ANEJO 7

Estudio respecto a las condiciones de ingeniería geológica sobre la parcela E

GEOLOGICAL ENGINEERING
AND ENVIRONMENTAL SERVICES

INFORME FINAL

CONDICIONES DE INGENIERÍA GEOLÓGICA SOBRE LA PARCELA "E" CONSIDERADA PARA EL PROPUESTO DESARROLLO INDUSTRIAL BAIROA", CAGUAS, PUERTO RICO

POR
MARIO SORIANO RESSY
INGENIERO GEOLÓGICO
LIC. #4131

22 DE ABRIL DE 2008

Urb Muñoz Rivera 44 Venus Ave Guaynabo P.R 00969

INFORME PRELIMINAR

CONDICIONES DE INGENIERÍA GEOLÓGICA SOBRE LA PARCELA "E" CONSIDERADA PARA EL PROPUESTO DESARROLLO "INDUSTRIAL BAIROA", CAGUAS, PUERTO RICO

I. INTRODUCCIÓN Y ÁMBITO DEL PROYECTO:

Se trata aquí de una parcela de terreno denominada Parcela "E" con una cabida aproximada de unas cuarenta y cuatro cuerdas (44.00 cds) a ser lotificadas y destinados los lotes a usos industriales. Ubica el referido predio en el Barrio Bairoa en las inmediaciones noreste de la ciudad de Caguas, Puerto Rico.

El presente informe preliminar recoge y analiza las condiciones y factores que fueron encontrados en estos terrenos de alto relieve y de suelos fósiles y profundos. Esta investigación fue solicitada por la firma de geotécnicos, Jaca & Sierra Testing Laboratories con el fin de complementar las investigaciones por sondeos de campo y los análisis de laboratorio realizados sobre las muestras, o testigos, de los suelos que fueron asegurados en diferentes localidades del predio y a diferentes profundidades.

Está en orden señalar que unos siete (7) barrenos o calas numeradas desde la número 14 a la 20 fueron hincadas en los lugares más críticos que abarca el área topográfica más superior y accidentada de la referida Parcela "E".

Para este estudio complementario fue preciso visitar y evaluar la finca en cuestión. Se analizaron megascópicamente todas las muestras substraídas del subsuelo, se evaluaron los aspectos mecánicos de penetración de cada cala o "boring" hincado en el lugar y se procedió también con las investigaciones de oficina pertinentes a los aspectos geológicos del lugar. Este estudio fue completado durante el mes de marzo de 2008.

A continuación los resultados de nuestras investigaciones y las determinaciones procedentes:

II CONSIDERACIONES GEOLÓGICAS DEL LUGAR:

Las condiciones geológicas prevalecientes en el lugar son por demás complejas. Esto debido a la presencia e intervención de fallas pretéritas, diques magmáticos y de procesos hidrotermales intensos que prácticamente han "cocinado" las rocas originales convirtiendolas en suelos profundos y suelos fósiles desprovistos de los minerales y es estructuras originales. Los suelos profundos prevalecientes en el lugar, aún en los puntos topográficamente más superiores, son limos arcillosos, sumamente livianos y polvorientos (powdery), escasos en minerales y fragmentos de roca, de un color grisáseo a marrón claro. Estas características son indicativas de que e horizonte geológico fue alterado y transformado intensamente por fluídos candentes que emanaron de magnas a profundidad. El resultado de estas emanaciones fue la transformación de las unidades rocosas locales en suelos que fueron lixiviados (leached) a profundidad. Tal condición lo demuestran uniformemente los perfiles de los suelos penetrados hasta una profundidad de 70 pies.

Se trata de rocas volcánicas e ígneas que originalmente eran de alta dureza y competencia. La propiedad fue, en el pasado geológico, interceptada por fallas geo-estructurales a través de las cuales emanaron estos fluídos hidrotermales que alteraron intensamente las rocas ya fracturada por los movimientos de la corteza.

Las muestras obtenidas en las calas hincadas en los medios o lotes numerados 15, 16, 17, 18, 19 y 20, todas demuestras la misma condición; suelos profundos y livianos con características de suelo limoso y polvoroso, que exhiben las diaclasas o juntas originales de las rocas transformadas en un horizonte de suelo. En otras

palabras; estamos ante la presencia de suelos fósiles o saprolitas de la roca original.

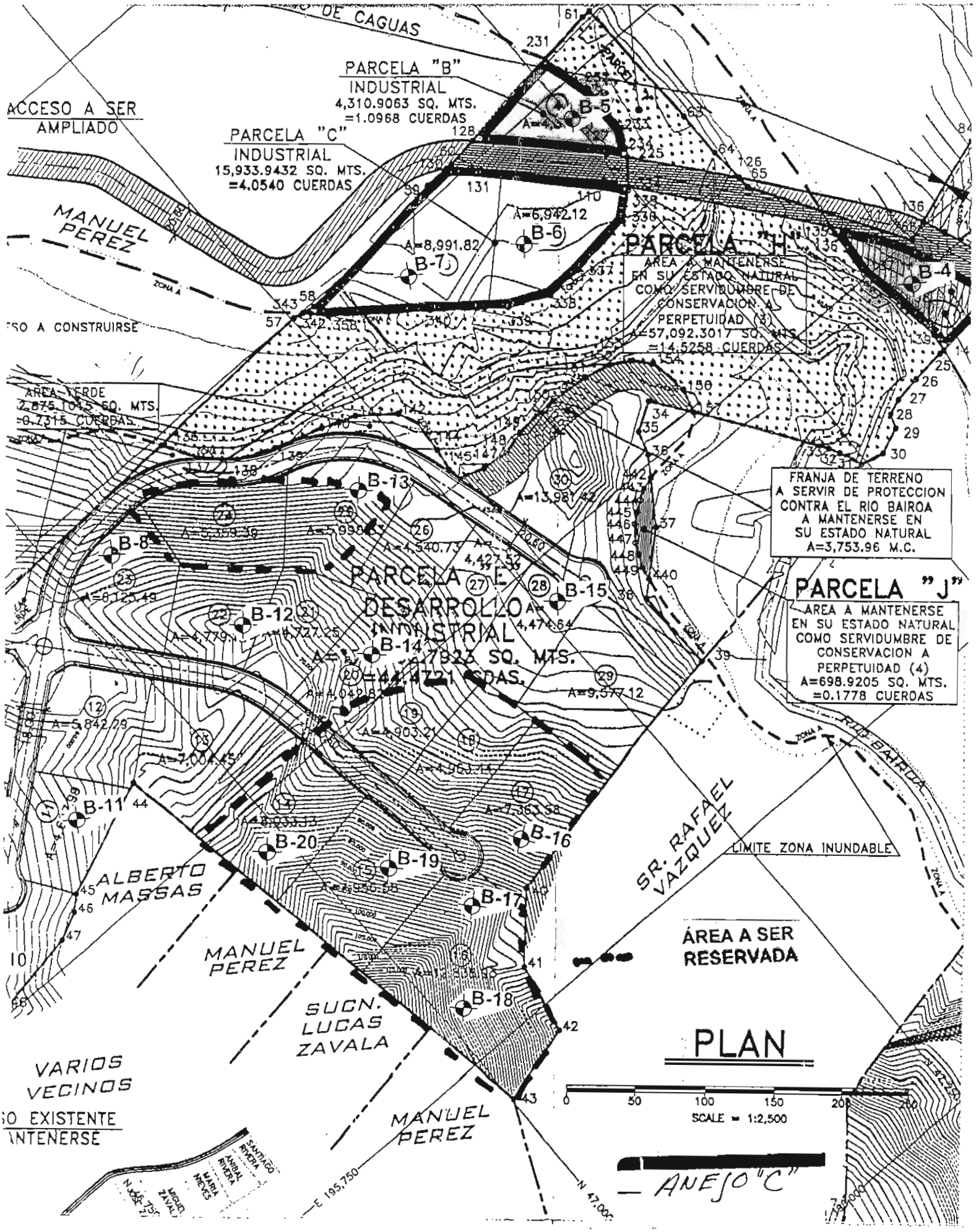
Tanto la topografía accidentada del lugar, donde existen laderas con relieves de unos cincuenta y cinco metros (55 m), así como también la condición geológica ya descrita presentan un cuadro de potencial inestabilidad a la menor alteración de los pendientes existentes. De hecho, durante el recorrido por estos terrenos, se evidencian cicatrices de deslizamientos antiguos que atestiguan a denudaciones activas que incluyen susceptibilidad a la erosión superficial derrumbes o colapsos y a deslizamientos progresivos de las laderas. Varias cicatrices, producto de deslizamientos antiguos, marcan la superficie de terrenos más accidentado de la propiedad con pendientes 1:1 (H:V).

III DETERMINACIONES y RECOMENDACIONES ORIGINALES:

Se nos ha solicitado hacer una determinación sobre la estabilidad de estos terrenos una vez modificados y alterados los mismos en su topografía y en su pendiente. A base de las investigaciones anteriormente señaladas, procedemos a exponer nuestras observaciones y determinaciones sobre este desarrollo según propuesto.

a) No se recomienda intervención alguna en los terrenos destinados a ser lotificados y modificados, tanto en su topografía como en su pendiente, para convertirlos en solares industriales con rasantes planas y accesibles; esto incluye el terreno que abarca los futuros solares 14, 15, 16, 17, 18, y 19 y 20.

b) Se recomienda que este terreno quede inalterado como una zona de amortiguamiento o de transición (buffer zone) que garantice la estabilidad


PARCELA "B"
INDUSTRIAL
4,310.9063 SQ. MTS.
=1.0968 CUERDAS
PARCELA "C"
INDUSTRIAL
15,933.9432 SQ. MTS.
=4.0540 CUERDAS
ACCESO A SER AMPLIADO
MANUEL PEREZ
PARCELA "H"
AREA A MANTENERSE EN SU ESTADO NATURAL COMO SERVIDUMBRE DE CONSERVACION A PERPETUIDAD (3)
A=57,092.3017 SQ. MTS.
=14.5258 CUERDAS
AREA VERDE
2,875.1045.60 MTS.
=0.7315 CUERDAS
FRANJA DE TERRENO A SERVIR DE PROTECCION CONTRA EL RIO BAIROA A MANTENERSE EN SU ESTADO NATURAL
A=3,753.96 M.C.
PARCELA "J"
AREA A MANTENERSE EN SU ESTADO NATURAL COMO SERVIDUMBRE DE CONSERVACION A PERPETUIDAD (4)
A=698.9205 SQ. MTS.
=0.1778 CUERDAS
PARCELA "E"
DESARROLLO INDUSTRIAL
17,923 SQ. MTS.
=44.4721 CUERDAS
RIO BAIROA
LIMITE ZONA INUNDABLE
SR. RAFAEL VAZQUEZ
ALBERTO MASSAS
MANUEL PEREZ
SUCN. LUCAS ZAVALA
VARIOS VECINOS
ÁREA A SER RESERVADA
PLAN
SCALE = 1:2,500
ANEJO "C"

de la ladera sur, así como las zonas topográficamente inferiores dentro de la finca a ser desarrollada.

c) La recomendación de preservación o no intervención del terreno ya señalado, incluye el evitar socavar o realizar cortes, mediante la eliminación de apoyo lateral al pie de la ladera, que propendan a la inestabilización y futuros deslizamientos. Quierese decir, que el terreno es propenso a la erosión y deslizamientos si se altera el ángulo de reposo natural de ladera existente, o sea, el grado de inclinación existente. Ya existen indicios de deslizamientos masivos en la ladera sur de esta misma colina.

d) Se recomienda, preferiblemente, rellenar y modificar hasta buscar la rasante final deseada en lotes inferiores, aptos par el desarrollo deseado, que el proceder a cortar y remover material de ladera en estos terrenos de suelos profundos e inherentemente inestables.

e) Los terrenos superiores donde enclavan varían los solares industriales 14 al 20, no deben despoblarse de su vegetación. En esta región de alta precipitación pluvial (sobre 75 pulgadas de lluvia anual) la erosión superficial, en estos terrenos, una vez desprovistos de vegetación, resultaría ser muy intensa y degradante.

IV OTRAS RECOMENDACIONES:

a. En vista de lo anteriormente analizado, es nuestra recomendación que el área que comprende los predios enumerados 14, 15, 16, 17, 18 y 19, no sean intervenidos y, por el contrario, se mantengan en su estado natural.

El predio número 22 puede ser fuente de material de relleno bajo ciertos controles pero se debe reconsiderar también el tener que intervenir con el predio número 24 el cual también consideramos es una situación topográfica algo precaria.

b. Es recomendable se proceda con una nueva re-alineación y ubicación de los caminos de acceso de manera que se pueda dar el máximo uso y accesibilidad a los restantes predios a ser desarrollados.

c. Es también recomendable traer material de relleno foráneo (de afuera de la finca objeto) para rellenar o emplazar en los lugares requeridos. No obstante, existen montículos aislados dentro de la propiedad, que pueden ser fuente de préstamo a ser complementado con el material traído de afuera.

d. Está en orden también notar que el material de relleno que se podría obtener en el lugar, no es el más idóneo para asegurar una compactación óptima bajo los controles normalmente aceptado.

En la figura que se acompaña, se han trazado las dos (2) áreas que hemos descifrado como zona sensitiva o inestable. Debe procurarse, en todo lo posible, que las mencionadas áreas se mantengan en su estado natural.

Respetuosamente sometido, hoy 1ro. de abril de 2008.

MARIO SORIANO RESSY
INGENIERO GEOLÓGICO
LIC. # 4131

INFORME FINAL

CONDICIONES DE INGENIERÍA GEOLÓGICA SOBRE LA PARCELA "E" CONSIDERADA PARA EL PROPUESTO DESARROLLO INDUSTRIAL BAIROA", CAGUAS, PUERTO RICO

I INTRODUCCIÓN

El día 1ro de abril de 2008 le fue presentado a los consultores geotécnicos, Jaca & Sierra Testing Laboratories, un Informe Preliminar donde se destacaban las consideraciones de ingeniería geológica con respecto al propuesto desarrollo de una finca de 44 cuerdas en el barrio Bairoa de Caguas. El desarrollo proponía la lotificación de la referida finca denominada Parcela "E" en unos 29 lotes para usos industriales con cabidas que fluctuaban entre los 4,500 y 12,800 metros cuadrados.

Debido a la geología y topografía del lugar, según descifrada mediante las exploraciones del subsuelo allí realizadas, así como también basado en las informaciones obtenidas mediante los estudios de campo y oficina, extendimos entonces nuestras determinaciones y recomendaciones.

En el referido Informe Preliminar recogimos y expusimos aquellas condiciones y aspectos inherentemente relacionados a la geología y fisiografía del lugar que desalentaban la lotificación y desarrollo de la finca según allí propuesto. Se une o queda incorporado en el presente Informe Final aquellos estudios, consideraciones y determinaciones originalmente consideradas. No obstante, está en orden partir de aquí, volviendo a reseñar, una vez más, aquellas primeras Determinaciones y Recomendaciones que expusimos, antes de evaluar las nuevas propuestas y conceptos que nos han sido presentados por los proponentes.

A continuación las Determinaciones y Recomendaciones originales:

DETERMINACIONES Y RECOMENDACIONES ORIGINALES:

"....Se nos ha solicitado hacer una determinación sobre la estabilidad de estos terrenos una vez modificados y alterados los mismos en su topografía y en su pendiente. A base de las investigaciones anteriormente señaladas, procedemos a exponer nuestras observaciones y determinaciones sobre este desarrollo según propuesto.

a) No se recomienda intervención alguna en los terrenos destinados a ser lotificados y modificados, tanto en su topografía como en su pendiente, para convertirlos en solares industriales con rasantes planas y accesibles; esto incluye el terreno que abarca los futuros solares 14, 15, 16, 17, 18, 19 y 20.

b) Se recomienda que este terreno quede inalterado como una zona de amortiguamiento o de transición (buffer zone) que garantice la estabilidad de la ladera sur, así como las zonas topográficamente inferiores dentro de la a ser desarrollada.

c) La recomendación de preservación o no intervención del terreno ya señalado, incluye el evitar socavar o realizar cortes, mediante la eliminación de apoyo lateral al pie de la ladera, que propendan a la inestabilización y futuros deslizamientos. Quierese decir, que el terreno es propenso a la erosión y deslizamientos si se altera el ángulo de reposo natural de la ladera existente, o sea, el grado de inclinación existente. Ya existen indicios de deslizamientos masivos en la ladera sur de esta misma colina.

d) Se recomienda, preferiblemente, rellenar y modificar hasta buscar la rasante final deseada en lotes inferiores, aptos para el desarrollo deseado, que el proceder a cortar y remover material de ladera en estos un terreno de suelos profundos e inherentemente inestables.

e) Los terrenos superiores donde enclavarían los solares industriales del 14 al 20 no deben despoblarse de su vegetación. En esta región de alta precipitación pluvial (sobre 75 pulgadas de lluvia anual) la erosión superficial, en estos terrenos, una vez desprovistos de vegetación, resultaría ser muy intensa y degradante.

OTRAS RECOMENDACIONES:

a) .....

b) .....

c) Es recomendable se proceda con una nueva realineación y ubicación de los caminos de acceso de manera que se pueda dar el máximo uso y accesibilidad a los restantes predios a ser desarrollados.

d) Es también recomendable traer material de relleno foráneo (de afuera de la finca objeto) para rellenar o emplazar en los lugares requeridos. No obstante, existen montículos aislados dentro de la propiedad, que pueden ser fuente de préstamo a ser complementado con el material traído de afuera.

e) Está en orden también notar que el material de relleno que se podría obtener en el lugar, no es el más idóneo para asegurar una compactación óptima bajo los controles normalmente aceptado.

En la figura que se acompaña, se han trazado las dos (2) áreas que hemos descifrado como zona sensitiva o inestable. Debe procurarse, en todo lo posible, que las mencionadas áreas se mantengan en su estado natural.

II ANÁLISIS Y COMENTARIOS DE LA SEGUNDA PROPUESTA PRESENTADA POR LOS PROPONENTES A TENOR CON LAS RECOMENDACIONES ANTERIORES

Bairoa Development Corp., proponentes del propuesto proyecto, ha tenido a bien acoger nuestras determinaciones y recomendaciones anteriormente reseñadas.

Luego de una visita adicional al área del proyecto y de discutir nuestras averiguaciones y recomendaciones presentadas en el referido Informe Preliminar, los proponentes han procedido a presentar un plan de desarrollo alterno. El nuevo plan es destacado en el plano elaborado durante el mes de abril el cual nos ha sido presentado para nuestros comentarios y recomendaciones: Se incluye dicho plano como anejo "B").

Antes de entrar a evaluar los méritos del nuevo concepto para el propuesto desarrollo, cabe destacar que también nos han sido entregados por la firma de geotécnicos, Jaca & Sierra Soil Laboratories, los análisis de laboratorios que les fuera encomendado.

Los resultados de dichos análisis incluidos en el Anejo "A", refuerza nuestra contención sobre el hecho de que el material geológico existente en los predios

topográficamente superiores son de pobre o dudosa calidad. Esto incluye y se refiere a que son suelos fósiles, desprovistos de sus minerales originales con alto límite líquido, moderada plasticidad y sujetos a cambios considerable en volumen; o sea son suelos expansivos.

Según los resultados obtenidos, estos suelos, asegurados en diferentes calas o perforaciones, caen mayoritariamente dentro de la clasificación como suelos MH Y ML, según la clasificación del U.S.C.S. Impera lo anterior que estos suelos inorgánicos limo-arcillosos, resultan inestables bajo cualquier condición extrema a los que puedan ser sometidos por ejemplo, cambio drástico en su ángulo de reposo natural, vibraciones extremas bajo condiciones de saturación y extrema deforestación o eliminación de su cubierta vegetal al mismo tiempo que se expondrían a lluvias extraordinarias y prolongadas. En resumen, los resultados de los análisis apoyan nuestras observaciones y recomendaciones cautelares contenidas en nuestro informe original.

De entrada reiteramos que nos satisface grandemente la acción tomada por los proponentes al revisar extensamente el plan original concebido para el desarrollo de la referida finca. La nueva propuesta para la parcelación y futuro desarrollo de la finca en un parque industrial toma en consideración todos los señalamientos y recomendaciones contenidas en nuestro informe original y los expuestos en las reuniones celebradas tanto con el personal de la firma de geotécnicos como con los proponentes. Cabe destacar que la consideración más prominente discutida, fundamentada en el potencial de inestabilidad de los terrenos topográficamente superiores, una vez éstos fueran intervenidos, ha sido seriamente considerada y adoptada por los proponentes. Esto ha redundado en un cambio total del concepto original para el desarrollo lo cual volvemos a considerar, por lo que tenemos a bien enumerar dichos cambios y discutir los mismos a continuación.

1. El concepto original pretendía la parcelación o lotificación de la finca en treinta (30) predios para usos comerciales-industriales. Dicho concepto original abarcaba terrenos sumamente accidentados y de alto relieve dentro de la finca que representaba considerable riesgo de instabilidad dado el material geológico de pobre calidad que allí aflora. Estas condiciones y señalamientos, verificados mediante las pruebas o sondeos del subsuelo y por los análisis geotecnicos de laboratorio solicitados, (Vease Anejo A), han sido tomados en serio y considerados por los proponentes en la elaboración del nuevo concepto para el desarrollo que nos ocupa. A continuación se evalúa el nuevo concepto adoptado.

   a. De los 30 predios industriales originalmente propuestos, estos quedaron reducidos a sólo trece (13). Esta reducción y la nueva distribución de los predios conlleva un aumento en cabida para los que ahora han sido delineados y adoptados para el futuro desarrollo.

   b. Los predios originales, enumerados del 14 al 20, los cuales ocupaban los terrenos mas bruscos en la topografía más superior de la finca han sido eliminados tal y como fuera recomendado. Dicho sector ha sido ahora reservado y designado como la Parcela "L" con una finca de 11.85 cuerdas, (a mantenerse en su estado natural a perpetuidad), no se ha presentado plan alguno para el futuro desarrollo de estos terrenos por lo que han quedado como zona de transición o de amortiguamiento donde no

se implementará movimientos de terreno que puedan impactar adversamente los predios a desarrollarse ladera abajo.

c. Una nueva vía de acceso ha sido implementada en el nuevo plan presentado para el desarrollo lo que contribuye a dar la mejor accesibilidad vial con el mínimo de movimiento o alteración del terreno. Este nuevo concepto vial está en acorde con nuestras recomendaciones contenidas en el informe original sometido.

d. Es de importancia también destacar que aunque no fue evaluado en nuestro informe original, los proponentes han presentado en su nuevo plan para este desarrollo la inclusión de una franja de unos 10 metros de ancho, que delimita la zona inundable del Rio Bairoa y los predios numerado 6 al 9 con los cuales colinda por el norte noroeste. La implementación de esta faja de terreno como zona de protección o zona verde, facilita para la no intervención en la condición hidro-dinámica del Rio Bairoa y su zona de expansión de sus aguas. La importancia en fijar esta faja de protección radica en el hecho de que los mencionados predios podrán ser acondicionados mejorados mediante el emplazamiento de relleno selecto, sin invadir las proximidades de la zona inundable con sedimentación foránea.

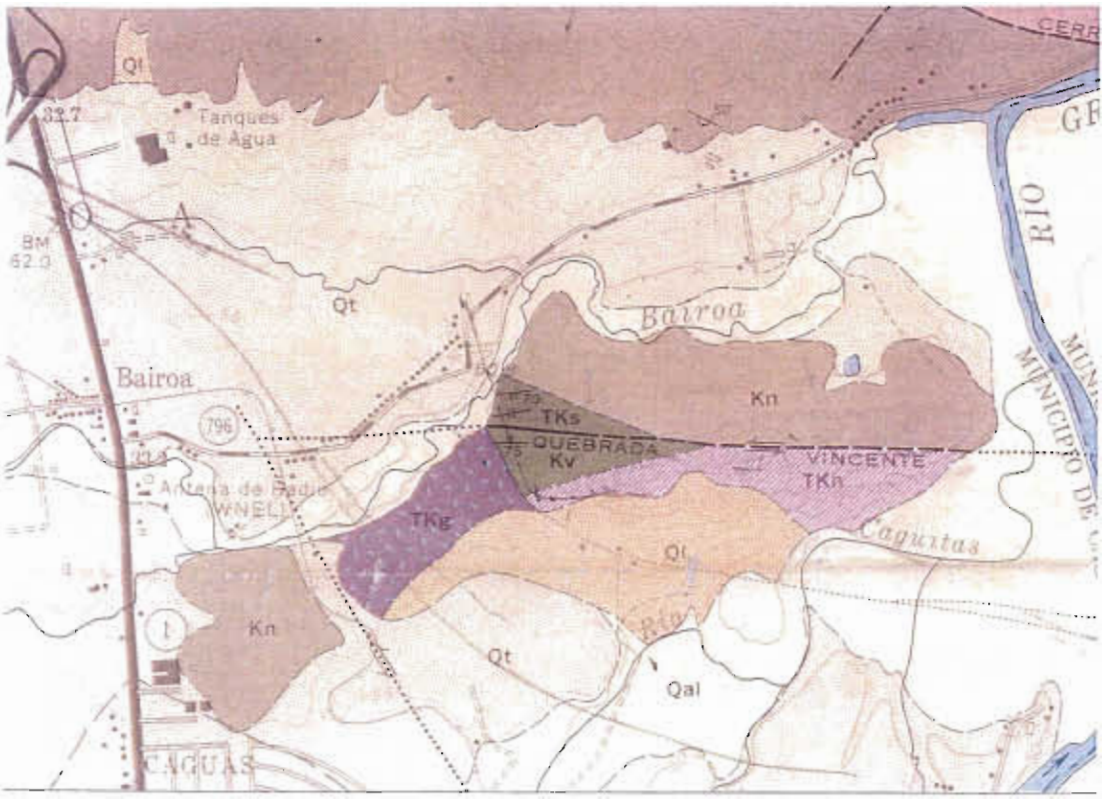
III CONCLUSIÓN:

Hemos evaluado el nuevo plan de desarrollo presentado por los proponentes para este proyecto el cual toma en consideración la totalidad de nuestras observaciones y recomendaciones expuestas en el informe presentado el día 1ro. de abril de 2008.

En vista de lo anteriormente analizado, recomendamos favorablemente el nuevo plan trazado según expuesto en el plano sometido que aquí incluimos como Anejo "B", descartándose así el plano original para este desarrollo, que también incluimos bajo la Figura Núm. 2 y el Anejo "C".

Respetuosamente sometido, hoy día 22 de abril de 2008.

MARIO SORIANO RESSY
INGENIERO CONSULTOR
LIC. 3141



MAPA GEOLÓGICO Y DE LOCALIZACIÓN

Fuente : USGS
Cuadrángulo de Aguas Buenas

Escala : 1:20,000

Leyenda:

QL -Deslizamientos Antiguas

TKh -Roca Alterada-hidro-termalmente

TKg -Granodiorita

KV -Tufa volcánica y lava

Fallas

Kv -Roca Volcanica

ANEJOS

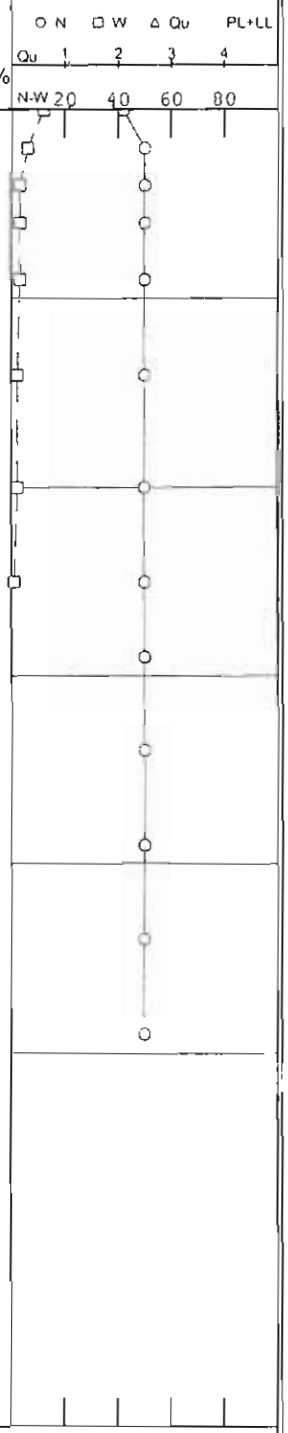
ANEJO "A"

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 12

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 1
LOCATION: CAGUAS, PR		DRILLER/DRILL RIG: C.I. DIAZ / B-53	
DESCRIPTION BY: R. TORRES		DATE HOLE STARTED: 2-14-08	COMPLETED: 2-14-08
GROUNDWATER (ft.) Initial: Not Found Final:		ELEVATION TOP OF HOLE (mts):	
TOTAL DEPTH OF HOLE: 50'		ENGINEER: R. TORRES	

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00									
	0	Grayish-green hydrothermally altered - weathered volcanic rock crumble under finger pressure			10 18 24	42	12			
					42 50	50	6			
					50 50	50	3			
					50/3"	50/3"	3			
	10				50	50	3			
					50/3"	50/3"	2			
	20	Do... more conpetent and hard with depth			50/2"	50/2"	2			
-7.62	25	Greenish volcanic rock highly mineralized			50/1"	50/1"	1			
	30				50/1"	50/1"				
					50/1"	50/1"				
	40				50/2"	50/2"				
					50/1"	50/1"				
	50				50/1"	50/1"				
	60									



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

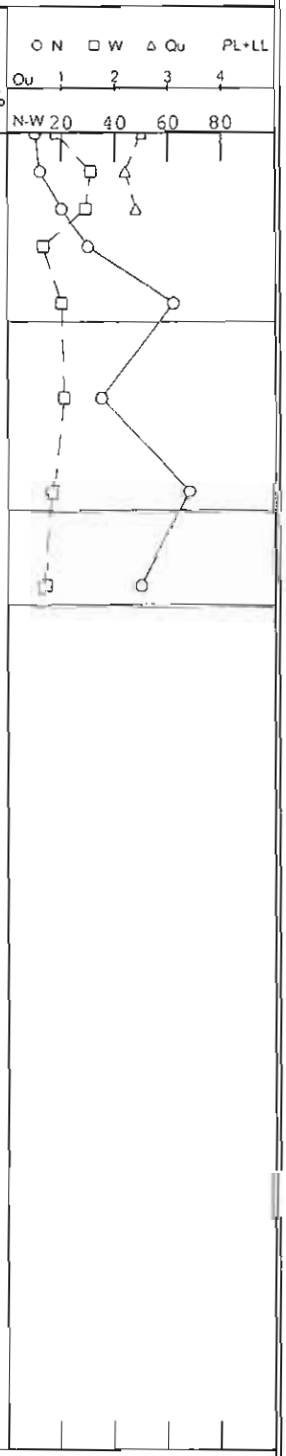
Initial G.W. Depth
Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 13

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 1
LOCATION	CAGUAS, PR	DRILLER/DRILL RIG:	C.I. DIAZ / B-53
DESCRIPTION BY	R. TORRES	DATE HOLE STARTED	2-12-08 COMPLETED 2-12-08
GROUNDWATER (ft.)	Initial: Not Found Final:	ELEVATION TOP OF HOLE (mts):	
TOTAL DEPTH OF HOLE	25'	ENGINEER	R. TORRES

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00									
-0.61	0	Dark brown organic silty clay			2 5 5	10	18	2.5		
-1.22	2	Light brown silty clay			5 6 6	12	31	2.2		
	4	Light brown clayey silt with rock fragments with relic joints			5 8 12 12 15 15	20	29	2.4		
-4.27	10					30	13			
	14	Light brown sandy silt with some rock fragments with relic joints			19 28 34 13 16 19 19 25 43	62	20			
	20					35	21			
					50	68	17			
						50	14			
	30									
	40									
	50									
	60									



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

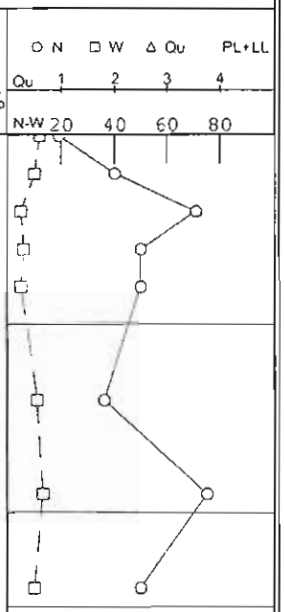
Initial G.W. Depth
Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 14

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 1
LOCATION	CAGUAS, PR	DRILLER/DRILL RIG:	C.I. DIAZ / B-53
DESCRIPTION BY	R. TORRES	DATE HOLE STARTED	2-13-08 COMPLETED 2-13-08
GROUNDWATER (ft.)	Initial: Not Found Final:	ELEVATION TOP OF HOLE (mts):	
TOTAL DEPTH OF HOLE	25'	ENGINEER	R. TORRES

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00									
	0	Highly weathered hydrothermal weathered granitic rock - sandy rock fragments - friable granular			9 9 10 13 18 22 26	19 40 71 50/4"	12 10 5 6			
-2.44	8									
	10	Grayish hidrothermal weathered granitic rock - powdery silty - dry			36 35 33 50/4" 26 45 50/5"	50/5" 36	5 11			
	20				15 15 21 25 50	75	13			
					50	50	10			
	30									
	40									
	50									
	60									



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

Initial G.W. Depth
Final G.W. Depth

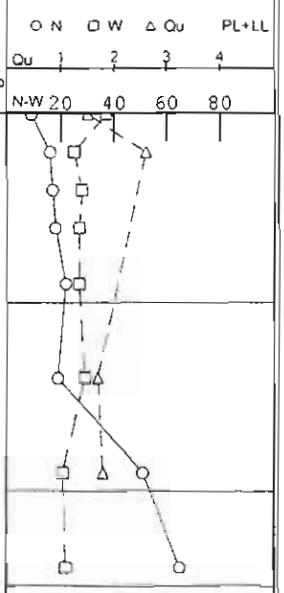
JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 15

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 1

LOCATION	CAGUAS, PR	DRILLER/DRILL RIG:	C.I. DIAZ / B-53
DESCRIPTION BY	R. TORRES	DATE HOLE STARTED	2-13-08 COMPLETED 2-13-08
GROUNDWATER (ft.)	Initial: Not Found Final:	ELEVATION TOP OF HOLE (mts):	
TOTAL DEPTH OF HOLE	25'	ENGINEER	R. TORRES

Elev. (mts	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00									
	0	Brown clay with some sand and small rock fragments - moist some organic material			2 3 6	9	37	1.5		
-1.22	4				6 7	16	25	2.6		
		Brown - motled gray clayey material with rock fragments and sand			9 5 8	17	28			
-2.74	9				9	18	27			
	10	Grayish mottled brown light silt - relic joints and becoming more clayey with depth			9 9 9 8	22	27			
					10 12 5 8	19	29	1.7		
	20				11 12 22 29	51	21	1.8		
					25 27 38	65	22			
	30									
	40									
	50									
	60									



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

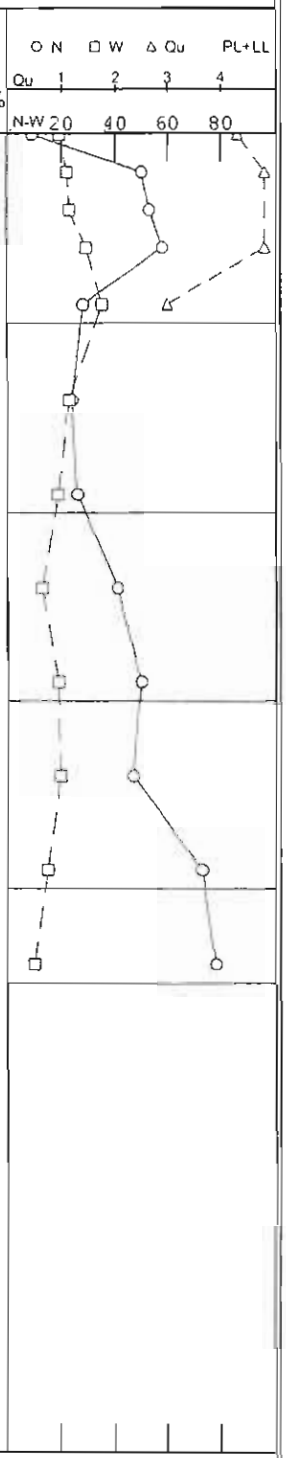
Initial G.W. Depth
Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 16

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 1
LOCATION	CAGUAS, PR	DRILLER/DRILL RIG:	C.I. DIAZ / B-53
DESCRIPTION BY	R. TORRES	DATE HOLE STARTED	2-13-08 COMPLETED 2-13-08
GROUNDWATER (ft.)	Initial: Not Found Final:	ELEVATION TOP OF HOLE (mts):	
TOTAL DEPTH OF HOLE	45'	ENGINEER	R. TORRES

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00	Brownish clayey silt with some sand and ironnodules - some organic matter hard - dry becoming more clayey with depth (0 – 14)			6, 8, 1, 16, 22, 28, 15, 24, 29, 24, 32, 26	9	19	4.3		
						50	22	4.8		
						53	23			
						58	29	4.8		
	10					28	35	3.0		
-4.27		Yellowish brown silt with some clay - light relic joints hydrothermally altered - roots dry (14 – 35)			8, 12, 16, 7, 10, 14, 7, 12, 14	24	23			
	20					26	19			
					12, 18, 23	41	13			
	30				12, 26, 24	50	19			
-10.67		Yellowish brown highly waethered hydrothermally altered rock (granodiorite) turned into material relic joints dry (35 – 45)			13, 18, 29	47	20			
	40				13, 23, 50	73	15			
					28, 50	78	10			
	50									
	60									



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

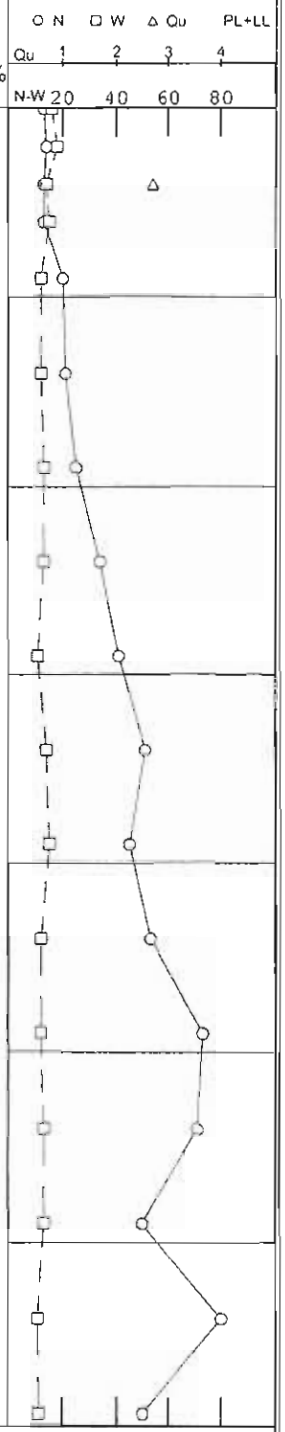
Initial G.W. Depth
Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 17

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 2
LOCATION: CAGUAS, PR		DRILLER/DRILL RIG: C.I. DIAZ / B-53	
DESCRIPTION BY: R. TORRES		DATE HOLE STARTED 2-20-08	COMPLETED 2-20-08
GROUNDWATER (ft.) Initial: Not Found Final:		ELEVATION TOP OF HOLE (mts):	
TOTAL DEPTH OF HOLE: 70'		ENGINEER: R. TORRES	

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00									
	0	Dark brown topsoil - clay intermixid with sand rock fragments - roots pieces of mica dry			3 6 7	13	16			
-1.22	4				7 7 7	14	18			
		Brownish sandy silt with spics if mica some rock fragments dry - becoming powdery silt with depth			5 6 7 6 6 7 7	13	14	2.7		
	10					13	15			
-4.27	14					20	12			
		Yellowish - light gray powdery silt - from hydrothermally altered rock dry - relic joints			10 10 7 10	21	12			
	20				11 7 11 14	25	13			
					11 14 20	34	13			
	30				13 19 22	41	11			
-10.67	35				10 20 31	51	14			
		Light - brown to yellwosih silt hydrothermally altered rock light - dry with relic joints turning more whitish and powdery with depth			16 22 23	45	15			
	40				15 23 30	53	12			
	50				23 50	73	12			
					21 50	71	13			
	60				33 50/3"	50/3"	13			
					30 50	80	11			



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

Initial G.W. Depth
Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 17

DRILLING LOG (CONT. SHEET)

PROJECT	JOB	SHEET
BAIROA INDUSTRIAL DEV.	6688	2 OF 2

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%	○ N □ W △ Qu PL+LL Qu 1 2 3 4 N-W 20 40 60 80
	0.00										
	70				50	50	11				
	80										
	90										
	100										
	110										
	120										
	130										
	140										

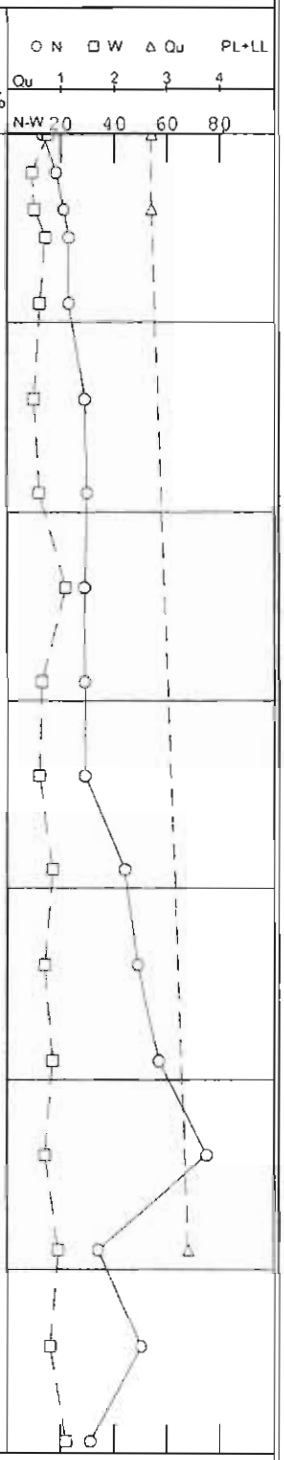
"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight. ▽ Initial G.W. Depth
"Qu" - Unconfined Compressive Strength in tons per square foot. ▼ Final G.W. Depth
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 18

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 2
LOCATION: CAGUAS, PR		DRILLER/DRILL RIG: C.I. DIAZ / B-53	
DESCRIPTION BY: R. TORRES		DATE HOLE STARTED 2-21-08	COMPLETED 2-21-08
GROUNDWATER (ft.) Initial: Not Found Final:		ELEVATION TOP OF HOLE (mts):	
TOTAL DEPTH OF HOLE: 70'		ENGINEER: R. TORRES	

Elev. (mts)	DEPTH (feet)	DESCRIPTION	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00							
	0	Brownish sandy silt with sandy mineral content (mica) loose - some organic material turning grayish with depth	4 5 8	13	15	2.7		
			11 10	18	9			
-1.68			8 8 10	21	10	2.7		
	5.5	Brownish - gray sandy silt cohesive - dry with relic joints - saprolitic material some weathered rock fragments hydrothermally altered rock	11 8 11	23	14			
	10		12 8 11	23	12			
			12 8 12	29	10			
	20		17 9 15	30	12			
			15 10 14	29	22			
	30		15 12 14	29	13			
-10.67	35	Gray to briwnish silt hydrothermally weathered rock with relic joints a fractures - dry miac specs abundant with depth as dry weathered rock fragments	15 11 12	29	12			
			17 12 17	44	17			
	40		27 17 22	49	14			
			27 12 27	57	17			
	50		30 27 35	75	14			
-16.46	54	Brownish - gray powdery silt hydrothermally weathered rock becoming sandies with depth relic joints dry	40 9 14	34	19	3.4		
	60		20 13 23	50	16			
			27					



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

Initial G.W. Depth
Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 18

DRILLING LOG (CONT. SHEET)	PROJECT BAIROA INDUSTRIAL DEV.	JOB 6688	SHEET 2 OF 2

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%	○ N □ W △ Qu PL+LL Qu 1 2 3 4 N-W 20 40 60 80
	0.00										
	70				9 15 16	31	22				
	80										
	90										
	100										
	110										
	120										
	130										
	140										

"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

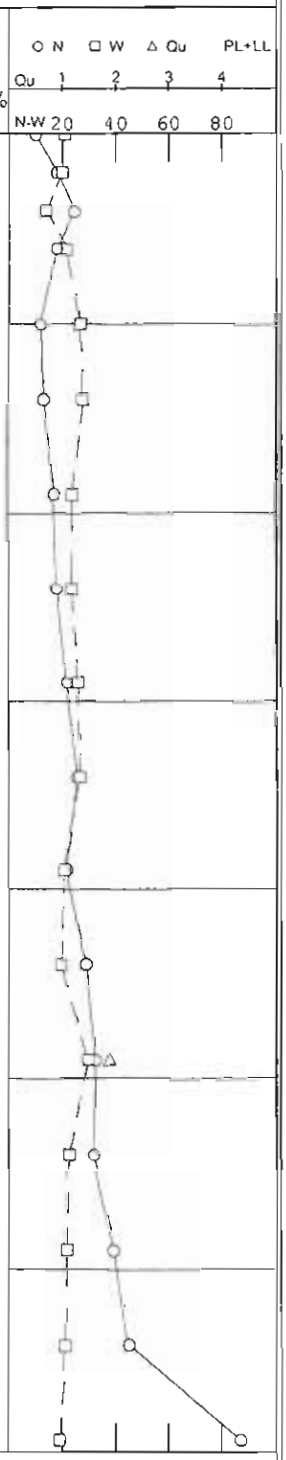
▽ Initial G.W. Depth
▼ Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 19

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 2
LOCATION: CAGUAS, PR		DRILLER/DRILL RIG: C.I. DIAZ / B-53	
DESCRIPTION BY: R. TORRES		DATE HOLE STARTED: 2-19-08	COMPLETED: 2-19-08
GROUNDWATER (ft.) Initial: Not Found Final:		ELEVATION TOP OF HOLE (mts):	
TOTAL DEPTH OF HOLE: 70'		ENGINEER: R. TORRES	

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00									
	0	Dark - brown sandy silt with roots and organic matter	0		2 4 6	10	21			
-1.22					10 8	18	20			
		Brownish clayey silt with sand and some rock fragments with frecks of mica slide material	4		10 10 12	25	14			
-3.05	10		10		13 9 9	18	22			
		Whitish - gray silt becoming powdery with depth moist (saprolite material relic joints present)			5 5 7	12	27			
	20				5 6 7	13	28			
					6 7 10	17	24			
	30				6 8 10	18	24			
					7 10 12	22	26			
-10.67			35		8 10 16	26	27			
		Yellowish brown powdery silt with relic joints dry - saprolitic material			8 9 13	22	21			
	40				9 11 18	29	20			
	50				10 13 20	33	30	1.9		
		Do... moist hydrothermally altered saprolitic material			11 14 18	32	23			
	60				20 20 20	40	22			
					13 18 27	45	22			



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

▽ Initial G.W. Depth
▼ Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 19

DRILLING LOG (CONT. SHEET)

PROJECT	JOB	SHEET
BAIROA INDUSTRIAL DEV.	6688	2 OF 2

Elev. (mts)	DEPTH (feet) 0.00	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%	○ N □ W △ Qu PL+LL Qu 1 2 3 4 N-W 20 40 60 80
	70				32 37 50	87	19				
	80										
	90										
	100										
	110										
	120										
	130										
	140										

"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

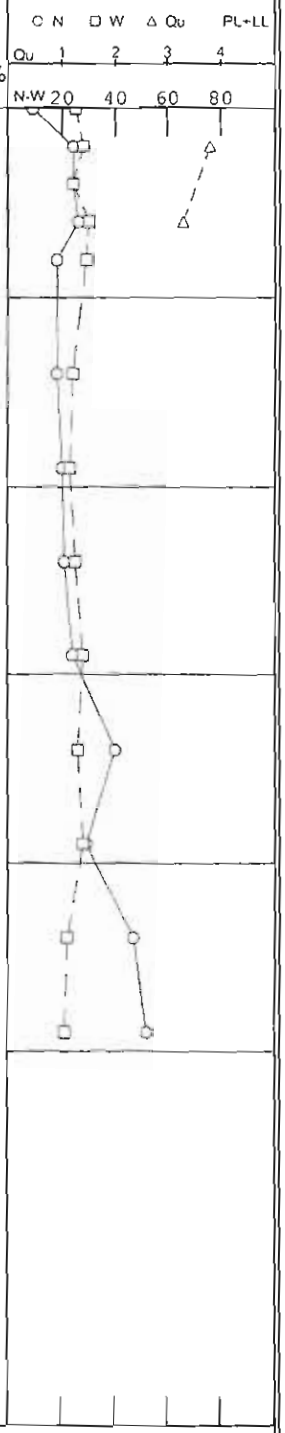
▽ Initial G.W. Depth
▼ Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 20

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 1
LOCATION	CAGUAS, PR	DRILLER/DRILL RIG:	C.I. DIAZ / B-53
DESCRIPTION BY	R. TORRES	DATE HOLE STARTED	1-25-08 COMPLETED 1-25-08
GROUNDWATER (ft.)	Initial: Not Found Final:	ELEVATION TOP OF HOLE (mts):	
TOTAL DEPTH OF HOLE	50'	ENGINEER	R. TORRES

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00									
	0	Hard reddish laterific silty clay - semi - plasticity with rock fragments and sandy spocks			3 4 5	9	25			
					7 11 13	24	28	3.8		
					9	24	24			
-2.44	8				12 12 11	26	30	3.3		
	10	Yellowish - gray silt with relic joints, dense, turning into silty clay - powdery and dry			14 12 6 8	18	29			
					10 6 8 10 10	18	24			
	20				10 10 10	20	23			
					7 10 11	21	25			
	30				7 10 14	24	28			
-10.67	35				14 20 20	40	26			
		Whitish - silty clay - powdery highly - altered geologic material by hydrothermal fluids dry			8 11 18	29	28			
	40				10 20 27	47	22			
	50				14 26 26	52	21			
	60									



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

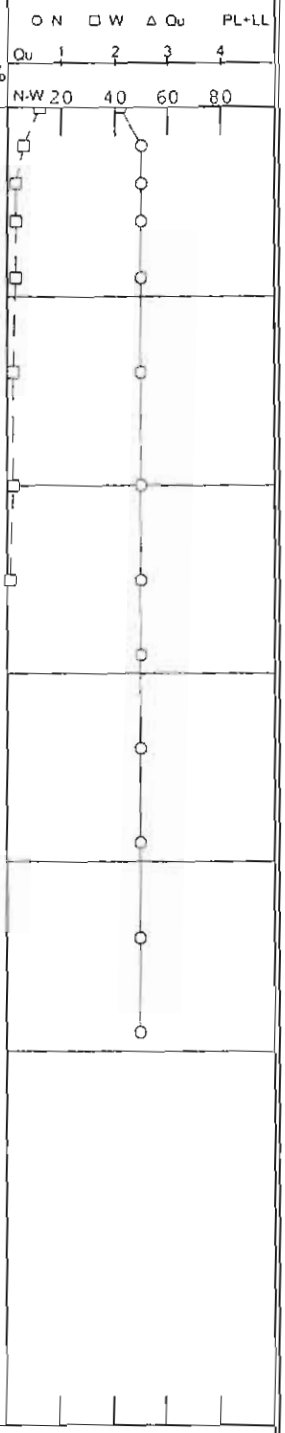
Initial G.W. Depth
Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 12

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 1
LOCATION	CAGUAS, PR	DRILLER/DRILL RIG:	C.I. DIAZ / B-53
DESCRIPTION BY	R. TORRES	DATE HOLE STARTED	2-14-08 COMPLETED 2-14-08
GROUNDWATER (ft.)	Initial: Not Found Final:	ELEVATION TOP OF HOLE (mts):	
TOTAL DEPTH OF HOLE	50'	ENGINEER	R. TORRES

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00									
	0	Grayish-green hydrothermally altered - weathered volcanic rock crumble under finger pressure			10 18 24 42 50	42	12			
					50	50	6			
					50	50	3			
					50 50/3"	50/3"	3			
	10				50	50	3			
					50/3"	50/3"	2			
	20	Do... more conpetent and hard with depth			50/2"	50/2"	2			
-7.62	25	Greenish volcanic rock highly mineralized			50/1"	50/1"	1			
	30				50/1"	50/1"				
					50/1"	50/1"				
	40				50/2"	50/2"				
					50/1"	50/1"				
	50				50/1"	50/1"				
	60									



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

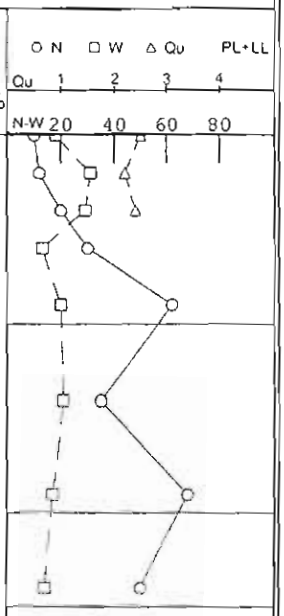
Initial G.W. Depth
Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 13

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 1
LOCATION: CAGUAS, PR		DRILLER/DRILL RIG: C.I. DIAZ / B-53	
DESCRIPTION BY: R. TORRES		DATE HOLE STARTED: 2-12-08	COMPLETED: 2-12-08
GROUNDWATER (ft.) Initial: Not Found	Final:	ELEVATION TOP OF HOLE (mts):	
TOTAL DEPTH OF HOLE: 25'		ENGINEER: R. TORRES	

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00									
0.00	0	Dark brown organic silty clay	0		2 5	10	18	2.5		
-0.61					5	12	31	2.2		
-1.22	2	Light brown silty clay	2		5 6	20	29	2.4		
	4	Light brown clayey silt with rock fragments with relic joints	4		6 5 8	30	13			
	10				12 12 15 15	62	20			
-4.27	14	Light brown sandy silt with some rock fragments with relic joints	14		19 28 34 13 16	35	21			
	20				19 19 25 43	68	17			
					50	50	14			
	30									
	40									
	50									
	60									



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

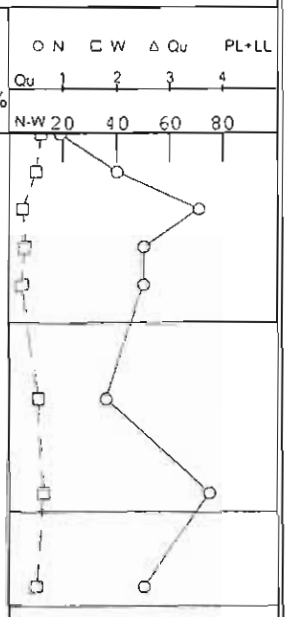
▽ Initial G.W. Depth
▼ Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 14

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 1
LOCATION: CAGUAS, PR	DRILLER/DRILL RIG: C.I. DIAZ / B-53		
DESCRIPTION BY: R. TORRES	DATE HOLE STARTED: 2-13-08	COMPLETED: 2-13-08	
GROUNDWATER (ft.) Initial: Not Found Final:	ELEVATION TOP OF HOLE (mts):		
TOTAL DEPTH OF HOLE: 25'	ENGINEER: R. TORRES		

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00									
	0	Highly weathered hydrothermal weathered granitic rock - sandy rock fragments - friable granular			9, 9, 10, 13, 18, 22, 26	19, 40, 71, 50/4"	12, 10, 5, 6			
-2.44	8	Grayish hidrothermal weathered granitic rock - powdery silty - dry			36, 35, 33, 50/4", 26, 45, 50/5", 15, 15, 21, 25, 50	50/5", 75	5, 13			
	10									
	20				50	50	10			
	30									
	40									
	50									
	60									



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

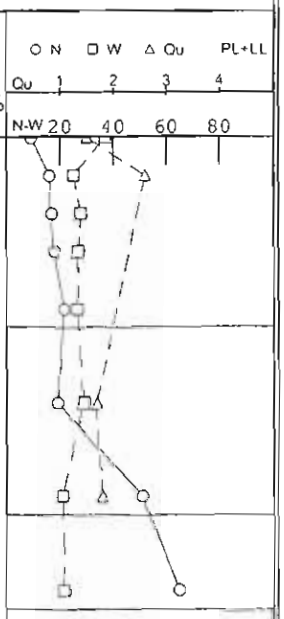
▽ Initial G.W. Depth
▼ Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 15

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 1
LOCATION: CAGUAS, PR		DRILLER/DRILL RIG: C.I. DIAZ / B-53	
DESCRIPTION BY: R. TORRES		DATE HOLE STARTED: 2-13-08	COMPLETED: 2-13-08
GROUNDWATER (ft.) Initial: Not Found Final:		ELEVATION TOP OF HOLE (mts):	
TOTAL DEPTH OF HOLE: 25'		ENGINEER: R. TORRES	

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00	Brown clay with some sand and small rock fragments - moist some organic material			2, 3, 6	9	37	1.5		
-1.22	0				6, 7	16	25	2.6		
	4	Brown - motled gray clayey material with rock fragments and sand			9, 5, 8	17	28			
-2.74	9				9, 9, 9, 9	18	27			
	10	Grayish mottled brown light silt - relic joints and becoming more clayey with depth			8, 10, 12, 5, 8	22	27			
					11, 12, 22, 29	19	29	1.7		
	20				25, 27, 38	51	21	1.8		
						65	22			
	30									
	40									
	50									
	60									



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

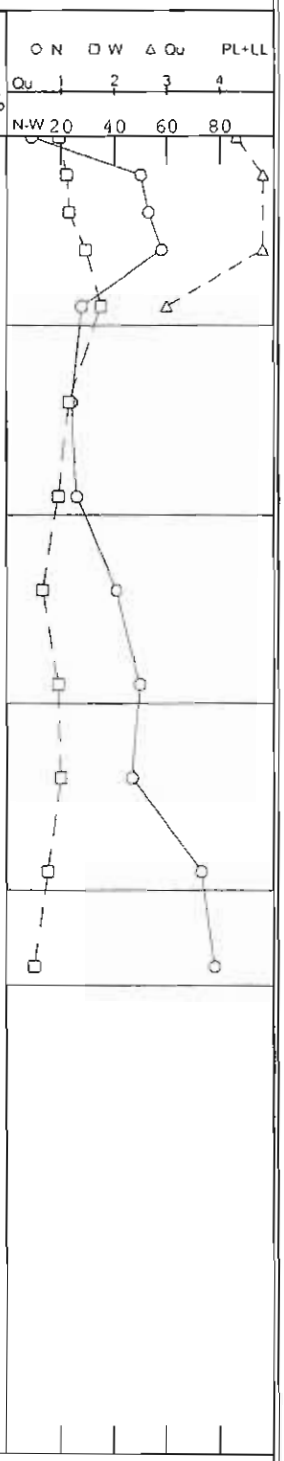
▽ Initial G.W. Depth
▼ Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 16

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 1
LOCATION: CAGUAS, PR		DRILLER/DRILL RIG: C.I. DIAZ / B-53	
DESCRIPTION BY: R. TORRES		DATE HOLE STARTED: 2-13-08	COMPLETED: 2-13-08
GROUNDWATER (ft.) Initial: Not Found Final:		ELEVATION TOP OF HOLE (mts):	
TOTAL DEPTH OF HOLE: 45'		ENGINEER: R. TORRES	

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00									
	0	Brownish clayey silt with some sand and ironnodules - some organic matter hard - dry becoming more clayey with depth			6 8 1 16 22 28 15 24 29 24 32 26	9 50 53 58 28	19 22 23 29 35	4.3 4.8 4.8 3.0		
	10									
-4.27	14	Yellowish brown silt with some clay - light relic joints hydrothermally altered - roots dry			8 12 16 7 10 14 7 12 14 12 18 23 12 26 24	24 26 41 50	23 19 13 19			
	20									
	30									
-10.67	35	Yellowish brown highly waethered hydrothermally altered rock (granodiorite) turned into material relic joints dry			13 18 29 13 23 50 28 50	47 73 78	20 15 10			
	40									
	50									
	60									



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

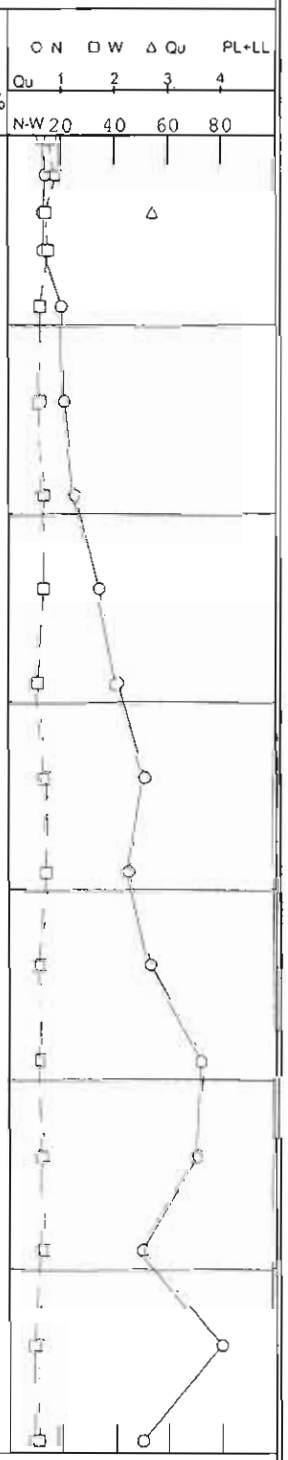
Initial G.W. Depth
Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 17

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 2
LOCATION: CAGUAS, PR		DRILLER/DRILL RIG: C.I. DIAZ / B-53	
DESCRIPTION BY: R. TORRES		DATE HOLE STARTED: 2-20-08	COMPLETED: 2-20-08
GROUNDWATER (ft.) Initial: Not Found Final:		ELEVATION TOP OF HOLE (mts):	
TOTAL DEPTH OF HOLE: 70'		ENGINEER: R. TORRES	

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00									
-1.22	0	Dark brown topsoil - clay intermixid with sand rock fragments - roots pieces of mica dry			3 6 7	13	16			
					7 7	14	18			
					7 7	13	14	2.7		
	4	Brownish sandy silt with spics if mica some rock fragments dry - becoming powdery silt with depth			7 5	13	15			
	10				6 7 6	20	12			
-4.27	14	Yellowish - light gray powdery silt - from hydrothermally altered rock dry - relic joints			6 7 7 10	21	12			
	20				10 7 10 11	25	13			
					7 11 14					
					11 14 20	34	13			
	30				13 19 22	41	11			
-10.67	35	Light - brown to yellwosih silt hydrothermally altered rock light - dry with relic joints turning more whitish and powdery with depth			10 20 31	51	14			
	40				16 22 23	45	15			
					15 23 30	53	12			
	50				23 50	73	12			
					21 50	71	13			
	60				33 50/3"	50/3"	13			
					30 50	80	11			



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

▽ Initial G.W. Depth
▼ Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 17

DRILLING LOG (CONT. SHEET)

PROJECT	JOB	SHEET
BAIROA INDUSTRIAL DEV.	6688	2 OF 2

Elev. (mts	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%	○ N □ W △ Qu PL+LL Qu 1 2 3 4 N-W 20 40 60 80
	0.00										
	70				50	50	11				
	80										
	90										
	100										
	110										
	120										
	130										
	140										

"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

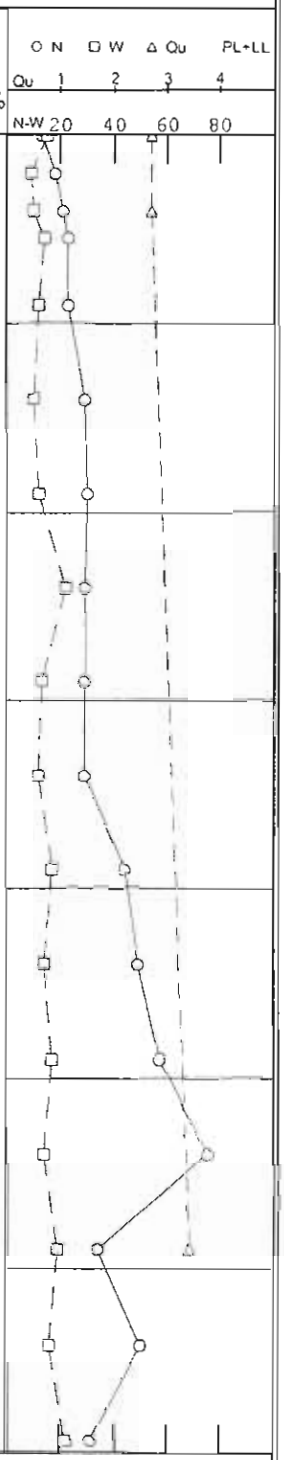
▽ Initial G.W. Depth
▼ Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 18

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 2
LOCATION: CAGUAS, PR	DRILLER/DRILL RIG: C.I. DIAZ / B-53		
DESCRIPTION BY: R. TORRES	DATE HOLE STARTED: 2-21-08	COMPLETED: 2-21-08	
GROUNDWATER (ft.) Initial: Not Found Final:	ELEVATION TOP OF HOLE (mts):		
TOTAL DEPTH OF HOLE: 70'	ENGINEER: R. TORRES		

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00									
	0	Brownish sandy silt with sandy mineral content (mica) loose - some organic material turning grayish with depth			4 5 8 11 10	13 18 21	15 9 10	2.7 2.7		
-1.68	5.5	Brownish - gray sandy silt cohesive - dry with relic joints - saprolitic material some weathered rock fragments hydrothermally altered rock			8 8 10 11 8 11 12 8 11 12 8 12 17 9 15 15 10 14 15 12 14 15	23 23 29 30 29 29	14 12 10 12 22 13			
	10									
	20									
	30									
-10.67	35	Gray to briwnish silt hydrothermally weathered rock with relic joints a fractures - dry miac specs abundant with depth as dry weathered rock fragments			11 12 17 12 17 27 17 22 27 12 27 30	29 44 49 57	12 17 14 17			
	40									
	50									
-16.46	54	Brownish - gray powdery silt hydrothermally weathered rock becoming sandies with depth relic joints dry			27 35 40 9 14 20 13 23 27	75 34 50	14 19 16	3.4		
	60									



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

Initial G.W. Depth
Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 18

DRILLING LOG (CONT. SHEET)	PROJECT BAIROA INDUSTRIAL DEV.	JOB 6688	SHEET 2 OF 2

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%	○ N □ W △ Qu PL+LL Qu 1 2 3 4 N-W 20 40 60 80
	0.00										
	70				9 15 16	31	22				
	80										
	90										
	100										
	110										
	120										
	130										
	140										

"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

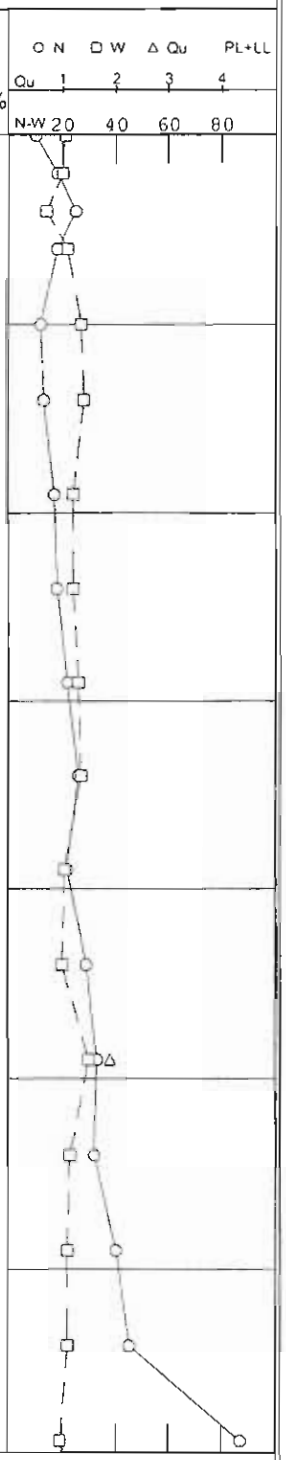
▽ Initial G.W. Depth
▼ Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 19

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 2
LOCATION	CAGUAS, PR	DRILLER/DRILL RIG:	C.I. DIAZ / B-53
DESCRIPTION BY	R. TORRES	DATE HOLE STARTED	2-19-08 COMPLETED 2-19-08
GROUNDWATER (ft.)	Initial: Not Found Final:	ELEVATION TOP OF HOLE (mts):	
TOTAL DEPTH OF HOLE	70'	ENGINEER	R. TORRES

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00									
	0	Dark - brown sandy silt with roots and organic matter			2 4 6	10	21			
-1.22	4	Brownish clayey silt with sand and some rock fragments with frecks of mica slide material			10 8 10 10 12 13	18 / 25	20 / 14			
-3.05	10	Whitish - gray silt becoming powdery with depth moist (saprolite material relic joints present)			9 9 9 5 5 7 5 6	18 / 12	22 / 27			
	20				7 6 7 10	13 / 17	28 / 24			
	30				6 8 10	18	24			
-10.67	35	Yellowish brown powdery silt with relic joints dry - saprolitic material			7 10 12	22	26			
	40				8 10 16	26	27			
	50				8 9 13	22	21			
					9 11 18	29	20			
		Do... moist hydrothermally altered saprolitic material			10 13 20	33	30	1.9		
	60				11 14 18	32	23			
					20 20 20	40	22			
					13 18 27	45	22			



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

Initial G.W. Depth
Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 19

DRILLING LOG (CONT. SHEET)

PROJECT	JOB	SHEET / OF
BAIROA INDUSTRIAL DEV.	6688	2 / 2

Elev. (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%	○ N □ W △ Qu PL-LL
	0.00										
	70				32 37 50	87	19				
	80										
	90										
	100										
	110										
	120										
	130										
	140										

Qu 1 2 3 4
N-W 20 40 60 80

"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

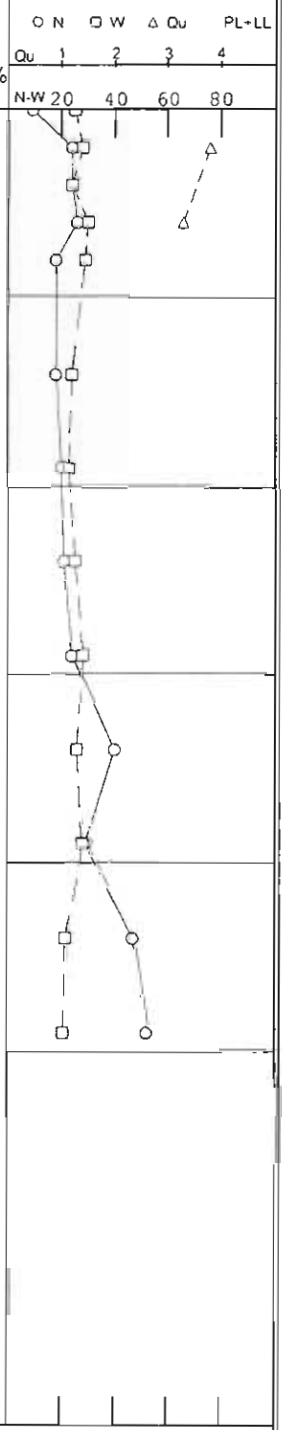
▽ Initial G.W. Depth
▼ Final G.W. Depth

JACA & SIERRA TESTING LABORATORIES, INC

BORING NUMBER: 20

DRILLING LOG	PROJECT: BAIROA INDUSTRIAL DEV.	JOB: 6688	SHEET 1 OF 1
LOCATION: CAGUAS, PR		DRILLER/DRILL RIG: C.I. DIAZ / B-53	
DESCRIPTION BY: R. TORRES		DATE HOLE STARTED: 1-25-08	COMPLETED: 1-25-08
GROUNDWATER (ft.) Initial: Not Found Final:		ELEVATION TOP OF HOLE (mts):	
TOTAL DEPTH OF HOLE: 50'		ENGINEER: R. TORRES	

Elev (mts)	DEPTH (feet)	DESCRIPTION	LEGEND	TYPE	BLOWS	SPT N	W	Qu	RC	RQD%
0.00	0.00									
	0	Hard reddish laterific silty clay - semi - plasticity with rock fragments and sandy spocks			3 4 5	9	25			
					7 11 13	24	28	3.8		
					9 12 12	24	24			
-2.44	8				11 14 12	26	30	3.3		
	10	Yellowish - gray silt with relic joints, dense, turning into silty clay - powdery and dry			6 8 10	18	29			
					6 8 10	18	24			
	20				10 10 10	20	23			
					10 7 10	21	25			
	30				11 7 10	24	28			
-10.67	35				14 14 20	40	26			
		Whitish - silty clay - powdery highly - altered geologic material by hydrothermal fluids dry			20 8 11	29	28			
	40				18 10 20	47	22			
					27 14 26	52	21			
	50				26					
	60									



"N" - Number of blows required to drive the sampling spoon a distance of 12 in. with a 140 lbs hammer falling 30 in.
"W" - Natural Moisture Content in percentage of dry weight.
"Qu" - Unconfined Compressive Strength in tons per square foot.
"Rc" - Core recovery in percent for each successive run. "Rqd" - Rock quality designation.
"WH" - Sample was recovered by advancing the sampler with the weight of the hammer.
"P" - A "P" in the Unconfined Compressive Strength test indicates the use of the pocket Penetrometer.

