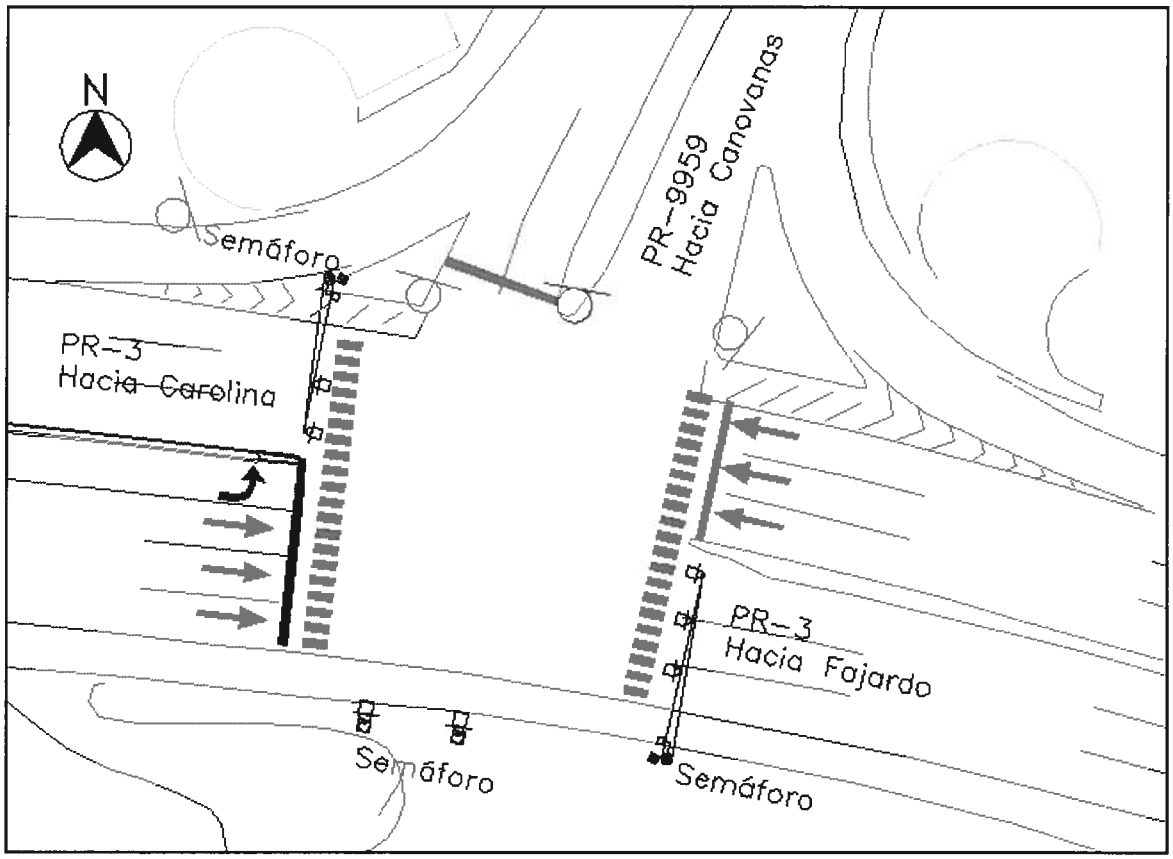


Figura 6: Geometría de la Intersección PR-3 con la Avenida El Comandante Canóvanas (Intersección Núm. 2)



c. Control de la Intersección – a continuación se presenta de forma gráfica los dispositivos de control de tráfico en las intersecciones evaluadas para el escenario existente año 2006:

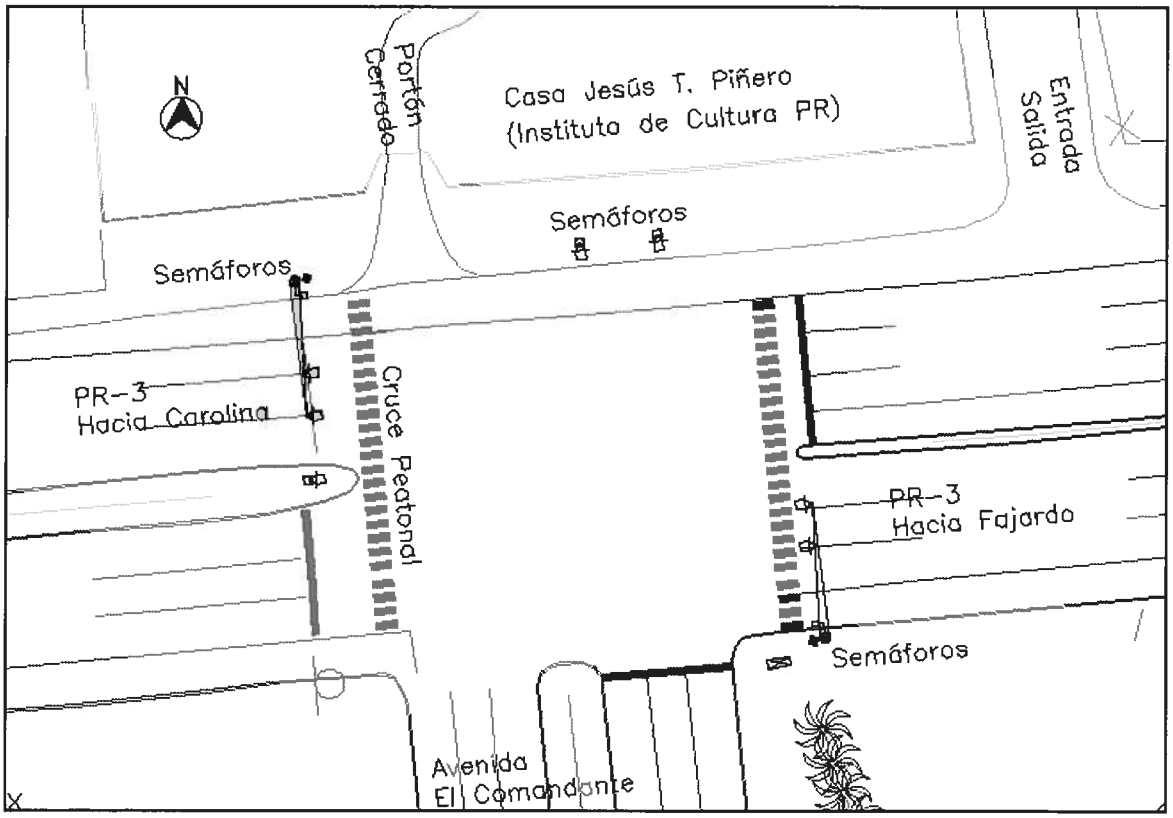
Figura 7: Intersección Semaforizada Núm. 1 – PR-3 @ PR-9959 y Fases del Sistema de Semáforos, Condición Existente.



Tiempo de Verde 14 segundos	Tiempo de Verde 106 segundos	Tiempo de Verde 11 segundos

Tiempo de Amarillo = 3 segundos, Todo Rojo = 2 segundos Ciclo=146 segundos

Figura 8: Intersección Semaforizada Núm. 2 – PR-3 @ Avenida El Comandante y Fases del Sistema de Semáforos, Condición Existente.



Tiempo de Verde 14 segundos	Tiempo de Verde 102 segundos	Tiempo de Verde 10 segundos

Tiempo de Amarillo = 3 segundos, Todo Rojo = 2 segundos Ciclo=141 segundos

d. Análisis de Capacidad – a continuación se incluye el resumen de los resultados obtenidos del programa aaSIDRA. Se presentan en forma tabulada por intersección y acceso los resultados de nivel de servicio LOS, demora promedio, largo de cola promedio y grado de saturación.

A continuación se incluye una figura de referencia con la localización de las intersecciones evaluadas en el sector de influencia del estudio:

Figura 9: Mapa del Sector de Influencia con las intersecciones existentes 1 y 2

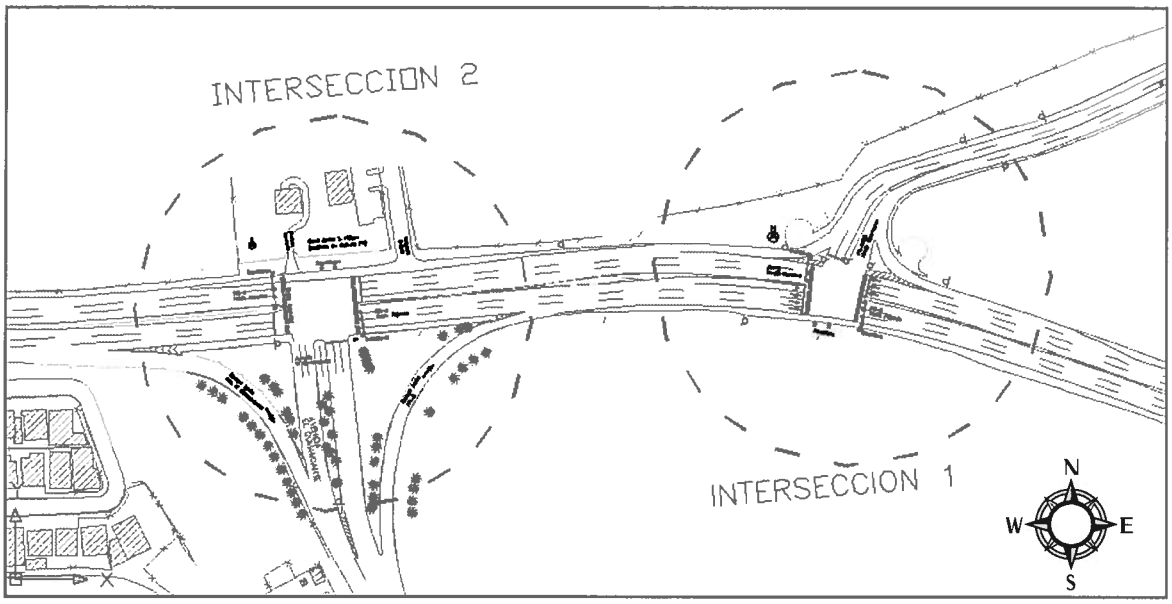
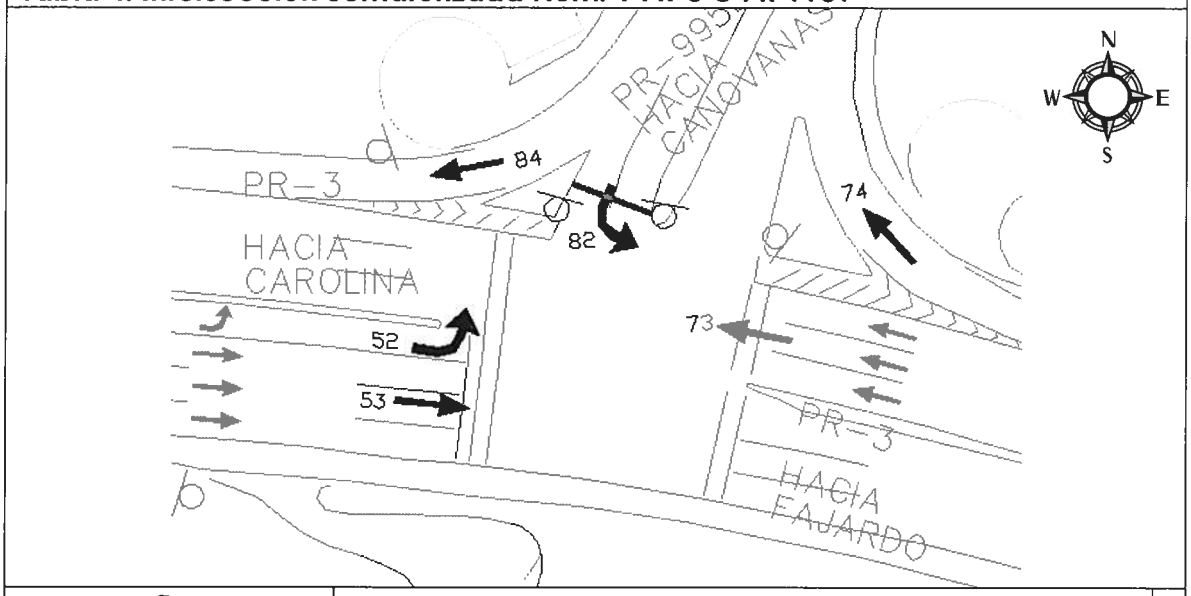


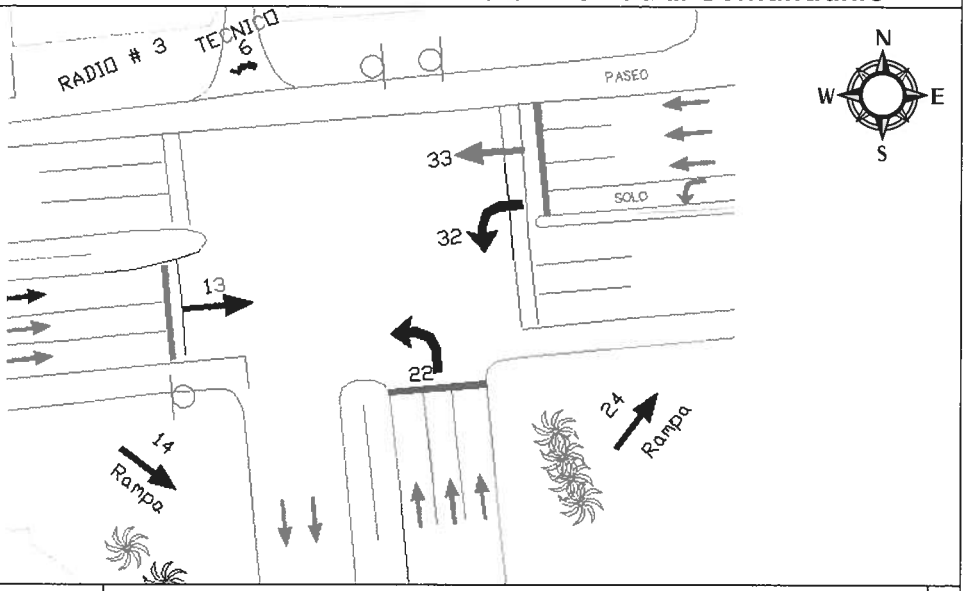
Tabla 4: Intersección Semaforizada Núm. 1 PR-3 @ PR-9959



Años		2006 - Existente			
Periodos		**AM**		**PM**	
Niveles de Servicio y Demoras (segundos)		**LOS**	**D**	**LOS**	**D**
PR-3 Este Hacia Fajardo	**52**	E	69.1	E	63.4
	53	A	3.1	A	4.1
PR-9959 Sur Hacia Fajardo	**82**	D	44.9	D	48.4
	84	A	5.7	A	5.7
PR-3 Oeste Hacia Carolina	**73**	C	20.7	B	18.5
	74	A	11.1	A	11.2
Nivel de Servicio de la Intersección		B		B	
Demora Promedio en Intersección, seg		16.9		11.0	
Largo de cola máximo 95% (metros)		24		14	
Grado de Saturación (v/c)		0.77 ≤ 1.0, OK		0.76 ≤ 1.0, OK	

Leyenda:
LOS = nivel de servicio del ingles "level of service"
D = demora del ingles "delay"
v/c = razón volumen versus capacidad menor a uno (1), intersección opera aceptablemente

Tabla 5: Intersección Semaforizada Núm. 2 - PR-3 @ Avenida El Comandante



Años		2006 - Existente			
Periodos		**AM**		**PM**	
Niveles de Servicio y Demoras (segundos)		**LOS**	**D**	**LOS**	**D**
PR-3 Este Hacia Fajardo	**13**	C	25.2	E	60.0
	14	A	11.1	A	11.1
PR-3 Norte Desde El Comandante	**22**	D	36.0	E	61.1
	24	A	8.7	A	8.6
PR-3 Oeste Hacia Carolina	**32**	F	87.8	E	63.0
	33	C	23.5	A	3.2
Nivel de Servicio de la Intersección		C		D	
Demora Promedio en Intersección, seg		24.2		40.0	
Largo de cola máximo 95% (metros)		34		49	
Grado de Saturación (v/c)		0.878		1.036	

Leyenda:
LOS = nivel de servicio del ingles "level of service"
D = demora del ingles "delay"
v/c = razón volumen versus capacidad menor a uno (1), intersección opera aceptablemente

SECCION 5.0 – ANALISIS DE CONDICION FUTURA- AÑOS 2011 y 2021

Generación de Viajes

El número de viajes generados por el proyecto El Nuevo Comandante se estimó utilizando el *"Trip Generation, Volumes I, II & II 7th Edition 2003"* del ITE en función del uso del terreno y las características del desarrollo propuesto. Este análisis permitió conocer el incremento en el volumen del flujo vehicular en la PR-3, la Avenida El Comandante y la red vial inmediata, específicamente la cantidad de vehículos entrando y saliendo del proyecto así como los períodos críticos para hacer los análisis. Los resultados obtenidos están mostrados en la siguiente tabla:

Tabla 6: Viajes a generarse por El Nuevo Comandante en horas pico AM y PM

Desarrollo Considerado	HORA PICO AM			HORA PICO PM		
Uso del Terreno	Vehículos Entrando	Vehículos Saliendo	Total	Vehículos Entrando	Vehículos Saliendo	Total
Apartamentos Tipo "Walk-up" 550 unidades	54	217	271	207	111	318
Centro Comercial 300,000 T.G.L.A.	181	116	297	435[1]	471[1]	906
Oficinas 90.960 Th.Gr.Sq.Ft.	153	21	174	31	150	181
Restaurantes 4.95 Th.Gr.Sq.Ft.	30	27	57	33	21	54
Restaurantes Comida Rápida 4.14 Th.Gr.Sq.Ft.	112	108	220	75	69	144
TOTALES	530	489	1019	954	1010	1603

1. Volúmenes ajustados debido a los "pass-by trips" en las horas picos para centros comerciales.

En el portal electrónico de la Administración de Reglamentos y Permisos (www.arpe.gov) del Gobierno de Puerto Rico se buscaron los proyectos con

permisos de construcción aprobados en el área de influencia desde la PR-188 @ PR-66 hasta la Urb. Loiza Valley en la PR-3. Se identificó el proyecto residencial Chalets de Vista Verde – Fase 1 y 2 (06PO2-CET00-03925) el cual tendrá acceso en la intersección de la PR-3 Km. 17.3 y la PR-9959, al este del casco urbano de Canóvanas. A continuación se incluye la generacion de viajes calculada para este ptoyecto:

Continuación Tabla 6: Viajes a generarse por Chalets de Vista Verde – Fase 1 y 2 en horas pico AM y PM

Desarrollo Considerado	HORA PICO AM			HORA PICO PM		
Uso del Terreno	Vehículos Entrando	Vehículos Saliendo	Total	Vehículos Entrando	Vehículos Saliendo	Total
Tipo "Walk-up" Fase 1 - 266 unidades	27	107	134	107	57	164
Fase 2 – 144 unidades	14	59	73	58	32	90
Totales	41	166	207	165	89	254

Proyecciones

Con base a la información de la ACT, se determinó la tasa de crecimiento anual vehicular para la red vial en el área de influencia del proyecto El Nuevo Comandante, utilizando la siguiente fórmula:

$$F = P (1 + i)^n$$

Donde: F = ADT futuro, P = ADT presente n = número de años
i = tasa de crecimiento anual vehicular

La Tabla Núm. 7 muestra los datos de tránsito utilizados para calcular la tasa de crecimiento anual.

Tabla 7: Datos de ACT y conteos de 2006 utilizados para la tasa de crecimiento

Año	Carretera Estatal PR-3 Km. 16.2 @ PR-9959	
	Volúmenes al Oeste PR-9959	Volúmenes al Este PR-9959
1994	75100 vehículos por día (vpd)	57,500 vpd
1997	77,100 vpd	76,500 vpd
2000	91,300 vpd	71,000 vpd
2001	82,000 vpd	n/a
2003	85,200 vpd	76,400 vpd
2004	79,100 vpd	68,800 vpd
2006	**60,800 vpd**	**57,750** vpd

Reemplazando los valores de AADT en la fórmula se obtuvo la tasa promedio de crecimiento anual, desde el 1994 al 2004, de ***i = 1.8%.*** Utilizando los volúmenes calculados de los conteos realizados en septiembre de 2006 se obtuvo una tasa promedio negativa de ***i = -1.7%*** entre el año 1994 y 2006.

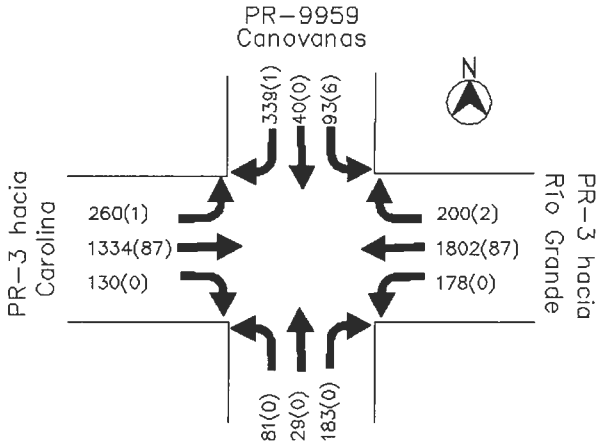
Al utilizar las proyecciones entre los años 2000 y 2006 obtenemos una disminución de aproximadamente 30% en los volúmenes de la PR-3 ó sea una proyección anual negativa de ***i =-6.5%.***

Se entiende que la reducción en el flujo vehicular en los últimos meses se debe a la apertura de la PR-66 (en la intersección de la PR-3 y PR-188) y la apertura reciente de la rampa hacia la PR-66 Oeste en la PR-185. La disminución en los volúmenes de tránsito fue presentada en la *Declaración de Impacto Ambiental Final (DIA-F) Corredor del Este – Carolina – Río Grande*, Diciembre 2002 Cap. 4.

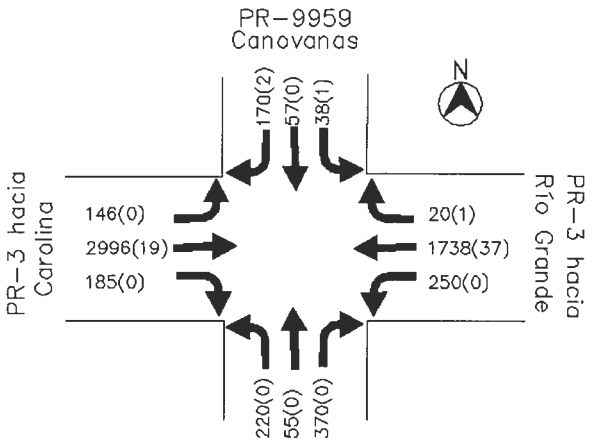
Para efectos de este informe utilizaremos una tasa de crecimiento anual en el tráfico vehicular de ***i=1.0%*** debido al constante desarrollo urbano en el área de influencia del estudio.

a. Volúmenes Tabulados Año – 2011 y 2021 - a continuación se incluyen los volúmenes tabulados en forma de gráfica por hora pico (AM/PM) y movimiento para los escenarios futuros:

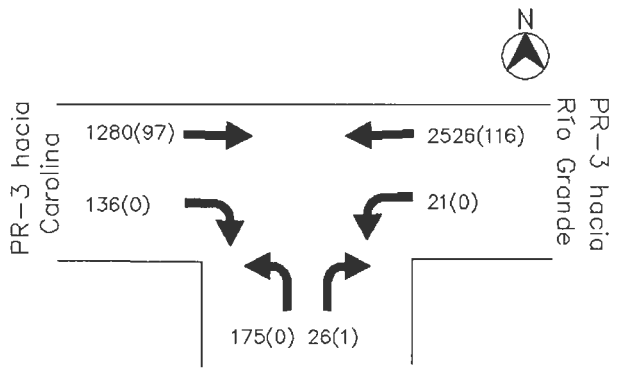
Figura 10: Volúmenes para las horas pico AM y PM - 2011



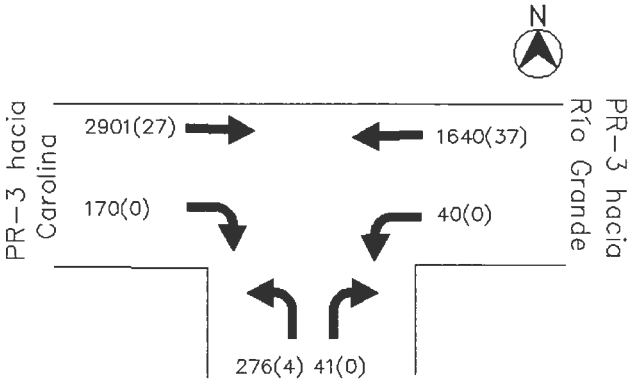
El Nuevo Comandante
Intersección Núm. 1, AM



El Nuevo Comandante
Intersección Núm. 1, PM

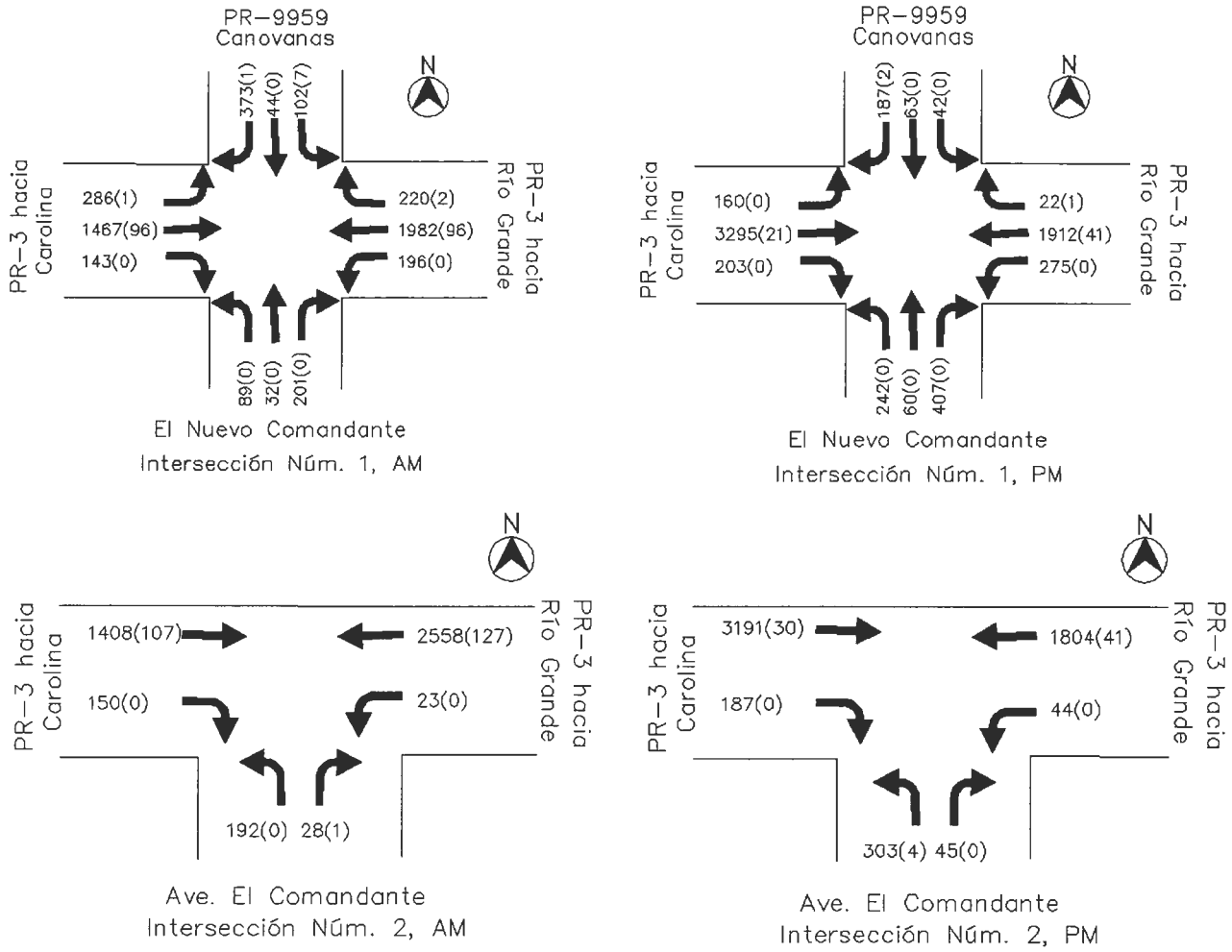


Ave. El Comandante
Intersección Núm. 2, AM



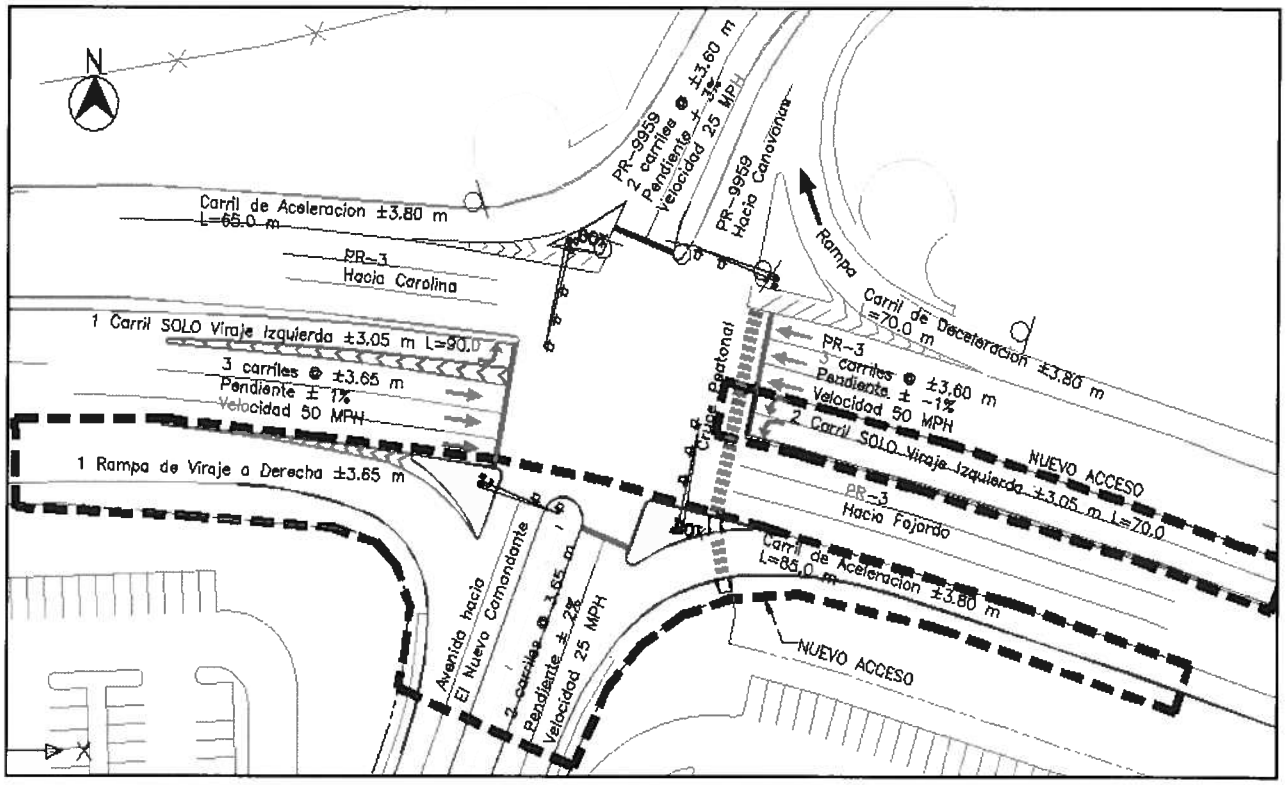
Ave. El Comandante
Intersección Núm. 2, PM

Figura 11: Volúmenes para las horas pico AM y PM - 2021



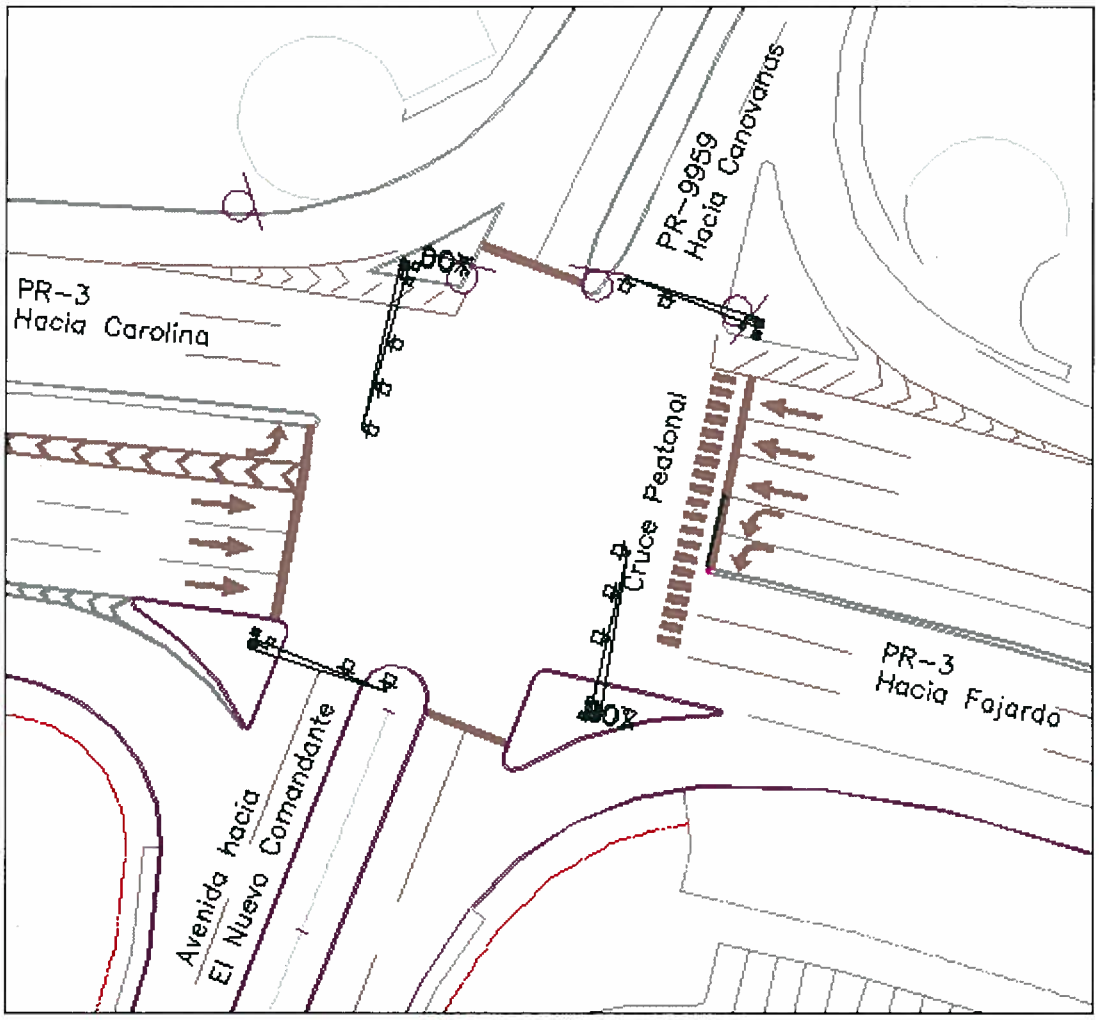
b. Geometría de las Intersecciones Analizadas – a continuación se presenta en forma gráfica la geometría propuesta (Escenario 2011 y 2021) para la intersección Núm. 1 PR-3 @ PR-9959 debido al acceso del proyecto El Nuevo Comandante. La geometría de la intersección PR-3 @ Avenida El Comandante se mantendrá inalterada, (Ver Figura 6).

Figura 12: Geometría de la Intersección PR-3, PR-9959 @ Avenida El Nuevo Comandante, Canóvanas



c. Control de la Intersección – a continuación se presenta de forma gráfica el sistema de semáforos propuestos a los escenarios futuros 2011 y 2021:

Figura 13: Intersección Semaforizada Núm. 1 – PR-3, PR-9959 y Avenida El Nuevo Comandante - Fases del Sistema de Semáforos, Condición Futura.

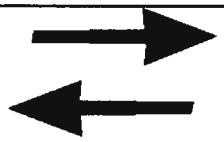


Tiempo de Verde 68 seg. AM 103 seg. PM	Tiempo de Verde 19 seg. AM 16 seg. PM	Tiempo de Verde 15 seg. AM 30 seg. PM	Tiempo de Verde 43 seg. AM 31 seg. PM

Tiempo de Amarillo = 3 seg., Todo Rojo = 2 seg. Ciclo=145 seg. AM, 180 seg. PM

El control de la intersección de la PR-3 @ Avenida El Comandante se mantendrá inalterado. Debido al incremento en los volúmenes de tránsito el tiempo del ciclo y sus fases aumentara. A continuación se incluye los tiempos:

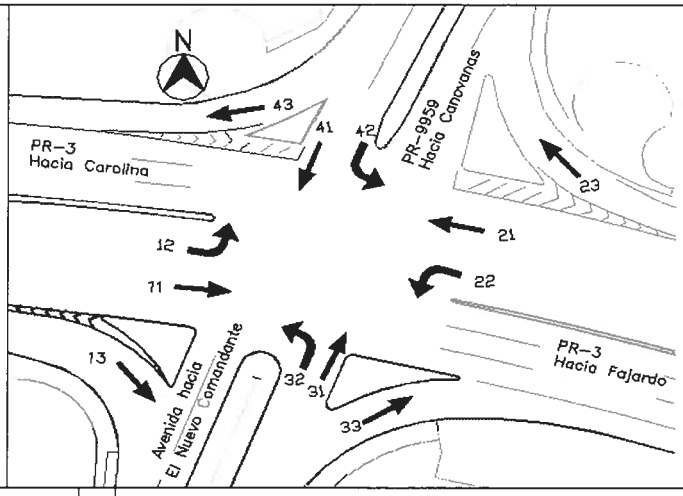
Figura 14: Tiempo del ciclo y fases de intersección PR-3 @ El Comandante

		
Tiempo de Verde 22 seg. AM 14 seg. PM	Tiempo de Verde 53 seg. AM 53 seg. PM	Tiempo de Verde 15 seg. AM 20 seg. PM

Tiempo de Amarillo = 3 seg., Todo Rojo = 2 seg. Ciclo=90 seg. AM y PM

d. Análisis de Capacidad – a continuación se incluye el resumen de los resultados obtenidos del programa aaSIDRA para los escenarios futuros 2011 y 2021. Se presentan en forma tabulada por intersección y acceso los resultados de nivel de servicio LOS, demora promedio, largo de cola promedio y grado de saturación.

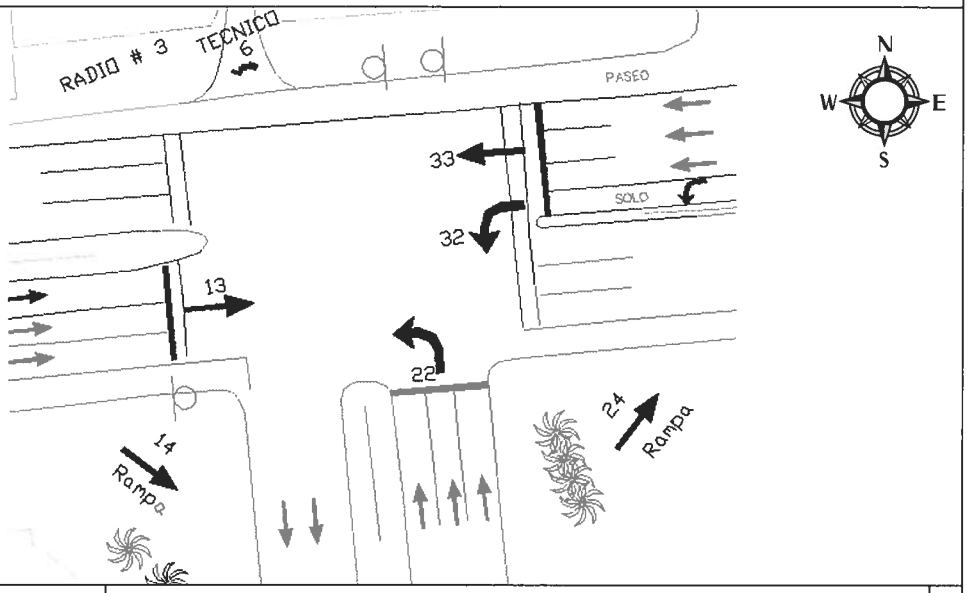
Tabla 8: Intersección semaforizada # 1 - PR-3, PR-9959 y Avenida El Nuevo Comandante – Año 2011



Años		2011 - Propuesto			
Periodos		**AM**		**PM**	
Niveles de Servicio y Demoras (segundos)		**LOS**	**D**	**LOS**	**D**
Desde El Nuevo Comandante	**32**	E	76.9	F	84.1
	31	E	71.1	E	78.3
	33	A	3.4	B	3.5
PR-3 Oeste Hacia Carolina	**22**	D	54.7	F	88.3
	21	C	31.1	B	18.8
	23	B	11.1	B	11.2
PR-9959 desde Canóvanas	**42**	E	73.3	F	95.1
	41	E	67.0	F	90.2
	43	B	3.5	A	3.5
PR-3 Este Hacia Fajardo	**12**	E	60.9	E	89.5
	11	C	27.3	E	56.2
	13	B	11.0	B	11.1
Nivel de Servicio de la Intersección		C		D	
Demora Promedio en Intersección, seg		30.3		43.4	
Largo de cola máximo 95% (metros)		28.0		55.0	
Grado de Saturación (v/c)		0.802 ≤ 1.0		0.999 ≤ 1.0	

Leyenda:
LOS = nivel de servicio del ingles "level of service"
D = demora del ingles "delay"
v/c = razón volumen versus capacidad menor a uno (1), intersección opera aceptablemente

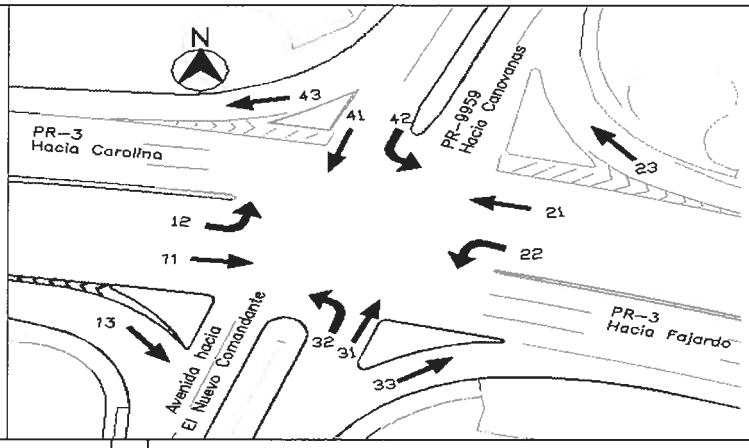
Tabla 9: Intersección Semaforizada Núm. 2 - PR-3 @ Avenida El Comandante – Año 2011



Años		2011 - Propuesto			
Periodos		**AM**		**PM**	
Niveles de Servicio y Demoras (segundos)		**LOS**	**D**	**LOS**	**D**
Desde El Comandante	**32**	D	49.3	D	41.8
	33	A	8.6	A	8.5
PR-3 Oeste Hacia Carolina	**22**	D	42.1	D	51.8
	21	A	3.0	A	3.1
PR-3 Este Hacia Fajardo	**11**	B	11.3	E	69.6
	13	A	11.1	A	11.1
Nivel de Servicio de la Intersección		A		D	
Demora Promedio en Intersección, seg		8.3		44.5	
Largo de cola máximo 95% (metros)		11		41	
Grado de Saturación (v/c)		0.650 ≤ 1.0		1.085 ≤ 1.0	

Leyenda:
LOS = nivel de servicio del ingles "level of service"
D = demora del ingles "delay"
v/c = razón volumen versus capacidad menor a uno (1), intersección opera aceptablemente

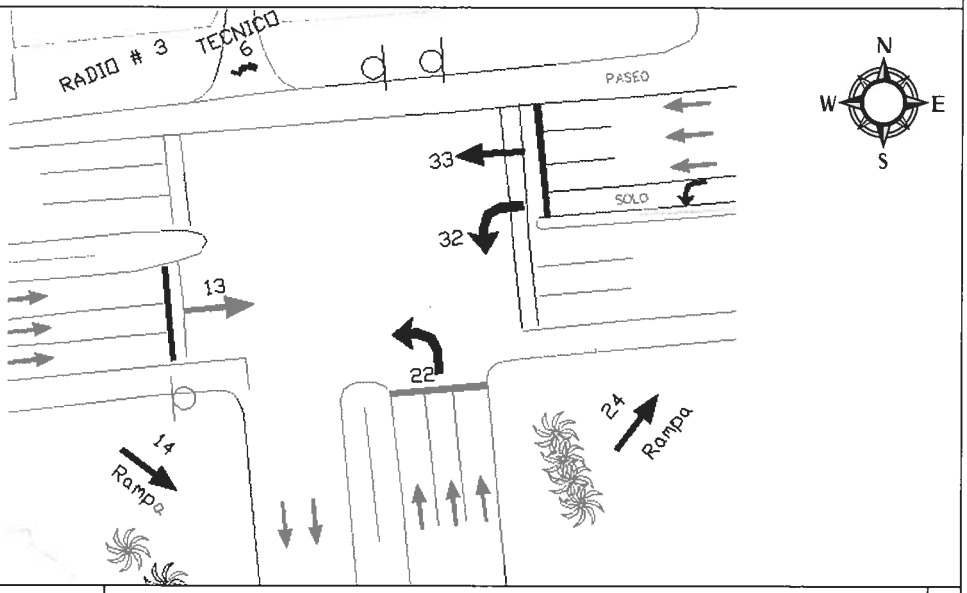
Tabla 10: Intersección semaforizada # 1 - PR-3, PR-9959 y Avenida El Nuevo Comandante – Año 2021



Años		2021 - Propuesto			
Periodos		**AM**		**PM**	
Niveles de Servicio y Demoras (segundos)		**LOS**	**D**	**LOS**	**D**
Desde El Nuevo Comandante	**32**	E	75.9	F	86.0
	31	E	70.1	F	80.1
	33	A	3.4	B	3.5
PR-3 Oeste Hacia Carolina	**22**	E	56.8	F	90.1
	21	D	35.6	B	18.1
	23	B	11.1	B	11.2
PR-9959 desde Canóvanas	**42**	E	72.3	F	95.1
	41	E	66.3	F	90.6
	43	B	3.5	A	3.5
PR-3 Este Hacia Fajardo	**12**	E	64.0	F	91.6
	11	C	28.4	F	83.8
	13	B	11.1	B	11.1
Nivel de Servicio de la Intersección		C		E	
Demora Promedio en Intersección, seg		32.6		56.6	
Largo de cola máximo 95% (metros)		34.0		67	
Grado de Saturación (v/c)		0.882 ≤ 1.0		1.077 ≥ 1.0	

Leyenda:
LOS = nivel de servicio del ingles "level of service"
D = demora del ingles "delay"
v/c = razón volumen versus capacidad menor a uno (1), intersección opera aceptablemente

Tabla 11: Intersección Semaforizada Núm. 2 - PR-3 @ Avenida El Comandante – **Año 2021**



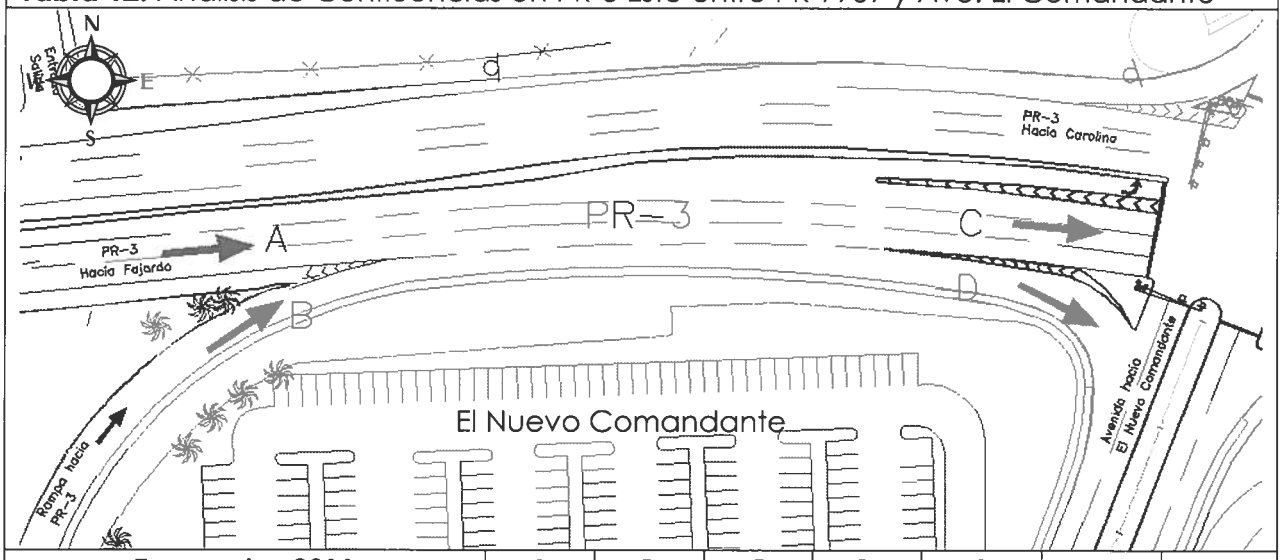
Años		**2021 - Propuesto**			
Periodos		**AM**		**PM**	
Niveles de Servicio y Demoras (segundos)		**LOS**	**D**	**LOS**	**D**
Desde El Comandante	**32**	D	49.3	D	43.0
	33	A	8.6	A	8.5
PR-3 Oeste Hacia Carolina	**22**	D	43.2	D	50.8
	21	A	3.1	A	3.0
PR-3 Este Hacia Fajardo	**11**	B	11.8	F	116.4
	13	A	11.1	A	11.1
Nivel de Servicio de la Intersección		A		E	
Demora Promedio en Intersección, seg		8.7		71.4	
Largo de cola máximo 95% (metros)		12.0		55.0	
Grado de Saturación (v/c)		0.673 ≤ 1.0		1.194 ≥1.0	

Leyenda:
LOS = nivel de servicio del ingles "level of service"
D = demora del ingles "delay"
v/c = razón volumen versus capacidad menor a uno (1), intersección opera aceptablemente

e. Análisis de Entrecruces ("Weaving")

En la Tabla Núm. 12 se presenta un resumen de los resultados obtenidos utilizando el programa de computadores "HCS+ 2000 Weaving". Los escenarios modelados fueron a los años 2011 y 2021. La carretera estatal PR-3 en este escenario tiene 6 carriles y 2 paseos entre la PR-9959 y la Avenida El Comandante.

Tabla 12: Análisis de Confluencias en PR-3 Este entre PR-9959 y Ave. El Comandante



Escenarios 2011	A	B	C	D	S	D	LOS
Entrecruce AM	1370	27	1421	130	52.51	8.44	A
Entrecruce PM	2928	41	3015	185	50.14	18.17	B

Escenarios 2021	A	B	C	D	S	D	LOS
Entrecruce AM	1515	29	1563	143	52.22	9.43	A
Entrecruce PM	3221	45	3316	203	49.59	20.31	C

Leyenda:
A, B, C y D = volúmenes de hora pico por dirección
S = velocidad en segmento de entrecruce (mi/h)
D = densidad en segmento de entrecruce (pc/mi/ln)
LOS = nivel de servicio

SECCION 6.0 – DISCUSION DE RESULTADOS

Análisis de Capacidad ("Capacity Analysis")

Intersección Núm. 1 – *PR-3 y PR-9959 (Desvío Norte de Canóvanas)* - esta intersección semaforizada resultó con niveles de servicio promedio favorables (B) en las horas de mayor flujo vehicular para el escenario existente. Al año 2006, el tiempo de demora promedio fluctuó entre 11.0 y 16.9 segundos por vehículo, el largo de cola promedio estuvo entre 14 y 24 metros; y el grado de saturación general resultó entre 0.76 y 0.77.

La entrada principal al proyecto propuesto El Nuevo Comandante se propone en esta intersección. Al modelar la intersección al año 2011 los resultados operacionales promedio se mantuvieron aceptables para las horas de mayor flujo vehicular. El tiempo de demora promedio varío entre 30.3 y 43.4 segundos por vehículo, el largo de cola promedio estuvo entre 28.0 y 55.0 metros; y el grado de saturación general resultó entre 0.802 y 0.999. Los niveles de servicio promedio obtenidos estuvieron entre LOS C (AM) y D (PM).

Al año 2021, el modelaje de la intersección obtuvo resultados operacionales promedio para las horas de mayor flujo vehicular. El tiempo de demora promedio varió entre 32.6 y 56.6 segundos por vehículo, el largo de cola promedio estuvo entre 34.0 y 56.6 metros; y el grado de saturación general resultó entre 0.882 y 1.077. Los niveles de servicio promedio obtenidos estuvieron entre LOS C (AM) y E (PM).

Intersección Núm. 2 – *PR-3 y Avenida El Comandante (entrada principal al Hipódromo El Comandante)* - esta intersección semaforizada resultó con niveles de servicio promedio favorables (C y D) en las horas de mayor flujo vehicular para el escenario existente. Al año 2006, el tiempo de demora promedio fluctuó entre 24.2 y 40.0 segundos por vehículo, el largo de cola promedio estuvo entre 34.0 y 49.0 metros; y el grado de saturación general resultó entre 0.87 y 1.036.

La entrada alterna al proyecto propuesto El Nuevo Comandante se propone en esta intersección. Al modelar la intersección al año 2011 los resultados operacionales promedio se mantuvieron aceptables para las horas de mayor flujo vehicular. El tiempo de demora promedio varió entre 8.3 y 44.5 segundos por vehículo, el largo de cola promedio estuvo entre 11.0 y 41.0 metros; y el grado de saturación general resultó entre 0.650 y 1.085. Los niveles de servicio promedio obtenidos estuvieron entre LOS A (AM) y D (PM).

Al año 2021, el modelaje de la intersección obtuvo resultados operacionales promedio para las horas de mayor flujo vehicular. El tiempo de demora promedio varió entre 8.7 y 71.4 segundos por vehículo, el largo de cola promedio estuvo entre 12.0 y 55.0 metros; y el grado de saturación general resultó entre 0.673 y 1.194. Los niveles de servicio promedio obtenidos estuvieron entre LOS A (AM) y E (PM).

Análisis de Entrecruces ("Weaving")

El segmento de entrecruces en el sector de influencia se localiza en al PR-3 entre la carretera estatal PR-9959 y la Avenida El Comandante en Canóvanas.

***Segmento de Entrecruce**: PR-3 Dirección Este entre la Avenida El Comandante y PR-9959* – Escenario 2011, en la mañana (hora pico de mayor flujo vehicular) el nivel de servicio resultó LOS A, velocidad promedio de 52.51 mph y densidad de 8.44 pc/mi/hr. En la tarde, el nivel de servicio cambió a LOS B, la velocidad promedio se redujo a 50.14 mph y la densidad aumentó a 18.17 pc/mi/hr.

Al modelar el escenario 2021 en la mañana el nivel de servicio resultó LOS A, velocidad promedio de 52.22 mph y densidad de 9.43 pc/mi/hr. En la tarde, el nivel de servicio cambió a LOS C, la velocidad promedio se redujo a 49.59 mph y la densidad aumentó a 20.31 pc/mi/hr.

