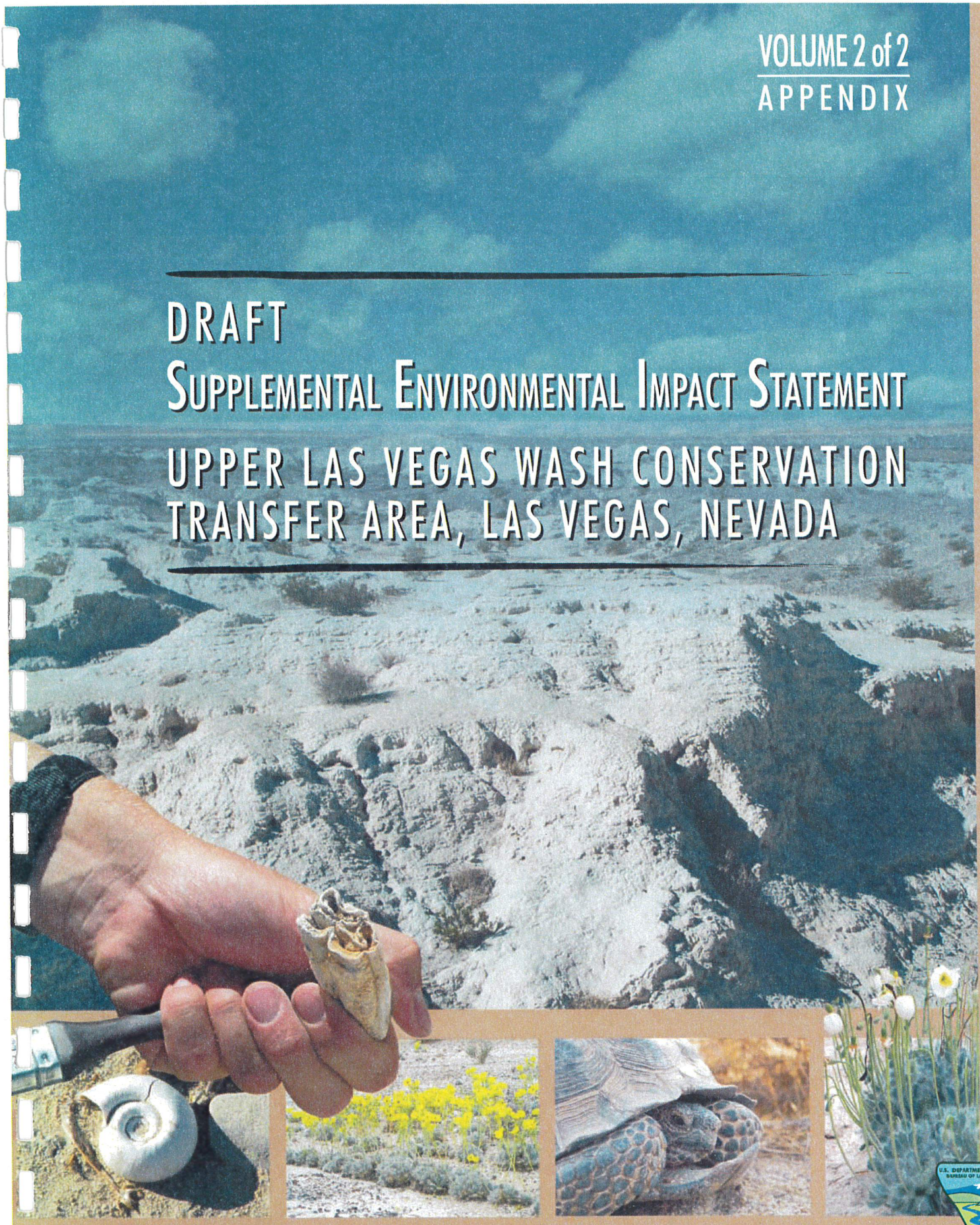
VOLUME 2 of 2

APPENDIX

BLM

DRAFT
SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT
UPPER LAS VEGAS WASH CONSERVATION TRANSFER AREA, LAS VEGAS, NEVADA



November 2009

Appendix A

BEST MANAGEMENT PRACTICES

BEST MANAGEMENT PRACTICES

BMPs are management actions that have been developed by an agency, industry, and/or scientific community as methods for reducing environmental impacts to certain resources associated with certain kinds of activities. They have been developed by the Southern Nevada District Office specifically to guide future management of the CTA. Additionally, the revised 1994 edition of the *Handbook of Best Management Practices,* adopted by the Nevada State Environmental Commission, can be used as applicable.

BMPs typically are implemented at the discretion of the BLM Authorized Officer at the activity plan or project-specific level. Depending on the specific project and types of anticipated disturbances, BMPs may not be appropriate to apply in all cases. The BMPs identified here will be used to guide the development of the Conservation Strategy Agreement, revisions to the Las Vegas RMP, and individual land use authorizations to provide for long-term protection of sensitive resources within the CTA.

Soil Resources

- Use specialized low-surface impact equipment (e.g., vehicles with balloon tires) for off-road access, where travel on foot is not feasible, in order to protect fragile soils and other resource values.
- Salvage and reapply topsoil from construction activities as appropriate during reclamation.
- Comply with county, state, and federal standards for implementation of erosion controls. Apply appropriate erosion control practices, such as silt fences and check dams, near disturbed areas where appropriate.
- Identify areas that need to be avoided in the CTA to protect the LVF, sensitive plant habitat, and wash resources.
- Restore human-caused disturbances to soils in order to prevent habitat fragmentation, soil erosion, and loss of nutrients.
- Use native species in restoration to stabilize surfaces.
- Avoid soil disturbance in Las Vegas buckwheat, Las Vegas bearpoppy, and Merriam's bearpoppy habitat in order to manage for sustainable natural populations.

Water Resources

- Design land uses to minimize disturbance to the ULVW.
- Design approved roadways to allow natural floodwaters from the alluvial fan between the Sheep Mountain and Las Vegas ranges and the ULVW to flow in a natural fashion; this could include elevating roads, creating appropriate dissipation structures with outflow phalanges, and installing porous pavement.
- Avoid modifying the ULVW, such as armoring (e.g., riprap), channeling, diversion structures, detention basins, etc., in the design and construction of new projects and land uses.
- Maintain natural ecosystem processes, including surface flows, wind/water erosion and deposition, and nutrient cycling, when designing projects.
- Protect natural drainages when considering land use authorizations. Land use authorizations, including recreational permits, should be designed to minimize impacts to wash resources.

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UNITED STATES DEPARTMENT OF THE INTERIOR
OFFICE OF HEARINGS AND APPEALS
INTERIOR BOARD OF LAND APPEALS

City of Las Vegas, Nevada, *et al.*
Appellants,
vs.
Bureau of Land Management,
Respondent.

IBLA No: 2012-0194

BLM'S ANSWER TO APPELLANTS' STATEMENT OF REASONS

The Bureau of Land Management ("BLM"), through the undersigned attorney, hereby submits its Answer to Appellants' Statement of Reasons ("SORs").

I. INTRODUCTION

The City of Las Vegas and North Las Vegas, Nevada, (collectively the "Appellants") have brought an appeal seeking to have the Interior Board of Land Appeals ("IBLA") reverse a decision by BLM which conditions the transfer of certain lands under its purview with protections for sensitive resources. *See generally* SORs at 1-5. The Record of Decision at issue was signed by BLM on October 21, 2011, ("Supplemental EIS ROD") and represented the culmination of BLM's environmental review for the Upper Las Vegas Wash Conservation Transfer Area Final Supplemental Environmental Impact Statement ("Supplemental EIS").

This Supplemental EIS was spurred forth by two primary events: 1) the passage of the Southern Nevada Public Land Management Act ("SNPLMA"), Pub. L. No. 105-263, 112 Stat. 2343 (1998); and 2) the underlying environmental review conducted by BLM in 2004 related to provisions within SNPLMA authorizing BLM to transfer certain federal lands into private/local government ownership. This 2004 environmental review left one principle issue unfinished which formed the basis for the Supplemental EIS. To appreciate how these two events resulted in the Supplemental EIS it is necessary to step back a decade-and-a-half.

In 1998, Congress created a piece of special legislation designed to address a particular problem in southern Nevada. Aptly named, the Southern Nevada Public Land Management Act sought to address the BLM's difficulty in managing public lands interspersed with private lands throughout the Las Vegas Valley, and alleviate the pressures of a growing population in and around the Las Vegas metropolitan area by promoting responsible and orderly development. *See* SNPLMA at § 2(a)(1)-(3).[1] The key to addressing both issues was the orderly disposal of public lands which provided the space needed for the Las Vegas area to expand, which in turn alleviated dispersed management problems for BLM and development pressure on the surrounding national recreation and conservation areas. *Id.* Congress designated a disposal boundary inside which federal lands were authorized for disposal. *Id.* at § 4(a). SNPLMA, and

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[1] SNPLMA has been amended numerous times. BLM keeps an "as amended" version on its website; http://www.blm.gov/nv/st/en/snplma/legislation.html (then select "Southern Nevada Public Land Management Act of 1998, as amended"). This version is attached as Exhibit 1 and also appears to be the version Appellants have used as Exhibit 10 following its SORs.

its disposal boundary, were amended in 2002 to add additional acres to the disposal area. *See* Clark County Conservation of Public Land and Natural Resources Act of 2002, ("Clark County Act") Pub. L. No. 107-282, § 401, 116 Stat. 1994 (applicable Title IV amendment section attached as Exhibit 2); *see also* Supplemental EIS at 6.

Subject to SNPLMA, BLM was authorized to dispose of the identified public land in accordance with applicable law. *See* SNPLMA at § 4(a). Accordingly, when SNPLMA was amended in 2002 and more acres were added that were not previously analyzed for disposal, BLM undertook the required National Environmental Policy Act ("NEPA") review. This review took the form of the 2004 Las Vegas Valley Disposal Boundary Final Environmental Impact Statement ("LVVDB FEIS").[2]

Through the LVVDB FEIS, BLM analyzed the environmental consequences of disposing all of the land within the boundary identified by Congress, while identifying ways to avoid, minimize, and mitigate potential adverse impacts. LVVDB FEIS at ES-1. One of the proposed action alternatives was called the Conservation Transfer Alternative. *Id.* Through this alternative, an approximate area of 5,000 acres was identified in the northern portion of the disposal boundary as the Conservation Transfer Area. *Id.* at 2-5, 2-8 (Figure 2.4-1). This area was identified for the future establishment of conservation measures based upon, among other things, surveys showing the existence of special status plant species, paleontological resources, and cultural resources. *Id.* at 2-5. These conservation measures are to be included in a Conservation Agreement created by appropriate interested parties, and would precede the transfer of these lands pursuant to SNPLMA. *Id.*

At the conclusion of the LVVDB FEIS, BLM's Las Vegas Field Manager signed a Record of Decision ("LVVDB ROD") selecting the Conservation Transfer Alternative. *See* LVVDB ROD at unpaginated 2. The Field Manager's decision noted that this alternative was the agency preferred as well as the environmentally preferred alternative. *Id.* Further, in regards

[2] Appellants have moved to add this FEIS to the case records for this appeal. *See* Appellants' Request to Correct and Augment the Administrative Record (received June 29, 2012). BLM does not oppose the addition of this document. The FEIS is also available at: http://www.blm.gov/nv/st/en/fo/lvfo/blm_programs/planning/las_vegas_valley_disposal.html.

to the Conservation Transfer Area, the Field Manager confirmed that a Conservation Agreement is necessary, and decided that this area should be subject to additional study, collaboration, and NEPA analysis. *Id.* BLM clearly noted that it intended the boundary of the Conservation Transfer Area to "be adaptable to the needs and concerns of interested parties that participate in the development of the conservation, including community land use planning." *Id.*

The Field Manager also clearly took into consideration community concern regarding the sensitive resources within the northern portion of the disposal boundary, inclusive of the Upper Las Vegas Wash[3], as well as the community's interests in open space and recreational opportunities. *Id.* at 4. Additionally, the LVVDB ROD specifically recognized that that the Upper Las Vegas Wash was a natural flood control feature and that additional study of water released into the wash and its effects on the entire wash system should occur. *Id.* at 5.

BLM's current Supplemental EIS is the result of the suggested additional study, collaboration, and NEPA analysis meant to more precisely set the adaptable Conservation Transfer Area boundary. Supplemental EIS at 5. More specifically, BLM held numerous stakeholder meetings soliciting ideas for the best size, boundary, and goals for the Conservation Transfer Area. *Id.* at 8, 19. From these stakeholder discussions, it became clear to BLM there was strong public support for considering a larger conservation area. *Id.*; *see also* Supplemental EIS ROD at 2. BLM subsequently utilized technical assistance from Utah State University in identifying areas in and around the contemplated Conservation Area with the most sensitive resources. *Id.* at 8, 19. BLM utilized stakeholder input, the information generated by Utah State, input from cooperating agencies, and internal discussion to settle on a final study area for the future Conservation Area of approximately 13,622 acres.[4] Supplemental EIS ROD at 2; Supplemental EIS at 7 (Fig. 1.1-2).

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[3] The Las Vegas Wash is a heavily incised natural flood channel that carries stormwater and runoff from the Las Vegas Valley to Lake Mead, and is therefore part of a tributary system feeding to the Colorado River. *See* LVVDB FEIS at 3-16; Supplemental EIS at 9. This wash shares the same name of an associated hydrographic basin (watershed) and it runs through the Conservation Transfer Area. *Id.* at 3-17 (Figure 3.3-1), and 2-8 (Figure 2.4-1). The ***Upper*** Las Vegas Wash represents the headwaters for the Las Vegas Wash. Supplemental EIS at 20. The Upper wash drains approximately 500 square miles including the alluvial fans north and northwest of the City of North Las Vegas. *Id.*

why your Expert only used 88 square miles & ~~square miles, per~~ Shaun Lewis

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To comply with NEPA, BLM developed a range of alternatives allowing for maximum development to maximum conservation. *Id.* The end result was BLM's selection of Alternative B, a 10,669 acre area. *Id.* An additional 2,654 acres of land within the study area was made available for private development within the jurisdiction of the City of Las Vegas, and a similar 373 acre area within the jurisdiction of the City of North Las Vegas; neither of these areas will be subject to requirements of a future Conservation Agreement. *Id.* The area within Alternative B's 10,669 acres would continue to be subject to disposal but only after the development of the aforementioned Conservation Agreement.

From this outcome came Appellants' appeal. BLM received Appellants' Notice of Appeal on April 25, 2012, and their SORs on June 29, 2012. After a couple extensions, BLM's Answer deadline was moved to October 9, 2012. Within this appeal Appellants attack BLM's decision on several distinct grounds. First, there is the allegation that BLM violated SNPLMA. *See* SORs at 4. Appellants assert that BLM impliedly violated SNPLMA by not disposing of land within the disposal boundary north of the Upper Las Vegas Wash and instead is retaining ownership for continued management.[5] *Id.* Additionally, Appellants contend that BLM's decision prohibits construction of flood-control facilities within the Conservation Transfer Area, while alleging SNPLMA requires BLM to grant rights-of-ways for such facilities. *Id.* These allegations do not show a violation of SNPLMA and fail to consider the level of discretion BLM has under the applicable SNPLMA provisions. BLM's decision is not to avoid disposing of the land at issue and does not prohibit right-of-way grants for the mentioned facilities. Notably, the decision at issue is not about granting rights-of-ways to for such facilities.

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[4] The study area sits east of U.S. Highway 95 from where the highway runs by the Paiute Reservation, west of Nellis Air Force Base and Interstate 15, south of the Desert National Wildlife Refuge, and north of the approximate southern edge of the Upper Las Vegas Wash. Supplemental EIS at 6-7, 9.

[5] The specific areas in question are the alluvial fans north of the Upper Las Vegas Wash. *See* SORs at 2; SORs Exhibit 5 (Appellants refer to the parts of the alluvial fans as the "Northern Areas"). Alluvial fans are "fan-shaped collections of loose or unconsolidated sediments that have been deposited by stream flow or debris flows at the base of a mountain front of valley side." Supplemental EIS at 45. The alluvial fans at issue sit at the base of the Sheep and Las Vegas ranges. *Id.* at 30.

Active or inactive? proof?

Appellants move on from SNPLMA to allege violations of the Administrative Procedures Act ("APA") (5 U.S.C. § 551 *et seq.*). This allegation claims BLM's decision was not rationally linked to the Supplemental EIS factual analysis. *See* SORs at 4. Principally, Appellants find no basis in BLM's determination that the alluvial fans north of the Las Vegas Wash have any value worth protecting. *Id.* BLM's Supplemental EIS and ROD both contradict this assertion, and the citations provided by Appellants to support their position are either mischaracterizations or simply inapplicable. BLM's decision does not violate the APA and such allegation is not appropriate before the IBLA in the first instance.

The final statute BLM has allegedly violated is NEPA (42 U.S.C. § 4321 *et seq.*). Appellants first contend that BLM's purpose and need statement is too narrow. *See* SORs at 4. This is primarily because BLM considered the protection of the Las Vegas Wash's natural function and its associated sensitive resources as important components to its action. *Id.* BLM's noted purpose fulfills a prior obligation as outlined in its 2004 LVVDB FEIS and associated ROD, while facilitating compliance with mandates calling for similar proactive measures. Supplemental EIS at 10-11. BLM's purpose and need does not violate NEPA.

BLM's Supplemental EIS also does not violate NEPA by failing to provide a full and fair discussion of the hydrological impacts related to the proposed action. *See* SORs at 4. Appellants have alleged that BLM's hydrological impacts analysis failed to consider certain factors which prejudiced BLM's decision against development of areas north of the Las Vegas Wash. *Id.* at 4-5. Further, Appellants attack BLM's water modeling expert by setting false legal standards for a BLM water modeler and mischaracterizing the expert's statements and findings. *Id.* at 5. As will be shown below, BLM's expert conducted a legitimate review of hydrologic functionally of the areas around the conservation study area, and the model used by BLM's expert was appropriate for the given decision at issue.

Finally, Appellants conclude the alleged NEPA violations by claiming that BLM failed to fully and fairly discuss the consequences of the Supplemental EIS alternatives. *Id.* In particular, Appellants wanted a full discussion of what land uses would be allowed within the selected Conservation Transfer Area. *Id.* This may have been Appellants' preference, but it is not a

violation of NEPA for BLM to focus on establishing the boundary of the area at issue without establishing a certain list of future allowable uses at the same time. As Appellants note, further NEPA analysis may be necessary as the unique and dynamic process of disposing of land pursuant to SNPLMA unfolds for the Conservation Transfer Area. *See* SORs at 5 n.6.[6] Such future NEPA does not invalidate the scope of the current NEPA.

BLM's Supplemental EIS NEPA analysis was thorough, complemented the LVVDB FEIS and ROD, and resulted in a decision fully supported by the information presented. As such, BLM's Supplemental EIS did not violate the requirements of NEPA.

II. FACTUAL BACKGROUND

a. Southern Nevada Public Land Management Act Provisions

The underpinnings of this appeal originate with SNPLMA. As such, a review of key provisions is helpful in keeping the appealed issues in context. The purpose of SNPLMA is provided in fairly straightforward terms: "The purpose of this Act is to provide for the orderly disposal of certain Federal lands in Clark County, Nevada, and to provide for the acquisition of environmentally sensitive lands in the State of Nevada." SNPLMA at § 2(b). This purpose was driven by Congressional findings which recognized BLM's dispersed land throughout the Las Vegas Valley which is difficult to manage; Congress favored orderly development for this Valley and agreed that certain Federal lands should be sold after considering local government and public recommendations; and the Las Vegas metropolitan area was growing rapidly which was having a direct and significant impact on several national conservation and recreation areas surrounding the metro area. *Id.* at § 2(a)(1)-(3).

From this purpose Congress articulated the discretion it afforded the Secretary of the Interior to carry out the disposal of Federal lands. *See id.* at § 4(a). As Congress noted: "[T]he Secretary, in accordance with this Act, the Federal Land Policy and Management Act of 1976, and other applicable law, and subject to valid existing rights, is authorized to dispose of lands

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[6] Appellants state that BLM "implies a four-EIS process...." SORs at 5 n.6. This is not BLM's official or implied position.

within the boundary of the area under the jurisdiction of the Director of the Bureau of Land Management in Clark County, Nevada...."[7] *Id.*

To carry out disposal actions, Congress required a "Joint Selection" process. *Id.* at § 4(d)(1). This process called for the unit of local government, where lands identified under § 4(a) will be disposed, to jointly select lands with the Secretary for sale or exchange under this Act. *Id.* The Secretary is to further coordinate disposal activities with that local governmental unit, and the disposal activities must "be consistent with local land use planning and zoning requirements and recommendations." *Id.*

In a related, but separate provision, Congress also provided units of local government the ability to secure certain lands for their ownership, or to secure rights-of-ways for particular uses. *See id.* at § 4(b). Specifically, local government units where lands have been selected for disposal may elect to retain the lands for public purposes in compliance with the Recreation and Public Purposes Act. *Id.* at § 4(b)(1). Additionally, appropriate units of local government or regional governmental entities may seek rights-of-ways from the Secretary for water management related needs. *Id.* at § 4(b)(2). Rights-of-ways granted under this provision do not result in the actual disposition of Federal land, but would represent valid existing rights that would be preserved when the underlying Federal land is actually sold or exchanged out of federal ownership.

The sections mentioned above are the provisions from SNPLMA which control and inform certain related appeal points.

b. BLM's 2004 LVVDB FEIS and Current 2011 Supplemental EIS

Much like SNPLMA, BLM's 2004 LVVDB FEIS and recent 2011 Supplemental EIS provide core underpinnings which must be considered in assessing the legitimacy of Appellants' appeal. The origins and scope of the LVVDB FEIS will be described first, followed by a synopsis of the complimentary Supplemental EIS purpose and scope.

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[7] "Secretary" was defined to mean the Secretary of the Interior. SNPLMA at § 3(1).

1. 2004 LVVDB FEIS and ROD

This FEIS originated through BLM's efforts to comply with SNPLMA. As the LVVDB FEIS explains, prior to SNPLMA and its amendments, BLM's local 1998 Las Vegas Resource Management Plan ("Las Vegas RMP") had already analyzed and accounted for the disposal of approximately 51,826 acres of Federal land in the Las Vegas metropolitan area. LVVDB FEIS at 1-3. The disposal boundary Congress identified within SNPLMA (§ 4(a)) encompassed the same disposal lands from BLM's Las Vegas RMP with approximately 200 additional acres, bringing the total close to 52,021 acres. *Id.* Leading up to the Las Vegas RMP, BLM analyzed the potential environmental impacts of disposal through the related RMP EIS. *Id.* This analysis, however, took into consideration projection population growth and community land use plans in determining the overall acres necessary for disposal to meet demand for development. *Id.* The result was an environmental impact analysis of only 25,540 of the original 51,826 acres. *Id.* BLM made the assumption that the 25,540 acres represented the upper limit of lands to be sold for extra developable space during the 20-year plan period of the Las Vegas RMP. *Id.* at 1-4.

Despite this assumption, the years immediately following the implementation of the Las Vegas RMP saw a dramatic increase in the Las Vegas area population, with the consequence of the projected acreage being disposed much faster than anticipated. *Id.* It became apparent that BLM needed to conclude the additional NEPA analysis related to the remaining 26,286 acres in the disposal area, and because of the timing, BLM could assess the addition of approximately 22,000 acres to the disposal boundary by Congress' amendment to SNPLMA through the 2002 Clark County Act. *Id.*

The LVVDB FEIS contained three alternatives for analysis; the Proposed Action – contemplated disposal of all 46,701 available acres; the Conservation Transfer Alternative – contemplated disposal of the same number of acres but for a Conservation Transfer Area of approximately 5,000 acres which would be disposed of after a Conservation Agreement is signed; and the No Action Alterative – kept the current level of disposal at the original 25,540 acres, resulting in no further disposals until 2018 when the RMP planning term expired. *Id.* at 2-2, 2-5, 2-6. BLM's preferred alternative was the Conservation Transfer Alternative. *Id.* at 2-2.

BLM explained that through surveys conducted for the FEIS, unique paleontological resources, cultural resources, and special status plant species were located within the area known as the Upper Las Vegas Wash. *Id.* at 2-2, 2-8 (Figure 2.4-1). The Conservation Transfer Area includes this Wash area along with an estimated number of acres to provide protection to those sensitive resources in and around the Wash. *Id.* at 2-2, 2-5. BLM clearly provided that these Conservation Transfer Area lands would continue to be subject to transfer to local government, but with the condition that a Conservation Agreement must be created and signed by the necessary parties prior to transfer. *Id.* at 2-5.

After BLM's comprehensive analysis of the alternatives, BLM's decision was to select the Conservation Transfer Alternative. LVVDB ROD at unpaginated 2. BLM's ROD noted that the related Conservation Transfer Area boundary within this alternative was considered adaptable (i.e., not set, subject to modification). *Id.* at paginated 2. This determination flows naturally from the LVVDB FEIS as no boundaries were ever precisely defined and described as the final boundary beyond assertions of an approximate 5,000 acre area. *See* LVVDB FEIS at 2-2, 2-5; LVVDB ROD at unpaginated 2. BLM's ROD further noted that further study, collaboration, and NEPA analysis would be necessary to address the various remaining issues related to the Conservation Transfer Area. *See* LVVDB ROD at unpaginated 2-paginated 2. Those issues principally revolved around how BLM would establish a boundary that protects the sensitive resources BLM identified – sensitive plants and their habitat, cultural resources, paleontological resources, and a naturally functioning wash system. *Id.* at 3. This ROD, and the related NEPA analysis, was not subject to any appeals or other legal challenge.

2. 2011 Supplemental FEIS and ROD

As the name would imply, this NEPA analysis was a supplement to, and in furtherance of, the previously completed LVVDB FEIS NEPA document and ROD. *See* Supplemental EIS at ES-1. This supplemental analysis was designed to fill some of the LVVDB ROD's suggested further NEPA analysis, study, and collaboration. *Id.* Specifically, where the LVVDB FEIS and

ROD did not identify a final boundary for the Conservation Transfer Area, this supplement would provide the necessary NEPA analysis to assist BLM in making that determination. *Id.*

BLM began this process by reaching out to the public. After the LVVDB ROD, and before the Supplemental FEIS scoping period, BLM held numerous pre-scoping meetings over a 2½ year period. *See* Supplemental FEIS at 269. From that public input, BLM quickly realized there was a diverse group of interested parties and a great deal of interest in a larger Conservation Transfer Area, inclusive of the alluvial fan north of the original 5,000 acres. *Id.* at 2. BLM assessed all the public input and eventually set the area for NEPA study/analysis at 13,622 acres. *Id.* Within this "study area" the Conservation Transfer Area would be established, and BLM offered a range of alternatives from 1,448 acres to 12,953 acres as the potential Conservation Transfer Area. *Id.* at 3.

BLM described its purpose and need for this Supplemental EIS as establishing a final Conservation Transfer Area boundary, supported by science, and meeting its obligations to protect sensitive resources. *Id.* at 10. The principle sensitive resources of concern to BLM were the Upper Las Vegas Wash and its natural functionality, along with the botanical, cultural, and paleontological resources within the Wash and surrounding area. *Id.* at 11. BLM's obligation to protect these resources are consistent with the LVVDB FEIS and ROD, BLM's Las Vegas RMP, SNPLMA as amended, and various other federal laws. *Id.* For example, BLM's LVVDB ROD repeatedly identified the natural functioning Upper Las Vegas Wash as a resource of concern needing further analysis and protection. *See* LVVDB ROD at 3-5. Additionally, pursuant to its controlling Las Vegas RMP, BLM is to protect the bearpoppy plant and its habitat (Las Vegas RMP at SS-2), protect cultural and paleontological resources as required by law (CR-1), and limit impacts to visual and aesthetic character of the public lands in the RMP planning area (VS-1). Supplemental FEIS at 11.

BLM accomplished its project purpose and need through its selection of the Supplemental EIS Alternative B. *See* Supplemental FEIS ROD at 2. Alternative B represents a 10,669 acre Conservation Transfer Area subject to disposal after the development and adoption of a Conservation Agreement signed by the recipient management entity(ies). *Id.* Out of the

original 13,622 study area acres, 2,654 were designated as ready for disposal within the jurisdiction of the City of Las Vegas, and 373 within the jurisdiction of the City of North Las Vegas. *Id.* These areas are not subject to the future Conservation Agreement necessary for the final Conservation Transfer Area. *Id.*

Following the decision adopting Alternative B, BLM published the Notice of Availability of the Supplemental FEIS on March 30, 2012. And as mentioned before, Appellants' filed their Notice of Appeal on April 25, 2012.

III. LEGAL ARGUMENT

a. BLM's Supplemental FEIS ROD Complies with SNPLMA

Appellants have asserted that BLM's decision at issue has violated SNPLMA in two ways. First, despite identifying approximately 46,700 acres out of 46,700 available acres as subject to disposal in coordination with the boundary set by Congress through SNPLMA and its amendment – the Clark County Act, BLM is somehow "refus[ing] to comply with the Congressional directive[]" to dispose of land. SORs at 15. Second, BLM has allegedly failed to adhere to an unidentified SNPLMA requirement that BLM "defer" to all of Appellants' local master plans and local planning requirements and recommendations. *Id.* at 15, 18. These allegations are supported by inaccurate conclusions drawn from mischaracterizations of the language of SNPLMA, and incorrect comparisons of distinct concepts provided under SNPLMA.

As to the first allegation, Appellants attempt to create an impression of BLM noncompliance with SNPLMA by comparing two distinct SNPLMA sections. One section provides the following directive under the only heading titled "Disposal":

> [T]he Secretary, in accordance with this Act, the Federal Land Policy and Management Act of 1976, and other applicable law, and subject to valid existing rights, ***is authorized*** to dispose of lands within the boundary of the area under the jurisdiction of the Director of the Bureau of Land Management in Clark County, Nevada....

SNPLMA at § 4(a) (emphasis added). SNPLMA then contains another directive which provides:

> [T]he Secretary, in accordance with this Act and the Federal Land Policy and Management Act of 1976, and other applicable provisions of law, shall ***issue right-of-way grants on Federal lands*** in Clark County, Nevada, for all reservoirs,

canals, channels, ditches, pipes, pipelines, tunnels, and other facilities and systems ***needed for***

i) The impoundment, storage, treatment, transportation, or distribution of water... or wastewater; or

ii) Flood control management.

Id. at § 4(b)(2)(A)(i)-(ii) (emphasis added).

Both of these sections speak to two different types of actions by BLM. Disposal is in the context of land sales or land exchanges. *See id.* at § 4(d)(1) (lands referred to in § 4(a) with local units of government are those to be offered for sale or exchange). Comparatively, right-of-ways BLM issues under § 4(b)(2)(A)(i)-(ii) are just that, grants of right-of-ways issued over Federal land pursuant to Title V of FLPMA (43 U.S.C. §§ 1761-1771). The fact the right-of-ways are noted by Congress as "on Federal lands" is a clear indication Congress did not include these lands in the same category as those subject to disposal, which are not retained under Federal ownership. *See* SNPLMA § 4(b)(2)(A).

Appellants, however, have taken issue with BLM's reliance on the legislative language to support its position that it is *authorized* to dispose of land, but is not required to dispose of the land when not in accordance with law. SORs at 17. Appellants assert that BLM is incorrect in its contention based upon the rights-of-way provision provided above. *Id.* This reasoning is not supportable. As described above, the SNPLMA obligation on the Secretary to issue rights-of-ways over Federal land for particular uses, when in accordance with law and only when needed, is not the same as a requirement to *dispose* of land, as that term is used in this Act. Further, BLM's Supplemental EIS is not in response to an application for a right-of-way submitted under § 4(b)(2)(A). BLM is not assessing whether it should or should not grant a right-of-way to either Appellant for any of the particularized uses allowed under SNPLMA. As such, BLM has not made an appealable decision related to issuing a right-of-way grant under § 4(b)(2)(A). *See Nevada Outdoor Recreation Association, Inc.*, 153 IBLA 8, 11 (2000) (IBLA's scope of jurisdiction "embraces the final decisionmaking authority with respect to appeals ***from decisions***

of BLM regarding the use of the public lands and their resources. 43 C.F.R. § 4.1.") (emphasis added).[8]

By separating out the concepts of disposal authorization and right-of-way granting obligations, it is clear BLM is *authorized* to sell or exchange land within the disposal boundary, but is not required to sell the land if such sale would be inconsistent with the requirements of applicable law. Despite this, Appellants correctly point out that BLM has repeatedly indicated it anticipates disposing of all the land within the disposal boundary. SORs at 17 (referencing the LVVDB FEIS). Appellants' claim is creating conflict where none exists.

In review of whether BLM has properly implemented the disposal provision within SNPLMA, Appellants correctly emphasizes a useful legal standard of review; BLM is to give effect to unambiguously expressed intentions of Congress. SORs at 15 (citing *Chevron U.S.A., Inc. v. NRDC, Inc.*, 467 U.S. 837, 842-843 (1984).[9] Based on Appellants' suggested standard, it is incorrect to allege that it is *BLM's* assertion that it has been authorized to dispose of land, when in fact it is Congress' position as expressed by its exact language. Appellants' allegation that BLM is required to dispose of land within the SNPLMA disposal boundary based on the right-of-way provision is simply wrong.

It is worth emphasizing, BLM is not attempting to withhold any land from disposal. Nothing in its Supplemental FEIS ROD has attempted to reduce the land eligible for disposal in Congress' disposal boundary. This new decision only requires the 10,669 acres within the Conservation Transfer Area be subject to a Conservation Agreement before transfer. *See* Supplemental FEIS ROD at 2. Appellants admit this point (SORs at 17) and any general assertions otherwise are incorrect.

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[8] The Board went on to explain, it "has no general supervisory authority over BLM officials and we do not exercise authority over matters not before us on appeal." *Id.* (citing *Animal Protection Institute of America*, 118 IBLA 20, 25 n.3 (1991)).

[9] *See also BedRoc Ltd., LLC v. United States*, 541 U.S. 176, 183 (2004) ("The preeminent canon of statutory interpretation requires us to 'presume that [the] legislature says in a statute what it means and means in a statute what it says there.'" (quoting *Connecticut Nat. Bank v. Germain*, 503 U.S. 249, 253-254 (1992)).

Appellants raise one final point to allege a BLM violation of SNPLMA; Appellants claim SNPLMA "requires BLM to defer to decisions made by the 'unit of local government,'" which includes Appellants. SORs at 18. Further stated, BLM is to defer to Appellants' land use requirements and recommendations. *Id.* For support of this position, Appellants cite to one section within SNPLMA that mentions local government. *Id.* That section falls under the heading "Joint selection required" which directs the Secretary to select lands from those cleared for disposal, in accordance with applicable law, and in coordination with applicable units of local government. As provided:

> The Secretary and the unit of local government in whose jurisdiction lands referred to in subsection (a) are located shall jointly select lands to be offered for sale or exchange under this section. The Secretary shall coordinate land disposal activities with the unit of local government in whose jurisdiction such lands are located. Land disposal activities of the Secretary shall be consistent with local land use planning and zoning requirements and recommendations.

SNPLMA at § 4(d). Nothing in this language requires the BLM to defer to whatever the Appellants want or design though their master plans. Appellants further cite to a SNPLMA Strategic Plan as some form of support for their position. SORs at 18. The language Appellant identifies does not prove their assertion. Efforts to develop "unique partnerships" or "[p]rovide for the orderly disposal of land in the disposal boundary... that supports local governments' master planning while ensuring a fair market return" are simply open-ended statements reflective of the general objectives. *See id.* Appellants' position that these statements, and the quoted statutory language above, lead to a conclusion that BLM must defer to Appellants' decisions contravenes SNPLMA itself.

When it comes to the lands subject to disposal through SNPLMA, Congress was clear that although BLM did not have to go through a land use planning exercise under FLPMA to identify such lands for disposal, any disposal had to be in compliance with SNPLMA, all other provisions of FLPMA, and any other applicable law. *See* SNPLMA at § 4(a) (Congress excepted out the requirements of 43 U.S.C. §§ 1711-1712). Such other laws include NEPA, the ESA, NHPA, etc... Through compliance with these laws came the necessary 2004 LVVDB FEIS and ROD with recommendations to protect sensitive resources found on lands subject to disposal.

SNPLMA then recommended a process in which the Secretary would select lands for disposal in a coordinated manner with units of local government. *See* SNPLMA at § 4(d)(1). This selection process, as the section title implies, is a "joint" process. *Id.* Coordination with local governments is required, and land disposals are to be consistent with local plans and zoning requirements and recommendations. *Id.* That is not to say, however, that for lands within the disposal boundary shown to have sensitive resources deserving of protection under applicable Federal law, that local governments can simply plan-away compliance with those laws and demand conveyance by BLM. That would be neither a "joint" or "coordinated" disposal action under the terms of SNPLMA, and would further negate Congress' requirement that such disposals be in compliance with all other laws.

If the process is as Appellants assert, and complete deference to local governments was the objective, Congress could have easily and simply stated – convey certain identified land to units of local government. No federal discretion, no compliance with other laws, no need to jointly select or coordinate anything, just convey the land. This did not occur.

Nothing BLM has done through its decision based upon the Supplemental FEIS contravenes the Congressional language or intent of SNPLMA.

b. BLM's Supplemental SEIS and ROD are Consistent with the 2004 LVVDB FEIS and ROD and Have a Rational Basis

Appellants' next SORs section attempts to undermine BLM's Supplemental EIS ROD by insinuating a conflict between this decision and the one reached in the 2004 LVVDB ROD, and further by alleging BLM's interest in protecting the natural hydrology of the Las Vegas Wash is unfounded. *See* SORs at 19. This is simply not accurate. BLM's decision and analysis within its Supplemental EIS clearly continue with directives contained with its LVVDB ROD, which was based upon public support for protecting the natural hydrological functionality of the Wash where possible.

At the outset, Appellants frame this argument in terms of an APA violation, although Appellants did not specifically cite to any provision of the APA that BLM allegedly violated. *See* SORs at 19-23. Regardless, the IBLA has previously explained that APA claims alleging

arbitrary and capricious decisions are those a party asserts for Federal Court review of decisions reached by the IBLA. *See Bristlecone Alliance et al.*, 179 IBLA 51 n.3 (2010). The IBLA has its own criteria for reviewing discretionary decisions made by BLM. *Id.* "[W]here the record shows that the decision represents a reasoned analysis of the factors involved, made with due regard for the public interest, and where no reason is shown to disturb BLM's decision" BLM's decision will be affirmed. *Id.* at 54-55; *see also Continental Land Resources*, 162 IBLA 1 (2004) ("an exercise of discretion must be supported by a rational and defensible basis which is set forth in the decision…."). In the context of this case, BLM is exercising discretion provided under SNPLMA to dispose of land in accordance with applicable law. *See* SNPLMA § 4(a).

As support for an allegation of inconsistent, and therefore a presumptively inappropriate decision, Appellants attempt to negatively juxtapose the LVVDB FEIS objectives with those of the Supplemental SEIS. *See* SORs at 19-23. As noted by Appellants, BLM's project for review through the LVVDB FEIS was the planned disposal of BLM managed land within the disposal boundary set by Congress through SNPLMA, as amended. *Id.* at 20 (referencing BLM's LVVDB FEIS at 1-1). Appellants then inaccurately describe the project for review in the Supplemental EIS as "the preservation of the 'hydrologic functioning' and existing conditions…" related to the Upper Las Vegas Wash. *Id.* Appellants have presented a false comparison to insinuate an alleged error of BLM in moving from planned disposal to preservation of lands.

The above description of the LVVDB FEIS project which formed the basis for the supplemental NEPA analysis is fairly accurate (planned disposal of land), but unlike Appellants' assertion, the project under consideration in the Supplemental EIS was, "to establish a final CTA boundary that is compatible with protecting natural, cultural, and biological resources and to facilitate orderly growth within the LVV that is consistent with the LVVDB ROD." Supplemental EIS at 10.

Appellants have mixed the project description from the LVVDB FEIS with portions of the NEPA purpose statement from the Supplemental EIS to create a false comparison. A project description is not necessarily the same as the purpose of the NEPA analysis. The agency shapes

the NEPA analysis to adequately assess and reach a decision about the project. For the LVVDB FEIS, the project/agency action was the planned disposal of land, but the purpose of the FEIS was stated as, to "identif[y] the environmental consequences that may result from the disposal and use of all remaining BLM managed lands within the disposal boundary area... and identif[y] methods to avoid, minimize, and mitigate, as appropriate for adverse impacts." LVVDB FEIS at 1-1 through 1-2.

And that is precisely what the LVVDB FEIS accomplished. From this NEPA analysis, BLM made a decision to select Alternative B, the Conservation Transfer Alternative, which analyzed the disposal of lands (i.e., intended project), but also included suggested actions to address adverse impacts caused by the project, such as the creation of a Conservation Transfer Area.[10] *See* LVVDB ROD at 3. BLM further clarified that based upon its review of the NEPA analysis, the Conservation Transfer Area was necessary to protect sensitive species, cultural, paleontological, and natural flood control resources. *Id.* To accomplish this protection, BLM's LVVDB ROD specifically stated that more study, collaboration, and NEPA analysis would be needed for the Conservation Transfer Area, and that the boundaries of that area were adaptable for the needs and concerns of those participating in the development of the Conservation Area. *Id.* at unpaginated 2 to paginated 2.

These decision-points within BLM's LVVDB ROD naturally flow directly into the Supplemental EIS, which as mentioned before is "to establish a final CTA boundary that is compatible with protecting natural, cultural, and biological resources and to facilitate orderly growth within the LVV that is consistent with the LVVDB ROD." Supplemental EIS at 10. An allegation that the LVVDB FEIS and ROD are inconsistent with the Supplemental EIS and ROD requires complete disregard for the language presented within all four documents. Appellants have not shown, by any measure, inconsistent agency determinations rising to the level of proving an irrational decision without record support. BLM's decision is based on a rational, defensible analysis and should not be overturned. *See Continental Land Resources*, 162 IBLA 1.

[10] BLM's LVVDB FEIS properly implemented NEPA regulatory requirements to analyze not only the environmental impacts of disposing of the land at issue, but suggest mitigation to address impacts. *See* 40 C.F.R. § 1502.16(h).

Another source Appellants allege as proof of its inconsistency allegation, is an environmental assessment completed for a shooting park developed by Clark County.[11] The Shooting Park at issue is just north of the central portion of the Conservation Transfer Area considered in the Supplemental EIS. *See* Supplemental EIS at 31. The development and environmental analysis related to that Park, however, do not prove the inconsistency with the Supplemental EIS as Appellants allege. This is the because of two primary factors: 1) the scope and nature of the shooting park is totally different from the development Appellants seek; and 2) because of the timing of the related NEPA analysis, the EA did not contain highly substantive discussions about hydrological impacts as it properly relied on a prior NEPA document that did.

As to the first point, the Shooting Park came into existence thanks to another piece of special legislation. Public Law 107-350 has as its singular core function the conveyance of Federal land to Clark County in Nevada for a Shooting Park. *See* Pub. L. No. 107-350, § 1(b), 116 Stat. 2975 (2002); attached as Exhibit 3. The law called for a conveyance "as soon as practicable after the date of enactment of this Act." *Id.* at § 1(c). BLM did just that, and on November 26, 2003, the land was transferred to Clark County. Shooting Park EA at Introduction. This, however, was not the end of the issue for BLM. In early 2009, a lawsuit was brought challenging BLM's transfer of land without a NEPA analysis. *Id.*, Attachment 1 at unpaginated 1. To settle this suit, BLM agreed to conduct a NEPA evaluation regarding the transfer although it was six years after conveyance and several components of the Park were already constructed. *Id.* At this point, the EA and resulting FONSI were focused on what impacts should be further mitigated if possible. As Appellants point out, BLM's EA noted that stormwater is being channelized and routed around the Park. SORs at 13. That was because Shooting Park structures were already built by the time BLM reviewed the action under NEPA.

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[11] Appellants have moved to add this Shooting Park EA to the case records for this appeal. *See* Appellants' Request to Correct and Augment the Administrative Record (received June 29, 2012). BLM does not oppose the addition of this document. The EA is also available at: http://www.blm.gov/nv/st/en/fo/lvfo/blm_information/nepa/clark_county_shooting/clark_county_shooting.html.

BLM was not agreeing the Shooting Park had no impacts to hydrological function, the impacts simply could not be further mitigated and did not require voluminous discussion. Additionally, BLM's mention that the Shooting Park's presence could offset illegal dumping, and resulting air impacts, is simply finding the positives in a non-retractable situation, not an endorsement of full-blown residential/commercial development on neighboring lands as implied by Appellants. *See* SORs at 13, 20. In that light, it should also be considered that the Shooting Park is a primarily open space feature on the landscape, which is considerably different in scale and impact than full-blown urban development.

As to Appellants' second point concerning a lack of hydrologic analysis within this EA, BLM clearly pointed out that through the LVVDB FEIS, BLM had already completed a full analysis of resource impacts related to the SNPLMA disposal boundary. *Id.* at 5. Therefore, BLM would only be augmenting/highlighting information that would indicate an increased impact beyond that already completed. *Id.* As further explained by BLM, when the proposed action subject to NEPA review is a non-discretionary transfer of title to land, there are no direct impacts caused by the act of transferring title. *Id.* at 12. Conversely, foreseeable indirect impacts and cumulative impacts related to the development of such land can be assessed, but those had been previously analyzed through the LVVDB FEIS. *Id.* at 12, 23-24. So contrary to Appellants' assertions, BLM did not express a lack of concern for the hydrological effects of the Shooting Park, it was simply not repeating previously completed analysis. The above factors explain the smaller amount of discussion within the EA related to hydrologic functionality, not an inconsistent endorsement of hydrologic impacts contrary to those of concern within the LVVDB ROD and Supplemental EIS. (what they did & did not Do.

Appellants' final set of arguments in this section allege BLM's objective of protecting the natural hydrological functioning of the Las Vegas Wash is unfounded. *See* SORs at 21-22. As mentioned previously, this directive flows directly from the BLM's prior LVVDB ROD (at 3-5), and also is based on basic management objectives to protect natural sensitive resources (Supplemental ROD at 11). BLM explained that the Las Vegas Wash is the heavily incised natural flood channel for essentially the entire Las Vegas Valley. Supplemental EIS at 9. Within

this Wash is a wide diversity of sensitive resources. *Id.* The development, and continued existence of these resources, can be tied to preserving the natural functionality of the hydrology both within and outside of the Wash. *Id.* at 9, 11. In essence, the alluvial fans north of the proposed Conservation Transfer Area naturally act as a storm water dispersal system which limits impacts to the sensitive resources within the Wash.[12] *Id.* The fans uniquely disperse water and sediments, reduce erosion related impacts within the Wash, and help maintain a certain water quality and sediment load. *Id.* at 45. BLM noted that because the most areas that drain into the Upper Las Vegas Wash have not all been developed, increased flow rates and channel erosion caused by engineered flood control to offset such development have not yet impacted the Wash. *Id.* Development, and its engineered flood control structures, is generally understood to cause channelization of stream courses, expanded areas of impervious land cover, construction within natural stream crossings, and modifications of sediment transport which can alter the Wash's shape and depth. *Id.* at 45, 127, 133. These characteristics can result in higher levels of contaminants both in the Wash and downstream. *Id.* at 20.

Overall, with urbanization a naturally functioning wash system is becoming a rarity around the Las Vegas Valley. *See id.* at 6, 17. These unique systems create and sustain sensitive resources in their own manner, and BLM's effort to protect one remaining system is consistent with its management objectives and based on wide public support. *Id.* at 8. BLM has a robust Supplemental EIS that correlates to its previous LVVDB FEIS and ROD, which all provide support for BLM's rationally defensible decision at issue. Appellants have failed to prove a basis for disturbing BLM's decision, which was made in due regard for the public's interest and based on a reasoned analysis of applicable factors. *See Bristlecone Alliance et al.*, 179 IBLA at 54-55. BLM's decision should not be reversed.

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[12] Appellants fault BLM for looking primarily at the impacts of development on areas north of the Wash. SORs at 22. BLM focused on the north alluvial fans primarily because of the particular problems caused by the steepness of the fans. Supplemental EIS at 124. In addition, a look at a map of the area at issue shows areas south of the Wash are largely already developed. *Id.* at 31.

c. BLM's Supplemental FEIS and ROD Comply with NEPA

Appellants' brief moves into a series of claims related to alleged NEPA violations. These claims can be separated in two distinct allegations. First, Appellants allege an improper scope for BLM's purpose and need, both by including the protection of the Upper Las Vegas Wash's hydrologic functioning and by not making this analysis a land use planning review. SORs at 23, 29. Then Appellants allege BLM's hydrologic analysis is false and misleading. *Id.* at 24.

1. BLM's Purpose and Need is Appropriate

The regulations guiding NEPA implementation provide that a purpose and need statement, "shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action." 40 C.F.R. § 1502.13. Courts generally provide a lot of discretion to an agency when setting its purpose and need. *See Westlands Water District v. United States*, 376 F.3d 853, 866 (9th Cir. 2004). A reasonableness standard is applied to assess whether a purpose and need statement is too narrow. *Id.* (citations omitted).

Appellants attack BLM' scope of its purpose and need of the Supplemental EIS by first arguing that BLM improperly included the objective to protect the "natural function of the ULVW...." SORs at 23 (quoting Supplemental EIS at 11). This argument ignores the point of BLM's prior LVVDB NEPA analysis, decision, and generally the objective of supplemental NEPA analysis.

As mentioned in previous sections of this brief, BLM's Supplemental EIS is carrying forward with suggested NEPA analysis suggested by the LVVDB ROD. *See* Supplemental EIS at 10. BLM quoted from the prior ROD to show why further NEPA analysis was being undertaken. "Approximately 5,000 acres will be subject to a process of more study, collaboration, further NEPA analysis...." *Id.* Further, the purpose of the suggested analysis was to establish a Conservation Transfer Area boundary that protects the sensitive resources BLM identified within its LVVDB ROD – sensitive plants and their habitat, cultural resources, paleontological resources, and a naturally functioning wash system. *See* LVVDB ROD at

unpaginated 2-paginated 3. Based upon the prior decision, and associated NEPA analysis, the current Supplemental EIS's inclusion of protecting the functionality of the ULVW is fulfilling the missing final analysis as described in the prior LVVDB ROD. That is precisely what supplemental NEPA is meant to do.

The CEQ regulations, which guide implementation of NEPA, describe the need for supplemental analysis when there is a substantial change to a previously analyzed project, or there are significant new circumstances or information relative to environmental concerns of a proposed action or its impacts. 40 C.F.R. § 1502.9(c)(1)(i)-(ii). Supplemental NEPA analysis does not have to comply with general scoping processes. *Id.* at § 1502.9(c)(4). The focus of supplemental NEPA is to analyze an issue or information not fully addressed by previous analysis, so developing a full wide-open project is not necessary or appropriate. *See cf. Center for Biological Diversity*, 181 IBLA 325, 344 (2010) (supplemental environmental reviews are for *remaining* actions or impacts not previously fully analyzed). BLM did not improperly narrow its purpose and need, it simply focused the analysis on the information needing further evaluation as described within its LVVDB ROD (establishment of a Conservation Transfer Area boundary to protect particularly identified sensitive resources). This is a reasonable purpose and need statement in compliance with NEPA and its implementing regulations. As such, this issue does not provide sufficient grounds to reverse BLM's discretionary decision. *See Westlands Water District*, 376 F.3d at 866.

Appellants' final allegation of improper scope of the Supplemental EIS is based upon an assertion that BLM must complete a full assessment of all future uses within the Conservation Transfer Area at this point in time. SORs at 29. Appellants note that BLM explained that it was not determining all future allowable uses at this time. *Id.* In fact, BLM explained that the Conservation Transfer Area boundary is the first step in setting up the future transfer of this land under SNPLMA. *See* Supplemental EIS at 12. The contemplated process is that once the boundary is set, interested parties in the area will continue working with BLM to establish the Conservation Agreement, which will guide future land uses in the area upon transfer. *Id.* This Agreement may involve some additional NEPA review and planning, or much of the additional

planning considerations will be included in the currently on-going NEPA process connected with the revisions to the Proposed Las Vegas Resource Management Plan and Final Environmental Impact Statement. *Id.* Appellants' assertion that BLM must ascertain all possible future uses at this time is simply Appellants' preference. This does not prove error in BLM's current, comprehensive, Supplemental EIS. BLM has discretion to determine when it will undertake any additional planning actions and associated NEPA; and in this instance, BLM offered a reasonable explanation that it has an on-going planning revision process which can embrace associated elements from this process if BLM chooses.

BLM's purpose and need is appropriate for this action and has not violated NEPA.

2. BLM's Hydrological Analysis is Appropriate

Appellants' second section of alleged NEPA violations is focused on trying to show error in BLM's discussion related to hydrological impacts. SORs at 24-29. In particular, Appellants assert that BLM's analysis is not acceptable because; 1) BLM's modeling expert was not licensed in Nevada, 2) BLM's modeling expert did not utilize the local Flood Control Districts Drainage Design Manual, 3) BLM's model made unreasonable assumptions, and 4) BLM's model was biased towards exaggerating development effects. Upon further review, these assertions are simply inapplicable or fail to show error in BLM's use of the model at issue.

A. BLM is Not Required to Use Nevada Licensed Experts or Local Drainage Manuals to Conduct a Water Model

The Board has clarified that it is the Appellant's burden to show by a preponderance of evidence, inclusive of objective proof, that "BLM failed to adequately consider a substantial environmental question of material significance to the proposed action, or otherwise failed to abide be Section 102(2)(C) of NEPA." *Wyoming Outdoor Council, et. al.,* 176 IBLA at 25, *citing Biodiversity Conservation Alliance*, 174 IBLA 1, 13-14 (2008). Further, with issues of a highly technical nature, the IBLA recognizes that when BLM relies on its technical experts' opinions concerning matters within their expertise, and such opinions are reasonable and supported by the record, any challenge to such reliance must demonstrate, by preponderance of

the evidence, error in data, methodology, analysis, or conclusion of the experts. *Id.* (citations omitted). Mere differences of opinion, even expert opinions, do not suffice to prove a failure by BLM to comprehend the nature or scope of a significant impact. *Id.* (*citing Fred E. Payne*, 159 IBLA 69, 78 (2003)).

Appellants' first two points to support their contention BLM's water model is deficient is to set up a false standard to which BLM never needed to adhere. Appellants contend that BLM's model is deficient by attacking the modeler as unlicensed in Nevada. SORs at 24. This allegation is baseless on its face. The Nevada administrative provision in question provides code of conduct, state administrative requirements on Nevada professionals. *See* Nevada Administrative Code § 625.610. If BLM had used a Nevada engineer for its model, this provision would apply to the modeler. BLM, however, is not subject to a Nevada Administrative Code that dictates what BLM can use for its own NEPA compliance, and is under no obligation to hire a Nevada engineer to complete a water model for BLM's NEPA analysis. Appellants' opinion that BLM should have used a Nevada licensed engineer is just that, their opinion, which is not sufficient to show error in BLM's expert analysis. *Wyoming Outdoor Council, et. al.*, 176 IBLA at 25.

Next, Appellants similarly allege that BLM's model was improper as it did not comply with the local Flood Control District's manual. SORs at 25. This again, is a baseless allegation. There is no requirement BLM must utilize a local water district's manual for its water model. BLM's model was, however, based upon models already accepted by the Clark County Regional Flood Control District, FEMA hydraulic model existing conditions, state-of-the-practice reference documents, and generally well accepted modeling practices. Supplemental EIS, Appendix N at N-32 through 34. These are perfectly appropriate standards for BLM to utilize for the purposes for which BLM's model was to serve. BLM explained its need for a model and water resource analysis was for a general comparative analysis and was never intended for use by local municipalities or flood control authorities. *Id.* at 34. Further, the Hydrology and Erosion Analysis itself clarified that its use was comparative and should be considered in a qualitative capacity. *Id.*, Hydrology and Erosion Analysis at 14. BLM simply was not designing

a master planned community with major flood-control features on a steep alluvial fan. BLM further clarified that its analysis of hydraulic related impacts to the Upper Las Vegas Wash was not solely about the prevention of erosion through control of peak flows; the functionality of the Wash involves natural flows (both discharge and velocity), natural flood control, sediment transport, erosional processes (deposition and aggradation), and naturally occurring vegetation and habitat. Supplemental EIS, Appendix N at N-30. Attacking BLM's modeling effort for alleged inadequacies of properly documented peak flows or erosion still does not undermine BLM's overall analysis for assessing hydrologic functionality issues.

Appellants have expressed an opinion as to the level of detail they would like to have seen in BLM's model, but this is not enough to show clear error or mistake in BLM's analysis, especially when the purpose of the model is considered along with the varying other aspects of hydrologic impacts which are equally important and analyzed outside of the model.

B. BLM's Water Model Made Appropriate Assumptions and Was Not Biased

The IBLA has articulated what it termed its "legal framework" for reviewing challenges to NEPA compliance. *See Wyoming Outdoor Council, et. al.*, 176 IBLA 15, 25 (2008). As this framework appears quite clear and concise, it is quoted in part:

> NEPA is a procedural statute designed to "insure a fully informed and well-considered decision...." [T]he process assures that decisionmakers are fully apprised of likely effects of alternative courses of action so that selection of an action represents a fully informed decision.... When BLM has satisfied the procedural requirements of section 102(2)(C) of NEPA, it will be deemed to have complied with NEPA, regardless of whether a different substantive outcome would be reached by appellants, this Board, or a reviewing court....
>
> An EIS is judged by whether it constitutes a "detailed statement" that takes a "hard look" at the potentially significant environmental consequences of the proposed Federal action and reasonable alternatives thereto, considering all relevant matters of environmental concern.... We are guided by a "rule of reason....." The EIS must contain a "reasonably thorough discussion of the significant aspects of the probable environmental consequences" of the proposed action and alternatives.

Wyoming Outdoor Council, et. al., 176 IBLA at 25, (citations omitted).

Appellants' challenge then, is to show that BLM's modeling analysis failed to allow for a fully informed decision by not taking a hard look at significant environmental consequences, and did not provide a reasonably thorough discussion of those consequences. *See id.* Appellants must prove this by a preponderance of the evidence showing error in BLM's expert's analysis. From these standards it is clear Appellants have not reached their burden.

The first primary claim of deficient modeling work is that BLM's model made improper assumptions. SORs at 25. In particular, Appellants allege BLM improperly assumed not all flood-control facilities would be built in and around the Upper Las Vegas Wash if development occurred. *Id.* To support its position that they would, Appellants point out that a Master Plan has been developed. *Id.* Further, Appellants note that flood control systems would *almost* certainly occur, and would *typically* be levee-and-channel systems. *Id.* at 28.

Appellants' position echoes BLM's response to critiques provided in comments to the Draft Supplemental EIS. BLM did consider whether to include suggested flood control concerns, but as noted by BLM in response to comments, and as implied by Appellants, implementation of plans is not guaranteed. Supplemental EIS, Appendix N at N-32. In light of that, it is speculative to assume as fact final designs of drainage infrastructure. *Id.* Therefore, BLM consistently responded to Appellants that:

> [T]he analysis was not intended to anticipate final design level future development conditions, such as on-site stormwater mitigation, because the location, function, and capacity of those systems are not known and cannot be determined presently; rather, the analysis was a comparison of potential hydrologic impacts from land use changes in the CTA boundary.

Id. at 34. BLM did not fail to consider Appellants concern of wanting credit for having a plan for possible future development; however, BLM's assessment that plans change or may not get implemented as expected, along with acknowledging that determining exact types, locations, capacities, etc. of flood-control facilities at this point relies on as much speculation as it does certainty, is a rationale assessment of the situation. Appellants' have not shown by preponderance of evidence error in BLM's methodology or conclusions. *See Wyoming Outdoor Council, et. al.*, 176 IBLA at 25.

As a second allegation of improper assumptions, Appellants assert that BLM assumed that development around the Wash would be built in violation of the Clean Water Act. SORs at 25-26. According to Appellants, the development in the areas at issue would be in accordance with any regulations and discharge permits issued pursuant to the Clean Water Act. *Id.* Through these provisions peak flows would be kept to near pre-development conditions. *Id.* BLM considered this assertion within its analysis and responded to this critique in its response to comments. The objective of the model, and the decision at issue, is not simply to determine how to control all aspects of water flow on the alluvial fans leading to the Las Vegas Wash. Engineering facilities to manage water flow may keep levels of flow comparable to pre-development levels, but that does not mean other aspects of the Wash are not greatly impacted. Supplemental EIS, Appendix N at N-34.

> [T]hat the same peak flow would result from high density to essentially zero development suggests that a very significant portion of the runoff from high-density development has been detained and must be released. These types of steady releases have other consequences, such as channel erosion and headcutting. In addition, another consequence not addressed is the steady baseflow of water in the wash resulting from lawn sprinkling, car washing, and other types of outside domestic use, which can have detrimental impacts to the wash.

Id. Even if BLM did not consider every action Appellants could possibly take to fulfill requirements under the Clean Water Act and maintain flows in their natural volumes, that does not prove error in BLM's model when including all those actions would have little to no effect on the qualitative assessment of engineered versus natural flows. BLM specifically disagreed with Appellants contention and noted that it believed the suggested mitigation was oversimplifying the situation and achieving nearly identical flows from engineered drainage systems was not realistic. *Id.* at 34-35. BLM considered this issue and provided a rational explanation as to the continued sufficiency of its model for the purposes it served. Appellants have not shown by a preponderance of evidence error in BLM's model and assessment of this issue.

The final point Appellants raise to allege deficiency in BLM's model was an assertion that it was improperly scaled or truncated, which in turn exaggerated the results. SORs at 26-27.

Appellants' position is that BLM should have modeled the entire watershed that had any flows attributable to the Las Vegas Wash. *Id.* at 26; *see also* Supplemental EIS, Appendix N at N-34. By doing this, Appellants assert that BLM would have avoided artificially high differences between alternatives. *Id.* BLM addressed these concerns in its response to comments.

As discussed, BLM noted that the model was, in the first instance, based upon an accepted model by Clark County Regional Flood Control District. Supplemental EIS, Appendix N at N-34. Next, BLM explained that as a standard modeling practice, extraneous areas (in this case additional washes within a basin) were removed from the analysis because inclusion would reduce the clarity of the analysis. *Id.* This is an acceptable methodology of analysis given the geography and weather patterns of the area. *Id.* Rain events often occur over distinct areas within a large drainage basin, which renders those areas not subject to the rain event non-contributing factors. BLM was assessing the water flow issues related to the alluvial fans north of the Upper Las Vegas Wash in relation to developed space on those areas. There was no need to include all washes from the entire Las Vegas Valley into this assessment. Doing so actually causes the reverse issue from what Appellants assert, a dilution of effects analysis by over-inclusion of unnecessary parameters. *Id.* This is as equally problematic as being under-inclusive. Appellants may have a difference of opinion as to the extent of how many wash areas should have been included in the model exercise, but that does not prove error in BLM's analysis when all factors are considered. not considered

BLM's water modeling was sufficient for the purposes it was to serve, and Appellants' have not shown by a clear preponderance of the evidence error in BLM's processes and assessment of this issue. As such, the adequacy of BLM's NEPA analysis and related decision should be affirmed.

IV. CONCLUSION

Appellants have attempted to undermine BLM's effort to follow through with the LVVDB ROD's suggested additional NEPA analysis for the establishment of the Conservation Transfer Area's boundary, and to protect the natural functionality of the Upper Las Vegas Wash

why not use 200 sq. mi. for storm centers. If RFCD manual is used use correctly use 200 sq mi picking & choosing site of storm centers & choosing tributary area at ROD sign of manufactured result favoring BLM decision

as part of that exercise. As such, Appellants' appeal is an indirect attempt to challenge a BLM decision made eight years ago. BLM's current Supplemental EIS has a proper scope, is based upon solid environmental analysis, and preserves the future analysis of specific uses within the Conservation Transfer Area until a later date as appropriate. Therefore, in consideration of the foregoing discussion BLM respectfully request the IBLA to affirm BLM's decision based upon its Supplemental EIS.

Dated this 9th day of October, 2012.

Daniel G. Shillito
Regional Solicitor

By: Luke Miller
Assistant Regional Solicitor

CERTIFICATE OF SERVICE

RE: City of Las Vegas, Nevada, et al. vs. Bureau of Land Management; IBLA 2012-0194

I, the undersigned, declare that:

I am a citizen of the United States, over the age of eighteen, and not a part of this litigation. On October 9, 2012, I served the

"BLM'S ANSWER TO APPELLANTS' STATEMENT OF REASONS"

by placing a true copy enclosed in a sealed envelope via U.S. Postal Service certified mail at Sacramento, California, addressed as follows:

U.S. Department of the Interior
Office of Hearings & Appeals
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I declare under penalty of perjury that the foregoing is true and correct. Executed on the 9th of October 2012, at Sacramento, California.

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UNITED STATES DEPARTMENT OF THE INTERIOR

OFFICE OF HEARINGS AND APPEALS

BOARD OF LAND APPEALS

CITY OF LAS VEGAS, NEVADA, a political subdivision of the State of Nevada, and CITY OF NORTH LAS VEGAS, NEVADA, a political subdivision of the State of Nevada Appellants, v. LAS VEGAS FIELD OFFICE, BUREAU OF LAND MANAGEMENT, UNITED STATES DEPARTMENT OF THE INTERIOR, Respondent.	IBLA Docket No. 2012-194 **REPLY BRIEF**

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I. INTRODUCTION

BLM argues that its decisions in this case are purely discretionary. But they are not. As BLM concedes, SNPLMA specifies that BLM *shall* "jointly select" lands for disposal, and *shall* "coordinate land disposal activities" with the Cities. (SNPLMA § 4(d), emphasis added.) Most importantly, SNPLA provides that "[l]and disposal activities of [BLM] *shall* be consistent with local land use planning and zoning requirements and recommendations." (*Id.*, emphasis added.) Plainly, Congress has imposed nondiscretionary requirements on BLM.

BLM has violated these nondiscretionary requirements. The Supplemental EIS here is a "land disposal activity", if only because BLM concedes that it has been prepared as part of a process that will lead to the disposal of the CTA. The Supplemental EIS must therefore have been coordinated with the Cities, and it must be "consistent with local land use planning and zoning requirements and recommendations." But BLM has neither coordinated with the Cities, nor acted consistently with the local planning requirements and recommendations, including the Master Plans for flood-control facilities and the local requirements applicable to hydrologic modeling. The words "joint selection", "coordinate", and "consistent" plainly do not mean that BLM can unilaterally expand the CTA from 5,000 to more than 10,000 acres, and unilaterally reverse the decision to allow the Northern Areas to be sold off and developed, without coordinating with the Cities and acting consistently with their requirements. For this reason alone, BLM's decision should be reversed and the matter remanded to the field office for compliance with SNPLMA.

Even if BLM's decision were purely discretionary, it would fail the standards applicable to discretionary decisions. For at least five reasons, BLM's decision does not demonstrate a rational connection between the facts and the result. First, BLM insists that its goal is to protect the "natural functionality" of the part of Las Vegas Wash within the CTA, but that part of Las Vegas Wash is no longer natural, owing (among other things) to the Decatur Detention Basin within the CTA, to a 2½-mile levee-and-channel system that captures and sends flow into the Decatur Detention Basin, and to two levee-and-channel systems that capture and send flow south and west from the Shooting Park. Second, there is

no good reason to protect natural hydrological conditions, because natural conditions cause flash floods that kill people and destroy property. And there is no good reason to prohibit the construction of flood-control facilities that save lives. Third, there is no reason to prohibit development in the Northern Areas, because (as BLM concedes) there are no resources within those areas that need protection, and because (contrary to BLM's assertions) prohibiting development *will not* protect resources in Las Vegas Wash. Fourth, BLM's assertions about the need to protect the "natural" flow conditions in Las Vegas Wash are contradicted by the Shooting Park EA and the Shooting Park FONSI, which concluded that identical alluvial fans in the adjacent Shooting Park could and should be developed, and which said nothing whatsoever about the natural hydrological "functionality" that the Supplemental EIS finds so precious. Fifth, BLM has not fairly responded to many facts that are beyond serious dispute; refused even to mention the Northern Areas, much less provide a reasonable explanation of why they should not be developed; and generally behaved as though the real reason for its decision is an undisclosed bias against development, rather than conclusions rationally drawn from facts. For this reason alone, BLM's decision should be reversed.

The Supplemental EIS also violates NEPA. The "purpose and need" section impermissibly dictates the outcome. Rather than asking *whether* the CTA boundary should be expanded to protect resources in Las Vegas Wash, it establishes the protection of "natural functionality" as the primary goal (and really the only goal). Natural functionality, as BLM sees it, can only be obtained by prohibiting development. The prohibition of development in the Northern Areas is therefore a foregone conclusion.

The Supplemental EIS also violates NEPA because the hydrological model is too defective to be used. The model uses the wrong inputs; it incorrectly assumes that development causes more runoff than is allowed under Clean Water Act requirements (as BLM appears to concede); and it improperly refuses to include *any* flood-control protection for the residential development being considered.

Finally, the Supplemental EIS is defective either because (a) it implies that BLM will violate SNPLMA by refusing to issue rights of way (including rights of way for flood-control

facilities) that SNPLMA requires it to issue, or (b) because it does not consider the possibility that the Cities will exercise those rights and build the flood-control facilities in the Master Plan, thereby making BLM's announced goal of protecting the "natural" hydrology impossible to achieve.

For these reasons, BLM's decision should be reversed.

II. BLM VIOLATED SNPLMA

BLM mischaracterizes the mandatory requirements of SNPLMA as a mere recommendation: "SNPLMA then recommended a process in which the Secretary would select lands for disposal in a coordinated manner with units of local government." (Answer at 16:1-2.) But the statutory requirements are not mere recommendations. There are three sentences in the relevant subsection, and each sentence includes the word "shall":

> **Joint selection required.**--The Secretary and the unit of local government in whose jurisdiction lands referred to in subsection (a) are located *shall jointly select* lands to be offered for sale or exchange under this section. The Secretary *shall coordinate* land disposal activities with the unit of local government in whose jurisdiction such lands are located. Land disposal activities of the Secretary *shall be consistent* with local land use planning and zoning requirements and recommendations.

(SNPLMA, § 4(b)(1), emphasis added.) The word "shall" in these sentences is mandatory, not discretionary. (*See National Association of Home Builders v. Defenders of Wildlife*, 551 U.S. 644, 661-662 (2007) (interpreting the word "shall" in the Clean Water Act as mandatory, and citing other cases for the proposition that "shall" is generally mandatory).) BLM is therefore wrong when asserts that these requirements are merely a recommendation.

Despite these specific requirements, BLM has not jointly selected lands for disposal, coordinated land-disposal activities with the Cities, or acted consistently with local land-use requirements and recommendations—and BLM does not argue that it has. For this reason alone, BLM has violated SNPLMA.

Despite these violations, the process proceeded well enough until BLM issued the Supplemental EIS. In the 2004 ROD, BLM had included the Northern Areas as part of the land that would be sold off and developed. (SORs at ___.) The Cities then updated their

master plans consistent with the 2004 ROD, and provided for development within the Northern Areas, for flood-control facilities at the uphill boundaries, and for sewers throughout the developed areas. (*Id.* at _____.) Once these plans had been updated, BLM could not unilaterally decide that the Northern Areas *would not* be developed without violating SNPLMA's mandatory requirements that BLM must jointly select lands for disposal, coordinate with the Cities, and act consistently with local planning requirements and recommendations. Because the Supplemental EIS and 2012 ROD take unilateral action without joint selection, coordination, or consistency with local planning requirements and recommendations, they violate SNPLMA. It's that simple.

BLM argues that "[n]othing in this language requires the BLM to defer to whatever the Appellants want or design through their master plans." (Answer at 15:14-15.) Yes it does. Congress commanded that BLM's "[l]and disposal activities shall be consistent with local land use planning requirements and recommendations." The Supplemental EIS is plan a land-disposal activity, as BLM concedes. (Answer at _____ ([steps towards ultimate disposal]).) It must therefore be consistent with local land-use plans.

BLM also argues that "any disposal had to be in compliance with . . . any other applicable law", and that if there are "lands within the disposal boundary shown to have sensitive resources deserving of protection under applicable Federal law", local governments cannot "simply plan-away compliance with those laws and demand conveyance by BLM." (*Id.* at 15:23-26, 16:5-8.) But BLM has not identified any other applicable law. Despite a wave of the hand at "NEPA, the ESA, HHPA, etc.", BLM does not cite anything, specific or general, that would prevent the disposal and development of Northern Areas. (*Id.* at 15:27-28.) When BLM decided, in the 2004 ROD, that the Northern Areas were part of the land that would be sold off and developed, BLM necessarily decided that no applicable law prevented these lands from being sold off and developed.

Moreover, the Northern Areas are not lands "shown to have sensitive resources deserving of protection under applicable Federal law"; on the contrary, there are no sensitive resources in these areas. (See section ___ below.)

BLM is wrong, therefore, when it asserts that mandatory requirements in SNPLMA are mere recommendations, and when it argues that some unspecified language in some other act requires it to protect nonexistent resources in the Northern Areas—despite its previous determination that these areas could and should be sold off and developed.[1, 2]

In short, BLM has not complied with the mandatory requirements of SNPLMA. For this reason alone, BLM's decision should be reversed.

III. BLM HAS NOT PROVIDED A REASONED ANALYSIS

Even if BLM's decision were discretionary, it should be reversed because BLM has not provided a satisfactory explanation. The Cities argued that BLM must "articulate a satisfactory explanation for its action." (SORs at 19, quoting *FCC v. Fox TV Stations, Inc.* (556 U.S. 502, 513-514 (2009).) BLM argues that the Administrative Procedure Act does not apply to this appeal, and that the IBLA uses its own standards for reviewing discretionary decisions. (Answer at 17:2-8, citing *Bristlecone Alliance*, 179 IBLA 51 (2010) and *Continental Land Resources* 162 IBLA 1 (2004).) But these two decisions also require BLM to provide a satisfactory explanation. (*Bristlecone* at 55 (IBLA will affirm "where the record shows that the decision represents a reasoned analysis of the factors involved"); *Continental* at 2 ("[a]n exercise of discretion must be supported by a rational and defensible basis which is set forth in the decision, or it will be found to be arbitrary and capricious"); see section ___ below.) BLM has not provided any satisfactory explanation, reasoned analysis, or rational and defensible basis for prohibiting the sale and development of the Northern Areas.

In any case, an appellant will prevail if it can show, by a preponderance of the evidence, that "BLM committed a material error in its factual analysis or that the decision

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[1] The Cities argued that BLM was required to dispose of all land within the disposal boundary. (SORs at ___.) BLM responds that it is not required to dispose of all the land within the disposal boundary, but that it intends to dispose of all anyway . . . someday. (Answer at ___.) This dispute need not be resolved for the purposes of this appeal. It is sufficient that the Supplemental EIS plainly comes within BLM's "land disposal activities", and that the provisions of SNPLMA § 4(d) apply.

[2] BLM also argues that it has not made any decisions about rights of way within the CTA. (Answer at __.) The Cities respond in section ___ below.

generally is not supported by a record showing that BLM gave due consideration to all relevant factors and acted on the basis of a rational connection between the facts found and the choice made." (*Bristlecone* at 55, quoting *International Sand & Gravel Corp.*, 153 IBLA 293, 299 (2000).) The Cities have demonstrated that BLM made material errors in its factual analysis (_____), did not give due consideration to relevant factors (_____), and did not act on the basis of a rational connection between the facts found and the choice made (_____). For these reasons, BLM's decision should be reversed.

BLM asserts that prohibiting development in the Northern Areas is necessary to preserve the "natural functionality" of Las Vegas Wash. (Answer at 11:15.) For the following reasons, BLM is wrong: (1) the hydrology of Las Vegas Wash is no longer natural, and BLM's refusal to acknowledge that fact demonstrates an unwillingness to engage in rational discussion, (2) there is no good reason to "protect" the existing hydrology, which causes detrimental flash floods, (3) prohibiting development in the Northern Areas will not protect resources in Las Vegas Wash, but on the contrary will harm them, (4) BLM's assertions in the Supplemental EIS are inconsistent with statements it made in the EA for the Shooting Park, and the factual assertions made in its Answer are not true, and (5) BLM's decision results from undisclosed biases, not from reason and logic. Any one of these reasons is sufficient to reverse BLM's decision.

A. The "Natural" Hydrology Is Unnatural

The Cities have explained that the hydrology of Las Vegas Wash *is not* natural, because of the various developments in and along the wash. (SORs at __, __ fn.__.) Among the developments is the Decatur Detention Basin, which includes a dam that extends across Las Vegas Wash. (*Id.*, Ex. 15 (blue area is detention basin), Ex. 5 (dam is V-shaped structure south of Shooting Park facilities).) This dam captures flash floods coming down Las Vegas Wash. The water captured behind the dam is then released at a lower flow, thereby turning a

harmful flood into a modest stream. (*Id.* at ___; *see also* maps.google.com[3] (by zooming in, one can see the small structure through which water is released).) The hydrology is also artificial because of the 2½-mile-long levee that crosses the CTA and directs flows into the detention basin, and the levee-and-channel system that diverts water around part of the Shooting Park. (*Id.* at ___.)

Because of the Decatur Detention Basin and the miles of levees and channels, no reasonable person would describe the hydrology of this part of Las Vegas Wash as "natural". And yet BLM insists on describing the hydrology as "natural", and ignores any argument to the contrary. BLM's insistence on referring to the artificial conditions as "natural", and its refusal even to discuss whether its stated goal of protecting "natural hydrology" makes any sense, demonstrate that BLM has not provided a reasonable explanation for its action.

B. BLM Has Not Explained Why It Wants To Block Local Flood Control

Third, the Cities pointed out that the "natural" hydrology of the area promotes flash flooding, which kills people and damages property. (*Id.* at __.) In the SORs, the Cities asked

> *why* does [BLM] want to maintain natural conditions . . .? BLM's goal of protecting "hydrologic functioning" and "natural functioning" cries out for an explanation. The "hydrologic functioning" and "natural functioning" of alluvial fans is to produce flash floods, which are bad for people, bad for property, bad for paleo resources . . ., and bad for plant resources.

(SORs at 21; *see id.* at 3 (flash floods have killed 31 people since 1960).) Flood-control facilities built in accordance with the Master Plan would protect human health and property. (*Id.* at __.) By prohibiting the construction of these facilities, BLM is endangering human health and property. Plainly, BLM should not be blocking the beneficial flood-control efforts of local governments without a very good reason.

But BLM has no good reason. Nowhere in the Supplemental EIS, the 2012 ROD, or in BLM's Answer is there any discussion about the harm to human health and property that

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[3] All references to maps.google.com apply to the satellite or earth view of the relevant part of the CTA or surrounding area (as of October __ 2012).

will result from BLM's prohibition on construction of flood-control facilities. Once again, BLM is refusing to discuss the important issues.[4]

BLM reaffirms its goal of "protecting natural hydrological functionality of the Wash". (Answer at 16:25.) But BLM does not explain what natural "functionality" it wants to protect. Does it really want to promote flash floods kill more people?

Plainly, BLM has not considered the harmful effects that will result from its decision. Its decision therefore "is not supported by a record showing that BLM gave due consideration to all relevant factors". (*See Bristlecone* at 55.)

Nor does it make sense to allow BLM, which does not claim any expertise in flood control within Las Vegas Valley, to override the decisions of the local flood-control district, which has that expertise.

C. Development Will Not Harm Paleo And Plant Resources

The Cities noted that there are no resources needing protection in the Northern Areas. (SORs at __.) BLM does not argue to the contrary.[5] That leaves the question of whether development in the Northern Areas will harm resources in the White Area.

The Cities provided evidence that development *will reduce* harm to the resources caused by natural conditions. Building flood-control facilities will reduce flooding, and will therefore reduce the harm caused by flooding, including the erosion and carrying off of paleo resources within the CTA. (SORs at ___.) In the 2012 ROD, BLM explained that protection of resources in Las Vegas Wash was subservient to its goal of protecting "natural processes":

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[4] In its responses to comments, BLM asserted that it *assumed* that flood-control facilities would not be built because "it is impossible to know the details of how the final design of drainage infrastructure will eventually play out." (SORs at 28.) BLM might as well argue that we should assume that homes will be built without roofs, because it is impossible to know exactly how the details of a roofing design will play out. Of course homes will have roofs, because homes need roofs to keep the rain out. And of course developments on alluvial fans will have flood-control facilities, because they need flood-control facilities to protect them from flash floods. Even Shooting Park facilities require a levee-and-channel system to protect the facilities. (See section __, below.)

[5] BLM's brief refers vaguely to resources "within the Wash and surrounding area." (Answer at 11:16, citing to Supp. EIS at 11.) But the Supplemental EIS at 11 makes clear that these resources "are predominantly located near the ULVW". Although the boundaries of the wash were not specified by BLM, the wash and the resources are all within the White Area. (SORs at __.)

> The Cities questioned . . . why BLM included the alluvial fan north of the ULVW in the CTA boundary, since flood control structures can be built to control erosion from flood events. The BLM's stated goal is to maintain natural processes in the ULVW, not just eliminate erosion.

(2012 ROD at 9.) BLM's position, therefore, is that the erosion and destruction of paleo resources is perfectly acceptable, as long as the destruction is caused by "natural processes". And make no mistake: the wash is "heavily incised" (Supp. EIS at 9), which means it is highly eroded (http://en.wikipedia.org/wiki/Incised, as of October 14, 2012).)

If BLM's explanation seems strange, that's because it is. *Why* is maintaining the existing, artificial hydrology of Las Vegas Wash more important to BLM than protecting the paleo resources? BLM has not provided a reasonable explanation for this strange preference. (See section ___ below.)

Counsel for BLM, who may recognize the capriciousness of protecting "natural processes" for no good reason, has provided a different response:

> the alluvial fans north of the proposed [CTA] naturally act as a storm water dispersal system which limits impacts to the sensitive resources within the Wash.

(Answer at 21:3-7.) This argument is wrong for at least two reasons: (1) the alluvial fans have not been effective at preventing erosion in Las Vegas Wash, and (2) flood-control facilities provide better erosion control. The basic (and correct) concept behind counsel's argument is that slow-moving water is less erosive than fast-moving water, all else being equal. Counsel argues that the alluvial fans slow down the water velocity by spreading the water out. But whatever effectiveness this spreading may have had in preventing erosion within the alluvial fans themselves, the spreading has not been effective at preventing erosion in Las Vegas Wash, which as noted above is "heavily incised". That's because the water can pick up speed in the wash.[6]

Nothing slows water down like a dam. Dams "impound" the water that gathers behind

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[6] Water can also pick up speed in the artificial channels. But the channels are generally lined with concrete, which prevents erosion. (See maps.google.com (earth view, as of October __, 2012) (channels along Shooting Park are concrete-lined).)

them, thereby creating a small lake. As stormwater flows into a lake, its velocity drops dramatically, often to nearly zero. The Master Plan calls for a new detention basin upstream of the CTA, and expansion of the detention basins within and just downstream of the CTA. (SORs at ___.) Each of these detention basins consists of a dam that will impound floodwaters coming from upstream, plus a small outlet that allows a small amount of flow to proceed downstream. (*Id.* at _____; Exhibits ___; see section __ above.) The Master Plan also calls for levee-and-channel systems that would divert stormwater into the detention basins. (*Id.*, Exhibits ____.) Because these detention basins capture flood flows and release only a modest flow, they will necessarily *reduce erosion* to less than natural conditions, which have caused Las Vegas Wash to be heavily incised and have resulted in flash floods that are sometimes fatal.[7, 8]

In short, there is no doubt that development will *reduce* erosion within Las Vegas Wash, and thereby reduce harm to resources within the wash. BLM's admits that its decision would allow for harm to resources as long as harm resulted from natural processes. BLM therefore did not give "due consideration to all relevant factors" nor act "on the basis of a rational connection between the facts found and the choice made." (*See Bristlecone* at 55.)

D. BLM Has Not Provided A Reasonable Explanation For The Contradictions Between The Supplement EIS And Shooting Park EA

The Cities noted that statements in the Supplemental EIS were contradicted by statements in the Shooting Park EA and FONSI. In the former, BLM concluded that the hydrological condition of the alluvial fans north of Las Vegas Wash was so precious that their development must be prohibited. But in the latter, BLM evaluated identical alluvial fans adjacent to the Northern Areas, made no mention of hydrologic value, and concluded that development of these areas would benefit the public by preventing illegal dumping, removing

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[7] Stormwater flows within the Northern Areas would be limited by Clean Water Act requirements, which BLM did not consider. (SORs at ___.)

[8] BLM also asserts that its decision will protect "water quality". (Answer at ___.) But the only water quality considered is the amount of sediment, and that depends entirely on water velocity and flow. (_____.) The flood-control facilities will reduce velocities and modulate flow, thereby resulting in less erosion and improved water quality.

dangerous nuisances, and improving air quality. (SORs at ___.)

BLM asserts that the Shooting Park EA did not identify the hydrologic importance of the alluvial fans because "stormwater is being channelized and routed around the Park", and therefore "the impacts simply could not be further mitigated". (Answer at 19:20-20:2.) This assertion is simply not true. Two-thirds of the park remain undeveloped, and stormwater is *not* being channelized and routed around that area. (maps.google.com (levee-and-channel system extends only across eastern one-third of park); Exhibit 5 (same).)[9] Furthermore, the channel along part of the northern boundary of the Shooting Park does not route stormwater around the park; instead, it discharges to the undeveloped area to the west. (*Id.* (channel along northern edge of park is closed at eastern end, open at western end).)

Although there are *plans* to build levee-and-channel systems across the northern boundary of the Shooting Park—just as there are plans to build levee-and-channel systems across the northern boundaries of the Northern Areas—none of these systems has yet been built. (*Compare id.* with SORs at __ (master flood-control plans).) Two thirds of the Shooting Park is therefore in the same undeveloped condition as the Northern Areas. If the alluvial fans in the Northern Areas are so precious that development must be prohibited, then development must also be prohibited in the western two-thirds of the Shooting Park.[10]

BLM also argues that it did not need to evaluate hydrological issues in the Shooting Park EA, because it had already evaluated them in the 2004 EIS. (Answer at 20:9-11.) But the 2004 EIS concluded that the alluvial fans north of the White Area could be sold off and developed. The inconsistency is between the Supplemental EIS, which was issued in draft form in January 2010, and both the Shooting Park EA, which was issued one month earlier, and the Shooting Park FONSI, which was issued one month later. The Shooting Park

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[9] BLM cites the SORs at 13 for the proposition that "stormwater *is* being channelized and routed around the park" (Answer at 22, emphasis added), but the SORs refer to the future, not the present: "BLM makes clear that the Shooting Park *will* artificially channelize stormwater around the developed areas" (SORs at 13, emphasis added).

[10] Since the conveyance of the Shooting Park was subject to NEPA, BLM must have had some ability to condition the transfer. (*See* _____U.S.____[trucking case] (NEPA not applicable when agency has no authority to affect outcome).)

documents found (as the 2004 EIS and 2004 ROD did) that there were no special resources requiring protection on the alluvial fans north of the White Area, and concluded that they can and should be developed. (SORs at ___.) The Supplemental EIS reached contrary conclusions. One or the other must be wrong, and the more reasonable conclusion is that the Supplemental EIS is wrong, if only because it places inordinate value on maintaining existing conditions without good reason. (See sections _____ above.)

BLM therefore "committed a material error in its factual analysis"; it did not give "due consideration to all relevant factors", and it did not act "on the basis of a rational connection between the facts found and the choice made." (*See Bristlecone* at 55.)

E. BLM's Decision Is Not Based On Reason And Logic

BLM ignores the facts and proposals it did not want to hear. Although this appeal challenges BLM's decision to expand the CTA into the Northern Areas, the phrase "Northern Areas" never appears in BLM's Answer. BLM argues that it must protect resources in *Las Vegas Wash* (*e.g.* Answer at __), but the Cities are not challenging the protection of resources in Las Vegas Wash (which is part of the White Area, as shown in Exhibit 1.) Instead, the Cities are challenging the decision to prevent development in the *Northern Areas*, where there are no resources. (SORs at ___.) An agency cannot respond fairly to an objection when it will not even acknowledge the area in question.

In the same way, BLM has not fairly responded to many facts that are beyond serious dispute, including (1) the fact that the hydrology of Las Vegas Wash in not natural (see section __ above), (2) the fact that BLM's decision will harm resources (and may endanger lives) if prevents the construction of flood-control facilities (see section ___ above), (3) the fact that BLM's conclusions in the Shooting Park documents really do contradict its conclusions in the Supplemental EIS (see section __ above), (4) the fact that BLM's own modeler described the model as "truncated" and abnormal (see section __ below), and (5) the fact that the Supplemental EIS prohibits the right-of-way grants that SNPLMA requires BLM to issue (see section __ below.) By ignoring these facts, BLM is not giving "due consideration to all relevant factors", and is not acting "on the basis of a rational connection

between the facts found and the choice made." (*See Bristlecone* at 55.)

The simple truth is that there is no good reason to prohibit development in the Northern Areas, just as there is no good reason to prohibit the development of the alluvial fans within the adjacent Shooting Park. Development of the Northern Areas will not harm resources in the wash itself (or in the White Area, which extends beyond the wash), and there is no reason to re-create natural flow conditions (which cause harmful flash floods). BLM is plainly straining to find an excuse to justify a decision it is making for other undisclosed reasons. This is hardly the kind of candor one expects from a federal agency.

In its Answer, BLM provides new excuses that are even more disconnected from reality. BLM asserts that the "a naturally functioning wash system is becoming a rarity around the Las Vegas Valley", and insists that these "systems" are "unique". (Answer at 21:15-16.) But "naturally functioning wash systems" are hardly rare. Washes that really are in their natural state (unlike the part of Las Vegas Wash within the CTA) can be found wherever there is no development. For example, there are many miles of natural washes beginning just upstream of the CTA. (maps.google.com.) And there are countless "naturally functioning wash systems" in the millions of acres of desert surrounding Las Vegas Valley—as the Cities pointed out. (SORs at ___.) A desert wash is neither rare nor unique.

BLM also asserts that these wash systems "create and sustain sensitive resources in their own manner". (Answer at 21:16-17.) Dry washes create resources? Neither the citation nor anything else in the Supplemental EIS supports this proposition. Las Vegas Wash certainly does not "create . . . sensitive resources" like the paleo resources or even the special plant resources (which are present in one part of the White Area but not the rest). Nor does the wash "sustain" them; on the contrary, harmful flash floods wash away the paleo and plant resources (unless the resources are sufficiently far from the wash to avoid destruction).) Nor is there any evidence that the other vegetation and habitat in Las Vegas Wash is any different from ordinary desert—after all, Las Vegas Wash is nearly always *dry*, and the absence of water prevents the development of such things as riparian vegetation and aquatic ecology.

Plainly, BLM's decision results from undisclosed biases, not from reason and logic.

The Cities suggested that BLM is biased against development of the Northern Areas (SORs at ___), and BLM did not disagree. BLM therefore has not provided a satisfactory explanation for its decision to expand the CTA into the Northern Areas. The evidence establishes that "BLM committed a material error in its factual analysis or that the decision generally is not supported by a record showing that BLM gave due consideration to all relevant factors and acted on the basis of a rational connection between the facts found and the choice made." (*Bristlecone* at 55.)

For this reason alone, BLM's decision should be reversed.

IV. BLM VIOLATED NEPA

A. BLM's "Purpose And Need" Improperly Preordained The Outcome

An agency may not define the objectives of an EIS so narrowly that the result would be preordained. (SORs at 23.) The Cities argued that BLM's goal in the Supplemental EIS—protecting the "natural functioning" of Las Vegas Wash—is unreasonably narrow. (*Id.*)

BLM argues that a "reasonableness standard" applies, and that it was merely following the suggestions of the 2004 ROD: "BLM's Supplemental EIS is carrying forward with suggested NEPA analysis suggested by the [2004] ROD". (Answer at 22:1-14, 21-22.) But nothing in the 2004 ROD suggested that the CTA should be expanded from 5,000 acres to more than 10,000 acres. According to the 2004 ROD, "[a]pproximately 5,000 acres will be subject to a process of more study, collaboration, further NEPA analysis, *as needed*, and *approval of a conservation agreement*, if signed, prior to any transfer of title." (2004 ROD at 1, emphasis added.) Plainly, the 2004 ROD did not *require* additional NEPA analysis. BLM asserts that a supplemental EIS should be prepared when "there is a substantial change to a previously analysis project, or there are significant new circumstances or information". (Answer at 23:5-8.) But the project has not changed, and BLM has not identified any significant new circumstances or information.

The purpose and need in the Supplemental EIS would be more reasonable if BLM had declared that it was trying to determine *whether* the boundary should be adjusted. But the actual purpose and need makes that determination a foregone conclusion. Because natural

conditions can be attained only without development, BLM effectively set its goal as "no development". That goal precludes the possibility of reasonable development that does not interfere with the resources in Las Vegas Wash that actually warrant protection. BLM's purpose and need was therefore impermissible.

B. BLM Cannot Properly Rely On Its Hydrological Analysis

The Cities argued that BLM's hydrological analysis was false and misleading. (SORs at 24-29.) BLM provides five arguments in response. None has merit.

First, BLM argues that it is not required to use an engineer licensed in Nevada, and that it is not required to develop a hydrological model that meets the requirements of Hydrologic Criteria and Drainage Design Manual issued by the local Flood Control District. (Answer at 25:5-19.) On the contrary, SNPLMA requires that "[l]and disposal activities of the Secretary shall be consistent with local land use planning and zoning requirements and recommendations." (SNPLMA, § 4(b)(1).) The Supplemental EIS is a "land disposal activity" because it is evaluating the need for a conservation easement on land that BLM intends to dispose of. The Supplemental EIS must therefore be consistent with local requirements, and the Flood Control District's manual is a local requirement—as is Nevada law requiring analyses to be prepared by a Nevada-registered engineer.

Second, BLM argues that the model is used was "based on models already accepted by the [local] Flood Control District" and others. (Answer at 25:20-22, 29:___.) But no one is challenging the underlying equations that BLM used, just the application to the CTA. To understand this argument, it is useful to consider the basic model for determining the balance in a bank account: initial balance plus deposits minus withdrawals equals final balance. In order to get the right final balance in a bank account, it is necessary not only to use the right equation, but also to input the right data. The model here is like a bank-account model because it adds and subtracts water. BLM got all three inputs wrong. It got the initial-balance number wrong because it used a "truncated" model that assumed no rain in much of the area upstream of the CTA. BLM's modeler acknowledged that this truncation was abnormal, and the Cities' expert modelers confirmed that BLM's assumptions about the 100-year storm were

incorrect. (SORs at ___.) BLM got the "deposits" data wrong because it improperly assumed that development would result in increased runoff, contrary to requirements imposed by the Clean Water Act. (*Id.* at ___.) BLM got the "withdrawals" data wrong because it refused to consider the effects of flood-control facilities, which divert waters into detention basins, thereby "withdrawing" them from the flood flows elsewhere in the wash. Modelers have a phrase for what happens when invalid data are entered into a model: Garbage in, garbage out.

There is no doubt that development will *decrease* the peak flows (which is what the model was trying to determine), not *increase* them (as the model concluded), because development includes detention basins whose entire purpose is to reduce peak flows. There is also no doubt that a 100-year storm (i.e. the largest storm expected within 100 years) will not cover only a small area; by definition, the 100-year storm is a *big* storm. When a storm covers a large area, runoff from a relatively small area (i.e. the roughly 5,000 acres at issue here) cannot make much difference to the overall result. The revised model provided by the Cities confirms that when the 100-year storm is properly modeled—consistent with local requirements about the extent of the storm, the duration, the pattern of rainfall, and so forth—development in the Northern Areas makes virtually no difference, even when the model includes the incorrect assumptions that the Clean Water Act will be violated and no flood-control facilities will be built. As a scientific matter, therefore, BLM could not properly come to the conclusion that development will increase flows in Las Vegas Wash.

As a regulatory matter, BLM must at the very least evaluate modeling results and expert opinions that contradict its own. (_____.) Here, BLM has conceded that the modeling results provided by the Cities are "valid". (_____.) The detailed model provided by the Cities, which is consistent with local requirements and uses data appropriate for local conditions, is plainly more reliable than the rough "qualitative" model prepared for BLM, a model BLM's expert acknowledges is abnormal and "truncated". (_____.) Because BLM has available a better, more

detailed model, it cannot reasonably choose to accept the contrary results of a poorer model.[11]

Third, BLM insists that the construction of flood-control facilities is "speculative". (Answer at 27:6-28.) But the construction of flood-control facilities is no more speculative than the construction of a roof on a house. (See section ___ above.) The Master Plan calls for flood-control facilities across the northern boundary of the Northern Areas and the Shooting Park, for the construction of a new detention basin just upstream from the CTA, and for expansion of the detention basins within and just downstream of the CTA. (SORs at ___.) The Cities also provided evidence that a substantial part of the facilities within the Master Plan had actually been built, including the Decatur Detention Basin within the CTA, a detention basin just downstream of the CTA, a 2½-mile levee-and-channel system that crosses the CTA and directs flow into the Decatur Detention Basin, and two levee-and-channel system that directs some of the flow from the Shooting Park to the south, and some to the west. (*Id.* at __; section __ above.) In comparison, BLM offers nothing to suggest that the construction of flood-control facilities is speculative. The evidence, therefore, is entirely in favor of the Cities.[12]

Fourth, BLM effectively concedes that it did not consider the effects of Clean Water Act requirements when assuming that development would increase the amount of runoff. It argues that this lack of consideration does not matter, because its real conclusion is that any change from natural conditions would be bad—simply because the conditions would no longer be natural. (Answer at 28:1-27.) This argument takes us back to the basic question of *why* it is so important to have natural conditions, which cannot be attained anyway. (See

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[11] BLM argues that its model is "qualitative" enough to be used for rough comparisons. (Answer at ___.) But even this argument is wrong. To be used qualitatively, the model must get the proportion between "deposits" and "withdrawals" approximately right. If it incorrectly assumes (as BLM has done here) that there are more deposits than withdrawals, the model will incorrectly concluded that the balance is going up, when in fact the balance is going down.

[12] BLM's attributes to the Cities the statement that "flood-control systems would *almost* certainly occur", and that they "would *typically* be levee-and-channel systems" (Answer at 27:11, emphasis in original) , when the Cities actually said "*of course* flood-control facilities will be built, because the residences will need protection from flash floods coming down from the mountains", and that levee-and-channel systems "are standard for the area" (SORs at 28).

sections _____ above.)

In the process of making this argument, BLM provides more evidence that its arguments are really excuses to cover up an undisclosed bias against development north of the White Area. BLM has found yet another objection to development, which is that there can be a "steady baseflow of water in the wash resulting from lawn sprinkling, car washing, and other types of outside domestic use, which can have detrimental impacts". (Answer at 28:15-16.) But *if* there is a steady baseflow in the wash (there is no evidence of one), it will surely come from the south, where there is a lot of development, not from the north, where development will be limited to a small area. The question for a Supplemental EIS, then, would be whether development in the north would increase the baseflow, and what consequences that increase would have. BLM is quick to jump to the conclusion that a baseflow is detrimental. Too quick. A steady source of water is often considered beneficial in the desert. Water is necessary for life; it also grows plants, and plants provide habitat for animals. The point here is not that a baseflow would be good (or bad), but rather that BLM will grab onto any excuse to prohibit development.[13]

Fifth, and finally, BLM insists that the model truncation was appropriate. (Answer at 29:5-19.) BLM argues that "inclusion [of a larger area] would reduce the clarity of the analysis." (*Id.* at 29:8-9.) But this argument is plainly wrong. If the goal is to model the flow at one or more points along Las Vegas Wash during the 100-year storm (and it was), the model must include *all* areas that will contribute flow to those points. If the model excludes any of these contributing areas, the final result will be inaccurately low. Truncation does not

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[13] In making this argument, BLM also shows that it has not done its homework. It assumes Clean Water Act compliance requires detention followed by "steady releases", which, it argues, "have other consequences." (Answer at 28:12-16.) But EPA prefers something else: "low impact development", which limits runoff by promotion systems that allow stormwater to "infiltrate" into the ground. (SORs at ___.)

increase *clarity*, it creates *error*.[14]

BLM's model, therefore, produces qualitatively as well as quantitatively wrong results for three reasons: it uses the wrong inputs, it overestimates the "deposits", and it completely ignores the "withdrawals". The model therefore cannot fairly be used to evaluate alternatives. More generally, BLM has demonstrated that it has no special expertise in hydrologic modeling. The Cities do have that expertise. (SORs at __.) BLM should therefore defer to the Cities' expertise.

C. BLM Cannot Fairly Evaluate Alternatives Without Considering SNPLMA's Mandatory Right-Of-Way Requirements

The Cities argued that BLM's refusal to discuss land uses precluded a full and fair evaluation of alternatives. (SORs at 29-30.) BLM's response is to mischaracterize this argument as a demand for "a full assessment of *all* future uses within the [CTA]", and resonds that this assertion "is simply Appellants' preference". (Answer at 23:21-22, 24:3-4, emphasis added.) But BLM plainly has to do *some* evaluation of uses so that it can compare alternatives, and it has not done enough. In particular, it has not considered the effects of SNPLMA's requirement that BLM *must* grant rights of way to the Cities for such things as flood control. A properly prepared Supplemental EIS would have acknowledged that the Cities can proceed to obtain rights of way for flood-control facilities, including the detention basins and levee-and-channel systems in the Master Plan. A properly prepared Supplemental EIS would also have recognized that if the Cities proceed to build even one facility—the detention basin just upstream in the CTA—then the portion of Las Vegas Wash within the CTA *cannot* have natural flows (at least not during high-flow conditions). And a properly

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[14] BLM argues that "[t]here is no need to include all washes *from the entire Las Vegas Valley* in this assessment." (Answer at 29:13-14, emphasis added.) There are two responses to this argument. First, if the purpose of the modeling effort is to identify flow within the CTA, then of course there is no need to consider areas *downstream* of the CTA, which obviously do not contribute flow within the CTA. But BLM must consider all contributing areas *upstream* if it is going to get an accurate result. Second, there would indeed be a need to include washes downstream of the CTA if BLM had considered—as it should have—how its decision to maintain "natural" flows within the CTA would harm people and property downstream. (See SORs at ___.)

prepared Supplemental EIS would therefore have concluded that *none* of the alternatives could achieve BLM's announced goal of protecting the "natural" flow of Las Vegas Wash. The Supplemental EIS therefore does not provide a fair evaluation of alternatives.

Worse still, the Supplemental EIS implies that BLM will refuse to comply with the mandatory requirements of SNPLMA. The 2012 ROD asserts that all development within the CTA will be reviewed for compliance with the goal of maintaining natural conditions, and implies that they will be disallowed if they are not compliant. That leaves BLM either in the position of refusing to comply with a mandatory Congressional requirement, or with a planning document that does not plan for the possibility that BLM will be asked to comply with SNPLMA. Either way, the planning is defective.

V. CONCLUSION

BLM's decision should be reversed.

DATED: October __, 2012.

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UNITED STATES DEPARTMENT OF THE INTERIOR

OFFICE OF HEARINGS AND APPEALS

BOARD OF LAND APPEALS

CITY OF LAS VEGAS, NEVADA, a political subdivision of the State of Nevada, and CITY OF NORTH LAS VEGAS, NEVADA, a political subdivision of the State of Nevada Appellants, v. LAS VEGAS FIELD OFFICE, BUREAU OF LAND MANAGEMENT, UNITED STATES DEPARTMENT OF THE INTERIOR, Respondent.	IBLA Docket No. 2012-194 **STATEMENT OF REASONS**

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I. INTRODUCTION

The City of Las Vegas, Nevada, and the City of North Las Vegas, Nevada (jointly the "Cities") have appealed a final supplemental environmental impact statement (the "Supplemental EIS") and a record of decision (the "2012 ROD") issued by the Las Vegas Field Office of the Bureau of Land Management ("BLM").[1] The Supplemental EIS and 2012 ROD violate the Southern Nevada Public Lands Management Act ("SNPLMA")[2], the Administrative Procedure Act ("APA"), and the National Environmental Policy Act ("NEPA"). BLM's decision should be reversed.

The Las Vegas metropolitan area is bounded by land owned by the United States government, much of which is managed by BLM. In 1998, Congress enacted SNPLMA, which provided for the disposal of federal land within a specified "disposal boundary", thereby allowing the metropolitan area to expand to the boundary. Because the land was to be disposed of—either transferred to local governments or sold to the public—Congress required BLM to act consistently with local requirements and even with local recommendations. In 2002, Congress expanded the boundary to provide for the disposal of additional land.

In 2004, BLM issued a final environmental impact statement (the "2004 EIS")[3] and record of decision (the "2004 ROD") for the disposal of BLM land within the disposal boundary. Consistent with Congressional intent, the 2004 EIS and 2004 ROD provided for the disposal of all BLM land within the boundary. About 5,000 acres at the northern edge of the metropolitan area, however, were identified as a "conservation transfer area" (the "2004 CTA") that would be transferred (i.e. disposed) subject to a conservation agreement for protecting sensitive resources, especially paleontological ("paleo") and plant resources.[4]

The paleo and plant resources are found in an area of light-colored soil readily

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[1] BLM (2011, issued 2012). Final Record of Decision and Final Supplemental Environmental Impact Statement, Upper Las Vegas Wash Conservation Transfer Area, Las Vegas, Nevada.

[2] "SNPLMA" is pronounced snip'-ul-muh or snip'-le-muh.

[3] BLM (2004) Las Vegas Valley Disposal Boundary Final Environmental Impact Statement.

[4] In the 2004 EIS, "CTA" referred to the "conservation transfer *alternative*", but the letters soon came to refer to the "conservation transfer *area*".

identifiable in aerial photographs. (*See* Exhibit 1 (showing white area on aerial photograph).) The boundaries of the 2004 CTA, although stair-stepped[5], generally followed the boundaries of the white area. (Exhibit 2 (identifying boundaries of Alternative D in the Supplemental EIS); *see* Supp. EIS at 28 (explaining that Alternative D is equivalent to the 2004 CTA).) The 2004 ROD recognized that these boundaries might need some adjustment.

The Cities incorporated the 2004 CTA into their master plans, including their plans for roads, utilities, and flood-control facilities. Consistent with the 2004 ROD, the master plans provided for development in the areas north and south of the 2004 CTA. In 2008, the Cities submitted a proposed conservation agreement, which (consistent with the 2004 ROD) would have allowed the CTA to be transferred to the Cities. BLM has not responded. In 2010, the Cities proposed an adjustment to the boundaries of the 2004 CTA. This proposal, referred to Alternative D2, would have expanded the 2004 CTA to approximately 5,800 acres. (Exhibit 3.) BLM rejected this proposal.

The Supplemental EIS reverses at least two key decisions in the 2004 EIS. The Supplemental EIS identifies a CTA of 10,669 acres (the "2012 CTA"), more than twice as large as the 5,000-acre 2004 CTA. (Exhibit 4.) And the Supplemental EIS decides that BLM, rather than a local entity, will manage the CTA for at least the near future.

The Cities do not oppose protection of the paleo and plant resources. This appeal is directed at BLM's decision to expand the CTA and prohibit development in two triangular areas north of the white area (the "Northern Areas") and in two road-and-utility corridors (the "Corridors"). The land at issue is the difference between the preferred alternative (Exhibit 4) and Alternative D2 (Exhibit 3). For clarity, a new figure has been prepared showing the boundaries of both alternatives, and the locations of the Northern Areas and the Corridors. (Exhibit 5.) One of the Northern Areas (the one on the left in Exhibit 5) is in the City of Las Vegas; the other is in the City of North Las Vegas. Both would be available for disposal

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[5] The boundary is stair-stepped because it generally followed the north-south and east-west lines of "sections" (i.e. 1-mile square areas of land) and fractions of sections.

and development if not for the Supplemental EIS and 2012 ROD.

The Northern Areas do not contain paleo or plant resources. Why, then, was the CTA expanded to cover the Northern Areas? BLM has not provided a clear answer. Its stated purpose is to protect "hydrologic functioning", and generally to maintain the area in its existing condition. But BLM has not provided a reasonable explanation about *why* the "hydrologic functioning" of the Northern Areas is so important that the disposal directive in SNPLMA should be disregarded. BLM's choices suggest a general bias against development, and a specific and undisclosed intent to block development north of the white area.

The existing "hydrologic functioning" of the Northern Areas does not warrant preservation. Most often there is no hydrologic functioning of any kind, because Las Vegas Valley is in the Mojave Desert, and the desert is usually dry. On those infrequent occasions when rain falls in the area, it has a tendency to cause flash floods, which are sometimes fatal to people and often detrimental to property. Since 1960, 31 lives have been lost in 21 flash floods. (http://www.ccrfcd.org/03-history.htm.) Flash floods overwhelm cars, as the Clark County Regional Flood Control District (the "Flood Control District") demonstrates in a graphic billboard campaign to warn the public about the dangers of flash floods. (Exhibit 6.) To combat flash floods, an extensive system of flood-control facilities has been developed by the Flood Control District, and has partly been built by the Cities and other local entities. Within the 2012 CTA there is now one detention basin, plus a levee-and-channel system more than 2½ miles long. Just outside the CTA there is another detention basin, and more levee-and-channel systems. Many more facilities are planned.

BLM's assertions about the importance of "hydrologic functioning" are contradicted by its environmental assessment ("EA") and finding of no significant impact ("FONSI") for the Clark County Shooting Park, which occupies a rectangular area of 2,880 acres between the two Northern Areas. (Exhibits 2, 5.) The land in the Shooting Park is identical to the CTA in all relevant measures. In the EA and FONSI, BLM concluded that the Shooting Park could be developed without harming any resource. BLM found no need to protect "hydrologic functioning" in the Shooting Park. In fact, it never even mentioned the concept.

The economic consequences of expanding the CTA are severe. According to the Supplemental EIS, BLM's decision will cost the Cities $225 million *per year* in lost business and tax revenue. (Supp. EIS at 221 (comparison of Alternatives B and D).)

BLM has violated SNPLMA. The purpose of SNPLMA is to dispose of the land within the disposal boundary, and yet BLM has decided to retain ownership for the foreseeable future and manage the Northern Areas and the Corridors. SNPLMA requires BLM to convey rights of way for flood-control facilities within the CTA, but the Supplemental EIS prohibits the construction of planned flood-control facilities. SNPLMA requires BLM to act consistently with their local requirements and even recommendations, but BLM has acted contrary to the Cities' requirements and recommendations.

BLM has violated the APA (5 USC § 551 *et seq.*) by not articulating a rational connection between the factual analysis (in the Supplemental EIS) and the decision (in the 2012 ROD). The Supplemental EIS recognizes that there are no sensitive paleo or plant resources in the Northern Areas, and yet BLM insists that the Northern Areas must be treated as sensitive environmental areas. This assertion is contradicted by the 2004 EIS, which did not identify the Northern Areas as sensitive areas, and by the Shooting Park EA and ROD, in which BLM concluded that identical land could be developed without harm to any resource.

BLM has violated NEPA (42 USC § 4321 *et seq.*) in at least three ways. First, BLM misidentified the purpose and need of the project, and defined them so narrowly that development was ruled out. The actual purpose and need of the project was to dispose of BLM-managed lands in accordance with SNPLMA, as the 2004 EIS recognized. But the Supplemental EIS identifies the purpose and need as the protection of the hydrologic functioning and the maintenance of the land in its existing condition. In the Northern Areas, there is no need for either.

Second, the Supplemental EIS does not provide a full and fair discussion of the hydrological effects. BLM's analysis is designed to come to the conclusion that development would produce higher peak stormwater flows and more erosion if the Northern Areas were developed. To achieve this result, BLM had to disregard planned stormwater-control

facilities, which would reduce peak flows, and federal Clean Water Act regulations, which require new developments to maintain stormwater flows at or near existing conditions. BLM's modeling expert, which was not licensed in Nevada and not familiar with local conditions, used nonstandard modeling techniques that exaggerated the hydrologic effects of development in the CTA—as the expert admitted.

Finally, the Supplemental EIS violates NEPA because it does not provide a full and fair discussion of the alternatives and their consequences. BLM has refused to discuss what land uses will be allowed within the CTA. According to BLM, the only thing being considered by the Supplemental EIS is the CTA *boundary*.[6] But there is no way to compare alternatives unless land uses are considered. BLM therefore implies that development inside the CTA will be severely curtailed, but does not disclose what development will be allowed.

This nondisclosure is particularly problematical for the Corridors. By setting the boundary so that the Corridors are inside the CTA, BLM implies that it will impose restrictions on the Corridors. Will these restrictions be so severe that roads and utilities cannot realistically be put in place? BLM refuses to say. But an EIS, above all, is a disclosure document. By not disclosing the consequences of the action, the Supplemental EIS fails its most fundamental test.

BLM's decision should be reversed.

II. FACTS

A. The Setting

Las Vegas Valley is in the Mojave Desert, which borders other deserts. (http://sciences.unlv.edu/desertsurvivors/Pages/mojave.htm.) For at least 100 miles in all directions, metropolitan Las Vegas is surrounded by desert that is almost entirely undeveloped. (http://maps.google.com (satellite view).) BLM manages most of the land in the State of Nevada, along with large areas of land adjoining Nevada to the south, east, and

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[6] BLM implies a four-EIS process: (1) the 2004 EIS, (2) the 2012 Supplemental EIS, (3) an EIS to evaluate land uses within the CTA, and (4) someday, perhaps, an EIS for the conservation agreement that will accompany a transfer of title.

north. (http://www.blm.gov/or/about/blmfacts3.php.) The land at issue here is a very small part of the countless millions of acres of desert managed by BLM.

The location figure provided by the Supplemental EIS, and its underlying aerial photograph, show at least two notable features. (Exhibit 1.) There is a white area, which is narrow at one location but becomes wider to the east. At the narrow location a channel can be identified, and the channel is labeled "Las Vegas Wash".[7]

The paleo resources are located in the white area, not in the lands north or south of the white area. (Exhibit 7.) The sensitive plant resources, both buckwheat and bearpoppy, are located in a portion of the white area identified as the "occupied" area. (Exhibits 8, 9.) BLM argues that these plants have a "potential" to grow elsewhere within the white area, but the "potential" areas are not actually occupied by the plants. There is no potential for these plants to grow within the 2012 CTA north and south of the white area. (*Id.*)

North of the white area, the aerial photographs show that there are overlapping alluvial fans, on which there are countless small channels that spread out somewhat like a fan. (Exhibit 1.) These alluvial fans occupy the space between the mountains and the white area. Alluvial fans are formed when water flows out of the mountains onto more level ground; the water slows down, fans out, and drops at least some of its sediment load. (http://en.wikipedia.org/wiki/Alluvial_fan.) Alluvial fans are common in the area, and throughout the deserts in the arid Southwest.

The Northern Areas at issue in this appeal consist of alluvial fans; they do not include any white area. (Exhibit 5.) The Northern Areas appear no different from the alluvial fans to the north, east, and west of them, and in fact are no different.

Local weather can produce severe thunderstorms with intense rainfall on steep mountain slopes and armored desert surfaces. The stormwater "runs off rapidly, concentrates in the urbanized areas at lower elevations", and causes "flash floods that are extremely

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[7] Although the figure is labeled "Las Vegas Wash", the Supplemental EIS often refers to the "Upper Las Vegas Wash" or the "ULVW". This brief refers to the "Las Vegas Wash".

dangerous for anyone within or adjacent to the path of the flood waters." (Master Plan For Flood Control[8] at 1-5.) To protect against flash floods, the Flood Control District has planned an extensive system of flood-control facilities, including levee-and-channel systems and detention basins. As of 2008, 94 detention basins had been planned, and 65 had been built (of which 14 were to be expanded). (*Id.* at ES-iv.) Approximately 750 miles of channels had been planned, and 388 miles had been built. (*Id.*)

A levee-and-channel system intercepts stormwater and carries it to a detention basin or other location where it is unlikely to cause harm. A detention basin consists of a broad dam, an area upstream of the dam (the basin), and an outlet to the dam. Detention basins catch flash floods, and then release the floodwaters slowly. (*Id.* at 2-4.) They convert a dangerous surge of water into a modest stream. Detention basins can thereby save property, and lives, by altering the natural hydrology.

The 2012 CTA is no longer in its natural condition, at least not hydrologically. Within the CTA there are now a levee-and-channel system more than 2½ miles long, plus a detention basin designed to hold 1,836 acre-feet of water.[9] (Section II.C below (discussing existing and planned stormwater facilities).)

Several other features have altered the natural hydrology of the CTA. There is a road (North Decatur Boulevard) that crosses the CTA just to the east of the Decatur Detention Basin; this road provides access to the Shooting Park. There are two sets of powerlines and their associated maintenance road. (Exhibit 3 (showing routes of powerlines).) The Shooting Park has constructed a concrete channel that intercepts stormwater coming down the alluvial fans, routes it around the facilities, and discharges it into the Decatur Basin. (Exhibit 5.) Development south of Las Vegas Wash—including the golf courses on the Paiute Reservation to the west (shaped like a reverse C on Exhibit 1), and extensive areas of residential development to the south (*id.*)—prevents stormwater from flowing into Las Vegas Wash as it

? Passage not Adj

[8] Clark County Regional Flood Control District (2008). 2008 Las Vegas Valley Flood Control Master Plan Update.

[9] An acre-foot is the amount of water that would cover 1 acre to a depth of 1 foot.

did naturally. As a result, the hydrology of the CTA is no longer natural.

B. The Southern Nevada Public Lands Management Act ("SNPLMA")

As BLM acknowledges, Las Vegas Valley has been one of the fastest growing areas in the United States. (Supp. EIS at 5.) Growth is expected to resume in the future. (*Id.*) Metropolitan Las Vegas is, however, surrounded by federal land, much of which is managed by BLM. In 1998, Congress passed SNPLMA to dispose of federal land within a defined disposal boundary, and in 2002 Congress amended SNPLMA to expand the boundary. (Exhibit 10 (SNPLMA, as amended.)

The principal purpose of SNPLMA is to provide for the disposal of lands within the disposal boundary: "The purpose of this Act is to provide for the orderly disposal of certain Federal lands in Clark County, Nevada . . . ." (SNPLMA, ¶ 2(b).) The secondary purpose is to purchase sensitive lands: ". . . and to provide for the acquisition of environmentally sensitive lands in the State of Nevada." (*Id.*) Consistent with these purposes, part of SNPLMA is devoted to the disposal of property, and another to the use of the money from these sales to purchase other lands. (*Id.*, § 4, § 5.)

SNPLMA imposes on BLM at least five mandatory requirements that favor the "unit of local government", which is defined to include the Cities. (*Id.*, ¶ 3(2).) Two provisions specify that BLM *shall* make available, when requested by the Cities, land for flood-control, water and wastewater, and other public purposes:

> *Recreation and public purposes.* "the unit of local government . . . may elect to obtain [lands to be offered for sale] for local public purposes . . . . Pursuant to any such election, [BLM] shall retain the elected lands for conveyance to . . . such unit of the local government . . . ." (*Id.*, ¶ 4(b)(1).)
>
> *Rights of way for water, sewer, and flood control.* Upon application, by a unit of local government . . ., [BLM] . . . shall issue rights-of-way grants . . . for all reservoirs, canals, channels, ditches, pipes, pipelines, tunnels, and other facilities and systems needed for—
>
> > (i) the impoundment, storage, treatment, transportation, or distribution of water . . . or wastewater; or
> >
> > (ii) flood control management." (*Id.*, ¶ 4(b)(2).)

Three provisions specify that BLM *shall* jointly with the Cities select lands for disposal, *shall* coordinate land-disposal activities, and *shall* act consistently with local requirements and even *recommendations*:

> *Joint selection*. "[BLM] and the unit of local government in whose jurisdiction lands [to be disposed of] are located shall jointly select lands to be offered for sale or exchange . . . ." (*Id.*, ¶ 4(d)(1).)
>
> *Coordination*. "[BLM] shall coordinate land disposal activities with the unit of local government in whose jurisdiction such lands are located." (*Id.*)
>
> *Consistency with local recommendations*. "Land disposal activities of [BLM] shall be consistent with local land use planning and zoning requirements and recommendations." (*Id.*)

Through these provisions, SNPLMA requires BLM to work closely with the Cities, and to defer to them on local planning issues.

In the SNPLMA Strategic Plan, BLM acknowledges that it must support "local governments' master planning". Goal 1 of that plan is to "Provide for the orderly disposal of land in the disposal boundary in a responsible manner that supports local governments' master planning while ensuring a fair market return." (SNPLMA Strategic Plan[10] at 9.)