Initial G.W. Depth
Final G.W. Depth

JACA & SIERRA
Testing Laboratories, Inc.
Geotechnical Engineers

April 2, 2008

EMPRESAS VRM INC.
P.O. BOX 20868
SAN JUAN, PR 00928

SUBJECT: P.V.C. TEST RESULTS

Project	:	Caguas Millennium Industrial Dev.
Samples Secured and Transported by	:	Jaca & Sierra Testing Laboratories
Location of Sample	:	Project Site
Standard Test Methods Used	:	FHA No. 595

Tests Results

A. ***Sample ID*** : ***Sample 1: Boring 20 (0 @ 7.5 ft)***

P.V.C. Test Results (FHA No. 595)

Swell Index	:	7467.9 psf
P.V.C.	:	+7.70
Category	:	Very Critical

B. ***Sample ID*** : ***Sample 2: Boring 20 (39.0 ft @ 50.5 ft)***

P.V.C. Test Results (FHA No. 595)

Swell Index	:	2987.2 psf
P.V.C.	:	3.70
Category	:	Marginal

C. ***Sample ID*** : ***Sample 3: Boring 18 (0 @ 7.5 ft)***

P.V.C. Test Results (FHA No. 595)

Swell Index	:	2655.3 psf
P.V.C.	:	3.25
Category	:	Marginal

PO Box 363116, San Juan, PR 00936-3116
Road 850 Km 0.2 Las Cuevas Ward, Trujillo Alto, PR 00976
☎ 787-761-2570 🖷 787-748-6970 www.jacasierra.com

D. ***Sample ID*** : ***Sample 4: Boring 18 (44.0 ft @ 60.5 ft)***

P.V.C. Test Results (FHA No. 595)

Swell Index	:	1825.5 psf
P.V.C.	:	2.15
Category	:	Marginal

E. ***Sample ID*** : ***Sample 5: Boring 18 (9.0 ft @ 25.5 ft)***

P.V.C. Test Results (FHA No. 595)

Swell Index	:	1161.7 psf
P.V.C.	:	1.30
Category	:	Non - Critical

F. ***Sample ID*** : ***Sample 6: Boring 19 (39.0 ft @ 55.5 ft)***

P.V.C. Test Results (FHA No. 595)

Swell Index	:	2157.4 psf
P.V.C.	:	2.60
Category	:	Marginal

G. ***Sample ID*** : ***Sample 7: Boring 20 (9.0 ft @ 25.5 ft)***

P.V.C. Test Results (FHA No. 595)

Swell Index	:	4314.8 psf
P.V.C.	:	5.50
Category	:	Critical

H. ***Sample ID*** : ***Sample 8: Boring 19 (14.0 ft @ 30.5 ft)***

P.V.C. Test Results (FHA No. 595)

Swell Index	:	2821.2 psf
P.V.C.	:	3.70
Category	:	Marginal

Empresas VRM Inc.
P.V.C. Test Results
April 2, 2008

I. ***Sample ID*** : ***Sample 9: Boring 19 (2.0 ft @ 10.5 ft)***

P.V.C. Test Results (FHA No. 595)

Swell Index	:	4314.8 psf
P.V.C.	:	5.50
Category	:	Critical

Respectfully submitted,
JACA & SIERRA TESTING LABORATORIES
Edwin Gutierrez
EDWIN GUTIERREZ TORRES, E.I.T.
LABORATORY ENGINEER

JACA & SIERRA
Testing Laboratories, Inc.
Geotechnical Engineers

April 9, 2008

EMPRESAS V.R.M.
PO BOX 20868
SAN JUAN, PR 00928

SUBJECT : CLASSIFICATION TEST RESULTS

Project	:	Caguas Millennium Industrial Dev.- Caguas, PR
Samples Secured and Transported by	:	Jaca & Sierra Testing Labs.
Source of Samples	:	Project Site-Caguas, PR Bo. 19 (2' @ 10'-6")
Date of Receipt of Test Samples	:	April 1, 2008
Dates Tests were Performed	:	April 2 to 9, 2008
Standard Test Methods Used	:	AASHTO M 145, ASTM D 3282 ASTM D 2487

Tests Results

Sample Description : Pale brown, clayey silt some sand trace gravel.

A. Classification Test Results (ASTM D 2487, ASTM D 3282 and AASHTO M 145)

USCS Classification	:	ML
AASHTO Classification	:	A-4

Respectfully submitted,

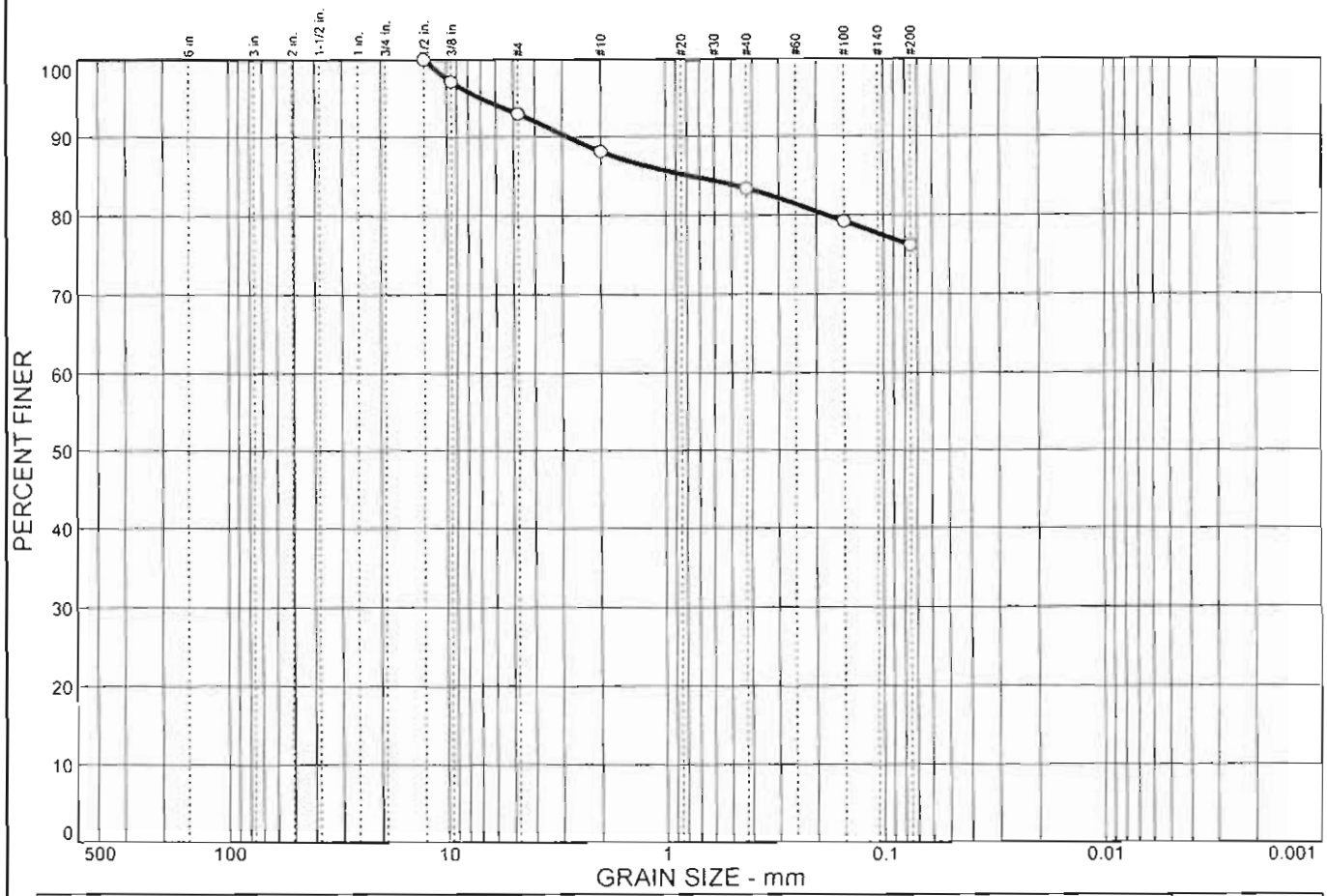
JACA & SIERRA TESTING LABORATORIES

LISELLE VEGA CORTES, MSCE, EIT

PO Box 363116, San Juan, PR 00936-3116
Road 850 Km 0.2 Las Cuevas Ward, Trujillo Alto, PR 00976
☎ 787-761-2570 787-748-6970 www.jacasierra.com

sm

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	7.1	16.7	76.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5 in.	100.0		
.375 in.	97.1		
#4	92.9		
#10	88.1		
#40	83.4		
#100	79.2		
#200	76.2		

* (no specification provided)

Material Description

Pale brown, clayey silt some sand trace gravel

Atterberg Limits

PL= 30 LL= 40 PI= 10

Coefficients

D_{85}= 0.770 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-4(8)

Remarks

Tested by: S.Perez
Checked by: Liselle Vega Cortes, MSCE, EIT

Sample No.: Bo. 19 **Source of Sample:** Project Site **Date:** 4/03/08
Location: Caguas, PR **Elev./Depth:** (2' @ 10'-6")

JACA & SIERRA TESTING LABORATORIES

Client: Empresas V.R.M.
Project: Caguas Millenium Industrial Dev.-Caguas, PR
Project No: **Figure**

JACA & SIERRA
Testing Laboratories, Inc.
Geotechnical Engineers

April 9, 2008

EMPRESAS V.R.M.
PO BOX 20868
SAN JUAN, PR 00928

SUBJECT : CLASSIFICATION TEST RESULTS

Project	:	Caguas Millennium Industrial Dev.-Caguas, PR
Samples Secured and Transported by	:	Jaca & Sierra Testing Labs.
Source of Samples	:	Project Site-Caguas, PR Bo. 18 (9' @ 25'-6")
Date of Receipt of Test Samples	:	April 1, 2008
Dates Tests were Performed	:	April 2 to 9, 2008
Standard Test Methods Used	:	AASHTO M 145, ASTM D 3282 ASTM D 2487

Tests Results

Sample Description	:	Pinkish white, lean clay with sand trace gravel and silt.

A. Classification Test Results (ASTM D 2487, ASTM D 3282 and AASHTO M 145)

USCS Classification	:	CL
AASHTO Classification	:	A-4

Respectfully submitted,

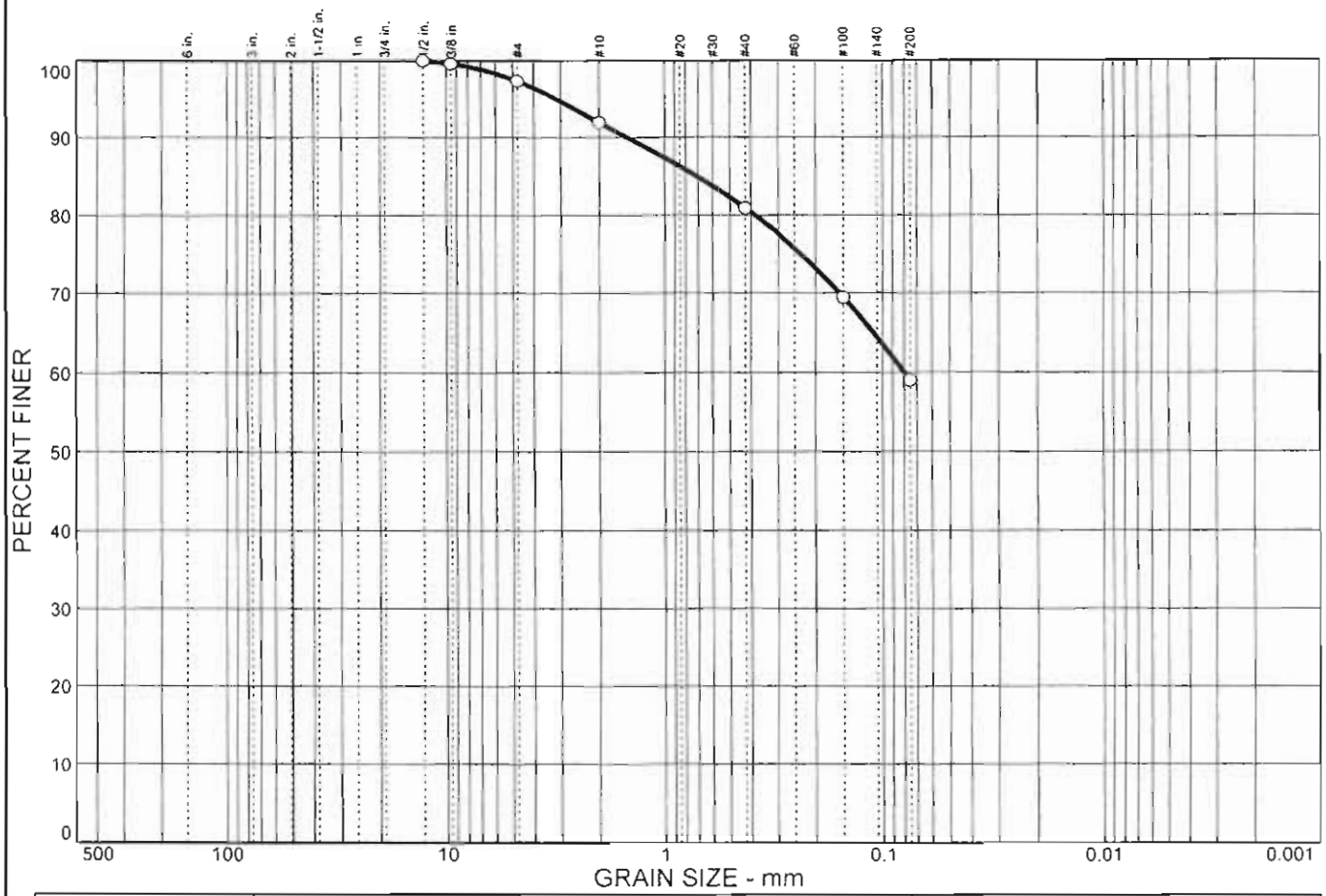
JACA & SIERRA TESTING LABORATORIES

LISELLE VEGA CORTES, MSCE, EIT

PO Box 363116, San Juan, PR 00936-3116
Road 850 Km 0.2 Las Cuevas Ward, Trujillo Alto, PR 00976
☎ 787-761-2570 787-748-6970 www.jacasierra.com

sm

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	2.7	38.3	59.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5 in.	100.0		
.375 in.	99.6		
#4	97.3		
#10	91.9		
#40	80.9		
#100	69.4		
#200	59.0		

* (no specification provided)

Material Description

Pinkish white, lean clay with sand trace gravel and silt

Atterberg Limits

PL= 23 LL= 32 PI= 9

Coefficients

D_{85}= 0.713 D_{60}= 0.0799 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-4(3)

Remarks

Tested by: S.Perez-S.Martinez
Checked by: Liselle Vega Cortes, MSCE, EIT

Sample No.: Bo. 18 **Source of Sample:** Project Site **Date:** 4/02/08
Location: Caguas, PR **Elev./Depth:** (9' @ 25'-6")

JACA & SIERRA TESTING LABORATORIES

Client: Empresas V.R.M.
Project: Caguas Millenium Industrial Dev.-Caguas, PR
Project No: **Figure**

JACA & SIERRA
Testing Laboratories, Inc.
Geotechnical Engineers

April 9, 2008

EMPRESAS V.R.M.
PO BOX 20868
SAN JUAN, PR 00928

SUBJECT : CLASSIFICATION TEST RESULTS

Project	:	Caguas Millennium Industrial Dev.- Caguas, PR
Samples Secured and Transported by	:	Jaca & Sierra Testing Labs.
Source of Samples	:	Project Site-Caguas, PR Bo. 18 (44' @ 60'-6")
Date of Receipt of Test Samples	:	April 1, 2008
Dates Tests were Performed	:	April 2 to 9, 2008
Standard Test Methods Used	:	AASHTO M 145, ASTM D 3282 ASTM D 2487

Tests Results

Sample Description : Pink, lean clay with sand trace gravel.

A. Classification Test Results (ASTM D 2487, ASTM D 3282 and AASHTO M 145)

USCS Classification	:	CL
AASHTO Classification	:	A-6

Respectfully submitted,

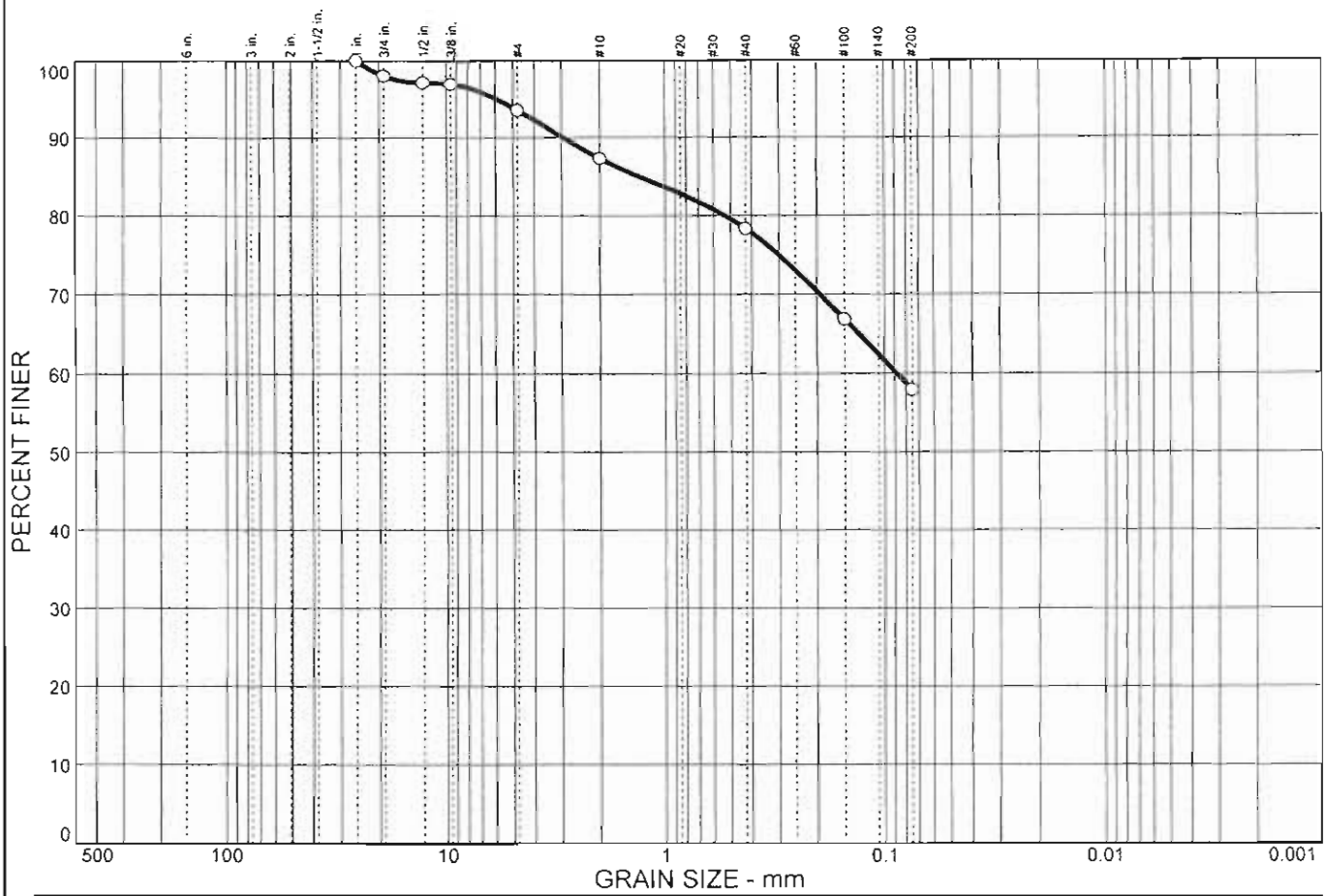
JACA & SIERRA TESTING LABORATORIES

LISELLE VEGA CORTES, MSCE, EIT

PO Box 363116, San Juan, PR 00936-3116
Road 850 Km 0.2 Las Cuevas Ward, Trujillo Alto, PR 00976
☎ 787-761-2570 787-748-6970 www.jacasierra.com

sm

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	6.5	35.6	57.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
.75 in.	98.0		
.5 in.	97.1		
.375 in.	96.9		
#4	93.5		
#10	87.3		
#40	78.3		
#100	66.8		
#200	57.9		

* (no specification provided)

Material Description

Pink, lean clay with sand trace gravel.

Atterberg Limits

PL= 22 LL= 33 PI= 11

Coefficients

D_{85}= 1.32 D_{60}= 0.0882 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(4)

Remarks

Tested by: S.Perez-S.Martinez
Checked by: Liselle Vega Cortes, MSCE, EIT

Sample No.: Bo. 18 **Source of Sample:** Project Site **Date:** 4/03/08
Location: Caguas, PR **Elev./Depth:** (44' @ 60'-6")

JACA & SIERRA TESTING LABORATORIES

Client: Empresas V.R.M.
Project: Caguas Millenium Industrial Dev.-Caguas, PR
Project No: **Figure**

JACA & SIERRA
Testing Laboratories, Inc.
Geotechnical Engineers

April 9, 2008

EMPRESAS V.R.M.
PO BOX 20868
SAN JUAN, PR 00928

SUBJECT : CLASSIFICATION TEST RESULTS

Project	:	Caguas Millennium Industrial Dev.- Caguas, PR
Samples Secured and Transported by	:	Jaca & Sierra Testing Labs.
Source of Samples	:	Project Site-Caguas, PR Bo. 18 (0' @ 7'-6")
Date of Receipt of Test Samples	:	April 1, 2008
Dates Tests were Performed	:	April 2 to 9, 2008
Standard Test Methods Used	:	AASHTO M 145, ASTM D 3282 ASTM D 2487

Tests Results

Sample Description : Pale brown, lean clay with sand trace gravel.

A. Classification Test Results (ASTM D 2487, ASTM D 3282 and AASHTO M 145)

USCS Classification	:	CL
AASHTO Classification	:	A-4

Respectfully submitted,

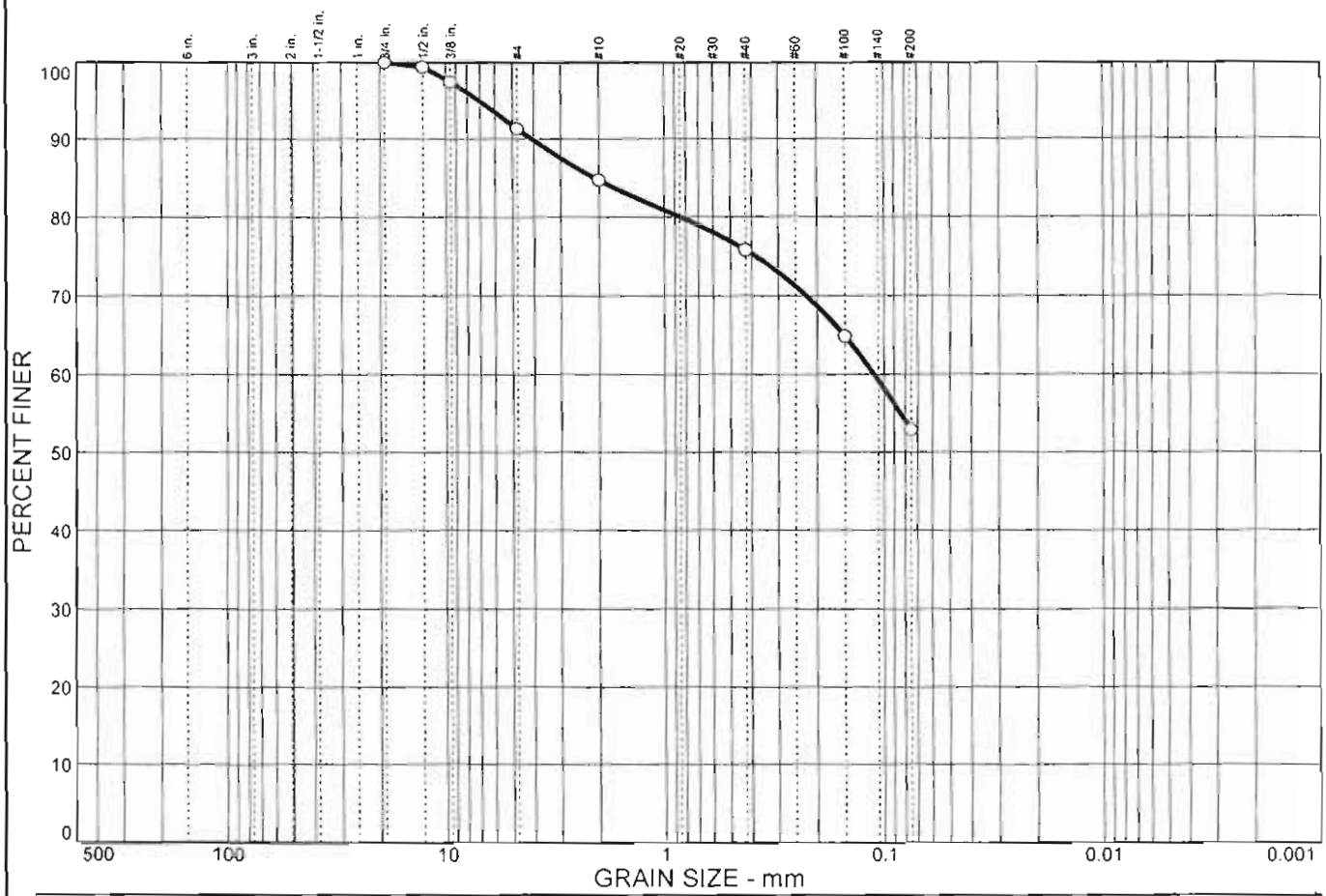
JACA & SIERRA TESTING LABORATORIES

LISELLE VEGA CORTES, MSCE, EIT

PO Box 363116, San Juan, PR 00936-3116
Road 850 Km 0.2 Las Cuevas Ward, Trujillo Alto, PR 00976
787-761-2570 787-748-6970 www.jacasierra.com

sm

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	8.7	38.4	52.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75 in.	100.0		
.5 in.	99.4		
.375 in.	97.4		
#4	91.3		
#10	84.7		
#40	75.8		
#100	64.8		
#200	52.9		

* (no specification provided)

Material Description

Pale brown, lean clay with sand trace gravel

Atterberg Limits

PL= 20 LL= 28 PI= 8

Coefficients

D_{85}= 2.10 D_{60}= 0.111 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-4(2)

Remarks

Tested by: S.Perez-S.Martinez
Checked by: Liselle Vega Cortes, MSCE, EIT

Sample No.: Bo. 18 **Source of Sample:** Project Site **Date:** 4/02/08
Location: Caguas, PR **Elev./Depth:** (0' @ 7'-6")

JACA & SIERRA TESTING LABORATORIES

Client: Empresas V.R.M.
Project: Caguas Millenium Industrial Dev.-Caguas, PR
Project No: **Figure**

JACA & SIERRA
Testing Laboratories, Inc.
Geotechnical Engineers

April 9, 2008

EMPRESAS V.R.M.
PO BOX 20868
SAN JUAN, PR 00928

SUBJECT : CLASSIFICATION TEST RESULTS

Project	:	Caguas Millennium Industrial Dev.- Caguas, PR
Samples Secured and Transported by	:	Jaca & Sierra Testing Labs.
Source of Samples	:	Project Site-Caguas, PR Bo. 19 (39' @ 55'-6")
Date of Receipt of Test Samples	:	April 1, 2008
Dates Tests were Performed	:	April 2 to 9, 2008
Standard Test Methods Used	:	AASHTO M 145, ASTM D 3282 ASTM D 2487

Tests Results

Sample Description	:	Brown, clayey silt some sand.

A. Classification Test Results (ASTM D 2487, ASTM D 3282 and AASHTO M 145)

USCS Classification	:	ML
AASHTO Classification	:	A-6

Respectfully submitted,

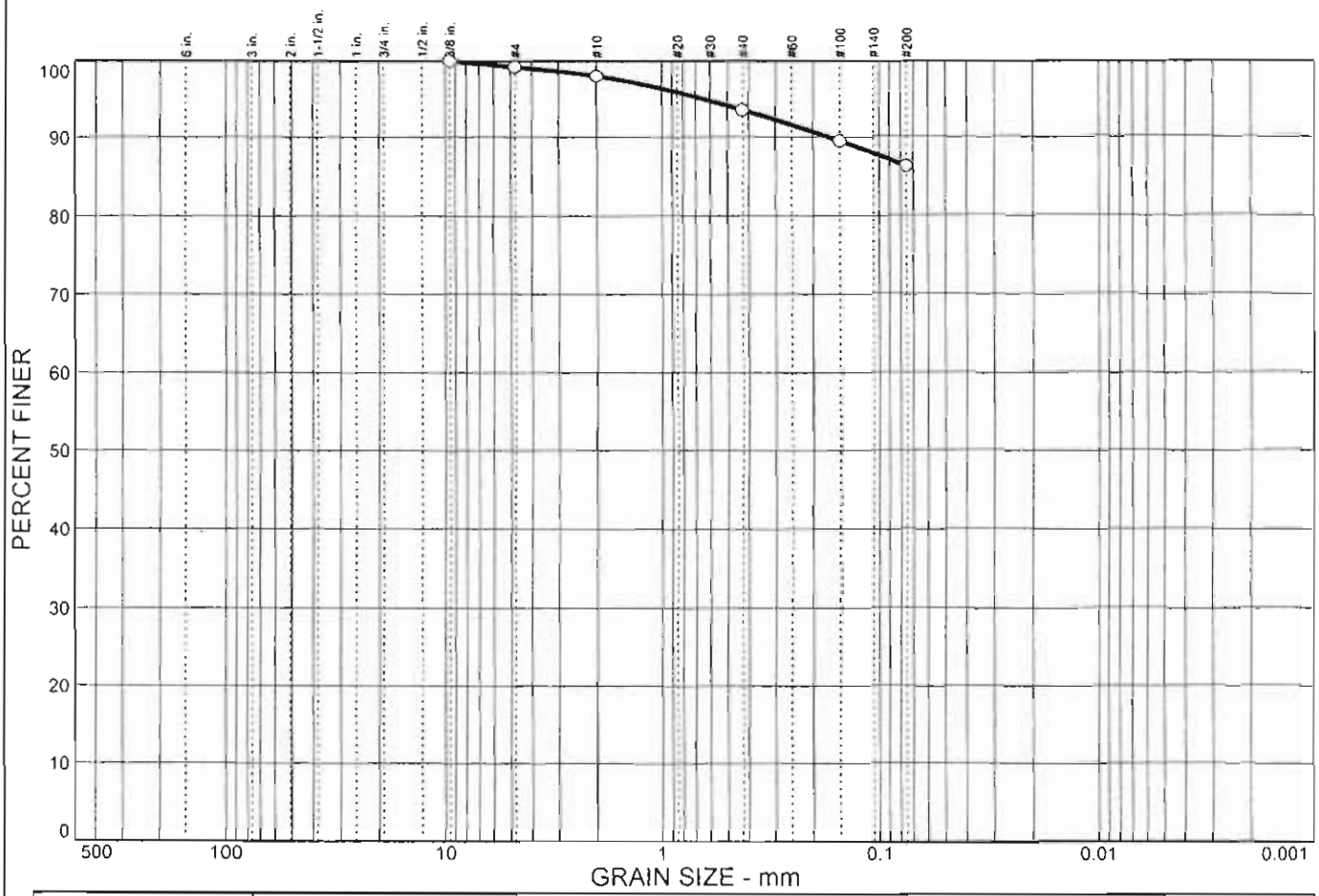
JACA & SIERRA TESTING LABORATORIES

LISELLE VEGA CORTES, MSCE, EIT

PO Box 363116, San Juan, PR 00936-3116
Road 850 Km 0.2 Las Cuevas Ward, Trujillo Alto, PR 00976
☎ 787-761-2570 787-748-6970 www.jacasierra.com

sm

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.8	12.8	86.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375 in.	100.0		
#4	99.2		
#10	98.0		
#40	93.5		
#100	89.5		
#200	86.4		

* (no specification provided)

Material Description

Brown, clayey silt some sand

Atterberg Limits

PL= 28 LL= 39 PI= 11

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-6(11)

Remarks

Tested by: S.Perez-S.Martinez
Checked by: Liselle Vega Cortes, MSCE , EIT

Sample No.: Bo. 19 **Source of Sample:** Project Site **Date:** 4/02/08
Location: Caguas. PR **Elev./Depth:** (39' @ 55'-6")

JACA & SIERRA TESTING LABORATORIES

Client: Empresas V.R.M.
Project: Caguas Millenium Industrial Dev.-Caguas, PR
Project No: **Figure**

JACA & SIERRA
Testing Laboratories, Inc.
Geotechnical Engineers

April 9, 2008

EMPRESAS V.R.M.
PO BOX 20868
SAN JUAN, PR 00928

SUBJECT : CLASSIFICATION TEST RESULTS

Project	:	Caguas Millennium Industrial Dev.- Caguas, PR
Samples Secured and Transported by	:	Jaca & Sierra Testing Labs.
Source of Samples	:	Project Site-Caguas, PR Bo. 19 (14' @ 30'-6")
Date of Receipt of Test Samples	:	April 1, 2008
Dates Tests were Performed	:	April 2 to 9, 2008
Standard Test Methods Used	:	AASHTO M 145, ASTM D 3282 ASTM D 2487

Tests Results

Sample Description : Pale brown, silt.

A. Classification Test Results (ASTM D 2487, ASTM D 3282 and AASHTO M 145)

USCS Classification	:	ML
AASHTO Classification	:	A-5

Respectfully submitted,

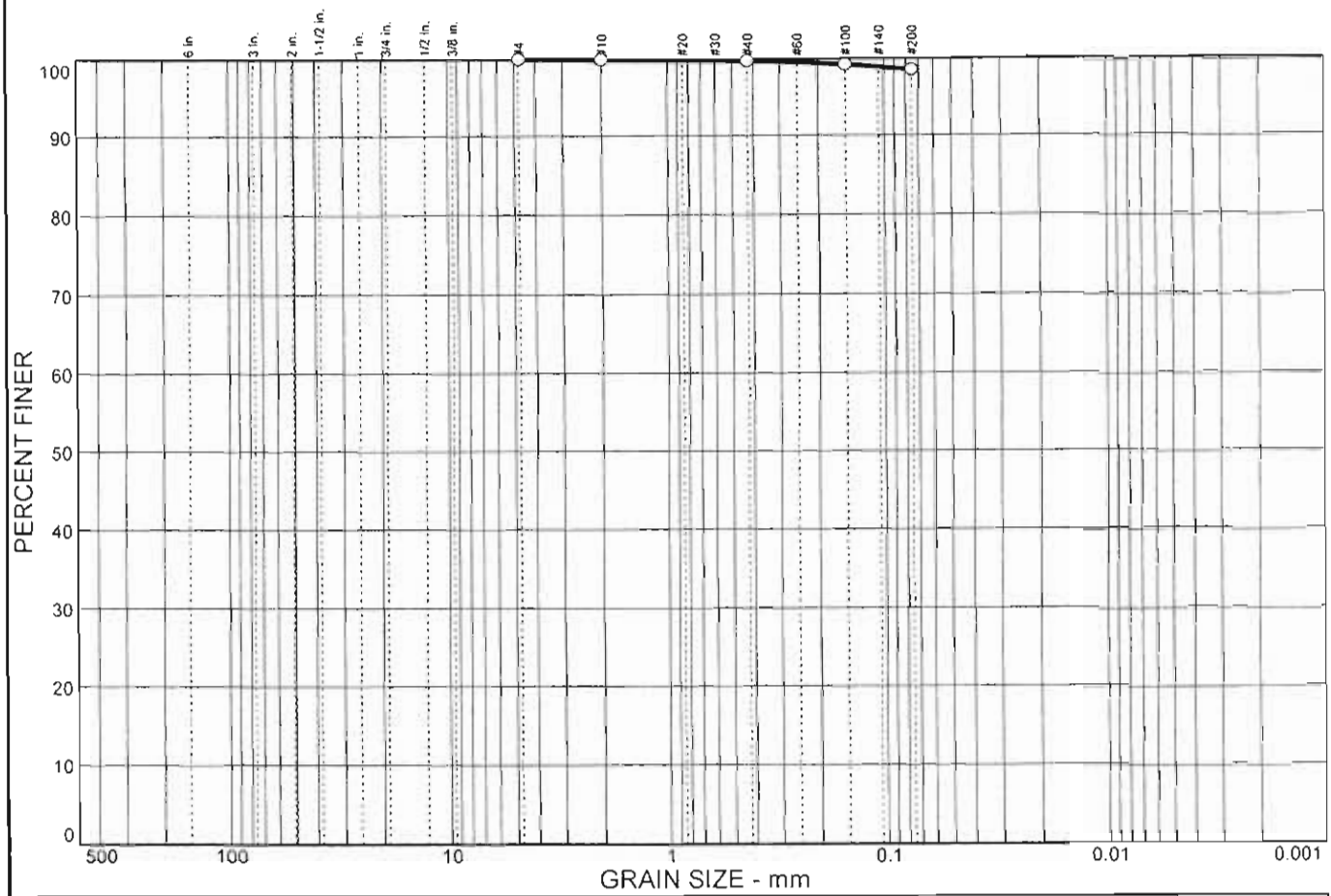
JACA & SIERRA TESTING LABORATORIES

LISELLE VEGA CORTES, MSCE, EIT

PO Box 363116, San Juan, PR 00936-3116
Road 850 Km 0.2 Las Cuevas Ward, Trujillo Alto, PR 00976
☎ 787-761-2570 787-748-6970 www.jacasierra.com

sm

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	1.5	98.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	99.9		
#40	99.7		
#100	99.2		
#200	98.5		

* (no specification provided)

Material Description

Pale brown, silt

Atterberg Limits

PL= 34 LL= 44 PI= 10

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO= A-5(14)

Remarks

Tested by: S.Perez-S.Martinez
Checked by: Liselle Vega Cortes, MSCE, EIT

Sample No.: Bo. 19 **Source of Sample:** Project Site **Date:** 4/03/08
Location: Caguas, PR **Elev./Depth:** (14' @ 30'-6")

JACA & SIERRA TESTING LABORATORIES

Client: Empresas V.R.M.
Project: Caguas Millenium Industrial Dev.-Caguas, PR
Project No: **Figure**

JACA & SIERRA
Testing Laboratories, Inc.
Geotechnical Engineers

April 9, 2008

EMPRESAS V.R.M.
PO BOX 20868
SAN JUAN, PR 00928

SUBJECT : CLASSIFICATION TEST RESULTS

Project	:	Caguas Millennium Industrial Dev.- Caguas, PR
Samples Secured and Transported by	:	Jaca & Sierra Testing Labs.
Source of Samples	:	Project Site-Caguas, PR Bo. 20 (9' @ 25'-6")
Date of Receipt of Test Samples	:	April 1, 2008
Dates Tests were Performed	:	April 2 to 9, 2008
Standard Test Methods Used	:	AASHTO M 145, ASTM D 3282 ASTM D 2487

Tests Results

Sample Description : Pale brown, elastic silt some clay trace sand.

A. Classification Test Results (ASTM D 2487, ASTM D 3282 and AASHTO M 145)

USCS Classification	:	MH
AASHTO Classification	:	A-7-5

Respectfully submitted,

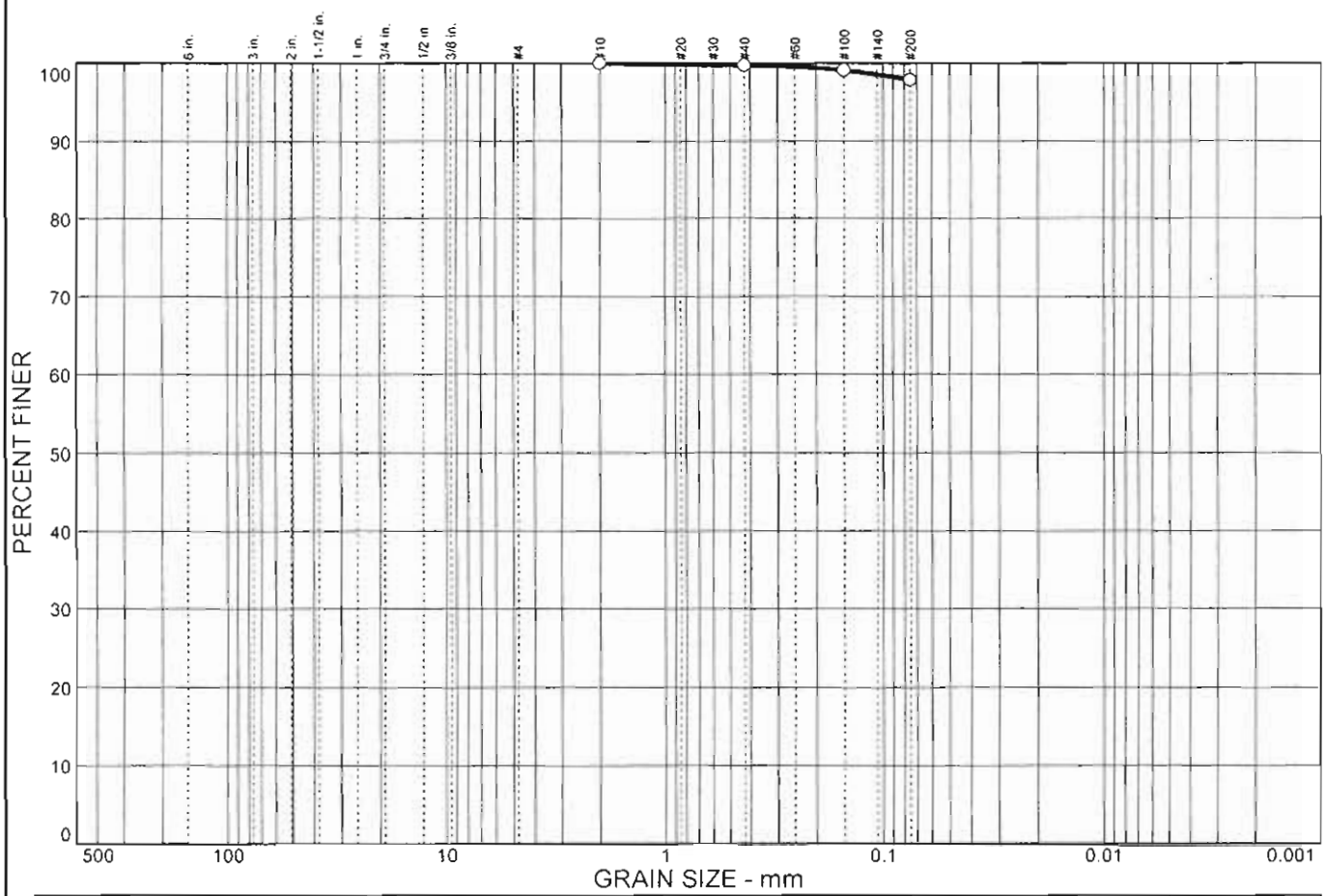
JACA & SIERRA TESTING LABORATORIES

LISELLE VEGA CORTES, MSCE, EIT

PO Box 363116, San Juan, PR 00936-3116
Road 850 Km 0.2 Las Cuevas Ward, Trujillo Alto, PR 00976
☎ 787-761-2570 787-748-6970 www.jacasierra.com

sm

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	2.1	97.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.7		
#100	99.1		
#200	97.9		

* (no specification provided)

Material Description

Pale brown, elastic silt some clay trace sand

Atterberg Limits

PL= 35 LL= 50 PI= 15

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= MH AASHTO= A-7-5(20)

Remarks

Tested by: S.Perez-S.Martinez
Checked by: Liselle Vega Cortes, MSCE, EIT

Sample No.: Bo. 20 **Source of Sample:** Project Site **Date:** 4/02/08
Location: Caguas, PR **Elev./Depth:** (9' @ 25'-6")

JACA & SIERRA TESTING LABORATORIES	**Client:** Empresas V.R.M. **Project:** Caguas Millenium Industrial Dev.-Caguas, PR **Project No:** **Figure**

JACA & SIERRA
Testing Laboratories, Inc.
Geotechnical Engineers

April 9, 2008

EMPRESAS V.R.M.
PO BOX 20868
SAN JUAN, PR 00928

SUBJECT : CLASSIFICATION TEST RESULTS

Project	:	Caguas Millennium Industrial Dev.-Caguas, PR
Samples Secured and Transported by	:	Jaca & Sierra Testing Labs.
Source of Samples	:	Project Site-Caguas, PR Bo. 20 (0' @ 7'-6")
Date of Receipt of Test Samples	:	April 1, 2008
Dates Tests were Performed	:	April 2 to 9, 2008
Standard Test Methods Used	:	AASHTO M 145, ASTM D 3282 ASTM D 2487

Tests Results

Sample Description	:	Reddish yellow, elastic silt, some clay trace gravel and sand.

A. Classification Test Results (ASTM D 2487, ASTM D 3282 and AASHTO M 145)

USCS Classification	:	MH
AASHTO Classification	:	A-7-5

Respectfully submitted,

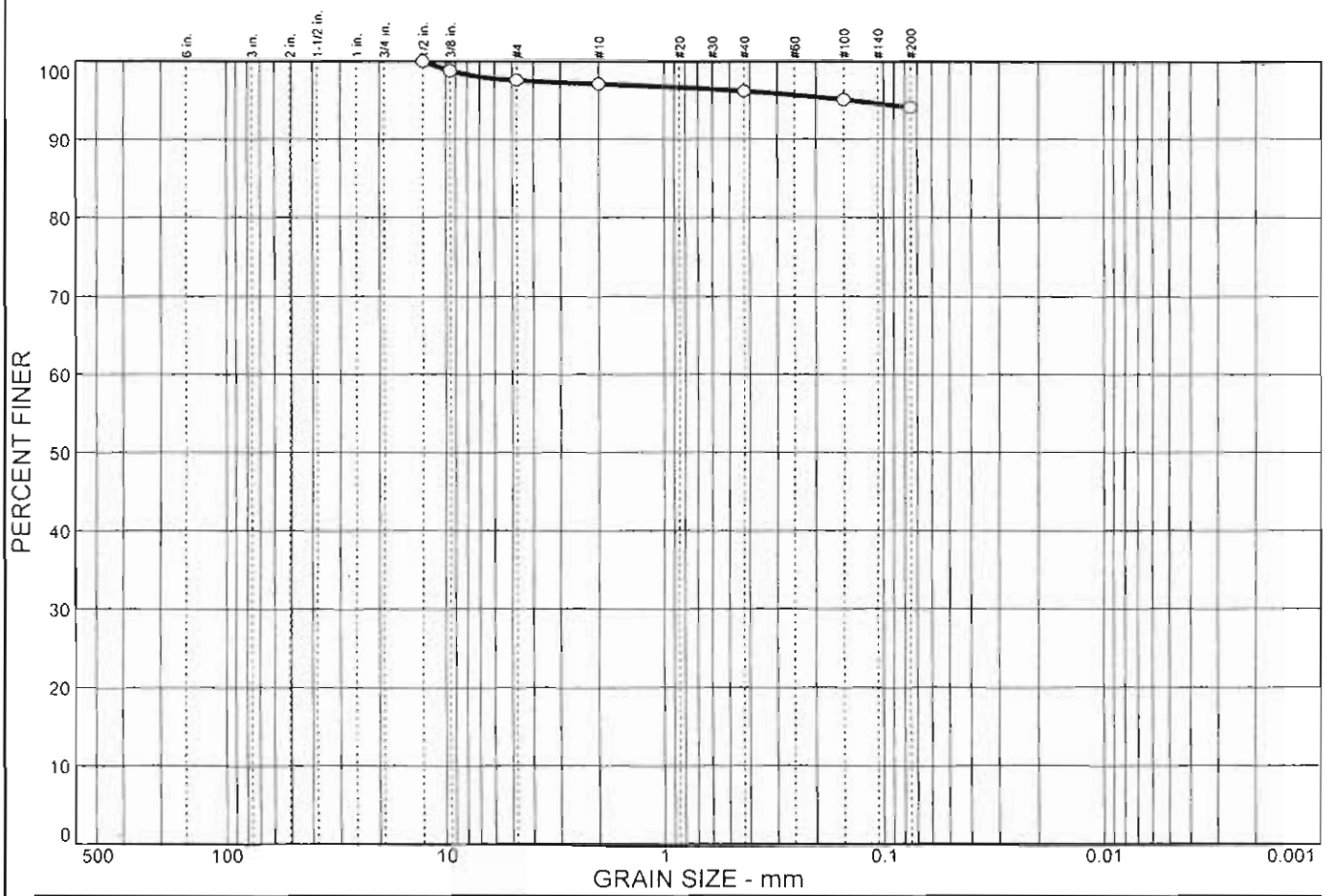
JACA & SIERRA TESTING LABORATORIES

LISELLE VEGA CORTES, MSCE, EIT

PO Box 363116, San Juan, PR 00936-3116
Road 850 Km 0.2 Las Cuevas Ward, Trujillo Alto, PR 00976
☎ 787-761-2570 787-748-6970 www.jacasierra.com

sm

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	2.4	3.5	94.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5 in.	100.0		
.375 in.	98.8		
#4	97.6		
#10	97.1		
#40	96.2		
#100	95.1		
#200	94.1		

* (no specification provided)

Material Description

Reddish yellow, elastic silt, some clay trace gravel and sand

Atterberg Limits

PL= 32 LL= 53 PI= 21

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= MH AASHTO= A-7-5(24)

Remarks

Tested by: S.Perez-S.Martinez
Checked by: Liselle Vega Cortes, MSCE, EIT

Sample No.: Bo. 20 **Source of Sample:** Project Site **Date:** 4/02/08
Location: Caguas, PR **Elev./Depth:** (0' @ 7'-6")

JACA & SIERRA TESTING LABORATORIES

Client: Empresas V.R.M.
Project: Caguas Millenium Industrial Dev.-Caguas, PR
Project No: **Figure**

JACA & SIERRA
Testing Laboratories, Inc.
Geotechnical Engineers

April 9, 2008

EMPRESAS V.R.M.
PO BOX 20868
SAN JUAN, PR 00928

SUBJECT : CLASSIFICATION TEST RESULTS

Project	:	Caguas Millennium Industrial Dev.-Caguas, PR
Samples Secured and Transported by	:	Jaca & Sierra Testing Labs.
Source of Samples	:	Project Site-Caguas, PR Bo. 20 (39' @ 50'-6")
Date of Receipt of Test Samples	:	April 1, 2008
Dates Tests were Performed	:	April 2 to 9, 2008
Standard Test Methods Used	:	AASHTO M 145, ASTM D 3282 ASTM D 2487

Tests Results

Sample Description	:	White, silt trace sand.

A. Classification Test Results (ASTM D 2487, ASTM D 3282 and AASHTO M 145)

USCS Classification	:	ML
AASHTO Classification	:	A-7-5

Respectfully submitted,

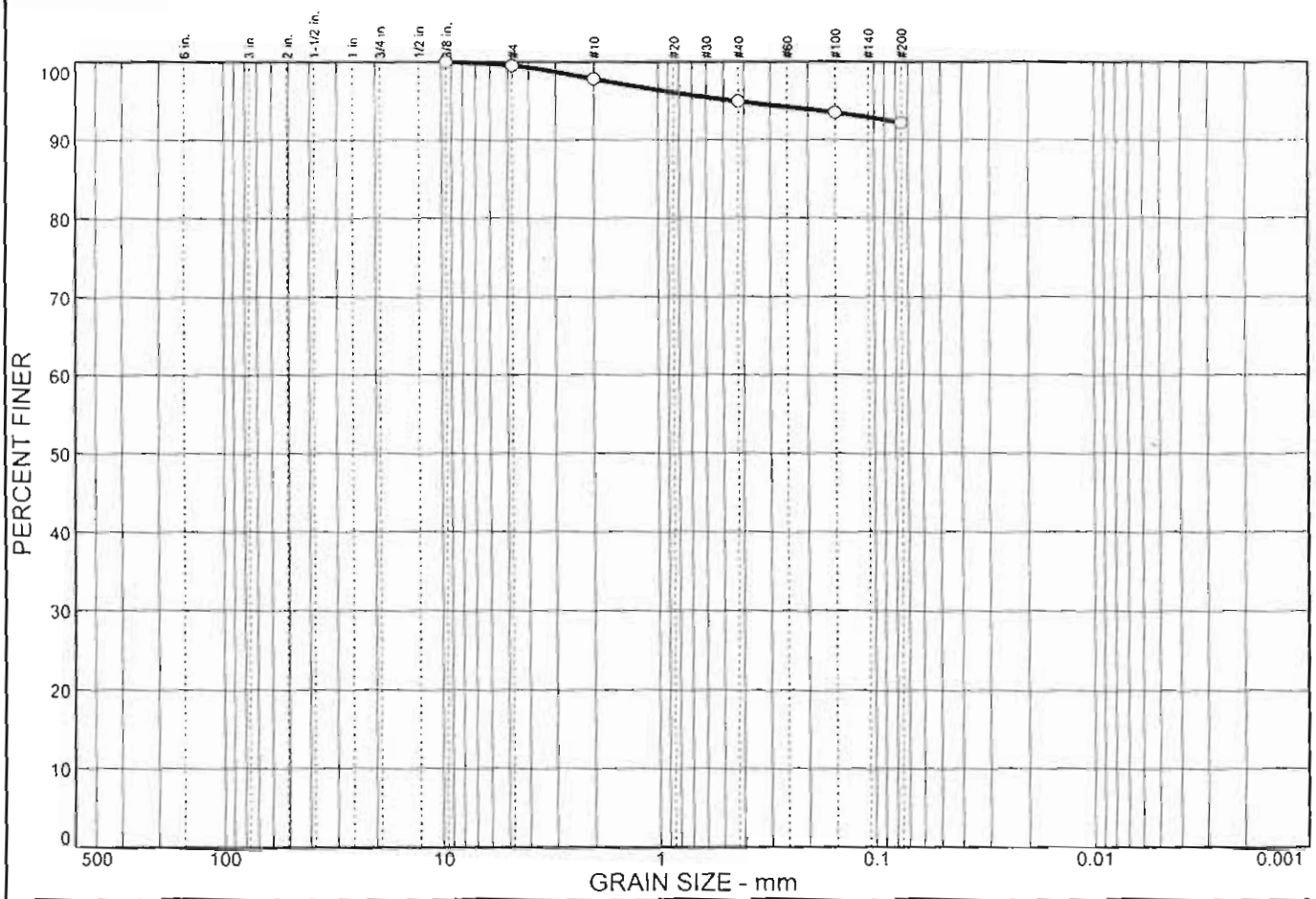
JACA & SIERRA TESTING LABORATORIES

LISELLE VEGA CORTES, MSCE, EIT

PO Box 363116, San Juan, PR 00936-3116
Road 850 Km 0.2 Las Cuevas Ward, Trujillo Alto, PR 00976
☎ 787-761-2570 787-748-6970 www.jacasierra.com

sm

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.5	7.3	92.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375 in.	100.0		
#4	99.5		
#10	97.8		
#40	94.9		
#100	93.5		
#200	92.2		

* (no specification provided)

Material Description

White, silt trace sand

Atterberg Limits

PL= 31 LL= 45 PI= 14

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

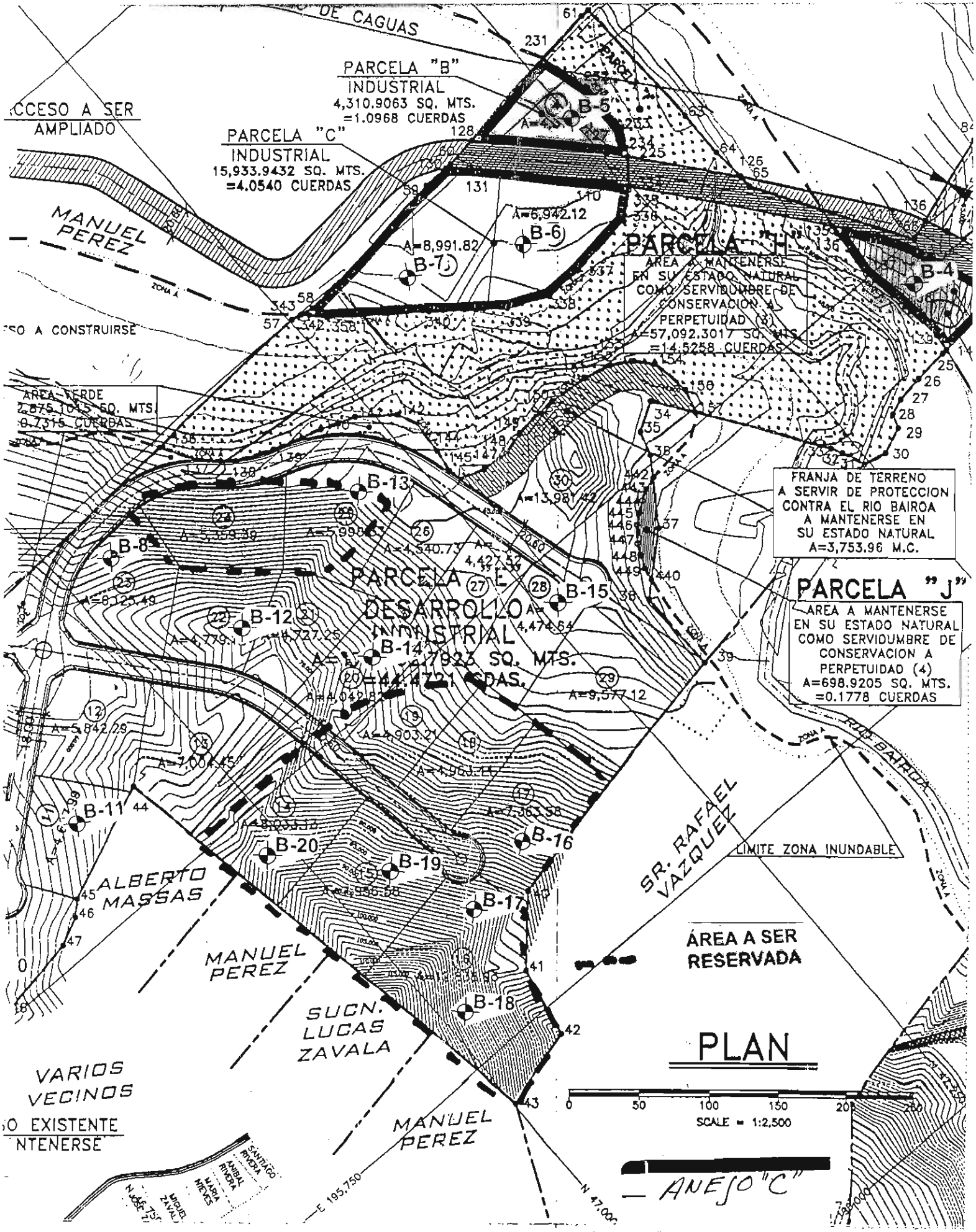
USCS= ML AASHTO= A-7-5(16)

Remarks

Tested by: S.Perez-S.Martinez
Checked by: Liselle Vega Cortes, MSCE, EIT

Sample No.: Bo. 20 **Source of Sample:** Project Site **Date:** 4/03/08
Location: Caguas, PR **Elev./Depth:** (39' @ 50'-6")

JACA & SIERRA TESTING LABORATORIES	**Client:** Empresas V.R.M. **Project:** Caguas Millenium Industrial Dev.-Caguas, PR **Project No:** **Figure**

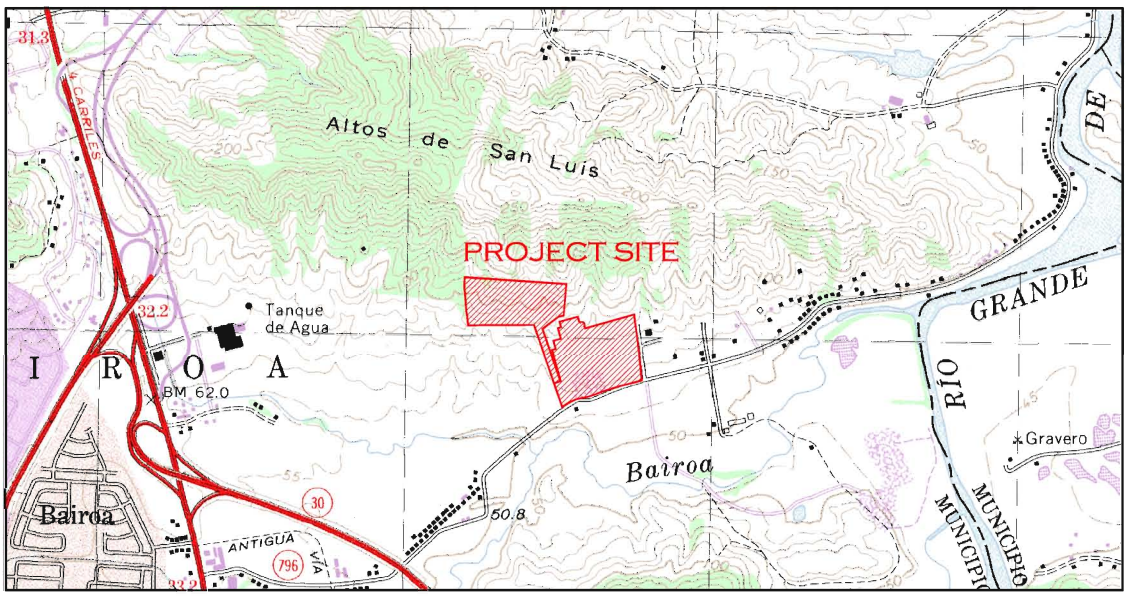

DE CAGUAS
PARCELA "B"
INDUSTRIAL
4,310.9063 SQ. MTS.
=1.0968 CUERDAS
PARCELA "C"
INDUSTRIAL
15,933.9432 SQ. MTS.
=4.0540 CUERDAS
ACCESO A SER
AMPLIADO
MANUEL
PEREZ
ZONA A
ESO A CONSTRUIRSE
PARCELA "H"
AREA A MANTENERSE
EN SU ESTADO NATURAL
COMO SERVIDUMBRE DE
CONSERVACION A
PERPETUIDAD (3)
A=57,092.3017 SQ. MTS.
=14.5258 CUERDAS
AREA VERDE
2,875.1045 SQ. MTS.
0.7315 CUERDAS
FRANJA DE TERRENO
A SERVIR DE PROTECCION
CONTRA EL RIO BAIROA
A MANTENERSE EN
SU ESTADO NATURAL
A=3,753.96 M.C.
PARCELA "J"
AREA A MANTENERSE
EN SU ESTADO NATURAL
COMO SERVIDUMBRE DE
CONSERVACION A
PERPETUIDAD (4)
A=698.9205 SQ. MTS.
=0.1778 CUERDAS
PARCELA "L"
DESARROLLO
INDUSTRIAL
SQ. MTS.
=44.4721 CDAS.
RIO BAIROA
SR. RAFAEL
VAZQUEZ
LIMITE ZONA INUNDABLE
ALBERTO
MASSAS
MANUEL
PEREZ
SUCN.
LUCAS
ZAVALA
VARIOS
VECINOS
ÁREA A SER
RESERVADA
PLAN
SCALE = 1:2,500
ANEJO "C"
E 195,750
N 47,000

ANEJO 8

Estudio hidrológico-hidráulico Caguas Milenio

Bairoa Development Corp.
Caguas, Puerto Rico

HYDROLOGIC-HYDRAULIC STUDY
CAGUAS MILENIO
CAGUAS, PUERTO RICO



Revised-April 2008

CA Engineering
PO BOX 190332, San Juan, PR 00919-0332
Phone: (787) 748-6106 Fax: (787) 780-0409
Website: http//:www.ca-eng.com
E-mail: ancallec@caribe.net

TABLE OF CONTENTS

I. INTRODUCTION 1

PURPOSE OF STUDY 1
AUTHORIZATION 2
APPROACH 2

II. PROJECT BACKGROUND 3

LOCATION 3
TOPOGRAPHY 3
WATER BODIES 3
FLOODING 3
FIELD WORK 3
FORMER STUDIES 4
STUDY LEVEL 4

III. HYDROLOGIC ANALYSIS 5

METHODOLOGY 5
DRAINAGE AREAS 5
CURVE NUMBERS 5
LAG TIME 6
RAINFALL DATA 6
DEPTH-AREA ADJUSTMENT 7
TIME DISTRIBUTION OF RAINFALL 7
RAINFALL EXTRACTION 7
HYDROLOGIC RESULTS 8

IV. RUNOFF MITIGATION ANALYSIS 10

APPROACH 10
METHODOLOGY 10
DEPTH-VOLUME RELATIONS 10
FLOW – DEPTH RELATIONS 10
RESULTS 11
MITIGATION STRUCTURE DIMENSIONS AND ACCESSORIES 13

V. HYDRAULIC ANALYSIS 14

HYDRAULIC ANALYSIS 14

OUTLET CONTROL COMPUTATIONS 16
EMERGENCY OVERFLOW 17

VI. CONCLUSIONS AND RECOMMENDATIONS 18

STUDY LIMITS 19

VII. BIBLIOGRAPHY 20

TABLE OF CONTENTS i

LIST OF FIGURES iii

LIST OF APPENDIXES iv

LIST OF FIGURES

FIGURE 1. Location Map

FIGURE 2. Proposed Development Layout

FIGURE 3. Topography for Existing Condition

FIGURE 4. Existing Condition Drainage Areas

FIGURE 5. Proposed Condition Drainage Areas

FIGURE 6. Soils Group Map

FIGURE 7. FEMA's Flood Map

FIGURE 8. Location of Proposed Structures

FIGURE 9. Schematics of the Detention Pond

FIGURE 10. Location of Cross Sections

FIGURE 11. Special Entrance Structure Schematic Design

LIST OF APPENDIXES

APPENDIX A. Hydrologic Parameters Estimation

APPENDIX B. Hydrologic Analysis Results for Existing Condition

APPENDIX C. Hydrologic Analysis Results for Proposed Condition

APPENDIX D. Flow-Depth-Volume Relations for the Detention Structure

APPENDIX E. Hydrologic Analysis Results for Proposed Condition w/Mitigation

APPENDIX F. Hydraulic Analysis Results

APPENDIX G. Field Work

APPENDIX H. Copy of the DRNA Letter of Endorsement

HYDROLOGIC-HYDRAULIC STUDY
CAGUAS MILENIO DEVELOPMENT
CAGUAS, PUERTO RICO

Casiano Ancalle, P.E.

Revised April, 2008

I. INTRODUCTION

This amendment was made in order to resize the proposed drainage structures due to the modifications on the project stages of construction and the relocation of the proposed detention pond. The original HH study submitted to the Department of Environment and Natural Resources (DRNA) has been revised in Amendment No. 1 conforming the DRNA comments. This amendment has been granted endorsement of the DRNA on December 28, 2007. Copy of this letter of endorsement is included in Appendix H.

A housing development project named Caguas Milenio is to be constructed in the Municipality of Caguas. The site is located at state road PR-796, aside east Caguas Regional Wastewater Treatment Plant, in the Municipality of Caguas. The project consists on housing units and a recreational facilities.

The project site is not considered floodable for the 100-year rainfall event by the regulatory flood maps. Offsite storm watercourses run through the project site.

The development of the site is going to increase runoff. This increase has to be mitigated according to the stipulations of the Puerto Rico Planning Board Regulation No. 3.

Purpose of Study

The purpose of the study is to size a runoff discharge detention structure to mitigate the increment in runoff discharge due to the development. The study will also perform the hydraulic analysis for sizing the offsite drainage pipes.

Authorization

Eng. José A. Melendez, on behalf of the owner, authorized this study under a contract signed with Eng. Casiano Ancalle, principal of CA Engineering.

Approach

The following steps have been undertaken throughout the study:

Hydrologic Analysis: The following parameters were determined for the hydrologic analysis: drainage areas, average soil curve number and runoff lag time. Based on these parameters, discharge for 100-years frequency storm was determined for existing and proposed conditions. HEC-1 model was used. More recurrent rainfall discharges were also estimated.

Detention Analysis: A detention analysis was made in order to size a structure that would counteract the increment in runoff discharge due to the development. HEC-1 model was used for the detention analysis. Discharges for 2-, 10-, 25-, 50-, and 100-year frequencies were analyzed for mitigation.

Hydraulic Analysis: Hydraulic computations were made for sizing the hydraulic structures that will be used at the project. COE's HECRAS model as used.

Conclusions and recommendations were elaborated.

II. PROJECT BACKGROUND

Location

The project site is located at state road PR-796, right east of the Caguas Regional Wastewater Treatment Plant, in the Municipality of Caguas. The site bounds north with a steep land lo be left undeveloped, south with state road PR-796, east with the property of the American Legion and west with the Caguas Regional Wastewater Treatment Plant. Figure 1 shows the approximate location of the site in the USGS quadrangle and Figure 2 shows a layout of the proposed project.

Topography

The site slopes from north to south. Ground elevations at the site vary between 130 m. to 59 m. Figure 3 shows the existing topography of the project site.

Water Bodies

There are no water bodies crossing the project site. Offsite storm watercourses run across the site. These storm watercourses will be routed through the site.

Flooding

From the regulatory point of view, the project site is not zoned as floodable. Figure 7 shows FEMA's Flood Map, Sheet 0745H issued on April 19, 2005.

Field Work

Field data used in this study has been provided by Eng. José A. Melendez. Results obtained in this study are strictly based on this information. Fieldwork is enclosed as Appendix G in a pocket at the back cover of this study

Former Studies

No hydrologic-hydraulic studies for the area of the project have been found during the information research. This study is original in its conception, and the results found are correspondent to the parameters adopted during the hydrologic and hydraulic simulation.

Study Level

This study is intended as an aid to the design engineer in the preparation of the construction drawings for the recommended structures. Figures, schematics and drawings must not be used as construction drawings. The design engineer must elaborate the construction drawings in agreements with the recommendations of this study.

III. HYDROLOGIC ANALYSIS

Methodology

The computer program entitled Flood Hydrograph Package (HEC-1) developed by the U.S. Army Corps of Engineers [1990] was used for the hydrologic analysis. Using this program, the Unit Hydrograph method and the Runoff Curve Number (CN) method, both developed by the Soil Conservation Service (SCS), were applied to determine the design hydrograph. This was computed by a process of translating the rainfall excess into a runoff hydrograph known as convolution.

Peak discharges ranging in frequencies from 2-, 10-, 25-, 50- and 100-year were estimated for the existing and proposed condition.

Drainage Areas

At existing condition, the project site has two drainage areas: P1 with 12.41 acres and P2 with 15.68. For the purpose of the analysis, Area P1 has been subdivided in P1a, P1b, and P1c. Apart from the project site drainage areas, four (4) offsite drainage areas has been identified: E1a with 7.64 acres, E1b with 6.25 acres, E2 with 17.93 acres and E3 with 1.07 acres. At proposed condition, Area P1 has been subdivided in P1A and P1B; the first to be discharged into the storm watercourse exiting the site towards PRASA's WWTP, and the second to be conveyed to the proposed detention pond. Area P2 have also been subdivided in P2A, P2B and P2C according to the project layout. Area P2A discharges to PRASA system and areas P2B and P2C to the detention pond. The drainage areas configuration is shown in Figures 4 and 5, for existing and proposed condition, respectively.

Curve Numbers

The Hydrologic Soil Group (HSG) for the site was obtained from the US Soil Conservation Service (SCS) maps. Curve Number for existing condition was estimated virtue of the soil use as per the site inspection and the soils classification of the SCS's Soil Survey of San Juan Area of Puerto Rico. Weighted Curve Number (CN) values were obtained for the project site

assuming the Antecedent Moisture condition (AMC) II. A CN of 93 was adopted for proposed condition. Appendix A shows the physiographic characteristics of the watershed and the weighted Curve Number (CN) estimations. Figure 6 shows the portion of the soil map corresponding to the watershed and project area.

Lag Time

The lag time was estimated as sixty percent of the time of concentration as estimated by the formula of Kirpitch.

$$Tc = 0.0078L^{0.77}/S^{0.385}$$

where:

L	=	channel length (ft)
S	=	channel slope
Tc	=	Time of concentration in min

Rainfall Data

The variation of rainfall volume with time was required as part of the storm input for the SCS Curve Number method. Therefore, the development of a design storm with a rainfall frequency and duration was necessary to compute the design hydrograph for the watershed. Rainfall data used in this study was obtained from NOAA's National Weather Service Atlas 14. The rainfall depths for 100, 50, 25, 10 and 2-years frequency for several durations was used and are shown in Table 1. Details of the rainfall depth information are shown in Appendix A.

Table 1
Rainfall for 2, 10, 25, 50 & 100 years

Duration *Hrs.*	**Precipitation** *Inches*				
	2-yr	***10-yr***	***25-yr***	***50-yr***	***100-yr***
0.083	0.45	0.65	0.74	0.82	0.89
0.25	0.78	1.13	1.31	1.43	1.56
1	1.86	2.70	3.10	3.40	3.70
2	2.61	4.01	4.76	5.35	5.94
3	2.81	4.51	5.45	6.18	6.93
6	3.37	5.85	7.25	8.37	9.53
12	3.91	7.25	9.26	10.89	12.63
24	4.59	8.86	11.51	13.68	16.03

Depth-Area Adjustment

Point rainfall estimates obtained from NOAA's National Weather Service, ATLAS 14 represent values for areas up to 10 mi^2; therefore, a depth-area adjustment should be applied to the rainfall data when the watershed area is greater. In this case, the watershed consists of 0.0953 mi^2. Hence, this adjustment was not applied.

Time Distribution of Rainfall

The triangular type methodology was used to distribute the rainfall depth in time. This method is considered acceptable for small areas.

Rainfall Extraction

Rainfall extraction such as the vegetative interception, the depressional storage, and the infiltration were estimated using the SCS's Runoff Curve Number method. Though this method is used to predict runoff volume directly, the rainfall extraction is incorporated in the model as function of the curve number of the watershed.

Hydrologic Results

Following HEC-1 methodology, peak discharges were determined from the hydrographs developed for existing and proposed condition for the project site.

Input and output data for the HEC-1 model are included in Appendix B and C, respectively, for existing and proposed condition. Table 2 shows the results of the hydrologic runs.

Table 2
Peak Discharges

AREA		Peak Discharge, cfs				
		2-yr	10-yr	25-yr	50-yr	100-yr
Existing	E1A	30	49	57	63	69
	P1A	33	52	60	67	73
	COMB1 (P1A+E1A)	63	100	117	130	142
	E1B	25	40	47	52	57
	P1B	15	24	29	32	35
	E3	4	7	8	9	10
	COMB2 (E3+P1B+E1B)	45	71	83	93	101
	COMB3 (COMB1+COMB2)	108	172	200	223	244
	E2	72	114	133	148	162
	P2	63	100	116	130	142
	P1C	2	3	3	4	4
	COMB4 (P1C+P2+E2)	136	217	253	281	308
Proposed	E1A	30	49	57	63	69
	E1B	25	40	47	52	57
	P1A	18	27	32	35	38
	E3	4	7	8	9	10
	P2A	4	6	7	8	8
	COMB1 (P2A+E3+P1A+E1B+E1A)	82	129	150	166	182
	E2	72	114	133	148	162

	P2C	38	57	66	73	80
	COMB2 (E2+P2C)	109	171	199	221	242
	P1B	33	50	58	64	69
	P2B	26	40	46	50	55
	COMB3 (P1B+P2B)	59	89	103	114	124
	COMB4 (COMB2+COMB3)	168	261	302	335	366

From the inspection of Table 2, the peak discharge for proposed condition, at the project site, is higher than that of the existing condition. The increment in discharge has to be mitigated as required by Puerto Rico Planning Board Regulation No. 3.

IV. RUNOFF MITIGATION ANALYSIS

The development of the site will increase the runoff discharge. The Puerto Rico Planning Board Regulation No. 3 requires a flow mitigation structure wherever an increase in discharge is produced. Therefore, a flow detention structure will be included in the project.

Approach

The project site will be provided with a detention pond. This pond will reduce the combined peak discharge of the project drainage area to a magnitude below the discharge at existing condition. The pond will be located at the southeastern limit of the developed area. See Figure 8.

Methodology

The computer program HEC-1 provides means for routing a hydrograph through detention structures. The purpose of detention is that the proposed condition peak discharge does not exceed the existing condition peak discharge.

Depth-Volume Relations

The detention pond will have a base area of 671 square meters. Appendix D includes a spreadsheet with the volume to depth relation computations.

Flow – Depth Relations

The control structure for the pond consists on three-36" diameter orifices located at the bottom of the pond and a 16.4-feet long weir located 2.00 meters above the pond bottom. See Appendix D for computations.