SECCION 8.0 – CONCLUSIONES Y RECOMENDACIONES

1. La Oficina de Recopilación y Análisis de Tránsito de la ACT confirmó al 3 de octubre de 2006 que no tienes datos disponibles en la PR-3 después de la apertura de la PR-66. Al comparar los datos históricos de tráfico vehicular en la PR-3 (según los números provistos por la Oficina de Recopilación) y los datos recopilados en los conteos realizados en la PR-3, Km. 16.2, ha ocurrido una disminución en los volúmenes de tránsito en la PR-3 desde la apertura de la PR-66.

2. En la actualidad la apertura del Corredor del Este, PR-66, esta recibiendo aproximadamente 30% del volumen total de la PR-3 en la confluencia de la PR-3, PR-188 y PR-3. Esta intersección se encuentra al Este de la intersección de la PR-3, PR-9959 y el proyecto propuesto El Nuevo Comandante.

3. La apertura de la rampas de entrada y salida al Corredor del Este en la PR-185 ha disminuido el volumen de tráfico vehicular que llegaba a la intersección de la PR-3 y PR-185 en la entrada al casco urbano de Canóvanas. Esta intersección se localiza al este de la intersección de la PR-3, PR-9959 y el proyecto propuesto.

4. La Avenida El Comandante es la entrada principal del Hipódromo El Comandante. Esta calle a su vez conecta entre la PR-3 y la carretera estatal PR-185. En esta intersección el acceso esta interrumpido por un portón.

5. En las horas de mayor flujo vehicular (AM y PM), la intersección de la PR-3 y PR-9989 está operando en niveles de servicio aceptables, según la modelación realizada con los tiempos de ciclo del semáforo existente.

6. La intersección de la PR-3 y la Avenida El Comandante está operando en niveles de servicio aceptables según la modelación realizada usando los tiempos del semáforo actual en las horas de mayor flujo vehicular (AM y PM)

7. El acceso principal al proyecto propuesto (Avenida El Nuevo Comandante) fue añadido a la geometría de la intersección PR-3 y PR-9959. La nueva intersección semaforizada fue modelada a los años 2011 (año donde se espera la apertura del proyecto y operación completa) y 2021 (10 años después de la apertura) utilizando las proyecciones de tránsito en la PR-3 @ PR-9959 y la generación de viajes del proyecto. El ciclo y fases de la intersección fueron optimizados y los niveles de servicio obtenidos para las horas picos fueron aceptables.

8. La intersección de la PR-3 y la Avenida El Comandante fue modelada utilizando las proyecciones, generación de viajes y la distribución de viajes del proyecto propuesto. Los niveles de servicios obtenidos fueron favorables para los escenarios futuros.

9. En el área de entrecruce ("weaving") en la PR-3 Este desde la Avenida El Comandante hasta la PR-3 @ PR-9959, el segmento puede manejar los volúmenes vehiculares en las horas picos y el intercambio de carriles. La densidad vehicular es aceptable, la velocidad promedio se mantiene y los niveles de servicio son aceptables. La geometría propuesta en la PR-3 y sus intersecciones puede manejar la adición del nuevo proyecto en este segmento.

10. La carretera estatal PR-3 tiene capacidad para manejar los viajes que se generarán por el proyecto propuesto El Nuevo Comandante entre en operaciones en aproximadamente 5 años. Recomendamos que la Autoridad de Carreteras y Transportación endose este proyecto que proveerá residencias, áreas de servicios y áreas de trabajo que son necesarias en la región noreste de la isla.

Recomendaciones - A continuación se presentan las recomendaciones en la infraestructura vial existente cercano al proyecto como consecuencia del desarrollo propuesto:

1. En la PR-3, en dirección este a oeste, se proveerán dos (2) carriles de viraje a la izquierda (SOLO) hacia el proyecto propuesto. Dichos carriles tendrán 3.65 metros de ancho, 60.00 metros de largo y transiciones de 50.00 a 75.00 metros. Se ampliará la sección en sector de influencia de la intersección para acomodar los carriles de viraje.

2. En la PR-3 se proveerán los correspondientes carriles de aceleración y deceleración en la intersección con el acceso propuesto al desarrollo. Dichos carriles tendrán un ancho de 3.65 metros, largo aproximado de 60 metros y tendrán la transición correspondiente con la vía de rodaje existente.

3. La infraestructura del sistema de semáforos existente se evaluará y será mejorado según sea necesario para controlar los nuevos movimientos en la intersección. A su vez se requiere la interconexión del semáforo de esta intersección con el sistema de semáforos de la PR-3 y la calle hacia El Hipódromo. Ambas intersecciones funcionarán de manera coordinada.

4. Se requiere proveer iluminación, señales de tránsito, marcado de pavimento en la intersección del acceso propuesto con la carretera estatal PR-3.

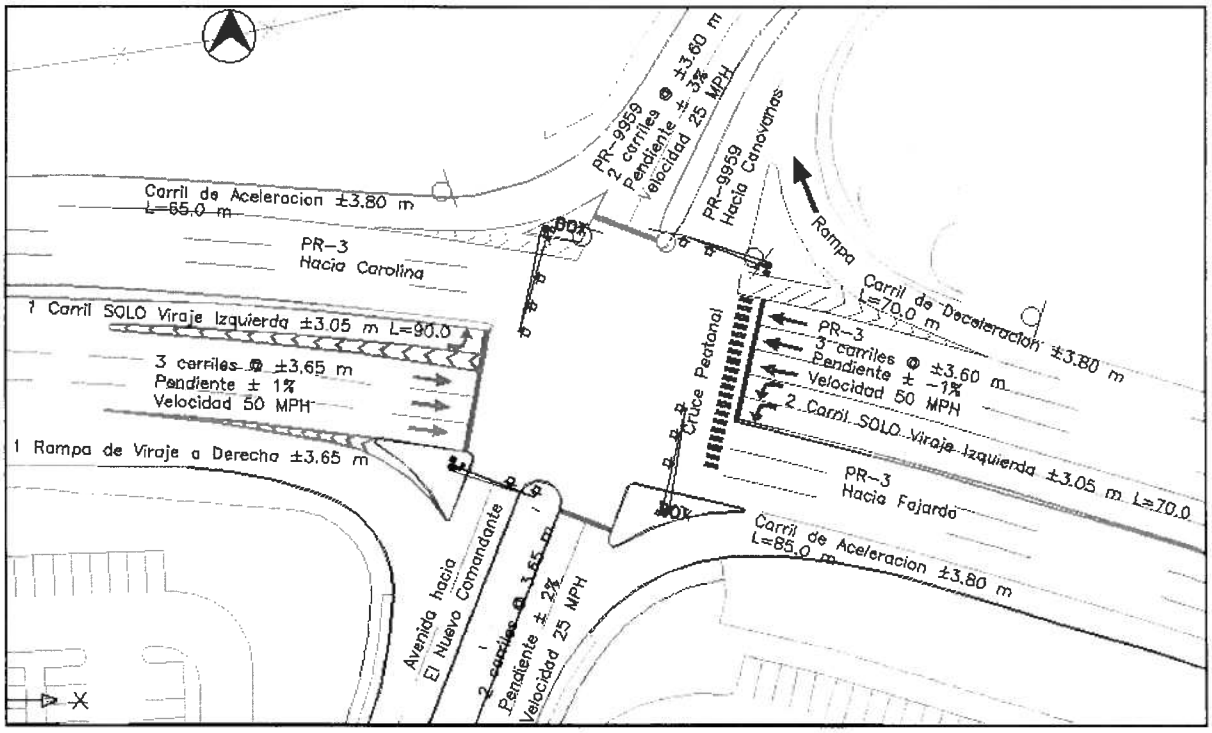
5. El acceso propuesto del proyecto tendrá una sección de cuatro carriles de 3.65 metros, isleta central de 6.00 metros, franja de siembra de 1.50 metros y acera de 1.50 metros. Los radios de curvatura tendrán un radio mínimo de 9.00 metros en su intersección con la carretera estatal PR-3.

6. El acceso propuesto al desarrollo contará con una acumulación mínima de 100 metros medidos desde el punto de tangencia en su enlace con la carretera estatal PR-3.

7. La pendiente de los accesos no excederá el siete (7%) medido desde el límite futuro del borde del pavimento.

8. Se instalará una verja en el límite de colindancia entre el proyecto y la PR-3.

A continuación se incluye un esquema conceptual de la intersección propuesta:



SECCION 9.0 – CERTIFICACION DE LA VALIDEZ DE LOS DATOS

Certifico que la información presentada en este informe es cierta, correcta y completa, y que fue obtenida utilizando los criterios de la práctica usual y aceptada de la ingeniería de tránsito en la Autoridad de Carreteras y Transportación y el Departamento de Transportación y Obras Públicas en el Estado Libre Asociado de Puerto Rico.

Ing. José A. Carro Miranda

Lic. 12676, P.E.

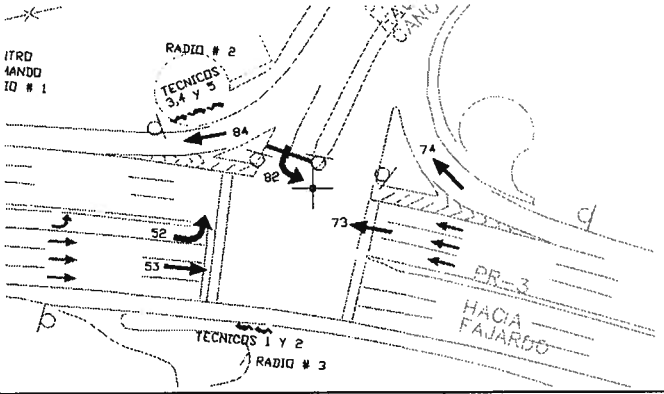
SECCION 10.0 – APENDICES

Apéndice A	Material crudo de los conteos vehiculares realizados cada quince (15) minutos por un periodo de doce (12) horas
Apéndice B	Impresión y copia digital de las corridas de SIDRA 2.1.0.346
Apéndice C	Fotos de las intersecciones analizadas

ANEJO A.

Material crudo de los conteos vehiculares realizados cada quince (15) minutos por en un periodo de 12 horas

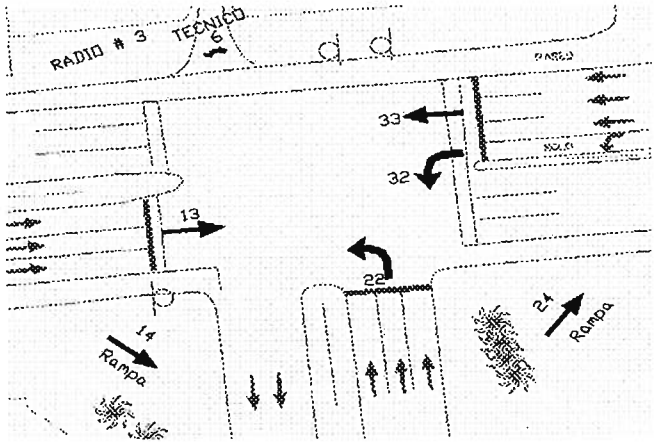
INT: 1



		53		52		82		84		73		74	
Hora	Horario	A	C	A	C	A	C	A	C	A	C	A	C
1	6:00 AM-6:15 AM	241	12	17	0	1	0	19	1	365	8	4	0
	6:15 AM-6:30 AM	217	6	10	0	1	0	23	1	317	6	1	0
	6:30 AM-6:45 AM	246	19	27	1	3	0	40	1	345	8	5	0
	6:45 AM-7:00 AM	343	11	42	0	3	0	28	0	396	3	3	2
2	7:00 AM-7:15 AM	305	42	52	0	12	0	56	1	351	5	14	3
	7:15 AM-7:30 AM	337	19	70	0	12	2	66	0	421	11	49	2
	7:30 AM-7:45 AM	306	28	77	0	23	1	98	1	422	10	57	0
	7:45 AM-8:00 AM	386	16	57	0	27	0	76	0	367	23	56	0
3	8:00 AM-8:15 AM	217	20	44	1	27	2	82	0	507	39	29	0
	8:15 AM-8:30 AM	291	19	35	0	8	1	34	1	430	33	10	1
	8:30 AM-8:45 AM	309	10	33	1	8	4	48	4	511	26	3	0
	8:45 AM-9:00 AM	353	21	35	0	8	1	51	0	485	28	7	1
4	9:00 AM-9:15 AM	290	34	29	0	8	0	49	1	330	16	3	1
	9:15 AM-9:30 AM	216	27	30	0	13	2	51	0	368	32	7	0
	9:30 AM-9:45 AM	414	26	30	0	9	1	52	4	387	29	5	2
	9:45 AM-10:00 AM	295	24	29	1	10	1	36	0	366	35	9	2
5	10:00 AM-10:15 AM	240	37	34	0	4	0	48	0	368	26	4	1
	10:15 AM-10:30 AM	305	15	38	0	3	1	35	0	364	22	4	0
	10:30 AM-10:45 AM	387	20	30	1	8	0	35	1	403	37	5	0
	10:45 AM-11:00 AM	256	26	38	0	9	1	33	0	438	28	4	1
6	11:00 AM-11:15 AM	350	25	34	1	8	2	34	0	400	21	6	0
	11:15 AM-11:30 AM	213	25	39	0	14	3	34	0	374	24	9	0
	11:30 AM-11:45 AM	372	25	34	1	15	0	41	0	369	27	5	1
	11:45 AM-12:00 PM	370	29	40	1	9	1	45	1	364	16	6	1

		53		52		82		84		73		74	
7	12:00 PM-12:15 PM	290	14	24	0	9	1	49	0	453	17	7	0
	12:15 PM-12:30 PM	436	13	34	0	5	0	37	1	737	17	8	2
	12:30 PM-12:45 PM	377	20	39	1	9	1	42	0	964	12	7	0
	12:45 PM-1:00 PM	298	21	34	2	5	0	56	1	817	12	6	2
8	1:00 PM-1:15 PM	459	10	35	0	3	0	24	1	399	16	6	0
	1:15 PM-1:30 PM	382	18	48	0	8	2	50	0	470	22	8	2
	1:30 PM-1:45 PM	491	10	32	1	9	2	55	1	350	34	7	1
	1:45 PM-2:00PM	569	12	47	0	13	0	40	0	283	21	10	0
9	2:00 PM-2:15PM	534	17	62	0	14	0	35	1	358	24	22	0
	2:15 PM-2:30 PM	507	20	66	1	12	0	51	1	302	27	19	0
	2:30 PM-2:45 PM	497	17	69	0	30	0	49	0	325	27	11	0
	2:45 PM-3:00 PM	586	17	49	0	32	0	63	0	311	20	18	0
10	3:00 PM-3:15 PM	722	10	57	0	34	0	79	1	366	12	19	0
	3:15 PM-3:30 PM	485	13	63	1	30	0	56	1	347	21	12	0
	3:30 PM-3:45 PM	529	10	39	0	17	0	55	1	394	19	6	0
	3:45 PM-4:00 PM	581	18	45	0	12	0	50	0	443	16	10	0
11	4:00 Pm-4:15 PM	561	1	39	0	14	0	42	0	346	19	10	0
	4:15 PM-4:30 PM	626	9	39	0	8	0	43	0	368	16	8	0
	4:30 PM-4:45 PM	518	9	49	1	11	0	63	0	451	14	8	0
	4:45 PM-5:00 PM	410	0	41	0	6	1	30	1	355	12	5	0
12	5:00 PM-5:15 PM	874	2	44	0	9	0	54	1	407	6	8	0
	5:15 PM-5:30 PM	710	7	39	0	14	0	54	1	455	6	5	0
	5:30 PM-5:45 PM	686	2	42	0	5	1	30	0	441	15	3	1
	5:45 PM-6:00 PM	584	7	14	0	8	0	24	0	352	8	3	0
	TOTALES	19971	813	1954	15	560	31	2245	29	19942	926	531	26

INT: 2



		13		14		22		24		32		33	
Hora	Horario	A	C	A	C	A	C	A	C	A	C	A	C
1	6:00 AM-6:15 AM	253	12	6	0	0	0	1	0	2	0	399	6
	6:15 AM-6:30 AM	237	6	3	0	0	0	1	0	3	0	298	5
	6:30 AM-6:45 AM	277	9	4	0	0	0	3	0	3	0	359	5
	6:45 AM-7:00 AM	335	13	11	0	3	0	1	0	4	0	287	5
2	7:00 AM-7:15 AM	306	11	4	0	2	0	3	0	0	0	354	3
	7:15 AM-7:30 AM	319	16	5	0	1	0	1	0	1	0	450	11
	7:30 AM-7:45 AM	364	15	8	0	7	0	4	0	2	0	471	10
	7:45 AM-8:00 AM	317	12	6	0	6	0	1	0	4	0	423	17
3	8:00 AM-8:15 AM	286	24	3	0	5	0	1	0	0	0	629	27
	8:15 AM-8:30 AM	305	21	7	0	9	0	2	0	2	0	516	35
	8:30 AM-8:45 AM	272	23	4	0	10	0	4	0	1	1	607	25
	8:45 AM-9:00 AM	356	24	6	0	9	0	4	1	0	1	577	24
4	9:00 AM-9:15 AM	284	34	5	0	8	0	1	0	0	0	476	18
	9:15 AM-9:30 AM	254	27	7	0	5	1	8	1	3	0	534	21
	9:30 AM-9:45 AM	368	35	3	0	11	0	6	0	6	0	480	27
	9:45 AM-10:00 AM	278	33	10	0	6	0	3	0	6	0	534	31
5	10:00 AM-10:15 AM	296	20	7	0	15	0	3	0	0	0	478	32
	10:15 AM-10:30 AM	365	24	9	0	12	0	2	0	3	0	455	17
	10:30 AM-10:45 AM	259	23	6	0	11	0	5	0	1	0	479	29
	10:45 AM-11:00 AM	300	35	4	0	12	0	3	0	1	0	595	31

		13		14		22		24		32		33	
6	11:00 AM-11:15 AM	364	24	5	1	16	0	2	0	2	0	427	19
	11:15 AM-11:30 AM	203	15	4	2	11	0	2	0	2	1	445	22
	11:30 AM-11:45 AM	342	24	3	0	9	0	3	0	2	1	484	28
	11:45 AM-12:00 PM	370	33	7	0	12	1	1	1	2	0	507	19
7	12:00 PM-12:15 PM	298	17	2	0	25	0	0	0	2	0	420	18
	12:15 PM-12:30 PM	412	30	5	0	27	0	2	0	1	0	455	21
	12:30 PM-12:45 PM	383	26	9	4	11	2	2	0	1	0	459	11
	12:45 PM-1:00 PM	337	24	4	0	16	0	3	0	1	0	442	16
8	1:00 PM-1:15 PM	540	21	7	0	8	0	2	1	1	1	552	18
	1:15 PM-1:30 PM	282	25	2	0	14	0	1	0	2	1	436	22
	1:30 PM-1:45 PM	518	22	5	1	12	0	3	0	2	0	345	26
	1:45 PM-2:00PM	531	19	3	2	8	3	6	0	4	0	389	22
9	2:00 PM-2:15PM	536	15	1	0	17	0	5	0	3	0	413	21
	2:15 PM-2:30 PM	538	15	3	0	16	0	2	0	3	0	506	21
	2:30 PM-2:45 PM	515	21	2	1	14	0	4	0	1	0	388	17
	2:45 PM-3:00 PM	596	15	1	1	1	0	2	0	3	0	392	17
10	3:00 PM-3:15 PM	704	16	5	0	6	0	2	0	3	0	356	14
	3:15 PM-3:30 PM	457	6	3	1	3	1	5	0	2	0	374	19
	3:30 PM-3:45 PM	552	15	3	0	3	0	3	1	1	0	353	18
	3:45 PM-4:00 PM	602	12	2	0	5	0	1	0	1	0	298	16
11	4:00 Pm-4:15 PM	539	7	4	0	6	0	5	0	2	0	332	12
	4:15 PM-4:30 PM	565	17	3	0	8	1	2	0	0	0	284	15
	4:30 PM-4:45 PM	585	14	3	0	7	0	7	1	5	0	420	10
	4:45 PM-5:00 PM	490	4	4	0	5	0	2	0	2	0	321	12
12	5:00 PM-5:15 PM	787	10	4	0	8	0	10	0	4	0	397	6
	5:15 PM-5:30 PM	706	7	1	0	11	1	2	1	1	0	330	9
	5:30 PM-5:45 PM	622	5	2	0	9	3	2	0	3	0	390	7
	5:45 PM-6:00 PM	648	4	2	0	5	0	3	0	2	0	409	13
	TOTALES	20053	880	217	13	425	13	141	7	100	6	20725	848

ANEJO B.

Impresión y copia digital de las corridas de SIDRA 2.1.0.346 y HCS 2000 para Entrecruces y Confluencias

Movement Summary

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante

INterseccion PR-3 @ PR-9959 - 2006 AM

Signalised - Actuated coordinated **Cycle Time = 146 seconds**

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
PR-3 HAcia Carolina										
21	T	2195	4.6	0.735	20.7	LOS C	24	0.62	0.63	45.3
23	R	227	0.9	0.151	11.1	LOS A#	3#	0.00	0.69	58.8
Approach		**2422**	**4.3**	**0.735**	**19.8**	**LOS B**	**24**	**0.56**	**0.64**	**46.4**
PR-9959 desde Canovanas										
42	L	116	5.2	0.283	44.9	LOS D	5	0.59	0.68	23.1
43	R	395	0.3	0.283	5.7	LOS A	1	0.06	0.56	38.3
Approach		**511**	**1.4**	**0.283**	**14.6**	**LOS B**	**5**	**0.18**	**0.58**	**33.3**
PR-3 Hacia Fajardo										
12	L	311	0.3	0.768	69.1	LOS E	12	0.97	0.86	21.5
11	T	1601	6.2	0.369	3.1	LOS A	3	0.08	0.22	70.2
Approach		**1912**	**5.3**	**0.768**	**13.8**	**LOS B**	**12**	**0.23**	**0.33**	**52.7**
All Vehicles		**4845**	**4.4**	**0.768**	**16.9**	**LOS B**	**24**	**0.39**	**0.51**	**46.6**

Pedestrian Movements

Mov No	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
24	1	66.3	LOS F	0	0.94	0.94
44	1	64.3	LOS F	0	0.94	0.94
14	1	66.3	LOS F	0	0.94	0.94
All Peds	**3**	**65.6**	**LOS F**	**0**	**0.94**	**0.94**

Akcelik & Associates Pty Ltd - aaSIDRA 2.1.1.354

CMA Architects & Engineers LLP
Jose A. Carro User ID: 50310
Licence Type: Single Computer

Time and Date of Analysis 4:33 PM, Oct 2,2006

Filename: C:\acad386\work\05201 - Estudio de Transito Interstate Comandante\Sidra\2006PR3PR9959AM.OUT

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
INterseccion PR-3 @ PR-9959 - 2006 AM
Intersection ID: 1

aaTraffic SIDRA US Highway Capacity Manual (2000) Metric Version

RUN INFORMATION

* Basic Parameters:
  Intersection Type: Signalised - Actuated Coordinated
  For fully-actuated signal timings, the following specifications will be ignored:
    Any maximum cycle time specification
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Default Values File No. 10
  Peak flow period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes (Hourly Rate)
  Delay definition: Control delay
                    Geometric delay included
  aaSIDRA Standard Delay and Queue models used
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile

* No. of Main (Timing-Capacity) Iterations = 2
  Comparison of last two iterations:
    Difference in intersection degree of satn = 0.0 %
    Largest difference in eff. green times = 0 secs
    (max. value for stopping = 0 secs)

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
INterseccion PR-3 @ PR-9959 - 2006 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.0 - TRAFFIC FLOW DATA

Mov No.	Left LV	Left HV	Through LV	Through HV	Right LV	Right HV	Flow Scale	Peak Flow Factor
VEHICLES	Demand flows in veh/hour as used by the program							
West: PR-3 Hacia Fajardo								
12	310	1	0	0	0	0	1.00	0.80
11	0	0	1501	100	0	0	1.00	0.83
East: PR-3 HAcia Carolina								
21	0	0	2094	101	0	0	1.00	0.82
23	0	0	0	0	225	2	1.00	0.85
North: PR-9959 desde Canovanas								
42	110	6	0	0	0	0	1.00	0.81
43	0	0	0	0	394	1	1.00	0.82
PEDESTRIANS	Flow (ped/hour)							
14	1						1.00	1.00
24	1						1.00	1.00
44	1						1.00	1.00

Based on unit time = 60 minutes.
Flow Scale and Peak Hour Factor effects included in flow values.

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
INterseccion PR-3 @ PR-9959 - 2006 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.1 - MOVEMENT PHASE AND TIMING PARAMETERS

Mov No.	Mov Typ	PHASE MATRIX First Green Fr	To	Op Pr	Second Green Fr	To	Op Pr	Lost Tim 1st Grn	2nd Grn	Req.Mov.Time 1st Grn	2nd Grn	Eff. Grn 1st Grn	2nd Grn
West: PR-3 Hacia Fajardo													
12 L	*B	C						3		38.0Max		35	
11 T		B	A					3		66.0		118	
East: PR-3 HAcia Carolina													
21 T	*C	A						3		65.7		80	
North: PR-9959 desde Canovanas													
42 L	(Und) A	B						3		18.6		22	
43 R	(Un2)*A	B			B	A	R	3	3	9.0Min	76.5	22	118
Pedestrians													
14	(Ped) A	B						20		9.0Min		9	
24	(Ped) A	B						20		9.0Min		9	
44	(Ped) B	C						8		9.0Min		9	

Current Phase Sequence No.: 1
Input phase sequence: A B C
Output phase sequence: A B C

* Critical Movement/Green Period

Movement Types:
Ped Pedestrian
Dum Dummy
Und Undetected in both green periods
Un1 Undetected in 1st green period
Un2 Undetected in 2nd green period

Under heading 'Op':
L "Left" turns are opposed
R "Right" turns are opposed
LR "Left and Right" opposed
C "Constant" saturation flow

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
INterseccion PR-3 @ PR-9959 - 2006 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Dem Flow (veh /h)	HV (%)	Satn Flow 1st Grn	Satn Flow 2nd Grn	Flow Ratio 1st Grn	Flow Ratio 2nd Grn	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: PR-3 Hacia Fajardo											
12 L	311	0.3	1690		0.184		405	0.95	24	100	0.768*
11 T	1601	6.2	5365		0.298		4336	0.95	157	100	0.369
East: PR-3 HAcia Carolina											
21 T	2195	4.6	5449		0.403		2986	0.95	29	100	0.735
23 R	227	0.9	1507		0.151		1507	0.98	551	100	0.151
North: PR-9959 desde Canovanas											
42 L	116	5.2	2720		0.043		410	0.95	236	100	0.283
43 R	395	0.3	1456	1456	0.020	0.251	1396	0.95	236	100	0.283
Pedestrians											
14	1		12000		0.000		740	0.95		100	0.001
24	1		12000		0.000		740	0.95		100	0.001
44	1		12000		0.000		740	0.95		100	0.001

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
INterseccion PR-3 @ PR-9959 - 2006 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.3 - INTERSECTION PARAMETERS

Crit Mov No.	App. & Turn	Green Period	Phases Fr	To	Adjusted Lost Time	Adjusted Flow Ratio	Required Grn Time	Required Movement Time
43	N_R	1st	A	B	9	-	-	9.0Min
12	W_L		B	C	38	-	-	38.0Max
21	E_T		C	A	3	0.403	0.429	65.7
				Total:	50	0.403	0.429	112.7

- Flow ratio not used for cycle time calculations and the adjusted lost time equals the required movement time (=Min or Max as shown in Table S.1)

Cycle Time:
Minimum 55 | Maximum NA | Practical 88 | Chosen 146
(Cycle time specified by the user)

Intersection Level of Service	=	B
Worst movement Level of Service	=	F
Average intersection delay (s)	=	16.9
Largest average movement delay (s)	=	69.1
Largest back of queue, 95% (m)	=	24
Performance Index	=	147.59
Degree of saturation (highest)	=	0.768
Practical Spare Capacity (lowest)	=	24 %
Effective intersection capacity, (veh/h)	=	6312
Total vehicle flow (veh/h)	=	4845
Total pedestrian flow (ped/h)	=	3
Total person flow (pers/h)	=	7271
Total vehicle delay (veh-h/h)	=	22.68
Total pedestrian delay (ped-h/h)	=	0.05
Total person delay (pers-h/h)	=	34.08
Total effective vehicle stops (veh/h)	=	2460
Total effective pedestrian stops (ped/h)	=	3
Total effective person stops (pers/h)	=	3694
Total vehicle travel (veh-km/h)	=	3021.8
Total cost ($/h)	=	2046.35
Total fuel (L/h)	=	338.9
Total CO2 (kg/h)	=	848.57

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
INterseccion PR-3 @ PR-9959 - 2006 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.4 - PHASE INFORMATION

Phase No.	Change Time	Green Start	Displayed Green	Grn+Intgrn Secs	Grn+Intgrn Prop.
A	0	3	22	25	0.171
B	25	28	35	38	0.260
C	63	66	80	83	0.568

Current Phase Sequence No.: 1
Input phase sequence: A B C
Output phase sequence: A B C

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INterseccion PR-3 @ PR-9959 - 2006 AM
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Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Queue Back (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
12 L	5.97	8.95	69.1	0.97	0.86	22.9	12	21.61	21.5
11 T	1.36	2.04	3.1	0.08	0.22	3.6	3	20.10	70.2
East: PR-3 HAcia Carolina									
21 T	12.59	18.89	20.7	0.62	0.63	31.4	24	88.40	45.3
23 R	0.70	1.05	11.1		0.69	3.1#		3.08	58.8
North: PR-9959 desde Canovanas									
42 L	1.45	2.17	44.9	0.59	0.68	5.8	5	6.42	23.1
43 R	0.62	0.93	5.7	0.06	0.56	1.2	1	7.91	38.3
Pedestrians									
14	0.02	0.02	66.3	0.94	0.94	0.0	0	0.02	0.5
24	0.02	0.02	66.3	0.94	0.94	0.0	0	0.02	0.5
44	0.02	0.02	64.3	0.94	0.94	0.0	0	0.02	0.5

Largest density (passenger cars per km or mile) for any lane

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Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
1912	0.768	7.33	10.99	13.8	0.23	0.33	12	41.71	52.7
East: PR-3 HAcia Carolina									
2422	0.735	13.29	19.94	19.8	0.56	0.64	24	91.48	46.4
North: PR-9959 desde Canovanas									
511	0.283	2.07	3.10	14.6	0.18	0.58	5	14.33	33.3
Pedestrians									
3	0.001	0.05	0.05	65.6	0.94	0.94	0	0.07	0.5
ALL VEHICLES:									

4845	0.768	22.68	34.03	16.9	0.39	0.51	24	147.52	46.6	
INTERSECTION (persons):										
7271	0.768		34.08	16.9	0.39	0.51		147.59	46.6	

Queue values in this table are 95% back of queue (metres).

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Intersection ID: 1
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Table S.7 - LANE PERFORMANCE

Lane No.	Mov No.	Effective Green (R1)	Red and Times (sec) G1	R2	G2	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue Back (m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo													
1 L	12	111	35	0	0	311	405	0.768	69.1	0.86	22.9	12	55
2 T	11	28	118	0	0	534	1445	0.369	3.1	0.22	3.6	3	
3 T	11	28	118	0	0	534	1445	0.369	3.1	0.22	3.6	3	
4 T	11	28	118	0	0	534	1445	0.369	3.1	0.22	3.6	3	
East: PR-3 HAcia Carolina													
1 T	21	66	80	0	0	732	995	0.735	20.7	0.63	31.4	24	
2 T	21	66	80	0	0	732	995	0.735	20.7	0.63	31.4	24	
3 T	21	66	80	0	0	732	995	0.735	20.7	0.63	31.4	24	
4 R	23	0	146	0	0	227	1507	0.151	11.1	0.69	3.1#		
North: PR-9959 desde Canovanas													
1 L	42	124	22	0	0	74	260	0.283	67.5	0.76	5.8	5	
2 LR	42, 43	3	22	3	118	437	1546	0.283	5.7	0.56	1.2	1	

\# Density (passenger cars per km or mile)

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INterseccion PR-3 @ PR-9959 - 2006 AM
Intersection ID: 1
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Table S.8A - LANE FLOW AND CAPACITY INFORMATION

Lane No.	Mov No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Lane Width (m)	Saturation Flow Adj. Basic (tcu)	Aver 1st (veh)	Aver 2nd (veh)	End Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: PR-3 Hacia Fajardo													
1 L	12	311	0	0	311	3.05	1784	1690	0	0	405	0.768	100
2 T	11	0	534	0	534	3.60	1900	1788	0	0	1445	0.369	100
3 T	11	0	534	0	534	3.60	1900	1788	0	0	1445	0.369	100
4 T	11	0	534	0	534	3.60	1900	1788	0	0	1445	0.369	100
East: PR-3 HAcia Carolina													
1 T	21	0	732	0	732	3.60	1900	1816	0	0	995	0.735	100
2 T	21	0	732	0	732	3.60	1900	1816	0	0	995	0.735	100
3 T	21	0	732	0	732	3.60	1900	1816	0	0	995	0.735	100
4 R	23	0	0	227	227	3.05	1784	1507	1507	0	1507	0.151	100
North: PR-9959 desde Canovanas													
1 L	42	74	0	0	74	3.60	1900	1725	0	0	260	0.283	100
2 LR	42, 43	42	0	395	437	3.60	1900	1612	1612	0	1546	0.283	100
3 T	11	85.5	466.48	0.275	6.06	0.423	214.3						
		107.5	691.22	0.376	8.40	0.525	269.3						
East: PR-3 HAcia Carolina													
21 T		167.1	968.89	0.680	28.12	1.009	418.5						
23 R		21.7	93.59	0.096	5.24	0.155	54.2						
		188.8	1062.48	0.777	33.36	1.164	472.7						
North: PR-9959 desde Canovanas													
42 L		12.2	93.64	0.053	2.40	0.066	30.6						
43 R		30.4	198.00	0.133	6.63	0.173	76.0						
		42.6	291.64	0.187	9.04	0.238	106.6						
Pedestrians													
14			0.34										
24			0.34										
44			0.33										
			1.01										
ALL VEHICLES:		338.9	2045.34	1.340	50.79	1.927	848.6						
INTERSECTION:		338.9	2046.35	1.340	50.79	1.927	848.6						

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	27.00
Time value factor	=	0.60
Average occupancy (persons/veh)	=	1.5
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

The idle fuel and vehicle mass parameters given above are the default values (data given in RIDES may override some of these parameters).

Basic Saturation Flow in this table is adjusted for lane width, approach grade, parking manoeuvres and number of buses stopping. Saturation flow scale applies if specified.

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Table S.8B - SCATS MF PARAMETER

Lane No.	Mov No.	Stopline Flow (veh/h)	Capacity (veh/h)	SCATS Satn Flow	SCATS MF	Deg. Satn x	Lane Util. %
West: PR-3 Hacia Fajardo							
1 L	12	311	405	1695	1561	0.768	100
2 T	11	534	1445	1900	1853	0.369	100
3 T	11	534	1445	1900	1853	0.369	100
4 T	11	534	1445	1900	1853	0.369	100
East: PR-3 HAcia Carolina							
1 T	21	732	995	1900	1831	0.735	100
2 T	21	732	995	1900	1831	0.735	100
3 T	21	732	995	1900	1831	0.735	100
4 R	23	227	1507	1516	NA	0.151	100
North: PR-9959 desde Canovanas							
1 L	42	74	260	1805	1588	0.283	100
2 LR	42, 43	437	1546	1632	NA	0.283	100

NA Not Applicable - SCATS MF was not calculated for this lane due to one of the following reasons:
- the lane is not controlled by signals (slip or continuous lane)
- two movements share this lane and do not run in the same phases

STOPLINE FLOW: Departure flow rate in veh/h as measured at the stop line. This cannot exceed capacity.

SCATS SATURATION FLOW: This allows for lane width, approach grade and turning vehicles. Saturation flow scale applies if specified. The effects of heavy vehicles, parking manoeuvres, number of buses stopping and conflicting pedestrian volume are not included.

SCATS MF: This emulates the MF (Maximum Flow) parameter used in the SCATS control system. It is calculated from the SCATS SATURATION FLOW parameter.

DEG. SATN: The Demand (Arrival) Flow Rate may exceed the Stopline Flow Rate, therefore x > 1 is possible.

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Table S.12A - FUEL CONSUMPTION, EMISSIONS AND COST - TOTAL

Mov No.	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: PR-3 Hacia Fajardo						
12 L	22.0	224.74	0.102	2.34	0.101	54.9
11 T	85.5	466.48	0.275	6.06	0.423	214.3
	107.5	691.22	0.376	8.40	0.525	269.3
East: PR-3 HAcia Carolina						
21 T	167.1	968.89	0.680	28.12	1.009	418.5
23 R	21.7	93.59	0.096	5.24	0.155	54.2
	188.8	1062.48	0.777	33.36	1.164	472.7
North: PR-9959 desde Canovanas						
42 L	12.2	93.64	0.053	2.40	0.066	30.6
43 R	30.4	198.00	0.133	6.63	0.173	76.0
	42.6	291.64	0.187	9.04	0.238	106.6
Pedestrians						
14		0.34				
24		0.34				
44		0.33				
		1.01				
ALL VEHICLES:	338.9	2045.34	1.340	50.79	1.927	848.6
INTERSECTION:	338.9	2046.35	1.340	50.79	1.927	848.6

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INterseccion PR-3 @ PR-9959 - 2006 AM
Intersection ID: 1
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Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo												
1 L	311			311	0	1783	35		0.768	69.1	12	55
2 T		534		534	6	1899	118		0.369	3.1	3	
3 T		534		534	6	1899	118		0.369	3.1	3	
4 T		534		534	6	1899	118		0.369	3.1	3	
	311	1601	0	1912	5				0.768	13.8	12	
East: PR-3 HAcia Carolina												
1 T		732		732	5	1899	80		0.735	20.7	24	
2 T		732		732	5	1899	80		0.735	20.7	24	
3 T		732		732	5	1899	80		0.735	20.7	24	
4 R			227	227	1	1783	146		0.151	11.1		
	0	2195	227	2422	4				0.735	19.8	24	
North: PR-9959 desde Canovanas												
1 L	74			74	5	1899	22		0.283	67.5	5	
2 LR	42		395	437	1	1900	22	118	0.283	5.7	1	
	116	0	395	511	1				0.283	14.6	5	
Pedestrians												
Across W approach		1				9			0.001	66.3	0.0	
Across E approach		1				9			0.001	66.3	0.0	
Across N approach		1				9			0.001	64.3	0.0	

ALL VEHICLES	Total Flow	% HV	Cycle Time	Max X	Aver. Delay	Max Queue
	4845	4	146	0.768	16.9	24

Total flow period = 60 minutes. Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows (in through car units) have been adjusted for grade, lane widths, parking manoeuvres and bus stops.

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INterseccion PR-3 @ PR-9959 - 2006 AM
Intersection ID: 1
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Table S.15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Green Time Ratio (g/C) 1st grn	2nd grn	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: PR-3 Hacia Fajardo										
12 L		0.240*		311	405	0.768*	69.1	E	22.9	12
11 T		0.808		1601	4336	0.369	3.1	A	3.6	3
				1912		0.768	13.8	B	22.9	12
East: PR-3 HAcia Carolina										
21 T		0.548*		2195	2986	0.735	20.7	C	31.4	24
23 R	(Con)	1.000		227	1507	0.151	11.1	A#	3.1#	
				2422		0.735	19.8	B	31.4	24
North: PR-9959 desde Canovanas										
42 L	(Und)	0.151		116	410	0.283	44.9	D	5.8	5
43 R	(Un2)	0.151*	0.808	395	1396	0.283	5.7	A	1.2	1
				511		0.283	14.6	B	5.8	5
Pedestrians										
14	(Ped)	0.062		1	740	0.001	66.3	F	0.0	0
24	(Ped)	0.062		1	740	0.001	66.3	F	0.0	0
44	(Ped)	0.062		1	740	0.001	64.3	F	0.0	0
				3		0.001	65.6	F	0.0	0
ALL VEHICLES:				4845		0.768	16.9	B	31.4	24
INTERSECTION (persons):				7271			16.9		31.4	24

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
aaSIDRA Output Guide or the Output section of the on-line help.
Intersection capacity is calculated considering vehicle movements only.
\# Continuous movements: Level Of Service based on density,
Density (passenger cars per km or mile) instead of queue.
* Maximum v/c ratio, or critical green periods

Table D.0 - GEOMETRIC DELAY DATA

From Approach	To Approach	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream Distance (m)
West: PR-3 Hacia Fajardo						
	East	S	65.0	18.6	500	132
	North	13.5	22.6	21.3	500	55
East: PR-3 HAcia Carolina						
	West	S	65.0	18.6	500	130
	North	20.0	26.2	31.4	500	186
North: PR-9959 desde Canovanas						
	West	15.0	23.5	23.6	500	126
	East	17.2	24.8	27.0	500	134

Downstream Distance calculated by aaSIDRA

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Delay (seconds/veh) Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Queue Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: PR-3 Hacia Fajardo											
1 L	12	0.768	58.3	0.1	58.4	4.3	54.0	0.0	54.0	10.7	69.1
2 T	11	0.369	1.2	0.0	1.2	0.7	0.5	0.0	0.5	1.8	3.1
3 T	11	0.369	1.2	0.0	1.2	0.7	0.5	0.0	0.5	1.8	3.1
4 T	11	0.369	1.2	0.0	1.2	0.7	0.5	0.0	0.5	1.8	3.1
East: PR-3 HAcia Carolina											
1 T	21	0.735	18.8	0.0	18.8	5.5	13.3	0.0	13.3	1.8	20.7
2 T	21	0.735	18.8	0.0	18.8	5.5	13.3	0.0	13.3	1.8	20.7
3 T	21	0.735	18.8	0.0	18.8	5.5	13.3	0.0	13.3	1.8	20.7
4 R	23	0.151			0.0					11.1	11.1
North: PR-9959 desde Canovanas											
1 L	42	0.283	62.0	0.0	62.0	4.3	57.7	0.0	57.7	5.5	67.5
2 LR	42, 43	0.283	0.1	0.0	0.1	0.3	0.0	0.0	0.0	5.5 5.6	5.7

dn is average stop-start delay for all vehicles queued and unqueued

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Table D.2 - LANE STOPS

Lane No.	Deg. Satn x	Effective Stop Rate hel	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: PR-3 Hacia Fajardo							
1 L	0.768	0.83	0.00	0.02	0.86	0.969	0.00
2 T	0.369	0.07	0.00	0.15	0.22	0.081	0.00
3 T	0.369	0.07	0.00	0.15	0.22	0.081	0.00
4 T	0.369	0.07	0.00	0.15	0.22	0.081	0.00
East: PR-3 HAcia Carolina							
1 T	0.735	0.57	0.00	0.06	0.63	0.620	0.00
2 T	0.735	0.57	0.00	0.06	0.63	0.620	0.00
3 T	0.735	0.57	0.00	0.06	0.63	0.620	0.00
4 R	0.151			0.69	0.69		
North: PR-9959 desde Canovanas							
1 L	0.283	0.71	0.00	0.05	0.76	0.903	0.00
2 LR	0.283	0.04	0.00	0.51	0.56	0.059	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

---

Table D.3A - LANE QUEUES (veh)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 L	0.768	0.0	12.7	0.0	12.8	15.0	19.1	20.5	22.9	26.5	0.22
2 T	0.369	0.0	1.7	0.0	1.7	2.1	2.8	3.1	3.6	4.5	0.01
3 T	0.369	0.0	1.7	0.0	1.7	2.1	2.8	3.1	3.6	4.5	0.01
4 T	0.369	0.0	1.7	0.0	1.7	2.1	2.8	3.1	3.6	4.5	0.01
East: PR-3 HAcia Carolina											
1 T	0.735	0.0	18.3	0.0	18.3	21.3	26.7	28.5	31.4	35.5	0.05
2 T	0.735	0.0	18.3	0.0	18.3	21.3	26.7	28.5	31.4	35.5	0.05
3 T	0.735	0.0	18.3	0.0	18.3	21.3	26.7	28.5	31.4	35.5	0.05
4 R	0.151				3.1#						0.00#
North: PR-9959 desde Canovanas											
1 L	0.283	0.0	2.9	0.0	2.9	3.4	4.5	5.0	5.8	7.2	0.01
2 LR	0.283	0.0	0.6	0.0	0.6	0.7	0.9	1.0	1.2	1.5	0.00

Values printed in this table are back of queue (vehicles).

\# Continuous movements: Density (passenger cars per km or mile)
instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

---

Table D.3B - LANE QUEUES (metres)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 L	0.768	0	7	0	7	8	10	11	12	14	0.22
2 T	0.369	0	1	0	1	2	2	3	3	4	0.01
3 T	0.369	0	1	0	1	2	2	3	3	4	0.01
4 T	0.369	0	1	0	1	2	2	3	3	4	0.01
East: PR-3 HAcia Carolina											
1 T	0.735	0	14	0	14	16	20	21	24	27	0.05
2 T	0.735	0	14	0	14	16	20	21	24	27	0.05
3 T	0.735	0	14	0	14	16	20	21	24	27	0.05
4 R	0.151				3.1#						0.00#
North: PR-9959 desde Canovanas											
1 L	0.283	0	2	0	2	3	4	4	5	6	0.01
2 LR	0.283	0	0	0	0	0	0	1	1	1	0.00

Values printed in this table are back of queue (metres).

\# Continuous movements: Density (passenger cars per km or mile)
instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

---

Table D.4 - MOVEMENT SPEEDS (km/h)

Mov No.	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall
West: PR-3 Hacia Fajardo								
12	80.0	22.6	22.6	40.0	11.3		51.4	21.5
11	80.0	65.0	65.0	65.0			71.3	70.2
East: PR-3 HAcia Carolina								
21	80.0	65.0	65.0	65.0			61.9	45.3
23	80.0	26.2	26.2	40.0			58.8	58.8
North: PR-9959 desde Canovanas								
42	40.0	24.8	24.8	65.0			36.8	23.1
43	40.0	23.5	23.5	65.0			38.3	38.3

"Running Speed" is the average speed excluding stopped periods.

Table D.5 - PROGRESSION FACTORS & ACTUATED SIGNAL PARAMETERS

Mov No.	Control	Coord.	Arrival Type	Delay Prog. Factor	Queue Prog. Factor	Gap Settings es	eh	Disp. Grn. Settings 1st Grn Gmin	Gmax	2nd Grn Gmin	Gmax
West: PR-3 Hacia Fajardo											
12	VA	No	3	1.000	1.000	3.0	3.1	6	35		
11	VA	Yes	4	0.300	0.282	3.0	3.2	6	80		
East: PR-3 HAcia Carolina											
21	VA	Yes	4	0.686	0.769	3.0	3.1	6	80		
23	VA	No	3	1.000	1.000	3.0	3.1	6	80		
North: PR-9959 desde Canovanas											
42	VA	No	3	1.000	1.000	3.0	3.3	6	35		
43	VA	Yes	4	1.000	1.000	3.0	3.3	6	80	6	80
Pedestrians											
14	VA	No	3	1.000	1.000						
24	VA	No	3	1.000	1.000						
44	VA	No	3	1.000	1.000						

--- End of aaSIDRA Output ---

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Movement Summary

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante

Interseccion PR-3 @ PR-9959 - 2006 PM

Signalised - Actuated coordinated **Cycle Time = 146 seconds**

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
PR-3 HAcia Carolina										
21	T	1837	2.1	0.600	18.5	LOS B	14	0.51	0.54	47.3
23	R	32	6.2	0.022	11.2	LOS A#	1#	0.00	0.69	58.9
Approach		**1869**	**2.1**	**0.600**	**18.4**	**LOS B**	**14**	**0.50**	**0.54**	**47.5**
PR-9959 desde Canovanas										
42	L	56	3.5	0.154	48.4	LOS D	2	0.64	0.67	22.3
43	R	219	1.4	0.154	5.7	LOS A	0	0.05	0.56	38.3
Approach		**276**	**1.8**	**0.154**	**14.5**	**LOS B**	**2**	**0.17**	**0.58**	**33.3**
PR-3 Hacia Fajardo										
12	L	176	0.0	0.433	63.4	LOS E	6	0.87	0.82	22.9
11	T	3502	0.6	0.765	4.1	LOS A	9	0.20	0.32	67.9
Approach		**3678**	**0.6**	**0.765**	**6.9**	**LOS A**	**9**	**0.23**	**0.34**	**62.7**
All Vehicles		**5823**	**1.2**	**0.765**	**11.0**	**LOS B**	**14**	**0.31**	**0.42**	**54.7**

Pedestrian Movements

Mov No	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
24	1	66.3	LOS F	0	0.94	0.94
44	1	64.3	LOS F	0	0.94	0.94
14	1	66.3	LOS F	0	0.94	0.94
All Peds	**3**	**65.6**	**LOS F**	**0**	**0.94**	**0.94**

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Jose A. Carro   User ID: 50310
Licence Type: Single Computer

Time and Date of Analysis   3:53 PM, Oct 2,2006

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Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1

aaTraffic SIDRA US Highway Capacity Manual (2000) Metric Version

RUN INFORMATION

* Basic Parameters:
  - Intersection Type: Signalised - Actuated Coordinated
  - For fully-actuated signal timings, the following specifications will be ignored:
    - Any maximum cycle time specification
  - Driving on the right-hand side of the road
  - Input data specified in Metric units
  - Default Values File No. 10
  - Peak flow period (for performance): 15 minutes
  - Unit time (for volumes): 60 minutes (Hourly Rate)
  - Delay definition: Control delay
    Geometric delay included
  - aaSIDRA Standard Delay and Queue models used
  - Level of Service based on: Delay (HCM method)
  - Queue definition: Back of queue, 95th Percentile

* No. of Main (Timing-Capacity) Iterations = 2
  Comparison of last two iterations:
  - Difference in intersection degree of satn = 0.0 %
  - Largest difference in eff. green times = 0 secs
  - (max. value for stopping = 0 secs)

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.0 - TRAFFIC FLOW DATA

Mov No.	Left LV	Left HV	Through LV	Through HV	Right LV	Right HV	Flow Scale	Peak Flow Factor
VEHICLES	Demand flows in veh/hour as used by the program							
West: PR-3 Hacia Fajardo								
12	176	0	0	0	0	0	1.00	0.79
11	0	0	3480	22	0	0	1.00	0.82
East: PR-3 HAcia Carolina								
21	0	0	1799	38	0	0	1.00	0.92
23	0	0	0	0	30	2	1.00	0.63
North: PR-9959 desde Canovanas								
42	55	2	0	0	0	0	1.00	0.66
43	0	0	0	0	216	3	1.00	0.75
PEDESTRIANS	Flow (ped/hour)							
14	1						1.00	1.00
24	1						1.00	1.00
44	1						1.00	1.00

Based on unit time = 60 minutes.
Flow Scale and Peak Hour Factor effects included in flow values.

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.1 - MOVEMENT PHASE AND TIMING PARAMETERS

Mov No.	Mov Typ	PHASE MATRIX First Green (Fr To Op Pr)	PHASE MATRIX Second Green (Fr To Op Pr)	Lost Tim 1st Grn	Lost Tim 2nd Grn	Req.Mov.Time 1st Grn	Req.Mov.Time 2nd Grn	Eff. Grn 1st Grn	Eff. Grn 2nd Grn
West: PR-3 Hacia Fajardo									
12 L		*B C		3		32.0		35	
11 T		B A		3		83.0Max		118	
East: PR-3 HAcia Carolina									
21 T		*C A		3		59.6		80	
North: PR-9959 desde Canovanas									
42 L	(Und)	A B		3		11.4		22	
43 R	(Un2)	*A B	B A R	3	3	9.0Min	50.8	22	118
Pedestrians									
14	(Ped)	A B		20		9.0Min		9	
24	(Ped)	A B		20		9.0Min		9	
44	(Ped)	B C		8		9.0Min		9	

Current Phase Sequence No.: 1
Input phase sequence: A B C
Output phase sequence: A B C

* Critical Movement/Green Period

Movement Types:
- Ped Pedestrian
- Dum Dummy
- Und Undetected in both green periods
- Un1 Undetected in 1st green period
- Un2 Undetected in 2nd green period

Under heading 'Op':
- L "Left" turns are opposed
- R "Right" turns are opposed
- LR "Left and Right" opposed
- C "Constant" saturation flow

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Dem Flow (veh /h)	HV (%)	Satn Flow 1st Grn	Satn Flow 2nd Grn	Flow Ratio 1st Grn	Flow Ratio 2nd Grn	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: PR-3 Hacia Fajardo											
12 L	176	0.0	1695		0.104		406	0.95	119	100	0.433
11 T	3502	0.6	5664		0.618		4578	0.95	24	100	0.765*
East: PR-3 HAcia Carolina											
21 T	1837	2.1	5584		0.329		3060	0.95	58	100	0.600
23 R	32	6.2	1453		0.022		1453	0.98	4350	100	0.022
North: PR-9959 desde Canovanas											
42 L	57	3.5	2464		0.023		371	0.95	519	100	0.154
43 R	219	1.4	1487	1487	0.016	0.131	1426	0.95	519	100	0.154
Pedestrians											
14	1		12000		0.000		740	0.95		100	0.001
24	1		12000		0.000		740	0.95		100	0.001
44	1		12000		0.000		740	0.95		100	0.001

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.3 - INTERSECTION PARAMETERS

Crit Mov No.	App. & Turn	Green Period	Phases Fr	Phases To	Adjusted Lost Time	Adjusted Flow Ratio	Required Grn Time Ratio	Required Movement Time
43	N_R	1st	A	B	9	-	-	9.0Min
12	W_L		B	C	3	0.104	0.198	32.0
21	E_T		C	A	3	0.329	0.388	59.6
				Total:	15	0.433	0.586	100.6

- Flow ratio not used for cycle time calculations and the adjusted lost time equals the required movement time (=Min or Max as shown in Table S.1)

Cycle Time:

Minimum	Maximum	Practical	Chosen
55	NA	55	146

(Cycle time specified by the user)

Intersection Level of Service	=	B
Worst movement Level of Service	=	F
Average intersection delay (s)	=	11.0
Largest average movement delay (s)	=	66.3
Largest back of queue, 95% (m)	=	14
Performance Index	=	145.49
Degree of saturation (highest)	=	0.765
Practical Spare Capacity (lowest)	=	24 %
Effective intersection capacity, (veh/h)	=	7612
Total vehicle flow (veh/h)	=	5823
Total pedestrian flow (ped/h)	=	3
Total person flow (pers/h)	=	8738
Total vehicle delay (veh-h/h)	=	17.74
Total pedestrian delay (ped-h/h)	=	0.05
Total person delay (pers-h/h)	=	26.66
Total effective vehicle stops (veh/h)	=	2446
Total effective pedestrian stops (ped/h)	=	3
Total effective person stops (pers/h)	=	3672
Total vehicle travel (veh-km/h)	=	3631.4
Total cost ($/h)	=	2073.92
Total fuel (L/h)	=	338.7
Total CO2 (kg/h)	=	847.13

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.4 - PHASE INFORMATION

Phase No.	Change Time	Green Start	Displayed Green	Grn+Intgrn Secs	Grn+Intgrn Prop.
A	0	3	22	25	0.171
B	25	28	35	38	0.260
C	63	66	80	83	0.568

Current Phase Sequence No.: 1
Input phase sequence: A B C
Output phase sequence: A B C

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
12 L	3.10	4.65	63.4	0.87	0.82	12.5	6	11.25	22.9
11 T	3.98	5.96	4.1	0.20	0.32	16.9	9	61.72	67.9
East: PR-3 HAcia Carolina									
21 T	9.45	14.18	18.5	0.51	0.54	22.6	14	64.34	47.3
23 R	0.10	0.15	11.2		0.69	0.7#		0.43	58.9
North: PR-9959 desde Canovanas									
42 L	0.77	1.15	48.4	0.64	0.67	3.2	2	3.33	22.3
43 R	0.34	0.52	5.7	0.05	0.56	0.5	0	4.34	38.3
Pedestrians									
14	0.02	0.02	66.3	0.94	0.94	0.0	0	0.02	0.5
24	0.02	0.02	66.3	0.94	0.94	0.0	0	0.02	0.5
44	0.02	0.02	64.3	0.94	0.94	0.0	0	0.02	0.5

Largest density (passenger cars per km or mile) for any lane

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
3678	0.765	7.07	10.61	6.9	0.23	0.34	9	72.97	62.7
East: PR-3 HAcia Carolina									
1869	0.600	9.55	14.33	18.4	0.50	0.54	14	64.77	47.5
North: PR-9959 desde Canovanas									
276	0.154	1.11	1.67	14.5	0.17	0.58	2	7.68	33.3
Pedestrians									
3	0.001	0.05	0.05	65.6	0.94	0.94	0	0.07	0.5

ALL VEHICLES:

5823	0.765	17.74	26.61	11.0	0.31	0.42	14	145.42	54.7			
INTERSECTION (persons):												
8738	0.765		26.66	11.0	0.31	0.42		145.49	54.7			

Queue values in this table are 95% back of queue (metres).