C. Master Plans For Flood Control And Utilities

Given this commitment to support "local governments' master planning", and given that Congress has required BLM to issue rights-of-way for "facilities and systems needed for . . . wastewater . . . [and] flood control management", the master plans for sewers and flood-control facilities are particularly relevant. The City of Las Vegas has prepared a master plan for wastewater collection (the "Master Plan For Sewers")[11] . The Flood Control District has prepared several updates, most recently a 2008 update, of its master plan for flood control (footnote 8 above).

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[10] U.S. Department of the Interior and U.S. Department of Agriculture (undated, c. 2010). SNPLMA Strategic Plan, FY 2010-FY 2014 (signed by, among others, Ron Wenker, Nevada State Director, BLM).

[11] City of Las Vegas (2008). Wastewater Collection System Master Plan Update.

The Master Plan For Sewers shows sewer lines through the two Corridors.[12] BLM has previously issued rights-of-way for some segments of these sewer lines, but not for all of them. (Supp. EIS at 74.)

The Master Plan For Flood Control provides for a new detention basin at the upper (Northwest) end of the CTA, and for expansion of the two existing detention basins. There will be detention basins at the top end, the middle, and the bottom end of the CTA.[13]

The Master Plan For Flood Control also provides a nearly continuous system of levees and channels across the 9-mile northern boundary of the two Northern Areas and the Shooting Park. These levees and channels will intercept water flowing south across the alluvial fans, and carry it safely to the three detention basins.[14]

D. The 2004 EIS And The 2004 ROD

The 2004 EIS reported that "[t]here are 46,701 acres of public land remaining to be disposed". (*Id.* at 1-4.)[15] The 2004 ROD concluded that all 46,700 acres would be disposed

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[12] A sewer line from the area northeast of the Paiute Reservation golf courses (an area outside the 2012 CTA that can be developed) curves around the northeastern point in the golf courses through the first Corridor, and heads southeast toward Moccasin Road. (Exhibit 11.) A sewer line heads due east along Moccasin Road, passes through the second Corridor, and turns south on North Decatur Boulevard. (Exhibit 12.)

[13] The new 3,385 acre-foot Northwest Detention Basin is to be built at the upper (Northwest) end of the 2012 CTA. (Exhibit 13 (proposed facilities shown in green); Table F-7 (tables are found in the master plan).) The Upper Las Vegas Wash Detention Basin, in the middle of the 2012 CTA, will be expanded from 1,836 acre-feet to 3,257 acre-feet. (Exhibit 15, Table F-9.) The North Las Vegas Detention Basin, just outside the lower end of the 2012 CTA, will be expanded from 1,435 acre-feet to 2,215 acre-feet. (Exhibit 17, Table F-15.)

[14] Across the northern boundary of one of the Northern Areas, there will be a 11.5-foot riprap levee extending 12,725 feet (about 2.4 miles), accompanied by a 200-foot-wide riprap channel extending 12,740 feet. (Exhibit 14, Table F-8.) This levee-and-channel system will divert stormwater into the Northwest Detention Basin. (*Id.*, Exhibit 13.) Along the 3-mile-long northern boundary of the Shooting Park, there will be 8- and 8.75-foot levees accompanied by 20- to 60-foot-wide concrete channels. (Exhibits 14, 15, Tables F-8, F-9.) These channels will connect to two levee-and-channel systems that will take the stormwater south; one will discharge into the Upper Las Vegas Wash Detention Basin. (*Id.*) Across the northern boundary of the other Northern Area, there will be approximately 3 miles of 11- and 12-foot riprap levees, accompanied by 100- to 140-foot-wide riprap channels. (Exhibits 15, 16, Tables F-9, F.10.) These channels will divert stormwater, through other channels, into the North Las Vegas Detention Basin.

[15] The 46,701 acres consisted of "26,286 acres within the original disposal boundary and the approximately 22,000 acres added when the boundary was expanded in 2002." (*Id.*)

of, although the CTA would be disposed of subject to a management agreement:

> BLM has decided to select the Conservation Transfer Alternative (CTA) as analyzed in the FEIS as the agency's preferred alternative. . . . . Selection of this alternative will allow BLM to dispose of approximately 46,700 acres of lands in the Las Vegas Valley. However, approximately 5,000 acres will be subject to a process of more study, collaboration, further NEPA analysis, as needed, and approval of a conservation agreement, if signed, prior to any transfer of title.

(2004 ROD at 1; *see id.* at 1-2 ("lands in the CTA would be disposed based on restrictions or mitigation measures determined necessary through the conservation agreement process.")

Local management of the CTA was consistent with SNPLMA, which had been enacted "to address concerns over federal management of lands in an urbanizing area" and to improve the process for disposing of federal land within Las Vegas Valley. (2004 EIS at 1-2.) BLM agreed that it should not be managing the land: "interspersed parcels [of BLM-managed land within the disposal boundary] are difficult for federal management and thus are more appropriate for disposal and management by local governments". (*Id.* at 1-1.) BLM would hand over control to local governments: "Disposal would allow the local governments to control, manage, and regulate the future uses of these lands." (*Id.* at 1-2.)

The 2004 ROD concluded that mitigation measures could be developed to protect all sensitive resources consistent with the disposal directive:

> [Field] survey results indicated that special status species, cultural resources, natural flood control, and unique paleontological resources are predominantly located in the vicinity of the Upper Las Vegas Wash . . . . The CTA was developed to provide protection and mitigation for these sensitive resources while continuing to dispose of lands as authorized.

(2004 ROD at 3, *see id.* at 5-6 (identifying mitigation measures).)

Hydrology was not a major issue in the 2004 EIS. "Construction and development may result in alteration of the land surface", but "[d]evelopers would be required to comply with construction storm water discharge permits and [other Clean Water Act requirements], thus minimizing impacts to water resources." (2004 EIS at ES-6.) In response to comments, BLM noted that "residential construction may have very little effect . . . where landscaping

results in little change in the amount and quality of runoff", and acknowledged the Flood Control District's responsibility for flood-control management.[16] (*Id.* at H-16.)

Nevertheless, hydrology suddenly appeared as an issue in the 2004 ROD. BLM asserted that the Flood Control District "expressed concern that the natural channel would be changed due to future development", and concluded that additional study should be done of "the potential water releases into the wash and what impacts that would cause throughout the entire wash system." (2004 ROD at 5.) But the Flood Control District's written comments say nothing about the subject. (2004 EIS at H-63 to H-64.)

E. The Draft Supplemental EIS

BLM has not implemented its decision, in the 2004 ROD, to work with a local entity on a conservation agreement. The Cities submitted a proposed conservation agreement for the CTA in January 2008[17], but BLM never responded to it.

The Draft Supplemental EIS, issued in January 2010, was not directed towards the development of a conservation agreement. Instead, it proposed expanding the CTA boundary from its original 5,000 acres to more than 11,000 acres. (Draft Supp. EIS at 26.) The draft is almost identical to the final Supplemental EIS, except for changes along the western edge of the boundary, which reduced the size of the CTA from 11,007.6 acres in the draft to 10,669 acres in the final. The draft, like the final, identifies the protection of "hydrologic function" and existing conditions as the purpose and need; the draft refuses to consider land uses within the CTA; the draft acknowledges that there are no paleo or plant resources within the Northern Areas; the draft relies on a model (and on the assumptions that flood-control measures will not be built, and that Clean Water Act requirements will not be followed) for its conclusion that development in the Northern Areas will increase peak flows; and the draft

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[16] The Flood Control District "is responsible for developing and implementing a comprehensive flood control master plan which serves as a planning tool for the implementation of the flood control system in the Valley and the design and construction of master plan facilities". (*Id.*)

[17] City of Las Vegas and City of North Las Vegas (January 2008). Upper Las Vegas Wash Conservation Transfer Area Management Agreement. Prepared by Entrix, Inc. and Logan Simpson Design, Inc.

does not provide a reasonable explanation for why the CTA is being expanded.

F. The Shooting Park EA And FONSI

BLM issued the Shooting Park EA in December 2009, one month before it issued the Draft Supplemental EIS in January 2010. The finding of no significant impact ("FONSI") was issued in February 2010. The Shooting Park EA evaluated the development of 2,880 acres located between the two Northern Areas. (Exhibits 2, 5.) The Shooting Park consists mostly of an alluvial fan identical in all relevant measures to the Northern Areas. (*Id.*) Facilities will extend over most of the alluvial fan, and even into the white area. (Exhibit 18.)

The Shooting Park EA and FONSI could hardly be more different from the Draft Supplemental EIS. Neither the EA nor the FONSI identifies any special hydrological resources, and there is no reference to "hydrologic function". The EA and FONSI do not identify any need to maintain existing patterns of flow across the alluvial fans into Las Vegas Wash; on the contrary, BLM makes clear that the Shooting Park will artificially channelize stormwater around the developed areas. (EA at 16 ("flows from the [alluvial] fan will be collected into channels and routed around the area").)

Paleo resources are found in the white area, as they are in the CTA. But they will be protected by only limiting the development mostly to alluvial fans. (*Id.* at 17; *see* Exhibit 18.) BLM does not assert that building the flood-control facilities, or that routing stormwater around the developed areas, will harm the paleo resources or any other resources.

Other than the paleo resources, BLM does not suggest that any of the land should be kept in its natural or existing condition. On the contrary, BLM asserts that the land *should be developed.* According to the FONSI, "BLM is not well suited to manage lands in and around urbanizing areas"; and because of these management difficulties "[m]any public lands within the SNPLMA disposal boundary are used by the public as dump sites, which can be hazardous to . . . children playing in these areas." (FONSI at fourth unnumbered page.) These dumps cause air pollution: The BLM has estimated that 70 percent of the corrective actions issued by Clark County for PM_{10} emissions (fine dust, an air pollutant particularly troublesome in desert areas) are directly related to dumping." (*Id.*) The solution, according to

BLM, is development: "By conveying public lands into private ownership, and as these lands are developed, dumping and unauthorized off-road use will cease and the PM_{10} emissions will be reduced." (*Id.*)

G. Comments Submitted By The Cities

In response to the Draft Supplemental EIS, the Cities submitted a 4-page cover letter, plus 72 single-spaced pages of detailed comments, plus a disk containing exhibits. The Cities identified ten major issues, including the inconsistency with SNPLMA, the inconsistency with the 2004 EIS and ROD, the unreasonably narrow definition of purpose and need, the incorrect hydrological analysis, the inconsistencies with local plans and requirements, the lack of a full and fair discussion of environmental consequences, the lack of progress on a conservation agreement, and virtues of Alternative D2.[18]

The Cities questioned two key assumptions underlying the BLM's hydrological model: (1) the assumption that the flood-control structures identified in the Flood Control District's master plans would *not* be built, and (2) the assumption that development would be implemented in violation of the Clean Water Act and other laws that require new development to maintain stormwater runoff at or near existing conditions. The Cities argued that these two assumptions were plainly false, and that either invalidated the entire modeling effort. Peak stormwater flows will obviously be less than they would otherwise be if the stormwater is routed into a detention basin, because detention basins reduce peak flows. Peak stormwater flows will obviously remain the same if development is designed so that these flows remain the same. Either way, BLM's model does not fairly simulate the effects of development. (*E.g.* Detailed Comments at 10.)

And there was more. The Flood Control Section of the City of Las Vegas Public Works Department, which reviews hydrological models submitted by developers, contacted BLM, obtained available information on the factors used to develop the model, re-created the

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[18] E. Fretwell and M. Ustick (May 21, 2010). Letter to Bob Ross at 1-4; City of Las Vegas and City of North Las Vegas (2010). Detailed Comments on the Upper Las Vegas Wash Conservation Transfer Area, Draft Supplemental Environmental Impact Statement, at 2-18.

model, and then revised the model to make it consistent with the requirements of the Hydrologic Criteria and Drainage Design Manual issued by the Flood Control District. (*Id.* at 61-68.) When the model was revised, development in the Northern Areas resulted in no significant increase in peak flows—even when BLM's two false assumptions were taken as givens. The revised model showed that the difference between the preferred alternative and Alternative D was less than ¼ %. (*Id.* at 66.)

H. BLM's Response To Comments, And The Final Supplemental EIS

BLM provided perfunctory responses to the Cities' comments. There was no followup meeting of the lawyers to resolve legal differences, for example, and no followup meeting of the modelers to resolve modeling differences. BLM acknowledged that the Cities' model was valid, but insisted that its model was valid too. (2012 ROD at 9-10.)

BLM slightly modified the boundary, which reduced the CTA from about 11,009 acres to 10,669 acres. (*Id.* at 2.)

On March 30, 2012, the notice of availability of the Supplemental EIS was published in the Federal Register. On April 25, 2012, the Cities filed a timely appeal.

III. BLM VIOLATED SNPLMA

BLM has violated SNPLMA in at least two ways. BLM has refused to comply with the Congressional directives that (1) it dispose of land within the disposal boundary, and (2) it act consistently with local planning requirements and recommendations.

A. Congress Directed BLM To Dispose Of The Land

Congress enacted SNPLMA for the purpose of disposing of lands within the disposal boundary: "The purpose of this Act is to provide for the orderly disposal of certain Federal lands in Clark County, Nevada . . . ." (SNPLMA, ¶ 2(b).) "If the intent of Congress is clear, that is the end of the matter; for the court, *as well as the agency*, must give effect to the unambiguously expressed intent of Congress." (*Chevron, U.S.A., Inc. v. NRDC, Inc.*, 467 U.S. 837, 842-843 (1984), emphasis added.) Here, the intent of Congress is clear—Congress intended BLM to dispose of BLM-managed land within the disposal boundary—and that is

the end of the matter.[19]

And that did indeed seem to be the end of the matter, until BLM issued the Supplemental EIS. Other BLM documents are consistent with the Congressional directive to dispose of BLM land within the boundary. In the SNPLMA Strategic Plan, disposal is both the mission ("program partners facilitate the orderly *disposal* of Federal land in the Las Vegas Valley") and Goal 1 ("Provide for the orderly *disposal* of land in the disposal boundary"). (Strategic Plan at 8-9, emphasis added.) The 2004 ROD concluded that all land within the boundary would be available for disposal, although "lands in the CTA would be disposed based on . . . the conservation agreement process". (2004 ROD at 1-2.)

One SNPLMA provision is particularly noteworthy. BLM must transfer rights of way identified by the Cities "for all reservoirs, canals, channels, ditches, pipes, pipelines, tunnels, and other facilities and systems needed for . . . wastewater; or . . . flood control management." (SNPLMA, § ¶ 4(b)(2).) Despite this provision, BLM has decided that it *will not allow* the development of planned flood-control facilities within the CTA:

> The following measures will be incorporated into the Conservation Agreement for the CTA
>
> . . . . Avoid . . . armoring (e.g., rip rap), channeling, diversion structures, detention basins, etc.

(2012 ROD at 5.) In other words, detention basins and riprap are prohibited.

The Master Plan For Flood Control identifies one new detention basin for construction, and expansion of two existing detention basins within the CTA and just downstream of the CTA. (Section II.C above.) The Master Plan also provides for the construction of nearly nine miles of armored levees and channels, using both riprap and concrete, across the northern edge of the Northern Areas and the Shooting Park. (*Id.*) The Supplemental EIS, therefore, prohibits the development of planned flood-control facilities

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[19] The Interior Board of Land Appeals ("IBLA") does not apply *Chevron* deference to interpretations of regional directors. (*Statoil Gulf of Mexico LLC*, 178 IBLA 244, 255-256 (2009).) *Chevron* is cited here to make the point that agencies, as well as courts, must comply with the unambiguously expressed intent of Congress.

within the CTA, in violation of SNLMA's requirement that BLM transfer the rights of way for flood-control facilities as requested by the Cities—and while it is allowing *concrete* levee-and-channel facilities to be built in the Shooting Park.

In response, BLM makes two arguments. First, BLM asserts that SNPLMA *authorizes* it to dispose of land within the disposal boundary, but does not *require* it to dispose of land within the boundary. (Supp. EIS at N-18.) On the contrary, the rights-of-way provision *requires* BLM to issue the rights of way. (SNPLMA, § ¶ 4(b)(2).) Moreover, although the general disposal provision is phrased in terms of authorization, it should be read together with the purpose of SNPLMA, which is "to provide for the orderly disposal of certain Federal lands". (SNPLMA § 4(a), § 2(b).)[20] The statute should also be read consistent with the 2004 EIS, which decided to dispose of *all* BLM-managed land within the disposal boundary, and with the SNPLMA Strategic Plan, which identifies disposal both as the mission and Goal 1. (Section II.D above; Strategic Plan at 8-9.)

Second, BLM asserts in its responses to comments that it will dispose of the CTA after development of a conservation agreement. (Supp. EIS at N-18.) But the 2012 ROD makes clear that BLM *will not* dispose of the CTA, at least not anytime in the near future: "The action enables [BLM] to continue to manage for the protection of sensitive resources in the Conservation Transfer Area study area". (2012 ROD, unnumbered signature page; *see also* Supp. EIS at N-18 ("uses on BLM-managed lands, including those that would occur within the final CTA boundary, will be determined through the current BLM . . . resource management planning process").) Only about 3,000 of the more than 13,000 acres will be available for disposal: "The lands available for disposal include 2,654 acres within the jurisdiction of the City of Las Vegas and 373 acres within the jurisdiction of the City of North Las Vegas." (*Id.* at 5.)

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[20] "In determining whether Congress has specifically addressed the question at issue, a reviewing court should not confine itself to examining a particular statutory provision in isolation"; on the contrary, "the words of a statute must be read in their context and with a view to their place in the overall statutory scheme." (*FDA v. Brown & Williamson Tobacco Corp.*, 529 U.S. 120, 132-133 (2000).)

Neither of BLM's arguments justifies its refusal to comply with a specific statute requiring BLM to convey rights of way for flood-control facilities, or its refusal to comply with a clear Congressional directive to dispose of the land within the disposal boundary.

B. Congress Directed BLM To Defer To The Cities' Land Use Requirements And Recommendations

In at least five provisions, SNPLMA requires BLM to defer to decisions made by the "unit of local government", which is defined to include the Cities. (Section II.B above.) BLM has refused to defer to local governments, in violation of SNPLMA.

SNPLMA requires BLM to follow not only local requirements, but also local *recommendations*: "Land disposal activities of [BLM] shall be consistent with local land use planning and zoning requirements and recommendations." (SNPLMA § 4(d)(1).) BLM must select lands for disposal jointly with the Cities, and "coordinate land disposal activities with the unit of local government in whose jurisdiction such lands are located." (*Id.*)

The SNPLMA Strategic Plan emphasizes that BLM has reached out to other entities "to develop a unique partnership" in which "partners work together to facilitate the sale of Federal lands within the disposal boundary". (Strategic Plan at 5.) Goal 1 acknowledges BLM's obligation to support the Cities' master plans: "Provide for the orderly disposal of land in the disposal boundary in a responsible manner that supports local governments' master planning while ensuring a fair market return". (*Id.* at 9.)

In the Supplemental EIS, BLM has not deferred to the Cities' master plans, or acted consistently with local planning requirements and recommendations. The Supplemental EIS does not provide for sewers consistent with the Master Plan For Sewers, and the 2012 ROD prohibits the very flood-control facilities that are identified in the Master Plan For Flood Control. (Section II.C above.) Rather than deferring to the recommendations of the local entities, BLM has rejected the Cities' requests to develop the Northern Areas and to locate utility easements outside the CTA. BLM has also usurped the authority of the Flood Control District by asserting control over flood-control facilities in the CTA—without any

consideration of whether BLM's decision will cause harm downstream.[21] When Congress required BLM to act consistently with local recommendations, it plainly did not intend BLM to ignore master plans, refuse requests for utility corridors, and dismiss reasonable requests for development in the Northern Areas. BLM has thereby violated SNPLMA.

IV. BLM DID NOT ARTICULATE A RATIONAL CONNECTION BETWEEN THE ENVIRONMENTAL ANALYSIS AND ITS DECISION

The APA requires an agency to "'examine the relevant data and articulate a satisfactory explanation for its action.'" (*FCC v. Fox TV Stations, Inc.*, 556 U.S. 502, 513-514 (2009), quoting *Motor Vehicle Mfrs. Assn. of United States, Inc. v. State Farm Mut. Automobile Ins. Co.*, 463 U.S. 29, 43 (1983).) An agency that changes position must say so:

> To be sure, the requirement that an agency provide reasoned explanation for its action would ordinarily demand that it display awareness that it is changing position. An agency may not, for example, depart from a prior policy *sub silentio* . . . . And of course the agency must show that there are good reasons for the new policy.

(*Id.* at 515.) When the new position depends on factual findings that contradict the previous policy, an agency must provide a reasoned explanation:

> [T]he agency need not always provide a more detailed justification than what would suffice for a new policy created on a blank slate. Sometimes it must—when, for example, its new policy rests upon factual findings that contradict those which underlay its prior policy . . . . It would be arbitrary or capricious to ignore such matters. In such cases it is not that further justification is demanded by the mere fact of policy change; but that a reasoned explanation is needed for disregarding facts and circumstances that underlay or were engendered by the prior policy.

(*Id.* at 515-516.)

Here BLM has not disclosed its change in position. It has neither articulated a rational connection between the facts and its decision, nor provided any reasonable explanation for its decision. As a result, it has violated the APA and IBLA requirements.

If the Supplemental EIS were truly a supplement to the 2004 EIS, it would describe

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[21] BLM's modeling is limited to stormwater flows *in the CTA*.

the same project as the original. But it does not. The project, as identified in the 2004 EIS, was the disposal of land in accordance with SNPLMA: "[BLM] plans to dispose of BLM-managed land in the Las Vegas Valley, consistent with [SNPLMA as amended]". (2004 EIS at 1-1.) The project, as envisioned in the Supplemental EIS, is the preservation of "hydrologic functioning" and existing conditions: "Establishing the CTA boundary is intended to preserve the ULVW's [Upper Las Vegas Wash's] natural hydrologic functioning and water quality." (Supp. EIS at 11.) BLM's "stated goal" is "to maintain natural processes in the ULVW". (2012 ROD at 9.) The goals have obviously changed, and BLM does not disclose *why* it has changed the goals.[22]

Nor does BLM provide a reasonable explanation for the change in position that resulted in this appeal: the expansion of the CTA to include not only the white area along the Las Vegas Wash, where the paleo and plant resources are present, but also the Northern Areas, in which there are no paleo or plant resources. (Section II.A above; Exhibits 7-9.)

The arbitrary nature of BLM's decision is highlighted by the contradictory positions BLM took in the Draft Supplemental EIS, issued in January 2010, and the Shooting Park EA, issued one month earlier. Both documents reviewed development on lands that are identical in all relevant respects; they are alluvial fans north of the white area. The Shooting Park lands are located between the two Northern Areas. (Exhibits 2, 5.) In the Draft Supplemental EIS, BLM asserted that the Northern Areas should not be developed because that would alter the "hydrologic functioning" of the Las Vegas Wash. (Draft Supp. EIS at 7, 26.) But in the Shooting Park EA, BLM expressed no concern about the hydrologic effects of development, and did not even mention "hydrologic functioning". (Section II.F above.)

There is an even greater contradiction between the final Supplemental EIS and the Shooting Park FONSI issued in February 2010. The Supplemental EIS insists that development within the CTA should be prohibited because it threatens sensitive resources,

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[22] Although the Cities have pointed out that the hydrology of Las Vegas Wash is no longer natural (section II.A above), BLM continues to refer to "natural functioning". This brief refers to BLM's goal as maintaining the area in its "existing" condition.

whereas the FONSI asserts that development should be encouraged because it prevents illegal dumping hazardous to children, and improves air quality. (Section II.F above.) To comply with the APA, BLM must explain why it has changed position from the Shooting Park FONSI and 2004 EIS. This it has not done.

BLM asserts that it wants to maintain the natural characteristics of the alluvial fans:

> To the extent practicable, BLM wants to maintain a dynamic wash system that requires the input of sheet flow and other run-off from the alluvial fan north of the ULVW to maintain the natural characteristics of its hydrologic condition.

(2012 ROD at 9.) But *why* does it want to maintain natural conditions in the Northern Areas? BLM's goal of protecting "hydrologic functioning" and "natural functioning" cries out for an explanation. The "hydrologic functioning" and "natural functioning" of alluvial fans is to produce flash floods, which are bad for people, bad for property, bad for paleo resources (which are washed away and forever lost), and bad for plant resources. (Sections I, II.A above.) If BLM truly wanted to protect paleo resources, it would endorse the planned flood-control facilities, which will direct stormwater to detention basins, thereby reducing peak flows (and erosion) within Las Vegas Wash.

BLM offers two rationales. First, BLM asserts that development outside the white area will affect conditions within Las Vegas Wash:

> Development on this alluvial fan will permanently alter the hydrologic conditions/water resources (surface and ground), watershed function, hydrologic function, and natural function of the wash.

(2012 ROD at 9.) Note that this sentence asserts only that there will be changes, not that the changes will be harmful to paleo resources, plant resources, or anything else. In fact, the changes will undoubtedly be beneficial, because the peak flows would be lower. BLM must therefore explain *why* the benefits of flood-control facilities should *not* be implemented.[23]

BLM also asserts that flood-control structures will "impact sensitive resources":

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[23] Elsewhere in the Supplemental EIS, BLM asserts that development will *increase* flows in Las Vegas Wash. But BLM did not consider the beneficial effects of the planned flood-control facilities. (Section VI.A below.)

> In addition, development on this alluvial fan will require the construction of flood control structures, utilities, roads and other infrastructure in the wash. This will directly impact sensitive resources even with mitigation measures in place.

(2012 ROD at 9.) This statement is directly contradicted by both the 2004 EIS and the Supplemental EIS. The 2004 EIS found that the effects of development within the CTA could be mitigated (section II.D above), which contradicts the statement that there will be harm "even with mitigation measures". The Supplemental EIS found that the sensitive paleo and plant resources were not harmed by either the preferred alternative (Alternative B) or the 5,000-acre-CTA alternative (Alternative D), thereby contradicting the statement that development in the Northern Areas "will directly impact sensitive resources".[24]

This statement is also wrong because it is not consistent with the facts. The levee-and-channel systems will be built *outside* the white area, where construction cannot harm resources *inside* the white area. Although a new detention basin will be built at the upper end of the CTA, there are no plant resources in that area, and any harm the construction might cause to paleo resources can be mitigated by retaining academic and museum personnel to excavate and preserve the resources. BLM is therefore wrong when it says that developing the Northern Areas would cause harm to sensitive resources that cannot be mitigated.

Note that BLM's statement above refers to "run-off from the alluvial fan *north* of the ULVW to maintain the natural characteristics of its hydrologic condition" (emphasis added). If the goal is truly to maintain existing flows in Las Vegas Wash, then runoff entering Las Vegas Wash from the *south* must also be kept in its existing condition. But the preferred alternative allows for development south of the wash. Why? BLM provides no answer. This inconsistency strongly suggests that BLM's true reason for disallowing growth north of the white area is *not* the maintenance of existing hydrological conditions in Las Vegas Wash, which will be changed by BLM-approved development south of the white area. BLM must

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[24] Alternative B would protect 436 fossil locations, whereas Alternative D would protect 422. (Supp. EIS at ES-9.) For plant resources, Alternative D is somewhat better, at least for bearpoppies. Alternative B would remove from protection 5.4 acres actually occupied by bearpoppies, whereas Alternative D would remove none. (Supp. EIS at ES-7.)

have some other, undisclosed reason for its decision.

In short, BLM has not provided any reasonable explanation for why "hydrologic function" should be protected, why flows in Las Vegas Wash should be kept in their existing condition, why the Northern Areas cannot be developed, why beneficial flood-control facilities should not be built, or why the factual conclusions in the Supplemental EIS are so different from those in the Shooting Park EA and ROD.

BLM has therefore violated the APA.

V. BLM SET ARTIFICIALLY NARROW GOALS THAT PREORDAIN THE OUTCOME

> [A]n agency may not define the objectives of its action in terms so unreasonably narrow that only one alternative from among the environmentally benign ones in the agency's power would accomplish the goals of the agency's action, and the EIS would become a foreordained formality. . . .
>
> Instead, agencies must look hard at the factors relevant to the definition of purpose. When an agency is asked to sanction a specific plan, the agency should take into account the needs and goals of the parties involved in the application. Perhaps more importantly, an agency should always consider the views of Congress, expressed, to the extent that the agency can determine them, in the agency's statutory authorization to act . . . .

(*Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 196 (D.C. Cir. 1991), citations omitted.) Here, BLM established, as one of the two purposes in the Supplemental EIS, protection of "the natural functioning of the ULVW". (Supp. EIS at 11.) This goal "requires the input of sheet flow and other run-off from the alluvial fan north of the ULVW". (2012 ROD at 9.) To maintain the runoff in its existing condition, development must be prohibited. The purpose thereby pre-ordains BLM's choice of a no-development alternative, in violation of NEPA.[25]

When BLM was developing the purpose of the Supplemental EIS, it did not adequately consider the views of Congress, which in SNPLMA directed BLM to dispose of

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[25] To be sure, BLM has not chosen the most extreme no-development alternative. But BLM's decision does not make its identified purpose less narrow. Instead, the decision makes clear that BLM is acting for reasons other than its identified purpose.

the land within the disposal boundary. Nothing in SNPLMA suggests that Congress would have wanted BLM to block development on land within the disposal boundary by insisting that the "hydrologic functioning" must be protected, when the local units of government are demanding otherwise.

BLM's artificially narrow goal thereby violates NEPA, as does its lack of deference to Congressional intent as expressed in SNPLMA.

VI. BLM DID NOT PROVIDE A FULL AND FAIR DISCUSSION

"An EIS must 'provide full and fair discussion of significant environmental impacts.'" (*National Parks & Conservation Association v. BLM*, 586 F.3d 735, 748 (9th 2009), quoting 40 CFR § 1502.1.) Here BLM did not provide a full and fair discussion of at least two key issues: hydrology and land use.

A. BLM's Hydrologic Analysis Is False And Misleading

> Where . . . BLM *properly relies* on the professional opinion of its technical experts concerning matters within the realm of their expertise, *which is reasonable and supported by record evidence*, an appellant challenging such reliance must demonstrate, by a preponderance of the evidence, *error in the* data, *methodology, analysis, or conclusion* of the experts. A mere difference of opinion, even of expert opinion, will not suffice . . . .

(*Backcountry Against Dumps*, 179 IBLA 148, 161-162 (2010), emphasis added.) Here the objections go far beyond a mere difference of opinion. BLM did not properly rely on its expert, which made unreasonable assumptions unsupported by the evidence. The expert's methods, analysis, and conclusions were in error because it intentionally biased its modeling results to exaggerate the effects of development, and because it chose incorrect parameters for its hydrology model.

BLM did not properly rely on its modeling expert because its expert was not licensed to prepare hydrologic evaluations of Las Vegas Valley. Nevada law requires hydrologic modeling evaluations to be stamped by a Nevada-certified engineer. BLM's expert did not provide the required certification, and the analysis was therefore in violation of Nevada law. (Detailed Comments at 11.)

BLM also did not properly rely on its modeling expert because the expert did not comply with local requirements for hydrologic models, as set out in the Hydrologic Criteria and Drainage Design Manual issued by the Flood Control District. (*Id.* at 10-12, 61-68.) These are the modeling requirements that would be imposed on a developer who was applying for permits to develop the Northern Areas. SNPLMA requires that "Land disposal activities of [BLM] shall be consistent with local land use planning and zoning requirements and recommendations." (SNPLMA ¶ 4(d)(1).) Here the expert did not comply with local planning requirements, and BLM could therefore not properly rely on the expert.

BLM's model depends on two unreasonable assumptions. First, BLM's expert assumed that although the area was fully developed, the flood-control facilities identified in the Master Plan would not be built. There was no good reason to make this assumption. The Master Plan provides for a new detention basin to be built, two detention basins to be expanded, and miles of levee-and-channel systems to be installed. (Section II.C above.) Detention basins and channels have been built throughout Las Vegas Valley; and there is no reason to doubt that facilities would be built to protect development in the Northern Areas. (Section II.A above.) The contrary assertion—that residences would be left vulnerable to flash flooding—is plainly wrong.

This incorrect assumption invalidates the modeling results. BLM's model was intended to simulate the peak flows associated with the alternatives, which included full development in the Northern Areas (Alternative D) and no development in the Northern Areas (Alternative B). The model calculated that peak flows would be higher with Alternative D. But if the model had assumed that the flood-control facilities would be built, as it should have, then the peak flows would be *lower*, because the purpose of detention basins is to lower peak flows. (Detailed Comments at 10-11; section II.A above.)

BLM's expert also assumed, incorrectly, that development would be built in violation of Clean Water Act and other requirements. (Detailed Comments at 10.) There was no good reason to make this assumption, which also invalidates the model. Regulations and NPDES discharge permits issued under the Clean Water Act promote "low impact development"

("LID"), whose goal "is to restore the natural, pre-developed ability of an urban site to absorb stormwater"[26], and require post-construction stormwater controls that maintain runoff at or near existing conditions.[27] Obviously, if runoff from developed areas is no greater than runoff from the same area before development, then peak flows cannot increase.

Next, the model was invalid because it was intentionally biased to exaggerate the effects of development. Here is the key technical concept: When results are expressed as a percentage increase over a baseline, the increase will be artificially high when the baseline is artificially low. For example, an increase of 100 gallons per day would be a small percent increase over a baseline of a million gallons per day, but a large percent increase over a baseline of 200 gallons per day. BLM's expert artificially lowered the baseline by modeling only a small area. The "rainfall-runoff model was truncated to include only the CTA study area and selected contributing subbasins". (Hydrology Report[28] at 4.) BLM's expert admits that this procedure is abnormal: "Normally a rainfall-runoff model would include all contributing subbasins appropriate for a specific storm event, including those upstream of the area of interest." (*Id.*) BLM's expert explains that the model was truncated for the purpose of exaggerating the differences among alternatives, and acknowledges that including more subbasins would "dampen the changes in hydrology". (*Id.*) In other words, the differences

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[26] http://cfpub1.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_results&view=specific&bmp=124

[27] *See e.g.* Clean Water Act § 402(p)(3)(A) (requiring NPDES permits for discharges of stormwater "associated with industrial activity"); 40 CFR § 122.26(b)(14)(x), (b)(15) (defining stormwater discharges associated with industrial activity to include construction sites greater than 1 acre); http://cfpub1.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=min_measure&min_measure_id=5 (EPA requirements for post-construction stormwater management in new development; "[t]he best way to mitigate stormwater impacts from new developments is to use practices to treat, store, and infiltrate runoff onsite before it can affect water bodies downstream"); http://ndep.nv.gov/bwpc/storm_cont03.htm (Nevada Division of Environmental Protection requires a permit for construction sites of greater than 1 acre); http://ndep.nv.gov/bwpc/conperm02.pdf at 1 (Nevada permit requirements for construction sites discharging stormwater), at 11-12 (requiring sediment basins, velocity-dissipation devices, and post-construction measures to retain stormwater and prevent erosion).

[28] BLM (2009). Bureau Of Land Management Seis Technical Support Hydrology And Erosion Analysis Upper Las Vegas Wash Clark County, Nevada. Prepared by Kleinfelder West, Inc.

would have been smaller if a larger area had been modeled, because the larger area would generate higher flows, and the percent increase over baseline would drop. Because BLM's expert concedes that the model was truncated and abnormal, there is no dispute that the model *does not* provide an accurate simulation of conditions associated with future development.

Truncation was only one of the model's many faults. There are many "parameters" that must be set when developing a model, for example the areal extent of the storm, the intensity of the rainfall, and the response of the soil. BLM's expert was apparently not familiar with the parameters used in Las Vegas Valley. The Flood Control Section of the City of Las Vegas Public Works Department, which reviews hydrological models submitted by developers, re-created BLM's model and then revised it using parameters appropriate for Las Vegas Valley. The revised model showed that there was virtually no difference among the alternatives, even when the false assumptions (no flood-control facilities, development in violation of law) were taken as givens. The difference between Alternative D (full development in the Northern Areas) and Alternative B (no development in the Northern Areas) was less than ¼ %. (Detailed Comments at 66 (comparison of Alternatives B and D).)

Finally, the Supplemental EIS does not provide a full and fair analysis because BLM made no attempt to determine the truth. BLM acknowledges that the Cities' model was valid, but asserted that BLM's model was also valid. (2012 ROD at 9-10.) But the two models strongly disagree on the increase in peak flows associated with development, and therefore cannot both be valid. BLM insists that "[t]he relative model outcomes would not change significantly if the much greater level of detail requested by the [Cities] was employed." (Supp. EIS at N-32.) On the contrary, the outcome does change. According to the Cities' model, the difference in peak flows with and without development is less than ¼ %; according to BLM's model, the difference is 12%. (Detailed Comments at 66.)[29]

In response to the comment that the model depends on false assumptions, BLM asserts

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[29] According to BLM's model, Alternative B produced an 8% increase over baseline, whereas Alternative D produced a 20% increase over baseline.

"it is impossible to know the details of how the final design of drainage infrastructure will eventually play out." (Supp. EIS at N-32.) This is not a serious response. If the Northern Areas are developed, then of course flood-control facilities will be built, because the residences will need protection from flash floods coming down from the mountains. The flood-control facilities will almost certainly consist of levee-and-channels systems that divert the water to detention basins, because these types of facilities are standard for the area. A levee-and-channel system has been built for the Shooting Park; this system diverts stormwater to the Decatur Detention Basin. (Exhibit 5.) A levee-and-channel system has also been built in North Las Vegas east of the CTA; this system diverts stormwater to the North Las Vegas Detention Basin. (Exhibit 17.) Levee-and-channel systems are typically built at the uphill extent of development, because anything uphill of the system is not protected. As a result, there is little doubt that development in the Northern Areas will be accompanied by levee-and-channel systems along the northern edges, and that these systems will divert water to detention basins—which is what the Master Plan For Flood Control Facilities calls for. BLM's assumption—that there will be *no* flood-control facilities built to protect the residences—has no connection to reality.

BLM also argues that "[s]implifications were made because it was never the intent to perform modeling at a master planning or final design level". (*Id.* at N-32.) But why should a federal agency base important decisions on modeling that would not pass muster if it were submitted by a developer? If BLM did not have the in-house expertise to model, and if it did not have the money to produce a model of the same quality as developers produce, then it should have asked the Cities for assistance. And, now that BLM has the results of the Cities' modeling expertise, it should use the results of the Cities model.

The Supplemental EIS, therefore, does not provide a full and fair discussion of the hydrological issues. BLM's model is not a valid simulation of stormwater associated with future development. It relies on false assumptions; it has been designed to exaggerate the effects of development; and it has not been prepared in accordance with local requirements and good engineering practice. Although BLM's main assertion about hydrology is

tautological—if there is change, there will be change—BLM has not performed any analysis of sufficient quality to demonstrate that development will increase peak flows. In fact, simple logic leads directly to the opposite conclusion. Development will be accompanied by detention basins. Detention basins are designed to decrease peak flows. Therefore, if there is development, there will be a decrease in peak flows.

BLM's hydrologic analysis violates NEPA.

B. BLM's Refusal To Disclose Land Uses Precludes A Fair Evaluation

BLM insists that it cannot evaluate land uses in this EIS. It says that it can evaluate uses *on BLM-managed lands* only as part of the resources management process, which will require another EIS. (Supp. EIS at N-19 ("[d]ecisions on allowable uses must be made through the BLM's land use planning process, not through this Final SEIS").) But this is a restriction of BLM's own making. Nothing prevented BLM from considering the land uses that would be allowed and disallowed as part of a conservation agreement that transferred the CTA to a local entity. Which is exactly what the 2004 ROD called for.

Without a discussion of land uses, there cannot be a full and fair discussion of the alternatives and their environmental consequences. In particular, there cannot be a full and fair discussion of the Corridors. The Cities intend to built roads, water-and-sewer lines, and other utilities along the Corridors. The Cities asked BLM to set the CTA boundary to exclude the Corridors, but BLM refused this request. The Supplemental EIS does not provide an explanation of why this request was rejected, but the implication is that BLM intends to prevent the Cities from running their roads and utilities through the Corridors.

The 2012 ROD asserts that, for roads inside the CTA, the Cities must build bridges in the desert. The Cities must "[d]esign approved roadways to allow natural floodwaters from the alluvial fan . . . to flow in a natural fashion; this could include elevating roads . . . . " (2012 ROD at 5.) The correct word here is not "could", but "must", because an ordinary on-the-ground road does not allow waters to flow naturally across the alluvial fans. Bridges are expensive, and the Cities may be disinclined to spend money on bridges that extend many miles across ordinary alluvial fans that otherwise would get ordinary on-the-

ground roads.

SNPLMA requires BLM to convey rights of way for sewer lines, and BLM has previously conveyed rights of way for portions of the Corridors, but not enough for a continuous sewer line. Will BLM convey the remaining rights of way? Or will it impose conditions so severe that they will have the practical effect of overriding SNPLMA's requirement?

BLM plainly has reached conclusions about what it will and will not allow within the CTA. Some of these conclusions have been disclosed, including BLM's prohibition on detention basins and armored flood-control facilities, and the requirement that roads be elevated. Other conclusions, including what BLM will allow to be built in the utility Corridors, have not been disclosed. If BLM is going to coordinate with the Cities, as required by SNPLMA, then there is no reason to keep these conclusions secret.

Secrecy has no place in an EIS, which more than anything else is a disclosure document. By refusing to disclose key elements of the project, BLM has violated NEPA.

VII. CONCLUSION

BLM's decision has violated SNPLMA, the APA, and NEPA. BLM's decision should be reversed.

DATED: June 28, 2012.

BRISCOE IVESTER & BAZEL LLP

By: _____
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CITY OF LAS VEGAS and
CITY OF NORTH LAS VEGAS

I. INTRODUCTION

BLM has moved for leave to file a sur-reply, and has submitted a memorandum in support of that motion (the "Memorandum"). The Memorandum is not limited to the motion, but rather makes the arguments that BLM would include in a sur-reply. Although BLM implies that the Memorandum *is* the proposed sur-reply—the motion argues that "good cause exists to . . . grant this motion and consider the attached short memorandum" (Motion at 3:6-7)—BLM could conceivably be requesting leave to file yet another brief.

Although it appears improper for BLM to be making arguments on the merits as part of this motion, the Cities are willing to waive their objection to the Memorandum as long as the counter-arguments in this opposition are also considered.[1] These counter-arguments should also be considered to preserve the Cities' right to a reply brief. Had BLM's new arguments been made in its Answer, as they could and should have been, the Cities could have replied to them. In any case, BLM should not be allowed to file a sur-reply other than the Memorandum. It has not demonstrated good cause for yet another brief.

On the merits, BLM is wrong. Its first argument relates to SNPLMA §4(d), which requires BLM's "land disposal activities" to be consistent with local requirements and even recommendations. BLM argues that it need not comply with this provision until it actually disposes of the land. This argument is wrong for four reasons. First, it is inconsistent with the language of the statute. The provision does not apply only to actual land disposals, but to all land disposal "activities". The use of the word "activities" broadens the provision so that it applies both to land disposals and to related activities. The phrase "land disposal activities" is plainly broad enough to include written decisions about how the disposals will proceed (such as the 2012 ROD) and NEPA review of the disposals (such as the Supplemental EIS).

Second, BLM's argument makes no difference to the result of this appeal. BLM concedes that at time it actually disposes of the CTA, it must act consistently with the Cities'

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[1] This opposition is being filed in accordance with 43 CFR § 4.407(b).

BLM asserts that its decision will not cause flooding *within the CTA*. But the real question is whether BLM's decision will exacerbate flooding *downstream*, and BLM has not considered this issue. BLM's lack of knowledge supports an important conclusion: BLM should not be interfering with local efforts to protect public health and safety.

Underlying all these arguments is a simple problem. Congress directed BLM to defer to local governments—the directive that BLM must act consistently with local *recommendations* can have no other meaning. And yet BLM cannot bring itself to defer to the local governments. It should. BLM has no authority to disobey an Act of Congress.

BLM's should not be allowed to file yet another brief. Its decision should be reversed.

II. BLM HAS NOT ESTABLISHED GOOD CAUSE FOR A SUR-REPLY

BLM argues that it should be allowed to file a sur-reply brief because the Cities "either raised a new argument or expanded upon a prior assertion to an extent necessitating a short response." (Motion at 2:11-12.) But there were no new arguments and no expansions "necessitating" a response.

BLM's first comment is directed at SNPLMA §4(d). (Memorandum at 2:15.) The Cities have put particular emphasis on one sentence in that section, which requires BLM to act consistently with local requirements and recommendations:

> Land disposal activities of [BLM] shall be consistent with local land use planning and zoning requirements and recommendations.

(SNPLMA, §4(d)(1).) For many years, the Cities have been complaining that BLM has been ignoring this provision. In their comments on the Draft Supplemental EIS, for example, the Cities quoted this provision, explained that "[t]his language shows the Congress intended BLM to defer not only to the formal requirements of local governments, but also to mere recommendations", and identified a series of requirements and recommendations that BLM had rejected. (Comments at 4; *see also* Comments at 12-13 (inconsistencies).) BLM noted this comment but provided no substantive response. (Supp. EIS at N-18.)

In the Statement of Reasons, this argument was loud and clear. Under the main heading

(*Id.* at 21, citation omitted.) The Statement of Reasons, in short, clearly argued that flash floods kill people, and that BLM's decision would endanger public safety. BLM had an opportunity to respond in its Answer, and chose not to. There is no reason for yet another brief.

The arguments BLM is making now should have been made in its Answer. To preserve the Cities' right to file a reply brief (43 CFR § 4.412(d)), the following responses should be considered.

III. THE SUPPLEMENTAL EIS IS A "LAND DISPOSAL ACTIVITY"

BLM's argument that the Supplemental EIS is not a "land disposal activity" is wrong for at least four reasons.

A. The Phrase "Land Disposal *Activities*" Includes Not Only Land Disposals, But Also *Related Activities*

BLM argues that the joint-selection, coordination, and consistency directives of SNPLMA §4(d) apply only to "actual" land disposals, not to NEPA review of those land disposals. (*See* Memorandum at 3:18-20 (the "NEPA documents were not assessing *actual land disposals* as generated under §4(d) of SNPLMA", emphasis added), 4:13-14 ("[i]t is after this initial NEPA compliance . . . that actual disposal of parcels occurs").) But BLM misreads SNPLMA, which imposes the coordination and consistency directives not on "actual" disposals—the word "actual" is not found in §4(d)—but broadly on all "land disposal activities". (SNPLMA §4(d)(1).) The word "activities" makes clear that Congress intended the directives to apply not only to actual disposals, but also to all related activities; in other words, throughout the land-disposal process. Here, the Supplemental EIS is a land-disposal activity because it evaluates the environmental consequences of, in the words of BLM, the "potential disposal of thousands of acres of public land." (Memorandum at 3:27-4:1.) The 2012 ROD is a land-disposal activity because it makes decisions about land disposal.

BLM relies in part on SNPLMA §4(a), but that section does not support BLM's argument. (*See* Memorandum at 3:20-22.) It authorizes BLM "to dispose of lands within the [disposal] boundary" in accordance with SNPLMA, FLPMA, and "other applicable law". But

SNPLMA in the future. Either way, BLM's decision is invalid.

C. NEPA Does Not Override SNPLMA

BLM insists that if it acts consistently with the Cities' requirements and recommendations (as required by §4(d)), then it will violate the general provision in §4(a) that it dispose of property in accordance with other applicable laws. (Memorandum at 5:5-15.) In particular, BLM complains that NEPA review will be futile: "there would be essentially no reason to discuss the impacts of such action and suggest mitigation to address adverse impacts, as the local plans would control any outcome." (*Id.* at 5:12-14.) But if there is indeed a conflict between the specific provisions of §4(d) and the general provision of §4(a), then BLM's argument is wrong because §4(d) prevails: "'[I]t is a commonplace of statutory construction that the specific governs the general.'" (*RadLAX Gateway Hotel, LLC v. Amalgamated Bank*, 132 S.Ct. 2065, 2068 (2012), quoting *Morales v. Trans World Airlines, Inc.*, 504 U.S. 374, 384 (1992), square brackets in original.)

The better conclusion, however, is that BLM can comply both with §4(d) and with NEPA. BLM can comply with §4(d) by acting consistently with the Cities' requirements and recommendations: allowing sale and development of the Northern Areas (as the 2004 ROD allowed), providing utility corridors, and not interfering with flood-control decisions. BLM can satisfy NEPA by evaluating the environmental consequences of these actions. Since NEPA's purpose is to promote informed decision-making, an EIS could provide information to the Cities, who could then modify their requirements and recommendations—which is exactly what happened after the 2004 EIS. The Cities modified their master plans to protect the paleo and plant resources, and since then have consistently acted to protect these resources. Of course, any decision to modify the Cities' requirements and recommendations is entirely under the discretion of the Cities, and is not within the authority of BLM.

NEPA does not require BLM to impose mitigation measures that are inconsistent with the Cities' requirements and recommendations. In fact, NEPA does not require any mitigation at all: "the Court of Appeals erred . . . in assuming that NEPA requires that action be taken to

violate a specific statutory directive.[2]

The real problem, therefore, appears not to be one of statutory interpretation. BLM apparently cannot bring itself to act consistently with local requirements and recommendations. But BLM has no authority to violate the law. It should be directed to comply with SNPLMA.

D. BLM's Position Is Contradicted By The Very Document It Cites

BLM cites to an "Implementation Agreement" that was entered into by several federal agencies, but not by the Cities. (Memorandum at 4:19-23; Implementation Agreement at 82.) According to BLM, this agreement "outlines the steps of joint selection and related activities." (Memorandum at 4:21-23.) But BLM ignores the culminating sentence in the section it cites. In this sentence, BLM commits to "make every effort" to sell all lands nominated by the Cities that "can be legally disposed of":

> BLM will make every effort to offer for sale all lands nominated by the local governments which meet the requirements for sale under SNPLMA and otherwise can be legally disposed of according to Federal laws and regulations.

(Implementation Agreement at 26.) Here, the Northern Areas meet the requirements for sale and can legally be disposed of—that was the conclusion in the 2004 EIS and 2004 ROD, and nothing in the Supplemental EIS or 2012 ROD suggests otherwise. If BLM is to live up to its commitment in the Implementation Agreement, it must make "every effort" to offer the Northern Areas for sale.

For all these reasons—the statutory language in SNPLMA applies broadly to land disposals *and related activities*, BLM's argument makes no difference to the result, NEPA does not override SNPLMA, and BLM's position is contradicted by the very document it cites—

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[2] BLM also asserts that the argument that BLM must defer to the master plans is "untimely". (Memorandum at 5:21-23.) It is not. In their SORs (at 18), the Cities argued that "BLM has not deferred to the Cities' master plans". In their comments on the draft SEIS (at 4), they said:

> BLM has ignored the local land use plans, including plans for roads, utilities, and flood-control structures submitted by the Cities. The SEIS should therefore clarify that BLM has not been acting consistently with local land use planning requirements and recommendations and explain why not.

flash floods, which kill people. (See section II above.) BLM does not deny that flash floods in Las Vegas Valley kill people. Nor are these deaths a thing of the past. In August 2012, one person drowned after being swept away during a storm; in September 2012, another person drowned after being swept away on a golf course.[3]

The question, therefore, is whether BLM's decision to prohibit flood-control facilities within the CTA—particularly the construction and expansion of detention basins—increases the risk to public health and safety downstream. If BLM had studied how flows in the CTA area affect the "entire wash system", as it committed to do in the 2004 ROD (Reply Brief at 13), then BLM might have some evidence that could provide a reasonably definitive answer to the question. But since BLM did not do the study, it has no evidence. The most reasonable conclusion is that the Flood Control District identifies flood-control facilities in its master plan for the purpose of protecting public health and safety, and that prohibiting the construction of these facilities increases the risk to public health and safety.

BLM asserts that the Upper Las Vegas Wash, within the CTA, has "sufficient natural flood control capacity" to handle a 100-year flood. (Memorandum at 6:7-9, citing to Supp. EIS at 46.) But the Supplemental EIS provides no evidence in support of this assertion, and concedes that information is not available:

> Specific flood flow information for the present-day 100-year scenario is not readily available . . . .
>
> The Regional Flood Control Master Plan map shows that any development that happens north of the wash on the fans would require flood control structures to move the waters. Without any further development, the wash has sufficient natural flood control capacity.

(Supp. EIS at 46.) In any case, BLM's assertion avoids the real question, which is not whether the 100-year flood will overtop the channel *within the CTA*, but whether BLM's prohibition on detention basins and other flood-control facilities will exacerbate flooding *downstream*. BLM

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[3] http://gustfront.ccrfcd.org/pdf_arch1/Public%20Information/2012%20Flash%20Flood%20Deaths.pdf

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UNITED STATES DEPARTMENT OF THE INTERIOR

OFFICE OF HEARINGS AND APPEALS

BOARD OF LAND APPEALS

CITY OF LAS VEGAS, NEVADA, a political subdivision of the State of Nevada, and CITY OF NORTH LAS VEGAS, NEVADA, a political subdivision of the State of Nevada

Appellants,

v.

LAS VEGAS FIELD OFFICE, BUREAU OF LAND MANAGEMENT, UNITED STATES DEPARTMENT OF THE INTERIOR,

Respondent.

IBLA Docket No. 2012-194

OPPOSITION TO BLM'S MOTION TO FILE SUR-REPLY

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
125A-2	U	0.269	73	0.574	100	1	9.5	5550	2.5	2.3	4.6	21.7	31.1	0.31
125A-3	U	0.270	73	0.574	100	1	9.5	5550	2.3	2.2	4.5	22.6	32.1	0.32
125A-4	U	0.246	73	0.574	100	1	9.5	5050	2.3	2.2	4.5	20.7	30.2	0.30
125A-6	U	0.165	73	0.574	100	1	9.5	3800	2.1	2.1	4.3	16.8	26.3	0.26
125A-7	U	0.382	73	0.574	100	1	9.5	5000	2.7	2.4	4.8	19.0	28.4	0.28
213A-2	U	0.500	73	0.574	500	10	9.8	8100	3	2.6	5.1	28.1	38.0	0.38
213A-3	U	0.371	73	0.574	100	1	9.5	6850	2.6	2.4	4.7	25.8	35.3	0.35
213A-4	U	0.251	73	0.574	100	1	9.5	5550	2.5	2.3	4.6	21.7	31.1	0.31
OFF1A-2	U	0.378	75	0.600	100	1	9.0	6500	3.4	2.7	5.4	21.5	30.5	0.31
OFF1A-3	U	0.302	74	0.581	100	1	9.3	7150	2.7	2.4	4.8	26.4	35.7	0.36
OFF1A-4	U	0.274	73	0.575	100	1	9.5	6400	2.8	2.5	4.9	23.4	32.8	0.33
213A-6	U	0.279	73	0.574	100	1	9.5	5550	1.3	1.7	3.4	30.0	39.5	0.40
213A-7	U	0.251	73	0.574	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213A-8	U	0.255	73	0.574	100	1	9.5	5450	2.2	2.2	4.4	22.7	32.2	0.32
213A-9	U	0.252	73	0.574	100	1	9.5	5300	1	1.5	2.9	32.8	42.3	0.42
213A-10	U	0.252	73	0.572	100	1	9.5	5500	2.2	2.2	4.4	22.9	32.4	0.32
213A-11	U	0.256	73	0.573	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213B-1	U	0.261	73	0.573	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213B-2	U	0.262	73	0.574	100	1	9.5	5600	2.4	2.3	4.6	22.3	31.8	0.32
213B-3	U	0.253	73	0.574	100	1	9.5	5400	2.3	2.2	4.5	22.0	31.5	0.32
213B-4	U	0.255	73	0.574	100	1	9.5	5500	2.1	2.1	4.3	23.4	32.9	0.33
213B-5	U	0.240	73	0.574	100	1	9.5	4900	1.3	1.7	3.4	26.8	36.3	0.36
213B-6	U	0.244	73	0.574	100	1	9.5	5350	2.1	2.1	4.3	22.9	32.3	0.32
213B-7	U	0.249	73	0.574	100	1	9.5	5200	1.2	1.6	3.2	29.5	38.9	0.39
223A-2	U	0.384	73	0.574	100	1	9.5	4750	2.2	2.2	4.4	20.0	29.5	0.30
223A-3	U	0.250	73	0.574	100	1	9.5	5400	2	2.1	4.2	23.6	33.1	0.33
223B-2	U	0.191	73	0.574	100	1	9.5	3450	1.7	1.9	3.8	17.1	26.6	0.27
223B-3	U	0.257	73	0.574	100	1	9.5	5500	1.6	1.9	3.7	26.9	36.3	0.36
223B-4	U	0.244	73	0.574	100	1	9.5	5400	1.8	2.0	3.9	24.9	34.4	0.34
223B-5	U	0.252	73	0.574	100	1	9.5	5450	1.5	1.8	3.6	27.5	37.0	0.37
223B-6	U	0.192	73	0.574	100	1	9.5	4600	0.9	1.4	2.8	30.4	39.9	0.40
223B-7	U	0.230	73	0.574	100	1	9.5	3800	2	2.1	4.2	17.2	26.7	0.27
223C-1	U	0.266	73	0.574	100	1	9.5	5600	1.7	1.9	3.8	26.5	36.0	0.36
223C-2	U	0.273	73	0.574	100	1	9.5	5650	1.8	2.0	3.9	26.0	35.4	0.35

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
223C-3	U	0.273	73	0.574	100	1	9.5	5650	1.8	2.0	3.9	26.0	35.4	0.35
223C-4	U	0.262	73	0.574	100	1	9.5	5600	0.9	1.4	2.8	36.4	45.9	0.46
223C-5	U	0.219	73	0.574	100	1	9.5	3100	2.5	2.3	4.6	12.9	22.4	0.22
223C-6	U	0.249	73	0.574	100	1	9.5	5400	1.8	2.0	3.9	24.9	34.4	0.34
223C-7	U	0.250	73	0.574	100	1	9.5	5350	1.7	1.9	3.8	25.4	34.9	0.35
223C-8	U	0.251	73	0.574	100	1	9.5	5450	1.7	1.9	3.8	25.8	35.3	0.35
223C-9	U	0.313	73	0.574	100	1	9.5	6000	1.3	1.7	3.4	32.3	41.8	0.42
223C-10	U	0.241	73	0.574	100	1	9.5	3900	2.4	2.3	4.6	16.1	25.6	0.26
223C-11	U	0.250	73	0.574	100	1	9.5	5400	1.9	2.0	4.1	24.2	33.7	0.34
223C-12	U	0.251	73	0.574	100	1	9.5	5500	2	2.1	4.2	24.0	33.5	0.33
223C-13	U	0.247	73	0.574	100	1	9.5	5350	1.9	2.0	4.1	24.0	33.5	0.34
223C-14	U	0.375	75	0.598	100	1	9.0	6700	1.3	1.7	3.4	35.8	44.8	0.45
223C-15	U	0.251	73	0.574	100	1	9.5	4100	2.4	2.3	4.6	16.8	26.3	0.26
223C-16	U	0.251	73	0.574	100	1	9.5	5400	1.9	2.0	4.1	24.2	33.7	0.34
223C-17	U	0.248	73	0.574	100	1	9.5	5400	1.7	1.9	3.8	25.6	35.1	0.35
223C-18	U	0.258	73	0.574	100	1	9.5	5500	1.7	1.9	3.8	26.1	35.5	0.36
223C-19	U	0.373	76	0.619	100	1	8.7	6400	1.2	1.6	3.2	35.7	44.3	0.44
223C-20	U	0.265	73	0.574	100	1	9.5	4150	2.5	2.3	4.6	16.6	26.1	0.26
223C-21	U	0.252	73	0.574	100	1	9.5	5400	1.8	2.0	3.9	24.9	34.4	0.34
223C-22	U	0.262	73	0.574	100	1	9.5	5500	1.5	1.8	3.6	27.7	37.2	0.37
223C-23	U	0.253	73	0.576	100	1	9.4	5400	1.5	1.8	3.6	27.3	36.7	0.37
223C-24	U	0.315	77	0.632	100	1	8.4	6850	1.2	1.6	3.2	38.0	46.4	0.46
NW1-C	U	0.293	81	0.676	100	1	7.6	6400	3.4	2.7	5.4	21.2	28.8	0.29
NW2-C	U	0.395	73	0.574	100	1	9.5	7300	2.2	2.2	4.4	29.8	39.3	0.39
NW5-C	U	0.275	73	0.574	100	1	9.5	5650	2.1	2.1	4.3	24.0	33.5	0.34
NW7-C	U	0.488	84	0.720	100	1	6.8	9700	3.2	2.6	5.3	32.3	39.1	0.39
NW9-C	U	0.273	73	0.574	100	1	9.5	6200	2.3	2.2	4.5	25.0	34.5	0.34
NW11-C	U	0.270	73	0.574	100	1	9.5	5600	2.6	2.4	4.7	21.4	30.9	0.31
NW17-C	U	0.430	73	0.574	100	1	9.5	7750	2.2	2.2	4.4	31.5	41.0	0.41
NW21-C	U	0.403	84	0.723	100	1	6.8	7850	3.1	2.6	5.2	26.9	33.6	0.34
NW23-C	U	0.376	73	0.574	100	1	9.5	6900	2.1	2.1	4.3	28.9	38.4	0.38
NW33-C	U	0.248	86	0.745	100	1	6.4	5400	2.8	2.5	4.9	20.0	26.4	0.26
NW35-C	U	0.434	83	0.710	100	1	7.0	5100	3.5	2.8	5.5	16.9	24.0	0.24
NW50-C	U	0.358	73	0.574	100	1	9.5	6300	3.3	2.7	5.3	21.2	30.7	0.31

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
NW51-C	U	0.306	73	0.574	100	1	9.5	5100	3.2	2.6	5.3	17.7	27.2	0.27
NW64-C	U	0.407	73	0.574	100	1	9.5	7500	2.8	2.5	4.9	27.1	36.6	0.37
NW102-C	U	0.412	73	0.574	100	1	9.5	8600	2.2	2.2	4.4	34.8	44.2	0.44
NW130-C	U	0.241	75	0.606	100	1	8.9	6550	1.5	1.8	3.6	32.6	41.5	0.42
OFF1A-5	U	0.418	73	0.574	100	1	9.5	7650	2.5	2.3	4.6	29.2	38.7	0.39
OFF1A-6	U	0.473	73	0.574	500	10	9.8	8300	3.5	2.8	5.5	26.6	36.5	0.36
OFF2A	U	0.318	73	0.574	100	1	9.5	6200	2.5	2.3	4.6	24.0	33.5	0.33
OFF2B	U	0.160	73	0.574	500	10	9.8	3700	3.5	2.8	5.5	12.7	22.5	0.23
OFF3	U	0.222	73	0.574	100	1	9.5	5200	2.4	2.3	4.6	20.8	30.3	0.30
OFF4-1	U	0.301	77	0.628	100	1	8.5	10400	6.2	3.7	7.3	24.8	33.3	0.33
OFF4-2	U	0.420	79	0.659	100	1	7.9	4600	12.7	5.3	10.5	8.1	16.0	0.16
OFF5-1	U	0.297	80	0.672	100	1	7.7	6700	6	3.6	7.2	16.6	24.4	0.24
OFF5-2	U	0.395	86	0.742	100	1	6.4	10000	4.8	3.2	6.4	27.2	33.6	0.34
OFF8	U	0.272	86	0.745	500	10	6.6	6500	3.9	2.9	5.8	20.1	26.7	0.27
OFF9	U	0.303	86	0.745	500	10	6.6	11100	4	3.0	5.9	32.9	39.5	0.39

Alternative A

Subbasin ID	Non-Disposal (ac)	Disposal (ac)	Out of CTA (ac)	CN_{NONDIS}	CN_{DIS}	CN_A
NW187-C	161	0	4	80	91	80
116-13	174	0	1	72	88	72
116-14	228	93	13	73	88	77
223C-21	159	1	2	73	88	73
223C-22	163	1	3	73	88	73
223C-23	14	109	38	73	88	83
223C-24	186	11	5	77	90	78
125A-15	131	0	11	75	90	75
125A-16	194	0	6	76	90	76
116-7	34	0	165	73	89	73
223C-17	155	0	4	73	88	73
223C-18	162	3	0	73	88	73
223C-19	177	62	0	76	89	80
125A-12	145	1	0	76	90	77
223C-13	153	1	4	73	88	73
125A-14	254	0	29	73	89	73
223C-14	241	1	0	75	89	75
125A-13	336	0	0	74	89	74
125A-10	153	0	0	74	89	74
125A-11	161	0	0	74	89	74
223C-9	196	1	5	73	88	73
125A-6	106	0	0	73	89	73
125A-7	245	1	0	73	88	73
125A-8	210	1	0	73	88	73
125A-9	209	0	1	73	88	73
125B-3	272	0	0	73	88	73
125B-4	241	5	86	73	88	73
223B-7	147	0	0	73	88	73
223C-1	170	0	0	73	88	73
223C-2	175	1	0	73	88	73
223C-3	172	1	3	73	88	73
223C-4	153	0	15	73	88	73
223A-2	246	1	0	73	88	73
125A-5	195	0	0	73	88	73
125A-4	203	0	0	73	88	73
125A-3	224	0	0	73	88	73
125A-1	249	0	0	73	88	73
125A-2	217	0	0	73	88	73
125B-1	197	0	0	73	88	73
125B-2	154	0	52	73	88	73
223B-2	107	1	15	73	88	73
223B-3	151	4	10	73	88	73
223B-4	144	8	4	73	88	74
223B-5	154	6	2	73	88	74
223B-6	123	0	0	73	88	73
102B	2061	6	3623	83	92	83
102A	620	5	3390	83	92	83
SOUTH	2114	506	6899	80	91	80

Upper Las Vegas Wash
SCS Lag Time Calculations for Alternative A

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
116-2	U	0.415	73	0.567	100	1	9.6	8150	1.3	1.7	3.4	43.0	52.6	0.53
116-3	U	0.403	72	0.561	100	1	9.7	7000	2.6	2.4	4.7	26.3	36.1	0.36
116-4	U	0.417	72	0.560	100	1	9.7	7100	3.5	2.8	5.5	23.0	32.7	0.33
116-5	U	0.418	73	0.576	100	1	9.4	7100	3.9	2.9	5.8	21.8	31.2	0.31
116-6	U	0.413	72	0.560	100	1	9.7	7150	4.7	3.2	6.4	20.0	29.7	0.30
116-9	U	0.271	75	0.605	100	1	8.9	5400	0.3	0.8	1.6	61.0	69.9	0.70
116-10	U	0.271	75	0.597	100	1	9.1	5000	1.7	1.9	3.8	23.9	32.9	0.33
116-11	U	0.270	72	0.563	100	1	9.7	5600	2	2.1	4.2	24.4	34.1	0.34
116-12	U	0.265	72	0.560	100	1	9.7	5550	2.6	2.4	4.7	21.2	31.0	0.31
116-13	U	0.273	72	0.559	100	1	9.7	5700	0.5	1.0	2.1	49.7	59.4	0.59
116-14	U	0.293	77	0.626	100	1	8.5	5100	1	1.5	2.9	31.7	40.2	0.40
NW187-C	U	0.259	80	0.665	100	1	7.8	7150	0.6	1.1	2.3	55.9	63.8	0.64
116-1	U	0.402	73	0.573	100	1	9.5	7100	1.1	1.6	3.1	41.0	50.5	0.51
116-7	U	0.311	73	0.575	100	1	9.5	6000	0.7	1.2	2.5	44.0	53.5	0.53
116-8	U	0.328	74	0.580	100	1	9.4	6150	0.6	1.1	2.3	48.6	58.0	0.58
125A-5	U	0.234	73	0.574	100	1	9.5	5200	2.5	2.3	4.6	20.4	29.9	0.30
125A-8	U	0.328	73	0.574	100	1	9.5	3500	3.1	2.6	5.2	12.9	22.3	0.22
125A-9	U	0.326	73	0.574	100	1	9.5	3500	3.9	2.9	5.8	11.5	20.9	0.21
125A-10	U	0.239	74	0.587	100	1	9.2	5000	1.1	1.6	3.1	29.7	38.9	0.39
125A-11	U	0.253	74	0.591	100	1	9.2	5450	1.2	1.6	3.2	30.8	39.9	0.40
125A-12	U	0.225	76	0.619	100	1	8.7	4900	0.9	1.4	2.8	32.2	40.9	0.41
125A-13	U	0.519	74	0.588	100	1	9.2	8000	0.9	1.4	2.8	50.8	60.0	0.60
125A-14	U	0.443	73	0.574	100	1	9.5	6700	1.2	1.6	3.2	37.2	46.7	0.47
125A-15	U	0.219	75	0.606	100	1	8.9	4800	1	1.5	2.9	30.0	38.9	0.39
125A-16	U	0.312	76	0.611	100	1	8.8	6650	0.7	1.2	2.5	48.4	57.2	0.57
125B-1	U	0.274	73	0.574	100	1	9.5	5100	2.9	2.5	5.0	18.6	28.1	0.28
125B-2	U	0.293	73	0.574	100	1	9.5	5100	2.8	2.5	4.9	18.9	28.4	0.28
125B-3	U	0.425	73	0.574	100	1	9.5	6950	2.6	2.4	4.7	26.2	35.6	0.36
125B-4	U	0.517	73	0.574	100	1	9.5	7950	2.6	2.4	4.7	29.7	39.2	0.39
125A-1	U	0.278	73	0.574	100	1	9.5	5200	1.8	2.0	3.9	24.1	33.5	0.34

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
125A-2	U	0.269	73	0.574	100	1	9.5	5550	2.5	2.3	4.6	21.7	31.1	0.31
125A-3	U	0.270	73	0.574	100	1	9.5	5550	2.3	2.2	4.5	22.6	32.1	0.32
125A-4	U	0.246	73	0.574	100	1	9.5	5050	2.3	2.2	4.5	20.7	30.2	0.30
125A-6	U	0.165	73	0.574	100	1	9.5	3800	2.1	2.1	4.3	16.8	26.3	0.26
125A-7	U	0.382	73	0.574	100	1	9.5	5000	2.7	2.4	4.8	19.0	28.4	0.28
213A-2	U	0.500	73	0.574	500	10	9.8	8100	3	2.6	5.1	28.1	38.0	0.38
213A-3	U	0.371	73	0.574	100	1	9.5	6850	2.6	2.4	4.7	25.8	35.3	0.35
213A-4	U	0.251	73	0.574	100	1	9.5	5550	2.5	2.3	4.6	21.7	31.1	0.31
OFF1A-2	U	0.378	74	0.591	100	1	9.2	6500	3.4	2.7	5.4	21.5	30.7	0.31
OFF1A-3	U	0.302	74	0.581	100	1	9.3	7150	2.7	2.4	4.8	26.4	35.7	0.36
OFF1A-4	U	0.274	73	0.575	100	1	9.5	6400	2.8	2.5	4.9	23.4	32.8	0.33
213A-6	U	0.279	73	0.574	100	1	9.5	5550	1.3	1.7	3.4	30.0	39.5	0.40
213A-7	U	0.251	73	0.574	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213A-8	U	0.255	73	0.574	100	1	9.5	5450	2.2	2.2	4.4	22.7	32.2	0.32
213A-9	U	0.252	73	0.574	100	1	9.5	5300	1	1.5	2.9	32.8	42.3	0.42
213A-10	U	0.252	73	0.572	100	1	9.5	5500	2.2	2.2	4.4	22.9	32.4	0.32
213A-11	U	0.256	73	0.573	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213B-1	U	0.261	73	0.573	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213B-2	U	0.262	73	0.574	100	1	9.5	5600	2.4	2.3	4.6	22.3	31.8	0.32
213B-3	U	0.253	73	0.574	100	1	9.5	5400	2.3	2.2	4.5	22.0	31.5	0.32
213B-4	U	0.255	73	0.574	100	1	9.5	5500	2.1	2.1	4.3	23.4	32.9	0.33
213B-5	U	0.240	73	0.574	100	1	9.5	4900	1.3	1.7	3.4	26.8	36.3	0.36
213B-6	U	0.244	73	0.574	100	1	9.5	5350	2.1	2.1	4.3	22.9	32.3	0.32
213B-7	U	0.249	73	0.574	100	1	9.5	5200	1.2	1.6	3.2	29.5	38.9	0.39
223A-2	U	0.384	73	0.574	100	1	9.5	4750	2.2	2.2	4.4	20.0	29.5	0.30
223A-3	U	0.250	73	0.574	100	1	9.5	5400	2	2.1	4.2	23.6	33.1	0.33
223B-2	U	0.191	73	0.574	100	1	9.5	3450	1.7	1.9	3.8	17.1	26.6	0.27
223B-3	U	0.257	73	0.574	100	1	9.5	5500	1.6	1.9	3.7	26.9	36.3	0.36
223B-4	U	0.244	73	0.574	100	1	9.5	5400	1.8	2.0	3.9	24.9	34.4	0.34
223B-5	U	0.252	73	0.574	100	1	9.5	5450	1.5	1.8	3.6	27.5	37.0	0.37
223B-6	U	0.192	73	0.574	100	1	9.5	4600	0.9	1.4	2.8	30.4	39.9	0.40
223B-7	U	0.230	73	0.574	100	1	9.5	3800	2	2.1	4.2	17.2	26.7	0.27
223C-1	U	0.266	73	0.574	100	1	9.5	5600	1.7	1.9	3.8	26.5	36.0	0.36
223C-2	U	0.273	73	0.574	100	1	9.5	5650	1.8	2.0	3.9	26.0	35.4	0.35

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
223C-3	U	0.273	73	0.574	100	1	9.5	5650	1.8	2.0	3.9	26.0	35.4	0.35
223C-4	U	0.262	73	0.574	100	1	9.5	5600	0.9	1.4	2.8	36.4	45.9	0.46
223C-5	U	0.219	73	0.574	100	1	9.5	3100	2.5	2.3	4.6	12.9	22.4	0.22
223C-6	U	0.249	73	0.574	100	1	9.5	5400	1.8	2.0	3.9	24.9	34.4	0.34
223C-7	U	0.250	73	0.574	100	1	9.5	5350	1.7	1.9	3.8	25.4	34.9	0.35
223C-8	U	0.251	73	0.574	100	1	9.5	5450	1.7	1.9	3.8	25.8	35.3	0.35
223C-9	U	0.313	73	0.574	100	1	9.5	6000	1.3	1.7	3.4	32.3	41.8	0.42
223C-10	U	0.241	73	0.574	100	1	9.5	3900	2.4	2.3	4.6	16.1	25.6	0.26
223C-11	U	0.250	73	0.574	100	1	9.5	5400	1.9	2.0	4.1	24.2	33.7	0.34
223C-12	U	0.251	73	0.574	100	1	9.5	5500	2	2.1	4.2	24.0	33.5	0.33
223C-13	U	0.247	73	0.574	100	1	9.5	5350	1.9	2.0	4.1	24.0	33.5	0.34
223C-14	U	0.375	75	0.598	100	1	9.0	6700	1.3	1.7	3.4	35.8	44.8	0.45
223C-15	U	0.251	73	0.574	100	1	9.5	4100	2.4	2.3	4.6	16.8	26.3	0.26
223C-16	U	0.251	73	0.574	100	1	9.5	5400	1.9	2.0	4.1	24.2	33.7	0.34
223C-17	U	0.248	73	0.574	100	1	9.5	5400	1.7	1.9	3.8	25.6	35.1	0.35
223C-18	U	0.258	73	0.574	100	1	9.5	5500	1.7	1.9	3.8	26.1	35.5	0.36
223C-19	U	0.373	80	0.666	100	1	7.8	6400	1.2	1.6	3.2	35.7	43.5	0.43
223C-20	U	0.265	73	0.574	100	1	9.5	4150	2.5	2.3	4.6	16.6	26.1	0.26
223C-21	U	0.252	73	0.574	100	1	9.5	5400	1.8	2.0	3.9	24.9	34.4	0.34
223C-22	U	0.262	73	0.574	100	1	9.5	5500	1.5	1.8	3.6	27.7	37.2	0.37
223C-23	U	0.253	83	0.706	100	1	7.1	5400	1.5	1.8	3.6	27.3	34.4	0.34
223C-24	U	0.315	78	0.640	100	1	8.3	6850	1.2	1.6	3.2	38.0	46.3	0.46
NW1-C	U	0.293	81	0.676	100	1	7.6	6400	3.4	2.7	5.4	21.2	28.8	0.29
NW2-C	U	0.395	73	0.574	100	1	9.5	7300	2.2	2.2	4.4	29.8	39.3	0.39
NW5-C	U	0.275	73	0.574	100	1	9.5	5650	2.1	2.1	4.3	24.0	33.5	0.34
NW7-C	U	0.488	84	0.720	100	1	6.8	9700	3.2	2.6	5.3	32.3	39.1	0.39
NW9-C	U	0.273	73	0.574	100	1	9.5	6200	2.3	2.2	4.5	25.0	34.5	0.34
NW11-C	U	0.270	73	0.574	100	1	9.5	5600	2.6	2.4	4.7	21.4	30.9	0.31
NW17-C	U	0.430	73	0.574	100	1	9.5	7750	2.2	2.2	4.4	31.5	41.0	0.41
NW21-C	U	0.403	84	0.723	100	1	6.8	7850	3.1	2.6	5.2	26.9	33.6	0.34
NW23-C	U	0.376	73	0.574	100	1	9.5	6900	2.1	2.1	4.3	28.9	38.4	0.38
NW33-C	U	0.248	86	0.745	100	1	6.4	5400	2.8	2.5	4.9	20.0	26.4	0.26
NW35-C	U	0.434	83	0.710	100	1	7.0	5100	3.5	2.8	5.5	16.9	24.0	0.24
NW50-C	U	0.358	73	0.574	100	1	9.5	6300	3.3	2.7	5.3	21.2	30.7	0.31

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
NW51-C	U	0.306	73	0.574	100	1	9.5	5100	3.2	2.6	5.3	17.7	27.2	0.27
NW64-C	U	0.407	73	0.574	100	1	9.5	7500	2.8	2.5	4.9	27.1	36.6	0.37
NW102-C	U	0.412	73	0.574	100	1	9.5	8600	2.2	2.2	4.4	34.8	44.2	0.44
NW130-C	U	0.241	75	0.606	100	1	8.9	6550	1.5	1.8	3.6	32.6	41.5	0.42
OFF1A-5	U	0.418	73	0.574	100	1	9.5	7650	2.5	2.3	4.6	29.2	38.7	0.39
OFF1A-6	U	0.473	73	0.574	500	10	9.8	8300	3.5	2.8	5.5	26.6	36.5	0.36
OFF2A	U	0.318	73	0.574	100	1	9.5	6200	2.5	2.3	4.6	24.0	33.5	0.33
OFF2B	U	0.160	73	0.574	500	10	9.8	3700	3.5	2.8	5.5	12.7	22.5	0.23
OFF3	U	0.222	73	0.574	100	1	9.5	5200	2.4	2.3	4.6	20.8	30.3	0.30
OFF4-1	U	0.301	77	0.628	100	1	8.5	10400	6.2	3.7	7.3	24.8	33.3	0.33
OFF4-2	U	0.420	79	0.659	100	1	7.9	4600	12.7	5.3	10.5	8.1	16.0	0.16
OFF5-1	U	0.297	80	0.672	100	1	7.7	6700	6	3.6	7.2	16.6	24.4	0.24
OFF5-2	U	0.395	86	0.742	100	1	6.4	10000	4.8	3.2	6.4	27.2	33.6	0.34
OFF8	U	0.272	86	0.745	500	10	6.6	6500	3.9	2.9	5.8	20.1	26.7	0.27
OFF9	U	0.303	86	0.745	500	10	6.6	11100	4	3.0	5.9	32.9	39.5	0.39

Alternative B

Subbasin ID	Non-Disposal (ac)	Disposal (ac)	Out of CTA (ac)	CN_{NONDIS}	CN_{DIS}	CN_B
NW187-C	161	1	4	80	91	80
116-13	174	0	1	72	88	72
116-14	306	16	13	73	88	74
223C-21	0	159	2	73	88	88
223C-22	0	164	3	73	88	88
223C-23	46	77	38	73	88	80
223C-24	197	0	5	77	90	77
125A-15	131	0	11	75	90	75
125A-16	194	1	6	76	90	76
116-7	34	0	165	73	89	73
223C-17	0	155	4	73	88	88
223C-18	16	149	0	73	88	87
223C-19	226	13	0	76	89	77
125A-12	144	1	0	76	90	77
223C-13	10	144	4	73	88	87
125A-14	254	1	29	73	89	73
223C-14	210	31	0	75	89	77
125A-13	336	1	0	74	89	74
125A-10	153	0	0	74	89	74
125A-11	161	0	0	74	89	74
223C-9	164	32	5	73	88	75
125A-6	106	1	0	73	89	73
125A-7	245	1	0	73	88	73
125A-8	209	1	0	73	88	73
125A-9	208	0	1	73	88	73
125B-3	272	1	0	73	88	73
125B-4	244	1	86	73	88	73
223B-7	0	147	0	73	88	88
223C-1	0	170	0	73	88	88
223C-2	175	0	0	73	88	73
223C-3	172	1	3	73	88	73
223C-4	153	0	15	73	88	73
223A-2	0	246	0	73	88	88
125A-5	195	1	0	73	88	73
125A-4	203	1	0	73	88	73
125A-3	224	1	0	73	88	73
125A-1	249	1	0	73	88	73
125A-2	216	2	0	73	88	73
125B-1	197	1	0	73	88	73
125B-2	154	0	52	73	88	73
223B-2	0	107	15	73	88	86
223B-3	0	155	10	73	88	87
223B-4	0	152	4	73	88	88
223B-5	160	0	2	73	88	73
223B-6	123	0	0	73	88	73
102B	1803	264	3623	83	92	83
102A	625	0	3390	83	92	83
SOUTH	2135	485	6899	80	91	80

Upper Las Vegas Wash
SCS Lag Time Calculations for Alternative B

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/ Undeveloped	Area (mi^2)	CN	K	Length (ft)	Slope (%)	t_i (min)	Length (ft)	Slope (%)	Velocity (fps) V_1	Velocity (fps) V_2	t_t (min)	t_c (min)	Lag Time (hours)
116-2	U	0.415	73	0.567	100	1	9.6	8150	1.3	1.7	3.4	43.0	52.6	0.53
116-3	U	0.403	72	0.561	100	1	9.7	7000	2.6	2.4	4.7	26.3	36.1	0.36
116-4	U	0.417	72	0.560	100	1	9.7	7100	3.5	2.8	5.5	23.0	32.7	0.33
116-5	U	0.418	73	0.576	100	1	9.4	7100	3.9	2.9	5.8	21.8	31.2	0.31
116-6	U	0.413	72	0.560	100	1	9.7	7150	4.7	3.2	6.4	20.0	29.7	0.30
116-9	U	0.271	75	0.605	100	1	8.9	5400	0.3	0.8	1.6	61.0	69.9	0.70
116-10	U	0.271	75	0.597	100	1	9.1	5000	1.7	1.9	3.8	23.9	32.9	0.33
116-11	U	0.270	72	0.563	100	1	9.7	5600	2	2.1	4.2	24.4	34.1	0.34
116-12	U	0.265	72	0.560	100	1	9.7	5550	2.6	2.4	4.7	21.2	31.0	0.31
116-13	U	0.273	72	0.559	100	1	9.7	5700	0.5	1.0	2.1	49.7	59.4	0.59
116-14	U	0.293	74	0.587	100	1	9.2	5100	1	1.5	2.9	31.7	40.9	0.41
NW187-C	U	0.259	80	0.665	100	1	7.8	7150	0.6	1.1	2.3	55.9	63.8	0.64
116-1	U	0.402	73	0.573	100	1	9.5	7100	1.1	1.6	3.1	41.0	50.5	0.51
116-7	U	0.311	73	0.575	100	1	9.5	6000	0.7	1.2	2.5	44.0	53.5	0.53
116-8	U	0.328	74	0.580	100	1	9.4	6150	0.6	1.1	2.3	48.6	58.0	0.58
125A-5	U	0.234	73	0.574	100	1	9.5	5200	2.5	2.3	4.6	20.4	29.9	0.30
125A-8	U	0.328	73	0.574	100	1	9.5	3500	3.1	2.6	5.2	12.9	22.3	0.22
125A-9	U	0.326	73	0.574	100	1	9.5	3500	3.9	2.9	5.8	11.5	20.9	0.21
125A-10	U	0.239	74	0.587	100	1	9.2	5000	1.1	1.6	3.1	29.7	38.9	0.39
125A-11	U	0.253	74	0.591	100	1	9.2	5450	1.2	1.6	3.2	30.8	39.9	0.40
125A-12	U	0.225	76	0.619	100	1	8.7	4900	0.9	1.4	2.8	32.2	40.9	0.41
125A-13	U	0.519	74	0.588	100	1	9.2	8000	0.9	1.4	2.8	50.8	60.0	0.60
125A-14	U	0.443	73	0.574	100	1	9.5	6700	1.2	1.6	3.2	37.2	46.7	0.47
125A-15	U	0.219	75	0.606	100	1	8.9	4800	1	1.5	2.9	30.0	38.9	0.39
125A-16	U	0.312	76	0.611	100	1	8.8	6650	0.7	1.2	2.5	48.4	57.2	0.57
125B-1	U	0.274	73	0.574	100	1	9.5	5100	2.9	2.5	5.0	18.6	28.1	0.28
125B-2	U	0.293	73	0.574	100	1	9.5	5100	2.8	2.5	4.9	18.9	28.4	0.28
125B-3	U	0.425	73	0.574	100	1	9.5	6950	2.6	2.4	4.7	26.2	35.6	0.36
125B-4	U	0.517	73	0.574	100	1	9.5	7950	2.6	2.4	4.7	29.7	39.2	0.39
125A-1	U	0.278	73	0.574	100	1	9.5	5200	1.8	2.0	3.9	24.1	33.5	0.34

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
125A-2	U	0.269	73	0.574	100	1	9.5	5550	2.5	2.3	4.6	21.7	31.1	0.31
125A-3	U	0.270	73	0.574	100	1	9.5	5550	2.3	2.2	4.5	22.6	32.1	0.32
125A-4	U	0.246	73	0.574	100	1	9.5	5050	2.3	2.2	4.5	20.7	30.2	0.30
125A-6	U	0.165	73	0.574	100	1	9.5	3800	2.1	2.1	4.3	16.8	26.3	0.26
125A-7	U	0.382	73	0.574	100	1	9.5	5000	2.7	2.4	4.8	19.0	28.4	0.28
213A-2	U	0.500	73	0.574	500	10	9.8	8100	3	2.6	5.1	28.1	38.0	0.38
213A-3	U	0.371	73	0.574	100	1	9.5	6850	2.6	2.4	4.7	25.8	35.3	0.35
213A-4	U	0.251	73	0.574	100	1	9.5	5550	2.5	2.3	4.6	21.7	31.1	0.31
OFF1A-2	U	0.378	74	0.591	100	1	9.2	6500	3.4	2.7	5.4	21.5	30.7	0.31
OFF1A-3	U	0.302	74	0.581	100	1	9.3	7150	2.7	2.4	4.8	26.4	35.7	0.36
OFF1A-4	U	0.274	73	0.575	100	1	9.5	6400	2.8	2.5	4.9	23.4	32.8	0.33
213A-6	U	0.279	73	0.574	100	1	9.5	5550	1.3	1.7	3.4	30.0	39.5	0.40
213A-7	U	0.251	73	0.574	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213A-8	U	0.255	73	0.574	100	1	9.5	5450	2.2	2.2	4.4	22.7	32.2	0.32
213A-9	U	0.252	73	0.574	100	1	9.5	5300	1	1.5	2.9	32.8	42.3	0.42
213A-10	U	0.252	73	0.572	100	1	9.5	5500	2.2	2.2	4.4	22.9	32.4	0.32
213A-11	U	0.256	73	0.573	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213B-1	U	0.261	73	0.573	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213B-2	U	0.262	73	0.574	100	1	9.5	5600	2.4	2.3	4.6	22.3	31.8	0.32
213B-3	U	0.253	73	0.574	100	1	9.5	5400	2.3	2.2	4.5	22.0	31.5	0.32
213B-4	U	0.255	73	0.574	100	1	9.5	5500	2.1	2.1	4.3	23.4	32.9	0.33
213B-5	U	0.240	73	0.574	100	1	9.5	4900	1.3	1.7	3.4	26.8	36.3	0.36
213B-6	U	0.244	73	0.574	100	1	9.5	5350	2.1	2.1	4.3	22.9	32.3	0.32
213B-7	U	0.249	73	0.574	100	1	9.5	5200	1.2	1.6	3.2	29.5	38.9	0.39
223A-2	D	0.384	88	0.772	100	1	5.9	4750	2.2	3.0	4.5	18.4	24.3	0.24
223A-3	U	0.250	73	0.574	100	1	9.5	5400	2	2.1	4.2	23.6	33.1	0.33
223B-2	U	0.191	86	0.745	100	1	6.4	3450	1.7	1.9	3.8	17.1	23.5	0.24
223B-3	D	0.257	87	0.758	100	1	6.1	5500	1.6	2.6	3.9	24.8	30.9	0.31
223B-4	D	0.244	88	0.772	100	1	5.9	5400	1.8	2.7	4.1	23.0	28.9	0.29
223B-5	U	0.252	73	0.574	100	1	9.5	5450	1.5	1.8	3.6	27.5	37.0	0.37
223B-6	U	0.192	73	0.574	100	1	9.5	4600	0.9	1.4	2.8	30.4	39.9	0.40
223B-7	D	0.230	88	0.772	100	1	5.9	3800	2	2.9	4.3	15.6	21.5	0.22
223C-1	D	0.266	88	0.772	100	1	5.9	5600	1.7	2.6	4.0	24.5	30.4	0.30
223C-2	U	0.273	73	0.574	100	1	9.5	5650	1.8	2.0	3.9	26.0	35.4	0.35

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
223C-3	U	0.273	73	0.574	100	1	9.5	5650	1.8	2.0	3.9	26.0	35.4	0.35
223C-4	U	0.262	73	0.574	100	1	9.5	5600	0.9	1.4	2.8	36.4	45.9	0.46
223C-5	U	0.219	73	0.574	100	1	9.5	3100	2.5	2.3	4.6	12.9	22.4	0.22
223C-6	U	0.249	73	0.574	100	1	9.5	5400	1.8	2.0	3.9	24.9	34.4	0.34
223C-7	U	0.250	73	0.574	100	1	9.5	5350	1.7	1.9	3.8	25.4	34.9	0.35
223C-8	U	0.251	73	0.574	100	1	9.5	5450	1.7	1.9	3.8	25.8	35.3	0.35
223C-9	U	0.313	73	0.574	100	1	9.5	6000	1.3	1.7	3.4	32.3	41.8	0.42
223C-10	U	0.241	73	0.574	100	1	9.5	3900	2.4	2.3	4.6	16.1	25.6	0.26
223C-11	U	0.250	73	0.574	100	1	9.5	5400	1.9	2.0	4.1	24.2	33.7	0.34
223C-12	U	0.251	73	0.574	100	1	9.5	5500	2	2.1	4.2	24.0	33.5	0.33
223C-13	D	0.247	87	0.758	100	1	6.1	5350	1.9	2.8	4.2	22.2	28.3	0.28
223C-14	U	0.375	77	0.626	100	1	8.5	6700	1.3	1.7	3.4	35.8	44.3	0.44
223C-15	U	0.251	73	0.574	100	1	9.5	4100	2.4	2.3	4.6	16.8	26.3	0.26
223C-16	U	0.251	73	0.574	100	1	9.5	5400	1.9	2.0	4.1	24.2	33.7	0.34
223C-17	D	0.248	88	0.772	100	1	5.9	5400	1.7	2.6	4.0	23.6	29.5	0.30
223C-18	D	0.258	87	0.758	100	1	6.1	5500	1.7	2.6	4.0	24.1	30.2	0.30
223C-19	U	0.373	77	0.626	100	1	8.5	6400	1.2	1.6	3.2	35.7	44.2	0.44
223C-20	U	0.265	73	0.574	100	1	9.5	4150	2.5	2.3	4.6	16.6	26.1	0.26
223C-21	D	0.252	88	0.772	100	1	5.9	5400	1.8	2.7	4.1	23.0	28.9	0.29
223C-22	D	0.262	88	0.772	100	1	5.9	5500	1.5	2.5	3.7	25.6	31.5	0.32
223C-23	U	0.253	80	0.666	100	1	7.8	5400	1.5	1.8	3.6	27.3	35.1	0.35
223C-24	U	0.315	77	0.632	100	1	8.4	6850	1.2	1.6	3.2	38.0	46.4	0.46
NW1-C	U	0.293	81	0.676	100	1	7.6	6400	3.4	2.7	5.4	21.2	28.8	0.29
NW2-C	U	0.395	73	0.574	100	1	9.5	7300	2.2	2.2	4.4	29.8	39.3	0.39
NW5-C	U	0.275	73	0.574	100	1	9.5	5650	2.1	2.1	4.3	24.0	33.5	0.34
NW7-C	U	0.488	84	0.720	100	1	6.8	9700	3.2	2.6	5.3	32.3	39.1	0.39
NW9-C	U	0.273	73	0.574	100	1	9.5	6200	2.3	2.2	4.5	25.0	34.5	0.34
NW11-C	U	0.270	73	0.574	100	1	9.5	5600	2.6	2.4	4.7	21.4	30.9	0.31
NW17-C	U	0.430	73	0.574	100	1	9.5	7750	2.2	2.2	4.4	31.5	41.0	0.41
NW21-C	U	0.403	84	0.723	100	1	6.8	7850	3.1	2.6	5.2	26.9	33.6	0.34
NW23-C	U	0.376	73	0.574	100	1	9.5	6900	2.1	2.1	4.3	28.9	38.4	0.38
NW33-C	U	0.248	86	0.745	100	1	6.4	5400	2.8	2.5	4.9	20.0	26.4	0.26
NW35-C	U	0.434	83	0.710	100	1	7.0	5100	3.5	2.8	5.5	16.9	24.0	0.24
NW50-C	U	0.358	73	0.574	100	1	9.5	6300	3.3	2.7	5.3	21.2	30.7	0.31

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
NW51-C	U	0.306	73	0.574	100	1	9.5	5100	3.2	2.6	5.3	17.7	27.2	0.27
NW64-C	U	0.407	73	0.574	100	1	9.5	7500	2.8	2.5	4.9	27.1	36.6	0.37
NW102-C	U	0.412	73	0.574	100	1	9.5	8600	2.2	2.2	4.4	34.8	44.2	0.44
NW130-C	U	0.241	75	0.606	100	1	8.9	6550	1.5	1.8	3.6	32.6	41.5	0.42
OFF1A-5	U	0.418	73	0.574	100	1	9.5	7650	2.5	2.3	4.6	29.2	38.7	0.39
OFF1A-6	U	0.473	73	0.574	500	10	9.8	8300	3.5	2.8	5.5	26.6	36.5	0.36
OFF2A	U	0.318	73	0.574	100	1	9.5	6200	2.5	2.3	4.6	24.0	33.5	0.33
OFF2B	U	0.160	73	0.574	500	10	9.8	3700	3.5	2.8	5.5	12.7	22.5	0.23
OFF3	U	0.222	73	0.574	100	1	9.5	5200	2.4	2.3	4.6	20.8	30.3	0.30
OFF4-1	U	0.301	77	0.628	100	1	8.5	10400	6.2	3.7	7.3	24.8	33.3	0.33
OFF4-2	U	0.420	79	0.659	100	1	7.9	4600	12.7	5.3	10.5	8.1	16.0	0.16
OFF5-1	U	0.297	80	0.672	100	1	7.7	6700	6	3.6	7.2	16.6	24.4	0.24
OFF5-2	U	0.395	86	0.742	100	1	6.4	10000	4.8	3.2	6.4	27.2	33.6	0.34
OFF8	U	0.272	86	0.745	500	10	6.6	6500	3.9	2.9	5.8	20.1	26.7	0.27
OFF9	U	0.303	86	0.745	500	10	6.6	11100	4	3.0	5.9	32.9	39.5	0.39

Alternative C

Subbasin ID	Non-Disposal (ac)	Disposal (ac)	Out of CTA (ac)	CN_{NONDIS}	CN_{DIS}	CN_C
NW187-C	161	0	4	80	91	80
116-13	174	0	1	72	88	72
116-14	228	93	13	73	88	77
223C-21	0	159	2	73	88	88
223C-22	0	164	3	73	88	88
223C-23	14	109	38	73	88	83
223C-24	186	11	5	77	90	78
125A-15	132	0	11	75	90	75
125A-16	194	0	6	76	90	76
116-7	34	0	165	73	89	73
223C-17	0	155	4	73	88	88
223C-18	0	165	0	73	88	88
223C-19	178	62	0	76	89	80
125A-12	145	1	0	76	90	77
223C-13	0	154	4	73	88	88
125A-14	227	27	29	73	89	75
223C-14	168	74	0	75	89	79
125A-13	311	25	0	74	89	75
125A-10	153	0	0	74	89	74
125A-11	149	12	0	74	89	75
223C-9	149	47	5	73	88	77
125A-6	105	1	0	73	89	73
125A-7	185	61	0	73	88	77
125A-8	50	161	0	73	88	84
125A-9	0	208	1	73	88	88
125B-3	0	273	0	73	88	88
125B-4	0	245	86	73	88	84
223B-7	0	147	0	73	88	88
223C-1	0	170	0	73	88	88
223C-2	0	175	0	73	88	88
223C-3	28	144	3	73	88	85
223C-4	119	34	15	73	88	76
223A-2	0	246	0	73	88	88
125A-5	0	195	0	73	88	88
125A-4	0	203	0	73	88	88
125A-3	0	224	0	73	88	88
125A-1	199	50	0	73	88	76
125A-2	46	171	0	73	88	85
125B-1	0	197	0	73	88	88
125B-2	0	154	52	73	88	84
223B-2	0	107	15	73	88	86
223B-3	0	155	10	73	88	87
223B-4	0	152	4	73	88	88
223B-5	25	136	2	73	88	86
223B-6	118	5	0	73	88	74
102B	414	1653	3623	83	92	86
102A	307	318	3390	83	92	84
SOUTH	2111	509	6899	80	91	80

Upper Las Vegas Wash
SCS Lag Time Calculations for Alternative C

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
116-2	U	0.415	73	0.567	100	1	9.6	8150	1.3	1.7	3.4	43.0	52.6	0.526
116-3	U	0.403	72	0.561	100	1	9.7	7000	2.6	2.4	4.7	26.3	36.1	0.361
116-4	U	0.417	72	0.560	100	1	9.7	7100	3.5	2.8	5.5	23.0	32.7	0.327
116-5	U	0.418	73	0.576	100	1	9.4	7100	3.9	2.9	5.8	21.8	31.2	0.312
116-6	U	0.413	72	0.560	100	1	9.7	7150	4.7	3.2	6.4	20.0	29.7	0.297
116-9	U	0.271	75	0.605	100	1	8.9	5400	0.3	0.8	1.6	61.0	69.9	0.699
116-10	U	0.271	75	0.597	100	1	9.1	5000	1.7	1.9	3.8	23.9	32.9	0.329
116-11	U	0.270	72	0.563	100	1	9.7	5600	2	2.1	4.2	24.4	34.1	0.341
116-12	U	0.265	72	0.560	100	1	9.7	5550	2.6	2.4	4.7	21.2	31.0	0.310
116-13	U	0.273	72	0.559	100	1	9.7	5700	0.5	1.0	2.1	49.7	59.4	0.594
116-14	U	0.293	77	0.626	100	1	8.5	5100	1	1.5	2.9	31.7	40.2	0.402
NW187-C	U	0.259	80	0.665	100	1	7.8	7150	0.6	1.1	2.3	55.9	63.8	0.638
116-1	U	0.402	73	0.573	100	1	9.5	7100	1.1	1.6	3.1	41.0	50.5	0.505
116-7	U	0.311	73	0.575	100	1	9.5	6000	0.7	1.2	2.5	44.0	53.5	0.535
116-8	U	0.328	74	0.580	100	1	9.4	6150	0.6	1.1	2.3	48.6	58.0	0.580
125A-5	D	0.234	88	0.772	100	1	5.9	5200	2.5	3.2	4.8	18.8	24.7	0.247
125A-8	D	0.328	84	0.719	100	1	6.9	3500	3.1	3.6	5.4	11.6	18.5	0.185
125A-9	D	0.326	88	0.772	100	1	5.9	3500	3.9	4.0	6.0	10.4	16.3	0.163
125A-10	U	0.239	74	0.587	100	1	9.2	5000	1.1	1.6	3.1	29.7	38.9	0.389
125A-11	U	0.253	75	0.600	100	1	9.0	5450	1.2	1.6	3.2	30.8	39.8	0.398
125A-12	U	0.225	76	0.619	100	1	8.7	4900	0.9	1.4	2.8	32.2	40.9	0.409
125A-13	U	0.519	75	0.600	100	1	9.0	8000	0.9	1.4	2.8	50.8	59.8	0.598
125A-14	U	0.443	75	0.600	100	1	9.0	6700	1.2	1.6	3.2	37.2	46.2	0.462
125A-15	U	0.219	75	0.606	100	1	8.9	4800	1	1.5	2.9	30.0	38.9	0.389
125A-16	U	0.312	76	0.611	100	1	8.8	6650	0.7	1.2	2.5	48.4	57.2	0.572
125B-1	D	0.274	88	0.772	100	1	5.9	5100	2.9	3.4	5.2	17.1	23.0	0.230
125B-2	D	0.293	84	0.719	100	1	6.9	5100	2.8	3.4	5.1	17.4	24.3	0.243
125B-3	D	0.425	88	0.772	100	1	5.9	6950	2.6	3.3	4.9	24.3	30.3	0.303
125B-4	D	0.517	84	0.719	100	1	6.9	7950	2.6	3.3	4.9	27.7	34.6	0.346
125A-1	U	0.278	76	0.613	100	1	8.8	5200	1.8	2.0	3.9	24.1	32.8	0.328

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
125A-2	D	0.269	85	0.732	100	1	6.6	5550	2.5	3.2	4.8	20.0	26.6	0.266
125A-3	D	0.270	88	0.772	100	1	5.9	5550	2.3	3.1	4.6	20.9	26.8	0.268
125A-4	D	0.246	88	0.772	100	1	5.9	5050	2.3	3.1	4.6	19.1	25.0	0.250
125A-6	U	0.165	73	0.574	100	1	9.5	3800	2.1	2.1	4.3	16.8	26.3	0.263
125A-7	U	0.382	77	0.626	100	1	8.5	5000	2.7	2.4	4.8	19.0	27.5	0.275
213A-2	U	0.500	73	0.574	500	10	9.8	8100	3	2.6	5.1	28.1	38.0	0.380
213A-3	U	0.371	73	0.574	100	1	9.5	6850	2.6	2.4	4.7	25.8	35.3	0.353
213A-4	U	0.251	73	0.574	100	1	9.5	5550	2.5	2.3	4.6	21.7	31.1	0.311
OFF1A-2	U	0.378	74	0.591	100	1	9.2	6500	3.4	2.7	5.4	21.5	30.7	0.307
OFF1A-3	U	0.302	74	0.581	100	1	9.3	7150	2.7	2.4	4.8	26.4	35.7	0.357
OFF1A-4	U	0.274	73	0.575	100	1	9.5	6400	2.8	2.5	4.9	23.4	32.8	0.328
213A-6	U	0.279	73	0.574	100	1	9.5	5550	1.3	1.7	3.4	30.0	39.5	0.395
213A-7	U	0.251	73	0.574	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.319
213A-8	U	0.255	73	0.574	100	1	9.5	5450	2.2	2.2	4.4	22.7	32.2	0.322
213A-9	U	0.252	73	0.574	100	1	9.5	5300	1	1.5	2.9	32.8	42.3	0.423
213A-10	U	0.252	73	0.572	100	1	9.5	5500	2.2	2.2	4.4	22.9	32.4	0.324
213A-11	U	0.256	73	0.573	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.319
213B-1	U	0.261	73	0.573	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.319
213B-2	U	0.262	73	0.574	100	1	9.5	5600	2.4	2.3	4.6	22.3	31.8	0.318
213B-3	U	0.253	73	0.574	100	1	9.5	5400	2.3	2.2	4.5	22.0	31.5	0.315
213B-4	U	0.255	73	0.574	100	1	9.5	5500	2.1	2.1	4.3	23.4	32.9	0.329
213B-5	U	0.240	73	0.574	100	1	9.5	4900	1.3	1.7	3.4	26.8	36.3	0.363
213B-6	U	0.244	73	0.574	100	1	9.5	5350	2.1	2.1	4.3	22.9	32.3	0.323
213B-7	U	0.249	73	0.574	100	1	9.5	5200	1.2	1.6	3.2	29.5	38.9	0.389
223A-2	D	0.384	88	0.772	100	1	5.9	4750	2.2	3.0	4.5	18.4	24.3	0.243
223A-3	U	0.250	73	0.574	100	1	9.5	5400	2	2.1	4.2	23.6	33.1	0.331
223B-2	D	0.191	86	0.745	100	1	6.4	3450	1.7	2.6	4.0	15.5	21.9	0.219
223B-3	D	0.257	87	0.758	100	1	6.1	5500	1.6	2.6	3.9	24.8	30.9	0.309
223B-4	D	0.244	88	0.772	100	1	5.9	5400	1.8	2.7	4.1	23.0	28.9	0.289
223B-5	D	0.252	86	0.745	100	1	6.4	5450	1.5	2.5	3.7	25.4	31.8	0.318
223B-6	U	0.192	74	0.587	100	1	9.2	4600	0.9	1.4	2.8	30.4	39.7	0.397
223B-7	D	0.230	88	0.772	100	1	5.9	3800	2	2.9	4.3	15.6	21.5	0.215
223C-1	D	0.266	88	0.772	100	1	5.9	5600	1.7	2.6	4.0	24.5	30.4	0.304
223C-2	D	0.273	88	0.772	100	1	5.9	5650	1.8	2.7	4.1	24.0	29.9	0.299

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
223C-3	D	0.273	85	0.732	100	1	6.6	5650	1.8	2.7	4.1	24.0	30.6	0.306
223C-4	D	0.262	76	0.613	100	1	8.8	5600	0.9	1.9	2.9	33.6	42.4	0.424
223C-5	U	0.219	73	0.574	100	1	9.5	3100	2.5	2.3	4.6	12.9	22.4	0.224
223C-6	U	0.249	73	0.574	100	1	9.5	5400	1.8	2.0	3.9	24.9	34.4	0.344
223C-7	U	0.250	73	0.574	100	1	9.5	5350	1.7	1.9	3.8	25.4	34.9	0.349
223C-8	U	0.251	73	0.574	100	1	9.5	5450	1.7	1.9	3.8	25.8	35.3	0.353
223C-9	U	0.313	77	0.626	100	1	8.5	6000	1.3	1.7	3.4	32.3	40.8	0.408
223C-10	U	0.241	73	0.574	100	1	9.5	3900	2.4	2.3	4.6	16.1	25.6	0.256
223C-11	U	0.250	73	0.574	100	1	9.5	5400	1.9	2.0	4.1	24.2	33.7	0.337
223C-12	U	0.251	73	0.574	100	1	9.5	5500	2	2.1	4.2	24.0	33.5	0.335
223C-13	D	0.247	88	0.772	100	1	5.9	5350	1.9	2.8	4.2	22.2	28.1	0.281
223C-14	U	0.375	79	0.653	100	1	8.0	6700	1.3	1.7	3.4	35.8	43.8	0.438
223C-15	U	0.251	73	0.574	100	1	9.5	4100	2.4	2.3	4.6	16.8	26.3	0.263
223C-16	U	0.251	73	0.574	100	1	9.5	5400	1.9	2.0	4.1	24.2	33.7	0.337
223C-17	D	0.248	88	0.772	100	1	5.9	5400	1.7	2.6	4.0	23.6	29.5	0.295
223C-18	D	0.258	88	0.772	100	1	5.9	5500	1.7	2.6	4.0	24.1	30.0	0.300
223C-19	D	0.373	80	0.666	100	1	7.8	6400	1.2	2.2	3.4	33.1	40.9	0.409
223C-20	U	0.265	73	0.574	100	1	9.5	4150	2.5	2.3	4.6	16.6	26.1	0.261
223C-21	D	0.252	88	0.772	100	1	5.9	5400	1.8	2.7	4.1	23.0	28.9	0.289
223C-22	D	0.262	88	0.772	100	1	5.9	5500	1.5	2.5	3.7	25.6	31.5	0.315
223C-23	D	0.253	83	0.706	100	1	7.1	5400	1.5	2.5	3.7	25.2	32.3	0.323
223C-24	U	0.315	78	0.640	100	1	8.3	6850	1.2	1.6	3.2	38.0	46.3	0.463
NW1-C	U	0.293	81	0.676	100	1	7.6	6400	3.4	2.7	5.4	21.2	28.8	0.288
NW2-C	U	0.395	73	0.574	100	1	9.5	7300	2.2	2.2	4.4	29.8	39.3	0.393
NW5-C	U	0.275	73	0.574	100	1	9.5	5650	2.1	2.1	4.3	24.0	33.5	0.335
NW7-C	U	0.488	84	0.720	100	1	6.8	9700	3.2	2.6	5.3	32.3	39.1	0.391
NW9-C	U	0.273	73	0.574	100	1	9.5	6200	2.3	2.2	4.5	25.0	34.5	0.345
NW11-C	U	0.270	73	0.574	100	1	9.5	5600	2.6	2.4	4.7	21.4	30.9	0.309
NW17-C	U	0.430	73	0.574	100	1	9.5	7750	2.2	2.2	4.4	31.5	41.0	0.410
NW21-C	U	0.403	84	0.723	100	1	6.8	7850	3.1	2.6	5.2	26.9	33.6	0.336
NW23-C	U	0.376	73	0.574	100	1	9.5	6900	2.1	2.1	4.3	28.9	38.4	0.384
NW33-C	U	0.248	86	0.745	100	1	6.4	5400	2.8	2.5	4.9	20.0	26.4	0.264
NW35-C	U	0.434	83	0.710	100	1	7.0	5100	3.5	2.8	5.5	16.9	24.0	0.240
NW50-C	U	0.358	73	0.574	100	1	9.5	6300	3.3	2.7	5.3	21.2	30.7	0.307

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
NW51-C	U	0.306	73	0.574	100	1	9.5	5100	3.2	2.6	5.3	17.7	27.2	0.272
NW64-C	U	0.407	73	0.574	100	1	9.5	7500	2.8	2.5	4.9	27.1	36.6	0.366
NW102-C	U	0.412	73	0.574	100	1	9.5	8600	2.2	2.2	4.4	34.8	44.2	0.442
NW130-C	U	0.241	75	0.606	100	1	8.9	6550	1.5	1.8	3.6	32.6	41.5	0.415
OFF1A-5	U	0.418	73	0.574	100	1	9.5	7650	2.5	2.3	4.6	29.2	38.7	0.387
OFF1A-6	U	0.473	73	0.574	500	10	9.8	8300	3.5	2.8	5.5	26.6	36.5	0.365
OFF2A	U	0.318	73	0.574	100	1	9.5	6200	2.5	2.3	4.6	24.0	33.5	0.335
OFF2B	U	0.160	73	0.574	500	10	9.8	3700	3.5	2.8	5.5	12.7	22.5	0.225
OFF3	U	0.222	73	0.574	100	1	9.5	5200	2.4	2.3	4.6	20.8	30.3	0.303
OFF4-1	U	0.301	77	0.628	100	1	8.5	10400	6.2	3.7	7.3	24.8	33.3	0.333
OFF4-2	U	0.420	79	0.659	100	1	7.9	4600	12.7	5.3	10.5	8.1	16.0	0.160
OFF5-1	U	0.297	80	0.672	100	1	7.7	6700	6	3.6	7.2	16.6	24.4	0.244
OFF5-2	U	0.395	86	0.742	100	1	6.4	10000	4.8	3.2	6.4	27.2	33.6	0.336
OFF8	U	0.272	86	0.745	500	10	6.6	6500	3.9	2.9	5.8	20.1	26.7	0.267
OFF9	U	0.303	86	0.745	500	10	6.6	11100	4	3.0	5.9	32.9	39.5	0.395

Alternative D

Subbasin ID	Non-Disposal (ac)	Disposal (ac)	Out of CTA (ac)	CN_{NONDIS}	CN_{DIS}	CN_D
NW187-C	161	0	4	80	91	80
116-13	174	0	1	72	88	72
116-14	228	93	13	73	88	77
223C-21	0	159	2	73	88	88
223C-22	0	164	3	73	88	88
223C-23	0	123	38	73	88	85
223C-24	106	91	5	77	90	83
125A-15	132	0	11	75	90	75
125A-16	194	0	6	76	90	76
116-7	34	0	165	73	89	73
223C-17	0	155	4	73	88	88
223C-18	0	165	0	73	88	88
223C-19	125	114	0	76	89	83
125A-12	145	1	0	76	90	77
223C-13	0	154	4	73	88	88
125A-14	62	193	29	73	89	84
223C-14	110	132	0	75	89	83
125A-13	127	209	0	74	89	83
125A-10	94	60	0	74	89	80
125A-11	66	95	0	74	89	83
223C-9	89	108	5	73	88	81
125A-6	73	33	0	73	89	78
125A-7	102	143	0	73	88	82
125A-8	0	210	0	73	88	88
125A-9	0	208	1	73	88	88
125B-3	0	273	0	73	88	88
125B-4	0	245	86	73	88	84
223B-7	0	147	0	73	88	88
223C-1	0	170	0	73	88	88
223C-2	0	175	0	73	88	88
223C-3	0	172	3	73	88	88
223C-4	98	55	15	73	88	78
223A-2	0	246	0	73	88	88
125A-5	0	195	0	73	88	88
125A-4	0	203	0	73	88	88
125A-3	0	224	0	73	88	88
125A-1	130	119	0	73	88	80
125A-2	0	217	0	73	88	88
125B-1	0	197	0	73	88	88
125B-2	0	154	52	73	88	84
223B-2	0	107	15	73	88	86
223B-3	0	155	10	73	88	87
223B-4	0	152	4	73	88	88
223B-5	0	160	2	73	88	88
223B-6	78	45	0	73	88	79
102B	381	1687	3623	83	92	86
102A	312	313	3390	83	92	84
SOUTH	2266	354	6899	80	91	80

Upper Las Vegas Wash
SCS Lag Time Calculations for Alternative D

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
116-2	U	0.415	73	0.567	100	1	9.6	8150	1.3	1.7	3.4	43.0	52.6	0.53
116-3	U	0.403	72	0.561	100	1	9.7	7000	2.6	2.4	4.7	26.3	36.1	0.36
116-4	U	0.417	72	0.560	100	1	9.7	7100	3.5	2.8	5.5	23.0	32.7	0.33
116-5	U	0.418	73	0.576	100	1	9.4	7100	3.9	2.9	5.8	21.8	31.2	0.31
116-6	U	0.413	72	0.560	100	1	9.7	7150	4.7	3.2	6.4	20.0	29.7	0.30
116-9	U	0.271	75	0.605	100	1	8.9	5400	0.3	0.8	1.6	61.0	69.9	0.70
116-10	U	0.271	75	0.597	100	1	9.1	5000	1.7	1.9	3.8	23.9	32.9	0.33
116-11	U	0.270	72	0.563	100	1	9.7	5600	2	2.1	4.2	24.4	34.1	0.34
116-12	U	0.265	72	0.560	100	1	9.7	5550	2.6	2.4	4.7	21.2	31.0	0.31
116-13	U	0.273	72	0.559	100	1	9.7	5700	0.5	1.0	2.1	49.7	59.4	0.59
116-14	U	0.293	77	0.626	100	1	8.5	5100	1	1.5	2.9	31.7	40.2	0.40
NW187-C	U	0.259	80	0.665	100	1	7.8	7150	0.6	1.1	2.3	55.9	63.8	0.64
116-1	U	0.402	73	0.573	100	1	9.5	7100	1.1	1.6	3.1	41.0	50.5	0.51
116-7	U	0.311	73	0.575	100	1	9.5	6000	0.7	1.2	2.5	44.0	53.5	0.53
116-8	U	0.328	74	0.580	100	1	9.4	6150	0.6	1.1	2.3	48.6	58.0	0.58
125A-5	D	0.234	88	0.772	100	1	5.9	5200	2.5	3.2	4.8	18.8	24.7	0.25
125A-8	D	0.328	88	0.772	100	1	5.9	3500	3.1	3.6	5.4	11.6	17.5	0.18
125A-9	D	0.326	88	0.772	100	1	5.9	3500	3.9	4.0	6.0	10.4	16.3	0.16
125A-10	U	0.239	80	0.666	100	1	7.8	5000	1.1	1.6	3.1	29.7	37.5	0.38
125A-11	D	0.253	83	0.706	100	1	7.1	5450	1.2	2.2	3.4	28.4	35.5	0.35
125A-12	U	0.225	76	0.619	100	1	8.7	4900	0.9	1.4	2.8	32.2	40.9	0.41
125A-13	D	0.519	83	0.706	100	1	7.1	8000	0.9	1.9	2.9	47.4	54.5	0.55
125A-14	D	0.443	84	0.719	100	1	6.9	6700	1.2	2.2	3.4	34.6	41.5	0.41
125A-15	U	0.219	75	0.606	100	1	8.9	4800	1	1.5	2.9	30.0	38.9	0.39
125A-16	U	0.312	76	0.611	100	1	8.8	6650	0.7	1.2	2.5	48.4	57.2	0.57
125B-1	D	0.274	88	0.772	100	1	5.9	5100	2.9	3.4	5.2	17.1	23.0	0.23
125B-2	D	0.293	84	0.719	100	1	6.9	5100	2.8	3.4	5.1	17.4	24.3	0.24
125B-3	D	0.425	88	0.772	100	1	5.9	6950	2.6	3.3	4.9	24.3	30.3	0.30
125B-4	D	0.517	84	0.719	100	1	6.9	7950	2.6	3.3	4.9	27.7	34.6	0.35
125A-1	D	0.278	80	0.666	100	1	7.8	5200	1.8	2.7	4.1	22.2	30.0	0.30

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
125A-2	D	0.269	88	0.772	100	1	5.9	5550	2.5	3.2	4.8	20.0	25.9	0.26
125A-3	D	0.270	88	0.772	100	1	5.9	5550	2.3	3.1	4.6	20.9	26.8	0.27
125A-4	D	0.246	88	0.772	100	1	5.9	5050	2.3	3.1	4.6	19.1	25.0	0.25
125A-6	U	0.165	78	0.640	100	1	8.3	3800	2.1	2.1	4.3	16.8	25.1	0.25
125A-7	D	0.382	82	0.692	100	1	7.3	5000	2.7	3.3	5.0	17.4	24.8	0.25
213A-2	U	0.500	73	0.574	500	10	9.8	8100	3	2.6	5.1	28.1	38.0	0.38
213A-3	U	0.371	73	0.574	100	1	9.5	6850	2.6	2.4	4.7	25.8	35.3	0.35
213A-4	U	0.251	73	0.574	100	1	9.5	5550	2.5	2.3	4.6	21.7	31.1	0.31
OFF1A-2	U	0.378	74	0.591	100	1	9.2	6500	3.4	2.7	5.4	21.5	30.7	0.31
OFF1A-3	U	0.302	74	0.581	100	1	9.3	7150	2.7	2.4	4.8	26.4	35.7	0.36
OFF1A-4	U	0.274	73	0.575	100	1	9.5	6400	2.8	2.5	4.9	23.4	32.8	0.33
213A-6	U	0.279	73	0.574	100	1	9.5	5550	1.3	1.7	3.4	30.0	39.5	0.40
213A-7	U	0.251	73	0.574	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213A-8	U	0.255	73	0.574	100	1	9.5	5450	2.2	2.2	4.4	22.7	32.2	0.32
213A-9	U	0.252	73	0.574	100	1	9.5	5300	1	1.5	2.9	32.8	42.3	0.42
213A-10	U	0.252	73	0.572	100	1	9.5	5500	2.2	2.2	4.4	22.9	32.4	0.32
213A-11	U	0.256	73	0.573	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213B-1	U	0.261	73	0.573	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213B-2	U	0.262	73	0.574	100	1	9.5	5600	2.4	2.3	4.6	22.3	31.8	0.32
213B-3	U	0.253	73	0.574	100	1	9.5	5400	2.3	2.2	4.5	22.0	31.5	0.32
213B-4	U	0.255	73	0.574	100	1	9.5	5500	2.1	2.1	4.3	23.4	32.9	0.33
213B-5	U	0.240	73	0.574	100	1	9.5	4900	1.3	1.7	3.4	26.8	36.3	0.36
213B-6	U	0.244	73	0.574	100	1	9.5	5350	2.1	2.1	4.3	22.9	32.3	0.32
213B-7	U	0.249	73	0.574	100	1	9.5	5200	1.2	1.6	3.2	29.5	38.9	0.39
223A-2	D	0.384	88	0.772	100	1	5.9	4750	2.2	3.0	4.5	18.4	24.3	0.24
223A-3	U	0.250	73	0.574	100	1	9.5	5400	2	2.1	4.2	23.6	33.1	0.33
223B-2	D	0.191	86	0.745	100	1	6.4	3450	1.7	2.6	4.0	15.5	21.9	0.22
223B-3	D	0.257	87	0.758	100	1	6.1	5500	1.6	2.6	3.9	24.8	30.9	0.31
223B-4	D	0.244	88	0.772	100	1	5.9	5400	1.8	2.7	4.1	23.0	28.9	0.29
223B-5	D	0.252	88	0.772	100	1	5.9	5450	1.5	2.5	3.7	25.4	31.3	0.31
223B-6	U	0.192	79	0.653	100	1	8.0	4600	0.9	1.4	2.8	30.4	38.5	0.38
223B-7	D	0.230	88	0.772	100	1	5.9	3800	2	2.9	4.3	15.6	21.5	0.22
223C-1	D	0.266	88	0.772	100	1	5.9	5600	1.7	2.6	4.0	24.5	30.4	0.30
223C-2	D	0.273	88	0.772	100	1	5.9	5650	1.8	2.7	4.1	24.0	29.9	0.30