Results

The results of the detention analysis show that the proposed detention pond provides appropriate runoff mitigation for the 100-year frequency discharges. Routing the discharge through the detention pond, the 100-year discharge at the project was reduced from 366 cfs to 269 cfs, which is less than the discharge computed for existing condition (308 cfs); thus complying with the Puerto Rico Planning Board Regulation No.3. Mitigation for more recurrent discharges was also verified.

Input and output data for the HEC-1 mitigation model are included in Appendix E. Table 3 shows the comparison of the resulting discharges for three conditions: existing, proposed and proposed with mitigation.

Table 3
Peak Discharges results for Existing, Proposed and Mitigation

AREA		Peak Discharge, cfs				
		2-yr	10-yr	25-yr	50-yr	100-yr
Existing	E1A	30	49	57	63	69
	P1A	33	52	60	67	73
	COMB1 (P1A+E1A)	63	100	117	130	142
	E1B	25	40	47	52	57
	P1B	15	24	29	32	35
	E3	4	7	8	9	10
	COMB2 (E3+P1B+E1B)	45	71	83	93	101
	COMB3 (COMB1+COMB2)	108	172	200	223	244
	E2	72	114	133	148	162
	P2	63	100	116	130	142
	P1C	2	3	3	4	4
	COMB4 (P1C+P2+E2)	136	217	253	281	308

Proposed	E1A	30	49	57	63	69
	E1B	25	40	47	52	57
	P1A	18	27	32	35	38
	E3	4	7	8	9	10
	P2A	4	6	7	8	8
	COMB1 (P2A+E3+P1A+E1B+E1A)	82	129	150	166	182
	E2	72	114	133	148	162
	P2C	38	57	66	73	80
	COMB2 (E2+P2C)	109	171	199	221	242
	P1B	33	50	58	64	69
	P2B	26	40	46	50	55
	COMB3 (P1B+P2B)	59	89	103	114	124
	COMB4 (COMB2+COMB3)	168	261	302	335	366
Proposed w/Mitigation	E1A	30	49	57	63	69
	E1B	25	40	47	52	57
	P1A	18	27	32	35	38
	E3	4	7	8	9	10
	P2A	4	6	7	8	8
	COMB1 (P2A+E3+P1A+E1B+E1A)	82	129	150	166	182
	E2	72	114	133	148	162
	P2C	38	57	66	73	80
	COMB2 (E2+P2C)	109	171	199	221	242
	P1B	33	50	58	64	69
	P2B	26	40	46	50	55
	COMB3 (P1B+P2B)	59	89	103	114	124
	COMB4 (COMB2+COMB3)	168	261	302	335	366
	POND	130	191	217	238	269

Mitigation Structure Dimensions and Accessories

The maximum water stage at the pond for the 100-yr peak will be 2.17m (7.13 ft). Final dimensions for the pond will include a minimum free board of 0.60 meters. Then, the detention pond will have the characteristics shown in Table 4.

Table 4
Detention Structure Characteristics

	Description	Pond
Pond Dimensions	Base Area	671 m^2
	Height	2.77 m
Outlet Accessories	Orifices@ bottom	Three (3)-36”ø
Outlet Chamber Discharge	Weir Width	5.00m @ 2.00m above bottom
	Open Rectangular Channel	5.00m wide

Schematic layout of the detention pond is presented in Figure 9.

V. HYDRAULIC ANALYSIS

A hydraulic analysis was made for sizing the main storm watercourse that will convey the offsite discharge through the site. This main will also serve for colleting the local discharge.

The hydraulic analysis was made by using the mathematical model HEC-RAS developed by the US Corps of Engineers. The friction coefficient used in the modeling was obtained from visual inspection of the existing structures; and cross-checked with the typical values provided by Barnes (1967) and Chow (1959). Manning coefficient adopted for the piping system was 0.013. Cross sections for analysis were located as shown in Figure 10. Coefficients of contraction and expansion used are those recommended by the HEC-RAS user's manual. Thus, coefficients of 0.1 and 0.3 respectively were used for gradual transitions.

Hydraulic Analysis

The storm drainage system consists on two sub-systems, both discharging into the detention pond. The sub-system that serves Project Area P2 consists on a 42-inch diameter pipe telescoping to a 60-inch pipe (Note that the entrance into the 42-inch pipe is a special structure having a 60-inch diameter mouth to reduce inlet control. (See Figure 11). And the sub-system for Area P1 is of 30-inch diameter pipe telescoping to 36-inch diameter. The two sub-systems merge at the road crossing to be conveyed to the detention pond by a 72-inch diameter pipe

The hydraulic analysis was made for a 100-year discharge. Appendix F includes the computer output of the hydraulic analysis. Table 5 shows the summary of the results.

Table 5
Hydraulic Analysis Results for 100-years Discharge

River	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	Vel Chnl	Flow Area	Top Width	Froude # Chl
					(m3/s)	(m)	(m)	(m)	(m)	(m/s)	(m2)	(m)
two	19.1	100-yrs	Proposed	1.96	81.05	83.91		83.91	0.34	5.71	2.00	0.06
two	19	100-yrs	Proposed	1.96	81.05	83.91	81.51	83.91	0.34	5.71	2.00	0.06
two	18.6			Culvert								
two	18.1	100-yrs	Proposed	1.96	74.90	75.42	75.36	75.60	1.89	1.04	2.00	0.84
two	18	100-yrs	Proposed	1.96	74.90	75.36	75.36	75.59	2.13	0.92	2.00	1.01
two	17.6			Culvert								
two	17.1	100-yrs	Proposed	1.96	70.12	72.21		72.22	0.46	4.70	8.00	0.10
two	17	100-yrs	Proposed	1.96	70.12	72.21	70.58	72.22	0.46	4.70	8.00	0.10
two	16.6			Culvert								
two	16.1	100-yrs	Proposed	1.96	64.48	65.00	64.94	65.18	1.89	1.04	2.00	0.84
two	16	100-yrs	Proposed	1.96	64.48	64.94	64.94	65.17	2.13	0.92	2.00	1.00
two	15.6			Culvert								
two	15.1	100-yrs	Proposed	1.96	58.53	61.03		61.03	0.34	6.53	8.00	0.07
two	15	100-yrs	Proposed	3.51	58.33	61.02	59.01	61.03	0.58	6.84	8.00	0.11
two	14.6			Culvert								
two	14.1	100-yrs	Proposed	3.51	56.98	59.33		59.34	0.60	6.77	8.00	0.13
two	14	100-yrs	Proposed	3.51	56.98	59.33	57.66	59.34	0.60	6.77	8.00	0.13
two	13.6			Culvert								
two	13.1	100-yrs	Proposed	3.51	56.37	59.15		59.17	0.56	7.09	8.00	0.11
two	13	100-yrs	Proposed	3.51	56.37	59.15	57.05	59.17	0.56	7.09	8.00	0.11
two	12.9			Culvert								
two	12.8	100-yrs	Proposed	3.51	54.66	58.26		58.27	0.49	7.20	2.00	0.08
three	5	100-yrs	Proposed	10.37	54.66	58.22	55.72	58.27	0.96	10.83	3.04	0.16
three	4.6			Culvert								
three	4.1	100-yrs	Proposed	10.37	54.40	57.22		57.30	1.21	8.58	3.04	0.23
three	4	100-yrs	Proposed	10.37	54.40	57.22	55.45	57.30	1.21	8.58	3.04	0.23
three	3			Culvert								
three	2.1	100-yrs	Proposed	10.37	52.33	55.13		55.21	1.20	8.93	6.00	0.23
three	2	100-yrs	Proposed	10.37	52.33	55.13	53.38	55.21	1.20	8.93	6.00	0.23
three	1.5			Culvert								
three	1	100-yrs	Proposed	10.37	51.70	52.76	52.76	53.29	3.23	3.21	3.04	1.00
one	12.1	100-yrs	Proposed	4.59	78.50	80.35		80.35	0.16	28.80	24.37	0.05
one	12	100-yrs	Proposed	4.59	78.50	80.35	78.97	80.35	0.16	28.80	24.37	0.05
one	11.6			Culvert								
one	11.1	100-yrs	Proposed	4.59	74.73	76.97		77.02	1.03	4.47	2.00	0.22
one	11	100-yrs	Proposed	4.59	74.73	76.97	75.54	77.02	1.03	4.47	2.00	0.22
one	10.6			Culvert								
one	10.1	100-yrs	Proposed	4.59	73.61	75.85		75.90	1.03	4.47	2.00	0.22
one	10	100-yrs	Proposed	4.59	73.61	75.85	74.42	75.90	1.03	4.47	2.00	0.22
one	9.6			Culvert								
one	9.1	100-yrs	Proposed	4.59	70.00	72.17		72.23	1.06	4.36	8.00	0.23
one	9	100-yrs	Proposed	4.59	70.00	72.17	70.81	72.23	1.06	4.36	8.00	0.23
one	8.6			Culvert								
one	8.1	100-yrs	Proposed	4.59	65.00	67.17		67.22	1.02	4.93	8.00	0.22
one	8	100-yrs	Proposed	4.59	65.00	67.17	65.81	67.22	1.02	4.93	8.00	0.22
one	7.6			Culvert								
one	7.1	100-yrs	Proposed	4.59	60.15	61.92		62.00	1.30	3.53	2.00	0.31
one	7	100-yrs	Proposed	4.59	60.15	61.92	60.96	62.00	1.30	3.53	2.00	0.31
one	6.6			Culvert								
one	6.1	100-yrs	Proposed	4.59	55.45	59.65		59.65	0.26	18.58	8.00	0.04
one	6	100-yrs	Proposed	6.86	55.45	59.64	56.51	59.65	0.38	18.55	8.00	0.06
one	5.6			Culvert								
one	5.1	100-yrs	Existing	8.62	57.44	58.91		58.94	0.83	12.02	16.00	0.22
one	5.1	100-yrs	Proposed	6.86	54.66	58.22		58.27	0.96	7.13	2.00	0.16
one	5	100-yrs	Existing	8.62	57.44	58.91	58.51	58.94	0.83	12.02	16.00	0.22
three	5	100-yrs	Proposed	10.37	54.66	58.22	55.72	58.27	0.96	10.83	3.04	0.16
three	4.6			Culvert								
one	4.1	100-yrs	Existing	8.62	57.00	58.23	58.23	58.86	3.49	2.47	2.00	1.00
three	4.1	100-yrs	Proposed	10.37	54.40	57.22		57.30	1.21	8.58	3.04	0.23
one	4	100-yrs	Existing	8.62	57.00	57.89	57.89	58.18	2.82	3.91	6.80	0.95
three	4	100-yrs	Proposed	10.37	54.40	57.22	55.45	57.30	1.21	8.58	3.04	0.23
three	3			Culvert								
three	2.1	100-yrs	Proposed	10.37	52.33	55.13		55.21	1.20	8.93	6.00	0.23
three	2	100-yrs	Proposed	10.37	52.33	55.13	53.38	55.21	1.20	8.93	6.00	0.23
three	1.5			Culvert								
three	1	100-yrs	Proposed	10.37	51.70	52.76	52.76	53.29	3.23	3.21	3.04	1.00

Note that Table 5 additionally includes water surface elevations for existing condition at sections 4, 4.1, 5 and 5.1 of River 1. This was made for purposes of comparison; because of the weir flow resulting at Section 5 of the proposed condition. The comparison indicates that even in this case the water surface elevations at proposed condition are lower than those of the existing condition.

Outlet Control Computations

The HECRAS model subroutine for culverts used in the hydraulic analysis includes inlet control at all culverts. However, this is not the case in all. Once the inlet control is surpassed by the necessary head and the water is already inside the pipe, outlet control will prevail. Therefore and for overcoming this limitation, outlet control computations were made using the Manning formula. The following table shows the results.

Table 6

Outlet Control Computation Results

River	Sta	Profile	Q Total		Min Ch El	W.S.E.	Crit W.S.	E.G. Elev	Vel Chnl	Flow Area	Top Width	Froude	Inv. Slope	Diam.	Q Full
			(m3/s)	(cfs)	(m)	(m)	(m)	(m)	(m/s)	(m2)	(m)	# Chl		(inch)	(cfs)
two	19	100-yrs	1.96	69.15	81.05	83.91	81.51	83.91	0.34	5.71	2	0.06	0.0925	30	126
two	18	100-yrs	1.96	69.15	74.9	75.36	75.36	75.59	2.13	0.92	2	1.01	0.0773	30	115
two	17	100-yrs	1.96	69.15	70.12	72.21	70.58	72.22	0.46	4.7	8	0.1	0.0918	30	125
two	16	100-yrs	1.96	69.15	64.48	64.94	64.94	65.17	2.13	0.92	2	1	0.0873	30	122
two	15	100-yrs	3.51	123.83	58.33	61.02	59.01	61.04	0.58	6.9	8	0.11	0.0614	36	166
two	14	100-yrs	3.51	123.83	56.98	59.33	57.66	59.34	0.6	6.79	8	0.13	0.034	36	124
two	13	100-yrs	3.51	123.83	56.6	59.15	57.28	59.16	0.61	6.58	8	0.12	0.0465	36	145
one	12	100-yrs	4.59	161.94	78.5	80.35	78.97	80.35	0.16	28.8	24.37	0.05	0.0996	42	319
one	11	100-yrs	4.59	161.94	74.73	76.97	75.54	77.02	1.03	4.47	2	0.22	0.2443	42	1294
one	10	100-yrs	4.59	161.94	73.61	75.85	74.42	75.9	1.03	4.47	2	0.22	0.0801	42	286
one	9	100-yrs	4.59	161.94	70	72.17	70.81	72.23	1.06	4.36	8	0.23	0.0781	42	283
one	8	100-yrs	4.59	161.94	65	67.17	65.81	67.22	1.02	4.93	8	0.22	0.0878	42	300
one	7	100-yrs	4.59	161.94	60.15	61.92	60.96	62	1.3	3.53	2	0.31	0.1337	42	365
one	6	100-yrs	6.86	242.02	55.45	59.64	56.51	59.65	0.38	18.55	8	0.06	0.0125	60	292
three	5	100-yrs	10.37	365.85	54.66	58.22	55.72	58.27	0.96	10.83	3.04	0.16	0.0218	72	628
three	4	100-yrs	10.37	365.85	54.4	57.22	55.45	57.3	1.21	8.58	3.04	0.23	0.0684	72	1118
three	2	100-yrs	10.37	365.85	52.33	55.13	53.38	55.21	1.2	8.93	6	0.23	0.0688	72	1118

Emergency Overflow

The offsite discharge from area E2 will be provided with an emergency overflow way. The overflow will consist on a 4.00-meters wide overflow way that will allow water release to the street (Calle 2) in case of severe obstruction of the entrance structure. The schematic design of this structure is shown in Figure 11.

VI. CONCLUSIONS AND RECOMMENDATIONS

1. According to the regulatory flood maps, the project site is not considered floodable for the 100-year rainfall event.

2. The development of the site increases the peak discharge at the project site. A runoff mitigation structure is needed as per the PR Planning Board Regulation No. 3.

3. The proposed detention pond reduces the 100-year discharge at project site to a level less than that of the existing condition.

The following are the recommendations of this study:

1. A mitigation system consisting on a pond with 671 square meters base area addressed to mitigate the discharge runoff increment from the project site. The detention pond will have the characteristics indicated in Table 4 of this report.

2. During the construction, a permit from the owner must be obtained for the replacement of the existing 30-inch diameter pipe across PR-796, by the proposed 72-inches diameter pipes.

3. The discharge from offsite area E2 will be provided with an emergency overflow course to avoid flooding to the upstream housing units in case of a severe obstruction of the entrance structure into the 42-inch pipe that crosses project area P2.

4. The manhole at Section 6 in Sub-system 1 must be watertight; so that it can handle internal pressure and avoid overflow to the road during extraordinary rainfall events.

5. It is very important to prepare a long-term maintenance plan, which should include the proposed pond, inlets, the outlet structures and the receiving storm system inspection after each significant discharge events. Damages, if any, must be repaired promptly and properly.

Study Limits

All the recommendations specified in this study must be considered to assure the optimum performance of the proposed discharge mitigation pond. The design engineer will be responsible for elaborating the drawings in conformance with the recommendations of this study.

The results of this study are based on free flow conditions through the hydraulic structures. Proper maintenance must be developed to assure this condition. On the event of the occurrence of any severe obstruction to the flow, the results and recommendations may be impaired. Finally, results and recommendations included in this report must be used only and exclusively by the design engineer for the intended purposes as indicated in this study.

VII. BIBLIOGRAPHY

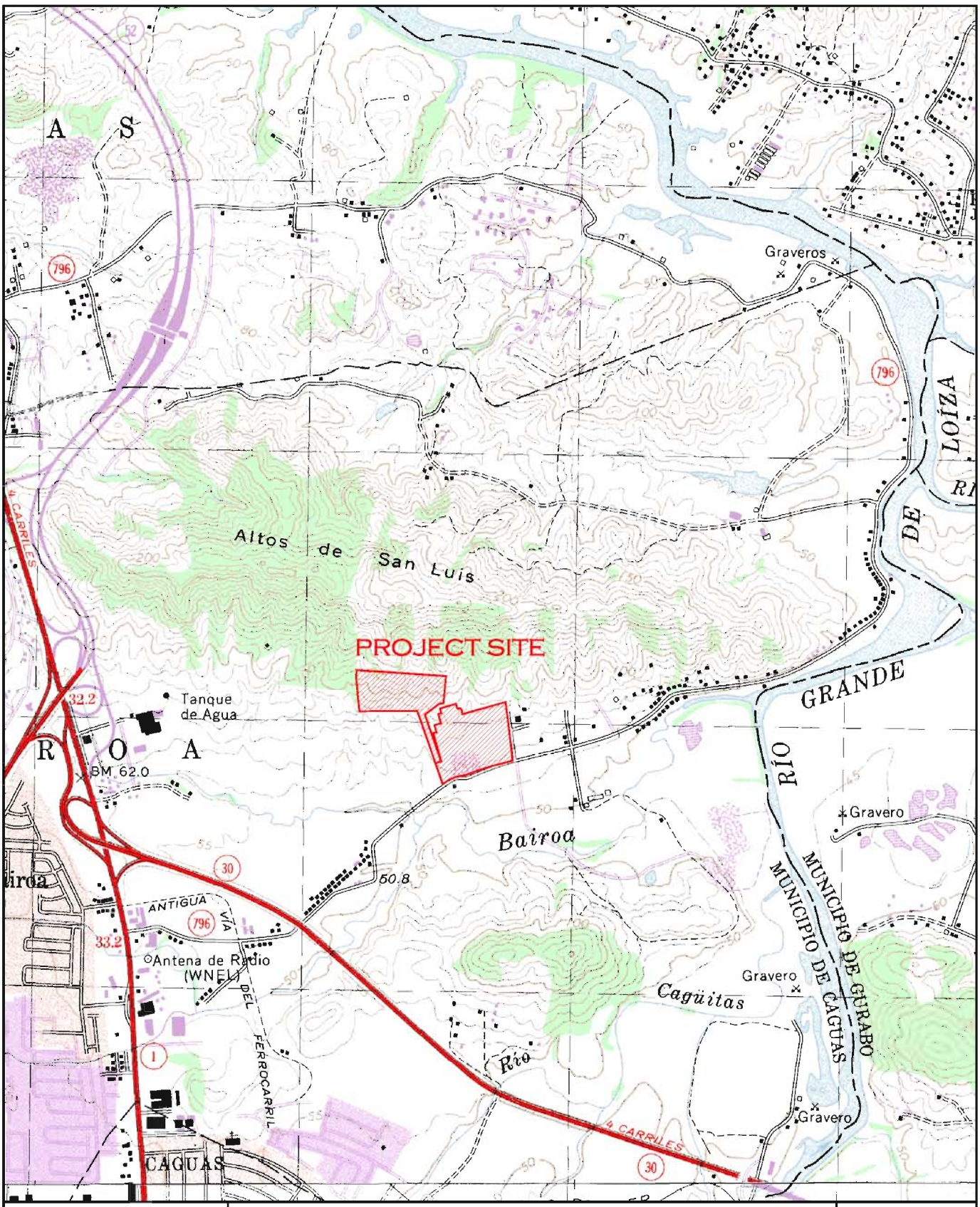
1. NOAA's National Weather Service, ATLAS 14, *Precipitation Frequency Data Server (PFDS).* Hydrometereological Design Studies Center.

2. P.R. Planning Board, 1992. *Reglamento sobre Zonas Susceptibles a Inundaciones.* Reglamento de Planificación Número 13. Estado Libre Asociado de Puerto Rico, Oficina del Gobernador.

3. Soil Conservation Service, 1978. *Soil Survey of San Juan Area of Puerto Rico.* U.S. Department of Agriculture.

4. U.S. Army Corps of Engineers, 1990. *Flood Hydrograph Package (HEC-1), User's Manual.* Hydrologic Engineering Center. Davis, California.

FIGURES

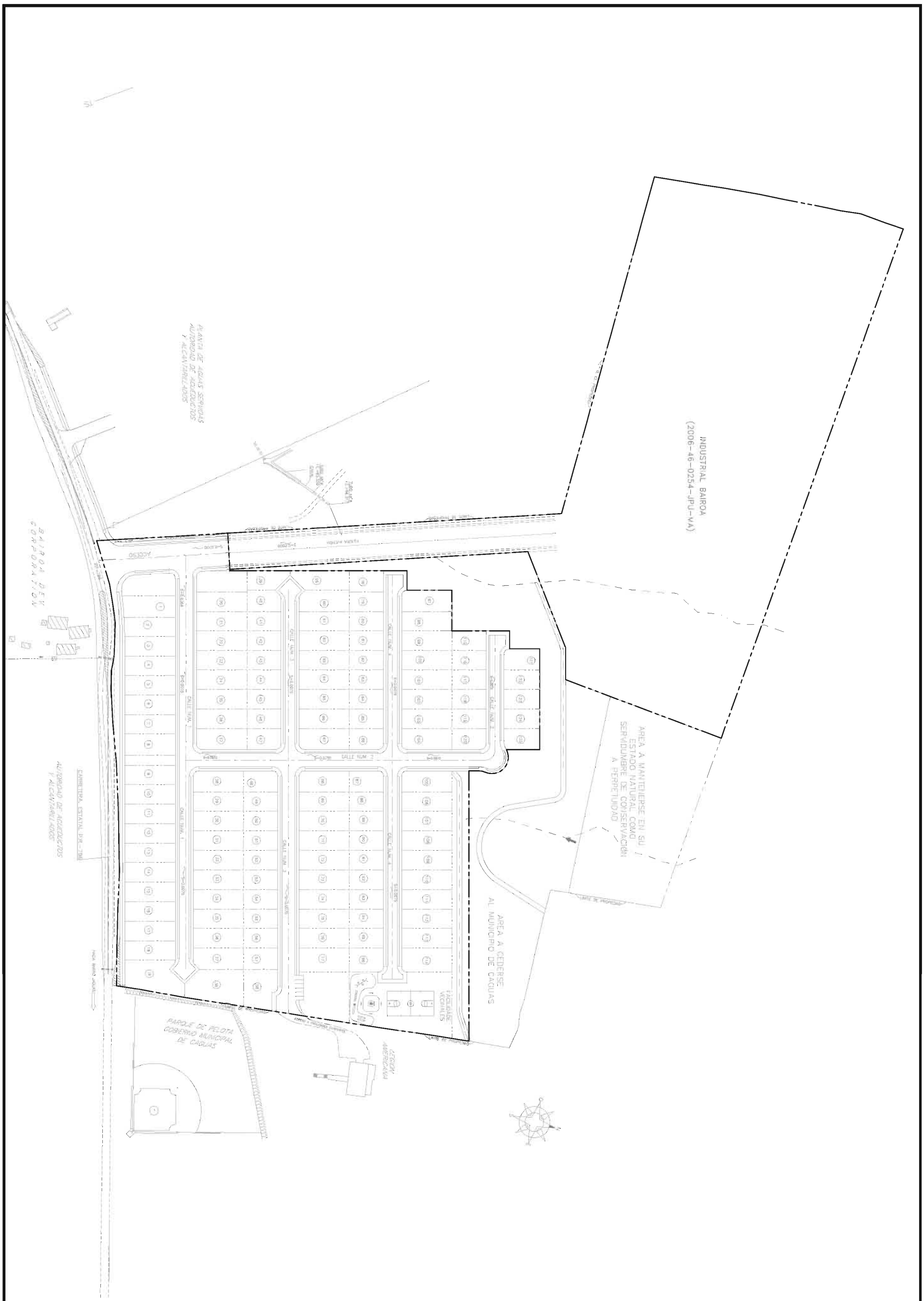


H/H STUDY - CAGUAS MILENIO, CAGUAS, P.R.

SCALE: 1:20,000

CA Engineering

FIGURE 1
LOCATION MAP



CA Engineering

SCALE: 1:2,300

H/H STUDY - CAGUAS MILENIO, CAGUAS, P.R.

FIGURE 2
PROPOSED DEVELOPMENT LAYOUT

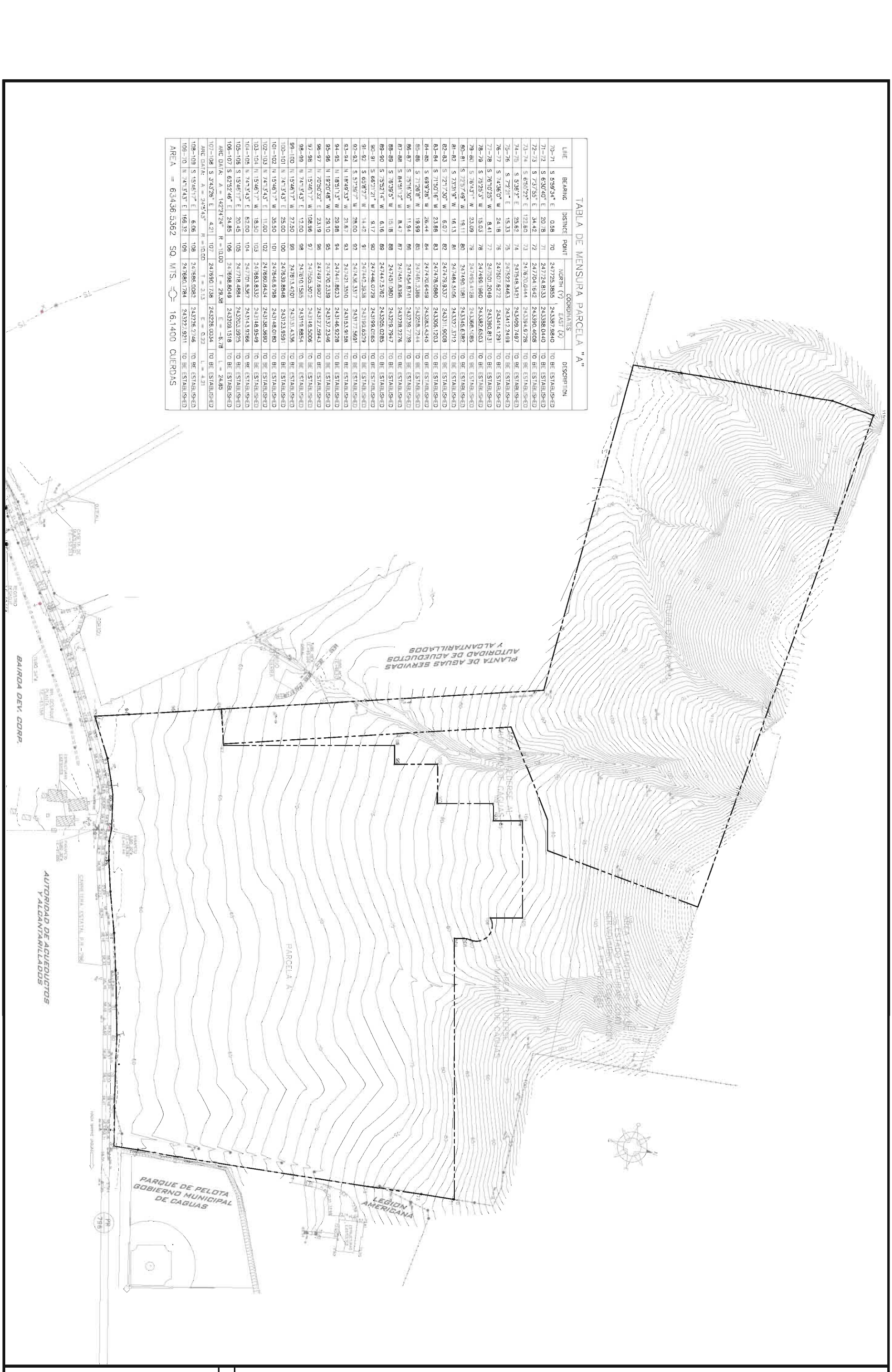


TABLA DE MENSURA PARCELA "A"

LINE	BEARING	DISTNCE	POINT	COORDINATES NORTH (Y)	COORDINATES EAST (X)	DESCRIPTION
70-71	S 5°59'34" E	0.58	70	247725.3855	243387.9840	TO BE ESTABLISHED
71-72	S 6°30'40" E	20.78	71	247724.8133	243388.0440	TO BE ESTABLISHED
72-73	S 73°7'55" E	34.42	72	247704.1642	243390.4008	TO BE ESTABLISHED
73-74	S 6°55'22" E	122.60	73	247670.0444	243394.6726	TO BE ESTABLISHED
74-75	S 5°36'2" E	25.62	74	247548.3421	243409.7497	TO BE ESTABLISHED
75-76	S 77°21'1" E	15.33	75	247522.8463	243412.2469	TO BE ESTABLISHED
76-77	S 74°36'0" W	24.18	76	247507.6272	243414.1291	TO BE ESTABLISHED
77-78	S 76°10'25" W	8.41	77	247501.2049	243390.8131	TO BE ESTABLISHED
78-79	S 75°25'3" W	15.03	78	247499.1960	243382.6503	TO BE ESTABLISHED
79-80	S 76°43'1" W	23.09	79	247495.4128	243368.1185	TO BE ESTABLISHED
80-81	S 72°57'49" W	19.11	80	247490.1081	243345.6382	TO BE ESTABLISHED
81-82	S 73°31'9" W	16.13	81	247484.5106	243337.3712	TO BE ESTABLISHED
82-83	S 72°17'30" W	6.07	82	247479.9337	243311.9008	TO BE ESTABLISHED
83-84	S 71°50'16" W	23.88	83	247478.0860	243306.1203	TO BE ESTABLISHED
84-85	S 69°9'28" W	26.44	84	247470.6439	243283.4345	TO BE ESTABLISHED
85-86	S 71°26'8" W	19.99	85	247461.1366	243258.7244	TO BE ESTABLISHED
86-87	S 75°16'30" W	11.84	86	247454.8741	243239.7739	TO BE ESTABLISHED
87-88	S 84°51'12" W	8.47	87	247451.8396	243228.2276	TO BE ESTABLISHED
88-89	S 76°39'5" W	15.18	88	247451.0801	243219.7947	TO BE ESTABLISHED
89-90	S 75°52'14" W	6.16	89	247447.5762	243205.0285	TO BE ESTABLISHED
90-91	S 66°21'21" W	9.17	90	247446.0729	243199.0765	TO BE ESTABLISHED
91-92	S 60°8'27" W	14.42	91	247442.9938	243190.6039	TO BE ESTABLISHED
92-93	S 57°39'7" W	28.00	92	247436.3317	243177.5691	TO BE ESTABLISHED
93-94	N 18°49'33" W	21.67	93	247421.3510	243153.9158	TO BE ESTABLISHED
94-95	N 18°51'13" W	29.98	94	247441.8623	243146.9228	TO BE ESTABLISHED
95-96	N 19°20'48" W	29.10	95	247470.2339	243137.2346	TO BE ESTABLISHED
96-97	N 70°50'32" E	23.19	96	247497.6907	243127.5943	TO BE ESTABLISHED
97-98	N 15°46'17" W	108.96	97	247505.3012	243149.5006	TO BE ESTABLISHED
98-99	N 74°13'43" E	12.00	98	247610.1585	243119.8854	TO BE ESTABLISHED
99-100	N 15°46'17" W	27.50	99	247613.4701	243131.4336	TO BE ESTABLISHED
100-101	N 74°13'43" E	25.00	100	247639.8848	243123.9591	TO BE ESTABLISHED
101-102	N 15°46'17" W	35.50	101	247646.6798	243148.0180	TO BE ESTABLISHED
102-103	N 74°13'43" E	11.00	102	247680.8434	243138.3680	TO BE ESTABLISHED
103-104	N 15°46'17" W	18.50	103	247683.8332	243148.9549	TO BE ESTABLISHED
104-105	N 74°13'43" E	62.00	104	247701.5367	243143.9766	TO BE ESTABLISHED
105-106	S 15°46'17" E	20.45	105	247718.4884	243700.5975	TO BE ESTABLISHED
106-107	S 62°52'46" E	24.85	106	247698.8049	243708.1518	TO BE ESTABLISHED
ARC DATA:	A = 142°24'24"	R = 10.00	T = 29.38		E = -6.78	L = 24.85
107-108	S 74°3'26" E	4.21	107	247690.1738	243726.0034	TO BE ESTABLISHED
ARC DATA:	A = 24°54'3"	R = 10.00	T = 2.13		E = 0.22	L = 4.21
108-109	S 15°46'17" E	6.06	108	247686.0082	243726.2746	TO BE ESTABLISHED
109-70	N 74°13'43" E	166.32	109	247680.1784	243722.9211	TO BE ESTABLISHED

AREA = 63436.5362 SQ. MTS. ± 16.1400 CUERDAS

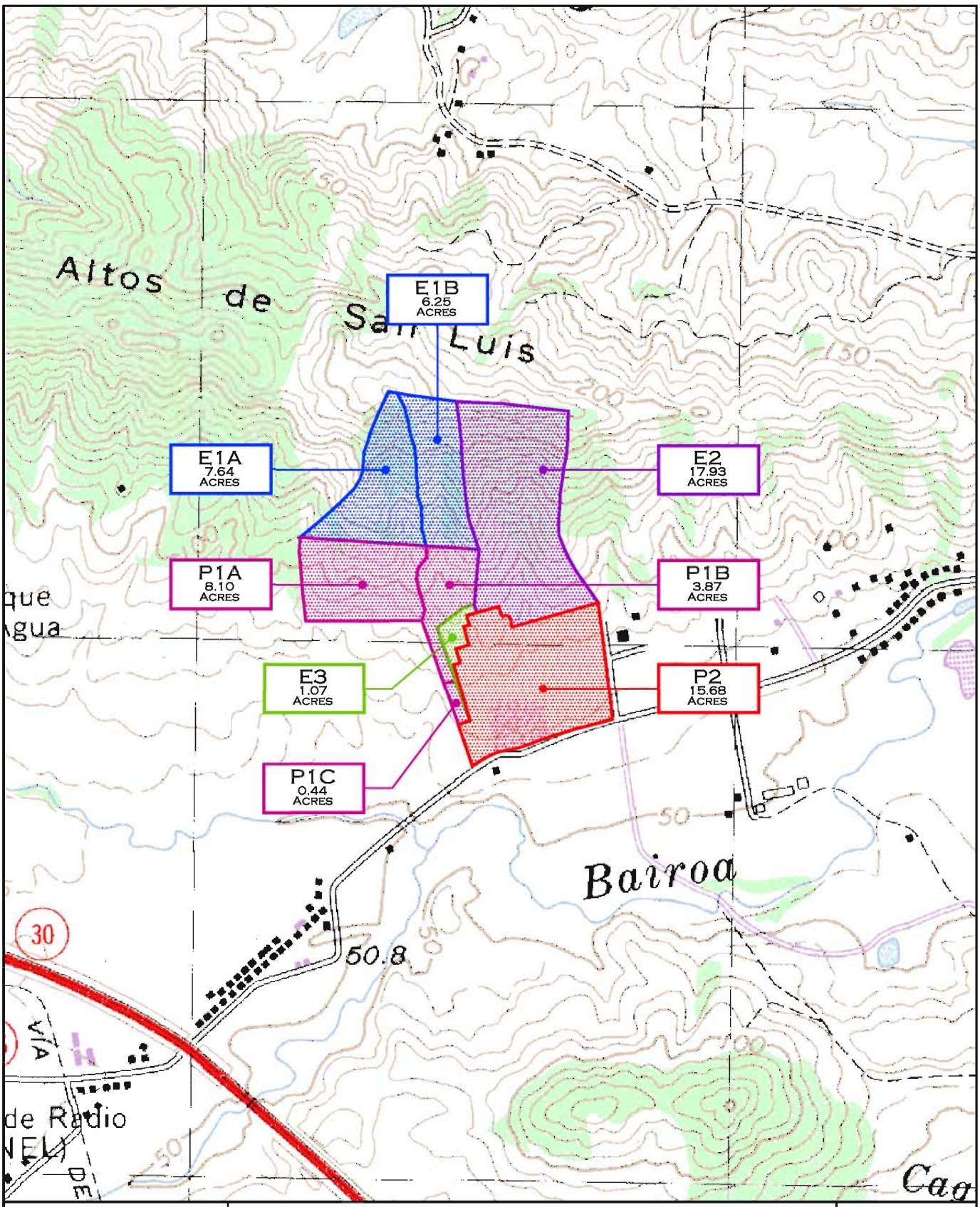
CA Engineering

SCALE: 1:2,300

H/H STUDY - CAGUAS MILENIO, CAGUAS, P.R.

FIGURE 3

TOPOGRAPHY FOR EXISTING CONDITION

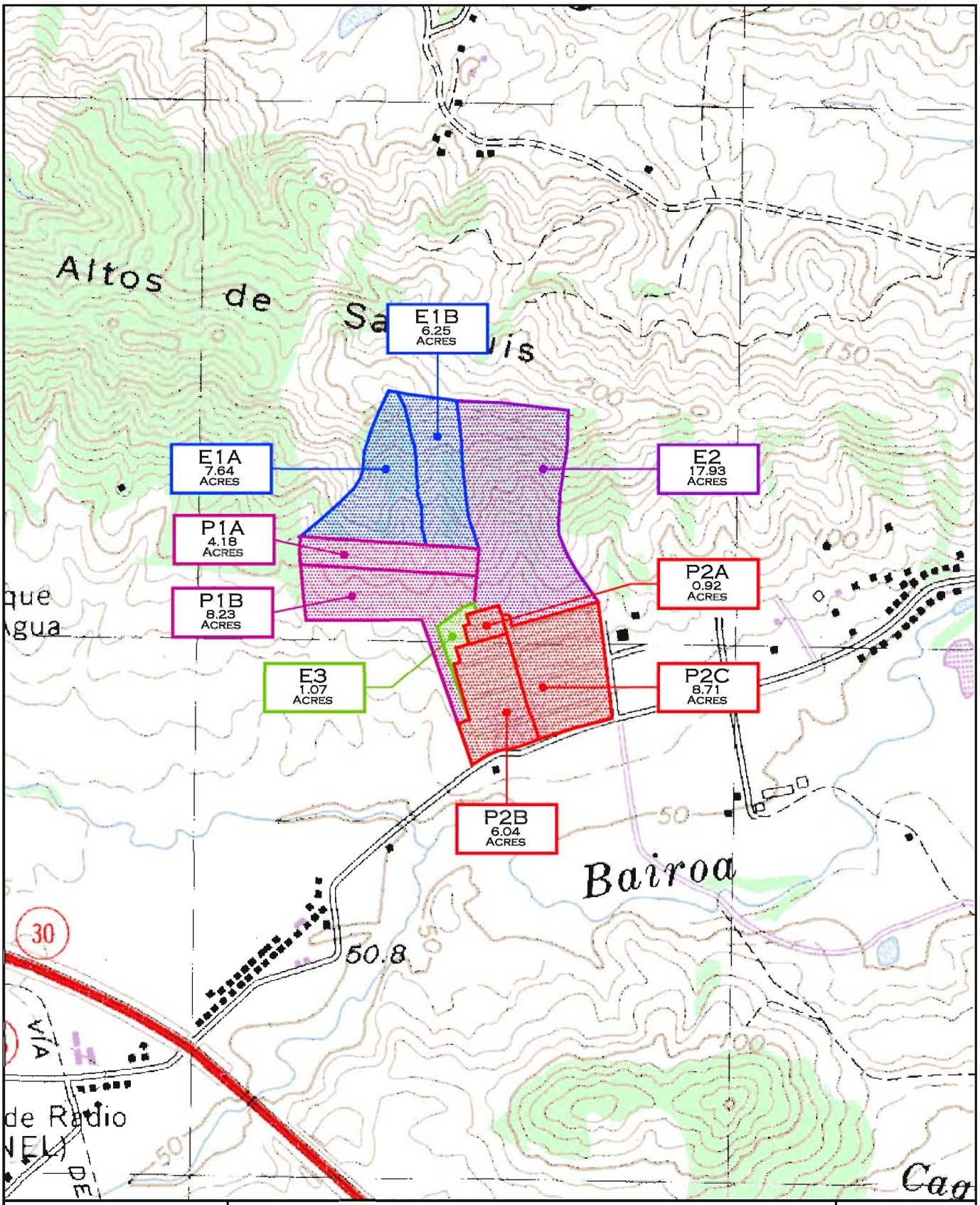


H/H STUDY - CAGUAS MILENIO, CAGUAS, P.R.

SCALE: 1:10,000

CA Engineering

FIGURE 4
DRAINAGE AREAS FOR EXISTING CONDITION



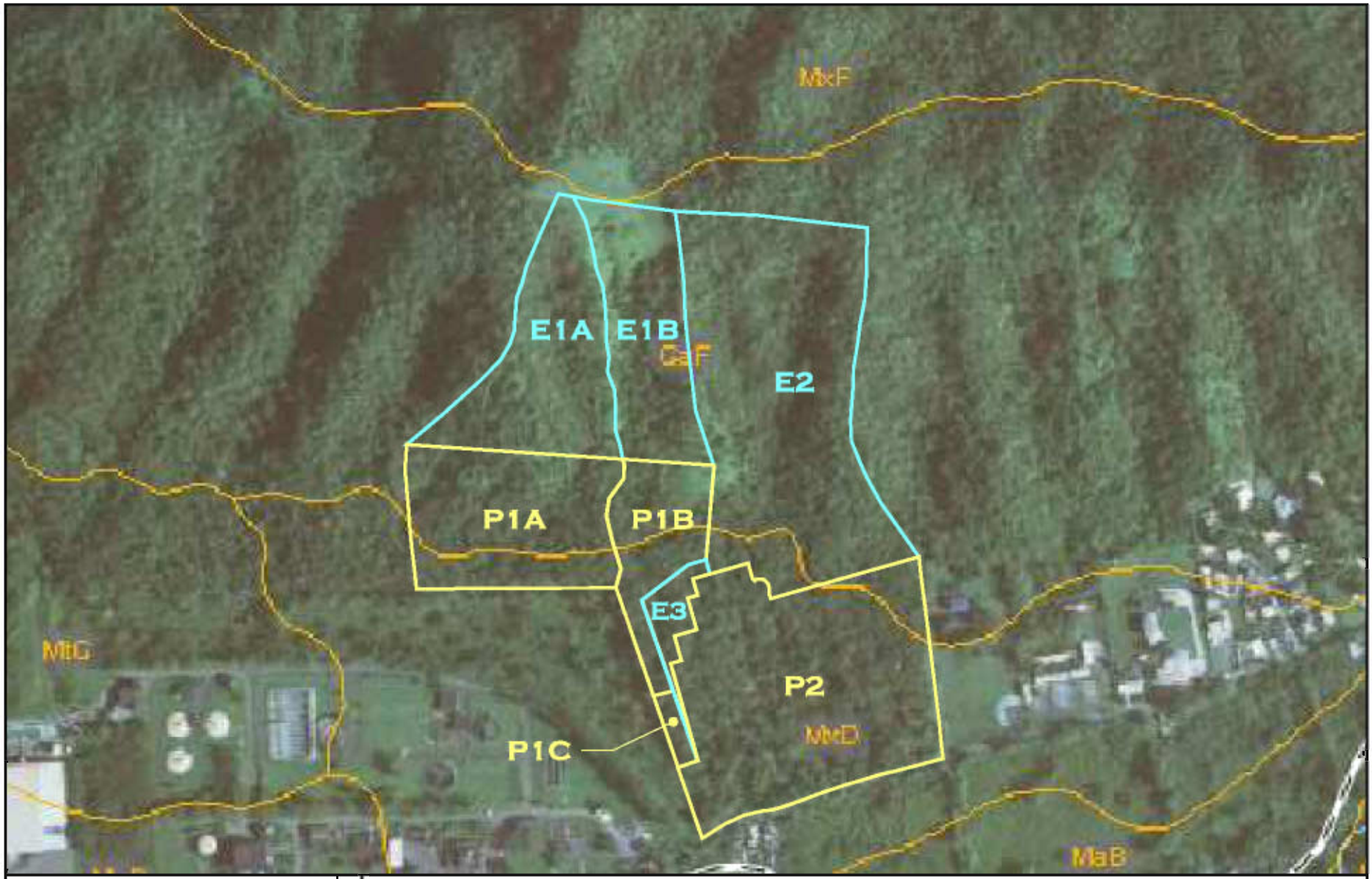
H/H STUDY - CAGUAS MILENIO, CAGUAS, P.R.

SCALE: 1:10,000

CA Engineering

FIGURE 5

DRAINAGE AREAS FOR PROPOSED CONDITION



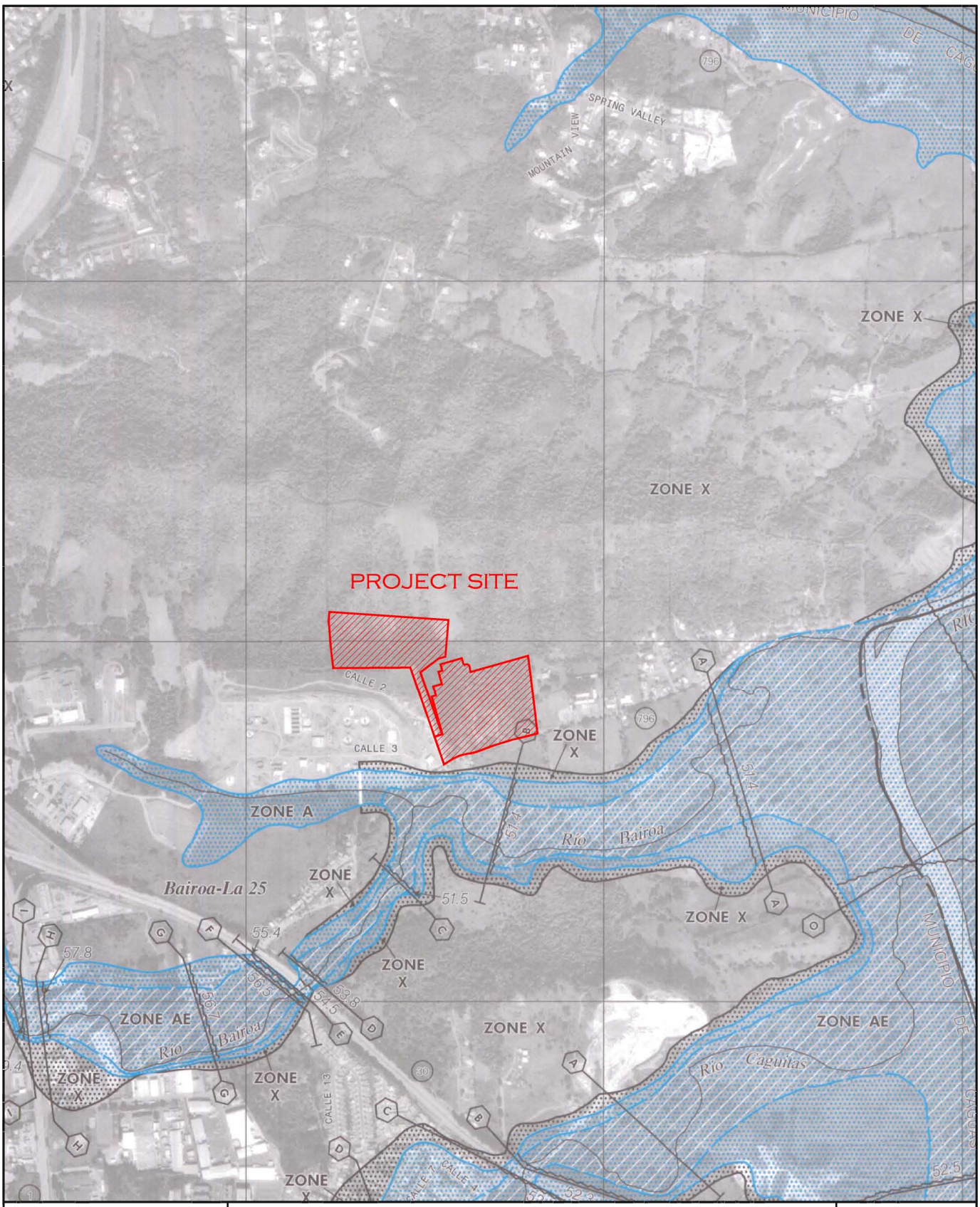
CA Engineering

SCALE: 1:6,000

H/H STUDY - CAGUAS MILENIO, CAGUAS, P.R.

FIGURE 6

SOILS GROUP MAP



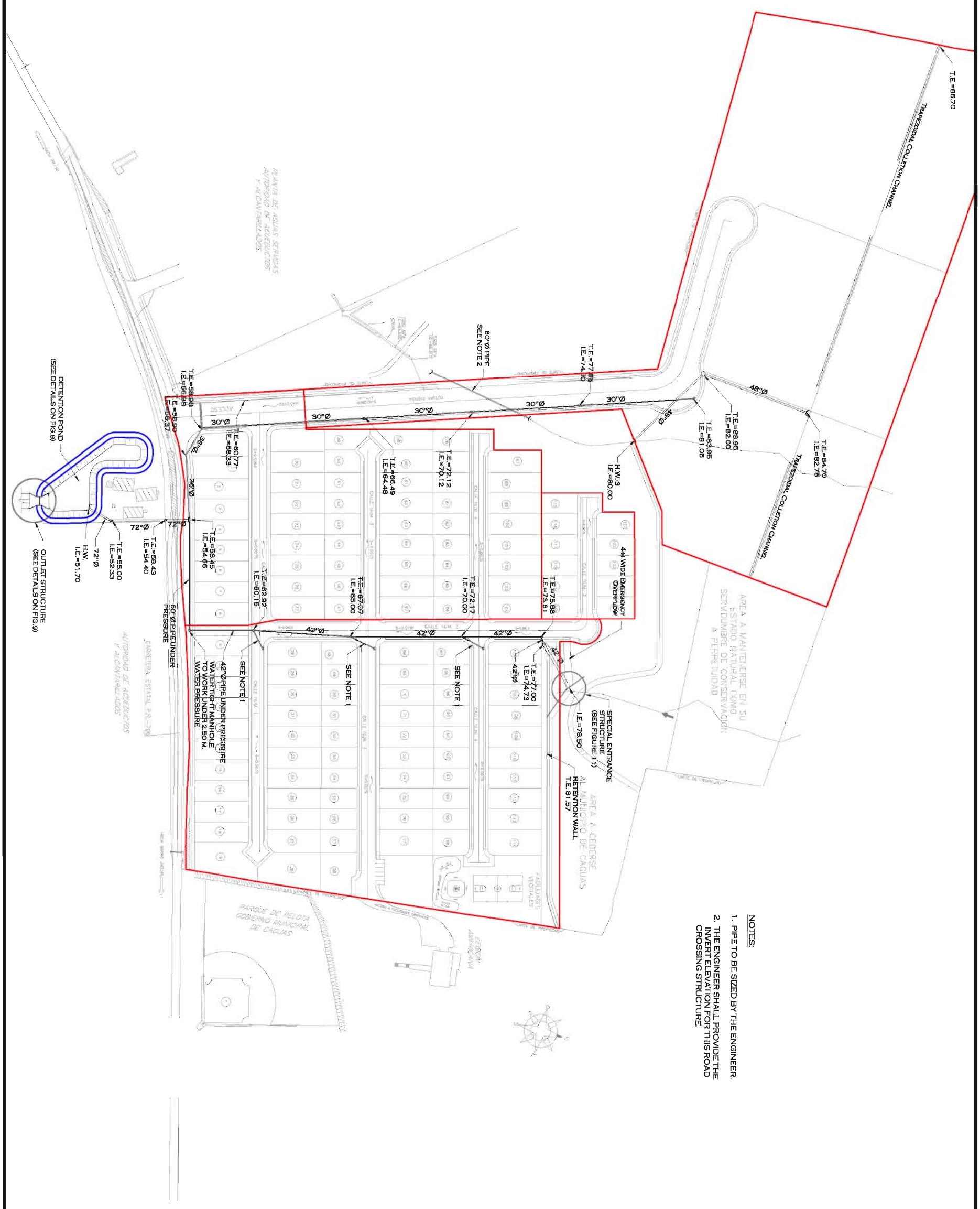
H/H STUDY - CAGUAS MILENIO, CAGUAS, P.R.

SCALE: 1:15,000

CA Engineering

FIGURE 7

FEMA'S FLOOD MAP



NOTES:

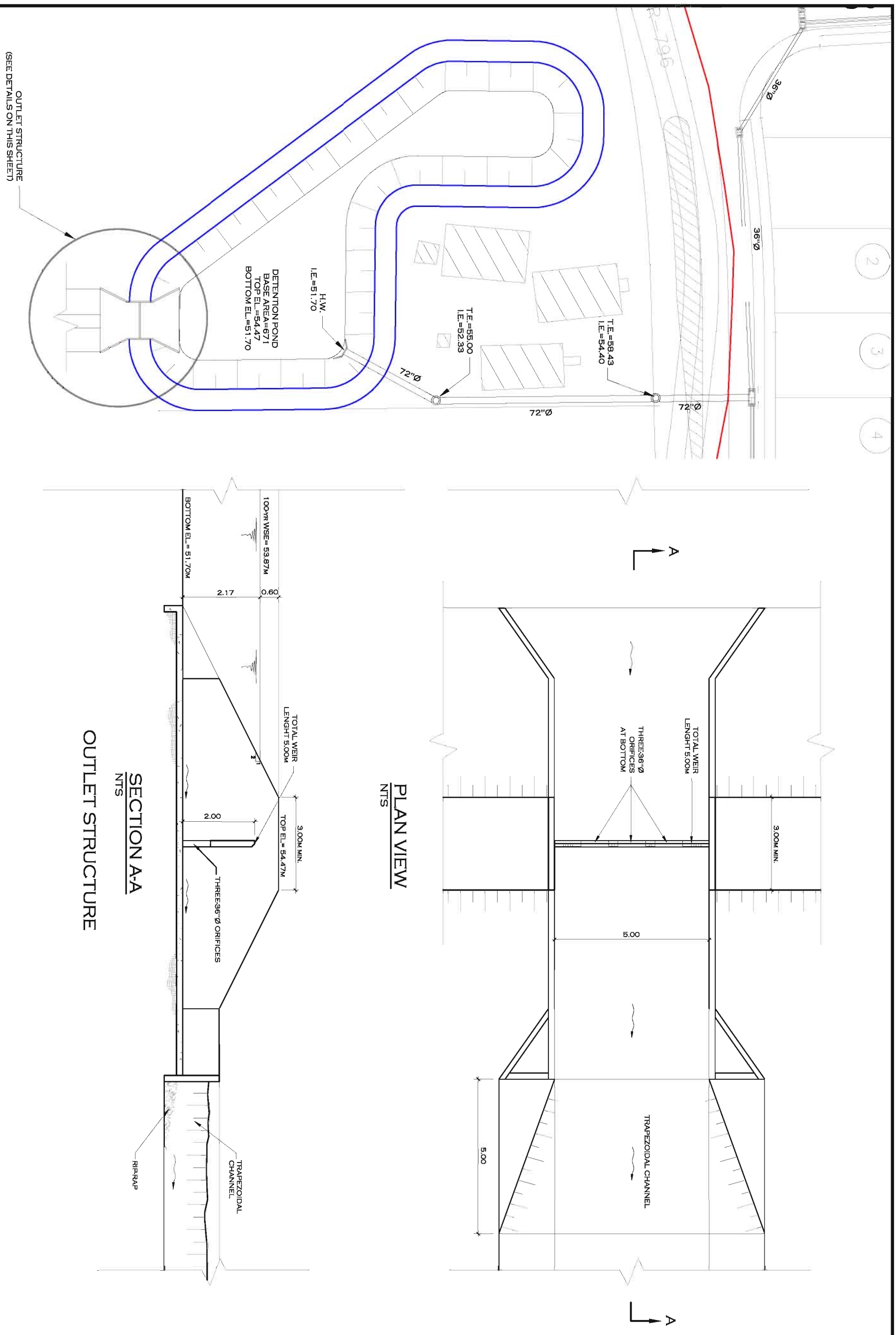
1. PIPE TO BE SIZED BY THE ENGINEER.
2. THE ENGINEER SHALL PROVIDE THE INVERT ELEVATION FOR THIS ROAD CROSSING STRUCTURE.

CA Engineering

SCALE:2.200

H/H STUDY - CAGUAS MILENIO, CAGUAS, P.R.

FIGURE 8
LOCATION OF PROPOSED STRUCTURES



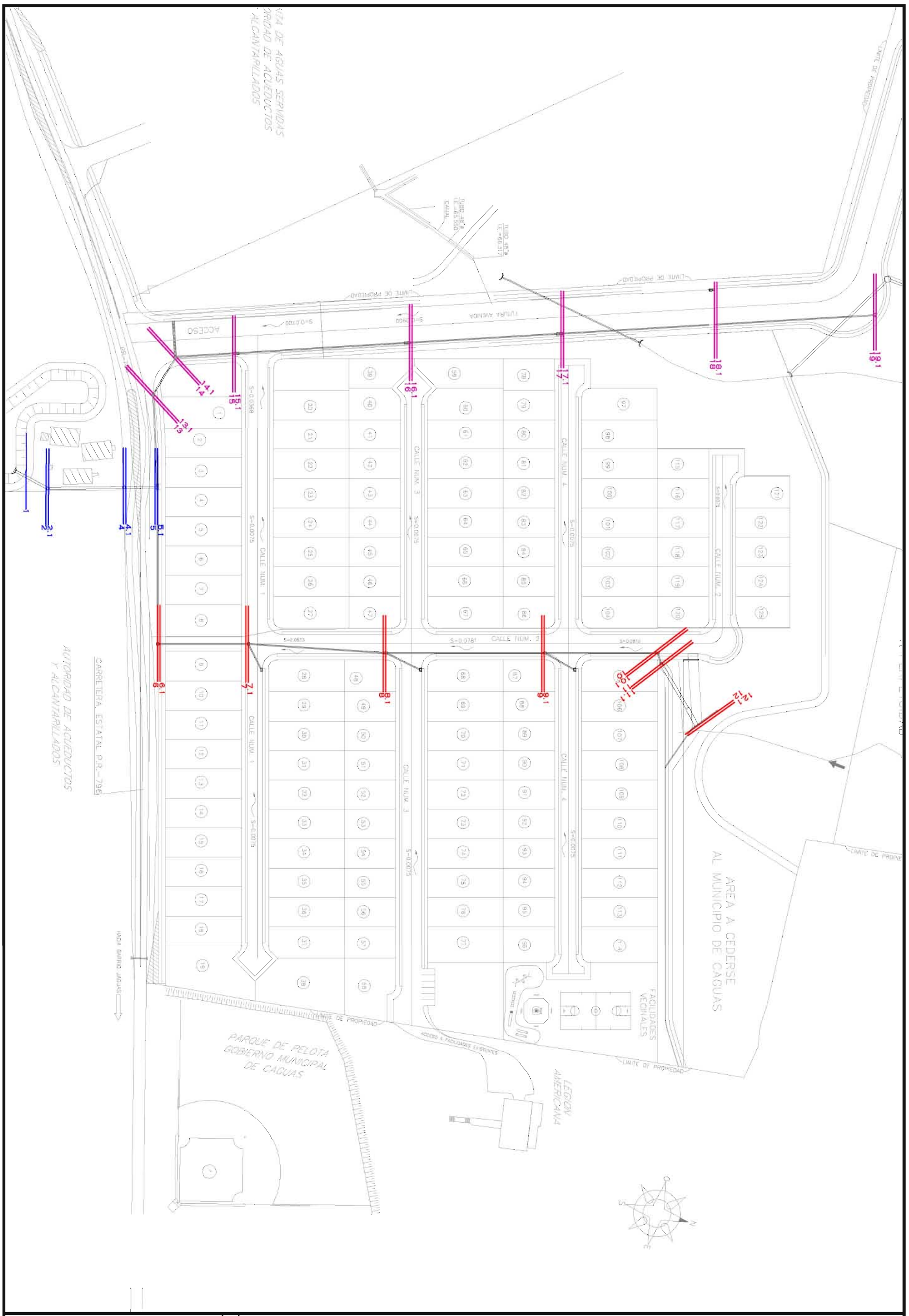
CA Engineering

NTS

H/H STUDY - CAGUAS MILENIO, CAGUAS, P.R.

FIGURE 9

SCHEMATICS OF THE DETENTION POND

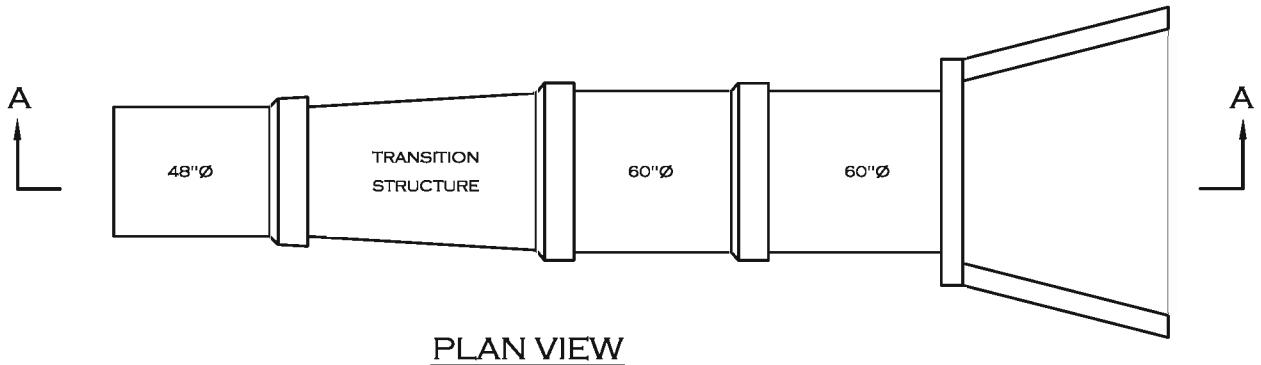


CA Engineering

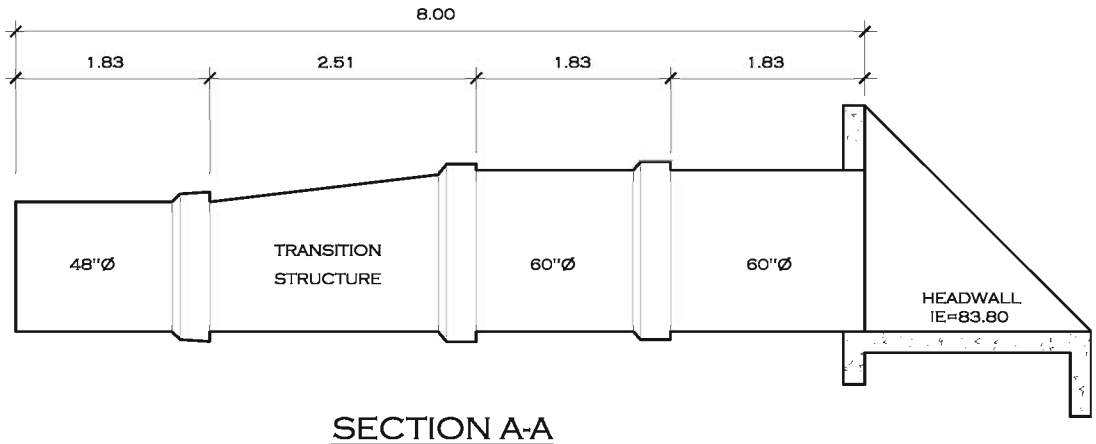
SCALE:1,500

H/H STUDY - CAGUAS MILENIO, CAGUAS, P.R.

Figure 10
Location of Cross Sections



PLAN VIEW
NTS



SECTION A-A
NTS

CA Engineering	H/H STUDY - CAGUAS MILENIO, CAGUAS, P.R.	N.T.S.
	FIGURE 11 SPECIAL ENTRANCE STRUCTURE	

APPENDIXES

APPENDIX A

HYDROLOGIC PARAMETERS ESTIMATION

POINT PRECIPITATION FREQUENCY ESTIMATES FROM NOAA ATLAS 14

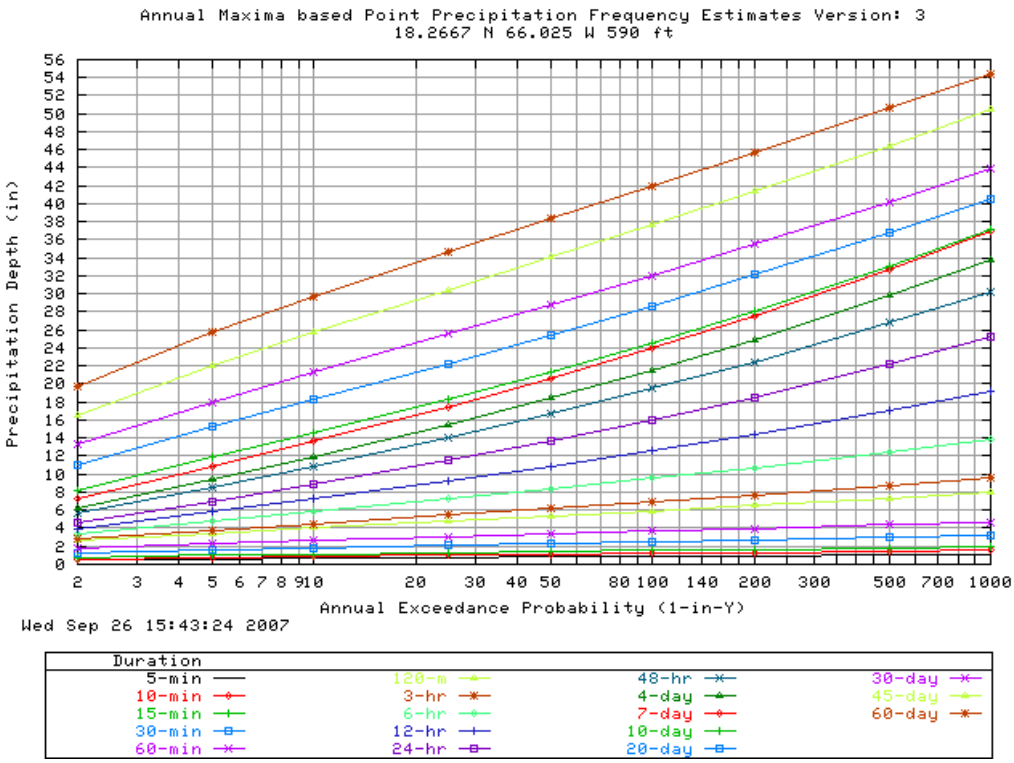
Puerto Rico 18.2667 N 66.025 W 590 feet

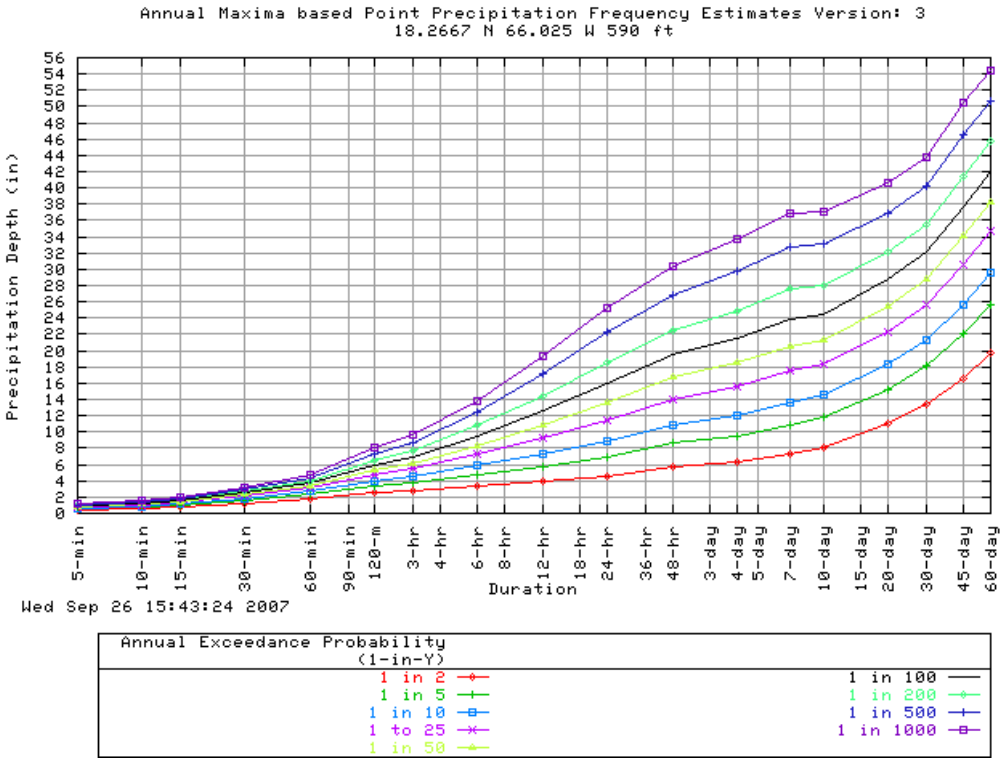
from "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 3, Version 3
G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley
NOAA, National Weather Service, Silver Spring, Maryland, 2006
Extracted: Wed Sep 26 2007

Precipitation Frequency Estimates (inches)

AEP* (1-in-Y)	5 min	10 min	15 min	30 min	60 min	120 min	3 hr	6 hr	12 hr	24 hr	48 hr	4 day	7 day	10 day	20 day	30 day	45 day	60 day
2	0.45	0.61	0.78	1.25	1.86	2.61	2.81	3.37	3.91	4.59	5.65	6.24	7.27	8.15	10.96	13.32	16.55	19.70
5	0.57	0.78	1.00	1.60	2.37	3.44	3.80	4.81	5.81	7.00	8.61	9.49	10.87	11.85	15.22	18.04	22.02	25.72
10	0.65	0.88	1.13	1.82	2.70	4.01	4.51	5.85	7.25	8.86	10.88	12.00	13.61	14.59	18.26	21.30	25.71	29.67
25	0.74	1.02	1.31	2.09	3.10	4.76	5.45	7.25	9.26	11.51	14.07	15.53	17.46	18.34	22.30	25.54	30.47	34.65
50	0.82	1.12	1.43	2.29	3.40	5.35	6.18	8.37	10.89	13.68	16.68	18.44	20.59	21.34	25.44	28.78	34.06	38.35
100	0.89	1.21	1.56	2.49	3.70	5.94	6.93	9.53	12.63	16.03	19.47	21.57	23.95	24.55	28.70	32.09	37.70	42.03
200	0.96	1.31	1.68	2.69	4.00	6.55	7.70	10.75	14.48	18.55	22.46	24.94	27.55	28.04	32.12	35.49	41.41	45.72
500	1.05	1.44	1.85	2.96	4.39	7.37	8.76	12.45	17.11	22.19	26.76	29.78	32.71	33.06	36.84	40.17	46.45	50.67
1000	1.13	1.54	1.98	3.16	4.69	8.01	9.60	13.81	19.26	25.19	30.28	33.76	36.94	37.16	40.60	43.85	50.41	54.48

* These precipitation frequency estimates are based on an annual maxima series. **AEP** is the Annual Exceedance Probability.
Please refer to the documentation for more information. NOTE: Formatting prevents estimates near zero to appear as zero.