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.7 - LANE PERFORMANCE

Lane No.	Mov No.	Effective Green Times (sec) R1	G1	R2	G2	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Q u e u e 95% Back (vehs)	(m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo													
1 L	12	111	35	0	0	176	406	0.433	63.4	0.82	12.5	6	55
2 T	11	28	118	0	0	1167	1526	0.765	4.1	0.32	16.9	9	
3 T	11	28	118	0	0	1167	1526	0.765	4.1	0.32	16.9	9	
4 T	11	28	118	0	0	1167	1526	0.765	4.1	0.32	16.9	9	
East: PR-3 HAcia Carolina													
1 T	21	66	80	0	0	612	1020	0.600	18.5	0.54	22.6	14	
2 T	21	66	80	0	0	612	1020	0.600	18.5	0.54	22.6	14	
3 T	21	66	80	0	0	612	1020	0.600	18.5	0.54	22.6	14	
4 R	23	0	146	0	0	32	1453	0.022	11.2	0.69	0.7#		
North: PR-9959 desde Canovanas													
1 L	42	124	22	0	0	40	264	0.154	65.8	0.73	3.2	2	
2 LR	42, 43	3	22	3	118	236	1534	0.154	5.7	0.55	0.5	0	

Density (passenger cars per km or mile)

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.8A - LANE FLOW AND CAPACITY INFORMATION

Lane No.	Mov No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Lane Width (m)	Saturation Flow Adj. Basic (tcu)	Aver 1st (veh)	Aver 2nd (veh)	End Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: PR-3 Hacia Fajardo													
1 L	12	176	0	0	176	3.05	1784	1695		0	406	0.433	100
2 T	11		0	1167	1167	3.60	1900	1888		0	1526	0.765	100
3 T	11		0	1167	1167	3.60	1900	1888		0	1526	0.765	100
4 T	11		0	1167	1167	3.60	1900	1888		0	1526	0.765	100
East: PR-3 HAcia Carolina													
1 T	21		0	612	612	3.60	1900	1861		0	1020	0.600	100
2 T	21		0	612	612	3.60	1900	1861		0	1020	0.600	100
3 T	21		0	612	612	3.60	1900	1861		0	1020	0.600	100
4 R	23		0	0	32	3.05	1784	1453	1453	0	1453	0.022	100
North: PR-9959 desde Canovanas													
1 L	42	40		0	0	40	3.60	1900	1750	0	0	264	0.154	100
2 LR	42, 43	17		0	219	236	3.60	1900	1600	1600	0	1534	0.154	100

Basic Saturation Flow in this table is adjusted for lane width, approach grade, parking manoeuvres and number of buses stopping. Saturation flow scale applies if specified.

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.8B - SCATS MF PARAMETER

Lane No.	Mov No.	Stopline Flow (veh/h)	Capacity (veh/h)	SCATS Satn Flow	SCATS MF	Deg. Satn x	Lane Util. %
West: PR-3 Hacia Fajardo							
1 L	12	176	406	1695	1561	0.433	100
2 T	11	1167	1526	1900	1853	0.765	100
3 T	11	1167	1526	1900	1853	0.765	100
4 T	11	1167	1526	1900	1853	0.765	100
East: PR-3 HAcia Carolina							
1 T	21	612	1020	1900	1831	0.600	100
2 T	21	612	1020	1900	1831	0.600	100
3 T	21	612	1020	1900	1831	0.600	100
4 R	23	32	1453	1516	NA	0.022	100
North: PR-9959 desde Canovanas							
1 L	42	40	264	1805	1588	0.154	100
2 LR	42, 43	236	1534	1627	NA	0.154	100

NA Not Applicable - SCATS MF was not calculated for this lane due to one of the following reasons:
- the lane is not controlled by signals (slip or continuous lane)
- two movements share this lane and do not run in the same phases

STOPLINE FLOW: Departure flow rate in veh/h as measured at the stop line. This cannot exceed capacity.

SCATS SATURATION FLOW: This allows for lane width, approach grade and turning vehicles. Saturation flow scale applies if specified. The effects of heavy vehicles, parking manoeuvres, number of buses stopping and conflicting pedestrian volume are not included.

SCATS MF: This emulates the MF (Maximum Flow) parameter used in the SCATS control system. It is calculated from the SCATS SATURATION FLOW parameter.

DEG. SATN: The Demand (Arrival) Flow Rate may exceed the Stopline Flow Rate, therefore x > 1 is possible.

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.12A - FUEL CONSUMPTION, EMISSIONS AND COST - TOTAL

Mov No.	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: PR-3 Hacia Fajardo						
12 L	11.9	119.75	0.055	1.27	0.056	29.8
11 T	176.9	1023.15	0.661	18.09	1.011	442.3
	188.8	1142.90	0.716	19.36	1.067	472.1
East: PR-3 HAcia Carolina						
21 T	123.4	758.86	0.508	18.73	0.727	308.7
23 R	3.5	13.83	0.014	0.83	0.025	8.7
	126.8	772.70	0.522	19.56	0.752	317.4
North: PR-9959 desde Canovanas						
42 L	5.7	46.90	0.026	1.11	0.030	14.4
43 R	17.3	110.43	0.075	3.77	0.099	43.3
	23.0	157.32	0.101	4.88	0.129	57.6
Pedestrians						
14		0.34				
24		0.34				
44		0.33				
		1.01				
ALL VEHICLES:	338.7	2072.91	1.340	43.80	1.948	847.1
INTERSECTION:	338.7	2073.92	1.340	43.80	1.948	847.1

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	27.00
Time value factor	=	0.60
Average occupancy (persons/veh)	=	1.5
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

The idle fuel and vehicle mass parameters given above are the default values (data given in RIDES may override some of these parameters).

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo												
1 L	176			176	0	1783	35		0.433	63.4	6	55
2 T		1167		1167	1	1899	118		0.765	4.1	9	
3 T		1167		1167	1	1899	118		0.765	4.1	9	
4 T		1167		1167	1	1899	118		0.765	4.1	9	
	176	3502	0	3678	1				0.765	6.9	9	
East: PR-3 HAcia Carolina												
1 T		612		612	2	1899	80		0.600	18.5	14	
2 T		612		612	2	1899	80		0.600	18.5	14	
3 T		612		612	2	1899	80		0.600	18.5	14	
4 R			32	32	6	1783	146		0.022	11.2		
	0	1837	32	1869	2				0.600	18.4	14	
North: PR-9959 desde Canovanas												
1 L	40			40	4	1899	22		0.154	65.8	2	
2 LR	17		219	236	2	1900	22	118	0.154	5.7	0	
	57	0	219	276	2				0.154	14.5	2	
Pedestrians												
Across W approach		1				9			0.001	66.3	0.0	
Across E approach		1				9			0.001	66.3	0.0	
Across N approach		1				9			0.001	64.3	0.0	

ALL VEHICLES	Total Flow	% HV	Cycle Time	Max X	Aver. Delay	Max Queue
	5823	1	146	0.765	11.0	14

Total flow period = 60 minutes. Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows (in through car units) have been adjusted for grade, lane widths, parking manoeuvres and bus stops.

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table S.15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Green Time Ratio (g/C) 1st grn	2nd grn	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: PR-3 Hacia Fajardo										
12 L		0.240*		176	406	0.433	63.4	E	12.5	6
11 T		0.808		3502	4578	0.765*	4.1	A	16.9	9
				3678		0.765	6.9	A	16.9	9
East: PR-3 HAcia Carolina										
21 T		0.548*		1837	3060	0.600	18.5	B	22.6	14
23 R	(Con)	1.000		32	1453	0.022	11.2	A#	0.7#	
				1869		0.600	18.4	B	22.6	14
North: PR-9959 desde Canovanas										
42 L	(Und)	0.151		57	371	0.154	48.4	D	3.2	2
43 R	(Un2)	0.151*	0.808	219	1426	0.154	5.7	A	0.5	0
				276		0.154	14.5	B	3.2	2
Pedestrians										
14	(Ped)	0.062		1	740	0.001	66.3	F	0.0	0
24	(Ped)	0.062		1	740	0.001	66.3	F	0.0	0
44	(Ped)	0.062		1	740	0.001	64.3	F	0.0	0
				3		0.001	65.6	F	0.0	0
ALL VEHICLES:				5823		0.765	11.0	B	22.6	14
INTERSECTION (persons):				8738			11.0		22.6	14

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
aaSIDRA Output Guide or the Output section of the on-line help.
Intersection capacity is calculated considering vehicle movements only.
\# Continuous movements: Level Of Service based on density,
Density (passenger cars per km or mile) instead of queue.
* Maximum v/c ratio, or critical green periods

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table D.0 - GEOMETRIC DELAY DATA

From Approach	To Approach	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream Distance (m)
West: PR-3 Hacia Fajardo						
	East	S	65.0	18.6	500	126
	North	13.5	22.6	21.3	500	55
East: PR-3 HAcia Carolina						
	West	S	65.0	18.6	500	127
	North	20.0	26.2	31.4	500	194
North: PR-9959 desde Canovanas						
	West	15.0	23.5	23.6	500	127
	East	17.2	24.8	27.0	500	131

Downstream Distance calculated by aaSIDRA

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Delay (seconds/veh) Stop-line 1st d1	Stop-line 2nd d2	Delay Total dSL	Acc. Dec. dn	Queuing Queued dq	Queuing MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: PR-3 Hacia Fajardo											
1 L	12	0.433	52.7	0.0	52.7	3.9	48.8	0.0	48.8	10.7	63.4
2 T	11	0.765	2.3	0.0	2.3	1.8	0.5	0.0	0.5	1.8	4.1
3 T	11	0.765	2.3	0.0	2.3	1.8	0.5	0.0	0.5	1.8	4.1
4 T	11	0.765	2.3	0.0	2.3	1.8	0.5	0.0	0.5	1.8	4.1
East: PR-3 HAcia Carolina											
1 T	21	0.600	16.7	0.0	16.7	4.5	12.2	0.0	12.2	1.8	18.5
2 T	21	0.600	16.7	0.0	16.7	4.5	12.2	0.0	12.2	1.8	18.5
3 T	21	0.600	16.7	0.0	16.7	4.5	12.2	0.0	12.2	1.8	18.5
4 R	23	0.022			0.0					11.2	11.2
North: PR-9959 desde Canovanas											
1 L	42	0.154	60.4	0.0	60.4	4.2	56.2	0.0	56.2	5.5	65.8
2 LR	42, 43	0.154	0.1	0.0	0.1	0.2	0.0	0.0	0.0	5.5	5.7
										5.6	

dn is average stop-start delay for all vehicles queued and unqueued

---

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table D.2 - LANE STOPS

Lane No.	Deg. Satn x	-- Effective Stop Rate -- Geom. hel	he2	hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: PR-3 Hacia Fajardo							
1 L	0.433	0.73	0.00	0.09	0.82	0.874	0.00
2 T	0.765	0.19	0.00	0.13	0.32	0.198	0.00
3 T	0.765	0.19	0.00	0.13	0.32	0.198	0.00
4 T	0.765	0.19	0.00	0.13	0.32	0.198	0.00
East: PR-3 HAcia Carolina							
1 T	0.600	0.46	0.00	0.08	0.54	0.508	0.00
2 T	0.600	0.46	0.00	0.08	0.54	0.508	0.00
3 T	0.600	0.46	0.00	0.08	0.54	0.508	0.00
4 R	0.022			0.69	0.69		
North: PR-9959 desde Canovanas							
1 L	0.154	0.66	0.00	0.06	0.73	0.881	0.00
2 LR	0.154	0.04	0.00	0.52	0.55	0.050	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

---

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table D.3A - LANE QUEUES (veh)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 L	0.433	0.0	6.5	0.0	6.5	7.7	10.1	11.0	12.5	15.1	0.11
2 T	0.765	0.0	9.1	0.0	9.1	10.7	13.8	15.0	16.9	20.0	0.02
3 T	0.765	0.0	9.1	0.0	9.1	10.7	13.8	15.0	16.9	20.0	0.02
4 T	0.765	0.0	9.1	0.0	9.1	10.7	13.8	15.0	16.9	20.0	0.02
East: PR-3 HAcia Carolina											
1 T	0.600	0.0	12.6	0.0	12.6	14.8	18.8	20.3	22.6	26.2	0.03
2 T	0.600	0.0	12.6	0.0	12.6	14.8	18.8	20.3	22.6	26.2	0.03
3 T	0.600	0.0	12.6	0.0	12.6	14.8	18.8	20.3	22.6	26.2	0.03
4 R	0.022				0.7#						0.00#
North: PR-9959 desde Canovanas											
1 L	0.154	0.0	1.5	0.0	1.5	1.9	2.5	2.7	3.2	4.0	0.00
2 LR	0.154	0.0	0.3	0.0	0.3	0.3	0.4	0.5	0.5	0.7	0.00

Values printed in this table are back of queue (vehicles).

\# Continuous movements: Density (passenger cars per km or mile)
instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

---

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table D.3B - LANE QUEUES (metres)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 L	0.433	0	3	0	3	4	5	6	6	8	0.11
2 T	0.765	0	5	0	5	6	7	8	9	11	0.02
3 T	0.765	0	5	0	5	6	7	8	9	11	0.02
4 T	0.765	0	5	0	5	6	7	8	9	11	0.02
East: PR-3 HAcia Carolina											
1 T	0.600	0	8	0	8	9	12	12	14	16	0.03
2 T	0.600	0	8	0	8	9	12	12	14	16	0.03
3 T	0.600	0	8	0	8	9	12	12	14	16	0.03
4 R	0.022				0.7#						0.00#
North: PR-9959 desde Canovanas											
1 L	0.154	0	1	0	1	1	2	2	2	3	0.00
2 LR	0.154	0	0	0	0	0	0	0	0	0	0.00

Values printed in this table are back of queue (metres).

\# Continuous movements: Density (passenger cars per km or mile)
instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

---

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 146

Table D.4 - MOVEMENT SPEEDS (km/h)

Mov No.	App. Speeds Cruise	App. Speeds Negn	Exit Speeds Negn	Exit Speeds Cruise	Queue Move-up 1st Grn	Queue Move-up 2nd Grn	Av. Section Spd Running	Av. Section Spd Overall
West: PR-3 Hacia Fajardo								
12	80.0	22.6	22.6	40.0			52.0	22.9
11	80.0	65.0	65.0	65.0			69.0	67.9
East: PR-3 HAcia Carolina								
21	80.0	65.0	65.0	65.0			63.6	47.3
23	80.0	26.2	26.2	40.0			58.9	58.9
North: PR-9959 desde Canovanas								
42	40.0	24.8	24.8	65.0			36.7	22.3
43	40.0	23.5	23.5	65.0			38.3	38.3

"Running Speed" is the average speed excluding stopped periods.

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2006 PM
Intersection ID: 1

Actuated Coordinated Signals, Cycle Time = 146

Table D.5 - PROGRESSION FACTORS & ACTUATED SIGNAL PARAMETERS

Mov No.	Control	Coord.	Arrival Type	Delay Prog. Factor	Queue Prog. Factor	Gap Settings es	Gap Settings eh	Disp. Grn. Settings 1st Grn Gmin	1st Grn Gmax	2nd Grn Gmin	2nd Grn Gmax
West: PR-3 Hacia Fajardo											
12	VA	No	3	1.000	1.000	3.0	3.1	6	35		
11	VA	Yes	4	0.300	0.364	3.0	3.1	6	80		
East: PR-3 HAcia Carolina											
21	VA	Yes	4	0.686	0.713	3.0	3.1	6	80		
23	VA	No	3	1.000	1.000	3.0	3.2	6	80		
North: PR-9959 desde Canovanas											
42	VA	No	3	1.000	1.000	3.0	3.3	6	35		
43	VA	Yes	4	1.000	1.000	3.0	3.3	6	80	6	80
Pedestrians											
14	VA	No	3	1.000	1.000						
24	VA	No	3	1.000	1.000						
44	VA	No	3	1.000	1.000						

--- End of aaSIDRA Output ---

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Movement Summary

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante

Interseccion PR-3 @ Avenida El Comandante - 2006 AM

Signalised - Actuated coordinated **Cycle Time = 146 seconds**

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Desde El Comandante										
32	L	40	0.0	0.019	36.0	LOS D	0	0.60	0.69	32.0
33	R	20	10.0	0.014	8.7	LOS A#	1#	0.00	0.63	52.3
Approach		**60**	**3.3**	**0.019**	**26.9**	**LOS C**	**0**	**0.40**	**0.67**	**36.7**
PR-3 HAcia Carolina										
22	L	5	0.0	0.072	87.8	LOS F	0	0.95	0.65	19.4
21	T	2624	4.5	0.878	23.5	LOS C	34	0.80	0.78	42.8
Approach		**2628**	**4.5**	**0.878**	**23.6**	**LOS C**	**34**	**0.80**	**0.78**	**42.7**
PR-3 Hacia Fajardo										
11	T	1524	7.0	0.588	25.2	LOS C	20	0.60	0.60	41.5
13	R	28	0.0	0.017	11.1	LOS A#	0#	0.00	0.69	58.9
Approach		**1552**	**6.9**	**0.588**	**25.0**	**LOS C**	**20**	**0.59**	**0.60**	**41.7**
All Vehicles		**4240**	**5.4**	**0.878**	**24.2**	**LOS C**	**34**	**0.72**	**0.71**	**42.3**

Pedestrian Movements

Mov No	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
34	1	64.3	LOS F	0	0.94	0.94
24	1	64.3	LOS F	0	0.94	0.94
14	1	64.3	LOS F	0	0.94	0.94
All Peds	**3**	**64.3**	**LOS F**	**0**	**0.94**	**0.94**

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CMA Architects & Engineers LLP
Jose A. Carro User ID: 50310
Licence Type: Single Computer

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Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 AM
Intersection ID: 2

aaTraffic SIDRA US Highway Capacity Manual (2000) Metric Version

RUN INFORMATION

* Basic Parameters:
Intersection Type: Signalised - Actuated Coordinated
For fully-actuated signal timings, the following specifications will be ignored:
Any maximum cycle time specification
Driving on the right-hand side of the road
Input data specified in Metric units
Default Values File No. 10
Peak flow period (for performance): 15 minutes
Unit time (for volumes): 60 minutes (Hourly Rate)
Delay definition: Control delay
Geometric delay included
aaSIDRA Standard Delay and Queue models used
Level of Service based on: Delay (HCM method)
Queue definition: Back of queue, 95th Percentile

* No. of Main (Timing-Capacity) Iterations = 1
Comparison of last two iterations:
Difference in intersection degree of satn = 0.0 %
Largest difference in eff. green times = 0 secs
(max. value for stopping = 0 secs)

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 AM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.0 - TRAFFIC FLOW DATA

Mov No.	Left LV	Left HV	Through LV	Through HV	Right LV	Right HV	Flow Scale	Peak Flow Factor
VEHICLES Demand flows in veh/hour as used by the program								
West: PR-3 Hacia Fajardo								
11	0	0	1417	107	0	0	1.00	0.86
13	0	0	0	0	28	0	1.00	0.71
South: Desde El Comandante								
32	40	0	0	0	0	0	1.00	0.83
33	0	0	0	0	18	2	1.00	0.60
East: PR-3 HAcia Carolina								
22	5	0	0	0	0	0	1.00	0.62
21	0	0	2504	119	0	0	1.00	0.93
PEDESTRIANS Flow (ped/hour)								
14			1				1.00	1.00
34			1				1.00	0.95
24			1				1.00	1.00

Based on unit time = 60 minutes.
Flow Scale and Peak Hour Factor effects included in flow values.

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 AM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.1 - MOVEMENT PHASE AND TIMING PARAMETERS

Mov No.	Mov Typ	PHASE MATRIX First Green Fr To Op Pr	PHASE MATRIX Second Green Fr To Op Pr	Lost Tim 1st Grn	Lost Tim 2nd Grn	Req.Mov.Time 1st Grn	Req.Mov.Time 2nd Grn	Eff. Grn 1st Grn	Eff. Grn 2nd Grn
West: PR-3 Hacia Fajardo									
11 T	C	A		3		54.6		71	
South: Desde El Comandante									
32 L	*A	B		3		9.0Min		60	
East: PR-3 HAcia Carolina									
22 L	B	C		3		9.0Min		6	
21 T	*B	A		3		76.9		80	
Pedestrians									
14	(Ped) A	B		17		9.0Min		9	
34	(Ped) C	A		16		9.0Min		9	
24	(Ped) A	B		19		9.0Min		9	

Current Phase Sequence No.: 1
Input phase sequence: A B C
Output phase sequence: A B C

* Critical Movement/Green Period

Movement Types:
Ped Pedestrian
Dum Dummy
Und Undetected in both green periods
Un1 Undetected in 1st green period
Un2 Undetected in 2nd green period

Under heading 'Op':
L "Left" turns are opposed
R "Right" turns are opposed
LR "Left and Right" opposed
C "Constant" saturation flow

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 AM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Dem Flow (veh /h)	HV (%)	Satn Flow 1st Grn	Satn Flow 2nd Grn	Flow Ratio 1st Grn	Flow Ratio 2nd Grn	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: PR-3 Hacia Fajardo											
11 T	1524	7.0	5326		0.286		2590	0.95	61	100	0.588
13 R	28	0.0	1615		0.017		1615	0.98	5553	100	0.017
South: Desde El Comandante											
32 L	40	0.0	5235		0.008		2151	0.95	5010	100	0.019
33 R	20	10.0	1459		0.014		1459	0.98	7049	100	0.014
East: PR-3 HAcia Carolina											
22 L	5	0.0	1695		0.003		70	0.90	1154	100	0.072
21 T	2623	4.5	5453		0.481		2988	0.95	8	100	0.878*
Pedestrians											
14	1		12000		0.000		740	0.95		100	0.001
34	1		12000		0.000		740	0.95		100	0.001
24	1		12000		0.000		740	0.95		100	0.001

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 AM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.3 - INTERSECTION PARAMETERS

Crit Mov No.	App. & Turn	Green Period	Phases Fr	Phases To	Adjusted Lost Time	Adjusted Flow Ratio	Required Grn Time Ratio	Required Movement Time
32	S_L		A	B	9	-	-	9.0Min
21	E_T		B	A	3	0.481	0.506	76.9
				Total:	12	0.481	0.506	85.9

- Flow ratio not used for cycle time calculations and the adjusted lost time equals the required movement time (=Min or Max as shown in Table S.1)

Cycle Time:
Minimum 62 Maximum NA Practical 62 Chosen 146
(Cycle time specified by the user)

Intersection Level of Service	=	C
Worst movement Level of Service	=	F
Average intersection delay (s)	=	24.2
Largest average movement delay (s)	=	87.8
Largest back of queue, 95% (m)	=	34
Performance Index	=	193.29
Degree of saturation (highest)	=	0.878
Practical Spare Capacity (lowest)	=	8 %
Effective intersection capacity, (veh/h)	=	4830
Total vehicle flow (veh/h)	=	4240
Total pedestrian flow (ped/h)	=	3
Total person flow (pers/h)	=	6363
Total vehicle delay (veh-h/h)	=	28.48
Total pedestrian delay (ped-h/h)	=	0.05
Total person delay (pers-h/h)	=	42.77
Total effective vehicle stops (veh/h)	=	3019
Total effective pedestrian stops (ped/h)	=	3
Total effective person stops (pers/h)	=	4532
Total vehicle travel (veh-km/h)	=	2653.7
Total cost ($/h)	=	2017.54
Total fuel (L/h)	=	351.0
Total CO2 (kg/h)	=	879.31

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 AM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.4 - PHASE INFORMATION

Phase	Change	Green	Displayed	Grn+Intgrn

No.	Time	Start	Green	Secs	Prop.
A	0	3	60	63	0.432
B	63	66	6	9	0.062
C	72	75	71	74	0.507

Current Phase Sequence No.: 1
Input phase sequence: A B C
Output phase sequence: A B C

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 AM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Queue Back (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
11 T	10.68	16.02	25.2	0.60	0.60	22.4	20	62.38	41.5
13 R	0.09	0.13	11.1		0.69	0.4#		0.38	58.9
South: Desde El Comandante									
32 L	0.40	0.60	36.0	0.60	0.69	0.7	0	1.87	32.0
33 R	0.05	0.07	8.7		0.63	0.6#		0.28	52.3
East: PR-3 HAcia Carolina									
22 L	0.12	0.18	87.8	0.95	0.65	0.5	0	0.39	19.4
21 T	17.14	25.71	23.5	0.80	0.78	45.8	34	127.93	42.8
Pedestrians									
14	0.02	0.02	64.3	0.94	0.94	0.0	0	0.02	0.5
34	0.02	0.02	64.3	0.94	0.94	0.0	0	0.02	0.5
24	0.02	0.02	64.3	0.94	0.94	0.0	0	0.02	0.5

Largest density (passenger cars per km or mile) for any lane

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Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
1552	0.588	10.76	16.15	25.0	0.59	0.60	20	62.76	41.7
South: Desde El Comandante									
60	0.019	0.45	0.67	26.9	0.40	0.67	1	2.15	36.7
East: PR-3 HAcia Carolina									
2628	0.878	17.26	25.90	23.6	0.80	0.78	34	128.32	42.7
Pedestrians									
3	0.001	0.05	0.05	64.3	0.94	0.94	0	0.07	0.5
ALL VEHICLES:									
4240	0.878	28.48	42.72	24.2	0.72	0.71	34	193.23	42.3

INTERSECTION (persons):
6363 0.878 42.77 24.2 0.72 0.71 193.29 42.2

Queue values in this table are 95% back of queue (metres).

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Table S.7 - LANE PERFORMANCE

Lane No.	Mov No.	Effective Green Times (sec) R1	G1	R2	G2	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	(m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo													
1 T	11	75	71	0	0	508	863	0.588	25.2	0.60	22.4	20	
2 T	11	75	71	0	0	508	863	0.588	25.2	0.60	22.4	20	
3 T	11	75	71	0	0	508	863	0.588	25.2	0.60	22.4	20	
4 R	13	0	146	0	0	28	1615	0.017	11.1	0.69	0.4#		
South: Desde El Comandante													
1 L	32	86	60	0	0	13	717	0.019	36.0	0.69	0.7	0	
2 L	32	86	60	0	0	13	717	0.019	36.0	0.69	0.7	0	
3 L	32	86	60	0	0	13	717	0.019	36.0	0.69	0.7	0	
4 R	33	0	146	0	0	20	1459	0.014	8.7	0.63	0.6#		
East: PR-3 HAcia Carolina													
1 L	22	140	6	0	0	5	70	0.072	87.8	0.65	0.5	0	55
2 T	21	66	80	0	0	874	996	0.878	23.5	0.78	45.8	34	
3 T	21	66	80	0	0	874	996	0.878	23.5	0.78	45.8	34	
4 T	21	66	80	0	0	874	996	0.878	23.5	0.78	45.8	34	

Density (passenger cars per km or mile)

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Table S.8A - LANE FLOW AND CAPACITY INFORMATION

Lane No.	Mov No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Lane Width (m)	Saturation Flow Adj. Basic (tcu)	Aver 1st (veh)	Aver 2nd (veh)	End Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: PR-3 Hacia Fajardo													
1 T	11	0	508	0	508	3.60	1900	1775	0	0	863	0.588	100
2 T	11	0	508	0	508	3.60	1900	1775	0	0	863	0.588	100
3 T	11	0	508	0	508	3.60	1900	1775	0	0	863	0.588	100
4 R	13	0	0	28	28	3.60	1900	1615	1615	0	1615	0.017	100
South: Desde El Comandante													
1 L	32	13	0	0	13	3.30	1837	1745	0	0	717	0.019	100
2 L	32	13	0	0	13	3.30	1837	1745	0	0	717	0.019	100
3 L	32	13	0	0	13	3.30	1837	1745	0	0	717	0.019	100
4 R	33	0	0	20	20	3.30	1837	1459	1459	0	1459	0.014	100
East: PR-3 HAcia Carolina													
1 L	22	5	0	0	5	3.05	1784	1695	0	0	70	0.072	100
2 T	21	0	874	0	874	3.60	1900	1818	0	0	996	0.878	100
3 T	21	0	874	0	874	3.60	1900	1818	0	0	996	0.878	100
4 T	21	0	874	0	874	3.60	1900	1818	0	0	996	0.878	100

Basic Saturation Flow in this table is adjusted for lane width, approach grade, parking manoeuvres and number of buses stopping. Saturation flow scale applies if specified.

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Table S.8B - SCATS MF PARAMETER

Lane No.	Mov No.	Stopline Flow (veh/h)	Capacity (veh/h)	SCATS Satn Flow	SCATS MF	Deg. Satn x	Lane Util. %
West: PR-3 Hacia Fajardo							
1 T	11	508	863	1900	1823	0.588	100
2 T	11	508	863	1900	1823	0.588	100
3 T	11	508	863	1900	1823	0.588	100
4 R	13	28	1615	1615	NA	0.017	100
South: Desde El Comandante							
1 L	32	13	717	1745	1662	0.019	100
2 L	32	13	717	1745	1662	0.019	100
3 L	32	13	717	1745	1662	0.019	100
4 R	33	20	1459	1561	NA	0.014	100
East: PR-3 HAcia Carolina							
1 L	22	5	70	1695	1130	0.072	100
2 T	21	874	996	1900	1831	0.878	100
3 T	21	874	996	1900	1831	0.878	100
4 T	21	874	996	1900	1831	0.878	100

NA Not Applicable - SCATS MF was not calculated for this lane due to one of the following reasons:
- the lane is not controlled by signals (slip or continuous lane)
- two movements share this lane and do not run in the same phases

STOPLINE FLOW: Departure flow rate in veh/h as measured at the stop line. This cannot exceed capacity.

SCATS SATURATION FLOW: This allows for lane width, approach grade and turning vehicles. Saturation flow scale applies if specified. The effects of heavy vehicles, parking manoeuvres, number of buses stopping and conflicting pedestrian volume are not included.

SCATS MF: This emulates the MF (Maximum Flow) parameter used in the SCATS control system. It is calculated from the SCATS SATURATION FLOW parameter.

DEG. SATN: The Demand (Arrival) Flow Rate may exceed the Stopline Flow Rate, therefore x > 1 is possible.

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Table S.12A - FUEL CONSUMPTION, EMISSIONS AND COST - TOTAL

Mov No.	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: PR-3 Hacia Fajardo						
11 T	124.5	733.63	0.495	20.38	0.734	312.1
13 R	2.6	11.40	0.012	0.63	0.018	6.5
	127.1	745.03	0.507	21.01	0.752	318.6
South: Desde El Comandante						
32 L	3.3	23.63	0.015	0.65	0.019	8.3
33 R	1.8	8.34	0.007	0.37	0.011	4.4
	5.1	31.97	0.022	1.01	0.031	12.7
East: PR-3 HAcia Carolina						
22 L	0.5	4.65	0.002	0.08	0.003	1.3
21 T	218.3	1234.91	0.919	41.62	1.377	546.7
	218.8	1239.56	0.922	41.70	1.380	548.0
Pedestrians						
14		0.33				
34		0.33				
24		0.33				
		0.99				
ALL VEHICLES:	351.0	2016.55	1.450	63.72	2.163	879.3
INTERSECTION:	351.0	2017.54	1.450	63.72	2.163	879.3

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	27.00
Time value factor	=	0.60
Average occupancy (persons/veh)	=	1.5
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

The idle fuel and vehicle mass parameters given above are the default values (data given in RIDES may override some of these parameters).

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Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo												
1 T		508		508	7	1899	71		0.588	25.2	20	
2 T		508		508	7	1899	71		0.588	25.2	20	
3 T		508		508	7	1899	71		0.588	25.2	20	
4 R			28	28	0	1899	146		0.017	11.1		
	0	1524	28	1552	7				0.588	25.0	20	
South: Desde El Comandante												
1 L	13			13	0	1836	60		0.019	36.0	0	
2 L	13			13	0	1836	60		0.019	36.0	0	
3 L	13			13	0	1836	60		0.019	36.0	0	
4 R			20	20	10	1836	146		0.014	8.7		
	40	0	20	60	3				0.019	26.9	0	
East: PR-3 HAcia Carolina												
1 L	5			5	0	1783	6		0.072	87.8	0	55
2 T		874		874	5	1899	80		0.878	23.5	34	
3 T		874		874	5	1899	80		0.878	23.5	34	
4 T		874		874	5	1899	80		0.878	23.5	34	
	5	2623	0	2628	5				0.878	23.6	34	
Pedestrians												
Across W approach		1				9			0.001	64.3	0.0	
Across S approach		1				9			0.001	64.3	0.0	
Across E approach		1				9			0.001	64.3	0.0	

ALL VEHICLES	Total Flow	% HV	Cycle Time	Max X	Aver. Delay	Max Queue
	4240	5	146	0.878	24.2	34

Total flow period = 60 minutes. Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows (in through car units) have been adjusted for grade, lane widths, parking manoeuvres and bus stops.

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Table S.15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Green Time Ratio (g/C) 1st grn	2nd grn	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: PR-3 Hacia Fajardo										
11 T		0.486		1524	2590	0.588	25.2	C	22.4	20
13 R	(Con)	1.000		28	1615	0.017	11.1	A#	0.4#	
				1552		0.588	25.0	C	22.4	20
South: Desde El Comandante										
32 L		0.411*		40	2151	0.019	36.0	D	0.7	0
33 R	(Con)	1.000		20	1459	0.014	8.7	A#	0.6#	
				60		0.019	26.9	C	0.7	0
East: PR-3 HAcia Carolina										
22 L		0.041		5	70	0.072	87.8	F	0.5	0
21 T		0.548*		2623	2988	0.878*	23.5	C	45.8	34
				2628		0.878	23.6	C	45.8	34
Pedestrians										
14	(Ped)	0.062		1	740	0.001	64.3	F	0.0	0
34	(Ped)	0.062		1	740	0.001	64.3	F	0.0	0
24	(Ped)	0.062		1	740	0.001	64.3	F	0.0	0
				3		0.001	64.3	F	0.0	0

ALL VEHICLES:	4240	0.878	24.2	C	45.8	34
INTERSECTION (persons):	6363		24.2		45.8	34

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
aaSIDRA Output Guide or the Output section of the on-line help.
Intersection capacity is calculated considering vehicle movements only.
\# Continuous movements: Level Of Service based on density,
Density (passenger cars per km or mile) instead of queue.
* Maximum v/c ratio, or critical green periods

Table D.0 - GEOMETRIC DELAY DATA

From Approach	To Approach	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream Distance (m)
West: PR-3 Hacia Fajardo						
	South	20.0	26.2	31.4	500	184
	East	S	65.0	31.7	500	132
South: Desde El Comandante						
	West	18.6	25.5	29.2	500	129
	East	20.0	26.2	31.4	500	140
East: PR-3 HAcia Carolina						
	West	S	65.0	31.7	500	130
	South	20.0	26.3	31.4	500	131

Downstream Distance calculated by aaSIDRA

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

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Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Delay (seconds/veh) Stop-line 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: PR-3 Hacia Fajardo											
1 T	11	0.588	23.4	0.0	23.4	5.3	18.1	0.0	18.1	1.8	25.2
2 T	11	0.588	23.4	0.0	23.4	5.3	18.1	0.0	18.1	1.8	25.2
3 T	11	0.588	23.4	0.0	23.4	5.3	18.1	0.0	18.1	1.8	25.2
4 R	13	0.017			0.0					11.1	11.1
South: Desde El Comandante											
1 L	32	0.019	27.5	0.0	27.5	2.9	24.5	0.0	24.5	8.6	36.0
2 L	32	0.019	27.5	0.0	27.5	2.9	24.5	0.0	24.5	8.6	36.0
3 L	32	0.019	27.5	0.0	27.5	2.9	24.5	0.0	24.5	8.6	36.0
4 R	33	0.014			0.0					8.7	8.7
East: PR-3 HAcia Carolina											
1 L	22	0.072	77.8	0.0	77.8	4.8	73.0	0.0	73.0	10.0	87.8
2 T	21	0.878	21.7	0.0	21.7	7.2	14.5	0.0	14.5	1.8	23.5
3 T	21	0.878	21.7	0.0	21.7	7.2	14.5	0.0	14.5	1.8	23.5
4 T	21	0.878	21.7	0.0	21.7	7.2	14.5	0.0	14.5	1.8	23.5

dn is average stop-start delay for all vehicles queued and unqueued

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Table D.2 - LANE STOPS

Lane No.	Deg. Satn x	Effective Stop Rate hel	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: PR-3 Hacia Fajardo							
1 T	0.588	0.54	0.00	0.06	0.60	0.599	0.00
2 T	0.588	0.54	0.00	0.06	0.60	0.599	0.00
3 T	0.588	0.54	0.00	0.06	0.60	0.599	0.00
4 R	0.017			0.69	0.69		
South: Desde El Comandante							
1 L	0.019	0.43	0.00	0.26	0.69	0.599	0.00
2 L	0.019	0.43	0.00	0.26	0.69	0.599	0.00
3 L	0.019	0.43	0.00	0.26	0.69	0.599	0.00
4 R	0.014			0.63	0.63		
East: PR-3 HAcia Carolina							
1 L	0.072	0.62	0.00	0.03	0.65	0.953	0.00
2 T	0.878	0.75	0.00	0.03	0.78	0.804	0.00
3 T	0.878	0.75	0.00	0.03	0.78	0.804	0.00
4 T	0.878	0.75	0.00	0.03	0.78	0.804	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

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Table D.3A - LANE QUEUES (veh)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 T	0.588	0.0	12.4	0.0	12.4	14.6	18.6	20.0	22.4	25.9	0.04
2 T	0.588	0.0	12.4	0.0	12.4	14.6	18.6	20.0	22.4	25.9	0.04
3 T	0.588	0.0	12.4	0.0	12.4	14.6	18.6	20.0	22.4	25.9	0.04
4 R	0.017				0.4#						0.00#
South: Desde El Comandante											
1 L	0.019	0.0	0.3	0.0	0.3	0.4	0.5	0.6	0.7	0.9	0.00
2 L	0.019	0.0	0.3	0.0	0.3	0.4	0.5	0.6	0.7	0.9	0.00
3 L	0.019	0.0	0.3	0.0	0.3	0.4	0.5	0.6	0.7	0.9	0.00
4 R	0.014				0.6#						0.00#
East: PR-3 HAcia Carolina											
1 L	0.072	0.0	0.2	0.0	0.2	0.3	0.3	0.4	0.5	0.6	0.00
2 T	0.878	0.0	28.2	0.0	28.2	32.4	40.0	42.2	45.8	51.2	0.07
3 T	0.878	0.0	28.2	0.0	28.2	32.4	40.0	42.2	45.8	51.2	0.07
4 T	0.878	0.0	28.2	0.0	28.2	32.4	40.0	42.2	45.8	51.2	0.07

Values printed in this table are back of queue (vehicles).
\# Continuous movements: Density (passenger cars per km or mile)
instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

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Table D.3B - LANE QUEUES (metres)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 T	0.588	0	11	0	11	13	16	18	20	23	0.04
2 T	0.588	0	11	0	11	13	16	18	20	23	0.04
3 T	0.588	0	11	0	11	13	16	18	20	23	0.04
4 R	0.017				0.4#						0.00#
South: Desde El Comandante											
1 L	0.019	0	0	0	0	0	0	0	0	0	0.00
2 L	0.019	0	0	0	0	0	0	0	0	0	0.00
3 L	0.019	0	0	0	0	0	0	0	0	0	0.00
4 R	0.014				0.6#						0.00#
East: PR-3 HAcia Carolina											
1 L	0.072	0	0	0	0	0	0	0	0	0	0.00
2 T	0.878	0	21	0	21	24	30	32	34	38	0.07
3 T	0.878	0	21	0	21	24	30	32	34	38	0.07
4 T	0.878	0	21	0	21	24	30	32	34	38	0.07

Values printed in this table are back of queue (metres).
\# Continuous movements: Density (passenger cars per km or mile)
instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

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Table D.4 - MOVEMENT SPEEDS (km/h)

Mov No.	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall
West: PR-3 Hacia Fajardo								
11	80.0	65.0	65.0	65.0			62.2	41.5
13	80.0	26.2	26.2	65.0			58.9	58.9
South: Desde El Comandante								
32	65.0	25.5	25.5	65.0			48.9	32.0
33	65.0	26.2	26.2	65.0			52.3	52.3
East: PR-3 HAcia Carolina								
22	80.0	26.3	26.3	65.0			51.5	19.4
21	80.0	65.0	65.0	65.0			59.2	42.8

"Running Speed" is the average speed excluding stopped periods.

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 AM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table D.5 - PROGRESSION FACTORS & ACTUATED SIGNAL PARAMETERS

Mov No.	Control	Coord.	Arrival Type	Delay Prog. Factor	Queue Prog. Factor	Gap Settings es	eh	Disp. Grn. Settings 1st Grn Gmin	Gmax	2nd Grn Gmin	Gmax
West: PR-3 Hacia Fajardo											
11	VA	Yes	4	0.787	0.790	3.0	3.2	6	80		
13	VA	No	3	1.000	1.000	3.0	3.1	6	80		
South: Desde El Comandante											
32	VA	No	3	1.000	1.000	3.0	3.2	6	35		
33	VA	No	3	1.000	1.000	3.0	3.2	6	80		
East: PR-3 HAcia Carolina											
22	VA	Yes	4	1.000	0.987	3.0	3.1	6	35		
21	VA	Yes	4	0.686	0.863	3.0	3.1	6	80		
Pedestrians											
14	VA	No	3	1.000	1.000						
34	VA	No	3	1.000	1.000						
24	VA	No	3	1.000	1.000						

--- End of aaSIDRA Output ---

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Movement Summary

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante

Interseccion PR-3 @ Avenida El Comandante - 2006 PM

Signalised - Actuated coordinated **Cycle Time = 146 seconds**

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Desde El Comandante										
32	L	48	10.4	0.050	61.1	LOS E	1	0.82	0.70	23.7
33	R	40	5.0	0.027	8.6	LOS A#	1#	0.00	0.63	52.3
Approach		**88**	**8.0**	**0.050**	**37.2**	**LOS D**	**1**	**0.45**	**0.67**	**31.5**
PR-3 HAcia Carolina										
22	L	16	0.0	0.049	63.0	LOS E	1	0.76	0.70	24.6
21	T	1736	2.2	0.409	3.4	LOS A	3	0.09	0.23	69.4
Approach		**1752**	**2.2**	**0.409**	**3.9**	**LOS A**	**3**	**0.09**	**0.23**	**68.3**
PR-3 Hacia Fajardo										
11	T	3206	0.9	1.036	60.0	LOS E	49	1.00	1.01	25.3
13	R	16	0.0	0.010	11.1	LOS A#	0#	0.00	0.69	58.9
Approach		**3222**	**0.9**	**1.036**	**59.7**	**LOS E**	**49**	**1.00**	**1.00**	**25.4**
All Vehicles		**5062**	**1.5**	**1.036**	**40.0**	**LOS D**	**49**	**0.67**	**0.73**	**32.6**

Pedestrian Movements

Mov No	Dem Flow (ped/h)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate
34	1	64.3	LOS F	0	0.94	0.94
24	1	64.3	LOS F	0	0.94	0.94
14	1	64.3	LOS F	0	0.94	0.94
All Peds	**3**	**64.3**	**LOS F**	**0**	**0.94**	**0.94**

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CMA Architects & Engineers LLP
Jose A. Carro User ID: 50310
Licence Type: Single Computer

Time and Date of Analysis 4:40 PM, Oct 2,2006

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Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2

aaTraffic SIDRA US Highway Capacity Manual (2000) Metric Version

RUN INFORMATION

* Basic Parameters:
  Intersection Type: Signalised - Actuated Coordinated
  For fully-actuated signal timings, the following specifications will be ignored:
    Any maximum cycle time specification
  Driving on the right-hand side of the road
  Input data specified in Metric units
  Default Values File No. 10
  Peak flow period (for performance): 15 minutes
  Unit time (for volumes): 60 minutes (Hourly Rate)
  Delay definition: Control delay
                    Geometric delay included
  aaSIDRA Standard Delay and Queue models used
  Level of Service based on: Delay (HCM method)
  Queue definition: Back of queue, 95th Percentile

* No. of Main (Timing-Capacity) Iterations = 1
  Comparison of last two iterations:
    Difference in intersection degree of satn = 0.0 %
    Largest difference in eff. green times = 0 secs
    (max. value for stopping = 0 secs)

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.0 - TRAFFIC FLOW DATA

Mov No.	Left		Through		Right		Flow Scale	Peak Flow Factor
	LV	HV	LV	HV	LV	HV		
VEHICLES Demand flows in veh/hour as used by the program								
West: PR-3 Hacia Fajardo								
11	0	0	3176	30	0	0	1.00	0.87
13	0	0	0	0	16	0	1.00	0.56
South: Desde El Comandante								
32	43	5	0	0	0	0	1.00	0.77
33	0	0	0	0	38	2	1.00	0.45
East: PR-3 HAcia Carolina								
22	16	0	0	0	0	0	1.00	0.62
21	0	0	1698	38	0	0	1.00	0.92
PEDESTRIANS Flow (ped/hour)								
14			1				1.00	1.00
34			1				1.00	0.95
24			1				1.00	1.00

Based on unit time = 60 minutes.
Flow Scale and Peak Hour Factor effects included in flow values.

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.1 - MOVEMENT PHASE AND TIMING PARAMETERS

Mov No.	Mov Typ	PHASE MATRIX First Green Fr	To	Op Pr	Second Green Fr	To	Op Pr	Lost Tim 1st Grn	2nd Grn	Req.Mov.Time 1st Grn	2nd Grn	Eff. Grn 1st Grn	2nd Grn
West: PR-3 Hacia Fajardo													
11 T	*C	A						3		83.0Max		80	
South: Desde El Comandante													
32 L	*A	B						3		9.0Min		29	
East: PR-3 HAcia Carolina													
22 L	*B	C						3		9.0Min		28	
21 T	B	A						3		64.7		111	
Pedestrians													
14	(Ped) A	B						17		9.0Min		9	
34	(Ped) C	A						16		9.0Min		9	
24	(Ped) A	B						19		9.0Min		9	

Current Phase Sequence No.: 1
Input phase sequence: A B C
Output phase sequence: A B C

* Critical Movement/Green Period

Movement Types:
Ped Pedestrian
Dum Dummy
Und Undetected in both green periods
Un1 Undetected in 1st green period
Un2 Undetected in 2nd green period

Under heading 'Op':
L "Left" turns are opposed
R "Right" turns are opposed
LR "Left and Right" opposed
C "Constant" saturation flow

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Dem Flow (veh /h)	HV (%)	Satn Flow 1st Grn	2nd Grn	Flow Ratio 1st Grn	2nd Grn	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: PR-3 Hacia Fajardo											
11 T	3206	0.9	5647		0.568		3094	0.95	-8	100	1.036*
13 R	16	0.0	1615		0.010		1615	0.98	9792	100	0.010
South: Desde El Comandante											
32 L	48	10.4	4786		0.010		951	0.95	1781	100	0.050
33 R	40	5.0	1508		0.027		1508	0.98	3595	100	0.027
East: PR-3 HAcia Carolina											
22 L	16	0.0	1695		0.009		325	0.90	1729	100	0.049
21 T	1736	2.2	5578		0.311		4241	0.95	132	100	0.409
Pedestrians											
14	1		12000		0.000		740	0.95		100	0.001
34	1		12000		0.000		740	0.95		100	0.001
24	1		12000		0.000		740	0.95		100	0.001

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.3 - INTERSECTION PARAMETERS

Crit Mov No.	App. & Turn	Green Period	Phases Fr	To	Adjusted Lost Time	Adjusted Flow Ratio	Required Grn Time Ratio	Required Movement Time
32	S_L		A	B	9	-	-	9.0Min
22	E_L		B	C	9	-	-	9.0Min
11	W_T		C	A	83	-	-	83.0Max
				Total:	101	0.000	0.000	101.0

- Flow ratio not used for cycle time calculations and the adjusted lost time equals the required movement time (*Min or Max as shown in Table S.1)

Cycle Time:

Minimum	Maximum	Practical	Chosen
62	NA	102	146

(Cycle time specified by the user)

Intersection Level of Service	=	D
Worst movement Level of Service	=	F
Average intersection delay (s)	=	40.0
Largest average movement delay (s)	=	64.3
Largest back of queue, 95% (m)	=	49
Performance Index	=	290.26
Degree of saturation (highest)	=	1.036
Practical Spare Capacity (lowest)	=	-8 %
Effective intersection capacity, (veh/h)	=	4886
Total vehicle flow (veh/h)	=	5062
Total pedestrian flow (ped/h)	=	3
Total person flow (pers/h)	=	7596
Total vehicle delay (veh-h/h)	=	56.29
Total pedestrian delay (ped-h/h)	=	0.05
Total person delay (pers-h/h)	=	84.49
Total effective vehicle stops (veh/h)	=	3703
Total effective pedestrian stops (ped/h)	=	3
Total effective person stops (pers/h)	=	5557
Total vehicle travel (veh-km/h)	=	3167.3
Total cost ($/h)	=	2915.99
Total fuel (L/h)	=	402.4
Total CO2 (kg/h)	=	1006.57

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.4 - PHASE INFORMATION

Phase No.	Change Time	Green Start	Displayed Green	Grn+Intgrn Secs	Prop.
A	0	3	29	32	0.219
B	32	35	28	31	0.212
C	63	66	80	83	0.568

Current Phase Sequence No.: 1
Input phase sequence: A B C
Output phase sequence: A B C

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	(m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
11 T	53.42	80.14	60.0	1.00	1.01	89.2	49	263.06	25.3
13 R	0.05	0.07	11.1		0.69	0.2#		0.22	58.9
South: Desde El Comandante									
32 L	0.81	1.22	61.1	0.82	0.70	1.2	1	3.06	23.7
33 R	0.10	0.14	8.6		0.63	1.0#		0.55	52.3
East: PR-3 HAcia Carolina									
22 L	0.28	0.42	63.0	0.76	0.70	1.1	1	0.96	24.6
21 T	1.63	2.45	3.4	0.09	0.23	4.1	3	22.34	69.4
Pedestrians									
14	0.02	0.02	64.3	0.94	0.94	0.0	0	0.02	0.5
34	0.02	0.02	64.3	0.94	0.94	0.0	0	0.02	0.5
24	0.02	0.02	64.3	0.94	0.94	0.0	0	0.02	0.5

Largest density (passenger cars per km or mile) for any lane

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
3222	1.036	53.47	80.21	59.7	1.00	1.00	49	263.28	25.4
South: Desde El Comandante									
88	0.050	0.91	1.37	37.2	0.45	0.67	1	3.61	31.5
East: PR-3 HAcia Carolina									
1752	0.409	1.91	2.87	3.9	0.09	0.23	3	23.30	68.3
Pedestrians									
3	0.001	0.05	0.05	64.3	0.94	0.94	0	0.07	0.5
ALL VEHICLES:									
5062	1.036	56.29	84.44	40.0	0.67	0.73	49	290.19	32.6

INTERSECTION (persons):													
7596	1.036			84.49	40.0	0.67	0.73			290.26		32.5	

Queue values in this table are 95% back of queue (metres).

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.7 - LANE PERFORMANCE

Lane No.	Mov No.	Effective Green (R1)	Red and Times (sec) G1	R2	G2	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue Back (m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo													
1 T	11	66	80	0	0	1069	1031	1.036	60.0	1.01	89.2	49	
2 T	11	66	80	0	0	1069	1031	1.036	60.0	1.01	89.2	49	
3 T	11	66	80	0	0	1069	1031	1.036	60.0	1.01	89.2	49	
4 R	13	0	146	0	0	16	1615	0.010	11.1	0.69	0.2#		
South: Desde El Comandante													
1 L	32	117	29	0	0	16	317	0.050	61.1	0.70	1.2	1	
2 L	32	117	29	0	0	16	317	0.050	61.1	0.70	1.2	1	
3 L	32	117	29	0	0	16	317	0.050	61.1	0.70	1.2	1	
4 R	33	0	146	0	0	40	1508	0.027	8.6	0.63	1.0#		
East: PR-3 HAcia Carolina													
1 L	22	118	28	0	0	16	325	0.049	63.0	0.70	1.1	1	55
2 T	21	35	111	0	0	579	1414	0.409	3.4	0.23	4.1	3	
3 T	21	35	111	0	0	579	1414	0.409	3.4	0.23	4.1	3	
4 T	21	35	111	0	0	579	1414	0.409	3.4	0.23	4.1	3	

Density (passenger cars per km or mile)

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.8A - LANE FLOW AND CAPACITY INFORMATION

Lane No.	Mov No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Lane Width (m)	Saturation Flow Adj. Basic (tcu)	Aver 1st (veh)	Aver 2nd (veh)	End Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: PR-3 Hacia Fajardo													
1 T	11	0	1069	0	1069	3.60	1900	1882	0	0	1031	1.036	100
2 T	11	0	1069	0	1069	3.60	1900	1882	0	0	1031	1.036	100
3 T	11	0	1069	0	1069	3.60	1900	1882	0	0	1031	1.036	100
4 R	13	0	0	16	16	3.60	1900	1615	1615	0	1615	0.010	100
South: Desde El Comandante													
1 L	32	16	0	0	16	3.30	1837	1595	0	0	317	0.050	100
2 L	32	16	0	0	16	3.30	1837	1595	0	0	317	0.050	100
3 L	32	16	0	0	16	3.30	1837	1595	0	0	317	0.050	100
4 R	33	0	0	40	40	3.30	1837	1508	1508	0	1508	0.027	100
East: PR-3 HAcia Carolina													
1 L	22	16	0	0	16	3.05	1784	1695	0	0	325	0.049	100
2 T	21	0	579	0	579	3.60	1900	1859	0	0	1414	0.409	100
3 T	21	0	579	0	579	3.60	1900	1859	0	0	1414	0.409	100
4 T	21	0	579	0	579	3.60	1900	1859	0	0	1414	0.409	100

Basic Saturation Flow in this table is adjusted for lane width, approach grade, parking manoeuvres and number of buses stopping. Saturation flow scale applies if specified.