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
223C-3	D	0.273	88	0.772	100	1	5.9	5650	1.8	2.7	4.1	24.0	29.9	0.30
223C-4	D	0.262	78	0.640	100	1	8.3	5600	0.9	1.9	2.9	33.6	41.9	0.42
223C-5	U	0.219	73	0.574	100	1	9.5	3100	2.5	2.3	4.6	12.9	22.4	0.22
223C-6	U	0.249	73	0.574	100	1	9.5	5400	1.8	2.0	3.9	24.9	34.4	0.34
223C-7	U	0.250	73	0.574	100	1	9.5	5350	1.7	1.9	3.8	25.4	34.9	0.35
223C-8	U	0.251	73	0.574	100	1	9.5	5450	1.7	1.9	3.8	25.8	35.3	0.35
223C-9	D	0.313	81	0.679	100	1	7.6	6000	1.3	2.3	3.5	29.9	37.5	0.37
223C-10	U	0.241	73	0.574	100	1	9.5	3900	2.4	2.3	4.6	16.1	25.6	0.26
223C-11	U	0.250	73	0.574	100	1	9.5	5400	1.9	2.0	4.1	24.2	33.7	0.34
223C-12	U	0.251	73	0.574	100	1	9.5	5500	2	2.1	4.2	24.0	33.5	0.33
223C-13	D	0.247	88	0.772	100	1	5.9	5350	1.9	2.8	4.2	22.2	28.1	0.28
223C-14	D	0.375	83	0.706	100	1	7.1	6700	1.3	2.3	3.5	33.2	40.3	0.40
223C-15	U	0.251	73	0.574	100	1	9.5	4100	2.4	2.3	4.6	16.8	26.3	0.26
223C-16	U	0.251	73	0.574	100	1	9.5	5400	1.9	2.0	4.1	24.2	33.7	0.34
223C-17	D	0.248	88	0.772	100	1	5.9	5400	1.7	2.6	4.0	23.6	29.5	0.30
223C-18	D	0.258	88	0.772	100	1	5.9	5500	1.7	2.6	4.0	24.1	30.0	0.30
223C-19	D	0.373	83	0.706	100	1	7.1	6400	1.2	2.2	3.4	33.1	40.2	0.40
223C-20	U	0.265	73	0.574	100	1	9.5	4150	2.5	2.3	4.6	16.6	26.1	0.26
223C-21	D	0.252	88	0.772	100	1	5.9	5400	1.8	2.7	4.1	23.0	28.9	0.29
223C-22	D	0.262	88	0.772	100	1	5.9	5500	1.5	2.5	3.7	25.6	31.5	0.32
223C-23	D	0.253	85	0.732	100	1	6.6	5400	1.5	2.5	3.7	25.2	31.8	0.32
223C-24	D	0.315	83	0.706	100	1	7.1	6850	1.2	2.2	3.4	35.3	42.4	0.42
NW1-C	U	0.293	81	0.676	100	1	7.6	6400	3.4	2.7	5.4	21.2	28.8	0.29
NW2-C	U	0.395	73	0.574	100	1	9.5	7300	2.2	2.2	4.4	29.8	39.3	0.39
NW5-C	U	0.275	73	0.574	100	1	9.5	5650	2.1	2.1	4.3	24.0	33.5	0.34
NW7-C	U	0.488	84	0.720	100	1	6.8	9700	3.2	2.6	5.3	32.3	39.1	0.39
NW9-C	U	0.273	73	0.574	100	1	9.5	6200	2.3	2.2	4.5	25.0	34.5	0.34
NW11-C	U	0.270	73	0.574	100	1	9.5	5600	2.6	2.4	4.7	21.4	30.9	0.31
NW17-C	U	0.430	73	0.574	100	1	9.5	7750	2.2	2.2	4.4	31.5	41.0	0.41
NW21-C	U	0.403	84	0.723	100	1	6.8	7850	3.1	2.6	5.2	26.9	33.6	0.34
NW23-C	U	0.376	73	0.574	100	1	9.5	6900	2.1	2.1	4.3	28.9	38.4	0.38
NW33-C	U	0.248	86	0.745	100	1	6.4	5400	2.8	2.5	4.9	20.0	26.4	0.26
NW35-C	U	0.434	83	0.710	100	1	7.0	5100	3.5	2.8	5.5	16.9	24.0	0.24
NW50-C	U	0.358	73	0.574	100	1	9.5	6300	3.3	2.7	5.3	21.2	30.7	0.31

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
NW51-C	U	0.306	73	0.574	100	1	9.5	5100	3.2	2.6	5.3	17.7	27.2	0.27
NW64-C	U	0.407	73	0.574	100	1	9.5	7500	2.8	2.5	4.9	27.1	36.6	0.37
NW102-C	U	0.412	73	0.574	100	1	9.5	8600	2.2	2.2	4.4	34.8	44.2	0.44
NW130-C	U	0.241	75	0.606	100	1	8.9	6550	1.5	1.8	3.6	32.6	41.5	0.42
OFF1A-5	U	0.418	73	0.574	100	1	9.5	7650	2.5	2.3	4.6	29.2	38.7	0.39
OFF1A-6	U	0.473	73	0.574	500	10	9.8	8300	3.5	2.8	5.5	26.6	36.5	0.36
OFF2A	U	0.318	73	0.574	100	1	9.5	6200	2.5	2.3	4.6	24.0	33.5	0.33
OFF2B	U	0.160	73	0.574	500	10	9.8	3700	3.5	2.8	5.5	12.7	22.5	0.23
OFF3	U	0.222	73	0.574	100	1	9.5	5200	2.4	2.3	4.6	20.8	30.3	0.30
OFF4-1	U	0.301	77	0.628	100	1	8.5	10400	6.2	3.7	7.3	24.8	33.3	0.33
OFF4-2	U	0.420	79	0.659	100	1	7.9	4600	12.7	5.3	10.5	8.1	16.0	0.16
OFF5-1	U	0.297	80	0.672	100	1	7.7	6700	6	3.6	7.2	16.6	24.4	0.24
OFF5-2	U	0.395	86	0.742	100	1	6.4	10000	4.8	3.2	6.4	27.2	33.6	0.34
OFF8	U	0.272	86	0.745	500	10	6.6	6500	3.9	2.9	5.8	20.1	26.7	0.27
OFF9	U	0.303	86	0.745	500	10	6.6	11100	4	3.0	5.9	32.9	39.5	0.39

Alternative E

Subbasin ID	Non-Disposal (ac)	Disposal (ac)	Out of CTA (ac)	CN_{NONDIS}	CN_{DIS}	CN_E
NW187-C	0	161	4	80	91	91
116-13	42	133	1	72	88	84
116-14	176	145	13	73	88	80
223C-21	0	159	2	73	88	88
223C-22	0	164	3	73	88	88
223C-23	0	123	38	73	88	85
223C-24	0	197	5	77	90	89
125A-15	88	43	11	75	90	80
125A-16	154	40	6	76	90	79
116-7	0	34	165	73	89	76
223C-17	0	155	4	73	88	88
223C-18	0	165	0	73	88	88
223C-19	34	205	0	76	89	88
125A-12	142	4	0	76	90	77
223C-13	0	154	4	73	88	88
125A-14	59	195	29	73	89	84
223C-14	75	166	0	75	89	85
125A-13	155	182	0	74	89	82
125A-10	101	52	0	74	89	79
125A-11	25	136	0	74	89	87
223C-9	36	160	5	73	88	85
125A-6	49	58	0	73	89	81
125A-7	75	171	0	73	88	84
125A-8	0	210	0	73	88	88
125A-9	0	208	1	73	88	88
125B-3	0	273	0	73	88	88
125B-4	0	245	86	73	88	84
223B-7	0	147	0	73	88	88
223C-1	0	170	0	73	88	88
223C-2	0	175	0	73	88	88
223C-3	0	172	3	73	88	88
223C-4	42	111	15	73	88	83
223A-2	0	246	0	73	88	88
125A-5	0	195	0	73	88	88
125A-4	0	203	0	73	88	88
125A-3	0	224	0	73	88	88
125A-1	66	183	0	73	88	84
125A-2	0	217	0	73	88	88
125B-1	0	197	0	73	88	88
125B-2	0	154	52	73	88	84
223B-2	0	107	15	73	88	86
223B-3	0	155	10	73	88	87
223B-4	0	152	4	73	88	88
223B-5	0	160	2	73	88	88
223B-6	60	64	0	73	88	81
102B	230	1837	3623	83	92	86
102A	174	451	3390	83	92	84
SOUTH	1523	1097	6899	80	91	81

Upper Las Vegas Wash
SCS Lag Time Calculations for Alternative E

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
116-2	U	0.415	73	0.567	100	1	9.6	8150	1.3	1.7	3.4	43.0	52.6	0.53
116-3	U	0.403	72	0.561	100	1	9.7	7000	2.6	2.4	4.7	26.3	36.1	0.36
116-4	U	0.417	72	0.560	100	1	9.7	7100	3.5	2.8	5.5	23.0	32.7	0.33
116-5	U	0.418	73	0.576	100	1	9.4	7100	3.9	2.9	5.8	21.8	31.2	0.31
116-6	U	0.413	72	0.560	100	1	9.7	7150	4.7	3.2	6.4	20.0	29.7	0.30
116-9	U	0.271	75	0.605	100	1	8.9	5400	0.3	0.8	1.6	61.0	69.9	0.70
116-10	U	0.271	75	0.597	100	1	9.1	5000	1.7	1.9	3.8	23.9	32.9	0.33
116-11	U	0.270	72	0.563	100	1	9.7	5600	2	2.1	4.2	24.4	34.1	0.34
116-12	U	0.265	72	0.560	100	1	9.7	5550	2.6	2.4	4.7	21.2	31.0	0.31
116-13	D	0.273	84	0.719	100	1	6.9	5700	0.5	1.4	2.2	45.9	52.7	0.53
116-14	D	0.293	80	0.666	100	1	7.8	5100	1	2.0	3.1	29.2	37.0	0.37
NW187-C	D	0.259	91	0.811	100	1	5.2	7150	0.6	1.6	2.4	52.1	57.3	0.57
116-1	U	0.402	73	0.573	100	1	9.5	7100	1.1	1.6	3.1	41.0	50.5	0.51
116-7	U	0.311	76	0.613	100	1	8.8	6000	0.7	1.2	2.5	44.0	52.8	0.53
116-8	U	0.328	74	0.580	100	1	9.4	6150	0.6	1.1	2.3	48.6	58.0	0.58
125A-5	D	0.234	88	0.772	100	1	5.9	5200	2.5	3.2	4.8	18.8	24.7	0.25
125A-8	D	0.328	88	0.772	100	1	5.9	3500	3.1	3.6	5.4	11.6	17.5	0.18
125A-9	D	0.326	88	0.772	100	1	5.9	3500	3.9	4.0	6.0	10.4	16.3	0.16
125A-10	D	0.239	79	0.653	100	1	8.0	5000	1.1	2.1	3.2	27.3	35.4	0.35
125A-11	D	0.253	87	0.758	100	1	6.1	5450	1.2	2.2	3.4	28.4	34.5	0.35
125A-12	D	0.225	77	0.626	100	1	8.5	4900	0.9	1.9	2.9	29.6	38.1	0.38
125A-13	D	0.519	82	0.692	100	1	7.3	8000	0.9	1.9	2.9	47.4	54.7	0.55
125A-14	D	0.443	84	0.719	100	1	6.9	6700	1.2	2.2	3.4	34.6	41.5	0.41
125A-15	U	0.219	80	0.666	100	1	7.8	4800	1	1.5	2.9	30.0	37.8	0.38
125A-16	U	0.312	79	0.653	100	1	8.0	6650	0.7	1.2	2.5	48.4	56.4	0.56
125B-1	D	0.274	88	0.772	100	1	5.9	5100	2.9	3.4	5.2	17.1	23.0	0.23
125B-2	D	0.293	84	0.719	100	1	6.9	5100	2.8	3.4	5.1	17.4	24.3	0.24
125B-3	D	0.425	88	0.772	100	1	5.9	6950	2.6	3.3	4.9	24.3	30.3	0.30
125B-4	D	0.517	84	0.719	100	1	6.9	7950	2.6	3.3	4.9	27.7	34.6	0.35
125A-1	D	0.278	84	0.719	100	1	6.9	5200	1.8	2.7	4.1	22.2	29.0	0.29

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
125A-2	D	0.269	88	0.772	100	1	5.9	5550	2.5	3.2	4.8	20.0	25.9	0.26
125A-3	D	0.270	88	0.772	100	1	5.9	5550	2.3	3.1	4.6	20.9	26.8	0.27
125A-4	D	0.246	88	0.772	100	1	5.9	5050	2.3	3.1	4.6	19.1	25.0	0.25
125A-6	D	0.165	81	0.679	100	1	7.6	3800	2.1	2.9	4.4	15.2	22.8	0.23
125A-7	D	0.382	84	0.719	100	1	6.9	5000	2.7	3.3	5.0	17.4	24.3	0.24
213A-2	U	0.500	73	0.574	500	10	9.8	8100	3	2.6	5.1	28.1	38.0	0.38
213A-3	U	0.371	73	0.574	100	1	9.5	6850	2.6	2.4	4.7	25.8	35.3	0.35
213A-4	U	0.251	73	0.574	100	1	9.5	5550	2.5	2.3	4.6	21.7	31.1	0.31
OFF1A-2	U	0.378	74	0.591	100	1	9.2	6500	3.4	2.7	5.4	21.5	30.7	0.31
OFF1A-3	U	0.302	74	0.581	100	1	9.3	7150	2.7	2.4	4.8	26.4	35.7	0.36
OFF1A-4	U	0.274	73	0.575	100	1	9.5	6400	2.8	2.5	4.9	23.4	32.8	0.33
213A-6	U	0.279	73	0.574	100	1	9.5	5550	1.3	1.7	3.4	30.0	39.5	0.40
213A-7	U	0.251	73	0.574	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213A-8	U	0.255	88	0.772	100	1	5.9	5450	2.2	2.2	4.4	22.7	28.6	0.29
213A-9	U	0.252	88	0.772	100	1	5.9	5300	1	1.5	2.9	32.8	38.8	0.39
213A-10	U	0.252	73	0.572	100	1	9.5	5500	2.2	2.2	4.4	22.9	32.4	0.32
213A-11	U	0.256	73	0.573	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213B-1	U	0.261	73	0.573	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213B-2	U	0.262	73	0.574	100	1	9.5	5600	2.4	2.3	4.6	22.3	31.8	0.32
213B-3	U	0.253	73	0.574	100	1	9.5	5400	2.3	2.2	4.5	22.0	31.5	0.32
213B-4	U	0.255	73	0.574	100	1	9.5	5500	2.1	2.1	4.3	23.4	32.9	0.33
213B-5	U	0.240	73	0.574	100	1	9.5	4900	1.3	1.7	3.4	26.8	36.3	0.36
213B-6	U	0.244	73	0.574	100	1	9.5	5350	2.1	2.1	4.3	22.9	32.3	0.32
213B-7	U	0.249	73	0.574	100	1	9.5	5200	1.2	1.6	3.2	29.5	38.9	0.39
223A-2	D	0.384	88	0.772	100	1	5.9	4750	2.2	3.0	4.5	18.4	24.3	0.24
223A-3	U	0.250	73	0.574	100	1	9.5	5400	2	2.1	4.2	23.6	33.1	0.33
223B-2	D	0.191	86	0.745	100	1	6.4	3450	1.7	2.6	4.0	15.5	21.9	0.22
223B-3	D	0.257	87	0.758	100	1	6.1	5500	1.6	2.6	3.9	24.8	30.9	0.31
223B-4	D	0.244	88	0.772	100	1	5.9	5400	1.8	2.7	4.1	23.0	28.9	0.29
223B-5	D	0.252	88	0.772	100	1	5.9	5450	1.5	2.5	3.7	25.4	31.3	0.31
223B-6	D	0.192	81	0.679	100	1	7.6	4600	0.9	1.9	2.9	27.9	35.5	0.35
223B-7	D	0.230	88	0.772	100	1	5.9	3800	2	2.9	4.3	15.6	21.5	0.22
223C-1	D	0.266	88	0.772	100	1	5.9	5600	1.7	2.6	4.0	24.5	30.4	0.30
223C-2	D	0.273	88	0.772	100	1	5.9	5650	1.8	2.7	4.1	24.0	29.9	0.30

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
223C-3	D	0.273	88	0.772	100	1	5.9	5650	1.8	2.7	4.1	24.0	29.9	0.30
223C-4	D	0.262	83	0.706	100	1	7.1	5600	0.9	1.9	2.9	33.6	40.7	0.41
223C-5	U	0.219	73	0.574	100	1	9.5	3100	2.5	2.3	4.6	12.9	22.4	0.22
223C-6	U	0.249	73	0.574	100	1	9.5	5400	1.8	2.0	3.9	24.9	34.4	0.34
223C-7	U	0.250	73	0.574	100	1	9.5	5350	1.7	1.9	3.8	25.4	34.9	0.35
223C-8	U	0.251	73	0.574	100	1	9.5	5450	1.7	1.9	3.8	25.8	35.3	0.35
223C-9	D	0.313	85	0.732	100	1	6.6	6000	1.3	2.3	3.5	29.9	36.5	0.37
223C-10	U	0.241	73	0.574	100	1	9.5	3900	2.4	2.3	4.6	16.1	25.6	0.26
223C-11	U	0.250	73	0.574	100	1	9.5	5400	1.9	2.0	4.1	24.2	33.7	0.34
223C-12	U	0.251	73	0.574	100	1	9.5	5500	2	2.1	4.2	24.0	33.5	0.33
223C-13	D	0.247	88	0.772	100	1	5.9	5350	1.9	2.8	4.2	22.2	28.1	0.28
223C-14	D	0.375	85	0.732	100	1	6.6	6700	1.3	2.3	3.5	33.2	39.9	0.40
223C-15	U	0.251	73	0.574	100	1	9.5	4100	2.4	2.3	4.6	16.8	26.3	0.26
223C-16	U	0.251	73	0.574	100	1	9.5	5400	1.9	2.0	4.1	24.2	33.7	0.34
223C-17	D	0.248	88	0.772	100	1	5.9	5400	1.7	2.6	4.0	23.6	29.5	0.30
223C-18	D	0.258	88	0.772	100	1	5.9	5500	1.7	2.6	4.0	24.1	30.0	0.30
223C-19	D	0.373	88	0.772	100	1	5.9	6400	1.2	2.2	3.4	33.1	39.0	0.39
223C-20	U	0.265	73	0.574	100	1	9.5	4150	2.5	2.3	4.6	16.6	26.1	0.26
223C-21	D	0.252	88	0.772	100	1	5.9	5400	1.8	2.7	4.1	23.0	28.9	0.29
223C-22	D	0.262	88	0.772	100	1	5.9	5500	1.5	2.5	3.7	25.6	31.5	0.32
223C-23	D	0.253	85	0.732	100	1	6.6	5400	1.5	2.5	3.7	25.2	31.8	0.32
223C-24	D	0.315	89	0.785	100	1	5.7	6850	1.2	2.2	3.4	35.3	41.0	0.41
NW1-C	U	0.293	81	0.676	100	1	7.6	6400	3.4	2.7	5.4	21.2	28.8	0.29
NW2-C	U	0.395	73	0.574	100	1	9.5	7300	2.2	2.2	4.4	29.8	39.3	0.39
NW5-C	U	0.275	73	0.574	100	1	9.5	5650	2.1	2.1	4.3	24.0	33.5	0.34
NW7-C	U	0.488	84	0.720	100	1	6.8	9700	3.2	2.6	5.3	32.3	39.1	0.39
NW9-C	U	0.273	73	0.574	100	1	9.5	6200	2.3	2.2	4.5	25.0	34.5	0.34
NW11-C	U	0.270	73	0.574	100	1	9.5	5600	2.6	2.4	4.7	21.4	30.9	0.31
NW17-C	U	0.430	73	0.574	100	1	9.5	7750	2.2	2.2	4.4	31.5	41.0	0.41
NW21-C	U	0.403	84	0.723	100	1	6.8	7850	3.1	2.6	5.2	26.9	33.6	0.34
NW23-C	U	0.376	73	0.574	100	1	9.5	6900	2.1	2.1	4.3	28.9	38.4	0.38
NW33-C	U	0.248	86	0.745	100	1	6.4	5400	2.8	2.5	4.9	20.0	26.4	0.26
NW35-C	U	0.434	83	0.710	100	1	7.0	5100	3.5	2.8	5.5	16.9	24.0	0.24
NW50-C	U	0.358	73	0.574	100	1	9.5	6300	3.3	2.7	5.3	21.2	30.7	0.31

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
NW51-C	U	0.306	73	0.574	100	1	9.5	5100	3.2	2.6	5.3	17.7	27.2	0.27
NW64-C	U	0.407	73	0.574	100	1	9.5	7500	2.8	2.5	4.9	27.1	36.6	0.37
NW102-C	U	0.412	73	0.574	100	1	9.5	8600	2.2	2.2	4.4	34.8	44.2	0.44
NW130-C	U	0.241	75	0.606	100	1	8.9	6550	1.5	1.8	3.6	32.6	41.5	0.42
OFF1A-5	U	0.418	73	0.574	100	1	9.5	7650	2.5	2.3	4.6	29.2	38.7	0.39
OFF1A-6	U	0.473	73	0.574	500	10	9.8	8300	3.5	2.8	5.5	26.6	36.5	0.36
OFF2A	U	0.318	73	0.574	100	1	9.5	6200	2.5	2.3	4.6	24.0	33.5	0.33
OFF2B	U	0.160	73	0.574	500	10	9.8	3700	3.5	2.8	5.5	12.7	22.5	0.23
OFF3	U	0.222	73	0.574	100	1	9.5	5200	2.4	2.3	4.6	20.8	30.3	0.30
OFF4-1	U	0.301	77	0.628	100	1	8.5	10400	6.2	3.7	7.3	24.8	33.3	0.33
OFF4-2	U	0.420	79	0.659	100	1	7.9	4600	12.7	5.3	10.5	8.1	16.0	0.16
OFF5-1	U	0.297	80	0.672	100	1	7.7	6700	6	3.6	7.2	16.6	24.4	0.24
OFF5-2	U	0.395	86	0.742	100	1	6.4	10000	4.8	3.2	6.4	27.2	33.6	0.34
OFF8	U	0.272	86	0.745	500	10	6.6	6500	3.9	2.9	5.8	20.1	26.7	0.27
OFF9	U	0.303	86	0.745	500	10	6.6	11100	4	3.0	5.9	32.9	39.5	0.39

No-Action Alternative

Subbasin ID	Non-Disposal (ac)	Disposal (ac)	Out of CTA (ac)	CN_{NONDIS}	CN_{DIS}	CN_{NOA}
NW187-C	0	161	4	80	91	91
116-13	0	174	1	72	88	88
116-14	0	322	13	73	88	88
223C-21	0	159	2	73	88	88
223C-22	0	164	3	73	88	88
223C-23	0	123	38	73	88	85
223C-24	0	197	5	77	90	89
125A-15	0	131	11	75	90	88
125A-16	0	194	6	76	90	89
116-7	0	34	165	73	89	76
223C-17	0	155	4	73	88	88
223C-18	0	165	0	73	88	88
223C-19	0	239	0	76	89	89
125A-12	0	145	0	76	90	90
223C-13	0	154	4	73	88	88
125A-14	0	255	29	73	89	87
223C-14	0	241	0	75	89	89
125A-13	0	337	0	74	89	89
125A-10	0	153	0	74	89	89
125A-11	0	161	0	74	89	89
223C-9	0	196	5	73	88	88
125A-6	0	106	0	73	89	89
125A-7	0	245	0	73	88	88
125A-8	0	210	0	73	88	88
125A-9	0	208	1	73	88	88
125B-3	0	273	0	73	88	88
125B-4	0	245	86	73	88	84
223B-7	0	147	0	73	88	88
223C-1	0	170	0	73	88	88
223C-2	0	175	0	73	88	88
223C-3	0	172	3	73	88	88
223C-4	0	153	15	73	88	87
223A-2	0	246	0	73	88	88
125A-5	0	195	0	73	88	88
125A-4	0	203	0	73	88	88
125A-3	0	224	0	73	88	88
125A-1	0	249	0	73	88	88
125A-2	0	217	0	73	88	88
125B-1	0	197	0	73	88	88
125B-2	0	154	52	73	88	84
223B-2	0	107	15	73	88	86
223B-3	0	155	10	73	88	87
223B-4	0	152	4	73	88	88
223B-5	0	160	2	73	88	88
223B-6	0	123	0	73	88	88
102B	192	1875	3623	83	92	86
102A	174	451	3390	83	92	84
SOUTH	1057	1564	6899	80	91	82

Upper Las Vegas Wash
SCS Lag Time Calculations for No-Action Alternative

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
116-2	U	0.415	73	0.567	100	1	9.6	8150	1.3	1.7	3.4	43.0	52.6	0.53
116-3	U	0.403	72	0.561	100	1	9.7	7000	2.6	2.4	4.7	26.3	36.1	0.36
116-4	U	0.417	72	0.560	100	1	9.7	7100	3.5	2.8	5.5	23.0	32.7	0.33
116-5	U	0.418	73	0.576	100	1	9.4	7100	3.9	2.9	5.8	21.8	31.2	0.31
116-6	U	0.413	72	0.560	100	1	9.7	7150	4.7	3.2	6.4	20.0	29.7	0.30
116-9	U	0.271	75	0.605	100	1	8.9	5400	0.3	0.8	1.6	61.0	69.9	0.70
116-10	U	0.271	75	0.597	100	1	9.1	5000	1.7	1.9	3.8	23.9	32.9	0.33
116-11	U	0.270	72	0.563	100	1	9.7	5600	2	2.1	4.2	24.4	34.1	0.34
116-12	U	0.265	72	0.560	100	1	9.7	5550	2.6	2.4	4.7	21.2	31.0	0.31
116-13	D	0.273	88	0.772	100	1	5.9	5700	0.5	1.4	2.2	45.9	51.8	0.52
116-14	U	0.293	88	0.772	100	1	5.9	5100	1	1.5	2.9	31.7	37.6	0.38
NW187-C	D	0.259	91	0.811	100	1	5.2	7150	0.6	1.6	2.4	52.1	57.3	0.57
116-1	U	0.402	73	0.573	100	1	9.5	7100	1.1	1.6	3.1	41.0	50.5	0.51
116-7	U	0.311	76	0.613	100	1	8.8	6000	0.7	1.2	2.5	44.0	52.8	0.53
116-8	U	0.328	74	0.580	100	1	9.4	6150	0.6	1.1	2.3	48.6	58.0	0.58
125A-5	D	0.234	88	0.772	100	1	5.9	5200	2.5	3.2	4.8	18.8	24.7	0.25
125A-8	D	0.328	88	0.772	100	1	5.9	3500	3.1	3.6	5.4	11.6	17.5	0.18
125A-9	D	0.326	88	0.772	100	1	5.9	3500	3.9	4.0	6.0	10.4	16.3	0.16
125A-10	D	0.239	89	0.785	100	1	5.7	5000	1.1	2.1	3.2	27.3	33.0	0.33
125A-11	D	0.253	89	0.785	100	1	5.7	5450	1.2	2.2	3.4	28.4	34.1	0.34
125A-12	D	0.225	90	0.798	100	1	5.4	4900	0.9	1.9	2.9	29.6	35.0	0.35
125A-13	D	0.519	89	0.785	100	1	5.7	8000	0.9	1.9	2.9	47.4	53.1	0.53
125A-14	D	0.443	87	0.758	100	1	6.1	6700	1.2	2.2	3.4	34.6	40.7	0.41
125A-15	D	0.219	88	0.772	100	1	5.9	4800	1	2.0	3.1	27.5	33.5	0.33
125A-16	D	0.312	89	0.785	100	1	5.7	6650	0.7	1.7	2.6	45.0	50.6	0.51
125B-1	D	0.274	88	0.772	100	1	5.9	5100	2.9	3.4	5.2	17.1	23.0	0.23
125B-2	D	0.293	84	0.719	100	1	6.9	5100	2.8	3.4	5.1	17.4	24.3	0.24
125B-3	D	0.425	88	0.772	100	1	5.9	6950	2.6	3.3	4.9	24.3	30.3	0.30
125B-4	D	0.517	84	0.719	100	1	6.9	7950	2.6	3.3	4.9	27.7	34.6	0.35
125A-1	D	0.278	88	0.772	100	1	5.9	5200	1.8	2.7	4.1	22.2	28.1	0.28

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
125A-2	D	0.269	88	0.772	100	1	5.9	5550	2.5	3.2	4.8	20.0	25.9	0.26
125A-3	D	0.270	88	0.772	100	1	5.9	5550	2.3	3.1	4.6	20.9	26.8	0.27
125A-4	D	0.246	88	0.772	100	1	5.9	5050	2.3	3.1	4.6	19.1	25.0	0.25
125A-6	D	0.165	89	0.785	100	1	5.7	3800	2.1	2.9	4.4	15.2	20.9	0.21
125A-7	D	0.382	88	0.772	100	1	5.9	5000	2.7	3.3	5.0	17.4	23.3	0.23
213A-2	U	0.500	73	0.574	500	10	9.8	8100	3	2.6	5.1	28.1	38.0	0.38
213A-3	U	0.371	73	0.574	100	1	9.5	6850	2.6	2.4	4.7	25.8	35.3	0.35
213A-4	U	0.251	73	0.574	100	1	9.5	5550	2.5	2.3	4.6	21.7	31.1	0.31
OFF1A-2	U	0.378	74	0.591	100	1	9.2	6500	3.4	2.7	5.4	21.5	30.7	0.31
OFF1A-3	U	0.302	74	0.581	100	1	9.3	7150	2.7	2.4	4.8	26.4	35.7	0.36
OFF1A-4	U	0.274	73	0.575	100	1	9.5	6400	2.8	2.5	4.9	23.4	32.8	0.33
213A-6	U	0.279	73	0.574	100	1	9.5	5550	1.3	1.7	3.4	30.0	39.5	0.40
213A-7	U	0.251	73	0.574	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213A-8	U	0.255	73	0.574	100	1	9.5	5450	2.2	2.2	4.4	22.7	32.2	0.32
213A-9	U	0.252	73	0.574	100	1	9.5	5300	1	1.5	2.9	32.8	42.3	0.42
213A-10	U	0.252	73	0.572	100	1	9.5	5500	2.2	2.2	4.4	22.9	32.4	0.32
213A-11	U	0.256	73	0.573	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213B-1	U	0.261	73	0.573	100	1	9.5	5500	2.3	2.2	4.5	22.4	31.9	0.32
213B-2	U	0.262	73	0.574	100	1	9.5	5600	2.4	2.3	4.6	22.3	31.8	0.32
213B-3	U	0.253	73	0.574	100	1	9.5	5400	2.3	2.2	4.5	22.0	31.5	0.32
213B-4	U	0.255	73	0.574	100	1	9.5	5500	2.1	2.1	4.3	23.4	32.9	0.33
213B-5	U	0.240	73	0.574	100	1	9.5	4900	1.3	1.7	3.4	26.8	36.3	0.36
213B-6	U	0.244	73	0.574	100	1	9.5	5350	2.1	2.1	4.3	22.9	32.3	0.32
213B-7	U	0.249	73	0.574	100	1	9.5	5200	1.2	1.6	3.2	29.5	38.9	0.39
223A-2	D	0.384	88	0.772	100	1	5.9	4750	2.2	3.0	4.5	18.4	24.3	0.24
223A-3	U	0.250	73	0.574	100	1	9.5	5400	2	2.1	4.2	23.6	33.1	0.33
223B-2	D	0.191	86	0.745	100	1	6.4	3450	1.7	2.6	4.0	15.5	21.9	0.22
223B-3	D	0.257	87	0.758	100	1	6.1	5500	1.6	2.6	3.9	24.8	30.9	0.31
223B-4	D	0.244	88	0.772	100	1	5.9	5400	1.8	2.7	4.1	23.0	28.9	0.29
223B-5	D	0.252	88	0.772	100	1	5.9	5450	1.5	2.5	3.7	25.4	31.3	0.31
223B-6	D	0.192	88	0.772	100	1	5.9	4600	0.9	1.9	2.9	27.9	33.8	0.34
223B-7	D	0.230	88	0.772	100	1	5.9	3800	2	2.9	4.3	15.6	21.5	0.22
223C-1	D	0.266	88	0.772	100	1	5.9	5600	1.7	2.6	4.0	24.5	30.4	0.30
223C-2	D	0.273	88	0.772	100	1	5.9	5650	1.8	2.7	4.1	24.0	29.9	0.30

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
223C-3	D	0.273	88	0.772	100	1	5.9	5650	1.8	2.7	4.1	24.0	29.9	0.30
223C-4	D	0.262	83	0.706	100	1	7.1	5600	0.9	1.9	2.9	33.6	40.7	0.41
223C-5	U	0.219	73	0.574	100	1	9.5	3100	2.5	2.3	4.6	12.9	22.4	0.22
223C-6	U	0.249	73	0.574	100	1	9.5	5400	1.8	2.0	3.9	24.9	34.4	0.34
223C-7	U	0.250	73	0.574	100	1	9.5	5350	1.7	1.9	3.8	25.4	34.9	0.35
223C-8	U	0.251	73	0.574	100	1	9.5	5450	1.7	1.9	3.8	25.8	35.3	0.35
223C-9	D	0.313	88	0.772	100	1	5.9	6000	1.3	2.3	3.5	29.9	35.8	0.36
223C-10	U	0.241	73	0.574	100	1	9.5	3900	2.4	2.3	4.6	16.1	25.6	0.26
223C-11	U	0.250	73	0.574	100	1	9.5	5400	1.9	2.0	4.1	24.2	33.7	0.34
223C-12	U	0.251	73	0.574	100	1	9.5	5500	2	2.1	4.2	24.0	33.5	0.33
223C-13	D	0.247	88	0.772	100	1	5.9	5350	1.9	2.8	4.2	22.2	28.1	0.28
223C-14	D	0.375	89	0.785	100	1	5.7	6700	1.3	2.3	3.5	33.2	38.9	0.39
223C-15	U	0.251	73	0.574	100	1	9.5	4100	2.4	2.3	4.6	16.8	26.3	0.26
223C-16	U	0.251	73	0.574	100	1	9.5	5400	1.9	2.0	4.1	24.2	33.7	0.34
223C-17	D	0.248	88	0.772	100	1	5.9	5400	1.7	2.6	4.0	23.6	29.5	0.30
223C-18	D	0.258	88	0.772	100	1	5.9	5500	1.7	2.6	4.0	24.1	30.0	0.30
223C-19	D	0.373	89	0.785	100	1	5.7	6400	1.2	2.2	3.4	33.1	38.8	0.39
223C-20	U	0.265	73	0.574	100	1	9.5	4150	2.5	2.3	4.6	16.6	26.1	0.26
223C-21	D	0.252	88	0.772	100	1	5.9	5400	1.8	2.7	4.1	23.0	28.9	0.29
223C-22	D	0.262	88	0.772	100	1	5.9	5500	1.5	2.5	3.7	25.6	31.5	0.32
223C-23	D	0.253	85	0.732	100	1	6.6	5400	1.5	2.5	3.7	25.2	31.8	0.32
223C-24	D	0.315	89	0.785	100	1	5.7	6850	1.2	2.2	3.4	35.3	41.0	0.41
NW1-C	U	0.293	81	0.676	100	1	7.6	6400	3.4	2.7	5.4	21.2	28.8	0.29
NW2-C	U	0.395	73	0.574	100	1	9.5	7300	2.2	2.2	4.4	29.8	39.3	0.39
NW5-C	U	0.275	73	0.574	100	1	9.5	5650	2.1	2.1	4.3	24.0	33.5	0.34
NW7-C	U	0.488	84	0.720	100	1	6.8	9700	3.2	2.6	5.3	32.3	39.1	0.39
NW9-C	U	0.273	73	0.574	100	1	9.5	6200	2.3	2.2	4.5	25.0	34.5	0.34
NW11-C	U	0.270	73	0.574	100	1	9.5	5600	2.6	2.4	4.7	21.4	30.9	0.31
NW17-C	U	0.430	73	0.574	100	1	9.5	7750	2.2	2.2	4.4	31.5	41.0	0.41
NW21-C	U	0.403	84	0.723	100	1	6.8	7850	3.1	2.6	5.2	26.9	33.6	0.34
NW23-C	U	0.376	73	0.574	100	1	9.5	6900	2.1	2.1	4.3	28.9	38.4	0.38
NW33-C	U	0.248	86	0.745	100	1	6.4	5400	2.8	2.5	4.9	20.0	26.4	0.26
NW35-C	U	0.434	83	0.710	100	1	7.0	5100	3.5	2.8	5.5	16.9	24.0	0.24
NW50-C	U	0.358	73	0.574	100	1	9.5	6300	3.3	2.7	5.3	21.2	30.7	0.31

Subbasin Data					Overland Time (t_i)			Travel Time (t_t)					Totals	
Subbasin ID	Developed/	Area	CN	K	Length	Slope	t_i	Length	Slope	Velocity (fps)		t_t	t_c	Lag Time
	Undeveloped	(mi^2)			(ft)	(%)	(min)	(ft)	(%)	V_1	V_2	(min)	(min)	(hours)
NW51-C	U	0.306	73	0.574	100	1	9.5	5100	3.2	2.6	5.3	17.7	27.2	0.27
NW64-C	U	0.407	73	0.574	100	1	9.5	7500	2.8	2.5	4.9	27.1	36.6	0.37
NW102-C	U	0.412	73	0.574	100	1	9.5	8600	2.2	2.2	4.4	34.8	44.2	0.44
NW130-C	U	0.241	75	0.606	100	1	8.9	6550	1.5	1.8	3.6	32.6	41.5	0.42
OFF1A-5	U	0.418	73	0.574	100	1	9.5	7650	2.5	2.3	4.6	29.2	38.7	0.39
OFF1A-6	U	0.473	73	0.574	500	10	9.8	8300	3.5	2.8	5.5	26.6	36.5	0.36
OFF2A	U	0.318	73	0.574	100	1	9.5	6200	2.5	2.3	4.6	24.0	33.5	0.33
OFF2B	U	0.160	73	0.574	500	10	9.8	3700	3.5	2.8	5.5	12.7	22.5	0.23
OFF3	U	0.222	73	0.574	100	1	9.5	5200	2.4	2.3	4.6	20.8	30.3	0.30
OFF4-1	U	0.301	77	0.628	100	1	8.5	10400	6.2	3.7	7.3	24.8	33.3	0.33
OFF4-2	U	0.420	79	0.659	100	1	7.9	4600	12.7	5.3	10.5	8.1	16.0	0.16
OFF5-1	U	0.297	80	0.672	100	1	7.7	6700	6	3.6	7.2	16.6	24.4	0.24
OFF5-2	U	0.395	86	0.742	100	1	6.4	10000	4.8	3.2	6.4	27.2	33.6	0.34
OFF8	U	0.272	86	0.745	500	10	6.6	6500	3.9	2.9	5.8	20.1	26.7	0.27
OFF9	U	0.303	86	0.745	500	10	6.6	11100	4	3.0	5.9	32.9	39.5	0.39

CN and Lag Time Summary for Land Disposal Alternatives

Subbasin ID	CN_{BAS}	LAG_{BAS}	CN_A	LAG_A	CN_B	LAG_B	CN_C	LAG_C	CN_D	LAG_D	CN_E	LAG_E	CN_{NOA}	LAG_{NOA}
		(hr)		(hr)		(hr)		(hr)		(hr)		(hr)		(hr)
116-2	73	0.53	73	0.53	73	0.53	73	0.53	73	0.53	73	0.53	73	0.53
116-3	72	0.36	72	0.36	72	0.36	72	0.36	72	0.36	72	0.36	72	0.36
116-4	72	0.33	72	0.33	72	0.33	72	0.33	72	0.33	72	0.33	72	0.33
116-5	73	0.31	73	0.31	73	0.31	73	0.31	73	0.31	73	0.31	73	0.31
116-6	72	0.30	72	0.30	72	0.30	72	0.30	72	0.30	72	0.30	72	0.30
116-9	75	0.70	75	0.70	75	0.70	75	0.70	75	0.70	75	0.70	75	0.70
116-10	75	0.33	75	0.33	75	0.33	75	0.33	75	0.33	75	0.33	75	0.33
116-11	72	0.34	72	0.34	72	0.34	72	0.34	72	0.34	72	0.34	72	0.34
116-12	72	0.31	72	0.31	72	0.31	72	0.31	72	0.31	72	0.31	72	0.31
116-13	72	0.59	72	0.59	72	0.59	72	0.59	72	0.59	84	0.53	88	0.52
116-14	73	0.41	77	0.40	74	0.41	77	0.40	77	0.40	80	0.37	88	0.38
NW187-C	80	0.64	80	0.64	80	0.64	80	0.64	80	0.64	91	0.57	91	0.57
116-1	73	0.51	73	0.51	73	0.51	73	0.51	73	0.51	73	0.51	73	0.51
116-7	73	0.53	73	0.53	73	0.53	73	0.53	73	0.53	76	0.53	76	0.53
116-8	74	0.58	74	0.58	74	0.58	74	0.58	74	0.58	74	0.58	74	0.58
125A-5	73	0.30	73	0.30	73	0.30	88	0.25	88	0.25	88	0.25	88	0.25
125A-8	73	0.22	73	0.22	73	0.22	84	0.18	88	0.18	88	0.18	88	0.18
125A-9	73	0.21	73	0.21	73	0.21	88	0.16	88	0.16	88	0.16	88	0.16
125A-10	74	0.39	74	0.39	74	0.39	74	0.39	80	0.38	79	0.35	89	0.33
125A-11	74	0.40	74	0.40	74	0.40	75	0.40	83	0.35	87	0.35	89	0.34
125A-12	76	0.41	76	0.41	76	0.41	76	0.41	76	0.41	77	0.38	90	0.35
125A-13	74	0.60	74	0.60	74	0.60	75	0.60	83	0.55	82	0.55	89	0.53
125A-14	73	0.47	73	0.47	73	0.47	75	0.46	84	0.41	84	0.41	87	0.41
125A-15	75	0.39	75	0.39	75	0.39	75	0.39	75	0.39	80	0.38	88	0.33
125A-16	76	0.57	76	0.57	76	0.57	76	0.57	76	0.57	79	0.56	89	0.51
125B-1	73	0.28	73	0.28	73	0.28	88	0.23	88	0.23	88	0.23	88	0.23
125B-2	73	0.28	73	0.28	73	0.28	84	0.24	84	0.24	84	0.24	84	0.24
125B-3	73	0.36	73	0.36	73	0.36	88	0.30	88	0.30	88	0.30	88	0.30
125B-4	73	0.39	73	0.39	73	0.39	84	0.35	84	0.35	84	0.35	84	0.35
125A-1	73	0.34	73	0.34	73	0.34	76	0.33	80	0.30	84	0.29	88	0.28
125A-2	73	0.31	73	0.31	73	0.31	85	0.27	88	0.26	88	0.26	88	0.26
125A-3	73	0.32	73	0.32	73	0.32	88	0.27	88	0.27	88	0.27	88	0.27
125A-4	73	0.30	73	0.30	73	0.30	88	0.25	88	0.25	88	0.25	88	0.25
125A-6	73	0.26	73	0.26	73	0.26	73	0.26	78	0.25	81	0.23	89	0.21
125A-7	73	0.28	73	0.28	73	0.28	77	0.27	82	0.25	84	0.24	88	0.23
213A-2	73	0.38	73	0.38	73	0.38	73	0.38	73	0.38	73	0.38	73	0.38
213A-3	73	0.35	73	0.35	73	0.35	73	0.35	73	0.35	73	0.35	73	0.35
213A-4	73	0.31	73	0.31	73	0.31	73	0.31	73	0.31	73	0.31	73	0.31
OFF1A-2	75	0.31	74	0.31	74	0.31	74	0.31	74	0.31	74	0.31	74	0.31
OFF1A-3	74	0.36	74	0.36	74	0.36	74	0.36	74	0.36	74	0.36	74	0.36
~~OFF1A-4~~	~~73~~	~~0.33~~	~~73~~	~~0.33~~	~~73~~	~~0.33~~	~~73~~	~~0.33~~	~~73~~	~~0.33~~	~~73~~	~~0.33~~	~~73~~	~~0.33~~
213A-6	73	0.40	73	0.40	73	0.40	73	0.40	73	0.40	73	0.40	73	0.40
213A-7	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32
213A-8	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32	88	0.29	73	0.32
213A-9	73	0.42	73	0.42	73	0.42	73	0.42	73	0.42	88	0.39	73	0.42
213A-10	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32
213A-11	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32
213B-1	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32
213B-2	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32
213B-3	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32
213B-4	73	0.33	73	0.33	73	0.33	73	0.33	73	0.33	73	0.33	73	0.33
213B-5	73	0.36	73	0.36	73	0.36	73	0.36	73	0.36	73	0.36	73	0.36
213B-6	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32	73	0.32
213B-7	73	0.39	73	0.39	73	0.39	73	0.39	73	0.39	73	0.39	73	0.39
223A-2	73	0.30	73	0.30	88	0.24	88	0.24	88	0.24	88	0.24	88	0.24
223A-3	73	0.33	73	0.33	73	0.33	73	0.33	73	0.33	73	0.33	73	0.33
223B-2	73	0.27	73	0.27	86	0.24	86	0.22	86	0.22	86	0.22	86	0.22
223B-3	73	0.36	73	0.36	87	0.31	87	0.31	87	0.31	87	0.31	87	0.31
223B-4	73	0.34	73	0.34	88	0.29	88	0.29	88	0.29	88	0.29	88	0.29
223B-5	73	0.37	73	0.37	73	0.37	86	0.32	88	0.31	88	0.31	88	0.31
223B-6	73	0.40	73	0.40	73	0.40	74	0.40	79	0.38	81	0.35	88	0.34
223B-7	73	0.27	73	0.27	88	0.22	88	0.22	88	0.22	88	0.22	88	0.22
223C-1	73	0.36	73	0.36	88	0.30	88	0.30	88	0.30	88	0.30	88	0.30
223C-2	73	0.35	73	0.35	73	0.35	88	0.30	88	0.30	88	0.30	88	0.30
223C-3	73	0.35	73	0.35	73	0.35	85	0.31	88	0.30	88	0.30	88	0.30
223C-4	73	0.46	73	0.46	73	0.46	76	0.42	78	0.42	83	0.41	83	0.41
223C-5	73	0.22	73	0.22	73	0.22	73	0.22	73	0.22	73	0.22	73	0.22
223C-6	73	0.34	73	0.34	73	0.34	73	0.34	73	0.34	73	0.34	73	0.34
223C-7	73	0.35	73	0.35	73	0.35	73	0.35	73	0.35	73	0.35	73	0.35
223C-8	73	0.35	73	0.35	73	0.35	73	0.35	73	0.35	73	0.35	73	0.35
223C-9	73	0.42	73	0.42	73	0.42	77	0.41	81	0.37	85	0.37	88	0.36
223C-10	73	0.26	73	0.26	73	0.26	73	0.26	73	0.26	73	0.26	73	0.26
223C-11	73	0.34	73	0.34	73	0.34	73	0.34	73	0.34	73	0.34	73	0.34
223C-12	73	0.33	73	0.33	73	0.33	73	0.33	73	0.33	73	0.33	73	0.33
223C-13	73	0.34	73	0.34	87	0.28	88	0.28	88	0.28	88	0.28	88	0.28
223C-14	75	0.45	75	0.45	77	0.44	79	0.44	83	0.40	85	0.40	89	0.39
223C-15	73	0.26	73	0.26	73	0.26	73	0.26	73	0.26	73	0.26	73	0.26
223C-16	73	0.34	73	0.34	73	0.34	73	0.34	73	0.34	73	0.34	73	0.34
223C-17	73	0.35	73	0.35	88	0.30	88	0.30	88	0.30	88	0.30	88	0.30
223C-18	73	0.36	73	0.36	87	0.30	88	0.30	88	0.30	88	0.30	88	0.30
223C-19	76	0.44	80	0.43	77	0.44	80	0.41	83	0.40	88	0.39	89	0.39
223C-20	73	0.26	73	0.26	73	0.26	73	0.26	73	0.26	73	0.26	73	0.26
223C-21	73	0.34	73	0.34	88	0.29	88	0.29	88	0.29	88	0.29	88	0.29

223C-22	73	0.37	73	0.37	88	0.32	88	0.32	88	0.32	88	0.32	88	0.32
223C-23	73	0.37	83	0.34	80	0.35	83	0.32	85	0.32	85	0.32	85	0.32
223C-24	77	0.46	78	0.46	77	0.46	78	0.46	83	0.42	89	0.41	89	0.41
NW1-C	81	0.29	81	0.29	81	0.29	81	0.29	81	0.29	81	0.29	81	0.29
NW2-C	73	0.39	73	0.39	73	0.39	73	0.39	73	0.39	73	0.39	73	0.39
NW5-C	73	0.34	73	0.34	73	0.34	73	0.34	73	0.34	73	0.34	73	0.34
NW7-C	84	0.39	84	0.39	84	0.39	84	0.39	84	0.39	84	0.39	84	0.39
NW9-C	73	0.34	73	0.34	73	0.34	73	0.34	73	0.34	73	0.34	73	0.34
NW11-C	73	0.31	73	0.31	73	0.31	73	0.31	73	0.31	73	0.31	73	0.31
NW17-C	73	0.41	73	0.41	73	0.41	73	0.41	73	0.41	73	0.41	73	0.41
NW21-C	84	0.34	84	0.34	84	0.34	84	0.34	84	0.34	84	0.34	84	0.34
NW23-C	73	0.38	73	0.38	73	0.38	73	0.38	73	0.38	73	0.38	73	0.38
NW33-C	86	0.26	86	0.26	86	0.26	86	0.26	86	0.26	86	0.26	86	0.26
NW35-C	83	0.24	83	0.24	83	0.24	83	0.24	83	0.24	83	0.24	83	0.24
NW50-C	73	0.31	73	0.31	73	0.31	73	0.31	73	0.31	73	0.31	73	0.31
NW51-C	73	0.27	73	0.27	73	0.27	73	0.27	73	0.27	73	0.27	73	0.27
NW64-C	73	0.37	73	0.37	73	0.37	73	0.37	73	0.37	73	0.37	73	0.37
NW102-C	73	0.44	73	0.44	73	0.44	73	0.44	73	0.44	73	0.44	73	0.44
NW130-C	75	0.42	75	0.42	75	0.42	75	0.42	75	0.42	75	0.42	75	0.42
OFF1A-5	73	0.39	73	0.39	73	0.39	73	0.39	73	0.39	73	0.39	73	0.39
OFF1A-6	73	0.36	73	0.36	73	0.36	73	0.36	73	0.36	73	0.36	73	0.36
OFF2A	73	0.33	73	0.33	73	0.33	73	0.33	73	0.33	73	0.33	73	0.33
OFF2B	73	0.23	73	0.23	73	0.23	73	0.23	73	0.23	73	0.23	73	0.23
OFF3	73	0.30	73	0.30	73	0.30	73	0.30	73	0.30	73	0.30	73	0.30
OFF4-1	77	0.33	77	0.33	77	0.33	77	0.33	77	0.33	77	0.33	77	0.33
OFF4-2	79	0.16	79	0.16	79	0.16	79	0.16	79	0.16	79	0.16	79	0.16
OFF5-1	80	0.24	80	0.24	80	0.24	80	0.24	80	0.24	80	0.24	80	0.24
OFF5-2	86	0.34	86	0.34	86	0.34	86	0.34	86	0.34	86	0.34	86	0.34
OFF8	86	0.27	86	0.27	86	0.27	86	0.27	86	0.27	86	0.27	86	0.27
OFF9	86	0.39	86	0.39	86	0.39	86	0.39	86	0.39	86	0.39	86	0.39

TABLE E-46 – PROPOSED ACTION
LAND SALE AND DEVELOPMENT SCENARIO – BLM LAS VEGAS VALLEY DISPOSAL BOUNDARY

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Acres Sold	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	2,701			
Total Acres Sold	**46,701**														
Acres Developed	1,330	1,330	1,330	1,330	1,330	1,330	1,330	1,330	1,330	1,330	1,330	1,330	1,330	1,330	1,330
Total Acres Developed	**19,950**														
Acres Developed By Land Use															
Residential															
Single Family	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600
Multi family	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
Non-Residential															
Office	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
Retail	130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
Mid Hotel/Casino	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Industrial	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
Recreation	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Religious	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Public Facilities	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Total	**1,330**	**1,330**	**1,330**	**1,330**	**1,330**	**1,330**	**1,330**	**1,330**	**1,330**	**1,330**	**1,330**	**1,330**	**1,330**	**1,330**	**1,330**
Cumulative Acres Developed By Land Use															
Residential															
Single Family	600	1,200	1,800	2,400	3,000	3,600	4,200	4,800	5,400	6,000	6,600	7,200	7,800	8,400	9,000
Multi family	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1,050
Non-Residential															
Office	160	320	480	640	800	960	1,120	1,280	1,440	1,600	1,760	1,920	2,080	2,240	2,400
Retail	130	260	390	520	650	780	910	1,040	1,170	1,300	1,430	1,560	1,690	1,820	1,950
Mid Hotel/Casino	30	60	90	120	150	180	210	240	270	300	330	360	390	420	450
Industrial	150	300	450	600	750	900	1,050	1,200	1,350	1,500	1,650	1,800	1,950	2,100	2,250
Recreation	100	200	300	400	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500
Religious	30	60	90	120	150	180	210	240	270	300	330	360	390	420	450
Public Facilities	60	120	180	240	300	360	420	480	540	600	660	720	780	840	900
Cumulative Total	**1,330**	**2,660**	**3,990**	**5,320**	**6,650**	**7,980**	**9,310**	**10,640**	**11,970**	**13,300**	**14,630**	**15,960**	**17,290**	**18,620**	**19,950**
Number of Units Constructed															
Residential															
Single Family	4286	4286	4286	4286	4286	4286	4286	4286	4286	4286	4286	4286	4286	4286	4286
Multi family	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800

TABLE E-48
NO ACTION
LAND SALE AND DEVELOPMENT SCENARIO – BLM LAS VEGAS VALLEY DISPOSAL BOUNDARY

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Construction Value Residential															
Single Family		$530,460,000	$530,460,000	$530,460,000	$530,460,000	$530,460,000	$530,460,000	$530,460,000	$530,460,000	$530,460,000	$530,460,000	$530,460,000	$530,460,000	$530,460,000	$0
Multi family	$172,594,800	$172,594,800	$172,594,800	$172,594,800	$172,594,800	$172,594,800	$172,594,800	$172,594,800	$172,594,800	$172,594,800	$172,594,800	$172,594,800	$172,594,800	$0	$0
Non-Residential	$155,769,167	$155,769,167	$155,769,167	$155,769,167	$155,769,167	$155,769,167	$155,769,167	$155,769,167	$155,769,167	$155,769,167	$155,769,167	$155,769,167	$155,769,167	$0	$0
# of New Residents	18,457	18,457	18,457	18,457	18,457	18,457	18,457	18,457	18,457	18,457	18,457	18,457	18,457	0	0

APPENDIX C
HEC-1 OUTPUT SUMMARY

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   09JAN09  TIME  11:08:05  *
*                                      *
****************************************
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**************************************
*                                    *
*    U.S. ARMY CORPS OF ENGINEERS    *
*    HYDROLOGIC ENGINEERING CENTER   *
*          609 SECOND STREET         *
*       DAVIS, CALIFORNIA 95616      *
*           (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
                    *DIAGRAM
 *** FREE ***
               1    ID    KLEINFELDER
               2    ID    FEBRUARY 2008
               3    ID
               4    ID    THIS MODEL OUTPUT PRESENTS THE BASIN CHARACTERISTICS, ROUTING ELEMENTS,
               5    ID    AND ROUTING NETWORK FOR THE BASELINE ALTERNATIVE. HOWEVER, THE OUTPUT
               6    ID    IS ALSO AN EXAMPLE OF THE ROUTING NETWORK USED IN ALL ALTERNATIVES. ONLY
               7    ID    THE LS AND UD CARDS WERE CHANGED IN OTHER MODELS TO REFELCT CHANGES AMONG
               8    ID    ALTERNATIVES.
               9    ID
              10    ID
              11    ID    DESIGN STORM = 100-YEAR 6-HOUR STORM
              12    ID    STORM DISTRIBUTION = SDN5
              13    ID
              14    ID
              15    IT       5       0       0     300
              16    IO       5       0       0
              17    IN       5       0       0
              18    JR    PREC   1.000   0.870   0.740   0.570   0.440   0.260
                    *
                    * SDN5
              19    KK  223B-2
              20    BA   0.191
              21    PB    2.77
              22    PC   0.000   0.020   0.059   0.080   0.110   0.144   0.150   0.160   0.168   0.171
              23    PC   0.180   0.182   0.187   0.190   0.197   0.202   0.210   0.220   0.230   0.241
              24    PC   0.250   0.259   0.265   0.280   0.290   0.300   0.305   0.309   0.310   0.317
              25    PC   0.321   0.327   0.333   0.346   0.361   0.381   0.408   0.430   0.477   0.514
              26    PC   0.561   0.630   0.710   0.720   0.731   0.752   0.779   0.790   0.795   0.804
              27    PC   0.810   0.820   0.826   0.840   0.859   0.889   0.910   0.938   0.966   0.970
              28    PC   0.974   0.979   0.981   0.983   0.985   0.989   0.990   0.992   0.993   0.996
              29    PC   0.997   0.999   1.000
              30    LS       0      73
              31    UD   0.266
                    *
              32    KK R223B-2
              33    KM   ROUTE 223B-2 TO 223B-3
              34    RD    2600  0.0204    0.05       0    TRAP      10      15
                    *
```

```
    35          KK  223B-3
    36          BA   0.257
    37          LS       0      73
    38          UD   0.363
                *

    39          KK C223B-3
    40          KM   COMBINE R223B-2 AND 223B-3
    41          HC       2
                *
1                                        HEC-1 INPUT                                        PAGE  2

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

    42          KKRC223B-3
    43          KM   ROUTE C223B-3 TO 223B-4
    44          RD    2600  0.0181    0.05       0    TRAP      10      15
                *

    45          KK  223B-4
    46          BA   0.244
    47          LS       0      73
    48          UD   0.344
                *

    49          KK C223B-4
    50          KM   COMBINE RC223B-3 AND 223B-4
    51          HC       2
                *

    52          KKRC223B-4
    53          KM   ROUTE C223B-4 TO 223B-5
    54          RD    2600  0.0192    0.05       0    TRAP      10      15
                *

    55          KK  223B-5
    56          BA   0.252
    57          LS       0      73
    58          UD   0.370
                *

    59          KK C223B-5
    60          KM   COMBINE RC223B-4 AND 223B-5
    61          HC       2
                *

    62          KKRC223B-5
    63          KM   ROUTE C223B-5 TO 223B-6
    64          RD    2600  0.0075    0.05       0    TRAP      10      15
                *

    65          KK  223B-6
    66          BA   0.192
    67          LS       0      73
    68          UD   0.399
                *

    69          KK C223B-6
    70          KM   COMBINE RC223B-5 AND 223B-6
    71          HC       2
                *

    72          KK  223B-7
    73          BA   0.230
    74          LS       0      73
    75          UD   0.267
                *
1                                        HEC-1 INPUT                                        PAGE  3

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

    76          KK R223B-7
    77          KM   ROUTE 223B-7 TO 223C-1
    78          RD    2600  0.0211    0.05       0    TRAP      10      15
                *

    79          KK  223C-1
    80          BA   0.266
    81          LS       0      73
```

```
 82          UD   0.360
             *

 83          KK C223C-1
 84          KM   COMBINE R223B-7 AND 223C-1
 85          HC       2
             *

 86          KKRC223C-1
 87          KM   ROUTE C223C-1 TO 223C-2
 88          RD    2600  0.0212    0.05       0    TRAP      10      15
             *

 89          KK  223C-2
 90          BA   0.273
 91          LS       0      73
 92          UD   0.354
             *

 93          KK C223C-2
 94          KM   COMBINE RC223C-1 AND 223C-2
 95          HC       2
             *

 96          KKRC223C-2
 97          KM   ROUTE C223C-2 TO 223C-3
 98          RD    2600  0.0211    0.05       0    TRAP      10      15
             *

 99          KK  223C-3
100          BA   0.273
101          LS       0      73
102          UD   0.354
             *

103          KK C223C-3
104          KM   COMBINE RC223C-2 AND 223C-3
105          HC       2
             *

106          KK2C223C-3
107          KM   COMBINE C223C-3 AND C223B-6
108          HC       2
             *
1                                    HEC-1 INPUT                                    PAGE  4

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

109          KKRC223C-3
110          KM   ROUTE C223C-3 TO 223C-4
111          KM   FACILITY = UPPER LAS VEGAS WASH WEST
112          KM   FACILITY ID-MILE = UPWE 0000
113          KM   LINING = CONCRETE
114          RD    2500  0.0115   0.015      0    DEEP      30       0
             *

115          KK  125A-1
116          BA   0.393
117          LS       0      73
118          UD   0.335
             *

119          KK     DP1
120          KM   COMBINE 125A-1 AND RC223C-3
121          HC       2
             *

122          KKRC125A-1
123          KM   ROUTE C223C-3 TO 223C-4
124          RD    2300  0.0115    0.05       0    TRAP      10      15
             *

125          KK  223C-4
126          BA   0.262
127          LS       0      73
128          UD   0.459
             *

129          KK C223C-4
130          KM   COMBINE RC223C-3 AND 223C-4
```

```
          131          HC       2
                       *

          132          KK  223C-5
          133          BA   0.219
          134          LS       0      73
          135          UD   0.224
                       *

          136          KK R223C-5
          137          KM   ROUTE 223C-5 TO 223C-6
          138          RD    2600  0.0231    0.05       0    TRAP      10      15
                       *

          139          KK  223C-6
          140          BA   0.249
          141          LS       0      73
          142          UD   0.344
                       *
1                                        HEC-1 INPUT                                        PAGE  5

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

          143          KK C223C-6
          144          KM   COMBINE R223C-5 AND 223C-6
          145          HC       2
                       *

          146          KKRC223C-6
          147          KM   ROUTE C223C-6 TO 223C-7
          148          RD    2600  0.0212    0.05       0    TRAP      10      15
                       *

          149          KK  223C-7
          150          BA   0.250
          151          LS       0      73
          152          UD   0.349
                       *

          153          KK C223C-7
          154          KM   COMBINE RC223C-6 AND 223C-7
          155          HC       2
                       *

          156          KKRC223C-7
          157          KM   ROUTE C223C-7 TO 223C-8
          158          RD    2600  0.0231    0.05       0    TRAP      10      15
                       *

          159          KK  223C-8
          160          BA   0.251
          161          LS       0      73
          162          UD   0.353
                       *

          163          KK C223C-8
          164          KM   COMBINE RC223C-7 AND 223C-8
          165          HC       2
                       *

          166          KK1RC23C-8
          167          KM   ROUTE C223C-8 TO UPWE 0000
          168          RD    1600  0.0231    0.05       0    TRAP      10      15
                       *

          169          KK2C223C-8
          170          KM   COMBINE 1RC23C-8 AND C223C-4
          171          HC       2
                       *

          172          KK2RC23C-8
          173          KM   ROUTE 2C223C-8 TO 223C-9
          174          RD    1400  0.0197    0.05       0    TRAP      20      10
                       *
1                                        HEC-1 INPUT                                        PAGE  6

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

          175          KK  125A-2
```

```
176          BA   0.339
177          LS      0      73
178          UD   0.311
             *

179          KK R125A-2
180          KM   ROUTE 125A-2 TO 125A-6
181          KM   STREET NAME = HUALAPAI
182          RD    2400  0.0317    0.05       0    TRAP      10      15
             *

183          KK  125A-6
184          BA   0.165
185          LS      0      73
186          UD   0.263
             *

187          KK C125A-6
188          KM   COMBINE 125A-6, R125A-2 AND RC125A-1
189          KM   COMBINATION @ HUALAPAI AND US95
190          HC      3
             *

191          KKRC125A-6
192          KM   ROUTE 2C223C-8 TO 223C-9
193          RD    2300  0.0197    0.05       0    TRAP      20      10
             *

194          KK  223C-9
195          BA   0.313
196          LS      0      73
197          UD   0.418
             *

198          KK C223C-9
199          KM   COMBINE RC223C-8 AND 223C-9
200          HC      2
             *

201          KK  125A-3
202          BA   0.357
203          LS      0      73
204          UD   0.321
             *

205          KK R125A-3
206          KM   ROUTE 125A-3 TO 125A-7
207          KM   STREET NAME = GRAND CANYON
208          RD    4900  0.0265    0.05       0    TRAP      10      15
             *
1                                    HEC-1 INPUT                                    PAGE  7

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

209          KK  125A-7
210          BA   0.382
211          LS      0      73
212          UD   0.284
             *

213          KK C125A-7
214          KM   COMBINE 125A-7, R125A-3 AND RC125A-6
215          KM   COMBINATION @ GRAND CANYON AND US95
216          HC      3
             *

217          KK 223C-10
218          BA   0.241
219          LS      0      73
220          UD   0.256
             *

221          KKR223C-10
222          KM   ROUTE 223C-10 TO 223C-11
223          RD    2600  0.0212    0.05       0    TRAP      10      15
             *

224          KK 223C-11
225          BA   0.250
226          LS      0      73
```

```
227          UD   0.337
             *

228          KKC223C-11
229          KM   COMBINE R223C-10 AND 223C-11
230          HC       2
             *

231          KKRC23C-11
232          KM   ROUTE C223C-11 TO 223C-12
233          RD    2600   0.025    0.05       0    TRAP      10      15
             *

234          KK 223C-12
235          BA   0.251
236          LS       0      73
237          UD   0.335
             *

238          KKC223C-12
239          KM   COMBINE RC23C-11 AND 223C-12
240          HC       2
             *
```



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

241          KKRC23C-12
242          KM   ROUTE C223C-12 TO 223C-13
243          RD    2600   0.025    0.05       0    TRAP      10      15
             *

244          KK 223C-13
245          BA   0.247
246          LS       0      73
247          UD   0.335
             *

248          KKC223C-13
249          KM   COMBINE RC23C-12 AND 223C-13
250          HC       2
             *

251          KK1RC3C-13
252          KM   ROUTE C223C-13 TO UPWE 0000
253          RD    2200  0.0218    0.05       0    TRAP      10      15
             *

254          KK2C23C-13
255          KM   COMBINE 1RC3C-13 AND C223C-9
256          HC       2
             *

257          KK2RC3C-13
258          KM   ROUTE 2C23C-13 TO 223C-14
259          RD    4000  0.0105    0.05       0    TRAP      10      15
             *

260          KK 223C-14
261          BA   0.375
262          LS       0      75
263          UD   0.448
             *

264          KKC223C-14
265          KM   COMBINE 2RC3C-13 AND 223C-14
266          HC       2
             *

267          KK  125A-4
268          BA   0.317
269          LS       0      73
270          UD   0.302
             *

271          KK R125A-4
272          KM   ROUTE 125A-4 TO 125A-8
273          KM   STREET NAME = FORT APACHE
274          RD    3400  0.0324    0.05       0    TRAP      10      15
             *
```

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

  275     KK  125A-8
  276     BA   0.328
  277     LS        0       73
  278     UD   0.223
          *

  279     KK C125A-8
  280     KM   COMBINE 125A-8 AND R125A-4
  281     KM   COMBINATION @ FORT APACHE AND US95
  282     HC        2
          *

  283     KKRC125A-8
  284     KM   ROUTE C125A-8 TO 125A-10
  285     KM   STREET NAME = FORT APACHE
  286     RD    3400  0.0162    0.05        0    TRAP       10       15
          *

  287     KK 125A-10
  288     BA   0.239
  289     LS        0       74
  290     UD   0.389
          *

  291     KKC125A-10
  292     KM   COMBINE 125A-10, RC125A-8 AND RC125A-7
  293     KM   COMBINATION @ FORT APACHE AND US95
  294     HC        3
          *

  295     KK 223C-15
  296     BA   0.251
  297     LS        0       73
  298     UD   0.263
          *

  299     KKR223C-15
  300     KM   ROUTE 223C-15 TO 223C-16
  301     RD    2600   0.025    0.05        0    TRAP       10       15
          *

  302     KK 223C-16
  303     BA   0.251
  304     LS        0       73
  305     UD   0.337
          *

  306     KKC223C-16
  307     KM   COMBINE R223C-15 AND 223C-16
  308     HC        2
          *
```



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

  309     KKRC23C-16
  310     KM   ROUTE C223C-16 TO 223C-17
  311     RD    2600   0.025    0.05        0    TRAP       10       15
          *

  312     KK 223C-17
  313     BA   0.248
  314     LS        0       73
  315     UD   0.351
          *

  316     KKC223C-17
  317     KM   COMBINE RC23C-16 AND 223C-17
  318     HC        2
          *

  319     KKRC23C-17
  320     KM   ROUTE C223C-17 TO 223C-18
  321     RD    2600  0.0269    0.05        0    TRAP       10       15
          *
```

```
322          KK 223C-18
323          BA   0.258
324          LS        0      73
325          UD   0.355
             *

326          KKC223C-18
327          KM   COMBINE RC23C-17 AND 223C-18
328          HC        2
             *

329          KK1RC3C-18
330          KM   ROUTE C223C-18 TO UPWE 0000
331          RD    3000    0.02    0.05       0    TRAP      10      15
             *

332          KK2C23C-18
333          KM   COMBINE 1RC3C-18 AND C223C-14
334          HC        2
             *

335          KK2RC3C-18
336          KM   ROUTE 2C23C-18 TO 223C-19
337          RD    2800  0.0714    0.05       0    TRAP      20      10
             *

338          KK 223C-19
339          BA   0.373
340          LS        0      76
341          UD   0.443
             *
```



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

342          KKC223C-19
343          KM   COMBINE RC23C-18 AND 223C-19
344          HC        2
             *

345          KK  125A-5
346          BA   0.305
347          LS        0      73
348          UD   0.299
             *

349          KK R125A-5
350          KM   ROUTE 125A-5 TO 125A-9
351          KM   STREET NAME = EL CAPITAN
352          RD    3400  0.0324    0.05       0    TRAP      10      15
             *

353          KK  125A-9
354          BA   0.326
355          LS        0      73
356          UD   0.209
             *

357          KK C125A-9
358          KM   COMBINE 125A-9 AND R125A-5
359          HC        2
             *

360          KKRC125A-9
361          KM   ROUTE C125A-9 TO 125A-11
362          KM   STREET NAME = EL CAPITAN
363          RD    2500   0.022    0.05       0    TRAP      10      15
             *

364          KK 125A-11
365          BA   0.253
366          LS        0      74
367          UD   0.399
             *

368          KKC125A-11
369          KM   COMBINE 125A-11 AND RC125A-9
370          HC        2
             *
```

```
371          KKRC25A-11
372          KM   ROUTE C125A-11 TO 125A-12
373          KM   STREET NAME = EL CAPITAN TO US 95
374          RD    3700  0.0081    0.05       0    TRAP      10      15
             *
1                                        HEC-1 INPUT                                        PAGE 12

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

375          KK 125A-12
376          BA   0.225
377          LS       0      76
378          UD   0.409
             *

379          KKC125A-12
380          KM   COMBINE 125A-12, RC25A-11 AND RC25A-10
381          KM   COMBINATION @ DURANGO AND US95
382          HC       3
             *

383          KK 223C-20
384          BA   0.265
385          LS       0      73
386          UD   0.261
             *

387          KKR223C-20
388          KM   ROUTE 223C-20 TO 223C-21
389          RD    2600   0.025    0.05       0    TRAP      10      15
             *

390          KK 223C-21
391          BA   0.252
392          LS       0      73
393          UD   0.344
             *

394          KKC223C-21
395          KM   COMBINE R223C-20 AND 223C-21
396          HC       2
             *

397          KKRC23C-21
398          KM   ROUTE C223C-21 TO 223C-22
399          RD    2600  0.0288    0.05       0    TRAP      10      15
             *

400          KK 223C-22
401          BA   0.262
402          LS       0      73
403          UD   0.372
             *

404          KKC223C-22
405          KM   COMBINE RC23C-21 AND 223C-22
406          HC       2
             *
1                                        HEC-1 INPUT                                        PAGE 13

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

407          KKRC23C-22
408          KM   ROUTE C223C-22 TO 223C-23
409          RD    2600   0.025    0.05       0    TRAP      10      15
             *

410          KK 223C-23
411          BA   0.253
412          LS       0      73
413          UD   0.367
             *

414          KKC223C-23
415          KM   COMBINE RC23C-22 AND 223C-23
416          HC       2
             *
```

```
417          KK1RC3C-23
418          KM   ROUTE C223C-23 TO UPWE 000
419          RD    2100   0.019    0.05       0    TRAP      10      15
             *

420          KK2C23C-23
421          KM   COMBINE 1RC3C-23 AND C223C-19
422          HC       2
             *

423          KK2RC3C-23
424          KM   ROUTE 2C23C-23 TO 223C-24
425          RD    3200  0.0125    0.05       0    TRAP      10      15
             *

426          KK 223C-24
427          BA   0.315
428          LS       0      77
429          UD   0.464
             *

430          KKC223C-24
431          KM   COMBINE RC23C-23 AND 223C-24
432          HC       2
             *

433          KK 125A-13
434          BA   0.519
435          LS       0      74
436          UD   0.600
             *

437          KKR125A-13
438          KM   ROUTE 125A-13 TO 125A-15
439          KM   STREET NAME = CIMARRON
440          RD    3200  0.0094    0.05       0    TRAP      10      15
             *
```



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

441          KK 125A-15
442          BA   0.219
443          LS       0      75
444          UD   0.389
             *

445          KK DP2WASH
446          KM   COMBINE 125A-15, R125A-13 AND RC25A-12
447          KM   CIMARRON AND MOCCASIN
448          HC       3
             *

449          KK  223A-1
450          BA   6.378
451          LS       0      74
452          UD   0.972
             *

453          KK  223A-2
454          BA   0.384
455          LS       0      73
456          UD   0.295
             *

457          KK C223A-2
458          KM   COMBINE C223A-1 AND 223A-2
459          HC       2
             *

460          KK  223A-3
461          BA   0.250
462          LS       0      73
463          UD   0.331
             *

464          KK R223A-3
465          KM   ROUTE 223A-2 TO C223A-2
466          RD    1300  0.0308    0.05       0    TRAP      10      15
             *
```

```
467          KK C223A-3
468          KM   COMBINE R223A-3 AND C223A-2
469          HC       2
             *

470          KKRC223A-3
471          RD    3500  0.0057    0.05       0    TRAP      10       5
             *
```



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

472          KK  213A-6
473          BA   0.279
474          LS       0      73
475          UD   0.395
             *

476          KK C213A-6
477          KM   COMBINE RC223A-3 AND 213A-6
478          HC       2
             *

479          KK  213A-7
480          BA   0.251
481          LS       0      73
482          UD   0.319
             *

483          KK R213A-7
484          KM   ROUTE 213A-7 TO 213A-8
485          RD    2600  0.0288    0.05       0    TRAP      10      15
             *

486          KK  213A-8
487          BA   0.255
488          LS       0      73
489          UD   0.322
             *

490          KK C213A-8
491          KM   COMBINE R213A-7 AND 213A-8
492          HC       2
             *

493          KKRC213A-8
494          KM   ROUTE C213A-8 TO 213A-6
495          RD    1500    0.02    0.05       0    TRAP      10      15
             *

496          KK2C213A-6
497          KM   COMBINE C213A-6 AND RC213A-8
498          HC       2
             *

499          KKRC213A-6
500          KM   ROUTE C213A-6 TO 213A-9
501          RD    3200  0.0063    0.05       0    TRAP      10       5
             *

502          KK  213A-9
503          BA   0.252
504          LS       0      73
505          UD   0.423
             *
```



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

506          KK C213A-9
507          KM   COMBINE RC213A-6 AND 213A-9
508          HC       2
             *

509          KK  213A-2
510          BA   0.500
511          LS       0      73
512          UD   0.380
```

```
                *
513             KKRC213A-2
514             KM   ROUTE C213A-2 TO 213A-3
515             KM   IRON MOUNTAIN
516             RD    2600  0.0269    0.05       0    TRAP      10      15
                *
517             KK  213A-3
518             BA   0.371
519             LS       0      73
520             UD   0.353
                *
521             KK C213A-3
522             KM   COMBINE RC213A-2 AND 213A-3
523             KM   IRON MOUNTAIN AND HURTADO
524             HC       2
                *
525             KKRC213A-3
526             KM   ROUTE C213A-3 TO 213A-4
527             KM   IRON MOUNTAIN
528             RD    2600  0.0346    0.05       0    TRAP      10      15
                *
529             KK  213A-4
530             BA   0.251
531             LS       0      73
532             UD   0.311
                *
533             KK C213A-4
534             KM   COMBINE RC213A-3 AND 213A-4
535             KM   IRON MOUNTAIN AND WOOLBRIGHT
536             HC       2
                *
537             KKRC213A-4
538             KM   ROUTE C213A-4 TO 213A-5
539             KM   NATURAL WASH
540             KM   TRAVEL LENGTH = 13,000
541             KM   SLOPE = 3.5%
542             KM   N = 0.040
543             KM   HYDRAULIC RADIUS = 1.5
1                                        HEC-1 INPUT                                        PAGE 17

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

544             KM   VELOCITY =
545             RM       3   0.247    0.15
                *
546             KK  213A-5
547             BA   2.059
548             LS       0      73
549             UD   0.701
                *
550             KK C213A-5
551             KM   COMBINE RC213A-4 AND 213A-5
552             HC       2
                *
553             KKRC213A-5
554             KM   ROUTE C213A-5 TO 213A-10
555             RD    2600  0.0288    0.05       0    TRAP      10      15
                *
556             KK 213A-10
557             BA   0.252
558             LS       0      73
559             UD   0.324
                *
560             KKC213A-10
561             KM   COMBINE RC213A-5 AND 213A-10
562             HC       2
                *
563             KKRC13A-10
```

```
564          KM   ROUTE C213A-10 TO 213A-11
565          RD    2600  0.0288    0.05       0    TRAP      10      15
             *

566          KK 213A-11
567          BA   0.256
568          LS       0      73
569          UD   0.319
             *

570          KKC213A-11
571          KM   COMBINE RC13A-10 AND 213A-11
572          HC       2
             *

573          KKRC13A-11
574          KM   ROUTE C213A-11 TO 213B-6
575          RD    2600  0.0231    0.05       0    TRAP      10      15
             *
```



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

576          KK  213B-6
577          BA   0.244
578          LS       0      73
579          UD   0.323
             *

580          KK C213B-6
581          KM   COMBINE RC13A-11 AND 213B-6
582          HC       2
             *

583          KKRC213B-6
584          KM   ROUTE C213B-6 TO 213A-9
585          RD    1100  0.0318    0.05       0    TRAP      10      15
             *

586          KK2C213A-9
587          KM   COMBINE RC213B-6 AND C213A-9
588          HC       2
             *

589          KKRC213A-9
590          KM   ROUTE C213A-9 TO 213B-7
591          RD    3200  0.0078    0.05       0    TRAP      10       5
             *

592          KK  213B-7
593          BA   0.249
594          LS       0      73
595          UD   0.389
             *

596          KK C213B-7
597          KM   COMBINE RC13A-11 AND 213B-6
598          HC       2
             *

599          KK  213B-1
600          BA   0.261
601          LS       0      73
602          UD   0.319
             *

603          KK R213B-1
604          KM   ROUTE 213B-1 TO 213B-2
605          RD    2600  0.0288    0.05       0    TRAP      10      15
             *

606          KK  213B-2
607          BA   0.262
608          LS       0      73
609          UD   0.318
             *
```



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LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10
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```
610          KK C213B-2
611          KM   COMBINE R213B-1 AND 213B-2
612          HC       2
             *

613          KKRC213B-2
614          KM   ROUTE C213B-2 TO 213B-3
615          RD    2600  0.0269    0.05       0    TRAP      10      15
             *

616          KK  213B-3
617          BA   0.253
618          LS       0      73
619          UD   0.315
             *

620          KK C213B-3
621          KM   COMBINE RC213B-2 AND 213B-3
622          HC       2
             *

623          KKRC213B-3
624          KM   ROUTE C213B-3 TO 213B-4
625          RD    2600  0.0269    0.05       0    TRAP      10      15
             *

626          KK  213B-4
627          BA   0.255
628          LS       0      73
629          UD   0.329
             *

630          KK C213B-4
631          KM   COMBINE RC213B-3 AND 213B-4
632          HC       2
             *

633          KKRC213B-4
634          KM   ROUTE C213B-4 TO 213B-7
635          RD    1100  0.0318    0.05       0    TRAP      10      15
             *

636          KK2C213B-7
637          KM   COMBINE C213B-7 AND RC213B-4
638          HC       2
             *

639          KKRC213B-7
640          KM   ROUTE C213B-7 TO 213B-5
641          RD    3200  0.0109    0.05       0    TRAP      10       5
             *
```



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

642          KK  213B-5
643          BA   0.240
644          LS       0      73
645          UD   0.363
             *

646          KK C213B-5
647          KM   COMBINE RC213B-7 AND 213B-5
648          HC       2
             *

649          KK OFF1A-2
650          BA   0.378
651          LS       0      75
652          UD   0.305
             *

653          KKRCFF1A-2
654          KM   ROUTE COFF1A-2 TO OFF1A-3
655          KM   SCOTTIE AND RACEL
656          RD    3600  0.0333    0.05       0    TRAP      10      15
             *

657          KK OFF1A-3
```

```
658          BA   0.302
659          LS        0       74
660          UD   0.357
             *

661          KKCOFF1A-3
662          KM   COMBINE RCFF1A-2 AND OFF1A-3
663          KM   RACEL AND HURTADO
664          HC        2
             *

665          KKRCFF1A-3
666          KM   ROUTE COFF1A-3 TO OFF1A-4
667          KM   HURTADO AND HORSE
668          RD    3900  0.0308    0.05       0    TRAP      10      15
             *

669          KK OFF1A-4
670          BA   0.274
671          LS        0       73
672          UD   0.328
             *

673          KKCOFF1A-4
674          KM   COMBINE RCFF1A-3 AND OFF1A-4
675          KM   HORSE AND WOOLBRIGHT
676          HC        2
             *
```



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

677          KKRCFF1A-4
678          KM   ROUTE COFF1A-4 TO OFF1A-5
679          KM   HORSE AND UNKNOWN STREET
680          RD    5100  0.0333    0.05       0    TRAP      10      15
             *

681          KK OFF1A-5
682          BA   0.418
683          LS        0       73
684          UD   0.387
             *

685          KKCOFF1A-5
686          KM   COMBINE RCFF1A-4 AND OFF1A-5
687          HC        2
             *

688          KKRCFF1A-5
689          KM   ROUTE COFF1A-5 TO OFF2A
690          KM   IRON MOUNTAIN
691          RD    2600  0.0288    0.05       0    TRAP      10      15
             *

692          KK   OFF2A
693          BA   0.318
694          LS        0       73
695          UD   0.335
             *

696          KK  COFF2A
697          KM   COMBINE RCFF1A-5 AND OFF2A
698          HC        2
             *

699          KK RCOFF2A
700          KM   ROUTE COFF2A TO OFF3
701          KM   IRON MOUNTAIN
702          RD    2600  0.0333    0.05       0    TRAP      10      15
             *

703          KK    OFF3
704          BA   0.222
705          LS        0       73
706          UD   0.303
             *

707          KK   COFF3
708          KM   COMBINE RC0FF2A AND OFF3
```

```
 709          HC       2
              *
1                                        HEC-1 INPUT                                        PAGE 22

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

 710          KK  RCOFF3
 711          KM   ROUTE COFF3 TO OFF2B
 712          RD    2600  0.0212    0.05       0    TRAP      10       5
              *

 713          KK   OFF2B
 714          BA   0.160
 715          LS       0      73
 716          UD   0.225
              *

 717          KK  COFF2B
 718          KM   COMBINE RCOFF3 AND OFF2B
 719          HC       2
              *

 720          KK RCOFF2B
 721          KM   ROUTE COFF2B TO OFF1A-6
 722          RD    2600  0.0296    0.05       0    TRAP      10       5
              *

 723          KK OFF1A-6
 724          BA   0.473
 725          LS       0      73
 726          UD   0.365
              *

 727          KKCOFF1A-6
 728          KM   COMBINE RCOFF2B AND OFF1A-6
 729          HC       2
              *

 730          KKRCFF1A-6
 731          KM   ROUTE COFF1A-6 TO NW5-C
 732          RD    2600  0.0288    0.05       0    TRAP      10       5
              *

 733          KK   NW2-C
 734          BA   0.395
 735          LS       0      73
 736          UD   0.393
              *

 737          KK  RNW2-C
 738          KM   ROUTE NW2-C TO NW5-C
 739          RD    2600   0.025    0.05       0    TRAP      10      15
              *

 740          KK   NW5-C
 741          BA   0.275
 742          LS       0      73
 743          UD   0.335
              *
1                                        HEC-1 INPUT                                        PAGE 23

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

 744          KK  CNW5-C
 745          KM   COMBINE RNW2-C AND NW5-C
 746          HC       2
              *

 747          KK 2CNW5-C
 748          KM   COMBINE RCFF1A-6 AND CNW5-C
 749          HC       2
              *

 750          KK RCNW5-C
 751          KM   ROUTE 2CNW5-C TO NW11-C
 752          RD    2600  0.0288    0.05       0    TRAP      10       5
              *

 753          KK   NW9-C
```

```
754          BA   0.273
755          LS      0      73
756          UD   0.345
             *

757          KK  RNW9-C
758          KM   ROUTE NW9-C TO NW11-C
759          KM   WITCH MOUNTAIN
760          RD    2600  0.0192    0.05       0    TRAP      10      15
             *

761          KK  NW11-C
762          BA   0.270
763          LS      0      73
764          UD   0.309
             *

765          KK CNW11-C
766          KM   COMBINE RNW9-C AND NW11-C
767          KM   WITCH MOUNTAIN AND MOCCASIN
768          HC       2
             *

769          KK2CNW11-C
770          KM   COMBINE RCNW5-C AND CNW11-C
771          KM   WITCH MOUNTAIN AND MOCCASIN
772          HC       2
             *

773          KKRCNW11-C
774          KM   ROUTE 2CNW11-C TO NW17-C
775          RD    2600  0.0327    0.05       0    TRAP      10       5
             *
```



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

776          KK  NW17-C
777          BA   0.430
778          LS      0      73
779          UD   0.410
             *

780          KK CNW17-C
781          KM   COMBINE RCNW11-C AND NW17-C
782          KM   NICKELSON AND MOCCASIN
783          HC       2
             *

784          KKRCNW17-C
785          KM   ROUTE CNW17-C TO NW23-C
786          RD    2600  0.0288    0.05       0    TRAP      10       5
             *

787          KK  NW23-C
788          BA   0.376
789          LS      0      73
790          UD   0.384
             *

791          KK CNW23-C
792          KM   COMBINE RCNW17-C AND NW23-C
793          KM   MAINWAL AND MOCCASIN
794          HC       2
             *

795          KKRCNW23-C
796          KM   ROUTE CNW23-C TO 213B-5
797          RD    3500  0.0286    0.05       0    TRAP      10       5
             *

798          KK2C213B-5
799          KM   COMBINE C213B-5 AND RCNW23-C
800          HC       2
             *

801          KKRC213B-5
802          KM   ROUTE 2C213B-5 TO NW64-C
803          RD    7000  0.0293    0.05       0    TRAP      10       5
             *
```

```
804          KK  NW51-C
805          BA   0.306
806          LS        0      73
807          UD   0.272
             *
```



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

808          KK RNW51-C
809          KM   ROUTE NW51-C TO NW64-C
810          RD    5900  0.0305    0.05       0    TRAP      10      15
             *

811          KK CNW64-C
812          KM   COMBINE RC213B-5 AND RNW51-C
813          HC        2
             *

814          KK  OFF4-1
815          BA   0.301
816          LS        0      77
817          UD   0.333
             *

818          KK ROFF4-1
819          KM   ROUTE OFF4-1 TO OFF4-2
820          KM   KYLE CANYON ROAD
821          RD    5800  0.0414    0.05       0    TRAP      10      15
             *

822          KK  OFF4-2
823          BA   0.420
824          LS        0      79
825          UD   0.160
             *

826          KK COFF4-2
827          KM   COMBINE ROFF4-1 AND OFF4-2
828          HC        2
             *

829          KKRCOFF4-2
830          KM   ROUTE COFF4-2 TO OFF5-1
831          KM   KYLE CANYON ROAD
832          RD    2800  0.0429   0.016       0    TRAP       0      50
             *

833          KK  OFF5-1
834          BA   0.297
835          LS        0      80
836          UD   0.244
             *

837          KK COFF5-1
838          KM   COMBINE RCOFF4-2 AND OFF5-1
839          HC        2
             *
```



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

840          KKRCOFF5-1
841          KM   ROUTE COFF5-1 TO NW1-C
842          RD    5800  0.0362    0.05       0    TRAP      10       3
             *

843          KK  OFF5-2
844          BA   0.395
845          LS        0      86
846          UD   0.336
             *

847          KK ROFF5-2
848          KM   ROUTE OFF5-2 TO NW1-C
849          RD    2300  0.0239    0.05       0    TRAP      10       3
             *
```

```
850          KK   NW1-C
851          BA   0.293
852          LS        0       81
853          UD   0.288
             *

854          KK  CNW1-C
855          KM   COMBINE ROFF5-2 AND NW1-C
856          HC        2
             *

857          KK 2CNW1-C
858          KM   COMBINE RCOFF5-1 AND CNW1-C
859          HC        2
             *

860          KKR2CNW1-C
861          KM   ROUTE 2CNW1-C TO NW7-C
862          RD    5500  0.0373    0.05       0    TRAP      10       5
             *

863          KK   NW7-C
864          BA   0.488
865          LS        0       84
866          UD   0.391
             *

867          KK  CNW7-C
868          KM   COMBINE NW7-C AND R2CNW1-C
869          HC        2
             *

870          KK RCNW7-C
871          KM   ROUTE CNW7-C TO NW21-C
872          RD    2600  0.0365    0.05       0    TRAP      10       5
             *
```



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

873          KK  NW21-C
874          BA   0.403
875          LS        0       84
876          UD   0.336
             *

877          KK CNW21-C
878          KM   COMBINE RCNW7-C AND NW21-C
879          KM   MAINWAL AND KYLE CANYON
880          HC        2
             *

881          KKRCNW21-C
882          KM   ROUTE CNW21-C TO NW35-C
883          RD    4000  0.0063    0.05       0    TRAP      10       5
             *

884          KK    OFF9
885          BA   0.303
886          LS        0       86
887          UD   0.395
             *

888          KK   ROFF9
889          KM   ROUTE OFF9 TO NW33-C
890          KM   HORSE HUALAPAI WEST
891          RD    4200  0.0321    0.05       0    TRAP      10      15
             *

892          KK  NW33-C
893          BA   0.248
894          LS        0       86
895          UD   0.264
             *

896          KK CNW33-C
897          KM   COMBINE ROFF9 AND NW33-C
898          KM   BRENT AND HUALAPAI WEST
899          HC        2
             *
```

```
 900          KK    OFF8
 901          BA   0.272
 902          LS       0      86
 903          UD   0.267
              *

 904          KK   ROFF8
 905          KM   ROUTE OFF8 TO NW33-C
 906          KM   BRENT
 907          RD    3100  0.0387    0.05       0    TRAP      10      15
              *
```



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

 908          KK2CNW33-C
 909          KM   COMBINE ROFF8 AND CNW33-C
 910          KM   BRENT AND HUALAPAI WEST
 911          HC       2
              *

 912          KKRCNW33-C
 913          KM   ROUTE 2CNW33-C TO NW35-C
 914          RD    3000  0.0321    0.05       0    TRAP      10      15
              *

 915          KK  NW35-C
 916          BA   0.434
 917          LS       0      83
 918          UD   0.240
              *

 919          KK CNW35-C
 920          KM   COMBINE RNW33-C AND NW35-C
 921          KM   KYLE CANYON ROAD AND HUALAPAI WEST
 922          HC       2
              *

 923          KK2CNW35-C
 924          KM   COMBINE CNW35-C AND RCNW21-C
 925          KM   KYLE CANYON ROAD AND HUALAPAI WEST
 926          HC       2
              *

 927          KKRCNW35-C
 928          KM   ROUTE 2CNW35-C TO NW50-C
 929          RD    1900  0.0342    0.05       0    TRAP      10       5
              *

 930          KK  NW50-C
 931          BA   0.358
 932          LS       0      73
 933          UD   0.307
              *

 934          KK CNW50-C
 935          KM   COMBINE RCNW35-C AND NW50-C
 936          KM   KYLE CANYON ROAD AND U.S. 95
 937          HC       2
              *

 938          KKRCNW50-C
 939          KM   ROUTE CNW50-C TO NW64-C
 940          RD    6000  0.0275    0.05       0    TRAP      10       5
              *
```



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

 941          KK  NW64-C
 942          BA   0.407
 943          LS       0      73
 944          UD   0.366
              *

 945          KK2CNW64-C
 946          KM   COMBINE RCNW50-C AND NW64-C
 947          KM   KYLE CANYON ROAD AND MOCCASIN
```

```
948          HC        2
             *

949          KK3CNW64-C
950          KM    COMBINE 2CNW64-C AND CNW64-C
951          KM    KYLE CANYON ROAD AND MOCCASIN
952          HC        2
             *

953          KKRCNW64-C
954          KM    ROUTE CNW64-C TO NW102-C
955          RD     2600  0.0269     0.05        0     TRAP       10        5
             *

956          KK NW102-C
957          BA    0.412
958          LS        0       73
959          UD    0.442
             *

960          KKCNW102-C
961          KM    COMBINE RCNW64-C AND NW102-C
962          KM    EL CAPITAN AND MOCCASIN
963          HC        2
             *

964          KK RC102-C
965          KM    ROUTE CNW102-C TO NW130-C
966          RD     4000  0.0225     0.05        0     TRAP       10        5
             *

967          KK NW130-C
968          BA    0.241
969          LS        0       75
970          UD    0.415
             *

971          KK DP2WEST
972          KM    COMBINE RC102-C AND NW130-C
973          KM    AL CARRISON AND MOCCASIN
974          HC        2
             *
1                                        HEC-1 INPUT                                        PAGE 30

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

975          KK2CNW130-C
976          KM    COMBINE C223C-24 AND CNW130-C
977          HC        2
             *

978          KKRC25A-15
979          KM    ROUTE C125A-15 TO 125A-16
980          KM    FACILITY = UPPER LAS VEGAS WASH
981          KM    FACILITY ID-MILE = LVUP 0976
982          KM    LINING = UNLINED
983          RD     2600  0.0065     0.02        0     TRAP      300        3
             *

984          KK  125B-1
985          BA    0.308
986          LS        0       73
987          UD    0.281
             *

988          KK R125B-1
989          KM    ROUTE 125B-1 TO 125B-3
990          KM    STREET NAME = CIMARRON
991          RD     4600  0.0391     0.05        0     TRAP       10       15
             *

992          KK  125B-3
993          BA    0.425
994          LS        0       73
995          UD    0.356
             *

996          KK C125B-3
997          KM    COMBINE 125B-3 AND R125B-1
998          KM    UPPER LAS VEGAS WASH EAST @ CIMARRON
```

```
 999          HC       2
              *

1000          KKRC125B-3
1001          KM   ROUTE C125B-3 TO 125B-4
1002          RD    3000  0.0083    0.05       0    TRAP      10      15
              *

1003          KK  125B-6
1004          BA   1.693
1005          LS       0      78
1006          UD   0.329
              *

1007          KK R125B-6
1008          KM   ROUTE 125B-6 TO 125B-2
1009          KM   STREET NAME = BUFFALO
1010          RD    3000  0.0433    0.05       0    TRAP      10      15
              *
```



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

1011          KK  125B-2
1012          BA   0.313
1013          LS       0      73
1014          UD   0.284
              *

1015          KK C125B-2
1016          KM   COMBINE 125B-2 AND R125B-6
1017          HC       2
              *

1018          KKRC125B-2
1019          KM   ROUTE C125B-2 TO 125B-4
1020          KM   STREET NAME = BUFFALO
1021          RD    5300  0.0377    0.05       0    TRAP      10      15
              *

1022          KK  125B-4
1023          BA   0.517
1024          LS       0      73
1025          UD   0.392
              *

1026          KK C125B-4
1027          KM   COMBINE 125B-4, RC125B-2 AND RC125B-3
1028          KM   STREET FLOW IN BUFFALO @ UPPER LAS VEGAS WASH EAST
1029          HC       3
              *

1030          KKRC125B-4
1031          KM   ROUTE C125B-4 TO 125A-14
1032          RD    4100  0.0146    0.05       0    TRAP      10      15
              *

1033          KK 125A-14
1034          BA   0.443
1035          LS       0      73
1036          UD   0.467
              *

1037          KKC125A-14
1038          KM   COMBINE 125A-14 AND RC125B-4
1039          HC       2
              *

1040          KKRC25A-14
1041          KM   ROUTE C125A-14 TO 125A-16
1042          RD    3200  0.0038    0.05       0    TRAP      10      15
              *
```



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

1043          KK 125A-16
1044          BA   0.312
1045          LS       0      76
```

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1046          UD   0.572
              *

1047          KKC125A-16
1048          KM   COMBINE 125A-16 AND RC25A-14
1049          KM   UPPER LV WASH EAST FLOW @ UPPER LAS VEGAS WASH
1050          HC       2
              *

1051          KK     DP2
1052          KM   COMBINE C125A-16 AND RC25A-15
1053          KM   UPPER LAS VEGAS WASH @ BUFFALO
1054          HC       2
              *

1055          KKRC25A-16
1056          KM   ROUTE 2C25A-16 TO 116-7
1057          KM   FACILITY = UPPER LAS VEGAS WASH
1058          KM   FACILITY ID-MILE = LVUP 0976
1059          KM   LINING = UNLINED
1060          RD    2600  0.0077    0.02       0    TRAP     300       3
              *

1061          KK   116-1
1062          BA   0.402
1063          LS       0       73
1064          UD   0.505
              *

1065          KK  R116-1
1066          KM   ROUTE 116-1 TO 116-7
1067          KM   STREET NAME = TENAYA
1068          RD    3200  0.0078    0.02       0    TRAP      10       15
              *

1069          KK   116-7
1070          BA   0.311
1071          LS       0       73
1072          UD   0.535
              *

1073          KK  C116-7
1074          KM   COMBINE 116-7, R116-1 AND RC25A-16
1075          KM   UPPER LAS VEGAS WASH @ TENAYA
1076          HC       3
              *
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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

1077          KK RC116-7
1078          KM   ROUTE C116-7 TO 116-8
1079          KM   FACILITY = UPPER LAS VEGAS WASH
1080          KM   FACILITY ID-MILE = LVUP 0976
1081          KM   LINING = UNLINED
1082          RD    2600  0.0077    0.02       0    TRAP     300       3
              *

1083          KK     118
1084          BA   3.549
1085          LS       0       84
1086          UD   0.520
              *

1087          KK    R118
1088          KM   ROUTE 118 TO 125B-5
1089          KM   NATURAL WASH
1090          KM   TRAVEL LENGTH = 10,500
1091          KM   SLOPE = 5.8%
1092          KM   N = 0.040
1093          KM   HYDRAULIC RADIUS = 1.5
1094          KM   VELOCITY = 13.43
1095          RM       2   0.155    0.15
              *

1096          KK  125B-5
1097          BA   3.120
1098          LS       0       78
1099          UD   0.625
              *
```

```
1100          KK C125B-5
1101          KM   COMBINE 125B-5, R118
1102          HC       2
              *

1103          KKRC125B-5
1104          RD    3200  0.0063    0.05       0    TRAP      10      15
              *

1105          KK   116-2
1106          BA   0.415
1107          LS       0      73
1108          UD   0.526
              *

1109          KK  C116-2
1110          HC       2
              *
```



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

1111          KK  R116-2
1112          KM   ROUTE 116-2 TO 116-8
1113          KM   STREET NAME = RAINBOW
1114          RD    3200  0.0063    0.05       0    TRAP      10      15
              *

1115          KK   116-8
1116          BA   0.328
1117          LS       0      74
1118          UD   0.580
              *

1119          KK  C116-8
1120          KM   COMBINE 116-8, R116-2 AND RC116-7
1121          KM   UPPER LAS VEGAS WASH @ RAINBOW
1122          HC       3
              *

1123          KK RC116-8
1124          KM   ROUTE C116-8 TO 116-9
1125          KM   FACILITY = UPPER LAS VEGAS WASH
1126          KM   FACILITY ID-MILE = LVUP 0976
1127          KM   LINING = NATURAL WASH
1128          RD    2600  0.0078    0.04       0    TRAP     300      3
              *

1129          KK   116-3
1130          BA   0.403
1131          LS       0      72
1132          UD   0.361
              *

1133          KK  R116-3
1134          KM   ROUTE 116-3 TO 116-9
1135          KM   STREET NAME = TORREY PINES
1136          RD    2600  0.0185    0.05       0    TRAP      10      15
              *

1137          KK   116-9
1138          BA   0.271
1139          LS       0      75
1140          UD   0.699
              *

1141          KK  C116-9
1142          KM   COMBINE 116-9, R116-3 AND RC116-8
1143          KM   UPPER LAS VEGAS WASH @ TORREY PINES
1144          HC       3
              *
```



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

1145          KK RC116-9
1146          KM   ROUTE C116-9 TO 116-13
1147          KM   FACILITY = UPPER LAS VEGAS WASH
```

```
1148          KM   FACILITY ID-MILE = LVUP 0976
1149          KM   LINING = NATURAL WASH
1150          RD    3400  0.0088    0.04       0    TRAP     300       3
              *

1151          KK   116-4
1152          BA   0.417
1153          LS       0      72
1154          UD   0.327
              *

1155          KK  R116-4
1156          KM   ROUTE 116-4 TO 116-10
1157          KM   STREET NAME = TORREY PINES
1158          RD    2700  0.0296    0.05       0    TRAP      10      15
              *

1159          KK  116-10
1160          BA   0.271
1161          LS       0      75
1162          UD   0.329
              *

1163          KK C116-10
1164          KM   COMBINE 116-10 AND R116-4
1165          HC       2
              *

1166          KK  116-13
1167          BA   0.273
1168          LS       0      72
1169          UD   0.594
              *

1170          KK C116-13
1171          KM   COMBINE 116-13, C116-10 AND RC116-9
1172          HC       3
              *

1173          KKRC116-13
1174          KM   ROUTE C116-13 TO 116-14
1175          KM   FACILITY = UPPER LAS VEGAS WASH
1176          KM   FACILITY ID-MILE = LVUP 0976
1177          KM   LINING = NATURAL WASH
1178          RD    3500  0.0086    0.04       0    TRAP     300       3
              *
```



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

1179          KK NW187-C
1180          BA   0.259
1181          LS       0      80
1182          UD   0.638
              *

1183          KK     DP3
1184          KM   COMBINE RC116-13, AND NW187-C
1185          HC       2
              *

1186          KK     111
1187          BA   1.479
1188          LS       0      84
1189          UD   0.453
              *

1190          KK    R111
1191          KM   ROUTE 111 TO 117
1192          KM   NATURAL WASH
1193          KM   TRAVEL LENGTH = 8,000
1194          KM   SLOPE = 7.1%
1195          KM   N = 0.040
1196          KM   HYDRAULIC RADIUS = 1.5
1197          KM   VELOCITY = 14.86
1198          RM       1   0.107    0.15
              *

1199          KK     117
1200          BA   2.334
```

```
1201          LS       0      78
1202          UD   0.554
              *
1203          KK    C117
1204          KM   COMBINE R111 AND 117
1205          HC       2
              *
1206          KK
1207          RD    2700  0.0389    0.05       0    TRAP      10      15
              *
1208          KK   116-5
1209          BA   0.418
1210          LS       0      73
1211          UD   0.312
              *
```



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

1212          KK  C116-5
1213          HC       2
              *
1214          KK  R116-5
1215          KM   ROUTE 116-5 TO 116-11
1216          KM   STREET NAME = JONES
1217          RD    2700  0.0389    0.05       0    TRAP      10      15
              *
1218          KK  116-11
1219          BA   0.270
1220          LS       0      72
1221          UD   0.341
              *
1222          KK C116-11
1223          KM   COMBINE 116-11 AND R116-5
1224          HC       2
              *
1225          KKRC116-11
1226          KM   ROUTE C116-11 TO 116-14
1227          KM   STREET NAME = JONES
1228          RD    3000    0.01    0.05       0    TRAP      10      15
              *
1229          KK   116-6
1230          BA   0.413
1231          LS       0      72
1232          UD   0.297
              *
1233          KK  R116-6
1234          KM   ROUTE 116-6 TO 116-12
1235          KM   STREET NAME = BRADLEY
1236          RD    2700  0.0389    0.05       0    TRAP      10      15
              *
1237          KK     110
1238          BA   3.260
1239          LS       0      85
1240          UD   0.821
              *
1241          KK  116-12
1242          BA   0.265
1243          LS       0      72
1244          UD   0.310
              *
```



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

1245          KK C116-12
1246          KM   COMBINE 116-12, 110 AND R116-6
1247          HC       3
```

```
                *
1248            KKRC116-12
1249            KM   ROUTE C116-12 TO 116-14
1250            KM   STREET NAME = BRADLEY
1251            RD    2800  0.0214    0.05       0    TRAP      10      15
                *
1252            KK  116-14
1253            BA   0.543
1254            LS       0      73
1255            UD   0.412
                *
1256            KK   ULWIN
1257            KM   COMBINE 116-14, RC116-12, RC116-11 AND RC116-13
1258            KM   TOTAL INFLOW TO THE UPPER LAS VEGAS WASH DETETENTION BASIN
1259            HC       4
1260            KO       1
                *
1261            KK ULWDBEX
1262            KM   FACILITY ID-MILE = LVUP 0910
1263            KM   STORAGE VOLUME = 1836 ACRE-FEET
1264            KM   OUTLET = 2, 8'X8' RCB
1265            KM   100-YEAR DISCHARGE = 4,260 CFS
1266            KM   SPILLWAY LENGTH = 750'
1267            KM   SPILLWAY HEIGHT = 18'
1268            KM   SPILLWAY CREST ELEVATION = 2374.6'
1269            KM   SPILLWAY TYPE = RCC BROAD CRESTED WEIR
1270            KM   PMF DISCHARGE = 182,000 CFS
1271            KM   TOP OF EMBANKMENT ELEVATION = 2393'
1272            RS    1.00    STOR      -1
                * NEW SV, SE, & SQ CARDS FROM VTN FINDINGS
                * OUTLET = 2: 8'X8' RCB
1273            SV     0.0     3.9    18.3    45.2    82.5   128.8   184.3   248.9   322.9   411.7
1274            SV   517.5   637.9   773.1   924.2  1092.8  1282.8  1500.1  1750.0  1836.0  2036.6
1275            SE    2340    2342    2344    2346    2348    2350    2352    2354    2356    2358
1276            SE    2360    2362    2364    2366    2368    2370    2372    2374  2374.6    2376
1277            SQ     0.0   197.1   471.5   735.7   989.7  1233.5  1467.1  1690.5  1903.7  2106.7
1278            SQ  2299.5  2482.1  2654.5  2816.7  2968.6  3110.4  3242.0  3363.4  3397.8  7201.7
                * ORIGINAL SV CARDS "STARRED" OUT
                * SV 0      40      75      110     250     500     920     1550    1700    1860
                * SV 2060   2200    2380    2530    2750    3000    3450    4880    6680
                * SV 0      47      89      130     295     590     1086    1829    2006    2195
                * SV 2431   2596    2808    2985    3245    3540    4071    5758    7882
                * SE 2335   2340    2345    2350    2355    2360    2365    2370    2371    2372
                * SE 2373   2374    2375    2376    2377    2378    2380    2385    2390
                * SQ 0      720     1690    2300    2800    3290    3730    4120    4190    4260
                * SQ 6840   10100   15490   20040   26090   34160   53290   106990  182210
                * KO 3
                *
1                                        HEC-1 INPUT                                    PAGE 39

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

1279            KK  RULWDB
1280            KM   ROUTE ULWDB TO CCNW206
1281            KM   FACILITY = UPPER LAS VEGAS WASH
1282            KM   FACILITY ID-MILE = LVUP 0446
1283            KM   LINING = NATURAL WASH
1284            RD    1500   0.009    0.05       0    TRAP     250       3
                *
1285            KK   SOUTH
1286            BA  14.867
1287            LS       0      80
1288            UD   1.856
                *
1289            KKS0_RULWDB
1290            HC       2
                *
1291            KK   R102A
1292            KM   ROUTE NBRULWDB TO 102A
1293            RD    1500   0.009    0.05       0    TRAP     250       3
                *
1294            KK    102A
```

```
1295          BA   6.273
1296          LS      0      83
1297          UD   0.775
              *

1298          KK  CR102A
1299          KM   COMBINE R102A AND NBRULWDB
1300          HC      2
              *

1301          KK   R102B
1302          KM   ROUTE CR102A TO 102B
1303          RD    1500   0.009    0.05       0    TRAP     250       3
              *

1304          KK    102B
1305          BA   8.885
1306          LS      0      83
1307          UD   0.834
              *

1308          KK  RC102B
1309          KM   COMBINE 102B AND CR102A
1310          HC      2
              *
1                                        HEC-1 INPUT                                                    PAGE 40

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


              1311          KK  FINISH
              1312          RD    1500   0.009    0.05       0    TRAP     250       3
              1313          KO      1
                            *
              1314          ZZ
1
```

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   18MAR08  TIME  14:27:12  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*         609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616        *
*           (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
```

```
*** FREE ***
*** NOLIST ***
```


```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   18MAR08  TIME  14:27:12  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*         609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```