Annual Maxima based Point Precipitation Frequency Estimates Version: 3
18.2667 N 66.025 W 590 ft
Precipitation Depth (in)
Annual Exceedance Probability (1-in-Y)
Wed Sep 26 15:43:24 2007
Duration
5-min
10-min
15-min
30-min
60-min
120-m
3-hr
6-hr
12-hr
24-hr
48-hr
4-day
7-day
10-day
20-day
30-day
45-day
60-day


Annual Maxima based Point Precipitation Frequency Estimates Version: 3
18.2667 N 66.025 W 590 ft
Precipitation Depth (in)
Duration
Wed Sep 26 15:43:24 2007
Annual Exceedance Probability
(1-in-Y)
1 in 2
1 in 5
1 in 10
1 to 25
1 in 50
1 in 100
1 in 200
1 in 500
1 in 1000

Confidence Limits -

* Upper bound of the 90% confidence interval Precipitation Frequency Estimates (inches)																		
AEP (1-in-Y)**	**5 min**	**10 min**	**15 min**	**30 min**	**60 min**	**120 min**	**3 hr**	**6 hr**	**12 hr**	**24 hr**	**48 hr**	**4 day**	**7 day**	**10 day**	**20 day**	**30 day**	**45 day**	**60 day**
2	0.50	0.68	0.87	1.40	2.07	3.21	3.34	3.88	4.57	5.36	6.57	7.23	8.37	9.27	12.27	14.73	18.23	21.55
5	0.71	0.97	1.25	2.00	2.96	4.26	4.58	5.58	6.78	8.14	9.99	10.99	12.47	13.44	17.01	19.94	24.25	28.13
10	0.73	1.00	1.29	2.06	3.06	5.01	5.47	6.80	8.48	10.30	12.61	13.85	15.59	16.53	20.41	23.52	28.32	32.47
25	0.84	1.14	1.47	2.35	3.49	6.02	6.66	8.46	9.28	13.34	16.31	17.93	19.98	20.79	24.95	28.24	33.62	37.95
50	0.92	1.26	1.62	2.59	3.84	6.83	7.61	9.83	11.00	15.87	19.39	21.33	23.59	24.24	28.50	31.92	37.68	42.08
100	1.00	1.37	1.76	2.82	4.18	7.68	8.63	11.25	12.75	18.60	22.76	25.05	27.58	28.01	32.32	35.68	41.79	46.26
200	1.09	1.49	1.91	3.06	4.54	8.57	9.69	12.78	14.62	21.56	26.37	29.06	31.85	32.12	36.24	39.54	46.03	50.46
500	1.20	1.65	2.11	3.38	5.02	9.81	11.15	14.93	17.28	25.88	31.65	34.89	38.07	38.13	41.87	45.02	51.87	56.23
1000	1.29	1.77	2.27	3.63	5.39	10.80	12.35	16.68	19.46	29.45	36.00	39.73	43.21	43.64	46.38	49.33	56.51	60.76

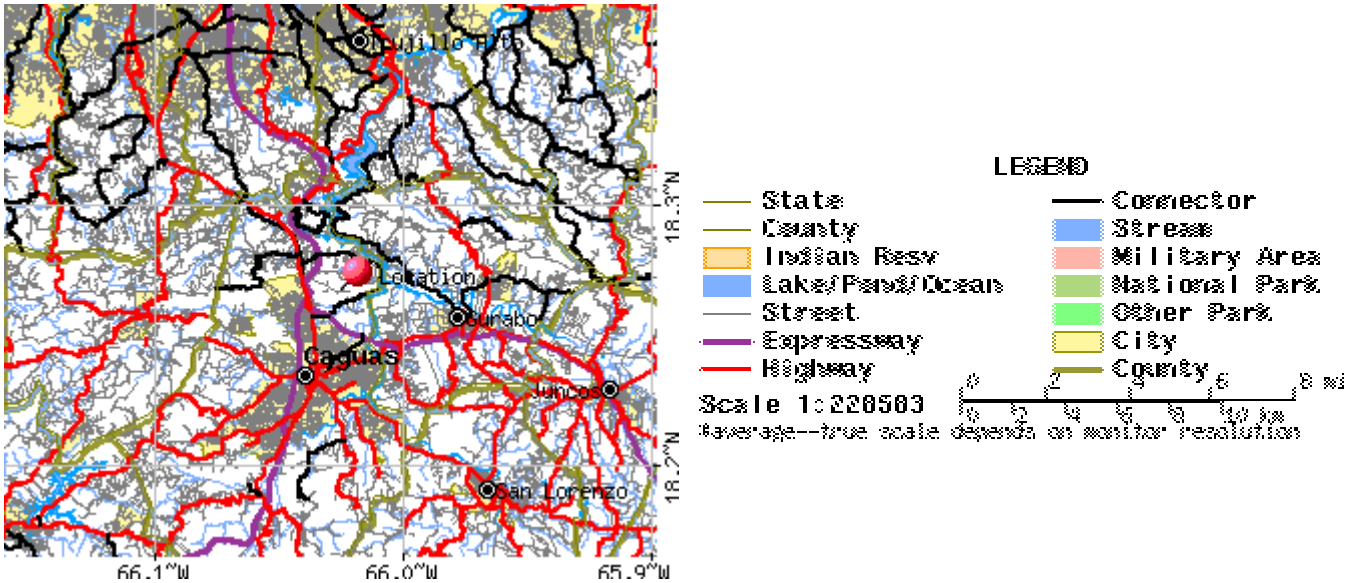
* The **upper** bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are **greater** than.
** These precipitation frequency estimates are based on an annual maxima series. **AEP** is the Annual Exceedance Probability.
Please refer to the documentation for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

* Lower bound of the 90% confidence interval Precipitation Frequency Estimates (inches)																		
AEP (1-in-Y)**	**5 min**	**10 min**	**15 min**	**30 min**	**60 min**	**120 min**	**3 hr**	**6 hr**	**12 hr**	**24 hr**	**48 hr**	**4 day**	**7 day**	**10 day**	**20 day**	**30 day**	**45 day**	**60 day**
2	0.40	0.55	0.71	1.13	1.68	2.35	2.51	2.98	3.39	4.00	4.91	5.45	6.38	7.22	9.84	12.14	15.12	18.03
5	0.56	0.76	0.98	1.57	2.33	3.07	3.38	4.22	5.02	6.07	7.46	8.25	9.51	10.46	13.62	16.39	20.06	23.49
10	0.59	0.80	1.03	1.65	2.45	3.56	3.98	5.11	6.22	7.65	9.36	10.37	11.84	12.82	16.28	19.29	23.34	27.05
25	0.67	0.91	1.17	1.87	2.78	4.20	4.76	6.27	7.82	9.83	11.97	13.29	15.04	15.99	19.75	22.99	27.53	31.45
50	0.73	1.00	1.28	2.04	3.03	4.68	5.35	7.16	9.08	11.60	14.05	15.62	17.57	18.46	22.40	25.75	30.62	34.64
100	0.79	1.07	1.38	2.21	3.28	5.16	5.94	8.05	10.38	13.48	16.24	18.11	20.25	21.06	25.10	28.53	33.66	37.82
200	0.84	1.15	1.48	2.37	3.52	5.64	6.55	8.98	11.74	15.48	18.56	20.72	23.06	23.83	27.84	31.34	36.72	40.91
500	0.92	1.26	1.61	2.58	3.83	6.29	7.36	10.26	13.63	18.30	21.78	24.36	26.99	27.73	31.58	35.15	40.85	44.94
1000	0.98	1.33	1.71	2.74	4.07	6.78	7.99	11.25	15.12	20.55	24.33	27.32	30.14	30.85	34.54	38.09	44.02	48.02

* The **lower** bound of the confidence interval at 90% confidence level is the value which 5% of the simulated quantile values for a given frequency are **less** than.
** These precipitation frequency estimates are based on an annual maxima series. **AEP** is the Annual Exceedance Probability.
Please refer to the documentation for more information. NOTE: Formatting prevents estimates near zero to appear as zero.

Maps -

19°N
18°N
Location
68°W
67°W
66°W
65°W
64°W


Location
Gurabo
Caguas
Juncos
San Lorenzo
18.3°N
18.2°N
66.1°W
66.0°W
65.9°W
LEGEND
State
County
Indian Resv
Lake/Pond/Ocean
Street
Expressway
Highway
Connector
Stream
Military Area
National Park
Other Park
City
County
Scale 1:220503
Average--true scale depends on monitor resolution

Project: **Caguas Millenium**
Caguas, Puerto Rico , Puerto Rico

PHYSIOGRAFIC INFORMATION

Soil	Description	HSG	Curve Number
CaF	Caguabo clay loam, 40 to 60 percent slopes	D	89
MxD	Mucara clay, 12 to 20 percent slopes	D	89

PROJECT AREA (P1A)

		Existing Condition	
Soil	HSG	Curve Number	Area (acre)
CaF	D	89	6.00
MxD	D	89	2.10
Total (acres)			8.10
Total (km2)			0.0328
Total (mi2)			**0.0127**
Weighted CN			**89.00**

PROJECT AREA (P1A)

		Proposed Condition	
Soil	HSG	Curve Number	Area (acre)
Developed	D	93	4.18
Total (acres)			4.18
Total (km2)			0.0169
Total (mi2)			**0.0065**
Weighted CN			**93.00**

PROJECT AREA (P1B)

		Existing Condition	
Soil	HSG	Curve Number	Area (acre)
CaF	D	89	2.06
MxD	D	89	1.80
Total (acres)			3.87
Total (km2)			0.0157
Total (mi2)			**0.0060**
Weighted CN			**89.00**

PROJECT AREA (P1B)

		Proposed Condition	
Soil	HSG	Curve Number	Area (acre)
Developed	D	93	8.23
Total (acres)			8.23
Total (km2)			0.0333
Total (mi2)			**0.0129**
Weighted CN			**93.00**

PROJECT AREA (P1C)

		Existing Condition	
Soil	HSG	Curve Number	Area (acre)
MxD	D	89	0.44
Total (acres)			0.44
Total (km2)			0.0018
Total (mi2)			**0.0007**
Weighted CN			**89.00**

PROJECT AREA (P2A)

		Proposed Condition	
Soil	HSG	Curve Number	Area (acre)
Developed	D	93	0.92
Total (acres)			0.92
Total (km2)			0.0037
Total (mi2)			**0.0014**
Weighted CN			**93.00**

PROJECT AREA (P2)

		Existing Condition	
Soil	HSG	Curve Number	Area (acre)
CaF	D	89	0.99
MxD	D	89	14.69
Total (acres)			15.68
Total (km2)			0.0634
Total (mi2)			**0.0245**
Weighted CN			**89.00**

PROJECT AREA (P2B)

		Proposed Condition	
Soil	HSG	Curve Number	Area (acre)
Developed	D	93	6.04
Total (acres)			6.04
Total (km2)			0.0245
Total (mi2)			**0.0094**
Weighted CN			**93.00**

EXTERIOR AREA (E1A)

		Existing Condition	
Soil	HSG	Curve Number	Area (acre)
CaF	D	89	7.64
Total (acres)			7.64
Total (km2)			0.0309
Total (mi2)			**0.0119**
Weighted CN			**89.00**

PROJECT AREA (P2C)

		Proposed Condition	
Soil	HSG	Curve Number	Area (acre)
Developed	D	93	8.71
Total (acres)			8.71
Total (km2)			0.0352
Total (mi2)			**0.0136**
Weighted CN			**93.00**

EXTERIOR AREA (E1B)

		Existing Condition	
Soil	HSG	Curve Number	Area (acre)
CaF	D	89	6.25
Total (acres)			6.25
Total (km2)			0.0253
Total (mi2)			**0.0098**
Weighted CN			**89.00**

EXTERIOR AREA (E2)

		Existing Condition	
Soil	HSG	Curve Number	Area (acre)
CaF	D	89	16.66
MxD	D	89	1.27
Total (acres)			17.93
Total (km2)			0.0726
Total (mi2)			**0.0280**
Weighted CN			**89.00**

EXTERIOR AREA (E3)

		Existing Condition	
Soil	HSG	Curve Number	Area (acre)
MxD	D	89	1.07
Total (acres)			1.07
Total (km2)			0.0043
Total (mi2)			**0.0017**
Weighted CN			**89.00**

COMPUTATIONS FOR TIME OF CONCENTRATION – Kirpitch Equation

$Tc = 0.0078L^{0.77}/S^{0.385}$

Where: L in ft, S in ft/ft, Tc in min

EXISTING CONDITION

	Higher Elevation		Lower Elevation		Distance		Time of Concentration		Lag Time
Area	**m**	**ft**	**m**	**ft**	**m**	**ft**	**min**	**hours**	**hours**
P1A	115.00	377.20	75.00	246.00	201.73	661.67	2.16	0.04	**0.022**
P1B	110.00	360.80	65.00	213.20	262.60	861.33	2.80	0.05	**0.028**
P1C	65.00	213.20	60.00	196.80	80.77	264.93	1.67	0.03	**0.017**
P2	87.00	285.36	59.00	193.52	262.42	860.74	3.36	0.06	**0.034**
E1A	270.00	885.60	115.00	377.20	327.41	1073.90	2.24	0.04	**0.022**
E1B	270.00	885.60	110.00	360.80	351.30	1152.26	2.40	0.04	**0.024**
E2	250.00	820.00	78.00	255.84	448.57	1471.31	3.10	0.05	**0.031**
E3	90.00	295.20	60.00	196.80	196.38	644.13	2.34	0.04	**0.023**

PROPOSED CONDITION

	Higher Elevation		Lower Elevation		Distance		Time of Concentration		Lag Time
Area	**m**	**ft**	**m**	**ft**	**m**	**ft**	**min**	**hours**	**hours**
P1A	120.00	393.60	82.75	271.42	275.00	902.00	3.18	0.05	**0.032**
P1B	85.00	278.80	63.49	208.25	370.00	1213.60	5.53	0.09	**0.055**
P2A	78.06	256.04	77.43	253.97	73.50	241.08	3.33	0.06	**0.033**
P2B	62.95	206.48	58.09	190.54	170.30	558.58	4.00	0.07	**0.040**
P2C	78.06	256.04	58.22	190.96	242.21	794.45	3.50	0.06	**0.035**

APPENDIX B

HYDROLOGIC ANALYSIS RESULTS FOR EXISTING CONDITION

```
*                                      *                                                    *                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                                    *    U.S. ARMY CORPS OF ENGINEERS      *
*              JUN   1998              *                                                    *    HYDROLOGIC ENGINEERING CENTER     *
*            VERSION 4.1               *                                                    *          609 SECOND STREET           *
*  RGMHEC2000               HEC-1.COM  *                                                    *       DAVIS, CALIFORNIA 95616        *
*  RUN DATE   19OCT07  TIME  08:38:43  *                                                    *           (916) 756-1104             *
*                                      *                                                    *                                      *
****************************************                                                    ****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID        HYDROLOGIC ANALYSIS
  2           ID        PROJECT:  CAGUAS MILENIO, CAGUAS, P.R.
  3           ID        TRIANGULAR DISTRIBUTION
  4           ID        FREQUENCY OF OCCURRENCE: 2, 10, 25, 50 AND 100 YEARS
  5           ID        CA ENGINEERING, OCTOBER 2007
  6           ID        EXISTING CONDITION
  7           IT       5                    289
  8           IO       3
  9           JP       5

 10           KK     E1A
 11           KP       1
 12           BA  0.0119
 13           LS       0      89
 14           UD   0.022
 15           IN      15
 16           KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
 17           PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
 18           KP       2
 19           KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
 20           PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
 21           KP       3
 22           KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
 23           PH                    0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
 24           KP       4
 25           KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
 26           PH                    0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
 27           KP       5
 28           KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
 29           PH                    0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

 30           KK     P1A
 31           KP       1
 32           BA  0.0127
 33           LS       0      89
 34           UD   0.022
 35           IN      15
 36           KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
 37           PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
 38           KP       2
 39           KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
 40           PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
 41           KP       3
 42           KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
 43           PH                    0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
 44           KP       4
 45           KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
 46           PH                    0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
 47           KP       5
 48           KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
 49           PH                    0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


 50           KK   COMB1
 51           HC       2

 52           KK     E1B
 53           KP       1
 54           BA  0.0098
 55           LS       0      89
 56           UD   0.024
 57           IN      15
 58           KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
 59           PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
 60           KP       2
 61           KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
 62           PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
 63           KP       3
 64           KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
 65           PH                    0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
 66           KP       4
 67           KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
 68           PH                    0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
 69           KP       5
```

```
  70          KM          RUNOFF COMPUTATION 100-YRS STORM IN BASIN
  71          PH                   0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

  72          KK     P1B
  73          KP       1
  74          BA  0.0060
  75          LS       0      89
  76          UD   0.028
  77          IN      15
  78          KM          RUNOFF COMPUTATION 2-YRS STORM IN BASIN
  79          PH                   0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
  80          KP       2
  81          KM          RUNOFF COMPUTATION 10-YRS STORM IN BASIN
  82          PH                   0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
  83          KP       3
  84          KM          RUNOFF COMPUTATION 25-YRS STORM IN BASIN
  85          PH                   0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
  86          KP       4
  87          KM          RUNOFF COMPUTATION 50-YRS STORM IN BASIN
  88          PH                   0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
  89          KP       5
  90          KM          RUNOFF COMPUTATION 100-YRS STORM IN BASIN
  91          PH                   0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

  92          KK      E3
  93          KP       1
  94          BA  0.0017
  95          LS       0      89
  96          UD   0.023
  97          IN      15
  98          KM          RUNOFF COMPUTATION 2-YRS STORM IN BASIN
  99          PH                   0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
 100          KP       2
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 101          KM          RUNOFF COMPUTATION 10-YRS STORM IN BASIN
 102          PH                   0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
 103          KP       3
 104          KM          RUNOFF COMPUTATION 25-YRS STORM IN BASIN
 105          PH                   0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
 106          KP       4
 107          KM          RUNOFF COMPUTATION 50-YRS STORM IN BASIN
 108          PH                   0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
 109          KP       5
 110          KM          RUNOFF COMPUTATION 100-YRS STORM IN BASIN
 111          PH                   0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

 112          KK   COMB2
 113          HC       3

 114          KK   COMB3
 115          HC       2

 116          KK      E2
 117          KP       1
 118          BA  0.0280
 119          LS       0      89
 120          UD   0.031
 121          IN      15
 122          KM          RUNOFF COMPUTATION 2-YRS STORM IN BASIN
 123          PH                   0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
 124          KP       2
 125          KM          RUNOFF COMPUTATION 10-YRS STORM IN BASIN
 126          PH                   0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
 127          KP       3
 128          KM          RUNOFF COMPUTATION 25-YRS STORM IN BASIN
 129          PH                   0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
 130          KP       4
 131          KM          RUNOFF COMPUTATION 50-YRS STORM IN BASIN
 132          PH                   0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
 133          KP       5
 134          KM          RUNOFF COMPUTATION 100-YRS STORM IN BASIN
 135          PH                   0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

 136          KK      P2
 137          KP       1
 138          BA  0.0245
 139          LS       0      89
 140          UD   0.034
```

```
          141          IN      15
          142          KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
          143          PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
          144          KP       2
          145          KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
          146          PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
          147          KP       3
          148          KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
          149          PH                    0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
          150          KP       4
          151          KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
1                                              HEC-1 INPUT                                          PAGE  4

         LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

          152          PH                    0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
          153          KP       5
          154          KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
          155          PH                    0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

          156          KK     P1C
          157          KP       1
          158          BA  0.0007
          159          LS       0      89
          160          UD   0.017
          161          IN      15
          162          KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
          163          PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
          164          KP       2
          165          KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
          166          PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
          167          KP       3
          168          KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
          169          PH                    0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
          170          KP       4
          171          KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
          172          PH                    0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
          173          KP       5
          174          KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
          175          PH                    0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

          176          KK   COMB4
          177          HC       3
          178          ZZ
1****************************************                                                  ****************************************
 *                                      *                                                  *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                                  *    U.S. ARMY CORPS OF ENGINEERS      *
 *              JUN   1998              *                                                  *    HYDROLOGIC ENGINEERING CENTER     *
 *           VERSION 4.1                *                                                  *          609 SECOND STREET           *
 *  RGMHEC2000               HEC-1.COM  *                                                  *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   19OCT07  TIME  08:38:43  *                                                  *           (916) 756-1104             *
 *                                      *                                                  *                                      *
 ****************************************                                                  ****************************************


                                HYDROLOGIC ANALYSIS
                                PROJECT:  CAGUAS MILENIO, CAGUAS, P.R.
                                TRIANGULAR DISTRIBUTION
                                FREQUENCY OF OCCURRENCE: 2, 10, 25, 50 AND 100 YEARS
                                CA ENGINEERING, OCTOBER 2007
                                EXISTING CONDITION

    8 IO          OUTPUT CONTROL VARIABLES
                        IPRNT           3  PRINT CONTROL
                        IPLOT           0  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE

      IT          HYDROGRAPH TIME DATA
                         NMIN           5  MINUTES IN COMPUTATION INTERVAL
                        IDATE      1    0  STARTING DATE
                        ITIME        0000  STARTING TIME
                           NQ         289  NUMBER OF HYDROGRAPH ORDINATES
                       NDDATE      2    0  ENDING DATE
                       NDTIME        0000  ENDING TIME
                        ICENT          19  CENTURY MARK

                   COMPUTATION INTERVAL     .08 HOURS
                        TOTAL TIME BASE   24.00 HOURS
```

```
          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT

     JP          MULTI-PLAN OPTION
                       NPLAN           5  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF RUNOFF
                    1.00


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  10 KK     *       E1A  *
            *            *
            **************


***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  11 KP        PLAN  1 FOR STATION      E1A
                                 RUNOFF COMPUTATION 2-YRS STORM IN BASIN

               SUBBASIN RUNOFF DATA

  12 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .01  SUBBASIN AREA

                 PRECIPITATION DATA

  17 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                 STORM AREA =     .01

  13 LS          SCS LOSS RATE
                       STRTL         .25  INITIAL ABSTRACTION
                      CRVNBR       89.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  14 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .02  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                      5 END-OF-PERIOD ORDINATES
                68.       19.        4.        1.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1A
                           FOR PLAN 1, RATIO = 1.00

    TOTAL RAINFALL =    4.59, TOTAL LOSS =    1.21, TOTAL EXCESS =    3.38

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                           (CFS)
+      30.     12.08                 4.          1.          1.          1.
                         (INCHES)     2.745       3.378       3.378       3.378
                          (AC-FT)       2.          2.          2.          2.

                         CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***
```

```
                        HYDROGRAPH AT STATION      E1A
                          FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      30.     12.08                  4.          1.          1.           1.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)       2.          2.          2.           2.

                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   18 KP        PLAN  2 FOR STATION      E1A
                                   RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   12 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   20 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                STORM AREA =     .01

   13 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   14 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                 ***

                                                        UNIT HYDROGRAPH
                                                   5 END-OF-PERIOD ORDINATES
                68.       19.        4.        1.        0.

       ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      E1A
                          FOR PLAN 2, RATIO = 1.00

     TOTAL RAINFALL =    8.86, TOTAL LOSS =    1.33, TOTAL EXCESS =    7.53

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      49.     12.08                  7.          2.          2.           2.
                        (INCHES)     5.421       7.525       7.525        7.525
                         (AC-FT)       3.          5.          5.           5.

                        CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      E1A
                          FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      49.     12.08                  7.          2.          2.           2.
                        (INCHES)     5.421       7.525       7.525        7.525
                         (AC-FT)       3.          5.          5.           5.

                        CUMULATIVE AREA =     .01 SQ MI
```

```
***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  21 KP        PLAN  3 FOR STATION      E1A
                                 RUNOFF COMPUTATION 25-YRS STORM IN BASIN

               SUBBASIN RUNOFF DATA

  12 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .01  SUBBASIN AREA

                 PRECIPITATION DATA

  23 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                   STORM AREA =     .01

  13 LS          SCS LOSS RATE
                       STRTL         .25  INITIAL ABSTRACTION
                      CRVNBR       89.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  14 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .02  LAG

                                                                ***

                                                         UNIT HYDROGRAPH
                                                     5 END-OF-PERIOD ORDINATES
               68.       19.        4.        1.        0.

      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      E1A
                          FOR PLAN 3, RATIO = 1.00

    TOTAL RAINFALL =   11.51, TOTAL LOSS =    1.36, TOTAL EXCESS =   10.15

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      57.     12.08                     9.          3.          3.           3.
                        (INCHES)     6.905      10.139      10.139       10.139
                         (AC-FT)        4.          6.          6.           6.

                         CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      E1A
                          FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      57.     12.08                     9.          3.          3.           3.
                        (INCHES)     6.905      10.139      10.139       10.139
                         (AC-FT)        4.          6.          6.           6.

                         CUMULATIVE AREA =     .01 SQ MI


***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  24 KP        PLAN  4 FOR STATION      E1A
                                 RUNOFF COMPUTATION 50-YRS STORM IN BASIN

               SUBBASIN RUNOFF DATA

  12 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .01  SUBBASIN AREA
```

```
                PRECIPITATION DATA

   26 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                     STORM AREA =     .01

   13 LS        SCS LOSS RATE
                      STRTL         .25  INITIAL ABSTRACTION
                     CRVNBR       89.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

   14 UD        SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .02  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                     5 END-OF-PERIOD ORDINATES
               68.       19.        4.        1.        0.

      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      E1A
                          FOR PLAN 4, RATIO = 1.00

    TOTAL RAINFALL =   13.68, TOTAL LOSS =    1.38, TOTAL EXCESS =   12.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      63.     12.08                    10.          4.          4.           4.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)        5.          8.          8.           8.

                        CUMULATIVE AREA =     .01 SQ MI


      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      E1A
                          FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      63.     12.08                    10.          4.          4.           4.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)        5.          8.          8.           8.

                        CUMULATIVE AREA =     .01 SQ MI


 ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***

   27 KP        PLAN  5 FOR STATION      E1A
                                   RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   12 BA        SUBBASIN CHARACTERISTICS
                      TAREA         .01  SUBBASIN AREA

                PRECIPITATION DATA

   29 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                     STORM AREA =     .01

   13 LS        SCS LOSS RATE
                      STRTL         .25  INITIAL ABSTRACTION
                     CRVNBR       89.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA
```

```
  14 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .02  LAG

                                                                  ***

                                                              UNIT HYDROGRAPH
                                                          5 END-OF-PERIOD ORDINATES
                68.       19.        4.        1.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1A
                           FOR PLAN 5, RATIO = 1.00

    TOTAL RAINFALL =   16.03, TOTAL LOSS =    1.39, TOTAL EXCESS =   14.64

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      69.     12.08                    12.          5.          5.           5.
                        (INCHES)     9.276      14.621      14.621       14.621
                         (AC-FT)        6.          9.          9.           9.

                         CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1A
                           FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      69.     12.08                    12.          5.          5.           5.
                        (INCHES)     9.276      14.621      14.621       14.621
                         (AC-FT)        6.          9.          9.           9.

                         CUMULATIVE AREA =     .01 SQ MI


 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  30 KK     *       P1A  *
            *            *
            **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  31 KP        PLAN  1 FOR STATION      P1A
                                RUNOFF COMPUTATION 2-YRS STORM IN BASIN

               SUBBASIN RUNOFF DATA

  32 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .01  SUBBASIN AREA

                 PRECIPITATION DATA

  37 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                     STORM AREA =     .01

  33 LS          SCS LOSS RATE
                       STRTL         .25  INITIAL ABSTRACTION
                      CRVNBR       89.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  34 UD          SCS DIMENSIONLESS UNITGRAPH
```

```
                        TLAG         .02  LAG

                                                                  ***

                                                          UNIT HYDROGRAPH
                                                      5 END-OF-PERIOD ORDINATES
                 73.       20.        4.        1.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P1A
                            FOR PLAN 1, RATIO = 1.00

     TOTAL RAINFALL =    4.59, TOTAL LOSS =    1.21, TOTAL EXCESS =    3.38

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      33.     12.08                  4.          1.          1.           1.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)        2.          2.          2.           2.

                        CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P1A
                            FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      33.     12.08                  4.          1.          1.           1.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)        2.          2.          2.           2.

                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   38 KP        PLAN  2 FOR STATION      P1A
                                  RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   32 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   40 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                      STORM AREA =     .01

   33 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   34 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .02  LAG

                                                                  ***

                                                          UNIT HYDROGRAPH
                                                      5 END-OF-PERIOD ORDINATES
                 73.       20.        4.        1.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P1A
                            FOR PLAN 2, RATIO = 1.00
```

```
     TOTAL RAINFALL =    8.86, TOTAL LOSS =    1.33, TOTAL EXCESS =    7.53

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      52.     12.08                     7.          3.          3.           3.
                        (INCHES)     5.421       7.525       7.525        7.525
                         (AC-FT)        4.          5.          5.           5.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION      P1A
                             FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      52.     12.08                     7.          3.          3.           3.
                        (INCHES)     5.421       7.525       7.525        7.525
                         (AC-FT)        4.          5.          5.           5.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   41 KP        PLAN  3 FOR STATION      P1A
                                    RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   32 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   43 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                     STORM AREA =     .01

   33 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   34 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 73.       20.        4.        1.        0.

       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION      P1A
                             FOR PLAN 3, RATIO = 1.00

     TOTAL RAINFALL =   11.51, TOTAL LOSS =    1.36, TOTAL EXCESS =   10.15

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      60.     12.08                     9.          3.          3.           3.
                        (INCHES)     6.905      10.139      10.139       10.139
                         (AC-FT)        5.          7.          7.           7.

                         CUMULATIVE AREA =     .01 SQ MI
```

```
      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      P1A
                          FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      60.     12.08                    9.          3.          3.           3.
                       (INCHES)     6.905      10.139      10.139       10.139
                        (AC-FT)        5.          7.          7.           7.

                       CUMULATIVE AREA =     .01 SQ MI


 ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***

   44 KP        PLAN  4 FOR STATION      P1A
                                    RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   32 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   46 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                   STORM AREA =     .01

   33 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   34 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                       5 END-OF-PERIOD ORDINATES
                 73.       20.        4.        1.        0.

      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      P1A
                          FOR PLAN 4, RATIO = 1.00

    TOTAL RAINFALL =   13.68, TOTAL LOSS =    1.38, TOTAL EXCESS =   12.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      67.     12.08                   11.          4.          4.           4.
                       (INCHES)     8.074      12.288      12.288       12.288
                        (AC-FT)        5.          8.          8.           8.

                       CUMULATIVE AREA =     .01 SQ MI


      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      P1A
                          FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      67.     12.08                   11.          4.          4.           4.
                       (INCHES)     8.074      12.288      12.288       12.288
                        (AC-FT)        5.          8.          8.           8.
```

```
                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   47 KP        PLAN  5 FOR STATION      P1A
                                  RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   32 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   49 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                 STORM AREA =     .01

   33 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   34 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 73.       20.        4.        1.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1A
                           FOR PLAN 5, RATIO = 1.00

    TOTAL RAINFALL =   16.03, TOTAL LOSS =    1.39, TOTAL EXCESS =   14.64

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      73.     12.08                  13.          5.          5.           5.
                        (INCHES)     9.276      14.621      14.621       14.621
                         (AC-FT)       6.         10.         10.          10.

                        CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1A
                           FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      73.     12.08                  13.          5.          5.           5.
                        (INCHES)     9.276      14.621      14.621       14.621
                         (AC-FT)       6.         10.         10.          10.

                        CUMULATIVE AREA =     .01 SQ MI


 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
   50 KK    *     COMB1  *
            *            *
            **************
```

```
 51 HC          HYDROGRAPH COMBINATION
                     ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    COMB1
                          FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      63.     12.08                     7.          2.          2.           2.
                       (INCHES)     2.745       3.378       3.378        3.378
                        (AC-FT)        4.          4.          4.           4.

                        CUMULATIVE AREA =     .02 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    COMB1
                          FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     100.     12.08                    14.          5.          5.           5.
                       (INCHES)     5.421       7.525       7.525        7.525
                        (AC-FT)        7.         10.         10.          10.

                        CUMULATIVE AREA =     .02 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    COMB1
                          FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     117.     12.08                    18.          7.          7.           7.
                       (INCHES)     6.905      10.139      10.139       10.139
                        (AC-FT)        9.         13.         13.          13.

                        CUMULATIVE AREA =     .02 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    COMB1
                          FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     130.     12.08                    21.          8.          8.           8.
                       (INCHES)     8.074      12.288      12.288       12.288
                        (AC-FT)       11.         16.         16.          16.

                        CUMULATIVE AREA =     .02 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    COMB1
                          FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     142.     12.08                    25.         10.         10.          10.
                       (INCHES)     9.276      14.621      14.621       14.621
```

```
                        (AC-FT)       12.         19.         19.          19.

                        CUMULATIVE AREA =     .02 SQ MI



*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  52 KK     *       E1B  *
            *            *
            **************


***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  53 KP        PLAN  1 FOR STATION      E1B
                                 RUNOFF COMPUTATION 2-YRS STORM IN BASIN

               SUBBASIN RUNOFF DATA

  54 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .01  SUBBASIN AREA

                 PRECIPITATION DATA

  59 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                   STORM AREA =     .01

  55 LS          SCS LOSS RATE
                       STRTL         .25  INITIAL ABSTRACTION
                      CRVNBR       89.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  56 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .02  LAG

                                                                  ***

                                                          UNIT HYDROGRAPH
                                                       5 END-OF-PERIOD ORDINATES
                 56.       16.        3.        1.        0.

      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      E1B
                          FOR PLAN 1, RATIO = 1.00

    TOTAL RAINFALL =    4.59, TOTAL LOSS =    1.21, TOTAL EXCESS =    3.38

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      25.     12.08                  3.          1.          1.           1.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)       1.          2.          2.           2.

                        CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      E1B
                          FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      25.     12.08                  3.          1.          1.           1.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)       1.          2.          2.           2.
```

```
                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   60 KP        PLAN  2 FOR STATION      E1B
                                    RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   54 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   62 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                STORM AREA =     .01

   55 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   56 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 56.       16.        3.        1.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1B
                           FOR PLAN 2, RATIO = 1.00

     TOTAL RAINFALL =    8.86, TOTAL LOSS =    1.33, TOTAL EXCESS =    7.53

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      40.     12.08                  6.          2.          2.           2.
                        (INCHES)     5.421       7.525       7.525        7.525
                         (AC-FT)        3.          4.          4.           4.

                        CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1B
                           FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      40.     12.08                  6.          2.          2.           2.
                        (INCHES)     5.421       7.525       7.525        7.525
                         (AC-FT)        3.          4.          4.           4.

                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   63 KP        PLAN  3 FOR STATION      E1B
                                    RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   54 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA
```

```
                PRECIPITATION DATA

   65 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                STORM AREA =     .01

   55 LS        SCS LOSS RATE
                      STRTL         .25  INITIAL ABSTRACTION
                     CRVNBR       89.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

   56 UD        SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .02  LAG

                                                                ***

                                                          UNIT HYDROGRAPH
                                                     5 END-OF-PERIOD ORDINATES
               56.       16.        3.        1.        0.

       ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      E1B
                          FOR PLAN 3, RATIO = 1.00

     TOTAL RAINFALL =   11.51, TOTAL LOSS =    1.36, TOTAL EXCESS =   10.15

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      47.     12.08                  7.          3.          3.           3.
                        (INCHES)     6.905      10.139      10.139       10.139
                         (AC-FT)       4.          5.          5.           5.

                         CUMULATIVE AREA =     .01 SQ MI


       ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      E1B
                          FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      47.     12.08                  7.          3.          3.           3.
                        (INCHES)     6.905      10.139      10.139       10.139
                         (AC-FT)       4.          5.          5.           5.

                         CUMULATIVE AREA =     .01 SQ MI


 ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***

   66 KP        PLAN  4 FOR STATION      E1B
                                  RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   54 BA        SUBBASIN CHARACTERISTICS
                       TAREA         .01  SUBBASIN AREA

                PRECIPITATION DATA

   68 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                STORM AREA =     .01

   55 LS        SCS LOSS RATE
                      STRTL         .25  INITIAL ABSTRACTION
                     CRVNBR       89.00  CURVE NUMBER
```

```
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

   56 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .02  LAG

                                                                ***

                                                          UNIT HYDROGRAPH
                                                       5 END-OF-PERIOD ORDINATES
                 56.       16.        3.        1.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1B
                           FOR PLAN 4, RATIO = 1.00

     TOTAL RAINFALL =   13.68, TOTAL LOSS =    1.38, TOTAL EXCESS =   12.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      52.     12.08                     9.          3.          3.           3.
                       (INCHES)     8.074      12.288      12.288       12.288
                        (AC-FT)        4.          6.          6.           6.

                        CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1B
                           FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      52.     12.08                     9.          3.          3.           3.
                       (INCHES)     8.074      12.288      12.288       12.288
                        (AC-FT)        4.          6.          6.           6.

                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   69 KP        PLAN  5 FOR STATION      E1B
                                  RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   54 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   71 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                     STORM AREA =     .01

   55 LS          SCS LOSS RATE
                       STRTL         .25  INITIAL ABSTRACTION
                      CRVNBR       89.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

   56 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .02  LAG

                                                                ***

                                                          UNIT HYDROGRAPH
                                                       5 END-OF-PERIOD ORDINATES
                 56.       16.        3.        1.        0.

       ***             ***             ***             ***             ***
```

```
                        HYDROGRAPH AT STATION      E1B
                          FOR PLAN 5, RATIO = 1.00

     TOTAL RAINFALL =   16.03, TOTAL LOSS =    1.39, TOTAL EXCESS =   14.64

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      57.     12.08                   10.          4.          4.           4.
                       (INCHES)     9.276      14.621      14.621       14.621
                        (AC-FT)        5.          8.          8.           8.

                       CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      E1B
                          FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      57.     12.08                   10.          4.          4.           4.
                       (INCHES)     9.276      14.621      14.621       14.621
                        (AC-FT)        5.          8.          8.           8.

                       CUMULATIVE AREA =     .01 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


             **************
             *            *
   72 KK     *       P1B  *
             *            *
             **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   73 KP        PLAN  1 FOR STATION      P1B
                                 RUNOFF COMPUTATION 2-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   74 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   79 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                   STORM AREA =     .01

   75 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   76 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                35.       10.        2.        0.        0.

       ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      P1B
                          FOR PLAN 1, RATIO = 1.00
```

```
     TOTAL RAINFALL =    4.59, TOTAL LOSS =    1.21, TOTAL EXCESS =    3.38

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      15.     12.08                  2.          1.          1.           1.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)       1.          1.          1.           1.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION      P1B
                             FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      15.     12.08                  2.          1.          1.           1.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)       1.          1.          1.           1.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   80 KP        PLAN  2 FOR STATION      P1B
                                  RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   74 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   82 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                     STORM AREA =     .01

   75 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   76 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                ***

                                                          UNIT HYDROGRAPH
                                                     5 END-OF-PERIOD ORDINATES
                35.       10.        2.        0.        0.

       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION      P1B
                             FOR PLAN 2, RATIO = 1.00

     TOTAL RAINFALL =    8.86, TOTAL LOSS =    1.33, TOTAL EXCESS =    7.53

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      24.     12.08                  3.          1.          1.           1.
                        (INCHES)     5.421       7.525       7.525        7.525
                         (AC-FT)       2.          2.          2.           2.

                         CUMULATIVE AREA =     .01 SQ MI
```

```
      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      P1B
                          FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                         (CFS)
+      24.     12.08                  3.          1.          1.           1.
                       (INCHES)     5.421       7.525       7.525        7.525
                        (AC-FT)        2.          2.          2.           2.

                       CUMULATIVE AREA =     .01 SQ MI


 ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***

   83 KP        PLAN  3 FOR STATION      P1B
                                  RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   74 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   85 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                     STORM AREA =     .01

   75 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   76 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                       5 END-OF-PERIOD ORDINATES
                35.       10.        2.        0.        0.

      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      P1B
                          FOR PLAN 3, RATIO = 1.00

    TOTAL RAINFALL =   11.51, TOTAL LOSS =    1.36, TOTAL EXCESS =   10.15

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                         (CFS)
+      29.     12.08                  4.          2.          2.           2.
                       (INCHES)     6.905      10.139      10.139       10.139
                        (AC-FT)        2.          3.          3.           3.

                       CUMULATIVE AREA =     .01 SQ MI


      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      P1B
                          FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                         (CFS)
+      29.     12.08                  4.          2.          2.           2.
                       (INCHES)     6.905      10.139      10.139       10.139
                        (AC-FT)        2.          3.          3.           3.
```

```
                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   86 KP        PLAN  4 FOR STATION      P1B
                                   RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   74 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   88 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                   STORM AREA =     .01

   75 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   76 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                35.       10.        2.        0.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1B
                           FOR PLAN 4, RATIO = 1.00

     TOTAL RAINFALL =   13.68, TOTAL LOSS =    1.38, TOTAL EXCESS =   12.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      32.     12.08                  5.          2.          2.           2.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)        3.          4.          4.           4.

                         CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1B
                           FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      32.     12.08                  5.          2.          2.           2.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)        3.          4.          4.           4.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   89 KP        PLAN  5 FOR STATION      P1B
                                   RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   74 BA          SUBBASIN CHARACTERISTICS
```

```
                    TAREA         .01  SUBBASIN AREA

                PRECIPITATION DATA

  91 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                STORM AREA =     .01

  75 LS         SCS LOSS RATE
                     STRTL         .25  INITIAL ABSTRACTION
                    CRVNBR       89.00  CURVE NUMBER
                     RTIMP         .00  PERCENT IMPERVIOUS AREA

  76 UD         SCS DIMENSIONLESS UNITGRAPH
                      TLAG         .03  LAG

                                                                  ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
               35.       10.        2.        0.        0.

     ***            ***            ***            ***            ***

                       HYDROGRAPH AT STATION      P1B
                         FOR PLAN 5, RATIO = 1.00

    TOTAL RAINFALL =   16.03, TOTAL LOSS =    1.39, TOTAL EXCESS =   14.64

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      35.     12.08                  6.          2.          2.           2.
                       (INCHES)     9.276      14.621      14.621       14.621
                        (AC-FT)       3.          5.          5.           5.

                        CUMULATIVE AREA =     .01 SQ MI


     ***            ***            ***            ***            ***

                       HYDROGRAPH AT STATION      P1B
                         FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      35.     12.08                  6.          2.          2.           2.
                       (INCHES)     9.276      14.621      14.621       14.621
                        (AC-FT)       3.          5.          5.           5.

                        CUMULATIVE AREA =     .01 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  92 KK     *        E3  *
            *            *
            **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  93 KP        PLAN  1 FOR STATION       E3
                                 RUNOFF COMPUTATION 2-YRS STORM IN BASIN

               SUBBASIN RUNOFF DATA

  94 BA          SUBBASIN CHARACTERISTICS
                    TAREA         .00  SUBBASIN AREA
```

```
                PRECIPITATION DATA

  99 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                   STORM AREA =     .00

  95 LS         SCS LOSS RATE
                      STRTL         .25  INITIAL ABSTRACTION
                     CRVNBR       89.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA

  96 UD         SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .02  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
               10.        3.        1.        0.        0.

      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION       E3
                          FOR PLAN 1, RATIO = 1.00

    TOTAL RAINFALL =    4.59, TOTAL LOSS =    1.21, TOTAL EXCESS =    3.38

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       4.     12.08                    1.          0.          0.           0.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)        0.          0.          0.           0.

                        CUMULATIVE AREA =     .00 SQ MI


      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION       E3
                          FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       4.     12.08                    1.          0.          0.           0.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)        0.          0.          0.           0.

                        CUMULATIVE AREA =     .00 SQ MI


 ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***

  100 KP        PLAN  2 FOR STATION       E3
                                   RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  94 BA         SUBBASIN CHARACTERISTICS
                      TAREA         .00  SUBBASIN AREA

                PRECIPITATION DATA

  102 PH                               DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                  .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                   STORM AREA =     .00

  95 LS         SCS LOSS RATE
                      STRTL         .25  INITIAL ABSTRACTION
                     CRVNBR       89.00  CURVE NUMBER
                      RTIMP         .00  PERCENT IMPERVIOUS AREA
```

```
  96 UD          SCS DIMENSIONLESS UNITGRAPH
                       TLAG         .02  LAG

                                                          ***

                                                      UNIT HYDROGRAPH
                                                  5 END-OF-PERIOD ORDINATES
                10.        3.        1.        0.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       E3
                           FOR PLAN 2, RATIO = 1.00

    TOTAL RAINFALL =    8.86, TOTAL LOSS =    1.33, TOTAL EXCESS =    7.53

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                         (CFS)
+       7.     12.08                  1.          0.          0.           0.
                       (INCHES)     5.421       7.525       7.525        7.525
                        (AC-FT)        0.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       E3
                           FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                         (CFS)
+       7.     12.08                  1.          0.          0.           0.
                       (INCHES)     5.421       7.525       7.525        7.525
                        (AC-FT)        0.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  103 KP        PLAN  3 FOR STATION       E3
                                  RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   94 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

  105 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                   STORM AREA =     .00

   95 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   96 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .02  LAG

                                                          ***

                                                      UNIT HYDROGRAPH
                                                  5 END-OF-PERIOD ORDINATES
                10.        3.        1.        0.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       E3
```

```
                          FOR PLAN 3, RATIO = 1.00

     TOTAL RAINFALL =   11.51, TOTAL LOSS =    1.36, TOTAL EXCESS =   10.15

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       8.     12.08                   1.          0.          0.           0.
                        (INCHES)     6.906      10.139      10.139       10.139
                         (AC-FT)        1.          1.          1.           1.

                         CUMULATIVE AREA =     .00 SQ MI


       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION       E3
                             FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       8.     12.08                   1.          0.          0.           0.
                        (INCHES)     6.906      10.139      10.139       10.139
                         (AC-FT)        1.          1.          1.           1.

                         CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  106 KP        PLAN  4 FOR STATION       E3
                                  RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   94 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

  108 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                   STORM AREA =     .00

   95 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   96 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                          ***

                                                      UNIT HYDROGRAPH
                                                  5 END-OF-PERIOD ORDINATES
                10.        3.        1.        0.        0.

       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION       E3
                             FOR PLAN 4, RATIO = 1.00

     TOTAL RAINFALL =   13.68, TOTAL LOSS =    1.38, TOTAL EXCESS =   12.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       9.     12.08                   1.          1.          1.           1.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)        1.          1.          1.           1.

                         CUMULATIVE AREA =     .00 SQ MI
```

```
      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION       E3
                          FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       9.     12.08                   1.          1.          1.           1.
                       (INCHES)     8.074      12.288      12.288       12.288
                        (AC-FT)        1.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  109 KP        PLAN  5 FOR STATION       E3
                                  RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   94 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

  111 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                   STORM AREA =     .00

   95 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   96 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                ***

                                                        UNIT HYDROGRAPH
                                                   5 END-OF-PERIOD ORDINATES
                10.        3.        1.        0.        0.

      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION       E3
                          FOR PLAN 5, RATIO = 1.00

    TOTAL RAINFALL =   16.03, TOTAL LOSS =    1.39, TOTAL EXCESS =   14.64

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      10.     12.08                   2.          1.          1.           1.
                       (INCHES)     9.277      14.621      14.621       14.621
                        (AC-FT)        1.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION       E3
                          FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      10.     12.08                   2.          1.          1.           1.
                       (INCHES)     9.277      14.621      14.621       14.621
```

```
                        (AC-FT)        1.          1.          1.          1.

                        CUMULATIVE AREA =     .00 SQ MI



*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  112 KK    *     COMB2  *
            *            *
            **************

  113 HC          HYDROGRAPH COMBINATION
                       ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB2
                            FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+      45.     12.08                     5.          2.          2.           2.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)        3.          3.          3.           3.

                        CUMULATIVE AREA =     .02 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB2
                            FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+      71.     12.08                    10.          4.          4.           4.
                        (INCHES)     5.421       7.525       7.525        7.525
                         (AC-FT)        5.          7.          7.           7.

                        CUMULATIVE AREA =     .02 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB2
                            FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+      83.     12.08                    13.          5.          5.           5.
                        (INCHES)     6.905      10.139      10.139       10.139
                         (AC-FT)        6.          9.          9.           9.

                        CUMULATIVE AREA =     .02 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB2
                            FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+      93.     12.08                    15.          6.          6.           6.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)        8.         11.         11.          11.
```

```
                        CUMULATIVE AREA =     .02 SQ MI

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB2
                            FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     101.     12.08                   17.          7.          7.           7.
                        (INCHES)     9.276      14.621      14.621       14.621
                         (AC-FT)        9.         14.         14.          14.

                        CUMULATIVE AREA =     .02 SQ MI


 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


             **************
             *            *
  114 KK     *     COMB3  *
             *            *
             **************

  115 HC          HYDROGRAPH COMBINATION
                        ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB3
                            FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     108.     12.08                   12.          4.          4.           4.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)        6.          8.          8.           8.

                        CUMULATIVE AREA =     .04 SQ MI

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB3
                            FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     172.     12.08                   25.          9.          9.           9.
                        (INCHES)     5.421       7.525       7.525        7.525
                         (AC-FT)       12.         17.         17.          17.

                        CUMULATIVE AREA =     .04 SQ MI

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB3
                            FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     200.     12.08                   31.         11.         11.          11.
                        (INCHES)     6.905      10.139      10.139       10.139
                         (AC-FT)       16.         23.         23.          23.
```

```
                        CUMULATIVE AREA =     .04 SQ MI

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION    COMB3
                           FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     223.     12.08                37.         14.         14.          14.
                         (INCHES)     8.074      12.288      12.288       12.288
                          (AC-FT)       18.         28.         28.          28.

                        CUMULATIVE AREA =     .04 SQ MI

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION    COMB3
                           FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     244.     12.08                42.         17.         17.          17.
                         (INCHES)     9.276      14.621      14.621       14.621
                          (AC-FT)       21.         33.         33.          33.

                        CUMULATIVE AREA =     .04 SQ MI


 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  116 KK    *        E2  *
            *            *
            **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  117 KP        PLAN  1 FOR STATION       E2
                                  RUNOFF COMPUTATION 2-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  118 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .03  SUBBASIN AREA

                  PRECIPITATION DATA

  123 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                     STORM AREA =     .03

  119 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  120 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                ***

                                                         UNIT HYDROGRAPH
                                                     5 END-OF-PERIOD ORDINATES
                161.       45.        9.        2.        0.

       ***             ***             ***             ***             ***
```

```
                        HYDROGRAPH AT STATION       E2
                          FOR PLAN 1, RATIO = 1.00

    TOTAL RAINFALL =    4.59, TOTAL LOSS =    1.21, TOTAL EXCESS =    3.38

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                         (CFS)
+      72.     12.08                  8.          3.          3.           3.
                       (INCHES)     2.745       3.378       3.378        3.378
                        (AC-FT)        4.          5.          5.           5.

                        CUMULATIVE AREA =     .03 SQ MI


       ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION       E2
                          FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                         (CFS)
+      72.     12.08                  8.          3.          3.           3.
                       (INCHES)     2.745       3.378       3.378        3.378
                        (AC-FT)        4.          5.          5.           5.

                        CUMULATIVE AREA =     .03 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  124 KP        PLAN  2 FOR STATION       E2
                                  RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  118 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .03  SUBBASIN AREA

                  PRECIPITATION DATA

  126 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                   STORM AREA =     .03

  119 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  120 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                161.       45.        9.        2.        0.

       ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION       E2
                          FOR PLAN 2, RATIO = 1.00

    TOTAL RAINFALL =    8.86, TOTAL LOSS =    1.33, TOTAL EXCESS =    7.53

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                         (CFS)
+     114.     12.08                 16.          6.          6.           6.
                       (INCHES)     5.420       7.524       7.524        7.524
                        (AC-FT)        8.         11.         11.          11.
```

```
                        CUMULATIVE AREA =     .03 SQ MI

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     114.     12.08                   16.          6.          6.           6.
                         (INCHES)     5.420       7.524       7.524        7.524
                          (AC-FT)        8.         11.         11.          11.

                        CUMULATIVE AREA =     .03 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  127 KP        PLAN  3 FOR STATION       E2
                                    RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  118 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .03  SUBBASIN AREA

                  PRECIPITATION DATA

  129 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                   STORM AREA =     .03

  119 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  120 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                161.       45.        9.        2.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 3, RATIO = 1.00

     TOTAL RAINFALL =   11.51, TOTAL LOSS =    1.36, TOTAL EXCESS =   10.15

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     133.     12.08                   21.          8.          8.           8.
                         (INCHES)     6.905      10.138      10.138       10.138
                          (AC-FT)       10.         15.         15.          15.

                        CUMULATIVE AREA =     .03 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
```

```
+     133.     12.08                    21.          8.          8.           8.
                        (INCHES)     6.905      10.138      10.138       10.138
                         (AC-FT)       10.         15.         15.          15.

                         CUMULATIVE AREA =     .03 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  130 KP        PLAN  4 FOR STATION       E2
                                    RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  118 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .03  SUBBASIN AREA

                  PRECIPITATION DATA

  132 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                STORM AREA =     .03

  119 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  120 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                161.       45.        9.        2.        0.

      ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 4, RATIO = 1.00

    TOTAL RAINFALL =   13.68, TOTAL LOSS =    1.38, TOTAL EXCESS =   12.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     148.     12.08                    24.          9.          9.           9.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)       12.         18.         18.          18.

                         CUMULATIVE AREA =     .03 SQ MI


      ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     148.     12.08                    24.          9.          9.           9.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)       12.         18.         18.          18.

                         CUMULATIVE AREA =     .03 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  133 KP        PLAN  5 FOR STATION       E2
                                    RUNOFF COMPUTATION 100-YRS STORM IN BASIN
```

```
                SUBBASIN RUNOFF DATA

  118 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .03  SUBBASIN AREA

                  PRECIPITATION DATA

  135 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                   STORM AREA =     .03

  119 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  120 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                161.       45.        9.        2.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 5, RATIO = 1.00

     TOTAL RAINFALL =   16.03, TOTAL LOSS =    1.39, TOTAL EXCESS =   14.64

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     162.     12.08                   28.         11.         11.          11.
                        (INCHES)     9.276      14.620      14.620       14.620
                         (AC-FT)       14.         22.         22.          22.

                         CUMULATIVE AREA =     .03 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     162.     12.08                   28.         11.         11.          11.
                        (INCHES)     9.276      14.620      14.620       14.620
                         (AC-FT)       14.         22.         22.          22.

                         CUMULATIVE AREA =     .03 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


             **************
             *            *
  136 KK     *         P2 *
             *            *
             **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  137 KP        PLAN  1 FOR STATION       P2
                                   RUNOFF COMPUTATION 2-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA
```

```
  138 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .02  SUBBASIN AREA

                  PRECIPITATION DATA

  143 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                     STORM AREA =     .02

  139 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  140 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                  ***

                                                              UNIT HYDROGRAPH
                                                         5 END-OF-PERIOD ORDINATES
               141.       39.        8.        2.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       P2
                           FOR PLAN 1, RATIO = 1.00

    TOTAL RAINFALL =    4.59, TOTAL LOSS =    1.21, TOTAL EXCESS =    3.38

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      63.     12.08                     7.          2.          2.           2.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)        4.          4.          4.           4.

                         CUMULATIVE AREA =     .02 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       P2
                           FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      63.     12.08                     7.          2.          2.           2.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)        4.          4.          4.           4.

                         CUMULATIVE AREA =     .02 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  144 KP        PLAN  2 FOR STATION       P2
                                   RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  138 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .02  SUBBASIN AREA

                  PRECIPITATION DATA

  146 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                     STORM AREA =     .02

  139 LS          SCS LOSS RATE
```

```
                    STRTL         .25  INITIAL ABSTRACTION
                   CRVNBR       89.00  CURVE NUMBER
                    RTIMP         .00  PERCENT IMPERVIOUS AREA

  140 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG         .03  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
               141.       39.        8.        2.        0.

      ***             ***             ***             ***             ***

                       HYDROGRAPH AT STATION       P2
                         FOR PLAN 2, RATIO = 1.00

    TOTAL RAINFALL =    8.86, TOTAL LOSS =    1.33, TOTAL EXCESS =    7.53

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                         (CFS)
+     100.     12.08                  14.          5.          5.           5.
                       (INCHES)     5.420       7.524       7.524        7.524
                        (AC-FT)        7.         10.         10.          10.

                       CUMULATIVE AREA =     .02 SQ MI


      ***             ***             ***             ***             ***

                       HYDROGRAPH AT STATION       P2
                         FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                         (CFS)
+     100.     12.08                  14.          5.          5.           5.
                       (INCHES)     5.420       7.524       7.524        7.524
                        (AC-FT)        7.         10.         10.          10.

                       CUMULATIVE AREA =     .02 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  147 KP        PLAN  3 FOR STATION       P2
                                RUNOFF COMPUTATION 25-YRS STORM IN BASIN

               SUBBASIN RUNOFF DATA

  138 BA          SUBBASIN CHARACTERISTICS
                     TAREA         .02  SUBBASIN AREA

                  PRECIPITATION DATA

  149 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                     STORM AREA =     .02

  139 LS          SCS LOSS RATE
                     STRTL         .25  INITIAL ABSTRACTION
                   CRVNBR       89.00  CURVE NUMBER
                    RTIMP         .00  PERCENT IMPERVIOUS AREA

  140 UD          SCS DIMENSIONLESS UNITGRAPH
                     TLAG         .03  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
               141.       39.        8.        2.        0.
```

```
      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION       P2
                          FOR PLAN 3, RATIO = 1.00

    TOTAL RAINFALL =   11.51, TOTAL LOSS =    1.36, TOTAL EXCESS =   10.15

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     116.     12.08                   18.          7.          7.           7.
                       (INCHES)     6.905      10.139      10.139       10.139
                        (AC-FT)        9.         13.         13.          13.

                        CUMULATIVE AREA =     .02 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION       P2
                          FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     116.     12.08                   18.          7.          7.           7.
                       (INCHES)     6.905      10.139      10.139       10.139
                        (AC-FT)        9.         13.         13.          13.

                        CUMULATIVE AREA =     .02 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  150 KP        PLAN  4 FOR STATION       P2
                                  RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  138 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .02  SUBBASIN AREA

                  PRECIPITATION DATA

  152 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                     STORM AREA =     .02

  139 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  140 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                      5 END-OF-PERIOD ORDINATES
                141.       39.        8.        2.        0.

      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION       P2
                          FOR PLAN 4, RATIO = 1.00

    TOTAL RAINFALL =   13.68, TOTAL LOSS =    1.38, TOTAL EXCESS =   12.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     130.     12.08                   21.          8.          8.           8.
                       (INCHES)     8.074      12.288      12.288       12.288
```

```
                        (AC-FT)       11.         16.         16.          16.

                        CUMULATIVE AREA =     .02 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       P2
                           FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     130.     12.08                  21.          8.          8.           8.
                       (INCHES)     8.074      12.288      12.288       12.288
                        (AC-FT)       11.         16.         16.          16.

                        CUMULATIVE AREA =     .02 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  153 KP        PLAN  5 FOR STATION       P2
                                   RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  138 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .02  SUBBASIN AREA

                  PRECIPITATION DATA

  155 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                     STORM AREA =     .02

  139 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  140 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                  ***

                                                              UNIT HYDROGRAPH
                                                         5 END-OF-PERIOD ORDINATES
                141.       39.        8.        2.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       P2
                           FOR PLAN 5, RATIO = 1.00

    TOTAL RAINFALL =   16.03, TOTAL LOSS =    1.39, TOTAL EXCESS =   14.64

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     142.     12.08                  24.         10.         10.          10.
                       (INCHES)     9.276      14.621      14.621       14.621
                        (AC-FT)       12.         19.         19.          19.

                        CUMULATIVE AREA =     .02 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       P2
                           FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
```

```
                          (CFS)
+     142.     12.08                   24.         10.         10.          10.
                       (INCHES)     9.276      14.621      14.621       14.621
                        (AC-FT)       12.         19.         19.          19.

                        CUMULATIVE AREA =     .02 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  156 KK    *       P1C  *
            *            *
            **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  157 KP        PLAN  1 FOR STATION      P1C
                                 RUNOFF COMPUTATION 2-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  158 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

  163 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                   STORM AREA =     .00

  159 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  160 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                     5 END-OF-PERIOD ORDINATES
                  4.        1.        0.        0.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P1C
                            FOR PLAN 1, RATIO = 1.00

     TOTAL RAINFALL =    4.59, TOTAL LOSS =    1.21, TOTAL EXCESS =    3.38

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       2.     12.08                    0.          0.          0.           0.
                       (INCHES)     2.745       3.378       3.378        3.378
                        (AC-FT)        0.          0.          0.           0.

                        CUMULATIVE AREA =     .00 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P1C
                            FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       2.     12.08                    0.          0.          0.           0.
```

```
                    (INCHES)     2.745       3.378       3.378        3.378
                     (AC-FT)        0.          0.          0.           0.

                     CUMULATIVE AREA =     .00 SQ MI


***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  164 KP        PLAN  2 FOR STATION      P1C
                                RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  158 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

  166 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                  STORM AREA =     .00

  159 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  160 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                       5 END-OF-PERIOD ORDINATES
                  4.        1.        0.        0.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1C
                           FOR PLAN 2, RATIO = 1.00

     TOTAL RAINFALL =    8.86, TOTAL LOSS =    1.33, TOTAL EXCESS =    7.53

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       3.     12.08                  0.          0.          0.           0.
                       (INCHES)     5.421       7.525       7.525        7.525
                        (AC-FT)        0.          0.          0.           0.

                        CUMULATIVE AREA =     .00 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1C
                           FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       3.     12.08                  0.          0.          0.           0.
                       (INCHES)     5.421       7.525       7.525        7.525
                        (AC-FT)        0.          0.          0.           0.

                        CUMULATIVE AREA =     .00 SQ MI


***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  167 KP        PLAN  3 FOR STATION      P1C
                                RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA
```

```
  158 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

  169 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                   STORM AREA =     .00

  159 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  160 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                  ***

                                                              UNIT HYDROGRAPH
                                                         5 END-OF-PERIOD ORDINATES
                  4.        1.        0.        0.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1C
                           FOR PLAN 3, RATIO = 1.00

     TOTAL RAINFALL =   11.51, TOTAL LOSS =    1.36, TOTAL EXCESS =   10.15

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                         (CFS)
+       3.     12.08                    1.          0.          0.           0.
                       (INCHES)     6.906      10.139      10.139       10.139
                        (AC-FT)        0.          0.          0.           0.

                        CUMULATIVE AREA =     .00 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1C
                           FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                         (CFS)
+       3.     12.08                    1.          0.          0.           0.
                       (INCHES)     6.906      10.139      10.139       10.139
                        (AC-FT)        0.          0.          0.           0.

                        CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  170 KP        PLAN  4 FOR STATION      P1C
                                   RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  158 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

  172 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                   STORM AREA =     .00
```

```
  159 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  160 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                          ***

                                                      UNIT HYDROGRAPH
                                                  5 END-OF-PERIOD ORDINATES
                  4.        1.        0.        0.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1C
                           FOR PLAN 4, RATIO = 1.00

    TOTAL RAINFALL =   13.68, TOTAL LOSS =    1.38, TOTAL EXCESS =   12.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       4.     12.08                  1.          0.          0.           0.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)        0.          0.          0.           0.

                         CUMULATIVE AREA =     .00 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1C
                           FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       4.     12.08                  1.          0.          0.           0.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)        0.          0.          0.           0.

                         CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  173 KP        PLAN  5 FOR STATION      P1C
                                  RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  158 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

  175 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                     STORM AREA =     .00

  159 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  160 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                          ***

                                                      UNIT HYDROGRAPH
                                                  5 END-OF-PERIOD ORDINATES
                  4.        1.        0.        0.        0.
```

```
      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      P1C
                          FOR PLAN 5, RATIO = 1.00

    TOTAL RAINFALL =   16.03, TOTAL LOSS =    1.39, TOTAL EXCESS =   14.64

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       4.     12.08                 1.          0.          0.           0.
                        (INCHES)     9.277      14.621      14.621       14.621
                         (AC-FT)       0.          1.          1.           1.

                         CUMULATIVE AREA =     .00 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      P1C
                          FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       4.     12.08                 1.          0.          0.           0.
                        (INCHES)     9.277      14.621      14.621       14.621
                         (AC-FT)       0.          1.          1.           1.

                         CUMULATIVE AREA =     .00 SQ MI


 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  176 KK    *     COMB4  *
            *            *
            **************

  177 HC          HYDROGRAPH COMBINATION
                        ICOMP           3  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    COMB4
                          FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     136.     12.08                16.          5.          5.           5.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)       8.         10.         10.          10.

                         CUMULATIVE AREA =     .05 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    COMB4
                          FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     217.     12.08                31.         11.         11.          11.
                        (INCHES)     5.420       7.524       7.524        7.524
                         (AC-FT)      15.         21.         21.          21.

                         CUMULATIVE AREA =     .05 SQ MI
```

```
       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB4
                            FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     253.     12.08                40.         15.         15.          15.
                         (INCHES)     6.905      10.139      10.139       10.139
                          (AC-FT)       20.         29.         29.          29.

                          CUMULATIVE AREA =     .05 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB4
                            FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     281.     12.08                46.         18.         18.          18.
                         (INCHES)     8.074      12.288      12.288       12.288
                          (AC-FT)       23.         35.         35.          35.

                          CUMULATIVE AREA =     .05 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB4
                            FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     308.     12.08                53.         21.         21.          21.
                         (INCHES)     9.276      14.620      14.620       14.620
                          (AC-FT)       26.         41.         41.          41.

                          CUMULATIVE AREA =     .05 SQ MI

1

                PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                                  FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                                TIME TO PEAK IN HOURS


                                                                    RATIOS APPLIED TO FLOWS
 OPERATION       STATION     AREA    PLAN            RATIO 1
                                                        1.00

 HYDROGRAPH AT
+                    E1A       .01     1   FLOW          30.
                                             TIME        12.08
                                         2   FLOW          49.
                                             TIME        12.08
                                         3   FLOW          57.
                                             TIME        12.08
                                         4   FLOW          63.
                                             TIME        12.08
                                         5   FLOW          69.
                                             TIME        12.08

 HYDROGRAPH AT
+                    P1A       .01     1   FLOW          33.
                                             TIME        12.08
                                         2   FLOW          52.
                                             TIME        12.08
                                         3   FLOW          60.
                                             TIME        12.08
                                         4   FLOW          67.
                                             TIME        12.08
```

```
                                        5   FLOW          73.
                                            TIME       12.08

  2 COMBINED AT
+                  COMB1       .02      1   FLOW          63.
                                            TIME       12.08
                                        2   FLOW         100.
                                            TIME       12.08
                                        3   FLOW         117.
                                            TIME       12.08
                                        4   FLOW         130.
                                            TIME       12.08
                                        5   FLOW         142.
                                            TIME       12.08

 HYDROGRAPH AT
+                    E1B       .01      1   FLOW          25.
                                            TIME       12.08
                                        2   FLOW          40.
                                            TIME       12.08
                                        3   FLOW          47.
                                            TIME       12.08
                                        4   FLOW          52.
                                            TIME       12.08
                                        5   FLOW          57.
                                            TIME       12.08

 HYDROGRAPH AT
+                    P1B       .01      1   FLOW          15.
                                            TIME       12.08
                                        2   FLOW          24.
                                            TIME       12.08
                                        3   FLOW          29.
                                            TIME       12.08
                                        4   FLOW          32.
                                            TIME       12.08
                                        5   FLOW          35.
                                            TIME       12.08

 HYDROGRAPH AT
+                     E3       .00      1   FLOW           4.
                                            TIME       12.08
                                        2   FLOW           7.
                                            TIME       12.08
                                        3   FLOW           8.
                                            TIME       12.08
                                        4   FLOW           9.
                                            TIME       12.08
                                        5   FLOW          10.
                                            TIME       12.08

  3 COMBINED AT
+                  COMB2       .02      1   FLOW          45.
                                            TIME       12.08
                                        2   FLOW          71.
                                            TIME       12.08
                                        3   FLOW          83.
                                            TIME       12.08
                                        4   FLOW          93.
                                            TIME       12.08
                                        5   FLOW         101.
                                            TIME       12.08

  2 COMBINED AT
+                  COMB3       .04      1   FLOW         108.
                                            TIME       12.08
                                        2   FLOW         172.
                                            TIME       12.08
                                        3   FLOW         200.
                                            TIME       12.08
                                        4   FLOW         223.
                                            TIME       12.08
                                        5   FLOW         244.
                                            TIME       12.08

 HYDROGRAPH AT
+                     E2       .03      1   FLOW          72.
                                            TIME       12.08
                                        2   FLOW         114.
                                            TIME       12.08
                                        3   FLOW         133.
```

```
                                        TIME        12.08
                                    4   FLOW         148.
                                        TIME        12.08
                                    5   FLOW         162.
                                        TIME        12.08

 HYDROGRAPH AT
+                     P2       .02    1   FLOW          63.
                                        TIME        12.08
                                    2   FLOW         100.
                                        TIME        12.08
                                    3   FLOW         116.
                                        TIME        12.08
                                    4   FLOW         130.
                                        TIME        12.08
                                    5   FLOW         142.
                                        TIME        12.08

 HYDROGRAPH AT
+                    P1C       .00    1   FLOW           2.
                                        TIME        12.08
                                    2   FLOW           3.
                                        TIME        12.08
                                    3   FLOW           3.
                                        TIME        12.08
                                    4   FLOW           4.
                                        TIME        12.08
                                    5   FLOW           4.
                                        TIME        12.08

  3 COMBINED AT
+                  COMB4       .05    1   FLOW         136.
                                        TIME        12.08
                                    2   FLOW         217.
                                        TIME        12.08
                                    3   FLOW         253.
                                        TIME        12.08
                                    4   FLOW         281.
                                        TIME        12.08
                                    5   FLOW         308.
                                        TIME        12.08


 *** NORMAL END OF HEC-1 ***
```