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.8B - SCATS MF PARAMETER

Lane No.	Mov No.	Stopline Flow (veh/h)	Capacity (veh/h)	SCATS Satn Flow	SCATS MF	Deg. Satn x	Lane Util. %
West: PR-3 Hacia Fajardo							
1 T	11	1031	1031	1900	1831	1.036	100
2 T	11	1031	1031	1900	1831	1.036	100
3 T	11	1031	1031	1900	1831	1.036	100
4 R	13	16	1615	1615	NA	0.010	100
South: Desde El Comandante							
1 L	32	16	317	1745	1581	0.050	100
2 L	32	16	317	1745	1581	0.050	100
3 L	32	16	317	1745	1581	0.050	100
4 R	33	40	1508	1561	NA	0.027	100
East: PR-3 HAcia Carolina							
1 L	22	16	325	1695	1531	0.049	100
2 T	21	579	1414	1900	1850	0.409	100
3 T	21	579	1414	1900	1850	0.409	100
4 T	21	579	1414	1900	1850	0.409	100

NA Not Applicable - SCATS MF was not calculated for this lane due to one of the following reasons:
- the lane is not controlled by signals (slip or continuous lane)
- two movements share this lane and do not run in the same phases

STOPLINE FLOW: Departure flow rate in veh/h as measured at the stop line. This cannot exceed capacity.

SCATS SATURATION FLOW: This allows for lane width, approach grade and turning vehicles. Saturation flow scale applies if specified. The effects of heavy vehicles, parking manoeuvres, number of buses stopping and conflicting pedestrian volume are not included.

SCATS MF: This emulates the MF (Maximum Flow) parameter used in the SCATS control system. It is calculated from the SCATS SATURATION FLOW parameter.

DEG. SATN: The Demand (Arrival) Flow Rate may exceed the Stopline Flow Rate, therefore x > 1 is possible.

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.12A - FUEL CONSUMPTION, EMISSIONS AND COST - TOTAL

Mov No.	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: PR-3 Hacia Fajardo						
11 T	305.4	2344.78	1.442	56.96	1.768	763.9
13 R	1.5	6.52	0.007	0.36	0.011	3.7
	306.9	2351.30	1.449	57.31	1.778	767.6
South: Desde El Comandante						
32 L	5.7	39.10	0.024	1.09	0.033	14.4
33 R	3.3	16.29	0.013	0.68	0.021	8.2
	9.0	55.39	0.037	1.77	0.054	22.6
East: PR-3 HAcia Carolina						
22 L	1.5	11.99	0.007	0.26	0.008	3.7
21 T	85.0	496.33	0.295	6.35	0.451	212.6
	86.5	508.32	0.302	6.61	0.460	216.4
Pedestrians						
14		0.33				
34		0.33				
24		0.33				
		0.99				
ALL VEHICLES:	402.4	2915.00	1.788	65.69	2.292	1006.6
INTERSECTION:	402.4	2915.99	1.788	65.69	2.292	1006.6

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	27.00
Time value factor	=	0.60
Average occupancy (persons/veh)	=	1.5
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

The idle fuel and vehicle mass parameters given above are the default values (data given in RIDES may override some of these parameters).

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo												
1 T		1069		1069	1	1899	80		1.036	60.0	49	
2 T		1069		1069	1	1899	80		1.036	60.0	49	
3 T		1069		1069	1	1899	80		1.036	60.0	49	
4 R			16	16	0	1899	146		0.010	11.1		
	0	3206	16	3222	1				1.036	59.7	49	
South: Desde El Comandante												
1 L	16			16	10	1836	29		0.050	61.1	1	
2 L	16			16	10	1836	29		0.050	61.1	1	
3 L	16			16	10	1836	29		0.050	61.1	1	
4 R			40	40	5	1836	146		0.027	8.6		
	48	0	40	88	8				0.050	37.2	1	
East: PR-3 HAcia Carolina												
1 L	16			16	0	1783	28		0.049	63.0	1	55
2 T		579		579	2	1899	111		0.409	3.4	3	
3 T		579		579	2	1899	111		0.409	3.4	3	
4 T		579		579	2	1899	111		0.409	3.4	3	
	16	1736	0	1752	2				0.409	3.9	3	
Pedestrians												
Across W approach		1				9			0.001	64.3	0.0	
Across S approach		1				9			0.001	64.3	0.0	
Across E approach		1				9			0.001	64.3	0.0	

ALL VEHICLES	Total Flow	% HV	Cycle Time	Max X	Aver. Delay	Max Queue
	5062	1	146	1.036	40.0	49

Total flow period = 60 minutes. Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows (in through car units) have been adjusted for grade, lane widths, parking manoeuvres and bus stops.

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table S.15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Green Time Ratio (g/C) 1st grn	2nd grn	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	Queue Back (m)
West: PR-3 Hacia Fajardo										
11 T		0.548*		3206	3094	1.036*	60.0	E	89.2	49
13 R	(Con)	1.000		16	1615	0.010	11.1	A#	0.2#	
				3222		1.036	59.7	E	89.2	49
South: Desde El Comandante										
32 L		0.199*		48	951	0.050	61.1	E	1.2	1
33 R	(Con)	1.000		40	1508	0.027	8.6	A#	1.0#	
				88		0.050	37.2	D	1.2	1
East: PR-3 HAcia Carolina										
22 L		0.192*		16	325	0.049	63.0	E	1.1	1
21 T		0.760		1736	4241	0.409	3.4	A	4.1	3
				1752		0.409	3.9	A	4.1	3
Pedestrians										
14	(Ped)	0.062		1	740	0.001	64.3	F	0.0	0
34	(Ped)	0.062		1	740	0.001	64.3	F	0.0	0
24	(Ped)	0.062		1	740	0.001	64.3	F	0.0	0
				3		0.001	64.3	F	0.0	0

ALL VEHICLES:	5062	1.036	40.0	D	89.2	49
INTERSECTION (persons):	7596		40.0		89.2	49

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
aaSIDRA Output Guide or the Output section of the on-line help.
Intersection capacity is calculated considering vehicle movements only.
\# Continuous movements: Level Of Service based on density,
Density (passenger cars per km or mile) instead of queue.
* Maximum v/c ratio, or critical green periods

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table D.0 - GEOMETRIC DELAY DATA

From Approach	To Approach	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream Distance (m)
West: PR-3 Hacia Fajardo						
	South	20.0	26.2	31.4	500	184
	East	S	65.0	31.7	500	126
South: Desde El Comandante						
	West	18.6	25.5	29.2	500	141
	East	20.0	26.2	31.4	500	137
East: PR-3 HAcia Carolina						
	West	S	65.0	31.7	500	128
	South	20.0	26.3	31.4	500	131

Downstream Distance calculated by aaSIDRA

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Delay (seconds/veh) Stop-line 1st d1	Stop-line 2nd d2	Delay Total dSL	Acc. Dec. dn	Queuing Queue Total dq	Queuing MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: PR-3 Hacia Fajardo											
1 T	11	1.036	24.9	33.3	58.2	8.9	49.3	1.5	47.8	1.8	60.0
2 T	11	1.036	24.9	33.3	58.2	8.9	49.3	1.5	47.8	1.8	60.0
3 T	11	1.036	24.9	33.3	58.2	8.9	49.3	1.5	47.8	1.8	60.0
4 R	13	0.010			0.0					11.1	11.1
South: Desde El Comandante											
1 L	32	0.050	52.2	0.0	52.2	4.0	48.3	0.0	48.3	8.8	61.1
2 L	32	0.050	52.2	0.0	52.2	4.0	48.3	0.0	48.3	8.8	61.1
3 L	32	0.050	52.2	0.0	52.2	4.0	48.3	0.0	48.3	8.8	61.1
4 R	33	0.027			0.0					8.6	8.6
East: PR-3 HAcia Carolina											
1 L	22	0.049	53.0	0.0	53.0	3.8	49.2	0.0	49.2	10.0	63.0
2 T	21	0.409	1.6	0.0	1.6	0.8	0.8	0.0	0.8	1.8	3.4
3 T	21	0.409	1.6	0.0	1.6	0.8	0.8	0.0	0.8	1.8	3.4
4 T	21	0.409	1.6	0.0	1.6	0.8	0.8	0.0	0.8	1.8	3.4

dn is average stop-start delay for all vehicles queued and unqueued

---

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table D.2 - LANE STOPS

Lane No.	Deg. Satn x	Effective Stop Rate hel	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: PR-3 Hacia Fajardo							
1 T	1.036	0.94	0.07	0.00	1.01	1.000	0.22
2 T	1.036	0.94	0.07	0.00	1.01	1.000	0.22
3 T	1.036	0.94	0.07	0.00	1.01	1.000	0.22
4 R	0.010			0.69	0.69		
South: Desde El Comandante							
1 L	0.050	0.59	0.00	0.12	0.70	0.817	0.00
2 L	0.050	0.59	0.00	0.12	0.70	0.817	0.00
3 L	0.050	0.59	0.00	0.12	0.70	0.817	0.00
4 R	0.027			0.63	0.63		
East: PR-3 HAcia Carolina							
1 L	0.049	0.54	0.00	0.16	0.70	0.760	0.00
2 T	0.409	0.08	0.00	0.15	0.23	0.087	0.00
3 T	0.409	0.08	0.00	0.15	0.23	0.087	0.00
4 T	0.409	0.08	0.00	0.15	0.23	0.087	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

---

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table D.3A - LANE QUEUES (veh)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 T	1.036	9.0	45.9	12.7	58.5	65.7	78.6	83.2	89.2	100.2	0.10
2 T	1.036	9.0	45.9	12.7	58.5	65.7	78.6	83.2	89.2	100.2	0.10
3 T	1.036	9.0	45.9	12.7	58.5	65.7	78.6	83.2	89.2	100.2	0.10
4 R	0.010			0.2#							0.00#
South: Desde El Comandante											
1 L	0.050	0.0	0.6	0.0	0.6	0.7	0.9	1.0	1.2	1.5	0.00
2 L	0.050	0.0	0.6	0.0	0.6	0.7	0.9	1.0	1.2	1.5	0.00
3 L	0.050	0.0	0.6	0.0	0.6	0.7	0.9	1.0	1.2	1.5	0.00
4 R	0.027			1.0#							0.00#
East: PR-3 HAcia Carolina											
1 L	0.049	0.0	0.5	0.0	0.5	0.6	0.8	0.9	1.1	1.4	0.01
2 T	0.409	0.0	2.0	0.0	2.0	2.4	3.2	3.5	4.1	5.1	0.01
3 T	0.409	0.0	2.0	0.0	2.0	2.4	3.2	3.5	4.1	5.1	0.01
4 T	0.409	0.0	2.0	0.0	2.0	2.4	3.2	3.5	4.1	5.1	0.01

Values printed in this table are back of queue (vehicles).
\# Continuous movements: Density (passenger cars per km or mile)
instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

---

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Intersecion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table D.3B - LANE QUEUES (metres)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 T	1.036	5	25	7	32	36	43	46	49	55	0.10
2 T	1.036	5	25	7	32	36	43	46	49	55	0.10
3 T	1.036	5	25	7	32	36	43	46	49	55	0.10
4 R	0.010			0.2#							0.00#
South: Desde El Comandante											
1 L	0.050	0	1	0	1	1	1	1	1	2	0.00
2 L	0.050	0	1	0	1	1	1	1	1	2	0.00
3 L	0.050	0	1	0	1	1	1	1	1	2	0.00
4 R	0.027			1.0#							0.00#
East: PR-3 HAcia Carolina											
1 L	0.049	0	0	0	0	0	0	0	1	1	0.01
2 T	0.409	0	1	0	1	1	2	2	3	3	0.01
3 T	0.409	0	1	0	1	1	2	2	3	3	0.01
4 T	0.409	0	1	0	1	1	2	2	3	3	0.01

Values printed in this table are back of queue (metres).
\# Continuous movements: Density (passenger cars per km or mile)
instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

---

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Intersecion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table D.4 - MOVEMENT SPEEDS (km/h)

Mov No.	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall
West: PR-3 Hacia Fajardo								
11	80.0	65.0	65.0	65.0	18.6		54.6	25.3
13	80.0	26.2	26.2	65.0			58.9	58.9
South: Desde El Comandante								
32	65.0	25.5	25.5	65.0			47.8	23.7
33	65.0	26.2	26.2	65.0			52.3	52.3
East: PR-3 HAcia Carolina								
22	80.0	26.3	26.3	65.0			52.7	24.6
21	80.0	65.0	65.0	65.0			71.2	69.4

"Running Speed" is the average speed excluding stopped periods.

Estudio Operacional de Transito Plan Maestro El Nuevo Comandante
Intersecion PR-3 @ Avenida El Comandante - 2006 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 146

Table D.5 - PROGRESSION FACTORS & ACTUATED SIGNAL PARAMETERS

Mov No.	Control	Coord.	Arrival Type	Delay Prog. Factor	Queue Prog. Factor	Gap Settings es	eh	Disp. Grn. Settings 1st Grn Gmin	Gmax	2nd Grn Gmin	Gmax
West: PR-3 Hacia Fajardo											
11	VA	Yes	4	0.686	1.000	3.0	3.1	6	80		
13	VA	No	3	1.000	1.000	3.0	3.1	6	80		
South: Desde El Comandante											
32	VA	No	3	1.000	1.000	3.0	3.2	6	35		
33	VA	No	3	1.000	1.000	3.0	3.2	6	80		
East: PR-3 HAcia Carolina											
22	VA	Yes	4	1.000	0.924	3.0	3.1	6	35		
21	VA	Yes	4	0.240	0.235	3.0	3.1	6	80		
Pedestrians											
14	VA	No	3	1.000	1.000						
34	VA	No	3	1.000	1.000						
24	VA	No	3	1.000	1.000						

--- End of aaSIDRA Output ---

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Movement Summary

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ PR-9959 - 2011 AM

Signalised - Actuated coordinated **Cycle Time = 145 seconds**

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
El Nuevo Comandante										
32	L	85	0.0	0.354	76.9	LOS E	2	0.95	0.75	18.6
31	T	31	0.0	0.354	71.1	LOS E	2	0.95	0.73	20.0
33	R	193	0.0	0.120	3.4	LOS A#	5#	0.00	0.41	37.4
Approach		**309**	**0.0**	**0.354**	**30.4**	**LOS C**	**2**	**0.36**	**0.53**	**26.5**
PR-3 HAcia Carolina										
22	L	187	0.0	0.195	54.7	LOS D	3	0.78	0.78	39.4
21	T	1988	4.6	0.802	31.1	LOS C	28	0.81	0.74	50.6
23	R	213	0.9	0.137	11.1	LOS B	0	0.03	0.69	66.1
Approach		**2389**	**3.9**	**0.802**	**31.2**	**LOS C**	**28**	**0.74**	**0.74**	**50.6**
PR-9959 desde Canovanas										
42	L	104	5.8	0.353	73.0	LOS E	4	0.94	0.76	24.6
41	T	42	0.0	0.353	67.0	LOS E	4	0.94	0.73	25.9
43	R	358	0.3	0.222	3.5	LOS B#	9#	0.00	0.41	38.6
Approach		**504**	**1.4**	**0.353**	**23.1**	**LOS C**	**5**	**0.27**	**0.51**	**33.0**
PR-3 Hacia Fajardo										
12	L	275	0.4	0.576	60.9	LOS E	10	0.89	0.84	37.3
11	T	1496	6.1	0.612	27.3	LOS C	20	0.66	0.59	53.0
13	R	137	0.0	0.087	11.1	LOS B	0	0.03	0.69	66.1
Approach		**1908**	**4.9**	**0.612**	**31.0**	**LOS C**	**20**	**0.65**	**0.63**	**50.7**
All Vehicles		**5110**	**3.8**	**0.802**	**30.3**	**LOS C**	**28**	**0.64**	**0.66**	**46.9**

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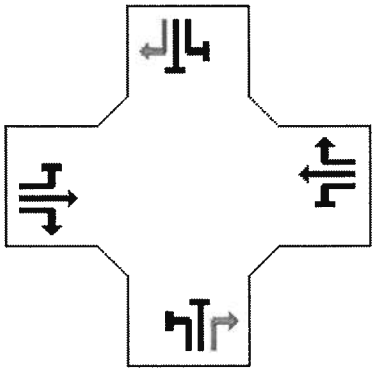
Phasing

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ PR-9959 - 2011 AM

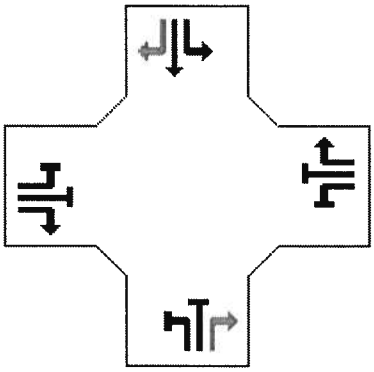
C = **145** seconds
Cycle Time Option: **User-specified cycle time**
Phase times determined by the program.

Phase A



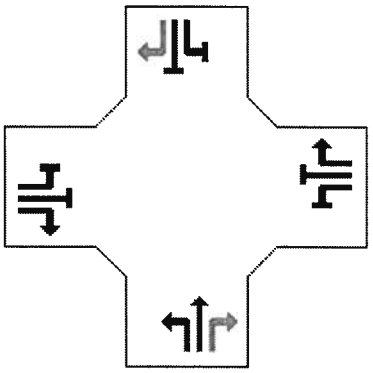
G = **66** seconds
G + I = **68** seconds
(G + I)/C = **46.9** %

Phase B



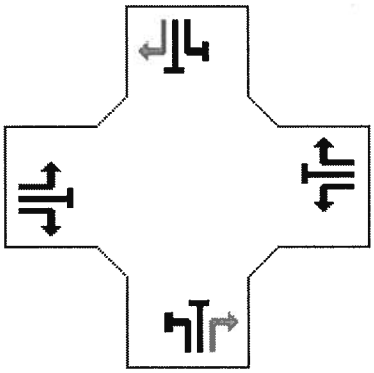
G = **17** seconds
G + I = **19** seconds
(G + I)/C = **13.1** %

Phase C

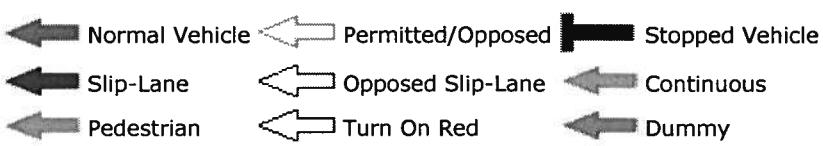


G = **13** seconds
G + I = **15** seconds
(G + I)/C = **10.3** %

Phase D



G = **41** seconds
G + I = **43** seconds
(G + I)/C = **29.7** %



C	Cycle Time
G	Green Time
I	Intergreen Time (yellow plus all-red)
(G + I)/C	Phase time as a percentage of cycle

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Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 AM
Intersection ID: 1

aaTraffic SIDRA US Highway Capacity Manual (2000) Metric Version

RUN INFORMATION

* Basic Parameters:
Intersection Type: Signalised - Actuated Coordinated
For fully-actuated signal timings, the following specifications will be ignored:
Any maximum cycle time specification
Driving on the right-hand side of the road
Input data specified in Metric units
Default Values File No. 10
Peak flow period (for performance): 15 minutes
Unit time (for volumes): 60 minutes (Hourly Rate)
Delay definition: Control delay
Geometric delay included
aaSIDRA Standard Delay and Queue models used
Level of Service based on: Delay (HCM method)
Queue definition: Back of queue, 95th Percentile

* No. of Main (Timing-Capacity) Iterations = 3
Comparison of last two iterations:
Difference in intersection degree of satn = 0.0 %
Largest difference in eff. green times = 0 secs
(max. value for stopping = 0 secs)

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table S.0 - TRAFFIC FLOW DATA

Mov No.	Left LV	Left HV	Through LV	Through HV	Right LV	Right HV	Flow Scale	Peak Flow Factor
VEHICLES	Demand flows in veh/hour as used by the program							
West: PR-3 Hacia Fajardo								
12	274	1	0	0	0	0	1.00	0.95
11	0	0	1404	92	0	0	1.00	0.95
13	0	0	0	0	137	0	1.00	0.95
South: El Nuevo Comandante								
32	85	0	0	0	0	0	1.00	0.95
31	0	0	31	0	0	0	1.00	0.95
33	0	0	0	0	193	0	1.00	0.95
East: PR-3 HAcia Carolina								
22	187	0	0	0	0	0	1.00	0.95
21	0	0	1897	92	0	0	1.00	0.95
23	0	0	0	0	211	2	1.00	0.95
North: PR-9959 desde Canovanas								
42	98	6	0	0	0	0	1.00	0.95
41	0	0	42	0	0	0	1.00	0.95
43	0	0	0	0	357	1	1.00	0.95

Based on unit time = 60 minutes.
Flow Scale and Peak Hour Factor effects included in flow values.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table S.1 - MOVEMENT PHASE AND TIMING PARAMETERS

Mov No.	Mov Typ	First Green Fr	To	Op	Pr	Second Green Fr	To	Op	Pr	Lost Tim 1st Grn	2nd Grn	Req.Mov.Time 1st Grn	2nd Grn	Eff. Grn 1st Grn	2nd Grn
West: PR-3 Hacia Fajardo															
12 L		*D	A							2		22.0Max		41	
11 T		A	B							2		51.3		66	
13 R	(Und)	A	B			B	A			2	2	10.8	24.0Min	66	75
South: El Nuevo Comandante															
32 L		*C	D							2		13.5		13	
31 T		C	D							2		13.5		13	
East: PR-3 HAcia Carolina															
22 L		D	A							2		22.0Max		41	
21 T		*A	B							2		52.0Max		66	
23 R	(Und)	A	B			B	A			2	2	26.1	26.1	66	75
North: PR-9959 desde Canovanas															
42 L		*B	C							2		17.0		17	
41 T		B	C							2		17.0		17	

Current Phase Sequence No.: 1
Input phase sequence: A B C D
Output phase sequence: A B C D

* Critical Movement/Green Period

Movement Types:
Ped Pedestrian
Dum Dummy
Und Undetected in both green periods
Un1 Undetected in 1st green period
Un2 Undetected in 2nd green period

Under heading 'Op':
L "Left" turns are opposed
R "Right" turns are opposed
LR "Left and Right" opposed
C "Constant" saturation flow

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Table S.2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Dem Flow (veh /h)	HV (%)	Satn Flow 1st Grn	Satn Flow 2nd Grn	Flow Ratio 1st Grn	Flow Ratio 2nd Grn	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: PR-3 Hacia Fajardo											
12 L	275	0.4	1689		0.163		478	0.95	65	100	0.576
11 T	1496	6.1	5370		0.279		2444	0.95	55	100	0.612
13 R	137	0.0	1615	1615	0.042	0.042	1570	0.90	932	100	0.087
South: El Nuevo Comandante											
32 L	85	0.0	2681		0.032		240	0.95	169	100	0.354
31 T	31	0.0	978		0.032		88	0.95	169	100	0.354
33 R	193	0.0	1615		0.120		1615	0.98	720	100	0.120
East: PR-3 HAcia Carolina											
22 L	187	0.0	3389		0.055		958	0.90	361	100	0.195
21 T	1989	4.6	5448		0.365		2480	0.95	18	100	0.802*
23 R	213	0.9	1604	1604	0.066	0.066	1560	0.90	559	100	0.137
North: PR-9959 desde Canovanas											
42 L	104	5.8	2515		0.041		295	0.95	169	100	0.353
41 T	42	0.0	1016		0.041		119	0.90	155	100	0.353
43 R	358	0.3	1612		0.222		1612	0.98	341	100	0.222

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Table S.3 - INTERSECTION PARAMETERS

Mov No.	Crit & Turn	App.	Green Period	Phases Fr	To	Adjusted Lost Time	Adjusted Flow Ratio	Required Grn Time Ratio	Required Movement Time
21	E_T			A	B	52	-	-	52.0Max
42	N_L			B	C	2	0.041	0.103	17.0
32	S_L			C	D	2	0.032	0.079	13.5
12	W_L			D	A	22	-	-	22.0Max
					Total:	78	0.073	0.183	104.5

- Flow ratio not used for cycle time calculations and the adjusted lost time equals the required movement time (=Min or Max as shown in Table S.1)

Cycle Time:

Minimum	Maximum	Practical	Chosen
32	NA	96	145

(Cycle time specified by the user)

Intersection Level of Service	=	C
Worst movement Level of Service	=	E
Average intersection delay (s)	=	30.3
Largest average movement delay (s)	=	76.9
Largest back of queue, 95% (m)	=	28
Performance Index	=	267.47
Degree of saturation (highest)	=	0.802
Practical Spare Capacity (lowest)	=	18 %
Effective intersection capacity, (veh/h)	=	6371
Total vehicle flow (veh/h)	=	5110
Total person flow (pers/h)	=	7665
Total vehicle delay (veh-h/h)	=	42.98
Total person delay (pers-h/h)	=	64.46
Total effective vehicle stops (veh/h)	=	3386
Total effective person stops (pers/h)	=	5079
Total vehicle travel (veh-km/h)	=	5857.0
Total cost ($/h)	=	4047.93
Total fuel (L/h)	=	735.6
Total CO2 (kg/h)	=	1841.95

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Table S.4 - PHASE INFORMATION

Phase No.	Change Time	Green Start	Displayed Green	Grn+Intgrn Secs	Grn+Intgrn Prop.
A	0	2	66	68	0.469
B	68	70	17	19	0.131
C	87	89	13	15	0.103
D	102	104	41	43	0.297

Current Phase Sequence No.: 1
Input phase sequence: A B C D
Output phase sequence: A B C D

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Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Queue Back (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
12 L	4.65	6.98	60.9	0.89	0.84	18.8	10	19.57	37.3
11 T	11.36	17.04	27.3	0.66	0.59	23.8	20	76.11	53.0
13 R	0.42	0.63	11.1	0.03	0.69	0.2	0	2.80	66.1
South: El Nuevo Comandante									
32 L	1.82	2.72	76.9	0.95	0.75	5.0	2	7.02	18.6
31 T	0.61	0.92	71.1	0.95	0.73	5.0	2	2.51	20.0
33 R	0.18	0.28	3.4		0.41	4.8#		3.11	37.4
East: PR-3 HAcia Carolina									
22 L	2.84	4.27	54.7	0.78	0.78	6.1	3	12.12	39.4
21 T	17.19	25.79	31.1	0.81	0.74	36.5	28	116.14	50.6
23 R	0.66	0.99	11.1	0.03	0.69	0.3	0	4.36	66.1
North: PR-9959 desde Canovanas									
42 L	2.11	3.16	73.0	0.94	0.76	6.1	4	9.65	24.6
41 T	0.78	1.17	67.0	0.94	0.73	6.1	4	3.83	25.9
43 R	0.35	0.52	3.5		0.41	9.2#		10.24	38.6

Largest density (passenger cars per km or mile) for any lane

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Intersection ID: 1
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Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
1908	0.612	16.43	24.65	31.0	0.65	0.63	20	98.48	50.7

South: El Nuevo Comandante											
309	0.354	2.61	3.92	30.4	0.36	0.53	2	12.64	26.5		
East: PR-3 HAcia Carolina											
2389	0.802	20.69	31.04	31.2	0.74	0.74	28	132.62	50.6		
North: PR-9959 desde Canovanas											
504	0.353	3.24	4.85	23.1	0.27	0.51	5	23.73	33.0		
ALL VEHICLES:											
5110	0.802	42.98	64.46	30.3	0.64	0.66	28	267.47	46.9		
INTERSECTION (persons):											
7665	0.802		64.46	30.3	0.64	0.66		267.47	46.9		

Queue values in this table are 95% back of queue (metres).

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Intersection ID: 1
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Table S.7 - LANE PERFORMANCE

Lane No.	Mov No.	Effective Green Times (sec) R1	G1	R2	G2	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	(m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo													
1 L	12	104	41	0	0	275	478	0.576	60.9	0.84	18.8	10	70
2 T	11	79	66	0	0	499	815	0.612	27.3	0.59	23.8	20	
3 T	11	79	66	0	0	499	815	0.612	27.3	0.59	23.8	20	
4 T	11	79	66	0	0	499	815	0.612	27.3	0.59	23.8	20	
5 R	13	2	66	2	75	137	1570	0.087	11.1	0.69	0.2	0	
South: El Nuevo Comandante													
1 L	32	132	13	0	0	57	162	0.354	76.9	0.75	4.9	2	
2 LT	32, 31	132	13	0	0	59	166	0.354	73.8	0.74	5.0	2	
3 R	33	0	145	0	0	193	1615	0.120	3.4	0.41	4.8#		
East: PR-3 HAcia Carolina													
1 L	22	104	41	0	0	94	479	0.195	54.7	0.78	6.1	3	70
2 L	22	104	41	0	0	94	479	0.195	54.7	0.78	6.1	3	70
3 T	21	79	66	0	0	663	827	0.802	31.1	0.74	36.5	28	
4 T	21	79	66	0	0	663	827	0.802	31.1	0.74	36.5	28	
5 T	21	79	66	0	0	663	827	0.802	31.1	0.74	36.5	28	
6 R	23	2	66	2	75	213	1560	0.137	11.1	0.69	0.3	0	
North: PR-9959 desde Canovanas													
1 L	42	128	17	0	0	71	201	0.353	73.0	0.76	5.8	5	
2 LT	42, 41	128	17	0	0	75	213	0.353	69.6	0.74	6.1	4	
3 R	43	0	145	0	0	358	1612	0.222	3.5	0.41	9.2#		

Density (passenger cars per km or mile)

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Table S.8A - LANE FLOW AND CAPACITY INFORMATION

Lane No.	Mov No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Lane Width (m)	Saturation Flow Adj. Basic (tcu)	Aver 1st (veh)	Aver 2nd (veh)	Cap (veh /h)	Cap (veh /h)	Deg. Satn x	Lane Util %
West: PR-3 Hacia Fajardo													
1 L	12	275	0	0	275	3.05	1784	1689	0	0	478	0.576	100
2 T	11	0	499	0	499	3.60	1900	1790	0	0	815	0.612	100
3 T	11	0	499	0	499	3.60	1900	1790	0	0	815	0.612	100
4 T	11	0	499	0	499	3.60	1900	1790	0	0	815	0.612	100
5 R	13	0	0	137	137	3.60	1900	1615	1615	0	1570	0.087	100
South: El Nuevo Comandante													
1 L	32	57	0	0	57	3.60	1900	1805	0	0	162	0.354	100
2 LT	32, 31	28	31	0	59	3.60	1900	1854	0	0	166	0.354	100
3 R	33	0	0	193	193	3.60	1900	1615	1615	0	1615	0.120	100
East: PR-3 HAcia Carolina													
1 L	22	94	0	0	94	3.05	1784	1695	0	0	479	0.195	100
2 L	22	94	0	0	94	3.05	1784	1695	0	0	479	0.195	100
3 T	21	0	663	0	663	3.60	1900	1816	0	0	827	0.802	100
4 T	21	0	663	0	663	3.60	1900	1816	0	0	827	0.802	100
5 T	21	0	663	0	663	3.60	1900	1816	0	0	827	0.802	100
6 R	23	0	0	213	213	3.60	1900	1604	1604	0	1560	0.137	100
North: PR-9959 desde Canovanas													
1 L	42	71	0	0	71	3.60	1900	1716	0	0	201	0.353	100
2 LT	42, 41	33	42	0	75	3.60	1900	1814	0	0	213	0.353	100
3 R	43	0	0	358	358	3.60	1900	1612	1612	0	1612	0.222	100

Basic Saturation Flow in this table is adjusted for lane width, approach grade, parking manoeuvres and number of buses stopping. Saturation flow scale applies if specified.

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Table S.8B - SCATS MF PARAMETER

Lane No.	Mov No.	Stopline Flow (veh/h)	Capacity (veh/h)	SCATS Satn Flow	SCATS MF	Deg. Satn x	Lane Util. %
West: PR-3 Hacia Fajardo							
1 L	12	275	478	1695	1616	0.576	100
2 T	11	499	815	1900	1844	0.612	100
3 T	11	499	815	1900	1844	0.612	100
4 T	11	499	815	1900	1844	0.612	100
5 R	13	137	1570	1615	NA	0.087	100
South: El Nuevo Comandante							
1 L	32	57	162	1805	1564	0.354	100
2 LT	32, 31	59	166	1854	1607	0.354	100
3 R	33	193	1615	1615	NA	0.120	100
East: PR-3 HAcia Carolina							
1 L	22	94	479	1695	1616	0.195	100
2 L	22	94	479	1695	1616	0.195	100
3 T	21	663	827	1900	1844	0.802	100
4 T	21	663	827	1900	1844	0.802	100
5 T	21	663	827	1900	1844	0.802	100
6 R	23	213	1560	1615	NA	0.137	100

North: PR-9959 desde Canovanas											
1 L	42	71	201	1805	1615	0.353	100				
2 LT	42, 41	75	213	1857	1662	0.353	100				
3 R	43	358	1612	1615	NA	0.222	100				

NA Not Applicable - SCATS MF was not calculated for this lane due to one of the following reasons:
- the lane is not controlled by signals (slip or continuous lane)
- two movements share this lane and do not run in the same phases

STOPLINE FLOW: Departure flow rate in veh/h as measured at the stop line. This cannot exceed capacity.

SCATS SATURATION FLOW: This allows for lane width, approach grade and turning vehicles. Saturation flow scale applies if specified. The effects of heavy vehicles, parking manoeuvres, number of buses stopping and conflicting pedestrian volume are not included.

SCATS MF: This emulates the MF (Maximum Flow) parameter used in the SCATS control system. It is calculated from the SCATS SATURATION FLOW parameter.

DEG. SATN: The Demand (Arrival) Flow Rate may exceed the Stopline Flow Rate, therefore x > 1 is possible.

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Table S.12A - FUEL CONSUMPTION, EMISSIONS AND COST - TOTAL

Mov No.	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: PR-3 Hacia Fajardo						
12 L	42.8	269.69	0.187	7.46	0.265	107.1
11 T	226.9	1132.61	0.834	33.40	1.384	568.7
13 R	18.0	84.01	0.075	3.32	0.122	45.1
	287.8	1486.32	1.096	44.18	1.771	720.9
South: El Nuevo Comandante						
32 L	10.9	90.57	0.053	2.32	0.059	27.2
31 T	3.9	31.40	0.019	0.83	0.021	9.8
33 R	9.5	83.02	0.038	1.29	0.040	23.8
	24.3	204.98	0.111	4.44	0.120	60.8
East: PR-3 HAcia Carolina						
22 L	28.3	174.43	0.124	4.97	0.177	70.8
21 T	308.3	1563.75	1.194	50.55	1.945	772.1
23 R	28.9	131.93	0.118	5.32	0.194	72.3
	365.5	1870.11	1.435	60.83	2.316	915.1
North: PR-9959 desde Canovanas						
42 L	19.8	148.85	0.084	3.75	0.104	49.6
41 T	6.8	56.21	0.031	1.27	0.034	17.0
43 R	31.4	281.46	0.124	3.73	0.121	78.5
	58.0	486.51	0.240	8.75	0.260	145.1
INTERSECTION:	735.6	4047.93	2.881	118.20	4.466	1842.0

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	27.00
Time value factor	=	0.60
Average occupancy (persons/veh)	=	1.5
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

The idle fuel and vehicle mass parameters given above are the default values (data given in RIDES may override some of these parameters).

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Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo												
1 L	275			275	0	1783	41		0.576	60.9	10	70
2 T		499		499	6	1899	66		0.612	27.3	20	
3 T		499		499	6	1899	66		0.612	27.3	20	
4 T		499		499	6	1899	66		0.612	27.3	20	
5 R			137	137	0	1899	66	75	0.087	11.1	0	
	275	1496	137	1908	5				0.612	31.0	20	
South: El Nuevo Comandante												
1 L	57			57	0	1899	13		0.354	76.9	2	
2 LT	28	31		59	0	1900	13		0.354	73.8	2	
3 R			193	193	0	1899	145		0.120	3.4		
	85	31	193	309	0				0.354	30.4	2	
East: PR-3 HAcia Carolina												
1 L	94			94	0	1783	41		0.195	54.7	3	70
2 L	94			94	0	1783	41		0.195	54.7	3	70
3 T		663		663	5	1899	66		0.802	31.1	28	
4 T		663		663	5	1899	66		0.802	31.1	28	
5 T		663		663	5	1899	66		0.802	31.1	28	
6 R			213	213	1	1899	66	75	0.137	11.1	0	
	187	1989	213	2389	4				0.802	31.2	28	
North: PR-9959 desde Canovanas												
1 L	71			71	6	1899	17		0.353	73.0	5	
2 LT	33	42		75	3	1900	17		0.353	69.6	4	
3 R			358	358	0	1899	145		0.222	3.5		
	104	42	358	504	1				0.353	23.1	5	

ALL VEHICLES	Total Flow	% HV	Cycle Time	Max X	Aver. Delay	Max Queue
	5110	4	145	0.802	30.3	28

Total flow period = 60 minutes. Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows (in through car units) have been adjusted for grade, lane widths, parking manoeuvres and bus stops.

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Table S.15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Green Ratio (g/C) 1st grn	Green Ratio (g/C) 2nd grn	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)
West: PR-3 Hacia Fajardo										
12 L		0.283*		275	478	0.576	60.9	E	18.8	10
11 T		0.455		1496	2444	0.612	27.3	C	23.8	20
13 R	(Und)	0.455	0.517	137	1570	0.087	11.1	B	0.2	0
				1908		0.612	31.0	C	23.8	20
South: El Nuevo Comandante										
32 L		0.090*		85	240	0.354	76.9	E	5.0	2
31 T		0.090		31	88	0.354	71.1	E	5.0	2
33 R	(Con)	1.000		193	1615	0.120	3.4	A#	4.8#	
				309		0.354	30.4	C	5.0	2
East: PR-3 HAcia Carolina										
22 L		0.283		187	958	0.195	54.7	D	6.1	3
21 T		0.455*		1989	2480	0.802*	31.1	C	36.5	28
23 R	(Und)	0.455	0.517	213	1560	0.137	11.1	B	0.3	0
				2389		0.802	31.2	C	36.5	28
North: PR-9959 desde Canovanas										
42 L		0.117*		104	295	0.353	73.0	E	6.1	4
41 T		0.117		42	119	0.353	67.0	E	6.1	4
43 R	(Con)	1.000		358	1612	0.222	3.5	B#	9.2#	
				504		0.353	23.1	C	6.1	4
ALL VEHICLES:				5110		0.802	30.3	C	36.5	28
INTERSECTION (persons):				7665			30.3		36.5	28

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the aaSIDRA Output Guide or the Output section of the on-line help.
\# Continuous movements: Level Of Service based on density, Density (passenger cars per km or mile) instead of queue.
* Maximum v/c ratio, or critical green periods

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Table D.0 - GEOMETRIC DELAY DATA

From	To	Negn Radius	Negn Speed	Negn Dist.	Appr. Dist.	Downstream Distance
West: PR-3 Hacia Fajardo						
	South	20.0	26.2	31.4	1000	184
	East		S 80.0	23.6	1000	202
	North	17.8	25.1	28.0	1000	183
South: El Nuevo Comandante						
	West	18.6	25.6	29.3	500	183
	East	20.0	26.2	31.4	500	60
	North		S 80.0	39.1	500	193
East: PR-3 HAcia Carolina						
	West		S 80.0	23.6	1000	200
	South	17.5	25.0	27.5	1000	181
	North	20.0	26.2	31.4	1000	186
North: PR-9959 desde Canovanas						
	West	20.0	26.2	31.4	1000	60
	South		S 80.0	39.1	1000	193
	East	19.4	25.9	30.4	1000	195

Downstream Distance calculated by aaSIDRA

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Delay (seconds/veh) Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: PR-3 Hacia Fajardo											
1 L	12	0.576	49.8	0.0	49.8	4.3	45.5	0.0	45.5	11.1	60.9
2 T	11	0.612	27.3	0.0	27.3	6.5	20.9	0.0	20.9	0.0	27.3
3 T	11	0.612	27.3	0.0	27.3	6.5	20.9	0.0	20.9	0.0	27.3
4 T	11	0.612	27.3	0.0	27.3	6.5	20.9	0.0	20.9	0.0	27.3
5 R	13	0.087	0.0	0.0	0.0	0.2	0.0	0.0	0.0	11.1	11.1
South: El Nuevo Comandante											
1 L	32	0.354	71.2	0.0	71.2	4.7	66.5	0.0	66.5	5.8	76.9
2 LT	32, 31	0.354	71.1	0.0	71.1	6.4	64.7	0.0	64.7	5.8 0.0	73.8
3 R	33	0.120			0.0					3.4	3.4
East: PR-3 HAcia Carolina											
1 L	22	0.195	43.7	0.0	43.7	3.7	39.9	0.0	39.9	11.1	54.7
2 L	22	0.195	43.7	0.0	43.7	3.7	39.9	0.0	39.9	11.1	54.7
3 T	21	0.802	31.1	0.0	31.1	8.0	23.1	0.0	23.1	0.0	31.1
4 T	21	0.802	31.1	0.0	31.1	8.0	23.1	0.0	23.1	0.0	31.1
5 T	21	0.802	31.1	0.0	31.1	8.0	23.1	0.0	23.1	0.0	31.1
6 R	23	0.137	0.0	0.0	0.0	0.2	0.0	0.0	0.0	11.1	11.1
North: PR-9959 desde Canovanas											
1 L	42	0.353	67.2	0.0	67.2	4.6	62.5	0.0	62.5	5.8	73.0
2 LT	42, 41	0.353	67.0	0.0	67.0	6.4	60.6	0.0	60.6	5.8 0.0	69.6
3 R	43	0.222			0.1					3.4	3.5

dn is average stop-start delay for all vehicles queued and unqueued

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table D.2 - LANE STOPS

Lane No.	Deg. Satn x	Effective Stop Rate hel	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: PR-3 Hacia Fajardo							
1 L	0.576	0.76	0.00	0.08	0.84	0.889	0.00
2 T	0.612	0.59	0.00	0.00	0.59	0.658	0.00
3 T	0.612	0.59	0.00	0.00	0.59	0.658	0.00
4 T	0.612	0.59	0.00	0.00	0.59	0.658	0.00
5 R	0.087	0.02	0.00	0.67	0.69	0.031	0.00
South: El Nuevo Comandante							
1 L	0.354	0.72	0.00	0.02	0.75	0.954	0.00
2 LT	0.354	0.73	0.00	0.01	0.74	0.954	0.00
3 R	0.120			0.41	0.41		
East: PR-3 HAcia Carolina							
1 L	0.195	0.62	0.00	0.16	0.78	0.776	0.00
2 L	0.195	0.62	0.00	0.16	0.78	0.776	0.00
3 T	0.802	0.74	0.00	0.00	0.74	0.812	0.00
4 T	0.802	0.74	0.00	0.00	0.74	0.812	0.00
5 T	0.802	0.74	0.00	0.00	0.74	0.812	0.00
6 R	0.137	0.02	0.00	0.67	0.69	0.033	0.00
North: PR-9959 desde Canovanas							
1 L	0.353	0.73	0.00	0.03	0.76	0.937	0.00
2 LT	0.353	0.73	0.00	0.01	0.74	0.937	0.00
3 R	0.222			0.41	0.41		

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table D.3A - LANE QUEUES (veh)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 L	0.576	0.0	10.2	0.0	10.2	12.0	15.5	16.7	18.8	22.0	0.14
2 T	0.612	0.0	13.3	0.0	13.3	15.6	19.9	21.4	23.8	27.5	0.02
3 T	0.612	0.0	13.3	0.0	13.3	15.6	19.9	21.4	23.8	27.5	0.02
4 T	0.612	0.0	13.3	0.0	13.3	15.6	19.9	21.4	23.8	27.5	0.02
5 R	0.087	0.0	0.1	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.00
South: El Nuevo Comandante											
1 L	0.354	0.0	2.4	0.0	2.4	2.9	3.8	4.2	4.9	6.1	0.00
2 LT	0.354	0.0	2.5	0.0	2.5	2.9	3.9	4.3	5.0	6.2	0.00
3 R	0.120				4.8#						-0.01#
East: PR-3 HAcia Carolina											
1 L	0.195	0.0	3.1	0.0	3.1	3.6	4.8	5.3	6.1	7.6	0.04
2 L	0.195	0.0	3.1	0.0	3.1	3.6	4.8	5.3	6.1	7.6	0.04
3 T	0.802	0.0	21.7	0.0	21.7	25.2	31.4	33.4	36.5	41.0	0.03
4 T	0.802	0.0	21.7	0.0	21.7	25.2	31.4	33.4	36.5	41.0	0.03
5 T	0.802	0.0	21.7	0.0	21.7	25.2	31.4	33.4	36.5	41.0	0.03
6 R	0.137	0.0	0.1	0.0	0.1	0.2	0.2	0.3	0.3	0.4	0.00
North: PR-9959 desde Canovanas											
1 L	0.353	0.0	2.9	0.0	2.9	3.5	4.6	5.1	5.8	7.3	0.00
2 LT	0.353	0.0	3.1	0.0	3.1	3.6	4.8	5.3	6.1	7.6	0.00
3 R	0.222				9.2#						-0.01#

Values printed in this table are back of queue (vehicles).
\# Continuous movements: Density (passenger cars per km or mile) instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table D.3B - LANE QUEUES (metres)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 L	0.576	0	5	0	5	6	8	9	10	11	0.14
2 T	0.612	0	11	0	11	13	17	18	20	23	0.02
3 T	0.612	0	11	0	11	13	17	18	20	23	0.02
4 T	0.612	0	11	0	11	13	17	18	20	23	0.02
5 R	0.087	0	0	0	0	0	0	0	0	0	0.00
South: El Nuevo Comandante											
1 L	0.354	0	1	0	1	1	2	2	2	3	0.00
2 LT	0.354	0	1	0	1	1	2	2	2	3	0.00
3 R	0.120				4.8#						-0.01#
East: PR-3 HAcia Carolina											
1 L	0.195	0	2	0	2	2	2	3	3	4	0.04
2 L	0.195	0	2	0	2	2	2	3	3	4	0.04
3 T	0.802	0	16	0	16	19	24	25	28	31	0.03
4 T	0.802	0	16	0	16	19	24	25	28	31	0.03
5 T	0.802	0	16	0	16	19	24	25	28	31	0.03
6 R	0.137	0	0	0	0	0	0	0	0	0	0.00
North: PR-9959 desde Canovanas											
1 L	0.353	0	2	0	2	3	4	4	5	6	0.00
2 LT	0.353	0	2	0	2	2	3	3	4	5	0.00
3 R	0.222				9.2#						-0.01#

Values printed in this table are back of queue (metres).
\# Continuous movements: Density (passenger cars per km or mile) instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table D.4 - MOVEMENT SPEEDS (km/h)

Mov No.	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall
West: PR-3 Hacia Fajardo								
12	80.0	25.1	25.1	80.0			62.1	37.3
11	80.0	80.0	80.0	80.0			71.4	53.0
13	80.0	26.2	26.2	80.0			66.1	66.1
South: El Nuevo Comandante								
32	40.0	25.6	25.6	80.0			37.4	18.6
31	40.0	40.0	80.0	80.0			40.4	20.0
33	40.0	26.2	26.2	80.0			37.4	37.4
East: PR-3 HAcia Carolina								
22	80.0	25.0	25.0	80.0			62.6	39.4
21	80.0	80.0	80.0	80.0			69.6	50.6
23	80.0	26.2	26.2	80.0			66.1	66.1
North: PR-9959 desde Canovanas								
42	40.0	25.9	25.9	80.0			38.5	24.6
41	40.0	40.0	80.0	80.0			40.3	25.9
43	40.0	26.2	26.2	80.0			38.6	38.6

"Running Speed" is the average speed excluding stopped periods.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table D.5 - PROGRESSION FACTORS & ACTUATED SIGNAL PARAMETERS

Mov No.	Control	Coord.	Arrival Type	Delay Prog. Factor	Queue Prog. Factor	Gap Settings es	eh	Disp. Grn. Settings 1st Grn Gmin	Gmax	2nd Grn Gmin	Gmax
West: PR-3 Hacia Fajardo											
12	VA	No	3	1.000	1.000	2.0	2.1	6	20		
11	VA	Yes	4	0.830	0.828	2.5	2.7	6	50		
13	VA	No	3	1.000	1.000	2.5	2.6	6	50	6	50
South: El Nuevo Comandante											
32	VA	No	3	1.000	1.000	2.0	2.3	6	20		
31	VA	No	3	1.000	1.000	2.5	2.8	6	50		
33	VA	No	3	1.000	1.000	2.5	2.8	6	50		
East: PR-3 HAcia Carolina											
22	VA	No	3	1.000	1.000	2.0	2.1	6	20		
21	VA	Yes	4	0.830	0.893	2.5	2.6	6	50		
23	VA	No	3	1.000	1.000	2.5	2.6	6	50	6	50
North: PR-9959 desde Canovanas											
42	VA	No	3	1.000	1.000	2.0	2.3	6	20		
41	VA	No	3	1.000	1.000	2.5	2.8	6	50		
43	VA	No	3	1.000	1.000	2.5	2.8	6	50		

--- End of aaSIDRA Output ---

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Movement Summary

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ PR-9959 - 2011 PM

Signalised - Actuated coordinated **Cycle Time = 180 seconds**

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
El Nuevo Comandante										
32	L	232	0.0	0.511	84.1	LOS F	7	0.94	0.80	17.6
31	T	58	0.0	0.511	78.3	LOS E	7	0.94	0.77	18.9
33	R	389	0.0	0.241	3.5	LOS B#	10#	0.00	0.41	37.4
Approach		**679**	**0.0**	**0.511**	**37.4**	**LOS D**	**7**	**0.40**	**0.57**	**24.6**
PR-3 HAcia Carolina										
22	L	263	0.0	0.482	88.3	LOS F	6	0.93	0.81	30.1
21	T	1868	2.1	0.596	18.8	LOS B	16	0.48	0.44	59.3
23	R	22	4.5	0.014	11.2	LOS B	0	0.02	0.69	66.1
Approach		**2153**	**1.9**	**0.596**	**27.2**	**LOS C**	**16**	**0.53**	**0.49**	**53.1**
PR-9959 desde Canovanas										
42	L	41	2.4	0.298	95.1	LOS F	3	0.96	0.74	21.8
41	T	60	0.0	0.406	90.2	LOS F	3	0.97	0.74	22.7
43	R	181	1.1	0.113	3.5	LOS A#	5#	0.00	0.41	38.6
Approach		**282**	**1.1**	**0.406**	**35.2**	**LOS D**	**3**	**0.34**	**0.52**	**30.2**
PR-3 Hacia Fajardo										
12	L	154	0.0	0.564	89.5	LOS F	7	0.95	0.81	29.8
11	T	3174	0.6	0.999	56.2	LOS E	55	1.00	0.99	39.1
13	R	195	0.0	0.123	11.1	LOS B	0	0.03	0.69	66.1
Approach		**3523**	**0.6**	**0.999**	**55.2**	**LOS E**	**55**	**0.94**	**0.97**	**39.4**
All Vehicles		**6637**	**0.9**	**0.999**	**43.4**	**LOS D**	**55**	**0.73**	**0.75**	**41.1**

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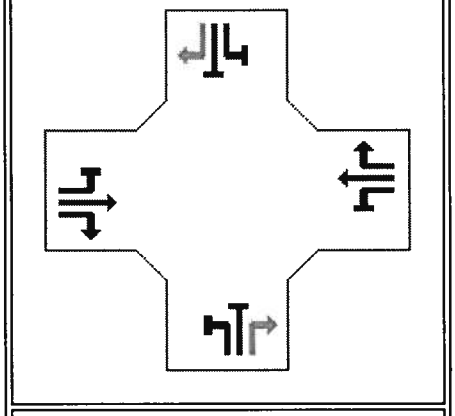
Phasing

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ PR-9959 - 2011 PM

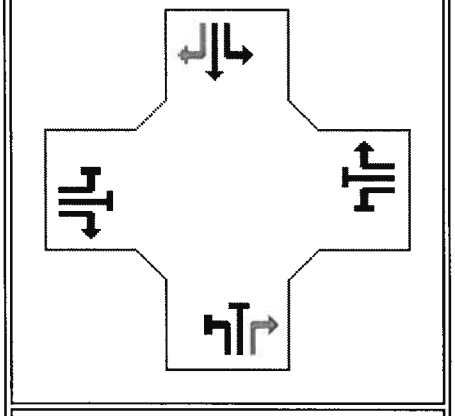
C = **180** seconds
Cycle Time Option: **User-specified cycle time**
Phase times determined by the program.