KLEINFELDER
FEBRUARY 2008
BASELINE MODEL

DESIGN STORM = 100-YEAR 6-HOUR STORM
STORM DISTRIBUTION = SDN5

```
  10 IO        OUTPUT CONTROL VARIABLES
                    IPRNT         5  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         300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE     2    0  ENDING DATE
                   NDTIME        0055  ENDING TIME
                   ICENT           19  CENTURY MARK

                 COMPUTATION INTERVAL      .08 HOURS
                     TOTAL TIME BASE    24.92 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            1  NUMBER OF PLANS

     JR       MULTI-RATIO OPTION
                 RATIOS OF PRECIPITATION
               1.00       .87       .74       .57       .44       .26


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


            **************
            *            *
1250 KK     *     ULWIN  *
            *            *
            **************

1254 KO          OUTPUT CONTROL VARIABLES
                      IPRNT            1  PRINT CONTROL
                      IPLOT            0  PLOT CONTROL
                      QSCAL           0.  HYDROGRAPH PLOT SCALE

1253 HC          HYDROGRAPH COMBINATION
                      ICOMP            4  NUMBER OF HYDROGRAPHS TO COMBINE

                                                  ***

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

                                                HYDROGRAPH AT STATION     ULWIN
                                                  SUM OF  4 HYDROGRAPHS
                                                  PLAN 1,    RATIO =  1.00

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

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	8101.	1		1230	151	5.	1		1845	226	0.
1		0005	2	0.	1		0620	77	7445.	1		1235	152	4.	1		1850	227	0.
1		0010	3	0.	1		0625	78	6836.	1		1240	153	4.	1		1855	228	0.
1		0015	4	0.	1		0630	79	6276.	1		1245	154	3.	1		1900	229	0.
1		0020	5	0.	1		0635	80	5763.	1		1250	155	3.	1		1905	230	0.
1		0025	6	0.	1		0640	81	5298.	1		1255	156	2.	1		1910	231	0.
1		0030	7	0.	1		0645	82	4876.	1		1300	157	2.	1		1915	232	0.
1		0035	8	0.	1		0650	83	4491.	1		1305	158	2.	1		1920	233	0.
1		0040	9	0.	1		0655	84	4136.	1		1310	159	2.	1		1925	234	0.
1		0045	10	0.	1		0700	85	3806.	1		1315	160	1.	1		1930	235	0.
1		0050	11	1.	1		0705	86	3502.	1		1320	161	1.	1		1935	236	0.
1		0055	12	2.	1		0710	87	3222.	1		1325	162	1.	1		1940	237	0.
1		0100	13	4.	1		0715	88	2961.	1		1330	163	1.	1		1945	238	0.
1		0105	14	6.	1		0720	89	2719.	1		1335	164	1.	1		1950	239	0.
1		0110	15	9.	1		0725	90	2495.	1		1340	165	1.	1		1955	240	0.
1		0115	16	12.	1		0730	91	2289.	1		1345	166	1.	1		2000	241	0.
1		0120	17	16.	1		0735	92	2100.	1		1350	167	0.	1		2005	242	0.
1		0125	18	20.	1		0740	93	1928.	1		1355	168	0.	1		2010	243	0.
1		0130	19	25.	1		0745	94	1770.	1		1400	169	0.	1		2015	244	0.
1		0135	20	31.	1		0750	95	1624.	1		1405	170	0.	1		2020	245	0.
1		0140	21	38.	1		0755	96	1490.	1		1410	171	0.	1		2025	246	0.
1		0145	22	46.	1		0800	97	1370.	1		1415	172	0.	1		2030	247	0.
1		0150	23	55.	1		0805	98	1260.	1		1420	173	0.	1		2035	248	0.
1		0155	24	65.	1		0810	99	1161.	1		1425	174	0.	1		2040	249	0.
1		0200	25	77.	1		0815	100	1070.	1		1430	175	0.	1		2045	250	0.
1		0205	26	91.	1		0820	101	983.	1		1435	176	0.	1		2050	251	0.
1		0210	27	109.	1		0825	102	901.	1		1440	177	0.	1		2055	252	0.
1		0215	28	131.	1		0830	103	825.	1		1445	178	0.	1		2100	253	0.
1		0220	29	156.	1		0835	104	754.	1		1450	179	0.	1		2105	254	0.
1		0225	30	184.	1		0840	105	688.	1		1455	180	0.	1		2110	255	0.
1		0230	31	215.	1		0845	106	626.	1		1500	181	0.	1		2115	256	0.
1		0235	32	247.	1		0850	107	569.	1		1505	182	0.	1		2120	257	0.
1		0240	33	280.	1		0855	108	516.	1		1510	183	0.	1		2125	258	0.
1		0245	34	312.	1		0900	109	469.	1		1515	184	0.	1		2130	259	0.
1		0250	35	344.	1		0905	110	425.	1		1520	185	0.	1		2135	260	0.

1	0255	36	375.	*	1	0910	111	387.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	410.	*	1	0915	112	352.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	453.	*	1	0920	113	320.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	510.	*	1	0925	114	292.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	588.	*	1	0930	115	266.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	696.	*	1	0935	116	242.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	850.	*	1	0940	117	220.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	1069.	*	1	0945	118	200.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	1378.	*	1	0950	119	181.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	1791.	*	1	0955	120	164.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	2290.	*	1	1000	121	148.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	2833.	*	1	1005	122	134.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	3365.	*	1	1010	123	121.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	3846.	*	1	1015	124	109.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	4350.	*	1	1020	125	98.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	5234.	*	1	1025	126	88.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	6747.	*	1	1030	127	79.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	8887.	*	1	1035	128	71.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	11092.	*	1	1040	129	64.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	12656.	*	1	1045	130	57.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	13496.	*	1	1050	131	51.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	13752.	*	1	1055	132	46.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	13580.	*	1	1100	133	41.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	13224.	*	1	1105	134	37.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	12817.	*	1	1110	135	33.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	12422.	*	1	1115	136	29.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	12106.	*	1	1120	137	26.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	11869.	*	1	1125	138	23.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	11701.	*	1	1130	139	21.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	11582.	*	1	1135	140	19.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	11513.	*	1	1140	141	17.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	11494.	*	1	1145	142	15.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	11496.	*	1	1150	143	13.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	11461.	*	1	1155	144	12.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	11346.	*	1	1200	145	10.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	11094.	*	1	1205	146	9.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	10672.	*	1	1210	147	8.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	10109.	*	1	1215	148	7.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	9466.	*	1	1220	149	6.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	8785.	*	1	1225	150	6.	*	1	1840	225	0.	*	2	0055	300	0.

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 13752.	4.67		5513.	1405.	1353.	1353.
		(INCHES)	.871	.888	.888	.888
		(AC-FT)	2734.	2787.	2787.	2787.

CUMULATIVE AREA = 58.84 SQ MI

HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .87

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	6688.	*	1		1230	151	7.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	6187.	*	1		1235	152	6.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	5707.	*	1		1240	153	6.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	5259.	*	1		1245	154	5.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	4844.	*	1		1250	155	4.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	4463.	*	1		1255	156	4.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	4116.	*	1		1300	157	3.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	3796.	*	1		1305	158	3.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	3504.	*	1		1310	159	3.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	3235.	*	1		1315	160	2.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	2987.	*	1		1320	161	2.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	2758.	*	1		1325	162	2.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	2545.	*	1		1330	163	2.	*	1		1945	238	0.
1		0105	14	1.	*	1		0720	89	2348.	*	1		1335	164	1.	*	1		1950	239	0.
1		0110	15	1.	*	1		0725	90	2165.	*	1		1340	165	1.	*	1		1955	240	0.
1		0115	16	2.	*	1		0730	91	1996.	*	1		1345	166	1.	*	1		2000	241	0.
1		0120	17	3.	*	1		0735	92	1839.	*	1		1350	167	1.	*	1		2005	242	0.

1	0125	18	4.	*	1	0740	93	1695.	*	1	1355	168	1.	*	1	2010	243	0.
1	0130	19	6.	*	1	0745	94	1563.	*	1	1400	169	1.	*	1	2015	244	0.
1	0135	20	8.	*	1	0750	95	1441.	*	1	1405	170	1.	*	1	2020	245	0.
1	0140	21	11.	*	1	0755	96	1330.	*	1	1410	171	1.	*	1	2025	246	0.
1	0145	22	15.	*	1	0800	97	1228.	*	1	1415	172	0.	*	1	2030	247	0.
1	0150	23	19.	*	1	0805	98	1135.	*	1	1420	173	0.	*	1	2035	248	0.
1	0155	24	25.	*	1	0810	99	1050.	*	1	1425	174	0.	*	1	2040	249	0.
1	0200	25	32.	*	1	0815	100	968.	*	1	1430	175	0.	*	1	2045	250	0.
1	0205	26	41.	*	1	0820	101	890.	*	1	1435	176	0.	*	1	2050	251	0.
1	0210	27	52.	*	1	0825	102	819.	*	1	1440	177	0.	*	1	2055	252	0.
1	0215	28	65.	*	1	0830	103	754.	*	1	1445	178	0.	*	1	2100	253	0.
1	0220	29	79.	*	1	0835	104	694.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	94.	*	1	0840	105	640.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	110.	*	1	0845	106	588.	*	1	1500	181	0.	*	1	2115	256	0.
1	0235	32	126.	*	1	0850	107	540.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	142.	*	1	0855	108	495.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	159.	*	1	0900	109	452.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	175.	*	1	0905	110	411.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	190.	*	1	0910	111	375.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	206.	*	1	0915	112	342.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	224.	*	1	0920	113	312.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	249.	*	1	0925	114	285.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	288.	*	1	0930	115	260.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	349.	*	1	0935	116	238.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	442.	*	1	0940	117	218.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	580.	*	1	0945	118	200.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	785.	*	1	0950	119	183.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	1077.	*	1	0955	120	167.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	1446.	*	1	1000	121	153.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	1860.	*	1	1005	122	140.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	2280.	*	1	1010	123	129.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	2653.	*	1	1015	124	118.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	2960.	*	1	1020	125	108.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	3224.	*	1	1025	126	99.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	3555.	*	1	1030	127	90.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	4472.	*	1	1035	128	82.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	5809.	*	1	1040	129	75.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	7246.	*	1	1045	130	68.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	8454.	*	1	1050	131	62.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	9227.	*	1	1055	132	56.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	9582.	*	1	1100	133	51.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	9666.	*	1	1105	134	46.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	9589.	*	1	1110	135	41.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	9422.	*	1	1115	136	37.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	9236.	*	1	1120	137	34.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	9081.	*	1	1125	138	30.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	8972.	*	1	1130	139	27.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	8902.	*	1	1135	140	24.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	8856.	*	1	1140	141	22.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	8837.	*	1	1145	142	19.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	8837.	*	1	1150	143	17.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	8827.	*	1	1155	144	16.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	8780.	*	1	1200	145	14.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	8651.	*	1	1205	146	13.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	8421.	*	1	1210	147	11.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	8089.	*	1	1215	148	10.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	7670.	*	1	1220	149	9.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	7192.	*	1	1225	150	8.	*	1	1840	225	0.	*	2	0055	300	0.

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
9666.	4.83		4123.	1051.	1012.	1012.
		(INCHES)	.652	.664	.664	.664
		(AC-FT)	2044.	2085.	2085.	2085.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .74

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DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW

1	0000	1	0.	*	1	0615	76	5213.	*	1	1230	151	11.	*	1	1845	226	0.
1	0005	2	0.	*	1	0620	77	4870.	*	1	1235	152	10.	*	1	1850	227	0.
1	0010	3	0.	*	1	0625	78	4527.	*	1	1240	153	9.	*	1	1855	228	0.
1	0015	4	0.	*	1	0630	79	4196.	*	1	1245	154	8.	*	1	1900	229	0.
1	0020	5	0.	*	1	0635	80	3882.	*	1	1250	155	7.	*	1	1905	230	0.
1	0025	6	0.	*	1	0640	81	3591.	*	1	1255	156	6.	*	1	1910	231	0.
1	0030	7	0.	*	1	0645	82	3323.	*	1	1300	157	6.	*	1	1915	232	0.
1	0035	8	0.	*	1	0650	83	3076.	*	1	1305	158	5.	*	1	1920	233	0.
1	0040	9	0.	*	1	0655	84	2849.	*	1	1310	159	5.	*	1	1925	234	0.
1	0045	10	0.	*	1	0700	85	2638.	*	1	1315	160	4.	*	1	1930	235	0.
1	0050	11	0.	*	1	0705	86	2445.	*	1	1320	161	4.	*	1	1935	236	0.
1	0055	12	0.	*	1	0710	87	2265.	*	1	1325	162	3.	*	1	1940	237	0.
1	0100	13	0.	*	1	0715	88	2100.	*	1	1330	163	3.	*	1	1945	238	0.
1	0105	14	0.	*	1	0720	89	1948.	*	1	1335	164	3.	*	1	1950	239	0.
1	0110	15	0.	*	1	0725	90	1805.	*	1	1340	165	2.	*	1	1955	240	0.
1	0115	16	0.	*	1	0730	91	1673.	*	1	1345	166	2.	*	1	2000	241	0.
1	0120	17	0.	*	1	0735	92	1549.	*	1	1350	167	2.	*	1	2005	242	0.
1	0125	18	0.	*	1	0740	93	1436.	*	1	1355	168	2.	*	1	2010	243	0.
1	0130	19	0.	*	1	0745	94	1330.	*	1	1400	169	1.	*	1	2015	244	0.
1	0135	20	1.	*	1	0750	95	1232.	*	1	1405	170	1.	*	1	2020	245	0.
1	0140	21	1.	*	1	0755	96	1141.	*	1	1410	171	1.	*	1	2025	246	0.
1	0145	22	2.	*	1	0800	97	1058.	*	1	1415	172	1.	*	1	2030	247	0.
1	0150	23	4.	*	1	0805	98	981.	*	1	1420	173	1.	*	1	2035	248	0.
1	0155	24	6.	*	1	0810	99	910.	*	1	1425	174	1.	*	1	2040	249	0.
1	0200	25	9.	*	1	0815	100	844.	*	1	1430	175	1.	*	1	2045	250	0.
1	0205	26	12.	*	1	0820	101	784.	*	1	1435	176	1.	*	1	2050	251	0.
1	0210	27	17.	*	1	0825	102	728.	*	1	1440	177	0.	*	1	2055	252	0.
1	0215	28	22.	*	1	0830	103	677.	*	1	1445	178	0.	*	1	2100	253	0.
1	0220	29	29.	*	1	0835	104	630.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	38.	*	1	0840	105	587.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	47.	*	1	0845	106	547.	*	1	1500	181	0.	*	1	2115	256	0.
1	0235	32	56.	*	1	0850	107	509.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	66.	*	1	0855	108	474.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	74.	*	1	0900	109	441.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	82.	*	1	0905	110	410.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	89.	*	1	0910	111	382.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	97.	*	1	0915	112	355.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	105.	*	1	0920	113	328.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	114.	*	1	0925	114	301.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	129.	*	1	0930	115	277.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	151.	*	1	0935	116	254.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	189.	*	1	0940	117	234.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	251.	*	1	0945	118	215.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	346.	*	1	0950	119	198.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	501.	*	1	0955	120	182.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	730.	*	1	1000	121	168.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	1015.	*	1	1005	122	155.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	1326.	*	1	1010	123	143.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	1617.	*	1	1015	124	132.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	1844.	*	1	1020	125	122.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	1994.	*	1	1025	126	112.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	2079.	*	1	1030	127	103.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	2123.	*	1	1035	128	95.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	2348.	*	1	1040	129	87.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	3171.	*	1	1045	130	80.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	3990.	*	1	1050	131	74.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	4678.	*	1	1055	132	67.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	5425.	*	1	1100	133	62.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	5907.	*	1	1105	134	56.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	6157.	*	1	1110	135	51.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	6238.	*	1	1115	136	47.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	6262.	*	1	1120	137	43.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	6284.	*	1	1125	138	39.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	6280.	*	1	1130	139	35.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	6273.	*	1	1135	140	32.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	6262.	*	1	1140	141	29.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	6249.	*	1	1145	142	26.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	6249.	*	1	1150	143	24.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	6252.	*	1	1155	144	22.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	6248.	*	1	1200	145	20.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	6228.	*	1	1205	146	18.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	6160.	*	1	1210	147	16.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	6023.	*	1	1215	148	14.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	5812.	*	1	1220	149	13.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	5536.	*	1	1225	150	12.	*	1	1840	225	0.	*	2	0055	300	0.

****

PEAK FLOW TIME

MAXIMUM AVERAGE FLOW

6-HR 24-HR 72-HR 24.92-HR

	(CFS)	(HR)				
			(CFS)			
+	6284.	5.17		2860.	731.	704.	704.
			(INCHES)	.452	.462	.462	.462
			(AC-FT)	1418.	1450.	1450.	1450.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .57

****

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	3039.	*	1		1230	151	18.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	2944.	*	1		1235	152	16.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	2825.	*	1		1240	153	15.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	2696.	*	1		1245	154	14.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	2548.	*	1		1250	155	13.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	2390.	*	1		1255	156	12.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	2235.	*	1		1300	157	11.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	2083.	*	1		1305	158	10.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	1940.	*	1		1310	159	9.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	1807.	*	1		1315	160	8.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	1685.	*	1		1320	161	8.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	1572.	*	1		1325	162	7.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	1468.	*	1		1330	163	6.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	1372.	*	1		1335	164	6.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	1281.	*	1		1340	165	5.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	1194.	*	1		1345	166	5.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	1113.	*	1		1350	167	5.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	1038.	*	1		1355	168	4.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	968.	*	1		1400	169	4.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	906.	*	1		1405	170	3.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	847.	*	1		1410	171	3.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	792.	*	1		1415	172	3.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	740.	*	1		1420	173	3.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	693.	*	1		1425	174	2.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	649.	*	1		1430	175	2.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	608.	*	1		1435	176	2.	*	1		2050	251	0.
1		0210	27	1.	*	1		0825	102	570.	*	1		1440	177	2.	*	1		2055	252	0.
1		0215	28	2.	*	1		0830	103	534.	*	1		1445	178	2.	*	1		2100	253	0.
1		0220	29	3.	*	1		0835	104	500.	*	1		1450	179	1.	*	1		2105	254	0.
1		0225	30	4.	*	1		0840	105	469.	*	1		1455	180	1.	*	1		2110	255	0.
1		0230	31	6.	*	1		0845	106	440.	*	1		1500	181	1.	*	1		2115	256	0.
1		0235	32	8.	*	1		0850	107	412.	*	1		1505	182	1.	*	1		2120	257	0.
1		0240	33	11.	*	1		0855	108	387.	*	1		1510	183	1.	*	1		2125	258	0.
1		0245	34	13.	*	1		0900	109	363.	*	1		1515	184	1.	*	1		2130	259	0.
1		0250	35	15.	*	1		0905	110	340.	*	1		1520	185	1.	*	1		2135	260	0.
1		0255	36	18.	*	1		0910	111	319.	*	1		1525	186	1.	*	1		2140	261	0.
1		0300	37	20.	*	1		0915	112	300.	*	1		1530	187	1.	*	1		2145	262	0.
1		0305	38	23.	*	1		0920	113	281.	*	1		1535	188	1.	*	1		2150	263	0.
1		0310	39	28.	*	1		0925	114	264.	*	1		1540	189	0.	*	1		2155	264	0.
1		0315	40	34.	*	1		0930	115	248.	*	1		1545	190	0.	*	1		2200	265	0.
1		0320	41	43.	*	1		0935	116	233.	*	1		1550	191	0.	*	1		2205	266	0.
1		0325	42	57.	*	1		0940	117	219.	*	1		1555	192	0.	*	1		2210	267	0.
1		0330	43	79.	*	1		0945	118	205.	*	1		1600	193	0.	*	1		2215	268	0.
1		0335	44	113.	*	1		0950	119	192.	*	1		1605	194	0.	*	1		2220	269	0.
1		0340	45	161.	*	1		0955	120	179.	*	1		1610	195	0.	*	1		2225	270	0.
1		0345	46	223.	*	1		1000	121	165.	*	1		1615	196	0.	*	1		2230	271	0.
1		0350	47	299.	*	1		1005	122	153.	*	1		1620	197	0.	*	1		2235	272	0.
1		0355	48	442.	*	1		1010	123	142.	*	1		1625	198	0.	*	1		2240	273	0.
1		0400	49	633.	*	1		1015	124	131.	*	1		1630	199	0.	*	1		2245	274	0.
1		0405	50	805.	*	1		1020	125	122.	*	1		1635	200	0.	*	1		2250	275	0.
1		0410	51	928.	*	1		1025	126	113.	*	1		1640	201	0.	*	1		2255	276	0.
1		0415	52	1012.	*	1		1030	127	105.	*	1		1645	202	0.	*	1		2300	277	0.
1		0420	53	1049.	*	1		1035	128	97.	*	1		1650	203	0.	*	1		2305	278	0.
1		0425	54	1051.	*	1		1040	129	91.	*	1		1655	204	0.	*	1		2310	279	0.
1		0430	55	1030.	*	1		1045	130	85.	*	1		1700	205	0.	*	1		2315	280	0.
1		0435	56	999.	*	1		1050	131	79.	*	1		1705	206	0.	*	1		2320	281	0.
1		0440	57	961.	*	1		1055	132	74.	*	1		1710	207	0.	*	1		2325	282	0.
1		0445	58	1051.	*	1		1100	133	69.	*	1		1715	208	0.	*	1		2330	283	0.
1		0450	59	1839.	*	1		1105	134	64.	*	1		1720	209	0.	*	1		2335	284	0.
1		0455	60	1978.	*	1		1110	135	60.	*	1		1725	210	0.	*	1		2340	285	0.
1		0500	61	2005.	*	1		1115	136	56.	*	1		1730	211	0.	*	1		2345	286	0.
1		0505	62	2421.	*	1		1120	137	52.	*	1		1735	212	0.	*	1		2350	287	0.

1	0510	63	2587.	*	1	1125	138	49.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	2823.	*	1	1130	139	46.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	2933.	*	1	1135	140	42.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	2987.	*	1	1140	141	40.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	2942.	*	1	1145	142	37.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	2986.	*	1	1150	143	34.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	3035.	*	1	1155	144	31.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	3063.	*	1	1200	145	29.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	3155.	*	1	1205	146	27.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	3209.	*	1	1210	147	25.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	3184.	*	1	1215	148	23.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	3146.	*	1	1220	149	21.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	3100.	*	1	1225	150	19.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 3209.	5.92		1461.	377.	363.	363.
		(INCHES)	.231	.239	.239	.239
		(AC-FT)	724.	749.	749.	749.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .44

****

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	1173.	*	1		1230	151	27.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	1183.	*	1		1235	152	25.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	1150.	*	1		1240	153	24.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	1135.	*	1		1245	154	22.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	1159.	*	1		1250	155	21.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	1161.	*	1		1255	156	20.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	1170.	*	1		1300	157	19.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	1150.	*	1		1305	158	17.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	1102.	*	1		1310	159	16.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	1051.	*	1		1315	160	15.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	995.	*	1		1320	161	14.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	958.	*	1		1325	162	13.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	903.	*	1		1330	163	12.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	846.	*	1		1335	164	12.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	799.	*	1		1340	165	11.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	752.	*	1		1345	166	10.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	719.	*	1		1350	167	9.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	674.	*	1		1355	168	9.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	639.	*	1		1400	169	8.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	604.	*	1		1405	170	8.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	574.	*	1		1410	171	7.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	541.	*	1		1415	172	7.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	509.	*	1		1420	173	6.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	482.	*	1		1425	174	6.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	456.	*	1		1430	175	6.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	429.	*	1		1435	176	5.	*	1		2050	251	0.
1		0210	27	0.	*	1		0825	102	404.	*	1		1440	177	5.	*	1		2055	252	0.
1		0215	28	0.	*	1		0830	103	382.	*	1		1445	178	5.	*	1		2100	253	0.
1		0220	29	0.	*	1		0835	104	360.	*	1		1450	179	4.	*	1		2105	254	0.
1		0225	30	0.	*	1		0840	105	340.	*	1		1455	180	4.	*	1		2110	255	0.
1		0230	31	0.	*	1		0845	106	322.	*	1		1500	181	4.	*	1		2115	256	0.
1		0235	32	0.	*	1		0850	107	305.	*	1		1505	182	3.	*	1		2120	257	0.
1		0240	33	0.	*	1		0855	108	289.	*	1		1510	183	3.	*	1		2125	258	0.
1		0245	34	0.	*	1		0900	109	274.	*	1		1515	184	3.	*	1		2130	259	0.
1		0250	35	0.	*	1		0905	110	260.	*	1		1520	185	3.	*	1		2135	260	0.
1		0255	36	0.	*	1		0910	111	246.	*	1		1525	186	3.	*	1		2140	261	0.
1		0300	37	1.	*	1		0915	112	233.	*	1		1530	187	2.	*	1		2145	262	0.
1		0305	38	1.	*	1		0920	113	221.	*	1		1535	188	2.	*	1		2150	263	0.
1		0310	39	1.	*	1		0925	114	210.	*	1		1540	189	2.	*	1		2155	264	0.
1		0315	40	2.	*	1		0930	115	199.	*	1		1545	190	2.	*	1		2200	265	0.
1		0320	41	4.	*	1		0935	116	189.	*	1		1550	191	2.	*	1		2205	266	0.
1		0325	42	6.	*	1		0940	117	181.	*	1		1555	192	2.	*	1		2210	267	0.
1		0330	43	12.	*	1		0945	118	172.	*	1		1600	193	2.	*	1		2215	268	0.
1		0335	44	24.	*	1		0950	119	164.	*	1		1605	194	2.	*	1		2220	269	0.

1	0340	45	43.	*	1	0955	120	156.	*	1	1610	195	1.	*	1	2225	270	0.
1	0345	46	69.	*	1	1000	121	148.	*	1	1615	196	1.	*	1	2230	271	0.
1	0350	47	102.	*	1	1005	122	141.	*	1	1620	197	1.	*	1	2235	272	0.
1	0355	48	137.	*	1	1010	123	134.	*	1	1625	198	1.	*	1	2240	273	0.
1	0400	49	174.	*	1	1015	124	127.	*	1	1630	199	1.	*	1	2245	274	0.
1	0405	50	215.	*	1	1020	125	121.	*	1	1635	200	1.	*	1	2250	275	0.
1	0410	51	320.	*	1	1025	126	115.	*	1	1640	201	1.	*	1	2255	276	0.
1	0415	52	425.	*	1	1030	127	110.	*	1	1645	202	1.	*	1	2300	277	0.
1	0420	53	468.	*	1	1035	128	105.	*	1	1650	203	1.	*	1	2305	278	0.
1	0425	54	494.	*	1	1040	129	100.	*	1	1655	204	1.	*	1	2310	279	0.
1	0430	55	498.	*	1	1045	130	95.	*	1	1700	205	1.	*	1	2315	280	0.
1	0435	56	491.	*	1	1050	131	90.	*	1	1705	206	1.	*	1	2320	281	0.
1	0440	57	477.	*	1	1055	132	85.	*	1	1710	207	1.	*	1	2325	282	0.
1	0445	58	459.	*	1	1100	133	80.	*	1	1715	208	1.	*	1	2330	283	0.
1	0450	59	442.	*	1	1105	134	75.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	430.	*	1	1110	135	71.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	425.	*	1	1115	136	67.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	430.	*	1	1120	137	63.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	444.	*	1	1125	138	59.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	810.	*	1	1130	139	55.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	1148.	*	1	1135	140	52.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	780.	*	1	1140	141	49.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	1010.	*	1	1145	142	46.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	1000.	*	1	1150	143	43.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	989.	*	1	1155	144	41.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	1219.	*	1	1200	145	38.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	1172.	*	1	1205	146	36.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	1218.	*	1	1210	147	34.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	1199.	*	1	1215	148	32.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	1278.	*	1	1220	149	30.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	1199.	*	1	1225	150	29.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
+ 1278.	6.08		645.	172.	166.	166.
		(INCHES)	.102	.109	.109	.109
		(AC-FT)	320.	341.	341.	341.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .26

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
					*						*						*					
1		0000	1	0.	*	1		0615	76	71.	*	1		1230	151	14.	*	1		1845	226	1.
1		0005	2	0.	*	1		0620	77	63.	*	1		1235	152	13.	*	1		1850	227	1.
1		0010	3	0.	*	1		0625	78	57.	*	1		1240	153	12.	*	1		1855	228	1.
1		0015	4	0.	*	1		0630	79	51.	*	1		1245	154	12.	*	1		1900	229	1.
1		0020	5	0.	*	1		0635	80	46.	*	1		1250	155	12.	*	1		1905	230	1.
1		0025	6	0.	*	1		0640	81	41.	*	1		1255	156	11.	*	1		1910	231	1.
1		0030	7	0.	*	1		0645	82	37.	*	1		1300	157	11.	*	1		1915	232	1.
1		0035	8	0.	*	1		0650	83	33.	*	1		1305	158	11.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	30.	*	1		1310	159	10.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	27.	*	1		1315	160	10.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	24.	*	1		1320	161	10.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	76.	*	1		1325	162	10.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	123.	*	1		1330	163	9.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	80.	*	1		1335	164	9.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	123.	*	1		1340	165	9.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	84.	*	1		1345	166	8.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	65.	*	1		1350	167	8.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	104.	*	1		1355	168	8.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	60.	*	1		1400	169	8.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	67.	*	1		1405	170	7.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	79.	*	1		1410	171	7.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	46.	*	1		1415	172	7.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	65.	*	1		1420	173	6.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	69.	*	1		1425	174	6.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	66.	*	1		1430	175	6.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	101.	*	1		1435	176	6.	*	1		2050	251	0.

1	0210	27	0.	*	1	0825	102	87.	*	1	1440	177	6.	*	1	2055	252	0.
1	0215	28	0.	*	1	0830	103	73.	*	1	1445	178	5.	*	1	2100	253	0.
1	0220	29	0.	*	1	0835	104	72.	*	1	1450	179	5.	*	1	2105	254	0.
1	0225	30	0.	*	1	0840	105	65.	*	1	1455	180	5.	*	1	2110	255	0.
1	0230	31	0.	*	1	0845	106	79.	*	1	1500	181	5.	*	1	2115	256	0.
1	0235	32	0.	*	1	0850	107	69.	*	1	1505	182	4.	*	1	2120	257	0.
1	0240	33	0.	*	1	0855	108	55.	*	1	1510	183	4.	*	1	2125	258	0.
1	0245	34	0.	*	1	0900	109	59.	*	1	1515	184	4.	*	1	2130	259	0.
1	0250	35	0.	*	1	0905	110	58.	*	1	1520	185	4.	*	1	2135	260	0.
1	0255	36	0.	*	1	0910	111	63.	*	1	1525	186	4.	*	1	2140	261	0.
1	0300	37	0.	*	1	0915	112	53.	*	1	1530	187	4.	*	1	2145	262	0.
1	0305	38	0.	*	1	0920	113	44.	*	1	1535	188	3.	*	1	2150	263	0.
1	0310	39	0.	*	1	0925	114	51.	*	1	1540	189	3.	*	1	2155	264	0.
1	0315	40	0.	*	1	0930	115	54.	*	1	1545	190	3.	*	1	2200	265	0.
1	0320	41	0.	*	1	0935	116	51.	*	1	1550	191	3.	*	1	2205	266	0.
1	0325	42	0.	*	1	0940	117	45.	*	1	1555	192	3.	*	1	2210	267	0.
1	0330	43	0.	*	1	0945	118	46.	*	1	1600	193	3.	*	1	2215	268	0.
1	0335	44	0.	*	1	0950	119	51.	*	1	1605	194	3.	*	1	2220	269	0.
1	0340	45	0.	*	1	0955	120	42.	*	1	1610	195	2.	*	1	2225	270	0.
1	0345	46	0.	*	1	1000	121	36.	*	1	1615	196	2.	*	1	2230	271	0.
1	0350	47	0.	*	1	1005	122	39.	*	1	1620	197	2.	*	1	2235	272	0.
1	0355	48	1.	*	1	1010	123	40.	*	1	1625	198	2.	*	1	2240	273	0.
1	0400	49	5.	*	1	1015	124	35.	*	1	1630	199	2.	*	1	2245	274	0.
1	0405	50	11.	*	1	1020	125	32.	*	1	1635	200	2.	*	1	2250	275	0.
1	0410	51	19.	*	1	1025	126	36.	*	1	1640	201	2.	*	1	2255	276	0.
1	0415	52	26.	*	1	1030	127	34.	*	1	1645	202	2.	*	1	2300	277	0.
1	0420	53	32.	*	1	1035	128	28.	*	1	1650	203	2.	*	1	2305	278	0.
1	0425	54	36.	*	1	1040	129	28.	*	1	1655	204	2.	*	1	2310	279	0.
1	0430	55	40.	*	1	1045	130	31.	*	1	1700	205	2.	*	1	2315	280	0.
1	0435	56	43.	*	1	1050	131	27.	*	1	1705	206	2.	*	1	2320	281	0.
1	0440	57	44.	*	1	1055	132	24.	*	1	1710	207	2.	*	1	2325	282	0.
1	0445	58	45.	*	1	1100	133	26.	*	1	1715	208	2.	*	1	2330	283	0.
1	0450	59	53.	*	1	1105	134	26.	*	1	1720	209	1.	*	1	2335	284	0.
1	0455	60	71.	*	1	1110	135	22.	*	1	1725	210	1.	*	1	2340	285	0.
1	0500	61	67.	*	1	1115	136	21.	*	1	1730	211	1.	*	1	2345	286	0.
1	0505	62	68.	*	1	1120	137	22.	*	1	1735	212	1.	*	1	2350	287	0.
1	0510	63	75.	*	1	1125	138	21.	*	1	1740	213	1.	*	1	2355	288	0.
1	0515	64	75.	*	1	1130	139	19.	*	1	1745	214	1.	*	2	0000	289	0.
1	0520	65	80.	*	1	1135	140	19.	*	1	1750	215	1.	*	2	0005	290	0.
1	0525	66	83.	*	1	1140	141	20.	*	1	1755	216	1.	*	2	0010	291	0.
1	0530	67	87.	*	1	1145	142	18.	*	1	1800	217	1.	*	2	0015	292	0.
1	0535	68	92.	*	1	1150	143	16.	*	1	1805	218	1.	*	2	0020	293	0.
1	0540	69	98.	*	1	1155	144	17.	*	1	1810	219	1.	*	2	0025	294	0.
1	0545	70	104.	*	1	1200	145	17.	*	1	1815	220	1.	*	2	0030	295	0.
1	0550	71	104.	*	1	1205	146	15.	*	1	1820	221	1.	*	2	0035	296	0.
1	0555	72	100.	*	1	1210	147	15.	*	1	1825	222	1.	*	2	0040	297	0.
1	0600	73	94.	*	1	1215	148	15.	*	1	1830	223	1.	*	2	0045	298	0.
1	0605	74	87.	*	1	1220	149	14.	*	1	1835	224	1.	*	2	0050	299	0.
1	0610	75	79.	*	1	1225	150	13.	*	1	1840	225	1.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 123.	7.25		64.	19.	19.	19.
		(INCHES)	.010	.012	.012	.012
		(AC-FT)	32.	39.	39.	39.

CUMULATIVE AREA = 58.84 SQ MI

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            **************
            *            *
1305 KK     *   FINISH   *
            *            *
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1307 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

1306 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1500.	CHANNEL LENGTH
S	.0090	SLOPE
N	.050	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	250.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

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COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	2.60	750.00	9675.12	325.30	.98	9.61
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		9672.78	325.00	.98	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4665E+04 EXCESS= .0000E+00 OUTFLOW= .4665E+04 BASIN STORAGE= .9672E-02 PERCENT ERROR= .0

HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = 1.00

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	7829.	*	1		1230	151	2593.	*	1		1845	226	73.
1		0005	2	0.	*	1		0620	77	7608.	*	1		1235	152	2569.	*	1		1850	227	55.
1		0010	3	0.	*	1		0625	78	7394.	*	1		1240	153	2545.	*	1		1855	228	41.
1		0015	4	0.	*	1		0630	79	7185.	*	1		1245	154	2521.	*	1		1900	229	31.
1		0020	5	0.	*	1		0635	80	6982.	*	1		1250	155	2497.	*	1		1905	230	23.
1		0025	6	0.	*	1		0640	81	6783.	*	1		1255	156	2471.	*	1		1910	231	18.
1		0030	7	0.	*	1		0645	82	6590.	*	1		1300	157	2445.	*	1		1915	232	13.
1		0035	8	0.	*	1		0650	83	6405.	*	1		1305	158	2419.	*	1		1920	233	10.
1		0040	9	0.	*	1		0655	84	6227.	*	1		1310	159	2393.	*	1		1925	234	8.
1		0045	10	0.	*	1		0700	85	6055.	*	1		1315	160	2368.	*	1		1930	235	6.
1		0050	11	1.	*	1		0705	86	5890.	*	1		1320	161	2342.	*	1		1935	236	4.
1		0055	12	2.	*	1		0710	87	5733.	*	1		1325	162	2317.	*	1		1940	237	3.
1		0100	13	3.	*	1		0715	88	5584.	*	1		1330	163	2290.	*	1		1945	238	2.
1		0105	14	6.	*	1		0720	89	5441.	*	1		1335	164	2262.	*	1		1950	239	2.
1		0110	15	10.	*	1		0725	90	5305.	*	1		1340	165	2234.	*	1		1955	240	1.
1		0115	16	16.	*	1		0730	91	5174.	*	1		1345	166	2206.	*	1		2000	241	1.
1		0120	17	24.	*	1		0735	92	5047.	*	1		1350	167	2178.	*	1		2005	242	1.
1		0125	18	33.	*	1		0740	93	4925.	*	1		1355	168	2150.	*	1		2010	243	1.
1		0130	19	44.	*	1		0745	94	4808.	*	1		1400	169	2122.	*	1		2015	244	0.
1		0135	20	58.	*	1		0750	95	4698.	*	1		1405	170	2093.	*	1		2020	245	0.
1		0140	21	75.	*	1		0755	96	4594.	*	1		1410	171	2061.	*	1		2025	246	0.
1		0145	22	97.	*	1		0800	97	4498.	*	1		1415	172	2030.	*	1		2030	247	0.
1		0150	23	124.	*	1		0805	98	4409.	*	1		1420	173	1998.	*	1		2035	248	0.
1		0155	24	158.	*	1		0810	99	4326.	*	1		1425	174	1967.	*	1		2040	249	0.
1		0200	25	197.	*	1		0815	100	4249.	*	1		1430	175	1936.	*	1		2045	250	0.
1		0205	26	243.	*	1		0820	101	4177.	*	1		1435	176	1905.	*	1		2050	251	0.
1		0210	27	294.	*	1		0825	102	4108.	*	1		1440	177	1871.	*	1		2055	252	0.
1		0215	28	351.	*	1		0830	103	4044.	*	1		1445	178	1835.	*	1		2100	253	0.
1		0220	29	411.	*	1		0835	104	3984.	*	1		1450	179	1800.	*	1		2105	254	0.
1		0225	30	473.	*	1		0840	105	3927.	*	1		1455	180	1765.	*	1		2110	255	0.
1		0230	31	535.	*	1		0845	106	3873.	*	1		1500	181	1731.	*	1		2115	256	0.
1		0235	32	594.	*	1		0850	107	3822.	*	1		1505	182	1697.	*	1		2120	257	0.
1		0240	33	649.	*	1		0855	108	3773.	*	1		1510	183	1660.	*	1		2125	258	0.
1		0245	34	700.	*	1		0900	109	3728.	*	1		1515	184	1623.	*	1		2130	259	0.
1		0250	35	747.	*	1		0905	110	3684.	*	1		1520	185	1586.	*	1		2135	260	0.
1		0255	36	795.	*	1		0910	111	3641.	*	1		1525	186	1550.	*	1		2140	261	0.
1		0300	37	850.	*	1		0915	112	3601.	*	1		1530	187	1514.	*	1		2145	262	0.
1		0305	38	918.	*	1		0920	113	3562.	*	1		1535	188	1478.	*	1		2150	263	0.
1		0310	39	1004.	*	1		0925	114	3526.	*	1		1540	189	1440.	*	1		2155	264	0.
1		0315	40	1124.	*	1		0930	115	3491.	*	1		1545	190	1402.	*	1		2200	265	0.
1		0320	41	1302.	*	1		0935	116	3458.	*	1		1550	191	1363.	*	1		2205	266	0.
1		0325	42	1558.	*	1		0940	117	3427.	*	1		1555	192	1326.	*	1		2210	267	0.
1		0330	43	1914.	*	1		0945	118	3396.	*	1		1600	193	1289.	*	1		2215	268	0.

1	0335	44	2400.	*	1	0950	119	3367.	*	1	1605	194	1252.	*	1	2220	269	0.
1	0340	45	3008.	*	1	0955	120	3339.	*	1	1610	195	1214.	*	1	2225	270	0.
1	0345	46	3702.	*	1	1000	121	3311.	*	1	1615	196	1175.	*	1	2230	271	0.
1	0350	47	4450.	*	1	1005	122	3283.	*	1	1620	197	1135.	*	1	2235	272	0.
1	0355	48	5220.	*	1	1010	123	3255.	*	1	1625	198	1096.	*	1	2240	273	0.
1	0400	49	5952.	*	1	1015	124	3228.	*	1	1630	199	1059.	*	1	2245	274	0.
1	0405	50	6582.	*	1	1020	125	3202.	*	1	1635	200	1022.	*	1	2250	275	0.
1	0410	51	7088.	*	1	1025	126	3176.	*	1	1640	201	985.	*	1	2255	276	0.
1	0415	52	7478.	*	1	1030	127	3152.	*	1	1645	202	946.	*	1	2300	277	0.
1	0420	53	7763.	*	1	1035	128	3128.	*	1	1650	203	906.	*	1	2305	278	0.
1	0425	54	7959.	*	1	1040	129	3105.	*	1	1655	204	867.	*	1	2310	279	0.
1	0430	55	8092.	*	1	1045	130	3082.	*	1	1700	205	830.	*	1	2315	280	0.
1	0435	56	8197.	*	1	1050	131	3058.	*	1	1705	206	794.	*	1	2320	281	0.
1	0440	57	8292.	*	1	1055	132	3034.	*	1	1710	207	759.	*	1	2325	282	0.
1	0445	58	8378.	*	1	1100	133	3010.	*	1	1715	208	721.	*	1	2330	283	0.
1	0450	59	8482.	*	1	1105	134	2987.	*	1	1720	209	682.	*	1	2335	284	0.
1	0455	60	8637.	*	1	1110	135	2964.	*	1	1725	210	643.	*	1	2340	285	0.
1	0500	61	8842.	*	1	1115	136	2942.	*	1	1730	211	605.	*	1	2345	286	0.
1	0505	62	9065.	*	1	1120	137	2920.	*	1	1735	212	569.	*	1	2350	287	0.
1	0510	63	9282.	*	1	1125	138	2898.	*	1	1740	213	535.	*	1	2355	288	0.
1	0515	64	9474.	*	1	1130	139	2875.	*	1	1745	214	501.	*	2	0000	289	0.
1	0520	65	9612.	*	1	1135	140	2853.	*	1	1750	215	463.	*	2	0005	290	0.
1	0525	66	9673.	*	1	1140	141	2829.	*	1	1755	216	420.	*	2	0010	291	0.
1	0530	67	9658.	*	1	1145	142	2805.	*	1	1800	217	375.	*	2	0015	292	0.
1	0535	68	9577.	*	1	1150	143	2782.	*	1	1805	218	334.	*	2	0020	293	0.
1	0540	69	9441.	*	1	1155	144	2759.	*	1	1810	219	297.	*	2	0025	294	0.
1	0545	70	9258.	*	1	1200	145	2736.	*	1	1815	220	264.	*	2	0030	295	0.
1	0550	71	9041.	*	1	1205	146	2714.	*	1	1820	221	232.	*	2	0035	296	0.
1	0555	72	8804.	*	1	1210	147	2691.	*	1	1825	222	198.	*	2	0040	297	0.
1	0600	73	8557.	*	1	1215	148	2667.	*	1	1830	223	162.	*	2	0045	298	0.
1	0605	74	8306.	*	1	1220	149	2643.	*	1	1835	224	127.	*	2	0050	299	0.
1	0610	75	8061.	*	1	1225	150	2618.	*	1	1840	225	97.	*	2	0055	300	0.

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 9673.	5.42	6255.	2352.	2266.	2266.
		(INCHES) .654	.984	.984	.984
		(AC-FT) 3101.	4665.	4665.	4665.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	2.82	750.00	7845.69	330.39	.75	8.85
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		7845.68	330.00	.75	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3540E+04 EXCESS= .0000E+00 OUTFLOW= .3540E+04 BASIN STORAGE= .1124E-01 PERCENT ERROR= .0

HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .87

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	6549.	*	1		1230	151	1920.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	6386.	*	1		1235	152	1885.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	6228.	*	1		1240	153	1848.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	6070.	*	1		1245	154	1812.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	5915.	*	1		1250	155	1776.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	5762.	*	1		1255	156	1741.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	5612.	*	1		1300	157	1705.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	5467.	*	1		1305	158	1668.	*	1		1920	233	0.

1	0040	9	0.	*	1	0655	84	5327.	*	1	1310	159	1630.	*	1	1925	234	0.
1	0045	10	0.	*	1	0700	85	5192.	*	1	1315	160	1592.	*	1	1930	235	0.
1	0050	11	0.	*	1	0705	86	5062.	*	1	1320	161	1555.	*	1	1935	236	0.
1	0055	12	0.	*	1	0710	87	4937.	*	1	1325	162	1519.	*	1	1940	237	0.
1	0100	13	0.	*	1	0715	88	4817.	*	1	1330	163	1482.	*	1	1945	238	0.
1	0105	14	0.	*	1	0720	89	4703.	*	1	1335	164	1444.	*	1	1950	239	0.
1	0110	15	0.	*	1	0725	90	4593.	*	1	1340	165	1405.	*	1	1955	240	0.
1	0115	16	1.	*	1	0730	91	4487.	*	1	1345	166	1366.	*	1	2000	241	0.
1	0120	17	2.	*	1	0735	92	4384.	*	1	1350	167	1328.	*	1	2005	242	0.
1	0125	18	4.	*	1	0740	93	4284.	*	1	1355	168	1291.	*	1	2010	243	0.
1	0130	19	6.	*	1	0745	94	4189.	*	1	1400	169	1254.	*	1	2015	244	0.
1	0135	20	11.	*	1	0750	95	4098.	*	1	1405	170	1215.	*	1	2020	245	0.
1	0140	21	17.	*	1	0755	96	4012.	*	1	1410	171	1176.	*	1	2025	246	0.
1	0145	22	26.	*	1	0800	97	3932.	*	1	1415	172	1136.	*	1	2030	247	0.
1	0150	23	39.	*	1	0805	98	3857.	*	1	1420	173	1097.	*	1	2035	248	0.
1	0155	24	55.	*	1	0810	99	3787.	*	1	1425	174	1060.	*	1	2040	249	0.
1	0200	25	77.	*	1	0815	100	3722.	*	1	1430	175	1023.	*	1	2045	250	0.
1	0205	26	103.	*	1	0820	101	3660.	*	1	1435	176	985.	*	1	2050	251	0.
1	0210	27	133.	*	1	0825	102	3600.	*	1	1440	177	946.	*	1	2055	252	0.
1	0215	28	168.	*	1	0830	103	3542.	*	1	1445	178	906.	*	1	2100	253	0.
1	0220	29	206.	*	1	0835	104	3488.	*	1	1450	179	867.	*	1	2105	254	0.
1	0225	30	246.	*	1	0840	105	3436.	*	1	1455	180	830.	*	1	2110	255	0.
1	0230	31	287.	*	1	0845	106	3386.	*	1	1500	181	794.	*	1	2115	256	0.
1	0235	32	327.	*	1	0850	107	3338.	*	1	1505	182	759.	*	1	2120	257	0.
1	0240	33	365.	*	1	0855	108	3293.	*	1	1510	183	721.	*	1	2125	258	0.
1	0245	34	399.	*	1	0900	109	3249.	*	1	1515	184	682.	*	1	2130	259	0.
1	0250	35	430.	*	1	0905	110	3208.	*	1	1520	185	643.	*	1	2135	260	0.
1	0255	36	461.	*	1	0910	111	3168.	*	1	1525	186	606.	*	1	2140	261	0.
1	0300	37	496.	*	1	0915	112	3129.	*	1	1530	187	570.	*	1	2145	262	0.
1	0305	38	540.	*	1	0920	113	3092.	*	1	1535	188	537.	*	1	2150	263	0.
1	0310	39	601.	*	1	0925	114	3055.	*	1	1540	189	503.	*	1	2155	264	0.
1	0315	40	686.	*	1	0930	115	3019.	*	1	1545	190	467.	*	1	2200	265	0.
1	0320	41	811.	*	1	0935	116	2984.	*	1	1550	191	427.	*	1	2205	266	0.
1	0325	42	996.	*	1	0940	117	2950.	*	1	1555	192	384.	*	1	2210	267	0.
1	0330	43	1254.	*	1	0945	118	2917.	*	1	1600	193	342.	*	1	2215	268	0.
1	0335	44	1603.	*	1	0950	119	2886.	*	1	1605	194	305.	*	1	2220	269	0.
1	0340	45	2041.	*	1	0955	120	2855.	*	1	1610	195	271.	*	1	2225	270	0.
1	0345	46	2561.	*	1	1000	121	2824.	*	1	1615	196	240.	*	1	2230	271	0.
1	0350	47	3146.	*	1	1005	122	2793.	*	1	1620	197	208.	*	1	2235	272	0.
1	0355	48	3769.	*	1	1010	123	2762.	*	1	1625	198	172.	*	1	2240	273	0.
1	0400	49	4383.	*	1	1015	124	2731.	*	1	1630	199	137.	*	1	2245	274	0.
1	0405	50	4915.	*	1	1020	125	2701.	*	1	1635	200	105.	*	1	2250	275	0.
1	0410	51	5341.	*	1	1025	126	2671.	*	1	1640	201	80.	*	1	2255	276	0.
1	0415	52	5678.	*	1	1030	127	2642.	*	1	1645	202	60.	*	1	2300	277	0.
1	0420	53	5931.	*	1	1035	128	2614.	*	1	1650	203	46.	*	1	2305	278	0.
1	0425	54	6097.	*	1	1040	129	2586.	*	1	1655	204	34.	*	1	2310	279	0.
1	0430	55	6196.	*	1	1045	130	2557.	*	1	1700	205	26.	*	1	2315	280	0.
1	0435	56	6267.	*	1	1050	131	2528.	*	1	1705	206	20.	*	1	2320	281	0.
1	0440	57	6342.	*	1	1055	132	2498.	*	1	1710	207	15.	*	1	2325	282	0.
1	0445	58	6433.	*	1	1100	133	2469.	*	1	1715	208	11.	*	1	2330	283	0.
1	0450	59	6560.	*	1	1105	134	2441.	*	1	1720	209	9.	*	1	2335	284	0.
1	0455	60	6739.	*	1	1110	135	2413.	*	1	1725	210	7.	*	1	2340	285	0.
1	0500	61	6957.	*	1	1115	136	2385.	*	1	1730	211	5.	*	1	2345	286	0.
1	0505	62	7185.	*	1	1120	137	2356.	*	1	1735	212	4.	*	1	2350	287	0.
1	0510	63	7404.	*	1	1125	138	2327.	*	1	1740	213	3.	*	1	2355	288	0.
1	0515	64	7597.	*	1	1130	139	2297.	*	1	1745	214	2.	*	2	0000	289	0.
1	0520	65	7743.	*	1	1135	140	2267.	*	1	1750	215	2.	*	2	0005	290	0.
1	0525	66	7826.	*	1	1140	141	2237.	*	1	1755	216	1.	*	2	0010	291	0.
1	0530	67	7846.	*	1	1145	142	2207.	*	1	1800	217	1.	*	2	0015	292	0.
1	0535	68	7807.	*	1	1150	143	2178.	*	1	1805	218	1.	*	2	0020	293	0.
1	0540	69	7721.	*	1	1155	144	2148.	*	1	1810	219	1.	*	2	0025	294	0.
1	0545	70	7597.	*	1	1200	145	2117.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	7443.	*	1	1205	146	2084.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	7271.	*	1	1210	147	2051.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	7089.	*	1	1215	148	2018.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	6904.	*	1	1220	149	1986.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	6721.	*	1	1225	150	1954.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)	(CFS)				
+ 7846.	5.50		5148.	1785.	1719.	1719.
		(INCHES)	.539	.747	.747	.747
		(AC-FT)	2553.	3540.	3540.	3540.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	COMPUTATION TIME STEP M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	3.14	750.00	5974.39	332.80	.53	7.96
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		5968.10	335.00	.53	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2510E+04 EXCESS= .0000E+00 OUTFLOW= .2510E+04 BASIN STORAGE= .1100E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .74

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	5169.	1		1230	151	1067.	1		1845	226	0.
1		0005	2	0.	1		0620	77	5060.	1		1235	152	1029.	1		1850	227	0.
1		0010	3	0.	1		0625	78	4953.	1		1240	153	991.	1		1855	228	0.
1		0015	4	0.	1		0630	79	4844.	1		1245	154	951.	1		1900	229	0.
1		0020	5	0.	1		0635	80	4736.	1		1250	155	911.	1		1905	230	0.
1		0025	6	0.	1		0640	81	4629.	1		1255	156	872.	1		1910	231	0.
1		0030	7	0.	1		0645	82	4522.	1		1300	157	835.	1		1915	232	0.
1		0035	8	0.	1		0650	83	4417.	1		1305	158	798.	1		1920	233	0.
1		0040	9	0.	1		0655	84	4315.	1		1310	159	762.	1		1925	234	0.
1		0045	10	0.	1		0700	85	4216.	1		1315	160	724.	1		1930	235	0.
1		0050	11	0.	1		0705	86	4119.	1		1320	161	685.	1		1935	236	0.
1		0055	12	0.	1		0710	87	4025.	1		1325	162	646.	1		1940	237	0.
1		0100	13	0.	1		0715	88	3935.	1		1330	163	608.	1		1945	238	0.
1		0105	14	0.	1		0720	89	3848.	1		1335	164	573.	1		1950	239	0.
1		0110	15	0.	1		0725	90	3763.	1		1340	165	539.	1		1955	240	0.
1		0115	16	0.	1		0730	91	3681.	1		1345	166	506.	1		2000	241	0.
1		0120	17	0.	1		0735	92	3600.	1		1350	167	471.	1		2005	242	0.
1		0125	18	0.	1		0740	93	3522.	1		1355	168	433.	1		2010	243	0.
1		0130	19	0.	1		0745	94	3446.	1		1400	169	392.	1		2015	244	0.
1		0135	20	0.	1		0750	95	3373.	1		1405	170	353.	1		2020	245	0.
1		0140	21	1.	1		0755	96	3303.	1		1410	171	316.	1		2025	246	0.
1		0145	22	2.	1		0800	97	3238.	1		1415	172	283.	1		2030	247	0.
1		0150	23	4.	1		0805	98	3176.	1		1420	173	251.	1		2035	248	0.
1		0155	24	8.	1		0810	99	3117.	1		1425	174	221.	1		2040	249	0.
1		0200	25	14.	1		0815	100	3062.	1		1430	175	187.	1		2045	250	0.
1		0205	26	23.	1		0820	101	3009.	1		1435	176	152.	1		2050	251	0.
1		0210	27	35.	1		0825	102	2957.	1		1440	177	119.	1		2055	252	0.
1		0215	28	49.	1		0830	103	2906.	1		1445	178	91.	1		2100	253	0.
1		0220	29	68.	1		0835	104	2857.	1		1450	179	70.	1		2105	254	0.
1		0225	30	88.	1		0840	105	2810.	1		1455	180	53.	1		2110	255	0.
1		0230	31	110.	1		0845	106	2765.	1		1500	181	40.	1		2115	256	0.
1		0235	32	133.	1		0850	107	2721.	1		1505	182	31.	1		2120	257	0.
1		0240	33	155.	1		0855	108	2679.	1		1510	183	24.	1		2125	258	0.
1		0245	34	176.	1		0900	109	2638.	1		1515	184	18.	1		2130	259	0.
1		0250	35	195.	1		0905	110	2598.	1		1520	185	14.	1		2135	260	0.
1		0255	36	214.	1		0910	111	2559.	1		1525	186	11.	1		2140	261	0.
1		0300	37	235.	1		0915	112	2521.	1		1530	187	8.	1		2145	262	0.
1		0305	38	261.	1		0920	113	2482.	1		1535	188	6.	1		2150	263	0.
1		0310	39	297.	1		0925	114	2444.	1		1540	189	5.	1		2155	264	0.
1		0315	40	347.	1		0930	115	2407.	1		1545	190	4.	1		2200	265	0.
1		0320	41	418.	1		0935	116	2371.	1		1550	191	3.	1		2205	266	0.
1		0325	42	530.	1		0940	117	2336.	1		1555	192	2.	1		2210	267	0.
1		0330	43	688.	1		0945	118	2302.	1		1600	193	2.	1		2215	268	0.
1		0335	44	923.	1		0950	119	2268.	1		1605	194	1.	1		2220	269	0.
1		0340	45	1235.	1		0955	120	2233.	1		1610	195	1.	1		2225	270	0.
1		0345	46	1608.	1		1000	121	2197.	1		1615	196	1.	1		2230	271	0.
1		0350	47	2032.	1		1005	122	2160.	1		1620	197	1.	1		2235	272	0.
1		0355	48	2485.	1		1010	123	2124.	1		1625	198	1.	1		2240	273	0.
1		0400	49	2932.	1		1015	124	2088.	1		1630	199	0.	1		2245	274	0.
1		0405	50	3338.	1		1020	125	2053.	1		1635	200	0.	1		2250	275	0.
1		0410	51	3689.	1		1025	126	2019.	1		1640	201	0.	1		2255	276	0.
1		0415	52	3981.	1		1030	127	1983.	1		1645	202	0.	1		2300	277	0.
1		0420	53	4204.	1		1035	128	1946.	1		1650	203	0.	1		2305	278	0.
1		0425	54	4354.	1		1040	129	1908.	1		1655	204	0.	1		2310	279	0.

1	0430	55	4442.	*	1	1045	130	1870.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	4491.	*	1	1050	131	1833.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	4525.	*	1	1055	132	1797.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	4574.	*	1	1100	133	1760.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	4661.	*	1	1105	134	1722.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	4803.	*	1	1110	135	1684.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	4999.	*	1	1115	136	1645.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	5221.	*	1	1120	137	1607.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	5439.	*	1	1125	138	1570.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	5639.	*	1	1130	139	1533.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	5801.	*	1	1135	140	1495.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	5908.	*	1	1140	141	1456.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	5962.	*	1	1145	142	1416.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	5968.	*	1	1150	143	1377.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	5933.	*	1	1155	144	1339.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	5861.	*	1	1200	145	1301.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	5765.	*	1	1205	146	1263.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	5652.	*	1	1210	147	1224.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	5532.	*	1	1215	148	1184.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	5408.	*	1	1220	149	1144.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	5285.	*	1	1225	150	1105.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW				
		6-HR	24-HR	72-HR	24.92-HR	
(CFS)	(HR)					
		(CFS)				
+ 5968.	5.58	3978.	1266.	1219.	1219.	
		(INCHES) .416	.530	.530	.530	
		(AC-FT) 1973.	2510.	2510.	2510.	

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	3.88	750.00	3458.31	341.73	.28	6.44
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		3457.73	340.00	.28	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1350E+04 EXCESS= .0000E+00 OUTFLOW= .1350E+04 BASIN STORAGE= .1100E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .57

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	3178.	*	1		1230	151	182.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	3133.	*	1		1235	152	152.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	3089.	*	1		1240	153	125.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	3044.	*	1		1245	154	102.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	2999.	*	1		1250	155	85.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	2951.	*	1		1255	156	71.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	2900.	*	1		1300	157	60.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	2848.	*	1		1305	158	51.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	2796.	*	1		1310	159	44.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	2742.	*	1		1315	160	38.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	2688.	*	1		1320	161	33.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	2634.	*	1		1325	162	29.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	2581.	*	1		1330	163	26.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	2529.	*	1		1335	164	23.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	2477.	*	1		1340	165	21.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	2425.	*	1		1345	166	19.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	2373.	*	1		1350	167	17.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	2321.	*	1		1355	168	16.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	2270.	*	1		1400	169	14.	*	1		2015	244	0.

1	0135	20	0.	*	1	0750	95	2220.	*	1	1405	170	13.	*	1	2020	245	0.
1	0140	21	0.	*	1	0755	96	2170.	*	1	1410	171	12.	*	1	2025	246	0.
1	0145	22	0.	*	1	0800	97	2122.	*	1	1415	172	11.	*	1	2030	247	0.
1	0150	23	0.	*	1	0805	98	2075.	*	1	1420	173	10.	*	1	2035	248	0.
1	0155	24	0.	*	1	0810	99	2029.	*	1	1425	174	9.	*	1	2040	249	0.
1	0200	25	0.	*	1	0815	100	1983.	*	1	1430	175	8.	*	1	2045	250	0.
1	0205	26	0.	*	1	0820	101	1939.	*	1	1435	176	7.	*	1	2050	251	0.
1	0210	27	0.	*	1	0825	102	1896.	*	1	1440	177	7.	*	1	2055	252	0.
1	0215	28	1.	*	1	0830	103	1854.	*	1	1445	178	6.	*	1	2100	253	0.
1	0220	29	2.	*	1	0835	104	1813.	*	1	1450	179	6.	*	1	2105	254	0.
1	0225	30	3.	*	1	0840	105	1772.	*	1	1455	180	5.	*	1	2110	255	0.
1	0230	31	5.	*	1	0845	106	1733.	*	1	1500	181	5.	*	1	2115	256	0.
1	0235	32	8.	*	1	0850	107	1694.	*	1	1505	182	4.	*	1	2120	257	0.
1	0240	33	12.	*	1	0855	108	1655.	*	1	1510	183	4.	*	1	2125	258	0.
1	0245	34	17.	*	1	0900	109	1615.	*	1	1515	184	4.	*	1	2130	259	0.
1	0250	35	21.	*	1	0905	110	1575.	*	1	1520	185	3.	*	1	2135	260	0.
1	0255	36	27.	*	1	0910	111	1536.	*	1	1525	186	3.	*	1	2140	261	0.
1	0300	37	34.	*	1	0915	112	1497.	*	1	1530	187	3.	*	1	2145	262	0.
1	0305	38	42.	*	1	0920	113	1460.	*	1	1535	188	2.	*	1	2150	263	0.
1	0310	39	54.	*	1	0925	114	1423.	*	1	1540	189	2.	*	1	2155	264	0.
1	0315	40	72.	*	1	0930	115	1387.	*	1	1545	190	2.	*	1	2200	265	0.
1	0320	41	98.	*	1	0935	116	1352.	*	1	1550	191	2.	*	1	2205	266	0.
1	0325	42	138.	*	1	0940	117	1315.	*	1	1555	192	2.	*	1	2210	267	0.
1	0330	43	196.	*	1	0945	118	1277.	*	1	1600	193	2.	*	1	2215	268	0.
1	0335	44	289.	*	1	0950	119	1238.	*	1	1605	194	1.	*	1	2220	269	0.
1	0340	45	436.	*	1	0955	120	1201.	*	1	1610	195	1.	*	1	2225	270	0.
1	0345	46	627.	*	1	1000	121	1165.	*	1	1615	196	1.	*	1	2230	271	0.
1	0350	47	860.	*	1	1005	122	1130.	*	1	1620	197	1.	*	1	2235	272	0.
1	0355	48	1122.	*	1	1010	123	1095.	*	1	1625	198	1.	*	1	2240	273	0.
1	0400	49	1384.	*	1	1015	124	1060.	*	1	1630	199	1.	*	1	2245	274	0.
1	0405	50	1626.	*	1	1020	125	1024.	*	1	1635	200	1.	*	1	2250	275	0.
1	0410	51	1836.	*	1	1025	126	987.	*	1	1640	201	1.	*	1	2255	276	0.
1	0415	52	2021.	*	1	1030	127	949.	*	1	1645	202	1.	*	1	2300	277	0.
1	0420	53	2184.	*	1	1035	128	913.	*	1	1650	203	1.	*	1	2305	278	0.
1	0425	54	2311.	*	1	1040	129	878.	*	1	1655	204	1.	*	1	2310	279	0.
1	0430	55	2406.	*	1	1045	130	844.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	2479.	*	1	1050	131	811.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	2527.	*	1	1055	132	777.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	2552.	*	1	1100	133	742.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	2578.	*	1	1105	134	705.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	2626.	*	1	1110	135	667.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	2708.	*	1	1115	136	632.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	2822.	*	1	1120	137	599.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	2955.	*	1	1125	138	568.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	3096.	*	1	1130	139	537.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	3222.	*	1	1135	140	506.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	3323.	*	1	1140	141	473.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	3400.	*	1	1145	142	436.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	3444.	*	1	1150	143	399.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	3458.	*	1	1155	144	365.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	3450.	*	1	1200	145	334.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	3421.	*	1	1205	146	305.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	3377.	*	1	1210	147	280.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	3328.	*	1	1215	148	257.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	3277.	*	1	1220	149	234.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	3227.	*	1	1225	150	210.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 3458.	5.67		2372.	681.	656.	656.
		(INCHES)	.248	.285	.285	.285
		(AC-FT)	1176.	1350.	1350.	1350.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	COMPUTATION TIME STEP M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	5.00	750.00	1750.86	345.00	.14	4.94

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN .08 1.64 5.00 1750.86 345.00 .14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6538E+03 EXCESS= .0000E+00 OUTFLOW= .6539E+03 BASIN STORAGE= .1003E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .44

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	1634.	*	1		1230	151	63.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	1620.	*	1		1235	152	59.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	1600.	*	1		1240	153	56.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	1580.	*	1		1245	154	52.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	1555.	*	1		1250	155	49.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	1533.	*	1		1255	156	46.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	1508.	*	1		1300	157	44.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	1484.	*	1		1305	158	41.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	1461.	*	1		1310	159	39.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	1438.	*	1		1315	160	37.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	1418.	*	1		1320	161	35.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	1397.	*	1		1325	162	33.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	1375.	*	1		1330	163	31.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	1352.	*	1		1335	164	29.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	1329.	*	1		1340	165	27.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	1304.	*	1		1345	166	26.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	1279.	*	1		1350	167	24.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	1252.	*	1		1355	168	23.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	1223.	*	1		1400	169	21.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	1194.	*	1		1405	170	20.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	1165.	*	1		1410	171	19.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	1136.	*	1		1415	172	18.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	1108.	*	1		1420	173	16.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	1080.	*	1		1425	174	15.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	1052.	*	1		1430	175	14.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	1025.	*	1		1435	176	13.	*	1		2050	251	0.
1		0210	27	0.	*	1		0825	102	998.	*	1		1440	177	13.	*	1		2055	252	0.
1		0215	28	0.	*	1		0830	103	971.	*	1		1445	178	12.	*	1		2100	253	0.
1		0220	29	0.	*	1		0835	104	945.	*	1		1450	179	11.	*	1		2105	254	0.
1		0225	30	0.	*	1		0840	105	919.	*	1		1455	180	10.	*	1		2110	255	0.
1		0230	31	0.	*	1		0845	106	894.	*	1		1500	181	10.	*	1		2115	256	0.
1		0235	32	0.	*	1		0850	107	868.	*	1		1505	182	9.	*	1		2120	257	0.
1		0240	33	0.	*	1		0855	108	841.	*	1		1510	183	8.	*	1		2125	258	0.
1		0245	34	0.	*	1		0900	109	813.	*	1		1515	184	8.	*	1		2130	259	0.
1		0250	35	0.	*	1		0905	110	783.	*	1		1520	185	7.	*	1		2135	260	0.
1		0255	36	0.	*	1		0910	111	752.	*	1		1525	186	7.	*	1		2140	261	0.
1		0300	37	0.	*	1		0915	112	724.	*	1		1530	187	7.	*	1		2145	262	0.
1		0305	38	0.	*	1		0920	113	697.	*	1		1535	188	6.	*	1		2150	263	0.
1		0310	39	1.	*	1		0925	114	671.	*	1		1540	189	6.	*	1		2155	264	0.
1		0315	40	2.	*	1		0930	115	645.	*	1		1545	190	5.	*	1		2200	265	0.
1		0320	41	5.	*	1		0935	116	621.	*	1		1550	191	5.	*	1		2205	266	0.
1		0325	42	11.	*	1		0940	117	597.	*	1		1555	192	5.	*	1		2210	267	0.
1		0330	43	22.	*	1		0945	118	574.	*	1		1600	193	4.	*	1		2215	268	0.
1		0335	44	44.	*	1		0950	119	551.	*	1		1605	194	4.	*	1		2220	269	0.
1		0340	45	82.	*	1		0955	120	529.	*	1		1610	195	4.	*	1		2225	270	0.
1		0345	46	141.	*	1		1000	121	504.	*	1		1615	196	4.	*	1		2230	271	0.
1		0350	47	244.	*	1		1005	122	475.	*	1		1620	197	3.	*	1		2235	272	0.
1		0355	48	368.	*	1		1010	123	444.	*	1		1625	198	3.	*	1		2240	273	0.
1		0400	49	508.	*	1		1015	124	415.	*	1		1630	199	3.	*	1		2245	274	0.
1		0405	50	655.	*	1		1020	125	390.	*	1		1635	200	3.	*	1		2250	275	0.
1		0410	51	779.	*	1		1025	126	367.	*	1		1640	201	3.	*	1		2255	276	0.
1		0415	52	879.	*	1		1030	127	345.	*	1		1645	202	3.	*	1		2300	277	0.
1		0420	53	960.	*	1		1035	128	325.	*	1		1650	203	2.	*	1		2305	278	0.
1		0425	54	1028.	*	1		1040	129	306.	*	1		1655	204	2.	*	1		2310	279	0.
1		0430	55	1086.	*	1		1045	130	289.	*	1		1700	205	2.	*	1		2315	280	0.
1		0435	56	1140.	*	1		1050	131	272.	*	1		1705	206	2.	*	1		2320	281	0.
1		0440	57	1197.	*	1		1055	132	257.	*	1		1710	207	2.	*	1		2325	282	0.
1		0445	58	1248.	*	1		1100	133	243.	*	1		1715	208	2.	*	1		2330	283	0.
1		0450	59	1283.	*	1		1105	134	230.	*	1		1720	209	2.	*	1		2335	284	0.
1		0455	60	1320.	*	1		1110	135	216.	*	1		1725	210	2.	*	1		2340	285	0.
1		0500	61	1381.	*	1		1115	136	200.	*	1		1730	211	1.	*	1		2345	286	0.
1		0505	62	1449.	*	1		1120	137	180.	*	1		1735	212	1.	*	1		2350	287	0.
1		0510	63	1516.	*	1		1125	138	164.	*	1		1740	213	1.	*	1		2355	288	0.
1		0515	64	1580.	*	1		1130	139	150.	*	1		1745	214	1.	*	2		0000	289	0.
1		0520	65	1633.	*	1		1135	140	138.	*	1		1750	215	1.	*	2		0005	290	0.

1	0525	66	1671.	*	1	1140	141	126.	*	1	1755	216	1.	*	2	0010	291	0.
1	0530	67	1693.	*	1	1145	142	116.	*	1	1800	217	1.	*	2	0015	292	0.
1	0535	68	1711.	*	1	1150	143	107.	*	1	1805	218	1.	*	2	0020	293	0.
1	0540	69	1734.	*	1	1155	144	100.	*	1	1810	219	1.	*	2	0025	294	0.
1	0545	70	1751.	*	1	1200	145	93.	*	1	1815	220	1.	*	2	0030	295	0.
1	0550	71	1738.	*	1	1205	146	87.	*	1	1820	221	1.	*	2	0035	296	0.
1	0555	72	1706.	*	1	1210	147	81.	*	1	1825	222	1.	*	2	0040	297	0.
1	0600	73	1685.	*	1	1215	148	76.	*	1	1830	223	1.	*	2	0045	298	0.
1	0605	74	1669.	*	1	1220	149	71.	*	1	1835	224	1.	*	2	0050	299	0.
1	0610	75	1648.	*	1	1225	150	67.	*	1	1840	225	1.	*	2	0055	300	0.

****

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 1751.	5.75	1196.	330.	318.	318.
	(INCHES)	.125	.138	.138	.138
	(AC-FT)	593.	654.	654.	654.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	5.00	375.00	284.95	355.00	.02	2.44
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		284.95	355.00	.02	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8591E+02 EXCESS= .0000E+00 OUTFLOW= .8593E+02 BASIN STORAGE= .4489E-01 PERCENT ERROR= -.1

****

HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .26

****

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	252.	*	1		1230	151	27.	*	1		1845	226	2.
1		0005	2	0.	*	1		0620	77	248.	*	1		1235	152	26.	*	1		1850	227	2.
1		0010	3	0.	*	1		0625	78	242.	*	1		1240	153	25.	*	1		1855	228	2.
1		0015	4	0.	*	1		0630	79	239.	*	1		1245	154	24.	*	1		1900	229	2.
1		0020	5	0.	*	1		0635	80	236.	*	1		1250	155	24.	*	1		1905	230	2.
1		0025	6	0.	*	1		0640	81	228.	*	1		1255	156	23.	*	1		1910	231	2.
1		0030	7	0.	*	1		0645	82	221.	*	1		1300	157	22.	*	1		1915	232	2.
1		0035	8	0.	*	1		0650	83	210.	*	1		1305	158	21.	*	1		1920	233	2.
1		0040	9	0.	*	1		0655	84	201.	*	1		1310	159	21.	*	1		1925	234	2.
1		0045	10	0.	*	1		0700	85	189.	*	1		1315	160	20.	*	1		1930	235	2.
1		0050	11	0.	*	1		0705	86	179.	*	1		1320	161	20.	*	1		1935	236	2.
1		0055	12	0.	*	1		0710	87	168.	*	1		1325	162	19.	*	1		1940	237	1.
1		0100	13	0.	*	1		0715	88	158.	*	1		1330	163	18.	*	1		1945	238	1.
1		0105	14	0.	*	1		0720	89	148.	*	1		1335	164	18.	*	1		1950	239	1.
1		0110	15	0.	*	1		0725	90	139.	*	1		1340	165	17.	*	1		1955	240	1.
1		0115	16	0.	*	1		0730	91	130.	*	1		1345	166	17.	*	1		2000	241	1.
1		0120	17	0.	*	1		0735	92	122.	*	1		1350	167	16.	*	1		2005	242	1.
1		0125	18	0.	*	1		0740	93	115.	*	1		1355	168	16.	*	1		2010	243	1.
1		0130	19	0.	*	1		0745	94	108.	*	1		1400	169	16.	*	1		2015	244	1.
1		0135	20	0.	*	1		0750	95	102.	*	1		1405	170	15.	*	1		2020	245	1.
1		0140	21	0.	*	1		0755	96	97.	*	1		1410	171	15.	*	1		2025	246	1.
1		0145	22	0.	*	1		0800	97	95.	*	1		1415	172	14.	*	1		2030	247	1.
1		0150	23	0.	*	1		0805	98	99.	*	1		1420	173	14.	*	1		2035	248	1.
1		0155	24	0.	*	1		0810	99	113.	*	1		1425	174	14.	*	1		2040	249	1.
1		0200	25	0.	*	1		0815	100	128.	*	1		1430	175	13.	*	1		2045	250	1.
1		0205	26	0.	*	1		0820	101	129.	*	1		1435	176	13.	*	1		2050	251	1.
1		0210	27	0.	*	1		0825	102	119.	*	1		1440	177	12.	*	1		2055	252	1.
1		0215	28	0.	*	1		0830	103	112.	*	1		1445	178	12.	*	1		2100	253	1.
1		0220	29	0.	*	1		0835	104	111.	*	1		1450	179	12.	*	1		2105	254	1.
1		0225	30	0.	*	1		0840	105	107.	*	1		1455	180	11.	*	1		2110	255	1.

1	0230	31	0.	*	1	0845	106	100.	*	1	1500	181	11.	*	1	2115	256	1.
1	0235	32	0.	*	1	0850	107	96.	*	1	1505	182	11.	*	1	2120	257	1.
1	0240	33	0.	*	1	0855	108	93.	*	1	1510	183	10.	*	1	2125	258	1.
1	0245	34	0.	*	1	0900	109	89.	*	1	1515	184	10.	*	1	2130	259	1.
1	0250	35	0.	*	1	0905	110	88.	*	1	1520	185	10.	*	1	2135	260	1.
1	0255	36	0.	*	1	0910	111	90.	*	1	1525	186	10.	*	1	2140	261	1.
1	0300	37	0.	*	1	0915	112	92.	*	1	1530	187	9.	*	1	2145	262	1.
1	0305	38	0.	*	1	0920	113	95.	*	1	1535	188	9.	*	1	2150	263	1.
1	0310	39	0.	*	1	0925	114	94.	*	1	1540	189	9.	*	1	2155	264	0.
1	0315	40	0.	*	1	0930	115	89.	*	1	1545	190	9.	*	1	2200	265	0.
1	0320	41	0.	*	1	0935	116	86.	*	1	1550	191	8.	*	1	2205	266	0.
1	0325	42	0.	*	1	0940	117	84.	*	1	1555	192	8.	*	1	2210	267	0.
1	0330	43	0.	*	1	0945	118	82.	*	1	1600	193	8.	*	1	2215	268	0.
1	0335	44	0.	*	1	0950	119	81.	*	1	1605	194	7.	*	1	2220	269	0.
1	0340	45	0.	*	1	0955	120	76.	*	1	1610	195	7.	*	1	2225	270	0.
1	0345	46	0.	*	1	1000	121	72.	*	1	1615	196	7.	*	1	2230	271	0.
1	0350	47	0.	*	1	1005	122	71.	*	1	1620	197	7.	*	1	2235	272	0.
1	0355	48	1.	*	1	1010	123	69.	*	1	1625	198	6.	*	1	2240	273	0.
1	0400	49	3.	*	1	1015	124	67.	*	1	1630	199	6.	*	1	2245	274	0.
1	0405	50	7.	*	1	1020	125	64.	*	1	1635	200	6.	*	1	2250	275	0.
1	0410	51	12.	*	1	1025	126	61.	*	1	1640	201	6.	*	1	2255	276	0.
1	0415	52	19.	*	1	1030	127	59.	*	1	1645	202	6.	*	1	2300	277	0.
1	0420	53	31.	*	1	1035	128	58.	*	1	1650	203	5.	*	1	2305	278	0.
1	0425	54	45.	*	1	1040	129	57.	*	1	1655	204	5.	*	1	2310	279	0.
1	0430	55	61.	*	1	1045	130	56.	*	1	1700	205	5.	*	1	2315	280	0.
1	0435	56	79.	*	1	1050	131	54.	*	1	1705	206	5.	*	1	2320	281	0.
1	0440	57	95.	*	1	1055	132	52.	*	1	1710	207	5.	*	1	2325	282	0.
1	0445	58	103.	*	1	1100	133	51.	*	1	1715	208	4.	*	1	2330	283	0.
1	0450	59	112.	*	1	1105	134	50.	*	1	1720	209	4.	*	1	2335	284	0.
1	0455	60	119.	*	1	1110	135	47.	*	1	1725	210	4.	*	1	2340	285	0.
1	0500	61	126.	*	1	1115	136	45.	*	1	1730	211	4.	*	1	2345	286	0.
1	0505	62	136.	*	1	1120	137	44.	*	1	1735	212	4.	*	1	2350	287	0.
1	0510	63	149.	*	1	1125	138	43.	*	1	1740	213	4.	*	1	2355	288	0.
1	0515	64	165.	*	1	1130	139	41.	*	1	1745	214	3.	*	2	0000	289	0.
1	0520	65	184.	*	1	1135	140	40.	*	1	1750	215	3.	*	2	0005	290	0.
1	0525	66	210.	*	1	1140	141	38.	*	1	1755	216	3.	*	2	0010	291	0.
1	0530	67	244.	*	1	1145	142	37.	*	1	1800	217	3.	*	2	0015	292	0.
1	0535	68	274.	*	1	1150	143	36.	*	1	1805	218	3.	*	2	0020	293	0.
1	0540	69	281.	*	1	1155	144	35.	*	1	1810	219	3.	*	2	0025	294	0.
1	0545	70	278.	*	1	1200	145	33.	*	1	1815	220	3.	*	2	0030	295	0.
1	0550	71	284.	*	1	1205	146	32.	*	1	1820	221	3.	*	2	0035	296	0.
1	0555	72	285.	*	1	1210	147	31.	*	1	1825	222	3.	*	2	0040	297	0.
1	0600	73	273.	*	1	1215	148	30.	*	1	1830	223	2.	*	2	0045	298	0.
1	0605	74	268.	*	1	1220	149	29.	*	1	1835	224	2.	*	2	0050	299	0.
1	0610	75	261.	*	1	1225	150	28.	*	1	1840	225	2.	*	2	0055	300	0.
				*					*					*				

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
+ 285.	5.92		145.	43.	42.	42.
		(INCHES)	.015	.018	.018	.018
		(AC-FT)	72.	86.	86.	86.

CUMULATIVE AREA = 88.86 SQ MI

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   18MAR08  TIME  14:38:08   *
*                                       *
*****************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (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
```

```
*** FREE ***
*** NOLIST ***
```


```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   18MAR08  TIME  14:38:08   *
*                                       *
*****************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```


KLEINFELDER
FEBRUARY 2008
ALTERNATIVE A

DESIGN STORM = 100-YEAR 6-HOUR STORM
STORM DISTRIBUTION = SDN5

```
  10 IO        OUTPUT CONTROL VARIABLES
                    IPRNT        5  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      300  NUMBER OF HYDROGRAPH ORDINATES
                   NDDATE    2   0  ENDING DATE
                   NDTIME     0055  ENDING TIME
                    ICENT       19  CENTURY MARK

                  COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE    24.92 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           1  NUMBER OF PLANS

    JR       MULTI-RATIO OPTION
                 RATIOS OF PRECIPITATION
               1.00       .87       .74       .57       .44       .26


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


          **************
          *            *
1250 KK   *     ULWIN  *
          *            *
          **************

1254 KO        OUTPUT CONTROL VARIABLES
                    IPRNT           1  PRINT CONTROL
                    IPLOT           0  PLOT CONTROL
                    QSCAL           0.  HYDROGRAPH PLOT SCALE

1253 HC        HYDROGRAPH COMBINATION
                    ICOMP           4  NUMBER OF HYDROGRAPHS TO COMBINE

                                                    ***
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****

HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = 1.00

****

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	8105.	1		1230	151	5.	1		1845	226	0.
1		0005	2	0.	1		0620	77	7451.	1		1235	152	4.	1		1850	227	0.
1		0010	3	0.	1		0625	78	6842.	1		1240	153	4.	1		1855	228	0.
1		0015	4	0.	1		0630	79	6278.	1		1245	154	3.	1		1900	229	0.
1		0020	5	0.	1		0635	80	5765.	1		1250	155	3.	1		1905	230	0.
1		0025	6	0.	1		0640	81	5302.	1		1255	156	2.	1		1910	231	0.
1		0030	7	0.	1		0645	82	4882.	1		1300	157	2.	1		1915	232	0.
1		0035	8	0.	1		0650	83	4494.	1		1305	158	2.	1		1920	233	0.
1		0040	9	0.	1		0655	84	4136.	1		1310	159	2.	1		1925	234	0.
1		0045	10	0.	1		0700	85	3807.	1		1315	160	1.	1		1930	235	0.
1		0050	11	1.	1		0705	86	3504.	1		1320	161	1.	1		1935	236	0.
1		0055	12	2.	1		0710	87	3223.	1		1325	162	1.	1		1940	237	0.
1		0100	13	4.	1		0715	88	2962.	1		1330	163	1.	1		1945	238	0.
1		0105	14	6.	1		0720	89	2719.	1		1335	164	1.	1		1950	239	0.
1		0110	15	9.	1		0725	90	2494.	1		1340	165	1.	1		1955	240	0.
1		0115	16	12.	1		0730	91	2289.	1		1345	166	1.	1		2000	241	0.
1		0120	17	16.	1		0735	92	2101.	1		1350	167	0.	1		2005	242	0.
1		0125	18	20.	1		0740	93	1929.	1		1355	168	0.	1		2010	243	0.
1		0130	19	25.	1		0745	94	1769.	1		1400	169	0.	1		2015	244	0.
1		0135	20	31.	1		0750	95	1623.	1		1405	170	0.	1		2020	245	0.
1		0140	21	38.	1		0755	96	1490.	1		1410	171	0.	1		2025	246	0.
1		0145	22	47.	1		0800	97	1370.	1		1415	172	0.	1		2030	247	0.
1		0150	23	56.	1		0805	98	1261.	1		1420	173	0.	1		2035	248	0.
1		0155	24	68.	1		0810	99	1161.	1		1425	174	0.	1		2040	249	0.
1		0200	25	81.	1		0815	100	1069.	1		1430	175	0.	1		2045	250	0.
1		0205	26	96.	1		0820	101	983.	1		1435	176	0.	1		2050	251	0.
1		0210	27	115.	1		0825	102	901.	1		1440	177	0.	1		2055	252	0.
1		0215	28	138.	1		0830	103	825.	1		1445	178	0.	1		2100	253	0.
1		0220	29	163.	1		0835	104	754.	1		1450	179	0.	1		2105	254	0.
1		0225	30	192.	1		0840	105	688.	1		1455	180	0.	1		2110	255	0.
1		0230	31	222.	1		0845	106	626.	1		1500	181	0.	1		2115	256	0.
1		0235	32	254.	1		0850	107	569.	1		1505	182	0.	1		2120	257	0.
1		0240	33	287.	1		0855	108	516.	1		1510	183	0.	1		2125	258	0.
1		0245	34	321.	1		0900	109	468.	1		1515	184	0.	1		2130	259	0.
1		0250	35	354.	1		0905	110	425.	1		1520	185	0.	1		2135	260	0.

1	0255	36	388.	*	1	0910	111	386.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	428.	*	1	0915	112	352.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	476.	*	1	0920	113	320.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	539.	*	1	0925	114	292.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	623.	*	1	0930	115	266.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	739.	*	1	0935	116	242.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	900.	*	1	0940	117	220.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	1127.	*	1	0945	118	200.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	1443.	*	1	0950	119	181.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	1861.	*	1	0955	120	164.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	2360.	*	1	1000	121	148.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	2899.	*	1	1005	122	134.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	3425.	*	1	1010	123	120.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	3902.	*	1	1015	124	109.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	4430.	*	1	1020	125	98.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	5376.	*	1	1025	126	88.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	7000.	*	1	1030	127	79.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	9168.	*	1	1035	128	71.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	11274.	*	1	1040	129	64.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	12794.	*	1	1045	130	57.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	13579.	*	1	1050	131	51.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	13785.	*	1	1055	132	46.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	13632.	*	1	1100	133	41.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	13291.	*	1	1105	134	37.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	12864.	*	1	1110	135	33.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	12466.	*	1	1115	136	29.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	12153.	*	1	1120	137	26.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	11916.	*	1	1125	138	23.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	11741.	*	1	1130	139	21.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	11624.	*	1	1135	140	18.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	11564.	*	1	1140	141	17.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	11547.	*	1	1145	142	15.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	11541.	*	1	1150	143	13.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	11500.	*	1	1155	144	12.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	11377.	*	1	1200	145	10.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	11108.	*	1	1205	146	9.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	10678.	*	1	1210	147	8.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	10124.	*	1	1215	148	7.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	9484.	*	1	1220	149	6.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	8795.	*	1	1225	150	6.	*	1	1840	225	0.	*	2	0055	300	0.

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 13785.	4.67	5548.	1414.	1362.	1362.
	(INCHES)	.877	.894	.894	.894
	(AC-FT)	2751.	2805.	2805.	2805.

CUMULATIVE AREA = 58.84 SQ MI

HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .87

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	6696.	*	1		1230	151	7.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	6193.	*	1		1235	152	6.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	5711.	*	1		1240	153	6.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	5261.	*	1		1245	154	5.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	4845.	*	1		1250	155	4.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	4464.	*	1		1255	156	4.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	4116.	*	1		1300	157	3.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	3797.	*	1		1305	158	3.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	3506.	*	1		1310	159	3.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	3237.	*	1		1315	160	2.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	2990.	*	1		1320	161	2.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	2761.	*	1		1325	162	2.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	2548.	*	1		1330	163	2.	*	1		1945	238	0.
1		0105	14	1.	*	1		0720	89	2350.	*	1		1335	164	1.	*	1		1950	239	0.
1		0110	15	1.	*	1		0725	90	2167.	*	1		1340	165	1.	*	1		1955	240	0.
1		0115	16	2.	*	1		0730	91	1997.	*	1		1345	166	1.	*	1		2000	241	0.
1		0120	17	3.	*	1		0735	92	1840.	*	1		1350	167	1.	*	1		2005	242	0.

1	0125	18	4.	*	1	0740	93	1696.	*	1	1355	168	1.	*	1	2010	243	0.
1	0130	19	6.	*	1	0745	94	1563.	*	1	1400	169	1.	*	1	2015	244	0.
1	0135	20	8.	*	1	0750	95	1442.	*	1	1405	170	1.	*	1	2020	245	0.
1	0140	21	11.	*	1	0755	96	1330.	*	1	1410	171	1.	*	1	2025	246	0.
1	0145	22	15.	*	1	0800	97	1228.	*	1	1415	172	0.	*	1	2030	247	0.
1	0150	23	19.	*	1	0805	98	1135.	*	1	1420	173	0.	*	1	2035	248	0.
1	0155	24	25.	*	1	0810	99	1050.	*	1	1425	174	0.	*	1	2040	249	0.
1	0200	25	33.	*	1	0815	100	968.	*	1	1430	175	0.	*	1	2045	250	0.
1	0205	26	42.	*	1	0820	101	890.	*	1	1435	176	0.	*	1	2050	251	0.
1	0210	27	54.	*	1	0825	102	818.	*	1	1440	177	0.	*	1	2055	252	0.
1	0215	28	68.	*	1	0830	103	753.	*	1	1445	178	0.	*	1	2100	253	0.
1	0220	29	82.	*	1	0835	104	694.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	98.	*	1	0840	105	639.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	114.	*	1	0845	106	588.	*	1	1500	181	0.	*	1	2115	256	0.
1	0235	32	130.	*	1	0850	107	540.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	146.	*	1	0855	108	495.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	163.	*	1	0900	109	452.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	180.	*	1	0905	110	412.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	197.	*	1	0910	111	375.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	214.	*	1	0915	112	342.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	235.	*	1	0920	113	312.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	264.	*	1	0925	114	285.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	309.	*	1	0930	115	260.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	376.	*	1	0935	116	238.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	477.	*	1	0940	117	218.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	623.	*	1	0945	118	199.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	836.	*	1	0950	119	183.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	1134.	*	1	0955	120	167.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	1505.	*	1	1000	121	153.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	1917.	*	1	1005	122	140.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	2333.	*	1	1010	123	128.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	2702.	*	1	1015	124	117.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	3007.	*	1	1020	125	107.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	3272.	*	1	1025	126	98.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	3652.	*	1	1030	127	90.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	4678.	*	1	1035	128	82.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	6077.	*	1	1040	129	75.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	7455.	*	1	1045	130	68.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	8585.	*	1	1050	131	62.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	9320.	*	1	1055	132	56.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	9657.	*	1	1100	133	51.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	9730.	*	1	1105	134	46.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	9644.	*	1	1110	135	41.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	9468.	*	1	1115	136	37.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	9274.	*	1	1120	137	34.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	9118.	*	1	1125	138	30.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	9014.	*	1	1130	139	27.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	8949.	*	1	1135	140	24.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	8906.	*	1	1140	141	22.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	8885.	*	1	1145	142	19.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	8882.	*	1	1150	143	17.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	8865.	*	1	1155	144	16.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	8809.	*	1	1200	145	14.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	8673.	*	1	1205	146	12.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	8438.	*	1	1210	147	11.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	8104.	*	1	1215	148	10.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	7683.	*	1	1220	149	9.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	7203.	*	1	1225	150	8.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
9730.	4.83		4154.	1059.	1020.	1020.
		(INCHES)	.656	.670	.670	.670
		(AC-FT)	2060.	2101.	2101.	2101.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .74

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW

1	0000	1	0.	*	1	0615	76	5221.	*	1	1230	151	11.	*	1	1845	226	0.
1	0005	2	0.	*	1	0620	77	4877.	*	1	1235	152	10.	*	1	1850	227	0.
1	0010	3	0.	*	1	0625	78	4533.	*	1	1240	153	9.	*	1	1855	228	0.
1	0015	4	0.	*	1	0630	79	4200.	*	1	1245	154	8.	*	1	1900	229	0.
1	0020	5	0.	*	1	0635	80	3886.	*	1	1250	155	7.	*	1	1905	230	0.
1	0025	6	0.	*	1	0640	81	3595.	*	1	1255	156	6.	*	1	1910	231	0.
1	0030	7	0.	*	1	0645	82	3326.	*	1	1300	157	6.	*	1	1915	232	0.
1	0035	8	0.	*	1	0650	83	3078.	*	1	1305	158	5.	*	1	1920	233	0.
1	0040	9	0.	*	1	0655	84	2851.	*	1	1310	159	5.	*	1	1925	234	0.
1	0045	10	0.	*	1	0700	85	2640.	*	1	1315	160	4.	*	1	1930	235	0.
1	0050	11	0.	*	1	0705	86	2446.	*	1	1320	161	4.	*	1	1935	236	0.
1	0055	12	0.	*	1	0710	87	2267.	*	1	1325	162	3.	*	1	1940	237	0.
1	0100	13	0.	*	1	0715	88	2102.	*	1	1330	163	3.	*	1	1945	238	0.
1	0105	14	0.	*	1	0720	89	1949.	*	1	1335	164	3.	*	1	1950	239	0.
1	0110	15	0.	*	1	0725	90	1806.	*	1	1340	165	2.	*	1	1955	240	0.
1	0115	16	0.	*	1	0730	91	1673.	*	1	1345	166	2.	*	1	2000	241	0.
1	0120	17	0.	*	1	0735	92	1550.	*	1	1350	167	2.	*	1	2005	242	0.
1	0125	18	0.	*	1	0740	93	1436.	*	1	1355	168	2.	*	1	2010	243	0.
1	0130	19	0.	*	1	0745	94	1330.	*	1	1400	169	1.	*	1	2015	244	0.
1	0135	20	1.	*	1	0750	95	1232.	*	1	1405	170	1.	*	1	2020	245	0.
1	0140	21	1.	*	1	0755	96	1141.	*	1	1410	171	1.	*	1	2025	246	0.
1	0145	22	2.	*	1	0800	97	1058.	*	1	1415	172	1.	*	1	2030	247	0.
1	0150	23	4.	*	1	0805	98	981.	*	1	1420	173	1.	*	1	2035	248	0.
1	0155	24	6.	*	1	0810	99	910.	*	1	1425	174	1.	*	1	2040	249	0.
1	0200	25	9.	*	1	0815	100	844.	*	1	1430	175	1.	*	1	2045	250	0.
1	0205	26	12.	*	1	0820	101	784.	*	1	1435	176	1.	*	1	2050	251	0.
1	0210	27	17.	*	1	0825	102	728.	*	1	1440	177	0.	*	1	2055	252	0.
1	0215	28	22.	*	1	0830	103	677.	*	1	1445	178	0.	*	1	2100	253	0.
1	0220	29	30.	*	1	0835	104	630.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	38.	*	1	0840	105	587.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	47.	*	1	0845	106	547.	*	1	1500	181	0.	*	1	2115	256	0.
1	0235	32	57.	*	1	0850	107	509.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	66.	*	1	0855	108	474.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	75.	*	1	0900	109	441.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	83.	*	1	0905	110	410.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	92.	*	1	0910	111	382.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	100.	*	1	0915	112	355.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	110.	*	1	0920	113	328.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	122.	*	1	0925	114	301.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	140.	*	1	0930	115	276.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	166.	*	1	0935	116	254.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	209.	*	1	0940	117	234.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	275.	*	1	0945	118	215.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	377.	*	1	0950	119	198.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	536.	*	1	0955	120	182.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	767.	*	1	1000	121	168.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	1052.	*	1	1005	122	155.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	1362.	*	1	1010	123	143.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	1652.	*	1	1015	124	132.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	1876.	*	1	1020	125	121.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	2023.	*	1	1025	126	112.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	2106.	*	1	1030	127	103.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	2149.	*	1	1035	128	95.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	2426.	*	1	1040	129	87.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	3347.	*	1	1045	130	80.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	4228.	*	1	1050	131	74.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	4878.	*	1	1055	132	67.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	5527.	*	1	1100	133	62.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	5970.	*	1	1105	134	56.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	6218.	*	1	1110	135	51.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	6282.	*	1	1115	136	47.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	6304.	*	1	1120	137	42.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	6316.	*	1	1125	138	39.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	6311.	*	1	1130	139	35.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	6307.	*	1	1135	140	32.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	6296.	*	1	1140	141	29.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	6286.	*	1	1145	142	26.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	6288.	*	1	1150	143	24.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	6290.	*	1	1155	144	22.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	6284.	*	1	1200	145	19.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	6258.	*	1	1205	146	18.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	6184.	*	1	1210	147	16.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	6043.	*	1	1215	148	14.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	5829.	*	1	1220	149	13.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	5548.	*	1	1225	150	12.	*	1	1840	225	0.	*	2	0055	300	0.

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PEAK FLOW TIME MAXIMUM AVERAGE FLOW

6-HR 24-HR 72-HR 24.92-HR

	(CFS)	(HR)				
			(CFS)			
+	6316.	5.17		2884.	738.	711.	711.
			(INCHES)	.456	.466	.466	.466
			(AC-FT)	1430.	1463.	1463.	1463.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .57

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	3050.	*	1		1230	151	18.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	2952.	*	1		1235	152	16.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	2831.	*	1		1240	153	15.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	2701.	*	1		1245	154	14.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	2552.	*	1		1250	155	13.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	2394.	*	1		1255	156	12.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	2238.	*	1		1300	157	11.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	2086.	*	1		1305	158	10.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	1943.	*	1		1310	159	9.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	1809.	*	1		1315	160	8.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	1687.	*	1		1320	161	8.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	1574.	*	1		1325	162	7.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	1470.	*	1		1330	163	6.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	1373.	*	1		1335	164	6.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	1282.	*	1		1340	165	5.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	1195.	*	1		1345	166	5.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	1113.	*	1		1350	167	5.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	1038.	*	1		1355	168	4.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	968.	*	1		1400	169	4.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	906.	*	1		1405	170	3.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	847.	*	1		1410	171	3.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	792.	*	1		1415	172	3.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	740.	*	1		1420	173	3.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	693.	*	1		1425	174	2.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	649.	*	1		1430	175	2.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	608.	*	1		1435	176	2.	*	1		2050	251	0.
1		0210	27	1.	*	1		0825	102	570.	*	1		1440	177	2.	*	1		2055	252	0.
1		0215	28	2.	*	1		0830	103	534.	*	1		1445	178	2.	*	1		2100	253	0.
1		0220	29	3.	*	1		0835	104	500.	*	1		1450	179	1.	*	1		2105	254	0.
1		0225	30	4.	*	1		0840	105	469.	*	1		1455	180	1.	*	1		2110	255	0.
1		0230	31	6.	*	1		0845	106	440.	*	1		1500	181	1.	*	1		2115	256	0.
1		0235	32	8.	*	1		0850	107	412.	*	1		1505	182	1.	*	1		2120	257	0.
1		0240	33	11.	*	1		0855	108	387.	*	1		1510	183	1.	*	1		2125	258	0.
1		0245	34	13.	*	1		0900	109	363.	*	1		1515	184	1.	*	1		2130	259	0.
1		0250	35	15.	*	1		0905	110	340.	*	1		1520	185	1.	*	1		2135	260	0.
1		0255	36	18.	*	1		0910	111	319.	*	1		1525	186	1.	*	1		2140	261	0.
1		0300	37	20.	*	1		0915	112	300.	*	1		1530	187	1.	*	1		2145	262	0.
1		0305	38	24.	*	1		0920	113	281.	*	1		1535	188	1.	*	1		2150	263	0.
1		0310	39	29.	*	1		0925	114	264.	*	1		1540	189	0.	*	1		2155	264	0.
1		0315	40	36.	*	1		0930	115	248.	*	1		1545	190	0.	*	1		2200	265	0.
1		0320	41	47.	*	1		0935	116	233.	*	1		1550	191	0.	*	1		2205	266	0.
1		0325	42	65.	*	1		0940	117	219.	*	1		1555	192	0.	*	1		2210	267	0.
1		0330	43	91.	*	1		0945	118	205.	*	1		1600	193	0.	*	1		2215	268	0.
1		0335	44	130.	*	1		0950	119	192.	*	1		1605	194	0.	*	1		2220	269	0.
1		0340	45	182.	*	1		0955	120	179.	*	1		1610	195	0.	*	1		2225	270	0.
1		0345	46	246.	*	1		1000	121	165.	*	1		1615	196	0.	*	1		2230	271	0.
1		0350	47	322.	*	1		1005	122	153.	*	1		1620	197	0.	*	1		2235	272	0.
1		0355	48	464.	*	1		1010	123	142.	*	1		1625	198	0.	*	1		2240	273	0.
1		0400	49	653.	*	1		1015	124	131.	*	1		1630	199	0.	*	1		2245	274	0.
1		0405	50	822.	*	1		1020	125	122.	*	1		1635	200	0.	*	1		2250	275	0.
1		0410	51	942.	*	1		1025	126	113.	*	1		1640	201	0.	*	1		2255	276	0.
1		0415	52	1025.	*	1		1030	127	105.	*	1		1645	202	0.	*	1		2300	277	0.
1		0420	53	1060.	*	1		1035	128	97.	*	1		1650	203	0.	*	1		2305	278	0.
1		0425	54	1060.	*	1		1040	129	91.	*	1		1655	204	0.	*	1		2310	279	0.
1		0430	55	1039.	*	1		1045	130	85.	*	1		1700	205	0.	*	1		2315	280	0.
1		0435	56	1007.	*	1		1050	131	79.	*	1		1705	206	0.	*	1		2320	281	0.
1		0440	57	971.	*	1		1055	132	74.	*	1		1710	207	0.	*	1		2325	282	0.
1		0445	58	1099.	*	1		1100	133	69.	*	1		1715	208	0.	*	1		2330	283	0.
1		0450	59	1951.	*	1		1105	134	64.	*	1		1720	209	0.	*	1		2335	284	0.
1		0455	60	2095.	*	1		1110	135	60.	*	1		1725	210	0.	*	1		2340	285	0.
1		0500	61	2184.	*	1		1115	136	56.	*	1		1730	211	0.	*	1		2345	286	0.
1		0505	62	2544.	*	1		1120	137	52.	*	1		1735	212	0.	*	1		2350	287	0.

1	0510	63	2620.	*	1	1125	138	49.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	2867.	*	1	1130	139	46.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	2977.	*	1	1135	140	42.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	3001.	*	1	1140	141	40.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	2967.	*	1	1145	142	37.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	3021.	*	1	1150	143	34.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	3057.	*	1	1155	144	31.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	3102.	*	1	1200	145	29.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	3191.	*	1	1205	146	27.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	3239.	*	1	1210	147	25.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	3212.	*	1	1215	148	23.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	3165.	*	1	1220	149	21.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	3117.	*	1	1225	150	19.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 3239.	5.92		1477.	382.	368.	368.
		(INCHES)	.233	.241	.241	.241
		(AC-FT)	733.	757.	757.	757.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .44

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	1218.	*	1		1230	151	27.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	1194.	*	1		1235	152	25.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	1168.	*	1		1240	153	24.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	1158.	*	1		1245	154	22.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	1161.	*	1		1250	155	21.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	1174.	*	1		1255	156	20.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	1175.	*	1		1300	157	19.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	1151.	*	1		1305	158	17.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	1110.	*	1		1310	159	16.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	1048.	*	1		1315	160	15.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	1001.	*	1		1320	161	14.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	960.	*	1		1325	162	13.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	903.	*	1		1330	163	12.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	851.	*	1		1335	164	12.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	798.	*	1		1340	165	11.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	755.	*	1		1345	166	10.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	718.	*	1		1350	167	9.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	676.	*	1		1355	168	9.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	639.	*	1		1400	169	8.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	605.	*	1		1405	170	8.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	574.	*	1		1410	171	7.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	542.	*	1		1415	172	7.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	510.	*	1		1420	173	6.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	482.	*	1		1425	174	6.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	456.	*	1		1430	175	6.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	429.	*	1		1435	176	5.	*	1		2050	251	0.
1		0210	27	0.	*	1		0825	102	404.	*	1		1440	177	5.	*	1		2055	252	0.
1		0215	28	0.	*	1		0830	103	382.	*	1		1445	178	5.	*	1		2100	253	0.
1		0220	29	0.	*	1		0835	104	361.	*	1		1450	179	4.	*	1		2105	254	0.
1		0225	30	0.	*	1		0840	105	340.	*	1		1455	180	4.	*	1		2110	255	0.
1		0230	31	0.	*	1		0845	106	322.	*	1		1500	181	4.	*	1		2115	256	0.
1		0235	32	0.	*	1		0850	107	305.	*	1		1505	182	3.	*	1		2120	257	0.
1		0240	33	0.	*	1		0855	108	289.	*	1		1510	183	3.	*	1		2125	258	0.
1		0245	34	0.	*	1		0900	109	274.	*	1		1515	184	3.	*	1		2130	259	0.
1		0250	35	0.	*	1		0905	110	260.	*	1		1520	185	3.	*	1		2135	260	0.
1		0255	36	0.	*	1		0910	111	246.	*	1		1525	186	3.	*	1		2140	261	0.
1		0300	37	1.	*	1		0915	112	233.	*	1		1530	187	2.	*	1		2145	262	0.
1		0305	38	1.	*	1		0920	113	221.	*	1		1535	188	2.	*	1		2150	263	0.
1		0310	39	1.	*	1		0925	114	210.	*	1		1540	189	2.	*	1		2155	264	0.
1		0315	40	2.	*	1		0930	115	199.	*	1		1545	190	2.	*	1		2200	265	0.
1		0320	41	4.	*	1		0935	116	189.	*	1		1550	191	2.	*	1		2205	266	0.
1		0325	42	7.	*	1		0940	117	181.	*	1		1555	192	2.	*	1		2210	267	0.
1		0330	43	15.	*	1		0945	118	172.	*	1		1600	193	2.	*	1		2215	268	0.
1		0335	44	29.	*	1		0950	119	164.	*	1		1605	194	2.	*	1		2220	269	0.

1	0340	45	51.	*	1	0955	120	156.	*	1	1610	195	1.	*	1	2225	270	0.
1	0345	46	80.	*	1	1000	121	148.	*	1	1615	196	1.	*	1	2230	271	0.
1	0350	47	114.	*	1	1005	122	141.	*	1	1620	197	1.	*	1	2235	272	0.
1	0355	48	149.	*	1	1010	123	134.	*	1	1625	198	1.	*	1	2240	273	0.
1	0400	49	186.	*	1	1015	124	127.	*	1	1630	199	1.	*	1	2245	274	0.
1	0405	50	226.	*	1	1020	125	121.	*	1	1635	200	1.	*	1	2250	275	0.
1	0410	51	330.	*	1	1025	126	115.	*	1	1640	201	1.	*	1	2255	276	0.
1	0415	52	433.	*	1	1030	127	110.	*	1	1645	202	1.	*	1	2300	277	0.
1	0420	53	475.	*	1	1035	128	105.	*	1	1650	203	1.	*	1	2305	278	0.
1	0425	54	501.	*	1	1040	129	100.	*	1	1655	204	1.	*	1	2310	279	0.
1	0430	55	504.	*	1	1045	130	95.	*	1	1700	205	1.	*	1	2315	280	0.
1	0435	56	497.	*	1	1050	131	90.	*	1	1705	206	1.	*	1	2320	281	0.
1	0440	57	484.	*	1	1055	132	85.	*	1	1710	207	1.	*	1	2325	282	0.
1	0445	58	467.	*	1	1100	133	80.	*	1	1715	208	1.	*	1	2330	283	0.
1	0450	59	451.	*	1	1105	134	75.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	439.	*	1	1110	135	71.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	435.	*	1	1115	136	67.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	439.	*	1	1120	137	63.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	452.	*	1	1125	138	59.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	829.	*	1	1130	139	55.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	1162.	*	1	1135	140	52.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	804.	*	1	1140	141	49.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	1077.	*	1	1145	142	46.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	1095.	*	1	1150	143	43.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	1116.	*	1	1155	144	41.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	1262.	*	1	1200	145	38.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	1147.	*	1	1205	146	36.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	1252.	*	1	1210	147	34.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	1251.	*	1	1215	148	32.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	1285.	*	1	1220	149	30.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	1216.	*	1	1225	150	29.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
+ 1285.	6.08		655.	175.	168.	168.
		(INCHES)	.104	.110	.110	.110
		(AC-FT)	325.	347.	347.	347.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .26

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
					*						*						*					
1		0000	1	0.	*	1		0615	76	71.	*	1		1230	151	13.	*	1		1845	226	1.
1		0005	2	0.	*	1		0620	77	64.	*	1		1235	152	13.	*	1		1850	227	1.
1		0010	3	0.	*	1		0625	78	57.	*	1		1240	153	13.	*	1		1855	228	1.
1		0015	4	0.	*	1		0630	79	51.	*	1		1245	154	12.	*	1		1900	229	1.
1		0020	5	0.	*	1		0635	80	46.	*	1		1250	155	12.	*	1		1905	230	1.
1		0025	6	0.	*	1		0640	81	41.	*	1		1255	156	12.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	37.	*	1		1300	157	11.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	33.	*	1		1305	158	11.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	30.	*	1		1310	159	10.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	27.	*	1		1315	160	10.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	24.	*	1		1320	161	10.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	90.	*	1		1325	162	9.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	113.	*	1		1330	163	9.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	83.	*	1		1335	164	9.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	127.	*	1		1340	165	8.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	74.	*	1		1345	166	8.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	74.	*	1		1350	167	8.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	100.	*	1		1355	168	7.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	56.	*	1		1400	169	7.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	78.	*	1		1405	170	7.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	75.	*	1		1410	171	7.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	64.	*	1		1415	172	6.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	107.	*	1		1420	173	6.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	98.	*	1		1425	174	6.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	96.	*	1		1430	175	6.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	83.	*	1		1435	176	5.	*	1		2050	251	0.

1	0210	27	0.	*	1	0825	102	65.	*	1	1440	177	5.	*	1	2055	252	0.
1	0215	28	0.	*	1	0830	103	89.	*	1	1445	178	5.	*	1	2100	253	0.
1	0220	29	0.	*	1	0835	104	83.	*	1	1450	179	5.	*	1	2105	254	0.
1	0225	30	0.	*	1	0840	105	76.	*	1	1455	180	5.	*	1	2110	255	0.
1	0230	31	0.	*	1	0845	106	65.	*	1	1500	181	4.	*	1	2115	256	0.
1	0235	32	0.	*	1	0850	107	57.	*	1	1505	182	4.	*	1	2120	257	0.
1	0240	33	0.	*	1	0855	108	73.	*	1	1510	183	4.	*	1	2125	258	0.
1	0245	34	0.	*	1	0900	109	67.	*	1	1515	184	4.	*	1	2130	259	0.
1	0250	35	0.	*	1	0905	110	57.	*	1	1520	185	4.	*	1	2135	260	0.
1	0255	36	0.	*	1	0910	111	52.	*	1	1525	186	3.	*	1	2140	261	0.
1	0300	37	0.	*	1	0915	112	53.	*	1	1530	187	3.	*	1	2145	262	0.
1	0305	38	0.	*	1	0920	113	60.	*	1	1535	188	3.	*	1	2150	263	0.
1	0310	39	0.	*	1	0925	114	50.	*	1	1540	189	3.	*	1	2155	264	0.
1	0315	40	0.	*	1	0930	115	46.	*	1	1545	190	3.	*	1	2200	265	0.
1	0320	41	0.	*	1	0935	116	52.	*	1	1550	191	3.	*	1	2205	266	0.
1	0325	42	0.	*	1	0940	117	54.	*	1	1555	192	3.	*	1	2210	267	0.
1	0330	43	0.	*	1	0945	118	48.	*	1	1600	193	3.	*	1	2215	268	0.
1	0335	44	0.	*	1	0950	119	42.	*	1	1605	194	2.	*	1	2220	269	0.
1	0340	45	0.	*	1	0955	120	46.	*	1	1610	195	2.	*	1	2225	270	0.
1	0345	46	0.	*	1	1000	121	42.	*	1	1615	196	2.	*	1	2230	271	0.
1	0350	47	0.	*	1	1005	122	36.	*	1	1620	197	2.	*	1	2235	272	0.
1	0355	48	1.	*	1	1010	123	36.	*	1	1625	198	2.	*	1	2240	273	0.
1	0400	49	5.	*	1	1015	124	40.	*	1	1630	199	2.	*	1	2245	274	0.
1	0405	50	11.	*	1	1020	125	35.	*	1	1635	200	2.	*	1	2250	275	0.
1	0410	51	19.	*	1	1025	126	31.	*	1	1640	201	2.	*	1	2255	276	0.
1	0415	52	26.	*	1	1030	127	33.	*	1	1645	202	2.	*	1	2300	277	0.
1	0420	53	32.	*	1	1035	128	33.	*	1	1650	203	2.	*	1	2305	278	0.
1	0425	54	36.	*	1	1040	129	28.	*	1	1655	204	2.	*	1	2310	279	0.
1	0430	55	40.	*	1	1045	130	27.	*	1	1700	205	2.	*	1	2315	280	0.
1	0435	56	43.	*	1	1050	131	29.	*	1	1705	206	2.	*	1	2320	281	0.
1	0440	57	44.	*	1	1055	132	27.	*	1	1710	207	1.	*	1	2325	282	0.
1	0445	58	46.	*	1	1100	133	24.	*	1	1715	208	1.	*	1	2330	283	0.
1	0450	59	53.	*	1	1105	134	24.	*	1	1720	209	1.	*	1	2335	284	0.
1	0455	60	72.	*	1	1110	135	24.	*	1	1725	210	1.	*	1	2340	285	0.
1	0500	61	68.	*	1	1115	136	22.	*	1	1730	211	1.	*	1	2345	286	0.
1	0505	62	70.	*	1	1120	137	21.	*	1	1735	212	1.	*	1	2350	287	0.
1	0510	63	77.	*	1	1125	138	20.	*	1	1740	213	1.	*	1	2355	288	0.
1	0515	64	77.	*	1	1130	139	20.	*	1	1745	214	1.	*	2	0000	289	0.
1	0520	65	81.	*	1	1135	140	20.	*	1	1750	215	1.	*	2	0005	290	0.
1	0525	66	84.	*	1	1140	141	18.	*	1	1755	216	1.	*	2	0010	291	0.
1	0530	67	88.	*	1	1145	142	18.	*	1	1800	217	1.	*	2	0015	292	0.
1	0535	68	93.	*	1	1150	143	18.	*	1	1805	218	1.	*	2	0020	293	0.
1	0540	69	99.	*	1	1155	144	17.	*	1	1810	219	1.	*	2	0025	294	0.
1	0545	70	105.	*	1	1200	145	16.	*	1	1815	220	1.	*	2	0030	295	0.
1	0550	71	105.	*	1	1205	146	16.	*	1	1820	221	1.	*	2	0035	296	0.
1	0555	72	101.	*	1	1210	147	15.	*	1	1825	222	1.	*	2	0040	297	0.
1	0600	73	95.	*	1	1215	148	14.	*	1	1830	223	1.	*	2	0045	298	0.
1	0605	74	87.	*	1	1220	149	14.	*	1	1835	224	1.	*	2	0050	299	0.
1	0610	75	79.	*	1	1225	150	14.	*	1	1840	225	1.	*	2	0055	300	0.

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 127.	7.42		66.	20.	19.	19.
		(INCHES)	.010	.013	.013	.013
		(AC-FT)	33.	40.	40.	40.

CUMULATIVE AREA = 58.84 SQ MI

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          **************
          *            *
1305 KK   *   FINISH   *
          *            *
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1307 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

1306 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1500.	CHANNEL LENGTH
S	.0090	SLOPE
N	.050	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	250.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

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COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	2.60	750.00	9685.89	325.15	.99	9.61

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.08	1.64	5.00		9684.64	325.00	.99

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4684E+04 EXCESS= .0000E+00 OUTFLOW= .4684E+04 BASIN STORAGE= .1032E-01 PERCENT ERROR= .0

HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = 1.00

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	7836.	1		1230	151	2606.	1		1845	226	86.
1		0005	2	0.	1		0620	77	7615.	1		1235	152	2582.	1		1850	227	65.
1		0010	3	0.	1		0625	78	7400.	1		1240	153	2558.	1		1855	228	49.
1		0015	4	0.	1		0630	79	7191.	1		1245	154	2534.	1		1900	229	37.
1		0020	5	0.	1		0635	80	6988.	1		1250	155	2510.	1		1905	230	28.
1		0025	6	0.	1		0640	81	6790.	1		1255	156	2485.	1		1910	231	21.
1		0030	7	0.	1		0645	82	6597.	1		1300	157	2459.	1		1915	232	16.
1		0035	8	0.	1		0650	83	6411.	1		1305	158	2433.	1		1920	233	12.
1		0040	9	0.	1		0655	84	6233.	1		1310	159	2407.	1		1925	234	9.
1		0045	10	0.	1		0700	85	6061.	1		1315	160	2381.	1		1930	235	7.
1		0050	11	1.	1		0705	86	5896.	1		1320	161	2356.	1		1935	236	5.
1		0055	12	2.	1		0710	87	5739.	1		1325	162	2331.	1		1940	237	4.
1		0100	13	3.	1		0715	88	5589.	1		1330	163	2305.	1		1945	238	3.
1		0105	14	6.	1		0720	89	5447.	1		1335	164	2277.	1		1950	239	2.
1		0110	15	10.	1		0725	90	5311.	1		1340	165	2249.	1		1955	240	2.
1		0115	16	16.	1		0730	91	5180.	1		1345	166	2221.	1		2000	241	1.
1		0120	17	24.	1		0735	92	5053.	1		1350	167	2193.	1		2005	242	1.
1		0125	18	33.	1		0740	93	4931.	1		1355	168	2165.	1		2010	243	1.
1		0130	19	44.	1		0745	94	4814.	1		1400	169	2138.	1		2015	244	1.
1		0135	20	58.	1		0750	95	4704.	1		1405	170	2109.	1		2020	245	0.
1		0140	21	75.	1		0755	96	4601.	1		1410	171	2079.	1		2025	246	0.
1		0145	22	97.	1		0800	97	4504.	1		1415	172	2047.	1		2030	247	0.
1		0150	23	124.	1		0805	98	4415.	1		1420	173	2016.	1		2035	248	0.
1		0155	24	158.	1		0810	99	4333.	1		1425	174	1984.	1		2040	249	0.
1		0200	25	197.	1		0815	100	4256.	1		1430	175	1954.	1		2045	250	0.
1		0205	26	243.	1		0820	101	4183.	1		1435	176	1922.	1		2050	251	0.
1		0210	27	295.	1		0825	102	4115.	1		1440	177	1890.	1		2055	252	0.
1		0215	28	352.	1		0830	103	4050.	1		1445	178	1855.	1		2100	253	0.
1		0220	29	412.	1		0835	104	3990.	1		1450	179	1820.	1		2105	254	0.
1		0225	30	474.	1		0840	105	3933.	1		1455	180	1785.	1		2110	255	0.
1		0230	31	537.	1		0845	106	3879.	1		1500	181	1750.	1		2115	256	0.
1		0235	32	597.	1		0850	107	3828.	1		1505	182	1716.	1		2120	257	0.
1		0240	33	654.	1		0855	108	3780.	1		1510	183	1681.	1		2125	258	0.
1		0245	34	705.	1		0900	109	3734.	1		1515	184	1644.	1		2130	259	0.
1		0250	35	753.	1		0905	110	3690.	1		1520	185	1607.	1		2135	260	0.
1		0255	36	802.	1		0910	111	3648.	1		1525	186	1570.	1		2140	261	0.
1		0300	37	856.	1		0915	112	3608.	1		1530	187	1534.	1		2145	262	0.
1		0305	38	923.	1		0920	113	3570.	1		1535	188	1498.	1		2150	263	0.
1		0310	39	1009.	1		0925	114	3533.	1		1540	189	1461.	1		2155	264	0.
1		0315	40	1128.	1		0930	115	3499.	1		1545	190	1423.	1		2200	265	0.
1		0320	41	1307.	1		0935	116	3466.	1		1550	191	1385.	1		2205	266	0.
1		0325	42	1566.	1		0940	117	3434.	1		1555	192	1347.	1		2210	267	0.
1		0330	43	1926.	1		0945	118	3404.	1		1600	193	1309.	1		2215	268	0.

1	0335	44	2415.	*	1	0950	119	3374.	*	1	1605	194	1273.	*	1	2220	269	0.
1	0340	45	3027.	*	1	0955	120	3346.	*	1	1610	195	1235.	*	1	2225	270	0.
1	0345	46	3722.	*	1	1000	121	3319.	*	1	1615	196	1197.	*	1	2230	271	0.
1	0350	47	4470.	*	1	1005	122	3291.	*	1	1620	197	1157.	*	1	2235	272	0.
1	0355	48	5241.	*	1	1010	123	3264.	*	1	1625	198	1118.	*	1	2240	273	0.
1	0400	49	5975.	*	1	1015	124	3237.	*	1	1630	199	1080.	*	1	2245	274	0.
1	0405	50	6603.	*	1	1020	125	3211.	*	1	1635	200	1043.	*	1	2250	275	0.
1	0410	51	7108.	*	1	1025	126	3185.	*	1	1640	201	1006.	*	1	2255	276	0.
1	0415	52	7497.	*	1	1030	127	3161.	*	1	1645	202	968.	*	1	2300	277	0.
1	0420	53	7784.	*	1	1035	128	3137.	*	1	1650	203	928.	*	1	2305	278	0.
1	0425	54	7982.	*	1	1040	129	3113.	*	1	1655	204	889.	*	1	2310	279	0.
1	0430	55	8117.	*	1	1045	130	3090.	*	1	1700	205	851.	*	1	2315	280	0.
1	0435	56	8222.	*	1	1050	131	3068.	*	1	1705	206	814.	*	1	2320	281	0.
1	0440	57	8315.	*	1	1055	132	3044.	*	1	1710	207	779.	*	1	2325	282	0.
1	0445	58	8399.	*	1	1100	133	3020.	*	1	1715	208	744.	*	1	2330	283	0.
1	0450	59	8500.	*	1	1105	134	2997.	*	1	1720	209	705.	*	1	2335	284	0.
1	0455	60	8654.	*	1	1110	135	2974.	*	1	1725	210	665.	*	1	2340	285	0.
1	0500	61	8858.	*	1	1115	136	2952.	*	1	1730	211	626.	*	1	2345	286	0.
1	0505	62	9079.	*	1	1120	137	2929.	*	1	1735	212	589.	*	1	2350	287	0.
1	0510	63	9295.	*	1	1125	138	2908.	*	1	1740	213	554.	*	1	2355	288	0.
1	0515	64	9486.	*	1	1130	139	2886.	*	1	1745	214	520.	*	2	0000	289	0.
1	0520	65	9623.	*	1	1135	140	2863.	*	1	1750	215	484.	*	2	0005	290	0.
1	0525	66	9685.	*	1	1140	141	2840.	*	1	1755	216	444.	*	2	0010	291	0.
1	0530	67	9670.	*	1	1145	142	2817.	*	1	1800	217	400.	*	2	0015	292	0.
1	0535	68	9588.	*	1	1150	143	2793.	*	1	1805	218	357.	*	2	0020	293	0.
1	0540	69	9451.	*	1	1155	144	2770.	*	1	1810	219	317.	*	2	0025	294	0.
1	0545	70	9268.	*	1	1200	145	2748.	*	1	1815	220	282.	*	2	0030	295	0.
1	0550	71	9051.	*	1	1205	146	2725.	*	1	1820	221	250.	*	2	0035	296	0.
1	0555	72	8813.	*	1	1210	147	2702.	*	1	1825	222	218.	*	2	0040	297	0.
1	0600	73	8565.	*	1	1215	148	2679.	*	1	1830	223	183.	*	2	0045	298	0.
1	0605	74	8314.	*	1	1220	149	2655.	*	1	1835	224	146.	*	2	0050	299	0.
1	0610	75	8069.	*	1	1225	150	2631.	*	1	1840	225	113.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 9685.	5.42	6265.	2361.	2274.	2274.
	(INCHES)	.655	.988	.988	.988
	(AC-FT)	3107.	4684.	4684.	4684.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	2.82	750.00	7860.77	330.15	.75	8.86
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		7860.68	330.00	.75	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3556E+04 EXCESS= .0000E+00 OUTFLOW= .3556E+04 BASIN STORAGE= .9648E-02 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .87

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	6559.	*	1		1230	151	1936.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	6397.	*	1		1235	152	1902.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	6238.	*	1		1240	153	1866.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	6079.	*	1		1245	154	1830.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	5923.	*	1		1250	155	1793.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	5770.	*	1		1255	156	1758.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	5621.	*	1		1300	157	1723.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	5476.	*	1		1305	158	1686.	*	1		1920	233	0.