APPENDIX C

HYDROLOGIC ANALYSIS RESULTS FOR PROPOSED CONDITION

```
*                                      *                                                    *                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                                    *    U.S. ARMY CORPS OF ENGINEERS    *
*              JUN   1998              *                                                    *    HYDROLOGIC ENGINEERING CENTER   *
*            VERSION 4.1               *                                                    *          609 SECOND STREET         *
*  RGMHEC2000               HEC-1.COM *                                                    *       DAVIS, CALIFORNIA 95616      *
*  RUN DATE   18APR08  TIME  11:11:49 *                                                    *           (916) 756-1104           *
*                                      *                                                    *                                    *
****************************************                                                    ****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID        HYDROLOGIC ANALYSIS
  2           ID        PROJECT:  CAGUAS MILENIO, CAGUAS, P.R.
  3           ID        TRIANGULAR DISTRIBUTION
  4           ID        FREQUENCY OF OCCURRENCE: 2, 10, 25, 50 AND 100 YEARS
  5           ID        CA ENGINEERING, OCTOBER 2007
  6           ID        PROPOSED CONDITION
  7           IT       5                    289
  8           IO       3
  9           JP       5

 10           KK     E1A
 11           KP       1
 12           BA  0.0119
 13           LS       0      89
 14           UD   0.022
 15           IN      15
 16           KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
 17           PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
 18           KP       2
 19           KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
 20           PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
 21           KP       3
 22           KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
 23           PH                    0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
 24           KP       4
 25           KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
 26           PH                    0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
 27           KP       5
 28           KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
 29           PH                    0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

 30           KK     E1B
 31           KP       1
 32           BA  0.0098
 33           LS       0      89
 34           UD   0.024
 35           IN      15
 36           KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
 37           PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
 38           KP       2
 39           KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
 40           PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
 41           KP       3
 42           KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
 43           PH                    0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
 44           KP       4
 45           KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
 46           PH                    0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
 47           KP       5
 48           KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
 49           PH                    0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 50           KK     P1A
 51           KP       1
 52           BA  0.0065
 53           LS       0      93
 54           UD   0.032
 55           IN      15
 56           KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
 57           PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
 58           KP       2
 59           KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
 60           PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
 61           KP       3
 62           KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
 63           PH                    0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
 64           KP       4
 65           KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
 66           PH                    0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
 67           KP       5
 68           KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
 69           PH                    0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03
```

```
  70          KK      E3
  71          KP       1
  72          BA  0.0017
  73          LS       0      89
  74          UD   0.023
  75          IN      15
  76          KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
  77          PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
  78          KP       2
  79          KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
  80          PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
  81          KP       3
  82          KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
  83          PH                    0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
  84          KP       4
  85          KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
  86          PH                    0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
  87          KP       5
  88          KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
  89          PH                    0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

  90          KK     P2A
  91          KP       1
  92          BA  0.0014
  93          LS       0      93
  94          UD   0.033
  95          IN      15
  96          KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
  97          PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
  98          KP       2
  99          KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
 100          PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
 101          KP       3
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 102          KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
 103          PH                    0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
 104          KP       4
 105          KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
 106          PH                    0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
 107          KP       5
 108          KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
 109          PH                    0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

 110          KK   COMB1
 111          HC       5

 112          KK      E2
 113          KP       1
 114          BA  0.0280
 115          LS       0      89
 116          UD   0.031
 117          IN      15
 118          KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
 119          PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
 120          KP       2
 121          KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
 122          PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
 123          KP       3
 124          KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
 125          PH                    0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
 126          KP       4
 127          KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
 128          PH                    0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
 129          KP       5
 130          KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
 131          PH                    0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

 132          KK     P2C
 133          KP       1
 134          BA  0.0136
 135          LS       0      93
 136          UD   0.035
 137          IN      15
 138          KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
 139          PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
 140          KP       2
 141          KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
 142          PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
```

```
          143          KP       3
          144          KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
          145          PH                   0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
          146          KP       4
          147          KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
          148          PH                   0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
          149          KP       5
          150          KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
          151          PH                   0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03
1                                                HEC-1 INPUT                                          PAGE  4

         LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          152          KK    COMB2
          153          HC       2

          154          KK     P1B
          155          KP       1
          156          BA  0.0129
          157          LS       0      93
          158          UD   0.055
          159          IN      15
          160          KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
          161          PH                   0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
          162          KP       2
          163          KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
          164          PH                   0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
          165          KP       3
          166          KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
          167          PH                   0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
          168          KP       4
          169          KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
          170          PH                   0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
          171          KP       5
          172          KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
          173          PH                   0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

          174          KK     P2B
          175          KP       1
          176          BA  0.0094
          177          LS       0      93
          178          UD   0.040
          179          IN      15
          180          KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
          181          PH                   0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
          182          KP       2
          183          KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
          184          PH                   0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
          185          KP       3
          186          KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
          187          PH                   0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
          188          KP       4
          189          KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
          190          PH                   0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
          191          KP       5
          192          KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
          193          PH                   0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

          194          KK   COMB3
          195          HC       2

          196          KK   COMB4
          197          HC       2
          198          ZZ
1****************************************                                          ****************************************
 *                                      *                                          *                                      *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                          *    U.S. ARMY CORPS OF ENGINEERS      *
 *              JUN   1998              *                                          *    HYDROLOGIC ENGINEERING CENTER     *
 *            VERSION 4.1               *                                          *          609 SECOND STREET           *
 *  RGMHEC2000               HEC-1.COM  *                                          *       DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   18APR08  TIME  11:11:49  *                                          *           (916) 756-1104             *
 *                                      *                                          *                                      *
 ****************************************                                          ****************************************


                                HYDROLOGIC ANALYSIS
                                PROJECT:  CAGUAS MILENIO, CAGUAS, P.R.
```

```
                              TRIANGULAR DISTRIBUTION
                              FREQUENCY OF OCCURRENCE: 2, 10, 25, 50 AND 100 YEARS
                              CA ENGINEERING, OCTOBER 2007
                              PROPOSED CONDITION

   8 IO          OUTPUT CONTROL VARIABLES
                       IPRNT           3  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                        NMIN           5  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1    0  STARTING DATE
                       ITIME        0000  STARTING TIME
                          NQ         289  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      2    0  ENDING DATE
                      NDTIME        0000  ENDING TIME
                      ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     .08 HOURS
                       TOTAL TIME BASE   24.00 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT

     JP          MULTI-PLAN OPTION
                       NPLAN           5  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF RUNOFF
                    1.00


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  10 KK     *       E1A  *
            *            *
            **************


***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  11 KP        PLAN  1 FOR STATION      E1A
                                 RUNOFF COMPUTATION 2-YRS STORM IN BASIN

               SUBBASIN RUNOFF DATA

  12 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .01  SUBBASIN AREA

                 PRECIPITATION DATA

  17 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                   STORM AREA =     .01

  13 LS          SCS LOSS RATE
                       STRTL         .25  INITIAL ABSTRACTION
                      CRVNBR       89.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  14 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .02  LAG

                                                                  ***

                                                             UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
```

```
                68.       19.        4.        1.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1A
                           FOR PLAN 1, RATIO = 1.00

     TOTAL RAINFALL =    4.59, TOTAL LOSS =    1.21, TOTAL EXCESS =    3.38

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      30.     12.08                  4.          1.          1.           1.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)       2.          2.          2.           2.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1A
                           FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      30.     12.08                  4.          1.          1.           1.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)       2.          2.          2.           2.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   18 KP        PLAN  2 FOR STATION      E1A
                                  RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   12 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   20 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                     STORM AREA =     .01

   13 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   14 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                      5 END-OF-PERIOD ORDINATES
                68.       19.        4.        1.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1A
                           FOR PLAN 2, RATIO = 1.00

     TOTAL RAINFALL =    8.86, TOTAL LOSS =    1.33, TOTAL EXCESS =    7.53

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
```

```
+      49.     12.08                    7.          2.          2.           2.
                        (INCHES)     5.421       7.525       7.525        7.525
                         (AC-FT)        3.          5.          5.           5.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      E1A
                            FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                           (CFS)
+      49.     12.08                    7.          2.          2.           2.
                        (INCHES)     5.421       7.525       7.525        7.525
                         (AC-FT)        3.          5.          5.           5.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   21 KP        PLAN  3 FOR STATION      E1A
                                   RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   12 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   23 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                   STORM AREA =     .01

   13 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   14 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 68.       19.        4.        1.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      E1A
                            FOR PLAN 3, RATIO = 1.00

     TOTAL RAINFALL =   11.51, TOTAL LOSS =    1.36, TOTAL EXCESS =   10.15

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                           (CFS)
+      57.     12.08                    9.          3.          3.           3.
                        (INCHES)     6.905      10.139      10.139       10.139
                         (AC-FT)        4.          6.          6.           6.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      E1A
                            FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
```

```
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      57.     12.08                  9.          3.          3.           3.
                        (INCHES)     6.905      10.139      10.139       10.139
                         (AC-FT)       4.          6.          6.           6.

                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   24 KP        PLAN  4 FOR STATION      E1A
                                RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   12 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   26 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                   STORM AREA =     .01

   13 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   14 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                     5 END-OF-PERIOD ORDINATES
                 68.       19.        4.        1.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1A
                           FOR PLAN 4, RATIO = 1.00

     TOTAL RAINFALL =   13.68, TOTAL LOSS =    1.38, TOTAL EXCESS =   12.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      63.     12.08                 10.          4.          4.           4.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)       5.          8.          8.           8.

                        CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1A
                           FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      63.     12.08                 10.          4.          4.           4.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)       5.          8.          8.           8.

                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***
```

```
  27 KP        PLAN  5 FOR STATION      E1A
                                RUNOFF COMPUTATION 100-YRS STORM IN BASIN

               SUBBASIN RUNOFF DATA

  12 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .01  SUBBASIN AREA

                 PRECIPITATION DATA

  29 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                   STORM AREA =     .01

  13 LS          SCS LOSS RATE
                       STRTL         .25  INITIAL ABSTRACTION
                      CRVNBR       89.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  14 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .02  LAG

                                                                  ***

                                                          UNIT HYDROGRAPH
                                                     5 END-OF-PERIOD ORDINATES
                68.       19.        4.        1.        0.

      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      E1A
                          FOR PLAN 5, RATIO = 1.00

    TOTAL RAINFALL =   16.03, TOTAL LOSS =    1.39, TOTAL EXCESS =   14.64

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      69.     12.08                   12.          5.          5.           5.
                        (INCHES)     9.276      14.621      14.621       14.621
                         (AC-FT)        6.          9.          9.           9.

                        CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      E1A
                          FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      69.     12.08                   12.          5.          5.           5.
                        (INCHES)     9.276      14.621      14.621       14.621
                         (AC-FT)        6.          9.          9.           9.

                        CUMULATIVE AREA =     .01 SQ MI


 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


             **************
             *            *
  30 KK      *       E1B  *
             *            *
             **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  31 KP        PLAN  1 FOR STATION      E1B
                                RUNOFF COMPUTATION 2-YRS STORM IN BASIN
```

```
                SUBBASIN RUNOFF DATA

   32 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   37 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                   STORM AREA =     .01

   33 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   34 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 56.       16.        3.        1.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1B
                           FOR PLAN 1, RATIO = 1.00

    TOTAL RAINFALL =    4.59, TOTAL LOSS =    1.21, TOTAL EXCESS =    3.38

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      25.     12.08                    3.          1.          1.           1.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)        1.          2.          2.           2.

                         CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1B
                           FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      25.     12.08                    3.          1.          1.           1.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)        1.          2.          2.           2.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   38 KP        PLAN  2 FOR STATION      E1B
                                   RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   32 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   40 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00
```

```
                                                STORM AREA =     .01

   33 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   34 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                ***

                                                          UNIT HYDROGRAPH
                                                     5 END-OF-PERIOD ORDINATES
                 56.       16.        3.        1.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      E1B
                            FOR PLAN 2, RATIO = 1.00

     TOTAL RAINFALL =    8.86, TOTAL LOSS =    1.33, TOTAL EXCESS =    7.53

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+      40.     12.08                    6.          2.          2.           2.
                         (INCHES)     5.421       7.525       7.525        7.525
                          (AC-FT)        3.          4.          4.           4.

                          CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      E1B
                            FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+      40.     12.08                    6.          2.          2.           2.
                         (INCHES)     5.421       7.525       7.525        7.525
                          (AC-FT)        3.          4.          4.           4.

                          CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   41 KP        PLAN  3 FOR STATION      E1B
                                    RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   32 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   43 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                STORM AREA =     .01

   33 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   34 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                ***

                                                          UNIT HYDROGRAPH
```

```
                                                    5 END-OF-PERIOD ORDINATES
                56.       16.        3.        1.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1B
                           FOR PLAN 3, RATIO = 1.00

     TOTAL RAINFALL =   11.51, TOTAL LOSS =    1.36, TOTAL EXCESS =   10.15

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      47.     12.08                   7.          3.          3.           3.
                        (INCHES)     6.905      10.139      10.139       10.139
                         (AC-FT)        4.          5.          5.           5.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1B
                           FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      47.     12.08                   7.          3.          3.           3.
                        (INCHES)     6.905      10.139      10.139       10.139
                         (AC-FT)        4.          5.          5.           5.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   44 KP        PLAN  4 FOR STATION      E1B
                                  RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   32 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   46 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                     STORM AREA =     .01

   33 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   34 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                          ***

                                                      UNIT HYDROGRAPH
                                                    5 END-OF-PERIOD ORDINATES
                56.       16.        3.        1.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1B
                           FOR PLAN 4, RATIO = 1.00

     TOTAL RAINFALL =   13.68, TOTAL LOSS =    1.38, TOTAL EXCESS =   12.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
```

```
                          (CFS)
+      52.     12.08                    9.          3.          3.           3.
                       (INCHES)     8.074      12.288      12.288       12.288
                        (AC-FT)        4.          6.          6.           6.

                        CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      E1B
                            FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      52.     12.08                    9.          3.          3.           3.
                       (INCHES)     8.074      12.288      12.288       12.288
                        (AC-FT)        4.          6.          6.           6.

                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   47 KP        PLAN  5 FOR STATION      E1B
                                  RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   32 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   49 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                   STORM AREA =     .01

   33 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   34 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                       5 END-OF-PERIOD ORDINATES
                 56.       16.        3.        1.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      E1B
                            FOR PLAN 5, RATIO = 1.00

     TOTAL RAINFALL =   16.03, TOTAL LOSS =    1.39, TOTAL EXCESS =   14.64

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      57.     12.08                   10.          4.          4.           4.
                       (INCHES)     9.276      14.621      14.621       14.621
                        (AC-FT)        5.          8.          8.           8.

                        CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      E1B
                            FOR PLAN 5, RATIO = 1.00
```

```
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                           (CFS)
+      57.     12.08                  10.          4.          4.           4.
                         (INCHES)     9.276      14.621      14.621       14.621
                          (AC-FT)        5.          8.          8.           8.

                          CUMULATIVE AREA =     .01 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


             **************
             *            *
   50 KK     *       P1A  *
             *            *
             **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   51 KP        PLAN  1 FOR STATION      P1A
                                  RUNOFF COMPUTATION 2-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   52 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   57 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                     STORM AREA =     .01

   53 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   54 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                      5 END-OF-PERIOD ORDINATES
                37.       10.        2.        0.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1A
                           FOR PLAN 1, RATIO = 1.00

     TOTAL RAINFALL =    4.59, TOTAL LOSS =     .79, TOTAL EXCESS =    3.80

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                           (CFS)
+      18.     12.08                   2.          1.          1.           1.
                         (INCHES)     3.031       3.793       3.793        3.793
                          (AC-FT)        1.          1.          1.           1.

                          CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1A
                           FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
```

```
+   (CFS)       (HR)
                          (CFS)
+      18.     12.08                    2.          1.          1.           1.
                        (INCHES)     3.031       3.793       3.793        3.793
                         (AC-FT)        1.          1.          1.           1.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   58 KP        PLAN  2 FOR STATION      P1A
                                    RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   52 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   60 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                     STORM AREA =     .01

   53 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   54 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                  ***

                                                          UNIT HYDROGRAPH
                                                      5 END-OF-PERIOD ORDINATES
                37.       10.        2.        0.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1A
                           FOR PLAN 2, RATIO = 1.00

     TOTAL RAINFALL =    8.86, TOTAL LOSS =     .84, TOTAL EXCESS =    8.02

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      27.     12.08                    4.          1.          1.           1.
                        (INCHES)     5.649       8.009       8.009        8.009
                         (AC-FT)        2.          3.          3.           3.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1A
                           FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      27.     12.08                    4.          1.          1.           1.
                        (INCHES)     5.649       8.009       8.009        8.009
                         (AC-FT)        2.          3.          3.           3.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   61 KP        PLAN  3 FOR STATION      P1A
```

```
                                RUNOFF COMPUTATION 25-YRS STORM IN BASIN

              SUBBASIN RUNOFF DATA

   52 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   63 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                     STORM AREA =     .01

   53 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   54 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                 ***

                                                              UNIT HYDROGRAPH
                                                          5 END-OF-PERIOD ORDINATES
                37.       10.        2.        0.        0.

      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      P1A
                          FOR PLAN 3, RATIO = 1.00

     TOTAL RAINFALL =   11.51, TOTAL LOSS =     .86, TOTAL EXCESS =   10.65

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      32.     12.08                  5.          2.          2.           2.
                        (INCHES)     7.096      10.643      10.643       10.643
                         (AC-FT)       2.          4.          4.           4.

                         CUMULATIVE AREA =     .01 SQ MI


      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      P1A
                          FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      32.     12.08                  5.          2.          2.           2.
                        (INCHES)     7.096      10.643      10.643       10.643
                         (AC-FT)       2.          4.          4.           4.

                         CUMULATIVE AREA =     .01 SQ MI


 ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***

   64 KP        PLAN  4 FOR STATION      P1A
                                RUNOFF COMPUTATION 50-YRS STORM IN BASIN

              SUBBASIN RUNOFF DATA

   52 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   66 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00
```

```
                                                STORM AREA =     .01

   53 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   54 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                37.       10.        2.        0.        0.

      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      P1A
                          FOR PLAN 4, RATIO = 1.00

    TOTAL RAINFALL =   13.68, TOTAL LOSS =     .86, TOTAL EXCESS =   12.82

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      35.     12.08                    6.          2.          2.           2.
                        (INCHES)     8.241      12.804      12.804       12.804
                         (AC-FT)        3.          4.          4.           4.

                         CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      P1A
                          FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      35.     12.08                    6.          2.          2.           2.
                        (INCHES)     8.241      12.804      12.804       12.804
                         (AC-FT)        3.          4.          4.           4.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   67 KP        PLAN  5 FOR STATION      P1A
                                 RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   52 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   69 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                STORM AREA =     .01

   53 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   54 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                          ***
```

```
                                                    UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                37.       10.        2.        0.        0.

      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      P1A
                          FOR PLAN 5, RATIO = 1.00

    TOTAL RAINFALL =   16.03, TOTAL LOSS =     .87, TOTAL EXCESS =   15.16

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      38.     12.08                  7.          3.          3.           3.
                        (INCHES)     9.421      15.145      15.145       15.145
                         (AC-FT)       3.          5.          5.           5.

                         CUMULATIVE AREA =     .01 SQ MI


      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      P1A
                          FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      38.     12.08                  7.          3.          3.           3.
                        (INCHES)     9.421      15.145      15.145       15.145
                         (AC-FT)       3.          5.          5.           5.

                         CUMULATIVE AREA =     .01 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
   70 KK    *        E3  *
            *            *
            **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   71 KP        PLAN  1 FOR STATION       E3
                                  RUNOFF COMPUTATION 2-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   72 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

   77 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                   STORM AREA =     .00

   73 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   74 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                          ***

                                                    UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
```

```
                10.        3.        1.        0.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       E3
                           FOR PLAN 1, RATIO = 1.00

     TOTAL RAINFALL =    4.59, TOTAL LOSS =    1.21, TOTAL EXCESS =    3.38

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       4.     12.08                  1.          0.          0.           0.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)       0.          0.          0.           0.

                         CUMULATIVE AREA =     .00 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       E3
                           FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       4.     12.08                  1.          0.          0.           0.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)       0.          0.          0.           0.

                         CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   78 KP        PLAN  2 FOR STATION       E3
                                  RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   72 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

   80 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                   STORM AREA =     .00

   73 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   74 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                      5 END-OF-PERIOD ORDINATES
                10.        3.        1.        0.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       E3
                           FOR PLAN 2, RATIO = 1.00

     TOTAL RAINFALL =    8.86, TOTAL LOSS =    1.33, TOTAL EXCESS =    7.53

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
```

```
+       7.     12.08                    1.          0.          0.           0.
                       (INCHES)     5.421       7.525       7.525        7.525
                        (AC-FT)        0.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI


       ***            ***            ***            ***            ***

                         HYDROGRAPH AT STATION       E3
                           FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       7.     12.08                    1.          0.          0.           0.
                       (INCHES)     5.421       7.525       7.525        7.525
                        (AC-FT)        0.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   81 KP        PLAN  3 FOR STATION       E3
                                  RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   72 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

   83 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                   STORM AREA =     .00

   73 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   74 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 10.        3.        1.        0.        0.

       ***            ***            ***            ***            ***

                         HYDROGRAPH AT STATION       E3
                           FOR PLAN 3, RATIO = 1.00

    TOTAL RAINFALL =   11.51, TOTAL LOSS =    1.36, TOTAL EXCESS =   10.15

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       8.     12.08                    1.          0.          0.           0.
                       (INCHES)     6.906      10.139      10.139       10.139
                        (AC-FT)        1.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI


       ***            ***            ***            ***            ***

                         HYDROGRAPH AT STATION       E3
                           FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
```

```
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       8.     12.08                  1.          0.          0.           0.
                        (INCHES)     6.906      10.139      10.139       10.139
                         (AC-FT)       1.          1.          1.           1.

                         CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   84 KP        PLAN  4 FOR STATION       E3
                                RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   72 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

   86 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                   STORM AREA =     .00

   73 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   74 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                              ***

                                                        UNIT HYDROGRAPH
                                                   5 END-OF-PERIOD ORDINATES
                10.        3.        1.        0.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       E3
                           FOR PLAN 4, RATIO = 1.00

     TOTAL RAINFALL =   13.68, TOTAL LOSS =    1.38, TOTAL EXCESS =   12.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       9.     12.08                  1.          1.          1.           1.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)       1.          1.          1.           1.

                         CUMULATIVE AREA =     .00 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       E3
                           FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       9.     12.08                  1.          1.          1.           1.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)       1.          1.          1.           1.

                         CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***
```

```
  87 KP        PLAN  5 FOR STATION       E3
                                RUNOFF COMPUTATION 100-YRS STORM IN BASIN

               SUBBASIN RUNOFF DATA

  72 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .00  SUBBASIN AREA

                 PRECIPITATION DATA

  89 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                   STORM AREA =     .00

  73 LS          SCS LOSS RATE
                       STRTL         .25  INITIAL ABSTRACTION
                      CRVNBR       89.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  74 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .02  LAG

                                                                  ***

                                                          UNIT HYDROGRAPH
                                                      5 END-OF-PERIOD ORDINATES
                10.        3.        1.        0.        0.

      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION       E3
                          FOR PLAN 5, RATIO = 1.00

    TOTAL RAINFALL =   16.03, TOTAL LOSS =    1.39, TOTAL EXCESS =   14.64

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      10.     12.08                     2.          1.          1.           1.
                       (INCHES)     9.277      14.621      14.621       14.621
                        (AC-FT)        1.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION       E3
                          FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      10.     12.08                     2.          1.          1.           1.
                       (INCHES)     9.277      14.621      14.621       14.621
                        (AC-FT)        1.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


             **************
             *            *
  90 KK      *       P2A  *
             *            *
             **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  91 KP        PLAN  1 FOR STATION      P2A
                                RUNOFF COMPUTATION 2-YRS STORM IN BASIN
```

```
                SUBBASIN RUNOFF DATA

   92 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

   97 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                STORM AREA =     .00

   93 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   94 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                  ***

                                                              UNIT HYDROGRAPH
                                                         5 END-OF-PERIOD ORDINATES
                  8.        2.        0.        0.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2A
                           FOR PLAN 1, RATIO = 1.00

    TOTAL RAINFALL =    4.59, TOTAL LOSS =     .79, TOTAL EXCESS =    3.80

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       4.     12.08                  0.          0.          0.           0.
                        (INCHES)     3.031       3.793       3.793        3.793
                         (AC-FT)        0.          0.          0.           0.

                         CUMULATIVE AREA =     .00 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2A
                           FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       4.     12.08                  0.          0.          0.           0.
                        (INCHES)     3.031       3.793       3.793        3.793
                         (AC-FT)        0.          0.          0.           0.

                         CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   98 KP        PLAN  2 FOR STATION      P2A
                                 RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   92 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

  100 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00
```

```
                                                STORM AREA =     .00

   93 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   94 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                  8.        2.        0.        0.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2A
                            FOR PLAN 2, RATIO = 1.00

     TOTAL RAINFALL =    8.86, TOTAL LOSS =     .84, TOTAL EXCESS =    8.02

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                           (CFS)
+       6.     12.08                  1.          0.          0.           0.
                        (INCHES)     5.649       8.009       8.009        8.009
                         (AC-FT)        0.          1.          1.           1.

                         CUMULATIVE AREA =     .00 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2A
                            FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                           (CFS)
+       6.     12.08                  1.          0.          0.           0.
                        (INCHES)     5.649       8.009       8.009        8.009
                         (AC-FT)        0.          1.          1.           1.

                         CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  101 KP        PLAN  3 FOR STATION      P2A
                                  RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   92 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

  103 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                STORM AREA =     .00

   93 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   94 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
```

```
                                                    5 END-OF-PERIOD ORDINATES
                 8.        2.        0.        0.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2A
                           FOR PLAN 3, RATIO = 1.00

     TOTAL RAINFALL =   11.51, TOTAL LOSS =     .86, TOTAL EXCESS =   10.65

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       7.     12.08                  1.          0.          0.           0.
                        (INCHES)     7.096      10.643      10.643       10.643
                         (AC-FT)       1.          1.          1.           1.

                         CUMULATIVE AREA =     .00 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2A
                           FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       7.     12.08                  1.          0.          0.           0.
                        (INCHES)     7.096      10.643      10.643       10.643
                         (AC-FT)       1.          1.          1.           1.

                         CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  104 KP        PLAN  4 FOR STATION      P2A
                                  RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   92 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

  106 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                     STORM AREA =     .00

   93 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   94 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                          ***

                                                      UNIT HYDROGRAPH
                                                    5 END-OF-PERIOD ORDINATES
                 8.        2.        0.        0.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2A
                           FOR PLAN 4, RATIO = 1.00

     TOTAL RAINFALL =   13.68, TOTAL LOSS =     .86, TOTAL EXCESS =   12.82

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
```

```
                          (CFS)
+       8.     12.08                    1.          0.          0.           0.
                       (INCHES)     8.241      12.804      12.804       12.804
                        (AC-FT)        1.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2A
                            FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       8.     12.08                    1.          0.          0.           0.
                       (INCHES)     8.241      12.804      12.804       12.804
                        (AC-FT)        1.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  107 KP        PLAN  5 FOR STATION      P2A
                                  RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   92 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

  109 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                   STORM AREA =     .00

   93 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   94 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                  8.        2.        0.        0.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2A
                            FOR PLAN 5, RATIO = 1.00

    TOTAL RAINFALL =   16.03, TOTAL LOSS =     .87, TOTAL EXCESS =   15.16

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       8.     12.08                    1.          1.          1.           1.
                       (INCHES)     9.421      15.145      15.145       15.145
                        (AC-FT)        1.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2A
                            FOR PLAN 5, RATIO = 1.00
```

```
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+       8.     12.08                  1.          1.          1.           1.
                         (INCHES)     9.421      15.145      15.145       15.145
                          (AC-FT)        1.          1.          1.           1.

                          CUMULATIVE AREA =     .00 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


             **************
             *            *
  110 KK     *     COMB1  *
             *            *
             **************

  111 HC          HYDROGRAPH COMBINATION
                        ICOMP           5  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

       ***             ***             ***             ***             ***

                            HYDROGRAPH AT STATION    COMB1
                              FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+      82.     12.08                  9.          3.          3.           3.
                         (INCHES)     2.816       3.483       3.483        3.483
                          (AC-FT)        5.          6.          6.           6.

                          CUMULATIVE AREA =     .03 SQ MI


       ***             ***             ***             ***             ***

                            HYDROGRAPH AT STATION    COMB1
                              FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     129.     12.08                 18.          6.          6.           6.
                         (INCHES)     5.478       7.647       7.647        7.647
                          (AC-FT)        9.         13.         13.          13.

                          CUMULATIVE AREA =     .03 SQ MI


       ***             ***             ***             ***             ***

                            HYDROGRAPH AT STATION    COMB1
                              FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     150.     12.08                 23.          9.          9.           9.
                         (INCHES)     6.953      10.266      10.266       10.266
                          (AC-FT)       12.         17.         17.          17.

                          CUMULATIVE AREA =     .03 SQ MI


       ***             ***             ***             ***             ***

                            HYDROGRAPH AT STATION    COMB1
                              FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
```

```
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     166.     12.08                27.         10.         10.          10.
                        (INCHES)     8.116      12.418      12.418       12.418
                         (AC-FT)      14.         21.         21.          21.

                         CUMULATIVE AREA =     .03 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB1
                            FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     182.     12.08                31.         12.         12.          12.
                        (INCHES)     9.313      14.753      14.753       14.753
                         (AC-FT)      16.         25.         25.          25.

                         CUMULATIVE AREA =     .03 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


             **************
             *            *
  112 KK     *        E2  *
             *            *
             **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  113 KP        PLAN  1 FOR STATION       E2
                                  RUNOFF COMPUTATION 2-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  114 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .03  SUBBASIN AREA

                  PRECIPITATION DATA

  119 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                   STORM AREA =     .03

  115 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  116 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                ***

                                                         UNIT HYDROGRAPH
                                                     5 END-OF-PERIOD ORDINATES
                161.       45.        9.        2.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 1, RATIO = 1.00

     TOTAL RAINFALL =    4.59, TOTAL LOSS =    1.21, TOTAL EXCESS =    3.38

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
```

```
                          (CFS)
+      72.     12.08                    8.          3.          3.           3.
                       (INCHES)     2.745       3.378       3.378        3.378
                        (AC-FT)        4.          5.          5.           5.

                       CUMULATIVE AREA =     .03 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       E2
                           FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      72.     12.08                    8.          3.          3.           3.
                       (INCHES)     2.745       3.378       3.378        3.378
                        (AC-FT)        4.          5.          5.           5.

                       CUMULATIVE AREA =     .03 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  120 KP        PLAN  2 FOR STATION       E2
                                  RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  114 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .03  SUBBASIN AREA

                  PRECIPITATION DATA

  122 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                   STORM AREA =     .03

  115 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  116 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                       5 END-OF-PERIOD ORDINATES
                161.       45.        9.        2.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       E2
                           FOR PLAN 2, RATIO = 1.00

    TOTAL RAINFALL =    8.86, TOTAL LOSS =    1.33, TOTAL EXCESS =    7.53

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     114.     12.08                   16.          6.          6.           6.
                       (INCHES)     5.420       7.524       7.524        7.524
                        (AC-FT)        8.         11.         11.          11.

                       CUMULATIVE AREA =     .03 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       E2
                           FOR PLAN 2, RATIO = 1.00
```

```
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     114.     12.08                  16.          6.          6.           6.
                        (INCHES)     5.420       7.524       7.524        7.524
                         (AC-FT)       8.         11.         11.          11.

                         CUMULATIVE AREA =     .03 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  123 KP        PLAN  3 FOR STATION       E2
                                   RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  114 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .03  SUBBASIN AREA

                  PRECIPITATION DATA

  125 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                   STORM AREA =     .03

  115 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  116 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                      5 END-OF-PERIOD ORDINATES
                161.       45.        9.        2.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 3, RATIO = 1.00

     TOTAL RAINFALL =   11.51, TOTAL LOSS =    1.36, TOTAL EXCESS =   10.15

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     133.     12.08                  21.          8.          8.           8.
                        (INCHES)     6.905      10.138      10.138       10.138
                         (AC-FT)      10.         15.         15.          15.

                         CUMULATIVE AREA =     .03 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     133.     12.08                  21.          8.          8.           8.
                        (INCHES)     6.905      10.138      10.138       10.138
                         (AC-FT)      10.         15.         15.          15.

                         CUMULATIVE AREA =     .03 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***
```

```
  126 KP        PLAN  4 FOR STATION       E2
                                    RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  114 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .03  SUBBASIN AREA

                  PRECIPITATION DATA

  128 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                 STORM AREA =     .03

  115 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  116 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                ***

                                                          UNIT HYDROGRAPH
                                                      5 END-OF-PERIOD ORDINATES
                161.       45.        9.        2.        0.

       ***            ***            ***            ***            ***

                         HYDROGRAPH AT STATION       E2
                           FOR PLAN 4, RATIO = 1.00

    TOTAL RAINFALL =   13.68, TOTAL LOSS =    1.38, TOTAL EXCESS =   12.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     148.     12.08                   24.          9.          9.           9.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)       12.         18.         18.          18.

                         CUMULATIVE AREA =     .03 SQ MI


       ***            ***            ***            ***            ***

                         HYDROGRAPH AT STATION       E2
                           FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     148.     12.08                   24.          9.          9.           9.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)       12.         18.         18.          18.

                         CUMULATIVE AREA =     .03 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  129 KP        PLAN  5 FOR STATION       E2
                                    RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  114 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .03  SUBBASIN AREA

                  PRECIPITATION DATA

  131 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
```

```
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                 STORM AREA =     .03

  115 LS         SCS LOSS RATE
                       STRTL         .25  INITIAL ABSTRACTION
                      CRVNBR       89.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  116 UD         SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .03  LAG

                                                               ***

                                                        UNIT HYDROGRAPH
                                                    5 END-OF-PERIOD ORDINATES
               161.       45.        9.        2.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       E2
                           FOR PLAN 5, RATIO = 1.00

    TOTAL RAINFALL =   16.03, TOTAL LOSS =    1.39, TOTAL EXCESS =   14.64

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     162.     12.08                   28.         11.         11.          11.
                         (INCHES)     9.276      14.620      14.620       14.620
                          (AC-FT)       14.         22.         22.          22.

                          CUMULATIVE AREA =     .03 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       E2
                           FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     162.     12.08                   28.         11.         11.          11.
                         (INCHES)     9.276      14.620      14.620       14.620
                          (AC-FT)       14.         22.         22.          22.

                          CUMULATIVE AREA =     .03 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  132 KK    *       P2C  *
            *            *
            **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  133 KP       PLAN  1 FOR STATION      P2C
                                    RUNOFF COMPUTATION 2-YRS STORM IN BASIN

               SUBBASIN RUNOFF DATA

  134 BA         SUBBASIN CHARACTERISTICS
                       TAREA         .01  SUBBASIN AREA

                 PRECIPITATION DATA

  139 PH                               DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00
```

```
                                                STORM AREA =     .01

  135 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  136 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                 78.       22.        4.        1.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2C
                           FOR PLAN 1, RATIO = 1.00

    TOTAL RAINFALL =    4.59, TOTAL LOSS =     .79, TOTAL EXCESS =    3.80

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      38.     12.08                    4.          1.          1.           1.
                        (INCHES)     3.031       3.793       3.793        3.793
                         (AC-FT)        2.          3.          3.           3.

                         CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2C
                           FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      38.     12.08                    4.          1.          1.           1.
                        (INCHES)     3.031       3.793       3.793        3.793
                         (AC-FT)        2.          3.          3.           3.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  140 KP        PLAN  2 FOR STATION      P2C
                                 RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  134 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  142 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                STORM AREA =     .01

  135 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  136 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                          ***
```

```
                                                    UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                78.       22.        4.        1.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2C
                            FOR PLAN 2, RATIO = 1.00

     TOTAL RAINFALL =    8.86, TOTAL LOSS =     .84, TOTAL EXCESS =    8.02

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      57.     12.08                  8.          3.          3.           3.
                        (INCHES)     5.649       8.009       8.009        8.009
                         (AC-FT)       4.          6.          6.           6.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2C
                            FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      57.     12.08                  8.          3.          3.           3.
                        (INCHES)     5.649       8.009       8.009        8.009
                         (AC-FT)       4.          6.          6.           6.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  143 KP        PLAN  3 FOR STATION      P2C
                                  RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  134 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  145 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                     STORM AREA =     .01

  135 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  136 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                                ***

                                                    UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                78.       22.        4.        1.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2C
                            FOR PLAN 3, RATIO = 1.00

     TOTAL RAINFALL =   11.51, TOTAL LOSS =     .86, TOTAL EXCESS =   10.65

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
```

```
+   (CFS)       (HR)
                          (CFS)
+      66.     12.08                  10.          4.          4.           4.
                       (INCHES)     7.096      10.643      10.643       10.643
                        (AC-FT)        5.          8.          8.           8.

                        CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2C
                           FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      66.     12.08                  10.          4.          4.           4.
                       (INCHES)     7.096      10.643      10.643       10.643
                        (AC-FT)        5.          8.          8.           8.

                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  146 KP        PLAN  4 FOR STATION      P2C
                                  RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  134 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  148 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                     STORM AREA =     .01

  135 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  136 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 78.       22.        4.        1.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2C
                           FOR PLAN 4, RATIO = 1.00

    TOTAL RAINFALL =   13.68, TOTAL LOSS =     .86, TOTAL EXCESS =   12.82

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      73.     12.08                  12.          5.          5.           5.
                       (INCHES)     8.241      12.803      12.803       12.803
                        (AC-FT)        6.          9.          9.           9.

                        CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2C
                           FOR PLAN 4, RATIO = 1.00
```

```
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      73.     12.08                  12.          5.          5.           5.
                        (INCHES)     8.241      12.803      12.803       12.803
                         (AC-FT)        6.          9.          9.           9.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  149 KP        PLAN  5 FOR STATION      P2C
                                   RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  134 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  151 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                     STORM AREA =     .01

  135 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  136 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 78.       22.        4.        1.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2C
                           FOR PLAN 5, RATIO = 1.00

    TOTAL RAINFALL =   16.03, TOTAL LOSS =     .87, TOTAL EXCESS =   15.16

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      80.     12.08                  14.          6.          6.           6.
                        (INCHES)     9.421      15.145      15.145       15.145
                         (AC-FT)        7.         11.         11.          11.

                         CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2C
                           FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      80.     12.08                  14.          6.          6.           6.
                        (INCHES)     9.421      15.145      15.145       15.145
                         (AC-FT)        7.         11.         11.          11.

                         CUMULATIVE AREA =     .01 SQ MI
```

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  152 KK    *      COMB  *     2
            *            *
            **************

  153 HC          HYDROGRAPH COMBINATION
                       ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION     COMB
                            FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     109.     12.08                13.          4.          4.           4.
                         (INCHES)     2.837       3.513       3.513        3.513
                          (AC-FT)        6.          8.          8.           8.

                         CUMULATIVE AREA =     .04 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION     COMB
                            FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     171.     12.08                25.          9.          9.           9.
                         (INCHES)     5.495       7.683       7.683        7.683
                          (AC-FT)       12.         17.         17.          17.

                         CUMULATIVE AREA =     .04 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION     COMB
                            FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     199.     12.08                31.         12.         12.          12.
                         (INCHES)     6.967      10.303      10.303       10.303
                          (AC-FT)       15.         23.         23.          23.

                         CUMULATIVE AREA =     .04 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION     COMB
                            FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     221.     12.08                36.         14.         14.          14.
                         (INCHES)     8.128      12.456      12.456       12.456
                          (AC-FT)       18.         28.         28.          28.

                         CUMULATIVE AREA =     .04 SQ MI


       ***             ***             ***             ***             ***
```

```
                        HYDROGRAPH AT STATION     COMB
                          FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     242.     12.08                  42.         17.         17.          17.
                       (INCHES)     9.323      14.792      14.792       14.792
                        (AC-FT)       21.         33.         33.          33.

                       CUMULATIVE AREA =     .04 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  154 KK    *       P1B  *
            *            *
            **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  155 KP        PLAN  1 FOR STATION      P1B
                                  RUNOFF COMPUTATION 2-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  156 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  161 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                     STORM AREA =     .01

  157 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  158 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .05  LAG

                                                                  ***

                                                          UNIT HYDROGRAPH
                                                     5 END-OF-PERIOD ORDINATES
                 62.       28.        7.        2.        0.

       ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      P1B
                          FOR PLAN 1, RATIO = 1.00

     TOTAL RAINFALL =    4.59, TOTAL LOSS =     .79, TOTAL EXCESS =    3.80

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      33.     12.08                   4.          1.          1.           1.
                       (INCHES)     3.031       3.792       3.792        3.792
                        (AC-FT)        2.          3.          3.           3.

                       CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      P1B
                          FOR PLAN 1, RATIO = 1.00
```

```
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      33.     12.08                   4.          1.          1.           1.
                        (INCHES)     3.031       3.792       3.792        3.792
                         (AC-FT)        2.          3.          3.           3.

                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  162 KP        PLAN  2 FOR STATION      P1B
                                   RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  156 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  164 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                   STORM AREA =     .01

  157 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  158 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .05  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 62.       28.        7.        2.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1B
                           FOR PLAN 2, RATIO = 1.00

    TOTAL RAINFALL =    8.86, TOTAL LOSS =     .84, TOTAL EXCESS =    8.02

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      50.     12.08                   8.          3.          3.           3.
                        (INCHES)     5.649       8.008       8.008        8.008
                         (AC-FT)        4.          6.          6.           6.

                        CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1B
                           FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      50.     12.08                   8.          3.          3.           3.
                        (INCHES)     5.649       8.008       8.008        8.008
                         (AC-FT)        4.          6.          6.           6.

                        CUMULATIVE AREA =     .01 SQ MI
```

```
***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

 165 KP        PLAN  3 FOR STATION      P1B
                                 RUNOFF COMPUTATION 25-YRS STORM IN BASIN

               SUBBASIN RUNOFF DATA

 156 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .01  SUBBASIN AREA

                 PRECIPITATION DATA

 167 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                 STORM AREA =     .01

 157 LS          SCS LOSS RATE
                       STRTL         .15  INITIAL ABSTRACTION
                      CRVNBR       93.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

 158 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .05  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 62.       28.        7.        2.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1B
                           FOR PLAN 3, RATIO = 1.00

    TOTAL RAINFALL =   11.51, TOTAL LOSS =     .86, TOTAL EXCESS =   10.65

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      58.     12.08                  10.          4.          4.           4.
                        (INCHES)     7.095      10.641      10.641       10.641
                         (AC-FT)        5.          7.          7.           7.

                         CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1B
                           FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      58.     12.08                  10.          4.          4.           4.
                        (INCHES)     7.095      10.641      10.641       10.641
                         (AC-FT)        5.          7.          7.           7.

                         CUMULATIVE AREA =     .01 SQ MI


***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

 168 KP        PLAN  4 FOR STATION      P1B
                                 RUNOFF COMPUTATION 50-YRS STORM IN BASIN

               SUBBASIN RUNOFF DATA

 156 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .01  SUBBASIN AREA

                 PRECIPITATION DATA

 170 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
```

```
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                STORM AREA =     .01

  157 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  158 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .05  LAG

                                                                  ***

                                                          UNIT HYDROGRAPH
                                                     5 END-OF-PERIOD ORDINATES
                 62.       28.        7.        2.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P1B
                            FOR PLAN 4, RATIO = 1.00

     TOTAL RAINFALL =   13.68, TOTAL LOSS =     .86, TOTAL EXCESS =   12.82

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      64.     12.08                  11.          4.          4.           4.
                        (INCHES)     8.240      12.801      12.801       12.801
                         (AC-FT)        6.          9.          9.           9.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P1B
                            FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      64.     12.08                  11.          4.          4.           4.
                        (INCHES)     8.240      12.801      12.801       12.801
                         (AC-FT)        6.          9.          9.           9.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  171 KP        PLAN  5 FOR STATION      P1B
                                   RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  156 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  173 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                STORM AREA =     .01

  157 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  158 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .05  LAG
```

```
                                                                  ***

                                                              UNIT HYDROGRAPH
                                                           5 END-OF-PERIOD ORDINATES
                 62.       28.        7.        2.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1B
                           FOR PLAN 5, RATIO = 1.00

     TOTAL RAINFALL =   16.03, TOTAL LOSS =     .87, TOTAL EXCESS =   15.16

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      69.     12.08                   13.          5.          5.           5.
                        (INCHES)     9.420      15.141      15.141       15.141
                         (AC-FT)        6.         10.         10.          10.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1B
                           FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      69.     12.08                   13.          5.          5.           5.
                        (INCHES)     9.420      15.141      15.141       15.141
                         (AC-FT)        6.         10.         10.          10.

                         CUMULATIVE AREA =     .01 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  174 KK    *       P2B  *
            *            *
            **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  175 KP        PLAN  1 FOR STATION      P2B
                                  RUNOFF COMPUTATION 2-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  176 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  181 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                   STORM AREA =     .01

  177 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  178 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                                  ***
```

```
                                                    UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                54.       15.        3.        1.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2B
                           FOR PLAN 1, RATIO = 1.00

    TOTAL RAINFALL =    4.59, TOTAL LOSS =     .79, TOTAL EXCESS =    3.80

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      26.     12.08                  3.          1.          1.           1.
                        (INCHES)     3.031       3.793       3.793        3.793
                         (AC-FT)       2.          2.          2.           2.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2B
                           FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      26.     12.08                  3.          1.          1.           1.
                        (INCHES)     3.031       3.793       3.793        3.793
                         (AC-FT)       2.          2.          2.           2.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  182 KP        PLAN  2 FOR STATION      P2B
                                  RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  176 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  184 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                   STORM AREA =     .01

  177 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  178 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                          ***

                                                    UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                54.       15.        3.        1.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2B
                           FOR PLAN 2, RATIO = 1.00

    TOTAL RAINFALL =    8.86, TOTAL LOSS =     .84, TOTAL EXCESS =    8.02

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
```

```
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      40.     12.08                 6.          2.          2.           2.
                        (INCHES)     5.649       8.009       8.009        8.009
                         (AC-FT)       3.          4.          4.           4.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION      P2B
                             FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      40.     12.08                 6.          2.          2.           2.
                        (INCHES)     5.649       8.009       8.009        8.009
                         (AC-FT)       3.          4.          4.           4.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  185 KP        PLAN  3 FOR STATION      P2B
                                  RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  176 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  187 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                     STORM AREA =     .01

  177 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  178 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                                ***

                                                          UNIT HYDROGRAPH
                                                       5 END-OF-PERIOD ORDINATES
                54.       15.        3.        1.        0.

       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION      P2B
                             FOR PLAN 3, RATIO = 1.00

    TOTAL RAINFALL =   11.51, TOTAL LOSS =     .86, TOTAL EXCESS =   10.65

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      46.     12.08                 7.          3.          3.           3.
                        (INCHES)     7.096      10.643      10.643       10.643
                         (AC-FT)       4.          5.          5.           5.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION      P2B
```

```
                         FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      46.     12.08                   7.          3.          3.           3.
                        (INCHES)     7.096      10.643      10.643       10.643
                         (AC-FT)        4.          5.          5.           5.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  188 KP        PLAN  4 FOR STATION      P2B
                                   RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  176 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  190 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                   STORM AREA =     .01

  177 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  178 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                       5 END-OF-PERIOD ORDINATES
                54.       15.        3.        1.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2B
                            FOR PLAN 4, RATIO = 1.00

     TOTAL RAINFALL =   13.68, TOTAL LOSS =     .86, TOTAL EXCESS =   12.82

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      50.     12.08                   8.          3.          3.           3.
                        (INCHES)     8.241      12.804      12.804       12.804
                         (AC-FT)        4.          6.          6.           6.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2B
                            FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      50.     12.08                   8.          3.          3.           3.
                        (INCHES)     8.241      12.804      12.804       12.804
                         (AC-FT)        4.          6.          6.           6.

                         CUMULATIVE AREA =     .01 SQ MI
```

```
***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

 191 KP        PLAN  5 FOR STATION      P2B
                                 RUNOFF COMPUTATION 100-YRS STORM IN BASIN

               SUBBASIN RUNOFF DATA

 176 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .01  SUBBASIN AREA

                 PRECIPITATION DATA

 193 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                   STORM AREA =     .01

 177 LS          SCS LOSS RATE
                       STRTL         .15  INITIAL ABSTRACTION
                      CRVNBR       93.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

 178 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .04  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                54.       15.        3.        1.        0.

      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      P2B
                          FOR PLAN 5, RATIO = 1.00

    TOTAL RAINFALL =   16.03, TOTAL LOSS =     .87, TOTAL EXCESS =   15.16

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      55.     12.08                   10.          4.          4.           4.
                        (INCHES)     9.421      15.145      15.145       15.145
                         (AC-FT)        5.          8.          8.           8.

                         CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      P2B
                          FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      55.     12.08                   10.          4.          4.           4.
                        (INCHES)     9.421      15.145      15.145       15.145
                         (AC-FT)        5.          8.          8.           8.

                         CUMULATIVE AREA =     .01 SQ MI



*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
 194 KK     *     COMB3  *
            *            *
            **************

 195 HC          HYDROGRAPH COMBINATION
                       ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE
```

```
                                                                  ***

      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    COMB3
                          FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      59.     12.08                  7.          2.          2.           2.
                        (INCHES)     3.031       3.792       3.792        3.792
                         (AC-FT)        4.          5.          5.           5.

                        CUMULATIVE AREA =     .02 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    COMB3
                          FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      89.     12.08                 14.          5.          5.           5.
                        (INCHES)     5.649       8.008       8.008        8.008
                         (AC-FT)        7.         10.         10.          10.

                        CUMULATIVE AREA =     .02 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    COMB3
                          FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     103.     12.08                 17.          6.          6.           6.
                        (INCHES)     7.095      10.642      10.642       10.642
                         (AC-FT)        8.         13.         13.          13.

                        CUMULATIVE AREA =     .02 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    COMB3
                          FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     114.     12.08                 20.          8.          8.           8.
                        (INCHES)     8.240      12.802      12.802       12.802
                         (AC-FT)       10.         15.         15.          15.

                        CUMULATIVE AREA =     .02 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    COMB3
                          FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     124.     12.08                 23.          9.          9.           9.
                        (INCHES)     9.420      15.143      15.143       15.143
                         (AC-FT)       11.         18.         18.          18.

                        CUMULATIVE AREA =     .02 SQ MI
```

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  196 KK    *     COMB4  *
            *            *
            **************

  197 HC          HYDROGRAPH COMBINATION
                       ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB4
                            FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     168.     12.08                  20.          6.          6.           6.
                        (INCHES)     2.904       3.611       3.611        3.611
                         (AC-FT)      10.         12.         12.          12.

                         CUMULATIVE AREA =     .06 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB4
                            FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     261.     12.08                  38.         13.         13.          13.
                        (INCHES)     5.548       7.797       7.797        7.797
                         (AC-FT)      19.         27.         27.          27.

                         CUMULATIVE AREA =     .06 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB4
                            FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     302.     12.08                  48.         18.         18.          18.
                        (INCHES)     7.012      10.422      10.422       10.422
                         (AC-FT)      24.         36.         36.          36.

                         CUMULATIVE AREA =     .06 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB4
                            FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     335.     12.08                  56.         22.         22.          22.
                        (INCHES)     8.167      12.577      12.577       12.577
                         (AC-FT)      28.         43.         43.          43.

                         CUMULATIVE AREA =     .06 SQ MI
```

```
      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION    COMB4
                          FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     366.     12.08                  64.         26.         26.          26.
                        (INCHES)     9.357      14.914      14.914       14.914
                         (AC-FT)      32.         51.         51.          51.

                        CUMULATIVE AREA =     .06 SQ MI

1

                PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                                  FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                                TIME TO PEAK IN HOURS


                                                                    RATIOS APPLIED TO FLOWS
 OPERATION       STATION     AREA    PLAN            RATIO 1
                                                       1.00

 HYDROGRAPH AT
+                    E1A       .01     1   FLOW          30.
                                           TIME        12.08
                                         2   FLOW          49.
                                           TIME        12.08
                                         3   FLOW          57.
                                           TIME        12.08
                                         4   FLOW          63.
                                           TIME        12.08
                                         5   FLOW          69.
                                           TIME        12.08

 HYDROGRAPH AT
+                    E1B       .01     1   FLOW          25.
                                           TIME        12.08
                                         2   FLOW          40.
                                           TIME        12.08
                                         3   FLOW          47.
                                           TIME        12.08
                                         4   FLOW          52.
                                           TIME        12.08
                                         5   FLOW          57.
                                           TIME        12.08

 HYDROGRAPH AT
+                    P1A       .01     1   FLOW          18.
                                           TIME        12.08
                                         2   FLOW          27.
                                           TIME        12.08
                                         3   FLOW          32.
                                           TIME        12.08
                                         4   FLOW          35.
                                           TIME        12.08
                                         5   FLOW          38.
                                           TIME        12.08

 HYDROGRAPH AT
+                     E3       .00     1   FLOW           4.
                                           TIME        12.08
                                         2   FLOW           7.
                                           TIME        12.08
                                         3   FLOW           8.
                                           TIME        12.08
                                         4   FLOW           9.
                                           TIME        12.08
                                         5   FLOW          10.
                                           TIME        12.08

 HYDROGRAPH AT
+                    P2A       .00     1   FLOW           4.
                                           TIME        12.08
                                         2   FLOW           6.
                                           TIME        12.08
                                         3   FLOW           7.
```

```
                                        TIME        12.08
                                    4   FLOW           8.
                                        TIME        12.08
                                    5   FLOW           8.
                                        TIME        12.08

  5 COMBINED AT
+                  COMB1       .03     1   FLOW          82.
                                         TIME        12.08
                                    2   FLOW         129.
                                         TIME        12.08
                                    3   FLOW         150.
                                         TIME        12.08
                                    4   FLOW         166.
                                         TIME        12.08
                                    5   FLOW         182.
                                         TIME        12.08

 HYDROGRAPH AT
+                     E2       .03     1   FLOW          72.
                                         TIME        12.08
                                    2   FLOW         114.
                                         TIME        12.08
                                    3   FLOW         133.
                                         TIME        12.08
                                    4   FLOW         148.
                                         TIME        12.08
                                    5   FLOW         162.
                                         TIME        12.08

 HYDROGRAPH AT
+                    P2C       .01     1   FLOW          38.
                                         TIME        12.08
                                    2   FLOW          57.
                                         TIME        12.08
                                    3   FLOW          66.
                                         TIME        12.08
                                    4   FLOW          73.
                                         TIME        12.08
                                    5   FLOW          80.
                                         TIME        12.08

  2 COMBINED AT
+                   COMB       .04     1   FLOW         109.
                                         TIME        12.08
                                    2   FLOW         171.
                                         TIME        12.08
                                    3   FLOW         199.
                                         TIME        12.08
                                    4   FLOW         221.
                                         TIME        12.08
                                    5   FLOW         242.
                                         TIME        12.08

 HYDROGRAPH AT
+                    P1B       .01     1   FLOW          33.
                                         TIME        12.08
                                    2   FLOW          50.
                                         TIME        12.08
                                    3   FLOW          58.
                                         TIME        12.08
                                    4   FLOW          64.
                                         TIME        12.08
                                    5   FLOW          69.
                                         TIME        12.08

 HYDROGRAPH AT
+                    P2B       .01     1   FLOW          26.
                                         TIME        12.08
                                    2   FLOW          40.
                                         TIME        12.08
                                    3   FLOW          46.
                                         TIME        12.08
                                    4   FLOW          50.
                                         TIME        12.08
                                    5   FLOW          55.
                                         TIME        12.08

  2 COMBINED AT
+                  COMB3       .02     1   FLOW          59.
                                         TIME        12.08
```

```
                                        2   FLOW          89.
                                            TIME       12.08
                                        3   FLOW         103.
                                            TIME       12.08
                                        4   FLOW         114.
                                            TIME       12.08
                                        5   FLOW         124.
                                            TIME       12.08

  2 COMBINED AT
+                  COMB4       .06      1   FLOW         168.
                                            TIME       12.08
                                        2   FLOW         261.
                                            TIME       12.08
                                        3   FLOW         302.
                                            TIME       12.08
                                        4   FLOW         335.
                                            TIME       12.08
                                        5   FLOW         366.
                                            TIME       12.08


 *** NORMAL END OF HEC-1 ***
```

APPENDIX D

FLOW-DEPTH-VOLUME RELATIONS

FOR THE DETENTION STRUCTURE

Project: Caguas Milenio
Caguas, Puerto Rico.
Description: Detention Pond

FLOW RATING CURVE		DELTA	**0.277778**	2.5								
Structure	Head	m	0	**0.277778**	**0.5556**	**0.83333**	**1.1111111**	**1.388889**	**1.66667**	**1.944444**	**2.22222**	**2.5**
		ft	0	0.911111	1.8222	2.73333	3.6444444	4.555556	5.46667	6.377778	7.28889	8.2
	Diameter (feet)		**3**	3	3	3	3	3	3	3	3	3
	Number		**3**	3	3	3	3	3	3	3	3	3
	Head over CL (feet)		-1.5	-0.58889	0.3222	1.23333	2.1444444	3.055556	3.96667	4.877778	5.78889	6.7
ORIF #1	Discharge Coef		**0.61**	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
	Flow (cfs)		0	0	58.926	115.284	152.014	181.456	206.748	229.265	249.761	268.698
	Head over invert (feet)		0	0.911111	1.8222	2.73333	3.6444444	4.555556	5.46667	6.377778	7.28889	8.2
	Velocity (fps)		0	0	8.336	16.309	21.506	25.671	29.249	32.434	35.334	38.013
	Invert El (m)		**0.9**	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
	(feet)		2.952	2.952	2.952	2.952	2.952	2.952	2.952	2.952	2.952	2.952
	Diameter (feet)		**3**	3	3	3	3	3	3	3	3	3
	Number			0	0	0	0	0	0	0	0	0
ORIF #2	Head over CL (feet)		-4.452	-3.54089	-2.6298	-1.7187	-0.807556	0.103556	1.01467	1.925778	2.83689	3.748
	Discharge Coef		**0.61**	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
	Flow (cfs)		0	0	0	0	0	0	0	0	0	0
	Velocity (fps)		0	0	0	0	0	0	0	0	0	0
6.56	Invert El (m)		**2**	2	2	2	2	2	2	2	2	2
	(feet)		6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56	6.56
WEIR	Width (feet)		**16.4**	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4
	Cc		**0.66**	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
	Head over weir (feet)		-6.56	-5.64889	-4.7378	-3.8267	-2.915556	-2.00444	-1.0933	-0.18222	0.72889	1.64
	Flow (cfs)		0	0	0	0	0	0	0	0	28.5402	96.323
	FLOW SUMMATION (cfs)		0	0	58.926	115.284	152.014	181.456	206.748	229.265	278.301	365.021
Rectangular Detention Structure			AREA	671.57 m2								
25.91	Lado A de la Base, ft		**85.00**	85	85	85	85	85	85	85	85	85
25.91	Lado B de la Base, ft		**85.00**	85	85	85	85	85	85	85	85	85
	h (ft)		**0**	**0.911111**	**1.8222**	**2.73333**	**3.6444444**	**4.555556**	**5.46667**	**6.377778**	**7.28889**	**8.2**
	Slope 1:		**2**	2	2	2	2	2	2	2	2	2
	Area (sqft)		7225	7858	8517	9203	9916	10655	11420	12213	13031	13877
	(acre)		**0.17**	**0.18**	**0.20**	**0.21**	**0.23**	**0.24**	**0.26**	**0.28**	**0.30**	**0.32**
	Volume, acre-ft		**0.00**	**0.16**	**0.33**	**0.52**	**0.72**	**0.94**	**1.17**	**1.42**	**1.70**	**1.99**
	Lado A del Tope		85	88.64444	92.289	95.9333	99.577778	103.2222	106.867	110.5111	114.156	117.8
	Lado B del Tope		85	88.64444	92.289	95.9333	99.577778	103.2222	106.867	110.5111	114.156	117.8