Phase A



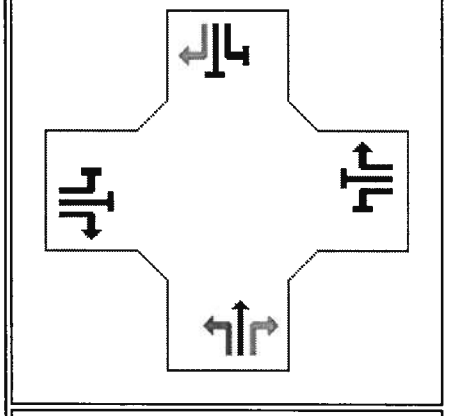
G = **101** seconds
G + I = **103** seconds
(G + I)/C = **57.2** %

Phase B



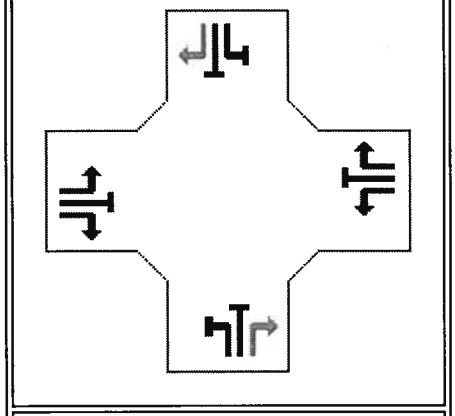
G = **14** seconds
G + I = **16** seconds
(G + I)/C = **8.9** %

Phase C

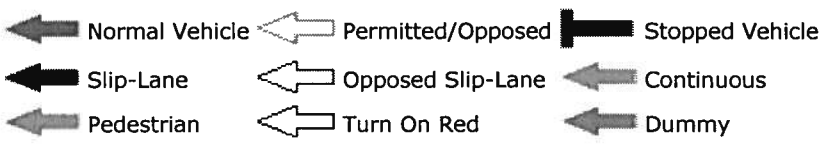


G = **28** seconds
G + I = **30** seconds
(G + I)/C = **16.7** %

Phase D



G = **29** seconds
G + I = **31** seconds
(G + I)/C = **17.2** %



C	Cycle Time
G	Green Time
I	Intergreen Time (yellow plus all-red)
(G + I)/C	Phase time as a percentage of cycle

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Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 PM
Intersection ID: 1

aaTraffic SIDRA US Highway Capacity Manual (2000) Metric Version

RUN INFORMATION

* Basic Parameters:
Intersection Type: Signalised - Actuated Coordinated
For fully-actuated signal timings, the following specifications will be ignored:
Any maximum cycle time specification
Driving on the right-hand side of the road
Input data specified in Metric units
Default Values File No. 10
Peak flow period (for performance): 15 minutes
Unit time (for volumes): 60 minutes (Hourly Rate)
Delay definition: Control delay
Geometric delay included
aaSIDRA Standard Delay and Queue models used
Level of Service based on: Delay (HCM method)
Queue definition: Back of queue, 95th Percentile

* No. of Main (Timing-Capacity) Iterations = 2
Comparison of last two iterations:
Difference in intersection degree of satn = 0.0 %
Largest difference in eff. green times = 0 secs
(max. value for stopping = 0 secs)

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.0 - TRAFFIC FLOW DATA

Mov No.	Left LV	Left HV	Through LV	Through HV	Right LV	Right HV	Flow Scale	Peak Flow Factor
VEHICLES	Demand flows in veh/hour as used by the program							
West: PR-3 Hacia Fajardo								
12	154	0	0	0	0	0	1.00	0.95
11	0	0	3154	20	0	0	1.00	0.95
13	0	0	0	0	195	0	1.00	0.95
South: El Nuevo Comandante								
32	232	0	0	0	0	0	1.00	0.95
31	0	0	58	0	0	0	1.00	0.95
33	0	0	0	0	389	0	1.00	0.95
East: PR-3 HAcia Carolina								
22	263	0	0	0	0	0	1.00	0.95
21	0	0	1829	39	0	0	1.00	0.95
23	0	0	0	0	21	1	1.00	0.95
North: PR-9959 desde Canovanas								
42	40	1	0	0	0	0	1.00	0.95
41	0	0	60	0	0	0	1.00	0.95
43	0	0	0	0	179	2	1.00	0.95

Based on unit time = 60 minutes.
Flow Scale and Peak Hour Factor effects included in flow values.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.1 - MOVEMENT PHASE AND TIMING PARAMETERS

Mov No.	Mov Typ	PHASE MATRIX First Green Fr	To	Op Pr	Second Green Fr	To	Op Pr	Lost Tim 1st Grn	2nd Grn	Req.Mov.Time 1st Grn	2nd Grn	Eff. Grn 1st Grn	2nd Grn
West: PR-3 Hacia Fajardo													
12 L	*D	A						2		22.0Max		29	
11 T	*A	B						2		52.0Max		101	
13 R (Und)	A	B			B	A		2	2	29.2	29.2	101	75
South: El Nuevo Comandante													
32 L	C	D						2		22.0Max		28	
31 T	*C	D						2		31.2		28	
East: PR-3 HAcia Carolina													
22 L	D	A						2		22.0Max		29	
21 T	A	B						2		52.0Max		101	
23 R (Und)	A	B			B	A		2	2	8.0Min	24.0Min	101	75
North: PR-9959 desde Canovanas													
42 L	B	C						2		12.4		14	
41 T	*B	C						2		16.2		14	

Current Phase Sequence No.: 1
Input phase sequence: A B C D
Output phase sequence: A B C D

* Critical Movement/Green Period

Movement Types:
Ped Pedestrian
Dum Dummy
Und Undetected in both green periods
Un1 Undetected in 1st green period
Un2 Undetected in 2nd green period

Under heading 'Op':
L "Left" turns are opposed
R "Right" turns are opposed
LR "Left and Right" opposed
C "Constant" saturation flow

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Dem Flow (veh /h)	HV (%)	Satn Flow 1st Grn	2nd Grn	Flow Ratio 1st Grn	2nd Grn	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: PR-3 Hacia Fajardo											
12 L	154	0.0	1695		0.091		273	0.95	68	100	0.564
11 T	3174	0.6	5664		0.560		3178	0.95	-5	100	0.999*
13 R	195	0.0	1615	1615	0.060	0.060	1579	0.90	629	100	0.123
South: El Nuevo Comandante											
32 L	232	0.0	2917		0.080		454	0.95	86	100	0.511
31 T	58	0.0	729		0.080		113	0.95	86	100	0.511
33 R	389	0.0	1615		0.241		1615	0.98	307	100	0.241
East: PR-3 HAcia Carolina											
22 L	263	0.0	3389		0.078		546	0.90	87	100	0.482
21 T	1868	2.1	5583		0.335		3133	0.95	59	100	0.596
23 R	22	4.5	1565	1565	0.007	0.007	1530	0.90	6160	100	0.014
North: PR-9959 desde Canovanas											
42 L	41	2.4	1766		0.023		137	0.95	218	74	0.298
41 T	60	0.0	1900		0.032		148	0.90	122	100	0.406
43 R	181	1.1	1603		0.113		1603	0.98	768	100	0.113

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Table S.3 - INTERSECTION PARAMETERS

Mov No.	Crit & Turn	App. Period	Green	Phases Fr	To	Adjusted Lost Time	Adjusted Flow Ratio	Required Grn Time Ratio	Required Movement Time
11	W_T			A	B	52	-	-	52.0Max
41	N_T			B	C	2	0.032	0.079	16.2
31	S_T			C	D	2	0.080	0.162	31.2
12	W_L			D	A	22	-	-	22.0Max
					Total:	78	0.111	0.241	121.4

- Flow ratio not used for cycle time calculations and the adjusted lost time equals the required movement time (=Min or Max as shown in Table S.1)

Cycle Time:

Minimum	Maximum	Practical	Chosen
32	NA	103	180

(Cycle time specified by the user)

Intersection Level of Service	=	D
Worst movement Level of Service	=	F
Average intersection delay (s)	=	43.4
Largest average movement delay (s)	=	95.1
Largest back of queue, 95% (m)	=	55
Performance Index	=	485.07
Degree of saturation (highest)	=	0.999
Practical Spare Capacity (lowest)	=	-5 %
Effective intersection capacity, (veh/h)	=	6646
Total vehicle flow (veh/h)	=	6637
Total person flow (pers/h)	=	9956
Total vehicle delay (veh-h/h)	=	80.06
Total person delay (pers-h/h)	=	120.09
Total effective vehicle stops (veh/h)	=	4997
Total effective person stops (pers/h)	=	7496
Total vehicle travel (veh-km/h)	=	7491.2
Total cost ($/h)	=	5677.14
Total fuel (L/h)	=	922.2
Total CO2 (kg/h)	=	2306.47

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ PR-9959 - 2011 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.4 - PHASE INFORMATION

Phase No.	Change Time	Green Start	Displayed Green	Secs	Grn+Intgrn Prop.
A	0	2	101	103	0.572
B	103	105	14	16	0.089
C	119	121	28	30	0.167
D	149	151	29	31	0.172

Current Phase Sequence No.: 1
Input phase sequence: A B C D
Output phase sequence: A B C D

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Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	(m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
12 L	3.83	5.74	89.5	0.95	0.81	14.6	7	14.16	29.8
11 T	49.58	74.36	56.2	1.00	0.99	102.6	55	308.92	39.1
13 R	0.60	0.90	11.1	0.03	0.69	0.3	0	3.99	66.1
South: El Nuevo Comandante									
32 L	5.42	8.13	84.1	0.94	0.80	13.8	7	21.41	17.6
31 T	1.26	1.89	78.3	0.94	0.77	13.8	7	5.27	18.9
33 R	0.37	0.56	3.5		0.41	9.7#		6.26	37.4
East: PR-3 HAcia Carolina									
22 L	6.45	9.67	88.3	0.93	0.81	12.4	6	23.88	30.1
21 T	9.73	14.59	18.8	0.48	0.44	26.2	16	84.46	59.3
23 R	0.07	0.10	11.2	0.02	0.69	0.0	0	0.45	66.1
North: PR-9959 desde Canovanas									
42 L	1.08	1.62	95.1	0.96	0.74	4.3	3	4.52	21.8
41 T	1.50	2.25	90.2	0.97	0.74	6.3	3	6.57	22.7
43 R	0.17	0.26	3.5		0.41	5.1#		5.18	38.6

Largest density (passenger cars per km or mile) for any lane

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Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
3523	0.999	54.00	81.01	55.2	0.94	0.97	55	327.07	39.4

South: El Nuevo Comandante										
679	0.511	7.05	10.58	37.4	0.40	0.57	7	32.94	24.6	
East: PR-3 HAcia Carolina										
2153	0.596	16.25	24.37	27.2	0.53	0.49	16	108.79	53.1	
North: PR-9959 desde Canovanas										
282	0.406	2.76	4.14	35.2	0.34	0.52	3	16.26	30.2	
ALL VEHICLES:										
6637	0.999	80.06	120.09	43.4	0.73	0.75	55	485.07	41.1	
INTERSECTION (persons):										
9956	0.999		120.09	43.4	0.73	0.75		485.07	41.1	

Queue values in this table are 95% back of queue (metres).

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Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.7 - LANE PERFORMANCE

Lane No.	Mov No.	Effective Green (sec) R1	G1	R2	G2	Red and	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	(m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo														
1 L	12	151	29	0	0		154	273	0.564	89.5	0.81	14.6	7	70
2 T	11	79	101	0	0		1058	1059	0.999	56.2	0.99	102.6	55	
3 T	11	79	101	0	0		1058	1059	0.999	56.2	0.99	102.6	55	
4 T	11	79	101	0	0		1058	1059	0.999	56.2	0.99	102.6	55	
5 R	13	2	101	2	75		195	1579	0.123	11.1	0.69	0.3	0	
South: El Nuevo Comandante														
1 L	32	152	28	0	0		144	281	0.511	84.1	0.80	13.6	7	
2 LT	32, 31	152	28	0	0		146	286	0.511	81.7	0.79	13.8	7	
3 R	33	0	180	0	0		389	1615	0.241	3.5	0.41	9.7#		
East: PR-3 HAcia Carolina														
1 L	22	151	29	0	0		132	273	0.482	88.3	0.81	12.4	6	70
2 L	22	151	29	0	0		132	273	0.482	88.3	0.81	12.4	6	70
3 T	21	79	101	0	0		623	1044	0.596	18.8	0.44	26.2	16	
4 T	21	79	101	0	0		623	1044	0.596	18.8	0.44	26.2	16	
5 T	21	79	101	0	0		623	1044	0.596	18.8	0.44	26.2	16	
6 R	23	2	101	2	75		22	1530	0.014	11.2	0.69	0.0	0	
North: PR-9959 desde Canovanas														
1 L	42	166	14	0	0		41	137	0.298	95.1	0.74	4.3	3	
2 T	42, 41	166	14	0	0		60	148	0.406	90.2	0.74	6.3	3	
3 R	43	0	180	0	0		181	1603	0.113	3.5	0.41	5.1#		

Density (passenger cars per km or mile)

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Table S.8A - LANE FLOW AND CAPACITY INFORMATION

Lane No.	Mov No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Lane Width (m)	Saturation Flow Adj. Basic (tcu)	Aver 1st (veh)	Aver 2nd (veh)	End Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: PR-3 Hacia Fajardo													
1 L	12	154	0	0	154	3.05	1784	1695	0	0	273	0.564	100
2 T	11	0	1058	0	1058	3.60	1900	1888	0	0	1059	0.999	100
3 T	11	0	1058	0	1058	3.60	1900	1888	0	0	1059	0.999	100
4 T	11	0	1058	0	1058	3.60	1900	1888	0	0	1059	0.999	100
5 R	13	0	0	195	195	3.60	1900	1615	1615	0	1579	0.123	100
South: El Nuevo Comandante													
1 L	32	144	0	0	144	3.60	1900	1805	0	0	281	0.511	100
2 LT	32, 31	88	58	0	146	3.60	1900	1841	0	0	286	0.511	100
3 R	33	0	0	389	389	3.60	1900	1615	1615	0	1615	0.241	100
East: PR-3 HAcia Carolina													
1 L	22	132	0	0	132	3.05	1784	1695	0	0	273	0.482	100
2 L	22	132	0	0	132	3.05	1784	1695	0	0	273	0.482	100
3 T	21	0	623	0	623	3.60	1900	1861	0	0	1044	0.596	100
4 T	21	0	623	0	623	3.60	1900	1861	0	0	1044	0.596	100
5 T	21	0	623	0	623	3.60	1900	1861	0	0	1044	0.596	100
6 R	23	0	0	22	22	3.60	1900	1565	1565	0	1530	0.014	100
North: PR-9959 desde Canovanas													
1 L	42	41	0	0	41	3.60	1900	1766	0	0	137	0.298	74P
2 T	42, 41	0	60	0	60	3.60	1900	1900	0	0	148	0.406	100
3 R	43	0	0	181	181	3.60	1900	1603	1603	0	1603	0.113	100

P Lane under-utilisation found by the "Program"

Basic Saturation Flow in this table is adjusted for lane width, approach grade, parking manoeuvres and number of buses stopping. Saturation flow scale applies if specified.

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Table S.8B - SCATS MF PARAMETER

Lane No.	Mov No.	Stopline Flow (veh/h)	Capacity (veh/h)	SCATS Satn Flow	SCATS MF	Deg. Satn x	Lane Util. %
West: PR-3 Hacia Fajardo							
1 L	12	154	273	1695	1585	0.564	100
2 T	11	1058	1059	1900	1863	0.999	100
3 T	11	1058	1059	1900	1863	0.999	100
4 T	11	1058	1059	1900	1863	0.999	100
5 R	13	195	1579	1615	NA	0.123	100
South: El Nuevo Comandante							
1 L	32	144	281	1805	1685	0.511	100
2 LT	32, 31	146	286	1841	1719	0.511	100
3 R	33	389	1615	1615	NA	0.241	100
East: PR-3 HAcia Carolina							
1 L	22	132	273	1695	1585	0.482	100
2 L	22	132	273	1695	1585	0.482	100
3 T	21	623	1044	1900	1863	0.596	100
4 T	21	623	1044	1900	1863	0.596	100
5 T	21	623	1044	1900	1863	0.596	100
6 R	23	22	1530	1615	NA	0.014	100
North: PR-9959 desde Canovanas							
1 L	42	41	137	1805	1579	0.298	74P
2 T	42, 41	60	148	1900	1662	0.406	100
3 R	43	181	1603	1615	NA	0.113	100

NA Not Applicable - SCATS MF was not calculated for this lane due to one of the following reasons:
- the lane is not controlled by signals (slip or continuous lane)
- two movements share this lane and do not run in the same phases

P Lane under-utilisation found by the "Program"

STOPLINE FLOW: Departure flow rate in veh/h as measured at the stop line. This cannot exceed capacity.

SCATS SATURATION FLOW: This allows for lane width, approach grade and turning vehicles. Saturation flow scale applies if specified. The effects of heavy vehicles, parking manoeuvres, number of buses stopping and conflicting pedestrian volume are not included.

SCATS MF: This emulates the MF (Maximum Flow) parameter used in the SCATS control system. It is calculated from the SCATS SATURATION FLOW parameter.

DEG. SATN: The Demand (Arrival) Flow Rate may exceed the Stopline Flow Rate, therefore x > 1 is possible.

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Table S.12A - FUEL CONSUMPTION, EMISSIONS AND COST - TOTAL

Mov No.	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: PR-3 Hacia Fajardo						
12 L	25.4	182.67	0.115	4.21	0.150	63.6
11 T	497.9	3031.18	2.148	86.63	3.111	1245.0
13 R	25.7	119.54	0.106	4.72	0.173	64.2
	549.0	3333.39	2.369	95.56	3.433	1372.8
South: El Nuevo Comandante						
32 L	30.4	259.22	0.149	6.36	0.162	75.9
31 T	7.5	61.75	0.036	1.55	0.040	18.6
33 R	19.2	167.36	0.077	2.59	0.080	47.9
	57.0	488.33	0.263	10.50	0.282	142.4
East: PR-3 HAcia Carolina						
22 L	43.3	309.50	0.195	7.18	0.255	108.2
21 T	235.7	1234.40	0.875	29.51	1.437	589.8
23 R	3.3	14.13	0.013	0.61	0.022	8.3
	282.3	1558.03	1.082	37.30	1.714	706.3
North: PR-9959 desde Canovanas						
42 L	7.5	64.35	0.034	1.37	0.037	18.9
41 T	10.3	90.37	0.048	1.84	0.050	25.7
43 R	16.2	142.67	0.063	1.91	0.062	40.4
	34.0	297.39	0.145	5.13	0.150	85.0
INTERSECTION:	922.2	5677.14	3.858	148.50	5.579	2306.5

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	27.00
Time value factor	=	0.60
Average occupancy (persons/veh)	=	1.5
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

The idle fuel and vehicle mass parameters given above are the default values (data given in RIDES may override some of these parameters).

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Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo												
1 L	154			154	0	1783	29		0.564	89.5	7	70
2 T		1058		1058	1	1899	101		0.999	56.2	55	
3 T		1058		1058	1	1899	101		0.999	56.2	55	
4 T		1058		1058	1	1899	101		0.999	56.2	55	
5 R			195	195	0	1899	101	75	0.123	11.1	0	
	154	3174	195	3523	1				0.999	55.2	55	
South: El Nuevo Comandante												
1 L	144			144	0	1899	28		0.511	84.1	7	
2 LT	88	58		146	0	1900	28		0.511	81.7	7	
3 R			389	389	0	1899	180		0.241	3.5		
	232	58	389	679	0				0.511	37.4	7	
East: PR-3 HAcia Carolina												
1 L	132			132	0	1783	29		0.482	88.3	6	70
2 L	132			132	0	1783	29		0.482	88.3	6	70
3 T		623		623	2	1899	101		0.596	18.8	16	
4 T		623		623	2	1899	101		0.596	18.8	16	
5 T		623		623	2	1899	101		0.596	18.8	16	
6 R			22	22	5	1899	101	75	0.014	11.2	0	
	263	1868	22	2153	2				0.596	27.2	16	
North: PR-9959 desde Canovanas												
1 L	41			41	2	1899	14		0.298	95.1	3	
2 T		60		60	0	1900	14		0.406	90.2	3	
3 R			181	181	1	1899	180		0.113	3.5		
	41	60	181	282	1				0.406	35.2	3	

ALL VEHICLES	Total Flow	% HV	Cycle Time	Max X	Aver. Delay	Max Queue
	6637	1	180	0.999	43.4	55

Total flow period = 60 minutes. Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows (in through car units) have been adjusted for grade, lane widths, parking manoeuvres and bus stops.

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Table S.15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Green Time Ratio (g/C) 1st grn	2nd grn	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: PR-3 Hacia Fajardo										
12 L		0.161*		154	273	0.564	89.5	F	14.6	7
11 T		0.561*		3174	3178	0.999*	56.2	E	102.6	55
13 R	(Und)	0.561	0.417	195	1579	0.123	11.1	B	0.3	0
				3523		0.999	55.2	E	102.6	55
South: El Nuevo Comandante										
32 L		0.156		232	454	0.511	84.1	F	13.8	7
31 T		0.156*		58	113	0.511	78.3	E	13.8	7
33 R	(Con)	1.000		389	1615	0.241	3.5	B#	9.7#	
				679		0.511	37.4	D	13.8	7
East: PR-3 HAcia Carolina										
22 L		0.161		263	546	0.482	88.3	F	12.4	6
21 T		0.561		1868	3133	0.596	18.8	B	26.2	16
23 R	(Und)	0.561	0.417	22	1530	0.014	11.2	B	0.0	0
				2153		0.596	27.2	C	26.2	16
North: PR-9959 desde Canovanas										
42 L		0.078		41	137	0.298	95.1	F	4.3	3
41 T		0.078*		60	148	0.406	90.2	F	6.3	3
43 R	(Con)	1.000		181	1603	0.113	3.5	A#	5.1#	
				282		0.406	35.2	D	6.3	3
ALL VEHICLES:				6637		0.999	43.4	D	102.6	55
INTERSECTION (persons):				9956			43.4		102.6	55

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
aaSIDRA Output Guide or the Output section of the on-line help.
\# Continuous movements: Level Of Service based on density,
Density (passenger cars per km or mile) instead of queue.
* Maximum v/c ratio, or critical green periods

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Actuated Coordinated Signals, Cycle Time = 180

Table D.0 - GEOMETRIC DELAY DATA

From Approach	To Approach	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream Distance (m)
West: PR-3 Hacia Fajardo						
	South	20.0	26.2	31.4	1000	184
	East	S	80.0	23.6	1000	194
	North	17.8	25.1	28.0	1000	182
South: El Nuevo Comandante						
	West	18.6	25.6	29.3	500	183
	East	20.0	26.2	31.4	500	60
	North	S	80.0	39.1	500	193
East: PR-3 HAcia Carolina						
	West	S	80.0	23.6	1000	196
	South	17.5	25.0	27.5	1000	181
	North	20.0	26.2	31.4	1000	194
North: PR-9959 desde Canovanas						
	West	20.0	26.2	31.4	1000	61
	South	S	80.0	39.1	1000	193
	East	19.4	25.9	30.4	1000	189

Downstream Distance calculated by aaSIDRA

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

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Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Delay (seconds/veh) Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: PR-3 Hacia Fajardo											
1 L	12	0.564	78.4	0.0	78.4	4.6	73.9	0.0	73.9	11.1	89.5
2 T	11	0.999	28.5	27.7	56.2	9.8	46.4	1.1	45.3	0.0	56.2
3 T	11	0.999	28.5	27.7	56.2	9.8	46.4	1.1	45.3	0.0	56.2
4 T	11	0.999	28.5	27.7	56.2	9.8	46.4	1.1	45.3	0.0	56.2
5 R	13	0.123	0.0	0.0	0.0	0.1	0.0	0.0	0.0	11.1	11.1
South: El Nuevo Comandante											
1 L	32	0.511	78.3	0.0	78.3	4.6	73.7	0.0	73.7	5.8	84.1
2 LT	32, 31	0.511	78.3	0.0	78.3	5.9	72.4	0.0	72.4	5.8 0.0	81.7
3 R	33	0.241			0.0					3.4	3.5
East: PR-3 HAcia Carolina											
1 L	22	0.482	77.2	0.0	77.2	4.5	72.7	0.0	72.7	11.1	88.3
2 L	22	0.482	77.2	0.0	77.2	4.5	72.7	0.0	72.7	11.1	88.3
3 T	21	0.596	18.8	0.0	18.8	4.7	14.0	0.0	14.0	0.0	18.8
4 T	21	0.596	18.8	0.0	18.8	4.7	14.0	0.0	14.0	0.0	18.8
5 T	21	0.596	18.8	0.0	18.8	4.7	14.0	0.0	14.0	0.0	18.8
6 R	23	0.014	0.0	0.0	0.0	0.1	0.0	0.0	0.0	11.2	11.2
North: PR-9959 desde Canovanas											
1 L	42	0.298	89.3	0.0	89.3	4.7	84.6	0.0	84.6	5.8	95.1
2 T	42, 41	0.406	90.2	0.0	90.2	8.1	82.1	0.0	82.1	0.0	90.2
3 R	43	0.113			0.0					3.4	3.5

dn is average stop-start delay for all vehicles queued and unqueued

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table D.2 - LANE STOPS

Lane No.	Deg. Satn x	Effective Stop Rate hei	hei2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: PR-3 Hacia Fajardo							
1 L	0.564	0.78	0.00	0.04	0.81	0.948	0.00
2 T	0.999	0.94	0.05	0.00	0.99	1.000	0.16
3 T	0.999	0.94	0.05	0.00	0.99	1.000	0.16
4 T	0.999	0.94	0.05	0.00	0.99	1.000	0.16
5 R	0.123	0.02	0.00	0.67	0.69	0.026	0.00
South: El Nuevo Comandante							
1 L	0.511	0.77	0.00	0.03	0.80	0.941	0.00
2 LT	0.511	0.77	0.00	0.02	0.79	0.941	0.00
3 R	0.241			0.41	0.41		
East: PR-3 HAcia Carolina							
1 L	0.482	0.76	0.00	0.05	0.81	0.932	0.00
2 L	0.482	0.76	0.00	0.05	0.81	0.932	0.00
3 T	0.596	0.44	0.00	0.00	0.44	0.482	0.00
4 T	0.596	0.44	0.00	0.00	0.44	0.482	0.00
5 T	0.596	0.44	0.00	0.00	0.44	0.482	0.00
6 R	0.014	0.02	0.00	0.67	0.69	0.023	0.00
North: PR-9959 desde Canovanas							
1 L	0.298	0.71	0.00	0.02	0.74	0.956	0.00
2 T	0.406	0.74	0.00	0.00	0.74	0.967	0.00
3 R	0.113			0.41	0.41		

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table D.3A - LANE QUEUES (veh)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 L	0.564	0.0	7.7	0.0	7.7	9.1	11.8	12.9	14.6	17.4	0.10
2 T	0.999	7.4	55.4	12.3	67.8	75.8	90.2	95.8	102.6	115.6	0.05
3 T	0.999	7.4	55.4	12.3	67.8	75.8	90.2	95.8	102.6	115.6	0.05
4 T	0.999	7.4	55.4	12.3	67.8	75.8	90.2	95.8	102.6	115.6	0.05
5 R	0.123	0.0	0.1	0.0	0.1	0.2	0.2	0.2	0.3	0.3	0.00
South: El Nuevo Comandante											
1 L	0.511	0.0	7.1	0.0	7.1	8.4	11.0	12.0	13.6	16.2	0.01
2 LT	0.511	0.0	7.3	0.0	7.3	8.6	11.2	12.2	13.8	16.5	0.01
3 R	0.241				9.7#						-0.01#
East: PR-3 HAcia Carolina											
1 L	0.482	0.0	6.5	0.0	6.5	7.7	10.0	10.9	12.4	15.0	0.09
2 L	0.482	0.0	6.5	0.0	6.5	7.7	10.0	10.9	12.4	15.0	0.09
3 T	0.596	0.0	14.9	0.0	14.9	17.4	22.0	23.6	26.2	30.0	0.02
4 T	0.596	0.0	14.9	0.0	14.9	17.4	22.0	23.6	26.2	30.0	0.02
5 T	0.596	0.0	14.9	0.0	14.9	17.4	22.0	23.6	26.2	30.0	0.02
6 R	0.014	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
North: PR-9959 desde Canovanas											
1 L	0.298	0.0	2.1	0.0	2.1	2.6	3.4	3.8	4.3	5.4	0.00
2 T	0.406	0.0	3.2	0.0	3.2	3.8	5.0	5.5	6.3	7.8	0.00
3 R	0.113				5.1#						-0.01#

Values printed in this table are back of queue (vehicles).
\# Continuous movements: Density (passenger cars per km or mile)
instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table D.3B - LANE QUEUES (metres)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 L	0.564	0	4	0	4	5	6	6	7	9	0.10
2 T	0.999	4	30	7	36	41	48	51	55	62	0.05
3 T	0.999	4	30	7	36	41	48	51	55	62	0.05
4 T	0.999	4	30	7	36	41	48	51	55	62	0.05
5 R	0.123	0	0	0	0	0	0	0	0	0	0.00
South: El Nuevo Comandante											
1 L	0.511	0	4	0	4	4	5	6	7	8	0.01
2 LT	0.511	0	4	0	4	4	6	6	7	8	0.01
3 R	0.241				9.7#						-0.01#
East: PR-3 HAcia Carolina											
1 L	0.482	0	3	0	3	4	5	5	6	7	0.09
2 L	0.482	0	3	0	3	4	5	5	6	7	0.09
3 T	0.596	0	9	0	9	11	14	15	16	18	0.02
4 T	0.596	0	9	0	9	11	14	15	16	18	0.02
5 T	0.596	0	9	0	9	11	14	15	16	18	0.02
6 R	0.014	0	0	0	0	0	0	0	0	0	0.00
North: PR-9959 desde Canovanas											
1 L	0.298	0	1	0	1	2	2	2	3	3	0.00
2 T	0.406	0	2	0	2	2	2	3	3	4	0.00
3 R	0.113				5.1#						-0.01#

Values printed in this table are back of queue (metres).
\# Continuous movements: Density (passenger cars per km or mile)
instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Mov No.	App. Speeds Cruise	App. Speeds Negn	Exit Speeds Negn	Exit Speeds Cruise	Queue Move-up 1st Grn	Queue Move-up 2nd Grn	Av. Section Spd Running	Av. Section Spd Overall
West: PR-3 Hacia Fajardo								
12	80.0	25.1	25.1	80.0			61.8	29.8
11	80.0	80.0	80.0	80.0	20.6		66.4	39.1
13	80.0	26.2	26.2	80.0			66.1	66.1
South: El Nuevo Comandante								
32	40.0	25.6	25.6	80.0			37.4	17.6
31	40.0	40.0	80.0	80.0			40.4	18.9
33	40.0	26.2	26.2	80.0			37.4	37.4
East: PR-3 HAcia Carolina								
22	80.0	25.0	25.0	80.0			61.9	30.1
21	80.0	80.0	80.0	80.0			73.5	59.3
23	80.0	26.2	26.2	80.0			66.1	66.1
North: PR-9959 desde Canovanas								
42	40.0	25.9	25.9	80.0			38.5	21.8
41	40.0	40.0	80.0	80.0			40.2	22.7
43	40.0	26.2	26.2	80.0			38.6	38.6

"Running Speed" is the average speed excluding stopped periods.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2011 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table D.5 - PROGRESSION FACTORS & ACTUATED SIGNAL PARAMETERS

Mov No.	Control	Coord.	Arrival Type	Delay Prog. Factor	Queue Prog. Factor	Gap Settings es	Gap Settings eh	Disp. Grn. Settings 1st Grn Gmin	1st Grn Gmax	2nd Grn Gmin	2nd Grn Gmax
West: PR-3 Hacia Fajardo											
12	VA	No	3	1.000	1.000	2.0	2.1	6	20		
11	VA	Yes	4	0.660	0.998	2.5	2.6	6	50		
13	VA	No	3	1.000	1.000	2.5	2.6	6	50	6	50
South: El Nuevo Comandante											
32	VA	No	3	1.000	1.000	2.0	2.3	6	20		
31	VA	No	3	1.000	1.000	2.5	2.8	6	50		
33	VA	No	3	1.000	1.000	2.5	2.8	6	50		
East: PR-3 HAcia Carolina											
22	VA	No	3	1.000	1.000	2.0	2.1	6	20		
21	VA	Yes	4	0.660	0.690	2.5	2.6	6	50		
23	VA	No	3	1.000	1.000	2.5	2.6	6	50	6	50
North: PR-9959 desde Canovanas											
42	VA	No	3	1.000	1.000	2.0	2.3	6	20		
41	VA	No	3	1.000	1.000	2.5	2.8	6	50		
43	VA	No	3	1.000	1.000	2.5	2.8	6	50		

--- End of aaSIDRA Output ---

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Movement Summary

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ Avenida El Comandante - 2011 AM

Signalised - Actuated coordinated **Cycle Time = 90 seconds**

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Desde El Comandante										
32	L	211	0.0	0.302	49.3	LOS D	2	0.92	0.76	26.9
33	R	45	4.4	0.030	8.6	LOS A#	1#	0.00	0.63	52.3
Approach		**256**	**0.8**	**0.302**	**42.1**	**LOS D**	**2**	**0.76**	**0.74**	**29.4**
PR-3 HAcia Carolina										
22	L	34	0.0	0.095	42.1	LOS D	1	0.75	0.72	31.8
21	T	2841	4.4	0.650	3.0	LOS A	5	0.14	0.27	70.2
Approach		**2875**	**4.3**	**0.650**	**3.5**	**LOS A**	**5**	**0.15**	**0.28**	**69.2**
PR-3 Hacia Fajardo										
11	T	1601	7.1	0.541	11.3	LOS B	11	0.46	0.49	55.8
13	R	192	0.0	0.119	11.1	LOS A#	2#	0.00	0.69	58.9
Approach		**1793**	**6.3**	**0.541**	**11.3**	**LOS B**	**11**	**0.41**	**0.52**	**56.1**
All Vehicles		**4924**	**4.9**	**0.650**	**8.3**	**LOS A**	**11**	**0.27**	**0.39**	**59.9**

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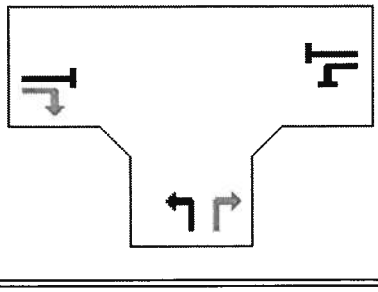
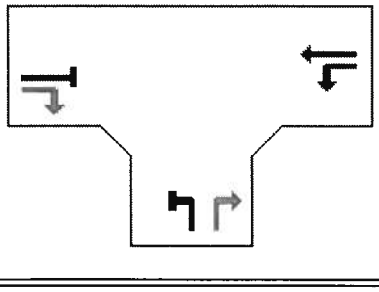
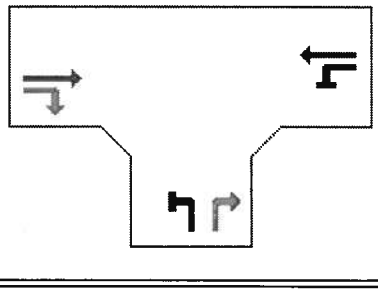
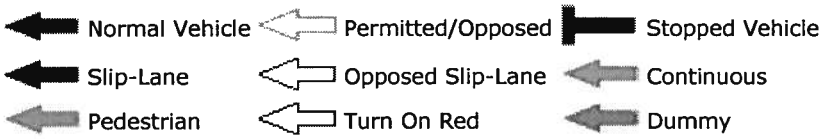
Phasing

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ Avenida El Comandante - 2011 AM

C = **90** seconds
Cycle Time Option: **User-specified cycle time**
Phase times determined by the program.

Phase A	Phase B	Phase C
		
G = **12** seconds G + I = **15** seconds (G + I)/C = **16.7** %	G = **19** seconds G + I = **22** seconds (G + I)/C = **24.4** %	G = **50** seconds G + I = **53** seconds (G + I)/C = **58.9** %



C	Cycle Time
G	Green Time
I	Intergreen Time (yellow plus all-red)
(G + I)/C	Phase time as a percentage of cycle

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Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 AM
Intersection ID: 2

aaTraffic SIDRA US Highway Capacity Manual (2000) Metric Version

RUN INFORMATION

* Basic Parameters:
Intersection Type: Signalised - Actuated Coordinated
For fully-actuated signal timings, the following specifications will be ignored:
Any maximum cycle time specification
Driving on the right-hand side of the road
Input data specified in Metric units
Default Values File No. 10
Peak flow period (for performance): 15 minutes
Unit time (for volumes): 60 minutes (Hourly Rate)
Delay definition: Control delay
Geometric delay included
aaSIDRA Standard Delay and Queue models used
Level of Service based on: Delay (HCM method)
Queue definition: Back of queue, 95th Percentile

* No. of Main (Timing-Capacity) Iterations = 2
Comparison of last two iterations:
Difference in intersection degree of satn = 0.0 %
Largest difference in eff. green times = 0 secs
(max. value for stopping = 0 secs)

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 AM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.0 - TRAFFIC FLOW DATA

Mov No.	Left		Through		Right		Flow Scale	Peak Flow Factor
	LV	HV	LV	HV	LV	HV		
VEHICLES Demand flows in veh/hour as used by the program								
West: PR-3 Hacia Fajardo								
11	0	0	1488	113	0	0	1.00	0.86
13	0	0	0	0	192	0	1.00	0.71
South: Desde El Comandante								
32	211	0	0	0	0	0	1.00	0.83
33	0	0	0	0	43	2	1.00	0.60
East: PR-3 HAcia Carolina								
22	34	0	0	0	0	0	1.00	0.62
21	0	0	2716	125	0	0	1.00	0.93

Based on unit time = 60 minutes.
Flow Scale and Peak Hour Factor effects included in flow values.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 AM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.1 - MOVEMENT PHASE AND TIMING PARAMETERS

Mov No.	Mov Typ	PHASE MATRIX First Green Fr To Op Pr	PHASE MATRIX Second Green Fr To Op Pr	Lost Tim 1st Grn	Lost Tim 2nd Grn	Req.Mov.Time 1st Grn	Req.Mov.Time 2nd Grn	Eff. Grn 1st Grn	Eff. Grn 2nd Grn
West: PR-3 Hacia Fajardo									
11 T	C	A		3		38.9		50	
South: Desde El Comandante									
32 L		*A B		3		12.1		12	
East: PR-3 HAcia Carolina									
22 L		B C		3		9.0Min		19	
21 T		*B A		3		53.0Max		72	

Current Phase Sequence No.: 1
Input phase sequence: A B C
Output phase sequence: A B C

* Critical Movement/Green Period

Movement Types:
Ped Pedestrian
Dum Dummy
Und Undetected in both green periods
Un1 Undetected in 1st green period
Un2 Undetected in 2nd green period

Under heading 'Op':
L "Left" turns are opposed
R "Right" turns are opposed
LR "Left and Right" opposed
C "Constant" saturation flow

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 AM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Dem Flow (veh/h)	HV (%)	Satn Flow 1st Grn	Satn Flow 2nd Grn	Flow Ratio 1st Grn	Flow Ratio 2nd Grn	Total Cap. (veh/h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: PR-3 Hacia Fajardo											
11 T	1601	7.1	5324		0.301		2958	0.95	76	100	0.541
13 R	192	0.0	1615		0.119		1615	0.98	724	100	0.119
South: Desde El Comandante											
32 L	211	0.0	5235		0.040		698	0.95	214	100	0.302
33 R	45	4.4	1514		0.030		1514	0.98	3197	100	0.030
East: PR-3 HAcia Carolina											
22 L	34	0.0	1695		0.020		358	0.90	847	100	0.095
21 T	2841	4.4	5460		0.520		4368	0.95	46	100	0.650*

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 AM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.3 - INTERSECTION PARAMETERS

Crit Mov No.	App. & Turn	Green Period	Phases Fr	Phases To	Adjusted Lost Time	Adjusted Flow Ratio	Required Grn Time Ratio	Required Movement Time
32	S_L		A	B	3	0.040	0.101	12.1
21	E_T		B	A	53	-	-	53.0Max
					----	------	------	------
				Total:	56	0.040	0.101	65.1

- Flow ratio not used for cycle time calculations and the adjusted lost time equals the required movement time (*Min or Max as shown in Table S.1)

Cycle Time:

Minimum	Maximum	Practical	Chosen
27	NA	63	90

(Cycle time specified by the user)

Intersection Level of Service	=	A
Worst movement Level of Service	=	D
Average intersection delay (s)	=	8.3
Largest average movement delay (s)	=	49.3
Largest back of queue, 95% (m)	=	11
Performance Index	=	90.26
Degree of saturation (highest)	=	0.650
Practical Spare Capacity (lowest)	=	46 %
Effective intersection capacity, (veh/h)	=	7571
Total vehicle flow (veh/h)	=	4924
Total person flow (pers/h)	=	7386
Total vehicle delay (veh-h/h)	=	11.39
Total person delay (pers-h/h)	=	17.08
Total effective vehicle stops (veh/h)	=	1905
Total effective person stops (pers/h)	=	2858
Total vehicle travel (veh-km/h)	=	3092.2
Total cost ($/h)	=	1684.04
Total fuel (L/h)	=	308.0
Total CO2 (kg/h)	=	771.56

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Table S.4 - PHASE INFORMATION

Phase No.	Change Time	Green Start	Displayed Green	Grn+Intgrn Secs	Grn+Intgrn Prop.
A	0	3	12	15	0.167
B	15	18	19	22	0.244
C	37	40	50	53	0.589

Current Phase Sequence No.: 1
Input phase sequence: A B C
Output phase sequence: A B C

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Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
11 T	5.04	7.56	11.3	0.46	0.49	11.9	11	38.32	55.8
13 R	0.59	0.89	11.1		0.69	2.4#		2.60	58.9
South: Desde El Comandante									
32 L	2.89	4.33	49.3	0.92	0.76	3.6	2	10.71	26.9
33 R	0.11	0.16	8.6		0.63	1.0#		0.62	52.3
East: PR-3 HAcia Carolina									
22 L	0.40	0.60	42.1	0.75	0.72	1.4	1	1.42	31.8
21 T	2.37	3.55	3.0	0.14	0.27	6.6	5	36.58	70.2

Largest density (passenger cars per km or mile) for any lane

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Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
1793	0.541	5.63	8.45	11.3	0.41	0.52	11	40.92	56.1
South: Desde El Comandante									
256	0.302	3.00	4.50	42.1	0.76	0.74	2	11.34	29.4
East: PR-3 HAcia Carolina									
2875	0.650	2.76	4.14	3.5	0.15	0.28	5	38.00	69.2
ALL VEHICLES:									
4924	0.650	11.39	17.08	8.3	0.27	0.39	11	90.26	59.9
INTERSECTION (persons):									
7386	0.650		17.08	8.3	0.27	0.39		90.26	59.9

Queue values in this table are 95% back of queue (metres).

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Table S.7 - LANE PERFORMANCE

Lane No.	Mov No.	Effective Green Times (sec) R1	Effective Green Times (sec) G1	Effective Green Times (sec) R2	Effective Green Times (sec) G2	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue 95% Back (m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo													
1 T	11	40	50	0	0	534	986	0.541	11.3	0.49	11.9	11	
2 T	11	40	50	0	0	534	986	0.541	11.3	0.49	11.9	11	
3 T	11	40	50	0	0	534	986	0.541	11.3	0.49	11.9	11	
4 R	13	0	90	0	0	192	1615	0.119	11.1	0.69	2.4#		
South: Desde El Comandante													

1 L	32	78	12	0	0	70	233	0.302	49.3	0.76	3.6	2	
2 L	32	78	12	0	0	70	233	0.302	49.3	0.76	3.6	2	
3 L	32	78	12	0	0	70	233	0.302	49.3	0.76	3.6	2	
4 R	33	0	90	0	0	45	1514	0.030	8.6	0.63	1.0#		
East: PR-3 HAcia Carolina													
1 L	22	71	19	0	0	34	358	0.095	42.1	0.72	1.4	1	55
2 T	21	18	72	0	0	947	1456	0.650	3.0	0.27	6.6	5	
3 T	21	18	72	0	0	947	1456	0.650	3.0	0.27	6.6	5	
4 T	21	18	72	0	0	947	1456	0.650	3.0	0.27	6.6	5	

Density (passenger cars per km or mile)

Table S.8A - LANE FLOW AND CAPACITY INFORMATION

Lane No.	Mov No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Lane Width (m)	Saturation Flow Adj. Basic (tcu)	Aver Aver 1st (veh)	2nd (veh)	End Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: PR-3 Hacia Fajardo													
1 T	11	0	534	0	534	3.60	1900	1775		0	986	0.541	100
2 T	11	0	534	0	534	3.60	1900	1775		0	986	0.541	100
3 T	11	0	534	0	534	3.60	1900	1775		0	986	0.541	100
4 R	13	0	0	192	192	3.60	1900	1615	1615	0	1615	0.119	100
South: Desde El Comandante													
1 L	32	70	0	0	70	3.30	1837	1745		0	233	0.302	100
2 L	32	70	0	0	70	3.30	1837	1745		0	233	0.302	100
3 L	32	70	0	0	70	3.30	1837	1745		0	233	0.302	100
4 R	33	0	0	45	45	3.30	1837	1514	1514	0	1514	0.030	100
East: PR-3 HAcia Carolina													
1 L	22	34	0	0	34	3.05	1784	1695		0	358	0.095	100
2 T	21	0	947	0	947	3.60	1900	1820		0	1456	0.650	100
3 T	21	0	947	0	947	3.60	1900	1820		0	1456	0.650	100
4 T	21	0	947	0	947	3.60	1900	1820		0	1456	0.650	100

Basic Saturation Flow in this table is adjusted for lane width, approach grade, parking manoeuvres and number of buses stopping. Saturation flow scale applies if specified.

Table S.8B - SCATS MF PARAMETER

Lane No.	Mov No.	Stopline Flow (veh/h)	Capacity (veh/h)	SCATS Satn Flow	SCATS MF	Deg. Satn x	Lane Util. %
West: PR-3 Hacia Fajardo							
1 T	11	534	986	1900	1792	0.541	100
2 T	11	534	986	1900	1792	0.541	100
3 T	11	534	986	1900	1792	0.541	100
4 R	13	192	1615	1615	NA	0.119	100
South: Desde El Comandante							
1 L	32	70	233	1745	1396	0.302	100
2 L	32	70	233	1745	1396	0.302	100
3 L	32	70	233	1745	1396	0.302	100
4 R	33	45	1514	1561	NA	0.030	100
East: PR-3 HAcia Carolina							
1 L	22	34	358	1695	1464	0.095	100
2 T	21	947	1456	1900	1824	0.650	100
3 T	21	947	1456	1900	1824	0.650	100
4 T	21	947	1456	1900	1824	0.650	100

NA Not Applicable - SCATS MF was not calculated for this lane due to one of the following reasons:
- the lane is not controlled by signals (slip or continuous lane)
- two movements share this lane and do not run in the same phases

STOPLINE FLOW: Departure flow rate in veh/h as measured at the stop line. This cannot exceed capacity.

SCATS SATURATION FLOW: This allows for lane width, approach grade and turning vehicles. Saturation flow scale applies if specified. The effects of heavy vehicles, parking manoeuvres, number of buses stopping and conflicting pedestrian volume are not included.

SCATS MF: This emulates the MF (Maximum Flow) parameter used in the SCATS control system. It is calculated from the SCATS SATURATION FLOW parameter.

DEG. SATN: The Demand (Arrival) Flow Rate may exceed the Stopline Flow Rate, therefore x > 1 is possible.

Table S.12A - FUEL CONSUMPTION, EMISSIONS AND COST - TOTAL

Mov No.	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: PR-3 Hacia Fajardo						
11 T	113.9	596.99	0.425	17.02	0.669	285.6
13 R	17.7	78.18	0.080	4.29	0.126	44.3
	131.7	675.17	0.505	21.31	0.795	329.9
South: Desde El Comandante						
32 L	18.9	145.36	0.087	3.58	0.106	47.2
33 R	3.5	18.04	0.014	0.73	0.022	8.8
	22.4	163.39	0.102	4.30	0.129	56.0
East: PR-3 HAcia Carolina						
22 L	2.9	20.33	0.013	0.54	0.017	7.2
21 T	151.1	825.15	0.514	13.21	0.801	378.4
	154.0	845.48	0.528	13.75	0.818	385.6
INTERSECTION:	308.0	1684.04	1.134	39.36	1.741	771.6

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	27.00
Time value factor	=	0.60
Average occupancy (persons/veh)	=	1.5
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

The idle fuel and vehicle mass parameters given above are the default values (data given in RIDES may override some of these parameters).

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo												
1 T		534		534	7	1899	50		0.541	11.3	11	
2 T		534		534	7	1899	50		0.541	11.3	11	
3 T		534		534	7	1899	50		0.541	11.3	11	
4 R			192	192	0	1899	90		0.119	11.1		
	0	1601	192	1793	6				0.541	11.3	11	
South: Desde El Comandante												
1 L	70			70	0	1836	12		0.302	49.3	2	
2 L	70			70	0	1836	12		0.302	49.3	2	
3 L	70			70	0	1836	12		0.302	49.3	2	
4 R			45	45	4	1836	90		0.030	8.6		
	211	0	45	256	1				0.302	42.1	2	
East: PR-3 HAcia Carolina												
1 L	34			34	0	1783	19		0.095	42.1	1	55
2 T		947		947	4	1899	72		0.650	3.0	5	
3 T		947		947	4	1899	72		0.650	3.0	5	
4 T		947		947	4	1899	72		0.650	3.0	5	
	34	2841	0	2875	4				0.650	3.5	5	

ALL VEHICLES	Total Flow	% HV	Cycle Time	Max X	Aver. Delay	Max Queue
	4924	5	90	0.650	8.3	11

Total flow period = 60 minutes. Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows (in through car units) have been adjusted for grade, lane widths, parking manoeuvres and bus stops.

Table S.15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Green Time Ratio (g/C) 1st grn	2nd grn	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: PR-3 Hacia Fajardo										
11 T		0.556		1601	2958	0.541	11.3	B	11.9	11
13 R	(Con)	1.000		192	1615	0.119	11.1	A#	2.4#	
				1793		0.541	11.3	B	11.9	11
South: Desde El Comandante										
32 L		0.133*		211	698	0.302	49.3	D	3.6	2
33 R	(Con)	1.000		45	1514	0.030	8.6	A#	1.0#	
				256		0.302	42.1	D	3.6	2
East: PR-3 HAcia Carolina										
22 L		0.211		34	358	0.095	42.1	D	1.4	1
21 T		0.800*		2841	4368	0.650*	3.0	A	6.6	5
				2875		0.650	3.5	A	6.6	5
ALL VEHICLES:				4924		0.650	8.3	A	11.9	11
INTERSECTION (persons):				7386			8.3		11.9	11

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the aaSIDRA Output Guide or the Output section of the on-line help.
Continuous movements: Level Of Service based on density, Density (passenger cars per km or mile) instead of queue.
* Maximum v/c ratio, or critical green periods

Table D.0 - GEOMETRIC DELAY DATA

From Approach	To Approach	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream Distance (m)
West: PR-3 Hacia Fajardo						
	South	20.0	26.2	31.4	500	184
	East	S	65.0	31.7	500	132
South: Desde El Comandante						
	West	18.6	25.5	29.2	500	129
	East	20.0	26.2	31.4	500	135
East: PR-3 HAcia Carolina						
	West	S	65.0	31.7	500	130
	South	21.8	27.1	34.2	500	133

Downstream Distance calculated by aaSIDRA

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

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Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Stop-line 1st d1	Stop-line 2nd d2	Delay Total dSL	Delay Acc. Dec. dn	Queuing Total dq	Queuing MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: PR-3 Hacia Fajardo											
1 T	11	0.541	9.5	0.0	9.5	4.1	5.4	0.0	5.4	1.8	11.3
2 T	11	0.541	9.5	0.0	9.5	4.1	5.4	0.0	5.4	1.8	11.3
3 T	11	0.541	9.5	0.0	9.5	4.1	5.4	0.0	5.4	1.8	11.3
4 R	13	0.119			0.0					11.0	11.1
South: Desde El Comandante											
1 L	32	0.302	40.7	0.0	40.7	4.5	36.3	0.0	36.3	8.6	49.3
2 L	32	0.302	40.7	0.0	40.7	4.5	36.3	0.0	36.3	8.6	49.3
3 L	32	0.302	40.7	0.0	40.7	4.5	36.3	0.0	36.3	8.6	49.3
4 R	33	0.030			0.0					8.6	8.6
East: PR-3 HAcia Carolina											
1 L	22	0.095	32.2	0.0	32.2	3.8	28.4	0.0	28.4	9.9	42.1
2 T	21	0.650	1.2	0.0	1.2	1.3	0.0	0.0	0.0	1.8	3.0
3 T	21	0.650	1.2	0.0	1.2	1.3	0.0	0.0	0.0	1.8	3.0
4 T	21	0.650	1.2	0.0	1.2	1.3	0.0	0.0	0.0	1.8	3.0

dn is average stop-start delay for all vehicles queued and unqueued

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Table D.2 - LANE STOPS

Lane No.	Deg. Satn x	Effective Stop Rate hel	hel2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: PR-3 Hacia Fajardo							
1 T	0.541	0.41	0.00	0.09	0.49	0.456	0.00
2 T	0.541	0.41	0.00	0.09	0.49	0.456	0.00
3 T	0.541	0.41	0.00	0.09	0.49	0.456	0.00
4 R	0.119			0.69	0.69		
South: Desde El Comandante							
1 L	0.302	0.71	0.00	0.05	0.76	0.918	0.00
2 L	0.302	0.71	0.00	0.05	0.76	0.918	0.00
3 L	0.302	0.71	0.00	0.05	0.76	0.918	0.00
4 R	0.030			0.63	0.63		
East: PR-3 HAcia Carolina							
1 L	0.095	0.56	0.00	0.17	0.72	0.747	0.00
2 T	0.650	0.13	0.00	0.14	0.27	0.140	0.00
3 T	0.650	0.13	0.00	0.14	0.27	0.140	0.00
4 T	0.650	0.13	0.00	0.14	0.27	0.140	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

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Table D.3A - LANE QUEUES (veh)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 T	0.541	0.0	6.2	0.0	6.2	7.3	9.6	10.5	11.9	14.4	0.02
2 T	0.541	0.0	6.2	0.0	6.2	7.3	9.6	10.5	11.9	14.4	0.02
3 T	0.541	0.0	6.2	0.0	6.2	7.3	9.6	10.5	11.9	14.4	0.02
4 R	0.119				2.4#						0.00#
South: Desde El Comandante											
1 L	0.302	0.0	1.8	0.0	1.8	2.1	2.8	3.1	3.6	4.6	0.00
2 L	0.302	0.0	1.8	0.0	1.8	2.1	2.8	3.1	3.6	4.6	0.00
3 L	0.302	0.0	1.8	0.0	1.8	2.1	2.8	3.1	3.6	4.6	0.00
4 R	0.030				1.0#						0.00#
East: PR-3 HAcia Carolina											
1 L	0.095	0.0	0.7	0.0	0.7	0.8	1.1	1.2	1.4	1.8	0.01
2 T	0.650	0.0	3.3	0.0	3.3	3.9	5.2	5.7	6.6	8.1	0.01
3 T	0.650	0.0	3.3	0.0	3.3	3.9	5.2	5.7	6.6	8.1	0.01
4 T	0.650	0.0	3.3	0.0	3.3	3.9	5.2	5.7	6.6	8.1	0.01

Values printed in this table are back of queue (vehicles).
Continuous movements: Density (passenger cars per km or mile) instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

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Table D.3B - LANE QUEUES (metres)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 T	0.541	0	5	0	5	7	8	9	11	13	0.02
2 T	0.541	0	5	0	5	7	8	9	11	13	0.02
3 T	0.541	0	5	0	5	7	8	9	11	13	0.02
4 R	0.119				2.4#						0.00#
South: Desde El Comandante											
1 L	0.302	0	1	0	1	1	1	2	2	2	0.00
2 L	0.302	0	1	0	1	1	1	2	2	2	0.00
3 L	0.302	0	1	0	1	1	1	2	2	2	0.00
4 R	0.030				1.0#						0.00#
East: PR-3 HAcia Carolina											
1 L	0.095	0	0	0	0	0	1	1	1	1	0.01
2 T	0.650	0	2	0	2	3	4	4	5	6	0.01
3 T	0.650	0	2	0	2	3	4	4	5	6	0.01
4 T	0.650	0	2	0	2	3	4	4	5	6	0.01

Values printed in this table are back of queue (metres).
Continuous movements: Density (passenger cars per km or mile) instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

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Table D.4 - MOVEMENT SPEEDS (km/h)

Mov No.	App. Speeds Cruise	App. Speeds Negn	Exit Speeds Negn	Exit Speeds Cruise	Queue Move-up 1st Grn	Queue Move-up 2nd Grn	Av. Section Spd Running	Av. Section Spd Overall
West: PR-3 Hacia Fajardo								
11	80.0	65.0	65.0	65.0			64.5	55.8
13	80.0	26.2	26.2	65.0			58.9	58.9
South: Desde El Comandante								
32	65.0	25.5	25.5	65.0			47.3	26.9
33	65.0	26.2	26.2	65.0			52.3	52.3
East: PR-3 HAcia Carolina								
22	80.0	27.1	27.1	65.0			52.7	31.8
21	80.0	65.0	65.0	65.0			70.2	70.2

"Running Speed" is the average speed excluding stopped periods.