1	0040	9	0.	*	1	0655	84	5336.	*	1	1310	159	1649.	*	1	1925	234	0.
1	0045	10	0.	*	1	0700	85	5200.	*	1	1315	160	1611.	*	1	1930	235	0.
1	0050	11	0.	*	1	0705	86	5070.	*	1	1320	161	1573.	*	1	1935	236	0.
1	0055	12	0.	*	1	0710	87	4945.	*	1	1325	162	1537.	*	1	1940	237	0.
1	0100	13	0.	*	1	0715	88	4826.	*	1	1330	163	1500.	*	1	1945	238	0.
1	0105	14	0.	*	1	0720	89	4711.	*	1	1335	164	1463.	*	1	1950	239	0.
1	0110	15	0.	*	1	0725	90	4602.	*	1	1340	165	1425.	*	1	1955	240	0.
1	0115	16	1.	*	1	0730	91	4496.	*	1	1345	166	1386.	*	1	2000	241	0.
1	0120	17	2.	*	1	0735	92	4393.	*	1	1350	167	1347.	*	1	2005	242	0.
1	0125	18	4.	*	1	0740	93	4293.	*	1	1355	168	1309.	*	1	2010	243	0.
1	0130	19	6.	*	1	0745	94	4197.	*	1	1400	169	1272.	*	1	2015	244	0.
1	0135	20	11.	*	1	0750	95	4106.	*	1	1405	170	1234.	*	1	2020	245	0.
1	0140	21	17.	*	1	0755	96	4020.	*	1	1410	171	1195.	*	1	2025	246	0.
1	0145	22	26.	*	1	0800	97	3940.	*	1	1415	172	1155.	*	1	2030	247	0.
1	0150	23	39.	*	1	0805	98	3865.	*	1	1420	173	1116.	*	1	2035	248	0.
1	0155	24	55.	*	1	0810	99	3795.	*	1	1425	174	1078.	*	1	2040	249	0.
1	0200	25	77.	*	1	0815	100	3730.	*	1	1430	175	1041.	*	1	2045	250	0.
1	0205	26	103.	*	1	0820	101	3668.	*	1	1435	176	1004.	*	1	2050	251	0.
1	0210	27	133.	*	1	0825	102	3608.	*	1	1440	177	966.	*	1	2055	252	0.
1	0215	28	168.	*	1	0830	103	3552.	*	1	1445	178	926.	*	1	2100	253	0.
1	0220	29	206.	*	1	0835	104	3497.	*	1	1450	179	887.	*	1	2105	254	0.
1	0225	30	246.	*	1	0840	105	3445.	*	1	1455	180	849.	*	1	2110	255	0.
1	0230	31	287.	*	1	0845	106	3395.	*	1	1500	181	812.	*	1	2115	256	0.
1	0235	32	328.	*	1	0850	107	3347.	*	1	1505	182	777.	*	1	2120	257	0.
1	0240	33	366.	*	1	0855	108	3302.	*	1	1510	183	741.	*	1	2125	258	0.
1	0245	34	400.	*	1	0900	109	3258.	*	1	1515	184	702.	*	1	2130	259	0.
1	0250	35	432.	*	1	0905	110	3217.	*	1	1520	185	663.	*	1	2135	260	0.
1	0255	36	463.	*	1	0910	111	3177.	*	1	1525	186	624.	*	1	2140	261	0.
1	0300	37	498.	*	1	0915	112	3138.	*	1	1530	187	588.	*	1	2145	262	0.
1	0305	38	543.	*	1	0920	113	3101.	*	1	1535	188	553.	*	1	2150	263	0.
1	0310	39	605.	*	1	0925	114	3065.	*	1	1540	189	520.	*	1	2155	264	0.
1	0315	40	691.	*	1	0930	115	3029.	*	1	1545	190	485.	*	1	2200	265	0.
1	0320	41	816.	*	1	0935	116	2994.	*	1	1550	191	447.	*	1	2205	266	0.
1	0325	42	1001.	*	1	0940	117	2960.	*	1	1555	192	405.	*	1	2210	267	0.
1	0330	43	1261.	*	1	0945	118	2928.	*	1	1600	193	363.	*	1	2215	268	0.
1	0335	44	1610.	*	1	0950	119	2896.	*	1	1605	194	323.	*	1	2220	269	0.
1	0340	45	2049.	*	1	0955	120	2865.	*	1	1610	195	288.	*	1	2225	270	0.
1	0345	46	2573.	*	1	1000	121	2834.	*	1	1615	196	256.	*	1	2230	271	0.
1	0350	47	3163.	*	1	1005	122	2804.	*	1	1620	197	224.	*	1	2235	272	0.
1	0355	48	3791.	*	1	1010	123	2773.	*	1	1625	198	190.	*	1	2240	273	0.
1	0400	49	4405.	*	1	1015	124	2743.	*	1	1630	199	154.	*	1	2245	274	0.
1	0405	50	4936.	*	1	1020	125	2712.	*	1	1635	200	120.	*	1	2250	275	0.
1	0410	51	5362.	*	1	1025	126	2683.	*	1	1640	201	91.	*	1	2255	276	0.
1	0415	52	5697.	*	1	1030	127	2654.	*	1	1645	202	69.	*	1	2300	277	0.
1	0420	53	5949.	*	1	1035	128	2625.	*	1	1650	203	52.	*	1	2305	278	0.
1	0425	54	6116.	*	1	1040	129	2597.	*	1	1655	204	39.	*	1	2310	279	0.
1	0430	55	6216.	*	1	1045	130	2569.	*	1	1700	205	30.	*	1	2315	280	0.
1	0435	56	6290.	*	1	1050	131	2540.	*	1	1705	206	23.	*	1	2320	281	0.
1	0440	57	6369.	*	1	1055	132	2511.	*	1	1710	207	17.	*	1	2325	282	0.
1	0445	58	6461.	*	1	1100	133	2482.	*	1	1715	208	13.	*	1	2330	283	0.
1	0450	59	6586.	*	1	1105	134	2453.	*	1	1720	209	10.	*	1	2335	284	0.
1	0455	60	6763.	*	1	1110	135	2425.	*	1	1725	210	7.	*	1	2340	285	0.
1	0500	61	6979.	*	1	1115	136	2397.	*	1	1730	211	6.	*	1	2345	286	0.
1	0505	62	7205.	*	1	1120	137	2369.	*	1	1735	212	4.	*	1	2350	287	0.
1	0510	63	7422.	*	1	1125	138	2341.	*	1	1740	213	3.	*	1	2355	288	0.
1	0515	64	7614.	*	1	1130	139	2311.	*	1	1745	214	2.	*	2	0000	289	0.
1	0520	65	7758.	*	1	1135	140	2281.	*	1	1750	215	2.	*	2	0005	290	0.
1	0525	66	7840.	*	1	1140	141	2251.	*	1	1755	216	1.	*	2	0010	291	0.
1	0530	67	7861.	*	1	1145	142	2221.	*	1	1800	217	1.	*	2	0015	292	0.
1	0535	68	7822.	*	1	1150	143	2192.	*	1	1805	218	1.	*	2	0020	293	0.
1	0540	69	7735.	*	1	1155	144	2162.	*	1	1810	219	1.	*	2	0025	294	0.
1	0545	70	7609.	*	1	1200	145	2132.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	7455.	*	1	1205	146	2100.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	7283.	*	1	1210	147	2067.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	7101.	*	1	1215	148	2034.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	6915.	*	1	1220	149	2001.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	6732.	*	1	1225	150	1969.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)	(CFS)				
+ 7861.	5.50		5161.	1793.	1727.	1727.
		(INCHES)	.540	.750	.750	.750
		(AC-FT)	2559.	3556.	3556.	3556.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	COMPUTATION TIME STEP M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	3.14	750.00	5990.66	332.43	.53	7.97
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		5984.42	335.00	.53	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2523E+04 EXCESS= .0000E+00 OUTFLOW= .2523E+04 BASIN STORAGE= .9971E-02 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .74

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	5182.	1		1230	151	1081.	1		1845	226	0.
1		0005	2	0.	1		0620	77	5072.	1		1235	152	1044.	1		1850	227	0.
1		0010	3	0.	1		0625	78	4964.	1		1240	153	1006.	1		1855	228	0.
1		0015	4	0.	1		0630	79	4856.	1		1245	154	967.	1		1900	229	0.
1		0020	5	0.	1		0635	80	4747.	1		1250	155	926.	1		1905	230	0.
1		0025	6	0.	1		0640	81	4640.	1		1255	156	887.	1		1910	231	0.
1		0030	7	0.	1		0645	82	4533.	1		1300	157	849.	1		1915	232	0.
1		0035	8	0.	1		0650	83	4428.	1		1305	158	812.	1		1920	233	0.
1		0040	9	0.	1		0655	84	4326.	1		1310	159	776.	1		1925	234	0.
1		0045	10	0.	1		0700	85	4226.	1		1315	160	740.	1		1930	235	0.
1		0050	11	0.	1		0705	86	4129.	1		1320	161	701.	1		1935	236	0.
1		0055	12	0.	1		0710	87	4035.	1		1325	162	661.	1		1940	237	0.
1		0100	13	0.	1		0715	88	3945.	1		1330	163	623.	1		1945	238	0.
1		0105	14	0.	1		0720	89	3858.	1		1335	164	586.	1		1950	239	0.
1		0110	15	0.	1		0725	90	3773.	1		1340	165	552.	1		1955	240	0.
1		0115	16	0.	1		0730	91	3691.	1		1345	166	519.	1		2000	241	0.
1		0120	17	0.	1		0735	92	3610.	1		1350	167	485.	1		2005	242	0.
1		0125	18	0.	1		0740	93	3532.	1		1355	168	447.	1		2010	243	0.
1		0130	19	0.	1		0745	94	3456.	1		1400	169	408.	1		2015	244	0.
1		0135	20	0.	1		0750	95	3383.	1		1405	170	368.	1		2020	245	0.
1		0140	21	1.	1		0755	96	3313.	1		1410	171	330.	1		2025	246	0.
1		0145	22	2.	1		0800	97	3247.	1		1415	172	296.	1		2030	247	0.
1		0150	23	4.	1		0805	98	3185.	1		1420	173	264.	1		2035	248	0.
1		0155	24	8.	1		0810	99	3127.	1		1425	174	234.	1		2040	249	0.
1		0200	25	14.	1		0815	100	3071.	1		1430	175	202.	1		2045	250	0.
1		0205	26	23.	1		0820	101	3018.	1		1435	176	167.	1		2050	251	0.
1		0210	27	35.	1		0825	102	2967.	1		1440	177	131.	1		2055	252	0.
1		0215	28	50.	1		0830	103	2917.	1		1445	178	101.	1		2100	253	0.
1		0220	29	68.	1		0835	104	2868.	1		1450	179	77.	1		2105	254	0.
1		0225	30	88.	1		0840	105	2821.	1		1455	180	59.	1		2110	255	0.
1		0230	31	110.	1		0845	106	2775.	1		1500	181	45.	1		2115	256	0.
1		0235	32	133.	1		0850	107	2731.	1		1505	182	34.	1		2120	257	0.
1		0240	33	155.	1		0855	108	2689.	1		1510	183	26.	1		2125	258	0.
1		0245	34	176.	1		0900	109	2648.	1		1515	184	20.	1		2130	259	0.
1		0250	35	195.	1		0905	110	2608.	1		1520	185	15.	1		2135	260	0.
1		0255	36	214.	1		0910	111	2569.	1		1525	186	12.	1		2140	261	0.
1		0300	37	235.	1		0915	112	2531.	1		1530	187	9.	1		2145	262	0.
1		0305	38	261.	1		0920	113	2493.	1		1535	188	7.	1		2150	263	0.
1		0310	39	297.	1		0925	114	2456.	1		1540	189	5.	1		2155	264	0.
1		0315	40	348.	1		0930	115	2419.	1		1545	190	4.	1		2200	265	0.
1		0320	41	419.	1		0935	116	2383.	1		1550	191	3.	1		2205	266	0.
1		0325	42	531.	1		0940	117	2347.	1		1555	192	3.	1		2210	267	0.
1		0330	43	690.	1		0945	118	2313.	1		1600	193	2.	1		2215	268	0.
1		0335	44	925.	1		0950	119	2279.	1		1605	194	2.	1		2220	269	0.
1		0340	45	1242.	1		0955	120	2245.	1		1610	195	1.	1		2225	270	0.
1		0345	46	1618.	1		1000	121	2209.	1		1615	196	1.	1		2230	271	0.
1		0350	47	2044.	1		1005	122	2173.	1		1620	197	1.	1		2235	272	0.
1		0355	48	2499.	1		1010	123	2137.	1		1625	198	1.	1		2240	273	0.
1		0400	49	2947.	1		1015	124	2101.	1		1630	199	0.	1		2245	274	0.
1		0405	50	3354.	1		1020	125	2066.	1		1635	200	0.	1		2250	275	0.
1		0410	51	3709.	1		1025	126	2031.	1		1640	201	0.	1		2255	276	0.
1		0415	52	4000.	1		1030	127	1996.	1		1645	202	0.	1		2300	277	0.
1		0420	53	4220.	1		1035	128	1960.	1		1650	203	0.	1		2305	278	0.
1		0425	54	4369.	1		1040	129	1922.	1		1655	204	0.	1		2310	279	0.

1	0430	55	4455.	*	1	1045	130	1884.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	4504.	*	1	1050	131	1847.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	4542.	*	1	1055	132	1810.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	4594.	*	1	1100	133	1774.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	4685.	*	1	1105	134	1737.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	4831.	*	1	1110	135	1699.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	5028.	*	1	1115	136	1660.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	5247.	*	1	1120	137	1622.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	5464.	*	1	1125	138	1584.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	5661.	*	1	1130	139	1547.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	5822.	*	1	1135	140	1510.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	5928.	*	1	1140	141	1471.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	5980.	*	1	1145	142	1432.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	5984.	*	1	1150	143	1392.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	5948.	*	1	1155	144	1354.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	5876.	*	1	1200	145	1316.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	5780.	*	1	1205	146	1278.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	5667.	*	1	1210	147	1239.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	5546.	*	1	1215	148	1199.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	5421.	*	1	1220	149	1159.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	5297.	*	1	1225	150	1120.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
+ 5984.	5.58		3992.	1272.	1225.	1225.
		(INCHES)	.418	.532	.532	.532
		(AC-FT)	1979.	2523.	2523.	2523.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

			COMPUTATION TIME STEP					
ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	3.87	750.00	3481.46	340.90	.29	6.45
			INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL					
MAIN	.08	1.64	5.00		3480.15	340.00	.29	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1359E+04 EXCESS= .0000E+00 OUTFLOW= .1359E+04 BASIN STORAGE= .9865E-02 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .57

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	3196.	*	1		1230	151	189.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	3150.	*	1		1235	152	159.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	3106.	*	1		1240	153	131.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	3061.	*	1		1245	154	107.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	3015.	*	1		1250	155	88.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	2966.	*	1		1255	156	73.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	2915.	*	1		1300	157	61.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	2862.	*	1		1305	158	52.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	2809.	*	1		1310	159	45.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	2755.	*	1		1315	160	39.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	2701.	*	1		1320	161	34.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	2647.	*	1		1325	162	30.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	2594.	*	1		1330	163	26.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	2541.	*	1		1335	164	24.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	2489.	*	1		1340	165	21.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	2437.	*	1		1345	166	19.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	2385.	*	1		1350	167	17.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	2333.	*	1		1355	168	16.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	2281.	*	1		1400	169	14.	*	1		2015	244	0.

1	0135	20	0.	*	1	0750	95	2231.	*	1	1405	170	13.	*	1	2020	245	0.
1	0140	21	0.	*	1	0755	96	2182.	*	1	1410	171	12.	*	1	2025	246	0.
1	0145	22	0.	*	1	0800	97	2134.	*	1	1415	172	11.	*	1	2030	247	0.
1	0150	23	0.	*	1	0805	98	2087.	*	1	1420	173	10.	*	1	2035	248	0.
1	0155	24	0.	*	1	0810	99	2041.	*	1	1425	174	9.	*	1	2040	249	0.
1	0200	25	0.	*	1	0815	100	1995.	*	1	1430	175	8.	*	1	2045	250	0.
1	0205	26	0.	*	1	0820	101	1951.	*	1	1435	176	7.	*	1	2050	251	0.
1	0210	27	0.	*	1	0825	102	1907.	*	1	1440	177	7.	*	1	2055	252	0.
1	0215	28	1.	*	1	0830	103	1865.	*	1	1445	178	6.	*	1	2100	253	0.
1	0220	29	2.	*	1	0835	104	1823.	*	1	1450	179	6.	*	1	2105	254	0.
1	0225	30	3.	*	1	0840	105	1783.	*	1	1455	180	5.	*	1	2110	255	0.
1	0230	31	5.	*	1	0845	106	1743.	*	1	1500	181	5.	*	1	2115	256	0.
1	0235	32	8.	*	1	0850	107	1705.	*	1	1505	182	4.	*	1	2120	257	0.
1	0240	33	12.	*	1	0855	108	1666.	*	1	1510	183	4.	*	1	2125	258	0.
1	0245	34	17.	*	1	0900	109	1627.	*	1	1515	184	4.	*	1	2130	259	0.
1	0250	35	21.	*	1	0905	110	1587.	*	1	1520	185	3.	*	1	2135	260	0.
1	0255	36	27.	*	1	0910	111	1547.	*	1	1525	186	3.	*	1	2140	261	0.
1	0300	37	34.	*	1	0915	112	1508.	*	1	1530	187	3.	*	1	2145	262	0.
1	0305	38	42.	*	1	0920	113	1470.	*	1	1535	188	2.	*	1	2150	263	0.
1	0310	39	54.	*	1	0925	114	1434.	*	1	1540	189	2.	*	1	2155	264	0.
1	0315	40	72.	*	1	0930	115	1397.	*	1	1545	190	2.	*	1	2200	265	0.
1	0320	41	98.	*	1	0935	116	1362.	*	1	1550	191	2.	*	1	2205	266	0.
1	0325	42	138.	*	1	0940	117	1325.	*	1	1555	192	2.	*	1	2210	267	0.
1	0330	43	197.	*	1	0945	118	1288.	*	1	1600	193	2.	*	1	2215	268	0.
1	0335	44	290.	*	1	0950	119	1249.	*	1	1605	194	1.	*	1	2220	269	0.
1	0340	45	436.	*	1	0955	120	1212.	*	1	1610	195	1.	*	1	2225	270	0.
1	0345	46	626.	*	1	1000	121	1175.	*	1	1615	196	1.	*	1	2230	271	0.
1	0350	47	862.	*	1	1005	122	1139.	*	1	1620	197	1.	*	1	2235	272	0.
1	0355	48	1126.	*	1	1010	123	1104.	*	1	1625	198	1.	*	1	2240	273	0.
1	0400	49	1391.	*	1	1015	124	1070.	*	1	1630	199	1.	*	1	2245	274	0.
1	0405	50	1637.	*	1	1020	125	1034.	*	1	1635	200	1.	*	1	2250	275	0.
1	0410	51	1852.	*	1	1025	126	997.	*	1	1640	201	1.	*	1	2255	276	0.
1	0415	52	2041.	*	1	1030	127	959.	*	1	1645	202	1.	*	1	2300	277	0.
1	0420	53	2200.	*	1	1035	128	922.	*	1	1650	203	1.	*	1	2305	278	0.
1	0425	54	2323.	*	1	1040	129	887.	*	1	1655	204	1.	*	1	2310	279	0.
1	0430	55	2420.	*	1	1045	130	853.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	2494.	*	1	1050	131	819.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	2537.	*	1	1055	132	786.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	2558.	*	1	1100	133	751.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	2584.	*	1	1105	134	714.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	2633.	*	1	1110	135	677.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	2717.	*	1	1115	136	641.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	2832.	*	1	1120	137	607.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	2969.	*	1	1125	138	575.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	3116.	*	1	1130	139	544.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	3246.	*	1	1135	140	514.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	3352.	*	1	1140	141	481.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	3427.	*	1	1145	142	445.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	3466.	*	1	1150	143	408.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	3480.	*	1	1155	144	372.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	3472.	*	1	1200	145	340.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	3441.	*	1	1205	146	312.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	3396.	*	1	1210	147	286.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	3348.	*	1	1215	148	262.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	3297.	*	1	1220	149	239.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	3245.	*	1	1225	150	216.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*					

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 3480.	5.67		2386.	685.	660.	660.
		(INCHES)	.250	.287	.287	.287
		(AC-FT)	1183.	1359.	1359.	1359.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	5.00	750.00	1757.50	345.00	.14	4.95

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN .08 1.64 5.00 1757.50 345.00 .14

CONTINUITY SUMMARY (AC-FT) - INFLOW= .6593E+03 EXCESS= .0000E+00 OUTFLOW= .6594E+03 BASIN STORAGE= .1003E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .44

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	1655.	*	1		1230	151	63.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	1638.	*	1		1235	152	59.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	1616.	*	1		1240	153	56.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	1596.	*	1		1245	154	52.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	1573.	*	1		1250	155	49.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	1551.	*	1		1255	156	46.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	1526.	*	1		1300	157	44.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	1502.	*	1		1305	158	41.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	1478.	*	1		1310	159	39.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	1455.	*	1		1315	160	37.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	1434.	*	1		1320	161	35.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	1412.	*	1		1325	162	33.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	1390.	*	1		1330	163	31.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	1367.	*	1		1335	164	29.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	1343.	*	1		1340	165	27.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	1317.	*	1		1345	166	26.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	1291.	*	1		1350	167	24.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	1264.	*	1		1355	168	23.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	1235.	*	1		1400	169	21.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	1205.	*	1		1405	170	20.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	1176.	*	1		1410	171	19.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	1147.	*	1		1415	172	18.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	1118.	*	1		1420	173	16.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	1089.	*	1		1425	174	15.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	1061.	*	1		1430	175	14.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	1034.	*	1		1435	176	13.	*	1		2050	251	0.
1		0210	27	0.	*	1		0825	102	1006.	*	1		1440	177	13.	*	1		2055	252	0.
1		0215	28	0.	*	1		0830	103	979.	*	1		1445	178	12.	*	1		2100	253	0.
1		0220	29	0.	*	1		0835	104	953.	*	1		1450	179	11.	*	1		2105	254	0.
1		0225	30	0.	*	1		0840	105	926.	*	1		1455	180	10.	*	1		2110	255	0.
1		0230	31	0.	*	1		0845	106	901.	*	1		1500	181	10.	*	1		2115	256	0.
1		0235	32	0.	*	1		0850	107	875.	*	1		1505	182	9.	*	1		2120	257	0.
1		0240	33	0.	*	1		0855	108	849.	*	1		1510	183	8.	*	1		2125	258	0.
1		0245	34	0.	*	1		0900	109	821.	*	1		1515	184	8.	*	1		2130	259	0.
1		0250	35	0.	*	1		0905	110	791.	*	1		1520	185	7.	*	1		2135	260	0.
1		0255	36	0.	*	1		0910	111	760.	*	1		1525	186	7.	*	1		2140	261	0.
1		0300	37	0.	*	1		0915	112	731.	*	1		1530	187	7.	*	1		2145	262	0.
1		0305	38	0.	*	1		0920	113	704.	*	1		1535	188	6.	*	1		2150	263	0.
1		0310	39	1.	*	1		0925	114	677.	*	1		1540	189	6.	*	1		2155	264	0.
1		0315	40	2.	*	1		0930	115	651.	*	1		1545	190	5.	*	1		2200	265	0.
1		0320	41	5.	*	1		0935	116	626.	*	1		1550	191	5.	*	1		2205	266	0.
1		0325	42	11.	*	1		0940	117	602.	*	1		1555	192	5.	*	1		2210	267	0.
1		0330	43	22.	*	1		0945	118	579.	*	1		1600	193	4.	*	1		2215	268	0.
1		0335	44	44.	*	1		0950	119	556.	*	1		1605	194	4.	*	1		2220	269	0.
1		0340	45	82.	*	1		0955	120	533.	*	1		1610	195	4.	*	1		2225	270	0.
1		0345	46	141.	*	1		1000	121	509.	*	1		1615	196	4.	*	1		2230	271	0.
1		0350	47	244.	*	1		1005	122	481.	*	1		1620	197	3.	*	1		2235	272	0.
1		0355	48	368.	*	1		1010	123	450.	*	1		1625	198	3.	*	1		2240	273	0.
1		0400	49	509.	*	1		1015	124	420.	*	1		1630	199	3.	*	1		2245	274	0.
1		0405	50	656.	*	1		1020	125	394.	*	1		1635	200	3.	*	1		2250	275	0.
1		0410	51	780.	*	1		1025	126	371.	*	1		1640	201	3.	*	1		2255	276	0.
1		0415	52	883.	*	1		1030	127	348.	*	1		1645	202	3.	*	1		2300	277	0.
1		0420	53	967.	*	1		1035	128	328.	*	1		1650	203	2.	*	1		2305	278	0.
1		0425	54	1038.	*	1		1040	129	309.	*	1		1655	204	2.	*	1		2310	279	0.
1		0430	55	1098.	*	1		1045	130	291.	*	1		1700	205	2.	*	1		2315	280	0.
1		0435	56	1154.	*	1		1050	131	275.	*	1		1705	206	2.	*	1		2320	281	0.
1		0440	57	1208.	*	1		1055	132	259.	*	1		1710	207	2.	*	1		2325	282	0.
1		0445	58	1254.	*	1		1100	133	245.	*	1		1715	208	2.	*	1		2330	283	0.
1		0450	59	1287.	*	1		1105	134	232.	*	1		1720	209	2.	*	1		2335	284	0.
1		0455	60	1326.	*	1		1110	135	218.	*	1		1725	210	2.	*	1		2340	285	0.
1		0500	61	1388.	*	1		1115	136	202.	*	1		1730	211	1.	*	1		2345	286	0.
1		0505	62	1454.	*	1		1120	137	183.	*	1		1735	212	1.	*	1		2350	287	0.
1		0510	63	1522.	*	1		1125	138	166.	*	1		1740	213	1.	*	1		2355	288	0.
1		0515	64	1586.	*	1		1130	139	152.	*	1		1745	214	1.	*	2		0000	289	0.
1		0520	65	1640.	*	1		1135	140	139.	*	1		1750	215	1.	*	2		0005	290	0.

1	0525	66	1678.	*	1	1140	141	127.	*	1	1755	216	1.	*	2	0010	291	0.
1	0530	67	1700.	*	1	1145	142	117.	*	1	1800	217	1.	*	2	0015	292	0.
1	0535	68	1718.	*	1	1150	143	108.	*	1	1805	218	1.	*	2	0020	293	0.
1	0540	69	1741.	*	1	1155	144	100.	*	1	1810	219	1.	*	2	0025	294	0.
1	0545	70	1757.	*	1	1200	145	93.	*	1	1815	220	1.	*	2	0030	295	0.
1	0550	71	1747.	*	1	1205	146	87.	*	1	1820	221	1.	*	2	0035	296	0.
1	0555	72	1721.	*	1	1210	147	81.	*	1	1825	222	1.	*	2	0040	297	0.
1	0600	73	1706.	*	1	1215	148	76.	*	1	1830	223	1.	*	2	0045	298	0.
1	0605	74	1693.	*	1	1220	149	71.	*	1	1835	224	1.	*	2	0050	299	0.
1	0610	75	1672.	*	1	1225	150	67.	*	1	1840	225	1.	*	2	0055	300	0.
				*					*					*				

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 1757.	5.75	1207.	332.	320.	320.
		(INCHES) .126	.139	.139	.139
		(AC-FT) 598.	659.	659.	659.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	5.00	375.00	286.45	355.00	.02	2.45
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		286.45	355.00	.02	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8690E+02 EXCESS= .0000E+00 OUTFLOW= .8692E+02 BASIN STORAGE= .4200E-01 PERCENT ERROR= -.1

HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .26

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	253.	*	1		1230	151	27.	*	1		1845	226	2.
1		0005	2	0.	*	1		0620	77	250.	*	1		1235	152	26.	*	1		1850	227	2.
1		0010	3	0.	*	1		0625	78	243.	*	1		1240	153	26.	*	1		1855	228	2.
1		0015	4	0.	*	1		0630	79	240.	*	1		1245	154	25.	*	1		1900	229	2.
1		0020	5	0.	*	1		0635	80	237.	*	1		1250	155	24.	*	1		1905	230	2.
1		0025	6	0.	*	1		0640	81	229.	*	1		1255	156	23.	*	1		1910	231	2.
1		0030	7	0.	*	1		0645	82	222.	*	1		1300	157	22.	*	1		1915	232	2.
1		0035	8	0.	*	1		0650	83	211.	*	1		1305	158	22.	*	1		1920	233	2.
1		0040	9	0.	*	1		0655	84	201.	*	1		1310	159	21.	*	1		1925	234	2.
1		0045	10	0.	*	1		0700	85	190.	*	1		1315	160	20.	*	1		1930	235	1.
1		0050	11	0.	*	1		0705	86	179.	*	1		1320	161	20.	*	1		1935	236	1.
1		0055	12	0.	*	1		0710	87	168.	*	1		1325	162	19.	*	1		1940	237	1.
1		0100	13	0.	*	1		0715	88	158.	*	1		1330	163	19.	*	1		1945	238	1.
1		0105	14	0.	*	1		0720	89	148.	*	1		1335	164	18.	*	1		1950	239	1.
1		0110	15	0.	*	1		0725	90	139.	*	1		1340	165	17.	*	1		1955	240	1.
1		0115	16	0.	*	1		0730	91	131.	*	1		1345	166	17.	*	1		2000	241	1.
1		0120	17	0.	*	1		0735	92	122.	*	1		1350	167	17.	*	1		2005	242	1.
1		0125	18	0.	*	1		0740	93	115.	*	1		1355	168	16.	*	1		2010	243	1.
1		0130	19	0.	*	1		0745	94	108.	*	1		1400	169	16.	*	1		2015	244	1.
1		0135	20	0.	*	1		0750	95	102.	*	1		1405	170	15.	*	1		2020	245	1.
1		0140	21	0.	*	1		0755	96	97.	*	1		1410	171	15.	*	1		2025	246	1.
1		0145	22	0.	*	1		0800	97	96.	*	1		1415	172	14.	*	1		2030	247	1.
1		0150	23	0.	*	1		0805	98	101.	*	1		1420	173	14.	*	1		2035	248	1.
1		0155	24	0.	*	1		0810	99	115.	*	1		1425	174	14.	*	1		2040	249	1.
1		0200	25	0.	*	1		0815	100	130.	*	1		1430	175	13.	*	1		2045	250	1.
1		0205	26	0.	*	1		0820	101	129.	*	1		1435	176	13.	*	1		2050	251	1.
1		0210	27	0.	*	1		0825	102	118.	*	1		1440	177	12.	*	1		2055	252	1.
1		0215	28	0.	*	1		0830	103	113.	*	1		1445	178	12.	*	1		2100	253	1.
1		0220	29	0.	*	1		0835	104	112.	*	1		1450	179	12.	*	1		2105	254	1.
1		0225	30	0.	*	1		0840	105	108.	*	1		1455	180	11.	*	1		2110	255	1.

1	0230	31	0.	*	1	0845	106	103.	*	1	1500	181	11.	*	1	2115	256	1.
1	0235	32	0.	*	1	0850	107	103.	*	1	1505	182	11.	*	1	2120	257	1.
1	0240	33	0.	*	1	0855	108	103.	*	1	1510	183	10.	*	1	2125	258	1.
1	0245	34	0.	*	1	0900	109	105.	*	1	1515	184	10.	*	1	2130	259	1.
1	0250	35	0.	*	1	0905	110	109.	*	1	1520	185	10.	*	1	2135	260	1.
1	0255	36	0.	*	1	0910	111	108.	*	1	1525	186	9.	*	1	2140	261	1.
1	0300	37	0.	*	1	0915	112	102.	*	1	1530	187	9.	*	1	2145	262	0.
1	0305	38	0.	*	1	0920	113	98.	*	1	1535	188	9.	*	1	2150	263	0.
1	0310	39	0.	*	1	0925	114	95.	*	1	1540	189	8.	*	1	2155	264	0.
1	0315	40	0.	*	1	0930	115	94.	*	1	1545	190	8.	*	1	2200	265	0.
1	0320	41	0.	*	1	0935	116	93.	*	1	1550	191	8.	*	1	2205	266	0.
1	0325	42	0.	*	1	0940	117	88.	*	1	1555	192	8.	*	1	2210	267	0.
1	0330	43	0.	*	1	0945	118	83.	*	1	1600	193	7.	*	1	2215	268	0.
1	0335	44	0.	*	1	0950	119	80.	*	1	1605	194	7.	*	1	2220	269	0.
1	0340	45	0.	*	1	0955	120	78.	*	1	1610	195	7.	*	1	2225	270	0.
1	0345	46	0.	*	1	1000	121	76.	*	1	1615	196	7.	*	1	2230	271	0.
1	0350	47	0.	*	1	1005	122	73.	*	1	1620	197	6.	*	1	2235	272	0.
1	0355	48	1.	*	1	1010	123	69.	*	1	1625	198	6.	*	1	2240	273	0.
1	0400	49	3.	*	1	1015	124	66.	*	1	1630	199	6.	*	1	2245	274	0.
1	0405	50	7.	*	1	1020	125	64.	*	1	1635	200	6.	*	1	2250	275	0.
1	0410	51	12.	*	1	1025	126	63.	*	1	1640	201	5.	*	1	2255	276	0.
1	0415	52	19.	*	1	1030	127	62.	*	1	1645	202	5.	*	1	2300	277	0.
1	0420	53	31.	*	1	1035	128	59.	*	1	1650	203	5.	*	1	2305	278	0.
1	0425	54	45.	*	1	1040	129	57.	*	1	1655	204	5.	*	1	2310	279	0.
1	0430	55	61.	*	1	1045	130	57.	*	1	1700	205	5.	*	1	2315	280	0.
1	0435	56	79.	*	1	1050	131	56.	*	1	1705	206	4.	*	1	2320	281	0.
1	0440	57	95.	*	1	1055	132	54.	*	1	1710	207	4.	*	1	2325	282	0.
1	0445	58	103.	*	1	1100	133	51.	*	1	1715	208	4.	*	1	2330	283	0.
1	0450	59	112.	*	1	1105	134	49.	*	1	1720	209	4.	*	1	2335	284	0.
1	0455	60	119.	*	1	1110	135	48.	*	1	1725	210	4.	*	1	2340	285	0.
1	0500	61	126.	*	1	1115	136	46.	*	1	1730	211	4.	*	1	2345	286	0.
1	0505	62	136.	*	1	1120	137	44.	*	1	1735	212	4.	*	1	2350	287	0.
1	0510	63	149.	*	1	1125	138	43.	*	1	1740	213	3.	*	1	2355	288	0.
1	0515	64	165.	*	1	1130	139	42.	*	1	1745	214	3.	*	2	0000	289	0.
1	0520	65	184.	*	1	1135	140	40.	*	1	1750	215	3.	*	2	0005	290	0.
1	0525	66	210.	*	1	1140	141	39.	*	1	1755	216	3.	*	2	0010	291	0.
1	0530	67	244.	*	1	1145	142	37.	*	1	1800	217	3.	*	2	0015	292	0.
1	0535	68	274.	*	1	1150	143	36.	*	1	1805	218	3.	*	2	0020	293	0.
1	0540	69	282.	*	1	1155	144	35.	*	1	1810	219	3.	*	2	0025	294	0.
1	0545	70	279.	*	1	1200	145	34.	*	1	1815	220	3.	*	2	0030	295	0.
1	0550	71	285.	*	1	1205	146	32.	*	1	1820	221	2.	*	2	0035	296	0.
1	0555	72	286.	*	1	1210	147	31.	*	1	1825	222	2.	*	2	0040	297	0.
1	0600	73	275.	*	1	1215	148	30.	*	1	1830	223	2.	*	2	0045	298	0.
1	0605	74	269.	*	1	1220	149	29.	*	1	1835	224	2.	*	2	0050	299	0.
1	0610	75	262.	*	1	1225	150	28.	*	1	1840	225	2.	*	2	0055	300	0.
				*					*					*				

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
+ 286.	5.92		148.	44.	42.	42.
		(INCHES)	.015	.018	.018	.018
		(AC-FT)	73.	87.	87.	87.

CUMULATIVE AREA = 88.86 SQ MI

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   05JAN09  TIME  14:28:18  *
*                                      *
****************************************
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```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (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
```

*** FREE ***
*** NOLIST ***


```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN  1998               *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   05JAN09  TIME  14:28:18  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
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KLEINFELDER
FEBRUARY 2008
ALTERNATIVE B

DESIGN STORM = 100-YEAR 6-HOUR STORM
STORM DISTRIBUTION = SDN5

```
  10 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  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        300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2   0  ENDING DATE
                     NDTIME       0055  ENDING TIME
                      ICENT         19  CENTURY MARK

                   COMPUTATION INTERVAL      .08 HOURS
                       TOTAL TIME BASE   24.92 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           1  NUMBER OF PLANS

     JR         MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                  1.00       .87       .74       .57       .44       .26


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


           **************
           *            *
1250 KK    *     ULWIN  *
           *            *
           **************

1254 KO         OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL           0.  HYDROGRAPH PLOT SCALE

1253 HC         HYDROGRAPH COMBINATION
                     ICOMP           4  NUMBER OF HYDROGRAPHS TO COMBINE

                                                  ***
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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = 1.00

****

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	8250.	1		1230	151	5.	1		1845	226	0.
1		0005	2	0.	1		0620	77	7575.	1		1235	152	4.	1		1850	227	0.
1		0010	3	0.	1		0625	78	6943.	1		1240	153	4.	1		1855	228	0.
1		0015	4	0.	1		0630	79	6357.	1		1245	154	3.	1		1900	229	0.
1		0020	5	0.	1		0635	80	5826.	1		1250	155	3.	1		1905	230	0.
1		0025	6	0.	1		0640	81	5346.	1		1255	156	2.	1		1910	231	0.
1		0030	7	0.	1		0645	82	4909.	1		1300	157	2.	1		1915	232	0.
1		0035	8	0.	1		0650	83	4510.	1		1305	158	2.	1		1920	233	0.
1		0040	9	0.	1		0655	84	4147.	1		1310	159	1.	1		1925	234	0.
1		0045	10	0.	1		0700	85	3815.	1		1315	160	1.	1		1930	235	0.
1		0050	11	1.	1		0705	86	3507.	1		1320	161	1.	1		1935	236	0.
1		0055	12	2.	1		0710	87	3223.	1		1325	162	1.	1		1940	237	0.
1		0100	13	4.	1		0715	88	2959.	1		1330	163	1.	1		1945	238	0.
1		0105	14	6.	1		0720	89	2716.	1		1335	164	1.	1		1950	239	0.
1		0110	15	9.	1		0725	90	2491.	1		1340	165	1.	1		1955	240	0.
1		0115	16	12.	1		0730	91	2285.	1		1345	166	1.	1		2000	241	0.
1		0120	17	16.	1		0735	92	2095.	1		1350	167	0.	1		2005	242	0.
1		0125	18	20.	1		0740	93	1922.	1		1355	168	0.	1		2010	243	0.
1		0130	19	25.	1		0745	94	1763.	1		1400	169	0.	1		2015	244	0.
1		0135	20	31.	1		0750	95	1618.	1		1405	170	0.	1		2020	245	0.
1		0140	21	38.	1		0755	96	1485.	1		1410	171	0.	1		2025	246	0.
1		0145	22	46.	1		0800	97	1364.	1		1415	172	0.	1		2030	247	0.
1		0150	23	55.	1		0805	98	1255.	1		1420	173	0.	1		2035	248	0.
1		0155	24	65.	1		0810	99	1156.	1		1425	174	0.	1		2040	249	0.
1		0200	25	77.	1		0815	100	1065.	1		1430	175	0.	1		2045	250	0.
1		0205	26	93.	1		0820	101	979.	1		1435	176	0.	1		2050	251	0.
1		0210	27	112.	1		0825	102	896.	1		1440	177	0.	1		2055	252	0.
1		0215	28	137.	1		0830	103	818.	1		1445	178	0.	1		2100	253	0.
1		0220	29	166.	1		0835	104	746.	1		1450	179	0.	1		2105	254	0.
1		0225	30	200.	1		0840	105	678.	1		1455	180	0.	1		2110	255	0.
1		0230	31	237.	1		0845	106	615.	1		1500	181	0.	1		2115	256	0.
1		0235	32	275.	1		0850	107	558.	1		1505	182	0.	1		2120	257	0.
1		0240	33	313.	1		0855	108	505.	1		1510	183	0.	1		2125	258	0.
1		0245	34	351.	1		0900	109	457.	1		1515	184	0.	1		2130	259	0.
1		0250	35	387.	1		0905	110	414.	1		1520	185	0.	1		2135	260	0.

1	0255	36	426.	*	1	0910	111	375.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	470.	*	1	0915	112	341.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	525.	*	1	0920	113	309.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	599.	*	1	0925	114	281.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	696.	*	1	0930	115	255.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	826.	*	1	0935	116	231.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	1000.	*	1	0940	117	210.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	1235.	*	1	0945	118	190.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	1555.	*	1	0950	119	172.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	1975.	*	1	0955	120	155.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	2477.	*	1	1000	121	140.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	3021.	*	1	1005	122	126.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	3559.	*	1	1010	123	114.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	4096.	*	1	1015	124	103.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	4917.	*	1	1020	125	92.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	6451.	*	1	1025	126	83.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	8595.	*	1	1030	127	75.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	10813.	*	1	1035	128	67.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	12706.	*	1	1040	129	60.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	14049.	*	1	1045	130	54.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	14729.	*	1	1050	131	49.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	14835.	*	1	1055	132	43.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	14555.	*	1	1100	133	39.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	14028.	*	1	1105	134	35.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	13424.	*	1	1110	135	31.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	12906.	*	1	1115	136	28.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	12498.	*	1	1120	137	25.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	12193.	*	1	1125	138	22.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	12003.	*	1	1130	139	20.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	11901.	*	1	1135	140	18.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	11858.	*	1	1140	141	16.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	11864.	*	1	1145	142	14.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	11877.	*	1	1150	143	12.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	11826.	*	1	1155	144	11.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	11664.	*	1	1200	145	10.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	11358.	*	1	1205	146	9.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	10891.	*	1	1210	147	8.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	10305.	*	1	1215	148	7.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	9650.	*	1	1220	149	6.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	8953.	*	1	1225	150	5.	*	1	1840	225	0.	*	2	0055	300	0.

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 14835.	4.67		5795.	1476.	1422.	1422.
		(INCHES)	.916	.933	.933	.933
		(AC-FT)	2874.	2928.	2928.	2928.

CUMULATIVE AREA = 58.84 SQ MI

HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .87

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	6853.	*	1		1230	151	7.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	6339.	*	1		1235	152	6.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	5841.	*	1		1240	153	5.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	5373.	*	1		1245	154	5.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	4938.	*	1		1250	155	4.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	4537.	*	1		1255	156	4.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	4171.	*	1		1300	157	3.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	3837.	*	1		1305	158	3.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	3534.	*	1		1310	159	2.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	3258.	*	1		1315	160	2.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	3006.	*	1		1320	161	2.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	2771.	*	1		1325	162	2.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	2554.	*	1		1330	163	1.	*	1		1945	238	0.
1		0105	14	1.	*	1		0720	89	2354.	*	1		1335	164	1.	*	1		1950	239	0.
1		0110	15	1.	*	1		0725	90	2169.	*	1		1340	165	1.	*	1		1955	240	0.
1		0115	16	2.	*	1		0730	91	1997.	*	1		1345	166	1.	*	1		2000	241	0.
1		0120	17	3.	*	1		0735	92	1838.	*	1		1350	167	1.	*	1		2005	242	0.

1	0125	18	4.	*	1	0740	93	1693.	*	1	1355	168	1.	*	1	2010	243	0.
1	0130	19	6.	*	1	0745	94	1559.	*	1	1400	169	1.	*	1	2015	244	0.
1	0135	20	8.	*	1	0750	95	1437.	*	1	1405	170	1.	*	1	2020	245	0.
1	0140	21	11.	*	1	0755	96	1326.	*	1	1410	171	0.	*	1	2025	246	0.
1	0145	22	15.	*	1	0800	97	1225.	*	1	1415	172	0.	*	1	2030	247	0.
1	0150	23	19.	*	1	0805	98	1132.	*	1	1420	173	0.	*	1	2035	248	0.
1	0155	24	25.	*	1	0810	99	1046.	*	1	1425	174	0.	*	1	2040	249	0.
1	0200	25	32.	*	1	0815	100	965.	*	1	1430	175	0.	*	1	2045	250	0.
1	0205	26	41.	*	1	0820	101	887.	*	1	1435	176	0.	*	1	2050	251	0.
1	0210	27	52.	*	1	0825	102	816.	*	1	1440	177	0.	*	1	2055	252	0.
1	0215	28	65.	*	1	0830	103	751.	*	1	1445	178	0.	*	1	2100	253	0.
1	0220	29	79.	*	1	0835	104	692.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	95.	*	1	0840	105	636.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	113.	*	1	0845	106	583.	*	1	1500	181	0.	*	1	2115	256	0.
1	0235	32	131.	*	1	0850	107	532.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	150.	*	1	0855	108	484.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	170.	*	1	0900	109	440.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	190.	*	1	0905	110	399.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	209.	*	1	0910	111	362.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	228.	*	1	0915	112	328.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	251.	*	1	0920	113	298.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	284.	*	1	0925	114	271.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	333.	*	1	0930	115	246.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	407.	*	1	0935	116	225.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	514.	*	1	0940	117	205.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	667.	*	1	0945	118	188.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	887.	*	1	0950	119	171.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	1192.	*	1	0955	120	157.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	1570.	*	1	1000	121	144.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	1989.	*	1	1005	122	131.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	2412.	*	1	1010	123	120.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	2789.	*	1	1015	124	110.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	3107.	*	1	1020	125	101.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	3407.	*	1	1025	126	92.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	4246.	*	1	1030	127	84.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	5902.	*	1	1035	128	77.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	7511.	*	1	1040	129	70.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	8747.	*	1	1045	130	64.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	9727.	*	1	1050	131	58.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	10371.	*	1	1055	132	53.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	10656.	*	1	1100	133	48.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	10629.	*	1	1105	134	43.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	10384.	*	1	1110	135	39.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	10056.	*	1	1115	136	35.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	9742.	*	1	1120	137	31.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	9499.	*	1	1125	138	28.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	9334.	*	1	1130	139	25.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	9239.	*	1	1135	140	23.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	9196.	*	1	1140	141	20.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	9187.	*	1	1145	142	18.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	9194.	*	1	1150	143	16.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	9182.	*	1	1155	144	15.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	9110.	*	1	1200	145	13.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	8950.	*	1	1205	146	12.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	8684.	*	1	1210	147	10.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	8319.	*	1	1215	148	9.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	7869.	*	1	1220	149	8.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	7370.	*	1	1225	150	7.	*	1	1840	225	0.	*	2	0055	300	0.

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 10656.	4.75		4371.	1113.	1072.	1072.
		(INCHES)	.691	.704	.704	.704
		(AC-FT)	2167.	2208.	2208.	2208.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .74

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DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW

1	0000	1	0.	*	1	0615	76	5375.	*	1	1230	151	10.	*	1	1845	226	0.
1	0005	2	0.	*	1	0620	77	5022.	*	1	1235	152	9.	*	1	1850	227	0.
1	0010	3	0.	*	1	0625	78	4672.	*	1	1240	153	8.	*	1	1855	228	0.
1	0015	4	0.	*	1	0630	79	4330.	*	1	1245	154	7.	*	1	1900	229	0.
1	0020	5	0.	*	1	0635	80	4003.	*	1	1250	155	7.	*	1	1905	230	0.
1	0025	6	0.	*	1	0640	81	3695.	*	1	1255	156	6.	*	1	1910	231	0.
1	0030	7	0.	*	1	0645	82	3409.	*	1	1300	157	5.	*	1	1915	232	0.
1	0035	8	0.	*	1	0650	83	3146.	*	1	1305	158	5.	*	1	1920	233	0.
1	0040	9	0.	*	1	0655	84	2904.	*	1	1310	159	4.	*	1	1925	234	0.
1	0045	10	0.	*	1	0700	85	2683.	*	1	1315	160	4.	*	1	1930	235	0.
1	0050	11	0.	*	1	0705	86	2479.	*	1	1320	161	3.	*	1	1935	236	0.
1	0055	12	0.	*	1	0710	87	2293.	*	1	1325	162	3.	*	1	1940	237	0.
1	0100	13	0.	*	1	0715	88	2121.	*	1	1330	163	3.	*	1	1945	238	0.
1	0105	14	0.	*	1	0720	89	1962.	*	1	1335	164	2.	*	1	1950	239	0.
1	0110	15	0.	*	1	0725	90	1815.	*	1	1340	165	2.	*	1	1955	240	0.
1	0115	16	0.	*	1	0730	91	1679.	*	1	1345	166	2.	*	1	2000	241	0.
1	0120	17	0.	*	1	0735	92	1554.	*	1	1350	167	2.	*	1	2005	242	0.
1	0125	18	0.	*	1	0740	93	1439.	*	1	1355	168	1.	*	1	2010	243	0.
1	0130	19	0.	*	1	0745	94	1333.	*	1	1400	169	1.	*	1	2015	244	0.
1	0135	20	1.	*	1	0750	95	1233.	*	1	1405	170	1.	*	1	2020	245	0.
1	0140	21	1.	*	1	0755	96	1142.	*	1	1410	171	1.	*	1	2025	246	0.
1	0145	22	2.	*	1	0800	97	1057.	*	1	1415	172	1.	*	1	2030	247	0.
1	0150	23	4.	*	1	0805	98	979.	*	1	1420	173	1.	*	1	2035	248	0.
1	0155	24	6.	*	1	0810	99	908.	*	1	1425	174	1.	*	1	2040	249	0.
1	0200	25	9.	*	1	0815	100	842.	*	1	1430	175	1.	*	1	2045	250	0.
1	0205	26	12.	*	1	0820	101	782.	*	1	1435	176	1.	*	1	2050	251	0.
1	0210	27	17.	*	1	0825	102	726.	*	1	1440	177	0.	*	1	2055	252	0.
1	0215	28	22.	*	1	0830	103	675.	*	1	1445	178	0.	*	1	2100	253	0.
1	0220	29	29.	*	1	0835	104	629.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	38.	*	1	0840	105	586.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	47.	*	1	0845	106	546.	*	1	1500	181	0.	*	1	2115	256	0.
1	0235	32	56.	*	1	0850	107	508.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	66.	*	1	0855	108	472.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	74.	*	1	0900	109	439.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	82.	*	1	0905	110	409.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	90.	*	1	0910	111	381.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	98.	*	1	0915	112	352.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	107.	*	1	0920	113	323.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	118.	*	1	0925	114	296.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	135.	*	1	0930	115	271.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	160.	*	1	0935	116	248.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	203.	*	1	0940	117	227.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	269.	*	1	0945	118	208.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	371.	*	1	0950	119	191.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	534.	*	1	0955	120	175.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	771.	*	1	1000	121	160.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	1065.	*	1	1005	122	147.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	1384.	*	1	1010	123	135.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	1682.	*	1	1015	124	124.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	1913.	*	1	1020	125	114.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	2066.	*	1	1025	126	105.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	2154.	*	1	1030	127	97.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	2252.	*	1	1035	128	89.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	2913.	*	1	1040	129	82.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	4425.	*	1	1045	130	75.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	5389.	*	1	1050	131	69.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	5835.	*	1	1055	132	63.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	6383.	*	1	1100	133	57.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	6807.	*	1	1105	134	52.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	7050.	*	1	1110	135	48.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	7115.	*	1	1115	136	43.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	7054.	*	1	1120	137	40.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	6917.	*	1	1125	138	36.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	6780.	*	1	1130	139	33.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	6683.	*	1	1135	140	30.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	6628.	*	1	1140	141	27.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	6600.	*	1	1145	142	24.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	6594.	*	1	1150	143	22.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	6592.	*	1	1155	144	20.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	6588.	*	1	1200	145	18.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	6545.	*	1	1205	146	17.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	6436.	*	1	1210	147	15.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	6258.	*	1	1215	148	14.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	6011.	*	1	1220	149	12.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	5711.	*	1	1225	150	11.	*	1	1840	225	0.	*	2	0055	300	0.

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR

+	(CFS)	(HR)					
			(CFS)				
+	7115.	5.00		3069.	783.	754.	754.
			(INCHES)	.485	.495	.495	.495
			(AC-FT)	1522.	1553.	1553.	1553.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .57

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	3219.	*	1		1230	151	15.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	3097.	*	1		1235	152	14.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	2965.	*	1		1240	153	13.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	2826.	*	1		1245	154	12.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	2674.	*	1		1250	155	11.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	2516.	*	1		1255	156	10.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	2354.	*	1		1300	157	9.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	2193.	*	1		1305	158	8.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	2038.	*	1		1310	159	8.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	1892.	*	1		1315	160	7.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	1756.	*	1		1320	161	7.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	1633.	*	1		1325	162	6.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	1519.	*	1		1330	163	6.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	1413.	*	1		1335	164	5.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	1315.	*	1		1340	165	5.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	1221.	*	1		1345	166	4.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	1135.	*	1		1350	167	4.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	1055.	*	1		1355	168	4.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	983.	*	1		1400	169	3.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	917.	*	1		1405	170	3.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	856.	*	1		1410	171	3.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	798.	*	1		1415	172	2.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	745.	*	1		1420	173	2.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	697.	*	1		1425	174	2.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	652.	*	1		1430	175	2.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	610.	*	1		1435	176	2.	*	1		2050	251	0.
1		0210	27	1.	*	1		0825	102	572.	*	1		1440	177	1.	*	1		2055	252	0.
1		0215	28	2.	*	1		0830	103	536.	*	1		1445	178	1.	*	1		2100	253	0.
1		0220	29	3.	*	1		0835	104	501.	*	1		1450	179	1.	*	1		2105	254	0.
1		0225	30	4.	*	1		0840	105	470.	*	1		1455	180	1.	*	1		2110	255	0.
1		0230	31	6.	*	1		0845	106	440.	*	1		1500	181	1.	*	1		2115	256	0.
1		0235	32	8.	*	1		0850	107	413.	*	1		1505	182	1.	*	1		2120	257	0.
1		0240	33	11.	*	1		0855	108	387.	*	1		1510	183	1.	*	1		2125	258	0.
1		0245	34	13.	*	1		0900	109	362.	*	1		1515	184	1.	*	1		2130	259	0.
1		0250	35	15.	*	1		0905	110	339.	*	1		1520	185	1.	*	1		2135	260	0.
1		0255	36	18.	*	1		0910	111	317.	*	1		1525	186	1.	*	1		2140	261	0.
1		0300	37	20.	*	1		0915	112	296.	*	1		1530	187	0.	*	1		2145	262	0.
1		0305	38	23.	*	1		0920	113	277.	*	1		1535	188	0.	*	1		2150	263	0.
1		0310	39	28.	*	1		0925	114	258.	*	1		1540	189	0.	*	1		2155	264	0.
1		0315	40	34.	*	1		0930	115	242.	*	1		1545	190	0.	*	1		2200	265	0.
1		0320	41	43.	*	1		0935	116	226.	*	1		1550	191	0.	*	1		2205	266	0.
1		0325	42	58.	*	1		0940	117	211.	*	1		1555	192	0.	*	1		2210	267	0.
1		0330	43	82.	*	1		0945	118	196.	*	1		1600	193	0.	*	1		2215	268	0.
1		0335	44	116.	*	1		0950	119	182.	*	1		1605	194	0.	*	1		2220	269	0.
1		0340	45	166.	*	1		0955	120	169.	*	1		1610	195	0.	*	1		2225	270	0.
1		0345	46	230.	*	1		1000	121	156.	*	1		1615	196	0.	*	1		2230	271	0.
1		0350	47	309.	*	1		1005	122	144.	*	1		1620	197	0.	*	1		2235	272	0.
1		0355	48	454.	*	1		1010	123	133.	*	1		1625	198	0.	*	1		2240	273	0.
1		0400	49	645.	*	1		1015	124	123.	*	1		1630	199	0.	*	1		2245	274	0.
1		0405	50	818.	*	1		1020	125	114.	*	1		1635	200	0.	*	1		2250	275	0.
1		0410	51	947.	*	1		1025	126	105.	*	1		1640	201	0.	*	1		2255	276	0.
1		0415	52	1032.	*	1		1030	127	97.	*	1		1645	202	0.	*	1		2300	277	0.
1		0420	53	1069.	*	1		1035	128	90.	*	1		1650	203	0.	*	1		2305	278	0.
1		0425	54	1075.	*	1		1040	129	83.	*	1		1655	204	0.	*	1		2310	279	0.
1		0430	55	1061.	*	1		1045	130	77.	*	1		1700	205	0.	*	1		2315	280	0.
1		0435	56	1035.	*	1		1050	131	71.	*	1		1705	206	0.	*	1		2320	281	0.
1		0440	57	1022.	*	1		1055	132	66.	*	1		1710	207	0.	*	1		2325	282	0.
1		0445	58	1570.	*	1		1100	133	62.	*	1		1715	208	0.	*	1		2330	283	0.
1		0450	59	2548.	*	1		1105	134	57.	*	1		1720	209	0.	*	1		2335	284	0.
1		0455	60	2685.	*	1		1110	135	53.	*	1		1725	210	0.	*	1		2340	285	0.
1		0500	61	2825.	*	1		1115	136	50.	*	1		1730	211	0.	*	1		2345	286	0.
1		0505	62	2870.	*	1		1120	137	46.	*	1		1735	212	0.	*	1		2350	287	0.

1	0510	63	3139.	*	1	1125	138	43.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	3367.	*	1	1130	139	40.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	3538.	*	1	1135	140	37.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	3609.	*	1	1140	141	35.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	3607.	*	1	1145	142	32.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	3577.	*	1	1150	143	30.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	3513.	*	1	1155	144	27.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	3511.	*	1	1200	145	25.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	3545.	*	1	1205	146	23.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	3538.	*	1	1210	147	21.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	3493.	*	1	1215	148	20.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	3417.	*	1	1220	149	18.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	3322.	*	1	1225	150	17.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 3609.	5.42	1615.	415.	400.	400.
		(INCHES) .255	.262	.262	.262
		(AC-FT) 801.	824.	824.	824.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .44

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	1585.	*	1		1230	151	25.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	1523.	*	1		1235	152	23.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	1476.	*	1		1240	153	22.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	1406.	*	1		1245	154	21.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	1400.	*	1		1250	155	19.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	1344.	*	1		1255	156	18.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	1297.	*	1		1300	157	17.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	1267.	*	1		1305	158	16.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	1225.	*	1		1310	159	15.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	1178.	*	1		1315	160	14.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	1110.	*	1		1320	161	13.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	1061.	*	1		1325	162	12.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	1004.	*	1		1330	163	11.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	931.	*	1		1335	164	10.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	874.	*	1		1340	165	10.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	824.	*	1		1345	166	9.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	770.	*	1		1350	167	8.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	719.	*	1		1355	168	8.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	682.	*	1		1400	169	7.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	641.	*	1		1405	170	7.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	600.	*	1		1410	171	6.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	565.	*	1		1415	172	6.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	533.	*	1		1420	173	6.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	499.	*	1		1425	174	5.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	470.	*	1		1430	175	5.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	443.	*	1		1435	176	5.	*	1		2050	251	0.
1		0210	27	0.	*	1		0825	102	415.	*	1		1440	177	4.	*	1		2055	252	0.
1		0215	28	0.	*	1		0830	103	391.	*	1		1445	178	4.	*	1		2100	253	0.
1		0220	29	0.	*	1		0835	104	369.	*	1		1450	179	4.	*	1		2105	254	0.
1		0225	30	0.	*	1		0840	105	347.	*	1		1455	180	4.	*	1		2110	255	0.
1		0230	31	0.	*	1		0845	106	327.	*	1		1500	181	3.	*	1		2115	256	0.
1		0235	32	0.	*	1		0850	107	310.	*	1		1505	182	3.	*	1		2120	257	0.
1		0240	33	0.	*	1		0855	108	293.	*	1		1510	183	3.	*	1		2125	258	0.
1		0245	34	0.	*	1		0900	109	277.	*	1		1515	184	3.	*	1		2130	259	0.
1		0250	35	0.	*	1		0905	110	263.	*	1		1520	185	3.	*	1		2135	260	0.
1		0255	36	0.	*	1		0910	111	249.	*	1		1525	186	2.	*	1		2140	261	0.
1		0300	37	1.	*	1		0915	112	236.	*	1		1530	187	2.	*	1		2145	262	0.
1		0305	38	1.	*	1		0920	113	223.	*	1		1535	188	2.	*	1		2150	263	0.
1		0310	39	1.	*	1		0925	114	211.	*	1		1540	189	2.	*	1		2155	264	0.
1		0315	40	2.	*	1		0930	115	201.	*	1		1545	190	2.	*	1		2200	265	0.
1		0320	41	4.	*	1		0935	116	191.	*	1		1550	191	2.	*	1		2205	266	0.
1		0325	42	6.	*	1		0940	117	182.	*	1		1555	192	2.	*	1		2210	267	0.
1		0330	43	12.	*	1		0945	118	174.	*	1		1600	193	1.	*	1		2215	268	0.
1		0335	44	25.	*	1		0950	119	165.	*	1		1605	194	1.	*	1		2220	269	0.

1	0340	45	44.	*	1	0955	120	157.	*	1	1610	195	1.	*	1	2225	270	0.
1	0345	46	71.	*	1	1000	121	149.	*	1	1615	196	1.	*	1	2230	271	0.
1	0350	47	104.	*	1	1005	122	142.	*	1	1620	197	1.	*	1	2235	272	0.
1	0355	48	139.	*	1	1010	123	135.	*	1	1625	198	1.	*	1	2240	273	0.
1	0400	49	177.	*	1	1015	124	129.	*	1	1630	199	1.	*	1	2245	274	0.
1	0405	50	217.	*	1	1020	125	122.	*	1	1635	200	1.	*	1	2250	275	0.
1	0410	51	322.	*	1	1025	126	117.	*	1	1640	201	1.	*	1	2255	276	0.
1	0415	52	427.	*	1	1030	127	111.	*	1	1645	202	1.	*	1	2300	277	0.
1	0420	53	469.	*	1	1035	128	106.	*	1	1650	203	1.	*	1	2305	278	0.
1	0425	54	496.	*	1	1040	129	101.	*	1	1655	204	1.	*	1	2310	279	0.
1	0430	55	499.	*	1	1045	130	96.	*	1	1700	205	1.	*	1	2315	280	0.
1	0435	56	493.	*	1	1050	131	91.	*	1	1705	206	1.	*	1	2320	281	0.
1	0440	57	479.	*	1	1055	132	86.	*	1	1710	207	1.	*	1	2325	282	0.
1	0445	58	461.	*	1	1100	133	81.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	444.	*	1	1105	134	76.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	432.	*	1	1110	135	72.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	427.	*	1	1115	136	68.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	432.	*	1	1120	137	63.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	451.	*	1	1125	138	59.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	1085.	*	1	1130	139	55.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	1369.	*	1	1135	140	52.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	1165.	*	1	1140	141	48.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	1462.	*	1	1145	142	45.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	1234.	*	1	1150	143	42.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	1382.	*	1	1155	144	39.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	1432.	*	1	1200	145	37.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	1449.	*	1	1205	146	34.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	1715.	*	1	1210	147	32.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	1689.	*	1	1215	148	30.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	1672.	*	1	1220	149	28.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	1582.	*	1	1225	150	27.	*	1	1840	225	0.	*	2	0055	300	0.

	PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
				6-HR	24-HR	72-HR	24.92-HR
+	(CFS)	(HR)					
			(CFS)				
+	1715.	5.92		748.	198.	190.	190.
			(INCHES)	.118	.125	.125	.125
			(AC-FT)	371.	392.	392.	392.

CUMULATIVE AREA = 58.84 SQ MI

HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .26

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	71.	*	1		1230	151	20.	*	1		1845	226	1.
1		0005	2	0.	*	1		0620	77	63.	*	1		1235	152	19.	*	1		1850	227	1.
1		0010	3	0.	*	1		0625	78	57.	*	1		1240	153	19.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	51.	*	1		1245	154	18.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	46.	*	1		1250	155	17.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	41.	*	1		1255	156	17.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	37.	*	1		1300	157	16.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	33.	*	1		1305	158	16.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	30.	*	1		1310	159	15.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	29.	*	1		1315	160	15.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	137.	*	1		1320	161	14.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	177.	*	1		1325	162	14.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	130.	*	1		1330	163	13.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	147.	*	1		1335	164	13.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	132.	*	1		1340	165	12.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	210.	*	1		1345	166	12.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	160.	*	1		1350	167	11.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	165.	*	1		1355	168	11.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	180.	*	1		1400	169	10.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	156.	*	1		1405	170	10.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	165.	*	1		1410	171	9.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	137.	*	1		1415	172	9.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	145.	*	1		1420	173	9.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	108.	*	1		1425	174	8.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	126.	*	1		1430	175	8.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	128.	*	1		1435	176	8.	*	1		2050	251	0.

1	0210	27	0.	*	1	0825	102	119.	*	1	1440	177	7.	*	1	2055	252	0.
1	0215	28	0.	*	1	0830	103	118.	*	1	1445	178	7.	*	1	2100	253	0.
1	0220	29	0.	*	1	0835	104	110.	*	1	1450	179	7.	*	1	2105	254	0.
1	0225	30	0.	*	1	0840	105	110.	*	1	1455	180	6.	*	1	2110	255	0.
1	0230	31	0.	*	1	0845	106	97.	*	1	1500	181	6.	*	1	2115	256	0.
1	0235	32	0.	*	1	0850	107	112.	*	1	1505	182	6.	*	1	2120	257	0.
1	0240	33	0.	*	1	0855	108	103.	*	1	1510	183	6.	*	1	2125	258	0.
1	0245	34	0.	*	1	0900	109	105.	*	1	1515	184	5.	*	1	2130	259	0.
1	0250	35	0.	*	1	0905	110	107.	*	1	1520	185	5.	*	1	2135	260	0.
1	0255	36	0.	*	1	0910	111	105.	*	1	1525	186	5.	*	1	2140	261	0.
1	0300	37	0.	*	1	0915	112	94.	*	1	1530	187	5.	*	1	2145	262	0.
1	0305	38	0.	*	1	0920	113	88.	*	1	1535	188	4.	*	1	2150	263	0.
1	0310	39	0.	*	1	0925	114	80.	*	1	1540	189	4.	*	1	2155	264	0.
1	0315	40	0.	*	1	0930	115	78.	*	1	1545	190	4.	*	1	2200	265	0.
1	0320	41	0.	*	1	0935	116	83.	*	1	1550	191	4.	*	1	2205	266	0.
1	0325	42	0.	*	1	0940	117	82.	*	1	1555	192	4.	*	1	2210	267	0.
1	0330	43	0.	*	1	0945	118	77.	*	1	1600	193	3.	*	1	2215	268	0.
1	0335	44	0.	*	1	0950	119	70.	*	1	1605	194	3.	*	1	2220	269	0.
1	0340	45	0.	*	1	0955	120	63.	*	1	1610	195	3.	*	1	2225	270	0.
1	0345	46	0.	*	1	1000	121	63.	*	1	1615	196	3.	*	1	2230	271	0.
1	0350	47	0.	*	1	1005	122	61.	*	1	1620	197	3.	*	1	2235	272	0.
1	0355	48	1.	*	1	1010	123	58.	*	1	1625	198	2.	*	1	2240	273	0.
1	0400	49	5.	*	1	1015	124	56.	*	1	1630	199	2.	*	1	2245	274	0.
1	0405	50	11.	*	1	1020	125	51.	*	1	1635	200	2.	*	1	2250	275	0.
1	0410	51	19.	*	1	1025	126	48.	*	1	1640	201	2.	*	1	2255	276	0.
1	0415	52	26.	*	1	1030	127	47.	*	1	1645	202	2.	*	1	2300	277	0.
1	0420	53	32.	*	1	1035	128	46.	*	1	1650	203	2.	*	1	2305	278	0.
1	0425	54	36.	*	1	1040	129	44.	*	1	1655	204	2.	*	1	2310	279	0.
1	0430	55	40.	*	1	1045	130	42.	*	1	1700	205	2.	*	1	2315	280	0.
1	0435	56	43.	*	1	1050	131	41.	*	1	1705	206	2.	*	1	2320	281	0.
1	0440	57	44.	*	1	1055	132	39.	*	1	1710	207	1.	*	1	2325	282	0.
1	0445	58	45.	*	1	1100	133	36.	*	1	1715	208	1.	*	1	2330	283	0.
1	0450	59	53.	*	1	1105	134	36.	*	1	1720	209	1.	*	1	2335	284	0.
1	0455	60	71.	*	1	1110	135	34.	*	1	1725	210	1.	*	1	2340	285	0.
1	0500	61	67.	*	1	1115	136	33.	*	1	1730	211	1.	*	1	2345	286	0.
1	0505	62	68.	*	1	1120	137	32.	*	1	1735	212	1.	*	1	2350	287	0.
1	0510	63	75.	*	1	1125	138	31.	*	1	1740	213	1.	*	1	2355	288	0.
1	0515	64	75.	*	1	1130	139	30.	*	1	1745	214	1.	*	2	0000	289	0.
1	0520	65	80.	*	1	1135	140	29.	*	1	1750	215	1.	*	2	0005	290	0.
1	0525	66	83.	*	1	1140	141	27.	*	1	1755	216	1.	*	2	0010	291	0.
1	0530	67	87.	*	1	1145	142	27.	*	1	1800	217	1.	*	2	0015	292	0.
1	0535	68	92.	*	1	1150	143	26.	*	1	1805	218	1.	*	2	0020	293	0.
1	0540	69	98.	*	1	1155	144	25.	*	1	1810	219	1.	*	2	0025	294	0.
1	0545	70	104.	*	1	1200	145	24.	*	1	1815	220	1.	*	2	0030	295	0.
1	0550	71	104.	*	1	1205	146	23.	*	1	1820	221	1.	*	2	0035	296	0.
1	0555	72	100.	*	1	1210	147	22.	*	1	1825	222	1.	*	2	0040	297	0.
1	0600	73	94.	*	1	1215	148	22.	*	1	1830	223	1.	*	2	0045	298	0.
1	0605	74	87.	*	1	1220	149	21.	*	1	1835	224	1.	*	2	0050	299	0.
1	0610	75	79.	*	1	1225	150	20.	*	1	1840	225	1.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 210.	7.50		92.	28.	27.	27.
		(INCHES)	.014	.017	.017	.017
		(AC-FT)	45.	55.	55.	55.

CUMULATIVE AREA = 58.84 SQ MI

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          *            *
1306 KK   *   FINISH     *
          *            *
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1308 KO          OUTPUT CONTROL VARIABLES
                      IPRNT          1  PRINT CONTROL
                      IPLOT          0  PLOT CONTROL
                      QSCAL          0.  HYDROGRAPH PLOT SCALE

               HYDROGRAPH ROUTING DATA

1307 RD          MUSKINGUM-CUNGE CHANNEL ROUTING
                          L       1500.  CHANNEL LENGTH
                          S       .0090  SLOPE
                          N        .050  CHANNEL ROUGHNESS COEFFICIENT
                         CA         .00  CONTRIBUTING AREA
                      SHAPE        TRAP  CHANNEL SHAPE
                         WD      250.00  BOTTOM WIDTH OR DIAMETER
                          Z        3.00  SIDE SLOPE

                                                  ***
                                  COMPUTED MUSKINGUM-CUNGE PARAMETERS
                                          COMPUTATION TIME STEP
                ELEMENT    ALPHA       M          DT          DX        PEAK     TIME TO      VOLUME     MAXIMUM
                                                                                    PEAK                  CELERITY
                                                  (MIN)       (FT)      (CFS)     (MIN)        (IN)       (FPS)

                  MAIN       .08      1.64        2.59      750.00    9761.97    326.77        1.01        9.64

                                          INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

                  MAIN       .08      1.64        5.00                9757.71    325.00        1.01

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4806E+04 EXCESS= .0000E+00 OUTFLOW= .4806E+04 BASIN STORAGE= .1190E-01 PERCENT ERROR=     .0
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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = 1.00

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	7886.	1		1230	151	2681.	1		1845	226	194.
1		0005	2	0.	1		0620	77	7665.	1		1235	152	2658.	1		1850	227	157.
1		0010	3	0.	1		0625	78	7451.	1		1240	153	2634.	1		1855	228	123.
1		0015	4	0.	1		0630	79	7241.	1		1245	154	2609.	1		1900	229	93.
1		0020	5	0.	1		0635	80	7037.	1		1250	155	2585.	1		1905	230	71.
1		0025	6	0.	1		0640	81	6841.	1		1255	156	2562.	1		1910	231	53.
1		0030	7	0.	1		0645	82	6669.	1		1300	157	2538.	1		1915	232	40.
1		0035	8	0.	1		0650	83	6548.	1		1305	158	2515.	1		1920	233	30.
1		0040	9	0.	1		0655	84	6485.	1		1310	159	2491.	1		1925	234	23.
1		0045	10	0.	1		0700	85	6433.	1		1315	160	2466.	1		1930	235	17.
1		0050	11	1.	1		0705	86	6339.	1		1320	161	2440.	1		1935	236	13.
1		0055	12	2.	1		0710	87	6201.	1		1325	162	2414.	1		1940	237	10.
1		0100	13	3.	1		0715	88	6031.	1		1330	163	2389.	1		1945	238	7.
1		0105	14	6.	1		0720	89	5837.	1		1335	164	2363.	1		1950	239	5.
1		0110	15	10.	1		0725	90	5625.	1		1340	165	2338.	1		1955	240	4.
1		0115	16	16.	1		0730	91	5404.	1		1345	166	2313.	1		2000	241	3.
1		0120	17	24.	1		0735	92	5188.	1		1350	167	2286.	1		2005	242	2.
1		0125	18	33.	1		0740	93	4999.	1		1355	168	2258.	1		2010	243	2.
1		0130	19	44.	1		0745	94	4853.	1		1400	169	2230.	1		2015	244	1.
1		0135	20	58.	1		0750	95	4738.	1		1405	170	2202.	1		2020	245	1.
1		0140	21	75.	1		0755	96	4636.	1		1410	171	2175.	1		2025	246	1.
1		0145	22	97.	1		0800	97	4540.	1		1415	172	2147.	1		2030	247	1.
1		0150	23	125.	1		0805	98	4451.	1		1420	173	2119.	1		2035	248	0.
1		0155	24	158.	1		0810	99	4370.	1		1425	174	2090.	1		2040	249	0.
1		0200	25	198.	1		0815	100	4294.	1		1430	175	2059.	1		2045	250	0.
1		0205	26	243.	1		0820	101	4222.	1		1435	176	2027.	1		2050	251	0.
1		0210	27	295.	1		0825	102	4153.	1		1440	177	1996.	1		2055	252	0.

1	0215	28	352.	*	1	0830	103	4089.	*	1	1445	178	1965.	*	1	2100	253	0.
1	0220	29	412.	*	1	0835	104	4029.	*	1	1450	179	1935.	*	1	2105	254	0.
1	0225	30	474.	*	1	0840	105	3972.	*	1	1455	180	1903.	*	1	2110	255	0.
1	0230	31	536.	*	1	0845	106	3918.	*	1	1500	181	1869.	*	1	2115	256	0.
1	0235	32	597.	*	1	0850	107	3866.	*	1	1505	182	1833.	*	1	2120	257	0.
1	0240	33	653.	*	1	0855	108	3818.	*	1	1510	183	1798.	*	1	2125	258	0.
1	0245	34	705.	*	1	0900	109	3772.	*	1	1515	184	1764.	*	1	2130	259	0.
1	0250	35	755.	*	1	0905	110	3728.	*	1	1520	185	1729.	*	1	2135	260	0.
1	0255	36	807.	*	1	0910	111	3687.	*	1	1525	186	1695.	*	1	2140	261	0.
1	0300	37	864.	*	1	0915	112	3649.	*	1	1530	187	1658.	*	1	2145	262	0.
1	0305	38	932.	*	1	0920	113	3613.	*	1	1535	188	1621.	*	1	2150	263	0.
1	0310	39	1021.	*	1	0925	114	3578.	*	1	1540	189	1584.	*	1	2155	264	0.
1	0315	40	1146.	*	1	0930	115	3544.	*	1	1545	190	1548.	*	1	2200	265	0.
1	0320	41	1326.	*	1	0935	116	3511.	*	1	1550	191	1512.	*	1	2205	266	0.
1	0325	42	1586.	*	1	0940	117	3480.	*	1	1555	192	1476.	*	1	2210	267	0.
1	0330	43	1950.	*	1	0945	118	3449.	*	1	1600	193	1439.	*	1	2215	268	0.
1	0335	44	2447.	*	1	0950	119	3420.	*	1	1605	194	1400.	*	1	2220	269	0.
1	0340	45	3064.	*	1	0955	120	3391.	*	1	1610	195	1361.	*	1	2225	270	0.
1	0345	46	3761.	*	1	1000	121	3364.	*	1	1615	196	1324.	*	1	2230	271	0.
1	0350	47	4510.	*	1	1005	122	3338.	*	1	1620	197	1287.	*	1	2235	272	0.
1	0355	48	5284.	*	1	1010	123	3312.	*	1	1625	198	1250.	*	1	2240	273	0.
1	0400	49	6016.	*	1	1015	124	3287.	*	1	1630	199	1212.	*	1	2245	274	0.
1	0405	50	6641.	*	1	1020	125	3263.	*	1	1635	200	1173.	*	1	2250	275	0.
1	0410	51	7144.	*	1	1025	126	3239.	*	1	1640	201	1133.	*	1	2255	276	0.
1	0415	52	7539.	*	1	1030	127	3214.	*	1	1645	202	1095.	*	1	2300	277	0.
1	0420	53	7840.	*	1	1035	128	3190.	*	1	1650	203	1057.	*	1	2305	278	0.
1	0425	54	8062.	*	1	1040	129	3166.	*	1	1655	204	1021.	*	1	2310	279	0.
1	0430	55	8223.	*	1	1045	130	3143.	*	1	1700	205	983.	*	1	2315	280	0.
1	0435	56	8344.	*	1	1050	131	3121.	*	1	1705	206	944.	*	1	2320	281	0.
1	0440	57	8438.	*	1	1055	132	3099.	*	1	1710	207	904.	*	1	2325	282	0.
1	0445	58	8514.	*	1	1100	133	3078.	*	1	1715	208	865.	*	1	2330	283	0.
1	0450	59	8609.	*	1	1105	134	3057.	*	1	1720	209	828.	*	1	2335	284	0.
1	0455	60	8759.	*	1	1110	135	3035.	*	1	1725	210	793.	*	1	2340	285	0.
1	0500	61	8959.	*	1	1115	136	3013.	*	1	1730	211	757.	*	1	2345	286	0.
1	0505	62	9176.	*	1	1120	137	2990.	*	1	1735	212	720.	*	1	2350	287	0.
1	0510	63	9387.	*	1	1125	138	2968.	*	1	1740	213	681.	*	1	2355	288	0.
1	0515	64	9572.	*	1	1130	139	2946.	*	1	1745	214	641.	*	2	0000	289	0.
1	0520	65	9702.	*	1	1135	140	2925.	*	1	1750	215	603.	*	2	0005	290	0.
1	0525	66	9758.	*	1	1140	141	2904.	*	1	1755	216	567.	*	2	0010	291	0.
1	0530	67	9742.	*	1	1145	142	2882.	*	1	1800	217	533.	*	2	0015	292	0.
1	0535	68	9659.	*	1	1150	143	2861.	*	1	1805	218	499.	*	2	0020	293	0.
1	0540	69	9519.	*	1	1155	144	2839.	*	1	1810	219	461.	*	2	0025	294	0.
1	0545	70	9333.	*	1	1200	145	2816.	*	1	1815	220	417.	*	2	0030	295	0.
1	0550	71	9113.	*	1	1205	146	2793.	*	1	1820	221	373.	*	2	0035	296	0.
1	0555	72	8873.	*	1	1210	147	2770.	*	1	1825	222	332.	*	2	0040	297	0.
1	0600	73	8623.	*	1	1215	148	2748.	*	1	1830	223	295.	*	2	0045	298	0.
1	0605	74	8369.	*	1	1220	149	2726.	*	1	1835	224	261.	*	2	0050	299	0.
1	0610	75	8120.	*	1	1225	150	2704.	*	1	1840	225	229.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 9758.	5.42		6359.	2423.	2334.	2334.
		(INCHES)	.665	1.014	1.014	1.014
		(AC-FT)	3153.	4806.	4806.	4806.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	2.81	750.00	7955.75	328.58	.77	8.90
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		7952.47	330.00	.77	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3663E+04 EXCESS= .0000E+00 OUTFLOW= .3663E+04 BASIN STORAGE= .1060E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .87

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	6631.	1		1230	151	2052.	1		1845	226	0.
1		0005	2	0.	1		0620	77	6465.	1		1235	152	2020.	1		1850	227	0.
1		0010	3	0.	1		0625	78	6303.	1		1240	153	1987.	1		1855	228	0.
1		0015	4	0.	1		0630	79	6144.	1		1245	154	1955.	1		1900	229	0.
1		0020	5	0.	1		0635	80	5988.	1		1250	155	1923.	1		1905	230	0.
1		0025	6	0.	1		0640	81	5835.	1		1255	156	1888.	1		1910	231	0.
1		0030	7	0.	1		0645	82	5686.	1		1300	157	1852.	1		1915	232	0.
1		0035	8	0.	1		0650	83	5540.	1		1305	158	1816.	1		1920	233	0.
1		0040	9	0.	1		0655	84	5401.	1		1310	159	1780.	1		1925	234	0.
1		0045	10	0.	1		0700	85	5265.	1		1315	160	1745.	1		1930	235	0.
1		0050	11	0.	1		0705	86	5134.	1		1320	161	1710.	1		1935	236	0.
1		0055	12	0.	1		0710	87	5008.	1		1325	162	1674.	1		1940	237	0.
1		0100	13	0.	1		0715	88	4889.	1		1330	163	1636.	1		1945	238	0.
1		0105	14	0.	1		0720	89	4774.	1		1335	164	1598.	1		1950	239	0.
1		0110	15	1.	1		0725	90	4665.	1		1340	165	1561.	1		1955	240	0.
1		0115	16	1.	1		0730	91	4559.	1		1345	166	1525.	1		2000	241	0.
1		0120	17	2.	1		0735	92	4456.	1		1350	167	1489.	1		2005	242	0.
1		0125	18	4.	1		0740	93	4356.	1		1355	168	1451.	1		2010	243	0.
1		0130	19	6.	1		0745	94	4260.	1		1400	169	1412.	1		2015	244	0.
1		0135	20	11.	1		0750	95	4168.	1		1405	170	1373.	1		2020	245	0.
1		0140	21	17.	1		0755	96	4082.	1		1410	171	1335.	1		2025	246	0.
1		0145	22	26.	1		0800	97	4001.	1		1415	172	1298.	1		2030	247	0.
1		0150	23	39.	1		0805	98	3926.	1		1420	173	1261.	1		2035	248	0.
1		0155	24	56.	1		0810	99	3856.	1		1425	174	1223.	1		2040	249	0.
1		0200	25	77.	1		0815	100	3791.	1		1430	175	1184.	1		2045	250	0.
1		0205	26	103.	1		0820	101	3729.	1		1435	176	1144.	1		2050	251	0.
1		0210	27	134.	1		0825	102	3670.	1		1440	177	1105.	1		2055	252	0.
1		0215	28	168.	1		0830	103	3614.	1		1445	178	1068.	1		2100	253	0.
1		0220	29	206.	1		0835	104	3561.	1		1450	179	1031.	1		2105	254	0.
1		0225	30	246.	1		0840	105	3511.	1		1455	180	993.	1		2110	255	0.
1		0230	31	287.	1		0845	106	3463.	1		1500	181	955.	1		2115	256	0.
1		0235	32	327.	1		0850	107	3416.	1		1505	182	915.	1		2120	257	0.
1		0240	33	366.	1		0855	108	3372.	1		1510	183	876.	1		2125	258	0.
1		0245	34	400.	1		0900	109	3328.	1		1515	184	839.	1		2130	259	0.
1		0250	35	431.	1		0905	110	3286.	1		1520	185	803.	1		2135	260	0.
1		0255	36	462.	1		0910	111	3245.	1		1525	186	767.	1		2140	261	0.
1		0300	37	498.	1		0915	112	3207.	1		1530	187	730.	1		2145	262	0.
1		0305	38	542.	1		0920	113	3170.	1		1535	188	692.	1		2150	263	0.
1		0310	39	605.	1		0925	114	3135.	1		1540	189	652.	1		2155	264	0.
1		0315	40	696.	1		0930	115	3101.	1		1545	190	614.	1		2200	265	0.
1		0320	41	824.	1		0935	116	3069.	1		1550	191	578.	1		2205	266	0.
1		0325	42	1007.	1		0940	117	3037.	1		1555	192	544.	1		2210	267	0.
1		0330	43	1266.	1		0945	118	3005.	1		1600	193	511.	1		2215	268	0.
1		0335	44	1620.	1		0950	119	2973.	1		1605	194	475.	1		2220	269	0.
1		0340	45	2066.	1		0955	120	2941.	1		1610	195	436.	1		2225	270	0.
1		0345	46	2589.	1		1000	121	2910.	1		1615	196	393.	1		2230	271	0.
1		0350	47	3180.	1		1005	122	2880.	1		1620	197	351.	1		2235	272	0.
1		0355	48	3816.	1		1010	123	2851.	1		1625	198	313.	1		2240	273	0.
1		0400	49	4426.	1		1015	124	2823.	1		1630	199	278.	1		2245	274	0.
1		0405	50	4954.	1		1020	125	2795.	1		1635	200	247.	1		2250	275	0.
1		0410	51	5388.	1		1025	126	2767.	1		1640	201	215.	1		2255	276	0.
1		0415	52	5725.	1		1030	127	2738.	1		1645	202	180.	1		2300	277	0.
1		0420	53	5973.	1		1035	128	2710.	1		1650	203	144.	1		2305	278	0.
1		0425	54	6147.	1		1040	129	2681.	1		1655	204	111.	1		2310	279	0.
1		0430	55	6267.	1		1045	130	2653.	1		1700	205	84.	1		2315	280	0.
1		0435	56	6367.	1		1050	131	2626.	1		1705	206	63.	1		2320	281	0.
1		0440	57	6469.	1		1055	132	2599.	1		1710	207	48.	1		2325	282	0.
1		0445	58	6579.	1		1100	133	2573.	1		1715	208	36.	1		2330	283	0.
1		0450	59	6711.	1		1105	134	2546.	1		1720	209	27.	1		2335	284	0.
1		0455	60	6885.	1		1110	135	2518.	1		1725	210	21.	1		2340	285	0.
1		0500	61	7097.	1		1115	136	2490.	1		1730	211	16.	1		2345	286	0.
1		0505	62	7320.	1		1120	137	2461.	1		1735	212	12.	1		2350	287	0.
1		0510	63	7533.	1		1125	138	2434.	1		1740	213	9.	1		2355	288	0.
1		0515	64	7721.	1		1130	139	2406.	1		1745	214	7.	2		0000	289	0.
1		0520	65	7863.	1		1135	140	2379.	1		1750	215	5.	2		0005	290	0.
1		0525	66	7939.	1		1140	141	2352.	1		1755	216	4.	2		0010	291	0.
1		0530	67	7952.	1		1145	142	2323.	1		1800	217	3.	2		0015	292	0.
1		0535	68	7911.	1		1150	143	2294.	1		1805	218	2.	2		0020	293	0.
1		0540	69	7823.	1		1155	144	2264.	1		1810	219	2.	2		0025	294	0.
1		0545	70	7695.	1		1200	145	2235.	1		1815	220	1.	2		0030	295	0.
1		0550	71	7537.	1		1205	146	2205.	1		1820	221	1.	2		0035	296	0.
1		0555	72	7362.	1		1210	147	2177.	1		1825	222	1.	2		0040	297	0.
1		0600	73	7177.	1		1215	148	2147.	1		1830	223	1.	2		0045	298	0.

1	0605	74	6989.	*	1	1220	149	2117.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	6806.	*	1	1225	150	2085.	*	1	1840	225	0.	*	2	0055	300	0.

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 7952.	5.50	5231.	1847.	1779.	1779.
		(INCHES) .547	.773	.773	.773
		(AC-FT) 2594.	3663.	3663.	3663.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	3.11	750.00	6111.55	332.97	.55	8.03
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		6103.91	330.00	.55	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2613E+04 EXCESS= .0000E+00 OUTFLOW= .2613E+04 BASIN STORAGE= .1096E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .74

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	5275.	*	1		1230	151	1208.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	5162.	*	1		1235	152	1168.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	5052.	*	1		1240	153	1128.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	4943.	*	1		1245	154	1089.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	4835.	*	1		1250	155	1052.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	4727.	*	1		1255	156	1014.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	4619.	*	1		1300	157	975.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	4513.	*	1		1305	158	935.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	4410.	*	1		1310	159	896.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	4309.	*	1		1315	160	857.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	4212.	*	1		1320	161	820.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	4117.	*	1		1325	162	785.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	4026.	*	1		1330	163	748.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	3939.	*	1		1335	164	710.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	3854.	*	1		1340	165	670.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	3772.	*	1		1345	166	631.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	3692.	*	1		1350	167	594.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	3614.	*	1		1355	168	560.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	3538.	*	1		1400	169	526.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	3465.	*	1		1405	170	492.	*	1		2020	245	0.
1		0140	21	1.	*	1		0755	96	3395.	*	1		1410	171	456.	*	1		2025	246	0.
1		0145	22	2.	*	1		0800	97	3329.	*	1		1415	172	417.	*	1		2030	247	0.
1		0150	23	4.	*	1		0805	98	3266.	*	1		1420	173	376.	*	1		2035	248	0.
1		0155	24	8.	*	1		0810	99	3207.	*	1		1425	174	338.	*	1		2040	249	0.
1		0200	25	14.	*	1		0815	100	3151.	*	1		1430	175	302.	*	1		2045	250	0.
1		0205	26	23.	*	1		0820	101	3098.	*	1		1435	176	270.	*	1		2050	251	0.
1		0210	27	35.	*	1		0825	102	3046.	*	1		1440	177	239.	*	1		2055	252	0.
1		0215	28	50.	*	1		0830	103	2997.	*	1		1445	178	207.	*	1		2100	253	0.
1		0220	29	68.	*	1		0835	104	2950.	*	1		1450	179	172.	*	1		2105	254	0.
1		0225	30	88.	*	1		0840	105	2905.	*	1		1455	180	137.	*	1		2110	255	0.
1		0230	31	110.	*	1		0845	106	2861.	*	1		1500	181	106.	*	1		2115	256	0.
1		0235	32	133.	*	1		0850	107	2818.	*	1		1505	182	81.	*	1		2120	257	0.
1		0240	33	155.	*	1		0855	108	2776.	*	1		1510	183	62.	*	1		2125	258	0.
1		0245	34	176.	*	1		0900	109	2735.	*	1		1515	184	47.	*	1		2130	259	0.
1		0250	35	195.	*	1		0905	110	2694.	*	1		1520	185	36.	*	1		2135	260	0.
1		0255	36	214.	*	1		0910	111	2655.	*	1		1525	186	27.	*	1		2140	261	0.
1		0300	37	235.	*	1		0915	112	2617.	*	1		1530	187	21.	*	1		2145	262	0.
1		0305	38	262.	*	1		0920	113	2581.	*	1		1535	188	16.	*	1		2150	263	0.

1	0310	39	298.	*	1	0925	114	2546.	*	1	1540	189	12.	*	1	2155	264	0.
1	0315	40	348.	*	1	0930	115	2511.	*	1	1545	190	9.	*	1	2200	265	0.
1	0320	41	421.	*	1	0935	116	2477.	*	1	1550	191	7.	*	1	2205	266	0.
1	0325	42	529.	*	1	0940	117	2442.	*	1	1555	192	6.	*	1	2210	267	0.
1	0330	43	691.	*	1	0945	118	2407.	*	1	1600	193	4.	*	1	2215	268	0.
1	0335	44	924.	*	1	0950	119	2372.	*	1	1605	194	3.	*	1	2220	269	0.
1	0340	45	1236.	*	1	0955	120	2338.	*	1	1610	195	3.	*	1	2225	270	0.
1	0345	46	1616.	*	1	1000	121	2304.	*	1	1615	196	2.	*	1	2230	271	0.
1	0350	47	2039.	*	1	1005	122	2271.	*	1	1620	197	1.	*	1	2235	272	0.
1	0355	48	2494.	*	1	1010	123	2239.	*	1	1625	198	1.	*	1	2240	273	0.
1	0400	49	2946.	*	1	1015	124	2206.	*	1	1630	199	1.	*	1	2245	274	0.
1	0405	50	3354.	*	1	1020	125	2171.	*	1	1635	200	1.	*	1	2250	275	0.
1	0410	51	3709.	*	1	1025	126	2136.	*	1	1640	201	1.	*	1	2255	276	0.
1	0415	52	4005.	*	1	1030	127	2100.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	4224.	*	1	1035	128	2066.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	4373.	*	1	1040	129	2032.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	4465.	*	1	1045	130	1998.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	4519.	*	1	1050	131	1963.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	4573.	*	1	1055	132	1927.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	4650.	*	1	1100	133	1890.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	4770.	*	1	1105	134	1852.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	4940.	*	1	1110	135	1816.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	5150.	*	1	1115	136	1780.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	5377.	*	1	1120	137	1743.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	5597.	*	1	1125	138	1706.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	5796.	*	1	1130	139	1668.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	5954.	*	1	1135	140	1629.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	6055.	*	1	1140	141	1591.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	6104.	*	1	1145	142	1554.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	6102.	*	1	1150	143	1517.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	6060.	*	1	1155	144	1479.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	5985.	*	1	1200	145	1440.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	5885.	*	1	1205	146	1400.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	5769.	*	1	1210	147	1361.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	5645.	*	1	1215	148	1323.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	5519.	*	1	1220	149	1286.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	5394.	*	1	1225	150	1247.	*	1	1840	225	0.	*	2	0055	300	0.

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 6104.	5.50		4073.	1318.	1269.	1269.
		(INCHES)	.426	.551	.551	.551
		(AC-FT)	2020.	2613.	2613.	2613.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	3.82	750.00	3612.02	343.61	.30	6.55
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		3611.84	340.00	.30	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1425E+04 EXCESS= .0000E+00 OUTFLOW= .1425E+04 BASIN STORAGE= .1110E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .57

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	3337.	*	1		1230	151	240.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	3290.	*	1		1235	152	215.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	3243.	*	1		1240	153	186.	*	1		1855	228	0.

1	0015	4	0.	*	1	0630	79	3194.	*	1	1245	154	155.	*	1	1900	229	0.
1	0020	5	0.	*	1	0635	80	3144.	*	1	1250	155	126.	*	1	1905	230	0.
1	0025	6	0.	*	1	0640	81	3092.	*	1	1255	156	101.	*	1	1910	231	0.
1	0030	7	0.	*	1	0645	82	3039.	*	1	1300	157	82.	*	1	1915	232	0.
1	0035	8	0.	*	1	0650	83	2987.	*	1	1305	158	67.	*	1	1920	233	0.
1	0040	9	0.	*	1	0655	84	2934.	*	1	1310	159	55.	*	1	1925	234	0.
1	0045	10	0.	*	1	0700	85	2880.	*	1	1315	160	46.	*	1	1930	235	0.
1	0050	11	0.	*	1	0705	86	2825.	*	1	1320	161	39.	*	1	1935	236	0.
1	0055	12	0.	*	1	0710	87	2770.	*	1	1325	162	33.	*	1	1940	237	0.
1	0100	13	0.	*	1	0715	88	2716.	*	1	1330	163	28.	*	1	1945	238	0.
1	0105	14	0.	*	1	0720	89	2662.	*	1	1335	164	24.	*	1	1950	239	0.
1	0110	15	0.	*	1	0725	90	2609.	*	1	1340	165	21.	*	1	1955	240	0.
1	0115	16	0.	*	1	0730	91	2555.	*	1	1345	166	19.	*	1	2000	241	0.
1	0120	17	0.	*	1	0735	92	2502.	*	1	1350	167	17.	*	1	2005	242	0.
1	0125	18	0.	*	1	0740	93	2448.	*	1	1355	168	15.	*	1	2010	243	0.
1	0130	19	0.	*	1	0745	94	2395.	*	1	1400	169	13.	*	1	2015	244	0.
1	0135	20	0.	*	1	0750	95	2343.	*	1	1405	170	12.	*	1	2020	245	0.
1	0140	21	0.	*	1	0755	96	2292.	*	1	1410	171	11.	*	1	2025	246	0.
1	0145	22	0.	*	1	0800	97	2242.	*	1	1415	172	10.	*	1	2030	247	0.
1	0150	23	0.	*	1	0805	98	2194.	*	1	1420	173	9.	*	1	2035	248	0.
1	0155	24	0.	*	1	0810	99	2148.	*	1	1425	174	8.	*	1	2040	249	0.
1	0200	25	0.	*	1	0815	100	2104.	*	1	1430	175	7.	*	1	2045	250	0.
1	0205	26	0.	*	1	0820	101	2061.	*	1	1435	176	7.	*	1	2050	251	0.
1	0210	27	0.	*	1	0825	102	2018.	*	1	1440	177	6.	*	1	2055	252	0.
1	0215	28	1.	*	1	0830	103	1977.	*	1	1445	178	5.	*	1	2100	253	0.
1	0220	29	2.	*	1	0835	104	1935.	*	1	1450	179	5.	*	1	2105	254	0.
1	0225	30	3.	*	1	0840	105	1893.	*	1	1455	180	4.	*	1	2110	255	0.
1	0230	31	5.	*	1	0845	106	1851.	*	1	1500	181	4.	*	1	2115	256	0.
1	0235	32	8.	*	1	0850	107	1810.	*	1	1505	182	4.	*	1	2120	257	0.
1	0240	33	12.	*	1	0855	108	1770.	*	1	1510	183	3.	*	1	2125	258	0.
1	0245	34	17.	*	1	0900	109	1731.	*	1	1515	184	3.	*	1	2130	259	0.
1	0250	35	22.	*	1	0905	110	1692.	*	1	1520	185	3.	*	1	2135	260	0.
1	0255	36	27.	*	1	0910	111	1655.	*	1	1525	186	2.	*	1	2140	261	0.
1	0300	37	34.	*	1	0915	112	1617.	*	1	1530	187	2.	*	1	2145	262	0.
1	0305	38	43.	*	1	0920	113	1579.	*	1	1535	188	2.	*	1	2150	263	0.
1	0310	39	55.	*	1	0925	114	1540.	*	1	1540	189	2.	*	1	2155	264	0.
1	0315	40	73.	*	1	0930	115	1501.	*	1	1545	190	2.	*	1	2200	265	0.
1	0320	41	100.	*	1	0935	116	1463.	*	1	1550	191	2.	*	1	2205	266	0.
1	0325	42	140.	*	1	0940	117	1426.	*	1	1555	192	1.	*	1	2210	267	0.
1	0330	43	198.	*	1	0945	118	1389.	*	1	1600	193	1.	*	1	2215	268	0.
1	0335	44	290.	*	1	0950	119	1353.	*	1	1605	194	1.	*	1	2220	269	0.
1	0340	45	437.	*	1	0955	120	1317.	*	1	1610	195	1.	*	1	2225	270	0.
1	0345	46	628.	*	1	1000	121	1279.	*	1	1615	196	1.	*	1	2230	271	0.
1	0350	47	862.	*	1	1005	122	1241.	*	1	1620	197	1.	*	1	2235	272	0.
1	0355	48	1124.	*	1	1010	123	1203.	*	1	1625	198	1.	*	1	2240	273	0.
1	0400	49	1388.	*	1	1015	124	1165.	*	1	1630	199	1.	*	1	2245	274	0.
1	0405	50	1631.	*	1	1020	125	1129.	*	1	1635	200	1.	*	1	2250	275	0.
1	0410	51	1843.	*	1	1025	126	1093.	*	1	1640	201	1.	*	1	2255	276	0.
1	0415	52	2029.	*	1	1030	127	1057.	*	1	1645	202	1.	*	1	2300	277	0.
1	0420	53	2190.	*	1	1035	128	1020.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	2316.	*	1	1040	129	983.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	2414.	*	1	1045	130	945.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	2488.	*	1	1050	131	907.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	2531.	*	1	1055	132	871.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	2556.	*	1	1100	133	837.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	2585.	*	1	1105	134	802.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	2640.	*	1	1110	135	768.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	2740.	*	1	1115	136	731.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	2876.	*	1	1120	137	694.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	3037.	*	1	1125	138	656.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	3202.	*	1	1130	139	621.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	3348.	*	1	1135	140	587.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	3463.	*	1	1140	141	555.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	3539.	*	1	1145	142	524.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	3588.	*	1	1150	143	491.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	3612.	*	1	1155	144	456.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	3606.	*	1	1200	145	418.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	3580.	*	1	1205	146	381.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	3542.	*	1	1210	147	347.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	3494.	*	1	1215	148	317.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	3440.	*	1	1220	149	289.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	3387.	*	1	1225	150	264.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 3612.	5.67		2480.	718.	692.	692.
		(INCHES)	.259	.301	.301	.301

(AC-FT) 1230. 1425. 1425. 1425.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	5.00	750.00	1809.41	349.86	.15	5.00
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		1809.17	350.00	.15	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7048E+03 EXCESS= .0000E+00 OUTFLOW= .7049E+03 BASIN STORAGE= .1024E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .44

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	1751.	1		1230	151	63.	1		1845	226	0.
1		0005	2	0.	1		0620	77	1744.	1		1235	152	59.	1		1850	227	0.
1		0010	3	0.	1		0625	78	1740.	1		1240	153	55.	1		1855	228	0.
1		0015	4	0.	1		0630	79	1731.	1		1245	154	52.	1		1900	229	0.
1		0020	5	0.	1		0635	80	1716.	1		1250	155	48.	1		1905	230	0.
1		0025	6	0.	1		0640	81	1701.	1		1255	156	45.	1		1910	231	0.
1		0030	7	0.	1		0645	82	1679.	1		1300	157	42.	1		1915	232	0.
1		0035	8	0.	1		0650	83	1655.	1		1305	158	40.	1		1920	233	0.
1		0040	9	0.	1		0655	84	1630.	1		1310	159	37.	1		1925	234	0.
1		0045	10	0.	1		0700	85	1605.	1		1315	160	35.	1		1930	235	0.
1		0050	11	0.	1		0705	86	1581.	1		1320	161	33.	1		1935	236	0.
1		0055	12	0.	1		0710	87	1555.	1		1325	162	31.	1		1940	237	0.
1		0100	13	0.	1		0715	88	1529.	1		1330	163	29.	1		1945	238	0.
1		0105	14	0.	1		0720	89	1504.	1		1335	164	27.	1		1950	239	0.
1		0110	15	0.	1		0725	90	1478.	1		1340	165	25.	1		1955	240	0.
1		0115	16	0.	1		0730	91	1451.	1		1345	166	24.	1		2000	241	0.
1		0120	17	0.	1		0735	92	1424.	1		1350	167	22.	1		2005	242	0.
1		0125	18	0.	1		0740	93	1395.	1		1355	168	21.	1		2010	243	0.
1		0130	19	0.	1		0745	94	1365.	1		1400	169	20.	1		2015	244	0.
1		0135	20	0.	1		0750	95	1335.	1		1405	170	18.	1		2020	245	0.
1		0140	21	0.	1		0755	96	1304.	1		1410	171	17.	1		2025	246	0.
1		0145	22	0.	1		0800	97	1274.	1		1415	172	16.	1		2030	247	0.
1		0150	23	0.	1		0805	98	1244.	1		1420	173	15.	1		2035	248	0.
1		0155	24	0.	1		0810	99	1215.	1		1425	174	14.	1		2040	249	0.
1		0200	25	0.	1		0815	100	1186.	1		1430	175	13.	1		2045	250	0.
1		0205	26	0.	1		0820	101	1155.	1		1435	176	12.	1		2050	251	0.
1		0210	27	0.	1		0825	102	1124.	1		1440	177	11.	1		2055	252	0.
1		0215	28	0.	1		0830	103	1092.	1		1445	178	11.	1		2100	253	0.
1		0220	29	0.	1		0835	104	1061.	1		1450	179	10.	1		2105	254	0.
1		0225	30	0.	1		0840	105	1030.	1		1455	180	9.	1		2110	255	0.
1		0230	31	0.	1		0845	106	1000.	1		1500	181	9.	1		2115	256	0.
1		0235	32	0.	1		0850	107	971.	1		1505	182	8.	1		2120	257	0.
1		0240	33	0.	1		0855	108	942.	1		1510	183	7.	1		2125	258	0.
1		0245	34	0.	1		0900	109	913.	1		1515	184	7.	1		2130	259	0.
1		0250	35	0.	1		0905	110	885.	1		1520	185	7.	1		2135	260	0.
1		0255	36	0.	1		0910	111	858.	1		1525	186	6.	1		2140	261	0.
1		0300	37	0.	1		0915	112	831.	1		1530	187	6.	1		2145	262	0.
1		0305	38	0.	1		0920	113	803.	1		1535	188	5.	1		2150	263	0.
1		0310	39	1.	1		0925	114	772.	1		1540	189	5.	1		2155	264	0.
1		0315	40	2.	1		0930	115	740.	1		1545	190	5.	1		2200	265	0.
1		0320	41	5.	1		0935	116	709.	1		1550	191	5.	1		2205	266	0.
1		0325	42	11.	1		0940	117	680.	1		1555	192	4.	1		2210	267	0.
1		0330	43	23.	1		0945	118	652.	1		1600	193	4.	1		2215	268	0.
1		0335	44	44.	1		0950	119	625.	1		1605	194	4.	1		2220	269	0.
1		0340	45	82.	1		0955	120	599.	1		1610	195	4.	1		2225	270	0.
1		0345	46	142.	1		1000	121	575.	1		1615	196	3.	1		2230	271	0.
1		0350	47	244.	1		1005	122	551.	1		1620	197	3.	1		2235	272	0.
1		0355	48	368.	1		1010	123	527.	1		1625	198	3.	1		2240	273	0.
1		0400	49	509.	1		1015	124	502.	1		1630	199	3.	1		2245	274	0.

1	0405	50	655.	*	1	1020	125	473.	*	1	1635	200	3.	*	1	2250	275	0.
1	0410	51	778.	*	1	1025	126	440.	*	1	1640	201	2.	*	1	2255	276	0.
1	0415	52	879.	*	1	1030	127	408.	*	1	1645	202	2.	*	1	2300	277	0.
1	0420	53	961.	*	1	1035	128	382.	*	1	1650	203	2.	*	1	2305	278	0.
1	0425	54	1030.	*	1	1040	129	358.	*	1	1655	204	2.	*	1	2310	279	0.
1	0430	55	1088.	*	1	1045	130	334.	*	1	1700	205	2.	*	1	2315	280	0.
1	0435	56	1143.	*	1	1050	131	314.	*	1	1705	206	2.	*	1	2320	281	0.
1	0440	57	1199.	*	1	1055	132	294.	*	1	1710	207	2.	*	1	2325	282	0.
1	0445	58	1249.	*	1	1100	133	276.	*	1	1715	208	2.	*	1	2330	283	0.
1	0450	59	1284.	*	1	1105	134	260.	*	1	1720	209	1.	*	1	2335	284	0.
1	0455	60	1322.	*	1	1110	135	245.	*	1	1725	210	1.	*	1	2340	285	0.
1	0500	61	1383.	*	1	1115	136	230.	*	1	1730	211	1.	*	1	2345	286	0.
1	0505	62	1450.	*	1	1120	137	216.	*	1	1735	212	1.	*	1	2350	287	0.
1	0510	63	1517.	*	1	1125	138	199.	*	1	1740	213	1.	*	1	2355	288	0.
1	0515	64	1581.	*	1	1130	139	179.	*	1	1745	214	1.	*	2	0000	289	0.
1	0520	65	1634.	*	1	1135	140	161.	*	1	1750	215	1.	*	2	0005	290	0.
1	0525	66	1673.	*	1	1140	141	146.	*	1	1755	216	1.	*	2	0010	291	0.
1	0530	67	1698.	*	1	1145	142	132.	*	1	1800	217	1.	*	2	0015	292	0.
1	0535	68	1726.	*	1	1150	143	119.	*	1	1805	218	1.	*	2	0020	293	0.
1	0540	69	1766.	*	1	1155	144	108.	*	1	1810	219	1.	*	2	0025	294	0.
1	0545	70	1802.	*	1	1200	145	99.	*	1	1815	220	1.	*	2	0030	295	0.
1	0550	71	1809.	*	1	1205	146	91.	*	1	1820	221	1.	*	2	0035	296	0.
1	0555	72	1801.	*	1	1210	147	85.	*	1	1825	222	1.	*	2	0040	297	0.
1	0600	73	1795.	*	1	1215	148	78.	*	1	1830	223	1.	*	2	0045	298	0.
1	0605	74	1782.	*	1	1220	149	73.	*	1	1835	224	1.	*	2	0050	299	0.
1	0610	75	1763.	*	1	1225	150	68.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

+ PEAK FLOW (CFS)	TIME (HR)		MAXIMUM AVERAGE FLOW 6-HR	24-HR	72-HR	24.92-HR
		(CFS)				
+ 1809.	5.83		1285.	355.	342.	342.
		(INCHES)	.134	.149	.149	.149
		(AC-FT)	637.	705.	705.	705.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	5.00	375.00	284.79	350.00	.02	2.44

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.08	1.64	5.00	284.79	350.00	.02	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1021E+03 EXCESS= .0000E+00 OUTFLOW= .1021E+03 BASIN STORAGE= .2644E-01 PERCENT ERROR= .0

HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .26

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	253.	*	1		1230	151	37.	*	1		1845	226	2.
1		0005	2	0.	*	1		0620	77	248.	*	1		1235	152	36.	*	1		1850	227	2.
1		0010	3	0.	*	1		0625	78	242.	*	1		1240	153	35.	*	1		1855	228	2.
1		0015	4	0.	*	1		0630	79	240.	*	1		1245	154	34.	*	1		1900	229	2.
1		0020	5	0.	*	1		0635	80	235.	*	1		1250	155	33.	*	1		1905	230	2.
1		0025	6	0.	*	1		0640	81	229.	*	1		1255	156	32.	*	1		1910	231	2.
1		0030	7	0.	*	1		0645	82	221.	*	1		1300	157	31.	*	1		1915	232	2.
1		0035	8	0.	*	1		0650	83	211.	*	1		1305	158	30.	*	1		1920	233	2.
1		0040	9	0.	*	1		0655	84	200.	*	1		1310	159	29.	*	1		1925	234	2.
1		0045	10	0.	*	1		0700	85	190.	*	1		1315	160	28.	*	1		1930	235	1.
1		0050	11	0.	*	1		0705	86	179.	*	1		1320	161	27.	*	1		1935	236	1.
1		0055	12	0.	*	1		0710	87	168.	*	1		1325	162	26.	*	1		1940	237	1.
1		0100	13	0.	*	1		0715	88	158.	*	1		1330	163	26.	*	1		1945	238	1.
1		0105	14	0.	*	1		0720	89	148.	*	1		1335	164	25.	*	1		1950	239	1.

1	0110	15	0.	*	1	0725	90	139.	*	1	1340	165	24.	*	1	1955	240	1.
1	0115	16	0.	*	1	0730	91	130.	*	1	1345	166	23.	*	1	2000	241	1.
1	0120	17	0.	*	1	0735	92	122.	*	1	1350	167	23.	*	1	2005	242	1.
1	0125	18	0.	*	1	0740	93	115.	*	1	1355	168	22.	*	1	2010	243	1.
1	0130	19	0.	*	1	0745	94	110.	*	1	1400	169	22.	*	1	2015	244	1.
1	0135	20	0.	*	1	0750	95	109.	*	1	1405	170	21.	*	1	2020	245	1.
1	0140	21	0.	*	1	0755	96	120.	*	1	1410	171	20.	*	1	2025	246	1.
1	0145	22	0.	*	1	0800	97	151.	*	1	1415	172	20.	*	1	2030	247	1.
1	0150	23	0.	*	1	0805	98	183.	*	1	1420	173	19.	*	1	2035	248	1.
1	0155	24	0.	*	1	0810	99	186.	*	1	1425	174	19.	*	1	2040	249	1.
1	0200	25	0.	*	1	0815	100	180.	*	1	1430	175	18.	*	1	2045	250	1.
1	0205	26	0.	*	1	0820	101	193.	*	1	1435	176	18.	*	1	2050	251	1.
1	0210	27	0.	*	1	0825	102	200.	*	1	1440	177	17.	*	1	2055	252	1.
1	0215	28	0.	*	1	0830	103	189.	*	1	1445	178	17.	*	1	2100	253	1.
1	0220	29	0.	*	1	0835	104	185.	*	1	1450	179	16.	*	1	2105	254	1.
1	0225	30	0.	*	1	0840	105	186.	*	1	1455	180	16.	*	1	2110	255	1.
1	0230	31	0.	*	1	0845	106	176.	*	1	1500	181	15.	*	1	2115	256	1.
1	0235	32	0.	*	1	0850	107	166.	*	1	1505	182	15.	*	1	2120	257	1.
1	0240	33	0.	*	1	0855	108	161.	*	1	1510	183	14.	*	1	2125	258	0.
1	0245	34	0.	*	1	0900	109	154.	*	1	1515	184	14.	*	1	2130	259	0.
1	0250	35	0.	*	1	0905	110	148.	*	1	1520	185	14.	*	1	2135	260	0.
1	0255	36	0.	*	1	0910	111	145.	*	1	1525	186	13.	*	1	2140	261	0.
1	0300	37	0.	*	1	0915	112	141.	*	1	1530	187	13.	*	1	2145	262	0.
1	0305	38	0.	*	1	0920	113	137.	*	1	1535	188	12.	*	1	2150	263	0.
1	0310	39	0.	*	1	0925	114	131.	*	1	1540	189	12.	*	1	2155	264	0.
1	0315	40	0.	*	1	0930	115	127.	*	1	1545	190	11.	*	1	2200	265	0.
1	0320	41	0.	*	1	0935	116	124.	*	1	1550	191	11.	*	1	2205	266	0.
1	0325	42	0.	*	1	0940	117	121.	*	1	1555	192	10.	*	1	2210	267	0.
1	0330	43	0.	*	1	0945	118	119.	*	1	1600	193	10.	*	1	2215	268	0.
1	0335	44	0.	*	1	0950	119	117.	*	1	1605	194	10.	*	1	2220	269	0.
1	0340	45	0.	*	1	0955	120	115.	*	1	1610	195	9.	*	1	2225	270	0.
1	0345	46	0.	*	1	1000	121	113.	*	1	1615	196	9.	*	1	2230	271	0.
1	0350	47	0.	*	1	1005	122	109.	*	1	1620	197	8.	*	1	2235	272	0.
1	0355	48	1.	*	1	1010	123	106.	*	1	1625	198	8.	*	1	2240	273	0.
1	0400	49	3.	*	1	1015	124	101.	*	1	1630	199	8.	*	1	2245	274	0.
1	0405	50	7.	*	1	1020	125	96.	*	1	1635	200	8.	*	1	2250	275	0.
1	0410	51	12.	*	1	1025	126	93.	*	1	1640	201	7.	*	1	2255	276	0.
1	0415	52	19.	*	1	1030	127	91.	*	1	1645	202	7.	*	1	2300	277	0.
1	0420	53	31.	*	1	1035	128	89.	*	1	1650	203	7.	*	1	2305	278	0.
1	0425	54	45.	*	1	1040	129	86.	*	1	1655	204	6.	*	1	2310	279	0.
1	0430	55	61.	*	1	1045	130	83.	*	1	1700	205	6.	*	1	2315	280	0.
1	0435	56	79.	*	1	1050	131	79.	*	1	1705	206	6.	*	1	2320	281	0.
1	0440	57	95.	*	1	1055	132	75.	*	1	1710	207	6.	*	1	2325	282	0.
1	0445	58	103.	*	1	1100	133	72.	*	1	1715	208	5.	*	1	2330	283	0.
1	0450	59	112.	*	1	1105	134	70.	*	1	1720	209	5.	*	1	2335	284	0.
1	0455	60	119.	*	1	1110	135	67.	*	1	1725	210	5.	*	1	2340	285	0.
1	0500	61	126.	*	1	1115	136	65.	*	1	1730	211	5.	*	1	2345	286	0.
1	0505	62	136.	*	1	1120	137	62.	*	1	1735	212	5.	*	1	2350	287	0.
1	0510	63	149.	*	1	1125	138	59.	*	1	1740	213	4.	*	1	2355	288	0.
1	0515	64	166.	*	1	1130	139	57.	*	1	1745	214	4.	*	2	0000	289	0.
1	0520	65	187.	*	1	1135	140	55.	*	1	1750	215	4.	*	2	0005	290	0.
1	0525	66	215.	*	1	1140	141	53.	*	1	1755	216	4.	*	2	0010	291	0.
1	0530	67	248.	*	1	1145	142	51.	*	1	1800	217	4.	*	2	0015	292	0.
1	0535	68	273.	*	1	1150	143	49.	*	1	1805	218	3.	*	2	0020	293	0.
1	0540	69	279.	*	1	1155	144	47.	*	1	1810	219	3.	*	2	0025	294	0.
1	0545	70	280.	*	1	1200	145	46.	*	1	1815	220	3.	*	2	0030	295	0.
1	0550	71	285.	*	1	1205	146	44.	*	1	1820	221	3.	*	2	0035	296	0.
1	0555	72	283.	*	1	1210	147	43.	*	1	1825	222	3.	*	2	0040	297	0.
1	0600	73	275.	*	1	1215	148	41.	*	1	1830	223	3.	*	2	0045	298	0.
1	0605	74	268.	*	1	1220	149	40.	*	1	1835	224	3.	*	2	0050	299	0.
1	0610	75	260.	*	1	1225	150	38.	*	1	1840	225	2.	*	2	0055	300	0.
				*					*					*				

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 285.	5.83		169.	51.	50.	50.
		(INCHES)	.018	.022	.022	.022
		(AC-FT)	84.	102.	102.	102.

CUMULATIVE AREA = 88.86 SQ MI

```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   18MAR08  TIME  14:48:35   *
*                                       *
*****************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (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
```

```
 *** FREE ***
 *** NOLIST ***
```


```
1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*              JUN   1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   18MAR08  TIME  14:48:35   *
*                                       *
*****************************************
```

```
*************************************
*                                   *
*    U.S. ARMY CORPS OF ENGINEERS   *
*    HYDROLOGIC ENGINEERING CENTER  *
*          609 SECOND STREET        *
*       DAVIS, CALIFORNIA 95616     *
*           (916) 756-1104          *
*                                   *
*************************************
```


KLEINFELDER
FEBRUARY 2008
ALTERNATIVE C

DESIGN STORM = 100-YEAR 6-HOUR STORM
STORM DISTRIBUTION = SDN5

```
  10 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  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        300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2   0  ENDING DATE
                     NDTIME       0055  ENDING TIME
                      ICENT         19  CENTURY MARK

                   COMPUTATION INTERVAL      .08 HOURS
                       TOTAL TIME BASE    24.92 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           1  NUMBER OF PLANS

     JR         MULTI-RATIO OPTION
                    RATIOS OF PRECIPITATION
                  1.00       .87       .74       .57       .44       .26


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


             **************
             *            *
1250 KK      *     ULWIN  *
             *            *
             **************

1254 KO          OUTPUT CONTROL VARIABLES
                     IPRNT           1  PRINT CONTROL
                     IPLOT           0  PLOT CONTROL
                     QSCAL           0.  HYDROGRAPH PLOT SCALE

1253 HC          HYDROGRAPH COMBINATION
                     ICOMP           4  NUMBER OF HYDROGRAPHS TO COMBINE

                                                  ***

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

                                                  HYDROGRAPH AT STATION     ULWIN
                                                    SUM OF  4 HYDROGRAPHS
                                                  PLAN 1,    RATIO =  1.00

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

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	8098.	1		1230	151	4.	1		1845	226	0.
1		0005	2	0.	1		0620	77	7401.	1		1235	152	4.	1		1850	227	0.
1		0010	3	0.	1		0625	78	6763.	1		1240	153	3.	1		1855	228	0.
1		0015	4	0.	1		0630	79	6185.	1		1245	154	3.	1		1900	229	0.
1		0020	5	0.	1		0635	80	5663.	1		1250	155	3.	1		1905	230	0.
1		0025	6	0.	1		0640	81	5198.	1		1255	156	2.	1		1910	231	0.
1		0030	7	0.	1		0645	82	4780.	1		1300	157	2.	1		1915	232	0.
1		0035	8	0.	1		0650	83	4397.	1		1305	158	2.	1		1920	233	0.
1		0040	9	0.	1		0655	84	4045.	1		1310	159	1.	1		1925	234	0.
1		0045	10	0.	1		0700	85	3724.	1		1315	160	1.	1		1930	235	0.
1		0050	11	1.	1		0705	86	3428.	1		1320	161	1.	1		1935	236	0.
1		0055	12	2.	1		0710	87	3153.	1		1325	162	1.	1		1940	237	0.
1		0100	13	4.	1		0715	88	2896.	1		1330	163	1.	1		1945	238	0.
1		0105	14	6.	1		0720	89	2659.	1		1335	164	1.	1		1950	239	0.
1		0110	15	9.	1		0725	90	2437.	1		1340	165	1.	1		1955	240	0.
1		0115	16	12.	1		0730	91	2232.	1		1345	166	0.	1		2000	241	0.
1		0120	17	16.	1		0735	92	2043.	1		1350	167	0.	1		2005	242	0.
1		0125	18	20.	1		0740	93	1869.	1		1355	168	0.	1		2010	243	0.
1		0130	19	25.	1		0745	94	1709.	1		1400	169	0.	1		2015	244	0.
1		0135	20	31.	1		0750	95	1562.	1		1405	170	0.	1		2020	245	0.
1		0140	21	38.	1		0755	96	1428.	1		1410	171	0.	1		2025	246	0.
1		0145	22	47.	1		0800	97	1308.	1		1415	172	0.	1		2030	247	0.
1		0150	23	57.	1		0805	98	1200.	1		1420	173	0.	1		2035	248	0.
1		0155	24	69.	1		0810	99	1102.	1		1425	174	0.	1		2040	249	0.
1		0200	25	86.	1		0815	100	1010.	1		1430	175	0.	1		2045	250	0.
1		0205	26	109.	1		0820	101	920.	1		1435	176	0.	1		2050	251	0.
1		0210	27	141.	1		0825	102	837.	1		1440	177	0.	1		2055	252	0.
1		0215	28	181.	1		0830	103	760.	1		1445	178	0.	1		2100	253	0.
1		0220	29	227.	1		0835	104	689.	1		1450	179	0.	1		2105	254	0.
1		0225	30	276.	1		0840	105	624.	1		1455	180	0.	1		2110	255	0.
1		0230	31	324.	1		0845	106	564.	1		1500	181	0.	1		2115	256	0.
1		0235	32	372.	1		0850	107	511.	1		1505	182	0.	1		2120	257	0.
1		0240	33	422.	1		0855	108	462.	1		1510	183	0.	1		2125	258	0.
1		0245	34	476.	1		0900	109	419.	1		1515	184	0.	1		2130	259	0.
1		0250	35	536.	1		0905	110	381.	1		1520	185	0.	1		2135	260	0.