APPENDIX E

HYDROLOGIC ANALYSIS RESULTS FOR

PROPOSED CONDITION W/ MITIGATION

```
*                                      *                                                    *                                    *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *                                                    *    U.S. ARMY CORPS OF ENGINEERS    *
*              JUN   1998              *                                                    *    HYDROLOGIC ENGINEERING CENTER   *
*            VERSION 4.1               *                                                    *          609 SECOND STREET         *
*  RGMHEC2000               HEC-1.COM *                                                    *       DAVIS, CALIFORNIA 95616      *
*  RUN DATE   18APR08  TIME  11:16:02 *                                                    *           (916) 756-1104           *
*                                      *                                                    *                                    *
****************************************                                                    ****************************************
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1           ID        HYDROLOGIC ANALYSIS
  2           ID        PROJECT:  CAGUAS MILENIO, CAGUAS, P.R.
  3           ID        TRIANGULAR DISTRIBUTION
  4           ID        FREQUENCY OF OCCURRENCE: 2, 10, 25, 50 AND 100 YEARS
  5           ID        CA ENGINEERING, OCTOBER 2007
  6           ID        PROPOSED CONDITION W/MITIGATION
  7           IT       5                    289
  8           IO       3
  9           JP       5

 10           KK     E1A
 11           KP       1
 12           BA  0.0119
 13           LS       0      89
 14           UD   0.022
 15           IN      15
 16           KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
 17           PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
 18           KP       2
 19           KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
 20           PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
 21           KP       3
 22           KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
 23           PH                    0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
 24           KP       4
 25           KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
 26           PH                    0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
 27           KP       5
 28           KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
 29           PH                    0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

 30           KK     E1B
 31           KP       1
 32           BA  0.0098
 33           LS       0      89
 34           UD   0.024
 35           IN      15
 36           KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
 37           PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
 38           KP       2
 39           KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
 40           PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
 41           KP       3
 42           KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
 43           PH                    0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
 44           KP       4
 45           KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
 46           PH                    0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
 47           KP       5
 48           KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
 49           PH                    0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 50           KK     P1A
 51           KP       1
 52           BA  0.0065
 53           LS       0      93
 54           UD   0.032
 55           IN      15
 56           KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
 57           PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
 58           KP       2
 59           KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
 60           PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
 61           KP       3
 62           KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
 63           PH                    0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
 64           KP       4
 65           KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
 66           PH                    0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
 67           KP       5
 68           KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
 69           PH                    0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03
```

```
  70          KK      E3
  71          KP       1
  72          BA  0.0017
  73          LS       0      89
  74          UD   0.023
  75          IN      15
  76          KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
  77          PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
  78          KP       2
  79          KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
  80          PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
  81          KP       3
  82          KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
  83          PH                    0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
  84          KP       4
  85          KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
  86          PH                    0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
  87          KP       5
  88          KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
  89          PH                    0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

  90          KK     P2A
  91          KP       1
  92          BA  0.0014
  93          LS       0      93
  94          UD   0.033
  95          IN      15
  96          KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
  97          PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
  98          KP       2
  99          KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
 100          PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
 101          KP       3
```



```
LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 102          KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
 103          PH                    0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
 104          KP       4
 105          KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
 106          PH                    0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
 107          KP       5
 108          KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
 109          PH                    0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

 110          KK    COMB1
 111          HC       5

 112          KK      E2
 113          KP       1
 114          BA  0.0280
 115          LS       0      89
 116          UD   0.031
 117          IN      15
 118          KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
 119          PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
 120          KP       2
 121          KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
 122          PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
 123          KP       3
 124          KM           RUNOFF COMPUTATION 25-YRS STORM IN BASIN
 125          PH                    0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
 126          KP       4
 127          KM           RUNOFF COMPUTATION 50-YRS STORM IN BASIN
 128          PH                    0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
 129          KP       5
 130          KM           RUNOFF COMPUTATION 100-YRS STORM IN BASIN
 131          PH                    0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

 132          KK     P2C
 133          KP       1
 134          BA  0.0136
 135          LS       0      93
 136          UD   0.035
 137          IN      15
 138          KM           RUNOFF COMPUTATION 2-YRS STORM IN BASIN
 139          PH                    0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
 140          KP       2
 141          KM           RUNOFF COMPUTATION 10-YRS STORM IN BASIN
 142          PH                    0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
```

```
          143          KP       3
          144          KM          RUNOFF COMPUTATION 25-YRS STORM IN BASIN
          145          PH                   0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
          146          KP       4
          147          KM          RUNOFF COMPUTATION 50-YRS STORM IN BASIN
          148          PH                   0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
          149          KP       5
          150          KM          RUNOFF COMPUTATION 100-YRS STORM IN BASIN
          151          PH                   0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03
1                                                HEC-1 INPUT                                          PAGE  4

         LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          152          KK    COMB2
          153          HC       2

          154          KK     P1B
          155          KP       1
          156          BA  0.0129
          157          LS       0      93
          158          UD   0.055
          159          IN      15
          160          KM          RUNOFF COMPUTATION 2-YRS STORM IN BASIN
          161          PH                   0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
          162          KP       2
          163          KM          RUNOFF COMPUTATION 10-YRS STORM IN BASIN
          164          PH                   0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
          165          KP       3
          166          KM          RUNOFF COMPUTATION 25-YRS STORM IN BASIN
          167          PH                   0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
          168          KP       4
          169          KM          RUNOFF COMPUTATION 50-YRS STORM IN BASIN
          170          PH                   0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
          171          KP       5
          172          KM          RUNOFF COMPUTATION 100-YRS STORM IN BASIN
          173          PH                   0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

          174          KK     P2B
          175          KP       1
          176          BA  0.0094
          177          LS       0      93
          178          UD   0.040
          179          IN      15
          180          KM          RUNOFF COMPUTATION 2-YRS STORM IN BASIN
          181          PH                   0.45    0.78    1.86    2.61    2.81    3.37    3.91    4.59
          182          KP       2
          183          KM          RUNOFF COMPUTATION 10-YRS STORM IN BASIN
          184          PH                   0.65    1.13    2.70    4.01    4.51    5.85    7.25    8.86
          185          KP       3
          186          KM          RUNOFF COMPUTATION 25-YRS STORM IN BASIN
          187          PH                   0.74    1.31    3.10    4.76    5.45    7.25    9.26   11.51
          188          KP       4
          189          KM          RUNOFF COMPUTATION 50-YRS STORM IN BASIN
          190          PH                   0.82    1.43    3.40    5.35    6.18    8.37   10.89   13.68
          191          KP       5
          192          KM          RUNOFF COMPUTATION 100-YRS STORM IN BASIN
          193          PH                   0.89    1.56    3.70    5.94    6.93    9.53   12.63   16.03

          194          KK   COMB3
          195          HC       2

          196          KK   COMB4
          197          HC       2
1                                                HEC-1 INPUT                                          PAGE  5

         LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


          198          KK    POND
          199          KM    RUNOFF MITIGATION POND CALCULATIION
          200          KO    3.00    1.00
          201          RS    1.00    ELEV    0.00
          202          SQ    0.00    0.00   58.93  115.28  152.01  181.46  206.75   229.3  278.30  365.02
          203          SV   0.000   0.158   0.330   0.516   0.718   0.936   1.171   1.424   1.696   1.988
          204          SE    0.00    0.91    1.82    2.73    3.64    4.56    5.47    6.38    7.29    8.20
          205          ZZ
1*****************************************                                                *************************************
 *                                       *                                                *                                   *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                *    U.S. ARMY CORPS OF ENGINEERS   *
 *               JUN   1998              *                                                *    HYDROLOGIC ENGINEERING CENTER  *
```

```
*           VERSION 4.1                *                                                    *          609 SECOND STREET          *
*  RGMHEC2000              HEC-1.COM   *                                                    *       DAVIS, CALIFORNIA 95616       *
*  RUN DATE   18APR08  TIME  11:16:02  *                                                    *           (916) 756-1104            *
*                                      *                                                    *                                     *
****************************************                                                    *****************************************


                                HYDROLOGIC ANALYSIS
                                PROJECT:  CAGUAS MILENIO, CAGUAS, P.R.
                                TRIANGULAR DISTRIBUTION
                                FREQUENCY OF OCCURRENCE: 2, 10, 25, 50 AND 100 YEARS
                                CA ENGINEERING, OCTOBER 2007
                                PROPOSED CONDITION W/MITIGATION

   8 IO          OUTPUT CONTROL VARIABLES
                       IPRNT           3  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

     IT          HYDROGRAPH TIME DATA
                        NMIN           5  MINUTES IN COMPUTATION INTERVAL
                       IDATE      1    0  STARTING DATE
                       ITIME        0000  STARTING TIME
                          NQ         289  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE      2    0  ENDING DATE
                      NDTIME        0000  ENDING TIME
                      ICENT          19  CENTURY MARK

                  COMPUTATION INTERVAL     .08 HOURS
                       TOTAL TIME BASE   24.00 HOURS

         ENGLISH UNITS
              DRAINAGE AREA         SQUARE MILES
              PRECIPITATION DEPTH   INCHES
              LENGTH, ELEVATION     FEET
              FLOW                  CUBIC FEET PER SECOND
              STORAGE VOLUME        ACRE-FEET
              SURFACE AREA          ACRES
              TEMPERATURE           DEGREES FAHRENHEIT

     JP          MULTI-PLAN OPTION
                       NPLAN           5  NUMBER OF PLANS

     JR          MULTI-RATIO OPTION
                     RATIOS OF RUNOFF
                    1.00


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  10 KK     *       E1A  *
            *            *
            **************


***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  11 KP        PLAN  1 FOR STATION      E1A
                                 RUNOFF COMPUTATION 2-YRS STORM IN BASIN

               SUBBASIN RUNOFF DATA

  12 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .01  SUBBASIN AREA

                 PRECIPITATION DATA

  17 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                 STORM AREA =     .01
```

```
  13 LS          SCS LOSS RATE
                       STRTL         .25  INITIAL ABSTRACTION
                      CRVNBR       89.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  14 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .02  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                68.       19.        4.        1.        0.

      ***            ***             ***             ***             ***

                        HYDROGRAPH AT STATION      E1A
                          FOR PLAN 1, RATIO = 1.00

    TOTAL RAINFALL =    4.59, TOTAL LOSS =    1.21, TOTAL EXCESS =    3.38

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      30.     12.08                  4.          1.          1.           1.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)       2.          2.          2.           2.

                         CUMULATIVE AREA =     .01 SQ MI


      ***            ***             ***             ***             ***

                        HYDROGRAPH AT STATION      E1A
                          FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      30.     12.08                  4.          1.          1.           1.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)       2.          2.          2.           2.

                         CUMULATIVE AREA =     .01 SQ MI


 ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***

  18 KP        PLAN  2 FOR STATION      E1A
                                 RUNOFF COMPUTATION 10-YRS STORM IN BASIN

               SUBBASIN RUNOFF DATA

  12 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .01  SUBBASIN AREA

                 PRECIPITATION DATA

  20 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                 ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                 5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                   .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                STORM AREA =     .01

  13 LS          SCS LOSS RATE
                       STRTL         .25  INITIAL ABSTRACTION
                      CRVNBR       89.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  14 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .02  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                68.       19.        4.        1.        0.
```

```
      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      E1A
                          FOR PLAN 2, RATIO = 1.00

    TOTAL RAINFALL =    8.86, TOTAL LOSS =    1.33, TOTAL EXCESS =    7.53

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      49.     12.08                  7.          2.          2.           2.
                        (INCHES)     5.421       7.525       7.525        7.525
                         (AC-FT)       3.          5.          5.           5.

                        CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      E1A
                          FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      49.     12.08                  7.          2.          2.           2.
                        (INCHES)     5.421       7.525       7.525        7.525
                         (AC-FT)       3.          5.          5.           5.

                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   21 KP        PLAN  3 FOR STATION      E1A
                                RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   12 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   23 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                   STORM AREA =     .01

   13 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   14 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                68.       19.        4.        1.        0.

      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      E1A
                          FOR PLAN 3, RATIO = 1.00

    TOTAL RAINFALL =   11.51, TOTAL LOSS =    1.36, TOTAL EXCESS =   10.15

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      57.     12.08                  9.          3.          3.           3.
```

```
                    (INCHES)     6.905      10.139      10.139       10.139
                     (AC-FT)        4.          6.          6.           6.

                    CUMULATIVE AREA =     .01 SQ MI


      ***            ***            ***            ***            ***

                      HYDROGRAPH AT STATION      E1A
                        FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                        (CFS)
+      57.     12.08                   9.          3.          3.           3.
                    (INCHES)     6.905      10.139      10.139       10.139
                     (AC-FT)        4.          6.          6.           6.

                    CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   24 KP        PLAN  4 FOR STATION      E1A
                                  RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   12 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   26 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                   STORM AREA =     .01

   13 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   14 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                          ***

                                                      UNIT HYDROGRAPH
                                                  5 END-OF-PERIOD ORDINATES
                68.       19.        4.        1.        0.

      ***            ***            ***            ***            ***

                      HYDROGRAPH AT STATION      E1A
                        FOR PLAN 4, RATIO = 1.00

    TOTAL RAINFALL =   13.68, TOTAL LOSS =    1.38, TOTAL EXCESS =   12.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                        (CFS)
+      63.     12.08                  10.          4.          4.           4.
                    (INCHES)     8.074      12.288      12.288       12.288
                     (AC-FT)        5.          8.          8.           8.

                    CUMULATIVE AREA =     .01 SQ MI


      ***            ***            ***            ***            ***

                      HYDROGRAPH AT STATION      E1A
                        FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
```

```
+   (CFS)       (HR)
                          (CFS)
+      63.     12.08                  10.          4.          4.           4.
                       (INCHES)     8.074      12.288      12.288       12.288
                        (AC-FT)        5.          8.          8.           8.

                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   27 KP        PLAN  5 FOR STATION      E1A
                                   RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   12 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   29 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                   STORM AREA =     .01

   13 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   14 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                  ***

                                                              UNIT HYDROGRAPH
                                                         5 END-OF-PERIOD ORDINATES
                68.       19.        4.        1.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      E1A
                            FOR PLAN 5, RATIO = 1.00

     TOTAL RAINFALL =   16.03, TOTAL LOSS =    1.39, TOTAL EXCESS =   14.64

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      69.     12.08                  12.          5.          5.           5.
                       (INCHES)     9.276      14.621      14.621       14.621
                        (AC-FT)        6.          9.          9.           9.

                        CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      E1A
                            FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      69.     12.08                  12.          5.          5.           5.
                       (INCHES)     9.276      14.621      14.621       14.621
                        (AC-FT)        6.          9.          9.           9.

                        CUMULATIVE AREA =     .01 SQ MI


 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
            **************
            *            *
   30 KK    *       E1B  *
            *            *
            **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   31 KP        PLAN  1 FOR STATION      E1B
                                  RUNOFF COMPUTATION 2-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   32 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   37 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                  STORM AREA =     .01

   33 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   34 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 56.       16.        3.        1.        0.

      ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      E1B
                            FOR PLAN 1, RATIO = 1.00

     TOTAL RAINFALL =    4.59, TOTAL LOSS =    1.21, TOTAL EXCESS =    3.38

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      25.     12.08                     3.          1.          1.           1.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)        1.          2.          2.           2.

                         CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      E1B
                            FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      25.     12.08                     3.          1.          1.           1.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)        1.          2.          2.           2.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   38 KP        PLAN  2 FOR STATION      E1B
                                  RUNOFF COMPUTATION 10-YRS STORM IN BASIN
```

```
                SUBBASIN RUNOFF DATA

   32 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   40 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                STORM AREA =     .01

   33 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   34 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 56.       16.        3.        1.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1B
                           FOR PLAN 2, RATIO = 1.00

     TOTAL RAINFALL =    8.86, TOTAL LOSS =    1.33, TOTAL EXCESS =    7.53

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                           (CFS)
+      40.     12.08                     6.          2.          2.           2.
                         (INCHES)     5.421       7.525       7.525        7.525
                          (AC-FT)        3.          4.          4.           4.

                          CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1B
                           FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                           (CFS)
+      40.     12.08                     6.          2.          2.           2.
                         (INCHES)     5.421       7.525       7.525        7.525
                          (AC-FT)        3.          4.          4.           4.

                          CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   41 KP        PLAN  3 FOR STATION      E1B
                                     RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   32 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   43 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                STORM AREA =     .01
```

```
   33 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   34 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                  ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 56.       16.        3.        1.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      E1B
                            FOR PLAN 3, RATIO = 1.00

     TOTAL RAINFALL =   11.51, TOTAL LOSS =    1.36, TOTAL EXCESS =   10.15

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      47.     12.08                     7.          3.          3.           3.
                        (INCHES)     6.905      10.139      10.139       10.139
                         (AC-FT)        4.          5.          5.           5.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      E1B
                            FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      47.     12.08                     7.          3.          3.           3.
                        (INCHES)     6.905      10.139      10.139       10.139
                         (AC-FT)        4.          5.          5.           5.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   44 KP        PLAN  4 FOR STATION      E1B
                                   RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   32 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   46 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                        STORM AREA =     .01

   33 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   34 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                  ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
```

```
                56.       16.        3.        1.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1B
                           FOR PLAN 4, RATIO = 1.00

     TOTAL RAINFALL =   13.68, TOTAL LOSS =    1.38, TOTAL EXCESS =   12.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      52.     12.08                  9.          3.          3.           3.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)        4.          6.          6.           6.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1B
                           FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      52.     12.08                  9.          3.          3.           3.
                        (INCHES)     8.074      12.288      12.288       12.288
                         (AC-FT)        4.          6.          6.           6.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   47 KP        PLAN  5 FOR STATION      E1B
                                  RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   32 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   49 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                   STORM AREA =     .01

   33 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   34 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                      5 END-OF-PERIOD ORDINATES
                56.       16.        3.        1.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      E1B
                           FOR PLAN 5, RATIO = 1.00

     TOTAL RAINFALL =   16.03, TOTAL LOSS =    1.39, TOTAL EXCESS =   14.64

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
```

```
+      57.     12.08                    10.          4.          4.           4.
                         (INCHES)     9.276      14.621      14.621       14.621
                          (AC-FT)        5.          8.          8.           8.

                          CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION      E1B
                             FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+      57.     12.08                    10.          4.          4.           4.
                         (INCHES)     9.276      14.621      14.621       14.621
                          (AC-FT)        5.          8.          8.           8.

                          CUMULATIVE AREA =     .01 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


             **************
             *            *
   50 KK     *       P1A  *
             *            *
             **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   51 KP        PLAN  1 FOR STATION      P1A
                                  RUNOFF COMPUTATION 2-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   52 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   57 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                     STORM AREA =     .01

   53 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   54 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                ***

                                                         UNIT HYDROGRAPH
                                                     5 END-OF-PERIOD ORDINATES
                37.       10.        2.        0.        0.

       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION      P1A
                             FOR PLAN 1, RATIO = 1.00

     TOTAL RAINFALL =    4.59, TOTAL LOSS =     .79, TOTAL EXCESS =    3.80

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+      18.     12.08                     2.          1.          1.           1.
                         (INCHES)     3.031       3.793       3.793        3.793
```

```
                        (AC-FT)        1.          1.          1.           1.

                        CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1A
                           FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      18.     12.08                  2.          1.          1.           1.
                       (INCHES)     3.031       3.793       3.793        3.793
                        (AC-FT)        1.          1.          1.           1.

                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   58 KP        PLAN  2 FOR STATION      P1A
                                   RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   52 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   60 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                     STORM AREA =     .01

   53 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   54 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                37.       10.        2.        0.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1A
                           FOR PLAN 2, RATIO = 1.00

     TOTAL RAINFALL =    8.86, TOTAL LOSS =     .84, TOTAL EXCESS =    8.02

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      27.     12.08                  4.          1.          1.           1.
                       (INCHES)     5.649       8.009       8.009        8.009
                        (AC-FT)        2.          3.          3.           3.

                        CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1A
                           FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
```

```
                        (CFS)
+      27.     12.08                    4.          1.          1.           1.
                      (INCHES)     5.649       8.009       8.009        8.009
                       (AC-FT)        2.          3.          3.           3.

                      CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   61 KP        PLAN  3 FOR STATION      P1A
                                  RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   52 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   63 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                   STORM AREA =     .01

   53 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   54 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                          ***

                                                      UNIT HYDROGRAPH
                                                  5 END-OF-PERIOD ORDINATES
                 37.       10.        2.        0.        0.

      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      P1A
                          FOR PLAN 3, RATIO = 1.00

     TOTAL RAINFALL =   11.51, TOTAL LOSS =     .86, TOTAL EXCESS =   10.65

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                        (CFS)
+      32.     12.08                    5.          2.          2.           2.
                      (INCHES)     7.096      10.643      10.643       10.643
                       (AC-FT)        2.          4.          4.           4.

                      CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      P1A
                          FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                        (CFS)
+      32.     12.08                    5.          2.          2.           2.
                      (INCHES)     7.096      10.643      10.643       10.643
                       (AC-FT)        2.          4.          4.           4.

                      CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   64 KP        PLAN  4 FOR STATION      P1A
                                  RUNOFF COMPUTATION 50-YRS STORM IN BASIN
```

```
                SUBBASIN RUNOFF DATA

   52 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   66 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                     STORM AREA =     .01

   53 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   54 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 37.       10.        2.        0.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1A
                           FOR PLAN 4, RATIO = 1.00

    TOTAL RAINFALL =   13.68, TOTAL LOSS =     .86, TOTAL EXCESS =   12.82

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      35.     12.08                  6.          2.          2.           2.
                        (INCHES)     8.241      12.804      12.804       12.804
                         (AC-FT)       3.          4.          4.           4.

                         CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1A
                           FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      35.     12.08                  6.          2.          2.           2.
                        (INCHES)     8.241      12.804      12.804       12.804
                         (AC-FT)       3.          4.          4.           4.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   67 KP        PLAN  5 FOR STATION      P1A
                                 RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   52 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

   69 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00
```

```
                                                STORM AREA =     .01

   53 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   54 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                ***

                                                        UNIT HYDROGRAPH
                                                   5 END-OF-PERIOD ORDINATES
                 37.       10.        2.        0.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P1A
                            FOR PLAN 5, RATIO = 1.00

     TOTAL RAINFALL =   16.03, TOTAL LOSS =     .87, TOTAL EXCESS =   15.16

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+      38.     12.08                   7.          3.          3.           3.
                         (INCHES)     9.421      15.145      15.145       15.145
                          (AC-FT)        3.          5.          5.           5.

                          CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P1A
                            FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+      38.     12.08                   7.          3.          3.           3.
                         (INCHES)     9.421      15.145      15.145       15.145
                          (AC-FT)        3.          5.          5.           5.

                          CUMULATIVE AREA =     .01 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


             **************
             *            *
   70 KK     *        E3  *
             *            *
             **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   71 KP        PLAN  1 FOR STATION       E3
                                   RUNOFF COMPUTATION 2-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   72 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

   77 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                STORM AREA =     .00
```

```
   73 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   74 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                  ***

                                                              UNIT HYDROGRAPH
                                                          5 END-OF-PERIOD ORDINATES
                 10.        3.        1.        0.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E3
                            FOR PLAN 1, RATIO = 1.00

     TOTAL RAINFALL =    4.59, TOTAL LOSS =    1.21, TOTAL EXCESS =    3.38

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       4.     12.08                   1.          0.          0.           0.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)        0.          0.          0.           0.

                         CUMULATIVE AREA =     .00 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E3
                            FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       4.     12.08                   1.          0.          0.           0.
                        (INCHES)     2.745       3.378       3.378        3.378
                         (AC-FT)        0.          0.          0.           0.

                         CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   78 KP        PLAN  2 FOR STATION       E3
                                   RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   72 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

   80 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                     STORM AREA =     .00

   73 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   74 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                  ***

                                                              UNIT HYDROGRAPH
                                                          5 END-OF-PERIOD ORDINATES
                 10.        3.        1.        0.        0.
```

```
      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION       E3
                          FOR PLAN 2, RATIO = 1.00

    TOTAL RAINFALL =    8.86, TOTAL LOSS =    1.33, TOTAL EXCESS =    7.53

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       7.     12.08                  1.          0.          0.           0.
                        (INCHES)     5.421       7.525       7.525        7.525
                         (AC-FT)       0.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION       E3
                          FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       7.     12.08                  1.          0.          0.           0.
                        (INCHES)     5.421       7.525       7.525        7.525
                         (AC-FT)       0.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   81 KP        PLAN  3 FOR STATION       E3
                                RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   72 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

   83 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                     STORM AREA =     .00

   73 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   74 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                10.        3.        1.        0.        0.

      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION       E3
                          FOR PLAN 3, RATIO = 1.00

    TOTAL RAINFALL =   11.51, TOTAL LOSS =    1.36, TOTAL EXCESS =   10.15

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       8.     12.08                  1.          0.          0.           0.
```

```
                    (INCHES)     6.906      10.139      10.139       10.139
                     (AC-FT)        1.          1.          1.           1.

                    CUMULATIVE AREA =     .00 SQ MI


      ***            ***            ***            ***            ***

                      HYDROGRAPH AT STATION       E3
                        FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                        (CFS)
+       8.     12.08                   1.          0.          0.           0.
                    (INCHES)     6.906      10.139      10.139       10.139
                     (AC-FT)        1.          1.          1.           1.

                    CUMULATIVE AREA =     .00 SQ MI


 ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***

   84 KP        PLAN  4 FOR STATION       E3
                                 RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   72 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

   86 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                   STORM AREA =     .00

   73 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   74 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                          ***

                                                      UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                10.        3.        1.        0.        0.

      ***            ***            ***            ***            ***

                      HYDROGRAPH AT STATION       E3
                        FOR PLAN 4, RATIO = 1.00

    TOTAL RAINFALL =   13.68, TOTAL LOSS =    1.38, TOTAL EXCESS =   12.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                        (CFS)
+       9.     12.08                   1.          1.          1.           1.
                    (INCHES)     8.074      12.288      12.288       12.288
                     (AC-FT)        1.          1.          1.           1.

                    CUMULATIVE AREA =     .00 SQ MI


      ***            ***            ***            ***            ***

                      HYDROGRAPH AT STATION       E3
                        FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
```

```
+   (CFS)       (HR)
                          (CFS)
+       9.     12.08                  1.          1.          1.           1.
                       (INCHES)     8.074      12.288      12.288       12.288
                        (AC-FT)        1.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   87 KP        PLAN  5 FOR STATION       E3
                                  RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   72 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

   89 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                     STORM AREA =     .00

   73 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   74 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .02  LAG

                                                                  ***

                                                              UNIT HYDROGRAPH
                                                          5 END-OF-PERIOD ORDINATES
                10.        3.        1.        0.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E3
                            FOR PLAN 5, RATIO = 1.00

     TOTAL RAINFALL =   16.03, TOTAL LOSS =    1.39, TOTAL EXCESS =   14.64

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      10.     12.08                  2.          1.          1.           1.
                       (INCHES)     9.277      14.621      14.621       14.621
                        (AC-FT)        1.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E3
                            FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      10.     12.08                  2.          1.          1.           1.
                       (INCHES)     9.277      14.621      14.621       14.621
                        (AC-FT)        1.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI


 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
              **************
              *            *
   90 KK      *       P2A  *
              *            *
              **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   91 KP        PLAN  1 FOR STATION      P2A
                                  RUNOFF COMPUTATION 2-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   92 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

   97 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                   STORM AREA =     .00

   93 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   94 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                  8.        2.        0.        0.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2A
                           FOR PLAN 1, RATIO = 1.00

     TOTAL RAINFALL =    4.59, TOTAL LOSS =     .79, TOTAL EXCESS =    3.80

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       4.     12.08                     0.          0.          0.           0.
                        (INCHES)     3.031       3.793       3.793        3.793
                         (AC-FT)        0.          0.          0.           0.

                         CUMULATIVE AREA =     .00 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2A
                           FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       4.     12.08                     0.          0.          0.           0.
                        (INCHES)     3.031       3.793       3.793        3.793
                         (AC-FT)        0.          0.          0.           0.

                         CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

   98 KP        PLAN  2 FOR STATION      P2A
                                  RUNOFF COMPUTATION 10-YRS STORM IN BASIN
```

```
                SUBBASIN RUNOFF DATA

   92 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

  100 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                   STORM AREA =     .00

   93 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   94 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                  8.        2.        0.        0.        0.

       ***            ***            ***            ***            ***

                          HYDROGRAPH AT STATION      P2A
                            FOR PLAN 2, RATIO = 1.00

     TOTAL RAINFALL =    8.86, TOTAL LOSS =     .84, TOTAL EXCESS =    8.02

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+       6.     12.08                   1.          0.          0.           0.
                         (INCHES)     5.649       8.009       8.009        8.009
                          (AC-FT)        0.          1.          1.           1.

                          CUMULATIVE AREA =     .00 SQ MI


       ***            ***            ***            ***            ***

                          HYDROGRAPH AT STATION      P2A
                            FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+       6.     12.08                   1.          0.          0.           0.
                         (INCHES)     5.649       8.009       8.009        8.009
                          (AC-FT)        0.          1.          1.           1.

                          CUMULATIVE AREA =     .00 SQ MI


 ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***

  101 KP        PLAN  3 FOR STATION      P2A
                                    RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   92 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

  103 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                   STORM AREA =     .00
```

```
  93 LS          SCS LOSS RATE
                       STRTL         .15  INITIAL ABSTRACTION
                      CRVNBR       93.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  94 UD          SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .03  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                 8.        2.        0.        0.        0.

      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      P2A
                          FOR PLAN 3, RATIO = 1.00

    TOTAL RAINFALL =   11.51, TOTAL LOSS =     .86, TOTAL EXCESS =   10.65

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       7.     12.08                    1.          0.          0.           0.
                       (INCHES)     7.096      10.643      10.643       10.643
                        (AC-FT)        1.          1.          1.           1.

                       CUMULATIVE AREA =     .00 SQ MI


      ***            ***            ***            ***            ***

                        HYDROGRAPH AT STATION      P2A
                          FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       7.     12.08                    1.          0.          0.           0.
                       (INCHES)     7.096      10.643      10.643       10.643
                        (AC-FT)        1.          1.          1.           1.

                       CUMULATIVE AREA =     .00 SQ MI


 ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***    ***

  104 KP        PLAN  4 FOR STATION      P2A
                                  RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  92 BA           SUBBASIN CHARACTERISTICS
                       TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

  106 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                      STORM AREA =     .00

  93 LS           SCS LOSS RATE
                       STRTL         .15  INITIAL ABSTRACTION
                      CRVNBR       93.00  CURVE NUMBER
                       RTIMP         .00  PERCENT IMPERVIOUS AREA

  94 UD           SCS DIMENSIONLESS UNITGRAPH
                        TLAG         .03  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
```

```
                8.        2.        0.        0.        0.

      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      P2A
                          FOR PLAN 4, RATIO = 1.00

    TOTAL RAINFALL =   13.68, TOTAL LOSS =     .86, TOTAL EXCESS =   12.82

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       8.     12.08                  1.          0.          0.           0.
                       (INCHES)     8.241      12.804      12.804       12.804
                        (AC-FT)        1.          1.          1.           1.

                       CUMULATIVE AREA =     .00 SQ MI


      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      P2A
                          FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       8.     12.08                  1.          0.          0.           0.
                       (INCHES)     8.241      12.804      12.804       12.804
                        (AC-FT)        1.          1.          1.           1.

                       CUMULATIVE AREA =     .00 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  107 KP        PLAN  5 FOR STATION      P2A
                                  RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

   92 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .00  SUBBASIN AREA

                  PRECIPITATION DATA

  109 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                   STORM AREA =     .00

   93 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

   94 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                          ***

                                                      UNIT HYDROGRAPH
                                                  5 END-OF-PERIOD ORDINATES
                8.        2.        0.        0.        0.

      ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      P2A
                          FOR PLAN 5, RATIO = 1.00

    TOTAL RAINFALL =   16.03, TOTAL LOSS =     .87, TOTAL EXCESS =   15.16

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
```

```
+       8.     12.08                  1.          1.          1.           1.
                       (INCHES)     9.421      15.145      15.145       15.145
                        (AC-FT)        1.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI


       ***            ***            ***            ***            ***

                         HYDROGRAPH AT STATION      P2A
                           FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+       8.     12.08                  1.          1.          1.           1.
                       (INCHES)     9.421      15.145      15.145       15.145
                        (AC-FT)        1.          1.          1.           1.

                        CUMULATIVE AREA =     .00 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


             **************
             *            *
  110 KK     *     COMB1  *
             *            *
             **************

  111 HC          HYDROGRAPH COMBINATION
                       ICOMP           5  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

       ***            ***            ***            ***            ***

                         HYDROGRAPH AT STATION    COMB1
                           FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      82.     12.08                  9.          3.          3.           3.
                       (INCHES)     2.816       3.483       3.483        3.483
                        (AC-FT)        5.          6.          6.           6.

                        CUMULATIVE AREA =     .03 SQ MI


       ***            ***            ***            ***            ***

                         HYDROGRAPH AT STATION    COMB1
                           FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     129.     12.08                 18.          6.          6.           6.
                       (INCHES)     5.478       7.647       7.647        7.647
                        (AC-FT)        9.         13.         13.          13.

                        CUMULATIVE AREA =     .03 SQ MI


       ***            ***            ***            ***            ***

                         HYDROGRAPH AT STATION    COMB1
                           FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                        MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     150.     12.08                 23.          9.          9.           9.
```

```
                        (INCHES)     6.953      10.266      10.266       10.266
                         (AC-FT)      12.         17.         17.          17.

                         CUMULATIVE AREA =     .03 SQ MI


       ***            ***            ***            ***            ***

                          HYDROGRAPH AT STATION    COMB1
                            FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     166.     12.08                27.         10.         10.          10.
                        (INCHES)     8.116      12.418      12.418       12.418
                         (AC-FT)      14.         21.         21.          21.

                         CUMULATIVE AREA =     .03 SQ MI


       ***            ***            ***            ***            ***

                          HYDROGRAPH AT STATION    COMB1
                            FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     182.     12.08                31.         12.         12.          12.
                        (INCHES)     9.313      14.753      14.753       14.753
                         (AC-FT)      16.         25.         25.          25.

                         CUMULATIVE AREA =     .03 SQ MI


 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  112 KK    *        E2  *
            *            *
            **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  113 KP        PLAN  1 FOR STATION       E2
                                  RUNOFF COMPUTATION 2-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  114 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .03  SUBBASIN AREA

                  PRECIPITATION DATA

  119 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                     STORM AREA =     .03

  115 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  116 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
```

```
                161.       45.        9.        2.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 1, RATIO = 1.00

     TOTAL RAINFALL =    4.59, TOTAL LOSS =    1.21, TOTAL EXCESS =    3.38

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+      72.     12.08                     8.          3.          3.           3.
                         (INCHES)     2.745       3.378       3.378        3.378
                          (AC-FT)        4.          5.          5.           5.

                          CUMULATIVE AREA =     .03 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+      72.     12.08                     8.          3.          3.           3.
                         (INCHES)     2.745       3.378       3.378        3.378
                          (AC-FT)        4.          5.          5.           5.

                          CUMULATIVE AREA =     .03 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  120 KP        PLAN  2 FOR STATION       E2
                                   RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  114 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .03  SUBBASIN AREA

                  PRECIPITATION DATA

  122 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                   STORM AREA =     .03

  115 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  116 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                161.       45.        9.        2.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 2, RATIO = 1.00

     TOTAL RAINFALL =    8.86, TOTAL LOSS =    1.33, TOTAL EXCESS =    7.53

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
```

```
+     114.     12.08                  16.          6.          6.           6.
                        (INCHES)     5.420       7.524       7.524        7.524
                         (AC-FT)        8.         11.         11.          11.

                         CUMULATIVE AREA =     .03 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                           (CFS)
+     114.     12.08                  16.          6.          6.           6.
                        (INCHES)     5.420       7.524       7.524        7.524
                         (AC-FT)        8.         11.         11.          11.

                         CUMULATIVE AREA =     .03 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  123 KP        PLAN  3 FOR STATION       E2
                                   RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  114 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .03  SUBBASIN AREA

                  PRECIPITATION DATA

  125 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                   STORM AREA =     .03

  115 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  116 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                       5 END-OF-PERIOD ORDINATES
                161.       45.        9.        2.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 3, RATIO = 1.00

    TOTAL RAINFALL =   11.51, TOTAL LOSS =    1.36, TOTAL EXCESS =   10.15

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                           (CFS)
+     133.     12.08                  21.          8.          8.           8.
                        (INCHES)     6.905      10.138      10.138       10.138
                         (AC-FT)       10.         15.         15.          15.

                         CUMULATIVE AREA =     .03 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
```

```
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     133.     12.08                21.          8.          8.           8.
                        (INCHES)    6.905      10.138      10.138       10.138
                         (AC-FT)     10.         15.         15.          15.

                        CUMULATIVE AREA =     .03 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  126 KP        PLAN  4 FOR STATION       E2
                                  RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  114 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .03  SUBBASIN AREA

                  PRECIPITATION DATA

  128 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                   STORM AREA =     .03

  115 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  116 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                     5 END-OF-PERIOD ORDINATES
                161.       45.        9.        2.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       E2
                           FOR PLAN 4, RATIO = 1.00

     TOTAL RAINFALL =   13.68, TOTAL LOSS =    1.38, TOTAL EXCESS =   12.30

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     148.     12.08                24.          9.          9.           9.
                        (INCHES)    8.074      12.288      12.288       12.288
                         (AC-FT)     12.         18.         18.          18.

                        CUMULATIVE AREA =     .03 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION       E2
                           FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     148.     12.08                24.          9.          9.           9.
                        (INCHES)    8.074      12.288      12.288       12.288
                         (AC-FT)     12.         18.         18.          18.

                        CUMULATIVE AREA =     .03 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***
```

```
  129 KP        PLAN  5 FOR STATION       E2
                                  RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  114 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .03  SUBBASIN AREA

                  PRECIPITATION DATA

  131 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                     STORM AREA =     .03

  115 LS          SCS LOSS RATE
                        STRTL         .25  INITIAL ABSTRACTION
                       CRVNBR       89.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  116 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .03  LAG

                                                                  ***

                                                              UNIT HYDROGRAPH
                                                         5 END-OF-PERIOD ORDINATES
                161.       45.        9.        2.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 5, RATIO = 1.00

     TOTAL RAINFALL =   16.03, TOTAL LOSS =    1.39, TOTAL EXCESS =   14.64

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                           (CFS)
+     162.     12.08                   28.         11.         11.          11.
                         (INCHES)     9.276      14.620      14.620       14.620
                          (AC-FT)       14.         22.         22.          22.

                          CUMULATIVE AREA =     .03 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION       E2
                            FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                           (CFS)
+     162.     12.08                   28.         11.         11.          11.
                         (INCHES)     9.276      14.620      14.620       14.620
                          (AC-FT)       14.         22.         22.          22.

                          CUMULATIVE AREA =     .03 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


             **************
             *            *
  132 KK     *       P2C  *
             *            *
             **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  133 KP        PLAN  1 FOR STATION      P2C
                                  RUNOFF COMPUTATION 2-YRS STORM IN BASIN
```

```
                SUBBASIN RUNOFF DATA

  134 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  139 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                   STORM AREA =     .01

  135 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  136 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 78.       22.        4.        1.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2C
                           FOR PLAN 1, RATIO = 1.00

    TOTAL RAINFALL =    4.59, TOTAL LOSS =     .79, TOTAL EXCESS =    3.80

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      38.     12.08                  4.          1.          1.           1.
                        (INCHES)     3.031       3.793       3.793        3.793
                         (AC-FT)        2.          3.          3.           3.

                         CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2C
                           FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      38.     12.08                  4.          1.          1.           1.
                        (INCHES)     3.031       3.793       3.793        3.793
                         (AC-FT)        2.          3.          3.           3.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  140 KP        PLAN  2 FOR STATION      P2C
                                RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  134 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  142 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00
```

```
                                                STORM AREA =     .01

  135 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  136 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                                ***

                                                          UNIT HYDROGRAPH
                                                     5 END-OF-PERIOD ORDINATES
                 78.       22.        4.        1.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2C
                            FOR PLAN 2, RATIO = 1.00

     TOTAL RAINFALL =    8.86, TOTAL LOSS =     .84, TOTAL EXCESS =    8.02

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      57.     12.08                  8.          3.          3.           3.
                        (INCHES)     5.649       8.009       8.009        8.009
                         (AC-FT)        4.          6.          6.           6.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2C
                            FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      57.     12.08                  8.          3.          3.           3.
                        (INCHES)     5.649       8.009       8.009        8.009
                         (AC-FT)        4.          6.          6.           6.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  143 KP        PLAN  3 FOR STATION      P2C
                                  RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  134 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  145 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                STORM AREA =     .01

  135 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  136 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                                ***

                                                          UNIT HYDROGRAPH
```

```
                                                    5 END-OF-PERIOD ORDINATES
                78.       22.        4.        1.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2C
                           FOR PLAN 3, RATIO = 1.00

     TOTAL RAINFALL =   11.51, TOTAL LOSS =     .86, TOTAL EXCESS =   10.65

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      66.     12.08                  10.          4.          4.           4.
                        (INCHES)     7.096      10.643      10.643       10.643
                         (AC-FT)        5.          8.          8.           8.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2C
                           FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      66.     12.08                  10.          4.          4.           4.
                        (INCHES)     7.096      10.643      10.643       10.643
                         (AC-FT)        5.          8.          8.           8.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  146 KP        PLAN  4 FOR STATION      P2C
                                  RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  134 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  148 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                     STORM AREA =     .01

  135 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  136 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                          ***

                                                      UNIT HYDROGRAPH
                                                    5 END-OF-PERIOD ORDINATES
                78.       22.        4.        1.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2C
                           FOR PLAN 4, RATIO = 1.00

     TOTAL RAINFALL =   13.68, TOTAL LOSS =     .86, TOTAL EXCESS =   12.82

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
```

```
                          (CFS)
+      73.     12.08                    12.          5.          5.           5.
                       (INCHES)     8.241      12.803      12.803       12.803
                        (AC-FT)        6.          9.          9.           9.

                        CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2C
                            FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      73.     12.08                    12.          5.          5.           5.
                       (INCHES)     8.241      12.803      12.803       12.803
                        (AC-FT)        6.          9.          9.           9.

                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  149 KP        PLAN  5 FOR STATION      P2C
                                  RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  134 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  151 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                   STORM AREA =     .01

  135 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  136 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 78.       22.        4.        1.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2C
                            FOR PLAN 5, RATIO = 1.00

    TOTAL RAINFALL =   16.03, TOTAL LOSS =     .87, TOTAL EXCESS =   15.16

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      80.     12.08                    14.          6.          6.           6.
                       (INCHES)     9.421      15.145      15.145       15.145
                        (AC-FT)        7.         11.         11.          11.

                        CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2C
                            FOR PLAN 5, RATIO = 1.00
```

```
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+      80.     12.08                  14.          6.          6.           6.
                         (INCHES)     9.421      15.145      15.145       15.145
                          (AC-FT)        7.         11.         11.          11.

                          CUMULATIVE AREA =     .01 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


             **************
             *            *
  152 KK     *      COMB  *     2
             *            *
             **************

  153 HC          HYDROGRAPH COMBINATION
                        ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION     COMB
                             FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     109.     12.08                  13.          4.          4.           4.
                         (INCHES)     2.837       3.513       3.513        3.513
                          (AC-FT)        6.          8.          8.           8.

                          CUMULATIVE AREA =     .04 SQ MI


       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION     COMB
                             FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     171.     12.08                  25.          9.          9.           9.
                         (INCHES)     5.495       7.683       7.683        7.683
                          (AC-FT)       12.         17.         17.          17.

                          CUMULATIVE AREA =     .04 SQ MI


       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION     COMB
                             FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     199.     12.08                  31.         12.         12.          12.
                         (INCHES)     6.967      10.303      10.303       10.303
                          (AC-FT)       15.         23.         23.          23.

                          CUMULATIVE AREA =     .04 SQ MI


       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION     COMB
                             FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
```

```
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     221.     12.08                36.         14.         14.          14.
                        (INCHES)     8.128      12.456      12.456       12.456
                         (AC-FT)      18.         28.         28.          28.

                         CUMULATIVE AREA =     .04 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION     COMB
                            FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     242.     12.08                42.         17.         17.          17.
                        (INCHES)     9.323      14.792      14.792       14.792
                         (AC-FT)      21.         33.         33.          33.

                         CUMULATIVE AREA =     .04 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


             **************
             *            *
  154 KK     *       P1B  *
             *            *
             **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  155 KP        PLAN  1 FOR STATION      P1B
                                 RUNOFF COMPUTATION 2-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  156 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  161 PH                              DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00

                                                   STORM AREA =     .01

  157 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  158 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .05  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                 62.       28.        7.        2.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P1B
                            FOR PLAN 1, RATIO = 1.00

     TOTAL RAINFALL =    4.59, TOTAL LOSS =     .79, TOTAL EXCESS =    3.80

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                    6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
```

```
                          (CFS)
+      33.     12.08                    4.          1.          1.           1.
                       (INCHES)     3.031       3.792       3.792        3.792
                        (AC-FT)        2.          3.          3.           3.

                        CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P1B
                            FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      33.     12.08                    4.          1.          1.           1.
                       (INCHES)     3.031       3.792       3.792        3.792
                        (AC-FT)        2.          3.          3.           3.

                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  162 KP        PLAN  2 FOR STATION      P1B
                                  RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  156 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  164 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                   STORM AREA =     .01

  157 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  158 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .05  LAG

                                                                 ***

                                                          UNIT HYDROGRAPH
                                                       5 END-OF-PERIOD ORDINATES
                 62.       28.        7.        2.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P1B
                            FOR PLAN 2, RATIO = 1.00

    TOTAL RAINFALL =    8.86, TOTAL LOSS =     .84, TOTAL EXCESS =    8.02

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      50.     12.08                    8.          3.          3.           3.
                       (INCHES)     5.649       8.008       8.008        8.008
                        (AC-FT)        4.          6.          6.           6.

                        CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P1B
                            FOR PLAN 2, RATIO = 1.00
```

```
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      50.     12.08                  8.          3.          3.           3.
                         (INCHES)     5.649       8.008       8.008        8.008
                          (AC-FT)        4.          6.          6.           6.

                          CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  165 KP        PLAN  3 FOR STATION      P1B
                                   RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  156 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  167 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                   STORM AREA =     .01

  157 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  158 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .05  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 62.       28.        7.        2.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P1B
                            FOR PLAN 3, RATIO = 1.00

     TOTAL RAINFALL =   11.51, TOTAL LOSS =     .86, TOTAL EXCESS =   10.65

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      58.     12.08                 10.          4.          4.           4.
                         (INCHES)     7.095      10.641      10.641       10.641
                          (AC-FT)        5.          7.          7.           7.

                          CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P1B
                            FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      58.     12.08                 10.          4.          4.           4.
                         (INCHES)     7.095      10.641      10.641       10.641
                          (AC-FT)        5.          7.          7.           7.

                          CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***
```

```
  168 KP        PLAN  4 FOR STATION      P1B
                                   RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  156 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  170 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                 STORM AREA =     .01

  157 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  158 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .05  LAG

                                                                  ***

                                                              UNIT HYDROGRAPH
                                                          5 END-OF-PERIOD ORDINATES
                 62.       28.        7.        2.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1B
                           FOR PLAN 4, RATIO = 1.00

    TOTAL RAINFALL =   13.68, TOTAL LOSS =     .86, TOTAL EXCESS =   12.82

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      64.     12.08                   11.          4.          4.           4.
                        (INCHES)     8.240      12.801      12.801       12.801
                         (AC-FT)        6.          9.          9.           9.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P1B
                           FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      64.     12.08                   11.          4.          4.           4.
                        (INCHES)     8.240      12.801      12.801       12.801
                         (AC-FT)        6.          9.          9.           9.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  171 KP        PLAN  5 FOR STATION      P1B
                                   RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  156 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  173 PH                                 DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
```

```
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                   STORM AREA =     .01

  157 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  158 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .05  LAG

                                                                  ***

                                                              UNIT HYDROGRAPH
                                                          5 END-OF-PERIOD ORDINATES
                 62.       28.        7.        2.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P1B
                            FOR PLAN 5, RATIO = 1.00

     TOTAL RAINFALL =   16.03, TOTAL LOSS =     .87, TOTAL EXCESS =   15.16

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      69.     12.08                   13.          5.          5.           5.
                        (INCHES)     9.420      15.141      15.141       15.141
                         (AC-FT)        6.         10.         10.          10.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P1B
                            FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      69.     12.08                   13.          5.          5.           5.
                        (INCHES)     9.420      15.141      15.141       15.141
                         (AC-FT)        6.         10.         10.          10.

                         CUMULATIVE AREA =     .01 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


             **************
             *            *
  174 KK     *       P2B  *
             *            *
             **************


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  175 KP        PLAN  1 FOR STATION      P2B
                                  RUNOFF COMPUTATION 2-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  176 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  181 PH                                  DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .45     .78    1.86    2.61    2.81    3.37    3.91    4.59     .00     .00     .00     .00
```

```
                                                STORM AREA =     .01

  177 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  178 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                          ***

                                                     UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                54.       15.        3.        1.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2B
                           FOR PLAN 1, RATIO = 1.00

    TOTAL RAINFALL =    4.59, TOTAL LOSS =     .79, TOTAL EXCESS =    3.80

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      26.     12.08                  3.          1.          1.          1.
                        (INCHES)     3.031       3.793       3.793       3.793
                         (AC-FT)       2.          2.          2.          2.

                         CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2B
                           FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      26.     12.08                  3.          1.          1.          1.
                        (INCHES)     3.031       3.793       3.793       3.793
                         (AC-FT)       2.          2.          2.          2.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  182 KP        PLAN  2 FOR STATION      P2B
                                RUNOFF COMPUTATION 10-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  176 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  184 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .65    1.13    2.70    4.01    4.51    5.85    7.25    8.86     .00     .00     .00     .00

                                                STORM AREA =     .01

  177 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  178 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                          ***
```

```
                                                    UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                54.       15.        3.        1.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2B
                            FOR PLAN 2, RATIO = 1.00

     TOTAL RAINFALL =    8.86, TOTAL LOSS =     .84, TOTAL EXCESS =    8.02

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      40.     12.08                  6.          2.          2.           2.
                        (INCHES)     5.649       8.009       8.009        8.009
                         (AC-FT)       3.          4.          4.           4.

                         CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2B
                            FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      40.     12.08                  6.          2.          2.           2.
                        (INCHES)     5.649       8.009       8.009        8.009
                         (AC-FT)       3.          4.          4.           4.

                         CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  185 KP        PLAN  3 FOR STATION      P2B
                                  RUNOFF COMPUTATION 25-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  176 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  187 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .74    1.31    3.10    4.76    5.45    7.25    9.26   11.51     .00     .00     .00     .00

                                                     STORM AREA =     .01

  177 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  178 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                                ***

                                                    UNIT HYDROGRAPH
                                                 5 END-OF-PERIOD ORDINATES
                54.       15.        3.        1.        0.

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      P2B
                            FOR PLAN 3, RATIO = 1.00

     TOTAL RAINFALL =   11.51, TOTAL LOSS =     .86, TOTAL EXCESS =   10.65

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
```

```
+   (CFS)       (HR)
                          (CFS)
+      46.     12.08                    7.          3.          3.           3.
                       (INCHES)     7.096      10.643      10.643       10.643
                        (AC-FT)        4.          5.          5.           5.

                        CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2B
                           FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      46.     12.08                    7.          3.          3.           3.
                       (INCHES)     7.096      10.643      10.643       10.643
                        (AC-FT)        4.          5.          5.           5.

                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  188 KP        PLAN  4 FOR STATION      P2B
                                  RUNOFF COMPUTATION 50-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  176 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  190 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .82    1.43    3.40    5.35    6.18    8.37   10.89   13.68     .00     .00     .00     .00

                                                     STORM AREA =     .01

  177 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  178 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 54.       15.        3.        1.        0.

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2B
                           FOR PLAN 4, RATIO = 1.00

    TOTAL RAINFALL =   13.68, TOTAL LOSS =     .86, TOTAL EXCESS =   12.82

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      50.     12.08                    8.          3.          3.           3.
                       (INCHES)     8.241      12.804      12.804       12.804
                        (AC-FT)        4.          6.          6.           6.

                        CUMULATIVE AREA =     .01 SQ MI


       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2B
                           FOR PLAN 4, RATIO = 1.00
```

```
  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      50.     12.08                    8.          3.          3.           3.
                        (INCHES)     8.241      12.804      12.804       12.804
                         (AC-FT)        4.          6.          6.           6.

                        CUMULATIVE AREA =     .01 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

  191 KP        PLAN  5 FOR STATION      P2B
                                    RUNOFF COMPUTATION 100-YRS STORM IN BASIN

                SUBBASIN RUNOFF DATA

  176 BA          SUBBASIN CHARACTERISTICS
                        TAREA         .01  SUBBASIN AREA

                  PRECIPITATION DATA

  193 PH                                DEPTHS FOR   0-PERCENT HYPOTHETICAL STORM
                  ..... HYDRO-35 .....   ............... TP-40 ...............   ........... TP-49 ...........
                  5-MIN  15-MIN  60-MIN    2-HR    3-HR    6-HR   12-HR   24-HR   2-DAY   4-DAY   7-DAY  10-DAY
                    .89    1.56    3.70    5.94    6.93    9.53   12.63   16.03     .00     .00     .00     .00

                                                   STORM AREA =     .01

  177 LS          SCS LOSS RATE
                        STRTL         .15  INITIAL ABSTRACTION
                       CRVNBR       93.00  CURVE NUMBER
                        RTIMP         .00  PERCENT IMPERVIOUS AREA

  178 UD          SCS DIMENSIONLESS UNITGRAPH
                         TLAG         .04  LAG

                                                                 ***

                                                            UNIT HYDROGRAPH
                                                        5 END-OF-PERIOD ORDINATES
                 54.       15.        3.        1.        0.

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2B
                           FOR PLAN 5, RATIO = 1.00

    TOTAL RAINFALL =   16.03, TOTAL LOSS =     .87, TOTAL EXCESS =   15.16

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      55.     12.08                   10.          4.          4.           4.
                        (INCHES)     9.421      15.145      15.145       15.145
                         (AC-FT)        5.          8.          8.           8.

                        CUMULATIVE AREA =     .01 SQ MI


      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      P2B
                           FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+      55.     12.08                   10.          4.          4.           4.
                        (INCHES)     9.421      15.145      15.145       15.145
                         (AC-FT)        5.          8.          8.           8.

                        CUMULATIVE AREA =     .01 SQ MI
```

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  194 KK    *     COMB3  *
            *            *
            **************

  195 HC          HYDROGRAPH COMBINATION
                       ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB3
                            FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+      59.     12.08                   7.          2.          2.           2.
                         (INCHES)     3.031       3.792       3.792        3.792
                          (AC-FT)        4.          5.          5.           5.

                          CUMULATIVE AREA =     .02 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB3
                            FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+      89.     12.08                  14.          5.          5.           5.
                         (INCHES)     5.649       8.008       8.008        8.008
                          (AC-FT)        7.         10.         10.          10.

                          CUMULATIVE AREA =     .02 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB3
                            FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     103.     12.08                  17.          6.          6.           6.
                         (INCHES)     7.095      10.642      10.642       10.642
                          (AC-FT)        8.         13.         13.          13.

                          CUMULATIVE AREA =     .02 SQ MI


       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION    COMB3
                            FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                            (CFS)
+     114.     12.08                  20.          8.          8.           8.
                         (INCHES)     8.240      12.802      12.802       12.802
                          (AC-FT)       10.         15.         15.          15.

                          CUMULATIVE AREA =     .02 SQ MI


       ***             ***             ***             ***             ***
```

```
                        HYDROGRAPH AT STATION    COMB3
                          FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     124.     12.08                  23.          9.          9.           9.
                       (INCHES)     9.420      15.143      15.143       15.143
                        (AC-FT)       11.         18.         18.          18.

                        CUMULATIVE AREA =     .02 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  196 KK    *     COMB4  *
            *            *
            **************

  197 HC          HYDROGRAPH COMBINATION
                       ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                  ***

       ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    COMB4
                          FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     168.     12.08                  20.          6.          6.           6.
                       (INCHES)     2.904       3.611       3.611        3.611
                        (AC-FT)       10.         12.         12.          12.

                        CUMULATIVE AREA =     .06 SQ MI


       ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    COMB4
                          FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     261.     12.08                  38.         13.         13.          13.
                       (INCHES)     5.548       7.797       7.797        7.797
                        (AC-FT)       19.         27.         27.          27.

                        CUMULATIVE AREA =     .06 SQ MI


       ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    COMB4
                          FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     302.     12.08                  48.         18.         18.          18.
                       (INCHES)     7.012      10.422      10.422       10.422
                        (AC-FT)       24.         36.         36.          36.

                        CUMULATIVE AREA =     .06 SQ MI


       ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION    COMB4
```

```
                          FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     335.     12.08                  56.         22.         22.          22.
                        (INCHES)     8.167      12.577      12.577       12.577
                         (AC-FT)      28.         43.         43.          43.

                         CUMULATIVE AREA =     .06 SQ MI


       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION    COMB4
                             FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     366.     12.08                  64.         26.         26.          26.
                        (INCHES)     9.357      14.914      14.914       14.914
                         (AC-FT)      32.         51.         51.          51.

                         CUMULATIVE AREA =     .06 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
  198 KK    *      POND  *
            *            *
            **************
                             RUNOFF MITIGATION POND CALCULATIION

  200 KO          OUTPUT CONTROL VARIABLES
                        IPRNT           3  PRINT CONTROL
                        IPLOT           1  PLOT CONTROL
                        QSCAL          0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

  201 RS          STORAGE ROUTING
                        NSTPS           1  NUMBER OF SUBREACHES
                         ITYP        ELEV  TYPE OF INITIAL CONDITION
                        RSVRIC         .00  INITIAL CONDITION
                             X         .00 WORKING R AND D COEFFICIENT

  203 SV            STORAGE          .0        .2        .3        .5        .7        .9       1.2       1.4       1.7       2.0


  204 SE          ELEVATION         .00       .91      1.82      2.73      3.64      4.56      5.47      6.38      7.29      8.20


  202 SQ          DISCHARGE          0.        0.       59.      115.      152.      181.      207.      229.      278.      365.


                                                                  ***

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO      365.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION     POND
                             FOR PLAN 1, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     130.     12.17                  20.          6.          6.           6.
                        (INCHES)     2.904       3.563       3.563        3.563
                         (AC-FT)      10.         12.         12.          12.
```

```
 PEAK STORAGE   TIME                        MAXIMUM AVERAGE STORAGE
                                      6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
        1.     12.17                    0.          0.          0.           0.

  PEAK STAGE    TIME                         MAXIMUM AVERAGE STAGE
                                      6-HR       24-HR       72-HR     24.00-HR
+   (FEET)      (HR)
      3.09     12.17                  1.22         .78         .78          .78

                         CUMULATIVE AREA =     .06 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

                PLAN  2 INPUT DATA FOR STATION     POND ARE SAME AS FOR PLAN  1

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO      365.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION     POND
                            FOR PLAN 2, RATIO = 1.00

  PEAK FLOW     TIME                         MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                           (CFS)
+     191.     12.17                   38.         13.         13.          13.
                         (INCHES)     5.548       7.746       7.746        7.746
                          (AC-FT)      19.         26.         26.          26.

 PEAK STORAGE   TIME                        MAXIMUM AVERAGE STORAGE
                                      6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
        1.     12.17                    0.          0.          0.           0.

  PEAK STAGE    TIME                         MAXIMUM AVERAGE STAGE
                                      6-HR       24-HR       72-HR     24.00-HR
+   (FEET)      (HR)
      4.90     12.17                  1.53        1.02        1.02         1.02

                         CUMULATIVE AREA =     .06 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

                PLAN  3 INPUT DATA FOR STATION     POND ARE SAME AS FOR PLAN  1

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO      365.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION     POND
                            FOR PLAN 3, RATIO = 1.00

  PEAK FLOW     TIME                         MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                           (CFS)
+     217.     12.17                   48.         18.         18.          18.
                         (INCHES)     7.012      10.370      10.370       10.370
                          (AC-FT)      24.         35.         35.          35.

 PEAK STORAGE   TIME                        MAXIMUM AVERAGE STORAGE
                                      6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
        1.     12.17                    0.          0.          0.           0.

  PEAK STAGE    TIME                         MAXIMUM AVERAGE STAGE
                                      6-HR       24-HR       72-HR     24.00-HR
+   (FEET)      (HR)
      5.88     12.17                  1.72        1.12        1.12         1.12
```

```
                        CUMULATIVE AREA =     .06 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

                PLAN  4 INPUT DATA FOR STATION     POND ARE SAME AS FOR PLAN  1

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO      365.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION     POND
                            FOR PLAN 4, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     238.     12.17                   56.         22.         22.          22.
                        (INCHES)     8.167      12.524      12.524       12.524
                         (AC-FT)       28.         43.         43.          43.

 PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                      6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
        1.     12.17                    0.          0.          0.           0.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                      6-HR       24-HR       72-HR     24.00-HR
+   (FEET)      (HR)
      6.55     12.17                  1.87        1.20        1.20         1.20

                        CUMULATIVE AREA =     .06 SQ MI


 ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***     ***

                PLAN  5 INPUT DATA FOR STATION     POND ARE SAME AS FOR PLAN  1

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN        0. TO      365.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION     POND
                            FOR PLAN 5, RATIO = 1.00

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR     24.00-HR
+   (CFS)       (HR)
                          (CFS)
+     269.     12.17                   64.         26.         26.          26.
                        (INCHES)     9.356      14.860      14.860       14.860
                         (AC-FT)       32.         51.         51.          51.

 PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                      6-HR       24-HR       72-HR     24.00-HR
+  (AC-FT)      (HR)
        2.     12.17                    0.          0.          0.           0.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                      6-HR       24-HR       72-HR     24.00-HR
+   (FEET)      (HR)
      7.13     12.17                  2.01        1.28        1.28         1.28

                        CUMULATIVE AREA =     .06 SQ MI

1

                PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                                  FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                              TIME TO PEAK IN HOURS


                                                                    RATIOS APPLIED TO FLOWS
 OPERATION       STATION     AREA    PLAN            RATIO 1
```

```
                                                  1.00

 HYDROGRAPH AT
+                    E1A       .01     1   FLOW          30.
                                             TIME        12.08
                                         2   FLOW          49.
                                             TIME        12.08
                                         3   FLOW          57.
                                             TIME        12.08
                                         4   FLOW          63.
                                             TIME        12.08
                                         5   FLOW          69.
                                             TIME        12.08

 HYDROGRAPH AT
+                    E1B       .01     1   FLOW          25.
                                             TIME        12.08
                                         2   FLOW          40.
                                             TIME        12.08
                                         3   FLOW          47.
                                             TIME        12.08
                                         4   FLOW          52.
                                             TIME        12.08
                                         5   FLOW          57.
                                             TIME        12.08

 HYDROGRAPH AT
+                    P1A       .01     1   FLOW          18.
                                             TIME        12.08
                                         2   FLOW          27.
                                             TIME        12.08
                                         3   FLOW          32.
                                             TIME        12.08
                                         4   FLOW          35.
                                             TIME        12.08
                                         5   FLOW          38.
                                             TIME        12.08

 HYDROGRAPH AT
+                     E3       .00     1   FLOW           4.
                                             TIME        12.08
                                         2   FLOW           7.
                                             TIME        12.08
                                         3   FLOW           8.
                                             TIME        12.08
                                         4   FLOW           9.
                                             TIME        12.08
                                         5   FLOW          10.
                                             TIME        12.08

 HYDROGRAPH AT
+                    P2A       .00     1   FLOW           4.
                                             TIME        12.08
                                         2   FLOW           6.
                                             TIME        12.08
                                         3   FLOW           7.
                                             TIME        12.08
                                         4   FLOW           8.
                                             TIME        12.08
                                         5   FLOW           8.
                                             TIME        12.08

  5 COMBINED AT
+                  COMB1       .03     1   FLOW          82.
                                             TIME        12.08
                                         2   FLOW         129.
                                             TIME        12.08
                                         3   FLOW         150.
                                             TIME        12.08
                                         4   FLOW         166.
                                             TIME        12.08
                                         5   FLOW         182.
                                             TIME        12.08

 HYDROGRAPH AT
+                     E2       .03     1   FLOW          72.
                                             TIME        12.08
                                         2   FLOW         114.
                                             TIME        12.08
                                         3   FLOW         133.
                                             TIME        12.08
```

```
                                        4   FLOW         148.
                                            TIME        12.08
                                        5   FLOW         162.
                                            TIME        12.08

 HYDROGRAPH AT
+                    P2C       .01     1   FLOW          38.
                                            TIME        12.08
                                        2   FLOW          57.
                                            TIME        12.08
                                        3   FLOW          66.
                                            TIME        12.08
                                        4   FLOW          73.
                                            TIME        12.08
                                        5   FLOW          80.
                                            TIME        12.08

  2 COMBINED AT
+                   COMB       .04     1   FLOW         109.
                                            TIME        12.08
                                        2   FLOW         171.
                                            TIME        12.08
                                        3   FLOW         199.
                                            TIME        12.08
                                        4   FLOW         221.
                                            TIME        12.08
                                        5   FLOW         242.
                                            TIME        12.08

 HYDROGRAPH AT
+                    P1B       .01     1   FLOW          33.
                                            TIME        12.08
                                        2   FLOW          50.
                                            TIME        12.08
                                        3   FLOW          58.
                                            TIME        12.08
                                        4   FLOW          64.
                                            TIME        12.08
                                        5   FLOW          69.
                                            TIME        12.08

 HYDROGRAPH AT
+                    P2B       .01     1   FLOW          26.
                                            TIME        12.08
                                        2   FLOW          40.
                                            TIME        12.08
                                        3   FLOW          46.
                                            TIME        12.08
                                        4   FLOW          50.
                                            TIME        12.08
                                        5   FLOW          55.
                                            TIME        12.08

  2 COMBINED AT
+                  COMB3       .02     1   FLOW          59.
                                            TIME        12.08
                                        2   FLOW          89.
                                            TIME        12.08
                                        3   FLOW         103.
                                            TIME        12.08
                                        4   FLOW         114.
                                            TIME        12.08
                                        5   FLOW         124.
                                            TIME        12.08

  2 COMBINED AT
+                  COMB4       .06     1   FLOW         168.
                                            TIME        12.08
                                        2   FLOW         261.
                                            TIME        12.08
                                        3   FLOW         302.
                                            TIME        12.08
                                        4   FLOW         335.
                                            TIME        12.08
                                        5   FLOW         366.
                                            TIME        12.08

 ROUTED TO
+                   POND       .06     1   FLOW         130.
                                            TIME        12.17
                                        2   FLOW         191.
```

```
    TIME        12.17
3   FLOW         217.
    TIME        12.17
4   FLOW         238.
    TIME        12.17
5   FLOW         269.
    TIME        12.17

** PEAK STAGES IN FEET **
1   STAGE        3.09
    TIME        12.17
2   STAGE        4.90
    TIME        12.17
3   STAGE        5.88
    TIME        12.17
4   STAGE        6.55
    TIME        12.17
5   STAGE        7.13
    TIME        12.17


*** NORMAL END OF HEC-1 ***
```

APPENDIX F

HYDRAULIC ANALYSIS RESULTS

HEC-RAS Version 3.1.3 May 2005
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```
X     X  XXXXXX    XXXX        XXXX       XX      XXXX
X     X  X        X    X       X   X     X  X    X
X     X  X        X            X   X    X    X   X
XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
X     X  X        X            X  X     X    X        X
X     X  X        X    X       X   X    X    X        X
X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Caguas Milenio
Project File : amendment2.prj
Run Date and Time: 4/23/2008 3:57:45 PM

Project in SI units

PLAN DATA

Plan Title: Proposed
Plan File : p:\435-Caguas Millenium\Rev.April-08\HEC-RAS\amendment2.p01

Geometry Title: Proposed Storm Sewer System
Geometry File : p:\435-Caguas Millenium\Rev.April-08\HEC-RAS\amendment2.g01

Flow Title : Proposed
Flow File : p:\435-Caguas Millenium\Rev.April-08\HEC-RAS\amendment2.f01

Plan Summary Information:
Number of: Cross Sections = 36 Multiple Openings = 0
Culverts = 17 Inline Structures = 0
Bridges = 0 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.003
Critical depth calculation tolerance = 0.003
Maximum number of iterations = 20
Maximum difference tolerance = 0.1
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Proposed
Flow File : p:\435-Caguas Millenium\Rev.April-08\HEC-RAS\amendment2.f01

Flow Data (m3/s)

River	Reach	RS	100-yrs	50-yrs	25-yrs	10-yrs	2-yrs
one	1	12.1	4.59	4.2	3.77	3.23	2.04
one	1	7.1	6.86	6.26	5.64	4.85	3.09
three	1	5	10.37	9.5	8.56	7.4	4.76
two	1	19.1	1.96	1.81	1.64	1.42	.94
two	1	15	3.51	3.23	2.92	2.52	1.67

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
one	1	100-yrs	Critical	
one	1	50-yrs	Critical	

one	1	25-yrs	Critical	
one	1	10-yrs	Critical	
one	1	2-yrs	Critical	
three	1	100-yrs		Normal S = 0.008
three	1	50-yrs		Normal S = 0.008
three	1	25-yrs		Normal S = 0.008
three	1	10-yrs		Normal S = 0.008
three	1	2-yrs		Normal S = 0.008
two	1	100-yrs	Critical	
two	1	50-yrs	Critical	
two	1	25-yrs	Critical	
two	1	10-yrs	Critical	
two	1	2-yrs	Critical	

GEOMETRY DATA

Geometry Title: Proposed Storm Sewer System
Geometry File : p:\435-Caguas Millenium\Rev.April-08\HEC-RAS\amendment2.g01

Reach Connection Table

River	Reach	Upstream Boundary	Downstream Boundary
one	1		A
three	1	A	
two	1		A

JUNCTION INFORMATION

Name: A
Description:
Energy computation Method

Length across Junction River	Reach	Tributary River	Reach	Length	Angle
one	1	to three	1	1	
two	1	to three	1	1	

CROSS SECTION

RIVER: one
REACH: 1 RS: 12.1

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-30.29	83	-25.48	82	-16.81	81	-13.62	80	-10.43	79
0	78.5	3.09	79	7.61	80	13.33	81	16.2	82
19.98	83								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-30.29	.04	-30.29	.04	19.98	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-30.29	19.98	1	1	1	.1	.3

CROSS SECTION OUTPUT Profile #100-yrs

			Left OB	Channel	Right OB
E.G. Elev (m)	80.35	Element			
Vel Head (m)	0.00	Wt. n-Val.		0.040	
W.S. Elev (m)	80.35	Reach Len. (m)	1.00	1.00	1.00
Crit W.S. (m)		Flow Area (m2)		28.80	
E.G. Slope (m/m)	0.000033	Area (m2)		28.80	
Q Total (m3/s)	4.59	Flow (m3/s)		4.59	
Top Width (m)	24.37	Top Width (m)		24.37	
Vel Total (m/s)	0.16	Avg. Vel. (m/s)		0.16	
Max Chl Dpth (m)	1.85	Hydr. Depth (m)		1.18	
Conv. Total (m3/s)	796.1	Conv. (m3/s)		796.1	
Length Wtd. (m)	1.00	Wetted Per. (m)		24.77	
Min Ch El (m)	78.50	Shear (N/m2)		0.38	
Alpha	1.00	Stream Power (N/m s)		0.06	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)	0.26	2.16	0.26
C & E Loss (m)	0.00	Cum SA (1000 m2)	0.50	1.07	0.50

CROSS SECTION

RIVER: one
REACH: 1 RS: 12

INPUT
Description:
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-30.29	83	-25.48	82	-16.81	81	-13.62	80	-10.43	79
0	78.5	3.09	79	7.61	80	13.33	81	16.2	82
19.98	83								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-30.29	.04	-30.29	.04	19.98	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-30.29	19.98	37.87	37.87	37.87	.1	.3

CROSS SECTION OUTPUT Profile #100-yrs

			Left OB	Channel	Right OB
E.G. Elev (m)	80.35	Element			
Vel Head (m)	0.00	Wt. n-Val.		0.040	
W.S. Elev (m)	80.35	Reach Len. (m)	37.87	37.87	37.87
Crit W.S. (m)	78.97	Flow Area (m2)		28.80	
E.G. Slope (m/m)	0.000033	Area (m2)		28.80	
Q Total (m3/s)	4.59	Flow (m3/s)		4.59	
Top Width (m)	24.37	Top Width (m)		24.37	
Vel Total (m/s)	0.16	Avg. Vel. (m/s)		0.16	
Max Chl Dpth (m)	1.85	Hydr. Depth (m)		1.18	
Conv. Total (m3/s)	796.0	Conv. (m3/s)		796.0	
Length Wtd. (m)	37.87	Wetted Per. (m)		24.77	
Min Ch El (m)	78.50	Shear (N/m2)		0.38	
Alpha	1.00	Stream Power (N/m s)		0.06	
Frctn Loss (m)		Cum Volume (1000 m3)	0.26	2.13	0.26
C & E Loss (m)		Cum SA (1000 m2)	0.50	1.05	0.50

CULVERT

RIVER: one
REACH: 1 RS: 11.6

INPUT
Description:
Distance from Upstream XS = .5
Deck/Roadway Width = 36.87
Weir Coefficient = 1.44
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-30.29	80.51		19.98	80.51	

Upstream Bridge Cross Section Data
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-30.29	83	-25.48	82	-16.81	81	-13.62	80	-10.43	79
0	78.5	3.09	79	7.61	80	13.33	81	16.2	82
19.98	83								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-30.29	.04	-30.29	.04	19.98	.04

Bank Sta: Left	Right	Coeff Contr.	Expan.
-30.29	19.98	.1	.3

Downstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-4	77		4	77	

Downstream Bridge Cross Section Data
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	77	-1	77	-1	74.73	1	74.73	1	77
4	77								

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =   80.51
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular    1.52
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .5   36.86     .013     .013        0                  .4               .8
Upstream   Elevation =  78.5
           Centerline Station =  0
Downstream Elevation =  74.73
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-yrs  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       4.59    Culv Full Len (m)         6.73
  # Barrels                    1    Culv Vel US (m/s)         3.22
  Q Barrel (m3/s)           4.59    Culv Vel DS (m/s)         2.53
  E.G. US. (m)             80.35    Culv Inv El Up (m)       78.50
  W.S. US. (m)             80.35    Culv Inv El Dn (m)       74.73
  E.G. DS (m)              77.02    Culv Frctn Ls (m)         2.90
  W.S. DS (m)              76.97    Culv Exit Loss (m)        0.22
  Delta EG (m)              3.33    Culv Entr Loss (m)        0.21
  Delta WS (m)              3.39    Q Weir (m3/s)
  E.G. IC (m)              80.27    Weir Sta Lft (m)
  E.G. OC (m)              80.35    Weir Sta Rgt (m)
  Culvert Control          Inlet    Weir Submerg
  Culv WS Inlet (m)        79.61    Weir Max Depth (m)
  Culv WS Outlet (m)       76.25    Weir Avg Depth (m)
  Culv Nml Depth (m)        0.46    Weir Flow Area (m2)
  Culv Crt Depth (m)        1.11    Min El Weir Flow (m)     80.51


Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.

CROSS SECTION


RIVER: one
REACH: 1                  RS: 11.1

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4      77      -1      77      -1   74.73       1   74.73       1      77
       4      77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -1       1                1       1       1             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            77.02    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.05    Wt. n-Val.                          0.013
  W.S. Elev (m)            76.97    Reach Len. (m)            1.00       1.00       1.00
  Crit W.S. (m)                     Flow Area (m2)                       4.47
  E.G. Slope (m/m)      0.000291    Area (m2)                            4.47
  Q Total (m3/s)            4.59    Flow (m3/s)                          4.59
  Top Width (m)             2.00    Top Width (m)                        2.00
```

```
  Vel Total (m/s)           1.03    Avg. Vel. (m/s)                     1.03
  Max Chl Dpth (m)          2.24    Hydr. Depth (m)                     2.24
  Conv. Total (m3/s)       269.0    Conv. (m3/s)                       269.0
  Length Wtd. (m)           1.00    Wetted Per. (m)                     6.47
  Min Ch El (m)            74.73    Shear (N/m2)                        1.97
  Alpha                     1.00    Stream Power (N/m s)                2.03
  Frctn Loss (m)            0.00    Cum Volume (1000 m3)      0.26      1.50       0.26
  C & E Loss (m)            0.00    Cum SA (1000 m2)          0.50      0.55       0.50


CROSS SECTION


RIVER: one
REACH: 1                  RS: 11

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4      77      -1      77      -1   74.73       1   74.73       1      77
       4      77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -1       1            4.583   4.583   4.583             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            77.02    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.05    Wt. n-Val.                          0.013
  W.S. Elev (m)            76.97    Reach Len. (m)            4.58      4.58       4.58
  Crit W.S. (m)            75.54    Flow Area (m2)                      4.47
  E.G. Slope (m/m)      0.000291    Area (m2)                           4.47
  Q Total (m3/s)            4.59    Flow (m3/s)                         4.59
  Top Width (m)             2.00    Top Width (m)                       2.00
  Vel Total (m/s)           1.03    Avg. Vel. (m/s)                     1.03
  Max Chl Dpth (m)          2.24    Hydr. Depth (m)                     2.24
  Conv. Total (m3/s)       268.9    Conv. (m3/s)                       268.9
  Length Wtd. (m)           4.58    Wetted Per. (m)                     6.47
  Min Ch El (m)            74.73    Shear (N/m2)                        1.97
  Alpha                     1.00    Stream Power (N/m s)                2.03
  Frctn Loss (m)                    Cum Volume (1000 m3)      0.26      1.50       0.26
  C & E Loss (m)                    Cum SA (1000 m2)          0.50      0.54       0.50


CULVERT


RIVER: one
REACH: 1                  RS: 10.6

INPUT
Description:
Distance from Upstream XS =      .5
Deck/Roadway Width        =   3.583
Weir Coefficient          =    1.44
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4      77               4      77

Upstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4      77      -1      77      -1   74.73       1   74.73       1      77
       4      77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3
```

```
Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   75.88               4   75.88

Downstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   75.88      -1   75.88      -1   73.61       1   73.61       1   75.88
       4   75.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =      77
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular    1.22
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                .5   3.583     .013     .013        0                  .4               .8
Upstream   Elevation =  74.73
           Centerline Station =  0
Downstream Elevation =  73.61
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-yrs  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       4.55    Culv Full Len (m)         2.91
  # Barrels                    1    Culv Vel US (m/s)         3.89
  Q Barrel (m3/s)           4.55    Culv Vel DS (m/s)         3.89
  E.G. US. (m)             77.02    Culv Inv El Up (m)       74.73
  W.S. US. (m)             76.97    Culv Inv El Dn (m)       73.61
  E.G. DS (m)              75.90    Culv Frctn Ls (m)         0.25
  W.S. DS (m)              75.85    Culv Exit Loss (m)        0.57
  Delta EG (m)              1.12    Culv Entr Loss (m)        0.31
  Delta WS (m)              1.12    Q Weir (m3/s)             0.04
  E.G. IC (m)              77.05    Weir Sta Lft (m)         -4.00
  E.G. OC (m)              77.02    Weir Sta Rgt (m)          4.00
  Culvert Control         Outlet    Weir Submerg              0.00
  Culv WS Inlet (m)        75.95    Weir Max Depth (m)        0.02
  Culv WS Outlet (m)       74.83    Weir Avg Depth (m)        0.02
  Culv Nml Depth (m)        0.37    Weir Flow Area (m2)       0.18
  Culv Crt Depth (m)        1.12    Min El Weir Flow (m)     77.00


Warning: During the culvert inlet computations, the program could not balance the culvert/weir flow.
         The reported inlet energy grade answer may not be valid.
Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note:    The culvert inlet is submerged and the culvert flows full over part or all of its length.  Therefore,
         the culvert inlet equations are not valid and the supercritical result has been discarded.  The
         outlet answer will be used.

CROSS SECTION


RIVER: one
REACH: 1                  RS: 10.1

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   75.88      -1   75.88      -1   73.61       1   73.61       1   75.88
       4   75.88

Manning's n Values        num=       3
```

```
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -1       1                1       1       1             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            75.90    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.05    Wt. n-Val.                         0.013
  W.S. Elev (m)            75.85    Reach Len. (m)            1.00      1.00       1.00
  Crit W.S. (m)                     Flow Area (m2)                       4.47
  E.G. Slope (m/m)      0.000291    Area (m2)                            4.47
  Q Total (m3/s)            4.59    Flow (m3/s)                          4.59
  Top Width (m)             2.00    Top Width (m)                        2.00
  Vel Total (m/s)           1.03    Avg. Vel. (m/s)                      1.03
  Max Chl Dpth (m)          2.24    Hydr. Depth (m)                      2.24
  Conv. Total (m3/s)       268.9    Conv. (m3/s)                        268.9
  Length Wtd. (m)           1.00    Wetted Per. (m)                      6.47
  Min Ch El (m)            73.61    Shear (N/m2)                         1.97
  Alpha                     1.00    Stream Power (N/m s)                 2.03
  Frctn Loss (m)            0.00    Cum Volume (1000 m3)      0.26       1.48       0.26
  C & E Loss (m)            0.00    Cum SA (1000 m2)          0.50       0.54       0.50


CROSS SECTION


RIVER: one
REACH: 1                  RS: 10

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   75.88      -1   75.88      -1   73.61       1   73.61       1   75.88
       4   75.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -1       1           45.059  45.059  45.059             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            75.90    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.05    Wt. n-Val.                         0.013
  W.S. Elev (m)            75.85    Reach Len. (m)           45.06     45.06      45.06
  Crit W.S. (m)            74.42    Flow Area (m2)                       4.47
  E.G. Slope (m/m)      0.000291    Area (m2)                            4.47
  Q Total (m3/s)            4.59    Flow (m3/s)                          4.59
  Top Width (m)             2.00    Top Width (m)                        2.00
  Vel Total (m/s)           1.03    Avg. Vel. (m/s)                      1.03
  Max Chl Dpth (m)          2.24    Hydr. Depth (m)                      2.24
  Conv. Total (m3/s)       268.9    Conv. (m3/s)                        268.9
  Length Wtd. (m)          45.06    Wetted Per. (m)                      6.47
  Min Ch El (m)            73.61    Shear (N/m2)                         1.98
  Alpha                     1.00    Stream Power (N/m s)                 2.03
  Frctn Loss (m)                    Cum Volume (1000 m3)      0.26       1.47       0.26
  C & E Loss (m)                    Cum SA (1000 m2)          0.50       0.53       0.50


CULVERT


RIVER: one
REACH: 1                  RS: 9.6

INPUT
Description:
Distance from Upstream XS =      .5
Deck/Roadway Width        =  44.059
Weir Coefficient          =    1.44
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   75.88               4   75.88

Upstream Bridge Cross Section Data
```

```
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   75.88      -1   75.88      -1   73.61       1   73.61       1   75.88
       4   75.88

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   72.17               4   72.17

Downstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   72.17      -1   72.17      -1      70       1      70       1   72.17
       4   72.17

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =   75.88
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular    1.22
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                .5  44.059     .013     .013        0                   .4               .8
Upstream   Elevation =  73.61
           Centerline Station =  0
Downstream Elevation =  70
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-yrs  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       4.55    Culv Full Len (m)        11.65
  # Barrels                    1    Culv Vel US (m/s)         3.89
  Q Barrel (m3/s)           4.55    Culv Vel DS (m/s)         3.89
  E.G. US. (m)             75.90    Culv Inv El Up (m)       73.61
  W.S. US. (m)             75.85    Culv Inv El Dn (m)       70.00
  E.G. DS (m)              72.23    Culv Frctn Ls (m)         2.80
  W.S. DS (m)              72.17    Culv Exit Loss (m)        0.57
  Delta EG (m)              3.67    Culv Entr Loss (m)        0.31
  Delta WS (m)              3.67    Q Weir (m3/s)             0.04
  E.G. IC (m)              75.93    Weir Sta Lft (m)         -4.00
  E.G. OC (m)              75.90    Weir Sta Rgt (m)          4.00
  Culvert Control         Outlet    Weir Submerg              0.00
  Culv WS Inlet (m)        74.83    Weir Max Depth (m)        0.02
  Culv WS Outlet (m)       71.22    Weir Avg Depth (m)        0.02
  Culv Nml Depth (m)        0.53    Weir Flow Area (m2)       0.18
  Culv Crt Depth (m)        1.12    Min El Weir Flow (m)     75.88


Warning: During the culvert inlet computations, the program could not balance the culvert/weir flow.
         The reported inlet energy grade answer may not be valid.
Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note:    The culvert inlet is submerged and the culvert flows full over part or all of its length.  Therefore,
         the culvert inlet equations are not valid and the supercritical result has been discarded.  The
         outlet answer will be used.
```

CROSS SECTION

RIVER: one
REACH: 1 RS: 9.1

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	72.17	-1	72.17	-1	70	1	70	1	72.17
4	72.17								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-4	.013	-1	.013	1	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-1	1	1	1	1	.1	.3

CROSS SECTION OUTPUT Profile #100-yrs

E.G. Elev (m)	72.23	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (m)	72.17	Reach Len. (m)	1.00	1.00	1.00
Crit W.S. (m)		Flow Area (m2)	0.01	4.34	0.01
E.G. Slope (m/m)	0.000312	Area (m2)	0.01	4.34	0.01
Q Total (m3/s)	4.59	Flow (m3/s)	0.00	4.59	0.00
Top Width (m)	8.00	Top Width (m)	3.00	2.00	3.00
Vel Total (m/s)	1.05	Avg. Vel. (m/s)	0.02	1.06	0.02
Max Chl Dpth (m)	2.17	Hydr. Depth (m)	0.00	2.17	0.00
Conv. Total (m3/s)	259.8	Conv. (m3/s)	0.0	259.8	0.0
Length Wtd. (m)	1.00	Wetted Per. (m)	3.00	6.34	3.00
Min Ch El (m)	70.00	Shear (N/m2)	0.01	2.10	0.01
Alpha	1.01	Stream Power (N/m s)	0.00	2.22	0.00
Frctn Loss (m)	0.00	Cum Volume (1000 m3)	0.26	1.27	0.26
C & E Loss (m)	0.00	Cum SA (1000 m2)	0.43	0.44	0.43

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION

RIVER: one
REACH: 1 RS: 9

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	72.17	-1	72.17	-1	70	1	70	1	72.17
4	72.17								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-4	.013	-1	.013	1	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-1	1	64	64	64	.1	.3

CROSS SECTION OUTPUT Profile #100-yrs

E.G. Elev (m)	72.23	Element	Left OB	Channel	Right OB
Vel Head (m)	0.06	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (m)	72.17	Reach Len. (m)	64.00	64.00	64.00
Crit W.S. (m)	70.81	Flow Area (m2)	0.01	4.34	0.01
E.G. Slope (m/m)	0.000312	Area (m2)	0.01	4.34	0.01
Q Total (m3/s)	4.59	Flow (m3/s)	0.00	4.59	0.00
Top Width (m)	8.00	Top Width (m)	3.00	2.00	3.00
Vel Total (m/s)	1.05	Avg. Vel. (m/s)	0.02	1.06	0.02
Max Chl Dpth (m)	2.17	Hydr. Depth (m)	0.00	2.17	0.00
Conv. Total (m3/s)	259.7	Conv. (m3/s)	0.0	259.7	0.0
Length Wtd. (m)	64.00	Wetted Per. (m)	3.00	6.34	3.00
Min Ch El (m)	70.00	Shear (N/m2)	0.01	2.10	0.01
Alpha	1.01	Stream Power (N/m s)	0.00	2.22	0.00
Frctn Loss (m)		Cum Volume (1000 m3)	0.26	1.27	0.26
C & E Loss (m)		Cum SA (1000 m2)	0.43	0.44	0.43

```
CULVERT


RIVER: one
REACH: 1                  RS: 8.6

INPUT
Description:
Distance from Upstream XS =      .5
Deck/Roadway Width        =      63
Weir Coefficient          =    1.44
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   72.17               4   72.17

Upstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   72.17      -1   72.17      -1      70       1      70       1   72.17
       4   72.17

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   67.07               4   67.07

Downstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   67.07      -1   67.07      -1      65       1      65       1   67.07
       4   67.07

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =   72.17
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular    1.22
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .5      63     .013     .013        0                   .4               .8
Upstream   Elevation =  70
           Centerline Station =  0
Downstream Elevation =  65
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-yrs  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       4.43    Culv Full Len (m)        11.02
  # Barrels                    1    Culv Vel US (m/s)         3.79
  Q Barrel (m3/s)           4.43    Culv Vel DS (m/s)         3.79
  E.G. US. (m)             72.23    Culv Inv El Up (m)       70.00
  W.S. US. (m)             72.17    Culv Inv El Dn (m)       65.00
  E.G. DS (m)              67.16    Culv Frctn Ls (m)         4.26
  W.S. DS (m)              67.10    Culv Exit Loss (m)        0.54
  Delta EG (m)              5.07    Culv Entr Loss (m)        0.29
  Delta WS (m)              5.07    Q Weir (m3/s)             0.16
  E.G. IC (m)              72.30    Weir Sta Lft (m)         -4.00
```

```
  E.G. OC (m)              72.23    Weir Sta Rgt (m)          4.00
  Culvert Control         Outlet    Weir Submerg              0.00
  Culv WS Inlet (m)        71.22    Weir Max Depth (m)        0.06
  Culv WS Outlet (m)       66.22    Weir Avg Depth (m)        0.06
  Culv Nml Depth (m)        0.52    Weir Flow Area (m2)       0.47
  Culv Crt Depth (m)        1.11    Min El Weir Flow (m)     72.17


Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note:    The culvert inlet is submerged and the culvert flows full over part or all of its length.  Therefore,
         the culvert inlet equations are not valid and the supercritical result has been discarded.  The
         outlet answer will be used.

CROSS SECTION


RIVER: one
REACH: 1                  RS: 8.1

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   67.07      -1   67.07      -1      65       1      65       1   67.07
       4   67.07

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -1       1                1       1       1             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            67.16    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.06    Wt. n-Val.               0.013      0.013      0.013
  W.S. Elev (m)            67.10    Reach Len. (m)            1.00       1.00       1.00
  Crit W.S. (m)                     Flow Area (m2)            0.09       4.20       0.09
  E.G. Slope (m/m)      0.000332    Area (m2)                 0.09       4.20       0.09
  Q Total (m3/s)            4.59    Flow (m3/s)               0.01       4.57       0.01
  Top Width (m)             8.00    Top Width (m)             3.00       2.00       3.00
  Vel Total (m/s)           1.05    Avg. Vel. (m/s)           0.13       1.09       0.13
  Max Chl Dpth (m)          2.10    Hydr. Depth (m)           0.03       2.10       0.03
  Conv. Total (m3/s)       251.8    Conv. (m3/s)               0.6      250.5        0.6
  Length Wtd. (m)           1.00    Wetted Per. (m)           3.03       6.14       3.03
  Min Ch El (m)            65.00    Shear (N/m2)              0.09       2.23       0.09
  Alpha                     1.07    Stream Power (N/m s)      0.01       2.42       0.01
  Frctn Loss (m)            0.00    Cum Volume (1000 m3)      0.26       1.00       0.26
  C & E Loss (m)            0.00    Cum SA (1000 m2)          0.24       0.31       0.24


Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION


RIVER: one
REACH: 1                  RS: 8

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   67.07      -1   67.07      -1      65       1      65       1   67.07
       4   67.07

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -1       1           55.231  55.231  55.231             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            67.16    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.06    Wt. n-Val.               0.013      0.013      0.013
  W.S. Elev (m)            67.10    Reach Len. (m)           55.23      55.23      55.23
  Crit W.S. (m)            65.81    Flow Area (m2)            0.08       4.20       0.08
  E.G. Slope (m/m)      0.000333    Area (m2)                 0.08       4.20       0.08
```

```
  Q Total (m3/s)            4.59    Flow (m3/s)               0.01       4.57       0.01
  Top Width (m)             8.00    Top Width (m)             3.00       2.00       3.00
  Vel Total (m/s)           1.05    Avg. Vel. (m/s)           0.13       1.09       0.13
  Max Chl Dpth (m)          2.10    Hydr. Depth (m)           0.03       2.10       0.03
  Conv. Total (m3/s)       251.7    Conv. (m3/s)               0.6      250.5        0.6
  Length Wtd. (m)          55.23    Wetted Per. (m)           3.03       6.14       3.03
  Min Ch El (m)            65.00    Shear (N/m2)              0.09       2.23       0.09
  Alpha                     1.07    Stream Power (N/m s)      0.01       2.43       0.01
  Frctn Loss (m)                    Cum Volume (1000 m3)      0.26       0.99       0.26
  C & E Loss (m)                    Cum SA (1000 m2)          0.23       0.31       0.23


CULVERT


RIVER: one
REACH: 1                  RS: 7.6

INPUT
Description:
Distance from Upstream XS =      .5
Deck/Roadway Width        =  54.231
Weir Coefficient          =    1.44
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   67.07               4   67.07

Upstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   67.07      -1   67.07      -1      65       1      65       1   67.07
       4   67.07

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   62.92               4   62.92

Downstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   62.92      -1   62.92      -1   60.15       1   60.15       1   62.92
       4   62.92

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =   67.07
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular    1.22
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .5  54.231     .013     .013        0                  .4                .8
Upstream   Elevation =  65
           Centerline Station =  0
Downstream Elevation =  60.15
           Centerline Station =  0
```

CULVERT OUTPUT Profile #100-yrs Culv Group: Culvert #1

Q Culv Group (m3/s)	4.28	Culv Full Len (m)	13.67
# Barrels	1	Culv Vel US (m/s)	3.66
Q Barrel (m3/s)	4.28	Culv Vel DS (m/s)	3.66
E.G. US. (m)	67.16	Culv Inv El Up (m)	65.00
W.S. US. (m)	67.10	Culv Inv El Dn (m)	60.15
E.G. DS (m)	62.66	Culv Frctn Ls (m)	3.78
W.S. DS (m)	62.56	Culv Exit Loss (m)	0.46
Delta EG (m)	4.50	Culv Entr Loss (m)	0.27
Delta WS (m)	4.54	Q Weir (m3/s)	0.31
E.G. IC (m)	67.22	Weir Sta Lft (m)	-4.00
E.G. OC (m)	67.16	Weir Sta Rgt (m)	4.00
Culvert Control	Outlet	Weir Submerg	0.00
Culv WS Inlet (m)	66.22	Weir Max Depth (m)	0.09
Culv WS Outlet (m)	61.37	Weir Avg Depth (m)	0.09
Culv Nml Depth (m)	0.50	Weir Flow Area (m2)	0.72
Culv Crt Depth (m)	1.10	Min El Weir Flow (m)	67.07

Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note: The culvert inlet is submerged and the culvert flows full over part or all of its length. Therefore, the culvert inlet equations are not valid and the supercritical result has been discarded. The outlet answer will be used.

CROSS SECTION

RIVER: one
REACH: 1 RS: 7.1

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	62.92	-1	62.92	-1	60.15	1	60.15	1	62.92
4	62.92								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-4	.013	-1	.013	1	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-1	1	1	1	1	.1	.3

CROSS SECTION OUTPUT Profile #100-yrs

E.G. Elev (m)	62.66	Element	Left OB	Channel	Right OB
Vel Head (m)	0.10	Wt. n-Val.		0.013	
W.S. Elev (m)	62.56	Reach Len. (m)	1.00	1.00	1.00
Crit W.S. (m)		Flow Area (m2)		4.82	
E.G. Slope (m/m)	0.000545	Area (m2)		4.82	
Q Total (m3/s)	6.86	Flow (m3/s)		6.86	
Top Width (m)	2.00	Top Width (m)		2.00	
Vel Total (m/s)	1.42	Avg. Vel. (m/s)		1.42	
Max Chl Dpth (m)	2.41	Hydr. Depth (m)		2.41	
Conv. Total (m3/s)	293.8	Conv. (m3/s)		293.8	
Length Wtd. (m)	1.00	Wetted Per. (m)		6.82	
Min Ch El (m)	60.15	Shear (N/m2)		3.78	
Alpha	1.00	Stream Power (N/m s)		5.38	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)	0.25	0.74	0.25
C & E Loss (m)	0.00	Cum SA (1000 m2)	0.15	0.20	0.15

CROSS SECTION

RIVER: one
REACH: 1 RS: 7

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	62.92	-1	62.92	-1	60.15	1	60.15	1	62.92
4	62.92								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-4	.013	-1	.013	1	.013

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -1       1            35.16   35.16   35.16             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            62.66    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.10    Wt. n-Val.                          0.013
  W.S. Elev (m)            62.56    Reach Len. (m)           35.16      35.16      35.16
  Crit W.S. (m)            61.21    Flow Area (m2)                       4.81
  E.G. Slope (m/m)      0.000545    Area (m2)                            4.81
  Q Total (m3/s)            6.86    Flow (m3/s)                          6.86
  Top Width (m)             2.00    Top Width (m)                        2.00
  Vel Total (m/s)           1.42    Avg. Vel. (m/s)                      1.42
  Max Chl Dpth (m)          2.41    Hydr. Depth (m)                      2.41
  Conv. Total (m3/s)       293.8    Conv. (m3/s)                        293.8
  Length Wtd. (m)          35.16    Wetted Per. (m)                      6.81
  Min Ch El (m)            60.15    Shear (N/m2)                         3.78
  Alpha                     1.00    Stream Power (N/m s)                 5.38
  Frctn Loss (m)                    Cum Volume (1000 m3)      0.25       0.74       0.25
  C & E Loss (m)                    Cum SA (1000 m2)          0.15       0.20       0.15


CULVERT


RIVER: one
REACH: 1                  RS: 6.6

INPUT
Description:
Distance from Upstream XS =      .5
Deck/Roadway Width        =   34.16
Weir Coefficient          =    1.44
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   62.92               4   62.92

Upstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   62.92      -1   62.92      -1   60.15       1   60.15       1   62.92
       4   62.92

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   57.95               4   57.95

Downstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   57.95      -1   57.95      -1   55.45       1   55.45       1   57.95
       4   57.95

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =   62.92
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular    1.52
```

```
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .5   34.16     .013     .013        0                  .4               .8
Upstream   Elevation =  60.15
           Centerline Station =  0
Downstream Elevation =  55.45
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-yrs  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       6.86    Culv Full Len (m)        19.63
  # Barrels                    1    Culv Vel US (m/s)         3.78
  Q Barrel (m3/s)           6.86    Culv Vel DS (m/s)         3.78
  E.G. US. (m)             62.66    Culv Inv El Up (m)       60.15
  W.S. US. (m)             62.56    Culv Inv El Dn (m)       55.45
  E.G. DS (m)              59.65    Culv Frctn Ls (m)         2.17
  W.S. DS (m)              59.64    Culv Exit Loss (m)        0.58
  Delta EG (m)              3.01    Culv Entr Loss (m)        0.29
  Delta WS (m)              2.91    Q Weir (m3/s)
  E.G. IC (m)              62.93    Weir Sta Lft (m)
  E.G. OC (m)              62.66    Weir Sta Rgt (m)
  Culvert Control         Outlet    Weir Submerg
  Culv WS Inlet (m)        61.67    Weir Max Depth (m)
  Culv WS Outlet (m)       56.97    Weir Avg Depth (m)
  Culv Nml Depth (m)        0.52    Weir Flow Area (m2)
  Culv Crt Depth (m)        1.33    Min El Weir Flow (m)     62.92


Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note:    The culvert inlet is submerged and the culvert flows full over part or all of its length.  Therefore,
         the culvert inlet equations are not valid and the supercritical result has been discarded.  The
         outlet answer will be used.