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Table D.5 - PROGRESSION FACTORS & ACTUATED SIGNAL PARAMETERS

Mov No.	Control	Coord.	Arrival Type	Delay Prog. Factor	Queue Prog. Factor	Gap Settings es	Gap Settings eh	Disp. Grn. Settings 1st Grn Gmin	1st Grn Gmax	2nd Grn Gmin	2nd Grn Gmax
West: PR-3 Hacia Fajardo											
11	VA	Yes	4	0.671	0.681	2.5	2.7	6	50		
13	VA	No	3	1.000	1.000	2.5	2.6	6	50		
South: Desde El Comandante											
32	VA	No	3	1.000	1.000	2.0	2.2	6	20		
33	VA	No	3	1.000	1.000	2.5	2.7	6	50		
East: PR-3 HAcia Carolina											
22	VA	Yes	4	1.000	0.917	2.0	2.1	6	20		
21	VA	Yes	4	0.288	0.314	2.5	2.6	6	50		

--- End of aaSIDRA Output ---

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Movement Summary

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ Avenida El Comandante - 2011 PM

Signalised - Actuated coordinated **Cycle Time = 90 seconds**

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Desde El Comandante										
32	L	337	1.5	0.294	41.8	LOS D	3	0.85	0.78	29.6
33	R	68	0.0	0.044	8.5	LOS A#	1#	0.00	0.63	52.3
Approach		**406**	**1.2**	**0.294**	**36.2**	**LOS D**	**3**	**0.71**	**0.75**	**31.9**
PR-3 HAcia Carolina										
22	L	65	0.0	0.314	51.8	LOS D	2	0.90	0.75	28.0
21	T	1803	2.2	0.455	3.1	LOS A	2	0.10	0.24	70.1
Approach		**1868**	**2.1**	**0.455**	**4.8**	**LOS A**	**2**	**0.12**	**0.25**	**66.6**
PR-3 Hacia Fajardo										
11	T	3405	0.9	1.085	69.6	LOS E	41	1.00	1.07	22.8
13	R	239	0.0	0.148	11.1	LOS A#	3#	0.00	0.69	58.8
Approach		**3643**	**0.9**	**1.085**	**65.8**	**LOS E**	**41**	**0.93**	**1.04**	**23.9**
All Vehicles		**5917**	**1.3**	**1.085**	**44.5**	**LOS D**	**41**	**0.66**	**0.77**	**30.6**

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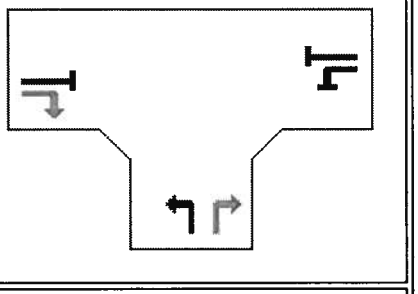
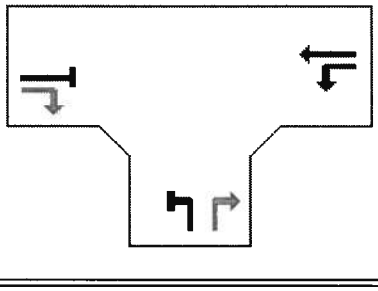
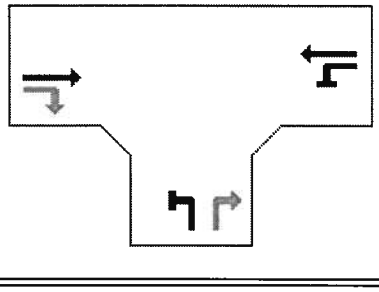
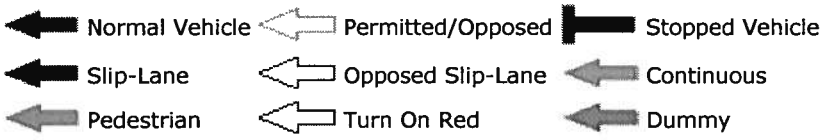
Phasing

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ Avenida El Comandante - 2011 PM

C = **90** seconds
Cycle Time Option: **User-specified cycle time**
Phase times determined by the program.

Phase A	Phase B	Phase C
		
G = **20** seconds G + I = **23** seconds (G + I)/C = **25.6** %	G = **11** seconds G + I = **14** seconds (G + I)/C = **15.6** %	G = **50** seconds G + I = **53** seconds (G + I)/C = **58.9** %



C	Cycle Time
G	Green Time
I	Intergreen Time (yellow plus all-red)
(G + I)/C	Phase time as a percentage of cycle

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Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 PM
Intersection ID: 2

aaTraffic SIDRA US Highway Capacity Manual (2000) Metric Version

RUN INFORMATION

* Basic Parameters:
Intersection Type: Signalised - Actuated Coordinated
For fully-actuated signal timings, the following specifications will be ignored:
Any maximum cycle time specification
Driving on the right-hand side of the road
Input data specified in Metric units
Default Values File No. 10
Peak flow period (for performance): 15 minutes
Unit time (for volumes): 60 minutes (Hourly Rate)
Delay definition: Control delay
Geometric delay included
aaSIDRA Standard Delay and Queue models used
Level of Service based on: Delay (HCM method)
Queue definition: Back of queue, 95th Percentile

* No. of Main (Timing-Capacity) Iterations = 1
Comparison of last two iterations:
Difference in intersection degree of satn = 0.0 %
Largest difference in eff. green times = 0 secs
(max. value for stopping = 0 secs)

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.0 - TRAFFIC FLOW DATA

Mov No.	Left		Through		Right		Flow Scale	Peak Flow Factor
	LV	HV	LV	HV	LV	HV		
VEHICLES Demand flows in veh/hour as used by the program								
West: PR-3 Hacia Fajardo								
11	0	0	3373	31	0	0	1.00	0.86
13	0	0	0	0	239	0	1.00	0.71
South: Desde El Comandante								
32	333	5	0	0	0	0	1.00	0.83
33	0	0	0	0	68	0	1.00	0.60
East: PR-3 HAcia Carolina								
22	65	0	0	0	0	0	1.00	0.62
21	0	0	1763	40	0	0	1.00	0.93

Based on unit time = 60 minutes.
Flow Scale and Peak Hour Factor effects included in flow values.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.1 - MOVEMENT PHASE AND TIMING PARAMETERS

Mov No.	Mov Typ	PHASE MATRIX First Green Fr To Op Pr	PHASE MATRIX Second Green Fr To Op Pr	Lost Tim 1st Grn	Lost Tim 2nd Grn	Req.Mov.Time 1st Grn	Req.Mov.Time 2nd Grn	Eff. Grn 1st Grn	Eff. Grn 2nd Grn
West: PR-3 Hacia Fajardo									
11 T	*C A			3		53.0Max		50	
South: Desde El Comandante									
32 L	*A B			3		17.7		20	
East: PR-3 HAcia Carolina									
22 L	*B C			3		11.6		11	
21 T	B A			3		43.2		64	

Current Phase Sequence No.: 1
Input phase sequence: A B C
Output phase sequence: A B C

* Critical Movement/Green Period

Movement Types:
Ped Pedestrian
Dum Dummy
Und Undetected in both green periods
Un1 Undetected in 1st green period
Un2 Undetected in 2nd green period

Under heading 'Op':
L "Left" turns are opposed
R "Right" turns are opposed
LR "Left and Right" opposed
C "Constant" saturation flow

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Dem Flow (veh /h)	HV (%)	Satn Flow 1st Grn	Satn Flow 2nd Grn	Flow Ratio 1st Grn	Flow Ratio 2nd Grn	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: PR-3 Hacia Fajardo											
11 T	3404	0.9	5649		0.603		3138	0.95	-12	100	1.085*
13 R	239	0.0	1615		0.148		1615	0.98	562	100	0.148
South: Desde El Comandante											
32 L	338	1.5	5166		0.065		1148	0.95	223	100	0.294
33 R	68	0.0	1561		0.044		1561	0.98	2150	100	0.044
East: PR-3 HAcia Carolina											
22 L	65	0.0	1695		0.038		207	0.90	187	100	0.314
21 T	1803	2.2	5576		0.323		3965	0.95	109	100	0.455

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.3 - INTERSECTION PARAMETERS

Crit Mov No.	App. & Turn	Green Period	Phases Fr	Phases To	Adjusted Lost Time	Adjusted Flow Ratio	Required Grn Time Ratio	Required Movement Time
32	S_L		A	B	3	0.065	0.164	17.7
22	E_L		B	C	3	0.038	0.096	11.6
11	W_T		C	A	53	-	-	53.0Max
				Total:	59	0.104	0.259	82.3

- Flow ratio not used for cycle time calculations and the adjusted lost time equals the required movement time (=Min or Max as shown in Table S.1)

Cycle Time:

Minimum	Maximum	Practical	Chosen
27	NA	80	90

(Cycle time specified by the user)

Intersection Level of Service	=	D
Worst movement Level of Service	=	E
Average intersection delay (s)	=	44.5
Largest average movement delay (s)	=	69.6
Largest back of queue, 95% (m)	=	41
Performance Index	=	293.15
Degree of saturation (highest)	=	1.085
Practical Spare Capacity (lowest)	=	-12 %
Effective intersection capacity, (veh/h)	=	5455
Total vehicle flow (veh/h)	=	5917
Total person flow (pers/h)	=	8876
Total vehicle delay (veh-h/h)	=	73.11
Total person delay (pers-h/h)	=	109.66
Total effective vehicle stops (veh/h)	=	4582
Total effective person stops (pers/h)	=	6873
Total vehicle travel (veh-km/h)	=	3716.8
Total cost ($/h)	=	3625.53
Total fuel (L/h)	=	489.0
Total CO2 (kg/h)	=	1222.99

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.4 - PHASE INFORMATION

Phase No.	Change Time	Green Start	Displayed Green	Grn+Intgrn Secs	Grn+Intgrn Prop.
A	0	3	20	23	0.256
B	23	26	11	14	0.156
C	37	40	50	53	0.589

Current Phase Sequence No.: 1
Input phase sequence: A B C
Output phase sequence: A B C

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
11 T	65.82	98.73	69.6	1.00	1.07	75.1	41	248.93	22.8
13 R	0.73	1.10	11.1		0.69	3.0#		3.24	58.8
South: Desde El Comandante									
32 L	3.92	5.88	41.8	0.85	0.78	5.2	3	15.65	29.6
33 R	0.16	0.24	8.5		0.63	1.0#		0.94	52.3
East: PR-3 HAcia Carolina									
22 L	0.94	1.40	51.8	0.90	0.75	3.3	2	3.20	28.0
21 T	1.54	2.30	3.1	0.10	0.24	3.0	2	21.20	70.1

Largest density (passenger cars per km or mile) for any lane

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
3643	1.085	66.56	99.83	65.8	0.93	1.04	41	252.17	23.9
South: Desde El Comandante									
406	0.294	4.08	6.12	36.2	0.71	0.75	3	16.59	31.9
East: PR-3 HAcia Carolina									
1868	0.455	2.47	3.71	4.8	0.12	0.25	2	24.40	66.6
ALL VEHICLES:									
5917	1.085	73.11	109.66	44.5	0.66	0.77	41	293.15	30.6
INTERSECTION (persons):									
8876	1.085		109.66	44.5	0.66	0.77		293.15	30.6

Queue values in this table are 95% back of queue (metres).

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.7 - LANE PERFORMANCE

Lane No.	Mov No.	Effective Green Times (sec) R1	Effective Green Times (sec) G1	Effective Green Times (sec) R2	Effective Green Times (sec) G2	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	Queue 95% Back (m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo													
1 T	11	40	50	0	0	1135	1046	1.085	69.6	1.07	75.1	41	
2 T	11	40	50	0	0	1135	1046	1.085	69.6	1.07	75.1	41	
3 T	11	40	50	0	0	1135	1046	1.085	69.6	1.07	75.1	41	
4 R	13	0	90	0	0	239	1615	0.148	11.1	0.69	3.0#		
South: Desde El Comandante													

1 L	32	70	20	0	0	113	383	0.294	41.8	0.78	5.2	3	
2 L	32	70	20	0	0	113	383	0.294	41.8	0.78	5.2	3	
3 L	32	70	20	0	0	113	383	0.294	41.8	0.78	5.2	3	
4 R	33	0	90	0	0	68	1561	0.044	8.5	0.63	1.0#		
East: PR-3 HAcia Carolina													
1 L	22	79	11	0	0	65	207	0.314	51.8	0.75	3.3	2	55
2 T	21	26	64	0	0	601	1322	0.455	3.1	0.24	3.0	2	
3 T	21	26	64	0	0	601	1322	0.455	3.1	0.24	3.0	2	
4 T	21	26	64	0	0	601	1322	0.455	3.1	0.24	3.0	2	

Density (passenger cars per km or mile)

Table S.8A - LANE FLOW AND CAPACITY INFORMATION

Lane No.	Mov No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Lane Width (m)	Saturation Flow Adj. Basic (tcu)	Aver 1st (veh)	Aver 2nd (veh)	End Cap (veh) /h	Tot Cap (veh) /h	Deg. Satn x	Lane Util %
West: PR-3 Hacia Fajardo													
1 T	11	0	1135	0	1135	3.60	1900	1883	0	0	1046	1.085	100
2 T	11	0	1135	0	1135	3.60	1900	1883	0	0	1046	1.085	100
3 T	11	0	1135	0	1135	3.60	1900	1883	0	0	1046	1.085	100
4 R	13	0	0	239	239	3.60	1900	1615	1615	0	1615	0.148	100
South: Desde El Comandante													
1 L	32	113	0	0	113	3.30	1837	1722	0	0	383	0.294	100
2 L	32	113	0	0	113	3.30	1837	1722	0	0	383	0.294	100
3 L	32	113	0	0	113	3.30	1837	1722	0	0	383	0.294	100
4 R	33	0	0	68	68	3.30	1837	1561	1561	0	1561	0.044	100
East: PR-3 HAcia Carolina													
1 L	22	65	0	0	65	3.05	1784	1695	0	0	207	0.314	100
2 T	21	0	601	0	601	3.60	1900	1859	0	0	1322	0.455	100
3 T	21	0	601	0	601	3.60	1900	1859	0	0	1322	0.455	100
4 T	21	0	601	0	601	3.60	1900	1859	0	0	1322	0.455	100

Basic Saturation Flow in this table is adjusted for lane width, approach grade, parking manoeuvres and number of buses stopping. Saturation flow scale applies if specified.

Table S.8B - SCATS MF PARAMETER

Lane No.	Mov No.	Stopline Flow (veh/h)	Capacity (veh/h)	SCATS Satn Flow	SCATS MF	Deg. Satn x	Lane Util. %
West: PR-3 Hacia Fajardo							
1 T	11	1046	1046	1900	1792	1.085	100
2 T	11	1046	1046	1900	1792	1.085	100
3 T	11	1046	1046	1900	1792	1.085	100
4 R	13	239	1615	1615	NA	0.148	100
South: Desde El Comandante							
1 L	32	113	383	1745	1517	0.294	100
2 L	32	113	383	1745	1517	0.294	100
3 L	32	113	383	1745	1517	0.294	100
4 R	33	68	1561	1561	NA	0.044	100
East: PR-3 HAcia Carolina							
1 L	22	65	207	1695	1332	0.314	100
2 T	21	601	1322	1900	1815	0.455	100
3 T	21	601	1322	1900	1815	0.455	100
4 T	21	601	1322	1900	1815	0.455	100

NA Not Applicable - SCATS MF was not calculated for this lane due to one of the following reasons:
- the lane is not controlled by signals (slip or continuous lane)
- two movements share this lane and do not run in the same phases

STOPLINE FLOW: Departure flow rate in veh/h as measured at the stop line. This cannot exceed capacity.

SCATS SATURATION FLOW: This allows for lane width, approach grade and turning vehicles. Saturation flow scale applies if specified. The effects of heavy vehicles, parking manoeuvres, number of buses stopping and conflicting pedestrian volume are not included.

SCATS MF: This emulates the MF (Maximum Flow) parameter used in the SCATS control system. It is calculated from the SCATS SATURATION FLOW parameter.

DEG. SATN: The Demand (Arrival) Flow Rate may exceed the Stopline Flow Rate, therefore x > 1 is possible.

Table S.12A - FUEL CONSUMPTION, EMISSIONS AND COST - TOTAL

Mov No.	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: PR-3 Hacia Fajardo						
11 T	337.4	2730.13	1.609	61.36	1.902	843.7
13 R	22.1	97.31	0.100	5.33	0.157	55.2
	359.4	2827.44	1.709	66.70	2.058	898.9
South: Desde El Comandante						
32 L	30.3	216.01	0.136	5.91	0.176	75.9
33 R	4.8	26.39	0.020	0.98	0.030	11.9
	35.1	242.40	0.157	6.89	0.206	87.8
East: PR-3 HAcia Carolina						
22 L	5.8	43.53	0.027	1.06	0.034	14.5
21 T	88.6	512.17	0.309	6.86	0.474	221.8
	94.4	555.70	0.336	7.92	0.508	236.3
INTERSECTION:	489.0	3625.53	2.201	81.50	2.773	1223.0

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	= 0.900
Fuel resource cost factor	= 0.50
Ratio of running cost to fuel cost	= 3.0
Average income ($/h)	= 27.00
Time value factor	= 0.60
Average occupancy (persons/veh)	= 1.5
Light vehicle mass (1000 kg)	= 1.4
Heavy vehicle mass (1000 kg)	= 11.0
Light vehicle idle fuel rate (L/h)	= 1.350
Heavy vehicle idle fuel rate (L/h)	= 2.000

The idle fuel and vehicle mass parameters given above are the default values (data given in RIDES may override some of these parameters).

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo												
1 T		1135		1135	1	1899	50		1.085	69.6	41	
2 T		1135		1135	1	1899	50		1.085	69.6	41	
3 T		1135		1135	1	1899	50		1.085	69.6	41	
4 R			239	239	0	1899	90		0.148	11.1		
	0	3404	239	3643	1				1.085	65.8	41	
South: Desde El Comandante												
1 L	113			113	1	1836	20		0.294	41.8	3	
2 L	113			113	1	1836	20		0.294	41.8	3	
3 L	113			113	1	1836	20		0.294	41.8	3	
4 R			68	68	0	1836	90		0.044	8.5		
	338	0	68	406	1				0.294	36.2	3	
East: PR-3 HAcia Carolina												
1 L	65			65	0	1783	11		0.314	51.8	2	55
2 T		601		601	2	1899	64		0.455	3.1	2	
3 T		601		601	2	1899	64		0.455	3.1	2	
4 T		601		601	2	1899	64		0.455	3.1	2	
	65	1803	0	1868	2				0.455	4.8	2	

ALL VEHICLES	Total Flow	% HV	Cycle Time	Max X	Aver. Delay	Max Queue
	5917	1	90	1.085	44.5	41

Total flow period = 60 minutes. Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows (in through car units) have been adjusted for grade, lane widths, parking manoeuvres and bus stops.

Table S.15 - CAPACITY AND LEVEL OF SERVICE

No.	Mov Typ	Green Time Ratio (g/C) 1st grn	2nd grn	Flow (veh /h)	Cap. (veh /h)	of Satn (v/c)	Delay (sec)		95% Back (vehs)	(m)
West: PR-3 Hacia Fajardo										
11 T		0.556*		3404	3138	1.085*	69.6	E	75.1	41
13 R	(Con)	1.000		239	1615	0.148	11.1	A#	3.0#	
				3643		1.085	65.8	E	75.1	41
South: Desde El Comandante										
32 L		0.222*		338	1148	0.294	41.8	D	5.2	3
33 R	(Con)	1.000		68	1561	0.044	8.5	A#	1.0#	
				406		0.294	36.2	D	5.2	3
East: PR-3 HAcia Carolina										
22 L		0.122*		65	207	0.314	51.8	D	3.3	2
21 T		0.711		1803	3965	0.455	3.1	A	3.0	2
				1868		0.455	4.8	A	3.3	2
ALL VEHICLES:				5917		1.085	44.5	D	75.1	41
INTERSECTION (persons):				8876			44.5		75.1	41

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the aaSIDRA Output Guide or the Output section of the on-line help.
Continuous movements: Level Of Service based on density, Density (passenger cars per km or mile) instead of queue.
* Maximum v/c ratio, or critical green periods

Table D.0 - GEOMETRIC DELAY DATA

From Approach	To Approach	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream Distance (m)
West: PR-3 Hacia Fajardo						
	South	20.0	26.2	31.4	500	184
	East	S	65.0	31.7	500	126
South: Desde El Comandante						
	West	18.6	25.5	29.2	500	131
	East	20.0	26.2	31.4	500	131
East: PR-3 HAcia Carolina						
	West	S	65.0	31.7	500	128
	South	21.8	27.1	34.2	500	133

Downstream Distance calculated by aaSIDRA

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Interseccion PR-3 @ Avenida El Comandante - 2011 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: PR-3 Hacia Fajardo											
1 T	11	1.085	15.0	52.8	67.8	8.9	58.9	3.1	55.8	1.8	69.6
2 T	11	1.085	15.0	52.8	67.8	8.9	58.9	3.1	55.8	1.8	69.6
3 T	11	1.085	15.0	52.8	67.8	8.9	58.9	3.1	55.8	1.8	69.6
4 R	13	0.148			0.0					11.0	11.1
South: Desde El Comandante											
1 L	32	0.294	33.2	0.0	33.2	4.2	29.0	0.0	29.0	8.6	41.8
2 L	32	0.294	33.2	0.0	33.2	4.2	29.0	0.0	29.0	8.6	41.8
3 L	32	0.294	33.2	0.0	33.2	4.2	29.0	0.0	29.0	8.6	41.8
4 R	33	0.044			0.0					8.5	8.5
East: PR-3 HAcia Carolina											
1 L	22	0.314	41.9	0.0	41.9	4.6	37.3	0.0	37.3	9.9	51.8
2 T	21	0.455	1.3	0.0	1.3	0.9	0.4	0.0	0.4	1.8	3.1
3 T	21	0.455	1.3	0.0	1.3	0.9	0.4	0.0	0.4	1.8	3.1
4 T	21	0.455	1.3	0.0	1.3	0.9	0.4	0.0	0.4	1.8	3.1

dn is average stop-start delay for all vehicles queued and unqueued

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table D.2 - LANE STOPS

Lane No.	Mov No.	Deg. Satn x	Effective Stop Rate he1	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: PR-3 Hacia Fajardo								
1 T	11	1.085	0.93	0.14	0.00	1.07	1.000	0.55
2 T	11	1.085	0.93	0.14	0.00	1.07	1.000	0.55
3 T	11	1.085	0.93	0.14	0.00	1.07	1.000	0.55
4 R	13	0.148			0.69	0.69		
South: Desde El Comandante								
1 L	32	0.294	0.68	0.00	0.09	0.78	0.851	0.00
2 L	32	0.294	0.68	0.00	0.09	0.78	0.851	0.00
3 L	32	0.294	0.68	0.00	0.09	0.78	0.851	0.00
4 R	33	0.044			0.63	0.63		
East: PR-3 HAcia Carolina								
1 L	22	0.314	0.69	0.00	0.07	0.75	0.896	0.00
2 T	21	0.455	0.09	0.00	0.15	0.24	0.097	0.00
3 T	21	0.455	0.09	0.00	0.15	0.24	0.097	0.00
4 T	21	0.455	0.09	0.00	0.15	0.24	0.097	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

---

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ Avenida El Comandante - 2011 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table D.3A - LANE QUEUES (veh)

Lane No.	Mov No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo												
1 T	11	1.085	14.8	30.5	18.3	48.8	55.1	66.3	70.0	75.1	84.1	0.08
2 T	11	1.085	14.8	30.5	18.3	48.8	55.1	66.3	70.0	75.1	84.1	0.08
3 T	11	1.085	14.8	30.5	18.3	48.8	55.1	66.3	70.0	75.1	84.1	0.08
4 R	13	0.148				3.0#						0.00#
South: Desde El Comandante												
1 L	32	0.294	0.0	2.6	0.0	2.6	3.1	4.1	4.5	5.2	6.5	0.01
2 L	32	0.294	0.0	2.6	0.0	2.6	3.1	4.1	4.5	5.2	6.5	0.01
3 L	32	0.294	0.0	2.6	0.0	2.6	3.1	4.1	4.5	5.2	6.5	0.01
4 R	33	0.044				1.0#						0.00#
East: PR-3 HAcia Carolina												
1 L	22	0.314	0.0	1.6	0.0	1.6	1.9	2.6	2.9	3.3	4.2	0.03
2 T	21	0.455	0.0	1.5	0.0	1.5	1.7	2.3	2.6	3.0	3.8	0.00
3 T	21	0.455	0.0	1.5	0.0	1.5	1.7	2.3	2.6	3.0	3.8	0.00
4 T	21	0.455	0.0	1.5	0.0	1.5	1.7	2.3	2.6	3.0	3.8	0.00

Values printed in this table are back of queue (vehicles).
Continuous movements: Density (passenger cars per km or mile) instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table D.3B - LANE QUEUES (metres)

Lane No.	Mov No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo												
1 T	11	1.085	8	17	10	27	30	36	39	41	46	0.08
2 T	11	1.085	8	17	10	27	30	36	39	41	46	0.08
3 T	11	1.085	8	17	10	27	30	36	39	41	46	0.08
4 R	13	0.148				3.0#						0.00#
South: Desde El Comandante												
1 L	32	0.294	0	1	0	1	2	2	3	3	4	0.01
2 L	32	0.294	0	1	0	1	2	2	3	3	4	0.01
3 L	32	0.294	0	1	0	1	2	2	3	3	4	0.01
4 R	33	0.044				1.0#						0.00#
East: PR-3 HAcia Carolina												
1 L	22	0.314	0	1	0	1	1	1	1	2	2	0.03
2 T	21	0.455	0	1	0	1	1	1	2	2	2	0.00
3 T	21	0.455	0	1	0	1	1	1	2	2	2	0.00
4 T	21	0.455	0	1	0	1	1	1	2	2	2	0.00

Values printed in this table are back of queue (metres).
Continuous movements: Density (passenger cars per km or mile) instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table D.4 - MOVEMENT SPEEDS (km/h)

Mov No.	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall
West: PR-3 Hacia Fajardo								
11	80.0	65.0	65.0	65.0	14.7		52.5	22.8
13	80.0	26.2	26.2	65.0			58.8	58.8
South: Desde El Comandante								
32	65.0	25.5	25.5	65.0			47.6	29.6
33	65.0	26.2	26.2	65.0			52.3	52.3
East: PR-3 HAcia Carolina								
22	80.0	27.1	27.1	65.0			51.8	28.0
21	80.0	65.0	65.0	65.0			71.0	70.1

"Running Speed" is the average speed excluding stopped periods.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2011 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table D.5 - PROGRESSION FACTORS & ACTUATED SIGNAL PARAMETERS

Mov No.	Control	Coord.	Arrival Type	Delay Prog. Factor	Queue Prog. Factor	Gap Settings es	eh	Disp. Grn. Settings 1st Grn Gmin	Gmax	2nd Grn Gmin	Gmax
West: PR-3 Hacia Fajardo											
11	VA	Yes	4	0.671	1.000	2.5	2.6	6	50		
13	VA	No	3	1.000	1.000	2.5	2.6	6	50		
South: Desde El Comandante											
32	VA	No	3	1.000	1.000	2.0	2.2	6	20		
33	VA	No	3	1.000	1.000	2.5	2.7	6	50		
East: PR-3 HAcia Carolina											
22	VA	Yes	4	1.000	0.966	2.0	2.1	6	20		
21	VA	Yes	4	0.207	0.214	2.5	2.6	6	50		

--- End of aaSIDRA Output ---

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Movement Summary

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ PR-9959 - 2021 AM

Signalised - Actuated coordinated **Cycle Time = 145 seconds**

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
El Nuevo Comandante										
32	L	94	0.0	0.362	75.9	LOS E	3	0.95	0.75	18.7
31	T	34	0.0	0.362	70.1	LOS E	3	0.95	0.73	20.1
33	R	212	0.0	0.131	3.4	LOS A#	5#	0.00	0.41	37.4
Approach		**340**	**0.0**	**0.362**	**30.1**	**LOS C**	**3**	**0.36**	**0.54**	**26.6**
PR-3 HAcia Carolina										
22	L	206	0.0	0.226	56.8	LOS E	3	0.80	0.78	38.7
21	T	2187	4.6	0.882	35.6	LOS D	34	0.90	0.83	48.1
23	R	234	0.9	0.150	11.1	LOS B	0	0.03	0.69	66.1
Approach		**2627**	**3.9**	**0.882**	**35.1**	**LOS D**	**34**	**0.81**	**0.81**	**48.3**
PR-9959 desde Canovanas										
42	L	120	5.8	0.379	72.3	LOS E	4	0.94	0.77	24.7
41	T	46	0.0	0.379	66.3	LOS E	4	0.94	0.73	26.0
43	R	394	0.3	0.244	3.5	LOS B#	10#	0.00	0.41	38.6
Approach		**560**	**1.4**	**0.379**	**23.4**	**LOS C**	**5**	**0.28**	**0.51**	**32.9**
PR-3 Hacia Fajardo										
12	L	302	0.3	0.664	64.0	LOS E	11	0.93	0.85	36.3
11	T	1645	6.1	0.673	28.4	LOS C	23	0.70	0.63	52.3
13	R	151	0.0	0.096	11.1	LOS B	0	0.03	0.69	66.1
Approach		**2098**	**4.9**	**0.673**	**32.3**	**LOS C**	**23**	**0.69**	**0.67**	**49.9**
All Vehicles		**5625**	**3.8**	**0.882**	**32.6**	**LOS C**	**34**	**0.68**	**0.71**	**45.6**

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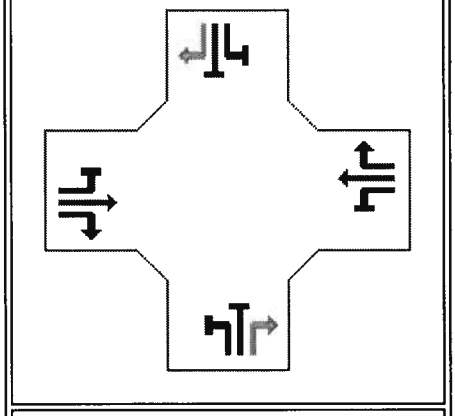
Phasing

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ PR-9959 - 2021 AM

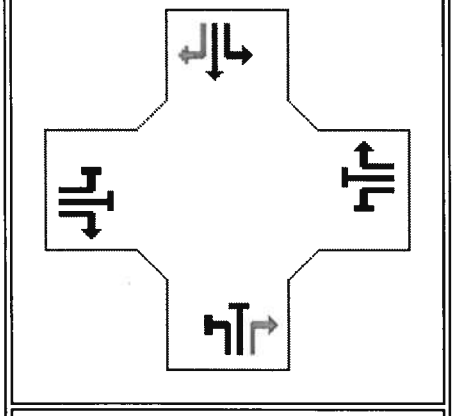
C = **145** seconds
Cycle Time Option: **User-specified cycle time**
Phase times determined by the program.

Phase A



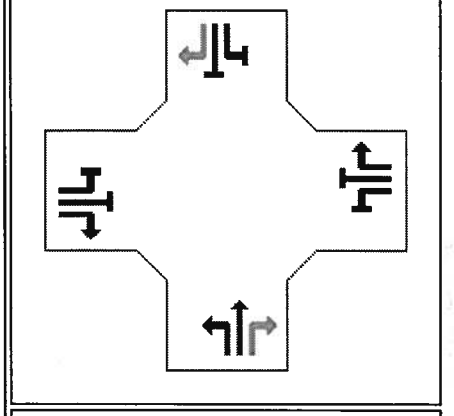
G = **66** seconds
G + I = **68** seconds
(G + I)/C = **46.9** %

Phase B



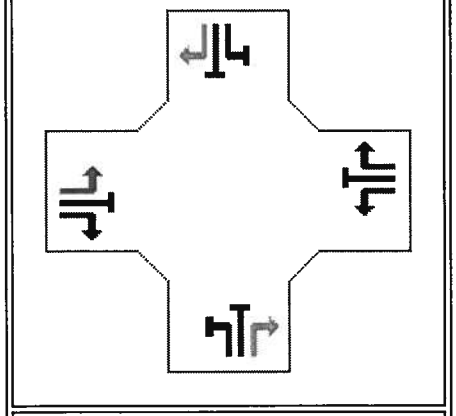
G = **18** seconds
G + I = **20** seconds
(G + I)/C = **13.8** %

Phase C

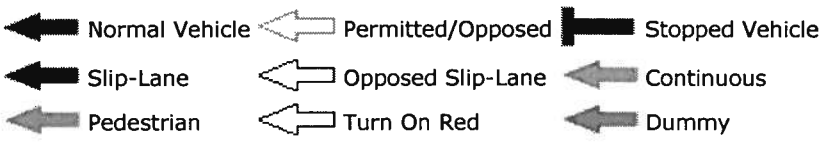


G = **14** seconds
G + I = **16** seconds
(G + I)/C = **11.0** %

Phase D



G = **39** seconds
G + I = **41** seconds
(G + I)/C = **28.3** %



C	Cycle Time
G	Green Time
I	Intergreen Time (yellow plus all-red)
(G + I)/C	Phase time as a percentage of cycle

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Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 AM
Intersection ID: 1

aaTraffic SIDRA US Highway Capacity Manual (2000) Metric Version

RUN INFORMATION

* Basic Parameters:
Intersection Type: Signalised - Actuated Coordinated
For fully-actuated signal timings, the following specifications will be ignored:
Any maximum cycle time specification
Driving on the right-hand side of the road
Input data specified in Metric units
Default Values File No. 10
Peak flow period (for performance): 15 minutes
Unit time (for volumes): 60 minutes (Hourly Rate)
Delay definition: Control delay
Geometric delay included
aaSIDRA Standard Delay and Queue models used
Level of Service based on: Delay (HCM method)
Queue definition: Back of queue, 95th Percentile

* No. of Main (Timing-Capacity) Iterations = 3
Comparison of last two iterations:
Difference in intersection degree of satn = 0.0 %
Largest difference in eff. green times = 0 secs
(max. value for stopping = 0 secs)

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table S.0 - TRAFFIC FLOW DATA

Mov No.	Left LV	Left HV	Through LV	Through HV	Right LV	Right HV	Flow Scale	Peak Flow Factor
VEHICLES	Demand flows in veh/hour as used by the program							
West: PR-3 Hacia Fajardo								
12	301	1	0	0	0	0	1.00	0.95
11	0	0	1544	101	0	0	1.00	0.95
13	0	0	0	0	151	0	1.00	0.95
South: El Nuevo Comandante								
32	94	0	0	0	0	0	1.00	0.95
31	0	0	34	0	0	0	1.00	0.95
33	0	0	0	0	212	0	1.00	0.95
East: PR-3 HAcia Carolina								
22	206	0	0	0	0	0	1.00	0.95
21	0	0	2086	101	0	0	1.00	0.95
23	0	0	0	0	232	2	1.00	0.95
North: PR-9959 desde Canovanas								
42	113	7	0	0	0	0	1.00	0.95
41	0	0	46	0	0	0	1.00	0.95
43	0	0	0	0	393	1	1.00	0.95

Based on unit time = 60 minutes.
Flow Scale and Peak Hour Factor effects included in flow values.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table S.1 - MOVEMENT PHASE AND TIMING PARAMETERS

Mov No.	Mov Typ	First Green Fr	To	Op Pr	Second Green Fr	To	Op Pr	Lost Tim 1st Grn	2nd Grn	Req.Mov.Time 1st Grn	2nd Grn	Eff. Grn 1st Grn	2nd Grn
West: PR-3 Hacia Fajardo													
12 L		*D	A					2		22.0Max		39	
11 T		A	B					2		52.0Max		66	
13 R	(Und)	A	B		B	A		2	2	13.9	24.0Min	66	75
South: El Nuevo Comandante													
32 L		*C	D					2		14.7		14	
31 T		C	D					2		14.7		14	
East: PR-3 HAcia Carolina													
22 L		D	A					2		22.0Max		39	
21 T		*A	B					2		52.0Max		66	
23 R	(Und)	A	B		B	A		2	2	28.4	28.4	66	75
North: PR-9959 desde Canovanas													
42 L		*B	C					2		19.1		18	
41 T		B	C					2		19.1		18	

Current Phase Sequence No.: 1
Input phase sequence: A B C D
Output phase sequence: A B C D

* Critical Movement/Green Period

Movement Types:
Ped Pedestrian
Dum Dummy
Und Undetected in both green periods
Un1 Undetected in 1st green period
Un2 Undetected in 2nd green period

Under heading 'Op':
L "Left" turns are opposed
R "Right" turns are opposed
LR "Left and Right" opposed
C "Constant" saturation flow

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table S.2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Dem Flow (veh/h)	HV (%)	Satn Flow 1st Grn	2nd Grn	Flow Ratio 1st Grn	2nd Grn	Total Cap. (veh/h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: PR-3 Hacia Fajardo											
12 L	302	0.3	1690		0.179		455	0.95	43	100	0.664
11 T	1645	6.1	5370		0.306		2444	0.95	41	100	0.673
13 R	151	0.0	1615	1615	0.047	0.047	1570	0.90	836	100	0.096
South: El Nuevo Comandante											
32 L	94	0.0	2687		0.035		259	0.95	162	100	0.362
31 T	34	0.0	972		0.035		94	0.95	162	100	0.362
33 R	212	0.0	1615		0.131		1615	0.98	647	100	0.131
East: PR-3 HAcia Carolina											
22 L	206	0.0	3389		0.061		912	0.90	298	100	0.226
21 T	2187	4.6	5448		0.401		2480	0.95	8	100	0.882*
23 R	234	0.9	1605	1605	0.073	0.073	1561	0.90	500	100	0.150
North: PR-9959 desde Canovanas											
42 L	120	5.8	2548		0.047		316	0.95	150	100	0.379
41 T	46	0.0	977		0.047		121	0.90	137	100	0.379
43 R	394	0.3	1612		0.244		1612	0.98	301	100	0.244

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Interseccion PR-3 @ PR-9959 - 2021 AM
Intersection ID: 1
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Table S.3 - INTERSECTION PARAMETERS

Crit Mov No.	App. & Turn	Green Period	Phases Fr	To	Adjusted Lost Time	Adjusted Flow Ratio	Required Grn Time Ratio	Required Movement Time
21	E_T		A	B	52	-	-	52.0Max
42	N_L		B	C	2	0.047	0.118	19.1
32	S_L		C	D	2	0.035	0.087	14.7
12	W_L		D	A	22	-	-	22.0Max
				Total:	78	0.082	0.205	107.8

- Flow ratio not used for cycle time calculations and the adjusted lost time equals the required movement time (=Min or Max as shown in Table S.1)

Cycle Time:

Minimum	Maximum	Practical	Chosen
32	NA	99	145

(Cycle time specified by the user)

Intersection Level of Service	=	C
Worst movement Level of Service	=	E
Average intersection delay (s)	=	32.6
Largest average movement delay (s)	=	75.9
Largest back of queue, 95% (m)	=	34
Performance Index	=	313.49
Degree of saturation (highest)	=	0.882
Practical Spare Capacity (lowest)	=	8 %
Effective intersection capacity, (veh/h)	=	6378
Total vehicle flow (veh/h)	=	5625
Total person flow (pers/h)	=	8438
Total vehicle delay (veh-h/h)	=	50.95
Total person delay (pers-h/h)	=	76.42
Total effective vehicle stops (veh/h)	=	4005
Total effective person stops (pers/h)	=	6007
Total vehicle travel (veh-km/h)	=	6447.4
Total cost ($/h)	=	4571.76
Total fuel (L/h)	=	827.9
Total CO2 (kg/h)	=	2073.14

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ PR-9959 - 2021 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table S.4 - PHASE INFORMATION

Phase No.	Change Time	Green Start	Displayed Green	Grn+Intgrn Secs	Prop.
A	0	2	66	68	0.469
B	68	70	18	20	0.138
C	88	90	14	16	0.110
D	104	106	39	41	0.283

Current Phase Sequence No.: 1
Input phase sequence: A B C D
Output phase sequence: A B C D

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Intersection ID: 1
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Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	(m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
12 L	5.37	8.05	64.0	0.93	0.85	21.2	11	22.22	36.3
11 T	13.00	19.50	28.4	0.70	0.63	27.3	23	87.17	52.3
13 R	0.46	0.70	11.1	0.03	0.69	0.2	0	3.09	66.1
South: El Nuevo Comandante									
32 L	1.98	2.97	75.9	0.95	0.75	5.5	3	7.71	18.7
31 T	0.66	0.99	70.1	0.95	0.73	5.5	3	2.74	20.1
33 R	0.20	0.30	3.4		0.41	5.3#		3.41	37.4
East: PR-3 HAcia Carolina									
22 L	3.25	4.88	56.8	0.80	0.78	6.9	3	13.66	38.7
21 T	21.65	32.48	35.6	0.90	0.83	45.0	34	142.14	48.1
23 R	0.72	1.08	11.1	0.03	0.69	0.3	0	4.80	66.1
North: PR-9959 desde Canovanas									
42 L	2.41	3.61	72.3	0.94	0.77	6.9	4	11.10	24.7
41 T	0.85	1.27	66.3	0.94	0.73	6.9	4	4.18	26.0
43 R	0.38	0.57	3.5		0.41	10.1#		11.27	38.6

Largest density (passenger cars per km or mile) for any lane

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
2098	0.673	18.83	28.25	32.3	0.69	0.67	23	112.48	49.9

South: El Nuevo Comandante											
340	0.362	2.85	4.27	30.1	0.36	0.54	3	13.86	26.6		
East: PR-3 HAcia Carolina											
2627	0.882	25.63	38.44	35.1	0.81	0.81	34	160.60	48.3		
North: PR-9959 desde Canovanas											
560	0.379	3.64	5.46	23.4	0.28	0.51	5	26.56	32.9		
ALL VEHICLES:											
5625	0.882	50.95	76.42	32.6	0.68	0.71	34	313.49	45.6		
INTERSECTION (persons):											
8438	0.882		76.42	32.6	0.68	0.71		313.49	45.6		

Queue values in this table are 95% back of queue (metres).

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Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table S.7 - LANE PERFORMANCE

Lane No.	Mov No.	Effective Green Times (sec) R1	G1	R2	G2	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	(m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo													
1 L	12	106	39	0	0	302	454	0.665	64.0	0.85	21.2	11	70
2 T	11	79	66	0	0	548	815	0.673	28.4	0.63	27.3	23	
3 T	11	79	66	0	0	548	815	0.673	28.4	0.63	27.3	23	
4 T	11	79	66	0	0	548	815	0.673	28.4	0.63	27.3	23	
5 R	13	2	66	2	75	151	1570	0.096	11.1	0.69	0.2	0	
South: El Nuevo Comandante													
1 L	32	131	14	0	0	63	174	0.362	76.0	0.75	5.3	3	
2 LT	32, 31	131	14	0	0	65	179	0.362	72.9	0.74	5.5	3	
3 R	33	0	145	0	0	212	1615	0.131	3.4	0.41	5.3#		
East: PR-3 HAcia Carolina													
1 L	22	106	39	0	0	103	456	0.226	56.8	0.78	6.9	3	70
2 L	22	106	39	0	0	103	456	0.226	56.8	0.78	6.9	3	70
3 T	21	79	66	0	0	729	827	0.882	35.6	0.83	45.0	34	
4 T	21	79	66	0	0	729	827	0.882	35.6	0.83	45.0	34	
5 T	21	79	66	0	0	729	827	0.882	35.6	0.83	45.0	34	
6 R	23	2	66	2	75	234	1561	0.150	11.1	0.69	0.3	0	
North: PR-9959 desde Canovanas													
1 L	42	127	18	0	0	81	213	0.379	72.3	0.77	6.6	5	
2 LT	42, 41	127	18	0	0	85	225	0.379	69.0	0.75	6.9	4	
3 R	43	0	145	0	0	394	1612	0.244	3.5	0.41	10.1#		

Density (passenger cars per km or mile)

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Interseccion PR-3 @ PR-9959 - 2021 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table S.8A - LANE FLOW AND CAPACITY INFORMATION

Lane No.	Mov No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Lane Width (m)	Adj. Saturation Flow Basic (tcu)	Aver 1st (veh)	Aver 2nd (veh)	Cap (veh /h)	Cap (veh /h)	Deg. Satn x	Lane Util %
West: PR-3 Hacia Fajardo													
1 L	12	302	0	0	302	3.05	1784	1690	0	0	454	0.665	100
2 T	11	0	548	0	548	3.60	1900	1790	0	0	815	0.673	100
3 T	11	0	548	0	548	3.60	1900	1790	0	0	815	0.673	100
4 T	11	0	548	0	548	3.60	1900	1790	0	0	815	0.673	100
5 R	13	0	0	151	151	3.60	1900	1615	1615	0	1570	0.096	100
South: El Nuevo Comandante													
1 L	32	63	0	0	63	3.60	1900	1805	0	0	174	0.362	100
2 LT	32, 31	31	34	0	65	3.60	1900	1854	0	0	179	0.362	100
3 R	33	0	0	212	212	3.60	1900	1615	1615	0	1615	0.131	100
East: PR-3 HAcia Carolina													
1 L	22	103	0	0	103	3.05	1784	1695	0	0	456	0.226	100
2 L	22	103	0	0	103	3.05	1784	1695	0	0	456	0.226	100
3 T	21	0	729	0	729	3.60	1900	1816	0	0	827	0.882	100
4 T	21	0	729	0	729	3.60	1900	1816	0	0	827	0.882	100
5 T	21	0	729	0	729	3.60	1900	1816	0	0	827	0.882	100
6 R	23	0	0	234	234	3.60	1900	1605	1605	0	1561	0.150	100
North: PR-9959 desde Canovanas													
1 L	42	81	0	0	81	3.60	1900	1715	0	0	213	0.379	100
2 LT	42, 41	39	46	0	85	3.60	1900	1810	0	0	225	0.379	100
3 R	43	0	0	394	394	3.60	1900	1612	1612	0	1612	0.244	100

Basic Saturation Flow in this table is adjusted for lane width, approach grade, parking manoeuvres and number of buses stopping. Saturation flow scale applies if specified.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table S.8B - SCATS MF PARAMETER

Lane No.	Mov No.	Stopline Flow (veh/h)	Capacity (veh/h)	SCATS Satn Flow	SCATS MF	Deg. Satn x	Lane Util. %
West: PR-3 Hacia Fajardo							
1 L	12	302	454	1695	1612	0.665	100
2 T	11	548	815	1900	1844	0.673	100
3 T	11	548	815	1900	1844	0.673	100
4 T	11	548	815	1900	1844	0.673	100
5 R	13	151	1570	1615	NA	0.096	100
South: El Nuevo Comandante							
1 L	32	63	174	1805	1579	0.362	100
2 LT	32, 31	65	179	1854	1622	0.362	100
3 R	33	212	1615	1615	NA	0.131	100
East: PR-3 HAcia Carolina							
1 L	22	103	456	1695	1612	0.226	100
2 L	22	103	456	1695	1612	0.226	100
3 T	21	729	827	1900	1844	0.882	100
4 T	21	729	827	1900	1844	0.882	100
5 T	21	729	827	1900	1844	0.882	100
6 R	23	234	1561	1615	NA	0.150	100
North: PR-9959 desde Canovanas							
1 L	42	81	213	1805	1625	0.379	100
2 LT	42, 41	85	225	1855	1670	0.379	100
3 R	43	394	1612	1615	NA	0.244	100

NA Not Applicable - SCATS MF was not calculated for this lane due to one of the following reasons:
- the lane is not controlled by signals (slip or continuous lane)
- two movements share this lane and do not run in the same phases

STOPLINE FLOW: Departure flow rate in veh/h as measured at the stop line. This cannot exceed capacity.

SCATS SATURATION FLOW: This allows for lane width, approach grade and turning vehicles. Saturation flow scale applies if specified. The effects of heavy vehicles, parking manoeuvres, number of buses stopping and conflicting pedestrian volume are not included.

SCATS MF: This emulates the MF (Maximum Flow) parameter used in the SCATS control system. It is calculated from the SCATS SATURATION FLOW parameter.

DEG. SATN: The Demand (Arrival) Flow Rate may exceed the Stopline Flow Rate, therefore x > 1 is possible.

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Table S.12A - FUEL CONSUMPTION, EMISSIONS AND COST - TOTAL

Mov No.	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: PR-3 Hacia Fajardo						
12 L	47.4	302.94	0.208	8.22	0.292	118.5
11 T	253.9	1264.07	0.942	38.65	1.563	636.4
13 R	19.9	92.60	0.082	3.66	0.134	49.7
	321.2	1659.61	1.232	50.53	1.988	804.6
South: El Nuevo Comandante						
32 L	12.0	99.49	0.059	2.57	0.065	30.0
31 T	4.3	34.19	0.021	0.91	0.024	10.7
33 R	10.4	91.19	0.042	1.41	0.043	26.1
	26.7	224.88	0.121	4.89	0.132	66.8
East: PR-3 HAcia Carolina						
22 L	31.4	195.29	0.138	5.48	0.195	78.4
21 T	352.1	1804.88	1.389	60.67	2.243	881.9
23 R	31.7	144.82	0.129	5.83	0.213	79.2
	415.2	2145.00	1.656	71.98	2.651	1039.5
North: PR-9959 desde Canovanas						
42 L	22.8	171.20	0.097	4.34	0.120	57.2
41 T	7.5	61.33	0.034	1.39	0.038	18.6
43 R	34.6	309.75	0.136	4.10	0.133	86.4
	64.8	542.28	0.268	9.83	0.291	162.2
INTERSECTION:	827.9	4571.76	3.277	137.22	5.063	2073.1

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	27.00
Time value factor	=	0.60
Average occupancy (persons/veh)	=	1.5
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

The idle fuel and vehicle mass parameters given above are the default values (data given in RIDES may override some of these parameters).

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Interseccion PR-3 @ PR-9959 - 2021 AM
Intersection ID: 1
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Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo												
1 L	302			302	0	1783	39		0.665	64.0	11	70
2 T		548		548	6	1899	66		0.673	28.4	23	
3 T		548		548	6	1899	66		0.673	28.4	23	
4 T		548		548	6	1899	66		0.673	28.4	23	
5 R			151	151	0	1899	66	75	0.096	11.1	0	
	302	1645	151	2098	5				0.673	32.3	23	
South: El Nuevo Comandante												
1 L	63			63	0	1899	14		0.362	76.0	3	
2 LT	31	34		65	0	1900	14		0.362	72.9	3	
3 R			212	212	0	1899	145		0.131	3.4		
	94	34	212	340	0				0.362	30.1	3	
East: PR-3 HAcia Carolina												
1 L	103			103	0	1783	39		0.226	56.8	3	70
2 L	103			103	0	1783	39		0.226	56.8	3	70
3 T		729		729	5	1899	66		0.882	35.6	34	
4 T		729		729	5	1899	66		0.882	35.6	34	
5 T		729		729	5	1899	66		0.882	35.6	34	
6 R			234	234	1	1899	66	75	0.150	11.1	0	
	206	2187	234	2627	4				0.882	35.1	34	
North: PR-9959 desde Canovanas												
1 L	81			81	6	1899	18		0.379	72.3	5	
2 LT	39	46		85	3	1900	18		0.379	69.0	4	
3 R			394	394	0	1899	145		0.244	3.5		
	120	46	394	560	1				0.379	23.4	5	

ALL VEHICLES	Total Flow	% HV	Cycle Time	Max X	Aver. Delay	Max Queue
	5625	4	145	0.882	32.6	34

Total flow period = 60 minutes. Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows (in through car units) have been adjusted for grade, lane widths, parking manoeuvres and bus stops.

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Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table S.15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Green Ratio (g/C) 1st grn	Green Ratio (g/C) 2nd grn	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	Longest Queue 95% Back (m)
West: PR-3 Hacia Fajardo										
12 L		0.269*		302	455	0.664	64.0	E	21.2	11
11 T		0.455		1645	2444	0.673	28.4	C	27.3	23
13 R	(Und)	0.455	0.517	151	1570	0.096	11.1	B	0.2	0
				2098		0.673	32.3	C	27.3	23
South: El Nuevo Comandante										
32 L		0.097*		94	259	0.362	75.9	E	5.5	3
31 T		0.097		34	94	0.362	70.1	E	5.5	3
33 R	(Con)	1.000		212	1615	0.131	3.4	A#	5.3#	
				340		0.362	30.1	C	5.5	3
East: PR-3 HAcia Carolina										
22 L		0.269		206	912	0.226	56.8	E	6.9	3
21 T		0.455*		2187	2480	0.882*	35.6	D	45.0	34
23 R	(Und)	0.455	0.517	234	1561	0.150	11.1	B	0.3	0
				2627		0.882	35.1	D	45.0	34
North: PR-9959 desde Canovanas										
42 L		0.124*		120	316	0.379	72.3	E	6.9	4
41 T		0.124		46	121	0.379	66.3	E	6.9	4
43 R	(Con)	1.000		394	1612	0.244	3.5	B#	10.1#	
				560		0.379	23.4	C	6.9	4
ALL VEHICLES:				5625		0.882	32.6	C	45.0	34
INTERSECTION (persons):				8438			32.6		45.0	34

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the aaSIDRA Output Guide or the Output section of the on-line help.

\# Continuous movements: Level Of Service based on density, Density (passenger cars per km or mile) instead of queue.