1	0255	36	606.	*	1	0910	111	346.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	690.	*	1	0915	112	315.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	788.	*	1	0920	113	287.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	903.	*	1	0925	114	262.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	1038.	*	1	0930	115	239.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	1198.	*	1	0935	116	218.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	1394.	*	1	0940	117	198.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	1646.	*	1	0945	118	180.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	1978.	*	1	0950	119	163.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	2407.	*	1	0955	120	148.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	2918.	*	1	1000	121	134.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	3491.	*	1	1005	122	121.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	4159.	*	1	1010	123	109.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	5233.	*	1	1015	124	99.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	7375.	*	1	1020	125	89.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	10320.	*	1	1025	126	80.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	12806.	*	1	1030	127	72.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	14518.	*	1	1035	128	65.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	15537.	*	1	1040	129	58.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	15961.	*	1	1045	130	52.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	15919.	*	1	1050	131	47.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	15522.	*	1	1055	132	42.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	14925.	*	1	1100	133	38.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	14233.	*	1	1105	134	34.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	13555.	*	1	1110	135	30.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	12996.	*	1	1115	136	27.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	12592.	*	1	1120	137	24.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	12348.	*	1	1125	138	21.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	12257.	*	1	1130	139	19.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	12293.	*	1	1135	140	17.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	12426.	*	1	1140	141	15.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	12593.	*	1	1145	142	14.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	12683.	*	1	1150	143	12.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	12592.	*	1	1155	144	11.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	12284.	*	1	1200	145	10.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	11777.	*	1	1205	146	8.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	11130.	*	1	1210	147	7.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	10396.	*	1	1215	148	7.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	9618.	*	1	1220	149	6.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	8842.	*	1	1225	150	5.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 15961.	4.50		6210.	1582.	1524.	1524.
		(INCHES)	.981	1.000	1.000	1.000
		(AC-FT)	3080.	3137.	3137.	3137.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .87

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
					*						*						*					
1		0000	1	0.	*	1		0615	76	6787.	*	1		1230	151	6.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	6228.	*	1		1235	152	6.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	5707.	*	1		1240	153	5.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	5234.	*	1		1245	154	4.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	4804.	*	1		1250	155	4.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	4414.	*	1		1255	156	3.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	4059.	*	1		1300	157	3.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	3737.	*	1		1305	158	3.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	3444.	*	1		1310	159	2.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	3178.	*	1		1315	160	2.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	2934.	*	1		1320	161	2.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	2708.	*	1		1325	162	2.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	2497.	*	1		1330	163	1.	*	1		1945	238	0.
1		0105	14	1.	*	1		0720	89	2302.	*	1		1335	164	1.	*	1		1950	239	0.
1		0110	15	1.	*	1		0725	90	2120.	*	1		1340	165	1.	*	1		1955	240	0.
1		0115	16	2.	*	1		0730	91	1951.	*	1		1345	166	1.	*	1		2000	241	0.
1		0120	17	3.	*	1		0735	92	1795.	*	1		1350	167	1.	*	1		2005	242	0.

1	0125	18	4.	*	1	0740	93	1650.	*	1	1355	168	1.	*	1	2010	243	0.
1	0130	19	6.	*	1	0745	94	1518.	*	1	1400	169	1.	*	1	2015	244	0.
1	0135	20	8.	*	1	0750	95	1396.	*	1	1405	170	1.	*	1	2020	245	0.
1	0140	21	11.	*	1	0755	96	1284.	*	1	1410	171	0.	*	1	2025	246	0.
1	0145	22	15.	*	1	0800	97	1182.	*	1	1415	172	0.	*	1	2030	247	0.
1	0150	23	19.	*	1	0805	98	1089.	*	1	1420	173	0.	*	1	2035	248	0.
1	0155	24	25.	*	1	0810	99	1002.	*	1	1425	174	0.	*	1	2040	249	0.
1	0200	25	33.	*	1	0815	100	919.	*	1	1430	175	0.	*	1	2045	250	0.
1	0205	26	43.	*	1	0820	101	843.	*	1	1435	176	0.	*	1	2050	251	0.
1	0210	27	55.	*	1	0825	102	774.	*	1	1440	177	0.	*	1	2055	252	0.
1	0215	28	70.	*	1	0830	103	710.	*	1	1445	178	0.	*	1	2100	253	0.
1	0220	29	87.	*	1	0835	104	650.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	108.	*	1	0840	105	594.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	133.	*	1	0845	106	541.	*	1	1500	181	0.	*	1	2115	256	0.
1	0235	32	159.	*	1	0850	107	491.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	186.	*	1	0855	108	446.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	214.	*	1	0900	109	405.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	242.	*	1	0905	110	368.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	272.	*	1	0910	111	334.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	307.	*	1	0915	112	304.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	352.	*	1	0920	113	277.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	415.	*	1	0925	114	253.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	500.	*	1	0930	115	231.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	611.	*	1	0935	116	212.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	750.	*	1	0940	117	194.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	928.	*	1	0945	118	178.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	1165.	*	1	0950	119	163.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	1480.	*	1	0955	120	150.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	1865.	*	1	1000	121	137.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	2288.	*	1	1005	122	126.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	2718.	*	1	1010	123	116.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	3113.	*	1	1015	124	106.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	3644.	*	1	1020	125	97.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	5292.	*	1	1025	126	89.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	7899.	*	1	1030	127	82.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	9808.	*	1	1035	128	75.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	10925.	*	1	1040	129	68.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	11492.	*	1	1045	130	62.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	11648.	*	1	1050	131	56.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	11629.	*	1	1055	132	51.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	11439.	*	1	1100	133	46.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	11083.	*	1	1105	134	42.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	10643.	*	1	1110	135	38.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	10205.	*	1	1115	136	34.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	9848.	*	1	1120	137	31.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	9614.	*	1	1125	138	27.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	9506.	*	1	1130	139	25.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	9508.	*	1	1135	140	22.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	9596.	*	1	1140	141	20.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	9743.	*	1	1145	142	18.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	9893.	*	1	1150	143	16.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	9944.	*	1	1155	144	14.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	9816.	*	1	1200	145	13.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	9503.	*	1	1205	146	11.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	9057.	*	1	1210	147	10.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	8534.	*	1	1215	148	9.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	7963.	*	1	1220	149	8.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	7373.	*	1	1225	150	7.	*	1	1840	225	0.	*	2	0055	300	0.

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 11648.	4.58		4739.	1206.	1162.	1162.
		(INCHES)	.749	.762	.762	.762
		(AC-FT)	2350.	2392.	2392.	2392.

CUMULATIVE AREA = 58.84 SQ MI

HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .74

DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW

1	0000	1	0.	*	1	0615	76	5429.	*	1	1230	151	9.	*	1	1845	226	0.
1	0005	2	0.	*	1	0620	77	5020.	*	1	1235	152	8.	*	1	1850	227	0.
1	0010	3	0.	*	1	0625	78	4624.	*	1	1240	153	7.	*	1	1855	228	0.
1	0015	4	0.	*	1	0630	79	4253.	*	1	1245	154	6.	*	1	1900	229	0.
1	0020	5	0.	*	1	0635	80	3912.	*	1	1250	155	6.	*	1	1905	230	0.
1	0025	6	0.	*	1	0640	81	3599.	*	1	1255	156	5.	*	1	1910	231	0.
1	0030	7	0.	*	1	0645	82	3317.	*	1	1300	157	5.	*	1	1915	232	0.
1	0035	8	0.	*	1	0650	83	3060.	*	1	1305	158	4.	*	1	1920	233	0.
1	0040	9	0.	*	1	0655	84	2826.	*	1	1310	159	4.	*	1	1925	234	0.
1	0045	10	0.	*	1	0700	85	2612.	*	1	1315	160	3.	*	1	1930	235	0.
1	0050	11	0.	*	1	0705	86	2415.	*	1	1320	161	3.	*	1	1935	236	0.
1	0055	12	0.	*	1	0710	87	2235.	*	1	1325	162	2.	*	1	1940	237	0.
1	0100	13	0.	*	1	0715	88	2070.	*	1	1330	163	2.	*	1	1945	238	0.
1	0105	14	0.	*	1	0720	89	1917.	*	1	1335	164	2.	*	1	1950	239	0.
1	0110	15	0.	*	1	0725	90	1773.	*	1	1340	165	2.	*	1	1955	240	0.
1	0115	16	0.	*	1	0730	91	1641.	*	1	1345	166	2.	*	1	2000	241	0.
1	0120	17	0.	*	1	0735	92	1519.	*	1	1350	167	1.	*	1	2005	242	0.
1	0125	18	0.	*	1	0740	93	1404.	*	1	1355	168	1.	*	1	2010	243	0.
1	0130	19	0.	*	1	0745	94	1298.	*	1	1400	169	1.	*	1	2015	244	0.
1	0135	20	1.	*	1	0750	95	1200.	*	1	1405	170	1.	*	1	2020	245	0.
1	0140	21	1.	*	1	0755	96	1108.	*	1	1410	171	1.	*	1	2025	246	0.
1	0145	22	2.	*	1	0800	97	1024.	*	1	1415	172	1.	*	1	2030	247	0.
1	0150	23	4.	*	1	0805	98	945.	*	1	1420	173	1.	*	1	2035	248	0.
1	0155	24	6.	*	1	0810	99	871.	*	1	1425	174	1.	*	1	2040	249	0.
1	0200	25	9.	*	1	0815	100	803.	*	1	1430	175	0.	*	1	2045	250	0.
1	0205	26	12.	*	1	0820	101	741.	*	1	1435	176	0.	*	1	2050	251	0.
1	0210	27	17.	*	1	0825	102	684.	*	1	1440	177	0.	*	1	2055	252	0.
1	0215	28	22.	*	1	0830	103	632.	*	1	1445	178	0.	*	1	2100	253	0.
1	0220	29	30.	*	1	0835	104	585.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	38.	*	1	0840	105	542.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	47.	*	1	0845	106	501.	*	1	1500	181	0.	*	1	2115	256	0.
1	0235	32	57.	*	1	0850	107	463.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	67.	*	1	0855	108	428.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	77.	*	1	0900	109	395.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	87.	*	1	0905	110	363.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	99.	*	1	0910	111	332.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	112.	*	1	0915	112	303.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	128.	*	1	0920	113	277.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	148.	*	1	0925	114	253.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	176.	*	1	0930	115	231.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	219.	*	1	0935	116	212.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	282.	*	1	0940	117	194.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	375.	*	1	0945	118	179.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	507.	*	1	0950	119	164.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	699.	*	1	0955	120	151.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	959.	*	1	1000	121	139.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	1265.	*	1	1005	122	128.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	1589.	*	1	1010	123	118.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	1889.	*	1	1015	124	109.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	2130.	*	1	1020	125	101.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	2323.	*	1	1025	126	93.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	2713.	*	1	1030	127	85.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	4510.	*	1	1035	128	79.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	6868.	*	1	1040	129	72.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	7439.	*	1	1045	130	66.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	7803.	*	1	1050	131	61.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	7919.	*	1	1055	132	56.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	7852.	*	1	1100	133	51.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	7791.	*	1	1105	134	46.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	7639.	*	1	1110	135	42.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	7474.	*	1	1115	136	38.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	7265.	*	1	1120	137	35.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	7067.	*	1	1125	138	32.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	6920.	*	1	1130	139	29.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	6863.	*	1	1135	140	26.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	6883.	*	1	1140	141	24.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	6969.	*	1	1145	142	21.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	7092.	*	1	1150	143	19.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	7207.	*	1	1155	144	18.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	7241.	*	1	1200	145	16.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	7149.	*	1	1205	146	14.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	6932.	*	1	1210	147	13.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	6623.	*	1	1215	148	12.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	6252.	*	1	1220	149	11.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	5846.	*	1	1225	150	10.	*	1	1840	225	0.	*	2	0055	300	0.

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR

+ (CFS)	(HR)					
		(CFS)				
+ 7919.	4.67	,	3381.	861.	829.	829.
		(INCHES)	.534	.544	.544	.544
		(AC-FT)	1677.	1707.	1707.	1707.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .57

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	3453.	1		1230	151	15.	1		1845	226	0.
1		0005	2	0.	1		0620	77	3264.	1		1235	152	14.	1		1850	227	0.
1		0010	3	0.	1		0625	78	3076.	1		1240	153	12.	1		1855	228	0.
1		0015	4	0.	1		0630	79	2887.	1		1245	154	11.	1		1900	229	0.
1		0020	5	0.	1		0635	80	2696.	1		1250	155	11.	1		1905	230	0.
1		0025	6	0.	1		0640	81	2505.	1		1255	156	10.	1		1910	231	0.
1		0030	7	0.	1		0645	82	2322.	1		1300	157	9.	1		1915	232	0.
1		0035	8	0.	1		0650	83	2149.	1		1305	158	8.	1		1920	233	0.
1		0040	9	0.	1		0655	84	1991.	1		1310	159	8.	1		1925	234	0.
1		0045	10	0.	1		0700	85	1845.	1		1315	160	7.	1		1930	235	0.
1		0050	11	0.	1		0705	86	1712.	1		1320	161	6.	1		1935	236	0.
1		0055	12	0.	1		0710	87	1591.	1		1325	162	6.	1		1940	237	0.
1		0100	13	0.	1		0715	88	1480.	1		1330	163	5.	1		1945	238	0.
1		0105	14	0.	1		0720	89	1377.	1		1335	164	5.	1		1950	239	0.
1		0110	15	0.	1		0725	90	1282.	1		1340	165	5.	1		1955	240	0.
1		0115	16	0.	1		0730	91	1194.	1		1345	166	4.	1		2000	241	0.
1		0120	17	0.	1		0735	92	1111.	1		1350	167	4.	1		2005	242	0.
1		0125	18	0.	1		0740	93	1034.	1		1355	168	4.	1		2010	243	0.
1		0130	19	0.	1		0745	94	962.	1		1400	169	3.	1		2015	244	0.
1		0135	20	0.	1		0750	95	897.	1		1405	170	3.	1		2020	245	0.
1		0140	21	0.	1		0755	96	836.	1		1410	171	3.	1		2025	246	0.
1		0145	22	0.	1		0800	97	780.	1		1415	172	2.	1		2030	247	0.
1		0150	23	0.	1		0805	98	727.	1		1420	173	2.	1		2035	248	0.
1		0155	24	0.	1		0810	99	678.	1		1425	174	2.	1		2040	249	0.
1		0200	25	0.	1		0815	100	633.	1		1430	175	2.	1		2045	250	0.
1		0205	26	0.	1		0820	101	591.	1		1435	176	2.	1		2050	251	0.
1		0210	27	1.	1		0825	102	552.	1		1440	177	1.	1		2055	252	0.
1		0215	28	2.	1		0830	103	516.	1		1445	178	1.	1		2100	253	0.
1		0220	29	3.	1		0835	104	482.	1		1450	179	1.	1		2105	254	0.
1		0225	30	4.	1		0840	105	451.	1		1455	180	1.	1		2110	255	0.
1		0230	31	6.	1		0845	106	421.	1		1500	181	1.	1		2115	256	0.
1		0235	32	8.	1		0850	107	394.	1		1505	182	1.	1		2120	257	0.
1		0240	33	11.	1		0855	108	368.	1		1510	183	1.	1		2125	258	0.
1		0245	34	13.	1		0900	109	343.	1		1515	184	1.	1		2130	259	0.
1		0250	35	15.	1		0905	110	319.	1		1520	185	1.	1		2135	260	0.
1		0255	36	18.	1		0910	111	297.	1		1525	186	1.	1		2140	261	0.
1		0300	37	20.	1		0915	112	277.	1		1530	187	1.	1		2145	262	0.
1		0305	38	24.	1		0920	113	258.	1		1535	188	0.	1		2150	263	0.
1		0310	39	29.	1		0925	114	241.	1		1540	189	0.	1		2155	264	0.
1		0315	40	36.	1		0930	115	224.	1		1545	190	0.	1		2200	265	0.
1		0320	41	47.	1		0935	116	208.	1		1550	191	0.	1		2205	266	0.
1		0325	42	65.	1		0940	117	193.	1		1555	192	0.	1		2210	267	0.
1		0330	43	92.	1		0945	118	178.	1		1600	193	0.	1		2215	268	0.
1		0335	44	130.	1		0950	119	164.	1		1605	194	0.	1		2220	269	0.
1		0340	45	184.	1		0955	120	151.	1		1610	195	0.	1		2225	270	0.
1		0345	46	251.	1		1000	121	139.	1		1615	196	0.	1		2230	271	0.
1		0350	47	332.	1		1005	122	129.	1		1620	197	0.	1		2235	272	0.
1		0355	48	480.	1		1010	123	119.	1		1625	198	0.	1		2240	273	0.
1		0400	49	677.	1		1015	124	110.	1		1630	199	0.	1		2245	274	0.
1		0405	50	859.	1		1020	125	102.	1		1635	200	0.	1		2250	275	0.
1		0410	51	997.	1		1025	126	94.	1		1640	201	0.	1		2255	276	0.
1		0415	52	1090.	1		1030	127	88.	1		1645	202	0.	1		2300	277	0.
1		0420	53	1133.	1		1035	128	81.	1		1650	203	0.	1		2305	278	0.
1		0425	54	1142.	1		1040	129	76.	1		1655	204	0.	1		2310	279	0.
1		0430	55	1133.	1		1045	130	71.	1		1700	205	0.	1		2315	280	0.
1		0435	56	1630.	1		1050	131	66.	1		1705	206	0.	1		2320	281	0.
1		0440	57	4133.	1		1055	132	61.	1		1710	207	0.	1		2325	282	0.
1		0445	58	4035.	1		1100	133	57.	1		1715	208	0.	1		2330	283	0.
1		0450	59	3845.	1		1105	134	54.	1		1720	209	0.	1		2335	284	0.
1		0455	60	4187.	1		1110	135	50.	1		1725	210	0.	1		2340	285	0.
1		0500	61	3909.	1		1115	136	47.	1		1730	211	0.	1		2345	286	0.
1		0505	62	3987.	1		1120	137	44.	1		1735	212	0.	1		2350	287	0.

1	0510	63	3878.	*	1	1125	138	41.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	3836.	*	1	1130	139	38.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	3807.	*	1	1135	140	36.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	3796.	*	1	1140	141	33.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	3801.	*	1	1145	142	31.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	3811.	*	1	1150	143	28.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	3853.	*	1	1155	144	26.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	3932.	*	1	1200	145	24.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	4011.	*	1	1205	146	22.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	4023.	*	1	1210	147	21.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	3946.	*	1	1215	148	19.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	3807.	*	1	1220	149	17.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	3638.	*	1	1225	150	16.	*	1	1840	225	0.	*	2	0055	300	0.

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)	(CFS)			
+ 4187.	4.92	1841.	471.	454.	454.
		(INCHES) .291	.298	.298	.298
		(AC-FT) 913.	935.	935.	935.

CUMULATIVE AREA = 58.84 SQ MI

HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .44

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	1882.	*	1		1230	151	18.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	1812.	*	1		1235	152	17.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	1729.	*	1		1240	153	16.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	1646.	*	1		1245	154	15.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	1550.	*	1		1250	155	14.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	1477.	*	1		1255	156	13.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	1421.	*	1		1300	157	12.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	1357.	*	1		1305	158	11.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	1275.	*	1		1310	159	10.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	1199.	*	1		1315	160	9.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	1128.	*	1		1320	161	9.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	1052.	*	1		1325	162	8.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	976.	*	1		1330	163	8.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	912.	*	1		1335	164	7.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	855.	*	1		1340	165	7.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	798.	*	1		1345	166	6.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	749.	*	1		1350	167	6.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	705.	*	1		1355	168	5.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	662.	*	1		1400	169	5.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	622.	*	1		1405	170	5.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	586.	*	1		1410	171	4.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	549.	*	1		1415	172	4.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	517.	*	1		1420	173	4.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	487.	*	1		1425	174	4.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	457.	*	1		1430	175	3.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	430.	*	1		1435	176	3.	*	1		2050	251	0.
1		0210	27	0.	*	1		0825	102	405.	*	1		1440	177	3.	*	1		2055	252	0.
1		0215	28	0.	*	1		0830	103	381.	*	1		1445	178	3.	*	1		2100	253	0.
1		0220	29	0.	*	1		0835	104	359.	*	1		1450	179	3.	*	1		2105	254	0.
1		0225	30	0.	*	1		0840	105	338.	*	1		1455	180	2.	*	1		2110	255	0.
1		0230	31	0.	*	1		0845	106	318.	*	1		1500	181	2.	*	1		2115	256	0.
1		0235	32	0.	*	1		0850	107	300.	*	1		1505	182	2.	*	1		2120	257	0.
1		0240	33	0.	*	1		0855	108	283.	*	1		1510	183	2.	*	1		2125	258	0.
1		0245	34	0.	*	1		0900	109	267.	*	1		1515	184	2.	*	1		2130	259	0.
1		0250	35	0.	*	1		0905	110	252.	*	1		1520	185	2.	*	1		2135	260	0.
1		0255	36	0.	*	1		0910	111	238.	*	1		1525	186	2.	*	1		2140	261	0.
1		0300	37	1.	*	1		0915	112	225.	*	1		1530	187	1.	*	1		2145	262	0.
1		0305	38	1.	*	1		0920	113	213.	*	1		1535	188	1.	*	1		2150	263	0.
1		0310	39	1.	*	1		0925	114	202.	*	1		1540	189	1.	*	1		2155	264	0.
1		0315	40	2.	*	1		0930	115	191.	*	1		1545	190	1.	*	1		2200	265	0.
1		0320	41	4.	*	1		0935	116	180.	*	1		1550	191	1.	*	1		2205	266	0.
1		0325	42	7.	*	1		0940	117	170.	*	1		1555	192	1.	*	1		2210	267	0.
1		0330	43	15.	*	1		0945	118	159.	*	1		1600	193	1.	*	1		2215	268	0.
1		0335	44	29.	*	1		0950	119	148.	*	1		1605	194	1.	*	1		2220	269	0.

1	0340	45	51.	*	1	0955	120	139.	*	1	1610	195	1.	*	1	2225	270	0.
1	0345	46	80.	*	1	1000	121	130.	*	1	1615	196	1.	*	1	2230	271	0.
1	0350	47	114.	*	1	1005	122	121.	*	1	1620	197	1.	*	1	2235	272	0.
1	0355	48	150.	*	1	1010	123	113.	*	1	1625	198	1.	*	1	2240	273	0.
1	0400	49	187.	*	1	1015	124	105.	*	1	1630	199	1.	*	1	2245	274	0.
1	0405	50	227.	*	1	1020	125	98.	*	1	1635	200	1.	*	1	2250	275	0.
1	0410	51	331.	*	1	1025	126	92.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	435.	*	1	1030	127	86.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	476.	*	1	1035	128	80.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	502.	*	1	1040	129	75.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	505.	*	1	1045	130	70.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	499.	*	1	1050	131	65.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	486.	*	1	1055	132	61.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	470.	*	1	1100	133	57.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	457.	*	1	1105	134	53.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	449.	*	1	1110	135	50.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	1403.	*	1	1115	136	46.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	2477.	*	1	1120	137	43.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	1533.	*	1	1125	138	41.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	1925.	*	1	1130	139	38.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	2145.	*	1	1135	140	36.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	1823.	*	1	1140	141	33.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	2030.	*	1	1145	142	31.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	1894.	*	1	1150	143	30.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	1853.	*	1	1155	144	28.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	1868.	*	1	1200	145	26.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	1873.	*	1	1205	146	25.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	1932.	*	1	1210	147	23.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	2004.	*	1	1215	148	22.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	2021.	*	1	1220	149	20.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	1992.	*	1	1225	150	19.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 2477.	5.08		908.	236.	227.	227.
		(INCHES)	.144	.149	.149	.149
		(AC-FT)	450.	467.	467.	467.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .26

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	71.	*	1		1230	151	15.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	64.	*	1		1235	152	14.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	60.	*	1		1240	153	13.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	280.	*	1		1245	154	12.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	303.	*	1		1250	155	12.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	134.	*	1		1255	156	11.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	376.	*	1		1300	157	11.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	427.	*	1		1305	158	10.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	325.	*	1		1310	159	10.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	401.	*	1		1315	160	9.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	289.	*	1		1320	161	9.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	309.	*	1		1325	162	8.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	343.	*	1		1330	163	8.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	261.	*	1		1335	164	7.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	261.	*	1		1340	165	7.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	261.	*	1		1345	166	6.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	243.	*	1		1350	167	6.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	233.	*	1		1355	168	6.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	229.	*	1		1400	169	6.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	202.	*	1		1405	170	5.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	205.	*	1		1410	171	5.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	212.	*	1		1415	172	5.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	184.	*	1		1420	173	5.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	190.	*	1		1425	174	4.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	177.	*	1		1430	175	4.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	164.	*	1		1435	176	4.	*	1		2050	251	0.

1	0210	27	0.	*	1	0825	102	161.	*	1	1440	177	4.	*	1	2055	252	0.
1	0215	28	0.	*	1	0830	103	144.	*	1	1445	178	4.	*	1	2100	253	0.
1	0220	29	0.	*	1	0835	104	134.	*	1	1450	179	4.	*	1	2105	254	0.
1	0225	30	0.	*	1	0840	105	133.	*	1	1455	180	3.	*	1	2110	255	0.
1	0230	31	0.	*	1	0845	106	122.	*	1	1500	181	3.	*	1	2115	256	0.
1	0235	32	0.	*	1	0850	107	120.	*	1	1505	182	3.	*	1	2120	257	0.
1	0240	33	0.	*	1	0855	108	118.	*	1	1510	183	3.	*	1	2125	258	0.
1	0245	34	0.	*	1	0900	109	109.	*	1	1515	184	3.	*	1	2130	259	0.
1	0250	35	0.	*	1	0905	110	104.	*	1	1520	185	3.	*	1	2135	260	0.
1	0255	36	0.	*	1	0910	111	98.	*	1	1525	186	2.	*	1	2140	261	0.
1	0300	37	0.	*	1	0915	112	91.	*	1	1530	187	2.	*	1	2145	262	0.
1	0305	38	0.	*	1	0920	113	87.	*	1	1535	188	2.	*	1	2150	263	0.
1	0310	39	0.	*	1	0925	114	84.	*	1	1540	189	2.	*	1	2155	264	0.
1	0315	40	0.	*	1	0930	115	85.	*	1	1545	190	2.	*	1	2200	265	0.
1	0320	41	0.	*	1	0935	116	83.	*	1	1550	191	2.	*	1	2205	266	0.
1	0325	42	0.	*	1	0940	117	78.	*	1	1555	192	2.	*	1	2210	267	0.
1	0330	43	0.	*	1	0945	118	73.	*	1	1600	193	2.	*	1	2215	268	0.
1	0335	44	0.	*	1	0950	119	69.	*	1	1605	194	2.	*	1	2220	269	0.
1	0340	45	0.	*	1	0955	120	66.	*	1	1610	195	1.	*	1	2225	270	0.
1	0345	46	0.	*	1	1000	121	64.	*	1	1615	196	1.	*	1	2230	271	0.
1	0350	47	0.	*	1	1005	122	61.	*	1	1620	197	1.	*	1	2235	272	0.
1	0355	48	1.	*	1	1010	123	57.	*	1	1625	198	1.	*	1	2240	273	0.
1	0400	49	5.	*	1	1015	124	53.	*	1	1630	199	1.	*	1	2245	274	0.
1	0405	50	11.	*	1	1020	125	50.	*	1	1635	200	1.	*	1	2250	275	0.
1	0410	51	19.	*	1	1025	126	48.	*	1	1640	201	1.	*	1	2255	276	0.
1	0415	52	26.	*	1	1030	127	47.	*	1	1645	202	1.	*	1	2300	277	0.
1	0420	53	32.	*	1	1035	128	45.	*	1	1650	203	1.	*	1	2305	278	0.
1	0425	54	36.	*	1	1040	129	44.	*	1	1655	204	1.	*	1	2310	279	0.
1	0430	55	40.	*	1	1045	130	42.	*	1	1700	205	1.	*	1	2315	280	0.
1	0435	56	43.	*	1	1050	131	40.	*	1	1705	206	1.	*	1	2320	281	0.
1	0440	57	44.	*	1	1055	132	38.	*	1	1710	207	1.	*	1	2325	282	0.
1	0445	58	46.	*	1	1100	133	36.	*	1	1715	208	1.	*	1	2330	283	0.
1	0450	59	53.	*	1	1105	134	35.	*	1	1720	209	1.	*	1	2335	284	0.
1	0455	60	72.	*	1	1110	135	34.	*	1	1725	210	1.	*	1	2340	285	0.
1	0500	61	68.	*	1	1115	136	32.	*	1	1730	211	1.	*	1	2345	286	0.
1	0505	62	70.	*	1	1120	137	31.	*	1	1735	212	1.	*	1	2350	287	0.
1	0510	63	77.	*	1	1125	138	29.	*	1	1740	213	1.	*	1	2355	288	0.
1	0515	64	77.	*	1	1130	139	28.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	81.	*	1	1135	140	26.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	84.	*	1	1140	141	25.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	88.	*	1	1145	142	24.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	93.	*	1	1150	143	23.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	99.	*	1	1155	144	21.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	105.	*	1	1200	145	20.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	105.	*	1	1205	146	19.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	101.	*	1	1210	147	18.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	95.	*	1	1215	148	17.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	87.	*	1	1220	149	16.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	79.	*	1	1225	150	16.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 427.	6.83		140.	39.	38.	38.
		(INCHES)	.022	.025	.025	.025
		(AC-FT)	70.	77.	77.	77.

CUMULATIVE AREA = 58.84 SQ MI

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          *            *
1305 KK   *   FINISH     *
          *            *
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1307 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

1306 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1500.	CHANNEL LENGTH
S	.0090	SLOPE
N	.050	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	250.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

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COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	2.55	750.00	10167.45	324.28	1.08	9.79

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.08	1.64	5.00		10165.62	325.00	1.08	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5134E+04 EXCESS= .0000E+00 OUTFLOW= .5134E+04 BASIN STORAGE= .1018E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = 1.00

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	8337.	1		1230	151	2694.	1		1845	226	206.
1		0005	2	0.	1		0620	77	8531.	1		1235	152	2671.	1		1850	227	169.
1		0010	3	0.	1		0625	78	8797.	1		1240	153	2647.	1		1855	228	133.
1		0015	4	0.	1		0630	79	8947.	1		1245	154	2623.	1		1900	229	101.
1		0020	5	0.	1		0635	80	8964.	1		1250	155	2599.	1		1905	230	76.
1		0025	6	0.	1		0640	81	8883.	1		1255	156	2575.	1		1910	231	57.
1		0030	7	0.	1		0645	82	8726.	1		1300	157	2551.	1		1915	232	43.
1		0035	8	1.	1		0650	83	8513.	1		1305	158	2528.	1		1920	233	32.
1		0040	9	3.	1		0655	84	8261.	1		1310	159	2505.	1		1925	234	24.
1		0045	10	6.	1		0700	85	7980.	1		1315	160	2480.	1		1930	235	18.
1		0050	11	11.	1		0705	86	7678.	1		1320	161	2455.	1		1935	236	14.
1		0055	12	19.	1		0710	87	7362.	1		1325	162	2429.	1		1940	237	10.
1		0100	13	29.	1		0715	88	7038.	1		1330	163	2403.	1		1945	238	8.
1		0105	14	42.	1		0720	89	6711.	1		1335	164	2378.	1		1950	239	6.
1		0110	15	58.	1		0725	90	6384.	1		1340	165	2353.	1		1955	240	4.
1		0115	16	74.	1		0730	91	6057.	1		1345	166	2328.	1		2000	241	3.
1		0120	17	92.	1		0735	92	5734.	1		1350	167	2302.	1		2005	242	2.
1		0125	18	111.	1		0740	93	5417.	1		1355	168	2275.	1		2010	243	2.
1		0130	19	130.	1		0745	94	5117.	1		1400	169	2247.	1		2015	244	1.
1		0135	20	152.	1		0750	95	4859.	1		1405	170	2219.	1		2020	245	1.
1		0140	21	177.	1		0755	96	4672.	1		1410	171	2191.	1		2025	246	1.
1		0145	22	207.	1		0800	97	4552.	1		1415	172	2163.	1		2030	247	1.
1		0150	23	243.	1		0805	98	4463.	1		1420	173	2136.	1		2035	248	0.
1		0155	24	285.	1		0810	99	4381.	1		1425	174	2108.	1		2040	249	0.
1		0200	25	334.	1		0815	100	4305.	1		1430	175	2078.	1		2045	250	0.
1		0205	26	390.	1		0820	101	4233.	1		1435	176	2046.	1		2050	251	0.
1		0210	27	453.	1		0825	102	4164.	1		1440	177	2015.	1		2055	252	0.
1		0215	28	520.	1		0830	103	4100.	1		1445	178	1984.	1		2100	253	0.
1		0220	29	591.	1		0835	104	4039.	1		1450	179	1953.	1		2105	254	0.
1		0225	30	663.	1		0840	105	3981.	1		1455	180	1922.	1		2110	255	0.
1		0230	31	737.	1		0845	106	3927.	1		1500	181	1889.	1		2115	256	0.
1		0235	32	809.	1		0850	107	3875.	1		1505	182	1855.	1		2120	257	0.
1		0240	33	877.	1		0855	108	3826.	1		1510	183	1819.	1		2125	258	0.
1		0245	34	938.	1		0900	109	3780.	1		1515	184	1784.	1		2130	259	0.
1		0250	35	994.	1		0905	110	3737.	1		1520	185	1750.	1		2135	260	0.
1		0255	36	1046.	1		0910	111	3695.	1		1525	186	1716.	1		2140	261	0.
1		0300	37	1100.	1		0915	112	3657.	1		1530	187	1680.	1		2145	262	0.
1		0305	38	1171.	1		0920	113	3620.	1		1535	188	1644.	1		2150	263	0.
1		0310	39	1275.	1		0925	114	3586.	1		1540	189	1606.	1		2155	264	0.
1		0315	40	1428.	1		0930	115	3552.	1		1545	190	1570.	1		2200	265	0.
1		0320	41	1653.	1		0935	116	3520.	1		1550	191	1534.	1		2205	266	0.
1		0325	42	1968.	1		0940	117	3488.	1		1555	192	1498.	1		2210	267	0.
1		0330	43	2392.	1		0945	118	3457.	1		1600	193	1461.	1		2215	268	0.

1	0335	44	2939.	*	1	0950	119	3428.	*	1	1605	194	1423.	*	1	2220	269	0.
1	0340	45	3603.	*	1	0955	120	3399.	*	1	1610	195	1384.	*	1	2225	270	0.
1	0345	46	4358.	*	1	1000	121	3372.	*	1	1615	196	1346.	*	1	2230	271	0.
1	0350	47	5169.	*	1	1005	122	3346.	*	1	1620	197	1309.	*	1	2235	272	0.
1	0355	48	5994.	*	1	1010	123	3320.	*	1	1625	198	1273.	*	1	2240	273	0.
1	0400	49	6760.	*	1	1015	124	3296.	*	1	1630	199	1235.	*	1	2245	274	0.
1	0405	50	7406.	*	1	1020	125	3272.	*	1	1635	200	1197.	*	1	2250	275	0.
1	0410	51	7918.	*	1	1025	126	3248.	*	1	1640	201	1157.	*	1	2255	276	0.
1	0415	52	8322.	*	1	1030	127	3223.	*	1	1645	202	1118.	*	1	2300	277	0.
1	0420	53	8644.	*	1	1035	128	3199.	*	1	1650	203	1080.	*	1	2305	278	0.
1	0425	54	8884.	*	1	1040	129	3176.	*	1	1655	204	1043.	*	1	2310	279	0.
1	0430	55	9037.	*	1	1045	130	3153.	*	1	1700	205	1006.	*	1	2315	280	0.
1	0435	56	9120.	*	1	1050	131	3130.	*	1	1705	206	968.	*	1	2320	281	0.
1	0440	57	9158.	*	1	1055	132	3108.	*	1	1710	207	928.	*	1	2325	282	0.
1	0445	58	9175.	*	1	1100	133	3087.	*	1	1715	208	889.	*	1	2330	283	0.
1	0450	59	9216.	*	1	1105	134	3066.	*	1	1720	209	851.	*	1	2335	284	0.
1	0455	60	9319.	*	1	1110	135	3045.	*	1	1725	210	814.	*	1	2340	285	0.
1	0500	61	9482.	*	1	1115	136	3023.	*	1	1730	211	779.	*	1	2345	286	0.
1	0505	62	9670.	*	1	1120	137	3001.	*	1	1735	212	743.	*	1	2350	287	0.
1	0510	63	9856.	*	1	1125	138	2979.	*	1	1740	213	705.	*	1	2355	288	0.
1	0515	64	10020.	*	1	1130	139	2957.	*	1	1745	214	665.	*	2	0000	289	0.
1	0520	65	10130.	*	1	1135	140	2935.	*	1	1750	215	625.	*	2	0005	290	0.
1	0525	66	10166.	*	1	1140	141	2914.	*	1	1755	216	588.	*	2	0010	291	0.
1	0530	67	10126.	*	1	1145	142	2893.	*	1	1800	217	552.	*	2	0015	292	0.
1	0535	68	10018.	*	1	1150	143	2872.	*	1	1805	218	517.	*	2	0020	293	0.
1	0540	69	9855.	*	1	1155	144	2851.	*	1	1810	219	480.	*	2	0025	294	0.
1	0545	70	9647.	*	1	1200	145	2828.	*	1	1815	220	438.	*	2	0030	295	0.
1	0550	71	9403.	*	1	1205	146	2805.	*	1	1820	221	393.	*	2	0035	296	0.
1	0555	72	9139.	*	1	1210	147	2782.	*	1	1825	222	349.	*	2	0040	297	0.
1	0600	73	8866.	*	1	1215	148	2760.	*	1	1830	223	308.	*	2	0045	298	0.
1	0605	74	8596.	*	1	1220	149	2738.	*	1	1835	224	272.	*	2	0050	299	0.
1	0610	75	8380.	*	1	1225	150	2716.	*	1	1840	225	239.	*	2	0055	300	0.

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 10166.	5.42		6908.	2588.	2493.	2493.
		(INCHES)	.723	1.083	1.083	1.083
		(AC-FT)	3425.	5134.	5134.	5134.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	2.75	750.00	8379.41	327.51	.83	9.08
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		8374.66	325.00	.83	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3953E+04 EXCESS= .0000E+00 OUTFLOW= .3953E+04 BASIN STORAGE= .1047E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .87

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	6849.	*	1		1230	151	2222.	*	1		1845	226	1.
1		0005	2	0.	*	1		0620	77	6667.	*	1		1235	152	2193.	*	1		1850	227	1.
1		0010	3	0.	*	1		0625	78	6491.	*	1		1240	153	2165.	*	1		1855	228	1.
1		0015	4	0.	*	1		0630	79	6319.	*	1		1245	154	2136.	*	1		1900	229	1.
1		0020	5	0.	*	1		0635	80	6151.	*	1		1250	155	2106.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	5988.	*	1		1255	156	2074.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	5828.	*	1		1300	157	2042.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	5674.	*	1		1305	158	2009.	*	1		1920	233	0.

1	0040	9	0.	*	1	0655	84	5527.	*	1	1310	159	1978.	*	1	1925	234	0.
1	0045	10	1.	*	1	0700	85	5385.	*	1	1315	160	1946.	*	1	1930	235	0.
1	0050	11	2.	*	1	0705	86	5249.	*	1	1320	161	1914.	*	1	1935	236	0.
1	0055	12	4.	*	1	0710	87	5119.	*	1	1325	162	1880.	*	1	1940	237	0.
1	0100	13	7.	*	1	0715	88	4995.	*	1	1330	163	1844.	*	1	1945	238	0.
1	0105	14	11.	*	1	0720	89	4877.	*	1	1335	164	1808.	*	1	1950	239	0.
1	0110	15	17.	*	1	0725	90	4764.	*	1	1340	165	1773.	*	1	1955	240	0.
1	0115	16	23.	*	1	0730	91	4656.	*	1	1345	166	1739.	*	1	2000	241	0.
1	0120	17	31.	*	1	0735	92	4551.	*	1	1350	167	1703.	*	1	2005	242	0.
1	0125	18	40.	*	1	0740	93	4449.	*	1	1355	168	1667.	*	1	2010	243	0.
1	0130	19	50.	*	1	0745	94	4352.	*	1	1400	169	1629.	*	1	2015	244	0.
1	0135	20	62.	*	1	0750	95	4261.	*	1	1405	170	1592.	*	1	2020	245	0.
1	0140	21	77.	*	1	0755	96	4175.	*	1	1410	171	1555.	*	1	2025	246	0.
1	0145	22	95.	*	1	0800	97	4094.	*	1	1415	172	1519.	*	1	2030	247	0.
1	0150	23	117.	*	1	0805	98	4020.	*	1	1420	173	1483.	*	1	2035	248	0.
1	0155	24	144.	*	1	0810	99	3950.	*	1	1425	174	1445.	*	1	2040	249	0.
1	0200	25	176.	*	1	0815	100	3885.	*	1	1430	175	1407.	*	1	2045	250	0.
1	0205	26	213.	*	1	0820	101	3824.	*	1	1435	176	1368.	*	1	2050	251	0.
1	0210	27	254.	*	1	0825	102	3766.	*	1	1440	177	1330.	*	1	2055	252	0.
1	0215	28	299.	*	1	0830	103	3711.	*	1	1445	178	1294.	*	1	2100	253	0.
1	0220	29	347.	*	1	0835	104	3658.	*	1	1450	179	1257.	*	1	2105	254	0.
1	0225	30	395.	*	1	0840	105	3607.	*	1	1455	180	1219.	*	1	2110	255	0.
1	0230	31	443.	*	1	0845	106	3559.	*	1	1500	181	1179.	*	1	2115	256	0.
1	0235	32	488.	*	1	0850	107	3512.	*	1	1505	182	1140.	*	1	2120	257	0.
1	0240	33	529.	*	1	0855	108	3468.	*	1	1510	183	1101.	*	1	2125	258	0.
1	0245	34	565.	*	1	0900	109	3425.	*	1	1515	184	1064.	*	1	2130	259	0.
1	0250	35	596.	*	1	0905	110	3385.	*	1	1520	185	1027.	*	1	2135	260	0.
1	0255	36	629.	*	1	0910	111	3346.	*	1	1525	186	989.	*	1	2140	261	0.
1	0300	37	668.	*	1	0915	112	3310.	*	1	1530	187	950.	*	1	2145	262	0.
1	0305	38	721.	*	1	0920	113	3275.	*	1	1535	188	911.	*	1	2150	263	0.
1	0310	39	794.	*	1	0925	114	3241.	*	1	1540	189	872.	*	1	2155	264	0.
1	0315	40	901.	*	1	0930	115	3208.	*	1	1545	190	835.	*	1	2200	265	0.
1	0320	41	1059.	*	1	0935	116	3175.	*	1	1550	191	799.	*	1	2205	266	0.
1	0325	42	1274.	*	1	0940	117	3143.	*	1	1555	192	763.	*	1	2210	267	0.
1	0330	43	1569.	*	1	0945	118	3112.	*	1	1600	193	727.	*	1	2215	268	0.
1	0335	44	1973.	*	1	0950	119	3082.	*	1	1605	194	688.	*	1	2220	269	0.
1	0340	45	2491.	*	1	0955	120	3052.	*	1	1610	195	648.	*	1	2225	270	0.
1	0345	46	3098.	*	1	1000	121	3024.	*	1	1615	196	610.	*	1	2230	271	0.
1	0350	47	3765.	*	1	1005	122	2996.	*	1	1620	197	575.	*	1	2235	272	0.
1	0355	48	4443.	*	1	1010	123	2969.	*	1	1625	198	540.	*	1	2240	273	0.
1	0400	49	5076.	*	1	1015	124	2942.	*	1	1630	199	507.	*	1	2245	274	0.
1	0405	50	5622.	*	1	1020	125	2914.	*	1	1635	200	471.	*	1	2250	275	0.
1	0410	51	6055.	*	1	1025	126	2886.	*	1	1640	201	430.	*	1	2255	276	0.
1	0415	52	6385.	*	1	1030	127	2859.	*	1	1645	202	387.	*	1	2300	277	0.
1	0420	53	6639.	*	1	1035	128	2833.	*	1	1650	203	345.	*	1	2305	278	0.
1	0425	54	6834.	*	1	1040	129	2807.	*	1	1655	204	307.	*	1	2310	279	0.
1	0430	55	6988.	*	1	1045	130	2781.	*	1	1700	205	273.	*	1	2315	280	0.
1	0435	56	7114.	*	1	1050	131	2756.	*	1	1705	206	242.	*	1	2320	281	0.
1	0440	57	7212.	*	1	1055	132	2731.	*	1	1710	207	209.	*	1	2325	282	0.
1	0445	58	7286.	*	1	1100	133	2705.	*	1	1715	208	174.	*	1	2330	283	0.
1	0450	59	7369.	*	1	1105	134	2678.	*	1	1720	209	137.	*	1	2335	284	0.
1	0455	60	7494.	*	1	1110	135	2652.	*	1	1725	210	106.	*	1	2340	285	0.
1	0500	61	7664.	*	1	1115	136	2626.	*	1	1730	211	80.	*	1	2345	286	0.
1	0505	62	7853.	*	1	1120	137	2600.	*	1	1735	212	61.	*	1	2350	287	0.
1	0510	63	8038.	*	1	1125	138	2575.	*	1	1740	213	46.	*	1	2355	288	0.
1	0515	64	8201.	*	1	1130	139	2550.	*	1	1745	214	35.	*	2	0000	289	0.
1	0520	65	8319.	*	1	1135	140	2524.	*	1	1750	215	26.	*	2	0005	290	0.
1	0525	66	8375.	*	1	1140	141	2498.	*	1	1755	216	20.	*	2	0010	291	0.
1	0530	67	8367.	*	1	1145	142	2470.	*	1	1800	217	15.	*	2	0015	292	0.
1	0535	68	8301.	*	1	1150	143	2443.	*	1	1805	218	11.	*	2	0020	293	0.
1	0540	69	8187.	*	1	1155	144	2416.	*	1	1810	219	9.	*	2	0025	294	0.
1	0545	70	8036.	*	1	1200	145	2389.	*	1	1815	220	7.	*	2	0030	295	0.
1	0550	71	7856.	*	1	1205	146	2363.	*	1	1820	221	5.	*	2	0035	296	0.
1	0555	72	7659.	*	1	1210	147	2336.	*	1	1825	222	4.	*	2	0040	297	0.
1	0600	73	7453.	*	1	1215	148	2309.	*	1	1830	223	3.	*	2	0045	298	0.
1	0605	74	7244.	*	1	1220	149	2280.	*	1	1835	224	2.	*	2	0050	299	0.
1	0610	75	7041.	*	1	1225	150	2251.	*	1	1840	225	2.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 8375.	5.42		5512.	1993.	1920.	1920.
		(INCHES)	.577	.834	.834	.834
		(AC-FT)	2733.	3953.	3953.	3953.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	COMPUTATION TIME STEP M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	3.03	750.00	6550.66	330.18	.60	8.25
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		6550.51	330.00	.60	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2858E+04 EXCESS= .0000E+00 OUTFLOW= .2858E+04 BASIN STORAGE= .1127E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .74

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	5527.	1		1230	151	1389.	1		1845	226	0.
1		0005	2	0.	1		0620	77	5399.	1		1235	152	1350.	1		1850	227	0.
1		0010	3	0.	1		0625	78	5275.	1		1240	153	1313.	1		1855	228	0.
1		0015	4	0.	1		0630	79	5152.	1		1245	154	1275.	1		1900	229	0.
1		0020	5	0.	1		0635	80	5032.	1		1250	155	1237.	1		1905	230	0.
1		0025	6	0.	1		0640	81	4914.	1		1255	156	1197.	1		1910	231	0.
1		0030	7	0.	1		0645	82	4797.	1		1300	157	1157.	1		1915	232	0.
1		0035	8	0.	1		0650	83	4683.	1		1305	158	1117.	1		1920	233	0.
1		0040	9	0.	1		0655	84	4573.	1		1310	159	1079.	1		1925	234	0.
1		0045	10	0.	1		0700	85	4466.	1		1315	160	1042.	1		1930	235	0.
1		0050	11	0.	1		0705	86	4362.	1		1320	161	1004.	1		1935	236	0.
1		0055	12	0.	1		0710	87	4262.	1		1325	162	965.	1		1940	237	0.
1		0100	13	0.	1		0715	88	4167.	1		1330	163	925.	1		1945	238	0.
1		0105	14	1.	1		0720	89	4075.	1		1335	164	886.	1		1950	239	0.
1		0110	15	2.	1		0725	90	3987.	1		1340	165	848.	1		1955	240	0.
1		0115	16	3.	1		0730	91	3902.	1		1345	166	812.	1		2000	241	0.
1		0120	17	4.	1		0735	92	3819.	1		1350	167	776.	1		2005	242	0.
1		0125	18	7.	1		0740	93	3738.	1		1355	168	739.	1		2010	243	0.
1		0130	19	10.	1		0745	94	3660.	1		1400	169	701.	1		2015	244	0.
1		0135	20	14.	1		0750	95	3586.	1		1405	170	661.	1		2020	245	0.
1		0140	21	20.	1		0755	96	3515.	1		1410	171	622.	1		2025	246	0.
1		0145	22	28.	1		0800	97	3449.	1		1415	172	586.	1		2030	247	0.
1		0150	23	38.	1		0805	98	3386.	1		1420	173	551.	1		2035	248	0.
1		0155	24	51.	1		0810	99	3327.	1		1425	174	518.	1		2040	249	0.
1		0200	25	68.	1		0815	100	3272.	1		1430	175	484.	1		2045	250	0.
1		0205	26	88.	1		0820	101	3219.	1		1435	176	447.	1		2050	251	0.
1		0210	27	112.	1		0825	102	3169.	1		1440	177	407.	1		2055	252	0.
1		0215	28	138.	1		0830	103	3120.	1		1445	178	366.	1		2100	253	0.
1		0220	29	167.	1		0835	104	3073.	1		1450	179	328.	1		2105	254	0.
1		0225	30	197.	1		0840	105	3028.	1		1455	180	293.	1		2110	255	0.
1		0230	31	227.	1		0845	106	2983.	1		1500	181	261.	1		2115	256	0.
1		0235	32	256.	1		0850	107	2939.	1		1505	182	231.	1		2120	257	0.
1		0240	33	282.	1		0855	108	2897.	1		1510	183	198.	1		2125	258	0.
1		0245	34	305.	1		0900	109	2857.	1		1515	184	162.	1		2130	259	0.
1		0250	35	324.	1		0905	110	2818.	1		1520	185	127.	1		2135	260	0.
1		0255	36	342.	1		0910	111	2781.	1		1525	186	97.	1		2140	261	0.
1		0300	37	363.	1		0915	112	2744.	1		1530	187	74.	1		2145	262	0.
1		0305	38	391.	1		0920	113	2709.	1		1535	188	56.	1		2150	263	0.
1		0310	39	430.	1		0925	114	2674.	1		1540	189	42.	1		2155	264	0.
1		0315	40	491.	1		0930	115	2639.	1		1545	190	32.	1		2200	265	0.
1		0320	41	582.	1		0935	116	2604.	1		1550	191	25.	1		2205	266	0.
1		0325	42	718.	1		0940	117	2570.	1		1555	192	19.	1		2210	267	0.
1		0330	43	917.	1		0945	118	2536.	1		1600	193	14.	1		2215	268	0.
1		0335	44	1196.	1		0950	119	2504.	1		1605	194	11.	1		2220	269	0.
1		0340	45	1565.	1		0955	120	2472.	1		1610	195	8.	1		2225	270	0.
1		0345	46	2003.	1		1000	121	2440.	1		1615	196	6.	1		2230	271	0.
1		0350	47	2482.	1		1005	122	2408.	1		1620	197	5.	1		2235	272	0.
1		0355	48	2987.	1		1010	123	2375.	1		1625	198	4.	1		2240	273	0.
1		0400	49	3480.	1		1015	124	2342.	1		1630	199	3.	1		2245	274	0.
1		0405	50	3924.	1		1020	125	2310.	1		1635	200	2.	1		2250	275	0.
1		0410	51	4291.	1		1025	126	2278.	1		1640	201	2.	1		2255	276	0.
1		0415	52	4573.	1		1030	127	2246.	1		1645	202	1.	1		2300	277	0.
1		0420	53	4781.	1		1035	128	2215.	1		1650	203	1.	1		2305	278	0.
1		0425	54	4919.	1		1040	129	2183.	1		1655	204	1.	1		2310	279	0.

1	0430	55	5009.	*	1	1045	130	2151.	*	1	1700	205	1.	*	1	2315	280	0.
1	0435	56	5095.	*	1	1050	131	2117.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	5200.	*	1	1055	132	2082.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	5318.	*	1	1100	133	2049.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	5447.	*	1	1105	134	2015.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	5604.	*	1	1110	135	1982.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	5791.	*	1	1115	136	1949.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	5984.	*	1	1120	137	1913.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	6169.	*	1	1125	138	1876.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	6335.	*	1	1130	139	1839.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	6459.	*	1	1135	140	1803.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	6530.	*	1	1140	141	1767.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	6551.	*	1	1145	142	1731.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	6522.	*	1	1150	143	1694.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	6453.	*	1	1155	144	1656.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	6355.	*	1	1200	145	1617.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	6232.	*	1	1205	146	1580.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	6094.	*	1	1210	147	1543.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	5950.	*	1	1215	148	1506.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	5805.	*	1	1220	149	1468.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	5662.	*	1	1225	150	1429.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 6551.	5.50	4357.	1441.	1388.	1388.
		(INCHES) .456	.603	.603	.603
		(AC-FT) 2160.	2858.	2858.	2858.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	3.64	750.00	4087.82	334.85	.34	6.87
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		4087.61	335.00	.34	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1606E+04 EXCESS= .0000E+00 OUTFLOW= .1606E+04 BASIN STORAGE= .1077E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .57

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	3647.	*	1		1230	151	321.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	3584.	*	1		1235	152	292.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	3521.	*	1		1240	153	265.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	3459.	*	1		1245	154	240.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	3396.	*	1		1250	155	213.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	3332.	*	1		1255	156	183.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	3267.	*	1		1300	157	150.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	3203.	*	1		1305	158	120.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	3139.	*	1		1310	159	96.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	3076.	*	1		1315	160	76.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	3013.	*	1		1320	161	61.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	2951.	*	1		1325	162	50.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	2891.	*	1		1330	163	41.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	2831.	*	1		1335	164	34.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	2773.	*	1		1340	165	28.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	2717.	*	1		1345	166	24.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	2660.	*	1		1350	167	20.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	2604.	*	1		1355	168	18.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	2550.	*	1		1400	169	15.	*	1		2015	244	0.

1	0135	20	0.	*	1	0750	95	2496.	*	1	1405	170	13.	*	1	2020	245	0.
1	0140	21	0.	*	1	0755	96	2445.	*	1	1410	171	12.	*	1	2025	246	0.
1	0145	22	1.	*	1	0800	97	2395.	*	1	1415	172	10.	*	1	2030	247	0.
1	0150	23	1.	*	1	0805	98	2348.	*	1	1420	173	9.	*	1	2035	248	0.
1	0155	24	3.	*	1	0810	99	2302.	*	1	1425	174	8.	*	1	2040	249	0.
1	0200	25	5.	*	1	0815	100	2257.	*	1	1430	175	7.	*	1	2045	250	0.
1	0205	26	8.	*	1	0820	101	2213.	*	1	1435	176	7.	*	1	2050	251	0.
1	0210	27	13.	*	1	0825	102	2169.	*	1	1440	177	6.	*	1	2055	252	0.
1	0215	28	19.	*	1	0830	103	2124.	*	1	1445	178	5.	*	1	2100	253	0.
1	0220	29	27.	*	1	0835	104	2081.	*	1	1450	179	5.	*	1	2105	254	0.
1	0225	30	36.	*	1	0840	105	2039.	*	1	1455	180	4.	*	1	2110	255	0.
1	0230	31	46.	*	1	0845	106	1997.	*	1	1500	181	4.	*	1	2115	256	0.
1	0235	32	57.	*	1	0850	107	1957.	*	1	1505	182	4.	*	1	2120	257	0.
1	0240	33	68.	*	1	0855	108	1917.	*	1	1510	183	3.	*	1	2125	258	0.
1	0245	34	78.	*	1	0900	109	1878.	*	1	1515	184	3.	*	1	2130	259	0.
1	0250	35	88.	*	1	0905	110	1838.	*	1	1520	185	3.	*	1	2135	260	0.
1	0255	36	97.	*	1	0910	111	1798.	*	1	1525	186	2.	*	1	2140	261	0.
1	0300	37	107.	*	1	0915	112	1758.	*	1	1530	187	2.	*	1	2145	262	0.
1	0305	38	119.	*	1	0920	113	1719.	*	1	1535	188	2.	*	1	2150	263	0.
1	0310	39	137.	*	1	0925	114	1680.	*	1	1540	189	2.	*	1	2155	264	0.
1	0315	40	162.	*	1	0930	115	1643.	*	1	1545	190	2.	*	1	2200	265	0.
1	0320	41	200.	*	1	0935	116	1606.	*	1	1550	191	2.	*	1	2205	266	0.
1	0325	42	255.	*	1	0940	117	1568.	*	1	1555	192	1.	*	1	2210	267	0.
1	0330	43	342.	*	1	0945	118	1530.	*	1	1600	193	1.	*	1	2215	268	0.
1	0335	44	477.	*	1	0950	119	1491.	*	1	1605	194	1.	*	1	2220	269	0.
1	0340	45	663.	*	1	0955	120	1452.	*	1	1610	195	1.	*	1	2225	270	0.
1	0345	46	900.	*	1	1000	121	1414.	*	1	1615	196	1.	*	1	2230	271	0.
1	0350	47	1175.	*	1	1005	122	1377.	*	1	1620	197	1.	*	1	2235	272	0.
1	0355	48	1474.	*	1	1010	123	1340.	*	1	1625	198	1.	*	1	2240	273	0.
1	0400	49	1772.	*	1	1015	124	1303.	*	1	1630	199	1.	*	1	2245	274	0.
1	0405	50	2039.	*	1	1020	125	1265.	*	1	1635	200	1.	*	1	2250	275	0.
1	0410	51	2263.	*	1	1025	126	1226.	*	1	1640	201	1.	*	1	2255	276	0.
1	0415	52	2453.	*	1	1030	127	1186.	*	1	1645	202	1.	*	1	2300	277	0.
1	0420	53	2602.	*	1	1035	128	1148.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	2715.	*	1	1040	129	1111.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	2798.	*	1	1045	130	1074.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	2844.	*	1	1050	131	1038.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	2865.	*	1	1055	132	1000.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	2879.	*	1	1100	133	961.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	2920.	*	1	1105	134	923.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	3023.	*	1	1110	135	885.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	3207.	*	1	1115	136	849.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	3418.	*	1	1120	137	814.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	3610.	*	1	1125	138	780.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	3776.	*	1	1130	139	744.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	3914.	*	1	1135	140	706.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	4012.	*	1	1140	141	668.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	4066.	*	1	1145	142	631.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	4088.	*	1	1150	143	596.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	4075.	*	1	1155	144	563.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	4039.	*	1	1200	145	531.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	3988.	*	1	1205	146	498.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	3922.	*	1	1210	147	463.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	3851.	*	1	1215	148	425.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	3780.	*	1	1220	149	388.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	3712.	*	1	1225	150	353.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 4088.	5.58		2749.	810.	780.	780.
		(INCHES)	.288	.339	.339	.339
		(AC-FT)	1363.	1606.	1606.	1606.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	4.59	750.00	2246.39	344.44	.18	5.44

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN .08 1.64 5.00 2245.91 345.00 .18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8302E+03 EXCESS= .0000E+00 OUTFLOW= .8303E+03 BASIN STORAGE= .1093E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .44

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	2093.	*	1		1230	151	48.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	2070.	*	1		1235	152	45.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	2051.	*	1		1240	153	42.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	2030.	*	1		1245	154	39.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	2007.	*	1		1250	155	36.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	1980.	*	1		1255	156	34.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	1950.	*	1		1300	157	32.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	1917.	*	1		1305	158	30.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	1884.	*	1		1310	159	28.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	1850.	*	1		1315	160	26.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	1817.	*	1		1320	161	25.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	1783.	*	1		1325	162	23.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	1749.	*	1		1330	163	22.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	1715.	*	1		1335	164	20.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	1681.	*	1		1340	165	19.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	1647.	*	1		1345	166	18.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	1613.	*	1		1350	167	16.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	1577.	*	1		1355	168	15.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	1541.	*	1		1400	169	14.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	1504.	*	1		1405	170	13.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	1467.	*	1		1410	171	12.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	1430.	*	1		1415	172	12.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	1394.	*	1		1420	173	11.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	1358.	*	1		1425	174	10.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	1324.	*	1		1430	175	9.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	1290.	*	1		1435	176	9.	*	1		2050	251	0.
1		0210	27	0.	*	1		0825	102	1257.	*	1		1440	177	8.	*	1		2055	252	0.
1		0215	28	0.	*	1		0830	103	1224.	*	1		1445	178	7.	*	1		2100	253	0.
1		0220	29	0.	*	1		0835	104	1192.	*	1		1450	179	7.	*	1		2105	254	0.
1		0225	30	1.	*	1		0840	105	1161.	*	1		1455	180	6.	*	1		2110	255	0.
1		0230	31	2.	*	1		0845	106	1130.	*	1		1500	181	6.	*	1		2115	256	0.
1		0235	32	3.	*	1		0850	107	1097.	*	1		1505	182	6.	*	1		2120	257	0.
1		0240	33	4.	*	1		0855	108	1064.	*	1		1510	183	5.	*	1		2125	258	0.
1		0245	34	5.	*	1		0900	109	1029.	*	1		1515	184	5.	*	1		2130	259	0.
1		0250	35	7.	*	1		0905	110	996.	*	1		1520	185	5.	*	1		2135	260	0.
1		0255	36	9.	*	1		0910	111	963.	*	1		1525	186	4.	*	1		2140	261	0.
1		0300	37	12.	*	1		0915	112	932.	*	1		1530	187	4.	*	1		2145	262	0.
1		0305	38	15.	*	1		0920	113	901.	*	1		1535	188	4.	*	1		2150	263	0.
1		0310	39	20.	*	1		0925	114	871.	*	1		1540	189	4.	*	1		2155	264	0.
1		0315	40	28.	*	1		0930	115	842.	*	1		1545	190	3.	*	1		2200	265	0.
1		0320	41	41.	*	1		0935	116	813.	*	1		1550	191	3.	*	1		2205	266	0.
1		0325	42	61.	*	1		0940	117	783.	*	1		1555	192	3.	*	1		2210	267	0.
1		0330	43	91.	*	1		0945	118	751.	*	1		1600	193	3.	*	1		2215	268	0.
1		0335	44	136.	*	1		0950	119	717.	*	1		1605	194	3.	*	1		2220	269	0.
1		0340	45	212.	*	1		0955	120	685.	*	1		1610	195	2.	*	1		2225	270	0.
1		0345	46	323.	*	1		1000	121	654.	*	1		1615	196	2.	*	1		2230	271	0.
1		0350	47	460.	*	1		1005	122	625.	*	1		1620	197	2.	*	1		2235	272	0.
1		0355	48	621.	*	1		1010	123	597.	*	1		1625	198	2.	*	1		2240	273	0.
1		0400	49	794.	*	1		1015	124	569.	*	1		1630	199	2.	*	1		2245	274	0.
1		0405	50	952.	*	1		1020	125	543.	*	1		1635	200	2.	*	1		2250	275	0.
1		0410	51	1085.	*	1		1025	126	517.	*	1		1640	201	2.	*	1		2255	276	0.
1		0415	52	1190.	*	1		1030	127	488.	*	1		1645	202	2.	*	1		2300	277	0.
1		0420	53	1272.	*	1		1035	128	456.	*	1		1650	203	1.	*	1		2305	278	0.
1		0425	54	1336.	*	1		1040	129	421.	*	1		1655	204	1.	*	1		2310	279	0.
1		0430	55	1385.	*	1		1045	130	389.	*	1		1700	205	1.	*	1		2315	280	0.
1		0435	56	1426.	*	1		1050	131	360.	*	1		1705	206	1.	*	1		2320	281	0.
1		0440	57	1462.	*	1		1055	132	334.	*	1		1710	207	1.	*	1		2325	282	0.
1		0445	58	1489.	*	1		1100	133	310.	*	1		1715	208	1.	*	1		2330	283	0.
1		0450	59	1508.	*	1		1105	134	287.	*	1		1720	209	1.	*	1		2335	284	0.
1		0455	60	1539.	*	1		1110	135	267.	*	1		1725	210	1.	*	1		2340	285	0.
1		0500	61	1592.	*	1		1115	136	248.	*	1		1730	211	1.	*	1		2345	286	0.
1		0505	62	1653.	*	1		1120	137	230.	*	1		1735	212	1.	*	1		2350	287	0.
1		0510	63	1722.	*	1		1125	138	212.	*	1		1740	213	1.	*	1		2355	288	0.
1		0515	64	1801.	*	1		1130	139	191.	*	1		1745	214	1.	*	2		0000	289	0.
1		0520	65	1903.	*	1		1135	140	168.	*	1		1750	215	1.	*	2		0005	290	0.

1	0525	66	2028.	*	1	1140	141	147.	*	1	1755	216	1.	*	2	0010	291	0.
1	0530	67	2146.	*	1	1145	142	127.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	2214.	*	1	1150	143	110.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	2237.	*	1	1155	144	97.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	2246.	*	1	1200	145	85.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	2239.	*	1	1205	146	76.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	2217.	*	1	1210	147	68.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	2190.	*	1	1215	148	62.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	2156.	*	1	1220	149	57.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	2122.	*	1	1225	150	52.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 2246.	5.75	1514.	419.	403.	403.
		(INCHES) .158	.175	.175	.175
		(AC-FT) 751.	830.	830.	830.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	5.00	375.00	374.06	340.00	.03	2.71
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		374.06	340.00	.03	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1451E+03 EXCESS= .0000E+00 OUTFLOW= .1452E+03 BASIN STORAGE= .1247E-01 PERCENT ERROR= .0

HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .26

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	303.	*	1		1230	151	36.	*	1		1845	226	1.
1		0005	2	0.	*	1		0620	77	292.	*	1		1235	152	35.	*	1		1850	227	1.
1		0010	3	0.	*	1		0625	78	283.	*	1		1240	153	34.	*	1		1855	228	1.
1		0015	4	0.	*	1		0630	79	275.	*	1		1245	154	32.	*	1		1900	229	1.
1		0020	5	0.	*	1		0635	80	267.	*	1		1250	155	31.	*	1		1905	230	1.
1		0025	6	0.	*	1		0640	81	257.	*	1		1255	156	30.	*	1		1910	231	1.
1		0030	7	0.	*	1		0645	82	245.	*	1		1300	157	29.	*	1		1915	232	1.
1		0035	8	0.	*	1		0650	83	232.	*	1		1305	158	28.	*	1		1920	233	1.
1		0040	9	0.	*	1		0655	84	220.	*	1		1310	159	27.	*	1		1925	234	1.
1		0045	10	0.	*	1		0700	85	209.	*	1		1315	160	26.	*	1		1930	235	1.
1		0050	11	0.	*	1		0705	86	205.	*	1		1320	161	25.	*	1		1935	236	1.
1		0055	12	0.	*	1		0710	87	221.	*	1		1325	162	24.	*	1		1940	237	1.
1		0100	13	0.	*	1		0715	88	266.	*	1		1330	163	23.	*	1		1945	238	1.
1		0105	14	0.	*	1		0720	89	314.	*	1		1335	164	22.	*	1		1950	239	1.
1		0110	15	0.	*	1		0725	90	323.	*	1		1340	165	21.	*	1		1955	240	1.
1		0115	16	0.	*	1		0730	91	320.	*	1		1345	166	20.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	339.	*	1		1350	167	19.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	345.	*	1		1355	168	18.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	333.	*	1		1400	169	17.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	335.	*	1		1405	170	16.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	335.	*	1		1410	171	15.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	322.	*	1		1415	172	15.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	318.	*	1		1420	173	14.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	311.	*	1		1425	174	13.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	301.	*	1		1430	175	12.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	297.	*	1		1435	176	12.	*	1		2050	251	0.
1		0210	27	0.	*	1		0825	102	287.	*	1		1440	177	11.	*	1		2055	252	0.
1		0215	28	0.	*	1		0830	103	277.	*	1		1445	178	11.	*	1		2100	253	0.
1		0220	29	0.	*	1		0835	104	272.	*	1		1450	179	10.	*	1		2105	254	0.
1		0225	30	0.	*	1		0840	105	262.	*	1		1455	180	10.	*	1		2110	255	0.

1	0230	31	0.	*	1	0845	106	255.	*	1	1500	181	9.	*	1	2115	256	0.
1	0235	32	0.	*	1	0850	107	248.	*	1	1505	182	9.	*	1	2120	257	0.
1	0240	33	0.	*	1	0855	108	239.	*	1	1510	183	8.	*	1	2125	258	0.
1	0245	34	0.	*	1	0900	109	231.	*	1	1515	184	8.	*	1	2130	259	0.
1	0250	35	0.	*	1	0905	110	222.	*	1	1520	185	7.	*	1	2135	260	0.
1	0255	36	0.	*	1	0910	111	213.	*	1	1525	186	7.	*	1	2140	261	0.
1	0300	37	0.	*	1	0915	112	201.	*	1	1530	187	7.	*	1	2145	262	0.
1	0305	38	0.	*	1	0920	113	188.	*	1	1535	188	6.	*	1	2150	263	0.
1	0310	39	0.	*	1	0925	114	174.	*	1	1540	189	6.	*	1	2155	264	0.
1	0315	40	0.	*	1	0930	115	162.	*	1	1545	190	6.	*	1	2200	265	0.
1	0320	41	0.	*	1	0935	116	153.	*	1	1550	191	6.	*	1	2205	266	0.
1	0325	42	0.	*	1	0940	117	146.	*	1	1555	192	5.	*	1	2210	267	0.
1	0330	43	0.	*	1	0945	118	139.	*	1	1600	193	5.	*	1	2215	268	0.
1	0335	44	0.	*	1	0950	119	131.	*	1	1605	194	5.	*	1	2220	269	0.
1	0340	45	0.	*	1	0955	120	125.	*	1	1610	195	5.	*	1	2225	270	0.
1	0345	46	1.	*	1	1000	121	119.	*	1	1615	196	5.	*	1	2230	271	0.
1	0350	47	5.	*	1	1005	122	113.	*	1	1620	197	4.	*	1	2235	272	0.
1	0355	48	14.	*	1	1010	123	108.	*	1	1625	198	4.	*	1	2240	273	0.
1	0400	49	29.	*	1	1015	124	103.	*	1	1630	199	4.	*	1	2245	274	0.
1	0405	50	61.	*	1	1020	125	99.	*	1	1635	200	4.	*	1	2250	275	0.
1	0410	51	92.	*	1	1025	126	96.	*	1	1640	201	4.	*	1	2255	276	0.
1	0415	52	120.	*	1	1030	127	93.	*	1	1645	202	3.	*	1	2300	277	0.
1	0420	53	145.	*	1	1035	128	90.	*	1	1650	203	3.	*	1	2305	278	0.
1	0425	54	170.	*	1	1040	129	86.	*	1	1655	204	3.	*	1	2310	279	0.
1	0430	55	191.	*	1	1045	130	82.	*	1	1700	205	3.	*	1	2315	280	0.
1	0435	56	205.	*	1	1050	131	79.	*	1	1705	206	3.	*	1	2320	281	0.
1	0440	57	213.	*	1	1055	132	76.	*	1	1710	207	3.	*	1	2325	282	0.
1	0445	58	219.	*	1	1100	133	73.	*	1	1715	208	3.	*	1	2330	283	0.
1	0450	59	222.	*	1	1105	134	70.	*	1	1720	209	2.	*	1	2335	284	0.
1	0455	60	225.	*	1	1110	135	67.	*	1	1725	210	2.	*	1	2340	285	0.
1	0500	61	231.	*	1	1115	136	64.	*	1	1730	211	2.	*	1	2345	286	0.
1	0505	62	241.	*	1	1120	137	61.	*	1	1735	212	2.	*	1	2350	287	0.
1	0510	63	258.	*	1	1125	138	59.	*	1	1740	213	2.	*	1	2355	288	0.
1	0515	64	281.	*	1	1130	139	56.	*	1	1745	214	2.	*	2	0000	289	0.
1	0520	65	309.	*	1	1135	140	54.	*	1	1750	215	2.	*	2	0005	290	0.
1	0525	66	337.	*	1	1140	141	52.	*	1	1755	216	2.	*	2	0010	291	0.
1	0530	67	358.	*	1	1145	142	50.	*	1	1800	217	2.	*	2	0015	292	0.
1	0535	68	370.	*	1	1150	143	49.	*	1	1805	218	2.	*	2	0020	293	0.
1	0540	69	374.	*	1	1155	144	47.	*	1	1810	219	1.	*	2	0025	294	0.
1	0545	70	373.	*	1	1200	145	45.	*	1	1815	220	1.	*	2	0030	295	0.
1	0550	71	370.	*	1	1205	146	43.	*	1	1820	221	1.	*	2	0035	296	0.
1	0555	72	360.	*	1	1210	147	42.	*	1	1825	222	1.	*	2	0040	297	0.
1	0600	73	345.	*	1	1215	148	40.	*	1	1830	223	1.	*	2	0045	298	0.
1	0605	74	330.	*	1	1220	149	39.	*	1	1835	224	1.	*	2	0050	299	0.
1	0610	75	317.	*	1	1225	150	38.	*	1	1840	225	1.	*	2	0055	300	0.
				*					*					*				

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 374.	5.67		254.	73.	71.	71.
		(INCHES)	.027	.031	.031	.031
		(AC-FT)	126.	145.	145.	145.

CUMULATIVE AREA = 88.86 SQ MI

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*               JUN   1998             *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   18MAR08  TIME  14:51:55  *
*                                      *
****************************************
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```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*          (916) 756-1104              *
*                                      *
****************************************
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```
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
 *** FREE ***
 *** NOLIST ***
```


```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*               JUN   1998             *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   18MAR08  TIME  14:51:55  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*          (916) 756-1104              *
*                                      *
****************************************
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KLEINFELDER
FEBRUARY 2008
ALTERNATIVE D

DESIGN STORM = 100-YEAR 6-HOUR STORM
STORM DISTRIBUTION = SDN5

```
  10 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  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          300  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE      2    0  ENDING DATE
                    NDTIME         0055  ENDING TIME
                     ICENT         19  CENTURY MARK

                  COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE    24.92 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           1  NUMBER OF PLANS

     JR       MULTI-RATIO OPTION
                 RATIOS OF PRECIPITATION
                1.00       .87       .74       .57       .44       .26


*** *** *** *
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1	0255	36	722.	*	1	0910	111	332.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	820.	*	1	0915	112	302.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	932.	*	1	0920	113	276.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	1058.	*	1	0925	114	251.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	1201.	*	1	0930	115	229.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	1364.	*	1	0935	116	208.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	1561.	*	1	0940	117	189.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	1813.	*	1	0945	118	171.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	2146.	*	1	0950	119	155.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	2579.	*	1	0955	120	140.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	3110.	*	1	1000	121	127.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	3762.	*	1	1005	122	114.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	4685.	*	1	1010	123	103.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	6275.	*	1	1015	124	93.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	8792.	*	1	1020	125	84.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	11642.	*	1	1025	126	75.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	13970.	*	1	1030	127	68.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	15495.	*	1	1035	128	61.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	16279.	*	1	1040	129	55.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	16488.	*	1	1045	130	49.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	16294.	*	1	1050	131	44.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	15790.	*	1	1055	132	39.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	15093.	*	1	1100	133	35.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	14348.	*	1	1105	134	31.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	13647.	*	1	1110	135	28.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	13076.	*	1	1115	136	25.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	12676.	*	1	1120	137	22.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	12444.	*	1	1125	138	20.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	12373.	*	1	1130	139	18.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	12437.	*	1	1135	140	16.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	12586.	*	1	1140	141	14.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	12746.	*	1	1145	142	13.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	12817.	*	1	1150	143	11.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	12697.	*	1	1155	144	10.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	12353.	*	1	1200	145	9.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	11808.	*	1	1205	146	8.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	11124.	*	1	1210	147	7.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	10360.	*	1	1215	148	6.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	9564.	*	1	1220	149	5.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	8775.	*	1	1225	150	5.	*	1	1840	225	0.	*	2	0055	300	0.

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 16488.	4.50		6356.	1619.	1559.	1559.
		(INCHES)	1.004	1.023	1.023	1.023
		(AC-FT)	3152.	3210.	3210.	3210.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .87

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	6737.	*	1		1230	151	6.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	6169.	*	1		1235	152	6.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	5647.	*	1		1240	153	5.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	5174.	*	1		1245	154	4.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	4744.	*	1		1250	155	4.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	4357.	*	1		1255	156	3.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	4007.	*	1		1300	157	3.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	3688.	*	1		1305	158	3.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	3399.	*	1		1310	159	2.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	3134.	*	1		1315	160	2.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	2889.	*	1		1320	161	2.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	2662.	*	1		1325	162	2.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	2451.	*	1		1330	163	1.	*	1		1945	238	0.
1		0105	14	1.	*	1		0720	89	2255.	*	1		1335	164	1.	*	1		1950	239	0.
1		0110	15	1.	*	1		0725	90	2074.	*	1		1340	165	1.	*	1		1955	240	0.
1		0115	16	2.	*	1		0730	91	1908.	*	1		1345	166	1.	*	1		2000	241	0.
1		0120	17	3.	*	1		0735	92	1755.	*	1		1350	167	1.	*	1		2005	242	0.

1	0125	18	4.	*	1	0740	93	1614.	*	1	1355	168	1.	*	1	2010	243	0.
1	0130	19	6.	*	1	0745	94	1484.	*	1	1400	169	1.	*	1	2015	244	0.
1	0135	20	8.	*	1	0750	95	1365.	*	1	1405	170	0.	*	1	2020	245	0.
1	0140	21	11.	*	1	0755	96	1256.	*	1	1410	171	0.	*	1	2025	246	0.
1	0145	22	15.	*	1	0800	97	1155.	*	1	1415	172	0.	*	1	2030	247	0.
1	0150	23	19.	*	1	0805	98	1064.	*	1	1420	173	0.	*	1	2035	248	0.
1	0155	24	25.	*	1	0810	99	978.	*	1	1425	174	0.	*	1	2040	249	0.
1	0200	25	33.	*	1	0815	100	897.	*	1	1430	175	0.	*	1	2045	250	0.
1	0205	26	43.	*	1	0820	101	822.	*	1	1435	176	0.	*	1	2050	251	0.
1	0210	27	56.	*	1	0825	102	753.	*	1	1440	177	0.	*	1	2055	252	0.
1	0215	28	72.	*	1	0830	103	688.	*	1	1445	178	0.	*	1	2100	253	0.
1	0220	29	92.	*	1	0835	104	628.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	116.	*	1	0840	105	571.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	143.	*	1	0845	106	519.	*	1	1500	181	0.	*	1	2115	256	0.
1	0235	32	173.	*	1	0850	107	471.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	205.	*	1	0855	108	427.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	239.	*	1	0900	109	387.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	277.	*	1	0905	110	351.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	320.	*	1	0910	111	319.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	370.	*	1	0915	112	290.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	430.	*	1	0920	113	265.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	508.	*	1	0925	114	242.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	605.	*	1	0930	115	221.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	725.	*	1	0935	116	202.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	870.	*	1	0940	117	185.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	1051.	*	1	0945	118	170.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	1290.	*	1	0950	119	156.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	1608.	*	1	0955	120	143.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	1994.	*	1	1000	121	131.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	2420.	*	1	1005	122	120.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	2864.	*	1	1010	123	110.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	3352.	*	1	1015	124	100.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	4353.	*	1	1020	125	92.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	6609.	*	1	1025	126	84.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	9227.	*	1	1030	127	77.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	10826.	*	1	1035	128	70.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	11711.	*	1	1040	129	64.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	12106.	*	1	1045	130	58.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	12126.	*	1	1050	131	53.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	11967.	*	1	1055	132	48.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	11670.	*	1	1100	133	43.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	11245.	*	1	1105	134	39.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	10755.	*	1	1110	135	35.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	10295.	*	1	1115	136	32.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	9932.	*	1	1120	137	29.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	9705.	*	1	1125	138	26.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	9616.	*	1	1130	139	23.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	9645.	*	1	1135	140	21.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	9760.	*	1	1140	141	19.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	9927.	*	1	1145	142	17.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	10079.	*	1	1150	143	15.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	10116.	*	1	1155	144	13.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	9954.	*	1	1200	145	12.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	9596.	*	1	1205	146	11.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	9111.	*	1	1210	147	10.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	8556.	*	1	1215	148	9.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	7953.	*	1	1220	149	8.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	7339.	*	1	1225	150	7.	*	1	1840	225	0.	*	2	0055	300	0.

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 12126.	4.58		4861.	1237.	1191.	1191.
		(INCHES)	.768	.782	.782	.782
		(AC-FT)	2411.	2453.	2453.	2453.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .74

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DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW

1	0000	1	0.	*	1	0615	76	5408.	*	1	1230	151	7.	*	1	1845	226	0.
1	0005	2	0.	*	1	0620	77	4987.	*	1	1235	152	6.	*	1	1850	227	0.
1	0010	3	0.	*	1	0625	78	4587.	*	1	1240	153	6.	*	1	1855	228	0.
1	0015	4	0.	*	1	0630	79	4210.	*	1	1245	154	5.	*	1	1900	229	0.
1	0020	5	0.	*	1	0635	80	3868.	*	1	1250	155	4.	*	1	1905	230	0.
1	0025	6	0.	*	1	0640	81	3558.	*	1	1255	156	4.	*	1	1910	231	0.
1	0030	7	0.	*	1	0645	82	3278.	*	1	1300	157	4.	*	1	1915	232	0.
1	0035	8	0.	*	1	0650	83	3023.	*	1	1305	158	3.	*	1	1920	233	0.
1	0040	9	0.	*	1	0655	84	2791.	*	1	1310	159	3.	*	1	1925	234	0.
1	0045	10	0.	*	1	0700	85	2580.	*	1	1315	160	2.	*	1	1930	235	0.
1	0050	11	0.	*	1	0705	86	2386.	*	1	1320	161	2.	*	1	1935	236	0.
1	0055	12	0.	*	1	0710	87	2205.	*	1	1325	162	2.	*	1	1940	237	0.
1	0100	13	0.	*	1	0715	88	2040.	*	1	1330	163	2.	*	1	1945	238	0.
1	0105	14	0.	*	1	0720	89	1886.	*	1	1335	164	1.	*	1	1950	239	0.
1	0110	15	0.	*	1	0725	90	1743.	*	1	1340	165	1.	*	1	1955	240	0.
1	0115	16	0.	*	1	0730	91	1611.	*	1	1345	166	1.	*	1	2000	241	0.
1	0120	17	0.	*	1	0735	92	1489.	*	1	1350	167	1.	*	1	2005	242	0.
1	0125	18	0.	*	1	0740	93	1375.	*	1	1355	168	1.	*	1	2010	243	0.
1	0130	19	0.	*	1	0745	94	1271.	*	1	1400	169	1.	*	1	2015	244	0.
1	0135	20	1.	*	1	0750	95	1174.	*	1	1405	170	1.	*	1	2020	245	0.
1	0140	21	1.	*	1	0755	96	1084.	*	1	1410	171	1.	*	1	2025	246	0.
1	0145	22	2.	*	1	0800	97	998.	*	1	1415	172	1.	*	1	2030	247	0.
1	0150	23	4.	*	1	0805	98	916.	*	1	1420	173	0.	*	1	2035	248	0.
1	0155	24	6.	*	1	0810	99	841.	*	1	1425	174	0.	*	1	2040	249	0.
1	0200	25	9.	*	1	0815	100	771.	*	1	1430	175	0.	*	1	2045	250	0.
1	0205	26	12.	*	1	0820	101	707.	*	1	1435	176	0.	*	1	2050	251	0.
1	0210	27	17.	*	1	0825	102	650.	*	1	1440	177	0.	*	1	2055	252	0.
1	0215	28	22.	*	1	0830	103	597.	*	1	1445	178	0.	*	1	2100	253	0.
1	0220	29	30.	*	1	0835	104	550.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	39.	*	1	0840	105	505.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	48.	*	1	0845	106	463.	*	1	1500	181	0.	*	1	2115	256	0.
1	0235	32	59.	*	1	0850	107	424.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	71.	*	1	0855	108	388.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	83.	*	1	0900	109	354.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	96.	*	1	0905	110	323.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	111.	*	1	0910	111	294.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	130.	*	1	0915	112	268.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	154.	*	1	0920	113	245.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	186.	*	1	0925	114	224.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	228.	*	1	0930	115	205.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	287.	*	1	0935	116	188.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	368.	*	1	0940	117	172.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	476.	*	1	0945	118	158.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	619.	*	1	0950	119	146.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	816.	*	1	0955	120	134.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	1076.	*	1	1000	121	123.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	1388.	*	1	1005	122	113.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	1713.	*	1	1010	123	105.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	2018.	*	1	1015	124	96.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	2277.	*	1	1020	125	89.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	2547.	*	1	1025	126	81.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	3868.	*	1	1030	127	75.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	6357.	*	1	1035	128	69.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	7685.	*	1	1040	129	63.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	8223.	*	1	1045	130	57.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	8388.	*	1	1050	131	52.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	8311.	*	1	1055	132	48.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	8170.	*	1	1100	133	43.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	7990.	*	1	1105	134	39.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	7796.	*	1	1110	135	36.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	7586.	*	1	1115	136	32.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	7358.	*	1	1120	137	29.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	7156.	*	1	1125	138	26.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	7027.	*	1	1130	139	24.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	6990.	*	1	1135	140	22.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	7041.	*	1	1140	141	19.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	7155.	*	1	1145	142	18.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	7302.	*	1	1150	143	16.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	7417.	*	1	1155	144	14.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	7434.	*	1	1200	145	13.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	7306.	*	1	1205	146	12.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	7041.	*	1	1210	147	11.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	6685.	*	1	1215	148	10.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	6277.	*	1	1220	149	9.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	5844.	*	1	1225	150	8.	*	1	1840	225	0.	*	2	0055	300	0.

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR

	(CFS)	(HR)				
			(CFS)			
+	8388.	4.58		3494.	888.	855.	855.
			(INCHES)	.552	.561	.561	.561
			(AC-FT)	1733.	1762.	1762.	1762.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .57

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	3520.	1		1230	151	12.	1		1845	226	0.
1		0005	2	0.	1		0620	77	3307.	1		1235	152	11.	1		1850	227	0.
1		0010	3	0.	1		0625	78	3097.	1		1240	153	10.	1		1855	228	0.
1		0015	4	0.	1		0630	79	2889.	1		1245	154	9.	1		1900	229	0.
1		0020	5	0.	1		0635	80	2685.	1		1250	155	8.	1		1905	230	0.
1		0025	6	0.	1		0640	81	2487.	1		1255	156	8.	1		1910	231	0.
1		0030	7	0.	1		0645	82	2299.	1		1300	157	7.	1		1915	232	0.
1		0035	8	0.	1		0650	83	2126.	1		1305	158	6.	1		1920	233	0.
1		0040	9	0.	1		0655	84	1968.	1		1310	159	6.	1		1925	234	0.
1		0045	10	0.	1		0700	85	1825.	1		1315	160	5.	1		1930	235	0.
1		0050	11	0.	1		0705	86	1694.	1		1320	161	5.	1		1935	236	0.
1		0055	12	0.	1		0710	87	1573.	1		1325	162	4.	1		1940	237	0.
1		0100	13	0.	1		0715	88	1463.	1		1330	163	4.	1		1945	238	0.
1		0105	14	0.	1		0720	89	1360.	1		1335	164	4.	1		1950	239	0.
1		0110	15	0.	1		0725	90	1266.	1		1340	165	3.	1		1955	240	0.
1		0115	16	0.	1		0730	91	1177.	1		1345	166	3.	1		2000	241	0.
1		0120	17	0.	1		0735	92	1095.	1		1350	167	3.	1		2005	242	0.
1		0125	18	0.	1		0740	93	1019.	1		1355	168	2.	1		2010	243	0.
1		0130	19	0.	1		0745	94	948.	1		1400	169	2.	1		2015	244	0.
1		0135	20	0.	1		0750	95	883.	1		1405	170	2.	1		2020	245	0.
1		0140	21	0.	1		0755	96	822.	1		1410	171	2.	1		2025	246	0.
1		0145	22	0.	1		0800	97	766.	1		1415	172	2.	1		2030	247	0.
1		0150	23	0.	1		0805	98	714.	1		1420	173	1.	1		2035	248	0.
1		0155	24	0.	1		0810	99	665.	1		1425	174	1.	1		2040	249	0.
1		0200	25	0.	1		0815	100	619.	1		1430	175	1.	1		2045	250	0.
1		0205	26	0.	1		0820	101	577.	1		1435	176	1.	1		2050	251	0.
1		0210	27	1.	1		0825	102	539.	1		1440	177	1.	1		2055	252	0.
1		0215	28	2.	1		0830	103	502.	1		1445	178	1.	1		2100	253	0.
1		0220	29	3.	1		0835	104	468.	1		1450	179	1.	1		2105	254	0.
1		0225	30	4.	1		0840	105	435.	1		1455	180	1.	1		2110	255	0.
1		0230	31	6.	1		0845	106	405.	1		1500	181	1.	1		2115	256	0.
1		0235	32	8.	1		0850	107	377.	1		1505	182	1.	1		2120	257	0.
1		0240	33	11.	1		0855	108	350.	1		1510	183	0.	1		2125	258	0.
1		0245	34	13.	1		0900	109	324.	1		1515	184	0.	1		2130	259	0.
1		0250	35	15.	1		0905	110	300.	1		1520	185	0.	1		2135	260	0.
1		0255	36	18.	1		0910	111	278.	1		1525	186	0.	1		2140	261	0.
1		0300	37	20.	1		0915	112	257.	1		1530	187	0.	1		2145	262	0.
1		0305	38	24.	1		0920	113	238.	1		1535	188	0.	1		2150	263	0.
1		0310	39	29.	1		0925	114	220.	1		1540	189	0.	1		2155	264	0.
1		0315	40	36.	1		0930	115	203.	1		1545	190	0.	1		2200	265	0.
1		0320	41	47.	1		0935	116	187.	1		1550	191	0.	1		2205	266	0.
1		0325	42	65.	1		0940	117	172.	1		1555	192	0.	1		2210	267	0.
1		0330	43	92.	1		0945	118	158.	1		1600	193	0.	1		2215	268	0.
1		0335	44	132.	1		0950	119	146.	1		1605	194	0.	1		2220	269	0.
1		0340	45	188.	1		0955	120	134.	1		1610	195	0.	1		2225	270	0.
1		0345	46	259.	1		1000	121	124.	1		1615	196	0.	1		2230	271	0.
1		0350	47	346.	1		1005	122	114.	1		1620	197	0.	1		2235	272	0.
1		0355	48	502.	1		1010	123	106.	1		1625	198	0.	1		2240	273	0.
1		0400	49	705.	1		1015	124	98.	1		1630	199	0.	1		2245	274	0.
1		0405	50	892.	1		1020	125	91.	1		1635	200	0.	1		2250	275	0.
1		0410	51	1033.	1		1025	126	84.	1		1640	201	0.	1		2255	276	0.
1		0415	52	1129.	1		1030	127	78.	1		1645	202	0.	1		2300	277	0.
1		0420	53	1176.	1		1035	128	73.	1		1650	203	0.	1		2305	278	0.
1		0425	54	1196.	1		1040	129	68.	1		1655	204	0.	1		2310	279	0.
1		0430	55	1651.	1		1045	130	63.	1		1700	205	0.	1		2315	280	0.
1		0435	56	4113.	1		1050	131	59.	1		1705	206	0.	1		2320	281	0.
1		0440	57	4559.	1		1055	132	55.	1		1710	207	0.	1		2325	282	0.
1		0445	58	4267.	1		1100	133	51.	1		1715	208	0.	1		2330	283	0.
1		0450	59	4534.	1		1105	134	48.	1		1720	209	0.	1		2335	284	0.
1		0455	60	4244.	1		1110	135	45.	1		1725	210	0.	1		2340	285	0.
1		0500	61	4215.	1		1115	136	42.	1		1730	211	0.	1		2345	286	0.
1		0505	62	4092.	1		1120	137	39.	1		1735	212	0.	1		2350	287	0.

1	0510	63	4001.	*	1	1125	138	36.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	3941.	*	1	1130	139	34.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	3906.	*	1	1135	140	31.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	3912.	*	1	1140	141	29.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	3923.	*	1	1145	142	26.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	3952.	*	1	1150	143	24.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	4012.	*	1	1155	144	22.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	4110.	*	1	1200	145	21.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	4196.	*	1	1205	146	19.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	4195.	*	1	1210	147	17.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	4091.	*	1	1215	148	16.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	3925.	*	1	1220	149	14.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	3730.	*	1	1225	150	13.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)	(CFS)			
+ 4559.	4.67	1929.	492.	474.	474.
		(INCHES) .305	.311	.311	.311
		(AC-FT) 957.	976.	976.	976.

CUMULATIVE AREA = 58.84 SQ MI

HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .44

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	1981.	*	1		1230	151	17.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	1891.	*	1		1235	152	16.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	1807.	*	1		1240	153	15.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	1702.	*	1		1245	154	14.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	1600.	*	1		1250	155	13.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	1514.	*	1		1255	156	12.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	1445.	*	1		1300	157	11.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	1367.	*	1		1305	158	10.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	1280.	*	1		1310	159	9.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	1202.	*	1		1315	160	9.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	1128.	*	1		1320	161	8.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	1049.	*	1		1325	162	7.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	973.	*	1		1330	163	7.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	910.	*	1		1335	164	6.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	851.	*	1		1340	165	6.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	794.	*	1		1345	166	5.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	745.	*	1		1350	167	5.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	701.	*	1		1355	168	5.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	657.	*	1		1400	169	4.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	617.	*	1		1405	170	4.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	581.	*	1		1410	171	4.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	544.	*	1		1415	172	3.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	511.	*	1		1420	173	3.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	481.	*	1		1425	174	3.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	451.	*	1		1430	175	3.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	424.	*	1		1435	176	3.	*	1		2050	251	0.
1		0210	27	0.	*	1		0825	102	399.	*	1		1440	177	2.	*	1		2055	252	0.
1		0215	28	0.	*	1		0830	103	375.	*	1		1445	178	2.	*	1		2100	253	0.
1		0220	29	0.	*	1		0835	104	353.	*	1		1450	179	2.	*	1		2105	254	0.
1		0225	30	0.	*	1		0840	105	332.	*	1		1455	180	2.	*	1		2110	255	0.
1		0230	31	0.	*	1		0845	106	313.	*	1		1500	181	2.	*	1		2115	256	0.
1		0235	32	0.	*	1		0850	107	295.	*	1		1505	182	2.	*	1		2120	257	0.
1		0240	33	0.	*	1		0855	108	277.	*	1		1510	183	2.	*	1		2125	258	0.
1		0245	34	0.	*	1		0900	109	261.	*	1		1515	184	1.	*	1		2130	259	0.
1		0250	35	0.	*	1		0905	110	246.	*	1		1520	185	1.	*	1		2135	260	0.
1		0255	36	0.	*	1		0910	111	233.	*	1		1525	186	1.	*	1		2140	261	0.
1		0300	37	1.	*	1		0915	112	220.	*	1		1530	187	1.	*	1		2145	262	0.
1		0305	38	1.	*	1		0920	113	207.	*	1		1535	188	1.	*	1		2150	263	0.
1		0310	39	1.	*	1		0925	114	196.	*	1		1540	189	1.	*	1		2155	264	0.
1		0315	40	2.	*	1		0930	115	184.	*	1		1545	190	1.	*	1		2200	265	0.
1		0320	41	4.	*	1		0935	116	172.	*	1		1550	191	1.	*	1		2205	266	0.
1		0325	42	7.	*	1		0940	117	161.	*	1		1555	192	1.	*	1		2210	267	0.
1		0330	43	15.	*	1		0945	118	151.	*	1		1600	193	1.	*	1		2215	268	0.
1		0335	44	29.	*	1		0950	119	141.	*	1		1605	194	1.	*	1		2220	269	0.

1	0340	45	51.	*	1	0955	120	131.	*	1	1610	195	1.	*	1	2225	270	0.
1	0345	46	80.	*	1	1000	121	123.	*	1	1615	196	1.	*	1	2230	271	0.
1	0350	47	114.	*	1	1005	122	114.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	150.	*	1	1010	123	107.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	187.	*	1	1015	124	100.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	227.	*	1	1020	125	93.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	331.	*	1	1025	126	87.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	435.	*	1	1030	127	81.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	476.	*	1	1035	128	76.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	502.	*	1	1040	129	70.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	505.	*	1	1045	130	66.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	499.	*	1	1050	131	61.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	487.	*	1	1055	132	57.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	473.	*	1	1100	133	53.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	463.	*	1	1105	134	50.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	1854.	*	1	1110	135	47.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	2764.	*	1	1115	136	44.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	1699.	*	1	1120	137	41.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	2251.	*	1	1125	138	38.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	2295.	*	1	1130	139	36.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	1929.	*	1	1135	140	34.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	2191.	*	1	1140	141	32.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	2000.	*	1	1145	142	30.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	1974.	*	1	1150	143	28.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	1998.	*	1	1155	144	26.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	1935.	*	1	1200	145	25.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	2039.	*	1	1205	146	23.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	2068.	*	1	1210	147	22.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	2145.	*	1	1215	148	20.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	2151.	*	1	1220	149	19.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	2080.	*	1	1225	150	18.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)					
		(CFS)				
2764.	5.00		970.	250.	241.	241.
		(INCHES)	.153	.158	.158	.158
		(AC-FT)	481.	497.	497.	497.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .26

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	125.	*	1		1230	151	12.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	446.	*	1		1235	152	12.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	315.	*	1		1240	153	11.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	243.	*	1		1245	154	10.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	500.	*	1		1250	155	10.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	373.	*	1		1255	156	9.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	393.	*	1		1300	157	9.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	479.	*	1		1305	158	8.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	344.	*	1		1310	159	8.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	412.	*	1		1315	160	7.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	370.	*	1		1320	161	7.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	308.	*	1		1325	162	7.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	362.	*	1		1330	163	6.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	295.	*	1		1335	164	6.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	294.	*	1		1340	165	6.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	293.	*	1		1345	166	5.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	258.	*	1		1350	167	5.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	259.	*	1		1355	168	5.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	239.	*	1		1400	169	5.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	226.	*	1		1405	170	4.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	220.	*	1		1410	171	4.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	209.	*	1		1415	172	4.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	192.	*	1		1420	173	4.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	193.	*	1		1425	174	4.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	178.	*	1		1430	175	4.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	165.	*	1		1435	176	3.	*	1		2050	251	0.

1	0210	27	0.	*	1	0825	102	161.	*	1	1440	177	3.	*	1	2055	252	0.
1	0215	28	0.	*	1	0830	103	144.	*	1	1445	178	3.	*	1	2100	253	0.
1	0220	29	0.	*	1	0835	104	139.	*	1	1450	179	3.	*	1	2105	254	0.
1	0225	30	0.	*	1	0840	105	129.	*	1	1455	180	3.	*	1	2110	255	0.
1	0230	31	0.	*	1	0845	106	124.	*	1	1500	181	3.	*	1	2115	256	0.
1	0235	32	0.	*	1	0850	107	121.	*	1	1505	182	3.	*	1	2120	257	0.
1	0240	33	0.	*	1	0855	108	114.	*	1	1510	183	2.	*	1	2125	258	0.
1	0245	34	0.	*	1	0900	109	111.	*	1	1515	184	2.	*	1	2130	259	0.
1	0250	35	0.	*	1	0905	110	104.	*	1	1520	185	2.	*	1	2135	260	0.
1	0255	36	0.	*	1	0910	111	96.	*	1	1525	186	2.	*	1	2140	261	0.
1	0300	37	0.	*	1	0915	112	90.	*	1	1530	187	2.	*	1	2145	262	0.
1	0305	38	0.	*	1	0920	113	86.	*	1	1535	188	2.	*	1	2150	263	0.
1	0310	39	0.	*	1	0925	114	85.	*	1	1540	189	2.	*	1	2155	264	0.
1	0315	40	0.	*	1	0930	115	84.	*	1	1545	190	2.	*	1	2200	265	0.
1	0320	41	0.	*	1	0935	116	82.	*	1	1550	191	1.	*	1	2205	266	0.
1	0325	42	0.	*	1	0940	117	77.	*	1	1555	192	1.	*	1	2210	267	0.
1	0330	43	0.	*	1	0945	118	72.	*	1	1600	193	1.	*	1	2215	268	0.
1	0335	44	0.	*	1	0950	119	69.	*	1	1605	194	1.	*	1	2220	269	0.
1	0340	45	0.	*	1	0955	120	66.	*	1	1610	195	1.	*	1	2225	270	0.
1	0345	46	0.	*	1	1000	121	63.	*	1	1615	196	1.	*	1	2230	271	0.
1	0350	47	0.	*	1	1005	122	60.	*	1	1620	197	1.	*	1	2235	272	0.
1	0355	48	1.	*	1	1010	123	56.	*	1	1625	198	1.	*	1	2240	273	0.
1	0400	49	5.	*	1	1015	124	53.	*	1	1630	199	1.	*	1	2245	274	0.
1	0405	50	11.	*	1	1020	125	50.	*	1	1635	200	1.	*	1	2250	275	0.
1	0410	51	19.	*	1	1025	126	48.	*	1	1640	201	1.	*	1	2255	276	0.
1	0415	52	26.	*	1	1030	127	47.	*	1	1645	202	1.	*	1	2300	277	0.
1	0420	53	32.	*	1	1035	128	45.	*	1	1650	203	1.	*	1	2305	278	0.
1	0425	54	36.	*	1	1040	129	43.	*	1	1655	204	1.	*	1	2310	279	0.
1	0430	55	40.	*	1	1045	130	41.	*	1	1700	205	1.	*	1	2315	280	0.
1	0435	56	43.	*	1	1050	131	39.	*	1	1705	206	1.	*	1	2320	281	0.
1	0440	57	44.	*	1	1055	132	37.	*	1	1710	207	1.	*	1	2325	282	0.
1	0445	58	46.	*	1	1100	133	36.	*	1	1715	208	1.	*	1	2330	283	0.
1	0450	59	53.	*	1	1105	134	34.	*	1	1720	209	1.	*	1	2335	284	0.
1	0455	60	72.	*	1	1110	135	32.	*	1	1725	210	1.	*	1	2340	285	0.
1	0500	61	68.	*	1	1115	136	30.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	70.	*	1	1120	137	29.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	77.	*	1	1125	138	27.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	77.	*	1	1130	139	25.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	81.	*	1	1135	140	24.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	84.	*	1	1140	141	23.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	88.	*	1	1145	142	21.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	93.	*	1	1150	143	20.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	99.	*	1	1155	144	19.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	105.	*	1	1200	145	18.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	105.	*	1	1205	146	17.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	101.	*	1	1210	147	16.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	95.	*	1	1215	148	15.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	87.	*	1	1220	149	14.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	79.	*	1	1225	150	13.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*					

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 500.	6.58		161.	44.	42.	42.
		(INCHES)	.025	.028	.028	.028
		(AC-FT)	80.	87.	87.	87.

CUMULATIVE AREA = 58.84 SQ MI

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            **************
            *            *
1305 KK     *   FINISH   *
            *            *
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1307 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

1306 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1500.	CHANNEL LENGTH
S	.0090	SLOPE
N	.050	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	250.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	2.55	750.00	10209.02	323.76	1.10	9.81
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		10207.58	325.00	1.10	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5207E+04 EXCESS= .0000E+00 OUTFLOW= .5207E+04 BASIN STORAGE= .1055E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = 1.00

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	9253.	1		1230	151	2692.	1		1845	226	200.
1		0005	2	0.	1		0620	77	9553.	1		1235	152	2669.	1		1850	227	162.
1		0010	3	0.	1		0625	78	9698.	1		1240	153	2645.	1		1855	228	126.
1		0015	4	0.	1		0630	79	9707.	1		1245	154	2621.	1		1900	229	96.
1		0020	5	0.	1		0635	80	9614.	1		1250	155	2597.	1		1905	230	72.
1		0025	6	0.	1		0640	81	9438.	1		1255	156	2573.	1		1910	231	54.
1		0030	7	0.	1		0645	82	9202.	1		1300	157	2549.	1		1915	232	40.
1		0035	8	1.	1		0650	83	8924.	1		1305	158	2526.	1		1920	233	30.
1		0040	9	3.	1		0655	84	8614.	1		1310	159	2503.	1		1925	234	22.
1		0045	10	6.	1		0700	85	8282.	1		1315	160	2478.	1		1930	235	17.
1		0050	11	11.	1		0705	86	7935.	1		1320	161	2453.	1		1935	236	13.
1		0055	12	19.	1		0710	87	7580.	1		1325	162	2427.	1		1940	237	9.
1		0100	13	29.	1		0715	88	7223.	1		1330	163	2401.	1		1945	238	7.
1		0105	14	42.	1		0720	89	6867.	1		1335	164	2376.	1		1950	239	5.
1		0110	15	58.	1		0725	90	6514.	1		1340	165	2351.	1		1955	240	4.
1		0115	16	74.	1		0730	91	6166.	1		1345	166	2326.	1		2000	241	3.
1		0120	17	92.	1		0735	92	5823.	1		1350	167	2300.	1		2005	242	2.
1		0125	18	111.	1		0740	93	5491.	1		1355	168	2272.	1		2010	243	2.
1		0130	19	131.	1		0745	94	5176.	1		1400	169	2244.	1		2015	244	1.
1		0135	20	153.	1		0750	95	4903.	1		1405	170	2216.	1		2020	245	1.
1		0140	21	178.	1		0755	96	4697.	1		1410	171	2188.	1		2025	246	1.
1		0145	22	208.	1		0800	97	4560.	1		1415	172	2161.	1		2030	247	0.
1		0150	23	244.	1		0805	98	4464.	1		1420	173	2134.	1		2035	248	0.
1		0155	24	286.	1		0810	99	4381.	1		1425	174	2105.	1		2040	249	0.
1		0200	25	335.	1		0815	100	4305.	1		1430	175	2075.	1		2045	250	0.
1		0205	26	391.	1		0820	101	4233.	1		1435	176	2043.	1		2050	251	0.
1		0210	27	454.	1		0825	102	4165.	1		1440	177	2012.	1		2055	252	0.
1		0215	28	522.	1		0830	103	4100.	1		1445	178	1981.	1		2100	253	0.
1		0220	29	594.	1		0835	104	4039.	1		1450	179	1950.	1		2105	254	0.
1		0225	30	668.	1		0840	105	3981.	1		1455	180	1919.	1		2110	255	0.
1		0230	31	745.	1		0845	106	3927.	1		1500	181	1886.	1		2115	256	0.
1		0235	32	821.	1		0850	107	3875.	1		1505	182	1852.	1		2120	257	0.
1		0240	33	894.	1		0855	108	3826.	1		1510	183	1816.	1		2125	258	0.
1		0245	34	960.	1		0900	109	3780.	1		1515	184	1781.	1		2130	259	0.
1		0250	35	1015.	1		0905	110	3736.	1		1520	185	1747.	1		2135	260	0.
1		0255	36	1065.	1		0910	111	3695.	1		1525	186	1712.	1		2140	261	0.
1		0300	37	1122.	1		0915	112	3656.	1		1530	187	1677.	1		2145	262	0.
1		0305	38	1200.	1		0920	113	3620.	1		1535	188	1640.	1		2150	263	0.
1		0310	39	1312.	1		0925	114	3585.	1		1540	189	1603.	1		2155	264	0.
1		0315	40	1477.	1		0930	115	3552.	1		1545	190	1566.	1		2200	265	0.
1		0320	41	1713.	1		0935	116	3519.	1		1550	191	1530.	1		2205	266	0.
1		0325	42	2033.	1		0940	117	3487.	1		1555	192	1494.	1		2210	267	0.
1		0330	43	2456.	1		0945	118	3457.	1		1600	193	1458.	1		2215	268	0.

1	0335	44	3006.	*	1	0950	119	3427.	*	1	1605	194	1419.	*	1	2220	269	0.
1	0340	45	3677.	*	1	0955	120	3399.	*	1	1610	195	1381.	*	1	2225	270	0.
1	0345	46	4432.	*	1	1000	121	3371.	*	1	1615	196	1343.	*	1	2230	271	0.
1	0350	47	5240.	*	1	1005	122	3345.	*	1	1620	197	1306.	*	1	2235	272	0.
1	0355	48	6061.	*	1	1010	123	3319.	*	1	1625	198	1269.	*	1	2240	273	0.
1	0400	49	6824.	*	1	1015	124	3295.	*	1	1630	199	1232.	*	1	2245	274	0.
1	0405	50	7472.	*	1	1020	125	3271.	*	1	1635	200	1193.	*	1	2250	275	0.
1	0410	51	7998.	*	1	1025	126	3247.	*	1	1640	201	1153.	*	1	2255	276	0.
1	0415	52	8426.	*	1	1030	127	3222.	*	1	1645	202	1114.	*	1	2300	277	0.
1	0420	53	8768.	*	1	1035	128	3198.	*	1	1650	203	1076.	*	1	2305	278	0.
1	0425	54	9014.	*	1	1040	129	3174.	*	1	1655	204	1039.	*	1	2310	279	0.
1	0430	55	9160.	*	1	1045	130	3151.	*	1	1700	205	1002.	*	1	2315	280	0.
1	0435	56	9229.	*	1	1050	131	3129.	*	1	1705	206	964.	*	1	2320	281	0.
1	0440	57	9252.	*	1	1055	132	3107.	*	1	1710	207	924.	*	1	2325	282	0.
1	0445	58	9258.	*	1	1100	133	3086.	*	1	1715	208	885.	*	1	2330	283	0.
1	0450	59	9291.	*	1	1105	134	3065.	*	1	1720	209	847.	*	1	2335	284	0.
1	0455	60	9389.	*	1	1110	135	3044.	*	1	1725	210	811.	*	1	2340	285	0.
1	0500	61	9546.	*	1	1115	136	3022.	*	1	1730	211	776.	*	1	2345	286	0.
1	0505	62	9730.	*	1	1120	137	3000.	*	1	1735	212	740.	*	1	2350	287	0.
1	0510	63	9912.	*	1	1125	138	2977.	*	1	1740	213	701.	*	1	2355	288	0.
1	0515	64	10070.	*	1	1130	139	2955.	*	1	1745	214	661.	*	2	0000	289	0.
1	0520	65	10175.	*	1	1135	140	2934.	*	1	1750	215	622.	*	2	0005	290	0.
1	0525	66	10208.	*	1	1140	141	2913.	*	1	1755	216	584.	*	2	0010	291	0.
1	0530	67	10166.	*	1	1145	142	2892.	*	1	1800	217	548.	*	2	0015	292	0.
1	0535	68	10059.	*	1	1150	143	2871.	*	1	1805	218	512.	*	2	0020	293	0.
1	0540	69	9894.	*	1	1155	144	2849.	*	1	1810	219	475.	*	2	0025	294	0.
1	0545	70	9681.	*	1	1200	145	2826.	*	1	1815	220	431.	*	2	0030	295	0.
1	0550	71	9435.	*	1	1205	146	2803.	*	1	1820	221	385.	*	2	0035	296	0.
1	0555	72	9174.	*	1	1210	147	2781.	*	1	1825	222	342.	*	2	0040	297	0.
1	0600	73	8935.	*	1	1215	148	2758.	*	1	1830	223	302.	*	2	0045	298	0.
1	0605	74	8814.	*	1	1220	149	2736.	*	1	1835	224	266.	*	2	0050	299	0.
1	0610	75	8933.	*	1	1225	150	2714.	*	1	1840	225	234.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 10208.	5.42		7053.	2625.	2529.	2529.
		(INCHES)	.738	1.099	1.099	1.099
		(AC-FT)	3497.	5207.	5207.	5207.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	2.75	750.00	8433.52	326.69	.85	9.11

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.08	1.64	5.00		8427.54	325.00	.85

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4014E+04 EXCESS= .0000E+00 OUTFLOW= .4014E+04 BASIN STORAGE= .1199E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .87

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	6884.	*	1		1230	151	2272.	*	1		1845	226	2.
1		0005	2	0.	*	1		0620	77	6701.	*	1		1235	152	2243.	*	1		1850	227	2.
1		0010	3	0.	*	1		0625	78	6524.	*	1		1240	153	2214.	*	1		1855	228	1.
1		0015	4	0.	*	1		0630	79	6351.	*	1		1245	154	2186.	*	1		1900	229	1.
1		0020	5	0.	*	1		0635	80	6184.	*	1		1250	155	2157.	*	1		1905	230	1.
1		0025	6	0.	*	1		0640	81	6019.	*	1		1255	156	2129.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	5860.	*	1		1300	157	2098.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	5706.	*	1		1305	158	2067.	*	1		1920	233	0.

1	0040	9	0.	*	1	0655	84	5558.	*	1	1310	159	2034.	*	1	1925	234	0.
1	0045	10	1.	*	1	0700	85	5415.	*	1	1315	160	2003.	*	1	1930	235	0.
1	0050	11	2.	*	1	0705	86	5279.	*	1	1320	161	1971.	*	1	1935	236	0.
1	0055	12	4.	*	1	0710	87	5148.	*	1	1325	162	1940.	*	1	1940	237	0.
1	0100	13	7.	*	1	0715	88	5024.	*	1	1330	163	1907.	*	1	1945	238	0.
1	0105	14	11.	*	1	0720	89	4906.	*	1	1335	164	1873.	*	1	1950	239	0.
1	0110	15	17.	*	1	0725	90	4793.	*	1	1340	165	1837.	*	1	1955	240	0.
1	0115	16	24.	*	1	0730	91	4684.	*	1	1345	166	1801.	*	1	2000	241	0.
1	0120	17	31.	*	1	0735	92	4579.	*	1	1350	167	1766.	*	1	2005	242	0.
1	0125	18	40.	*	1	0740	93	4477.	*	1	1355	168	1732.	*	1	2010	243	0.
1	0130	19	50.	*	1	0745	94	4380.	*	1	1400	169	1697.	*	1	2015	244	0.
1	0135	20	62.	*	1	0750	95	4288.	*	1	1405	170	1660.	*	1	2020	245	0.
1	0140	21	77.	*	1	0755	96	4202.	*	1	1410	171	1622.	*	1	2025	246	0.
1	0145	22	95.	*	1	0800	97	4121.	*	1	1415	172	1585.	*	1	2030	247	0.
1	0150	23	117.	*	1	0805	98	4046.	*	1	1420	173	1548.	*	1	2035	248	0.
1	0155	24	144.	*	1	0810	99	3977.	*	1	1425	174	1512.	*	1	2040	249	0.
1	0200	25	176.	*	1	0815	100	3912.	*	1	1430	175	1476.	*	1	2045	250	0.
1	0205	26	213.	*	1	0820	101	3850.	*	1	1435	176	1439.	*	1	2050	251	0.
1	0210	27	254.	*	1	0825	102	3792.	*	1	1440	177	1400.	*	1	2055	252	0.
1	0215	28	299.	*	1	0830	103	3737.	*	1	1445	178	1361.	*	1	2100	253	0.
1	0220	29	347.	*	1	0835	104	3685.	*	1	1450	179	1324.	*	1	2105	254	0.
1	0225	30	395.	*	1	0840	105	3636.	*	1	1455	180	1287.	*	1	2110	255	0.
1	0230	31	443.	*	1	0845	106	3588.	*	1	1500	181	1250.	*	1	2115	256	0.
1	0235	32	489.	*	1	0850	107	3542.	*	1	1505	182	1212.	*	1	2120	257	0.
1	0240	33	530.	*	1	0855	108	3498.	*	1	1510	183	1173.	*	1	2125	258	0.
1	0245	34	566.	*	1	0900	109	3455.	*	1	1515	184	1133.	*	1	2130	259	0.
1	0250	35	599.	*	1	0905	110	3415.	*	1	1520	185	1094.	*	1	2135	260	0.
1	0255	36	633.	*	1	0910	111	3376.	*	1	1525	186	1057.	*	1	2140	261	0.
1	0300	37	674.	*	1	0915	112	3339.	*	1	1530	187	1021.	*	1	2145	262	0.
1	0305	38	730.	*	1	0920	113	3304.	*	1	1535	188	983.	*	1	2150	263	0.
1	0310	39	808.	*	1	0925	114	3271.	*	1	1540	189	944.	*	1	2155	264	0.
1	0315	40	918.	*	1	0930	115	3239.	*	1	1545	190	904.	*	1	2200	265	0.
1	0320	41	1074.	*	1	0935	116	3207.	*	1	1550	191	865.	*	1	2205	266	0.
1	0325	42	1293.	*	1	0940	117	3177.	*	1	1555	192	828.	*	1	2210	267	0.
1	0330	43	1600.	*	1	0945	118	3146.	*	1	1600	193	793.	*	1	2215	268	0.
1	0335	44	2020.	*	1	0950	119	3116.	*	1	1605	194	757.	*	1	2220	269	0.
1	0340	45	2554.	*	1	0955	120	3086.	*	1	1610	195	719.	*	1	2225	270	0.
1	0345	46	3166.	*	1	1000	121	3057.	*	1	1615	196	680.	*	1	2230	271	0.
1	0350	47	3828.	*	1	1005	122	3029.	*	1	1620	197	641.	*	1	2235	272	0.
1	0355	48	4500.	*	1	1010	123	3002.	*	1	1625	198	604.	*	1	2240	273	0.
1	0400	49	5130.	*	1	1015	124	2976.	*	1	1630	199	568.	*	1	2245	274	0.
1	0405	50	5671.	*	1	1020	125	2950.	*	1	1635	200	534.	*	1	2250	275	0.
1	0410	51	6107.	*	1	1025	126	2923.	*	1	1640	201	501.	*	1	2255	276	0.
1	0415	52	6448.	*	1	1030	127	2897.	*	1	1645	202	465.	*	1	2300	277	0.
1	0420	53	6717.	*	1	1035	128	2870.	*	1	1650	203	423.	*	1	2305	278	0.
1	0425	54	6931.	*	1	1040	129	2844.	*	1	1655	204	380.	*	1	2310	279	0.
1	0430	55	7099.	*	1	1045	130	2818.	*	1	1700	205	338.	*	1	2315	280	0.
1	0435	56	7228.	*	1	1050	131	2793.	*	1	1705	206	301.	*	1	2320	281	0.
1	0440	57	7322.	*	1	1055	132	2768.	*	1	1710	207	268.	*	1	2325	282	0.
1	0445	58	7386.	*	1	1100	133	2744.	*	1	1715	208	236.	*	1	2330	283	0.
1	0450	59	7459.	*	1	1105	134	2719.	*	1	1720	209	203.	*	1	2335	284	0.
1	0455	60	7576.	*	1	1110	135	2693.	*	1	1725	210	167.	*	1	2340	285	0.
1	0500	61	7740.	*	1	1115	136	2667.	*	1	1730	211	131.	*	1	2345	286	0.
1	0505	62	7923.	*	1	1120	137	2642.	*	1	1735	212	101.	*	1	2350	287	0.
1	0510	63	8103.	*	1	1125	138	2616.	*	1	1740	213	76.	*	1	2355	288	0.
1	0515	64	8262.	*	1	1130	139	2591.	*	1	1745	214	57.	*	2	0000	289	0.
1	0520	65	8376.	*	1	1135	140	2566.	*	1	1750	215	43.	*	2	0005	290	0.
1	0525	66	8428.	*	1	1140	141	2541.	*	1	1755	216	33.	*	2	0010	291	0.
1	0530	67	8417.	*	1	1145	142	2515.	*	1	1800	217	25.	*	2	0015	292	0.
1	0535	68	8352.	*	1	1150	143	2489.	*	1	1805	218	19.	*	2	0020	293	0.
1	0540	69	8237.	*	1	1155	144	2462.	*	1	1810	219	14.	*	2	0025	294	0.
1	0545	70	8083.	*	1	1200	145	2435.	*	1	1815	220	11.	*	2	0030	295	0.
1	0550	71	7901.	*	1	1205	146	2408.	*	1	1820	221	8.	*	2	0035	296	0.
1	0555	72	7701.	*	1	1210	147	2381.	*	1	1825	222	6.	*	2	0040	297	0.
1	0600	73	7494.	*	1	1215	148	2355.	*	1	1830	223	5.	*	2	0045	298	0.
1	0605	74	7284.	*	1	1220	149	2328.	*	1	1835	224	4.	*	2	0050	299	0.
1	0610	75	7078.	*	1	1225	150	2301.	*	1	1840	225	3.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
	(CFS)				
+ 8428.	5.42	5557.	2024.	1949.	1949.
	(INCHES)	.581	.847	.847	.847
	(AC-FT)	2755.	4014.	4014.	4014.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	COMPUTATION TIME STEP M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	3.02	750.00	6621.68	328.78	.61	8.29
		INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL						
MAIN	.08	1.64	5.00		6619.14	330.00	.61	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2913E+04 EXCESS= .0000E+00 OUTFLOW= .2913E+04 BASIN STORAGE= .1112E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .74

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	5580.	1		1230	151	1448.	1		1845	226	0.
1		0005	2	0.	1		0620	77	5451.	1		1235	152	1408.	1		1850	227	0.
1		0010	3	0.	1		0625	78	5326.	1		1240	153	1369.	1		1855	228	0.
1		0015	4	0.	1		0630	79	5203.	1		1245	154	1331.	1		1900	229	0.
1		0020	5	0.	1		0635	80	5082.	1		1250	155	1293.	1		1905	230	0.
1		0025	6	0.	1		0640	81	4961.	1		1255	156	1256.	1		1910	231	0.
1		0030	7	0.	1		0645	82	4842.	1		1300	157	1217.	1		1915	232	0.
1		0035	8	0.	1		0650	83	4726.	1		1305	158	1177.	1		1920	233	0.
1		0040	9	0.	1		0655	84	4615.	1		1310	159	1137.	1		1925	234	0.
1		0045	10	0.	1		0700	85	4507.	1		1315	160	1098.	1		1930	235	0.
1		0050	11	0.	1		0705	86	4402.	1		1320	161	1060.	1		1935	236	0.
1		0055	12	0.	1		0710	87	4302.	1		1325	162	1023.	1		1940	237	0.
1		0100	13	0.	1		0715	88	4207.	1		1330	163	985.	1		1945	238	0.
1		0105	14	1.	1		0720	89	4115.	1		1335	164	946.	1		1950	239	0.
1		0110	15	2.	1		0725	90	4027.	1		1340	165	905.	1		1955	240	0.
1		0115	16	3.	1		0730	91	3942.	1		1345	166	867.	1		2000	241	0.
1		0120	17	5.	1		0735	92	3860.	1		1350	167	829.	1		2005	242	0.
1		0125	18	7.	1		0740	93	3779.	1		1355	168	793.	1		2010	243	0.
1		0130	19	10.	1		0745	94	3702.	1		1400	169	757.	1		2015	244	0.
1		0135	20	14.	1		0750	95	3627.	1		1405	170	720.	1		2020	245	0.
1		0140	21	20.	1		0755	96	3557.	1		1410	171	681.	1		2025	246	0.
1		0145	22	28.	1		0800	97	3490.	1		1415	172	641.	1		2030	247	0.
1		0150	23	38.	1		0805	98	3427.	1		1420	173	604.	1		2035	248	0.
1		0155	24	51.	1		0810	99	3367.	1		1425	174	568.	1		2040	249	0.
1		0200	25	68.	1		0815	100	3312.	1		1430	175	535.	1		2045	250	0.
1		0205	26	88.	1		0820	101	3258.	1		1435	176	501.	1		2050	251	0.
1		0210	27	112.	1		0825	102	3207.	1		1440	177	466.	1		2055	252	0.
1		0215	28	138.	1		0830	103	3159.	1		1445	178	427.	1		2100	253	0.
1		0220	29	167.	1		0835	104	3112.	1		1450	179	386.	1		2105	254	0.
1		0225	30	197.	1		0840	105	3067.	1		1455	180	346.	1		2110	255	0.
1		0230	31	228.	1		0845	106	3024.	1		1500	181	309.	1		2115	256	0.
1		0235	32	256.	1		0850	107	2981.	1		1505	182	275.	1		2120	257	0.
1		0240	33	283.	1		0855	108	2939.	1		1510	183	244.	1		2125	258	0.
1		0245	34	305.	1		0900	109	2898.	1		1515	184	213.	1		2130	259	0.
1		0250	35	324.	1		0905	110	2859.	1		1520	185	178.	1		2135	260	0.
1		0255	36	343.	1		0910	111	2821.	1		1525	186	142.	1		2140	261	0.
1		0300	37	363.	1		0915	112	2784.	1		1530	187	110.	1		2145	262	0.
1		0305	38	392.	1		0920	113	2748.	1		1535	188	84.	1		2150	263	0.
1		0310	39	432.	1		0925	114	2714.	1		1540	189	64.	1		2155	264	0.
1		0315	40	493.	1		0930	115	2680.	1		1545	190	48.	1		2200	265	0.
1		0320	41	589.	1		0935	116	2647.	1		1550	191	37.	1		2205	266	0.
1		0325	42	725.	1		0940	117	2613.	1		1555	192	28.	1		2210	267	0.
1		0330	43	928.	1		0945	118	2579.	1		1600	193	21.	1		2215	268	0.
1		0335	44	1222.	1		0950	119	2545.	1		1605	194	16.	1		2220	269	0.
1		0340	45	1598.	1		0955	120	2513.	1		1610	195	12.	1		2225	270	0.
1		0345	46	2040.	1		1000	121	2481.	1		1615	196	9.	1		2230	271	0.
1		0350	47	2526.	1		1005	122	2450.	1		1620	197	7.	1		2235	272	0.
1		0355	48	3037.	1		1010	123	2419.	1		1625	198	5.	1		2240	273	0.
1		0400	49	3538.	1		1015	124	2387.	1		1630	199	4.	1		2245	274	0.
1		0405	50	3983.	1		1020	125	2355.	1		1635	200	3.	1		2250	275	0.
1		0410	51	4348.	1		1025	126	2322.	1		1640	201	2.	1		2255	276	0.
1		0415	52	4626.	1		1030	127	2290.	1		1645	202	2.	1		2300	277	0.
1		0420	53	4833.	1		1035	128	2259.	1		1650	203	1.	1		2305	278	0.
1		0425	54	4982.	1		1040	129	2228.	1		1655	204	1.	1		2310	279	0.

1	0430	55	5096.	*	1	1045	130	2197.	*	1	1700	205	1.	*	1	2315	280	0.
1	0435	56	5212.	*	1	1050	131	2165.	*	1	1705	206	1.	*	1	2320	281	0.
1	0440	57	5340.	*	1	1055	132	2132.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	5461.	*	1	1100	133	2098.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	5581.	*	1	1105	134	2064.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	5727.	*	1	1110	135	2031.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	5902.	*	1	1115	136	1998.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	6084.	*	1	1120	137	1965.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	6261.	*	1	1125	138	1930.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	6418.	*	1	1130	139	1894.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	6539.	*	1	1135	140	1857.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	6605.	*	1	1140	141	1821.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	6619.	*	1	1145	142	1784.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	6589.	*	1	1150	143	1749.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	6520.	*	1	1155	144	1712.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	6418.	*	1	1200	145	1675.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	6293.	*	1	1205	146	1636.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	6155.	*	1	1210	147	1598.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	6010.	*	1	1215	148	1561.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	5862.	*	1	1220	149	1524.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	5717.	*	1	1225	150	1486.	*	1	1840	225	0.	*	2	0055	300	0.

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 6619.	5.50	4414.	1469.	1415.	1415.
		(INCHES) .462	.615	.615	.615
		(AC-FT) 2189.	2913.	2913.	2913.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	3.61	750.00	4186.98	335.27	.35	6.93
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		4186.51	335.00	.35	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1647E+04 EXCESS= .0000E+00 OUTFLOW= .1647E+04 BASIN STORAGE= .1210E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .57

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	3721.	*	1		1230	151	352.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	3657.	*	1		1235	152	320.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	3595.	*	1		1240	153	290.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	3532.	*	1		1245	154	263.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	3469.	*	1		1250	155	236.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	3404.	*	1		1255	156	208.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	3337.	*	1		1300	157	176.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	3270.	*	1		1305	158	143.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	3203.	*	1		1310	159	114.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	3138.	*	1		1315	160	90.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	3074.	*	1		1320	161	71.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	3011.	*	1		1325	162	57.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	2950.	*	1		1330	163	46.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	2891.	*	1		1335	164	37.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	2833.	*	1		1340	165	30.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	2776.	*	1		1345	166	25.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	2718.	*	1		1350	167	21.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	2661.	*	1		1355	168	17.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	2606.	*	1		1400	169	15.	*	1		2015	244	0.

1	0135	20	0.	*	1	0750	95	2551.	*	1	1405	170	13.	*	1	2020	245	0.
1	0140	21	0.	*	1	0755	96	2499.	*	1	1410	171	11.	*	1	2025	246	0.
1	0145	22	1.	*	1	0800	97	2448.	*	1	1415	172	9.	*	1	2030	247	0.
1	0150	23	1.	*	1	0805	98	2399.	*	1	1420	173	8.	*	1	2035	248	0.
1	0155	24	3.	*	1	0810	99	2353.	*	1	1425	174	7.	*	1	2040	249	0.
1	0200	25	5.	*	1	0815	100	2308.	*	1	1430	175	6.	*	1	2045	250	0.
1	0205	26	8.	*	1	0820	101	2265.	*	1	1435	176	5.	*	1	2050	251	0.
1	0210	27	13.	*	1	0825	102	2222.	*	1	1440	177	5.	*	1	2055	252	0.
1	0215	28	19.	*	1	0830	103	2180.	*	1	1445	178	4.	*	1	2100	253	0.
1	0220	29	27.	*	1	0835	104	2137.	*	1	1450	179	4.	*	1	2105	254	0.
1	0225	30	36.	*	1	0840	105	2094.	*	1	1455	180	3.	*	1	2110	255	0.
1	0230	31	47.	*	1	0845	106	2052.	*	1	1500	181	3.	*	1	2115	256	0.
1	0235	32	57.	*	1	0850	107	2010.	*	1	1505	182	3.	*	1	2120	257	0.
1	0240	33	68.	*	1	0855	108	1969.	*	1	1510	183	2.	*	1	2125	258	0.
1	0245	34	79.	*	1	0900	109	1930.	*	1	1515	184	2.	*	1	2130	259	0.
1	0250	35	88.	*	1	0905	110	1891.	*	1	1520	185	2.	*	1	2135	260	0.
1	0255	36	97.	*	1	0910	111	1852.	*	1	1525	186	2.	*	1	2140	261	0.
1	0300	37	107.	*	1	0915	112	1812.	*	1	1530	187	2.	*	1	2145	262	0.
1	0305	38	120.	*	1	0920	113	1772.	*	1	1535	188	1.	*	1	2150	263	0.
1	0310	39	137.	*	1	0925	114	1733.	*	1	1540	189	1.	*	1	2155	264	0.
1	0315	40	162.	*	1	0930	115	1693.	*	1	1545	190	1.	*	1	2200	265	0.
1	0320	41	200.	*	1	0935	116	1655.	*	1	1550	191	1.	*	1	2205	266	0.
1	0325	42	256.	*	1	0940	117	1618.	*	1	1555	192	1.	*	1	2210	267	0.
1	0330	43	343.	*	1	0945	118	1580.	*	1	1600	193	1.	*	1	2215	268	0.
1	0335	44	479.	*	1	0950	119	1542.	*	1	1605	194	1.	*	1	2220	269	0.
1	0340	45	664.	*	1	0955	120	1503.	*	1	1610	195	1.	*	1	2225	270	0.
1	0345	46	898.	*	1	1000	121	1463.	*	1	1615	196	1.	*	1	2230	271	0.
1	0350	47	1178.	*	1	1005	122	1424.	*	1	1620	197	1.	*	1	2235	272	0.
1	0355	48	1475.	*	1	1010	123	1386.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	1771.	*	1	1015	124	1349.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	2040.	*	1	1020	125	1311.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	2269.	*	1	1025	126	1273.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	2457.	*	1	1030	127	1234.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	2611.	*	1	1035	128	1194.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	2724.	*	1	1040	129	1155.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	2806.	*	1	1045	130	1117.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	2857.	*	1	1050	131	1080.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	2887.	*	1	1055	132	1043.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	2925.	*	1	1100	133	1006.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	3011.	*	1	1105	134	967.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	3166.	*	1	1110	135	928.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	3363.	*	1	1115	136	890.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	3565.	*	1	1120	137	853.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	3749.	*	1	1125	138	818.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	3909.	*	1	1130	139	783.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	4034.	*	1	1135	140	746.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	4123.	*	1	1140	141	709.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	4171.	*	1	1145	142	670.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	4187.	*	1	1150	143	633.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	4171.	*	1	1155	144	597.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	4130.	*	1	1200	145	564.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	4075.	*	1	1205	146	531.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	4008.	*	1	1210	147	498.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	3937.	*	1	1215	148	463.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	3863.	*	1	1220	149	425.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	3790.	*	1	1225	150	387.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 4187.	5.58		2812.	831.	800.	800.
		(INCHES)	.294	.348	.348	.348
		(AC-FT)	1395.	1647.	1647.	1647.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	4.51	750.00	2354.68	342.66	.18	5.54

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN .08 1.64 5.00 2351.49 345.00 .18

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8597E+03 EXCESS= .0000E+00 OUTFLOW= .8597E+03 BASIN STORAGE= .1104E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .44

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	2182.	1		1230	151	47.	1		1845	226	0.
1		0005	2	0.	1		0620	77	2160.	1		1235	152	43.	1		1850	227	0.
1		0010	3	0.	1		0625	78	2137.	1		1240	153	40.	1		1855	228	0.
1		0015	4	0.	1		0630	79	2112.	1		1245	154	37.	1		1900	229	0.
1		0020	5	0.	1		0635	80	2084.	1		1250	155	35.	1		1905	230	0.
1		0025	6	0.	1		0640	81	2054.	1		1255	156	32.	1		1910	231	0.
1		0030	7	0.	1		0645	82	2022.	1		1300	157	30.	1		1915	232	0.
1		0035	8	0.	1		0650	83	1989.	1		1305	158	28.	1		1920	233	0.
1		0040	9	0.	1		0655	84	1955.	1		1310	159	27.	1		1925	234	0.
1		0045	10	0.	1		0700	85	1921.	1		1315	160	25.	1		1930	235	0.
1		0050	11	0.	1		0705	86	1885.	1		1320	161	23.	1		1935	236	0.
1		0055	12	0.	1		0710	87	1850.	1		1325	162	22.	1		1940	237	0.
1		0100	13	0.	1		0715	88	1814.	1		1330	163	20.	1		1945	238	0.
1		0105	14	0.	1		0720	89	1778.	1		1335	164	19.	1		1950	239	0.
1		0110	15	0.	1		0725	90	1743.	1		1340	165	18.	1		1955	240	0.
1		0115	16	0.	1		0730	91	1707.	1		1345	166	17.	1		2000	241	0.
1		0120	17	0.	1		0735	92	1670.	1		1350	167	15.	1		2005	242	0.
1		0125	18	0.	1		0740	93	1633.	1		1355	168	14.	1		2010	243	0.
1		0130	19	0.	1		0745	94	1597.	1		1400	169	13.	1		2015	244	0.
1		0135	20	0.	1		0750	95	1560.	1		1405	170	12.	1		2020	245	0.
1		0140	21	0.	1		0755	96	1524.	1		1410	171	12.	1		2025	246	0.
1		0145	22	0.	1		0800	97	1488.	1		1415	172	11.	1		2030	247	0.
1		0150	23	0.	1		0805	98	1452.	1		1420	173	10.	1		2035	248	0.
1		0155	24	0.	1		0810	99	1415.	1		1425	174	9.	1		2040	249	0.
1		0200	25	0.	1		0815	100	1379.	1		1430	175	8.	1		2045	250	0.
1		0205	26	0.	1		0820	101	1343.	1		1435	176	8.	1		2050	251	0.
1		0210	27	0.	1		0825	102	1307.	1		1440	177	7.	1		2055	252	0.
1		0215	28	0.	1		0830	103	1273.	1		1445	178	7.	1		2100	253	0.
1		0220	29	0.	1		0835	104	1239.	1		1450	179	6.	1		2105	254	0.
1		0225	30	1.	1		0840	105	1206.	1		1455	180	6.	1		2110	255	0.
1		0230	31	2.	1		0845	106	1173.	1		1500	181	5.	1		2115	256	0.
1		0235	32	3.	1		0850	107	1141.	1		1505	182	5.	1		2120	257	0.
1		0240	33	4.	1		0855	108	1109.	1		1510	183	5.	1		2125	258	0.
1		0245	34	5.	1		0900	109	1076.	1		1515	184	4.	1		2130	259	0.
1		0250	35	7.	1		0905	110	1042.	1		1520	185	4.	1		2135	260	0.
1		0255	36	9.	1		0910	111	1007.	1		1525	186	4.	1		2140	261	0.
1		0300	37	12.	1		0915	112	972.	1		1530	187	3.	1		2145	262	0.
1		0305	38	15.	1		0920	113	940.	1		1535	188	3.	1		2150	263	0.
1		0310	39	20.	1		0925	114	909.	1		1540	189	3.	1		2155	264	0.
1		0315	40	28.	1		0930	115	878.	1		1545	190	3.	1		2200	265	0.
1		0320	41	41.	1		0935	116	848.	1		1550	191	3.	1		2205	266	0.
1		0325	42	61.	1		0940	117	818.	1		1555	192	2.	1		2210	267	0.
1		0330	43	92.	1		0945	118	788.	1		1600	193	2.	1		2215	268	0.
1		0335	44	139.	1		0950	119	756.	1		1605	194	2.	1		2220	269	0.
1		0340	45	216.	1		0955	120	722.	1		1610	195	2.	1		2225	270	0.
1		0345	46	327.	1		1000	121	688.	1		1615	196	2.	1		2230	271	0.
1		0350	47	463.	1		1005	122	656.	1		1620	197	2.	1		2235	272	0.
1		0355	48	623.	1		1010	123	626.	1		1625	198	2.	1		2240	273	0.
1		0400	49	794.	1		1015	124	596.	1		1630	199	1.	1		2245	274	0.
1		0405	50	953.	1		1020	125	568.	1		1635	200	1.	1		2250	275	0.
1		0410	51	1084.	1		1025	126	541.	1		1640	201	1.	1		2255	276	0.
1		0415	52	1190.	1		1030	127	513.	1		1645	202	1.	1		2300	277	0.
1		0420	53	1272.	1		1035	128	483.	1		1650	203	1.	1		2305	278	0.
1		0425	54	1336.	1		1040	129	450.	1		1655	204	1.	1		2310	279	0.
1		0430	55	1386.	1		1045	130	415.	1		1700	205	1.	1		2315	280	0.
1		0435	56	1426.	1		1050	131	382.	1		1705	206	1.	1		2320	281	0.
1		0440	57	1462.	1		1055	132	353.	1		1710	207	1.	1		2325	282	0.
1		0445	58	1489.	1		1100	133	327.	1		1715	208	1.	1		2330	283	0.
1		0450	59	1509.	1		1105	134	303.	1		1720	209	1.	1		2335	284	0.
1		0455	60	1541.	1		1110	135	280.	1		1725	210	1.	1		2340	285	0.
1		0500	61	1593.	1		1115	136	260.	1		1730	211	1.	1		2345	286	0.
1		0505	62	1660.	1		1120	137	240.	1		1735	212	1.	1		2350	287	0.
1		0510	63	1749.	1		1125	138	221.	1		1740	213	0.	1		2355	288	0.
1		0515	64	1875.	1		1130	139	201.	1		1745	214	0.	2		0000	289	0.
1		0520	65	2043.	1		1135	140	179.	1		1750	215	0.	2		0005	290	0.

1	0525	66	2198.	*	1	1140	141	156.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	2281.	*	1	1145	142	135.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	2322.	*	1	1150	143	116.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	2348.	*	1	1155	144	100.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	2351.	*	1	1200	145	87.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	2337.	*	1	1205	146	77.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	2310.	*	1	1210	147	68.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	2276.	*	1	1215	148	61.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	2241.	*	1	1220	149	56.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	2209.	*	1	1225	150	51.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

****

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 2351.	5.75	1567.	433.	418.	418.
		(INCHES) .164	.181	.181	.181
		(AC-FT) 777.	860.	860.	860.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	COMPUTATION TIME STEP M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	5.00	500.00	400.53	445.00	.03	2.78

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.08	1.64	5.00		400.53	445.00	.03	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1547E+03 EXCESS= .0000E+00 OUTFLOW= .1548E+03 BASIN STORAGE= .1129E-01 PERCENT ERROR= .0

****

HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .26

****

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	303.	*	1		1230	151	35.	*	1		1845	226	1.
1		0005	2	0.	*	1		0620	77	292.	*	1		1235	152	33.	*	1		1850	227	1.
1		0010	3	0.	*	1		0625	78	283.	*	1		1240	153	32.	*	1		1855	228	1.
1		0015	4	0.	*	1		0630	79	275.	*	1		1245	154	31.	*	1		1900	229	1.
1		0020	5	0.	*	1		0635	80	267.	*	1		1250	155	29.	*	1		1905	230	1.
1		0025	6	0.	*	1		0640	81	257.	*	1		1255	156	28.	*	1		1910	231	1.
1		0030	7	0.	*	1		0645	82	248.	*	1		1300	157	27.	*	1		1915	232	1.
1		0035	8	0.	*	1		0650	83	244.	*	1		1305	158	25.	*	1		1920	233	1.
1		0040	9	0.	*	1		0655	84	260.	*	1		1310	159	24.	*	1		1925	234	1.
1		0045	10	0.	*	1		0700	85	309.	*	1		1315	160	23.	*	1		1930	235	1.
1		0050	11	0.	*	1		0705	86	362.	*	1		1320	161	22.	*	1		1935	236	1.
1		0055	12	0.	*	1		0710	87	368.	*	1		1325	162	21.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	358.	*	1		1330	163	20.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	382.	*	1		1335	164	18.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	401.	*	1		1340	165	18.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	391.	*	1		1345	166	17.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	394.	*	1		1350	167	16.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	398.	*	1		1355	168	15.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	385.	*	1		1400	169	14.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	382.	*	1		1405	170	13.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	377.	*	1		1410	171	13.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	364.	*	1		1415	172	12.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	358.	*	1		1420	173	11.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	348.	*	1		1425	174	11.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	336.	*	1		1430	175	10.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	328.	*	1		1435	176	10.	*	1		2050	251	0.
1		0210	27	0.	*	1		0825	102	316.	*	1		1440	177	9.	*	1		2055	252	0.
1		0215	28	0.	*	1		0830	103	306.	*	1		1445	178	9.	*	1		2100	253	0.
1		0220	29	0.	*	1		0835	104	296.	*	1		1450	179	8.	*	1		2105	254	0.
1		0225	30	0.	*	1		0840	105	285.	*	1		1455	180	8.	*	1		2110	255	0.

1	0230	31	0.	*	1	0845	106	276.	*	1	1500	181	7.	*	1	2115	256	0.
1	0235	32	0.	*	1	0850	107	265.	*	1	1505	182	7.	*	1	2120	257	0.
1	0240	33	0.	*	1	0855	108	255.	*	1	1510	183	7.	*	1	2125	258	0.
1	0245	34	0.	*	1	0900	109	245.	*	1	1515	184	6.	*	1	2130	259	0.
1	0250	35	0.	*	1	0905	110	235.	*	1	1520	185	6.	*	1	2135	260	0.
1	0255	36	0.	*	1	0910	111	225.	*	1	1525	186	6.	*	1	2140	261	0.
1	0300	37	0.	*	1	0915	112	214.	*	1	1530	187	6.	*	1	2145	262	0.
1	0305	38	0.	*	1	0920	113	202.	*	1	1535	188	5.	*	1	2150	263	0.
1	0310	39	0.	*	1	0925	114	189.	*	1	1540	189	5.	*	1	2155	264	0.
1	0315	40	0.	*	1	0930	115	175.	*	1	1545	190	5.	*	1	2200	265	0.
1	0320	41	0.	*	1	0935	116	161.	*	1	1550	191	5.	*	1	2205	266	0.
1	0325	42	0.	*	1	0940	117	151.	*	1	1555	192	4.	*	1	2210	267	0.
1	0330	43	0.	*	1	0945	118	143.	*	1	1600	193	4.	*	1	2215	268	0.
1	0335	44	0.	*	1	0950	119	135.	*	1	1605	194	4.	*	1	2220	269	0.
1	0340	45	2.	*	1	0955	120	127.	*	1	1610	195	4.	*	1	2225	270	0.
1	0345	46	5.	*	1	1000	121	120.	*	1	1615	196	4.	*	1	2230	271	0.
1	0350	47	12.	*	1	1005	122	114.	*	1	1620	197	4.	*	1	2235	272	0.
1	0355	48	23.	*	1	1010	123	108.	*	1	1625	198	3.	*	1	2240	273	0.
1	0400	49	38.	*	1	1015	124	104.	*	1	1630	199	3.	*	1	2245	274	0.
1	0405	50	61.	*	1	1020	125	100.	*	1	1635	200	3.	*	1	2250	275	0.
1	0410	51	92.	*	1	1025	126	96.	*	1	1640	201	3.	*	1	2255	276	0.
1	0415	52	119.	*	1	1030	127	93.	*	1	1645	202	3.	*	1	2300	277	0.
1	0420	53	145.	*	1	1035	128	89.	*	1	1650	203	3.	*	1	2305	278	0.
1	0425	54	170.	*	1	1040	129	86.	*	1	1655	204	3.	*	1	2310	279	0.
1	0430	55	192.	*	1	1045	130	82.	*	1	1700	205	2.	*	1	2315	280	0.
1	0435	56	205.	*	1	1050	131	79.	*	1	1705	206	2.	*	1	2320	281	0.
1	0440	57	213.	*	1	1055	132	76.	*	1	1710	207	2.	*	1	2325	282	0.
1	0445	58	219.	*	1	1100	133	73.	*	1	1715	208	2.	*	1	2330	283	0.
1	0450	59	222.	*	1	1105	134	70.	*	1	1720	209	2.	*	1	2335	284	0.
1	0455	60	225.	*	1	1110	135	67.	*	1	1725	210	2.	*	1	2340	285	0.
1	0500	61	231.	*	1	1115	136	64.	*	1	1730	211	2.	*	1	2345	286	0.
1	0505	62	241.	*	1	1120	137	61.	*	1	1735	212	2.	*	1	2350	287	0.
1	0510	63	258.	*	1	1125	138	58.	*	1	1740	213	2.	*	1	2355	288	0.
1	0515	64	281.	*	1	1130	139	56.	*	1	1745	214	2.	*	2	0000	289	0.
1	0520	65	309.	*	1	1135	140	54.	*	1	1750	215	1.	*	2	0005	290	0.
1	0525	66	337.	*	1	1140	141	52.	*	1	1755	216	1.	*	2	0010	291	0.
1	0530	67	358.	*	1	1145	142	50.	*	1	1800	217	1.	*	2	0015	292	0.
1	0535	68	370.	*	1	1150	143	48.	*	1	1805	218	1.	*	2	0020	293	0.
1	0540	69	374.	*	1	1155	144	46.	*	1	1810	219	1.	*	2	0025	294	0.
1	0545	70	373.	*	1	1200	145	45.	*	1	1815	220	1.	*	2	0030	295	0.
1	0550	71	370.	*	1	1205	146	43.	*	1	1820	221	1.	*	2	0035	296	0.
1	0555	72	360.	*	1	1210	147	41.	*	1	1825	222	1.	*	2	0040	297	0.
1	0600	73	345.	*	1	1215	148	40.	*	1	1830	223	1.	*	2	0045	298	0.
1	0605	74	330.	*	1	1220	149	38.	*	1	1835	224	1.	*	2	0050	299	0.
1	0610	75	317.	*	1	1225	150	36.	*	1	1840	225	1.	*	2	0055	300	0.
				*					*					*					

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 401.	7.42		275.	78.	75.	75.
		(INCHES)	.029	.033	.033	.033
		(AC-FT)	136.	155.	155.	155.

CUMULATIVE AREA = 88.86 SQ MI