CROSS SECTION


RIVER: one
REACH: 1                  RS: 6.1

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   57.95      -1   57.95      -1   55.45       1   55.45       1   57.95
       4   57.95

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -1       1                1       1       1             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            59.65    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.01    Wt. n-Val.               0.013      0.013      0.013
  W.S. Elev (m)            59.64    Reach Len. (m)            1.00       1.00       1.00
  Crit W.S. (m)                     Flow Area (m2)            5.08       8.39       5.08
  E.G. Slope (m/m)      0.000020    Area (m2)                 5.08       8.39       5.08
  Q Total (m3/s)            6.86    Flow (m3/s)               1.82       3.22       1.82
  Top Width (m)             8.00    Top Width (m)             3.00       2.00       3.00
  Vel Total (m/s)           0.37    Avg. Vel. (m/s)           0.36       0.38       0.36
  Max Chl Dpth (m)          4.19    Hydr. Depth (m)           1.69       4.19       1.69
  Conv. Total (m3/s)      1551.6    Conv. (m3/s)             411.9      727.8      411.9
  Length Wtd. (m)           1.00    Wetted Per. (m)           4.69       7.00       4.69
  Min Ch El (m)            55.45    Shear (N/m2)              0.21       0.23       0.21
  Alpha                     1.00    Stream Power (N/m s)      0.07       0.09       0.07
  Frctn Loss (m)            0.00    Cum Volume (1000 m3)      0.17       0.51       0.17
  C & E Loss (m)            0.00    Cum SA (1000 m2)          0.10       0.13       0.10


Warning: The cross-section end points had to be extended vertically for the computed water surface.
```

CROSS SECTION

RIVER: one
REACH: 1 RS: 6

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	57.95	-1	57.95	-1	55.45	1	55.45	1	57.95
4	57.95								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-4	.013	-1	.013	1	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-1	1	63.046	63.046	63.046	.1	.3

CROSS SECTION OUTPUT Profile #100-yrs

			Left OB	Channel	Right OB
E.G. Elev (m)	59.65	Element			
Vel Head (m)	0.01	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (m)	59.64	Reach Len. (m)	63.05	63.05	63.05
Crit W.S. (m)	56.51	Flow Area (m2)	5.08	8.39	5.08
E.G. Slope (m/m)	0.000020	Area (m2)	5.08	8.39	5.08
Q Total (m3/s)	6.86	Flow (m3/s)	1.82	3.22	1.82
Top Width (m)	8.00	Top Width (m)	3.00	2.00	3.00
Vel Total (m/s)	0.37	Avg. Vel. (m/s)	0.36	0.38	0.36
Max Chl Dpth (m)	4.19	Hydr. Depth (m)	1.69	4.19	1.69
Conv. Total (m3/s)	1551.5	Conv. (m3/s)	411.9	727.8	411.9
Length Wtd. (m)	63.05	Wetted Per. (m)	4.69	7.00	4.69
Min Ch El (m)	55.45	Shear (N/m2)	0.21	0.23	0.21
Alpha	1.00	Stream Power (N/m s)	0.07	0.09	0.07
Frctn Loss (m)		Cum Volume (1000 m3)	0.16	0.50	0.16
C & E Loss (m)		Cum SA (1000 m2)	0.09	0.13	0.09

CULVERT

RIVER: one
REACH: 1 RS: 5.6

INPUT
Description:
Distance from Upstream XS = .5
Deck/Roadway Width = 62.046
Weir Coefficient = 1.44
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-4	57.95		4	57.95	

Upstream Bridge Cross Section Data
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	57.95	-1	57.95	-1	55.45	1	55.45	1	57.95
4	57.95								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-4	.013	-1	.013	1	.013

Bank Sta: Left	Right	Coeff Contr.	Expan.
-1	1	.1	.3

Downstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-4	58.45		4	58.45	

Downstream Bridge Cross Section Data
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	58.45	-1	58.45	-1	54.66	1	54.66	1	58.45
4	58.45								

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =      60
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular    1.52
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .5  62.046     .013     .013        0                   .4               .8
Upstream   Elevation =  55.45
           Centerline Station =  0
Downstream Elevation =  54.66
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-yrs  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       6.86    Culv Full Len (m)        62.05
  # Barrels                    1    Culv Vel US (m/s)         3.78
  Q Barrel (m3/s)           6.86    Culv Vel DS (m/s)         3.78
  E.G. US. (m)             59.65    Culv Inv El Up (m)       55.45
  W.S. US. (m)             59.64    Culv Inv El Dn (m)       54.66
  E.G. DS (m)              58.27    Culv Frctn Ls (m)         0.54
  W.S. DS (m)              58.22    Culv Exit Loss (m)        0.54
  Delta EG (m)              1.38    Culv Entr Loss (m)        0.29
  Delta WS (m)              1.42    Q Weir (m3/s)
  E.G. IC (m)              58.32    Weir Sta Lft (m)
  E.G. OC (m)              59.65    Weir Sta Rgt (m)
  Culvert Control         Outlet    Weir Submerg
  Culv WS Inlet (m)        56.97    Weir Max Depth (m)
  Culv WS Outlet (m)       56.18    Weir Avg Depth (m)
  Culv Nml Depth (m)                Weir Flow Area (m2)
  Culv Crt Depth (m)        1.33    Min El Weir Flow (m)     60.00


CROSS SECTION


RIVER: one
REACH: 1                  RS: 5.1

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   58.45      -1   58.45      -1   54.66       1   54.66       1   58.45
       4   58.45

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -1       1                 0       0       0             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            58.27    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.05    Wt. n-Val.                          0.013
  W.S. Elev (m)            58.22    Reach Len. (m)            1.00       1.00       1.00
  Crit W.S. (m)                     Flow Area (m2)                       7.13
  E.G. Slope (m/m)      0.000218    Area (m2)                            7.13
  Q Total (m3/s)            6.86    Flow (m3/s)                          6.86
  Top Width (m)             2.00    Top Width (m)                        2.00
  Vel Total (m/s)           0.96    Avg. Vel. (m/s)                      0.96
  Max Chl Dpth (m)          3.56    Hydr. Depth (m)                      3.56
  Conv. Total (m3/s)       464.8    Conv. (m3/s)                        464.8
```

```
  Length Wtd. (m)           1.00    Wetted Per. (m)                     9.13
  Min Ch El (m)            54.66    Shear (N/m2)                        1.67
  Alpha                     1.00    Stream Power (N/m s)                1.61
  Frctn Loss (m)            0.00    Cum Volume (1000 m3)                0.01
  C & E Loss (m)            0.00    Cum SA (1000 m2)


CROSS SECTION


RIVER: three
REACH: 1                  RS: 5

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -3   58.45   -1.52   58.45   -1.52   54.66    1.52   54.66    1.52   58.45
       3   58.45

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -3    .013   -1.52    .013    1.52    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -1.52    1.52            11.93   11.93   11.93             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            58.27    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.05    Wt. n-Val.                          0.013
  W.S. Elev (m)            58.22    Reach Len. (m)           11.93      11.93      11.93
  Crit W.S. (m)            55.72    Flow Area (m2)                      10.83
  E.G. Slope (m/m)      0.000142    Area (m2)                           10.83
  Q Total (m3/s)           10.37    Flow (m3/s)                         10.37
  Top Width (m)             3.04    Top Width (m)                        3.04
  Vel Total (m/s)           0.96    Avg. Vel. (m/s)                      0.96
  Max Chl Dpth (m)          3.56    Hydr. Depth (m)                      3.56
  Conv. Total (m3/s)       869.2    Conv. (m3/s)                        869.2
  Length Wtd. (m)          11.93    Wetted Per. (m)                     10.17
  Min Ch El (m)            54.66    Shear (N/m2)                         1.49
  Alpha                     1.00    Stream Power (N/m s)                 1.42
  Frctn Loss (m)                    Cum Volume (1000 m3)      0.00       0.45       0.00
  C & E Loss (m)                    Cum SA (1000 m2)          0.03       0.16       0.03


CULVERT


RIVER: three
REACH: 1                  RS: 4.6

INPUT
Description:
Distance from Upstream XS =      .5
Deck/Roadway Width        =   10.93
Weir Coefficient          =    1.44
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   58.45               4   58.45

Upstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -3   58.45   -1.52   58.45   -1.52   54.66    1.52   54.66    1.52   58.45
       3   58.45

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -3    .013   -1.52    .013    1.52    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -1.52    1.52             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   58.43               4   58.43

Downstream Bridge Cross Section Data
```

```
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -3   58.43   -1.52   58.43   -1.52    54.4    1.52    54.4    1.52   58.43
       3   58.43

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -3    .013   -1.52    .013    1.52    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -1.52    1.52             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =   58.45
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular    1.83
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .5   10.93     .013     .013        0                  .4               .8
Upstream   Elevation =  54.66
           Centerline Station =  0
Downstream Elevation =  54.4
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-yrs  Culv Group:  Culvert #1

  Q Culv Group (m3/s)      10.37    Culv Full Len (m)        10.93
  # Barrels                    1    Culv Vel US (m/s)         3.94
  Q Barrel (m3/s)          10.37    Culv Vel DS (m/s)         3.94
  E.G. US. (m)             58.27    Culv Inv El Up (m)       54.66
  W.S. US. (m)             58.22    Culv Inv El Dn (m)       54.40
  E.G. DS (m)              57.30    Culv Frctn Ls (m)         0.08
  W.S. DS (m)              57.22    Culv Exit Loss (m)        0.57
  Delta EG (m)              0.97    Culv Entr Loss (m)        0.32
  Delta WS (m)              1.00    Q Weir (m3/s)
  E.G. IC (m)              57.89    Weir Sta Lft (m)
  E.G. OC (m)              58.27    Weir Sta Rgt (m)
  Culvert Control         Outlet    Weir Submerg
  Culv WS Inlet (m)        56.49    Weir Max Depth (m)
  Culv WS Outlet (m)       56.23    Weir Avg Depth (m)
  Culv Nml Depth (m)                Weir Flow Area (m2)
  Culv Crt Depth (m)        1.57    Min El Weir Flow (m)     58.45


CROSS SECTION


RIVER: three
REACH: 1                  RS: 4.1

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -3   58.43   -1.52   58.43   -1.52    54.4    1.52    54.4    1.52   58.43
       3   58.43

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -3    .013   -1.52    .013    1.52    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -1.52    1.52                1       1       1             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            57.30    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.07    Wt. n-Val.                          0.013
  W.S. Elev (m)            57.22    Reach Len. (m)            1.00       1.00       1.00
  Crit W.S. (m)                     Flow Area (m2)                       8.58
  E.G. Slope (m/m)      0.000251    Area (m2)                            8.58
```

```
  Q Total (m3/s)           10.37    Flow (m3/s)                        10.37
  Top Width (m)             3.04    Top Width (m)                       3.04
  Vel Total (m/s)           1.21    Avg. Vel. (m/s)                     1.21
  Max Chl Dpth (m)          2.82    Hydr. Depth (m)                     2.82
  Conv. Total (m3/s)       655.0    Conv. (m3/s)                       655.0
  Length Wtd. (m)           1.00    Wetted Per. (m)                     8.69
  Min Ch El (m)            54.40    Shear (N/m2)                        2.43
  Alpha                     1.00    Stream Power (N/m s)                2.93
  Frctn Loss (m)            0.00    Cum Volume (1000 m3)      0.00      0.33       0.00
  C & E Loss (m)            0.00    Cum SA (1000 m2)          0.03      0.13       0.03


CROSS SECTION


RIVER: three
REACH: 1                  RS: 4

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -3   58.43   -1.52   58.43   -1.52    54.4    1.52    54.4    1.52   58.43
       3   58.43

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -3    .013   -1.52    .013    1.52    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -1.52    1.52            30.28   30.28   30.28             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            57.30    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.07    Wt. n-Val.                          0.013
  W.S. Elev (m)            57.22    Reach Len. (m)           30.28      30.28      30.28
  Crit W.S. (m)            55.45    Flow Area (m2)                       8.58
  E.G. Slope (m/m)      0.000251    Area (m2)                            8.58
  Q Total (m3/s)           10.37    Flow (m3/s)                        10.37
  Top Width (m)             3.04    Top Width (m)                       3.04
  Vel Total (m/s)           1.21    Avg. Vel. (m/s)                     1.21
  Max Chl Dpth (m)          2.82    Hydr. Depth (m)                     2.82
  Conv. Total (m3/s)       654.9    Conv. (m3/s)                       654.9
  Length Wtd. (m)          30.28    Wetted Per. (m)                     8.69
  Min Ch El (m)            54.40    Shear (N/m2)                        2.43
  Alpha                     1.00    Stream Power (N/m s)                2.94
  Frctn Loss (m)                    Cum Volume (1000 m3)      0.00      0.32       0.00
  C & E Loss (m)                    Cum SA (1000 m2)          0.03      0.12       0.03


CULVERT


RIVER: three
REACH: 1                  RS: 3

INPUT
Description:
Distance from Upstream XS =      .5
Deck/Roadway Width        =   29.28
Weir Coefficient          =    1.44
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   58.43               4   58.43

Upstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -3   58.43   -1.52   58.43   -1.52    54.4    1.52    54.4    1.52   58.43
       3   58.43

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -3    .013   -1.52    .013    1.52    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -1.52    1.52             .1       .3
```

```
Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4      55               4      55

Downstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -3      55   -1.52      55   -1.52   52.33    1.52   52.33    1.52      55
       3      55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -3    .013   -1.52    .013    1.52    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -1.52    1.52             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =   58.43
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular    1.83
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                .5   29.28     .013     .013        0                  .4               .8
Upstream   Elevation =  54.4
           Centerline Station =  0
Downstream Elevation =  52.33
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-yrs  Culv Group:  Culvert #1

  Q Culv Group (m3/s)      10.37    Culv Full Len (m)        13.14
  # Barrels                    1    Culv Vel US (m/s)         3.94
  Q Barrel (m3/s)          10.37    Culv Vel DS (m/s)         3.94
  E.G. US. (m)             57.30    Culv Inv El Up (m)       54.40
  W.S. US. (m)             57.22    Culv Inv El Dn (m)       52.33
  E.G. DS (m)              55.21    Culv Frctn Ls (m)         1.24
  W.S. DS (m)              55.13    Culv Exit Loss (m)        0.58
  Delta EG (m)              2.09    Culv Entr Loss (m)        0.32
  Delta WS (m)              2.09    Q Weir (m3/s)
  E.G. IC (m)              57.59    Weir Sta Lft (m)
  E.G. OC (m)              57.30    Weir Sta Rgt (m)
  Culvert Control         Outlet    Weir Submerg
  Culv WS Inlet (m)        56.23    Weir Max Depth (m)
  Culv WS Outlet (m)       54.16    Weir Avg Depth (m)
  Culv Nml Depth (m)        0.72    Weir Flow Area (m2)
  Culv Crt Depth (m)        1.57    Min El Weir Flow (m)     58.43


Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note:    The culvert inlet is submerged and the culvert flows full over part or all of its length.  Therefore,
         the culvert inlet equations are not valid and the supercritical result has been discarded.  The
         outlet answer will be used.

CROSS SECTION


RIVER: three
REACH: 1                  RS: 2.1

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -3      55   -1.52      55   -1.52   52.33    1.52   52.33    1.52      55
       3      55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -3    .013   -1.52    .013    1.52    .013
```

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -1.52    1.52                1       1       1             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            55.21    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.07    Wt. n-Val.               0.013      0.013      0.013
  W.S. Elev (m)            55.13    Reach Len. (m)            1.00       1.00       1.00
  Crit W.S. (m)                     Flow Area (m2)            0.20       8.53       0.20
  E.G. Slope (m/m)      0.000239    Area (m2)                 0.20       8.53       0.20
  Q Total (m3/s)           10.37    Flow (m3/s)               0.06      10.25       0.06
  Top Width (m)             6.00    Top Width (m)             1.48       3.04       1.48
  Vel Total (m/s)           1.16    Avg. Vel. (m/s)           0.29       1.20       0.29
  Max Chl Dpth (m)          2.80    Hydr. Depth (m)           0.13       2.80       0.13
  Conv. Total (m3/s)       671.2    Conv. (m3/s)               3.8      663.6        3.8
  Length Wtd. (m)           1.00    Wetted Per. (m)           1.62       8.38       1.62
  Min Ch El (m)            52.33    Shear (N/m2)              0.29       2.38       0.29
  Alpha                     1.06    Stream Power (N/m s)      0.09       2.86       0.09
  Frctn Loss (m)            0.00    Cum Volume (1000 m3)      0.00       0.06       0.00
  C & E Loss (m)            0.00    Cum SA (1000 m2)          0.01       0.03       0.01


Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION


RIVER: three
REACH: 1                  RS: 2

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -3      55   -1.52      55   -1.52   52.33    1.52   52.33    1.52      55
       3      55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -3    .013   -1.52    .013    1.52    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         -1.52    1.52             9.16    9.16    9.16             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            55.21    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.07    Wt. n-Val.               0.013      0.013      0.013
  W.S. Elev (m)            55.13    Reach Len. (m)            9.16       9.16       9.16
  Crit W.S. (m)            53.38    Flow Area (m2)            0.20       8.53       0.20
  E.G. Slope (m/m)      0.000239    Area (m2)                 0.20       8.53       0.20
  Q Total (m3/s)           10.37    Flow (m3/s)               0.06      10.25       0.06
  Top Width (m)             6.00    Top Width (m)             1.48       3.04       1.48
  Vel Total (m/s)           1.16    Avg. Vel. (m/s)           0.29       1.20       0.29
  Max Chl Dpth (m)          2.80    Hydr. Depth (m)           0.13       2.80       0.13
  Conv. Total (m3/s)       671.1    Conv. (m3/s)               3.8      663.5        3.8
  Length Wtd. (m)           9.16    Wetted Per. (m)           1.61       8.38       1.61
  Min Ch El (m)            52.33    Shear (N/m2)              0.29       2.38       0.29
  Alpha                     1.06    Stream Power (N/m s)      0.09       2.86       0.09
  Frctn Loss (m)                    Cum Volume (1000 m3)      0.00       0.05       0.00
  C & E Loss (m)                    Cum SA (1000 m2)          0.01       0.03       0.01


CULVERT


RIVER: three
REACH: 1                  RS: 1.5

INPUT
Description:
Distance from Upstream XS =      .5
Deck/Roadway Width        =    8.16
Weir Coefficient          =    1.44
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4      55               4      55
```

```
Upstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -3      55   -1.52      55   -1.52   52.33    1.52   52.33    1.52      55
       3      55

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -3    .013   -1.52    .013    1.52    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -1.52    1.52             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   54.47               4   54.47

Downstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -3   54.47   -1.52   54.47   -1.52    51.7    1.52    51.7    1.52   54.47
       3   54.47

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -3    .013   -1.52    .013    1.52    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
         -1.52    1.52             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =      55
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular    1.83
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .5    8.16     .013     .013        0                   .4               .8
Upstream   Elevation =  52.33
           Centerline Station =  0
Downstream Elevation =  51.7
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-yrs  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       9.56    Culv Full Len (m)
  # Barrels                    1    Culv Vel US (m/s)         3.63
  Q Barrel (m3/s)           9.56    Culv Vel DS (m/s)         6.46
  E.G. US. (m)             55.21    Culv Inv El Up (m)       52.33
  W.S. US. (m)             55.13    Culv Inv El Dn (m)       51.70
  E.G. DS (m)              53.29    Culv Frctn Ls (m)         0.11
  W.S. DS (m)              52.76    Culv Exit Loss (m)        1.54
  Delta EG (m)              1.92    Culv Entr Loss (m)        0.27
  Delta WS (m)              2.38    Q Weir (m3/s)             0.81
  E.G. IC (m)              55.21    Weir Sta Lft (m)         -3.00
  E.G. OC (m)              55.04    Weir Sta Rgt (m)          3.00
  Culvert Control          Inlet    Weir Submerg              0.00
  Culv WS Inlet (m)        54.16    Weir Max Depth (m)        0.21
  Culv WS Outlet (m)       52.70    Weir Avg Depth (m)        0.21
  Culv Nml Depth (m)        0.67    Weir Flow Area (m2)       1.24
  Culv Crt Depth (m)        1.52    Min El Weir Flow (m)     55.00


Warning: Since the culvert has supercritical flow, the program should be run in mixed flow in order to
         check if the cross section downstream of the culvert has supercritical flow.
Note:    The flow in the culvert is entirely supercritical.
```

CROSS SECTION

RIVER: three
REACH: 1 RS: 1

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-3	54.47	-1.52	54.47	-1.52	51.7	1.52	51.7	1.52	54.47
3	54.47								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-3	.013	-1.52	.013	1.52	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-1.52	1.52	0	0	0	.1	.3

CROSS SECTION OUTPUT Profile #100-yrs

E.G. Elev (m)	53.29	Element	Left OB	Channel	Right OB
Vel Head (m)	0.53	Wt. n-Val.		0.013	
W.S. Elev (m)	52.76	Reach Len. (m)			
Crit W.S. (m)	52.76	Flow Area (m2)		3.21	
E.G. Slope (m/m)	0.003320	Area (m2)		3.21	
Q Total (m3/s)	10.37	Flow (m3/s)		10.37	
Top Width (m)	3.04	Top Width (m)		3.04	
Vel Total (m/s)	3.23	Avg. Vel. (m/s)		3.23	
Max Chl Dpth (m)	1.06	Hydr. Depth (m)		1.06	
Conv. Total (m3/s)	180.0	Conv. (m3/s)		180.0	
Length Wtd. (m)		Wetted Per. (m)		5.15	
Min Ch El (m)	51.70	Shear (N/m2)		20.28	
Alpha	1.00	Stream Power (N/m s)		65.55	
Frctn Loss (m)		Cum Volume (1000 m3)			
C & E Loss (m)		Cum SA (1000 m2)			

Warning: Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth). Water surface set to critical depth.

CROSS SECTION

RIVER: two
REACH: 1 RS: 19.1

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	83.95	-1	83.95	-1	81.05	1	81.05	1	83.95
4	83.95								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-4	.013	-1	.013	1	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-1	1	1	1	1	.1	.3

CROSS SECTION OUTPUT Profile #100-yrs

E.G. Elev (m)	83.91	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.		0.013	
W.S. Elev (m)	83.91	Reach Len. (m)	1.00	1.00	1.00
Crit W.S. (m)		Flow Area (m2)		5.71	
E.G. Slope (m/m)	0.000030	Area (m2)		5.71	
Q Total (m3/s)	1.96	Flow (m3/s)		1.96	
Top Width (m)	2.00	Top Width (m)		2.00	
Vel Total (m/s)	0.34	Avg. Vel. (m/s)		0.34	
Max Chl Dpth (m)	2.86	Hydr. Depth (m)		2.86	
Conv. Total (m3/s)	359.8	Conv. (m3/s)		359.8	
Length Wtd. (m)	1.00	Wetted Per. (m)		7.71	
Min Ch El (m)	81.05	Shear (N/m2)		0.22	
Alpha	1.00	Stream Power (N/m s)		0.07	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)	0.09	1.22	0.09
C & E Loss (m)	0.00	Cum SA (1000 m2)	0.47	0.68	0.47

CROSS SECTION

RIVER: two
REACH: 1 RS: 19

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	83.95	-1	83.95	-1	81.05	1	81.05	1	83.95
4	83.95								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-4	.013	-1	.013	1	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-1	1	66.5	66.5	66.5	.1	.3

CROSS SECTION OUTPUT Profile #100-yrs

E.G. Elev (m)	83.91	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.		0.013	
W.S. Elev (m)	83.91	Reach Len. (m)	66.50	66.50	66.50
Crit W.S. (m)	81.51	Flow Area (m2)		5.71	
E.G. Slope (m/m)	0.000030	Area (m2)		5.71	
Q Total (m3/s)	1.96	Flow (m3/s)		1.96	
Top Width (m)	2.00	Top Width (m)		2.00	
Vel Total (m/s)	0.34	Avg. Vel. (m/s)		0.34	
Max Chl Dpth (m)	2.86	Hydr. Depth (m)		2.86	
Conv. Total (m3/s)	359.8	Conv. (m3/s)		359.8	
Length Wtd. (m)	66.50	Wetted Per. (m)		7.71	
Min Ch El (m)	81.05	Shear (N/m2)		0.22	
Alpha	1.00	Stream Power (N/m s)		0.07	
Frctn Loss (m)		Cum Volume (1000 m3)	0.09	1.21	0.09
C & E Loss (m)		Cum SA (1000 m2)	0.47	0.68	0.47

CULVERT

RIVER: two
REACH: 1 RS: 18.6

INPUT
Description:
Distance from Upstream XS = .5
Deck/Roadway Width = 65.5
Weir Coefficient = 1.44
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-4	83.95		4	83.95	

Upstream Bridge Cross Section Data
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	83.95	-1	83.95	-1	81.05	1	81.05	1	83.95
4	83.95								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-4	.013	-1	.013	1	.013

Bank Sta: Left	Right	Coeff Contr.	Expan.
-1	1	.1	.3

Downstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-4	77.85		4	77.85	

Downstream Bridge Cross Section Data
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	77.85	-1	77.85	-1	74.9	1	74.9	1	77.85
4	77.85								

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =   83.95
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular     .76
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .5    65.5     .013     .013        0                   .4               .8
Upstream   Elevation =  81
           Centerline Station =  0
Downstream Elevation =  74.9
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-yrs  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       1.96    Culv Full Len (m)
  # Barrels                    1    Culv Vel US (m/s)         4.32
  Q Barrel (m3/s)           1.96    Culv Vel DS (m/s)         7.97
  E.G. US. (m)             83.91    Culv Inv El Up (m)       81.00
  W.S. US. (m)             83.91    Culv Inv El Dn (m)       74.90
  E.G. DS (m)              75.60    Culv Frctn Ls (m)         4.99
  W.S. DS (m)              75.42    Culv Exit Loss (m)        2.94
  Delta EG (m)              8.31    Culv Entr Loss (m)        0.38
  Delta WS (m)              8.49    Q Weir (m3/s)
  E.G. IC (m)              83.91    Weir Sta Lft (m)
  E.G. OC (m)              78.89    Weir Sta Rgt (m)
  Culvert Control          Inlet    Weir Submerg
  Culv WS Inlet (m)        81.76    Weir Max Depth (m)
  Culv WS Outlet (m)       75.31    Weir Avg Depth (m)
  Culv Nml Depth (m)        0.41    Weir Flow Area (m2)
  Culv Crt Depth (m)        0.76    Min El Weir Flow (m)     83.95


Warning: During the supercritical analysis, the program could not converge on a supercritical answer in
         the downstream cross section.  The program used the solution with the least error.
Note:    Culvert critical depth exceeds the height of the culvert.
Note:    During supercritical analysis, the culvert direct step method went to normal depth.  The program
         then assumed normal depth at the outlet.
Note:    The flow in the culvert is entirely supercritical.

CROSS SECTION


RIVER: two
REACH: 1                  RS: 18.1

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   77.85      -1   77.85      -1    74.9       1    74.9       1   77.85
       4   77.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -1       1                1       1       1             .1       .3
```

```
CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            75.60    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.18    Wt. n-Val.                         0.013
  W.S. Elev (m)            75.42    Reach Len. (m)           1.00       1.00       1.00
  Crit W.S. (m)            75.36    Flow Area (m2)                      1.04
  E.G. Slope (m/m)      0.002521    Area (m2)                           1.04
  Q Total (m3/s)            1.96    Flow (m3/s)                         1.96
  Top Width (m)             2.00    Top Width (m)                       2.00
  Vel Total (m/s)           1.89    Avg. Vel. (m/s)                     1.89
  Max Chl Dpth (m)          0.52    Hydr. Depth (m)                     0.52
  Conv. Total (m3/s)        39.0    Conv. (m3/s)                        39.0
  Length Wtd. (m)           1.00    Wetted Per. (m)                     3.04
  Min Ch El (m)            74.90    Shear (N/m2)                        8.45
  Alpha                     1.00    Stream Power (N/m s)               15.95
  Frctn Loss (m)            0.00    Cum Volume (1000 m3)      0.09      0.99       0.09
  C & E Loss (m)            0.01    Cum SA (1000 m2)          0.47      0.55       0.47


CROSS SECTION


RIVER: two
REACH: 1                  RS: 18

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   77.85      -1   77.85      -1    74.9       1    74.9       1   77.85
       4   77.85

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -1       1            61.84   61.84   61.84             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            75.59    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.23    Wt. n-Val.                         0.013
  W.S. Elev (m)            75.36    Reach Len. (m)          61.84      61.84      61.84
  Crit W.S. (m)            75.36    Flow Area (m2)                      0.92
  E.G. Slope (m/m)      0.003596    Area (m2)                           0.92
  Q Total (m3/s)            1.96    Flow (m3/s)                         1.96
  Top Width (m)             2.00    Top Width (m)                       2.00
  Vel Total (m/s)           2.13    Avg. Vel. (m/s)                     2.13
  Max Chl Dpth (m)          0.46    Hydr. Depth (m)                     0.46
  Conv. Total (m3/s)        32.7    Conv. (m3/s)                        32.7
  Length Wtd. (m)          61.84    Wetted Per. (m)                     2.92
  Min Ch El (m)            74.90    Shear (N/m2)                       11.10
  Alpha                     1.00    Stream Power (N/m s)               23.68
  Frctn Loss (m)                    Cum Volume (1000 m3)      0.09      0.99       0.09
  C & E Loss (m)                    Cum SA (1000 m2)          0.47      0.55       0.47


Warning: During subcritical analysis, the water surface upstream of culvert went to critical depth.

CULVERT


RIVER: two
REACH: 1                  RS: 17.6

INPUT
Description:
Distance from Upstream XS =      .5
Deck/Roadway Width        =   60.84
Weir Coefficient          =    1.44
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   77.85               4   77.85

Upstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   77.85      -1   77.85      -1    74.9       1    74.9       1   77.85
       4   77.85
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   72.12               4   72.12

Downstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   72.12      -1   72.12      -1   70.12       1   70.12       1   72.12
       4   72.12

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =   77.85
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular     .76
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                .5   60.84     .013     .013        0                  .4               .8
Upstream   Elevation =  74.9
           Centerline Station =  0
Downstream Elevation =  70.12
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-yrs  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       1.96    Culv Full Len (m)        60.84
  # Barrels                    1    Culv Vel US (m/s)         4.32
  Q Barrel (m3/s)           1.96    Culv Vel DS (m/s)         4.32
  E.G. US. (m)             75.11    Culv Inv El Up (m)       74.90
  W.S. US. (m)             75.36    Culv Inv El Dn (m)       70.12
  E.G. DS (m)              72.22    Culv Frctn Ls (m)         3.64
  W.S. DS (m)              72.21    Culv Exit Loss (m)        0.75
  Delta EG (m)              2.89    Culv Entr Loss (m)        0.38
  Delta WS (m)              3.15    Q Weir (m3/s)
  E.G. IC (m)              77.82    Weir Sta Lft (m)
  E.G. OC (m)              75.11    Weir Sta Rgt (m)
  Culvert Control          Inlet    Weir Submerg
  Culv WS Inlet (m)        75.66    Weir Max Depth (m)
  Culv WS Outlet (m)       70.88    Weir Avg Depth (m)
  Culv Nml Depth (m)        0.43    Weir Flow Area (m2)
  Culv Crt Depth (m)        0.76    Min El Weir Flow (m)     77.85


Warning: During subcritical analysis, the water surface upstream of culvert went to critical depth.
Note:    Culvert critical depth exceeds the height of the culvert.
Note:    During supercritical analysis, the culvert direct step method went to normal depth.  The program
         then assumed normal depth at the outlet.
Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note:    The culvert inlet is submerged and the culvert flows full over part or all of its length.  Therefore,
         the culvert inlet equations are not valid and the supercritical result has been discarded.  The
         outlet answer will be used.
```

CROSS SECTION

RIVER: two
REACH: 1 RS: 17.1

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	72.12	-1	72.12	-1	70.12	1	70.12	1	72.12
4	72.12								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-4	.013	-1	.013	1	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-1	1	1	1	1	.1	.3

CROSS SECTION OUTPUT Profile #100-yrs

E.G. Elev (m)	72.22	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (m)	72.21	Reach Len. (m)	1.00	1.00	1.00
Crit W.S. (m)		Flow Area (m2)	0.26	4.18	0.26
E.G. Slope (m/m)	0.000057	Area (m2)	0.26	4.18	0.26
Q Total (m3/s)	1.96	Flow (m3/s)	0.03	1.90	0.03
Top Width (m)	8.00	Top Width (m)	3.00	2.00	3.00
Vel Total (m/s)	0.42	Avg. Vel. (m/s)	0.11	0.46	0.11
Max Chl Dpth (m)	2.09	Hydr. Depth (m)	0.09	2.09	0.09
Conv. Total (m3/s)	260.0	Conv. (m3/s)	3.9	252.2	3.9
Length Wtd. (m)	1.00	Wetted Per. (m)	3.09	6.00	3.09
Min Ch El (m)	70.12	Shear (N/m2)	0.05	0.39	0.05
Alpha	1.16	Stream Power (N/m s)	0.01	0.18	0.01
Frctn Loss (m)	0.00	Cum Volume (1000 m3)	0.09	0.83	0.09
C & E Loss (m)	0.00	Cum SA (1000 m2)	0.38	0.42	0.38

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION

RIVER: two
REACH: 1 RS: 17

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	72.12	-1	72.12	-1	70.12	1	70.12	1	72.12
4	72.12								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-4	.013	-1	.013	1	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-1	1	61.468	61.468	61.468	.1	.3

CROSS SECTION OUTPUT Profile #100-yrs

E.G. Elev (m)	72.22	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (m)	72.21	Reach Len. (m)	61.47	61.47	61.47
Crit W.S. (m)	70.58	Flow Area (m2)	0.26	4.18	0.26
E.G. Slope (m/m)	0.000057	Area (m2)	0.26	4.18	0.26
Q Total (m3/s)	1.96	Flow (m3/s)	0.03	1.90	0.03
Top Width (m)	8.00	Top Width (m)	3.00	2.00	3.00
Vel Total (m/s)	0.42	Avg. Vel. (m/s)	0.11	0.46	0.11
Max Chl Dpth (m)	2.09	Hydr. Depth (m)	0.09	2.09	0.09
Conv. Total (m3/s)	260.0	Conv. (m3/s)	3.9	252.2	3.9
Length Wtd. (m)	61.47	Wetted Per. (m)	3.09	6.00	3.09
Min Ch El (m)	70.12	Shear (N/m2)	0.05	0.39	0.05
Alpha	1.16	Stream Power (N/m s)	0.01	0.18	0.01
Frctn Loss (m)		Cum Volume (1000 m3)	0.09	0.82	0.09
C & E Loss (m)		Cum SA (1000 m2)	0.38	0.42	0.38

```
CULVERT


RIVER: two
REACH: 1                  RS: 16.6

INPUT
Description:
Distance from Upstream XS =      .5
Deck/Roadway Width        =  60.468
Weir Coefficient          =    1.44
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   72.12               4   72.12

Upstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   72.12      -1   72.12      -1   70.12       1   70.12       1   72.12
       4   72.12

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   66.49               4   66.49

Downstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   66.49      -1   66.49      -1   64.48       1   64.48       1   66.49
       4   66.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =   72.12
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular     .76
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .5  60.468     .013     .013        0                   .4               .8
Upstream   Elevation =  70.12
           Centerline Station =  0
Downstream Elevation =  64.48
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-yrs  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       1.60    Culv Full Len (m)
  # Barrels                    1    Culv Vel US (m/s)         3.53
  Q Barrel (m3/s)           1.60    Culv Vel DS (m/s)         7.62
  E.G. US. (m)             72.22    Culv Inv El Up (m)       70.12
  W.S. US. (m)             72.21    Culv Inv El Dn (m)       64.48
  E.G. DS (m)              65.18    Culv Frctn Ls (m)         4.17
  W.S. DS (m)              65.00    Culv Exit Loss (m)        2.61
  Delta EG (m)              7.04    Culv Entr Loss (m)        0.25
  Delta WS (m)              7.21    Q Weir (m3/s)             0.36
  E.G. IC (m)              72.22    Weir Sta Lft (m)         -4.00
```

```
  E.G. OC (m)              67.29    Weir Sta Rgt (m)          4.00
  Culvert Control          Inlet    Weir Submerg              0.00
  Culv WS Inlet (m)        70.88    Weir Max Depth (m)        0.10
  Culv WS Outlet (m)       64.84    Weir Avg Depth (m)        0.10
  Culv Nml Depth (m)        0.36    Weir Flow Area (m2)       0.79
  Culv Crt Depth (m)        0.76    Min El Weir Flow (m)     72.12


Warning: During the supercritical analysis, the program could not converge on a supercritical answer in
         the downstream cross section.  The program used the solution with the least error.
Warning: During the culvert outlet computations, the program could not balance the culvert/weir flow.
         The reported outlet energy grade answer may not be valid.
Note:    Culvert critical depth exceeds the height of the culvert.
Note:    During supercritical analysis, the culvert direct step method went to normal depth.  The program
         then assumed normal depth at the outlet.
Note:    The flow in the culvert is entirely supercritical.

CROSS SECTION


RIVER: two
REACH: 1                  RS: 16.1

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   66.49      -1   66.49      -1   64.48       1   64.48       1   66.49
       4   66.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -1       1                1       1       1             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            65.18    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.18    Wt. n-Val.                          0.013
  W.S. Elev (m)            65.00    Reach Len. (m)            1.00       1.00       1.00
  Crit W.S. (m)            64.94    Flow Area (m2)                       1.04
  E.G. Slope (m/m)      0.002521    Area (m2)                            1.04
  Q Total (m3/s)            1.96    Flow (m3/s)                          1.96
  Top Width (m)             2.00    Top Width (m)                        2.00
  Vel Total (m/s)           1.89    Avg. Vel. (m/s)                      1.89
  Max Chl Dpth (m)          0.52    Hydr. Depth (m)                      0.52
  Conv. Total (m3/s)        39.0    Conv. (m3/s)                         39.0
  Length Wtd. (m)           1.00    Wetted Per. (m)                      3.04
  Min Ch El (m)            64.48    Shear (N/m2)                         8.45
  Alpha                     1.00    Stream Power (N/m s)                15.95
  Frctn Loss (m)            0.00    Cum Volume (1000 m3)      0.08       0.66       0.08
  C & E Loss (m)            0.00    Cum SA (1000 m2)          0.29       0.30       0.29


CROSS SECTION


RIVER: two
REACH: 1                  RS: 16

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   66.49      -1   66.49      -1   64.48       1   64.48       1   66.49
       4   66.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -1       1           68.122  68.122  68.122             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            65.17    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.23    Wt. n-Val.                          0.013
  W.S. Elev (m)            64.94    Reach Len. (m)           68.12      68.12      68.12
```

```
  Crit W.S. (m)            64.94    Flow Area (m2)                      0.92
  E.G. Slope (m/m)      0.003575    Area (m2)                           0.92
  Q Total (m3/s)            1.96    Flow (m3/s)                         1.96
  Top Width (m)             2.00    Top Width (m)                       2.00
  Vel Total (m/s)           2.13    Avg. Vel. (m/s)                     2.13
  Max Chl Dpth (m)          0.46    Hydr. Depth (m)                     0.46
  Conv. Total (m3/s)        32.8    Conv. (m3/s)                        32.8
  Length Wtd. (m)          68.12    Wetted Per. (m)                     2.92
  Min Ch El (m)            64.48    Shear (N/m2)                       11.05
  Alpha                     1.00    Stream Power (N/m s)               23.53
  Frctn Loss (m)                    Cum Volume (1000 m3)      0.08      0.66       0.08
  C & E Loss (m)                    Cum SA (1000 m2)          0.29      0.30       0.29


Warning: During subcritical analysis, the water surface upstream of culvert went to critical depth.

CULVERT


RIVER: two
REACH: 1                  RS: 15.6

INPUT
Description:
Distance from Upstream XS =      .5
Deck/Roadway Width        =  67.122
Weir Coefficient          =    1.44
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   66.49               4   66.49

Upstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   66.49      -1   66.49      -1   64.48       1   64.48       1   66.49
       4   66.49

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   60.77               4   60.77

Downstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   60.77      -1   60.77      -1   58.53       1   58.53       1   60.77
       4   60.77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =   66.49
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular     .76
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .5  67.122     .013     .013        0                   .4               .8
```

```
Upstream   Elevation =  64.48
           Centerline Station =  0
Downstream Elevation =  58.53
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-yrs  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       1.96    Culv Full Len (m)        67.12
  # Barrels                    1    Culv Vel US (m/s)         4.32
  Q Barrel (m3/s)           1.96    Culv Vel DS (m/s)         4.32
  E.G. US. (m)             64.11    Culv Inv El Up (m)       64.48
  W.S. US. (m)             64.94    Culv Inv El Dn (m)       58.53
  E.G. DS (m)              61.03    Culv Frctn Ls (m)         4.40
  W.S. DS (m)              61.03    Culv Exit Loss (m)        0.76
  Delta EG (m)              3.08    Culv Entr Loss (m)        0.38
  Delta WS (m)              3.91    Q Weir (m3/s)
  E.G. IC (m)              67.39    Weir Sta Lft (m)
  E.G. OC (m)              64.11    Weir Sta Rgt (m)
  Culvert Control          Inlet    Weir Submerg
  Culv WS Inlet (m)        65.24    Weir Max Depth (m)
  Culv WS Outlet (m)       59.29    Weir Avg Depth (m)
  Culv Nml Depth (m)        0.41    Weir Flow Area (m2)
  Culv Crt Depth (m)        0.76    Min El Weir Flow (m)     66.49


Warning: During subcritical analysis, the water surface upstream of culvert went to critical depth.
Note:    Culvert critical depth exceeds the height of the culvert.
Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note:    The culvert inlet is submerged and the culvert flows full over part or all of its length.  Therefore,
         the culvert inlet equations are not valid and the supercritical result has been discarded.  The
         outlet answer will be used.

CROSS SECTION


RIVER: two
REACH: 1                  RS: 15.1

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   60.77      -1   60.77      -1   58.53       1   58.53       1   60.77
       4   60.77

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -1       1                 1       1       1             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            61.03    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.01    Wt. n-Val.               0.013      0.013      0.013
  W.S. Elev (m)            61.03    Reach Len. (m)            1.00       1.00       1.00
  Crit W.S. (m)                     Flow Area (m2)            0.77       4.99       0.77
  E.G. Slope (m/m)      0.000028    Area (m2)                 0.77       4.99       0.77
  Q Total (m3/s)            1.96    Flow (m3/s)               0.12       1.72       0.12
  Top Width (m)             8.00    Top Width (m)             3.00       2.00       3.00
  Vel Total (m/s)           0.30    Avg. Vel. (m/s)           0.16       0.34       0.16
  Max Chl Dpth (m)          2.50    Hydr. Depth (m)           0.26       2.50       0.26
  Conv. Total (m3/s)       368.1    Conv. (m3/s)              22.6      322.8       22.6
  Length Wtd. (m)           1.00    Wetted Per. (m)           3.26       6.48       3.26
  Min Ch El (m)            58.53    Shear (N/m2)              0.07       0.21       0.07
  Alpha                     1.19    Stream Power (N/m s)      0.01       0.07       0.01
  Frctn Loss (m)            0.00    Cum Volume (1000 m3)      0.05       0.46       0.05
  C & E Loss (m)            0.00    Cum SA (1000 m2)          0.18       0.16       0.18


Warning: The cross-section end points had to be extended vertically for the computed water surface.
```

CROSS SECTION

RIVER: two
REACH: 1 RS: 15

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	60.77	-1	60.77	-1	58.33	1	58.33	1	60.77
4	60.77								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-4	.013	-1	.013	1	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-1	1	22	22	22	.1	.3

CROSS SECTION OUTPUT Profile #100-yrs

E.G. Elev (m)	61.03	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (m)	61.02	Reach Len. (m)	22.00	22.00	22.00
Crit W.S. (m)	59.01	Flow Area (m2)	0.74	5.37	0.74
E.G. Slope (m/m)	0.000080	Area (m2)	0.74	5.37	0.74
Q Total (m3/s)	3.51	Flow (m3/s)	0.19	3.13	0.19
Top Width (m)	8.00	Top Width (m)	3.00	2.00	3.00
Vel Total (m/s)	0.51	Avg. Vel. (m/s)	0.26	0.58	0.26
Max Chl Dpth (m)	2.69	Hydr. Depth (m)	0.25	2.69	0.25
Conv. Total (m3/s)	392.3	Conv. (m3/s)	21.0	350.3	21.0
Length Wtd. (m)	22.00	Wetted Per. (m)	3.24	6.88	3.24
Min Ch El (m)	58.33	Shear (N/m2)	0.18	0.61	0.18
Alpha	1.18	Stream Power (N/m s)	0.05	0.36	0.05
Frctn Loss (m)		Cum Volume (1000 m3)	0.05	0.46	0.05
C & E Loss (m)		Cum SA (1000 m2)	0.18	0.16	0.18

CULVERT

RIVER: two
REACH: 1 RS: 14.6

INPUT
Description:
Distance from Upstream XS = .5
Deck/Roadway Width = 21
Weir Coefficient = 1.44
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-4	60.77		4	60.77	

Upstream Bridge Cross Section Data
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	60.77	-1	60.77	-1	58.33	1	58.33	1	60.77
4	60.77								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-4	.013	-1	.013	1	.013

Bank Sta: Left	Right	Coeff Contr.	Expan.
-1	1	.1	.3

Downstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-4	58.98		4	58.98	

Downstream Bridge Cross Section Data
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	58.98	-1	58.98	-1	56.98	1	56.98	1	58.98
4	58.98								

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =   60.77
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular     .76
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .5      21     .013     .013        0                   .4               .8
Upstream   Elevation =  58.33
           Centerline Station =  0
Downstream Elevation =  56.98
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-yrs  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       1.93    Culv Full Len (m)        21.00
  # Barrels                    1    Culv Vel US (m/s)         4.26
  Q Barrel (m3/s)           1.93    Culv Vel DS (m/s)         4.26
  E.G. US. (m)             61.03    Culv Inv El Up (m)       58.33
  W.S. US. (m)             61.02    Culv Inv El Dn (m)       56.98
  E.G. DS (m)              59.34    Culv Frctn Ls (m)         0.59
  W.S. DS (m)              59.33    Culv Exit Loss (m)        0.73
  Delta EG (m)              1.69    Culv Entr Loss (m)        0.37
  Delta WS (m)              1.69    Q Weir (m3/s)             1.58
  E.G. IC (m)              61.05    Weir Sta Lft (m)         -4.00
  E.G. OC (m)              61.03    Weir Sta Rgt (m)          4.00
  Culvert Control          Inlet    Weir Submerg              0.00
  Culv WS Inlet (m)        59.09    Weir Max Depth (m)        0.27
  Culv WS Outlet (m)       57.74    Weir Avg Depth (m)        0.27
  Culv Nml Depth (m)        0.45    Weir Flow Area (m2)       2.12
  Culv Crt Depth (m)        0.76    Min El Weir Flow (m)     60.77


Note:    Culvert critical depth exceeds the height of the culvert.
Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note:    The culvert inlet is submerged and the culvert flows full over part or all of its length.  Therefore,
         the culvert inlet equations are not valid and the supercritical result has been discarded.  The
         outlet answer will be used.

CROSS SECTION


RIVER: two
REACH: 1                  RS: 14.1

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   58.98      -1   58.98      -1   56.98       1   56.98       1   58.98
       4   58.98

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -1       1                1       1       1             .1       .3
```

CROSS SECTION OUTPUT Profile #100-yrs

E.G. Elev (m)	59.34	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (m)	59.33	Reach Len. (m)	1.00	1.00	1.00
Crit W.S. (m)		Flow Area (m2)	1.04	4.69	1.04
E.G. Slope (m/m)	0.000085	Area (m2)	1.04	4.69	1.04
Q Total (m3/s)	3.51	Flow (m3/s)	0.34	2.83	0.34
Top Width (m)	8.00	Top Width (m)	3.00	2.00	3.00
Vel Total (m/s)	0.52	Avg. Vel. (m/s)	0.33	0.60	0.33
Max Chl Dpth (m)	2.35	Hydr. Depth (m)	0.35	2.35	0.35
Conv. Total (m3/s)	380.0	Conv. (m3/s)	36.7	306.6	36.7
Length Wtd. (m)	1.00	Wetted Per. (m)	3.35	6.00	3.35
Min Ch El (m)	56.98	Shear (N/m2)	0.26	0.65	0.26
Alpha	1.17	Stream Power (N/m s)	0.08	0.39	0.08
Frctn Loss (m)	0.00	Cum Volume (1000 m3)	0.03	0.35	0.03
C & E Loss (m)	0.00	Cum SA (1000 m2)	0.11	0.11	0.11

Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION

RIVER: two
REACH: 1 RS: 14

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	58.98	-1	58.98	-1	56.98	1	56.98	1	58.98
4	58.98								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-4	.013	-1	.013	1	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-1	1	17.81	17.81	17.81	.1	.3

CROSS SECTION OUTPUT Profile #100-yrs

E.G. Elev (m)	59.34	Element	Left OB	Channel	Right OB
Vel Head (m)	0.02	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (m)	59.33	Reach Len. (m)	17.81	17.81	17.81
Crit W.S. (m)	57.66	Flow Area (m2)	1.04	4.69	1.04
E.G. Slope (m/m)	0.000085	Area (m2)	1.04	4.69	1.04
Q Total (m3/s)	3.51	Flow (m3/s)	0.34	2.83	0.34
Top Width (m)	8.00	Top Width (m)	3.00	2.00	3.00
Vel Total (m/s)	0.52	Avg. Vel. (m/s)	0.33	0.60	0.33
Max Chl Dpth (m)	2.35	Hydr. Depth (m)	0.35	2.35	0.35
Conv. Total (m3/s)	380.0	Conv. (m3/s)	36.7	306.5	36.7
Length Wtd. (m)	17.81	Wetted Per. (m)	3.35	6.00	3.35
Min Ch El (m)	56.98	Shear (N/m2)	0.26	0.65	0.26
Alpha	1.17	Stream Power (N/m s)	0.08	0.39	0.08
Frctn Loss (m)		Cum Volume (1000 m3)	0.03	0.34	0.03
C & E Loss (m)		Cum SA (1000 m2)	0.11	0.11	0.11

CULVERT

RIVER: two
REACH: 1 RS: 13.6

INPUT
Description:
Distance from Upstream XS = .5
Deck/Roadway Width = 16.81
Weir Coefficient = 1.44
Upstream Deck/Roadway Coordinates
num= 2

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
-4	58.98		4	58.98	

Upstream Bridge Cross Section Data
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	58.98	-1	58.98	-1	56.98	1	56.98	1	58.98
4	58.98								

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4    58.9               4    58.9

Downstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4    58.9      -1    58.9      -1   56.37       1   56.37       1    58.9
       4    58.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =   58.98
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular     .91
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                .5   16.81     .013     .013        0                   .4                .8
Upstream   Elevation =  56.98
           Centerline Station =  0
Downstream Elevation =  56.37
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-yrs  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       0.98    Culv Full Len (m)        16.81
  # Barrels                    1    Culv Vel US (m/s)         1.51
  Q Barrel (m3/s)           0.98    Culv Vel DS (m/s)         1.51
  E.G. US. (m)             59.34    Culv Inv El Up (m)       56.98
  W.S. US. (m)             59.33    Culv Inv El Dn (m)       56.37
  E.G. DS (m)              59.17    Culv Frctn Ls (m)         0.05
  W.S. DS (m)              59.15    Culv Exit Loss (m)        0.08
  Delta EG (m)              0.17    Culv Entr Loss (m)        0.05
  Delta WS (m)              0.17    Q Weir (m3/s)             2.53
  E.G. IC (m)              59.21    Weir Sta Lft (m)         -4.00
  E.G. OC (m)              59.34    Weir Sta Rgt (m)          4.00
  Culvert Control         Outlet    Weir Submerg              0.48
  Culv WS Inlet (m)        57.89    Weir Max Depth (m)        0.36
  Culv WS Outlet (m)       57.28    Weir Avg Depth (m)        0.36
  Culv Nml Depth (m)                Weir Flow Area (m2)       2.91
  Culv Crt Depth (m)        0.58    Min El Weir Flow (m)     58.98


CROSS SECTION


RIVER: two
REACH: 1                  RS: 13.1

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4    58.9      -1    58.9      -1   56.37       1   56.37       1    58.9
       4    58.9
```

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -1       1                 1       1       1             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            59.17    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.01    Wt. n-Val.               0.013      0.013      0.013
  W.S. Elev (m)            59.15    Reach Len. (m)            1.00       1.00       1.00
  Crit W.S. (m)                     Flow Area (m2)            0.76       5.57       0.76
  E.G. Slope (m/m)      0.000073    Area (m2)                 0.76       5.57       0.76
  Q Total (m3/s)            3.51    Flow (m3/s)               0.19       3.13       0.19
  Top Width (m)             8.00    Top Width (m)             3.00       2.00       3.00
  Vel Total (m/s)           0.49    Avg. Vel. (m/s)           0.25       0.56       0.25
  Max Chl Dpth (m)          2.78    Hydr. Depth (m)           0.25       2.78       0.25
  Conv. Total (m3/s)       410.1    Conv. (m3/s)              22.3      365.6       22.3
  Length Wtd. (m)           1.00    Wetted Per. (m)           3.25       7.06       3.25
  Min Ch El (m)            56.37    Shear (N/m2)              0.17       0.57       0.17
  Alpha                     1.18    Stream Power (N/m s)      0.04       0.32       0.04
  Frctn Loss (m)            0.00    Cum Volume (1000 m3)      0.01       0.25       0.01
  C & E Loss (m)            0.00    Cum SA (1000 m2)          0.06       0.08       0.06


Warning: The cross-section end points had to be extended vertically for the computed water surface.

CROSS SECTION


RIVER: two
REACH: 1                  RS: 13

INPUT
Description:
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4    58.9      -1    58.9      -1   56.37       1   56.37       1    58.9
       4    58.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            -1       1            36.76   36.76   36.76             .1       .3

CROSS SECTION OUTPUT  Profile #100-yrs

  E.G. Elev (m)            59.17    Element                 Left OB    Channel   Right OB
  Vel Head (m)              0.01    Wt. n-Val.               0.013      0.013      0.013
  W.S. Elev (m)            59.15    Reach Len. (m)           36.76      36.76      36.76
  Crit W.S. (m)            57.05    Flow Area (m2)            0.76       5.57       0.76
  E.G. Slope (m/m)      0.000073    Area (m2)                 0.76       5.57       0.76
  Q Total (m3/s)            3.51    Flow (m3/s)               0.19       3.13       0.19
  Top Width (m)             8.00    Top Width (m)             3.00       2.00       3.00
  Vel Total (m/s)           0.49    Avg. Vel. (m/s)           0.25       0.56       0.25
  Max Chl Dpth (m)          2.78    Hydr. Depth (m)           0.25       2.78       0.25
  Conv. Total (m3/s)       410.1    Conv. (m3/s)              22.3      365.6       22.3
  Length Wtd. (m)          36.76    Wetted Per. (m)           3.25       7.06       3.25
  Min Ch El (m)            56.37    Shear (N/m2)              0.17       0.57       0.17
  Alpha                     1.18    Stream Power (N/m s)      0.04       0.32       0.04
  Frctn Loss (m)                    Cum Volume (1000 m3)      0.01       0.24       0.01
  C & E Loss (m)                    Cum SA (1000 m2)          0.06       0.07       0.06


CULVERT


RIVER: two
REACH: 1                  RS: 12.9

INPUT
Description:
Distance from Upstream XS =      .5
Deck/Roadway Width        =   35.76
Weir Coefficient          =    1.44
Upstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
```

```
      -4    58.9               4    58.9

Upstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4    58.9      -1    58.9      -1   56.37       1   56.37       1    58.9
       4    58.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Downstream  Deck/Roadway Coordinates
    num=       2
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
      -4   58.45               4   58.45

Downstream Bridge Cross Section Data
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      -4   58.45      -1   58.45      -1   54.66       1   54.66       1   58.45
       4   58.45

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      -4    .013      -1    .013       1    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
            -1       1             .1       .3

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .95
Elevation at which weir flow begins         =    58.9
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular     .91
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .5   35.76     .013     .013        0                   .4                .8
Upstream   Elevation =  56.37
           Centerline Station =  0
Downstream Elevation =  54.66
           Centerline Station =  0