* Maximum v/c ratio, or critical green periods

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Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table D.0 - GEOMETRIC DELAY DATA

From	To	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream Distance (m)
West: PR-3 Hacia Fajardo						
	South	20.0	26.2	31.4	1000	184
	East	S	80.0	23.6	1000	202
	North	17.8	25.1	28.0	1000	182
South: El Nuevo Comandante						
	West	18.6	25.6	29.3	500	183
	East	20.0	26.2	31.4	500	60
	North	S	80.0	39.1	500	193
East: PR-3 HAcia Carolina						
	West	S	80.0	23.6	1000	200
	South	17.5	25.0	27.5	1000	181
	North	20.0	26.2	31.4	1000	186
North: PR-9959 desde Canovanas						
	West	20.0	26.2	31.4	1000	60
	South	S	80.0	39.1	1000	193
	East	19.4	25.9	30.4	1000	195

Downstream Distance calculated by aaSIDRA

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

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Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Stop-line Delay 1st d1	Stop-line Delay 2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	Queuing MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
			Delay (seconds/veh)								
West: PR-3 Hacia Fajardo											
1 L	12	0.665	52.9	0.0	52.9	4.5	48.5	0.0	48.5	11.1	64.0
2 T	11	0.673	28.4	0.0	28.4	6.9	21.6	0.0	21.6	0.0	28.4
3 T	11	0.673	28.4	0.0	28.4	6.9	21.6	0.0	21.6	0.0	28.4
4 T	11	0.673	28.4	0.0	28.4	6.9	21.6	0.0	21.6	0.0	28.4
5 R	13	0.096	0.0	0.0	0.0	0.2	0.0	0.0	0.0	11.1	11.1
South: El Nuevo Comandante											
1 L	32	0.362	70.2	0.0	70.2	4.6	65.5	0.0	65.5	5.8	76.0
2 LT	32, 31	0.362	70.1	0.0	70.1	6.4	63.7	0.0	63.7	5.8 0.0	72.9
3 R	33	0.131			0.0					3.4	3.4
East: PR-3 HAcia Carolina											
1 L	22	0.226	45.8	0.0	45.8	3.8	41.9	0.0	41.9	11.1	56.8
2 L	22	0.226	45.8	0.0	45.8	3.8	41.9	0.0	41.9	11.1	56.8
3 T	21	0.882	33.0	2.6	35.6	8.8	26.8	0.2	26.6	0.0	35.6
4 T	21	0.882	33.0	2.6	35.6	8.8	26.8	0.2	26.6	0.0	35.6
5 T	21	0.882	33.0	2.6	35.6	8.8	26.8	0.2	26.6	0.0	35.6
6 R	23	0.150	0.0	0.0	0.0	0.2	0.0	0.0	0.0	11.1	11.1
North: PR-9959 desde Canovanas											
1 L	42	0.379	66.5	0.0	66.5	4.6	61.8	0.0	61.8	5.8	72.3
2 LT	42, 41	0.379	66.3	0.0	66.3	6.4	60.0	0.0	60.0	5.8 0.0	69.0
3 R	43	0.244			0.1					3.4	3.5

dn is average stop-start delay for all vehicles queued and unqueued

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table D.2 - LANE STOPS

Lane No.	Deg. Satn x	Effective Stop Rate hei	hei2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: PR-3 Hacia Fajardo							
1 L	0.665	0.80	0.00	0.05	0.85	0.925	0.00
2 T	0.673	0.63	0.00	0.00	0.63	0.701	0.00
3 T	0.673	0.63	0.00	0.00	0.63	0.701	0.00
4 T	0.673	0.63	0.00	0.00	0.63	0.701	0.00
5 R	0.096	0.02	0.00	0.67	0.69	0.031	0.00
South: El Nuevo Comandante							
1 L	0.362	0.73	0.00	0.03	0.75	0.951	0.00
2 LT	0.362	0.73	0.00	0.01	0.74	0.951	0.00
3 R	0.131			0.41	0.41		
East: PR-3 HAcia Carolina							
1 L	0.226	0.64	0.00	0.14	0.78	0.796	0.00
2 L	0.226	0.64	0.00	0.14	0.78	0.796	0.00
3 T	0.882	0.82	0.01	0.00	0.83	0.899	0.03
4 T	0.882	0.82	0.01	0.00	0.83	0.899	0.03
5 T	0.882	0.82	0.01	0.00	0.83	0.899	0.03
6 R	0.150	0.03	0.00	0.67	0.69	0.034	0.00
North: PR-9959 desde Canovanas							
1 L	0.379	0.73	0.00	0.03	0.77	0.936	0.00
2 LT	0.379	0.73	0.00	0.02	0.75	0.937	0.00
3 R	0.244			0.41	0.41		

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table D.3A - LANE QUEUES (veh)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 L	0.665	0.0	11.7	0.0	11.7	13.7	17.6	19.0	21.2	24.6	0.16
2 T	0.673	0.0	15.6	0.0	15.6	18.2	23.0	24.7	27.3	31.2	0.02
3 T	0.673	0.0	15.6	0.0	15.6	18.2	23.0	24.7	27.3	31.2	0.02
4 T	0.673	0.0	15.6	0.0	15.6	18.2	23.0	24.7	27.3	31.2	0.02
5 R	0.096	0.0	0.1	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.00
South: El Nuevo Comandante											
1 L	0.362	0.0	2.6	0.0	2.6	3.1	4.2	4.6	5.3	6.6	0.01
2 LT	0.362	0.0	2.7	0.0	2.7	3.2	4.3	4.7	5.5	6.8	0.01
3 R	0.131				5.3#						-0.01#
East: PR-3 HAcia Carolina											
1 L	0.226	0.0	3.5	0.0	3.5	4.1	5.4	6.0	6.9	8.5	0.05
2 L	0.226	0.0	3.5	0.0	3.5	4.1	5.4	6.0	6.9	8.5	0.05
3 T	0.882	0.5	26.4	1.2	27.6	31.8	39.2	41.4	45.0	50.2	0.03
4 T	0.882	0.5	26.4	1.2	27.6	31.8	39.2	41.4	45.0	50.2	0.03
5 T	0.882	0.5	26.4	1.2	27.6	31.8	39.2	41.4	45.0	50.2	0.03
6 R	0.150	0.0	0.2	0.0	0.2	0.2	0.3	0.3	0.3	0.4	0.00
North: PR-9959 desde Canovanas											
1 L	0.379	0.0	3.3	0.0	3.3	3.9	5.2	5.7	6.6	8.1	0.01
2 LT	0.379	0.0	3.5	0.0	3.5	4.1	5.4	6.0	6.9	8.5	0.00
3 R	0.244				10.1#						-0.02#

Values printed in this table are back of queue (vehicles).

\# Continuous movements: Density (passenger cars per km or mile) instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table D.3B - LANE QUEUES (metres)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 L	0.665	0	6	0	6	7	9	10	11	13	0.16
2 T	0.673	0	13	0	13	15	19	21	23	26	0.02
3 T	0.673	0	13	0	13	15	19	21	23	26	0.02
4 T	0.673	0	13	0	13	15	19	21	23	26	0.02
5 R	0.096	0	0	0	0	0	0	0	0	0	0.00
South: El Nuevo Comandante											
1 L	0.362	0	1	0	1	2	2	2	3	3	0.01
2 LT	0.362	0	1	0	1	2	2	2	3	3	0.01
3 R	0.131				5.3#						-0.01#
East: PR-3 HAcia Carolina											
1 L	0.226	0	2	0	2	2	3	3	3	4	0.05
2 L	0.226	0	2	0	2	2	3	3	3	4	0.05
3 T	0.882	0	20	1	21	24	30	31	34	38	0.03
4 T	0.882	0	20	1	21	24	30	31	34	38	0.03
5 T	0.882	0	20	1	21	24	30	31	34	38	0.03
6 R	0.150	0	0	0	0	0	0	0	0	0	0.00
North: PR-9959 desde Canovanas											
1 L	0.379	0	3	0	3	3	4	5	5	7	0.01
2 LT	0.379	0	2	0	2	3	4	4	4	6	0.00
3 R	0.244				10.1#						-0.02#

Values printed in this table are back of queue (metres).

\# Continuous movements: Density (passenger cars per km or mile) instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table D.4 - MOVEMENT SPEEDS (km/h)

Mov No.	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall
West: PR-3 Hacia Fajardo								
12	80.0	25.1	25.1	80.0			61.9	36.3
11	80.0	80.0	80.0	80.0			70.9	52.3
13	80.0	26.2	26.2	80.0			66.1	66.1
South: El Nuevo Comandante								
32	40.0	25.6	25.6	80.0			37.4	18.7
31	40.0	40.0	80.0	80.0			40.4	20.1
33	40.0	26.2	26.2	80.0			37.4	37.4
East: PR-3 HAcia Carolina								
22	80.0	25.0	25.0	80.0			62.5	38.7
21	80.0	80.0	80.0	80.0	19.4		68.5	48.1
23	80.0	26.2	26.2	80.0			66.1	66.1
North: PR-9959 desde Canovanas								
42	40.0	25.9	25.9	80.0			38.5	24.7
41	40.0	40.0	80.0	80.0			40.3	26.0
43	40.0	26.2	26.2	80.0			38.6	38.6

"Running Speed" is the average speed excluding stopped periods.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 AM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 145

Table D.5 - PROGRESSION FACTORS & ACTUATED SIGNAL PARAMETERS

Mov No.	Control	Coord.	Arrival Type	Delay Prog. Factor	Queue Prog. Factor	Gap Settings es	eh	Disp. Grn. Settings 1st Grn Gmin	Gmax	2nd Grn Gmin	Gmax
West: PR-3 Hacia Fajardo											
12	VA	No	3	1.000	1.000	2.0	2.1	6	20		
11	VA	Yes	4	0.830	0.846	2.5	2.7	6	50		
13	VA	No	3	1.000	1.000	2.5	2.6	6	50	6	50
South: El Nuevo Comandante											
32	VA	No	3	1.000	1.000	2.0	2.3	6	20		
31	VA	No	3	1.000	1.000	2.5	2.8	6	50		
33	VA	No	3	1.000	1.000	2.5	2.8	6	50		
East: PR-3 HAcia Carolina											
22	VA	No	3	1.000	1.000	2.0	2.1	6	20		
21	VA	Yes	4	0.830	0.929	2.5	2.6	6	50		
23	VA	No	3	1.000	1.000	2.5	2.6	6	50	6	50
North: PR-9959 desde Canovanas											
42	VA	No	3	1.000	1.000	2.0	2.3	6	20		
41	VA	No	3	1.000	1.000	2.5	2.8	6	50		
43	VA	No	3	1.000	1.000	2.5	2.8	6	50		

--- End of aaSIDRA Output ---

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Movement Summary

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ PR-9959 - 2021 PM

Signalised - Actuated coordinated **Cycle Time = 180 seconds**

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
El Nuevo Comandante										
32	L	255	0.0	0.581	86.0	LOS F	8	0.96	0.81	17.4
31	T	63	0.0	0.582	80.1	LOS F	8	0.96	0.78	18.6
33	R	428	0.0	0.265	3.5	LOS B#	11#	0.00	0.41	37.4
Approach		**746**	**0.0**	**0.581**	**38.1**	**LOS D**	**8**	**0.41**	**0.58**	**24.4**
PR-3 HAcia Carolina										
22	L	289	0.0	0.548	90.1	LOS F	7	0.95	0.81	29.7
21	T	2056	2.1	0.644	18.1	LOS B	18	0.50	0.45	59.8
23	R	24	4.2	0.016	11.2	LOS B	0	0.02	0.69	66.1
Approach		**2369**	**1.9**	**0.644**	**26.8**	**LOS C**	**18**	**0.55**	**0.50**	**53.3**
PR-9959 desde Canovanas										
42	L	44	0.0	0.313	95.1	LOS F	2	0.96	0.74	21.8
41	T	66	0.0	0.447	90.6	LOS F	3	0.97	0.74	22.7
43	R	199	1.0	0.124	3.5	LOS A#	6#	0.00	0.41	38.6
Approach		**309**	**0.6**	**0.447**	**35.1**	**LOS D**	**3**	**0.34**	**0.53**	**30.2**
PR-3 Hacia Fajardo										
12	L	169	0.6	0.644	91.6	LOS F	9	0.97	0.82	29.4
11	T	3491	0.6	1.077	83.8	LOS F	67	1.00	1.04	31.2
13	R	214	0.0	0.136	11.1	LOS B	0	0.03	0.69	66.1
Approach		**3873**	**0.6**	**1.077**	**80.2**	**LOS F**	**67**	**0.94**	**1.01**	**32.1**
All Vehicles		**7297**	**0.9**	**1.077**	**56.6**	**LOS E**	**67**	**0.73**	**0.78**	**36.3**

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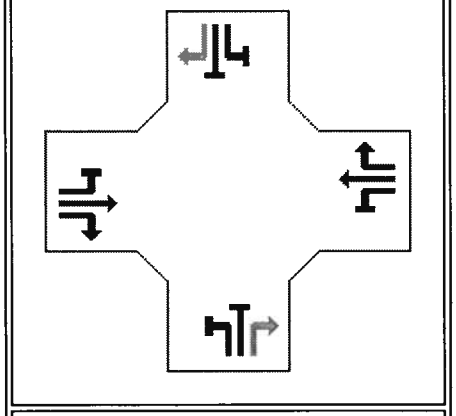
Phasing

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ PR-9959 - 2021 PM

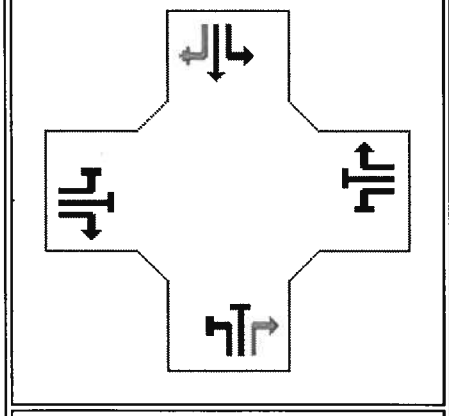
C = **180** seconds
Cycle Time Option: **User-specified cycle time**
Phase times determined by the program.

Phase A



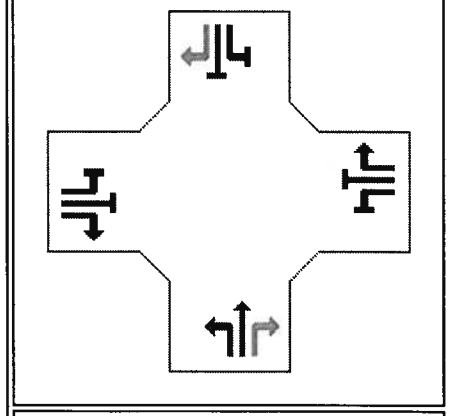
G = **103** seconds
G + I = **105** seconds
(G + I)/C = **58.3** %

Phase B



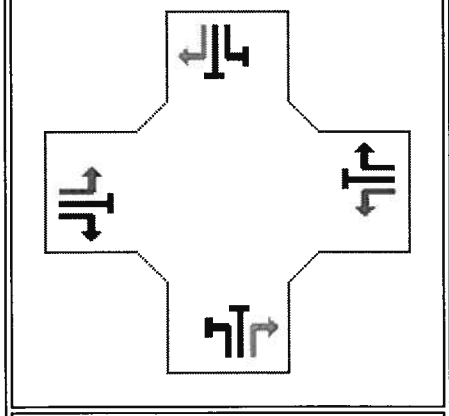
G = **14** seconds
G + I = **16** seconds
(G + I)/C = **8.9** %

Phase C

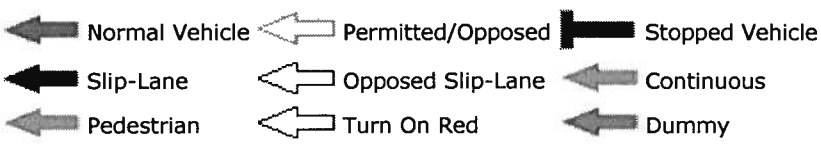


G = **27** seconds
G + I = **29** seconds
(G + I)/C = **16.1** %

Phase D



G = **28** seconds
G + I = **30** seconds
(G + I)/C = **16.7** %



C	Cycle Time
G	Green Time
I	Intergreen Time (yellow plus all-red)
(G + I)/C	Phase time as a percentage of cycle

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Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 PM
Intersection ID: 1

aaTraffic SIDRA US Highway Capacity Manual (2000) Metric Version

RUN INFORMATION

* Basic Parameters:
Intersection Type: Signalised - Actuated Coordinated
For fully-actuated signal timings, the following specifications will be ignored:
Any maximum cycle time specification
Driving on the right-hand side of the road
Input data specified in Metric units
Default Values File No. 10
Peak flow period (for performance): 15 minutes
Unit time (for volumes): 60 minutes (Hourly Rate)
Delay definition: Control delay
Geometric delay included
aaSIDRA Standard Delay and Queue models used
Level of Service based on: Delay (HCM method)
Queue definition: Back of queue, 95th Percentile

* No. of Main (Timing-Capacity) Iterations = 2
Comparison of last two iterations:
Difference in intersection degree of satn = 0.0 %
Largest difference in eff. green times = 0 secs
(max. value for stopping = 0 secs)

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.0 - TRAFFIC FLOW DATA

Mov No.	Left		Through		Right		Flow Scale	Peak Flow Factor
	LV	HV	LV	HV	LV	HV		
VEHICLES Demand flows in veh/hour as used by the program								
West: PR-3 Hacia Fajardo								
12	168	1	0	0	0	0	1.00	0.95
11	0	0	3468	22	0	0	1.00	0.95
13	0	0	0	0	214	0	1.00	0.95
South: El Nuevo Comandante								
32	255	0	0	0	0	0	1.00	0.95
31	0	0	63	0	0	0	1.00	0.95
33	0	0	0	0	428	0	1.00	0.95
East: PR-3 HAcia Carolina								
22	289	0	0	0	0	0	1.00	0.95
21	0	0	2013	43	0	0	1.00	0.95
23	0	0	0	0	23	1	1.00	0.95
North: PR-9959 desde Canovanas								
42	44	0	0	0	0	0	1.00	0.95
41	0	0	66	0	0	0	1.00	0.95
43	0	0	0	0	197	2	1.00	0.95

Based on unit time = 60 minutes.
Flow Scale and Peak Hour Factor effects included in flow values.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.1 - MOVEMENT PHASE AND TIMING PARAMETERS

Mov No.	Mov Typ	PHASE MATRIX First Green Fr To Op Pr	PHASE MATRIX Second Green Fr To Op Pr	Lost Tim 1st Grn	Lost Tim 2nd Grn	Req.Mov.Time 1st Grn	Req.Mov.Time 2nd Grn	Eff. Grn 1st Grn	Eff. Grn 2nd Grn
West: PR-3 Hacia Fajardo									
12 L	*D	A		2		22.0Max		28	
11 T	*A	B		2		52.0Max		103	
13 R (Und)	A	B	B A	2	2	31.8	31.8	103	73
South: El Nuevo Comandante									
32 L		C D		2		22.0Max		27	
31 T	*C	D		2		32.5		27	
East: PR-3 HAcia Carolina									
22 L		D A		2		22.0Max		28	
21 T		A B		2		52.0Max		103	
23 R (Und)	A	B	B A	2	2	8.0Min	24.0Min	103	73
North: PR-9959 desde Canovanas									
42 L		B C		2		13.0		14	
41 T	*B	C		2		17.6		14	

Current Phase Sequence No.: 1
Input phase sequence: A B C D
Output phase sequence: A B C D

* Critical Movement/Green Period

Movement Types:
Ped Pedestrian
Dum Dummy
Und Undetected in both green periods
Un1 Undetected in 1st green period
Un2 Undetected in 2nd green period

Under heading 'Op':
L "Left" turns are opposed
R "Right" turns are opposed
LR "Left and Right" opposed
C "Constant" saturation flow

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Dem Flow (veh/h)	HV (%)	Satn Flow 1st Grn	Satn Flow 2nd Grn	Flow Ratio 1st Grn	Flow Ratio 2nd Grn	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: PR-3 Hacia Fajardo											
12 L	169	0.6	1686		0.100		262	0.95	47	100	0.644
11 T	3490	0.6	5664		0.616		3241	0.95	-12	100	1.077*
13 R	214	0.0	1615	1615	0.066	0.066	1579	0.90	564	100	0.136
South: El Nuevo Comandante											
32 L	255	0.0	2924		0.087		439	0.95	63	100	0.581
31 T	63	0.0	722		0.087		108	0.95	63	100	0.582
33 R	428	0.0	1615		0.265		1615	0.98	270	100	0.265
East: PR-3 HAcia Carolina											
22 L	289	0.0	3389		0.085		527	0.90	64	100	0.548
21 T	2056	2.1	5583		0.368		3195	0.95	48	100	0.644
23 R	24	4.2	1569	1569	0.008	0.008	1534	0.90	5653	100	0.016
North: PR-9959 desde Canovanas											
42 L	44	0.0	1805		0.024		140	0.95	203	70	0.313
41 T	66	0.0	1900		0.035		148	0.90	102	100	0.447
43 R	199	1.0	1604		0.124		1604	0.98	690	100	0.124

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.3 - INTERSECTION PARAMETERS

Crit Mov No.	App. & Turn	Green Period	Phases Fr	Phases To	Adjusted Lost Time	Adjusted Flow Ratio	Required Grn Time Ratio	Required Movement Time
11	W_T		A	B	52	-	-	52.0Max
41	N_T		B	C	2	0.035	0.087	17.6
31	S_T		C	D	2	0.087	0.170	32.5
12	W_L		D	A	22	-	-	22.0Max
				Total:	78	0.122	0.256	124.2

- Flow ratio not used for cycle time calculations and the adjusted lost time equals the required movement time (=Min or Max as shown in Table S.1)

Cycle Time:

Minimum	Maximum	Practical	Chosen
32	NA	105	180

(Cycle time specified by the user)

Intersection Level of Service	=	E
Worst movement Level of Service	=	F
Average intersection delay (s)	=	56.6
Largest average movement delay (s)	=	95.1
Largest back of queue, 95% (m)	=	67
Performance Index	=	589.04
Degree of saturation (highest)	=	1.077
Practical Spare Capacity (lowest)	=	-12 %
Effective intersection capacity, (veh/h)	=	6777
Total vehicle flow (veh/h)	=	7297
Total person flow (pers/h)	=	10946
Total vehicle delay (veh-h/h)	=	114.82
Total person delay (pers-h/h)	=	172.23
Total effective vehicle stops (veh/h)	=	5708
Total effective person stops (pers/h)	=	8563
Total vehicle travel (veh-km/h)	=	8236.4
Total cost ($/h)	=	6947.00
Total fuel (L/h)	=	1052.7
Total CO2 (kg/h)	=	2632.61

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ PR-9959 - 2021 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.4 - PHASE INFORMATION

Phase No.	Change Time	Green Start	Displayed Green	Grn+Intgrn Secs	Grn+Intgrn Prop.
A	0	2	103	105	0.583
B	105	107	14	16	0.089
C	121	123	27	29	0.161
D	150	152	28	30	0.167

Current Phase Sequence No.: 1
Input phase sequence: A B C D
Output phase sequence: A B C D

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Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
12 L	4.30	6.45	91.6	0.97	0.82	16.1	9	15.81	29.4
11 T	81.28	121.92	83.8	1.00	1.04	125.5	67	393.45	31.2
13 R	0.66	0.99	11.1	0.03	0.69	0.3	0	4.38	66.1
South: El Nuevo Comandante									
32 L	6.09	9.13	86.0	0.96	0.81	15.3	8	23.89	17.4
31 T	1.40	2.10	80.1	0.96	0.78	15.3	8	5.81	18.6
33 R	0.41	0.62	3.5		0.41	10.7#		6.89	37.4
East: PR-3 HAcia Carolina									
22 L	7.24	10.85	90.1	0.95	0.81	13.8	7	26.64	29.7
21 T	10.35	15.53	18.1	0.50	0.45	29.1	18	93.87	59.8
23 R	0.07	0.11	11.2	0.02	0.69	0.0	0	0.49	66.1
North: PR-9959 desde Canovanas									
42 L	1.16	1.74	95.1	0.96	0.74	4.7	2	4.85	21.8
41 T	1.66	2.49	90.6	0.97	0.74	6.9	3	7.25	22.7
43 R	0.19	0.29	3.5		0.41	5.5#		5.69	38.6

Largest density (passenger cars per km or mile) for any lane

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Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
3873	1.077	86.24	129.36	80.2	0.94	1.01	67	413.64	32.1

```
South: El Nuevo Comandante
  746   0.582    7.90    11.85     38.1   0.41  0.58      8   36.60     24.4
--------------------------------------------------------------------------------
East: PR-3 HAcia Carolina
 2369   0.644   17.66    26.49     26.8   0.55  0.50     18  121.00     53.3
--------------------------------------------------------------------------------
North: PR-9959 desde Canovanas
  309   0.447    3.01     4.52     35.1   0.34  0.53      3   17.79     30.2
--------------------------------------------------------------------------------
ALL VEHICLES:
 7297   1.077  114.82   172.23     56.6   0.73  0.78     67  589.04     36.3
--------------------------------------------------------------------------------
INTERSECTION (persons):
10946   1.077           172.23     56.6   0.73  0.78         589.04     36.3
--------------------------------------------------------------------------------
Queue values in this table are 95% back of queue (metres).
```

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Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.7 - LANE PERFORMANCE

Lane No.	Mov No.	Effective Green R1	Red and Times (sec) G1	R2	G2	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% (vehs)	Back (m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo													
1 L	12	152	28	0	0	169	262	0.644	91.6	0.82	16.1	9	70
2 T	11	77	103	0	0	1163	1080	1.077	83.8	1.04	125.5	67	
3 T	11	77	103	0	0	1163	1080	1.077	83.8	1.04	125.5	67	
4 T	11	77	103	0	0	1163	1080	1.077	83.8	1.04	125.5	67	
5 R	13	2	103	2	73	214	1579	0.136	11.1	0.69	0.3	0	
South: El Nuevo Comandante													
1 L	32	153	27	0	0	157	271	0.581	86.0	0.81	15.0	7	
2 LT	32, 31	153	27	0	0	161	276	0.581	83.7	0.80	15.3	8	
3 R	33	0	180	0	0	428	1615	0.265	3.5	0.41	10.7#		
East: PR-3 HAcia Carolina													
1 L	22	152	28	0	0	145	264	0.548	90.1	0.81	13.8	7	70
2 L	22	152	28	0	0	145	264	0.548	90.1	0.81	13.8	7	70
3 T	21	77	103	0	0	685	1065	0.644	18.1	0.45	29.1	18	
4 T	21	77	103	0	0	685	1065	0.644	18.1	0.45	29.1	18	
5 T	21	77	103	0	0	685	1065	0.644	18.1	0.45	29.1	18	
6 R	23	2	103	2	73	24	1534	0.016	11.2	0.69	0.0	0	
North: PR-9959 desde Canovanas													
1 L	42	166	14	0	0	44	140	0.313	95.1	0.74	4.7	2	
2 T	42, 41	166	14	0	0	66	148	0.447	90.6	0.74	6.9	3	
3 R	43	0	180	0	0	199	1604	0.124	3.5	0.41	5.5#		

\# Density (passenger cars per km or mile)

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Interseccion PR-3 @ PR-9959 - 2021 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.8A - LANE FLOW AND CAPACITY INFORMATION

Lane No.	Mov No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Lane Width (m)	Adj. Basic (tcu)	Aver 1st (veh)	Aver 2nd (veh)	Cap (veh /h)	Cap (veh /h)	Deg. Satn x	Lane Util %
West: PR-3 Hacia Fajardo													
1 L	12	169	0	0	169	3.05	1784	1686	0	0	262	0.644	100
2 T	11	0	1163	0	1163	3.60	1900	1888	0	0	1080	1.077	100
3 T	11	0	1163	0	1163	3.60	1900	1888	0	0	1080	1.077	100
4 T	11	0	1163	0	1163	3.60	1900	1888	0	0	1080	1.077	100
5 R	13	0	0	214	214	3.60	1900	1615	1615	0	1579	0.136	100
South: El Nuevo Comandante													
1 L	32	157	0	0	157	3.60	1900	1805	0	0	271	0.581	100
2 LT	32, 31	98	63	0	161	3.60	1900	1841	0	0	276	0.581	100
3 R	33	0	0	428	428	3.60	1900	1615	1615	0	1615	0.265	100
East: PR-3 HAcia Carolina													
1 L	22	145	0	0	145	3.05	1784	1695	0	0	264	0.548	100
2 L	22	145	0	0	145	3.05	1784	1695	0	0	264	0.548	100
3 T	21	0	685	0	685	3.60	1900	1861	0	0	1065	0.644	100
4 T	21	0	685	0	685	3.60	1900	1861	0	0	1065	0.644	100
5 T	21	0	685	0	685	3.60	1900	1861	0	0	1065	0.644	100
6 R	23	0	0	24	24	3.60	1900	1569	1569	0	1534	0.016	100
North: PR-9959 desde Canovanas													
1 L	42	44	0	0	44	3.60	1900	1805	0	0	140	0.313	70P
2 T	42, 41	0	66	0	66	3.60	1900	1900	0	0	148	0.447	100
3 R	43	0	0	199	199	3.60	1900	1604	1604	0	1604	0.124	100

P Lane under-utilisation found by the "Program"

Basic Saturation Flow in this table is adjusted for lane width, approach grade, parking manoeuvres and number of buses stopping. Saturation flow scale applies if specified.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.8B - SCATS MF PARAMETER

Lane No.	Mov No.	Stopline Flow (veh/h)	Capacity (veh/h)	SCATS Satn Flow	SCATS MF	Deg. Satn x	Lane Util. %
West: PR-3 Hacia Fajardo							
1 L	12	169	262	1695	1582	0.644	100
2 T	11	1080	1080	1900	1864	1.077	100
3 T	11	1080	1080	1900	1864	1.077	100
4 T	11	1080	1080	1900	1864	1.077	100
5 R	13	214	1579	1615	NA	0.136	100
South: El Nuevo Comandante							
1 L	32	157	271	1805	1681	0.581	100
2 LT	32, 31	161	276	1841	1714	0.581	100
3 R	33	428	1615	1615	NA	0.265	100
East: PR-3 HAcia Carolina							
1 L	22	145	264	1695	1582	0.548	100
2 L	22	145	264	1695	1582	0.548	100
3 T	21	685	1065	1900	1864	0.644	100
4 T	21	685	1065	1900	1864	0.644	100
5 T	21	685	1065	1900	1864	0.644	100
6 R	23	24	1534	1615	NA	0.016	100
North: PR-9959 desde Canovanas							
1 L	42	140	1805	1579	0.313	70P	
2 T	42, 41	66	148	1900	1662	0.447	100
3 R	43	199	1604	1615	NA	0.124	100

NA Not Applicable - SCATS MF was not calculated for this lane due to one of the following reasons:
- the lane is not controlled by signals (slip or continuous lane)
- two movements share this lane and do not run in the same phases

P Lane under-utilisation found by the "Program"

STOPLINE FLOW: Departure flow rate in veh/h as measured at the stop line. This cannot exceed capacity.

SCATS SATURATION FLOW: This allows for lane width, approach grade and turning vehicles. Saturation flow scale applies if specified. The effects of heavy vehicles, parking manoeuvres, number of buses stopping and conflicting pedestrian volume are not included.

SCATS MF: This emulates the MF (Maximum Flow) parameter used in the SCATS control system. It is calculated from the SCATS SATURATION FLOW parameter.

DEG. SATN: The Demand (Arrival) Flow Rate may exceed the Stopline Flow Rate, therefore x > 1 is possible.

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Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.12A - FUEL CONSUMPTION, EMISSIONS AND COST - TOTAL

Mov No.	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: PR-3 Hacia Fajardo						
12 L	28.5	203.75	0.127	4.71	0.167	71.3
11 T	585.0	4036.34	2.583	97.30	3.485	1462.8
13 R	28.2	131.19	0.117	5.19	0.190	70.5
	641.6	4371.28	2.827	107.20	3.842	1604.5
South: El Nuevo Comandante						
32 L	33.6	288.44	0.165	7.01	0.178	83.9
31 T	8.2	67.95	0.039	1.69	0.044	20.4
33 R	21.1	184.15	0.085	2.85	0.088	52.7
	62.8	540.54	0.290	11.55	0.310	157.0
East: PR-3 HAcia Carolina						
22 L	47.8	344.04	0.215	7.91	0.281	119.5
21 T	260.2	1351.04	0.967	33.11	1.593	651.1
23 R	3.6	15.35	0.014	0.66	0.024	8.9
	311.6	1710.44	1.196	41.67	1.898	779.5
North: PR-9959 desde Canovanas						
42 L	7.6	68.33	0.036	1.38	0.037	19.0
41 T	11.3	99.60	0.053	2.03	0.055	28.3
43 R	17.7	156.81	0.069	2.10	0.068	44.3
	36.7	324.74	0.158	5.50	0.160	91.7
INTERSECTION:	1052.7	6947.00	4.471	165.92	6.210	2632.6

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	27.00
Time value factor	=	0.60
Average occupancy (persons/veh)	=	1.5
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

The idle fuel and vehicle mass parameters given above are the default values (data given in RIDES may override some of these parameters).

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Interseccion PR-3 @ PR-9959 - 2021 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo												
1 L	169			169	1	1783	28		0.644	91.6	9	70
2 T		1163		1163	1	1899	103		1.077	83.8	67	
3 T		1163		1163	1	1899	103		1.077	83.8	67	
4 T		1163		1163	1	1899	103		1.077	83.8	67	
5 R			214	214	0	1899	103	73	0.136	11.1	0	
	169	3490	214	3873	1				1.077	80.2	67	
South: El Nuevo Comandante												
1 L	157			157	0	1899	27		0.581	86.0	7	
2 LT	98	63		161	0	1900	27		0.581	83.7	8	
3 R			428	428	0	1899	180		0.265	3.5		
	255	63	428	746	0				0.581	38.1	8	
East: PR-3 HAcia Carolina												
1 L	145			145	0	1783	28		0.548	90.1	7	70
2 L	145			145	0	1783	28		0.548	90.1	7	70
3 T		685		685	2	1899	103		0.644	18.1	18	
4 T		685		685	2	1899	103		0.644	18.1	18	
5 T		685		685	2	1899	103		0.644	18.1	18	
6 R			24	24	4	1899	103	73	0.016	11.2	0	
	289	2056	24	2369	2				0.644	26.8	18	
North: PR-9959 desde Canovanas												
1 L	44			44	0	1899	14		0.313	95.1	2	
2 T		66		66	0	1900	14		0.447	90.6	3	
3 R			199	199	1	1899	180		0.124	3.5		
	44	66	199	309	1				0.447	35.1	3	

ALL VEHICLES	Total Flow	% HV	Cycle Time	Max X	Aver. Delay	Max Queue
	7297	1	180	1.077	56.6	67

Total flow period = 60 minutes. Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows (in through car units) have been adjusted for grade, lane widths, parking manoeuvres and bus stops.

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Interseccion PR-3 @ PR-9959 - 2021 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table S.15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Green Time Ratio (g/C) 1st grn	2nd grn	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: PR-3 Hacia Fajardo										
12 L		0.156*		169	262	0.644	91.6	F	16.1	9
11 T		0.572*		3490	3241	1.077*	83.8	F	125.5	67
13 R	(Und)	0.572	0.406	214	1579	0.136	11.1	B	0.3	0
				3873		1.077	80.2	F	125.5	67
South: El Nuevo Comandante										
32 L		0.150		255	439	0.581	86.0	F	15.3	8
31 T		0.150*		63	108	0.582	80.1	F	15.3	8
33 R	(Con)	1.000		428	1615	0.265	3.5	B#	10.7#	
				746		0.582	38.1	D	15.3	8
East: PR-3 HAcia Carolina										
22 L		0.156		289	527	0.548	90.1	F	13.8	7
21 T		0.572		2056	3195	0.644	18.1	B	29.1	18
23 R	(Und)	0.572	0.406	24	1534	0.016	11.2	B	0.0	0
				2369		0.644	26.8	C	29.1	18
North: PR-9959 desde Canovanas										
42 L		0.078		44	140	0.313	95.1	F	4.7	2
41 T		0.078*		66	148	0.447	90.6	F	6.9	3
43 R	(Con)	1.000		199	1604	0.124	3.5	A#	5.5#	
				309		0.447	35.1	D	6.9	3
ALL VEHICLES:				7297		1.077	56.6	E	125.5	67
INTERSECTION (persons):				10946			56.6		125.5	67

Level of Service calculations are based on
average control delay including geometric delay (HCM criteria),
independent of the current delay definition used.
For the criteria, refer to the "Level of Service" topic in the
aaSIDRA Output Guide or the Output section of the on-line help.
\# Continuous movements: Level Of Service based on density,
Density (passenger cars per km or mile) instead of queue.
* Maximum v/c ratio, or critical green periods

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Interseccion PR-3 @ PR-9959 - 2021 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table D.0 - GEOMETRIC DELAY DATA

From Approach	To Approach	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream Distance (m)
West: PR-3 Hacia Fajardo						
	South	20.0	26.2	31.4	1000	184
	East	S	80.0	23.6	1000	194
	North	17.8	25.1	28.0	1000	183
South: El Nuevo Comandante						
	West	18.6	25.6	29.3	500	183
	East	20.0	26.2	31.4	500	60
	North	S	80.0	39.1	500	193
East: PR-3 HAcia Carolina						
	West	S	80.0	23.6	1000	196
	South	17.5	25.0	27.5	1000	181
	North	20.0	26.2	31.4	1000	193
North: PR-9959 desde Canovanas						
	West	20.0	26.2	31.4	1000	61
	South	S	80.0	39.1	1000	193
	East	19.4	25.9	30.4	1000	184

Downstream Distance calculated by aaSIDRA

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

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Interseccion PR-3 @ PR-9959 - 2021 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MyUp dqm	Stopd (Idle) di	Geom dig	Control dic
			Delay (seconds/veh)								
West: PR-3 Hacia Fajardo											
1 L	12	0.644	80.5	0.0	80.5	4.7	75.9	0.0	75.9	11.1	91.6
2 T	11	1.077	26.9	57.0	83.8	9.8	74.0	2.1	71.9	0.0	83.8
3 T	11	1.077	26.9	57.0	83.8	9.8	74.0	2.1	71.9	0.0	83.8
4 T	11	1.077	26.9	57.0	83.8	9.8	74.0	2.1	71.9	0.0	83.8
5 R	13	0.136	0.0	0.0	0.0	0.1	0.0	0.0	0.0	11.1	11.1
South: El Nuevo Comandante											
1 L	32	0.581	80.2	0.0	80.2	4.7	75.5	0.0	75.5	5.8	86.0
2 LT	32, 31	0.581	80.1	0.0	80.1	6.0	74.2	0.0	74.2	5.8 0.0	83.7
3 R	33	0.265			0.0					3.4	3.5
East: PR-3 HAcia Carolina											
1 L	22	0.548	79.1	0.0	79.1	4.6	74.5	0.0	74.5	11.1	90.1
2 L	22	0.548	79.1	0.0	79.1	4.6	74.5	0.0	74.5	11.1	90.1
3 T	21	0.644	18.1	0.0	18.1	4.9	13.3	0.0	13.3	0.0	18.1
4 T	21	0.644	18.1	0.0	18.1	4.9	13.3	0.0	13.3	0.0	18.1
5 T	21	0.644	18.1	0.0	18.1	4.9	13.3	0.0	13.3	0.0	18.1
6 R	23	0.016	0.0	0.0	0.0	0.1	0.0	0.0	0.0	11.2	11.2
North: PR-9959 desde Canovanas											
1 L	42	0.313	89.4	0.0	89.4	4.7	84.7	0.0	84.7	5.7	95.1
2 T	42, 41	0.447	90.6	0.0	90.6	8.1	82.4	0.0	82.4	0.0	90.6
3 R	43	0.124			0.0					3.4	3.5

dn is average stop-start delay for all vehicles queued and unqueued

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table D.2 - LANE STOPS

Lane No.	Deg. Satn x	Effective Stop Rate hel	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: PR-3 Hacia Fajardo							
1 L	0.644	0.80	0.00	0.02	0.82	0.965	0.00
2 T	1.077	0.95	0.10	0.00	1.04	1.000	0.29
3 T	1.077	0.95	0.10	0.00	1.04	1.000	0.29
4 T	1.077	0.95	0.10	0.00	1.04	1.000	0.29
5 R	0.136	0.02	0.00	0.67	0.69	0.027	0.00
South: El Nuevo Comandante							
1 L	0.581	0.78	0.00	0.02	0.81	0.956	0.00
2 LT	0.581	0.78	0.00	0.01	0.80	0.956	0.00
3 R	0.265			0.41	0.41		
East: PR-3 HAcia Carolina							
1 L	0.548	0.77	0.00	0.04	0.81	0.948	0.00
2 L	0.548	0.77	0.00	0.04	0.81	0.948	0.00
3 T	0.644	0.45	0.00	0.00	0.45	0.495	0.00
4 T	0.644	0.45	0.00	0.00	0.45	0.495	0.00
5 T	0.644	0.45	0.00	0.00	0.45	0.495	0.00
6 R	0.016	0.02	0.00	0.67	0.69	0.023	0.00
North: PR-9959 desde Canovanas							
1 L	0.313	0.72	0.00	0.02	0.74	0.958	0.00
2 T	0.447	0.74	0.00	0.00	0.74	0.971	0.00
3 R	0.124			0.41	0.41		

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table D.3A - LANE QUEUES (veh)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 L	0.644	0.0	8.6	0.0	8.6	10.2	13.2	14.3	16.1	19.1	0.12
2 T	1.077	16.2	61.2	22.2	83.3	92.7	109.9	117.2	125.5	141.8	0.07
3 T	1.077	16.2	61.2	22.2	83.3	92.7	109.9	117.2	125.5	141.8	0.07
4 T	1.077	16.2	61.2	22.2	83.3	92.7	109.9	117.2	125.5	141.8	0.07
5 R	0.136	0.0	0.1	0.0	0.1	0.2	0.2	0.3	0.3	0.4	0.00
South: El Nuevo Comandante											
1 L	0.581	0.0	8.0	0.0	8.0	9.4	12.2	13.3	15.0	17.8	0.01
2 LT	0.581	0.0	8.1	0.0	8.1	9.6	12.4	13.5	15.3	18.1	0.02
3 R	0.265				10.7#						-0.02#
East: PR-3 HAcia Carolina											
1 L	0.548	0.0	7.2	0.0	7.2	8.6	11.1	12.2	13.8	16.5	0.10
2 L	0.548	0.0	7.2	0.0	7.2	8.6	11.1	12.2	13.8	16.5	0.10
3 T	0.644	0.0	16.8	0.0	16.8	19.5	24.7	26.4	29.1	33.1	0.02
4 T	0.644	0.0	16.8	0.0	16.8	19.5	24.7	26.4	29.1	33.1	0.02
5 T	0.644	0.0	16.8	0.0	16.8	19.5	24.7	26.4	29.1	33.1	0.02
6 R	0.016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
North: PR-9959 desde Canovanas											
1 L	0.313	0.0	2.3	0.0	2.3	2.7	3.6	4.0	4.7	5.8	0.00
2 T	0.447	0.0	3.5	0.0	3.5	4.2	5.5	6.0	6.9	8.6	0.00
3 R	0.124				5.5#						-0.01#

Values printed in this table are back of queue (vehicles).
\# Continuous movements: Density (passenger cars per km or mile)
instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table D.3B - LANE QUEUES (metres)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 L	0.644	0	5	0	5	5	7	8	9	10	0.12
2 T	1.077	9	33	12	45	50	59	63	67	76	0.07
3 T	1.077	9	33	12	45	50	59	63	67	76	0.07
4 T	1.077	9	33	12	45	50	59	63	67	76	0.07
5 R	0.136	0	0	0	0	0	0	0	0	0	0.00
South: El Nuevo Comandante											
1 L	0.581	0	4	0	4	5	6	7	7	9	0.01
2 LT	0.581	0	4	0	4	5	6	7	8	9	0.02
3 R	0.265				10.7#						-0.02#
East: PR-3 HAcia Carolina											
1 L	0.548	0	4	0	4	4	6	6	7	8	0.10
2 L	0.548	0	4	0	4	4	6	6	7	8	0.10
3 T	0.644	0	10	0	10	12	15	16	18	20	0.02
4 T	0.644	0	10	0	10	12	15	16	18	20	0.02
5 T	0.644	0	10	0	10	12	15	16	18	20	0.02
6 R	0.016	0	0	0	0	0	0	0	0	0	0.00
North: PR-9959 desde Canovanas											
1 L	0.313	0	1	0	1	1	2	2	2	3	0.00
2 T	0.447	0	2	0	2	2	3	3	3	4	0.00
3 R	0.124				5.5#						-0.01#

Values printed in this table are back of queue (metres).
\# Continuous movements: Density (passenger cars per km or mile)
instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Mov No.	App. Speeds Cruise	App. Speeds Negn	Exit Speeds Negn	Exit Speeds Cruise	Queue Move-up 1st Grn	Queue Move-up 2nd Grn	Av. Section Spd Running	Av. Section Spd Overall
West: PR-3 Hacia Fajardo								
12	80.0	25.1	25.1	80.0			61.7	29.4
11	80.0	80.0	80.0	80.0	20.9		65.5	31.2
13	80.0	26.2	26.2	80.0			66.1	66.1
South: El Nuevo Comandante								
32	40.0	25.6	25.6	80.0			37.4	17.4
31	40.0	40.0	80.0	80.0			40.4	18.6
33	40.0	26.2	26.2	80.0			37.4	37.4
East: PR-3 HAcia Carolina								
22	80.0	25.0	25.0	80.0			61.8	29.7
21	80.0	80.0	80.0	80.0			73.4	59.8
23	80.0	26.2	26.2	80.0			66.1	66.1
North: PR-9959 desde Canovanas								
42	40.0	25.9	25.9	80.0			38.5	21.8
41	40.0	40.0	80.0	80.0			40.2	22.7
43	40.0	26.2	26.2	80.0			38.6	38.6

"Running Speed" is the average speed excluding stopped periods.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ PR-9959 - 2021 PM
Intersection ID: 1
Actuated Coordinated Signals, Cycle Time = 180

Table D.5 - PROGRESSION FACTORS & ACTUATED SIGNAL PARAMETERS

Mov No.	Control	Coord.	Arrival Type	Delay Prog. Factor	Queue Prog. Factor	Gap Settings es	Gap Settings eh	Disp. Grn. Settings 1st Grn Gmin	1st Grn Gmax	2nd Grn Gmin	2nd Grn Gmax
West: PR-3 Hacia Fajardo											
12	VA	No	3	1.000	1.000	2.0	2.1	6	20		
11	VA	Yes	4	0.638	1.000	2.5	2.6	6	50		
13	VA	No	3	1.000	1.000	2.5	2.6	6	50	6	50
South: El Nuevo Comandante											
32	VA	No	3	1.000	1.000	2.0	2.3	6	20		
31	VA	No	3	1.000	1.000	2.5	2.8	6	50		
33	VA	No	3	1.000	1.000	2.5	2.8	6	50		
East: PR-3 HAcia Carolina											
22	VA	No	3	1.000	1.000	2.0	2.1	6	20		
21	VA	Yes	4	0.638	0.688	2.5	2.6	6	50		
23	VA	No	3	1.000	1.000	2.5	2.6	6	50	6	50
North: PR-9959 desde Canovanas											
42	VA	No	3	1.000	1.000	2.0	2.3	6	20		
41	VA	No	3	1.000	1.000	2.5	2.8	6	50		
43	VA	No	3	1.000	1.000	2.5	2.8	6	50		

--- End of aaSIDRA Output ---

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Movement Summary

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ Avenida El Comandante - 2021 AM

Signalised - Actuated coordinated **Cycle Time = 90 seconds**

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Desde El Comandante										
32	L	231	0.0	0.305	48.3	LOS D	2	0.91	0.76	27.2
33	R	48	4.1	0.032	8.6	LOS A#	1#	0.00	0.63	52.3
Approach		**280**	**0.7**	**0.306**	**41.4**	**LOS D**	**2**	**0.75**	**0.74**	**29.7**
PR-3 HAcia Carolina										
22	L	37	0.0	0.109	43.2	LOS D	1	0.77	0.73	31.4
21	T	2887	4.7	0.673	3.1	LOS A	5	0.15	0.28	70.0
Approach		**2925**	**4.7**	**0.673**	**3.6**	**LOS A**	**5**	**0.16**	**0.28**	**68.9**
PR-3 Hacia Fajardo										
11	T	1762	7.0	0.595	11.8	LOS B	12	0.49	0.52	55.2
13	R	211	0.0	0.131	11.1	LOS A#	3#	0.00	0.69	58.9
Approach		**1972**	**6.3**	**0.595**	**11.7**	**LOS B**	**12**	**0.44**	**0.54**	**55.6**
All Vehicles		**5177**	**5.1**	**0.673**	**8.7**	**LOS A**	**12**	**0.30**	**0.41**	**59.2**

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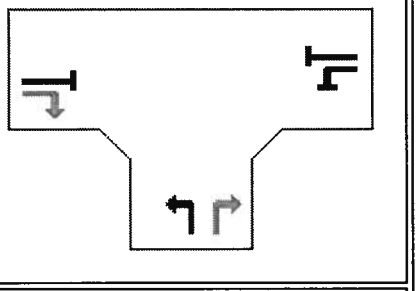
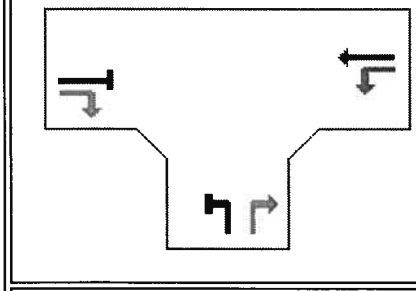
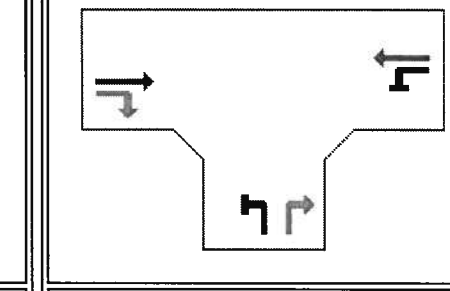
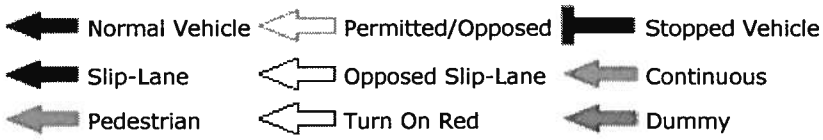
Phasing

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ Avenida El Comandante - 2021 AM

C = **90** seconds
Cycle Time Option: **User-specified cycle time**
Phase times determined by the program.

Phase A	Phase B	Phase C
		
G = **13** seconds G + I = **16** seconds (G + I)/C = **17.8** %	G = **18** seconds G + I = **21** seconds (G + I)/C = **23.3** %	G = **50** seconds G + I = **53** seconds (G + I)/C = **58.9** %



C	Cycle Time
G	Green Time
I	Intergreen Time (yellow plus all-red)
(G + I)/C	Phase time as a percentage of cycle

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Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 AM
Intersection ID: 2

aaTraffic SIDRA US Highway Capacity Manual (2000) Metric Version

RUN INFORMATION

* Basic Parameters:
Intersection Type: Signalised - Actuated Coordinated
For fully-actuated signal timings, the following specifications will be ignored:
Any maximum cycle time specification
Driving on the right-hand side of the road
Input data specified in Metric units
Default Values File No. 10
Peak flow period (for performance): 15 minutes
Unit time (for volumes): 60 minutes (Hourly Rate)
Delay definition: Control delay
Geometric delay included
aaSIDRA Standard Delay and Queue models used
Level of Service based on: Delay (HCM method)
Queue definition: Back of queue, 95th Percentile

* No. of Main (Timing-Capacity) Iterations = 2
Comparison of last two iterations:
Difference in intersection degree of satn = 0.0 %
Largest difference in eff. green times = 0 secs
(max. value for stopping = 0 secs)

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 AM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.0 - TRAFFIC FLOW DATA

Mov No.	Left LV	Left HV	Through LV	Through HV	Right LV	Right HV	Flow Scale	Peak Flow Factor
VEHICLES Demand flows in veh/hour as used by the program								
West: PR-3 Hacia Fajardo								
11	0	0	1637	124	0	0	1.00	0.86
13	0	0	0	0	211	0	1.00	0.71
South: Desde El Comandante								
32	231	0	0	0	0	0	1.00	0.83
33	0	0	0	0	47	2	1.00	0.60
East: PR-3 HAcia Carolina								
22	37	0	0	0	0	0	1.00	0.62
21	0	0	2751	137	0	0	1.00	0.93

Based on unit time = 60 minutes.
Flow Scale and Peak Hour Factor effects included in flow values.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 AM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.1 - MOVEMENT PHASE AND TIMING PARAMETERS

Mov No.	Mov Typ	PHASE MATRIX First Green Fr	To	Op Pr	Second Green Fr	To	Op Pr	Lost Tim 1st Grn	2nd Grn	Req.Mov.Time 1st Grn	2nd Grn	Eff. Grn 1st Grn	2nd Grn
West: PR-3 Hacia Fajardo													
11 T	C	A						3		40.7		50	
South: Desde El Comandante													
32 L	*A	B						3		12.9		13	
East: PR-3 HAcia Carolina													
22 L	B	C						3		9.0Min		18	
21 T	*B	A						3		53.0Max		71	

Current Phase Sequence No.: 1
Input phase sequence: A B C
Output phase sequence: A B C

* Critical Movement/Green Period

Movement Types:
Ped Pedestrian
Dum Dummy
Und Undetected in both green periods
Un1 Undetected in 1st green period
Un2 Undetected in 2nd green period

Under heading 'Op':
L "Left" turns are opposed
R "Right" turns are opposed
LR "Left and Right" opposed
C "Constant" saturation flow

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 AM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Dem Flow (veh /h)	HV (%)	Satn Flow 1st Grn	2nd Grn	Flow Ratio 1st Grn	2nd Grn	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: PR-3 Hacia Fajardo											
11 T	1761	7.0	5325		0.331		2958	0.95	60	100	0.595
13 R	211	0.0	1615		0.131		1615	0.98	650	100	0.131
South: Desde El Comandante											
32 L	231	0.0	5235		0.044		756	0.95	211	100	0.305
33 R	49	4.1	1518		0.032		1518	0.98	2936	100	0.032
East: PR-3 HAcia Carolina											
22 L	37	0.0	1695		0.022		339	0.90	725	100	0.109
21 T	2888	4.7	5442		0.531		4293	0.95	41	100	0.673*

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 AM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.3 - INTERSECTION PARAMETERS

Crit Mov No.	App. & Turn	Green Period	Phases Fr	To	Adjusted Lost Time	Adjusted Flow Ratio	Required Grn Time Ratio	Required Movement Time
32 S_L			A	B	3	0.044	0.110	12.9
21 E_T			B	A	53	-	-	53.0Max
				Total:	56	0.044	0.110	65.9

- Flow ratio not used for cycle time calculations and the adjusted lost time equals the required movement time (=Min or Max as shown in Table S.1)

Cycle Time:

Minimum	Maximum	Practical	Chosen
27	NA	63	90

(Cycle time specified by the user)

Intersection Level of Service	=	A
Worst movement Level of Service	=	D
Average intersection delay (s)	=	8.7
Largest average movement delay (s)	=	48.3
Largest back of queue, 95% (m)	=	12
Performance Index	=	98.59
Degree of saturation (highest)	=	0.673
Practical Spare Capacity (lowest)	=	41 %
Effective intersection capacity, (veh/h)	=	7696
Total vehicle flow (veh/h)	=	5177
Total person flow (pers/h)	=	7766
Total vehicle delay (veh-h/h)	=	12.55
Total person delay (pers-h/h)	=	18.82
Total effective vehicle stops (veh/h)	=	2097
Total effective person stops (pers/h)	=	3146
Total vehicle travel (veh-km/h)	=	3251.6
Total cost ($/h)	=	1794.48
Total fuel (L/h)	=	330.5
Total CO2 (kg/h)	=	828.01

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 AM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.4 - PHASE INFORMATION

Phase No.	Change Time	Green Start	Displayed Green	Grn+Intgrn Secs	Prop.
A	0	3	13	16	0.178
B	16	19	18	21	0.233
C	37	40	50	53	0.589

Current Phase Sequence No.: 1
Input phase sequence: A B C
Output phase sequence: A B C

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 AM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	(m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
11 T	5.76	8.64	11.8	0.49	0.52	13.9	12	43.98	55.2
13 R	0.65	0.97	11.1		0.69	2.6#		2.86	58.9
South: Desde El Comandante									
32 L	3.10	4.65	48.3	0.91	0.76	3.9	2	11.60	27.2
33 R	0.12	0.18	8.6		0.63	1.1#		0.68	52.3
East: PR-3 HAcia Carolina									
22 L	0.44	0.67	43.2	0.77	0.73	1.6	1	1.58	31.4
21 T	2.48	3.72	3.1	0.15	0.28	7.1	5	37.91	70.0

Largest density (passenger cars per km or mile) for any lane

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Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
1972	0.595	6.41	9.61	11.7	0.44	0.54	12	46.83	55.6
South: Desde El Comandante									
280	0.305	3.22	4.83	41.4	0.75	0.74	2	12.28	29.7
East: PR-3 HAcia Carolina									
2925	0.673	2.93	4.39	3.6	0.16	0.28	5	39.48	68.9
ALL VEHICLES:									
5177	0.673	12.55	18.82	8.7	0.30	0.41	12	98.59	59.2
INTERSECTION (persons):									
7766	0.673		18.82	8.7	0.30	0.41		98.59	59.2

Queue values in this table are 95% back of queue (metres).