```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *               JUN   1998              *
 *             VERSION 4.1               *
 *                                       *
 *  RUN DATE   18MAR08  TIME  14:56:20   *
 *                                       *
 *****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (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
 *** FREE ***
 *** NOLIST ***
```


```
1*****************************************
 *                                       *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
 *               JUN   1998              *
 *             VERSION 4.1               *
 *                                       *
 *  RUN DATE   18MAR08  TIME  14:56:20   *
 *                                       *
 *****************************************
```

```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*          609 SECOND STREET            *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```


KLEINFELDER
FEBRUARY 2008
ALTERNATIVE E

DESIGN STORM = 100-YEAR 6-HOUR STORM
STORM DISTRIBUTION = SDN5

```
  10 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  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        300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2   0  ENDING DATE
                     NDTIME       0055  ENDING TIME
                      ICENT         19  CENTURY MARK

                   COMPUTATION INTERVAL      .08 HOURS
                        TOTAL TIME BASE    24.92 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           1  NUMBER OF PLANS

     JR       MULTI-RATIO OPTION
                  RATIOS OF PRECIPITATION
                1.00       .87       .74       .57       .44       .26


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


            **************
            *            *
1250 KK     *     ULWIN  *
            *            *
            **************

1254 KO          OUTPUT CONTROL VARIABLES
                      IPRNT           1  PRINT CONTROL
                      IPLOT           0  PLOT CONTROL
                      QSCAL           0.  HYDROGRAPH PLOT SCALE

1253 HC          HYDROGRAPH COMBINATION
                      ICOMP           4  NUMBER OF HYDROGRAPHS TO COMBINE

                                                  ***

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

                                                HYDROGRAPH AT STATION     ULWIN
                                                  SUM OF   4 HYDROGRAPHS
                                                  PLAN 1,    RATIO =  1.00

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

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	7801.	1		1230	151	3.	1		1845	226	0.
1		0005	2	0.	1		0620	77	7104.	1		1235	152	3.	1		1850	227	0.
1		0010	3	0.	1		0625	78	6480.	1		1240	153	3.	1		1855	228	0.
1		0015	4	0.	1		0630	79	5917.	1		1245	154	2.	1		1900	229	0.
1		0020	5	0.	1		0635	80	5417.	1		1250	155	2.	1		1905	230	0.
1		0025	6	1.	1		0640	81	4964.	1		1255	156	2.	1		1910	231	0.
1		0030	7	2.	1		0645	82	4554.	1		1300	157	1.	1		1915	232	0.
1		0035	8	3.	1		0650	83	4183.	1		1305	158	1.	1		1920	233	0.
1		0040	9	5.	1		0655	84	3838.	1		1310	159	1.	1		1925	234	0.
1		0045	10	8.	1		0700	85	3522.	1		1315	160	1.	1		1930	235	0.
1		0050	11	10.	1		0705	86	3229.	1		1320	161	1.	1		1935	236	0.
1		0055	12	13.	1		0710	87	2958.	1		1325	162	1.	1		1940	237	0.
1		0100	13	16.	1		0715	88	2706.	1		1330	163	1.	1		1945	238	0.
1		0105	14	19.	1		0720	89	2472.	1		1335	164	0.	1		1950	239	0.
1		0110	15	23.	1		0725	90	2257.	1		1340	165	0.	1		1955	240	0.
1		0115	16	27.	1		0730	91	2058.	1		1345	166	0.	1		2000	241	0.
1		0120	17	31.	1		0735	92	1876.	1		1350	167	0.	1		2005	242	0.
1		0125	18	37.	1		0740	93	1710.	1		1355	168	0.	1		2010	243	0.
1		0130	19	45.	1		0745	94	1558.	1		1400	169	0.	1		2015	244	0.
1		0135	20	55.	1		0750	95	1419.	1		1405	170	0.	1		2020	245	0.
1		0140	21	69.	1		0755	96	1293.	1		1410	171	0.	1		2025	246	0.
1		0145	22	87.	1		0800	97	1180.	1		1415	172	0.	1		2030	247	0.
1		0150	23	111.	1		0805	98	1077.	1		1420	173	0.	1		2035	248	0.
1		0155	24	141.	1		0810	99	981.	1		1425	174	0.	1		2040	249	0.
1		0200	25	177.	1		0815	100	891.	1		1430	175	0.	1		2045	250	0.
1		0205	26	219.	1		0820	101	809.	1		1435	176	0.	1		2050	251	0.
1		0210	27	267.	1		0825	102	733.	1		1440	177	0.	1		2055	252	0.
1		0215	28	320.	1		0830	103	663.	1		1445	178	0.	1		2100	253	0.
1		0220	29	375.	1		0835	104	600.	1		1450	179	0.	1		2105	254	0.
1		0225	30	432.	1		0840	105	544.	1		1455	180	0.	1		2110	255	0.
1		0230	31	491.	1		0845	106	493.	1		1500	181	0.	1		2115	256	0.
1		0235	32	557.	1		0850	107	447.	1		1505	182	0.	1		2120	257	0.
1		0240	33	632.	1		0855	108	406.	1		1510	183	0.	1		2125	258	0.
1		0245	34	720.	1		0900	109	369.	1		1515	184	0.	1		2130	259	0.
1		0250	35	820.	1		0905	110	335.	1		1520	185	0.	1		2135	260	0.

1	0255	36	931.	*	1	0910	111	305.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	1053.	*	1	0915	112	277.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	1185.	*	1	0920	113	252.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	1326.	*	1	0925	114	230.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	1475.	*	1	0930	115	209.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	1639.	*	1	0935	116	189.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	1836.	*	1	0940	117	171.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	2093.	*	1	0945	118	155.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	2447.	*	1	0950	119	140.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	2924.	*	1	0955	120	126.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	3540.	*	1	1000	121	114.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	4404.	*	1	1005	122	102.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	5788.	*	1	1010	123	92.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	7898.	*	1	1015	124	83.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	10616.	*	1	1020	125	74.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	13208.	*	1	1025	126	67.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	15089.	*	1	1030	127	60.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	16172.	*	1	1035	128	53.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	16720.	*	1	1040	129	48.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	16717.	*	1	1045	130	43.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	16373.	*	1	1050	131	38.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	15786.	*	1	1055	132	34.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	15050.	*	1	1100	133	30.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	14295.	*	1	1105	134	27.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	13601.	*	1	1110	135	24.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	13059.	*	1	1115	136	21.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	12705.	*	1	1120	137	19.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	12543.	*	1	1125	138	17.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	12520.	*	1	1130	139	15.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	12649.	*	1	1135	140	14.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	12842.	*	1	1140	141	12.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	13000.	*	1	1145	142	11.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	13012.	*	1	1150	143	10.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	12814.	*	1	1155	144	8.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	12374.	*	1	1200	145	7.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	11762.	*	1	1205	146	7.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	11016.	*	1	1210	147	6.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	10194.	*	1	1215	148	5.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	9371.	*	1	1220	149	4.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	8562.	*	1	1225	150	4.	*	1	1840	225	0.	*	2	0055	300	0.

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 16720.	4.42		6486.	1654.	1593.	1593.
		(INCHES)	1.025	1.045	1.045	1.045
		(AC-FT)	3216.	3280.	3280.	3280.

CUMULATIVE AREA = 58.84 SQ MI

HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .87

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	6553.	*	1		1230	151	5.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	5987.	*	1		1235	152	5.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	5468.	*	1		1240	153	4.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	4994.	*	1		1245	154	4.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	4574.	*	1		1250	155	3.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	4202.	*	1		1255	156	3.	*	1		1910	231	0.
1		0030	7	1.	*	1		0645	82	3862.	*	1		1300	157	2.	*	1		1915	232	0.
1		0035	8	2.	*	1		0650	83	3551.	*	1		1305	158	2.	*	1		1920	233	0.
1		0040	9	3.	*	1		0655	84	3266.	*	1		1310	159	2.	*	1		1925	234	0.
1		0045	10	4.	*	1		0700	85	3004.	*	1		1315	160	2.	*	1		1930	235	0.
1		0050	11	6.	*	1		0705	86	2761.	*	1		1320	161	1.	*	1		1935	236	0.
1		0055	12	7.	*	1		0710	87	2537.	*	1		1325	162	1.	*	1		1940	237	0.
1		0100	13	8.	*	1		0715	88	2331.	*	1		1330	163	1.	*	1		1945	238	0.
1		0105	14	9.	*	1		0720	89	2139.	*	1		1335	164	1.	*	1		1950	239	0.
1		0110	15	10.	*	1		0725	90	1961.	*	1		1340	165	1.	*	1		1955	240	0.
1		0115	16	11.	*	1		0730	91	1798.	*	1		1345	166	1.	*	1		2000	241	0.
1		0120	17	12.	*	1		0735	92	1647.	*	1		1350	167	1.	*	1		2005	242	0.

1	0125	18	14.	*	1	0740	93	1508.	*	1	1355	168	1.	*	1	2010	243	0.
1	0130	19	17.	*	1	0745	94	1382.	*	1	1400	169	0.	*	1	2015	244	0.
1	0135	20	20.	*	1	0750	95	1267.	*	1	1405	170	0.	*	1	2020	245	0.
1	0140	21	25.	*	1	0755	96	1162.	*	1	1410	171	0.	*	1	2025	246	0.
1	0145	22	32.	*	1	0800	97	1066.	*	1	1415	172	0.	*	1	2030	247	0.
1	0150	23	41.	*	1	0805	98	979.	*	1	1420	173	0.	*	1	2035	248	0.
1	0155	24	51.	*	1	0810	99	897.	*	1	1425	174	0.	*	1	2040	249	0.
1	0200	25	65.	*	1	0815	100	822.	*	1	1430	175	0.	*	1	2045	250	0.
1	0205	26	83.	*	1	0820	101	753.	*	1	1435	176	0.	*	1	2050	251	0.
1	0210	27	104.	*	1	0825	102	689.	*	1	1440	177	0.	*	1	2055	252	0.
1	0215	28	129.	*	1	0830	103	629.	*	1	1445	178	0.	*	1	2100	253	0.
1	0220	29	157.	*	1	0835	104	572.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	188.	*	1	0840	105	520.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	220.	*	1	0845	106	472.	*	1	1500	181	0.	*	1	2115	256	0.
1	0235	32	254.	*	1	0850	107	429.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	291.	*	1	0855	108	390.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	334.	*	1	0900	109	355.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	384.	*	1	0905	110	323.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	442.	*	1	0910	111	294.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	512.	*	1	0915	112	268.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	598.	*	1	0920	113	244.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	702.	*	1	0925	114	223.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	824.	*	1	0930	115	204.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	960.	*	1	0935	116	187.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	1116.	*	1	0940	117	171.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	1309.	*	1	0945	118	157.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	1564.	*	1	0950	119	143.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	1900.	*	1	0955	120	131.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	2307.	*	1	1000	121	120.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	2783.	*	1	1005	122	110.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	3397.	*	1	1010	123	101.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	4450.	*	1	1015	124	92.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	6352.	*	1	1020	125	84.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	8616.	*	1	1025	126	77.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	10466.	*	1	1030	127	70.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	11645.	*	1	1035	128	64.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	12205.	*	1	1040	129	58.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	12399.	*	1	1045	130	53.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	12298.	*	1	1050	131	48.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	12046.	*	1	1055	132	43.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	11685.	*	1	1100	133	39.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	11231.	*	1	1105	134	35.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	10731.	*	1	1110	135	31.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	10294.	*	1	1115	136	28.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	9968.	*	1	1120	137	25.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	9796.	*	1	1125	138	23.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	9769.	*	1	1130	139	20.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	9834.	*	1	1135	140	18.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	9987.	*	1	1140	141	16.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	10169.	*	1	1145	142	15.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	10271.	*	1	1150	143	13.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	10221.	*	1	1155	144	12.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	9970.	*	1	1200	145	11.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	9552.	*	1	1205	146	9.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	9033.	*	1	1210	147	8.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	8432.	*	1	1215	148	8.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	7794.	*	1	1220	149	7.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	7161.	*	1	1225	150	6.	*	1	1840	225	0.	*	2	0055	300	0.

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 12399.	4.50		4980.	1269.	1222.	1222.
		(INCHES)	.787	.802	.802	.802
		(AC-FT)	2469.	2517.	2517.	2517.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .74

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DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW

1	0000	1	0.	*	1	0615	76	5256.	*	1	1230	151	6.	*	1	1845	226	0.
1	0005	2	0.	*	1	0620	77	4829.	*	1	1235	152	5.	*	1	1850	227	0.
1	0010	3	0.	*	1	0625	78	4425.	*	1	1240	153	5.	*	1	1855	228	0.
1	0015	4	0.	*	1	0630	79	4053.	*	1	1245	154	4.	*	1	1900	229	0.
1	0020	5	0.	*	1	0635	80	3719.	*	1	1250	155	4.	*	1	1905	230	0.
1	0025	6	0.	*	1	0640	81	3418.	*	1	1255	156	3.	*	1	1910	231	0.
1	0030	7	0.	*	1	0645	82	3147.	*	1	1300	157	3.	*	1	1915	232	0.
1	0035	8	1.	*	1	0650	83	2899.	*	1	1305	158	3.	*	1	1920	233	0.
1	0040	9	1.	*	1	0655	84	2672.	*	1	1310	159	2.	*	1	1925	234	0.
1	0045	10	2.	*	1	0700	85	2464.	*	1	1315	160	2.	*	1	1930	235	0.
1	0050	11	3.	*	1	0705	86	2274.	*	1	1320	161	2.	*	1	1935	236	0.
1	0055	12	4.	*	1	0710	87	2099.	*	1	1325	162	2.	*	1	1940	237	0.
1	0100	13	4.	*	1	0715	88	1936.	*	1	1330	163	1.	*	1	1945	238	0.
1	0105	14	5.	*	1	0720	89	1785.	*	1	1335	164	1.	*	1	1950	239	0.
1	0110	15	5.	*	1	0725	90	1644.	*	1	1340	165	1.	*	1	1955	240	0.
1	0115	16	5.	*	1	0730	91	1514.	*	1	1345	166	1.	*	1	2000	241	0.
1	0120	17	5.	*	1	0735	92	1395.	*	1	1350	167	1.	*	1	2005	242	0.
1	0125	18	6.	*	1	0740	93	1285.	*	1	1355	168	1.	*	1	2010	243	0.
1	0130	19	6.	*	1	0745	94	1183.	*	1	1400	169	1.	*	1	2015	244	0.
1	0135	20	7.	*	1	0750	95	1088.	*	1	1405	170	1.	*	1	2020	245	0.
1	0140	21	9.	*	1	0755	96	1001.	*	1	1410	171	0.	*	1	2025	246	0.
1	0145	22	11.	*	1	0800	97	919.	*	1	1415	172	0.	*	1	2030	247	0.
1	0150	23	14.	*	1	0805	98	844.	*	1	1420	173	0.	*	1	2035	248	0.
1	0155	24	18.	*	1	0810	99	774.	*	1	1425	174	0.	*	1	2040	249	0.
1	0200	25	23.	*	1	0815	100	710.	*	1	1430	175	0.	*	1	2045	250	0.
1	0205	26	29.	*	1	0820	101	652.	*	1	1435	176	0.	*	1	2050	251	0.
1	0210	27	37.	*	1	0825	102	599.	*	1	1440	177	0.	*	1	2055	252	0.
1	0215	28	46.	*	1	0830	103	551.	*	1	1445	178	0.	*	1	2100	253	0.
1	0220	29	56.	*	1	0835	104	507.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	68.	*	1	0840	105	465.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	80.	*	1	0845	106	426.	*	1	1500	181	0.	*	1	2115	256	0.
1	0235	32	94.	*	1	0850	107	389.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	109.	*	1	0855	108	356.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	125.	*	1	0900	109	325.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	144.	*	1	0905	110	297.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	167.	*	1	0910	111	271.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	198.	*	1	0915	112	248.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	237.	*	1	0920	113	227.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	287.	*	1	0925	114	208.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	350.	*	1	0930	115	191.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	433.	*	1	0935	116	175.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	539.	*	1	0940	117	160.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	672.	*	1	0945	118	147.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	835.	*	1	0950	119	135.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	1049.	*	1	0955	120	124.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	1323.	*	1	1000	121	114.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	1642.	*	1	1005	122	105.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	1977.	*	1	1010	123	97.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	2341.	*	1	1015	124	89.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	2907.	*	1	1020	125	82.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	4176.	*	1	1025	126	75.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	6120.	*	1	1030	127	69.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	7540.	*	1	1035	128	63.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	8274.	*	1	1040	129	58.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	8595.	*	1	1045	130	52.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	8612.	*	1	1050	131	48.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	8464.	*	1	1055	132	43.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	8257.	*	1	1100	133	39.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	8041.	*	1	1105	134	36.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	7823.	*	1	1110	135	32.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	7599.	*	1	1115	136	29.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	7373.	*	1	1120	137	26.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	7193.	*	1	1125	138	24.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	7115.	*	1	1130	139	21.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	7141.	*	1	1135	140	19.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	7244.	*	1	1140	141	17.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	7395.	*	1	1145	142	16.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	7542.	*	1	1150	143	14.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	7606.	*	1	1155	144	13.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	7533.	*	1	1200	145	12.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	7317.	*	1	1205	146	10.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	6991.	*	1	1210	147	9.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	6597.	*	1	1215	148	8.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	6161.	*	1	1220	149	8.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	5705.	*	1	1225	150	7.	*	1	1840	225	0.	*	2	0055	300	0.

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR

+	(CFS)	(HR)				
			(CFS)			
+	8612.	4.58	3593.	914.	881.	881.
			(INCHES) .568	.578	.578	.578
			(AC-FT) 1781.	1814.	1814.	1814.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .57

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	3442.	1		1230	151	10.	1		1845	226	0.
1		0005	2	0.	1		0620	77	3216.	1		1235	152	9.	1		1850	227	0.
1		0010	3	0.	1		0625	78	2994.	1		1240	153	8.	1		1855	228	0.
1		0015	4	0.	1		0630	79	2779.	1		1245	154	8.	1		1900	229	0.
1		0020	5	0.	1		0635	80	2571.	1		1250	155	7.	1		1905	230	0.
1		0025	6	0.	1		0640	81	2373.	1		1255	156	6.	1		1910	231	0.
1		0030	7	0.	1		0645	82	2189.	1		1300	157	6.	1		1915	232	0.
1		0035	8	0.	1		0650	83	2020.	1		1305	158	5.	1		1920	233	0.
1		0040	9	0.	1		0655	84	1868.	1		1310	159	5.	1		1925	234	0.
1		0045	10	0.	1		0700	85	1729.	1		1315	160	4.	1		1930	235	0.
1		0050	11	1.	1		0705	86	1603.	1		1320	161	4.	1		1935	236	0.
1		0055	12	1.	1		0710	87	1487.	1		1325	162	4.	1		1940	237	0.
1		0100	13	1.	1		0715	88	1380.	1		1330	163	3.	1		1945	238	0.
1		0105	14	1.	1		0720	89	1280.	1		1335	164	3.	1		1950	239	0.
1		0110	15	1.	1		0725	90	1187.	1		1340	165	3.	1		1955	240	0.
1		0115	16	2.	1		0730	91	1101.	1		1345	166	2.	1		2000	241	0.
1		0120	17	2.	1		0735	92	1021.	1		1350	167	2.	1		2005	242	0.
1		0125	18	2.	1		0740	93	946.	1		1355	168	2.	1		2010	243	0.
1		0130	19	2.	1		0745	94	878.	1		1400	169	2.	1		2015	244	0.
1		0135	20	3.	1		0750	95	815.	1		1405	170	2.	1		2020	245	0.
1		0140	21	3.	1		0755	96	757.	1		1410	171	1.	1		2025	246	0.
1		0145	22	4.	1		0800	97	702.	1		1415	172	1.	1		2030	247	0.
1		0150	23	4.	1		0805	98	652.	1		1420	173	1.	1		2035	248	0.
1		0155	24	5.	1		0810	99	605.	1		1425	174	1.	1		2040	249	0.
1		0200	25	6.	1		0815	100	561.	1		1430	175	1.	1		2045	250	0.
1		0205	26	7.	1		0820	101	521.	1		1435	176	1.	1		2050	251	0.
1		0210	27	8.	1		0825	102	484.	1		1440	177	1.	1		2055	252	0.
1		0215	28	9.	1		0830	103	448.	1		1445	178	1.	1		2100	253	0.
1		0220	29	11.	1		0835	104	415.	1		1450	179	1.	1		2105	254	0.
1		0225	30	13.	1		0840	105	385.	1		1455	180	0.	1		2110	255	0.
1		0230	31	15.	1		0845	106	357.	1		1500	181	0.	1		2115	256	0.
1		0235	32	18.	1		0850	107	331.	1		1505	182	0.	1		2120	257	0.
1		0240	33	20.	1		0855	108	307.	1		1510	183	0.	1		2125	258	0.
1		0245	34	23.	1		0900	109	284.	1		1515	184	0.	1		2130	259	0.
1		0250	35	26.	1		0905	110	263.	1		1520	185	0.	1		2135	260	0.
1		0255	36	29.	1		0910	111	244.	1		1525	186	0.	1		2140	261	0.
1		0300	37	34.	1		0915	112	225.	1		1530	187	0.	1		2145	262	0.
1		0305	38	41.	1		0920	113	208.	1		1535	188	0.	1		2150	263	0.
1		0310	39	52.	1		0925	114	191.	1		1540	189	0.	1		2155	264	0.
1		0315	40	68.	1		0930	115	176.	1		1545	190	0.	1		2200	265	0.
1		0320	41	90.	1		0935	116	163.	1		1550	191	0.	1		2205	266	0.
1		0325	42	122.	1		0940	117	150.	1		1555	192	0.	1		2210	267	0.
1		0330	43	169.	1		0945	118	138.	1		1600	193	0.	1		2215	268	0.
1		0335	44	232.	1		0950	119	128.	1		1605	194	0.	1		2220	269	0.
1		0340	45	313.	1		0955	120	118.	1		1610	195	0.	1		2225	270	0.
1		0345	46	405.	1		1000	121	109.	1		1615	196	0.	1		2230	271	0.
1		0350	47	506.	1		1005	122	101.	1		1620	197	0.	1		2235	272	0.
1		0355	48	670.	1		1010	123	93.	1		1625	198	0.	1		2240	273	0.
1		0400	49	877.	1		1015	124	86.	1		1630	199	0.	1		2245	274	0.
1		0405	50	1064.	1		1020	125	80.	1		1635	200	0.	1		2250	275	0.
1		0410	51	1199.	1		1025	126	74.	1		1640	201	0.	1		2255	276	0.
1		0415	52	1320.	1		1030	127	69.	1		1645	202	0.	1		2300	277	0.
1		0420	53	1699.	1		1035	128	64.	1		1650	203	0.	1		2305	278	0.
1		0425	54	2819.	1		1040	129	60.	1		1655	204	0.	1		2310	279	0.
1		0430	55	4056.	1		1045	130	56.	1		1700	205	0.	1		2315	280	0.
1		0435	56	4526.	1		1050	131	52.	1		1705	206	0.	1		2320	281	0.
1		0440	57	4609.	1		1055	132	49.	1		1710	207	0.	1		2325	282	0.
1		0445	58	4614.	1		1100	133	45.	1		1715	208	0.	1		2330	283	0.
1		0450	59	4500.	1		1105	134	42.	1		1720	209	0.	1		2335	284	0.
1		0455	60	4362.	1		1110	135	39.	1		1725	210	0.	1		2340	285	0.
1		0500	61	4228.	1		1115	136	37.	1		1730	211	0.	1		2345	286	0.
1		0505	62	4112.	1		1120	137	34.	1		1735	212	0.	1		2350	287	0.

1	0510	63	4030.	*	1	1125	138	32.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	3988.	*	1	1130	139	29.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	3990.	*	1	1135	140	27.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	4021.	*	1	1140	141	25.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	4070.	*	1	1145	142	23.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	4140.	*	1	1150	143	21.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	4229.	*	1	1155	144	19.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	4306.	*	1	1200	145	17.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	4324.	*	1	1205	146	16.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	4251.	*	1	1210	147	14.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	4096.	*	1	1215	148	13.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	3893.	*	1	1220	149	12.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	3670.	*	1	1225	150	11.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 4614.	4.75		2002.	511.	492.	492.
		(INCHES)	.316	.323	.323	.323
		(AC-FT)	992.	1013.	1013.	1013.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .44

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	1973.	*	1		1230	151	13.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	1872.	*	1		1235	152	12.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	1757.	*	1		1240	153	12.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	1638.	*	1		1245	154	11.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	1542.	*	1		1250	155	10.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	1465.	*	1		1255	156	9.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	1379.	*	1		1300	157	8.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	1290.	*	1		1305	158	8.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	1211.	*	1		1310	159	7.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	1134.	*	1		1315	160	7.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	1050.	*	1		1320	161	6.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	973.	*	1		1325	162	6.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	909.	*	1		1330	163	5.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	846.	*	1		1335	164	5.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	788.	*	1		1340	165	5.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	739.	*	1		1345	166	4.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	691.	*	1		1350	167	4.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	645.	*	1		1355	168	4.	*	1		2010	243	0.
1		0130	19	1.	*	1		0745	94	606.	*	1		1400	169	3.	*	1		2015	244	0.
1		0135	20	1.	*	1		0750	95	567.	*	1		1405	170	3.	*	1		2020	245	0.
1		0140	21	1.	*	1		0755	96	529.	*	1		1410	171	3.	*	1		2025	246	0.
1		0145	22	1.	*	1		0800	97	497.	*	1		1415	172	3.	*	1		2030	247	0.
1		0150	23	2.	*	1		0805	98	464.	*	1		1420	173	2.	*	1		2035	248	0.
1		0155	24	2.	*	1		0810	99	435.	*	1		1425	174	2.	*	1		2040	249	0.
1		0200	25	2.	*	1		0815	100	408.	*	1		1430	175	2.	*	1		2045	250	0.
1		0205	26	3.	*	1		0820	101	381.	*	1		1435	176	2.	*	1		2050	251	0.
1		0210	27	3.	*	1		0825	102	358.	*	1		1440	177	2.	*	1		2055	252	0.
1		0215	28	3.	*	1		0830	103	336.	*	1		1445	178	2.	*	1		2100	253	0.
1		0220	29	4.	*	1		0835	104	315.	*	1		1450	179	2.	*	1		2105	254	0.
1		0225	30	4.	*	1		0840	105	295.	*	1		1455	180	1.	*	1		2110	255	0.
1		0230	31	4.	*	1		0845	106	277.	*	1		1500	181	1.	*	1		2115	256	0.
1		0235	32	4.	*	1		0850	107	259.	*	1		1505	182	1.	*	1		2120	257	0.
1		0240	33	4.	*	1		0855	108	244.	*	1		1510	183	1.	*	1		2125	258	0.
1		0245	34	4.	*	1		0900	109	229.	*	1		1515	184	1.	*	1		2130	259	0.
1		0250	35	4.	*	1		0905	110	215.	*	1		1520	185	1.	*	1		2135	260	0.
1		0255	36	5.	*	1		0910	111	203.	*	1		1525	186	1.	*	1		2140	261	0.
1		0300	37	5.	*	1		0915	112	190.	*	1		1530	187	1.	*	1		2145	262	0.
1		0305	38	7.	*	1		0920	113	177.	*	1		1535	188	1.	*	1		2150	263	0.
1		0310	39	9.	*	1		0925	114	166.	*	1		1540	189	1.	*	1		2155	264	0.
1		0315	40	13.	*	1		0930	115	155.	*	1		1545	190	1.	*	1		2200	265	0.
1		0320	41	19.	*	1		0935	116	145.	*	1		1550	191	1.	*	1		2205	266	0.
1		0325	42	28.	*	1		0940	117	135.	*	1		1555	192	1.	*	1		2210	267	0.
1		0330	43	45.	*	1		0945	118	126.	*	1		1600	193	0.	*	1		2215	268	0.
1		0335	44	70.	*	1		0950	119	118.	*	1		1605	194	0.	*	1		2220	269	0.

1	0340	45	103.	*	1	0955	120	110.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	142.	*	1	1000	121	102.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	183.	*	1	1005	122	96.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	223.	*	1	1010	123	89.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	261.	*	1	1015	124	83.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	300.	*	1	1020	125	77.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	400.	*	1	1025	126	72.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	499.	*	1	1030	127	67.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	537.	*	1	1035	128	63.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	561.	*	1	1040	129	58.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	564.	*	1	1045	130	55.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	562.	*	1	1050	131	51.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	683.	*	1	1055	132	48.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	1983.	*	1	1100	133	44.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	2809.	*	1	1105	134	42.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	1949.	*	1	1110	135	39.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	2373.	*	1	1115	136	36.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	2370.	*	1	1120	137	34.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	2112.	*	1	1125	138	32.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	2252.	*	1	1130	139	30.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	2081.	*	1	1135	140	28.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	2116.	*	1	1140	141	26.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	2065.	*	1	1145	142	25.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	2036.	*	1	1150	143	23.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	2068.	*	1	1155	144	22.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	2117.	*	1	1200	145	20.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	2198.	*	1	1205	146	19.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	2258.	*	1	1210	147	18.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	2271.	*	1	1215	148	17.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	2188.	*	1	1220	149	16.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	2074.	*	1	1225	150	14.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 2809.	4.83		1024.	264.	254.	254.
		(INCHES)	.162	.167	.167	.167
		(AC-FT)	508.	523.	523.	523.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .26

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
					*						*						*					
1		0000	1	0.	*	1		0615	76	364.	*	1		1230	151	8.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	385.	*	1		1235	152	8.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	499.	*	1		1240	153	7.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	406.	*	1		1245	154	7.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	494.	*	1		1250	155	6.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	464.	*	1		1255	156	6.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	404.	*	1		1300	157	6.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	436.	*	1		1305	158	5.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	378.	*	1		1310	159	5.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	367.	*	1		1315	160	5.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	350.	*	1		1320	161	5.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	317.	*	1		1325	162	4.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	319.	*	1		1330	163	4.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	288.	*	1		1335	164	4.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	269.	*	1		1340	165	4.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	260.	*	1		1345	166	4.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	238.	*	1		1350	167	4.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	229.	*	1		1355	168	3.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	215.	*	1		1400	169	3.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	202.	*	1		1405	170	3.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	196.	*	1		1410	171	3.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	184.	*	1		1415	172	3.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	173.	*	1		1420	173	3.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	161.	*	1		1425	174	3.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	150.	*	1		1430	175	2.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	138.	*	1		1435	176	2.	*	1		2050	251	0.

1	0210	27	0.	*	1	0825	102	129.	*	1	1440	177	2.	*	1	2055	252	0.
1	0215	28	0.	*	1	0830	103	124.	*	1	1445	178	2.	*	1	2100	253	0.
1	0220	29	0.	*	1	0835	104	119.	*	1	1450	179	2.	*	1	2105	254	0.
1	0225	30	0.	*	1	0840	105	114.	*	1	1455	180	2.	*	1	2110	255	0.
1	0230	31	0.	*	1	0845	106	109.	*	1	1500	181	2.	*	1	2115	256	0.
1	0235	32	0.	*	1	0850	107	102.	*	1	1505	182	2.	*	1	2120	257	0.
1	0240	33	0.	*	1	0855	108	93.	*	1	1510	183	2.	*	1	2125	258	0.
1	0245	34	0.	*	1	0900	109	86.	*	1	1515	184	1.	*	1	2130	259	0.
1	0250	35	0.	*	1	0905	110	84.	*	1	1520	185	1.	*	1	2135	260	0.
1	0255	36	0.	*	1	0910	111	83.	*	1	1525	186	1.	*	1	2140	261	0.
1	0300	37	1.	*	1	0915	112	82.	*	1	1530	187	1.	*	1	2145	262	0.
1	0305	38	1.	*	1	0920	113	78.	*	1	1535	188	1.	*	1	2150	263	0.
1	0310	39	1.	*	1	0925	114	73.	*	1	1540	189	1.	*	1	2155	264	0.
1	0315	40	2.	*	1	0930	115	69.	*	1	1545	190	1.	*	1	2200	265	0.
1	0320	41	3.	*	1	0935	116	65.	*	1	1550	191	1.	*	1	2205	266	0.
1	0325	42	4.	*	1	0940	117	63.	*	1	1555	192	1.	*	1	2210	267	0.
1	0330	43	5.	*	1	0945	118	59.	*	1	1600	193	1.	*	1	2215	268	0.
1	0335	44	7.	*	1	0950	119	55.	*	1	1605	194	1.	*	1	2220	269	0.
1	0340	45	10.	*	1	0955	120	51.	*	1	1610	195	1.	*	1	2225	270	0.
1	0345	46	12.	*	1	1000	121	48.	*	1	1615	196	1.	*	1	2230	271	0.
1	0350	47	15.	*	1	1005	122	46.	*	1	1620	197	1.	*	1	2235	272	0.
1	0355	48	18.	*	1	1010	123	45.	*	1	1625	198	1.	*	1	2240	273	0.
1	0400	49	22.	*	1	1015	124	43.	*	1	1630	199	1.	*	1	2245	274	0.
1	0405	50	30.	*	1	1020	125	41.	*	1	1635	200	1.	*	1	2250	275	0.
1	0410	51	37.	*	1	1025	126	38.	*	1	1640	201	1.	*	1	2255	276	0.
1	0415	52	44.	*	1	1030	127	36.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	49.	*	1	1035	128	34.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	52.	*	1	1040	129	33.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	55.	*	1	1045	130	31.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	57.	*	1	1050	131	28.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	59.	*	1	1055	132	27.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	61.	*	1	1100	133	25.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	69.	*	1	1105	134	24.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	90.	*	1	1110	135	22.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	87.	*	1	1115	136	21.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	89.	*	1	1120	137	19.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	96.	*	1	1125	138	18.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	95.	*	1	1130	139	17.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	99.	*	1	1135	140	16.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	101.	*	1	1140	141	15.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	103.	*	1	1145	142	14.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	107.	*	1	1150	143	13.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	111.	*	1	1155	144	12.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	114.	*	1	1200	145	11.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	244.	*	1	1205	146	11.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	538.	*	1	1210	147	10.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	368.	*	1	1215	148	10.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	257.	*	1	1220	149	9.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	494.	*	1	1225	150	8.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*					

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 538.	5.92		182.	49.	47.	47.
		(INCHES)	.029	.031	.031	.031
		(AC-FT)	90.	96.	96.	96.

CUMULATIVE AREA = 58.84 SQ MI

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          **************
          *            *
1305 KK   *   FINISH     *
          *            *
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1307 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

1306 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1500.	CHANNEL LENGTH
S	.0090	SLOPE
N	.050	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	250.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

***

COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	2.52	750.00	10469.42	380.98	1.11	9.91

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.08	1.64	5.00		10457.09	380.00	1.11	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5277E+04 EXCESS= .0000E+00 OUTFLOW= .5277E+04 BASIN STORAGE= .1001E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = 1.00

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	10332.	1		1230	151	2680.	1		1845	226	174.
1		0005	2	0.	1		0620	77	10457.	1		1235	152	2656.	1		1850	227	137.
1		0010	3	0.	1		0625	78	10447.	1		1240	153	2632.	1		1855	228	105.
1		0015	4	0.	1		0630	79	10328.	1		1245	154	2608.	1		1900	229	79.
1		0020	5	0.	1		0635	80	10127.	1		1250	155	2584.	1		1905	230	59.
1		0025	6	0.	1		0640	81	9863.	1		1255	156	2560.	1		1910	231	44.
1		0030	7	0.	1		0645	82	9553.	1		1300	157	2536.	1		1915	232	33.
1		0035	8	1.	1		0650	83	9210.	1		1305	158	2513.	1		1920	233	25.
1		0040	9	3.	1		0655	84	8846.	1		1310	159	2489.	1		1925	234	18.
1		0045	10	6.	1		0700	85	8468.	1		1315	160	2464.	1		1930	235	14.
1		0050	11	11.	1		0705	86	8081.	1		1320	161	2438.	1		1935	236	10.
1		0055	12	19.	1		0710	87	7692.	1		1325	162	2412.	1		1940	237	8.
1		0100	13	30.	1		0715	88	7305.	1		1330	163	2387.	1		1945	238	6.
1		0105	14	43.	1		0720	89	6923.	1		1335	164	2361.	1		1950	239	4.
1		0110	15	60.	1		0725	90	6548.	1		1340	165	2336.	1		1955	240	3.
1		0115	16	78.	1		0730	91	6180.	1		1345	166	2311.	1		2000	241	2.
1		0120	17	97.	1		0735	92	5822.	1		1350	167	2284.	1		2005	242	2.
1		0125	18	118.	1		0740	93	5474.	1		1355	168	2256.	1		2010	243	1.
1		0130	19	139.	1		0745	94	5148.	1		1400	169	2228.	1		2015	244	1.
1		0135	20	163.	1		0750	95	4871.	1		1405	170	2200.	1		2020	245	1.
1		0140	21	190.	1		0755	96	4675.	1		1410	171	2172.	1		2025	246	1.
1		0145	22	222.	1		0800	97	4553.	1		1415	172	2145.	1		2030	247	0.
1		0150	23	259.	1		0805	98	4463.	1		1420	173	2117.	1		2035	248	0.
1		0155	24	303.	1		0810	99	4380.	1		1425	174	2088.	1		2040	249	0.
1		0200	25	355.	1		0815	100	4303.	1		1430	175	2056.	1		2045	250	0.
1		0205	26	414.	1		0820	101	4230.	1		1435	176	2025.	1		2050	251	0.
1		0210	27	482.	1		0825	102	4161.	1		1440	177	1994.	1		2055	252	0.
1		0215	28	557.	1		0830	103	4096.	1		1445	178	1963.	1		2100	253	0.
1		0220	29	637.	1		0835	104	4035.	1		1450	179	1932.	1		2105	254	0.
1		0225	30	724.	1		0840	105	3977.	1		1455	180	1900.	1		2110	255	0.
1		0230	31	815.	1		0845	106	3922.	1		1500	181	1866.	1		2115	256	0.
1		0235	32	900.	1		0850	107	3871.	1		1505	182	1831.	1		2120	257	0.
1		0240	33	972.	1		0855	108	3821.	1		1510	183	1795.	1		2125	258	0.
1		0245	34	1029.	1		0900	109	3775.	1		1515	184	1761.	1		2130	259	0.
1		0250	35	1079.	1		0905	110	3731.	1		1520	185	1727.	1		2135	260	0.
1		0255	36	1131.	1		0910	111	3690.	1		1525	186	1692.	1		2140	261	0.
1		0300	37	1196.	1		0915	112	3651.	1		1530	187	1656.	1		2145	262	0.
1		0305	38	1285.	1		0920	113	3614.	1		1535	188	1618.	1		2150	263	0.
1		0310	39	1411.	1		0925	114	3580.	1		1540	189	1581.	1		2155	264	0.
1		0315	40	1584.	1		0930	115	3546.	1		1545	190	1545.	1		2200	265	0.
1		0320	41	1817.	1		0935	116	3513.	1		1550	191	1509.	1		2205	266	0.
1		0325	42	2133.	1		0940	117	3481.	1		1555	192	1473.	1		2210	267	0.
1		0330	43	2561.	1		0945	118	3450.	1		1600	193	1435.	1		2215	268	0.

1	0335	44	3124.	*	1	0950	119	3420.	*	1	1605	194	1397.	*	1	2220	269	0.
1	0340	45	3801.	*	1	0955	120	3392.	*	1	1610	195	1358.	*	1	2225	270	0.
1	0345	46	4553.	*	1	1000	121	3364.	*	1	1615	196	1321.	*	1	2230	271	0.
1	0350	47	5360.	*	1	1005	122	3338.	*	1	1620	197	1284.	*	1	2235	272	0.
1	0355	48	6184.	*	1	1010	123	3312.	*	1	1625	198	1247.	*	1	2240	273	0.
1	0400	49	6952.	*	1	1015	124	3287.	*	1	1630	199	1209.	*	1	2245	274	0.
1	0405	50	7609.	*	1	1020	125	3263.	*	1	1635	200	1169.	*	1	2250	275	0.
1	0410	51	8148.	*	1	1025	126	3238.	*	1	1640	201	1130.	*	1	2255	276	0.
1	0415	52	8589.	*	1	1030	127	3214.	*	1	1645	202	1092.	*	1	2300	277	0.
1	0420	53	8935.	*	1	1035	128	3189.	*	1	1650	203	1054.	*	1	2305	278	0.
1	0425	54	9172.	*	1	1040	129	3166.	*	1	1655	204	1018.	*	1	2310	279	0.
1	0430	55	9300.	*	1	1045	130	3143.	*	1	1700	205	980.	*	1	2315	280	0.
1	0435	56	9351.	*	1	1050	131	3120.	*	1	1705	206	941.	*	1	2320	281	0.
1	0440	57	9361.	*	1	1055	132	3098.	*	1	1710	207	901.	*	1	2325	282	0.
1	0445	58	9355.	*	1	1100	133	3077.	*	1	1715	208	862.	*	1	2330	283	0.
1	0450	59	9376.	*	1	1105	134	3056.	*	1	1720	209	825.	*	1	2335	284	0.
1	0455	60	9464.	*	1	1110	135	3034.	*	1	1725	210	790.	*	1	2340	285	0.
1	0500	61	9614.	*	1	1115	136	3012.	*	1	1730	211	755.	*	1	2345	286	0.
1	0505	62	9791.	*	1	1120	137	2989.	*	1	1735	212	717.	*	1	2350	287	0.
1	0510	63	9969.	*	1	1125	138	2967.	*	1	1740	213	677.	*	1	2355	288	0.
1	0515	64	10125.	*	1	1130	139	2945.	*	1	1745	214	637.	*	2	0000	289	0.
1	0520	65	10228.	*	1	1135	140	2924.	*	1	1750	215	598.	*	2	0005	290	0.
1	0525	66	10256.	*	1	1140	141	2902.	*	1	1755	216	560.	*	2	0010	291	0.
1	0530	67	10211.	*	1	1145	142	2881.	*	1	1800	217	525.	*	2	0015	292	0.
1	0535	68	10100.	*	1	1150	143	2860.	*	1	1805	218	489.	*	2	0020	293	0.
1	0540	69	9933.	*	1	1155	144	2837.	*	1	1810	219	448.	*	2	0025	294	0.
1	0545	70	9719.	*	1	1200	145	2814.	*	1	1815	220	400.	*	2	0030	295	0.
1	0550	71	9479.	*	1	1205	146	2791.	*	1	1820	221	354.	*	2	0035	296	0.
1	0555	72	9282.	*	1	1210	147	2769.	*	1	1825	222	313.	*	2	0040	297	0.
1	0600	73	9291.	*	1	1215	148	2746.	*	1	1830	223	277.	*	2	0045	298	0.
1	0605	74	9603.	*	1	1220	149	2724.	*	1	1835	224	244.	*	2	0050	299	0.
1	0610	75	10033.	*	1	1225	150	2702.	*	1	1840	225	210.	*	2	0055	300	0.

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 10457.	6.33	7198.	2660.	2563.	2563.
		(INCHES) .753	1.113	1.113	1.113
		(AC-FT) 3569.	5277.	5277.	5277.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	2.74	750.00	8495.68	325.77	.86	9.13
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		8491.82	325.00	.86	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4077E+04 EXCESS= .0000E+00 OUTFLOW= .4077E+04 BASIN STORAGE= .1037E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .87

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	6922.	*	1		1230	151	2309.	*	1		1845	226	3.
1		0005	2	0.	*	1		0620	77	6739.	*	1		1235	152	2280.	*	1		1850	227	2.
1		0010	3	0.	*	1		0625	78	6561.	*	1		1240	153	2251.	*	1		1855	228	2.
1		0015	4	0.	*	1		0630	79	6387.	*	1		1245	154	2222.	*	1		1900	229	1.
1		0020	5	0.	*	1		0635	80	6218.	*	1		1250	155	2194.	*	1		1905	230	1.
1		0025	6	0.	*	1		0640	81	6052.	*	1		1255	156	2166.	*	1		1910	231	1.
1		0030	7	0.	*	1		0645	82	5890.	*	1		1300	157	2137.	*	1		1915	232	1.
1		0035	8	0.	*	1		0650	83	5734.	*	1		1305	158	2108.	*	1		1920	233	0.

1	0040	9	0.	*	1	0655	84	5585.	*	1	1310	159	2077.	*	1	1925	234	0.
1	0045	10	1.	*	1	0700	85	5442.	*	1	1315	160	2044.	*	1	1930	235	0.
1	0050	11	2.	*	1	0705	86	5304.	*	1	1320	161	2012.	*	1	1935	236	0.
1	0055	12	4.	*	1	0710	87	5173.	*	1	1325	162	1981.	*	1	1940	237	0.
1	0100	13	7.	*	1	0715	88	5049.	*	1	1330	163	1950.	*	1	1945	238	0.
1	0105	14	12.	*	1	0720	89	4930.	*	1	1335	164	1918.	*	1	1950	239	0.
1	0110	15	17.	*	1	0725	90	4818.	*	1	1340	165	1884.	*	1	1955	240	0.
1	0115	16	24.	*	1	0730	91	4709.	*	1	1345	166	1849.	*	1	2000	241	0.
1	0120	17	33.	*	1	0735	92	4604.	*	1	1350	167	1813.	*	1	2005	242	0.
1	0125	18	42.	*	1	0740	93	4502.	*	1	1355	168	1778.	*	1	2010	243	0.
1	0130	19	54.	*	1	0745	94	4405.	*	1	1400	169	1743.	*	1	2015	244	0.
1	0135	20	67.	*	1	0750	95	4313.	*	1	1405	170	1708.	*	1	2020	245	0.
1	0140	21	83.	*	1	0755	96	4226.	*	1	1410	171	1672.	*	1	2025	246	0.
1	0145	22	102.	*	1	0800	97	4145.	*	1	1415	172	1635.	*	1	2030	247	0.
1	0150	23	125.	*	1	0805	98	4070.	*	1	1420	173	1597.	*	1	2035	248	0.
1	0155	24	153.	*	1	0810	99	3999.	*	1	1425	174	1560.	*	1	2040	249	0.
1	0200	25	185.	*	1	0815	100	3934.	*	1	1430	175	1524.	*	1	2045	250	0.
1	0205	26	223.	*	1	0820	101	3872.	*	1	1435	176	1488.	*	1	2050	251	0.
1	0210	27	266.	*	1	0825	102	3814.	*	1	1440	177	1451.	*	1	2055	252	0.
1	0215	28	312.	*	1	0830	103	3758.	*	1	1445	178	1413.	*	1	2100	253	0.
1	0220	29	362.	*	1	0835	104	3706.	*	1	1450	179	1374.	*	1	2105	254	0.
1	0225	30	414.	*	1	0840	105	3657.	*	1	1455	180	1337.	*	1	2110	255	0.
1	0230	31	466.	*	1	0845	106	3609.	*	1	1500	181	1300.	*	1	2115	256	0.
1	0235	32	517.	*	1	0850	107	3564.	*	1	1505	182	1263.	*	1	2120	257	0.
1	0240	33	564.	*	1	0855	108	3521.	*	1	1510	183	1225.	*	1	2125	258	0.
1	0245	34	608.	*	1	0900	109	3479.	*	1	1515	184	1186.	*	1	2130	259	0.
1	0250	35	649.	*	1	0905	110	3438.	*	1	1520	185	1146.	*	1	2135	260	0.
1	0255	36	691.	*	1	0910	111	3399.	*	1	1525	186	1107.	*	1	2140	261	0.
1	0300	37	739.	*	1	0915	112	3362.	*	1	1530	187	1070.	*	1	2145	262	0.
1	0305	38	798.	*	1	0920	113	3327.	*	1	1535	188	1033.	*	1	2150	263	0.
1	0310	39	873.	*	1	0925	114	3293.	*	1	1540	189	996.	*	1	2155	264	0.
1	0315	40	980.	*	1	0930	115	3261.	*	1	1545	190	957.	*	1	2200	265	0.
1	0320	41	1135.	*	1	0935	116	3230.	*	1	1550	191	917.	*	1	2205	266	0.
1	0325	42	1362.	*	1	0940	117	3200.	*	1	1555	192	878.	*	1	2210	267	0.
1	0330	43	1693.	*	1	0945	118	3170.	*	1	1600	193	841.	*	1	2215	268	0.
1	0335	44	2140.	*	1	0950	119	3141.	*	1	1605	194	805.	*	1	2220	269	0.
1	0340	45	2685.	*	1	0955	120	3111.	*	1	1610	195	769.	*	1	2225	270	0.
1	0345	46	3290.	*	1	1000	121	3082.	*	1	1615	196	733.	*	1	2230	271	0.
1	0350	47	3939.	*	1	1005	122	3054.	*	1	1620	197	694.	*	1	2235	272	0.
1	0355	48	4614.	*	1	1010	123	3027.	*	1	1625	198	655.	*	1	2240	273	0.
1	0400	49	5249.	*	1	1015	124	3000.	*	1	1630	199	616.	*	1	2245	274	0.
1	0405	50	5789.	*	1	1020	125	2974.	*	1	1635	200	580.	*	1	2250	275	0.
1	0410	51	6232.	*	1	1025	126	2949.	*	1	1640	201	546.	*	1	2255	276	0.
1	0415	52	6597.	*	1	1030	127	2924.	*	1	1645	202	512.	*	1	2300	277	0.
1	0420	53	6899.	*	1	1035	128	2898.	*	1	1650	203	477.	*	1	2305	278	0.
1	0425	54	7132.	*	1	1040	129	2872.	*	1	1655	204	437.	*	1	2310	279	0.
1	0430	55	7297.	*	1	1045	130	2846.	*	1	1700	205	394.	*	1	2315	280	0.
1	0435	56	7405.	*	1	1050	131	2820.	*	1	1705	206	352.	*	1	2320	281	0.
1	0440	57	7473.	*	1	1055	132	2795.	*	1	1710	207	313.	*	1	2325	282	0.
1	0445	58	7516.	*	1	1100	133	2771.	*	1	1715	208	278.	*	1	2330	283	0.
1	0450	59	7570.	*	1	1105	134	2747.	*	1	1720	209	247.	*	1	2335	284	0.
1	0455	60	7676.	*	1	1110	135	2723.	*	1	1725	210	215.	*	1	2340	285	0.
1	0500	61	7831.	*	1	1115	136	2698.	*	1	1730	211	180.	*	1	2345	286	0.
1	0505	62	8005.	*	1	1120	137	2672.	*	1	1735	212	143.	*	1	2350	287	0.
1	0510	63	8178.	*	1	1125	138	2647.	*	1	1740	213	110.	*	1	2355	288	0.
1	0515	64	8334.	*	1	1130	139	2621.	*	1	1745	214	83.	*	2	0000	289	0.
1	0520	65	8445.	*	1	1135	140	2596.	*	1	1750	215	63.	*	2	0005	290	0.
1	0525	66	8492.	*	1	1140	141	2571.	*	1	1755	216	47.	*	2	0010	291	0.
1	0530	67	8477.	*	1	1145	142	2546.	*	1	1800	217	36.	*	2	0015	292	0.
1	0535	68	8407.	*	1	1150	143	2521.	*	1	1805	218	27.	*	2	0020	293	0.
1	0540	69	8292.	*	1	1155	144	2495.	*	1	1810	219	20.	*	2	0025	294	0.
1	0545	70	8137.	*	1	1200	145	2468.	*	1	1815	220	15.	*	2	0030	295	0.
1	0550	71	7953.	*	1	1205	146	2441.	*	1	1820	221	12.	*	2	0035	296	0.
1	0555	72	7751.	*	1	1210	147	2415.	*	1	1825	222	9.	*	2	0040	297	0.
1	0600	73	7541.	*	1	1215	148	2388.	*	1	1830	223	7.	*	2	0045	298	0.
1	0605	74	7327.	*	1	1220	149	2362.	*	1	1835	224	5.	*	2	0050	299	0.
1	0610	75	7119.	*	1	1225	150	2336.	*	1	1840	225	4.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 8492.	5.42		5613.	2056.	1980.	1980.
		(INCHES)	.587	.860	.860	.860
		(AC-FT)	2783.	4077.	4077.	4077.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	COMPUTATION TIME STEP M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	3.00	750.00	6695.21	327.36	.63	8.32
		INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL						
MAIN	.08	1.64	5.00		6693.29	330.00	.63	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2965E+04 EXCESS= .0000E+00 OUTFLOW= .2965E+04 BASIN STORAGE= .1030E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .74

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	5633.	1		1230	151	1485.	1		1845	226	0.
1		0005	2	0.	1		0620	77	5502.	1		1235	152	1447.	1		1850	227	0.
1		0010	3	0.	1		0625	78	5375.	1		1240	153	1407.	1		1855	228	0.
1		0015	4	0.	1		0630	79	5248.	1		1245	154	1368.	1		1900	229	0.
1		0020	5	0.	1		0635	80	5123.	1		1250	155	1330.	1		1905	230	0.
1		0025	6	0.	1		0640	81	5000.	1		1255	156	1292.	1		1910	231	0.
1		0030	7	0.	1		0645	82	4880.	1		1300	157	1255.	1		1915	232	0.
1		0035	8	0.	1		0650	83	4763.	1		1305	158	1216.	1		1920	233	0.
1		0040	9	0.	1		0655	84	4651.	1		1310	159	1176.	1		1925	234	0.
1		0045	10	0.	1		0700	85	4542.	1		1315	160	1136.	1		1930	235	0.
1		0050	11	0.	1		0705	86	4436.	1		1320	161	1097.	1		1935	236	0.
1		0055	12	0.	1		0710	87	4335.	1		1325	162	1059.	1		1940	237	0.
1		0100	13	0.	1		0715	88	4239.	1		1330	163	1022.	1		1945	238	0.
1		0105	14	1.	1		0720	89	4146.	1		1335	164	984.	1		1950	239	0.
1		0110	15	2.	1		0725	90	4058.	1		1340	165	945.	1		1955	240	0.
1		0115	16	3.	1		0730	91	3972.	1		1345	166	904.	1		2000	241	0.
1		0120	17	5.	1		0735	92	3889.	1		1350	167	866.	1		2005	242	0.
1		0125	18	7.	1		0740	93	3808.	1		1355	168	828.	1		2010	243	0.
1		0130	19	11.	1		0745	94	3730.	1		1400	169	792.	1		2015	244	0.
1		0135	20	16.	1		0750	95	3656.	1		1405	170	756.	1		2020	245	0.
1		0140	21	22.	1		0755	96	3585.	1		1410	171	719.	1		2025	246	0.
1		0145	22	30.	1		0800	97	3519.	1		1415	172	679.	1		2030	247	0.
1		0150	23	42.	1		0805	98	3456.	1		1420	173	640.	1		2035	248	0.
1		0155	24	56.	1		0810	99	3396.	1		1425	174	603.	1		2040	249	0.
1		0200	25	73.	1		0815	100	3339.	1		1430	175	567.	1		2045	250	0.
1		0205	26	93.	1		0820	101	3285.	1		1435	176	534.	1		2050	251	0.
1		0210	27	118.	1		0825	102	3234.	1		1440	177	501.	1		2055	252	0.
1		0215	28	145.	1		0830	103	3184.	1		1445	178	465.	1		2100	253	0.
1		0220	29	174.	1		0835	104	3137.	1		1450	179	426.	1		2105	254	0.
1		0225	30	206.	1		0840	105	3092.	1		1455	180	384.	1		2110	255	0.
1		0230	31	237.	1		0845	106	3048.	1		1500	181	345.	1		2115	256	0.
1		0235	32	268.	1		0850	107	3006.	1		1505	182	308.	1		2120	257	0.
1		0240	33	296.	1		0855	108	2965.	1		1510	183	274.	1		2125	258	0.
1		0245	34	321.	1		0900	109	2925.	1		1515	184	243.	1		2130	259	0.
1		0250	35	343.	1		0905	110	2885.	1		1520	185	211.	1		2135	260	0.
1		0255	36	364.	1		0910	111	2846.	1		1525	186	177.	1		2140	261	0.
1		0300	37	388.	1		0915	112	2809.	1		1530	187	141.	1		2145	262	0.
1		0305	38	420.	1		0920	113	2773.	1		1535	188	109.	1		2150	263	0.
1		0310	39	464.	1		0925	114	2739.	1		1540	189	83.	1		2155	264	0.
1		0315	40	530.	1		0930	115	2705.	1		1545	190	63.	1		2200	265	0.
1		0320	41	631.	1		0935	116	2672.	1		1550	191	48.	1		2205	266	0.
1		0325	42	780.	1		0940	117	2639.	1		1555	192	36.	1		2210	267	0.
1		0330	43	991.	1		0945	118	2606.	1		1600	193	27.	1		2215	268	0.
1		0335	44	1294.	1		0950	119	2572.	1		1605	194	21.	1		2220	269	0.
1		0340	45	1676.	1		0955	120	2539.	1		1610	195	16.	1		2225	270	0.
1		0345	46	2116.	1		1000	121	2507.	1		1615	196	12.	1		2230	271	0.
1		0350	47	2614.	1		1005	122	2476.	1		1620	197	9.	1		2235	272	0.
1		0355	48	3146.	1		1010	123	2445.	1		1625	198	7.	1		2240	273	0.
1		0400	49	3658.	1		1015	124	2414.	1		1630	199	5.	1		2245	274	0.
1		0405	50	4097.	1		1020	125	2383.	1		1635	200	4.	1		2250	275	0.
1		0410	51	4450.	1		1025	126	2351.	1		1640	201	3.	1		2255	276	0.
1		0415	52	4735.	1		1030	127	2319.	1		1645	202	2.	1		2300	277	0.
1		0420	53	4958.	1		1035	128	2287.	1		1650	203	2.	1		2305	278	0.
1		0425	54	5136.	1		1040	129	2256.	1		1655	204	1.	1		2310	279	0.

1	0430	55	5290.	*	1	1045	130	2225.	*	1	1700	205	1.	*	1	2315	280	0.
1	0435	56	5426.	*	1	1050	131	2194.	*	1	1705	206	1.	*	1	2320	281	0.
1	0440	57	5542.	*	1	1055	132	2163.	*	1	1710	207	1.	*	1	2325	282	0.
1	0445	58	5639.	*	1	1100	133	2130.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	5737.	*	1	1105	134	2096.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	5862.	*	1	1110	135	2062.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	6020.	*	1	1115	136	2029.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	6190.	*	1	1120	137	1996.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	6356.	*	1	1125	138	1963.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	6506.	*	1	1130	139	1929.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	6618.	*	1	1135	140	1893.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	6680.	*	1	1140	141	1856.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	6693.	*	1	1145	142	1819.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	6660.	*	1	1150	143	1783.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	6587.	*	1	1155	144	1747.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	6484.	*	1	1200	145	1711.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	6358.	*	1	1205	146	1673.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	6218.	*	1	1210	147	1635.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	6070.	*	1	1215	148	1597.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	5919.	*	1	1220	149	1559.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	5772.	*	1	1225	150	1523.	*	1	1840	225	0.	*	2	0055	300	0.

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 6693.	5.50	4476.	1495.	1440.	1440.
		(INCHES) .468	.626	.626	.626
		(AC-FT) 2219.	2965.	2965.	2965.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	3.57	750.00	4288.43	332.07	.36	7.00
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		4287.86	335.00	.36	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1684E+04 EXCESS= .0000E+00 OUTFLOW= .1684E+04 BASIN STORAGE= .1117E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .57

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	3798.	*	1		1230	151	356.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	3732.	*	1		1235	152	323.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	3666.	*	1		1240	153	293.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	3597.	*	1		1245	154	265.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	3528.	*	1		1250	155	238.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	3458.	*	1		1255	156	209.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	3389.	*	1		1300	157	177.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	3319.	*	1		1305	158	144.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	3251.	*	1		1310	159	114.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	3184.	*	1		1315	160	90.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	3117.	*	1		1320	161	71.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	3053.	*	1		1325	162	56.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	2990.	*	1		1330	163	45.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	2929.	*	1		1335	164	36.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	2870.	*	1		1340	165	29.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	2812.	*	1		1345	166	24.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	2755.	*	1		1350	167	20.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	2699.	*	1		1355	168	16.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	2643.	*	1		1400	169	14.	*	1		2015	244	0.

1	0135	20	0.	*	1	0750	95	2588.	*	1	1405	170	12.	*	1	2020	245	0.
1	0140	21	0.	*	1	0755	96	2534.	*	1	1410	171	10.	*	1	2025	246	0.
1	0145	22	1.	*	1	0800	97	2481.	*	1	1415	172	8.	*	1	2030	247	0.
1	0150	23	2.	*	1	0805	98	2431.	*	1	1420	173	7.	*	1	2035	248	0.
1	0155	24	3.	*	1	0810	99	2383.	*	1	1425	174	6.	*	1	2040	249	0.
1	0200	25	6.	*	1	0815	100	2337.	*	1	1430	175	5.	*	1	2045	250	0.
1	0205	26	9.	*	1	0820	101	2292.	*	1	1435	176	5.	*	1	2050	251	0.
1	0210	27	15.	*	1	0825	102	2249.	*	1	1440	177	4.	*	1	2055	252	0.
1	0215	28	21.	*	1	0830	103	2206.	*	1	1445	178	4.	*	1	2100	253	0.
1	0220	29	29.	*	1	0835	104	2164.	*	1	1450	179	3.	*	1	2105	254	0.
1	0225	30	39.	*	1	0840	105	2121.	*	1	1455	180	3.	*	1	2110	255	0.
1	0230	31	49.	*	1	0845	106	2078.	*	1	1500	181	2.	*	1	2115	256	0.
1	0235	32	61.	*	1	0850	107	2035.	*	1	1505	182	2.	*	1	2120	257	0.
1	0240	33	72.	*	1	0855	108	1993.	*	1	1510	183	2.	*	1	2125	258	0.
1	0245	34	83.	*	1	0900	109	1952.	*	1	1515	184	2.	*	1	2130	259	0.
1	0250	35	93.	*	1	0905	110	1912.	*	1	1520	185	2.	*	1	2135	260	0.
1	0255	36	103.	*	1	0910	111	1872.	*	1	1525	186	1.	*	1	2140	261	0.
1	0300	37	114.	*	1	0915	112	1833.	*	1	1530	187	1.	*	1	2145	262	0.
1	0305	38	127.	*	1	0920	113	1793.	*	1	1535	188	1.	*	1	2150	263	0.
1	0310	39	146.	*	1	0925	114	1752.	*	1	1540	189	1.	*	1	2155	264	0.
1	0315	40	172.	*	1	0930	115	1712.	*	1	1545	190	1.	*	1	2200	265	0.
1	0320	41	211.	*	1	0935	116	1672.	*	1	1550	191	1.	*	1	2205	266	0.
1	0325	42	268.	*	1	0940	117	1634.	*	1	1555	192	1.	*	1	2210	267	0.
1	0330	43	356.	*	1	0945	118	1596.	*	1	1600	193	1.	*	1	2215	268	0.
1	0335	44	493.	*	1	0950	119	1557.	*	1	1605	194	1.	*	1	2220	269	0.
1	0340	45	682.	*	1	0955	120	1518.	*	1	1610	195	1.	*	1	2225	270	0.
1	0345	46	923.	*	1	1000	121	1478.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	1208.	*	1	1005	122	1438.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	1521.	*	1	1010	123	1399.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	1834.	*	1	1015	124	1361.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	2119.	*	1	1020	125	1323.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	2360.	*	1	1025	126	1285.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	2550.	*	1	1030	127	1246.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	2701.	*	1	1035	128	1206.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	2822.	*	1	1040	129	1166.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	2901.	*	1	1045	130	1128.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	2955.	*	1	1050	131	1090.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	3018.	*	1	1055	132	1053.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	3115.	*	1	1100	133	1015.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	3243.	*	1	1105	134	976.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	3401.	*	1	1110	135	937.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	3570.	*	1	1115	136	898.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	3738.	*	1	1120	137	861.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	3898.	*	1	1125	138	826.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	4044.	*	1	1130	139	790.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	4159.	*	1	1135	140	754.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	4239.	*	1	1140	141	717.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	4280.	*	1	1145	142	678.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	4288.	*	1	1150	143	640.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	4269.	*	1	1155	144	604.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	4226.	*	1	1200	145	569.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	4169.	*	1	1205	146	536.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	4100.	*	1	1210	147	503.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	4023.	*	1	1215	148	468.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	3945.	*	1	1220	149	430.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	3869.	*	1	1225	150	392.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 4288.	5.58		2880.	849.	818.	818.
		(INCHES)	.301	.355	.355	.355
		(AC-FT)	1428.	1684.	1684.	1684.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	4.42	750.00	2481.76	340.21	.19	5.66

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN .08 1.64 5.00 2481.49 340.00 .19

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8861E+03 EXCESS= .0000E+00 OUTFLOW= .8862E+03 BASIN STORAGE= .1055E-01 PERCENT ERROR= .0

HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .44

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	2281.	1		1230	151	40.	1		1845	226	0.
1		0005	2	0.	1		0620	77	2253.	1		1235	152	37.	1		1850	227	0.
1		0010	3	0.	1		0625	78	2226.	1		1240	153	34.	1		1855	228	0.
1		0015	4	0.	1		0630	79	2197.	1		1245	154	32.	1		1900	229	0.
1		0020	5	0.	1		0635	80	2166.	1		1250	155	30.	1		1905	230	0.
1		0025	6	0.	1		0640	81	2133.	1		1255	156	28.	1		1910	231	0.
1		0030	7	0.	1		0645	82	2097.	1		1300	157	26.	1		1915	232	0.
1		0035	8	0.	1		0650	83	2060.	1		1305	158	24.	1		1920	233	0.
1		0040	9	0.	1		0655	84	2023.	1		1310	159	23.	1		1925	234	0.
1		0045	10	0.	1		0700	85	1984.	1		1315	160	21.	1		1930	235	0.
1		0050	11	0.	1		0705	86	1946.	1		1320	161	20.	1		1935	236	0.
1		0055	12	0.	1		0710	87	1906.	1		1325	162	18.	1		1940	237	0.
1		0100	13	0.	1		0715	88	1867.	1		1330	163	17.	1		1945	238	0.
1		0105	14	0.	1		0720	89	1828.	1		1335	164	16.	1		1950	239	0.
1		0110	15	0.	1		0725	90	1788.	1		1340	165	15.	1		1955	240	0.
1		0115	16	0.	1		0730	91	1749.	1		1345	166	14.	1		2000	241	0.
1		0120	17	0.	1		0735	92	1709.	1		1350	167	13.	1		2005	242	0.
1		0125	18	0.	1		0740	93	1670.	1		1355	168	12.	1		2010	243	0.
1		0130	19	0.	1		0745	94	1630.	1		1400	169	11.	1		2015	244	0.
1		0135	20	0.	1		0750	95	1591.	1		1405	170	10.	1		2020	245	0.
1		0140	21	0.	1		0755	96	1552.	1		1410	171	9.	1		2025	246	0.
1		0145	22	0.	1		0800	97	1515.	1		1415	172	9.	1		2030	247	0.
1		0150	23	0.	1		0805	98	1478.	1		1420	173	8.	1		2035	248	0.
1		0155	24	0.	1		0810	99	1441.	1		1425	174	7.	1		2040	249	0.
1		0200	25	0.	1		0815	100	1403.	1		1430	175	7.	1		2045	250	0.
1		0205	26	0.	1		0820	101	1365.	1		1435	176	6.	1		2050	251	0.
1		0210	27	0.	1		0825	102	1328.	1		1440	177	6.	1		2055	252	0.
1		0215	28	0.	1		0830	103	1291.	1		1445	178	5.	1		2100	253	0.
1		0220	29	1.	1		0835	104	1255.	1		1450	179	5.	1		2105	254	0.
1		0225	30	1.	1		0840	105	1220.	1		1455	180	5.	1		2110	255	0.
1		0230	31	2.	1		0845	106	1185.	1		1500	181	4.	1		2115	256	0.
1		0235	32	3.	1		0850	107	1152.	1		1505	182	4.	1		2120	257	0.
1		0240	33	5.	1		0855	108	1118.	1		1510	183	4.	1		2125	258	0.
1		0245	34	6.	1		0900	109	1084.	1		1515	184	3.	1		2130	259	0.
1		0250	35	8.	1		0905	110	1049.	1		1520	185	3.	1		2135	260	0.
1		0255	36	11.	1		0910	111	1012.	1		1525	186	3.	1		2140	261	0.
1		0300	37	14.	1		0915	112	977.	1		1530	187	3.	1		2145	262	0.
1		0305	38	18.	1		0920	113	942.	1		1535	188	3.	1		2150	263	0.
1		0310	39	23.	1		0925	114	909.	1		1540	189	2.	1		2155	264	0.
1		0315	40	32.	1		0930	115	877.	1		1545	190	2.	1		2200	265	0.
1		0320	41	45.	1		0935	116	846.	1		1550	191	2.	1		2205	266	0.
1		0325	42	66.	1		0940	117	815.	1		1555	192	2.	1		2210	267	0.
1		0330	43	98.	1		0945	118	783.	1		1600	193	2.	1		2215	268	0.
1		0335	44	146.	1		0950	119	749.	1		1605	194	2.	1		2220	269	0.
1		0340	45	223.	1		0955	120	714.	1		1610	195	1.	1		2225	270	0.
1		0345	46	335.	1		1000	121	679.	1		1615	196	1.	1		2230	271	0.
1		0350	47	473.	1		1005	122	646.	1		1620	197	1.	1		2235	272	0.
1		0355	48	635.	1		1010	123	615.	1		1625	198	1.	1		2240	273	0.
1		0400	49	811.	1		1015	124	585.	1		1630	199	1.	1		2245	274	0.
1		0405	50	975.	1		1020	125	557.	1		1635	200	1.	1		2250	275	0.
1		0410	51	1116.	1		1025	126	528.	1		1640	201	1.	1		2255	276	0.
1		0415	52	1234.	1		1030	127	497.	1		1645	202	1.	1		2300	277	0.
1		0420	53	1331.	1		1035	128	465.	1		1650	203	1.	1		2305	278	0.
1		0425	54	1409.	1		1040	129	430.	1		1655	204	1.	1		2310	279	0.
1		0430	55	1463.	1		1045	130	395.	1		1700	205	1.	1		2315	280	0.
1		0435	56	1493.	1		1050	131	364.	1		1705	206	1.	1		2320	281	0.
1		0440	57	1510.	1		1055	132	335.	1		1710	207	1.	1		2325	282	0.
1		0445	58	1529.	1		1100	133	310.	1		1715	208	1.	1		2330	283	0.
1		0450	59	1554.	1		1105	134	286.	1		1720	209	0.	1		2335	284	0.
1		0455	60	1599.	1		1110	135	264.	1		1725	210	0.	1		2340	285	0.
1		0500	61	1677.	1		1115	136	244.	1		1730	211	0.	1		2345	286	0.
1		0505	62	1807.	1		1120	137	223.	1		1735	212	0.	1		2350	287	0.
1		0510	63	1982.	1		1125	138	203.	1		1740	213	0.	1		2355	288	0.
1		0515	64	2153.	1		1130	139	180.	1		1745	214	0.	2		0000	289	0.
1		0520	65	2282.	1		1135	140	156.	1		1750	215	0.	2		0005	290	0.

1	0525	66	2374.	*	1	1140	141	133.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	2436.	*	1	1145	142	113.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	2471.	*	1	1150	143	97.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	2481.	*	1	1155	144	84.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	2471.	*	1	1200	145	73.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	2448.	*	1	1205	146	65.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	2417.	*	1	1210	147	58.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	2382.	*	1	1215	148	53.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	2347.	*	1	1220	149	48.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	2313.	*	1	1225	150	44.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

****

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 2481.	5.67	1628.	447.	430.	430.
		(INCHES) .170	.187	.187	.187
		(AC-FT) 807.	886.	886.	886.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	COMPUTATION TIME STEP M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	5.00	500.00	469.02	430.00	.03	2.95
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		469.02	430.00	.03	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1643E+03 EXCESS= .0000E+00 OUTFLOW= .1644E+03 BASIN STORAGE= .1007E-01 PERCENT ERROR= .0

****

HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .26

****

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	322.	*	1		1230	151	25.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	316.	*	1		1235	152	24.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	328.	*	1		1240	153	22.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	372.	*	1		1245	154	21.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	425.	*	1		1250	155	20.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	433.	*	1		1255	156	19.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	414.	*	1		1300	157	17.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	428.	*	1		1305	158	16.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	450.	*	1		1310	159	16.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	447.	*	1		1315	160	15.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	456.	*	1		1320	161	14.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	469.	*	1		1325	162	13.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	463.	*	1		1330	163	12.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	463.	*	1		1335	164	12.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	459.	*	1		1340	165	11.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	449.	*	1		1345	166	10.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	443.	*	1		1350	167	10.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	431.	*	1		1355	168	9.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	419.	*	1		1400	169	9.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	408.	*	1		1405	170	8.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	394.	*	1		1410	171	8.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	380.	*	1		1415	172	7.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	366.	*	1		1420	173	7.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	353.	*	1		1425	174	7.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	339.	*	1		1430	175	6.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	327.	*	1		1435	176	6.	*	1		2050	251	0.
1		0210	27	0.	*	1		0825	102	313.	*	1		1440	177	6.	*	1		2055	252	0.
1		0215	28	0.	*	1		0830	103	301.	*	1		1445	178	5.	*	1		2100	253	0.
1		0220	29	0.	*	1		0835	104	289.	*	1		1450	179	5.	*	1		2105	254	0.
1		0225	30	0.	*	1		0840	105	277.	*	1		1455	180	5.	*	1		2110	255	0.

1	0230	31	0.	*	1	0845	106	265.	*	1	1500	181	5.	*	1	2115	256	0.
1	0235	32	0.	*	1	0850	107	253.	*	1	1505	182	4.	*	1	2120	257	0.
1	0240	33	0.	*	1	0855	108	242.	*	1	1510	183	4.	*	1	2125	258	0.
1	0245	34	0.	*	1	0900	109	230.	*	1	1515	184	4.	*	1	2130	259	0.
1	0250	35	0.	*	1	0905	110	218.	*	1	1520	185	4.	*	1	2135	260	0.
1	0255	36	0.	*	1	0910	111	205.	*	1	1525	186	4.	*	1	2140	261	0.
1	0300	37	0.	*	1	0915	112	191.	*	1	1530	187	4.	*	1	2145	262	0.
1	0305	38	0.	*	1	0920	113	175.	*	1	1535	188	3.	*	1	2150	263	0.
1	0310	39	0.	*	1	0925	114	161.	*	1	1540	189	3.	*	1	2155	264	0.
1	0315	40	0.	*	1	0930	115	149.	*	1	1545	190	3.	*	1	2200	265	0.
1	0320	41	0.	*	1	0935	116	140.	*	1	1550	191	3.	*	1	2205	266	0.
1	0325	42	0.	*	1	0940	117	132.	*	1	1555	192	3.	*	1	2210	267	0.
1	0330	43	0.	*	1	0945	118	123.	*	1	1600	193	3.	*	1	2215	268	0.
1	0335	44	0.	*	1	0950	119	115.	*	1	1605	194	3.	*	1	2220	269	0.
1	0340	45	2.	*	1	0955	120	109.	*	1	1610	195	3.	*	1	2225	270	0.
1	0345	46	5.	*	1	1000	121	104.	*	1	1615	196	2.	*	1	2230	271	0.
1	0350	47	12.	*	1	1005	122	100.	*	1	1620	197	2.	*	1	2235	272	0.
1	0355	48	23.	*	1	1010	123	96.	*	1	1625	198	2.	*	1	2240	273	0.
1	0400	49	39.	*	1	1015	124	92.	*	1	1630	199	2.	*	1	2245	274	0.
1	0405	50	64.	*	1	1020	125	88.	*	1	1635	200	2.	*	1	2250	275	0.
1	0410	51	97.	*	1	1025	126	84.	*	1	1640	201	2.	*	1	2255	276	0.
1	0415	52	127.	*	1	1030	127	80.	*	1	1645	202	2.	*	1	2300	277	0.
1	0420	53	153.	*	1	1035	128	77.	*	1	1650	203	2.	*	1	2305	278	0.
1	0425	54	176.	*	1	1040	129	74.	*	1	1655	204	2.	*	1	2310	279	0.
1	0430	55	194.	*	1	1045	130	70.	*	1	1700	205	1.	*	1	2315	280	0.
1	0435	56	208.	*	1	1050	131	67.	*	1	1705	206	1.	*	1	2320	281	0.
1	0440	57	218.	*	1	1055	132	64.	*	1	1710	207	1.	*	1	2325	282	0.
1	0445	58	225.	*	1	1100	133	61.	*	1	1715	208	1.	*	1	2330	283	0.
1	0450	59	231.	*	1	1105	134	58.	*	1	1720	209	1.	*	1	2335	284	0.
1	0455	60	237.	*	1	1110	135	56.	*	1	1725	210	1.	*	1	2340	285	0.
1	0500	61	247.	*	1	1115	136	53.	*	1	1730	211	1.	*	1	2345	286	0.
1	0505	62	263.	*	1	1120	137	51.	*	1	1735	212	1.	*	1	2350	287	0.
1	0510	63	286.	*	1	1125	138	49.	*	1	1740	213	1.	*	1	2355	288	0.
1	0515	64	314.	*	1	1130	139	47.	*	1	1745	214	1.	*	2	0000	289	0.
1	0520	65	342.	*	1	1135	140	45.	*	1	1750	215	1.	*	2	0005	290	0.
1	0525	66	364.	*	1	1140	141	43.	*	1	1755	216	1.	*	2	0010	291	0.
1	0530	67	380.	*	1	1145	142	40.	*	1	1800	217	1.	*	2	0015	292	0.
1	0535	68	390.	*	1	1150	143	39.	*	1	1805	218	1.	*	2	0020	293	0.
1	0540	69	395.	*	1	1155	144	37.	*	1	1810	219	1.	*	2	0025	294	0.
1	0545	70	396.	*	1	1200	145	35.	*	1	1815	220	1.	*	2	0030	295	0.
1	0550	71	390.	*	1	1205	146	33.	*	1	1820	221	1.	*	2	0035	296	0.
1	0555	72	379.	*	1	1210	147	31.	*	1	1825	222	1.	*	2	0040	297	0.
1	0600	73	364.	*	1	1215	148	29.	*	1	1830	223	1.	*	2	0045	298	0.
1	0605	74	350.	*	1	1220	149	28.	*	1	1835	224	1.	*	2	0050	299	0.
1	0610	75	335.	*	1	1225	150	26.	*	1	1840	225	1.	*	2	0055	300	0.
				*					*					*				

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 469.	7.17		301.	83.	80.	80.
		(INCHES)	.032	.035	.035	.035
		(AC-FT)	149.	164.	164.	164.

CUMULATIVE AREA = 88.86 SQ MI

```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   18MAR08  TIME  15:00:52  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (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
 *** FREE ***
 *** NOLIST ***
```


```
1****************************************
*                                      *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)  *
*              JUN   1998              *
*            VERSION 4.1               *
*                                      *
*  RUN DATE   18MAR08  TIME  15:00:52  *
*                                      *
****************************************
```

```
****************************************
*                                      *
*    U.S. ARMY CORPS OF ENGINEERS      *
*    HYDROLOGIC ENGINEERING CENTER     *
*          609 SECOND STREET           *
*       DAVIS, CALIFORNIA 95616        *
*           (916) 756-1104             *
*                                      *
****************************************
```


KLEINFELDER
FEBRUARY 2008
NO-ACTION ALTERNATIVE

DESIGN STORM = 100-YEAR 6-HOUR STORM
STORM DISTRIBUTION = SDN5

```
  10 IO          OUTPUT CONTROL VARIABLES
                      IPRNT          5  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        300  NUMBER OF HYDROGRAPH ORDINATES
                     NDDATE      2   0  ENDING DATE
                     NDTIME       0055  ENDING TIME
                      ICENT         19  CENTURY MARK

                   COMPUTATION INTERVAL     .08 HOURS
                       TOTAL TIME BASE   24.92 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           1  NUMBER OF PLANS

     JR       MULTI-RATIO OPTION
                  RATIOS OF PRECIPITATION
                 1.00       .87       .74       .57       .44       .26


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


          **************
          *            *
1250 KK   *     ULWIN  *
          *            *
          **************

1254 KO        OUTPUT CONTROL VARIABLES
                   IPRNT           1  PRINT CONTROL
                   IPLOT           0  PLOT CONTROL
                   QSCAL          0.  HYDROGRAPH PLOT SCALE

1253 HC        HYDROGRAPH COMBINATION
                   ICOMP           4  NUMBER OF HYDROGRAPHS TO COMBINE

                                                  ***
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****

HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = 1.00

****

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	7837.	*	1		1230	151	3.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	7134.	*	1		1235	152	3.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	6500.	*	1		1240	153	3.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	5937.	*	1		1245	154	2.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	5427.	*	1		1250	155	2.	*	1		1905	230	0.
1		0025	6	1.	*	1		0640	81	4973.	*	1		1255	156	2.	*	1		1910	231	0.
1		0030	7	4.	*	1		0645	82	4562.	*	1		1300	157	1.	*	1		1915	232	0.
1		0035	8	9.	*	1		0650	83	4188.	*	1		1305	158	1.	*	1		1920	233	0.
1		0040	9	15.	*	1		0655	84	3845.	*	1		1310	159	1.	*	1		1925	234	0.
1		0045	10	21.	*	1		0700	85	3526.	*	1		1315	160	1.	*	1		1930	235	0.
1		0050	11	27.	*	1		0705	86	3233.	*	1		1320	161	1.	*	1		1935	236	0.
1		0055	12	32.	*	1		0710	87	2961.	*	1		1325	162	1.	*	1		1940	237	0.
1		0100	13	36.	*	1		0715	88	2708.	*	1		1330	163	1.	*	1		1945	238	0.
1		0105	14	40.	*	1		0720	89	2474.	*	1		1335	164	0.	*	1		1950	239	0.
1		0110	15	43.	*	1		0725	90	2258.	*	1		1340	165	0.	*	1		1955	240	0.
1		0115	16	48.	*	1		0730	91	2059.	*	1		1345	166	0.	*	1		2000	241	0.
1		0120	17	54.	*	1		0735	92	1877.	*	1		1350	167	0.	*	1		2005	242	0.
1		0125	18	63.	*	1		0740	93	1710.	*	1		1355	168	0.	*	1		2010	243	0.
1		0130	19	78.	*	1		0745	94	1557.	*	1		1400	169	0.	*	1		2015	244	0.
1		0135	20	100.	*	1		0750	95	1418.	*	1		1405	170	0.	*	1		2020	245	0.
1		0140	21	130.	*	1		0755	96	1293.	*	1		1410	171	0.	*	1		2025	246	0.
1		0145	22	168.	*	1		0800	97	1179.	*	1		1415	172	0.	*	1		2030	247	0.
1		0150	23	212.	*	1		0805	98	1075.	*	1		1420	173	0.	*	1		2035	248	0.
1		0155	24	260.	*	1		0810	99	978.	*	1		1425	174	0.	*	1		2040	249	0.
1		0200	25	309.	*	1		0815	100	887.	*	1		1430	175	0.	*	1		2045	250	0.
1		0205	26	362.	*	1		0820	101	804.	*	1		1435	176	0.	*	1		2050	251	0.
1		0210	27	418.	*	1		0825	102	728.	*	1		1440	177	0.	*	1		2055	252	0.
1		0215	28	477.	*	1		0830	103	659.	*	1		1445	178	0.	*	1		2100	253	0.
1		0220	29	536.	*	1		0835	104	597.	*	1		1450	179	0.	*	1		2105	254	0.
1		0225	30	596.	*	1		0840	105	541.	*	1		1455	180	0.	*	1		2110	255	0.
1		0230	31	661.	*	1		0845	106	490.	*	1		1500	181	0.	*	1		2115	256	0.
1		0235	32	736.	*	1		0850	107	445.	*	1		1505	182	0.	*	1		2120	257	0.
1		0240	33	824.	*	1		0855	108	404.	*	1		1510	183	0.	*	1		2125	258	0.
1		0245	34	926.	*	1		0900	109	367.	*	1		1515	184	0.	*	1		2130	259	0.
1		0250	35	1039.	*	1		0905	110	333.	*	1		1520	185	0.	*	1		2135	260	0.

1	0255	36	1163.	*	1	0910	111	303.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	1295.	*	1	0915	112	275.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	1435.	*	1	0920	113	251.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	1583.	*	1	0925	114	228.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	1732.	*	1	0930	115	207.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	1891.	*	1	0935	116	188.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	2083.	*	1	0940	117	170.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	2344.	*	1	0945	118	154.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	2714.	*	1	0950	119	139.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	3232.	*	1	0955	120	125.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	3950.	*	1	1000	121	113.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	5031.	*	1	1005	122	101.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	6700.	*	1	1010	123	91.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	9058.	*	1	1015	124	82.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	11694.	*	1	1020	125	74.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	14021.	*	1	1025	126	66.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	15706.	*	1	1030	127	59.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	16749.	*	1	1035	128	53.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	17126.	*	1	1040	129	47.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	17097.	*	1	1045	130	42.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	16688.	*	1	1050	131	38.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	16030.	*	1	1055	132	34.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	15275.	*	1	1100	133	30.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	14484.	*	1	1105	134	27.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	13770.	*	1	1110	135	24.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	13221.	*	1	1115	136	21.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	12873.	*	1	1120	137	19.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	12715.	*	1	1125	138	17.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	12748.	*	1	1130	139	15.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	12874.	*	1	1135	140	13.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	13072.	*	1	1140	141	12.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	13226.	*	1	1145	142	11.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	13211.	*	1	1150	143	9.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	12951.	*	1	1155	144	8.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	12489.	*	1	1200	145	7.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	11836.	*	1	1205	146	7.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	11073.	*	1	1210	147	6.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	10249.	*	1	1215	148	5.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	9410.	*	1	1220	149	4.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	8600.	*	1	1225	150	4.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 17126.	4.42		6677.	1707.	1644.	1644.
		(INCHES)	1.055	1.079	1.079	1.079
		(AC-FT)	3311.	3386.	3386.	3386.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .87

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
					*						*						*					
1		0000	1	0.	*	1		0615	76	6586.	*	1		1230	151	5.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	6013.	*	1		1235	152	5.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	5491.	*	1		1240	153	4.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	5016.	*	1		1245	154	4.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	4592.	*	1		1250	155	3.	*	1		1905	230	0.
1		0025	6	1.	*	1		0640	81	4217.	*	1		1255	156	3.	*	1		1910	231	0.
1		0030	7	2.	*	1		0645	82	3876.	*	1		1300	157	2.	*	1		1915	232	0.
1		0035	8	4.	*	1		0650	83	3562.	*	1		1305	158	2.	*	1		1920	233	0.
1		0040	9	7.	*	1		0655	84	3275.	*	1		1310	159	2.	*	1		1925	234	0.
1		0045	10	10.	*	1		0700	85	3012.	*	1		1315	160	2.	*	1		1930	235	0.
1		0050	11	13.	*	1		0705	86	2767.	*	1		1320	161	1.	*	1		1935	236	0.
1		0055	12	16.	*	1		0710	87	2542.	*	1		1325	162	1.	*	1		1940	237	0.
1		0100	13	19.	*	1		0715	88	2334.	*	1		1330	163	1.	*	1		1945	238	0.
1		0105	14	20.	*	1		0720	89	2140.	*	1		1335	164	1.	*	1		1950	239	0.
1		0110	15	22.	*	1		0725	90	1960.	*	1		1340	165	1.	*	1		1955	240	0.
1		0115	16	24.	*	1		0730	91	1795.	*	1		1345	166	1.	*	1		2000	241	0.
1		0120	17	26.	*	1		0735	92	1643.	*	1		1350	167	1.	*	1		2005	242	0.

1	0125	18	29.	*	1	0740	93	1503.	*	1	1355	168	1.	*	1	2010	243	0.
1	0130	19	35.	*	1	0745	94	1377.	*	1	1400	169	0.	*	1	2015	244	0.
1	0135	20	43.	*	1	0750	95	1261.	*	1	1405	170	0.	*	1	2020	245	0.
1	0140	21	55.	*	1	0755	96	1155.	*	1	1410	171	0.	*	1	2025	246	0.
1	0145	22	70.	*	1	0800	97	1059.	*	1	1415	172	0.	*	1	2030	247	0.
1	0150	23	90.	*	1	0805	98	971.	*	1	1420	173	0.	*	1	2035	248	0.
1	0155	24	113.	*	1	0810	99	889.	*	1	1425	174	0.	*	1	2040	249	0.
1	0200	25	140.	*	1	0815	100	814.	*	1	1430	175	0.	*	1	2045	250	0.
1	0205	26	171.	*	1	0820	101	745.	*	1	1435	176	0.	*	1	2050	251	0.
1	0210	27	204.	*	1	0825	102	679.	*	1	1440	177	0.	*	1	2055	252	0.
1	0215	28	238.	*	1	0830	103	618.	*	1	1445	178	0.	*	1	2100	253	0.
1	0220	29	273.	*	1	0835	104	562.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	310.	*	1	0840	105	511.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	348.	*	1	0845	106	465.	*	1	1500	181	0.	*	1	2115	256	0.
1	0235	32	389.	*	1	0850	107	422.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	436.	*	1	0855	108	384.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	490.	*	1	0900	109	349.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	555.	*	1	0905	110	318.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	631.	*	1	0910	111	290.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	719.	*	1	0915	112	264.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	818.	*	1	0920	113	241.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	932.	*	1	0925	114	220.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	1060.	*	1	0930	115	201.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	1198.	*	1	0935	116	184.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	1354.	*	1	0940	117	169.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	1549.	*	1	0945	118	155.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	1811.	*	1	0950	119	142.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	2160.	*	1	0955	120	130.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	2592.	*	1	1000	121	119.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	3138.	*	1	1005	122	109.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	3982.	*	1	1010	123	100.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	5434.	*	1	1015	124	91.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	7455.	*	1	1020	125	83.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	9612.	*	1	1025	126	76.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	11234.	*	1	1030	127	70.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	12255.	*	1	1035	128	63.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	12725.	*	1	1040	129	57.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	12797.	*	1	1045	130	52.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	12649.	*	1	1050	131	47.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	12343.	*	1	1055	132	43.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	11918.	*	1	1100	133	38.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	11422.	*	1	1105	134	34.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	10916.	*	1	1110	135	31.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	10471.	*	1	1115	136	28.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	10162.	*	1	1120	137	25.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	9988.	*	1	1125	138	22.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	9977.	*	1	1130	139	20.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	10081.	*	1	1135	140	18.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	10233.	*	1	1140	141	16.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	10401.	*	1	1145	142	14.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	10479.	*	1	1150	143	13.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	10382.	*	1	1155	144	12.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	10106.	*	1	1200	145	10.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	9658.	*	1	1205	146	9.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	9104.	*	1	1210	147	8.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	8493.	*	1	1215	148	7.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	7844.	*	1	1220	149	7.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	7201.	*	1	1225	150	6.	*	1	1840	225	0.	*	2	0055	300	0.

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 12797.	4.50		5157.	1318.	1270.	1270.
		(INCHES)	.815	.833	.833	.833
		(AC-FT)	2557.	2614.	2614.	2614.