CULVERT OUTPUT  Profile #100-yrs  Culv Group:  Culvert #1

  Q Culv Group (m3/s)       1.91    Culv Full Len (m)        35.76
  # Barrels                    1    Culv Vel US (m/s)         2.94
  Q Barrel (m3/s)           1.91    Culv Vel DS (m/s)         2.94
  E.G. US. (m)             59.17    Culv Inv El Up (m)       56.37
  W.S. US. (m)             59.15    Culv Inv El Dn (m)       54.66
  E.G. DS (m)              58.27    Culv Frctn Ls (m)         0.38
  W.S. DS (m)              58.26    Culv Exit Loss (m)        0.34
  Delta EG (m)              0.90    Culv Entr Loss (m)        0.18
  Delta WS (m)              0.89    Q Weir (m3/s)             1.60
  E.G. IC (m)              59.09    Weir Sta Lft (m)         -4.00
  E.G. OC (m)              59.17    Weir Sta Rgt (m)          4.00
  Culvert Control         Outlet    Weir Submerg              0.00
  Culv WS Inlet (m)        57.28    Weir Max Depth (m)        0.27
  Culv WS Outlet (m)       55.57    Weir Avg Depth (m)        0.27
  Culv Nml Depth (m)                Weir Flow Area (m2)       2.14
  Culv Crt Depth (m)        0.80    Min El Weir Flow (m)     58.90
```

CROSS SECTION

RIVER: two
REACH: 1 RS: 12.8

INPUT
Description:
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-4	58.45	-1	58.45	-1	54.66	1	54.66	1	58.45
4	58.45								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-4	.013	-1	.013	1	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-1	1	0	0	0	.1	.3

CROSS SECTION OUTPUT Profile #100-yrs

E.G. Elev (m)	58.27	Element	Left OB	Channel	Right OB
Vel Head (m)	0.01	Wt. n-Val.		0.013	
W.S. Elev (m)	58.26	Reach Len. (m)	1.00	1.00	1.00
Crit W.S. (m)		Flow Area (m2)		7.20	
E.G. Slope (m/m)	0.000056	Area (m2)		7.20	
Q Total (m3/s)	3.51	Flow (m3/s)		3.51	
Top Width (m)	2.00	Top Width (m)		2.00	
Vel Total (m/s)	0.49	Avg. Vel. (m/s)		0.49	
Max Chl Dpth (m)	3.60	Hydr. Depth (m)		3.60	
Conv. Total (m3/s)	470.6	Conv. (m3/s)		470.6	
Length Wtd. (m)	1.00	Wetted Per. (m)		9.20	
Min Ch El (m)	54.66	Shear (N/m2)		0.43	
Alpha	1.00	Stream Power (N/m s)		0.21	
Frctn Loss (m)	0.00	Cum Volume (1000 m3)		0.01	
C & E Loss (m)	0.00	Cum SA (1000 m2)			

SUMMARY OF MANNING'S N VALUES

River:one

Reach	River Sta.	n1	n2	n3
1	12.1	.04	.04	.04
1	12	.04	.04	.04
1	11.6	Culvert		
1	11.1	.013	.013	.013
1	11	.013	.013	.013
1	10.6	Culvert		
1	10.1	.013	.013	.013
1	10	.013	.013	.013
1	9.6	Culvert		
1	9.1	.013	.013	.013
1	9	.013	.013	.013
1	8.6	Culvert		
1	8.1	.013	.013	.013
1	8	.013	.013	.013
1	7.6	Culvert		
1	7.1	.013	.013	.013
1	7	.013	.013	.013
1	6.6	Culvert		
1	6.1	.013	.013	.013
1	6	.013	.013	.013
1	5.6	Culvert		
1	5.1	.013	.013	.013

River:three

Reach	River Sta.	n1	n2	n3
1	5	.013	.013	.013
1	4.6	Culvert		
1	4.1	.013	.013	.013
1	4	.013	.013	.013
1	3	Culvert		
1	2.1	.013	.013	.013

1	2	.013	.013	.013
1	1.5	Culvert		
1	1	.013	.013	.013

River:two

Reach	River Sta.	n1	n2	n3
1	19.1	.013	.013	.013
1	19	.013	.013	.013
1	18.6	Culvert		
1	18.1	.013	.013	.013
1	18	.013	.013	.013
1	17.6	Culvert		
1	17.1	.013	.013	.013
1	17	.013	.013	.013
1	16.6	Culvert		
1	16.1	.013	.013	.013
1	16	.013	.013	.013
1	15.6	Culvert		
1	15.1	.013	.013	.013
1	15	.013	.013	.013
1	14.6	Culvert		
1	14.1	.013	.013	.013
1	14	.013	.013	.013
1	13.6	Culvert		
1	13.1	.013	.013	.013
1	13	.013	.013	.013
1	12.9	Culvert		
1	12.8	.013	.013	.013

SUMMARY OF REACH LENGTHS

River: one

Reach	River Sta.	Left	Channel	Right
1	12.1	1	1	1
1	12	37.87	37.87	37.87
1	11.6	Culvert		
1	11.1	1	1	1
1	11	4.583	4.583	4.583
1	10.6	Culvert		
1	10.1	1	1	1
1	10	45.059	45.059	45.059
1	9.6	Culvert		
1	9.1	1	1	1
1	9	64	64	64
1	8.6	Culvert		
1	8.1	1	1	1
1	8	55.231	55.231	55.231
1	7.6	Culvert		
1	7.1	1	1	1
1	7	35.16	35.16	35.16
1	6.6	Culvert		
1	6.1	1	1	1
1	6	63.046	63.046	63.046
1	5.6	Culvert		
1	5.1	0	0	0

River: three

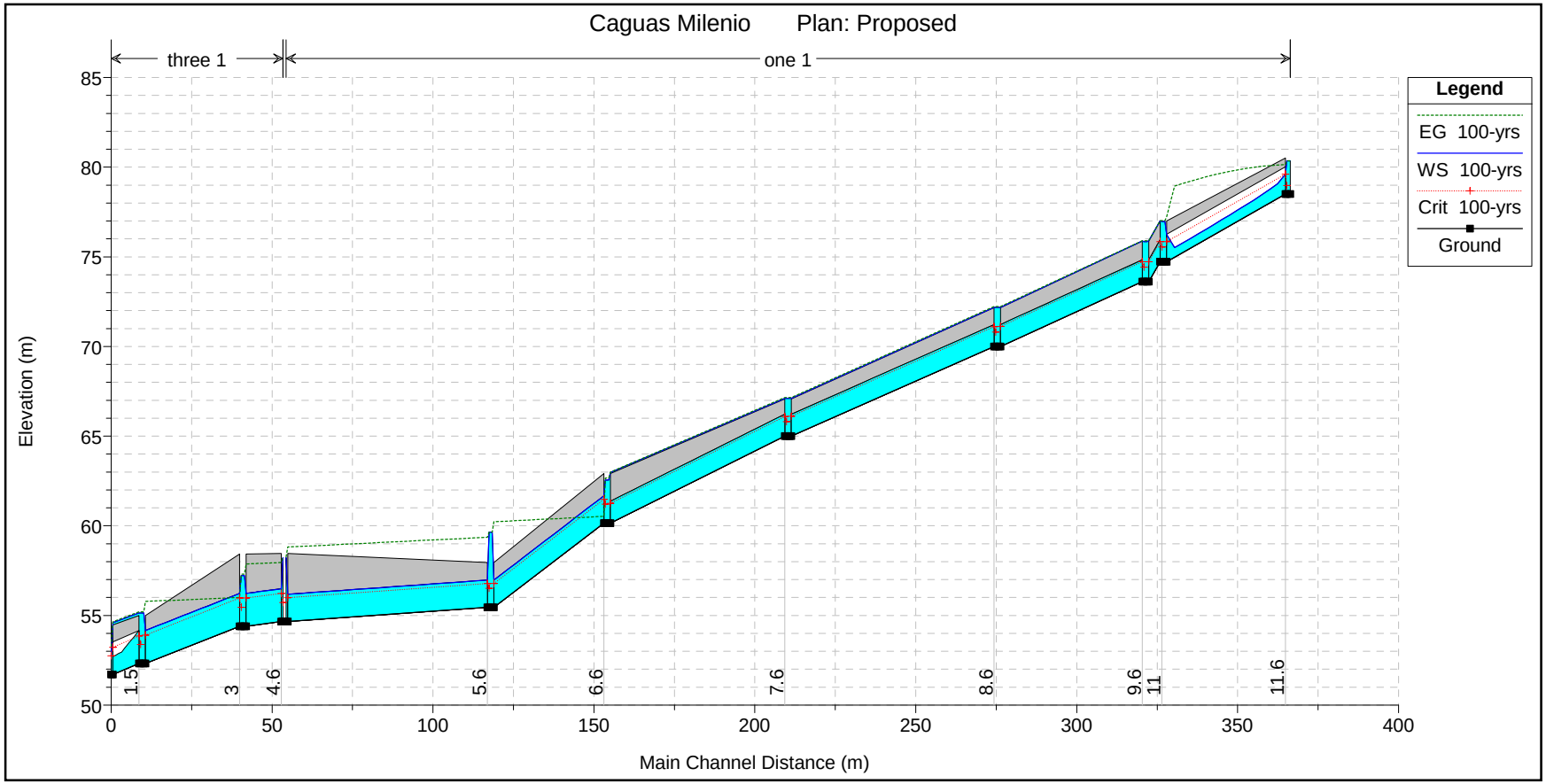
Reach	River Sta.	Left	Channel	Right
1	5	11.93	11.93	11.93
1	4.6	Culvert		
1	4.1	1	1	1
1	4	30.28	30.28	30.28
1	3	Culvert		
1	2.1	1	1	1
1	2	9.16	9.16	9.16
1	1.5	Culvert		
1	1	0	0	0

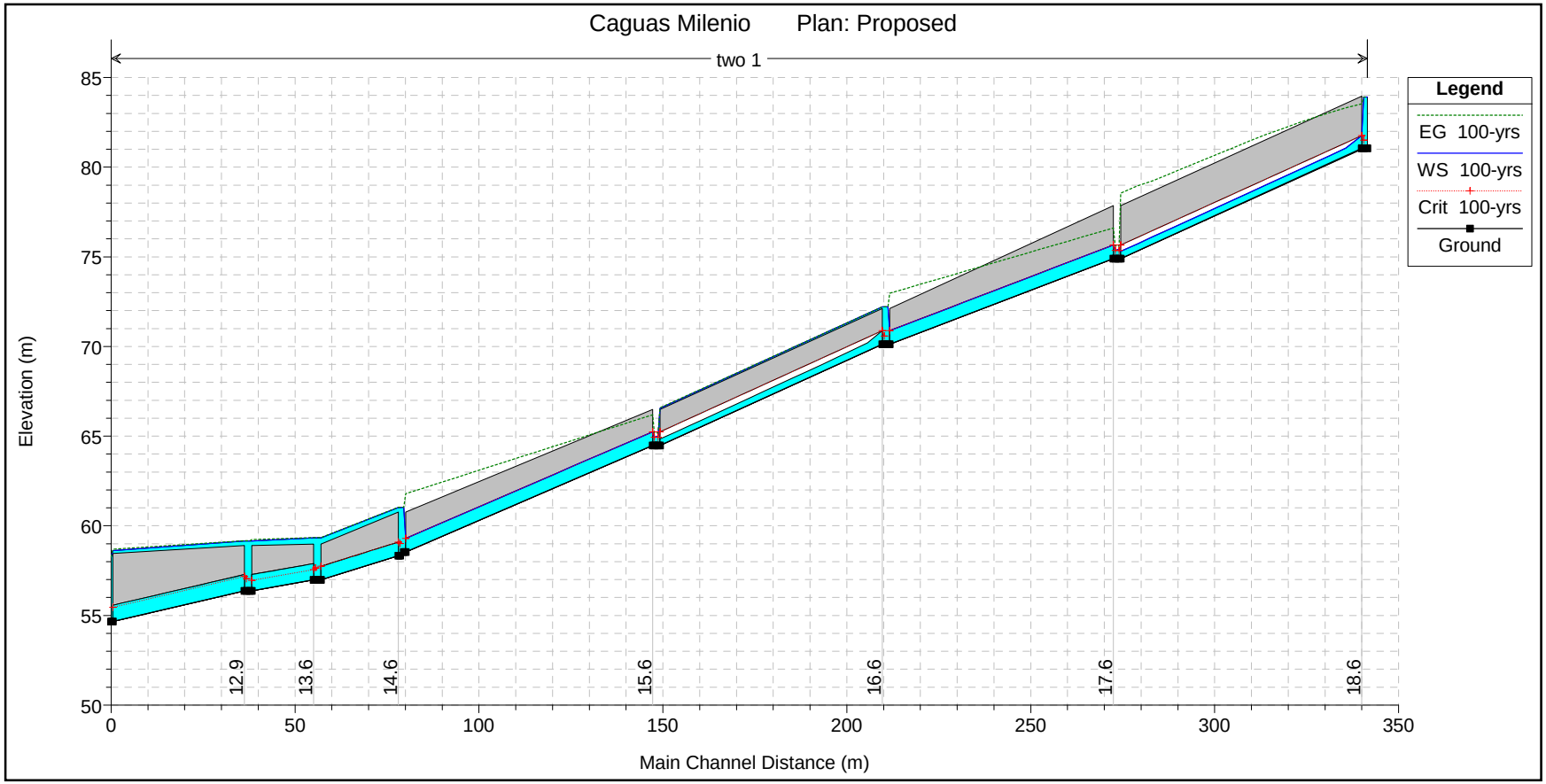
River: two

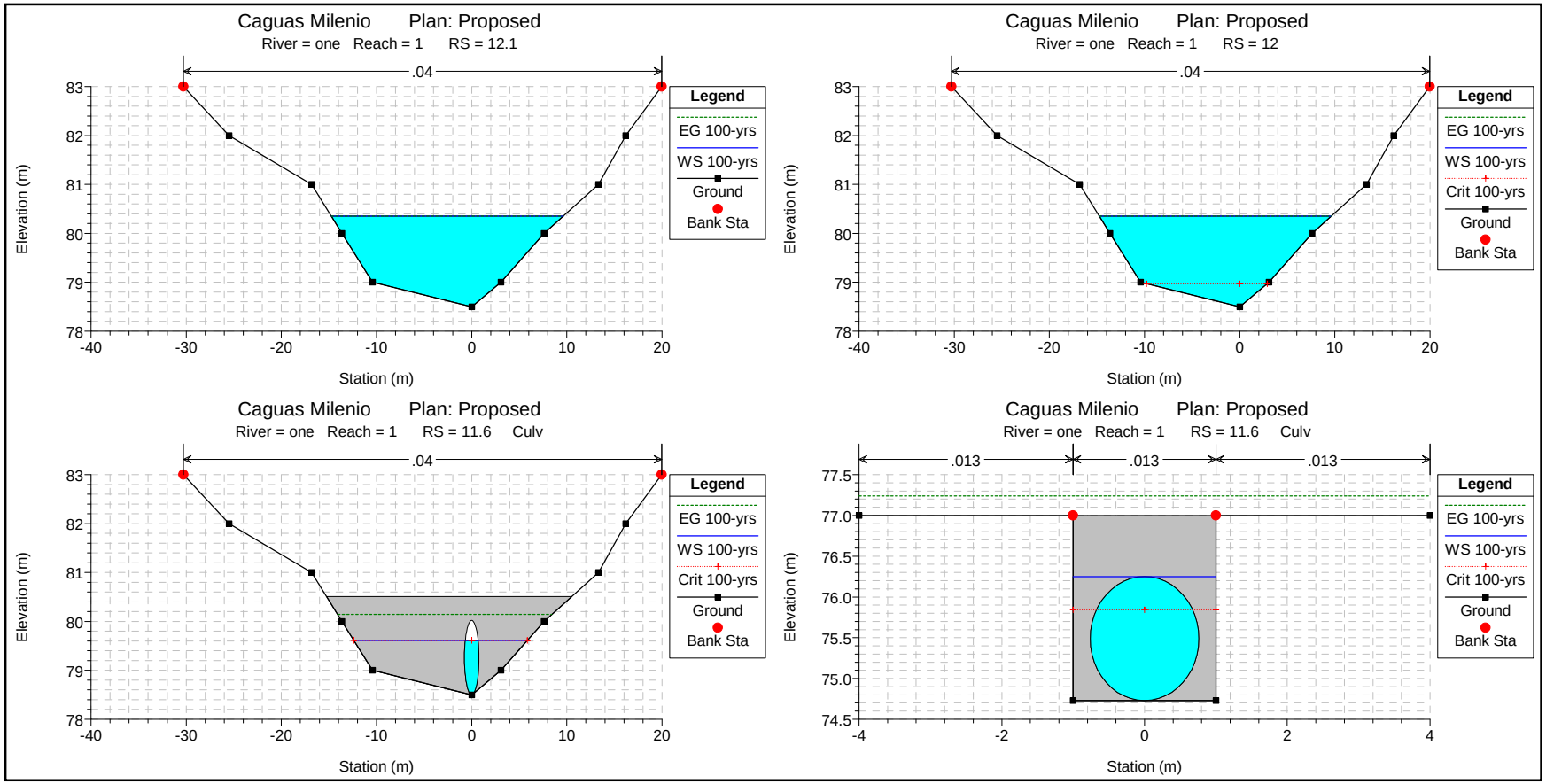
Reach	River Sta.	Left	Channel	Right
1	19.1	1	1	1
1	19	66.5	66.5	66.5
1	18.6	Culvert		
1	18.1	1	1	1
1	18	61.84	61.84	61.84
1	17.6	Culvert		
1	17.1	1	1	1
1	17	61.468	61.468	61.468
1	16.6	Culvert		
1	16.1	1	1	1
1	16	68.122	68.122	68.122
1	15.6	Culvert		
1	15.1	1	1	1
1	15	22	22	22
1	14.6	Culvert		
1	14.1	1	1	1
1	14	17.81	17.81	17.81
1	13.6	Culvert		
1	13.1	1	1	1
1	13	36.76	36.76	36.76
1	12.9	Culvert		
1	12.8	0	0	0

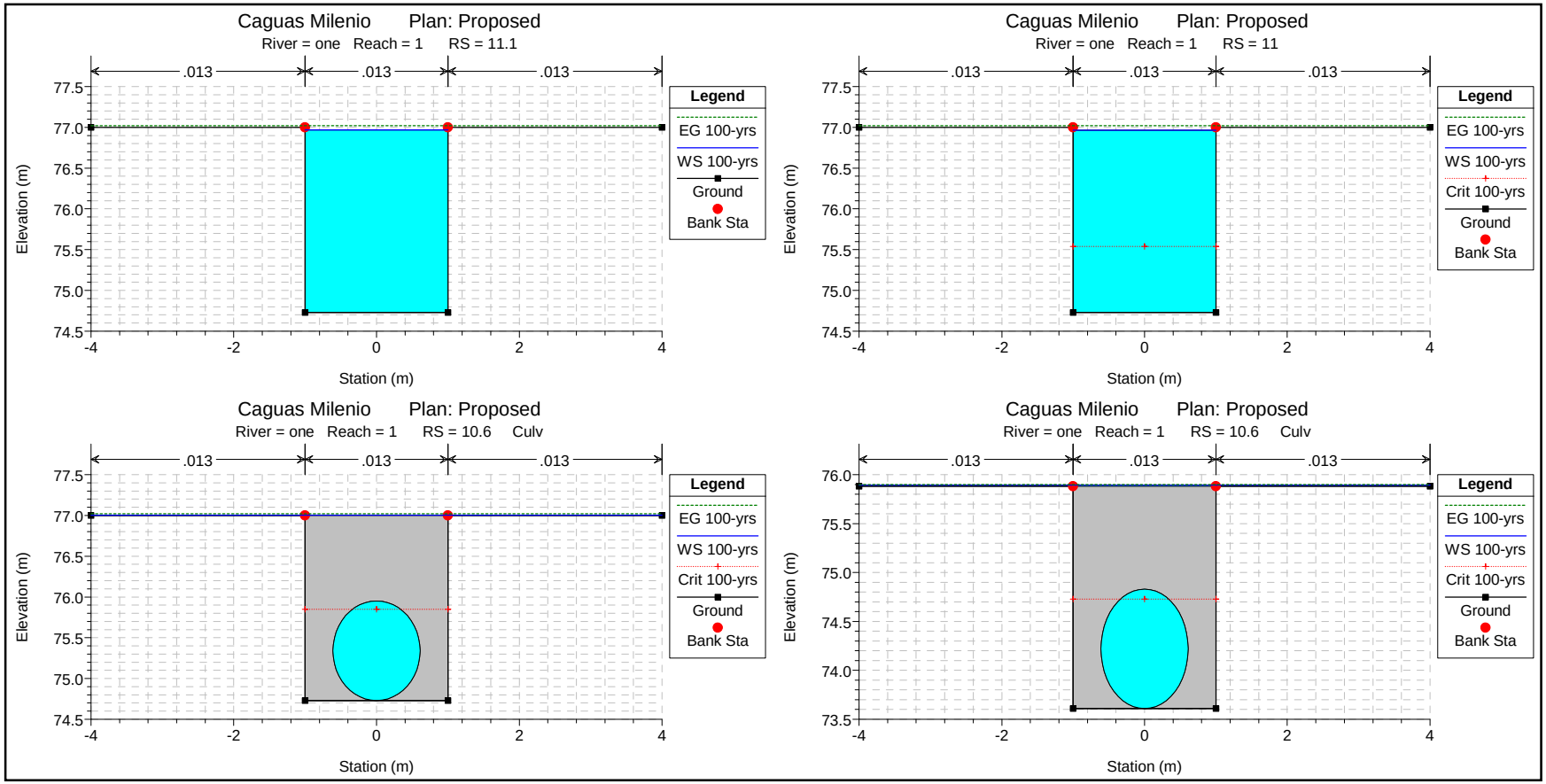
HEC-RAS Plan: Proposed River: one Reach: 1 Profile: 100-yrs

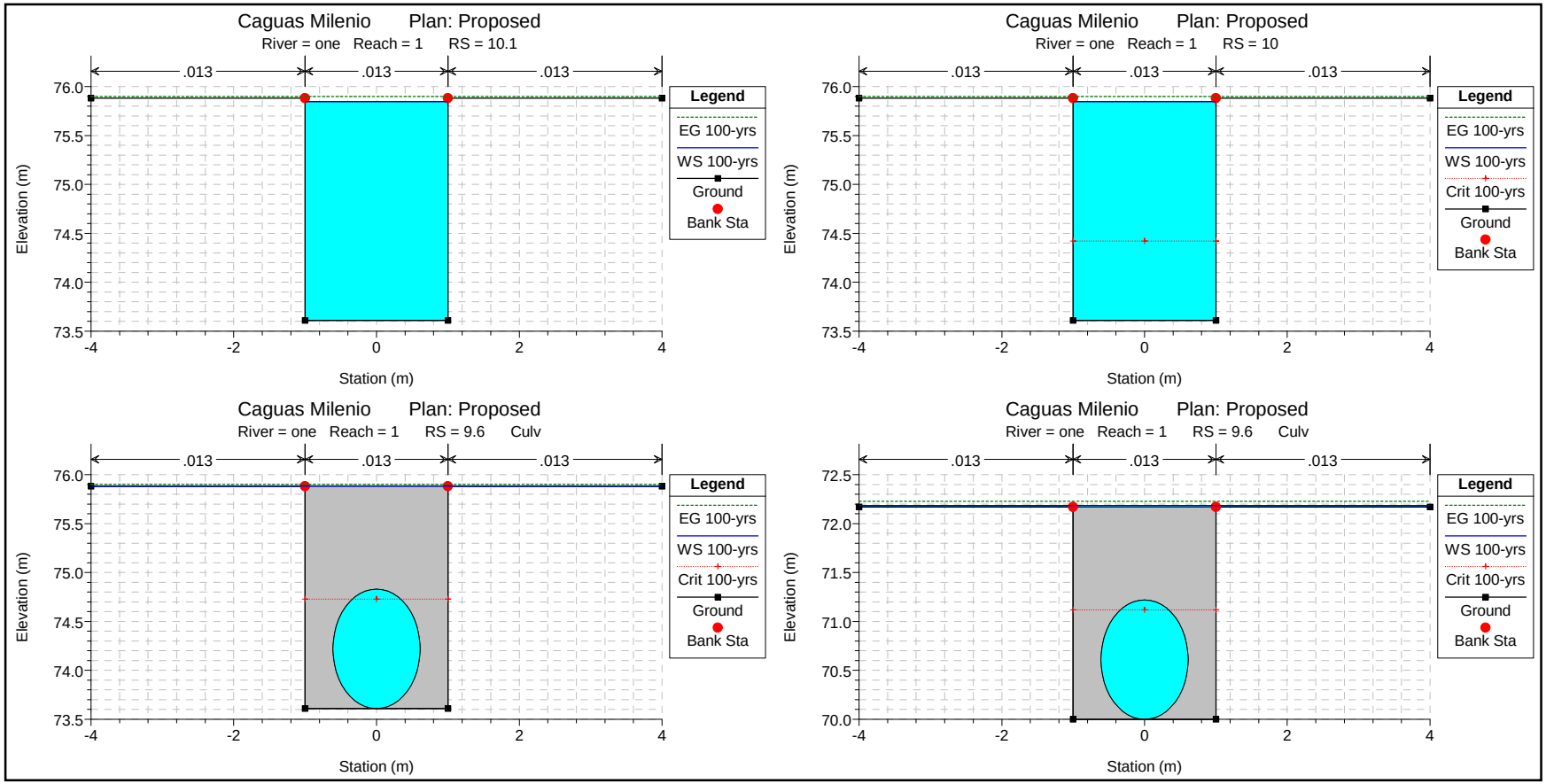
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(m3/s)	(m)	(m)	(m)	(m)	(m/m)	(m/s)	(m2)	(m)	
1	12.1	100-yrs	4.59	78.50	80.35		80.35	0.000	0.16	28.80	24.37	0.05
1	12	100-yrs	4.59	78.50	80.35	78.97	80.35	0.000	0.16	28.80	24.37	0.05
1	11.6		Culvert									
1	11.1	100-yrs	4.59	74.73	76.97		77.02	0.000	1.03	4.47	2.00	0.22
1	11	100-yrs	4.59	74.73	76.97	75.54	77.02	0.000	1.03	4.47	2.00	0.22
1	10.6		Culvert									
1	10.1	100-yrs	4.59	73.61	75.85		75.90	0.000	1.03	4.47	2.00	0.22
1	10	100-yrs	4.59	73.61	75.85	74.42	75.90	0.000	1.03	4.47	2.00	0.22
1	9.6		Culvert									
1	9.1	100-yrs	4.59	70.00	72.17		72.23	0.000	1.06	4.36	8.00	0.23
1	9	100-yrs	4.59	70.00	72.17	70.81	72.23	0.000	1.06	4.36	8.00	0.23
1	8.6		Culvert									
1	8.1	100-yrs	4.59	65.00	67.10		67.16	0.000	1.09	4.37	8.00	0.24
1	8	100-yrs	4.59	65.00	67.10	65.81	67.16	0.000	1.09	4.37	8.00	0.24
1	7.6		Culvert									
1	7.1	100-yrs	6.86	60.15	62.56		62.66	0.001	1.42	4.82	2.00	0.29
1	7	100-yrs	6.86	60.15	62.56	61.21	62.66	0.001	1.42	4.81	2.00	0.29
1	6.6		Culvert									
1	6.1	100-yrs	6.86	55.45	59.64		59.65	0.000	0.38	18.55	8.00	0.06
1	6	100-yrs	6.86	55.45	59.64	56.51	59.65	0.000	0.38	18.55	8.00	0.06
1	5.6		Culvert									
1	5.1	100-yrs	6.86	54.66	58.22		58.27	0.000	0.96	7.13	2.00	0.16

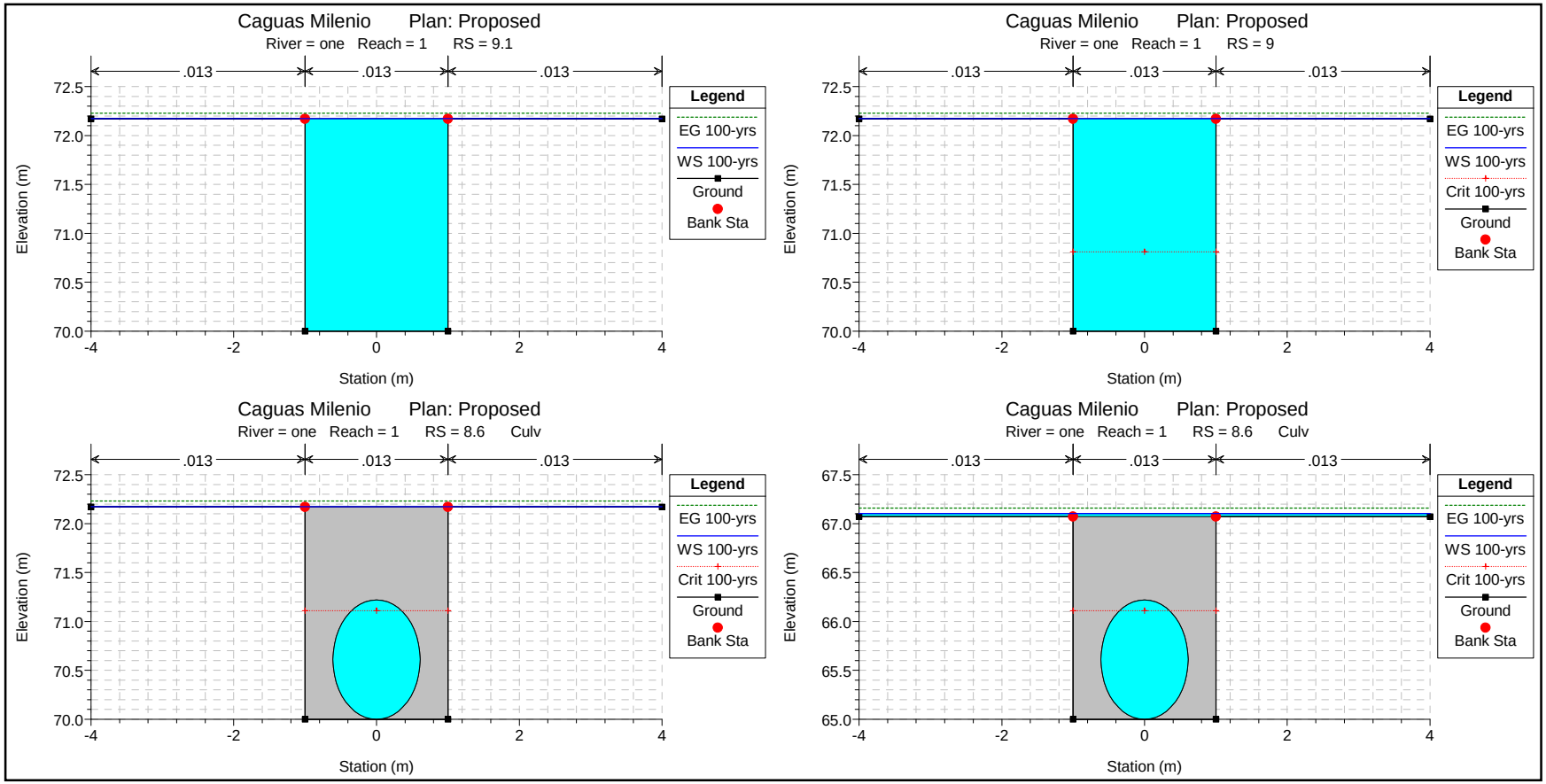

Caguas Milenio Plan: Proposed
three 1
one 1
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Elevation (m)
Main Channel Distance (m)
85
80
75
70
65
60
55
50
0
50
100
150
200
250
300
350
400
1.5
3
4.6
5.6
6.6
7.6
8.6
9.6
11
11.6

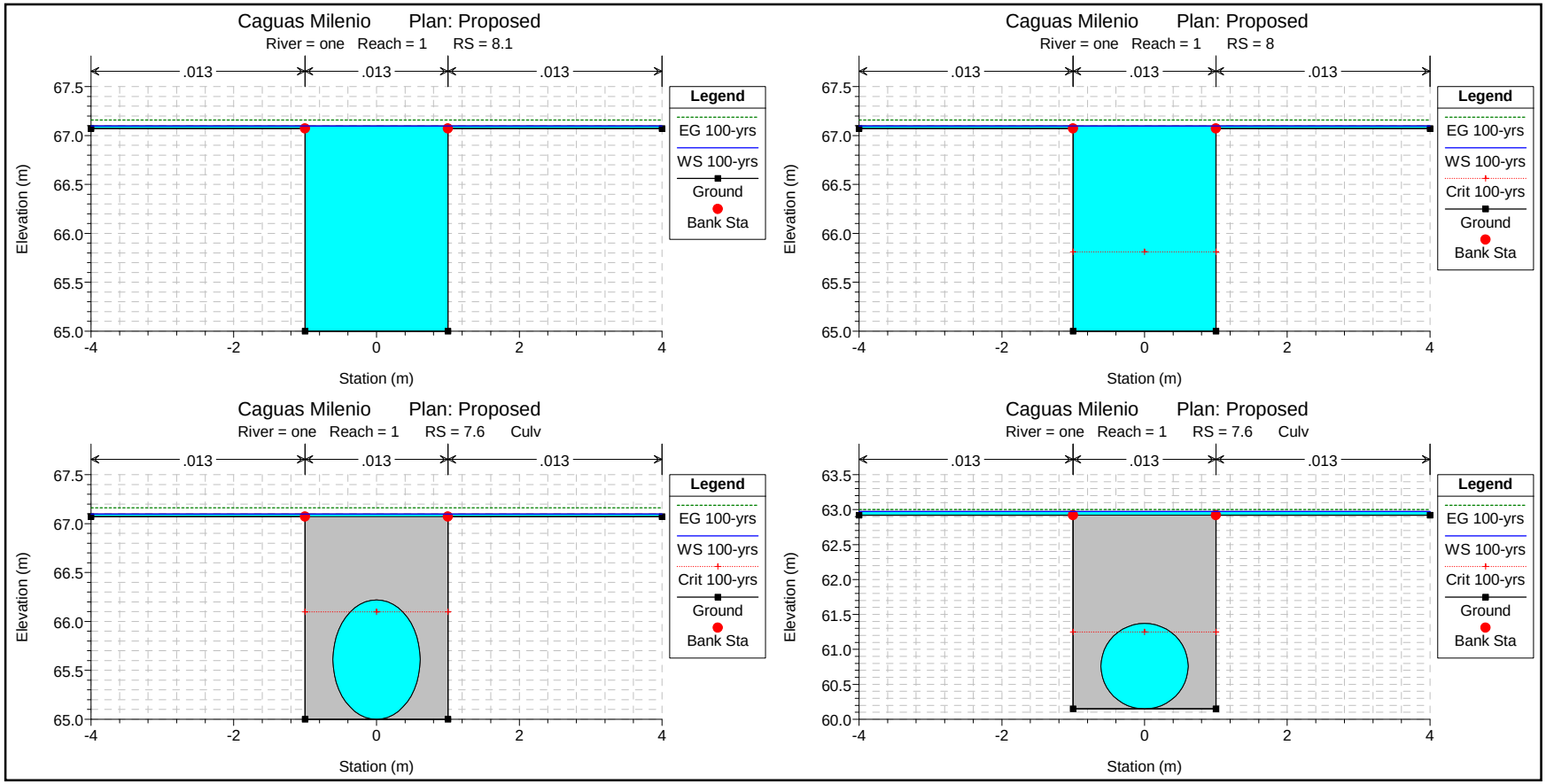

Caguas Milenio Plan: Proposed
two 1
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Elevation (m)
Main Channel Distance (m)
85
80
75
70
65
60
55
50
0
50
100
150
200
250
300
350
12.9
13.6
14.6
15.6
16.6
17.6
18.6

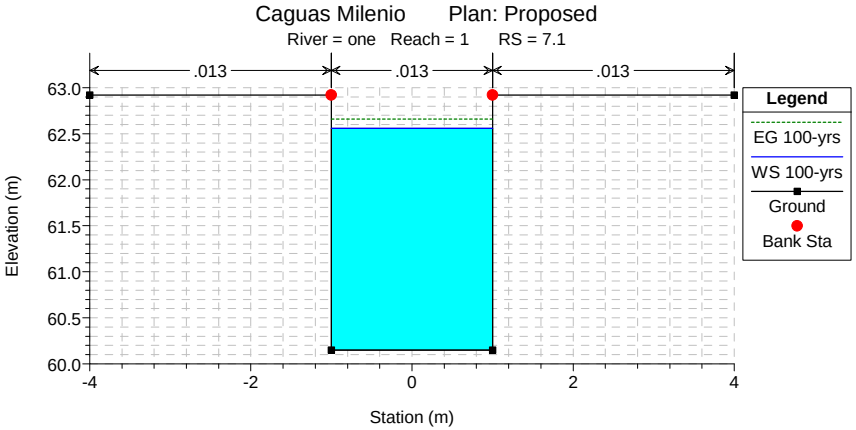

Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 12.1
.04
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Ground
Bank Sta
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 12
.04
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 11.6 Culv
.04
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 11.6 Culv
.013
.013
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta

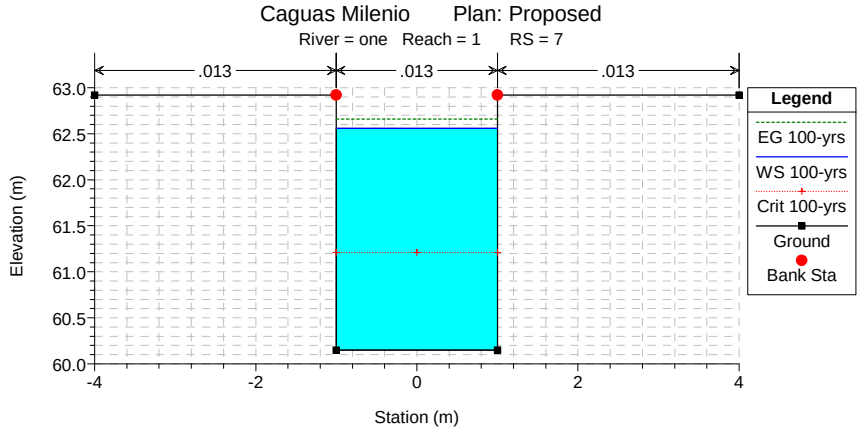

Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 11.1
.013 .013 .013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Ground
Bank Sta
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 11
.013 .013 .013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 10.6 Culv
.013 .013 .013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 10.6 Culv
.013 .013 .013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta

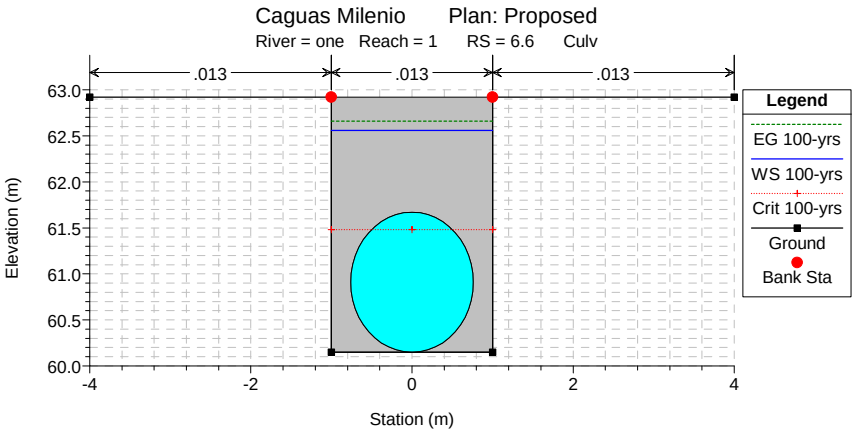

Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 10.1
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 10
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 9.6 Culv
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 9.6 Culv
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta

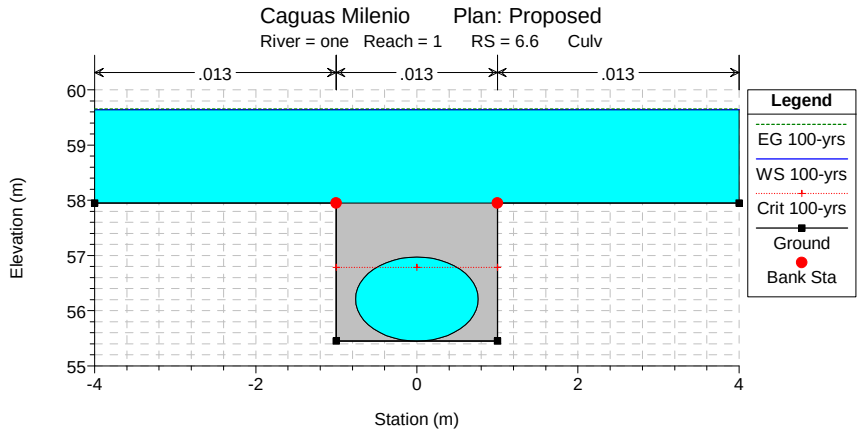

Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 9.1
.013 .013 .013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Ground
Bank Sta
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 9
.013 .013 .013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 8.6 Culv
.013 .013 .013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 8.6 Culv
.013 .013 .013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta

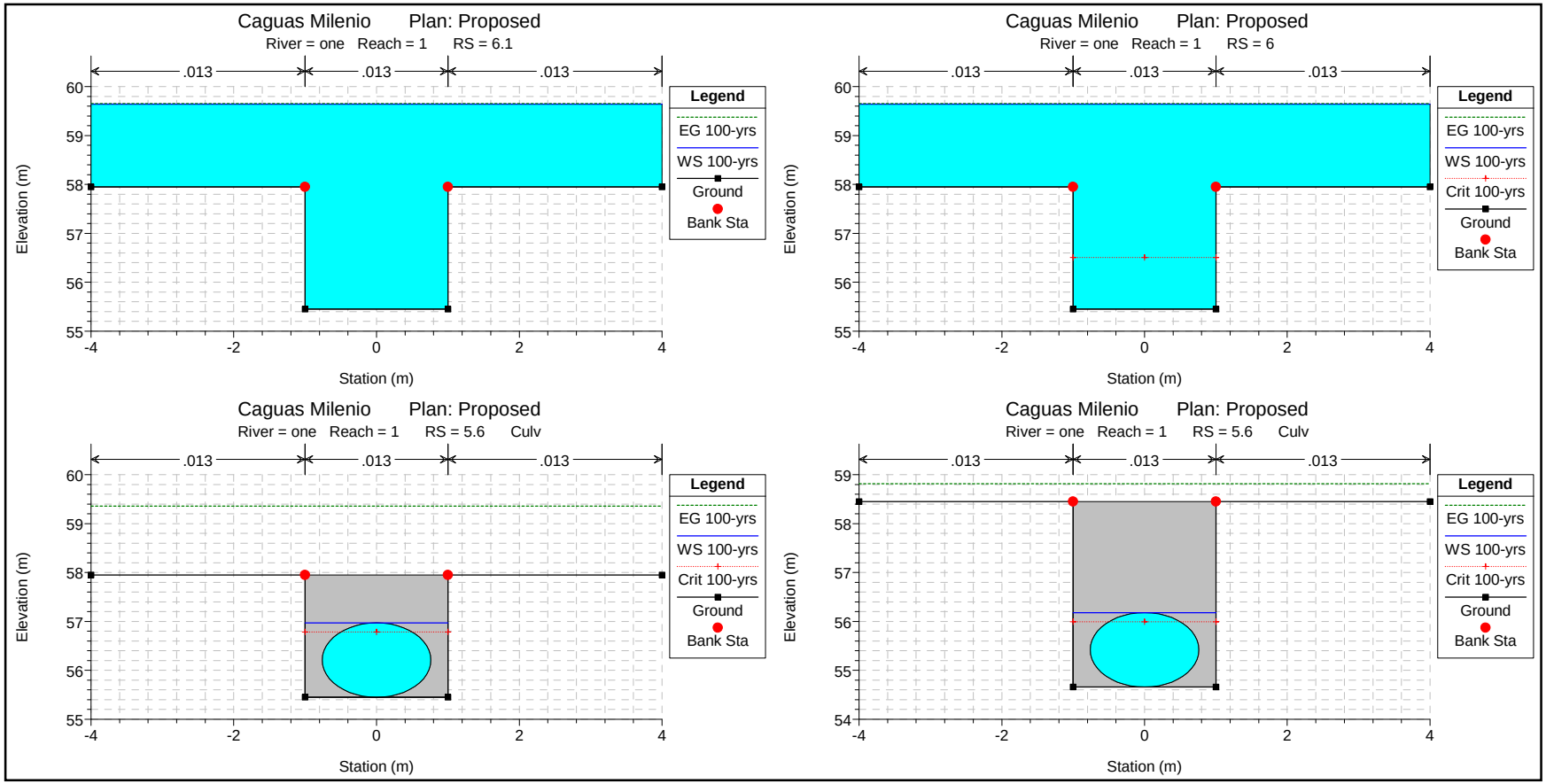

Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 8.1
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 8
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 7.6 Culv
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 7.6 Culv
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta

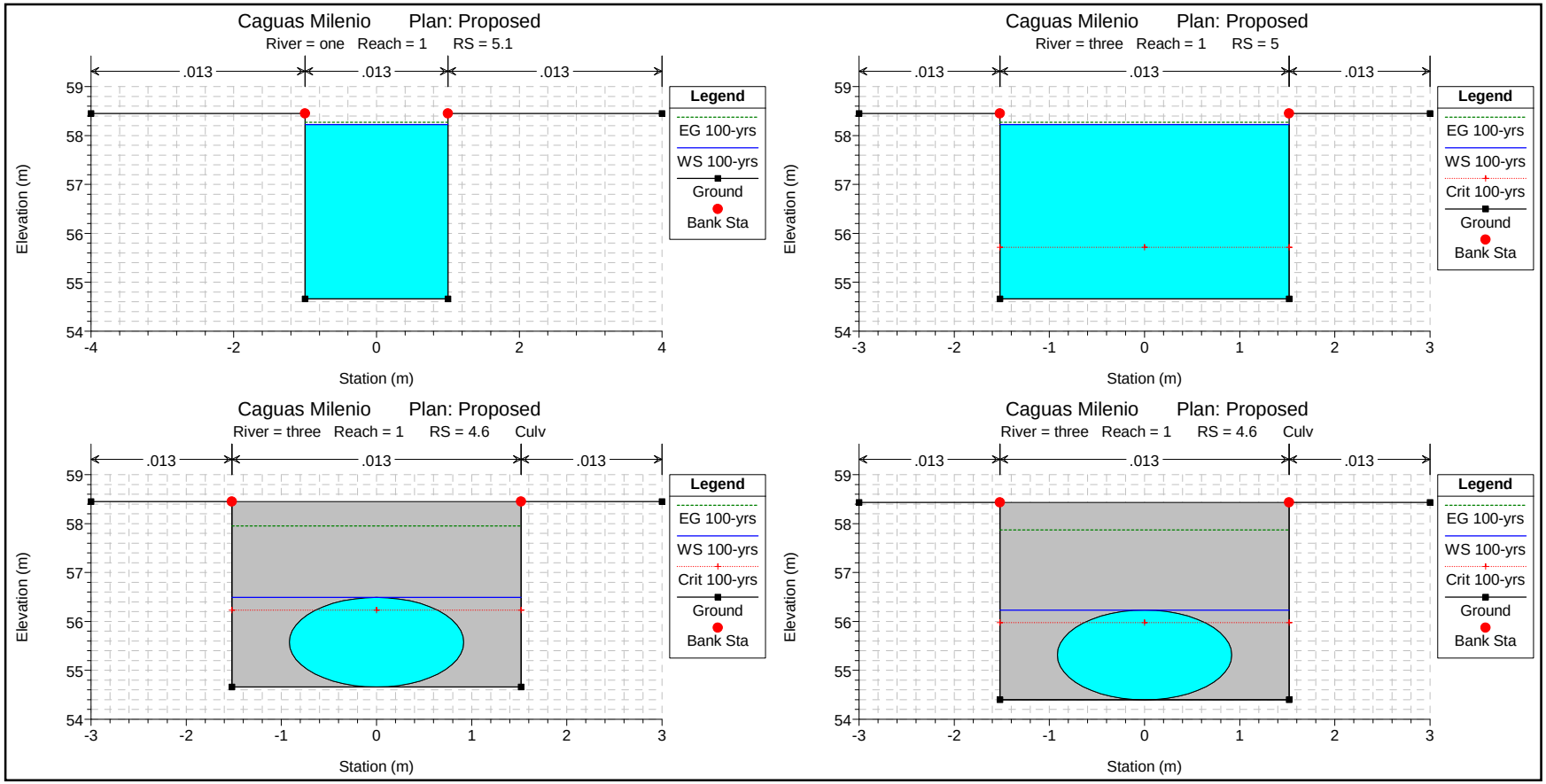

Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 7.1
.013
.013
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Ground
Bank Sta

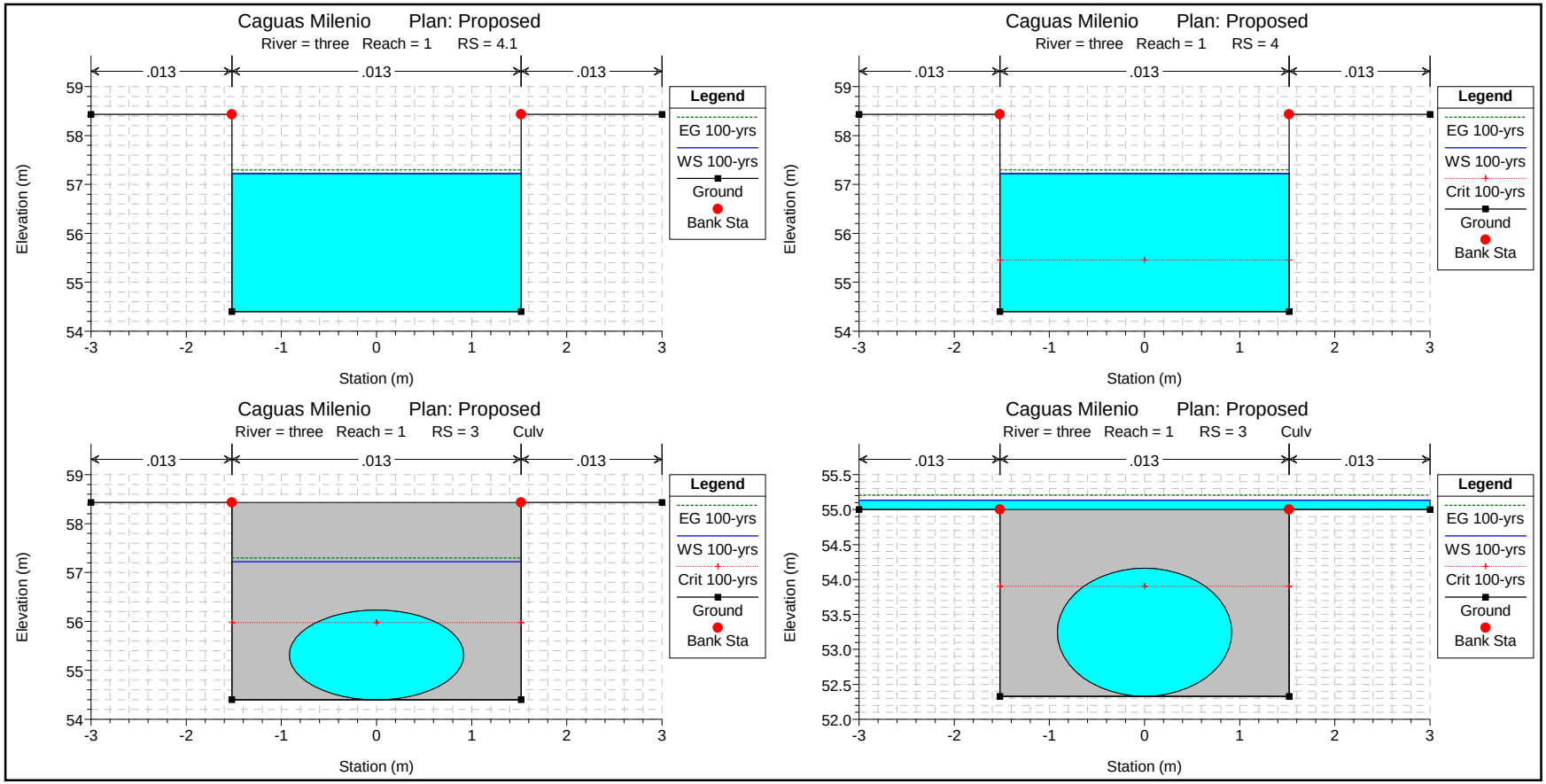

Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 7
.013
.013
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta

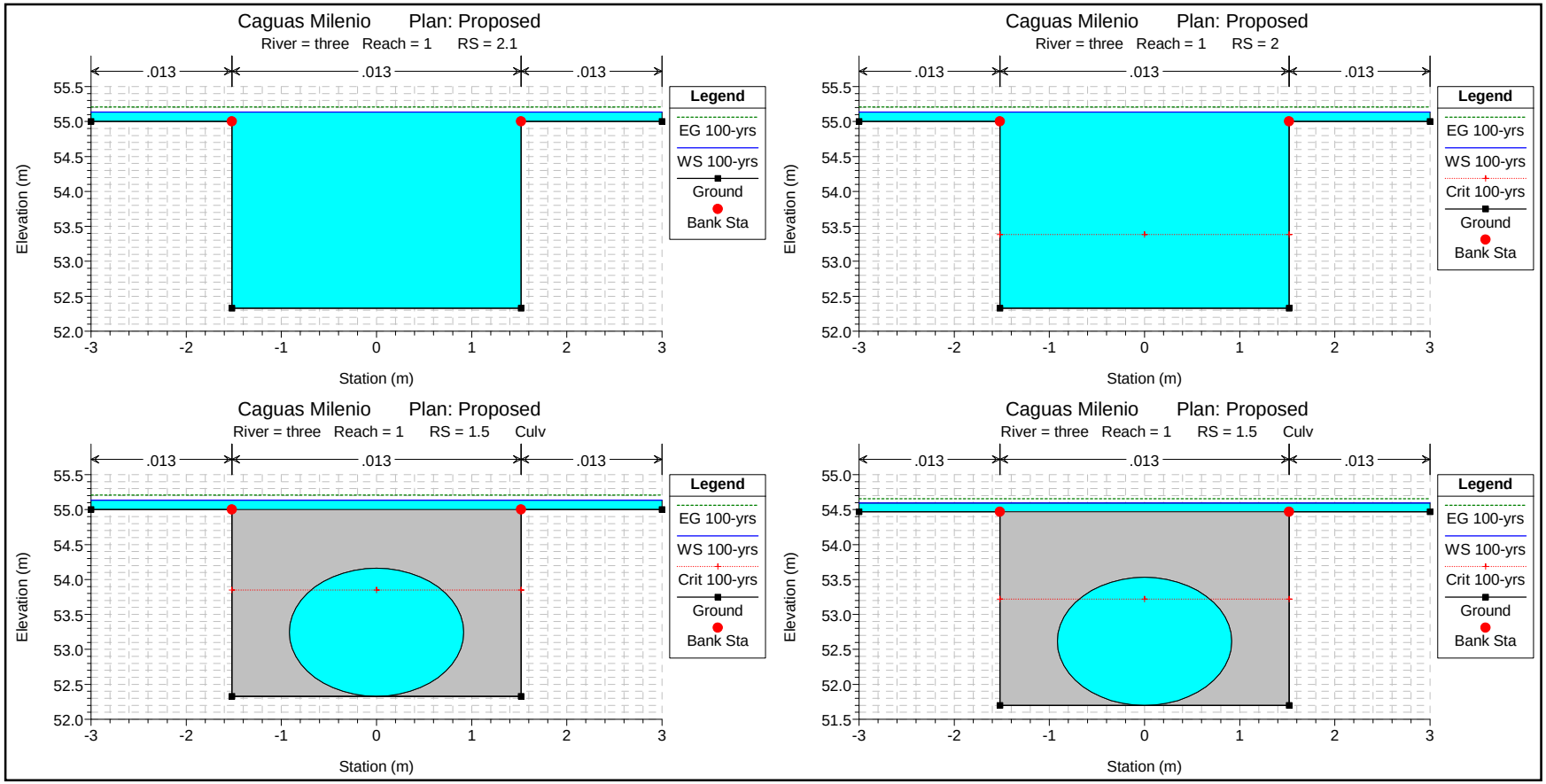

Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 6.6 Culv
.013
.013
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta

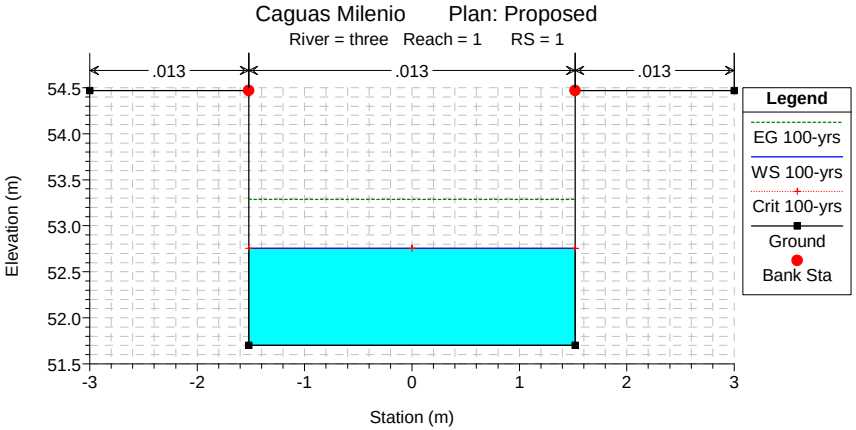

Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 6.6 Culv
.013
.013
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta

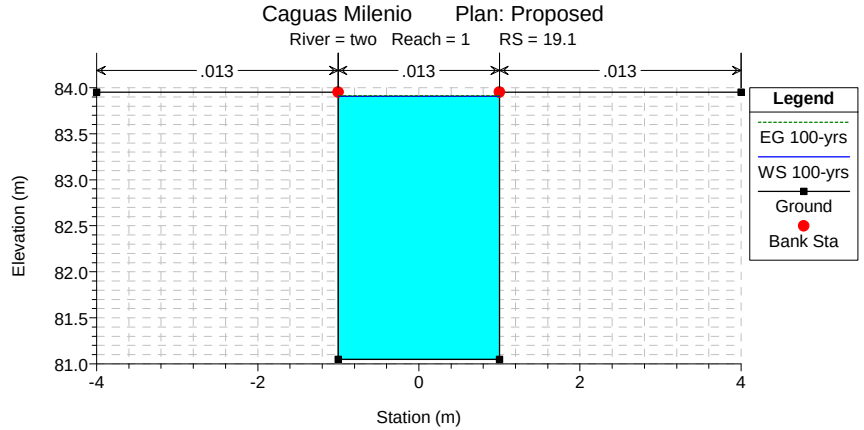

Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 6.1
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 6
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 5.6 Culv
Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 5.6 Culv
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta

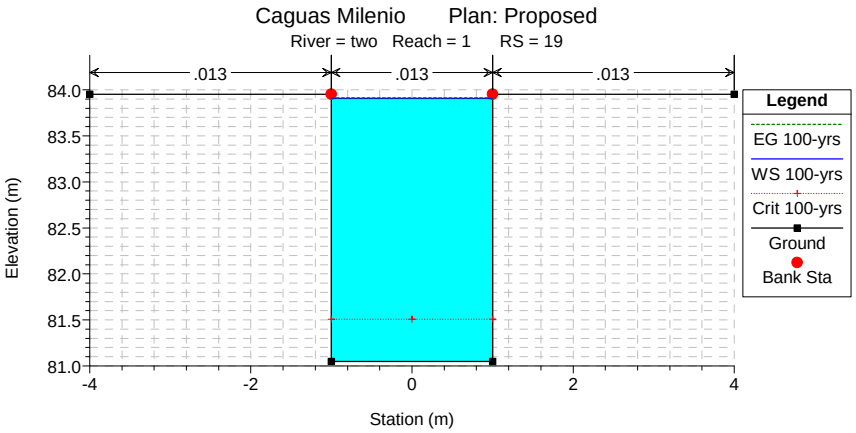

Caguas Milenio Plan: Proposed
River = one Reach = 1 RS = 5.1
Caguas Milenio Plan: Proposed
River = three Reach = 1 RS = 5
Caguas Milenio Plan: Proposed
River = three Reach = 1 RS = 4.6 Culv
Caguas Milenio Plan: Proposed
River = three Reach = 1 RS = 4.6 Culv
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta

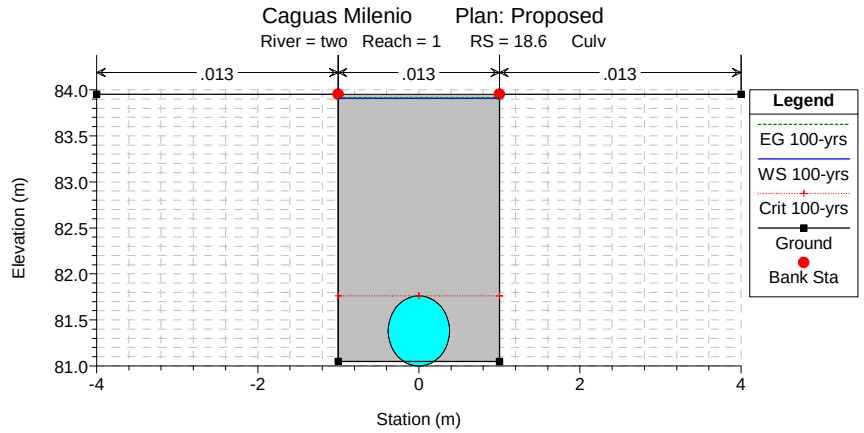

Caguas Milenio Plan: Proposed
River = three Reach = 1 RS = 4.1
Caguas Milenio Plan: Proposed
River = three Reach = 1 RS = 4
Caguas Milenio Plan: Proposed
River = three Reach = 1 RS = 3 Culv
Caguas Milenio Plan: Proposed
River = three Reach = 1 RS = 3 Culv
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta

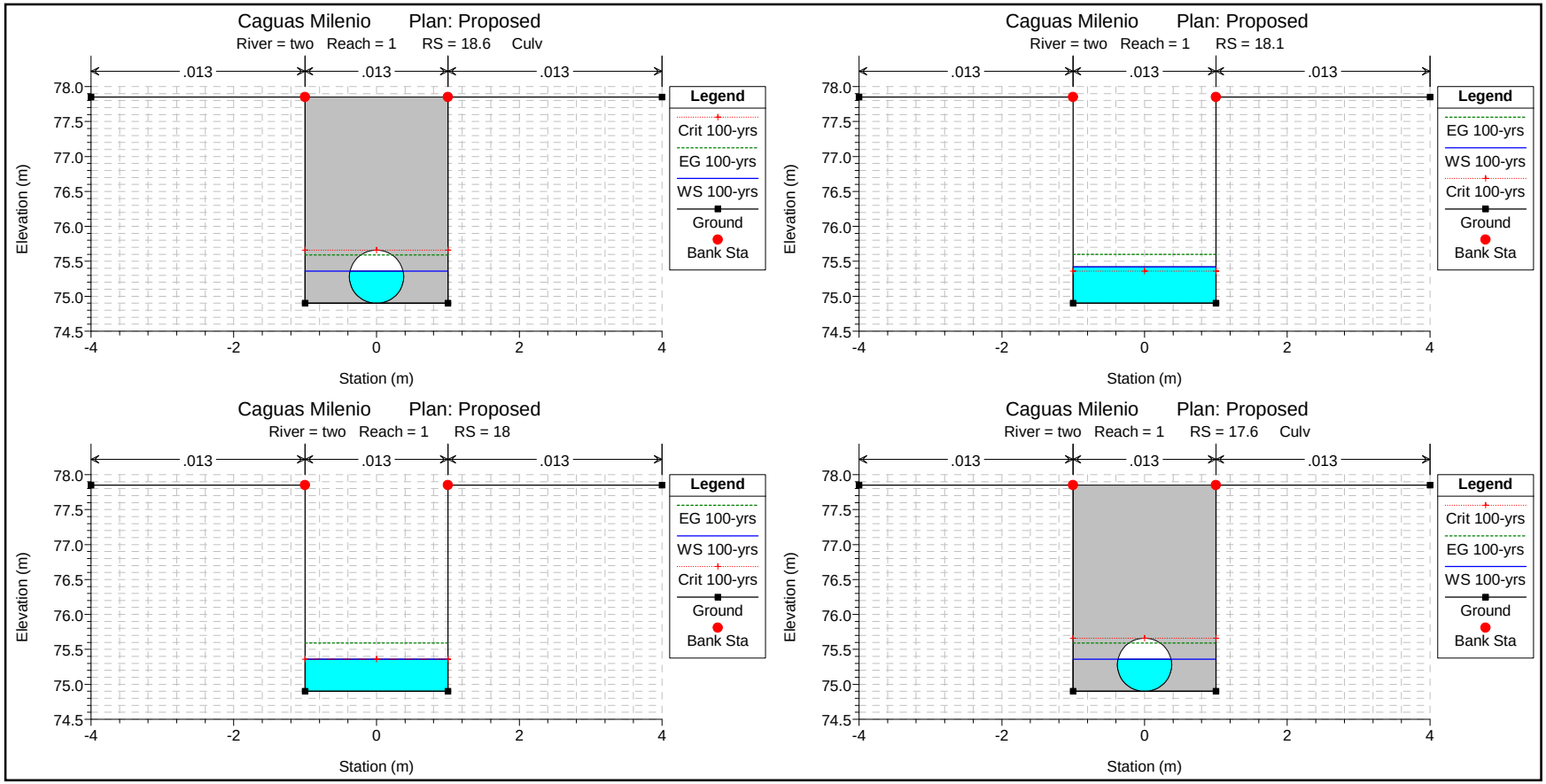

Caguas Milenio Plan: Proposed
River = three Reach = 1 RS = 2.1
Caguas Milenio Plan: Proposed
River = three Reach = 1 RS = 2
Caguas Milenio Plan: Proposed
River = three Reach = 1 RS = 1.5 Culv
Caguas Milenio Plan: Proposed
River = three Reach = 1 RS = 1.5 Culv
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta

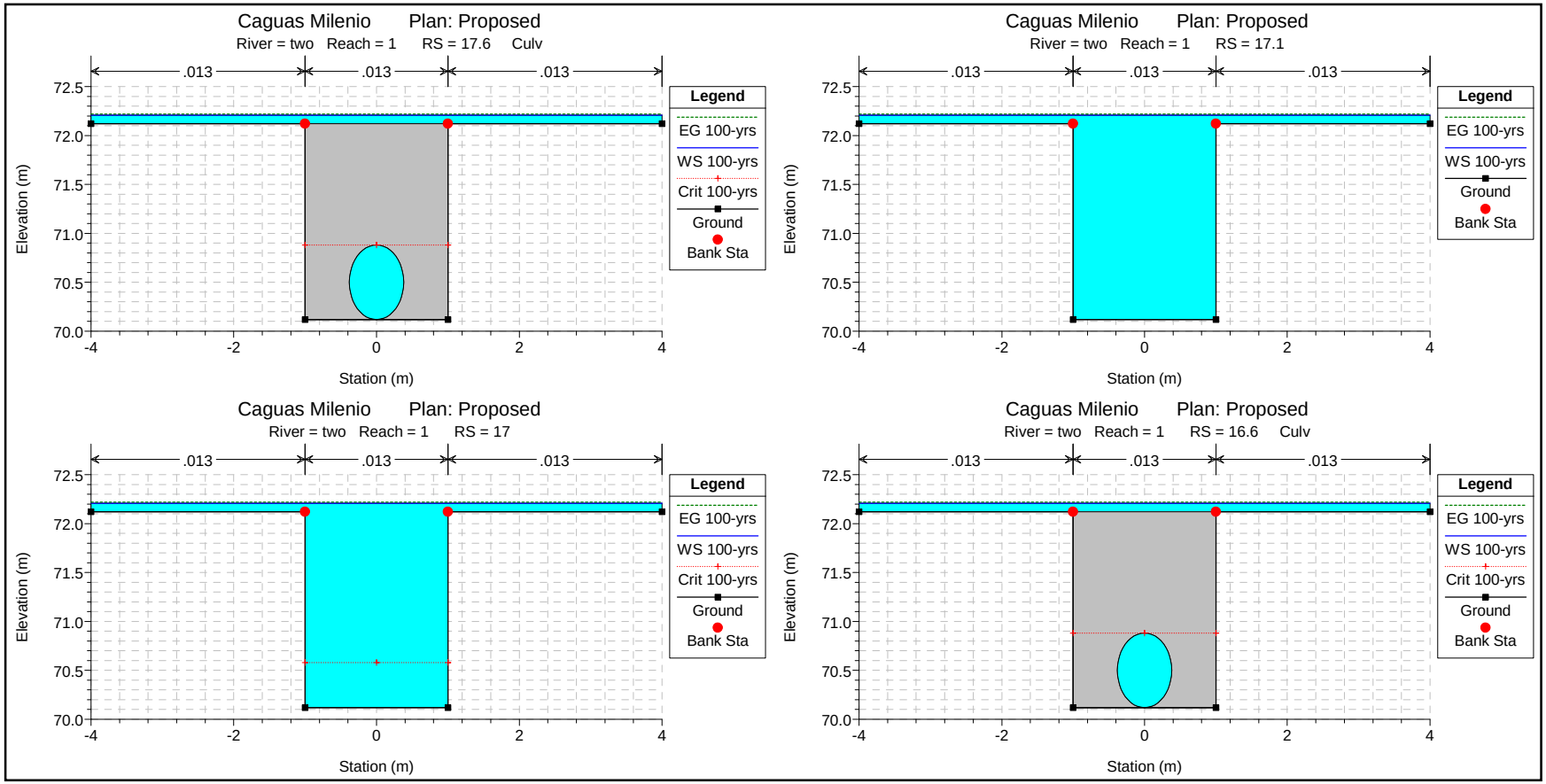

Caguas Milenio Plan: Proposed
River = three Reach = 1 RS = 1
.013
.013
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta

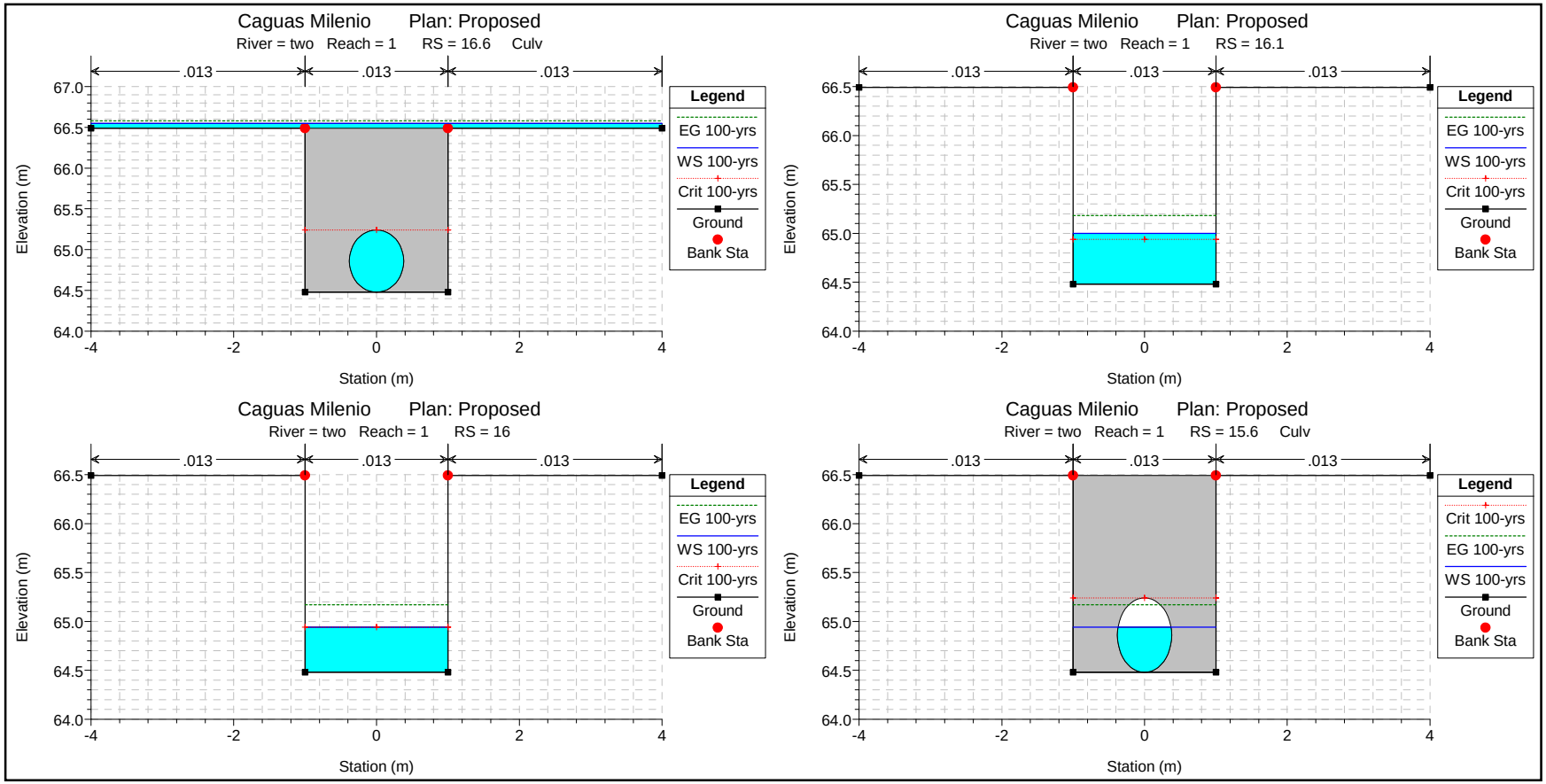

Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 19.1
.013
.013
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Ground
Bank Sta

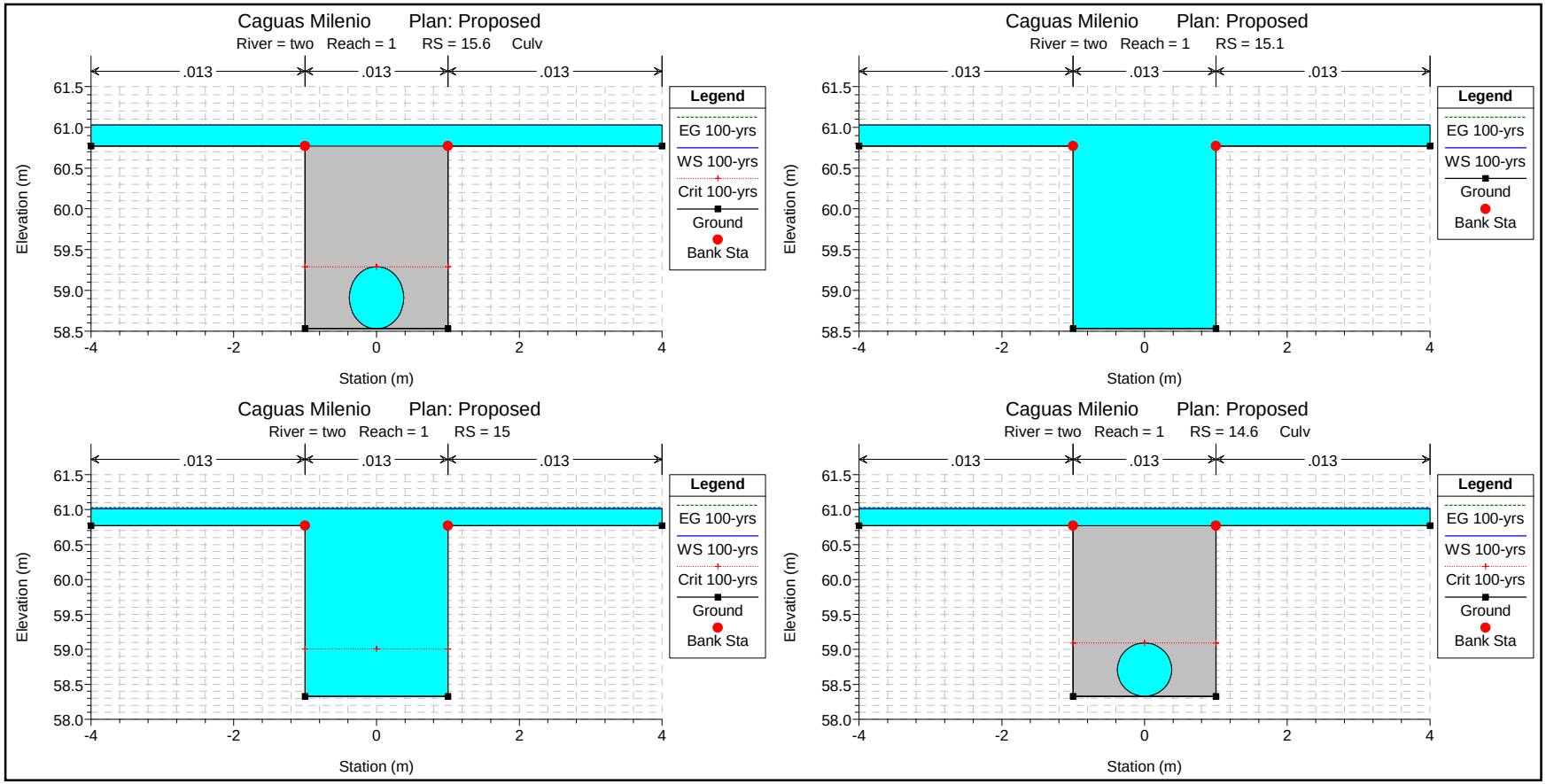

Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 19
.013
.013
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta

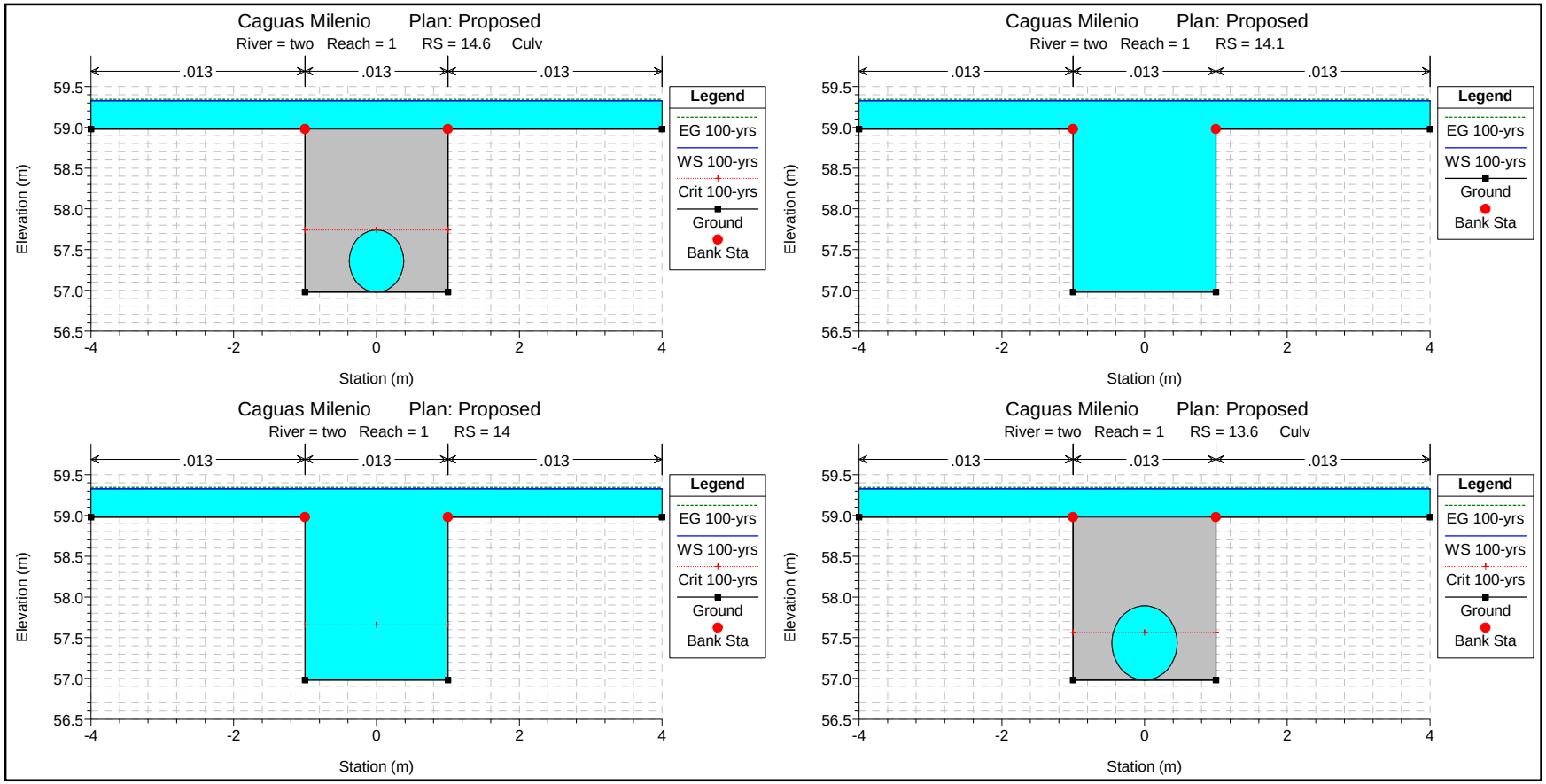

Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 18.6 Culv
.013
.013
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta

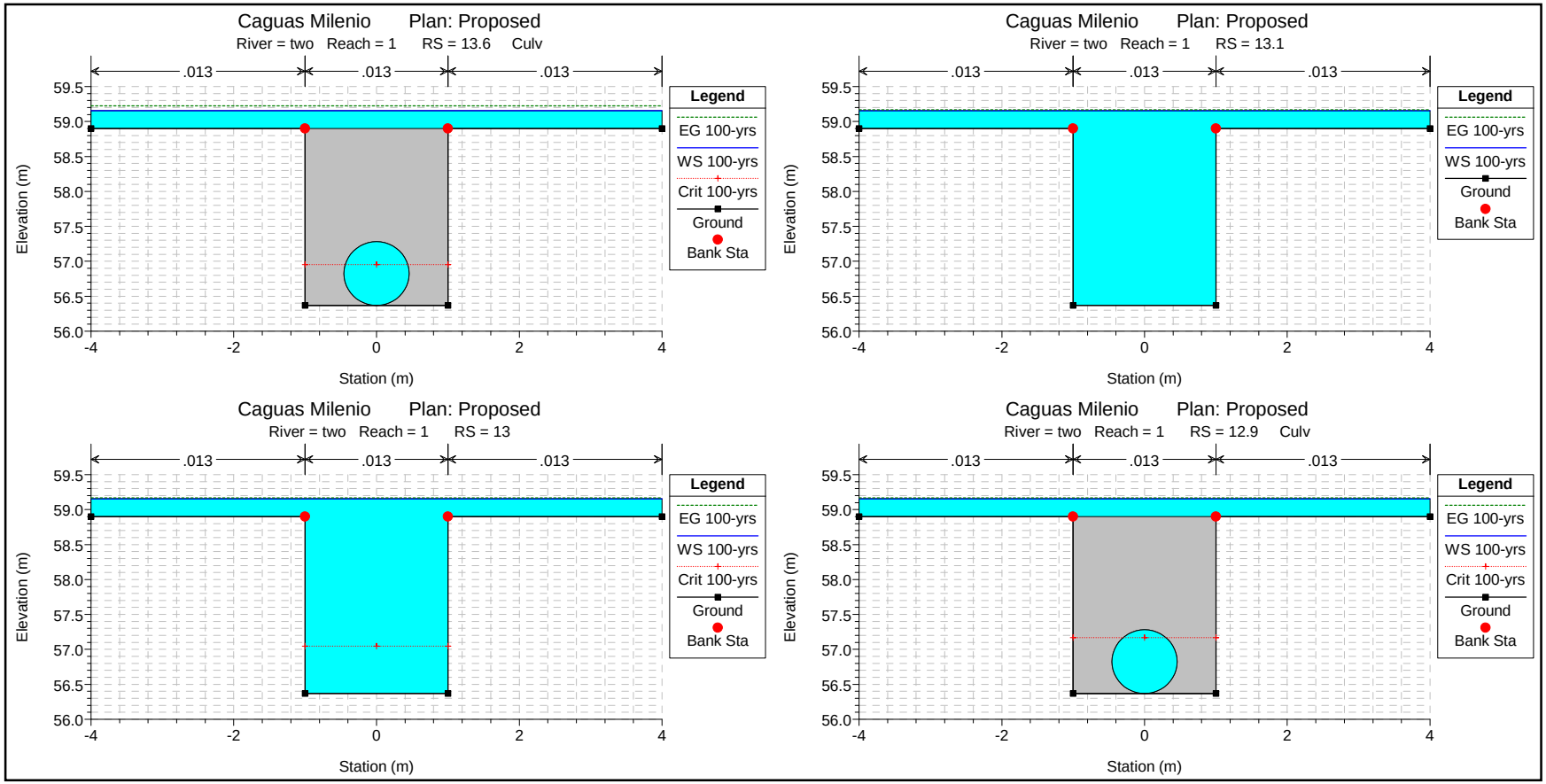

Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 18.6 Culv
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 18.1
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 18
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 17.6 Culv
.013
Elevation (m)
Station (m)
Legend
Crit 100-yrs
EG 100-yrs
WS 100-yrs
Ground
Bank Sta

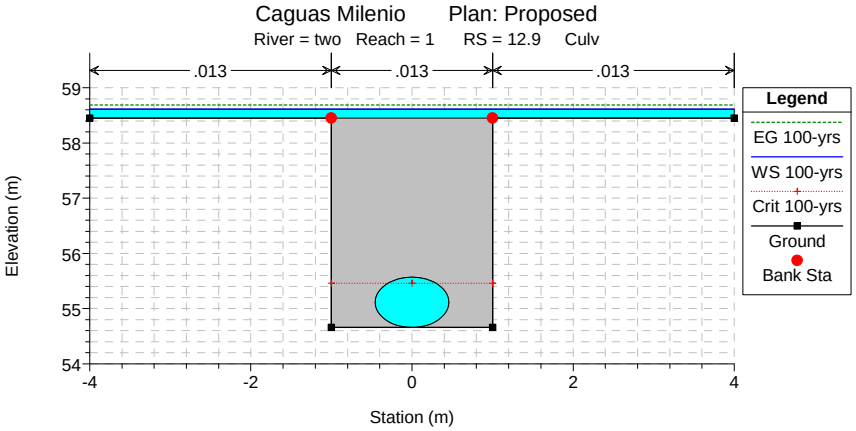

Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 17.6 Culv
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 17.1
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 17
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 16.6 Culv
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta

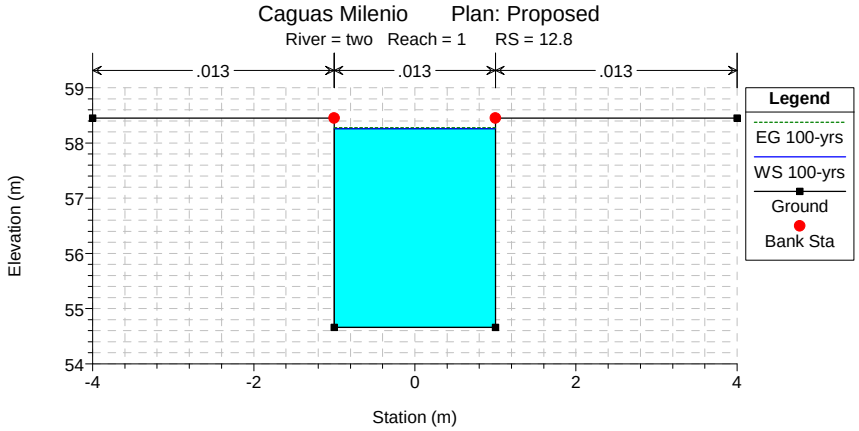

Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 16.6 Culv
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 16.1
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 16
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 15.6 Culv
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta


Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 15.6 Culv
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 15.1
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 15
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 14.6 Culv
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta


Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 14.6 Culv
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 14.1
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 14
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 13.6 Culv
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta


Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 13.6 Culv
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 13.1
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 13
Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 12.9 Culv
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta


Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 12.9 Culv
.013
.013
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Crit 100-yrs
Ground
Bank Sta


Caguas Milenio Plan: Proposed
River = two Reach = 1 RS = 12.8
.013
.013
.013
Elevation (m)
Station (m)
Legend
EG 100-yrs
WS 100-yrs
Ground
Bank Sta

APPENDIX G

FIELD WORK

APPENDIX F

COPY OF THE DRNA LETTER OF ENDORSEMENT

Estado Libre Asociado de Puerto Ric
Departamento de Recursos Naturales y Ambientales

DEC 2 8 2007

ING CASIANO ANCALLE
CA ENGINEERING
PO BOX 190332
SAN JUAN PR 00919-0332

Estimado ingeniero Ancalle:

Estudio Hidrológico-Hidráulico
Caguas Milenio
PR-796
Bo. Bairoa, Caguas

O-HH-EJP07-SJ-00538-05092007

Hemos evaluado el estudio de referencia preparado por usted en noviembre de 2007. Se propone la construcción de una estructura de detención para cumplir con el requisito de mitigación de escorrentías establecido en el Reglamento de Planificación #3, Sección 14.04. Además, se recomiendan en el estudio estructuras para manejar las escorrentías externas que discurren a través del predio objeto de desarrollo. El Departamento de Recursos Naturales y Ambientales (DRNA) no tiene objeción al estudio con la condición de que todas sus recomendaciones sean integradas en el diseño e implementadas durante la fase de construcción. Este endoso se limita al estudio hidrológico-hidráulico y no le exime de la obtención de cualquier permiso, autorización, concesión o franquicia del Departamento.

Este endoso es solamente aplicable a la situación de hechos y los datos según presentados y evaluados en el caso y el Secretario se reserva el derecho de reevaluar, variar o modificar el mismo en cualquier momento anterior a la emisión del permiso o la acción administrativa correspondiente por parte de la agencia solicitante o proponente cuando surja nueva información oficial específica estableciendo que el derecho aplicable o las condiciones ambientales en el predio han cambiado sustancialmente, o cuando el endoso original se emitió bajo premisas falsas o fraudulentas.

Las obras propuestas podrían requerir un permiso del Cuerpo de Ingenieros bajo la Sección 404 de la Ley de Agua Limpia, ya que puede haber una descarga de material en terrenos jurisdiccionales. También podría requerir un permiso de dicha entidad federal bajo la Sección 10 de la Ley de Ríos y Puertos, ya que las estructuras podrían afectar o estar en aguas jurisdiccionales.

P.O. Box 366147, San Juan, Puerto Rico 00936
Tel. (787) 999-2200

De descubrirse en el predio objeto de desarrollo algún cuerpo de agua superficial o subterráneo, sea perenne o intermitente, que no esté contemplado en este estudio deberá informarlo inmediatamente al DRNA y demás agencias concernidas. No informar hallazgos de este tipo así como las medidas de mitigación que se implantarán para proteger estos recursos naturales conllevará una revocación automática de la presente comunicación de no objeción y podrá ser base para acciones legales por parte del DRNA en los foros disponibles.

Cordialmente,

Javier Vélez Arocho
Secretario

JVA/AGV/GFS/IMC