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Table S.7 - LANE PERFORMANCE

Lane No.	Mov No.	Effective Green Times (sec) R1	G1	R2	G2	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Queue 95% Back (vehs)	(m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo													
1 T	11	40	50	0	0	587	986	0.595	11.8	0.52	13.9	12	
2 T	11	40	50	0	0	587	986	0.595	11.8	0.52	13.9	12	
3 T	11	40	50	0	0	587	986	0.595	11.8	0.52	13.9	12	
4 R	13	0	90	0	0	211	1615	0.131	11.1	0.69	2.6#		
South: Desde El Comandante													

1 L	32	77	13	0	0	77	252	0.306	48.3	0.76	3.9	2	
2 L	32	77	13	0	0	77	252	0.306	48.3	0.76	3.9	2	
3 L	32	77	13	0	0	77	252	0.306	48.3	0.76	3.9	2	
4 R	33	0	90	0	0	49	1518	0.032	8.6	0.63	1.1#		
East: PR-3 HAcia Carolina													
1 L	22	72	18	0	0	37	339	0.109	43.2	0.73	1.6	1	55
2 T	21	19	71	0	0	963	1431	0.673	3.1	0.28	7.1	5	
3 T	21	19	71	0	0	963	1431	0.673	3.1	0.28	7.1	5	
4 T	21	19	71	0	0	963	1431	0.673	3.1	0.28	7.1	5	

Density (passenger cars per km or mile)

Table S.8A - LANE FLOW AND CAPACITY INFORMATION

Lane No.	Mov No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Lane Width (m)	Saturation Flow Adj. Basic (tcu)	Aver 1st (veh)	Aver 2nd (veh)	End Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: PR-3 Hacia Fajardo													
1 T	11	0	587	0	587	3.60	1900	1775	0	0	986	0.595	100
2 T	11	0	587	0	587	3.60	1900	1775	0	0	986	0.595	100
3 T	11	0	587	0	587	3.60	1900	1775	0	0	986	0.595	100
4 R	13	0	0	211	211	3.60	1900	1615	1615	0	1615	0.131	100
South: Desde El Comandante													
1 L	32	77	0	0	77	3.30	1837	1745	0	0	252	0.306	100
2 L	32	77	0	0	77	3.30	1837	1745	0	0	252	0.306	100
3 L	32	77	0	0	77	3.30	1837	1745	0	0	252	0.306	100
4 R	33	0	0	49	49	3.30	1837	1518	1518	0	1518	0.032	100
East: PR-3 HAcia Carolina													
1 L	22	37	0	0	37	3.05	1784	1695	0	0	339	0.109	100
2 T	21	0	963	0	963	3.60	1900	1814	0	0	1431	0.673	100
3 T	21	0	963	0	963	3.60	1900	1814	0	0	1431	0.673	100
4 T	21	0	963	0	963	3.60	1900	1814	0	0	1431	0.673	100

Basic Saturation Flow in this table is adjusted for lane width, approach grade, parking manoeuvres and number of buses stopping. Saturation flow scale applies if specified.

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Table S.8B - SCATS MF PARAMETER

Lane No.	Mov No.	Stopline Flow (veh/h)	Capacity (veh/h)	SCATS Satn Flow	SCATS MF	Deg. Satn x	Lane Util. %
West: PR-3 Hacia Fajardo							
1 T	11	587	986	1900	1792	0.595	100
2 T	11	587	986	1900	1792	0.595	100
3 T	11	587	986	1900	1792	0.595	100
4 R	13	211	1615	1615	NA	0.131	100
South: Desde El Comandante							
1 L	32	77	252	1745	1418	0.306	100
2 L	32	77	252	1745	1418	0.306	100
3 L	32	77	252	1745	1418	0.306	100
4 R	33	49	1518	1561	NA	0.032	100
East: PR-3 HAcia Carolina							
1 L	22	37	339	1695	1453	0.109	100
2 T	21	963	1431	1900	1823	0.673	100
3 T	21	963	1431	1900	1823	0.673	100
4 T	21	963	1431	1900	1823	0.673	100

NA Not Applicable - SCATS MF was not calculated for this lane due to one of the following reasons:
- the lane is not controlled by signals (slip or continuous lane)
- two movements share this lane and do not run in the same phases

STOPLINE FLOW: Departure flow rate in veh/h as measured at the stop line. This cannot exceed capacity.

SCATS SATURATION FLOW: This allows for lane width, approach grade and turning vehicles. Saturation flow scale applies if specified. The effects of heavy vehicles, parking manoeuvres, number of buses stopping and conflicting pedestrian volume are not included.

SCATS MF: This emulates the MF (Maximum Flow) paramater used in the SCATS control system. It is calculated from the SCATS SATURATION FLOW parameter.

DEG. SATN: The Demand (Arrival) Flow Rate may exceed the Stopline Flow Rate, therefore x > 1 is possible.

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Table S.12A - FUEL CONSUMPTION, EMISSIONS AND COST - TOTAL

Mov No.	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: PR-3 Hacia Fajardo						
11 T	127.8	665.47	0.481	19.81	0.760	320.5
13 R	19.5	85.91	0.088	4.71	0.138	48.7
	147.3	751.39	0.569	24.52	0.898	369.2
South: Desde El Comandante						
32 L	20.6	157.48	0.095	3.91	0.116	51.4
33 R	3.8	19.60	0.015	0.79	0.024	9.5
	24.4	177.08	0.110	4.69	0.140	61.0
East: PR-3 HAcia Carolina						
22 L	3.2	22.42	0.014	0.59	0.019	7.9
21 T	155.7	843.60	0.529	13.92	0.825	390.0
	158.9	866.02	0.543	14.50	0.844	397.9
INTERSECTION:	330.5	1794.48	1.223	43.71	1.883	828.0

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	=	0.900
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income ($/h)	=	27.00
Time value factor	=	0.60
Average occupancy (persons/veh)	=	1.5
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

The idle fuel and vehicle mass parameters given above are the default values (data given in RIDES may override some of these parameters).

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Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo												
1 T		587		587	7	1899	50		0.595	11.8	12	
2 T		587		587	7	1899	50		0.595	11.8	12	
3 T		587		587	7	1899	50		0.595	11.8	12	
4 R			211	211	0	1899	90		0.131	11.1		
	0	1761	211	1972	6				0.595	11.7	12	
South: Desde El Comandante												
1 L	77			77	0	1836	13		0.306	48.3	2	
2 L	77			77	0	1836	13		0.306	48.3	2	
3 L	77			77	0	1836	13		0.306	48.3	2	
4 R			49	49	4	1836	90		0.032	8.6		
	231	0	49	280	1				0.306	41.4	2	
East: PR-3 HAcia Carolina												
1 L	37			37	0	1783	18		0.109	43.2	1	55
2 T		963		963	5	1899	71		0.673	3.1	5	
3 T		963		963	5	1899	71		0.673	3.1	5	
4 T		963		963	5	1899	71		0.673	3.1	5	
	37	2888	0	2925	5				0.673	3.6	5	

ALL VEHICLES	Total Flow	% HV	Cycle Time	Max X	Aver. Delay	Max Queue
	5177	5	90	0.673	8.7	12

Total flow period = 60 minutes. Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows (in through car units) have been adjusted for grade, lane widths, parking manoeuvres and bus stops.

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Table S.15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Green Time Ratio (g/C) 1st grn	2nd grn	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	Longest Queue 95% Back (vehs)	(m)
West: PR-3 Hacia Fajardo										
11 T		0.556		1761	2958	0.595	11.8	B	13.9	12
13 R	(Con)	1.000		211	1615	0.131	11.1	A#	2.6#	
				1972		0.595	11.7	B	13.9	12
South: Desde El Comandante										
32 L		0.144*		231	756	0.305	48.3	D	3.9	2
33 R	(Con)	1.000		49	1518	0.032	8.6	A#	1.1#	
				280		0.305	41.4	D	3.9	2
East: PR-3 HAcia Carolina										
22 L		0.200		37	339	0.109	43.2	D	1.6	1
21 T		0.789*		2888	4293	0.673*	3.1	A	7.1	5
				2925		0.673	3.6	A	7.1	5
ALL VEHICLES:				5177		0.673	8.7	A	13.9	12
INTERSECTION (persons):				7766			8.7		13.9	12

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the aaSIDRA Output Guide or the Output section of the on-line help.
Continuous movements: Level Of Service based on density, Density (passenger cars per km or mile) instead of queue.
* Maximum v/c ratio, or critical green periods

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Table D.0 - GEOMETRIC DELAY DATA

From Approach	To Approach	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream Distance (m)
West: PR-3 Hacia Fajardo						
	South	20.0	26.2	31.4	500	184
	East	S	65.0	31.7	500	132
South: Desde El Comandante						
	West	18.6	25.5	29.2	500	129
	East	20.0	26.2	31.4	500	135
East: PR-3 HAcia Carolina						
	West	S	65.0	31.7	500	130
	South	21.8	27.1	34.2	500	133

Downstream Distance calculated by aaSIDRA

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

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Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: PR-3 Hacia Fajardo											
1 T	11	0.595	10.0	0.0	10.0	4.4	5.6	0.0	5.6	1.8	11.8
2 T	11	0.595	10.0	0.0	10.0	4.4	5.6	0.0	5.6	1.8	11.8
3 T	11	0.595	10.0	0.0	10.0	4.4	5.6	0.0	5.6	1.8	11.8
4 R	13	0.131			0.0					11.0	11.1
South: Desde El Comandante											
1 L	32	0.306	39.8	0.0	39.8	4.5	35.3	0.0	35.3	8.6	48.3
2 L	32	0.306	39.8	0.0	39.8	4.5	35.3	0.0	35.3	8.6	48.3
3 L	32	0.306	39.8	0.0	39.8	4.5	35.3	0.0	35.3	8.6	48.3
4 R	33	0.032			0.0					8.6	8.6
East: PR-3 HAcia Carolina											
1 L	22	0.109	33.2	0.0	33.2	3.9	29.3	0.0	29.3	9.9	43.2
2 T	21	0.673	1.3	0.0	1.3	1.3	0.0	0.0	0.0	1.8	3.1
3 T	21	0.673	1.3	0.0	1.3	1.3	0.0	0.0	0.0	1.8	3.1
4 T	21	0.673	1.3	0.0	1.3	1.3	0.0	0.0	0.0	1.8	3.1

dn is average stop-start delay for all vehicles queued and unqueued

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Table D.2 - LANE STOPS

Lane No.	Deg. Satn x	-- Effective Stop Rate -- he1	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: PR-3 Hacia Fajardo							
1 T	0.595	0.44	0.00	0.08	0.52	0.490	0.00
2 T	0.595	0.44	0.00	0.08	0.52	0.490	0.00
3 T	0.595	0.44	0.00	0.08	0.52	0.490	0.00
4 R	0.131			0.69	0.69		
South: Desde El Comandante							
1 L	0.306	0.71	0.00	0.06	0.76	0.911	0.00
2 L	0.306	0.71	0.00	0.06	0.76	0.911	0.00
3 L	0.306	0.71	0.00	0.06	0.76	0.911	0.00
4 R	0.032			0.63	0.63		
East: PR-3 HAcia Carolina							
1 L	0.109	0.57	0.00	0.16	0.73	0.765	0.00
2 T	0.673	0.14	0.00	0.14	0.28	0.149	0.00
3 T	0.673	0.14	0.00	0.14	0.28	0.149	0.00
4 T	0.673	0.14	0.00	0.14	0.28	0.149	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

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Estudio Operacional de Transito El Nuevo Comandante

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Table D.3A - LANE QUEUES (veh)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 T	0.595	0.0	7.3	0.0	7.3	8.6	11.2	12.2	13.9	16.6	0.02
2 T	0.595	0.0	7.3	0.0	7.3	8.6	11.2	12.2	13.9	16.6	0.02
3 T	0.595	0.0	7.3	0.0	7.3	8.6	11.2	12.2	13.9	16.6	0.02
4 R	0.131				2.6#						0.00#
South: Desde El Comandante											
1 L	0.306	0.0	1.9	0.0	1.9	2.3	3.0	3.4	3.9	4.9	0.00
2 L	0.306	0.0	1.9	0.0	1.9	2.3	3.0	3.4	3.9	4.9	0.00
3 L	0.306	0.0	1.9	0.0	1.9	2.3	3.0	3.4	3.9	4.9	0.00
4 R	0.032				1.1#						0.00#
East: PR-3 HAcia Carolina											
1 L	0.109	0.0	0.8	0.0	0.8	0.9	1.2	1.4	1.6	2.0	0.01
2 T	0.673	0.0	3.5	0.0	3.5	4.2	5.6	6.1	7.1	8.7	0.01
3 T	0.673	0.0	3.5	0.0	3.5	4.2	5.6	6.1	7.1	8.7	0.01
4 T	0.673	0.0	3.5	0.0	3.5	4.2	5.6	6.1	7.1	8.7	0.01

Values printed in this table are back of queue (vehicles).
\# Continuous movements: Density (passenger cars per km or mile) instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

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Table D.3B - LANE QUEUES (metres)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 T	0.595	0	6	0	6	8	10	11	12	15	0.02
2 T	0.595	0	6	0	6	8	10	11	12	15	0.02
3 T	0.595	0	6	0	6	8	10	11	12	15	0.02
4 R	0.131				2.6#						0.00#
South: Desde El Comandante											
1 L	0.306	0	1	0	1	1	2	2	2	2	0.00
2 L	0.306	0	1	0	1	1	2	2	2	2	0.00
3 L	0.306	0	1	0	1	1	2	2	2	2	0.00
4 R	0.032				1.1#						0.00#
East: PR-3 HAcia Carolina											
1 L	0.109	0	0	0	0	0	1	1	1	1	0.01
2 T	0.673	0	3	0	3	3	4	5	5	7	0.01
3 T	0.673	0	3	0	3	3	4	5	5	7	0.01
4 T	0.673	0	3	0	3	3	4	5	5	7	0.01

Values printed in this table are back of queue (metres).
\# Continuous movements: Density (passenger cars per km or mile) instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

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Interseccion PR-3 @ Avenida El Comandante - 2021 AM
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Table D.4 - MOVEMENT SPEEDS (km/h)

Mov No.	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall
West: PR-3 Hacia Fajardo								
11	80.0	65.0	65.0	65.0			63.9	55.2
13	80.0	26.2	26.2	65.0			58.9	58.9
South: Desde El Comandante								
32	65.0	25.5	25.5	65.0			47.3	27.2
33	65.0	26.2	26.2	65.0			52.3	52.3
East: PR-3 HAcia Carolina								
22	80.0	27.1	27.1	65.0			52.6	31.4
21	80.0	65.0	65.0	65.0			70.0	70.0

"Running Speed" is the average speed excluding stopped periods.

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Intersection ID: 2
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Table D.5 - PROGRESSION FACTORS & ACTUATED SIGNAL PARAMETERS

Mov No.	Control	Coord.	Arrival Type	Delay Prog. Factor	Queue Prog. Factor	Gap Settings es	eh	Disp. Grn. Settings 1st Grn Gmin	Gmax	2nd Grn Gmin	Gmax
West: PR-3 Hacia Fajardo											
11	VA	Yes	4	0.671	0.699	2.5	2.7	6	50		
13	VA	No	3	1.000	1.000	2.5	2.6	6	50		
South: Desde El Comandante											
32	VA	No	3	1.000	1.000	2.0	2.2	6	20		
33	VA	No	3	1.000	1.000	2.5	2.7	6	50		
East: PR-3 HAcia Carolina											
22	VA	Yes	4	1.000	0.924	2.0	2.1	6	20		
21	VA	Yes	4	0.272	0.308	2.5	2.6	6	50		

--- End of aaSIDRA Output ---

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Movement Summary

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ Avenida El Comandante - 2021 PM

Signalised - Actuated coordinated **Cycle Time = 90 seconds**

Vehicle Movements

Mov No	Turn	Dem Flow (veh/h)	%HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95% Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Desde El Comandante										
32	L	370	1.4	0.339	43.0	LOS D	3	0.87	0.78	29.1
33	R	75	0.0	0.048	8.5	LOS A#	1#	0.00	0.63	52.3
Approach		**445**	**1.1**	**0.339**	**37.2**	**LOS D**	**3**	**0.72**	**0.76**	**31.5**
PR-3 HAcia Carolina										
22	L	71	0.0	0.314	50.8	LOS D	2	0.89	0.76	28.4
21	T	1984	2.2	0.493	3.0	LOS A	2	0.10	0.24	70.2
Approach		**2055**	**2.1**	**0.493**	**4.7**	**LOS A**	**2**	**0.13**	**0.26**	**66.8**
PR-3 Hacia Fajardo										
11	T	3745	0.9	1.194	116.4	LOS F	55	1.00	1.17	15.5
13	R	263	0.0	0.163	11.1	LOS A#	3#	0.00	0.69	58.8
Approach		**4008**	**0.9**	**1.194**	**109.5**	**LOS F**	**55**	**0.93**	**1.14**	**16.3**
All Vehicles		**6508**	**1.3**	**1.194**	**71.4**	**LOS E**	**55**	**0.66**	**0.83**	**22.4**

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Phasing

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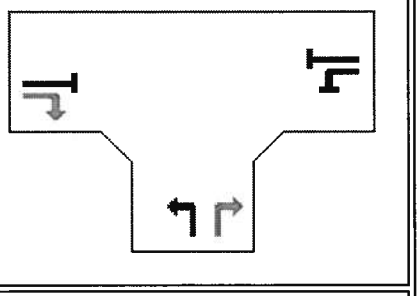
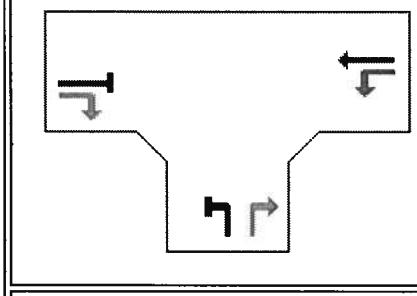
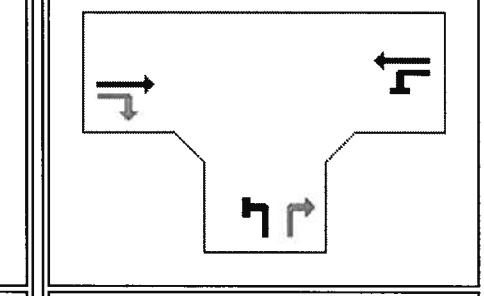
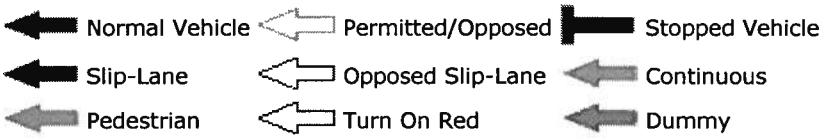
Interseccion PR-3 @ Avenida El Comandante - 2021 PM

C = **90** seconds
Cycle Time Option: **User-specified cycle time**
Phase times determined by the program.

Phase A	Phase B	Phase C
		
G = **19** seconds G + I = **22** seconds (G + I)/C = **24.4** %	G = **12** seconds G + I = **15** seconds (G + I)/C = **16.7** %	G = **50** seconds G + I = **53** seconds (G + I)/C = **58.9** %



C Cycle Time
G Green Time
I Intergreen Time (yellow plus all-red)
(G + I)/C Phase time as a percentage of cycle

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 Estudio Operacional de Transito El Nuevo Comandante
 Interseccion PR-3 @ Avenida El Comandante - 2021 PM
 Intersection ID:     2

 aaTraffic SIDRA US Highway Capacity Manual (2000) Metric Version


 RUN INFORMATION
 ---------------
 * Basic Parameters:
   Intersection Type: Signalised - Actuated Coordinated
   For fully-actuated signal timings, the following specifications will be ignored:
     Any maximum cycle time specification
   Driving on the right-hand side of the road
   Input data specified in Metric units
   Default Values File No. 10
   Peak flow period (for performance): 15 minutes
   Unit time (for volumes): 60 minutes (Hourly Rate)
   Delay definition: Control delay
                     Geometric delay included
   aaSIDRA Standard Delay and Queue models used
   Level of Service based on: Delay (HCM method)
   Queue definition: Back of queue, 95th Percentile

 * No. of Main (Timing-Capacity) Iterations =  2
   Comparison of last two iterations:
     Difference in intersection degree of satn =  0.0 %
     Largest difference in eff. green times =  0 secs
     (max. value for stopping = 0 secs)
```

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.0 - TRAFFIC FLOW DATA

Mov No.	Left		Through		Right		Flow Scale	Peak Flow Factor
	LV	HV	LV	HV	LV	HV		
VEHICLES Demand flows in veh/hour as used by the program								
West: PR-3 Hacia Fajardo								
11	0	0	3710	35	0	0	1.00	0.86
13	0	0	0	0	263	0	1.00	0.71
South: Desde El Comandante								
32	365	5	0	0	0	0	1.00	0.83
33	0	0	0	0	75	0	1.00	0.60
East: PR-3 HAcia Carolina								
22	71	0	0	0	0	0	1.00	0.62
21	0	0	1940	44	0	0	1.00	0.93

Based on unit time = 60 minutes.
Flow Scale and Peak Hour Factor effects included in flow values.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.1 - MOVEMENT PHASE AND TIMING PARAMETERS

Mov No.	Mov Typ	PHASE MATRIX First Green Fr	To	Op Pr	Second Green Fr	To	Op Pr	Lost Tim 1st Grn	2nd Grn	Req.Mov.Time 1st Grn	2nd Grn	Eff. Grn 1st Grn	2nd Grn
West: PR-3 Hacia Fajardo													
11 T	*C	A						3		53.0Max		50	
South: Desde El Comandante													
32 L	*A	B						3		18.5		19	
East: PR-3 HAcia Carolina													
22 L	*B	C						3		12.4		12	
21 T	B	A						3		45.5		65	

Current Phase Sequence No.: 1
Input phase sequence: A B C
Output phase sequence: A B C

* Critical Movement/Green Period

Movement Types:
Ped Pedestrian
Dum Dummy
Und Undetected in both green periods
Un1 Undetected in 1st green period
Un2 Undetected in 2nd green period

Under heading 'Op':
L "Left" turns are opposed
R "Right" turns are opposed
LR "Left and Right" opposed
C "Constant" saturation flow

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.2 - MOVEMENT CAPACITY PARAMETERS

Mov No.	Dem Flow (veh /h)	HV (%)	Satn Flow 1st Grn	2nd Grn	Flow Ratio 1st Grn	2nd Grn	Total Cap. (veh /h)	Prac. Deg. Satn xp	Prac. Spare Cap. (%)	Lane Util (%)	Deg. Satn x
West: PR-3 Hacia Fajardo											
11 T	3745	0.9	5647		0.663		3137	0.95	-20	100	1.194*
13 R	263	0.0	1615		0.163		1615	0.98	502	100	0.163
South: Desde El Comandante											
32 L	370	1.4	5172		0.072		1092	0.95	180	100	0.339
33 R	75	0.0	1561		0.048		1561	0.98	1940	100	0.048
East: PR-3 HAcia Carolina											
22 L	71	0.0	1695		0.042		226	0.90	186	100	0.314
21 T	1984	2.2	5576		0.356		4027	0.95	93	100	0.493

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.3 - INTERSECTION PARAMETERS

Crit Mov No.	App. & Turn	Green Period	Phases Fr	To	Adjusted Lost Time	Adjusted Flow Ratio	Required Grn Time Ratio	Required Movement Time
32	S_L		A	B	3	0.072	0.172	18.5
22	E_L		B	C	3	0.042	0.105	12.4
11	W_T		C	A	53	-	-	53.0Max
				Total:	59	0.113	0.277	83.9

\- Flow ratio not used for cycle time calculations and the adjusted lost time equals the required movement time (=Min or Max as shown in Table S.1)

Cycle Time:

Minimum	Maximum	Practical	Chosen
27	NA	82	90

(Cycle time specified by the user)

Intersection Level of Service	=	E
Worst movement Level of Service	=	F
Average intersection delay (s)	=	71.4
Largest average movement delay (s)	=	116.4
Largest back of queue, 95% (m)	=	55
Performance Index	=	407.83
Degree of saturation (highest)	=	1.194
Practical Spare Capacity (lowest)	=	-20 %
Effective intersection capacity, (veh/h)	=	5452
Total vehicle flow (veh/h)	=	6508
Total person flow (pers/h)	=	9762
Total vehicle delay (veh-h/h)	=	129.13
Total person delay (pers-h/h)	=	193.70
Total effective vehicle stops (veh/h)	=	5419
Total effective person stops (pers/h)	=	8128
Total vehicle travel (veh-km/h)	=	4088.1
Total cost ($/h)	=	5267.13
Total fuel (L/h)	=	605.9
Total CO2 (kg/h)	=	1515.32

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.4 - PHASE INFORMATION

Phase No.	Change Time	Green Start	Displayed Green	Grn+Intgrn Secs	Prop.
A	0	3	19	22	0.244
B	22	25	12	15	0.167
C	37	40	50	53	0.589

Current Phase Sequence No.: 1
Input phase sequence: A B C
Output phase sequence: A B C

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.5 - MOVEMENT PERFORMANCE

Mov No.	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue 95% Back (vehs)	(m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
11 T	121.05	181.58	116.4	1.00	1.17	99.2	55	358.87	15.5
13 R	0.81	1.21	11.1		0.69	3.3#		3.56	58.8
South: Desde El Comandante									
32 L	4.42	6.64	43.0	0.87	0.78	5.8	3	17.47	29.1
33 R	0.18	0.27	8.5		0.63	1.2#		1.04	52.3
East: PR-3 HAcia Carolina									
22 L	1.00	1.50	50.8	0.89	0.76	3.5	2	3.45	28.4
21 T	1.67	2.50	3.0	0.10	0.24	3.4	2	23.45	70.2

\# Largest density (passenger cars per km or mile) for any lane

---

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.6 - INTERSECTION PERFORMANCE

Total Flow (veh/h)	Deg. Satn x	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Prop. Queued	Eff. Stop Rate	Longest Queue (m)	Perf. Index	Aver. Speed (km/h)
West: PR-3 Hacia Fajardo									
4008	1.194	121.86	182.79	109.5	0.93	1.14	55	362.43	16.3
South: Desde El Comandante									
445	0.339	4.60	6.90	37.2	0.72	0.76	3	18.51	31.5
East: PR-3 HAcia Carolina									
2055	0.493	2.67	4.01	4.7	0.13	0.26	2	26.89	66.8
ALL VEHICLES:									
6508	1.194	129.13	193.70	71.4	0.66	0.83	55	407.83	22.4
INTERSECTION (persons):									
9762	1.194		193.70	71.4	0.66	0.83		407.83	22.4

Queue values in this table are 95% back of queue (metres).

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.7 - LANE PERFORMANCE

Lane No.	Mov No.	Effective Green Times (sec) R1	G1	R2	G2	Dem Flow (veh /h)	Cap (veh /h)	Deg. Satn x	Aver. Delay (sec)	Eff. Stop Rate	Q u e u e 95% Back (vehs)	(m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo													
1 T	11	40	50	0	0	1248	1046	1.194	116.4	1.17	99.2	55	
2 T	11	40	50	0	0	1248	1046	1.194	116.4	1.17	99.2	55	
3 T	11	40	50	0	0	1248	1046	1.194	116.4	1.17	99.2	55	
4 R	13	0	90	0	0	263	1615	0.163	11.1	0.69	3.3#		
South: Desde El Comandante													

1 L	32	71	19	0	0	123	364	0.339	43.0	0.78	5.8	3	
2 L	32	71	19	0	0	123	364	0.339	43.0	0.78	5.8	3	
3 L	32	71	19	0	0	123	364	0.339	43.0	0.78	5.8	3	
4 R	33	0	90	0	0	75	1561	0.048	8.5	0.63	1.2#		
East: PR-3 HAcia Carolina													
1 L	22	78	12	0	0	71	226	0.314	50.8	0.76	3.5	2	55
2 T	21	25	65	0	0	661	1342	0.493	3.0	0.24	3.4	2	
3 T	21	25	65	0	0	661	1342	0.493	3.0	0.24	3.4	2	
4 T	21	25	65	0	0	661	1342	0.493	3.0	0.24	3.4	2	

Density (passenger cars per km or mile)

Table S.8A - LANE FLOW AND CAPACITY INFORMATION

Lane No.	Mov No.	Dem Flow (veh/h) Lef	Thru	Rig	Tot	Lane Width (m)	Saturation Flow Adj. Basic (tcu)	Aver 1st (veh)	Aver 2nd (veh)	End Cap (veh /h)	Tot Cap (veh /h)	Deg. Satn x	Lane Util %
West: PR-3 Hacia Fajardo													
1 T	11	0	1248	0	1248	3.60	1900	1882	0	0	1046	1.194	100
2 T	11	0	1248	0	1248	3.60	1900	1882	0	0	1046	1.194	100
3 T	11	0	1248	0	1248	3.60	1900	1882	0	0	1046	1.194	100
4 R	13	0	0	263	263	3.60	1900	1615	1615	0	1615	0.163	100
South: Desde El Comandante													
1 L	32	123	0	0	123	3.30	1837	1724	0	0	364	0.339	100
2 L	32	123	0	0	123	3.30	1837	1724	0	0	364	0.339	100
3 L	32	123	0	0	123	3.30	1837	1724	0	0	364	0.339	100
4 R	33	0	0	75	75	3.30	1837	1561	1561	0	1561	0.048	100
East: PR-3 HAcia Carolina													
1 L	22	71	0	0	71	3.05	1784	1695	0	0	226	0.314	100
2 T	21	0	661	0	661	3.60	1900	1859	0	0	1342	0.493	100
3 T	21	0	661	0	661	3.60	1900	1859	0	0	1342	0.493	100
4 T	21	0	661	0	661	3.60	1900	1859	0	0	1342	0.493	100

Basic Saturation Flow in this table is adjusted for lane width, approach grade, parking manoeuvres and number of buses stopping. Saturation flow scale applies if specified.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.8B - SCATS MF PARAMETER

Lane No.	Mov No.	Stopline Flow (veh/h)	Capacity (veh/h)	SCATS Satn Flow	SCATS MF	Deg. Satn x	Lane Util. %
West: PR-3 Hacia Fajardo							
1 T	11	1046	1046	1900	1792	1.194	100
2 T	11	1046	1046	1900	1792	1.194	100
3 T	11	1046	1046	1900	1792	1.194	100
4 R	13	263	1615	1615	NA	0.163	100
South: Desde El Comandante							
1 L	32	123	364	1745	1507	0.339	100
2 L	32	123	364	1745	1507	0.339	100
3 L	32	123	364	1745	1507	0.339	100
4 R	33	75	1561	1561	NA	0.048	100
East: PR-3 HAcia Carolina							
1 L	22	71	226	1695	1356	0.314	100
2 T	21	661	1342	1900	1816	0.493	100
3 T	21	661	1342	1900	1816	0.493	100
4 T	21	661	1342	1900	1816	0.493	100

NA Not Applicable - SCATS MF was not calculated for this lane due to one of the following reasons:
- the lane is not controlled by signals (slip or continuous lane)
- two movements share this lane and do not run in the same phases

STOPLINE FLOW: Departure flow rate in veh/h as measured at the stop line. This cannot exceed capacity.

SCATS SATURATION FLOW: This allows for lane width, approach grade and turning vehicles. Saturation flow scale applies if specified. The effects of heavy vehicles, parking manoeuvres, number of buses stopping and conflicting pedestrian volume are not included.

SCATS MF: This emulates the MF (Maximum Flow) parameter used in the SCATS control system. It is calculated from the SCATS SATURATION FLOW parameter.

DEG. SATN: The Demand (Arrival) Flow Rate may exceed the Stopline Flow Rate, therefore x > 1 is possible.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.12A - FUEL CONSUMPTION, EMISSIONS AND COST - TOTAL

Mov No.	Fuel Total L/h	Cost Total $/h	HC Total kg/h	CO Total kg/h	NOX Total kg/h	CO2 Total kg/h
West: PR-3 Hacia Fajardo						
11 T	439.0	4280.82	2.170	70.98	2.206	1097.9
13 R	24.3	107.08	0.110	5.87	0.172	60.7
	463.3	4387.89	2.280	76.85	2.379	1158.6
South: Desde El Comandante						
32 L	33.3	239.79	0.150	6.46	0.193	83.3
33 R	5.3	29.10	0.022	1.08	0.033	13.2
	38.6	268.89	0.172	7.55	0.226	96.5
East: PR-3 HAcia Carolina						
22 L	6.3	47.01	0.029	1.15	0.037	15.8
21 T	97.7	563.33	0.340	7.64	0.523	244.5
	104.0	610.34	0.370	8.79	0.561	260.3
INTERSECTION:	605.9	5267.13	2.822	93.18	3.165	1515.3

PARAMETERS USED IN COST CALCULATIONS

Pump price of fuel ($/L)	= 0.900
Fuel resource cost factor	= 0.50
Ratio of running cost to fuel cost	= 3.0
Average income ($/h)	= 27.00
Time value factor	= 0.60
Average occupancy (persons/veh)	= 1.5
Light vehicle mass (1000 kg)	= 1.4
Heavy vehicle mass (1000 kg)	= 11.0
Light vehicle idle fuel rate (L/h)	= 1.350
Heavy vehicle idle fuel rate (L/h)	= 2.000

The idle fuel and vehicle mass parameters given above are the default values (data given in RIDES may override some of these parameters).

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.14 - SUMMARY OF INPUT AND OUTPUT DATA

Lane No.	Demand Flow (veh/h) L	T	R	Tot	%HV	Adj. Basic Satf.	Eff Grn (secs) 1st	2nd	Deg Sat x	Aver. Delay (sec)	Longest Queue (m)	Shrt Lane (m)
West: PR-3 Hacia Fajardo												
1 T		1248		1248	1	1899	50		1.194	116.4	55	
2 T		1248		1248	1	1899	50		1.194	116.4	55	
3 T		1248		1248	1	1899	50		1.194	116.4	55	
4 R			263	263	0	1899	90		0.163	11.1		
	0	3745	263	4008	1				1.194	109.5	55	
South: Desde El Comandante												
1 L	123			123	1	1836	19		0.339	43.0	3	
2 L	123			123	1	1836	19		0.339	43.0	3	
3 L	123			123	1	1836	19		0.339	43.0	3	
4 R			75	75	0	1836	90		0.048	8.5		
	370	0	75	445	1				0.339	37.2	3	
East: PR-3 HAcia Carolina												
1 L	71			71	0	1783	12		0.314	50.8	2	55
2 T		661		661	2	1899	65		0.493	3.0	2	
3 T		661		661	2	1899	65		0.493	3.0	2	
4 T		661		661	2	1899	65		0.493	3.0	2	
	71	1984	0	2055	2				0.493	4.7	2	

ALL VEHICLES	Total Flow	% HV	Cycle Time	Max X	Aver. Delay	Max Queue
	6508	1	90	1.194	71.4	55

Total flow period = 60 minutes. Peak flow period = 15 minutes.

Queue values in this table are 95% back of queue (metres).

Note: Basic Saturation Flows (in through car units) have been adjusted for grade, lane widths, parking manoeuvres and bus stops.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table S.15 - CAPACITY AND LEVEL OF SERVICE

Mov No.	Mov Typ	Green Time Ratio (g/C) 1st grn	2nd grn	Total Flow (veh /h)	Total Cap. (veh /h)	Deg. of Satn (v/c)	Aver. Delay (sec)	LOS	95% Back Longest Queue (vehs)	(m)
West: PR-3 Hacia Fajardo										
11 T		0.556*		3745	3137	1.194*	116.4	F	99.2	55
13 R	(Con)	1.000		263	1615	0.163	11.1	A#	3.3#	
				4008		1.194	109.5	F	99.2	55
South: Desde El Comandante										
32 L		0.211*		370	1092	0.339	43.0	D	5.8	3
33 R	(Con)	1.000		75	1561	0.048	8.5	A#	1.2#	
				445		0.339	37.2	D	5.8	3
East: PR-3 HAcia Carolina										
22 L		0.133*		71	226	0.314	50.8	D	3.5	2
21 T		0.722		1984	4027	0.493	3.0	A	3.4	2
				2055		0.493	4.7	A	3.5	2
ALL VEHICLES:				6508		1.194	71.4	E	99.2	55
INTERSECTION (persons):				9762			71.4		99.2	55

Level of Service calculations are based on average control delay including geometric delay (HCM criteria), independent of the current delay definition used. For the criteria, refer to the "Level of Service" topic in the aaSIDRA Output Guide or the Output section of the on-line help.
\# Continuous movements: Level Of Service based on density, Density (passenger cars per km or mile) instead of queue.
* Maximum v/c ratio, or critical green periods

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table D.0 - GEOMETRIC DELAY DATA

From Approach	To Approach	Negn Radius (m)	Negn Speed (km/h)	Negn Dist. (m)	Appr. Dist. (m)	Downstream Distance (m)
West: PR-3 Hacia Fajardo						
South		20.0	26.2	31.4	500	184
East		S	65.0	31.7	500	126
South: Desde El Comandante						
West		18.6	25.5	29.2	500	131
East		20.0	26.2	31.4	500	131
East: PR-3 HAcia Carolina						
West		S	65.0	31.7	500	128
South		21.8	27.1	34.2	500	133

Downstream Distance calculated by aaSIDRA

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table D.1 - LANE DELAYS

Lane No.	Mov No.	Deg. Satn x	Stop-line Delay 1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
West: PR-3 Hacia Fajardo											
1 T	11	1.194	15.0	99.5	114.6	8.9	105.6	5.3	100.4	1.8	116.4
2 T	11	1.194	15.0	99.5	114.6	8.9	105.6	5.3	100.4	1.8	116.4
3 T	11	1.194	15.0	99.5	114.6	8.9	105.6	5.3	100.4	1.8	116.4
4 R	13	0.163			0.0					11.0	11.1
South: Desde El Comandante											
1 L	32	0.339	34.4	0.0	34.4	4.2	30.2	0.0	30.2	8.6	43.0
2 L	32	0.339	34.4	0.0	34.4	4.2	30.2	0.0	30.2	8.6	43.0
3 L	32	0.339	34.4	0.0	34.4	4.2	30.2	0.0	30.2	8.6	43.0
4 R	33	0.048			0.0					8.5	8.5
East: PR-3 HAcia Carolina											
1 L	22	0.314	40.9	0.0	40.9	4.5	36.4	0.0	36.4	9.9	50.8
2 T	21	0.493	1.2	0.0	1.2	0.9	0.3	0.0	0.3	1.8	3.0
3 T	21	0.493	1.2	0.0	1.2	0.9	0.3	0.0	0.3	1.8	3.0
4 T	21	0.493	1.2	0.0	1.2	0.9	0.3	0.0	0.3	1.8	3.0

dn is average stop-start delay for all vehicles queued and unqueued

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Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table D.2 - LANE STOPS

Lane No.	Deg. Satn x	-- Effective Stop Rate -- he1	he2	Geom. hig	Overall h	Prop. Queued pq	Queue Move-up Rate hqm
West: PR-3 Hacia Fajardo							
1 T	1.194	0.94	0.23	0.00	1.17	1.000	0.93
2 T	1.194	0.94	0.23	0.00	1.17	1.000	0.93
3 T	1.194	0.94	0.23	0.00	1.17	1.000	0.93
4 R	0.163			0.69	0.69		
South: Desde El Comandante							
1 L	0.339	0.70	0.00	0.08	0.78	0.870	0.00
2 L	0.339	0.70	0.00	0.08	0.78	0.870	0.00
3 L	0.339	0.70	0.00	0.08	0.78	0.870	0.00
4 R	0.048			0.63	0.63		
East: PR-3 HAcia Carolina							
1 L	0.314	0.68	0.00	0.08	0.76	0.886	0.00
2 T	0.493	0.09	0.00	0.15	0.24	0.100	0.00
3 T	0.493	0.09	0.00	0.15	0.24	0.100	0.00
4 T	0.493	0.09	0.00	0.15	0.24	0.100	0.00

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

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Estudio Operacional de Transito El Nuevo Comandante

Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table D.3A - LANE QUEUES (veh)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (veh) Nb1	Nb2	Nb	Percentile (veh) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 T	1.194	28.4	33.5	32.0	65.5	73.3	87.3	92.6	99.2	111.7	0.11
2 T	1.194	28.4	33.5	32.0	65.5	73.3	87.3	92.6	99.2	111.7	0.11
3 T	1.194	28.4	33.5	32.0	65.5	73.3	87.3	92.6	99.2	111.7	0.11
4 R	0.163				3.3#						0.00#
South: Desde El Comandante											
1 L	0.339	0.0	2.9	0.0	2.9	3.4	4.5	5.0	5.8	7.2	0.01
2 L	0.339	0.0	2.9	0.0	2.9	3.4	4.5	5.0	5.8	7.2	0.01
3 L	0.339	0.0	2.9	0.0	2.9	3.4	4.5	5.0	5.8	7.2	0.01
4 R	0.048				1.2#						0.00#
East: PR-3 HAcia Carolina											
1 L	0.314	0.0	1.7	0.0	1.7	2.1	2.7	3.1	3.5	4.5	0.03
2 T	0.493	0.0	1.7	0.0	1.7	2.0	2.6	2.9	3.4	4.3	0.00
3 T	0.493	0.0	1.7	0.0	1.7	2.0	2.6	2.9	3.4	4.3	0.00
4 T	0.493	0.0	1.7	0.0	1.7	2.0	2.6	2.9	3.4	4.3	0.00

Values printed in this table are back of queue (vehicles).
Continuous movements: Density (passenger cars per km or mile) instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

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Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table D.3B - LANE QUEUES (metres)

Lane No.	Deg. Satn x	Ovrfl. Queue No	Average (metres) Nb1	Nb2	Nb	Percentile (metres) 70%	85%	90%	95%	98%	Queue Stor. Ratio
West: PR-3 Hacia Fajardo											
1 T	1.194	16	18	18	36	40	48	51	55	62	0.11
2 T	1.194	16	18	18	36	40	48	51	55	62	0.11
3 T	1.194	16	18	18	36	40	48	51	55	62	0.11
4 R	0.163				3.3#						0.00#
South: Desde El Comandante											
1 L	0.339	0	2	0	2	2	3	3	3	4	0.01
2 L	0.339	0	2	0	2	2	3	3	3	4	0.01
3 L	0.339	0	2	0	2	2	3	3	3	4	0.01
4 R	0.048				1.2#						0.00#
East: PR-3 HAcia Carolina											
1 L	0.314	0	1	0	1	1	1	2	2	2	0.03
2 T	0.493	0	1	0	1	1	2	2	2	3	0.00
3 T	0.493	0	1	0	1	1	2	2	2	3	0.00
4 T	0.493	0	1	0	1	1	2	2	2	3	0.00

Values printed in this table are back of queue (metres).
Continuous movements: Density (passenger cars per km or mile) instead of queue, Space Occupancy Ratio instead of Queue Storage Ratio

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Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table D.4 - MOVEMENT SPEEDS (km/h)

Mov No.	App. Speeds Cruise	Negn	Exit Speeds Negn	Cruise	Queue Move-up 1st Grn	2nd Grn	Av. Section Spd Running	Overall
West: PR-3 Hacia Fajardo								
11	80.0	65.0	65.0	65.0	14.7		50.0	15.5
13	80.0	26.2	26.2	65.0			58.8	58.8
South: Desde El Comandante								
32	65.0	25.5	25.5	65.0			47.5	29.1
33	65.0	26.2	26.2	65.0			52.3	52.3
East: PR-3 HAcia Carolina								
22	80.0	27.1	27.1	65.0			51.9	28.4
21	80.0	65.0	65.0	65.0			71.0	70.2

"Running Speed" is the average speed excluding stopped periods.

Estudio Operacional de Transito El Nuevo Comandante
Interseccion PR-3 @ Avenida El Comandante - 2021 PM
Intersection ID: 2
Actuated Coordinated Signals, Cycle Time = 90

Table D.5 - PROGRESSION FACTORS & ACTUATED SIGNAL PARAMETERS

Mov No.	Control	Coord.	Arrival Type	Delay Prog. Factor	Queue Prog. Factor	Gap Settings es	eh	Disp. Grn. Settings 1st Grn Gmin	Gmax	2nd Grn Gmin	Gmax
West: PR-3 Hacia Fajardo											
11	VA	Yes	4	0.671	1.000	2.5	2.6	6	50		
13	VA	No	3	1.000	1.000	2.5	2.6	6	50		
South: Desde El Comandante											
32	VA	No	3	1.000	1.000	2.0	2.2	6	20		
33	VA	No	3	1.000	1.000	2.5	2.7	6	50		
East: PR-3 HAcia Carolina											
22	VA	Yes	4	1.000	0.963	2.0	2.1	6	20		
21	VA	Yes	4	0.207	0.218	2.5	2.6	6	50		

--- End of aaSIDRA Output ---

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FREEWAY WEAVING WORKSHEET

General Information

Analyst	R. Rivera
Agency/Company	CMA
Date Performed	10/6/2006
Analysis Time Period	Peak AM

Site Information

Freeway/Dir of Travel	PR-3 km. 16.2 East
Weaving Seg Location	El Comandante Av to PR-9959
Jurisdiction	Canovanas
Analysis Year	2011

Inputs

Freeway free-flow speed, S_{FF} (mi/h)	50	Weaving type	A
Weaving number of lanes, N	4	Volume ratio, VR	0.10
Weaving seg length, L (ft)	1650	Weaving ratio, R	0.17
Terrain	Level		

Conversions to pc/h Under Base Conditions

(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	fp	v
V_{o1}	1377	0.90	7	0	1.5	1.2	0.966	1.00	1583
V_{o2}	15	0.90	0	0	1.5	1.2	1.000	1.00	16
V_{w1}	130	0.90	0	0	1.5	1.2	1.000	1.00	144
V_{w2}	27	0.90	0	0	1.5	1.2	1.000	1.00	30
V_w				174	V_{nw}				1599
V									1773

Weaving and Non-Weaving Speeds

	Unconstrained		Constrained	
	Weaving (i = w)	Non-Weaving (i = nw)	Weaving (i = w)	Non-Weaving (= nw)
a (Exhibit 24-6)	0.15	0.00		
b (Exhibit 24-6)	2.20	4.00		
c (Exhibit 24-6)	0.97	1.30		
d (Exhibit 24-6)	0.80	0.75		
Weaving intensity factor, Wi	0.18	0.05		
Weaving and non-weaving speeds, Si (mi/h)	48.86	52.94		

Number of lanes required for unconstrained operation, Nw 0.81
Maximum number of lanes, Nw (max) 1.40

☑ If Nw < Nw(max) unconstrained operation ☐ if Nw > Nw (max) constrained operation

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment speed, S (mi/h)	52.51
Weaving segment density, D (pc/mi/ln)	8.44
Level of service, LOS	A
Capacity of base condition, c_b (pc/h)	8001
Capacity as a 15-minute flow rate, c (veh/h)	7730
Capacity as a full-hour volume, c_h (veh/h)	6957

Notes

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such

FREEWAY WEAVING WORKSHEET

General Information

Analyst	R. Rivera
Agency/Company	CMA
Date Performed	10/6/2006
Analysis Time Period	Peak PM

Site Information

Freeway/Dir of Travel	PR-3 km. 16.2 East
Weaving Seg Location	El Comandante Av to PR-9959
Jurisdiction	Canovanas
Analysis Year	2011

Inputs

Freeway free-flow speed, S_{FF} (mi/h)	50	Weaving type	A
Weaving number of lanes, N	4	Volume ratio, VR	0.07
Weaving seg length, L (ft)	1650	Weaving ratio, R	0.18
Terrain	Level		

Conversions to pc/h Under Base Conditions

(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	fp	v
V_{o1}	2928	0.90	7	0	1.5	1.2	0.966	1.00	3367
V_{o2}	25	0.90	0	0	1.5	1.2	1.000	1.00	27
V_{w1}	185	0.90	0	0	1.5	1.2	1.000	1.00	205
V_{w2}	41	0.90	0	0	1.5	1.2	1.000	1.00	45
V_w				250	V_{nw}				3394
V									3644

Weaving and Non-Weaving Speeds

	Unconstrained		Constrained	
	Weaving (i = w)	Non-Weaving (i = nw)	Weaving (i = w)	Non-Weaving (= nw)
a (Exhibit 24-6)	0.15	0.00		
b (Exhibit 24-6)	2.20	4.00		
c (Exhibit 24-6)	0.97	1.30		
d (Exhibit 24-6)	0.80	0.75		
Weaving intensity factor, Wi	0.34	0.12		
Weaving and non-weaving speeds, Si (mi/h)	44.77	50.59		

Number of lanes required for unconstrained operation, Nw 0.69
Maximum number of lanes, Nw (max) 1.40

☑ If Nw < Nw(max) unconstrained operation ☐ if Nw > Nw (max) constrained operation

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment speed, S (mi/h)	50.14
Weaving segment density, D (pc/mi/ln)	18.17
Level of service, LOS	B
Capacity of base condition, c_b (pc/h)	8001
Capacity as a 15-minute flow rate, c (veh/h)	7730
Capacity as a full-hour volume, c_h (veh/h)	6957

Notes

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such

FREEWAY WEAVING WORKSHEET

General Information

Analyst	R. Rivera
Agency/Company	CMA
Date Performed	10/6/2006
Analysis Time Period	Peak AM

Site Information

Freeway/Dir of Travel	PR-3 km. 16.2 East
Weaving Seg Location	El Comandante Av to PR-9959
Jurisdiction	Canovanas
Analysis Year	2021

Inputs

Freeway free-flow speed, S_{FF} (mi/h)	50
Weaving number of lanes, N	4
Weaving seg length, L (ft)	1650
Terrain	Level
Weaving type	A
Volume ratio, VR	0.10
Weaving ratio, R	0.17

Conversions to pc/h Under Base Conditions

(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	fp	v
V_{o1}	1515	0.90	7	0	1.5	1.2	0.966	1.00	1742
V_{o2}	35	0.90	0	0	1.5	1.2	1.000	1.00	38
V_{w1}	143	0.90	0	0	1.5	1.2	1.000	1.00	158
V_{w2}	29	0.90	0	0	1.5	1.2	1.000	1.00	32
V_w				190	V_{nw}				1780
V									1970

Weaving and Non-Weaving Speeds

	Unconstrained		Constrained	
	Weaving (i = w)	Non-Weaving (i = nw)	Weaving (i = w)	Non-Weaving (= nw)
a (Exhibit 24-6)	0.15	0.00		
b (Exhibit 24-6)	2.20	4.00		
c (Exhibit 24-6)	0.97	1.30		
d (Exhibit 24-6)	0.80	0.75		
Weaving intensity factor, Wi	0.20	0.06		
Weaving and non-weaving speeds, Si (mi/h)	48.32	52.67		

Number of lanes required for unconstrained operation, Nw 0.81
Maximum number of lanes, Nw (max) 1.40

☑ If Nw < Nw(max) unconstrained operation ☐ if Nw > Nw (max) constrained operation

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment speed, S (mi/h)	52.22
Weaving segment density, D (pc/mi/ln)	9.43
Level of service, LOS	A
Capacity of base condition, c_b (pc/h)	8001
Capacity as a 15-minute flow rate, c (veh/h)	7730
Capacity as a full-hour volume, c_h (veh/h)	6957

Notes

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such

FREEWAY WEAVING WORKSHEET

General Information

Analyst	R. Rivera
Agency/Company	CMA
Date Performed	10/6/2006
Analysis Time Period	Peak PM

Site Information

Freeway/Dir of Travel	PR-3 km. 16.2 East
Weaving Seg Location	El Comandante Av to PR-9959
Jurisdiction	Canovanas
Analysis Year	2021

Inputs

Freeway free-flow speed, S_{FF} (mi/h)	50	Weaving type	A
Weaving number of lanes, N	4	Volume ratio, VR	0.07
Weaving seg length, L (ft)	1650	Weaving ratio, R	0.18
Terrain	Level		

Conversions to pc/h Under Base Conditions

(pc/h)	V	PHF	Truck %	RV %	E_T	E_R	f_{HV}	fp	v
V_{o1}	3221	0.90	7	0	1.5	1.2	0.966	1.00	3704
V_{o2}	45	0.90	0	0	1.5	1.2	1.000	1.00	50
V_{w1}	203	0.90	0	0	1.5	1.2	1.000	1.00	225
V_{w2}	45	0.90	0	0	1.5	1.2	1.000	1.00	50
V_w				275	V_{nw}				3754
V									4029

Weaving and Non-Weaving Speeds

	Unconstrained		Constrained	
	Weaving (i = w)	Non-Weaving (i = nw)	Weaving (i = w)	Non-Weaving (= nw)
a (Exhibit 24-6)	0.15	0.00		
b (Exhibit 24-6)	2.20	4.00		
c (Exhibit 24-6)	0.97	1.30		
d (Exhibit 24-6)	0.80	0.75		
Weaving intensity factor, Wi	0.38	0.14		
Weaving and non-weaving speeds, Si (mi/h)	44.01	50.05		

Number of lanes required for unconstrained operation, Nw 0.69
Maximum number of lanes, Nw (max) 1.40

☑ If Nw < Nw(max) unconstrained operation ☐ if Nw > Nw (max) constrained operation

Weaving Segment Speed, Density, Level of Service, and Capacity

Weaving segment speed, S (mi/h)	49.59
Weaving segment density, D (pc/mi/ln)	20.31
Level of service, LOS	C
Capacity of base condition, c_b (pc/h)	8001
Capacity as a 15-minute flow rate, c (veh/h)	7730
Capacity as a full-hour volume, c_h (veh/h)	6957

Notes

a. Weaving segments longer than 2500 ft. are treated as isolated merge and diverge areas using the procedures of Chapter 25, "Ramps and Ramp Junctions".
b. Capacity constrained by basic freeway capacity.
c. Capacity occurs under constrained operating conditions.
d. Three-lane Type A segments do not operate well at volume ratios greater than 0.45. Poor operations and some local queuing are expected in such cases.
e. Four-lane Type A segments do not operate well at volume ratios greater than 0.35. Poor operations and some local queuing are expected in such cases.
f. Capacity constrained by maximum allowable weaving flow rate: 2,800 pc/h (Type A), 4,000 (Type B), 3,500 (Type C).
g. Five-lane Type A segments do not operate well at volume ratios greater than 0.20. Poor operations and some local queuing are expected in such cases.
h. Type B weaving segments do not operate well at volume ratios greater than 0.80. Poor operations and some local queuing are expected in such

ANEJO C.

Fotos de las intersecciones analizadas

Foto 1: PR-3 en dirección oeste antes de la PR-9959

Foto 2: PR-3 en dirección este pasando la PR-9959

Foto 3: PR-3 en dirección este antes de la PR-9959

Foto 4: PR-3 en dirección este antes de la PR-9959

Foto 5: PR-3 en dirección este antes de la PR-9959

Foto 6: PR-3 en dirección oeste antes de la PR-9959

Foto 7: PR-9959 en dirección oeste antes de la PR-3

Foto 8: PR-9959 en dirección oeste antes de la PR-3

Foto 9: PR-3 desde la PR-9959

Foto 10: PR-3 en dirección este antes de la Ave. El Comandante

Foto 11: Salida de la Ave. El Comandante hacia PR-3

Foto 12: PR-3 desde la Avenida El Comandante

Foto 13: PR-3 en dirección este antes de El Comandante

Foto 14: Avenida El Comandante hacia PR-3

Foto 15: PR-3 dirección oeste antes de Avenida El Comandante