CUMULATIVE AREA = 58.84 SQ MI

HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .74

DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW	*	DA MON HRMN	ORD	FLOW

1	0000	1	0.	*	1	0615	76	5297.	*	1	1230	151	6.	*	1	1845	226	0.
1	0005	2	0.	*	1	0620	77	4864.	*	1	1235	152	5.	*	1	1850	227	0.
1	0010	3	0.	*	1	0625	78	4457.	*	1	1240	153	5.	*	1	1855	228	0.
1	0015	4	0.	*	1	0630	79	4083.	*	1	1245	154	4.	*	1	1900	229	0.
1	0020	5	0.	*	1	0635	80	3746.	*	1	1250	155	4.	*	1	1905	230	0.
1	0025	6	0.	*	1	0640	81	3443.	*	1	1255	156	3.	*	1	1910	231	0.
1	0030	7	0.	*	1	0645	82	3167.	*	1	1300	157	3.	*	1	1915	232	0.
1	0035	8	1.	*	1	0650	83	2915.	*	1	1305	158	3.	*	1	1920	233	0.
1	0040	9	2.	*	1	0655	84	2686.	*	1	1310	159	2.	*	1	1925	234	0.
1	0045	10	4.	*	1	0700	85	2478.	*	1	1315	160	2.	*	1	1930	235	0.
1	0050	11	5.	*	1	0705	86	2286.	*	1	1320	161	2.	*	1	1935	236	0.
1	0055	12	7.	*	1	0710	87	2109.	*	1	1325	162	2.	*	1	1940	237	0.
1	0100	13	8.	*	1	0715	88	1944.	*	1	1330	163	1.	*	1	1945	238	0.
1	0105	14	9.	*	1	0720	89	1790.	*	1	1335	164	1.	*	1	1950	239	0.
1	0110	15	10.	*	1	0725	90	1649.	*	1	1340	165	1.	*	1	1955	240	0.
1	0115	16	11.	*	1	0730	91	1520.	*	1	1345	166	1.	*	1	2000	241	0.
1	0120	17	12.	*	1	0735	92	1399.	*	1	1350	167	1.	*	1	2005	242	0.
1	0125	18	14.	*	1	0740	93	1288.	*	1	1355	168	1.	*	1	2010	243	0.
1	0130	19	16.	*	1	0745	94	1185.	*	1	1400	169	1.	*	1	2015	244	0.
1	0135	20	19.	*	1	0750	95	1091.	*	1	1405	170	1.	*	1	2020	245	0.
1	0140	21	23.	*	1	0755	96	1004.	*	1	1410	171	0.	*	1	2025	246	0.
1	0145	22	29.	*	1	0800	97	922.	*	1	1415	172	0.	*	1	2030	247	0.
1	0150	23	35.	*	1	0805	98	846.	*	1	1420	173	0.	*	1	2035	248	0.
1	0155	24	43.	*	1	0810	99	775.	*	1	1425	174	0.	*	1	2040	249	0.
1	0200	25	52.	*	1	0815	100	711.	*	1	1430	175	0.	*	1	2045	250	0.
1	0205	26	63.	*	1	0820	101	653.	*	1	1435	176	0.	*	1	2050	251	0.
1	0210	27	76.	*	1	0825	102	600.	*	1	1440	177	0.	*	1	2055	252	0.
1	0215	28	90.	*	1	0830	103	551.	*	1	1445	178	0.	*	1	2100	253	0.
1	0220	29	106.	*	1	0835	104	506.	*	1	1450	179	0.	*	1	2105	254	0.
1	0225	30	123.	*	1	0840	105	463.	*	1	1455	180	0.	*	1	2110	255	0.
1	0230	31	140.	*	1	0845	106	424.	*	1	1500	181	0.	*	1	2115	256	0.
1	0235	32	160.	*	1	0850	107	387.	*	1	1505	182	0.	*	1	2120	257	0.
1	0240	33	181.	*	1	0855	108	353.	*	1	1510	183	0.	*	1	2125	258	0.
1	0245	34	207.	*	1	0900	109	322.	*	1	1515	184	0.	*	1	2130	259	0.
1	0250	35	238.	*	1	0905	110	294.	*	1	1520	185	0.	*	1	2135	260	0.
1	0255	36	277.	*	1	0910	111	269.	*	1	1525	186	0.	*	1	2140	261	0.
1	0300	37	325.	*	1	0915	112	246.	*	1	1530	187	0.	*	1	2145	262	0.
1	0305	38	384.	*	1	0920	113	225.	*	1	1535	188	0.	*	1	2150	263	0.
1	0310	39	456.	*	1	0925	114	206.	*	1	1540	189	0.	*	1	2155	264	0.
1	0315	40	541.	*	1	0930	115	189.	*	1	1545	190	0.	*	1	2200	265	0.
1	0320	41	639.	*	1	0935	116	173.	*	1	1550	191	0.	*	1	2205	266	0.
1	0325	42	756.	*	1	0940	117	159.	*	1	1555	192	0.	*	1	2210	267	0.
1	0330	43	896.	*	1	0945	118	146.	*	1	1600	193	0.	*	1	2215	268	0.
1	0335	44	1066.	*	1	0950	119	134.	*	1	1605	194	0.	*	1	2220	269	0.
1	0340	45	1285.	*	1	0955	120	123.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	1564.	*	1	1000	121	113.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	1890.	*	1	1005	122	104.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	2262.	*	1	1010	123	96.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	2792.	*	1	1015	124	88.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	3841.	*	1	1020	125	81.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	5466.	*	1	1025	126	74.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	7104.	*	1	1030	127	68.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	8281.	*	1	1035	128	62.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	8856.	*	1	1040	129	57.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	9022.	*	1	1045	130	52.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	8951.	*	1	1050	131	47.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	8750.	*	1	1055	132	43.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	8509.	*	1	1100	133	39.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	8263.	*	1	1105	134	35.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	8021.	*	1	1110	135	32.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	7784.	*	1	1115	136	29.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	7560.	*	1	1120	137	26.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	7384.	*	1	1125	138	23.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	7317.	*	1	1130	139	21.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	7360.	*	1	1135	140	19.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	7473.	*	1	1140	141	17.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	7616.	*	1	1145	142	15.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	7741.	*	1	1150	143	14.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	7772.	*	1	1155	144	13.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	7660.	*	1	1200	145	11.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	7416.	*	1	1205	146	10.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	7071.	*	1	1210	147	9.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	6661.	*	1	1215	148	8.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	6211.	*	1	1220	149	7.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	5750.	*	1	1225	150	7.	*	1	1840	225	0.	*	2	0055	300	0.

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR

+	(CFS)	(HR)				
			(CFS)			
+	9022.	4.50		3754.	958.	923.	923.
			(INCHES)	.593	.606	.606	.606
			(AC-FT)	1861.	1901.	1901.	1901.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .57

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	3490.	*	1		1230	151	10.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	3256.	*	1		1235	152	9.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	3027.	*	1		1240	153	8.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	2806.	*	1		1245	154	7.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	2594.	*	1		1250	155	7.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	2394.	*	1		1255	156	6.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	2208.	*	1		1300	157	6.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	2038.	*	1		1305	158	5.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	1883.	*	1		1310	159	5.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	1742.	*	1		1315	160	4.	*	1		1930	235	0.
1		0050	11	1.	*	1		0705	86	1614.	*	1		1320	161	4.	*	1		1935	236	0.
1		0055	12	1.	*	1		0710	87	1496.	*	1		1325	162	4.	*	1		1940	237	0.
1		0100	13	1.	*	1		0715	88	1387.	*	1		1330	163	3.	*	1		1945	238	0.
1		0105	14	1.	*	1		0720	89	1286.	*	1		1335	164	3.	*	1		1950	239	0.
1		0110	15	2.	*	1		0725	90	1193.	*	1		1340	165	3.	*	1		1955	240	0.
1		0115	16	2.	*	1		0730	91	1105.	*	1		1345	166	2.	*	1		2000	241	0.
1		0120	17	3.	*	1		0735	92	1024.	*	1		1350	167	2.	*	1		2005	242	0.
1		0125	18	3.	*	1		0740	93	950.	*	1		1355	168	2.	*	1		2010	243	0.
1		0130	19	4.	*	1		0745	94	881.	*	1		1400	169	2.	*	1		2015	244	0.
1		0135	20	5.	*	1		0750	95	817.	*	1		1405	170	2.	*	1		2020	245	0.
1		0140	21	7.	*	1		0755	96	758.	*	1		1410	171	1.	*	1		2025	246	0.
1		0145	22	9.	*	1		0800	97	704.	*	1		1415	172	1.	*	1		2030	247	0.
1		0150	23	11.	*	1		0805	98	653.	*	1		1420	173	1.	*	1		2035	248	0.
1		0155	24	13.	*	1		0810	99	606.	*	1		1425	174	1.	*	1		2040	249	0.
1		0200	25	15.	*	1		0815	100	562.	*	1		1430	175	1.	*	1		2045	250	0.
1		0205	26	18.	*	1		0820	101	522.	*	1		1435	176	1.	*	1		2050	251	0.
1		0210	27	21.	*	1		0825	102	484.	*	1		1440	177	1.	*	1		2055	252	0.
1		0215	28	24.	*	1		0830	103	448.	*	1		1445	178	1.	*	1		2100	253	0.
1		0220	29	26.	*	1		0835	104	415.	*	1		1450	179	1.	*	1		2105	254	0.
1		0225	30	28.	*	1		0840	105	385.	*	1		1455	180	0.	*	1		2110	255	0.
1		0230	31	30.	*	1		0845	106	357.	*	1		1500	181	0.	*	1		2115	256	0.
1		0235	32	32.	*	1		0850	107	331.	*	1		1505	182	0.	*	1		2120	257	0.
1		0240	33	35.	*	1		0855	108	306.	*	1		1510	183	0.	*	1		2125	258	0.
1		0245	34	39.	*	1		0900	109	284.	*	1		1515	184	0.	*	1		2130	259	0.
1		0250	35	44.	*	1		0905	110	262.	*	1		1520	185	0.	*	1		2135	260	0.
1		0255	36	52.	*	1		0910	111	242.	*	1		1525	186	0.	*	1		2140	261	0.
1		0300	37	63.	*	1		0915	112	224.	*	1		1530	187	0.	*	1		2145	262	0.
1		0305	38	80.	*	1		0920	113	206.	*	1		1535	188	0.	*	1		2150	263	0.
1		0310	39	102.	*	1		0925	114	190.	*	1		1540	189	0.	*	1		2155	264	0.
1		0315	40	133.	*	1		0930	115	175.	*	1		1545	190	0.	*	1		2200	265	0.
1		0320	41	172.	*	1		0935	116	161.	*	1		1550	191	0.	*	1		2205	266	0.
1		0325	42	223.	*	1		0940	117	149.	*	1		1555	192	0.	*	1		2210	267	0.
1		0330	43	290.	*	1		0945	118	137.	*	1		1600	193	0.	*	1		2215	268	0.
1		0335	44	374.	*	1		0950	119	127.	*	1		1605	194	0.	*	1		2220	269	0.
1		0340	45	474.	*	1		0955	120	117.	*	1		1610	195	0.	*	1		2225	270	0.
1		0345	46	578.	*	1		1000	121	108.	*	1		1615	196	0.	*	1		2230	271	0.
1		0350	47	681.	*	1		1005	122	100.	*	1		1620	197	0.	*	1		2235	272	0.
1		0355	48	841.	*	1		1010	123	92.	*	1		1625	198	0.	*	1		2240	273	0.
1		0400	49	1045.	*	1		1015	124	86.	*	1		1630	199	0.	*	1		2245	274	0.
1		0405	50	1232.	*	1		1020	125	79.	*	1		1635	200	0.	*	1		2250	275	0.
1		0410	51	1415.	*	1		1025	126	74.	*	1		1640	201	0.	*	1		2255	276	0.
1		0415	52	1856.	*	1		1030	127	69.	*	1		1645	202	0.	*	1		2300	277	0.
1		0420	53	2878.	*	1		1035	128	64.	*	1		1650	203	0.	*	1		2305	278	0.
1		0425	54	4051.	*	1		1040	129	59.	*	1		1655	204	0.	*	1		2310	279	0.
1		0430	55	4712.	*	1		1045	130	55.	*	1		1700	205	0.	*	1		2315	280	0.
1		0435	56	4943.	*	1		1050	131	52.	*	1		1705	206	0.	*	1		2320	281	0.
1		0440	57	4976.	*	1		1055	132	48.	*	1		1710	207	0.	*	1		2325	282	0.
1		0445	58	4886.	*	1		1100	133	45.	*	1		1715	208	0.	*	1		2330	283	0.
1		0450	59	4736.	*	1		1105	134	42.	*	1		1720	209	0.	*	1		2335	284	0.
1		0455	60	4568.	*	1		1110	135	39.	*	1		1725	210	0.	*	1		2340	285	0.
1		0500	61	4412.	*	1		1115	136	36.	*	1		1730	211	0.	*	1		2345	286	0.
1		0505	62	4282.	*	1		1120	137	34.	*	1		1735	212	0.	*	1		2350	287	0.

1	0510	63	4190.	*	1	1125	138	31.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	4149.	*	1	1130	139	29.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	4156.	*	1	1135	140	26.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	4193.	*	1	1140	141	24.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	4246.	*	1	1145	142	22.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	4321.	*	1	1150	143	20.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	4418.	*	1	1155	144	19.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	4498.	*	1	1200	145	17.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	4492.	*	1	1205	146	15.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	4373.	*	1	1210	147	14.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	4184.	*	1	1215	148	13.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	3965.	*	1	1220	149	12.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	3730.	*	1	1225	150	11.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 4976.	4.67		2129.	544.	524.	524.
		(INCHES)	.336	.344	.344	.344
		(AC-FT)	1056.	1080.	1080.	1080.

CUMULATIVE AREA = 58.84 SQ MI

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HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .44

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	2038.	*	1		1230	151	13.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	1924.	*	1		1235	152	12.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	1797.	*	1		1240	153	12.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	1673.	*	1		1245	154	11.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	1574.	*	1		1250	155	10.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	1490.	*	1		1255	156	9.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	1400.	*	1		1300	157	8.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	1308.	*	1		1305	158	8.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	1227.	*	1		1310	159	7.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	1147.	*	1		1315	160	7.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	1061.	*	1		1320	161	6.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	983.	*	1		1325	162	6.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	918.	*	1		1330	163	5.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	854.	*	1		1335	164	5.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	794.	*	1		1340	165	5.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	744.	*	1		1345	166	4.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	695.	*	1		1350	167	4.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	649.	*	1		1355	168	4.	*	1		2010	243	0.
1		0130	19	1.	*	1		0745	94	609.	*	1		1400	169	3.	*	1		2015	244	0.
1		0135	20	1.	*	1		0750	95	569.	*	1		1405	170	3.	*	1		2020	245	0.
1		0140	21	1.	*	1		0755	96	531.	*	1		1410	171	3.	*	1		2025	246	0.
1		0145	22	1.	*	1		0800	97	499.	*	1		1415	172	3.	*	1		2030	247	0.
1		0150	23	2.	*	1		0805	98	466.	*	1		1420	173	2.	*	1		2035	248	0.
1		0155	24	3.	*	1		0810	99	436.	*	1		1425	174	2.	*	1		2040	249	0.
1		0200	25	4.	*	1		0815	100	409.	*	1		1430	175	2.	*	1		2045	250	0.
1		0205	26	5.	*	1		0820	101	382.	*	1		1435	176	2.	*	1		2050	251	0.
1		0210	27	6.	*	1		0825	102	359.	*	1		1440	177	2.	*	1		2055	252	0.
1		0215	28	7.	*	1		0830	103	336.	*	1		1445	178	2.	*	1		2100	253	0.
1		0220	29	8.	*	1		0835	104	315.	*	1		1450	179	2.	*	1		2105	254	0.
1		0225	30	9.	*	1		0840	105	296.	*	1		1455	180	1.	*	1		2110	255	0.
1		0230	31	9.	*	1		0845	106	277.	*	1		1500	181	1.	*	1		2115	256	0.
1		0235	32	9.	*	1		0850	107	260.	*	1		1505	182	1.	*	1		2120	257	0.
1		0240	33	9.	*	1		0855	108	244.	*	1		1510	183	1.	*	1		2125	258	0.
1		0245	34	9.	*	1		0900	109	229.	*	1		1515	184	1.	*	1		2130	259	0.
1		0250	35	10.	*	1		0905	110	215.	*	1		1520	185	1.	*	1		2135	260	0.
1		0255	36	12.	*	1		0910	111	202.	*	1		1525	186	1.	*	1		2140	261	0.
1		0300	37	15.	*	1		0915	112	189.	*	1		1530	187	1.	*	1		2145	262	0.
1		0305	38	19.	*	1		0920	113	177.	*	1		1535	188	1.	*	1		2150	263	0.
1		0310	39	26.	*	1		0925	114	165.	*	1		1540	189	1.	*	1		2155	264	0.
1		0315	40	35.	*	1		0930	115	154.	*	1		1545	190	1.	*	1		2200	265	0.
1		0320	41	48.	*	1		0935	116	144.	*	1		1550	191	1.	*	1		2205	266	0.
1		0325	42	66.	*	1		0940	117	134.	*	1		1555	192	1.	*	1		2210	267	0.
1		0330	43	93.	*	1		0945	118	125.	*	1		1600	193	0.	*	1		2215	268	0.
1		0335	44	128.	*	1		0950	119	116.	*	1		1605	194	0.	*	1		2220	269	0.

1	0340	45	171.	*	1	0955	120	109.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	216.	*	1	1000	121	101.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	258.	*	1	1005	122	95.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	297.	*	1	1010	123	88.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	334.	*	1	1015	124	82.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	369.	*	1	1020	125	77.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	468.	*	1	1025	126	72.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	566.	*	1	1030	127	67.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	605.	*	1	1035	128	62.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	632.	*	1	1040	129	58.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	653.	*	1	1045	130	54.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	1178.	*	1	1050	131	51.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	2618.	*	1	1055	132	47.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	2656.	*	1	1100	133	44.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	2405.	*	1	1105	134	41.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	2645.	*	1	1110	135	39.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	2446.	*	1	1115	136	36.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	2483.	*	1	1120	137	34.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	2358.	*	1	1125	138	32.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	2303.	*	1	1130	139	30.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	2261.	*	1	1135	140	28.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	2215.	*	1	1140	141	26.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	2197.	*	1	1145	142	25.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	2179.	*	1	1150	143	23.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	2227.	*	1	1155	144	22.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	2293.	*	1	1200	145	20.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	2362.	*	1	1205	146	19.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	2407.	*	1	1210	147	18.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	2383.	*	1	1215	148	17.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	2276.	*	1	1220	149	16.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	2150.	*	1	1225	150	14.	*	1	1840	225	0.	*	2	0055	300	0.

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
(CFS)	(HR)				
		(CFS)			
2656.	4.75	1116.	288.	277.	277.
		(INCHES) .176	.182	.182	.182
		(AC-FT) 553.	571.	571.	571.

CUMULATIVE AREA = 58.84 SQ MI

HYDROGRAPH AT STATION ULWIN
SUM OF 4 HYDROGRAPHS
PLAN 1, RATIO = .26

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	496.	*	1		1230	151	7.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	543.	*	1		1235	152	7.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	515.	*	1		1240	153	6.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	551.	*	1		1245	154	6.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	512.	*	1		1250	155	6.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	500.	*	1		1255	156	5.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	469.	*	1		1300	157	5.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	443.	*	1		1305	158	5.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	419.	*	1		1310	159	5.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	384.	*	1		1315	160	4.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	367.	*	1		1320	161	4.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	346.	*	1		1325	162	4.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	326.	*	1		1330	163	4.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	301.	*	1		1335	164	4.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	283.	*	1		1340	165	4.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	265.	*	1		1345	166	3.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	251.	*	1		1350	167	3.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	234.	*	1		1355	168	3.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	221.	*	1		1400	169	3.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	211.	*	1		1405	170	3.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	200.	*	1		1410	171	3.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	188.	*	1		1415	172	3.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	177.	*	1		1420	173	2.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	165.	*	1		1425	174	2.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	151.	*	1		1430	175	2.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	141.	*	1		1435	176	2.	*	1		2050	251	0.

1	0210	27	0.	*	1	0825	102	133.	*	1	1440	177	2.	*	1	2055	252	0.
1	0215	28	0.	*	1	0830	103	126.	*	1	1445	178	2.	*	1	2100	253	0.
1	0220	29	0.	*	1	0835	104	121.	*	1	1450	179	2.	*	1	2105	254	0.
1	0225	30	0.	*	1	0840	105	117.	*	1	1455	180	2.	*	1	2110	255	0.
1	0230	31	0.	*	1	0845	106	110.	*	1	1500	181	1.	*	1	2115	256	0.
1	0235	32	0.	*	1	0850	107	101.	*	1	1505	182	1.	*	1	2120	257	0.
1	0240	33	0.	*	1	0855	108	93.	*	1	1510	183	1.	*	1	2125	258	0.
1	0245	34	0.	*	1	0900	109	88.	*	1	1515	184	1.	*	1	2130	259	0.
1	0250	35	0.	*	1	0905	110	86.	*	1	1520	185	1.	*	1	2135	260	0.
1	0255	36	0.	*	1	0910	111	85.	*	1	1525	186	1.	*	1	2140	261	0.
1	0300	37	1.	*	1	0915	112	82.	*	1	1530	187	1.	*	1	2145	262	0.
1	0305	38	1.	*	1	0920	113	78.	*	1	1535	188	1.	*	1	2150	263	0.
1	0310	39	2.	*	1	0925	114	73.	*	1	1540	189	1.	*	1	2155	264	0.
1	0315	40	3.	*	1	0930	115	69.	*	1	1545	190	1.	*	1	2200	265	0.
1	0320	41	5.	*	1	0935	116	67.	*	1	1550	191	1.	*	1	2205	266	0.
1	0325	42	9.	*	1	0940	117	63.	*	1	1555	192	1.	*	1	2210	267	0.
1	0330	43	14.	*	1	0945	118	58.	*	1	1600	193	1.	*	1	2215	268	0.
1	0335	44	21.	*	1	0950	119	54.	*	1	1605	194	1.	*	1	2220	269	0.
1	0340	45	29.	*	1	0955	120	51.	*	1	1610	195	1.	*	1	2225	270	0.
1	0345	46	35.	*	1	1000	121	49.	*	1	1615	196	1.	*	1	2230	271	0.
1	0350	47	40.	*	1	1005	122	47.	*	1	1620	197	1.	*	1	2235	272	0.
1	0355	48	43.	*	1	1010	123	45.	*	1	1625	198	1.	*	1	2240	273	0.
1	0400	49	48.	*	1	1015	124	42.	*	1	1630	199	1.	*	1	2245	274	0.
1	0405	50	54.	*	1	1020	125	40.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	60.	*	1	1025	126	37.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	65.	*	1	1030	127	35.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	67.	*	1	1035	128	33.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	69.	*	1	1040	129	30.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	70.	*	1	1045	130	28.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	72.	*	1	1050	131	26.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	74.	*	1	1055	132	25.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	77.	*	1	1100	133	23.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	87.	*	1	1105	134	22.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	108.	*	1	1110	135	20.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	106.	*	1	1115	136	19.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	108.	*	1	1120	137	18.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	114.	*	1	1125	138	16.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	112.	*	1	1130	139	15.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	113.	*	1	1135	140	14.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	113.	*	1	1140	141	13.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	196.	*	1	1145	142	13.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	576.	*	1	1150	143	12.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	577.	*	1	1155	144	11.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	368.	*	1	1200	145	10.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	564.	*	1	1205	146	10.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	462.	*	1	1210	147	9.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	417.	*	1	1215	148	9.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	554.	*	1	1220	149	8.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	445.	*	1	1225	150	8.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*					

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 577.	5.67		222.	59.	57.	57.
		(INCHES)	.035	.037	.037	.037
		(AC-FT)	110.	117.	117.	117.

CUMULATIVE AREA = 58.84 SQ MI

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              *            *
1305 KK       *   FINISH   *
              *            *
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1307 KO OUTPUT CONTROL VARIABLES

IPRNT	1	PRINT CONTROL
IPLOT	0	PLOT CONTROL
QSCAL	0.	HYDROGRAPH PLOT SCALE

HYDROGRAPH ROUTING DATA

1306 RD MUSKINGUM-CUNGE CHANNEL ROUTING

L	1500.	CHANNEL LENGTH
S	.0090	SLOPE
N	.050	CHANNEL ROUGHNESS COEFFICIENT
CA	.00	CONTRIBUTING AREA
SHAPE	TRAP	CHANNEL SHAPE
WD	250.00	BOTTOM WIDTH OR DIAMETER
Z	3.00	SIDE SLOPE

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COMPUTED MUSKINGUM-CUNGE PARAMETERS
COMPUTATION TIME STEP

ELEMENT	ALPHA	M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	2.45	750.00	11279.67	377.53	1.14	10.20
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		11268.66	380.00	1.14	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .5383E+04 EXCESS= .0000E+00 OUTFLOW= .5383E+04 BASIN STORAGE= .1063E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = 1.00

DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	11262.	1		1230	151	2683.	1		1845	226	176.
1		0005	2	0.	1		0620	77	11269.	1		1235	152	2660.	1		1850	227	138.
1		0010	3	0.	1		0625	78	11154.	1		1240	153	2636.	1		1855	228	105.
1		0015	4	0.	1		0630	79	10948.	1		1245	154	2611.	1		1900	229	79.
1		0020	5	0.	1		0635	80	10670.	1		1250	155	2587.	1		1905	230	59.
1		0025	6	0.	1		0640	81	10339.	1		1255	156	2563.	1		1910	231	44.
1		0030	7	0.	1		0645	82	9970.	1		1300	157	2540.	1		1915	232	33.
1		0035	8	1.	1		0650	83	9577.	1		1305	158	2516.	1		1920	233	25.
1		0040	9	3.	1		0655	84	9168.	1		1310	159	2492.	1		1925	234	18.
1		0045	10	6.	1		0700	85	8750.	1		1315	160	2467.	1		1930	235	14.
1		0050	11	11.	1		0705	86	8329.	1		1320	161	2442.	1		1935	236	10.
1		0055	12	20.	1		0710	87	7911.	1		1325	162	2416.	1		1940	237	8.
1		0100	13	31.	1		0715	88	7498.	1		1330	163	2390.	1		1945	238	6.
1		0105	14	46.	1		0720	89	7094.	1		1335	164	2365.	1		1950	239	4.
1		0110	15	64.	1		0725	90	6698.	1		1340	165	2340.	1		1955	240	3.
1		0115	16	85.	1		0730	91	6313.	1		1345	166	2315.	1		2000	241	2.
1		0120	17	107.	1		0735	92	5938.	1		1350	167	2288.	1		2005	242	2.
1		0125	18	131.	1		0740	93	5577.	1		1355	168	2260.	1		2010	243	1.
1		0130	19	155.	1		0745	94	5237.	1		1400	169	2232.	1		2015	244	1.
1		0135	20	181.	1		0750	95	4938.	1		1405	170	2204.	1		2020	245	1.
1		0140	21	210.	1		0755	96	4710.	1		1410	171	2176.	1		2025	246	1.
1		0145	22	243.	1		0800	97	4562.	1		1415	172	2149.	1		2030	247	0.
1		0150	23	283.	1		0805	98	4464.	1		1420	173	2121.	1		2035	248	0.
1		0155	24	330.	1		0810	99	4382.	1		1425	174	2092.	1		2040	249	0.
1		0200	25	387.	1		0815	100	4304.	1		1430	175	2061.	1		2045	250	0.
1		0205	26	456.	1		0820	101	4232.	1		1435	176	2030.	1		2050	251	0.
1		0210	27	536.	1		0825	102	4163.	1		1440	177	1998.	1		2055	252	0.
1		0215	28	625.	1		0830	103	4098.	1		1445	178	1968.	1		2100	253	0.
1		0220	29	721.	1		0835	104	4037.	1		1450	179	1937.	1		2105	254	0.
1		0225	30	816.	1		0840	105	3979.	1		1455	180	1906.	1		2110	255	0.
1		0230	31	902.	1		0845	106	3924.	1		1500	181	1872.	1		2115	256	0.
1		0235	32	980.	1		0850	107	3872.	1		1505	182	1836.	1		2120	257	0.
1		0240	33	1051.	1		0855	108	3823.	1		1510	183	1801.	1		2125	258	0.
1		0245	34	1115.	1		0900	109	3777.	1		1515	184	1766.	1		2130	259	0.
1		0250	35	1175.	1		0905	110	3733.	1		1520	185	1732.	1		2135	260	0.
1		0255	36	1240.	1		0910	111	3692.	1		1525	186	1697.	1		2140	261	0.
1		0300	37	1315.	1		0915	112	3653.	1		1530	187	1661.	1		2145	262	0.
1		0305	38	1405.	1		0920	113	3616.	1		1535	188	1624.	1		2150	263	0.
1		0310	39	1523.	1		0925	114	3581.	1		1540	189	1587.	1		2155	264	0.
1		0315	40	1690.	1		0930	115	3548.	1		1545	190	1550.	1		2200	265	0.
1		0320	41	1927.	1		0935	116	3515.	1		1550	191	1515.	1		2205	266	0.
1		0325	42	2253.	1		0940	117	3483.	1		1555	192	1479.	1		2210	267	0.
1		0330	43	2688.	1		0945	118	3452.	1		1600	193	1441.	1		2215	268	0.

1	0335	44	3248.	*	1	0950	119	3422.	*	1	1605	194	1402.	*	1	2220	269	0.
1	0340	45	3920.	*	1	0955	120	3394.	*	1	1610	195	1364.	*	1	2225	270	0.
1	0345	46	4672.	*	1	1000	121	3366.	*	1	1615	196	1326.	*	1	2230	271	0.
1	0350	47	5478.	*	1	1005	122	3340.	*	1	1620	197	1290.	*	1	2235	272	0.
1	0355	48	6299.	*	1	1010	123	3314.	*	1	1625	198	1253.	*	1	2240	273	0.
1	0400	49	7068.	*	1	1015	124	3290.	*	1	1630	199	1215.	*	1	2245	274	0.
1	0405	50	7730.	*	1	1020	125	3265.	*	1	1635	200	1175.	*	1	2250	275	0.
1	0410	51	8277.	*	1	1025	126	3241.	*	1	1640	201	1136.	*	1	2255	276	0.
1	0415	52	8722.	*	1	1030	127	3216.	*	1	1645	202	1097.	*	1	2300	277	0.
1	0420	53	9062.	*	1	1035	128	3192.	*	1	1650	203	1060.	*	1	2305	278	0.
1	0425	54	9284.	*	1	1040	129	3168.	*	1	1655	204	1023.	*	1	2310	279	0.
1	0430	55	9398.	*	1	1045	130	3145.	*	1	1700	205	986.	*	1	2315	280	0.
1	0435	56	9438.	*	1	1050	131	3123.	*	1	1705	206	947.	*	1	2320	281	0.
1	0440	57	9439.	*	1	1055	132	3101.	*	1	1710	207	907.	*	1	2325	282	0.
1	0445	58	9426.	*	1	1100	133	3079.	*	1	1715	208	868.	*	1	2330	283	0.
1	0450	59	9443.	*	1	1105	134	3058.	*	1	1720	209	831.	*	1	2335	284	0.
1	0455	60	9527.	*	1	1110	135	3037.	*	1	1725	210	795.	*	1	2340	285	0.
1	0500	61	9672.	*	1	1115	136	3014.	*	1	1730	211	760.	*	1	2345	286	0.
1	0505	62	9844.	*	1	1120	137	2992.	*	1	1735	212	722.	*	1	2350	287	0.
1	0510	63	10017.	*	1	1125	138	2970.	*	1	1740	213	682.	*	1	2355	288	0.
1	0515	64	10170.	*	1	1130	139	2948.	*	1	1745	214	641.	*	2	0000	289	0.
1	0520	65	10269.	*	1	1135	140	2926.	*	1	1750	215	601.	*	2	0005	290	0.
1	0525	66	10296.	*	1	1140	141	2905.	*	1	1755	216	563.	*	2	0010	291	0.
1	0530	67	10250.	*	1	1145	142	2884.	*	1	1800	217	528.	*	2	0015	292	0.
1	0535	68	10137.	*	1	1150	143	2863.	*	1	1805	218	493.	*	2	0020	293	0.
1	0540	69	9970.	*	1	1155	144	2840.	*	1	1810	219	450.	*	2	0025	294	0.
1	0545	70	9775.	*	1	1200	145	2818.	*	1	1815	220	403.	*	2	0030	295	0.
1	0550	71	9648.	*	1	1205	146	2795.	*	1	1820	221	357.	*	2	0035	296	0.
1	0555	72	9780.	*	1	1210	147	2772.	*	1	1825	222	316.	*	2	0040	297	0.
1	0600	73	10239.	*	1	1215	148	2749.	*	1	1830	223	279.	*	2	0045	298	0.
1	0605	74	10767.	*	1	1220	149	2727.	*	1	1835	224	245.	*	2	0050	299	0.
1	0610	75	11111.	*	1	1225	150	2705.	*	1	1840	225	212.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 11269.	6.33		7379.	2714.	2614.	2614.
		(INCHES)	.772	1.136	1.136	1.136
		(AC-FT)	3659.	5383.	5383.	5383.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	2.73	750.00	8549.73	324.96	.88	9.16

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.08	1.64	5.00		8549.72	325.00	.88

CONTINUITY SUMMARY (AC-FT) - INFLOW= .4175E+04 EXCESS= .0000E+00 OUTFLOW= .4175E+04 BASIN STORAGE= .1056E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .87

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	6964.	*	1		1230	151	2378.	*	1		1845	226	6.
1		0005	2	0.	*	1		0620	77	6778.	*	1		1235	152	2352.	*	1		1850	227	5.
1		0010	3	0.	*	1		0625	78	6598.	*	1		1240	153	2326.	*	1		1855	228	4.
1		0015	4	0.	*	1		0630	79	6422.	*	1		1245	154	2299.	*	1		1900	229	3.
1		0020	5	0.	*	1		0635	80	6252.	*	1		1250	155	2270.	*	1		1905	230	2.
1		0025	6	0.	*	1		0640	81	6085.	*	1		1255	156	2241.	*	1		1910	231	2.
1		0030	7	0.	*	1		0645	82	5923.	*	1		1300	157	2213.	*	1		1915	232	1.
1		0035	8	0.	*	1		0650	83	5767.	*	1		1305	158	2185.	*	1		1920	233	1.

1	0040	9	0.	*	1	0655	84	5617.	*	1	1310	159	2157.	*	1	1925	234	1.
1	0045	10	1.	*	1	0700	85	5474.	*	1	1315	160	2129.	*	1	1930	235	0.
1	0050	11	2.	*	1	0705	86	5337.	*	1	1320	161	2099.	*	1	1935	236	0.
1	0055	12	4.	*	1	0710	87	5206.	*	1	1325	162	2068.	*	1	1940	237	0.
1	0100	13	7.	*	1	0715	88	5081.	*	1	1330	163	2036.	*	1	1945	238	0.
1	0105	14	12.	*	1	0720	89	4962.	*	1	1335	164	2004.	*	1	1950	239	0.
1	0110	15	18.	*	1	0725	90	4849.	*	1	1340	165	1973.	*	1	1955	240	0.
1	0115	16	26.	*	1	0730	91	4741.	*	1	1345	166	1942.	*	1	2000	241	0.
1	0120	17	35.	*	1	0735	92	4636.	*	1	1350	167	1910.	*	1	2005	242	0.
1	0125	18	46.	*	1	0740	93	4534.	*	1	1355	168	1876.	*	1	2010	243	0.
1	0130	19	59.	*	1	0745	94	4438.	*	1	1400	169	1840.	*	1	2015	244	0.
1	0135	20	74.	*	1	0750	95	4346.	*	1	1405	170	1804.	*	1	2020	245	0.
1	0140	21	91.	*	1	0755	96	4260.	*	1	1410	171	1769.	*	1	2025	246	0.
1	0145	22	112.	*	1	0800	97	4181.	*	1	1415	172	1735.	*	1	2030	247	0.
1	0150	23	136.	*	1	0805	98	4107.	*	1	1420	173	1700.	*	1	2035	248	0.
1	0155	24	165.	*	1	0810	99	4037.	*	1	1425	174	1664.	*	1	2040	249	0.
1	0200	25	199.	*	1	0815	100	3972.	*	1	1430	175	1626.	*	1	2045	250	0.
1	0205	26	239.	*	1	0820	101	3910.	*	1	1435	176	1589.	*	1	2050	251	0.
1	0210	27	286.	*	1	0825	102	3851.	*	1	1440	177	1553.	*	1	2055	252	0.
1	0215	28	338.	*	1	0830	103	3796.	*	1	1445	178	1517.	*	1	2100	253	0.
1	0220	29	395.	*	1	0835	104	3744.	*	1	1450	179	1481.	*	1	2105	254	0.
1	0225	30	455.	*	1	0840	105	3694.	*	1	1455	180	1444.	*	1	2110	255	0.
1	0230	31	518.	*	1	0845	106	3647.	*	1	1500	181	1405.	*	1	2115	256	0.
1	0235	32	581.	*	1	0850	107	3602.	*	1	1505	182	1366.	*	1	2120	257	0.
1	0240	33	641.	*	1	0855	108	3559.	*	1	1510	183	1329.	*	1	2125	258	0.
1	0245	34	695.	*	1	0900	109	3518.	*	1	1515	184	1292.	*	1	2130	259	0.
1	0250	35	738.	*	1	0905	110	3479.	*	1	1520	185	1255.	*	1	2135	260	0.
1	0255	36	776.	*	1	0910	111	3442.	*	1	1525	186	1217.	*	1	2140	261	0.
1	0300	37	817.	*	1	0915	112	3406.	*	1	1530	187	1178.	*	1	2145	262	0.
1	0305	38	873.	*	1	0920	113	3371.	*	1	1535	188	1138.	*	1	2150	263	0.
1	0310	39	956.	*	1	0925	114	3337.	*	1	1540	189	1100.	*	1	2155	264	0.
1	0315	40	1079.	*	1	0930	115	3305.	*	1	1545	190	1062.	*	1	2200	265	0.
1	0320	41	1258.	*	1	0935	116	3273.	*	1	1550	191	1025.	*	1	2205	266	0.
1	0325	42	1505.	*	1	0940	117	3243.	*	1	1555	192	988.	*	1	2210	267	0.
1	0330	43	1839.	*	1	0945	118	3214.	*	1	1600	193	949.	*	1	2215	268	0.
1	0335	44	2277.	*	1	0950	119	3186.	*	1	1605	194	909.	*	1	2220	269	0.
1	0340	45	2808.	*	1	0955	120	3159.	*	1	1610	195	870.	*	1	2225	270	0.
1	0345	46	3413.	*	1	1000	121	3132.	*	1	1615	196	833.	*	1	2230	271	0.
1	0350	47	4067.	*	1	1005	122	3105.	*	1	1620	197	797.	*	1	2235	272	0.
1	0355	48	4738.	*	1	1010	123	3077.	*	1	1625	198	762.	*	1	2240	273	0.
1	0400	49	5368.	*	1	1015	124	3050.	*	1	1630	199	725.	*	1	2245	274	0.
1	0405	50	5909.	*	1	1020	125	3024.	*	1	1635	200	686.	*	1	2250	275	0.
1	0410	51	6356.	*	1	1025	126	2999.	*	1	1640	201	647.	*	1	2255	276	0.
1	0415	52	6728.	*	1	1030	127	2974.	*	1	1645	202	609.	*	1	2300	277	0.
1	0420	53	7036.	*	1	1035	128	2949.	*	1	1650	203	573.	*	1	2305	278	0.
1	0425	54	7273.	*	1	1040	129	2925.	*	1	1655	204	539.	*	1	2310	279	0.
1	0430	55	7432.	*	1	1045	130	2901.	*	1	1700	205	505.	*	1	2315	280	0.
1	0435	56	7526.	*	1	1050	131	2877.	*	1	1705	206	469.	*	1	2320	281	0.
1	0440	57	7576.	*	1	1055	132	2852.	*	1	1710	207	428.	*	1	2325	282	0.
1	0445	58	7606.	*	1	1100	133	2827.	*	1	1715	208	384.	*	1	2330	283	0.
1	0450	59	7654.	*	1	1105	134	2803.	*	1	1720	209	343.	*	1	2335	284	0.
1	0455	60	7753.	*	1	1110	135	2779.	*	1	1725	210	305.	*	1	2340	285	0.
1	0500	61	7902.	*	1	1115	136	2755.	*	1	1730	211	271.	*	1	2345	286	0.
1	0505	62	8072.	*	1	1120	137	2732.	*	1	1735	212	239.	*	1	2350	287	0.
1	0510	63	8243.	*	1	1125	138	2708.	*	1	1740	213	207.	*	1	2355	288	0.
1	0515	64	8395.	*	1	1130	139	2684.	*	1	1745	214	171.	*	2	0000	289	0.
1	0520	65	8503.	*	1	1135	140	2659.	*	1	1750	215	135.	*	2	0005	290	0.
1	0525	66	8550.	*	1	1140	141	2633.	*	1	1755	216	103.	*	2	0010	291	0.
1	0530	67	8533.	*	1	1145	142	2608.	*	1	1800	217	78.	*	2	0015	292	0.
1	0535	68	8461.	*	1	1150	143	2584.	*	1	1805	218	59.	*	2	0020	293	0.
1	0540	69	8342.	*	1	1155	144	2559.	*	1	1810	219	45.	*	2	0025	294	0.
1	0545	70	8184.	*	1	1200	145	2535.	*	1	1815	220	34.	*	2	0030	295	0.
1	0550	71	7999.	*	1	1205	146	2510.	*	1	1820	221	25.	*	2	0035	296	0.
1	0555	72	7796.	*	1	1210	147	2484.	*	1	1825	222	19.	*	2	0040	297	0.
1	0600	73	7584.	*	1	1215	148	2457.	*	1	1830	223	15.	*	2	0045	298	0.
1	0605	74	7369.	*	1	1220	149	2431.	*	1	1835	224	11.	*	2	0050	299	0.
1	0610	75	7160.	*	1	1225	150	2404.	*	1	1840	225	8.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 8550.	5.42		5669.	2105.	2027.	2027.
		(INCHES)	.593	.881	.881	.881
		(AC-FT)	2811.	4175.	4175.	4175.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	COMPUTATION TIME STEP M	DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	2.99	750.00	6767.18	328.96	.64	8.36
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		6763.94	330.00	.64	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .3052E+04 EXCESS= .0000E+00 OUTFLOW= .3052E+04 BASIN STORAGE= .1017E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .74

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	5688.	1		1230	151	1578.	1		1845	226	0.
1		0005	2	0.	1		0620	77	5555.	1		1235	152	1541.	1		1850	227	0.
1		0010	3	0.	1		0625	78	5425.	1		1240	153	1504.	1		1855	228	0.
1		0015	4	0.	1		0630	79	5298.	1		1245	154	1466.	1		1900	229	0.
1		0020	5	0.	1		0635	80	5174.	1		1250	155	1427.	1		1905	230	0.
1		0025	6	0.	1		0640	81	5051.	1		1255	156	1388.	1		1910	231	0.
1		0030	7	0.	1		0645	82	4930.	1		1300	157	1349.	1		1915	232	0.
1		0035	8	0.	1		0650	83	4813.	1		1305	158	1311.	1		1920	233	0.
1		0040	9	0.	1		0655	84	4701.	1		1310	159	1274.	1		1925	234	0.
1		0045	10	0.	1		0700	85	4592.	1		1315	160	1236.	1		1930	235	0.
1		0050	11	0.	1		0705	86	4486.	1		1320	161	1197.	1		1935	236	0.
1		0055	12	0.	1		0710	87	4385.	1		1325	162	1157.	1		1940	237	0.
1		0100	13	0.	1		0715	88	4288.	1		1330	163	1117.	1		1945	238	0.
1		0105	14	1.	1		0720	89	4195.	1		1335	164	1079.	1		1950	239	0.
1		0110	15	2.	1		0725	90	4106.	1		1340	165	1042.	1		1955	240	0.
1		0115	16	3.	1		0730	91	4020.	1		1345	166	1004.	1		2000	241	0.
1		0120	17	5.	1		0735	92	3937.	1		1350	167	966.	1		2005	242	0.
1		0125	18	8.	1		0740	93	3855.	1		1355	168	926.	1		2010	243	0.
1		0130	19	12.	1		0745	94	3777.	1		1400	169	886.	1		2015	244	0.
1		0135	20	17.	1		0750	95	3703.	1		1405	170	848.	1		2020	245	0.
1		0140	21	24.	1		0755	96	3633.	1		1410	171	812.	1		2025	246	0.
1		0145	22	34.	1		0800	97	3567.	1		1415	172	776.	1		2030	247	0.
1		0150	23	45.	1		0805	98	3504.	1		1420	173	740.	1		2035	248	0.
1		0155	24	60.	1		0810	99	3446.	1		1425	174	701.	1		2040	249	0.
1		0200	25	78.	1		0815	100	3391.	1		1430	175	662.	1		2045	250	0.
1		0205	26	100.	1		0820	101	3338.	1		1435	176	623.	1		2050	251	0.
1		0210	27	126.	1		0825	102	3287.	1		1440	177	587.	1		2055	252	0.
1		0215	28	155.	1		0830	103	3238.	1		1445	178	552.	1		2100	253	0.
1		0220	29	187.	1		0835	104	3190.	1		1450	179	519.	1		2105	254	0.
1		0225	30	221.	1		0840	105	3145.	1		1455	180	485.	1		2110	255	0.
1		0230	31	256.	1		0845	106	3101.	1		1500	181	447.	1		2115	256	0.
1		0235	32	291.	1		0850	107	3059.	1		1505	182	407.	1		2120	257	0.
1		0240	33	323.	1		0855	108	3018.	1		1510	183	367.	1		2125	258	0.
1		0245	34	352.	1		0900	109	2979.	1		1515	184	328.	1		2130	259	0.
1		0250	35	379.	1		0905	110	2941.	1		1520	185	292.	1		2135	260	0.
1		0255	36	406.	1		0910	111	2904.	1		1525	186	260.	1		2140	261	0.
1		0300	37	436.	1		0915	112	2868.	1		1530	187	230.	1		2145	262	0.
1		0305	38	473.	1		0920	113	2832.	1		1535	188	197.	1		2150	263	0.
1		0310	39	527.	1		0925	114	2797.	1		1540	189	161.	1		2155	264	0.
1		0315	40	603.	1		0930	115	2763.	1		1545	190	125.	1		2200	265	0.
1		0320	41	711.	1		0935	116	2730.	1		1550	191	96.	1		2205	266	0.
1		0325	42	866.	1		0940	117	2698.	1		1555	192	73.	1		2210	267	0.
1		0330	43	1083.	1		0945	118	2666.	1		1600	193	55.	1		2215	268	0.
1		0335	44	1381.	1		0950	119	2635.	1		1605	194	42.	1		2220	269	0.
1		0340	45	1776.	1		0955	120	2604.	1		1610	195	32.	1		2225	270	0.
1		0345	46	2244.	1		1000	121	2572.	1		1615	196	24.	1		2230	271	0.
1		0350	47	2756.	1		1005	122	2540.	1		1620	197	18.	1		2235	272	0.
1		0355	48	3284.	1		1010	123	2508.	1		1625	198	14.	1		2240	273	0.
1		0400	49	3780.	1		1015	124	2478.	1		1630	199	11.	1		2245	274	0.
1		0405	50	4211.	1		1020	125	2448.	1		1635	200	8.	1		2250	275	0.
1		0410	51	4565.	1		1025	126	2418.	1		1640	201	6.	1		2255	276	0.
1		0415	52	4850.	1		1030	127	2388.	1		1645	202	5.	1		2300	277	0.
1		0420	53	5089.	1		1035	128	2358.	1		1650	203	4.	1		2305	278	0.
1		0425	54	5289.	1		1040	129	2326.	1		1655	204	3.	1		2310	279	0.

1	0430	55	5452.	*	1	1045	130	2295.	*	1	1700	205	2.	*	1	2315	280	0.
1	0435	56	5583.	*	1	1050	131	2264.	*	1	1705	206	2.	*	1	2320	281	0.
1	0440	57	5686.	*	1	1055	132	2234.	*	1	1710	207	1.	*	1	2325	282	0.
1	0445	58	5768.	*	1	1100	133	2204.	*	1	1715	208	1.	*	1	2330	283	0.
1	0450	59	5852.	*	1	1105	134	2173.	*	1	1720	209	1.	*	1	2335	284	0.
1	0455	60	5968.	*	1	1110	135	2142.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	6118.	*	1	1115	136	2109.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	6280.	*	1	1120	137	2076.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	6440.	*	1	1125	138	2042.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	6585.	*	1	1130	139	2010.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	6697.	*	1	1135	140	1977.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	6756.	*	1	1140	141	1944.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	6764.	*	1	1145	142	1909.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	6729.	*	1	1150	143	1873.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	6656.	*	1	1155	144	1836.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	6551.	*	1	1200	145	1800.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	6423.	*	1	1205	146	1764.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	6280.	*	1	1210	147	1728.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	6131.	*	1	1215	148	1692.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	5979.	*	1	1220	149	1654.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	5830.	*	1	1225	150	1615.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 6764.	5.50	4547.	1539.	1482.	1482.
		(INCHES) .476	.644	.644	.644
		(AC-FT) 2255.	3052.	3052.	3052.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	3.54	750.00	4393.92	332.55	.37	7.07
INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL								
MAIN	.08	1.64	5.00		4390.90	335.00	.37	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1751E+04 EXCESS= .0000E+00 OUTFLOW= .1751E+04 BASIN STORAGE= .1218E-01 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .57

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DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	3879.	*	1		1230	151	429.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	3808.	*	1		1235	152	390.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	3738.	*	1		1240	153	354.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	3669.	*	1		1245	154	321.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	3599.	*	1		1250	155	290.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	3528.	*	1		1255	156	262.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	3458.	*	1		1300	157	235.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	3388.	*	1		1305	158	205.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	3319.	*	1		1310	159	172.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	3251.	*	1		1315	160	139.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	3184.	*	1		1320	161	110.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	3119.	*	1		1325	162	86.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	3055.	*	1		1330	163	67.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	2994.	*	1		1335	164	53.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	2934.	*	1		1340	165	42.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	2875.	*	1		1345	166	33.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	2818.	*	1		1350	167	27.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	2761.	*	1		1355	168	22.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	2706.	*	1		1400	169	18.	*	1		2015	244	0.

1	0135	20	0.	*	1	0750	95	2652.	*	1	1405	170	15.	*	1	2020	245	0.
1	0140	21	0.	*	1	0755	96	2600.	*	1	1410	171	12.	*	1	2025	246	0.
1	0145	22	1.	*	1	0800	97	2550.	*	1	1415	172	10.	*	1	2030	247	0.
1	0150	23	2.	*	1	0805	98	2502.	*	1	1420	173	8.	*	1	2035	248	0.
1	0155	24	4.	*	1	0810	99	2454.	*	1	1425	174	7.	*	1	2040	249	0.
1	0200	25	6.	*	1	0815	100	2407.	*	1	1430	175	6.	*	1	2045	250	0.
1	0205	26	10.	*	1	0820	101	2362.	*	1	1435	176	5.	*	1	2050	251	0.
1	0210	27	15.	*	1	0825	102	2317.	*	1	1440	177	4.	*	1	2055	252	0.
1	0215	28	22.	*	1	0830	103	2274.	*	1	1445	178	4.	*	1	2100	253	0.
1	0220	29	31.	*	1	0835	104	2232.	*	1	1450	179	3.	*	1	2105	254	0.
1	0225	30	41.	*	1	0840	105	2191.	*	1	1455	180	3.	*	1	2110	255	0.
1	0230	31	53.	*	1	0845	106	2151.	*	1	1500	181	3.	*	1	2115	256	0.
1	0235	32	66.	*	1	0850	107	2111.	*	1	1505	182	2.	*	1	2120	257	0.
1	0240	33	78.	*	1	0855	108	2070.	*	1	1510	183	2.	*	1	2125	258	0.
1	0245	34	91.	*	1	0900	109	2028.	*	1	1515	184	2.	*	1	2130	259	0.
1	0250	35	102.	*	1	0905	110	1986.	*	1	1520	185	2.	*	1	2135	260	0.
1	0255	36	114.	*	1	0910	111	1946.	*	1	1525	186	1.	*	1	2140	261	0.
1	0300	37	126.	*	1	0915	112	1906.	*	1	1530	187	1.	*	1	2145	262	0.
1	0305	38	141.	*	1	0920	113	1868.	*	1	1535	188	1.	*	1	2150	263	0.
1	0310	39	160.	*	1	0925	114	1829.	*	1	1540	189	1.	*	1	2155	264	0.
1	0315	40	187.	*	1	0930	115	1790.	*	1	1545	190	1.	*	1	2200	265	0.
1	0320	41	227.	*	1	0935	116	1750.	*	1	1550	191	1.	*	1	2205	266	0.
1	0325	42	285.	*	1	0940	117	1710.	*	1	1555	192	1.	*	1	2210	267	0.
1	0330	43	378.	*	1	0945	118	1671.	*	1	1600	193	1.	*	1	2215	268	0.
1	0335	44	520.	*	1	0950	119	1633.	*	1	1605	194	1.	*	1	2220	269	0.
1	0340	45	719.	*	1	0955	120	1595.	*	1	1610	195	0.	*	1	2225	270	0.
1	0345	46	976.	*	1	1000	121	1557.	*	1	1615	196	0.	*	1	2230	271	0.
1	0350	47	1279.	*	1	1005	122	1518.	*	1	1620	197	0.	*	1	2235	272	0.
1	0355	48	1605.	*	1	1010	123	1478.	*	1	1625	198	0.	*	1	2240	273	0.
1	0400	49	1929.	*	1	1015	124	1438.	*	1	1630	199	0.	*	1	2245	274	0.
1	0405	50	2215.	*	1	1020	125	1399.	*	1	1635	200	0.	*	1	2250	275	0.
1	0410	51	2452.	*	1	1025	126	1361.	*	1	1640	201	0.	*	1	2255	276	0.
1	0415	52	2650.	*	1	1030	127	1323.	*	1	1645	202	0.	*	1	2300	277	0.
1	0420	53	2805.	*	1	1035	128	1285.	*	1	1650	203	0.	*	1	2305	278	0.
1	0425	54	2921.	*	1	1040	129	1247.	*	1	1655	204	0.	*	1	2310	279	0.
1	0430	55	3006.	*	1	1045	130	1207.	*	1	1700	205	0.	*	1	2315	280	0.
1	0435	56	3084.	*	1	1050	131	1167.	*	1	1705	206	0.	*	1	2320	281	0.
1	0440	57	3180.	*	1	1055	132	1128.	*	1	1710	207	0.	*	1	2325	282	0.
1	0445	58	3293.	*	1	1100	133	1090.	*	1	1715	208	0.	*	1	2330	283	0.
1	0450	59	3420.	*	1	1105	134	1053.	*	1	1720	209	0.	*	1	2335	284	0.
1	0455	60	3562.	*	1	1110	135	1016.	*	1	1725	210	0.	*	1	2340	285	0.
1	0500	61	3721.	*	1	1115	136	977.	*	1	1730	211	0.	*	1	2345	286	0.
1	0505	62	3880.	*	1	1120	137	938.	*	1	1735	212	0.	*	1	2350	287	0.
1	0510	63	4029.	*	1	1125	138	899.	*	1	1740	213	0.	*	1	2355	288	0.
1	0515	64	4167.	*	1	1130	139	862.	*	1	1745	214	0.	*	2	0000	289	0.
1	0520	65	4277.	*	1	1135	140	826.	*	1	1750	215	0.	*	2	0005	290	0.
1	0525	66	4350.	*	1	1140	141	790.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	4387.	*	1	1145	142	754.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	4391.	*	1	1150	143	717.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	4371.	*	1	1155	144	678.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	4324.	*	1	1200	145	639.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	4260.	*	1	1205	146	603.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	4188.	*	1	1210	147	569.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	4111.	*	1	1215	148	535.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	4033.	*	1	1220	149	502.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	3955.	*	1	1225	150	467.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

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PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 4391.	5.58		2967.	883.	850.	850.
		(INCHES)	.310	.369	.369	.369
		(AC-FT)	1471.	1751.	1751.	1751.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	4.34	750.00	2600.14	338.39	.20	5.76

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN .08 1.64 5.00 2598.41 340.00 .20

CONTINUITY SUMMARY (AC-FT) - INFLOW= .9339E+03 EXCESS= .0000E+00 OUTFLOW= .9339E+03 BASIN STORAGE= .9589E-02 PERCENT ERROR= .0

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HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .44

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DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	1		0615	76	2382.	1		1230	151	41.	1		1845	226	0.
1		0005	2	0.	1		0620	77	2354.	1		1235	152	38.	1		1850	227	0.
1		0010	3	0.	1		0625	78	2325.	1		1240	153	35.	1		1855	228	0.
1		0015	4	0.	1		0630	79	2294.	1		1245	154	32.	1		1900	229	0.
1		0020	5	0.	1		0635	80	2261.	1		1250	155	30.	1		1905	230	0.
1		0025	6	0.	1		0640	81	2225.	1		1255	156	28.	1		1910	231	0.
1		0030	7	0.	1		0645	82	2186.	1		1300	157	26.	1		1915	232	0.
1		0035	8	0.	1		0650	83	2146.	1		1305	158	24.	1		1920	233	0.
1		0040	9	0.	1		0655	84	2107.	1		1310	159	23.	1		1925	234	0.
1		0045	10	0.	1		0700	85	2067.	1		1315	160	21.	1		1930	235	0.
1		0050	11	0.	1		0705	86	2027.	1		1320	161	20.	1		1935	236	0.
1		0055	12	0.	1		0710	87	1987.	1		1325	162	18.	1		1940	237	0.
1		0100	13	0.	1		0715	88	1947.	1		1330	163	17.	1		1945	238	0.
1		0105	14	0.	1		0720	89	1907.	1		1335	164	16.	1		1950	239	0.
1		0110	15	0.	1		0725	90	1867.	1		1340	165	15.	1		1955	240	0.
1		0115	16	0.	1		0730	91	1826.	1		1345	166	14.	1		2000	241	0.
1		0120	17	0.	1		0735	92	1784.	1		1350	167	13.	1		2005	242	0.
1		0125	18	0.	1		0740	93	1742.	1		1355	168	12.	1		2010	243	0.
1		0130	19	0.	1		0745	94	1701.	1		1400	169	11.	1		2015	244	0.
1		0135	20	0.	1		0750	95	1660.	1		1405	170	10.	1		2020	245	0.
1		0140	21	0.	1		0755	96	1620.	1		1410	171	9.	1		2025	246	0.
1		0145	22	0.	1		0800	97	1580.	1		1415	172	9.	1		2030	247	0.
1		0150	23	0.	1		0805	98	1542.	1		1420	173	8.	1		2035	248	0.
1		0155	24	0.	1		0810	99	1504.	1		1425	174	7.	1		2040	249	0.
1		0200	25	0.	1		0815	100	1468.	1		1430	175	7.	1		2045	250	0.
1		0205	26	0.	1		0820	101	1432.	1		1435	176	6.	1		2050	251	0.
1		0210	27	0.	1		0825	102	1396.	1		1440	177	6.	1		2055	252	0.
1		0215	28	0.	1		0830	103	1358.	1		1445	178	5.	1		2100	253	0.
1		0220	29	1.	1		0835	104	1320.	1		1450	179	5.	1		2105	254	0.
1		0225	30	1.	1		0840	105	1283.	1		1455	180	5.	1		2110	255	0.
1		0230	31	2.	1		0845	106	1246.	1		1500	181	4.	1		2115	256	0.
1		0235	32	3.	1		0850	107	1211.	1		1505	182	4.	1		2120	257	0.
1		0240	33	5.	1		0855	108	1176.	1		1510	183	4.	1		2125	258	0.
1		0245	34	7.	1		0900	109	1142.	1		1515	184	3.	1		2130	259	0.
1		0250	35	9.	1		0905	110	1108.	1		1520	185	3.	1		2135	260	0.
1		0255	36	12.	1		0910	111	1074.	1		1525	186	3.	1		2140	261	0.
1		0300	37	15.	1		0915	112	1038.	1		1530	187	3.	1		2145	262	0.
1		0305	38	20.	1		0920	113	1002.	1		1535	188	2.	1		2150	263	0.
1		0310	39	26.	1		0925	114	966.	1		1540	189	2.	1		2155	264	0.
1		0315	40	35.	1		0930	115	932.	1		1545	190	2.	1		2200	265	0.
1		0320	41	49.	1		0935	116	898.	1		1550	191	2.	1		2205	266	0.
1		0325	42	70.	1		0940	117	866.	1		1555	192	2.	1		2210	267	0.
1		0330	43	103.	1		0945	118	834.	1		1600	193	2.	1		2215	268	0.
1		0335	44	152.	1		0950	119	802.	1		1605	194	2.	1		2220	269	0.
1		0340	45	232.	1		0955	120	769.	1		1610	195	1.	1		2225	270	0.
1		0345	46	347.	1		1000	121	734.	1		1615	196	1.	1		2230	271	0.
1		0350	47	489.	1		1005	122	699.	1		1620	197	1.	1		2235	272	0.
1		0355	48	658.	1		1010	123	664.	1		1625	198	1.	1		2240	273	0.
1		0400	49	842.	1		1015	124	631.	1		1630	199	1.	1		2245	274	0.
1		0405	50	1016.	1		1020	125	600.	1		1635	200	1.	1		2250	275	0.
1		0410	51	1169.	1		1025	126	570.	1		1640	201	1.	1		2255	276	0.
1		0415	52	1298.	1		1030	127	541.	1		1645	202	1.	1		2300	277	0.
1		0420	53	1405.	1		1035	128	511.	1		1650	203	1.	1		2305	278	0.
1		0425	54	1480.	1		1040	129	479.	1		1655	204	1.	1		2310	279	0.
1		0430	55	1518.	1		1045	130	445.	1		1700	205	1.	1		2315	280	0.
1		0435	56	1537.	1		1050	131	409.	1		1705	206	1.	1		2320	281	0.
1		0440	57	1557.	1		1055	132	375.	1		1710	207	1.	1		2325	282	0.
1		0445	58	1584.	1		1100	133	345.	1		1715	208	1.	1		2330	283	0.
1		0450	59	1625.	1		1105	134	317.	1		1720	209	0.	1		2335	284	0.
1		0455	60	1701.	1		1110	135	293.	1		1725	210	0.	1		2340	285	0.
1		0500	61	1838.	1		1115	136	270.	1		1730	211	0.	1		2345	286	0.
1		0505	62	2014.	1		1120	137	249.	1		1735	212	0.	1		2350	287	0.
1		0510	63	2181.	1		1125	138	229.	1		1740	213	0.	1		2355	288	0.
1		0515	64	2319.	1		1130	139	208.	1		1745	214	0.	2		0000	289	0.
1		0520	65	2432.	1		1135	140	185.	1		1750	215	0.	2		0005	290	0.

1	0525	66	2517.	*	1	1140	141	159.	*	1	1755	216	0.	*	2	0010	291	0.
1	0530	67	2570.	*	1	1145	142	134.	*	1	1800	217	0.	*	2	0015	292	0.
1	0535	68	2594.	*	1	1150	143	113.	*	1	1805	218	0.	*	2	0020	293	0.
1	0540	69	2598.	*	1	1155	144	96.	*	1	1810	219	0.	*	2	0025	294	0.
1	0545	70	2587.	*	1	1200	145	82.	*	1	1815	220	0.	*	2	0030	295	0.
1	0550	71	2561.	*	1	1205	146	71.	*	1	1820	221	0.	*	2	0035	296	0.
1	0555	72	2526.	*	1	1210	147	63.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	2487.	*	1	1215	148	56.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	2449.	*	1	1220	149	50.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	2413.	*	1	1225	150	45.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*				

****

PEAK FLOW	TIME	MAXIMUM AVERAGE FLOW			
		6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)				
		(CFS)			
+ 2598.	5.67	1710.	471.	454.	454.
		(INCHES) .179	.197	.197	.197
		(AC-FT) 848.	934.	934.	934.

CUMULATIVE AREA = 88.86 SQ MI

COMPUTED MUSKINGUM-CUNGE PARAMETERS

ELEMENT	ALPHA	M	COMPUTATION TIME STEP DT (MIN)	DX (FT)	PEAK (CFS)	TIME TO PEAK (MIN)	VOLUME (IN)	MAXIMUM CELERITY (FPS)
MAIN	.08	1.64	5.00	500.00	560.76	420.00	.04	3.17

INTERPOLATED TO SPECIFIED COMPUTATION INTERVAL

MAIN	.08	1.64	5.00		560.76	420.00	.04	

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1851E+03 EXCESS= .0000E+00 OUTFLOW= .1851E+03 BASIN STORAGE= .1121E-01 PERCENT ERROR= .0

****

HYDROGRAPH AT STATION FINISH
PLAN 1, RATIO = .26

****

DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW	*	DA	MON	HRMN	ORD	FLOW
1		0000	1	0.	*	1		0615	76	510.	*	1		1230	151	22.	*	1		1845	226	0.
1		0005	2	0.	*	1		0620	77	526.	*	1		1235	152	21.	*	1		1850	227	0.
1		0010	3	0.	*	1		0625	78	509.	*	1		1240	153	20.	*	1		1855	228	0.
1		0015	4	0.	*	1		0630	79	525.	*	1		1245	154	18.	*	1		1900	229	0.
1		0020	5	0.	*	1		0635	80	540.	*	1		1250	155	17.	*	1		1905	230	0.
1		0025	6	0.	*	1		0640	81	533.	*	1		1255	156	16.	*	1		1910	231	0.
1		0030	7	0.	*	1		0645	82	544.	*	1		1300	157	15.	*	1		1915	232	0.
1		0035	8	0.	*	1		0650	83	552.	*	1		1305	158	14.	*	1		1920	233	0.
1		0040	9	0.	*	1		0655	84	551.	*	1		1310	159	14.	*	1		1925	234	0.
1		0045	10	0.	*	1		0700	85	561.	*	1		1315	160	13.	*	1		1930	235	0.
1		0050	11	0.	*	1		0705	86	558.	*	1		1320	161	12.	*	1		1935	236	0.
1		0055	12	0.	*	1		0710	87	554.	*	1		1325	162	11.	*	1		1940	237	0.
1		0100	13	0.	*	1		0715	88	549.	*	1		1330	163	11.	*	1		1945	238	0.
1		0105	14	0.	*	1		0720	89	537.	*	1		1335	164	10.	*	1		1950	239	0.
1		0110	15	0.	*	1		0725	90	526.	*	1		1340	165	10.	*	1		1955	240	0.
1		0115	16	0.	*	1		0730	91	512.	*	1		1345	166	9.	*	1		2000	241	0.
1		0120	17	0.	*	1		0735	92	498.	*	1		1350	167	9.	*	1		2005	242	0.
1		0125	18	0.	*	1		0740	93	481.	*	1		1355	168	8.	*	1		2010	243	0.
1		0130	19	0.	*	1		0745	94	466.	*	1		1400	169	8.	*	1		2015	244	0.
1		0135	20	0.	*	1		0750	95	449.	*	1		1405	170	7.	*	1		2020	245	0.
1		0140	21	0.	*	1		0755	96	432.	*	1		1410	171	7.	*	1		2025	246	0.
1		0145	22	0.	*	1		0800	97	415.	*	1		1415	172	6.	*	1		2030	247	0.
1		0150	23	0.	*	1		0805	98	398.	*	1		1420	173	6.	*	1		2035	248	0.
1		0155	24	0.	*	1		0810	99	381.	*	1		1425	174	6.	*	1		2040	249	0.
1		0200	25	0.	*	1		0815	100	365.	*	1		1430	175	6.	*	1		2045	250	0.
1		0205	26	0.	*	1		0820	101	350.	*	1		1435	176	5.	*	1		2050	251	0.
1		0210	27	0.	*	1		0825	102	335.	*	1		1440	177	5.	*	1		2055	252	0.
1		0215	28	0.	*	1		0830	103	320.	*	1		1445	178	5.	*	1		2100	253	0.
1		0220	29	0.	*	1		0835	104	306.	*	1		1450	179	5.	*	1		2105	254	0.
1		0225	30	0.	*	1		0840	105	293.	*	1		1455	180	4.	*	1		2110	255	0.

1	0230	31	0.	*	1	0845	106	279.	*	1	1500	181	4.	*	1	2115	256	0.
1	0235	32	0.	*	1	0850	107	266.	*	1	1505	182	4.	*	1	2120	257	0.
1	0240	33	0.	*	1	0855	108	253.	*	1	1510	183	4.	*	1	2125	258	0.
1	0245	34	0.	*	1	0900	109	241.	*	1	1515	184	4.	*	1	2130	259	0.
1	0250	35	0.	*	1	0905	110	229.	*	1	1520	185	4.	*	1	2135	260	0.
1	0255	36	0.	*	1	0910	111	217.	*	1	1525	186	3.	*	1	2140	261	0.
1	0300	37	0.	*	1	0915	112	204.	*	1	1530	187	3.	*	1	2145	262	0.
1	0305	38	0.	*	1	0920	113	189.	*	1	1535	188	3.	*	1	2150	263	0.
1	0310	39	0.	*	1	0925	114	173.	*	1	1540	189	3.	*	1	2155	264	0.
1	0315	40	0.	*	1	0930	115	158.	*	1	1545	190	3.	*	1	2200	265	0.
1	0320	41	0.	*	1	0935	116	146.	*	1	1550	191	3.	*	1	2205	266	0.
1	0325	42	0.	*	1	0940	117	136.	*	1	1555	192	3.	*	1	2210	267	0.
1	0330	43	0.	*	1	0945	118	127.	*	1	1600	193	2.	*	1	2215	268	0.
1	0335	44	0.	*	1	0950	119	119.	*	1	1605	194	2.	*	1	2220	269	0.
1	0340	45	2.	*	1	0955	120	112.	*	1	1610	195	2.	*	1	2225	270	0.
1	0345	46	5.	*	1	1000	121	107.	*	1	1615	196	2.	*	1	2230	271	0.
1	0350	47	12.	*	1	1005	122	102.	*	1	1620	197	2.	*	1	2235	272	0.
1	0355	48	23.	*	1	1010	123	98.	*	1	1625	198	2.	*	1	2240	273	0.
1	0400	49	39.	*	1	1015	124	93.	*	1	1630	199	2.	*	1	2245	274	0.
1	0405	50	64.	*	1	1020	125	89.	*	1	1635	200	2.	*	1	2250	275	0.
1	0410	51	97.	*	1	1025	126	85.	*	1	1640	201	2.	*	1	2255	276	0.
1	0415	52	127.	*	1	1030	127	81.	*	1	1645	202	1.	*	1	2300	277	0.
1	0420	53	154.	*	1	1035	128	78.	*	1	1650	203	1.	*	1	2305	278	0.
1	0425	54	179.	*	1	1040	129	74.	*	1	1655	204	1.	*	1	2310	279	0.
1	0430	55	200.	*	1	1045	130	71.	*	1	1700	205	1.	*	1	2315	280	0.
1	0435	56	219.	*	1	1050	131	67.	*	1	1705	206	1.	*	1	2320	281	0.
1	0440	57	235.	*	1	1055	132	64.	*	1	1710	207	1.	*	1	2325	282	0.
1	0445	58	247.	*	1	1100	133	61.	*	1	1715	208	1.	*	1	2330	283	0.
1	0450	59	256.	*	1	1105	134	58.	*	1	1720	209	1.	*	1	2335	284	0.
1	0455	60	265.	*	1	1110	135	56.	*	1	1725	210	1.	*	1	2340	285	0.
1	0500	61	278.	*	1	1115	136	53.	*	1	1730	211	1.	*	1	2345	286	0.
1	0505	62	296.	*	1	1120	137	51.	*	1	1735	212	1.	*	1	2350	287	0.
1	0510	63	319.	*	1	1125	138	49.	*	1	1740	213	1.	*	1	2355	288	0.
1	0515	64	343.	*	1	1130	139	46.	*	1	1745	214	1.	*	2	0000	289	0.
1	0520	65	366.	*	1	1135	140	43.	*	1	1750	215	1.	*	2	0005	290	0.
1	0525	66	385.	*	1	1140	141	41.	*	1	1755	216	1.	*	2	0010	291	0.
1	0530	67	401.	*	1	1145	142	39.	*	1	1800	217	1.	*	2	0015	292	0.
1	0535	68	411.	*	1	1150	143	36.	*	1	1805	218	1.	*	2	0020	293	0.
1	0540	69	418.	*	1	1155	144	34.	*	1	1810	219	1.	*	2	0025	294	0.
1	0545	70	418.	*	1	1200	145	32.	*	1	1815	220	1.	*	2	0030	295	0.
1	0550	71	410.	*	1	1205	146	30.	*	1	1820	221	1.	*	2	0035	296	0.
1	0555	72	399.	*	1	1210	147	28.	*	1	1825	222	0.	*	2	0040	297	0.
1	0600	73	391.	*	1	1215	148	27.	*	1	1830	223	0.	*	2	0045	298	0.
1	0605	74	401.	*	1	1220	149	25.	*	1	1835	224	0.	*	2	0050	299	0.
1	0610	75	447.	*	1	1225	150	24.	*	1	1840	225	0.	*	2	0055	300	0.
				*					*					*					

****

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	24.92-HR
+ (CFS)	(HR)					
		(CFS)				
+ 561.	7.00		344.	93.	90.	90.
		(INCHES)	.036	.039	.039	.039
		(AC-FT)	171.	185.	185.	185.

CUMULATIVE AREA = 88.86 SQ MI

APPENDIX D
STREAMBANK EROSION FOR SPECIFIC STORM EVENTS

Upstream Reach

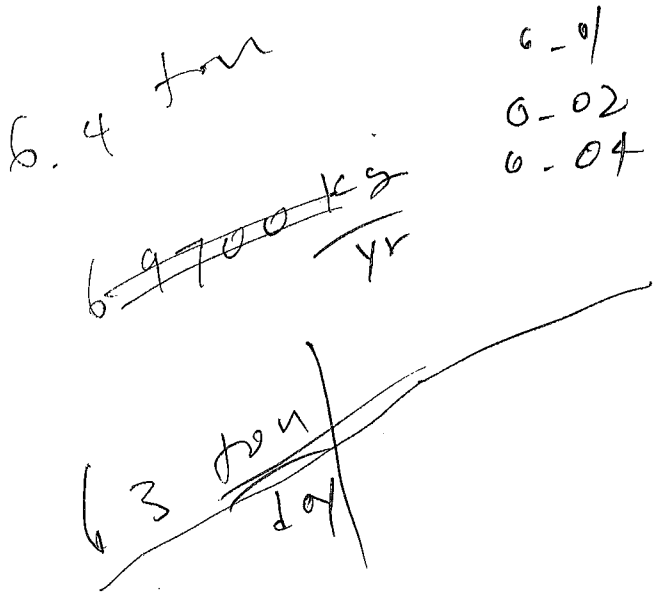
Event Frequency

Alternative	100 Yr	50 Yr	25 Yr	10 Yr	5 Yr	2 Yr	Annual
	(kg/yr)						
Baseline	6.23E+04	1.02E+05	1.36E+05	1.56E+05	1.21E+05	2.88E+04	6.07E+05
Alternative A	6.97E+04	1.03E+05	1.37E+05	1.58E+05	1.23E+05	2.86E+04	6.20E+05
Alternative B	7.29E+04	1.09E+05	1.47E+05	1.76E+05	1.44E+05	4.47E+04	6.93E+05
Alternative C	7.80E+04	1.19E+05	1.64E+05	2.06E+05	1.80E+05	6.09E+04	8.08E+05
Alternative D	7.99E+04	1.22E+05	1.71E+05	2.18E+05	1.95E+05	6.98E+04	8.54E+05
Alternative E	8.16E+04	1.25E+05	1.76E+05	2.28E+05	2.08E+05	7.92E+04	8.97E+05
No-Action	8.41E+04	1.30E+05	1.85E+05	2.45E+05	2.29E+05	1.00E+05	9.73E+05

Downstream Reach

Event Frequency

Alternative	100 Yr	50 Yr	25 Yr	10 Yr	5 Yr	2 Yr	Annual
	(kg/yr)						
Baseline	4.16E+04	6.69E+04	9.79E+04	1.31E+05	9.08E+04	1.27E+05	3.01E+05
Alternative A	4.19E+04	6.69E+04	9.94E+04	1.33E+05	8.82E+04	1.19E+05	3.11E+05
Alternative B	4.37E+04	7.04E+04	1.04E+05	1.45E+05	1.08E+05	1.22E+05	3.49E+05
Alternative C	4.39E+04	7.35E+04	1.10E+05	1.56E+05	1.38E+05	7.36E+04	4.47E+05
Alternative D	4.41E+04	7.43E+04	1.12E+05	1.63E+05	1.46E+05	6.55E+04	4.73E+05
Alternative E	4.43E+04	7.51E+04	1.14E+05	1.67E+05	1.51E+05	3.73E+04	5.13E+05
No-Action	4.44E+04	7.68E+04	1.17E+05	1.72E+05	1.62E+05	2.25E+04	5.49E+05



Appendix M

VISUAL RESOURCES

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date (of fieldwork): February 27, 2008
District: Las Vegas Field Office
Resource Area:
Activity (program): Lands and Realty–1430

SECTION A. PROJECT INFORMATION

1. Project Name Upper Las Vegas Wash CTA SEIS
Urban development; Thunderbird electric trans. line

2. Key Observation Point (KOP)
Floyd Lamb Park – KOP 2

3. VRM Class
Class III

4. Location
Township(s) 18 S
Range(s) 60 E
Section(s) 19–21, 28–29

5. Location Sketch
See the attached map for location of the KOP (Figure L.1-1). The attached photo is a simulation of the proposed development, as seen from the KOP.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Gently sloping bajada in MG; rugged mountains in BG; small hills and mesas in FG. Road and parking area in FG.	Bajada – continuous carpet of vegetation in MG. Urban landscaping trees, shrubs, and grasses in FG. BG vegetation not distinguishable.	Vertical power poles; blocky houses; rectangular fence.
LINE	Undulating horizontal line on horizon of mountain range. Horizontal layers in mountain range. Diagonal and horizontal lines in mesa of FG.	No distinct line in MG vegetation. FG vegetation vertical.	Vertical and horizontal lines of power poles and fence. Horizontal and vertical lines of houses, with some diagonal roof lines.
COLOR	Bajada – tans and buff colors. Mountains – tans with black layers. FG hills and mesa – tans. Black road and parking area.	Bajada – olive green shrubs, gray grasses. FG – dark green trees, yellow grasses, yellow/green shrubs (winter time colors).	Gray power poles; white fence; white and tan houses.
TEXTURE	Bajada – smooth; mountains – rough; FG hills and mesa – smooth. FG road and parking area – smooth.	Bajada – moderately dense, continuous, almost smooth. FG park vegetation – rough.	Power poles and fence – smooth. Houses – medium.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Leveling, terracing of bajadas; stair-stepping of bajada.	Patchy urban landscaping between residential and commercial buildings.	Blocky square and rectangular buildings. Vertical electrical power poles, street lights, etc.
LINE	Multiple horizontal lines created by leveling of the land form.	Vertical lines of landscaping trees.	Vertical and horizontal lines of buildings. Curvilinear and straight lines of roads. Vertical lines of electrical poles.
COLOR	Black asphalts, gray concretes of roads. Natural buffs, tans, and grays of undisturbed lands. Urban landscaping.	Various greens of urban landscaping.	Various colors of buildings. Gray and dark colors of power poles. Black asphalt; gray concrete.
TEXTURE	Smooth to medium.	Smooth lawns to medium shrubs and trees.	Mostly smooth.

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. **DEGREE OF CONTRAST**

FEATURES

ELEMENTS	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form		X			X						X	
Line		X				X					X	
Color		X			X						X	
Texture			X			X					X	

2. Does project design meet visual resource management objectives? ☐ Yes ☒ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☐ Yes ☒ No (Explain on reverse side)

Evaluators Name(s) Steve Knox– SWCA, Inc.
Date March 19, 2008

SECTION D. (Continued)

Comments from Item 2.

Outside the CTA – Development of the bajada across Las Vegas Wash as seen from this KOP would transform the landscape from an undeveloped and natural middle ground landscape to an urban setting composed of residential areas, businesses, and light industrial development. This transformation would dominate the view and would not be consistent with BLM's VRM Class III objectives. However, when the lands are transferred out of public ownership, these public land objectives will no longer apply to those lands. Further, from this KOP, the view of urban growth would be seen as an extension of identical development that currently exists in the foreground of the landscape, repeating the form, line, color, and texture of that development. The Thunderbird electric transmission line would repeat the line and texture of the existing power poles that rise above the urban development in the foreground. Urban (residential and park) landscaping would repeat the form, line, color, and texture of the exiting urban vegetation at Floyd Lamb Park.

Additional Mitigation Measures (See Item 3)

No additional mitigating measures are proposed for the lands that would be developed for the growth of Las Vegas.

U. S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33094

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date (of fieldwork): February 27, 2008
District: Las Vegas Field Office
Resource Area:
Activity (program): Lands and Realty–1430

SECTION A. PROJECT INFORMATION

1. Project Name Upper Las Vegas Wash CTA SEIS
Urban development; Sheep Mountain Parkway

2. Key Observation Point (KOP)
McCool Regional Park – KOP 3

3. VRM Class
Class III

4. Location
Township(s) 19 S
Range(s) 61 E
Section(s) 2–6, 9–11

5. Location Sketch
See the attached map for location of the KOP (Figure L.1-1). The attached photo is a simulation of the proposed development, as seen from the KOP.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Gently sloping bajada in MG; rugged mountains in BG; flat airport runway in FG.	Bajada – continuous carpet of vegetation. Vegetation on mountains not distinguishable. Scattered, clumpy shrubs in FG.	Power poles.
LINE	Undulating horizontal line on horizon of mountain range. Horizontal layers in mountains.	No characteristic line in the vegetation.	Vertical power poles.
COLOR	Bajada – tans and buff colors. Mountains – tan with black layers. Light tan/white soils and black asphalt in FG.	Bajada – olive green shrubs, gray grasses. FG shrubs – gray and olive green.	Light gray power poles.
TEX-TURE	Bajada – smooth; mountains – rough; FG – smooth to medium.	Bajada – moderately dense, continuous, almost smooth. FG medium.	Smooth power poles.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Leveling, terracing of bajadas; stair-stepping of bajada.	Patchy urban landscaping between residential and commercial buildings, and of public use area of Sheep Mtn. Parkway.	Blocky square and rectangular buildings. Vertical electrical power poles, street lights, etc.
LINE	Multiple horizontal lines created by leveling of the land form.	Vertical lines of landscaping trees.	Vertical and horizontal lines of buildings. Curvilinear and straight lines of roads. Vertical lines of electrical poles. Horizontal line of cut slope of Sheep Mountain Parkway.
COLOR	Black asphalts, gray concretes of roads. Natural buffs, tans, and grays of undisturbed lands. Urban landscaping.	Various greens of urban landscaping.	Various colors of buildings. Gray and dark colors of power poles. Black asphalt, gray concrete of roads.
TEX-TURE	Smooth to medium.	Smooth lawns to medium shrubs and trees.	Power poles – smooth. Buildings – medium.

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST

	FEATURES											
	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS Form		X			X				X			
ELEMENTS Line		X				X			X			
ELEMENTS Color		X			X				X			
ELEMENTS Texture			X			X					X	

2. Does project design meet visual resource management objectives? ☐ Yes ☒ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☒ Yes ☐ No (Explain on reverse side)

Evaluators Name(s) Steve Knox–SWCA, Inc.
Date March 19, 2008

SECTION D. (Continued)

Comments from Item 2.

Outside the CTA – Lands on the bajadas beyond Las Vegas Wash would be made available for disposal and developed for urban uses, including residential neighborhoods, commercial businesses, light industrial uses, schools and other public buildings, and parks. This development would include roads, utilities, and landscaping. Further, the Thunderbird powerline would traverse the perimeter of the urban development. And, the Sheep Mountain Parkway would be constructed around most of the future urban development. The proposed degree of development would transform a natural, and mostly undeveloped, landscape to an urban landscape. While mitigation would help reduce some of the contrast to the landscape, this transformation would dominate the scene and would not be consistent with BLM objectives for VRM Class III management objectives. However, when the lands are transferred out of public ownership, these public land objectives will no longer apply to those lands.

Additional Mitigation Measures (See Item 3)

1. Reshape and re-contour the cut slope (up slope side) of the excavation for the Sheep Mountain Parkway and re-vegetate by planting to reduce the visual impact of the horizontal line on the landscape.

2. Paint power poles a color that blends with the background landform and vegetation colors to reduce the visual impact of the vertical poles on the landscape.

U. S. GOVERNMENT PRINTING OFFICE: 1985-461-988/33084

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date (of fieldwork): February 27, 2008
District: Las Vegas Field Office
Resource Area:
Activity (program): Lands and Realty–1430

SECTION A. PROJECT INFORMATION

1. Project Name Upper Las Vegas Wash CTA SEIS
Urban development; Sheep Mountain Parkway

2. Key Observation Point (KOP)
Grand Teton Drive at Eglington Preserve – KOP 4

3. VRM Class
Class III

4. Location
Township(s) 19 S
Range(s) 61 E
Section(s) 2–6, 9–11

5. Location Sketch
See the attached map for location of the KOP (Figure L.1-1). The attached photo is a simulation of the proposed development, as seen from the KOP.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Gently sloping bajada in MG; rugged mountains in BG. Flat dirt road in FG.	Bajada – continuous carpet of vegetation. Vegetation on mountains not distinguishable. Scattered, clumpy shrubs in FG.	Power poles. Rectangular, blocky wall.
LINE	Undulating horizontal line on horizon of mountain range. Horizontal layers in mountains.	No characteristic lines in the vegetation.	Vertical power poles. Horizontal line of brick wall.
COLOR	Bajada – tans and buff colors. Mountains – tan with black layers. FG – light tans and white soils.	Bajada – olive green shrubs, gray grasses. FG shrubs – gray and olive green.	Light gray power poles. Tan brick wall.
TEX-TURE	Bajada – smooth; mountains – rough. FG cobbly – medium.	Bajada – moderately dense, continuous, almost smooth. FG medium.	Smooth

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Leveling, terracing of bajadas; stair-stepping of bajada.	Patchy urban landscaping between residential and commercial buildings, and of public use area of Sheep Mtn. Parkway.	Blocky square and rectangular buildings. Vertical electrical power poles, street lights, etc.
LINE	Multiple horizontal lines created by leveling of the landform.	Vertical lines of landscaping trees.	Vertical and horizontal lines of buildings. Curvilinear and straight lines of roads. Vertical lines of electrical poles. Horizontal line of cut slope of the Sheep Mountain Parkway.
COLOR	Black asphalts, gray concretes of roads. Natural buffs, tans, and grays of undisturbed or undeveloped lands.	Various greens of urban landscaping.	Various colors of buildings. Gray and dark colors of power poles. Black asphalt, gray concrete of roads.
TEX-TURE	Smooth to medium.	Smooth lawns to medium shrubs and trees.	Power poles – smooth; buildings – medium.

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. **DEGREE OF CONTRAST**

FEATURES

ELEMENTS	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
Form		X			X				X			
Line		X				X			X			
Color		X			X				X			
Texture			X			X				X		

2. Does project design meet visual resource management objectives? ☐ Yes ☒ No (Explain on reverse side)

3. Additional mitigating measures recommended? ☒ Yes ☐ No (Explain on reverse side)

Evaluators Name(s) Steve Knox– SWCA, Inc.
Date March 19, 2008

SECTION D. (Continued)

Comments from Item 2.

Outside the CTA – Lands on the bajadas beyond Las Vegas Wash would be made available for disposal and developed for urban uses, including residential neighborhoods, commercial businesses, light industrial uses, schools and other public buildings, and parks. This development would include roads, utilities, and landscaping. Further, the Thunderbird transmission line would traverse the perimeter of the urban development. And, the Sheep Mountain Parkway would be constructed around most of the future urban development. This proposed degree of development would transform a natural, and mostly undeveloped, landscape to an urban landscape. While mitigation would help reduce some of the contrast to the landscape, this transformation would dominate the scene and would not be consistent with BLM objectives for VRM Class III management objectives. However, when the lands are transferred out of public ownership, these public land objectives will no longer apply to those lands.

Additional Mitigation Measures (See Item 3)

1. Reshape and re-contour the cut slope (up slope side) of the excavation for the Sheep Mountain Parkway and re-vegetate by planting to reduce the visual impact of the horizontal line on the landscape.

2. Paint power poles a color that blends with the background landform and vegetation colors to reduce the visual contrast of the vertical poles on the landscape.

U. S. GOVERNMENT PRINTING OFFICE: 1985-461-888/33084

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date (of fieldwork): March 31, 2008
District: Las Vegas Field Office
Resource Area:
Activity (program): Lands and Realty–1430

SECTION A. PROJECT INFORMATION

1. Project Name Upper Las Vegas Wash CTA SEIS
Urban development, Sheep Mtn. Parkway, trans. line

2. Key Observation Point (KOP)
215 and Lone Mountain Road – KOP 5

3. VRM Class
Class III

4. Location
Township(s) 18 S
Range(s) 60 E
Section(s) 19–21, 28–33

5. Location Sketch
See the attached map for location of the KOP (Figure L.1-1). The attached photo is a simulation of the proposed development, as seen from the KOP.

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Gently sloping bajadas and rugged mountains in BG. Cities of Las Vegas and North Las Vegas in FG.	Vegetation cover of mountains and bajadas not distinguishable. Clumpy trees of urban landscaping in MG. Native shrubs and yuccas in FG.	Blocky square and rectangular buildings, rectangular signs, and electrical power poles in FG.
LINE	Undulating line of mountain range. Horizontal layers in mountain range. Horizontal line of LV Wash. Diagonal line of Decatur Rd. to shooting park.	Joshua trees in FG – vertical. No characteristic lines in vegetation cover in the city.	Electrical power poles – vertical. Signs and some buildings – vertical. Most building – horizontal, with some diagonal roof lines.
COLOR	Bajadas – tans and buff colors. Mountains – tan with black layers. LV Wash – light tans and white.	Bajada – olive green tint. Urban landscaping – dark greens. Native vegetation grays and light greens.	Power poles – gray and white. Buildings – earth tones. Signs – red, white, and black.
TEX-TURE	Bajada – smooth; mountains – moderate; City development – moderate to rough.	Bajada – moderately dense, continuous; almost smooth. Urban landscaping and native vegetation – rough.	All structures – mostly moderate texture. Rougher in FG.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Leveling, terracing of bajadas; stair-stepping of bajada.	Patchy urban landscaping – mostly trees - between and rising above residential and commercial buildings	Blocky square and rectangular buildings. Vertical electrical power poles.
LINE	Multiple horizontal lines created by leveling of the land form.	No apparent line.	Multiple horizontal lines of continuous buildings. Horizontal line of Sheep Mountain Parkway. Vertical lines of electrical poles.
COLOR	Black asphalt and gray concrete of roads. Natural buffs, tans, and gray of undisturbed land form. Light colored road cuts and power line ROWs.	Various greens of urban landscaping. Darker greens most noticeable.	Various colors of buildings. Gray and light colors for power poles.
TEX-TURE	Smooth.	Moderate.	Smooth to moderate.

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. **DEGREE OF CONTRAST**

FEATURES

ELEMENTS	LAND/WATER BODY (1) Strong	Moderate	Weak	None	VEGETATION (2) Strong	Moderate	Weak	None	STRUCTURES (3) Strong	Moderate	Weak	None
Form		X				X					X	
Line			X				X				X	
Color		X				X					X	
Texture			X			X				X		

2. Does project design meet visual resource management objectives? ☐ Yes ☒ No
(Explain on reverse side)

3. Additional mitigating measures recommended? ☐ Yes ☒ No (Explain on reverse side)

Evaluators Name(s) Steve Knox–SWCA, Inc.
Date April 1, 2008

SECTION D. (Continued)

Comments from Item 2.

CTA – Given the distance from the KOP to the CTA and adjacent lands and given the degree of urban development of lands outside but immediately adjacent to the CTA, it will be difficult to distinguish the lands within the CTA. Thus, it will be difficult to distinguish the developments that do occur in the CTA. The development of lands within the CTA will blend with adjacent urban development outside the CTA.

Outside the CTA – Distance will diminish the effect (view) of the anticipated urban development on the lands adjacent to the CTA, and it will be difficult to determine where the existing city development ends and the future development begins (following disposal of lands outside the CTA). Distance will soften the effect of development on the form, line, color, and texture of the land, vegetation, and structures. While it will be difficult to distinguish the effects of the new development and distance will reduce the effects of that development to moderate and weak ratings (see contrast rating above), the existing undeveloped landscape will still transform to dense urban development. That degree of development, even when viewed at a greater distance, is not consistent with BLM's VRM Class III objectives.

Additional Mitigation Measures (See Item 3)

No additional mitigating measures are proposed for the lands that would be developed for the growth of Las Vegas.

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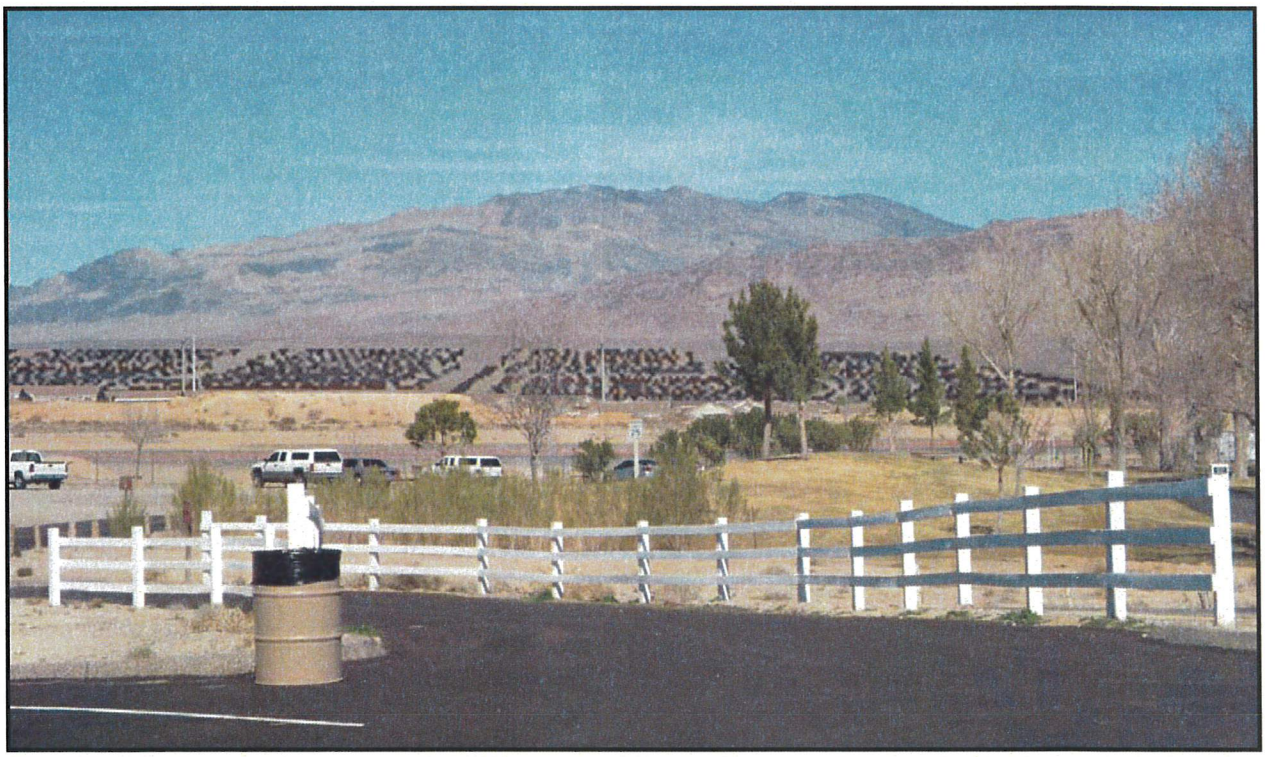
Existing Landscape

Simulated Landscape

Figure M.1-2. Visual Simulation KOP 1.

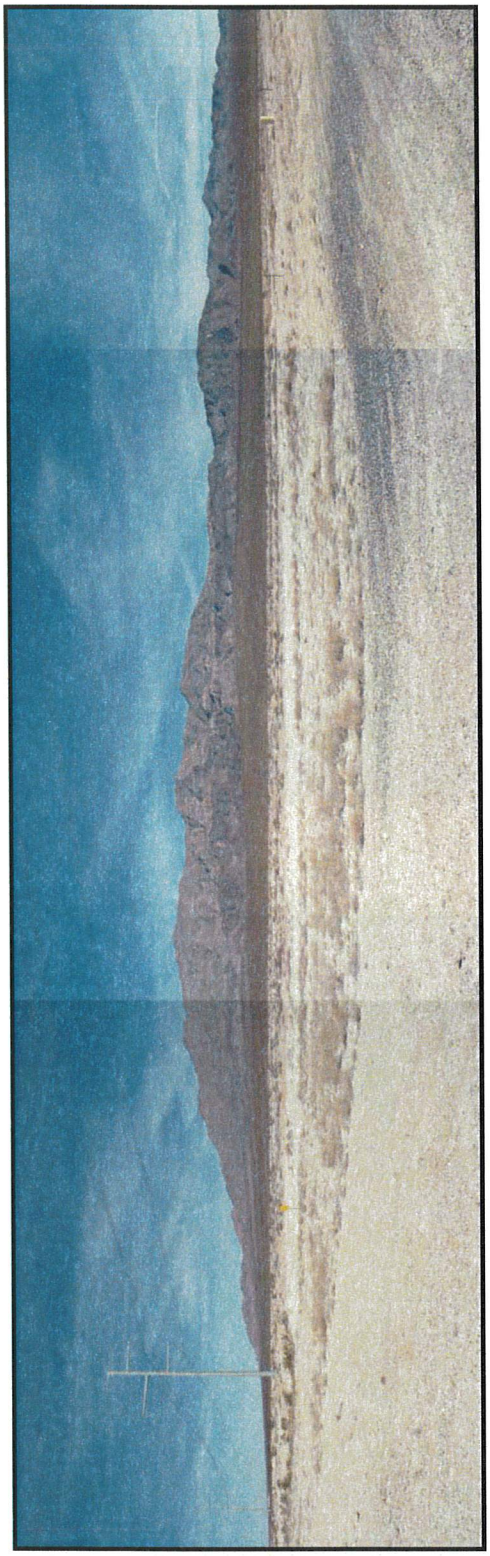
Existing Landscape



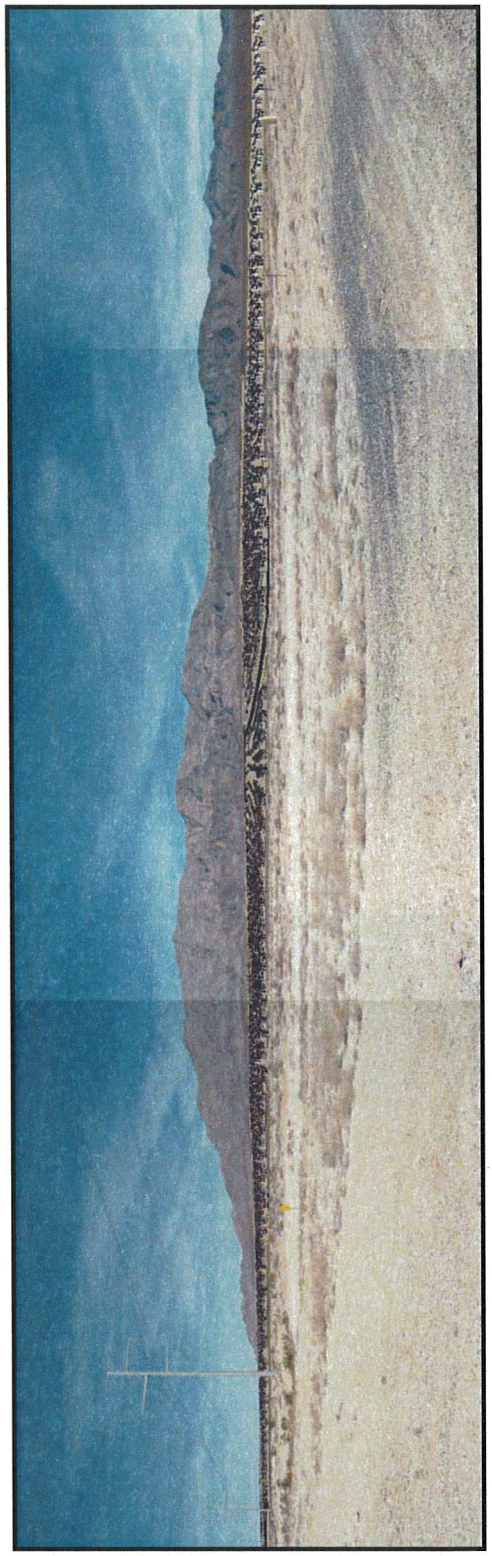
Simulated Landscape

Figure M.1-3. Visual Simulation KOP 2.

Figure M.1-4. Visual Simulation KOP 3.

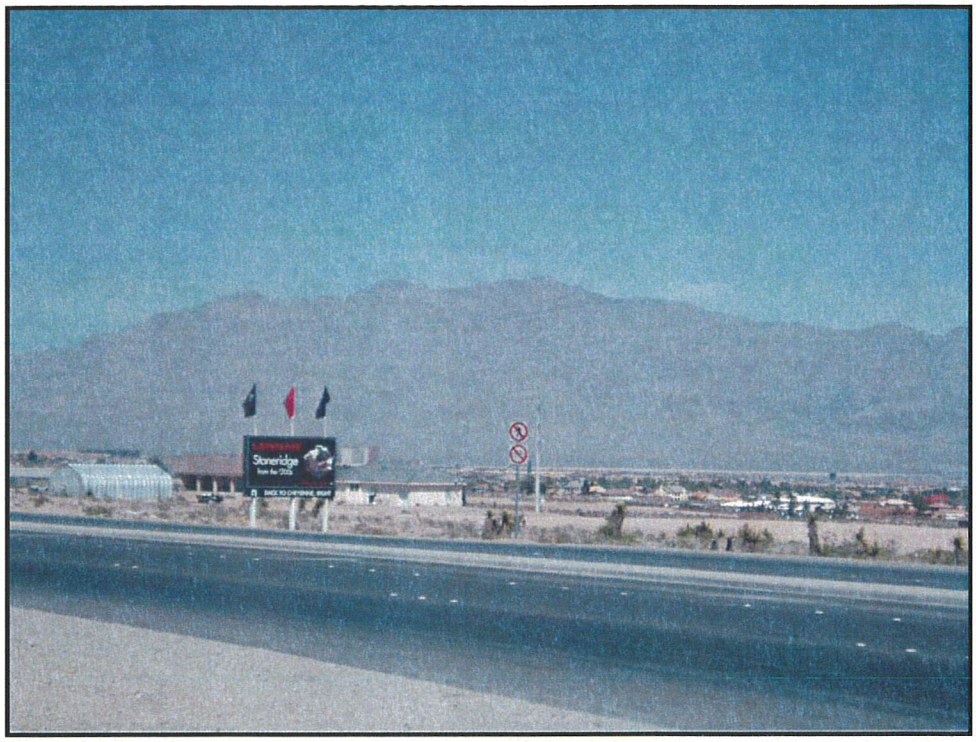


Existing Landscape

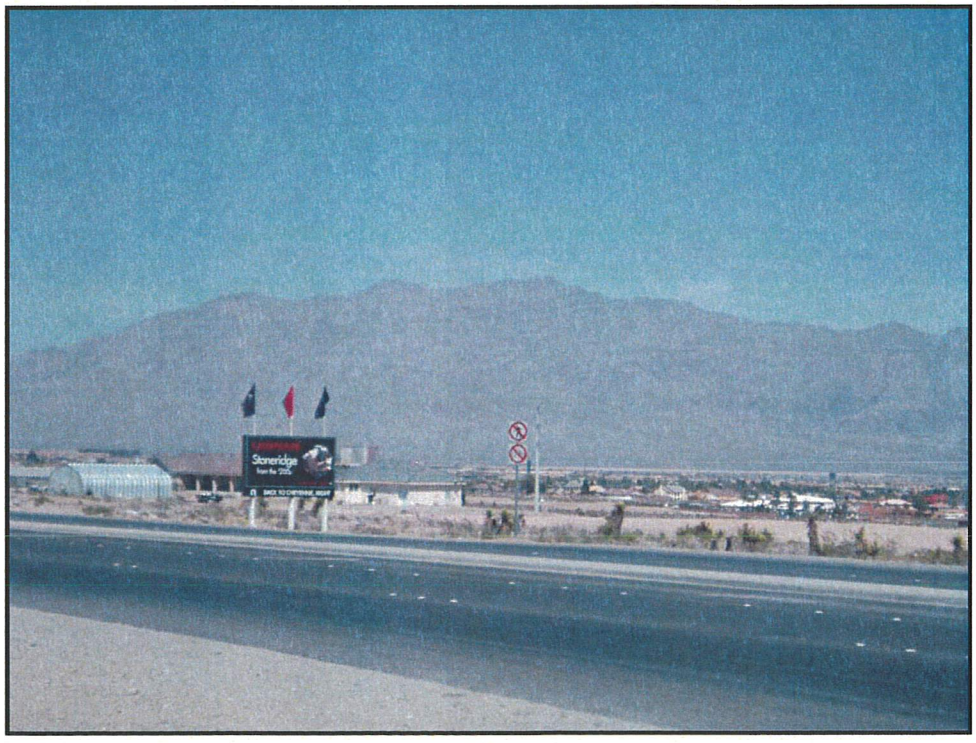


Simulated Landscape

Figure M.1-5. Visual Simulation KOP 4.



Existing Landscape



Simulated Landscape

Figure M.1-6a. Visual Simulation KOP 5.

Existing Landscape

Simulated Landscape

Figure M.1-6b. Visual Simulation KOP 5.

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Appendix N

SOCIOECONOMICS

Appendix E
Socioeconomics

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APPENDIX E
METHODOLOGY AND ASSUMPTIONS FOR SOCIOECONOMIC IMPACTS

IMPLAN Pro® (Version 2.0) (IMPLAN), a computer-based I-O modeling program, was used to predict economic effects associated with the two proposed project alternatives and the no-action alternative. This I-O model is used by the analyst in conjunction with a detailed set of assumptions and alternative details to predict how related expenditures would impact the economies of Clark County. This I-O model predicts how expenditures that are associated with the proposed project alternatives would affect specific industries within the county as dollars are spent and re-spent locally. The IMPLAN results are expressed as construction, construction industry related, other commercial, and are discussed in terms of total impacts to total output, indirect business taxes, and employment. Each of the alternatives involves a transfer of title only and the only direct impact would be the receipt of funding under SNPLMA. Therefore, all of the impacts addressed in the IMPLAN model reflect indirect impacts. The following defines how the output of the model was used:

- Construction impacts are the changes in the industry demands from development through the three alternatives.
- Construction support addresses the indirect changes in inter-industry purchases as they respond to the new demands of the construction (a rise or reduction in production of raw building materials).
- Other commercial effects typically reflect changes in spending from households as income increases or decreases due to the changes in production.
- Total impacts are simply the summation of construction, construction support and other commercial impacts.
- Total-output is a measure of the total value of purchases by intermediate and final consumers, or by intermediate outlays plus value-added. It is the total production by the given industry for the year of the data.
- Value-added is a measurement of the value that is added to intermediate goods and services. It is equal to the total of employee compensation, proprietor income, other property income, and indirect business taxes.
- Indirect business tax impacts measure the amount of local (county, city, and other local taxing entities), and State sales taxes combined that would occur as a result of project-related expenditures.
- Employment impacts show the number of new jobs that would be created as a result the alternative related expenditures. Other employment impacts involve infusion of cash into the local economy as money is spent and re-spent locally and new jobs are created in other industries.

Argonne National Laboratory completed a comprehensive air quality modeling study, and supporting field measurements were taken to assess current and future cumulative air quality impacts in the urban Las Vegas Valley. The accessed cumulative impacts implicitly account for all known or foreseeable public or private development in Clark County from 1998 through 2018.

Information developed by Argonne for the air quality study included projections of disposal rates and subsequent development and land use activities. Projected types of development and land use for ongoing disposal actions were determined through analysis of current community land use plans and existing land uses within the disposal boundary area. Land use projections devel-

oped by Argonne were used to assess future socioeconomic trends in the Las Vegas Valley.

In order to estimate the indirect impacts related to land disposal in the Las Vegas Valley, the results of recent disposal actions were reviewed and compared to actual and planned land uses in the disposal boundary area. Based on the trends in the rate of disposal, land use type and rates of development that have occurred in the disposal boundary area in this period, average rates of land disposal, distribution of land use type for lands transferred from federal control, and development rates were determined for the alternatives. Disposal actions performed since 1998 and projected rates of disposal for planned sales in 2004 and 2005 indicate that an average of 4,000 acres per year is being transferred to non-federal ownership. The land use types, land disposal rates, and development projections for disposal and development of remaining land were determined by Argonne (2004).

A set of land disposal development assumptions were developed for the analysis by Argonne and these assumptions were used as the basis for estimating the dollar values of construction expenditures that would occur for the proposed action. The projections were then adjusted based on the land available for disposal and subsequent development under the other alternatives. The projections are based on the following considerations:

- The average amount of acres disposed of annually since 1998 indicate that 4,000 acres per year is being transferred.
- Under each alternative, BLM land disposal would make land available for development, based on the projections evaluated in the current RMP for the No Action Alternative, or the additional lands that would be available for disposal and development under the two action alternatives.
- All project construction expenditures are assumed to occur in Clark County, Nevada.

The land use category assignments are based on the best available data for projecting future land end use from a regional compilation of community land use plans compiled by the Regional Transportation Commission of Southern Nevada (RTC). Although these land end-use assignments consider local zoning restrictions, the authorized land uses can be changed through local government processes that establish the methods for petitioning changes in land use. However, the use of the best available data on known land use is a well-established practice that is followed by transportation and community planners to project and plan for regional transportation development, because this is the best available information on land uses in the disposal area.

The U.S. Bureau of Economic Analysis (BEA) uses the Standard Industrial Classification (SIC) system to identify business establishments by the principal activity in which they are engaged. The SIC system was expanded in 2001 to the North American Industry Classification System (NAICS) to clarify several industries. For comparison purposes for this analysis, similar types of service industries have been combined from the SIC and NAICS. The IMPLAN industry sectors are based on the NAICS system. Construction costs or expenditures were organized by three major land use categories that were used as inputs into IMPLAN to estimate economic impacts. The three major categories were single family housing units, multiple family housing units, and non-residential development.

The following table summarizes the assumed land disposition and development projections used for estimating development rates and indirect impacts associated with BLM land disposal actions. The "known" end-use land acreage shown as developable BLM land is the designated land use for currently undeveloped land that is not reserved for a ROW or open space. Approximately 4,286 new single-family units, 2,800 new multi-family units and 40 non-residential structures would be built each year between 2004 and 2018. Sub-categories were assigned in the non-residential development category based on the NAICS system, and general assumptions were made regarding the average parcel size, the average unit size (in square feet), the number of units per lot, and the average cost (per unit and per square foot) for construction.

LAND USE CATEGORIES, SUB-CATEGORIES AND IMPLAN INDUSTRY SECTORS		
Major Land Use Category	**Land Use Sub-Categories**	**Corresponding IMPLAN Industry Sector**
Single-Family Residential Housing Units	Single-Family Residential Housing Units	Sector 33, New Residential 1-Unit Structures
Multi-Family Housing Units	Multi-Family Housing Units	Sector 34, New Multi-Family Housing Structures
Non-Residential Development	Office, Retail, Hotel / Casino, Religious, Public Facilities, Industrial and Manufacturing	Sector 38, Commercial and Institutional Buildings

As previously noted for the projected land use types, the acreage assigned to each land use category is based on the RTC transportation planning database. Some lands in the disposal boundary area do not have a specific designation for future land use because the source data (RTC 2003) for land use did not cover the full disposal area. For these lands, the known land use for more than 100,000 acres of vacant land within the disposal boundary as of June 2002 was used determine the proportion of land use categories for disposal lands with no assigned land use categories.

The proportions of vacant land in different land use categories within the Las Vegas Valley range from 0.5 percent for public facilities (e.g., schools, parks, and hospitals) to 51 percent for single-and multi-family housing. Based on the analysis of development rates performed by Argonne, it has been projected that approximately 1,330 acres per year will be developed. These development rates include approximately 100 acres per year of parks and recreation land.

The types of development conducted in each land use within the Las Vegas area were evaluated based on development plans and building permits. This included development on land acquired through recent disposal actions and development of vacant land that was already in private ownership prior to initiation of the disposal actions.

Development scenarios have been created for each land use category. These scenarios were used to project the indirect impacts from the land disposal. Average lot size, building size, building type, number of residents (or workers and visitors for non-residential buildings) were determined for each land use category so that construction and land use impacts could be estimated. In some cases, these parameters have been adjusted to achieve consistency with the overall rates of development and valuation of construction that have occurred in the disposal boundary area based on information on the construction value of each type of building permit issued in Clark County.

For the No Action Alternative, it was assumed that land disposal would be discontinued once the amount of land disposed reached the total acreage that was projected for disposal and that was evaluated for impacts in the 1998 Las Vegas Resource Management Plan (RMP). Based on the projections for land disposal and development in the existing plan, disposal would not be continued after 2004 and ongoing development of previously disposed land at the rate projected for the area would result in complete build out of the disposed properties by the end of 2013.

For the Conservation Transfer Alternative it was estimated that approximately 5,000 acres of land within the disposal boundary area would be managed to protect resources and would not be available for intense development. Based on this consideration the total amount of land disposed was reduced by 5,000 acres and projected development during the planning period (through 2018) was reduced by approximately 2,500 acres. These values were used to reduce the projected disposal and development rates derived for the Proposed Action, resulting in average development rates of 1,144 acres per year.

LAND USE CATEGORY	PERCENTAGE
Single-family housing	46
Multifamily housing	5
Office buildings	12
Retail	10
Moderate-sized casinos and hotels	1
Industry	13
Recreation	1
Public facilities	5
Religious	7

After the IMPLAN model was run the data were placed in tables for each of the alternatives. These tables summarize:

- Construction Cost Estimates by IMPLAN Sector (NAICS) and Land Use Category
- Total Construction Output
- Value Added Construction Output
- Indirect Business Tax
- Employment
- Total Employment Output
- Value Added Employment Output
- Property Tax Collection

The most recent IMPLAN data for Clark County is 2001. Input dollars were deflated using the built-in IMPLAN Deflator option to provide inflation adjusted dollars for the same year (2001). Output dollars were adjusted for inflation and converted to 2004 dollars. The IMPLAN model was run on an industry basis and assuming that 100 percent of the construction expenditure would be local (Clark County, Nevada).

The IMPLAN modeling program does not predict population impacts. Therefore, predictions for population impacts were based on past population fluctuations and assumptions of the area's past ability to absorb growth or recover from reduction in population numbers. The Nevada State Demographer projects population numbers and these projections have also been put into a summary table.

Significance Criteria

Significance criteria for socioeconomics were determined by analyzing long-term fluctuations in Clark County employment. This analysis allows a county specific determination of the appropriate levels, or thresholds, beyond which changes in employment would noticeably affect individuals and communities.

Under all three alternatives, land development activities associated with the BLM land sale are expected to generate positive economic benefits within Clark County. Most of the benefits would be due to the construction of residential units, and to a lesser degree from construction of non-residential development.

For each of the alternatives, tables have been created from the IMPLAN model results that represent construction costs in terms of direct, indirect and induced impacts. Direct impacts are construction industry related, indirect impacts are construction supply industry related and induced impacts are from dollars spent and re-spent in the community. For each of the alternatives, the top ten industries that are expected to benefit in terms of total output and value-added are presented in tabular form. The first three sectors represent construction of those categories. Sectors 4 through 10 are industries that are affected more through indirect and induced effects, as intermediate goods and services are purchased to supply the construction of the new development, and as income generated through construction is re-spent in the local economy on housing, food real estate, health care, etc. The tables are presented as follows:

IMPACT CATEGORY	PROPOSED ACTION	CONSERVATION TRANSFER	NO ACTION
Construction Costs	E-1	E-10	E-19
Total Output	E-2	E-11	E-20
Top 10 Industries	E-3	E-12	E-21
Value Added Output	E-4	E-13	E-22
Value Added Top 10 Industries	E-5	E-14	E-23
Indirect Business Taxes	E-6	E-15	E-24
Top 10 Business Tax Industries	E-7	E-16	E-25
Overall Employment	E-8	E-17	E-26
Top 10 Employment Industries	E-9	E-18	E-27
Summary of Real Property Tax Impacts	E-28	E-33	E-38
Undeveloped Land Real Property Tax Impacts	E-29	E-34	E-39
Single Family Residential Real Property Tax Impacts	E-30	E-35	E-40
Multi-Family Real Property Tax Impacts	E-31	E-36	E-41
Non-Residential Real Property Tax Impacts	E-32	E-37	E-42
Land Sale Development Scenario	E-46	E-47	E-48
GENERAL TABLES			
Clark County Historical Population	E-43		
Clark County Projected Population	E-44		
Clark County Labor Force Trends 1983-2003	E-45		

TABLE E-1
PROPOSED ACTION – CONSTRUCTION COSTS

Land Use Category	Implan Sector Used	2004 Construction Cost*
Single Family Housing Units	33	$530,461,567
Multi-Family Housing Units	34	$172,594,800
Non-Residential	38	$155,769,167
Total		$858,825,534

*2004 Construction Costs were used as inputs into Implan, and were adjusted to 2001 dollars (the year of the Implan data for Clark County) using the built-in Implan Deflator option. The Implan model was run on an Industry basis, and assuming that 100% of the construction expenditure would be local (would occur in Clark County, NV.)

TABLE E-2
TOTAL OUTPUT*

Type of Impact	Direct	Indirect	Induced	Total
Impact in 2004 dollars	$858,825,728	$263,263,050	$275,349,940	$1,397,438,718
Inflator	1.023003518	1.023003518	1.023003518	1.023003518
2005	$878,581,741	$269,319,026	$281,683,957	$1,429,584,725
2006	$894,741,660	$275,514,311	$288,163,679	$1,462,470,203
2007	$911,240,062	$280,594,600	$293,477,213	$1,489,437,117
2008	$928,084,694	$285,781,502	$298,902,255	$1,516,969,950
2009	$945,283,494	$291,077,461	$304,441,362	$1,545,081,675
2010	$962,844,594	$296,484,982	$310,097,152	$1,573,785,586
2011	$980,776,327	$302,006,631	$315,872,310	$1,603,095,304
2012	$999,087,233	$307,645,037	$321,769,585	$1,633,024,785
2013	$1,017,786,060	$313,402,894	$327,791,796	$1,663,588,332
2014	$1,036,881,777	$319,282,963	$333,941,831	$1,694,800,600
2015	$1,056,383,572	$325,288,075	$340,222,648	$1,726,676,609
2016	$1,076,349,564	$331,436,125	$346,652,966	$1,759,311,357
2017	$1,096,742,543	$337,715,656	$353,220,801	$1,792,644,022
2018	$1,117,572,459	$344,129,731	$359,929,358	$1,826,690,869
Planning Period Impact (2004 dollars)	$13,741,211,648	$4,212,208,800	$4,405,599,040	$22,359,019,488
Planning Period Impact (w/annual inflation adjustment)	$14,761,181,508	$4,542,942,044	$4,751,516,855	$24,114,599,852

*Impacts expressed in 2001 dollars were converted to 2004 (inflation adjusted) dollars for the first project year (2004) using Implan's built-in Deflator. All impacts for 2005 to 2018 are expressed in inflation-adjusted dollars for each particular year using the average annual percentage increase in the CPI from 1998 to 2003.

TABLE E-3
TOTAL OUTPUT
TOP 10 IMPLAN INDUSTRY SECTORS IMPACTED

Sector #	Sector Name	Total Impact (2004 $)
33	New residential 1-unit structures- nonfarm	$530,461,696
34	New multifamily housing structures- nonfarm	$172,594,832
38	Commercial and institutional buildings	$155,769,200
390	Wholesale trade	$37,460,616
439	Architectural and engineering services	$35,303,512
509	Owner-occupied dwellings	$25,834,096
481	Food services and drinking places	$20,819,204
431	Real estate	$20,527,088
405	Food and beverage stores	$20,431,436
465	Offices of physicians- dentists- and other health	$18,329,212

TABLE E-4
VALUE-ADDED*

Type of Impact	Direct	Indirect	Induced	Total
Impact in 2004 dollars	$375,830,312	$165,064,438	$167,138,258	$708,033,008
Inflator	1.023003518	1.023003518	1.023003518	1.023003518
2005	$384,475,731	$168,861,501	$170,983,026	$724,320,258
2006	$391,547,466	$172,745,909	$174,916,237	$740,982,172
2007	$398,767,324	$175,931,221	$178,141,568	$754,645,358
2008	$406,138,695	$179,183,380	$181,434,586	$768,595,275
2009	$413,665,053	$182,503,916	$184,796,840	$782,838,497
2010	$421,349,958	$185,894,401	$188,229,922	$797,381,759
2011	$429,197,055	$189,356,443	$191,735,461	$812,231,961
2012	$437,210,081	$192,891,692	$195,315,125	$827,396,175
2013	$445,392,866	$196,501,835	$198,970,625	$842,881,649
2014	$453,749,334	$200,188,606	$202,703,715	$858,695,806
2015	$462,283,505	$203,953,777	$206,516,191	$874,846,258
2016	$471,020,813	$207,808,569	$210,419,414	$891,381,136
2017	$479,944,974	$211,745,799	$214,406,110	$908,269,624
2018	$489,060,344	$215,767,388	$218,478,224	$925,519,963
Planning Period Impact (2004 dollars)	$6,013,284,992	$2,641,031,008	$2,674,212,128	$11,328,528,128
Planning Period Impact (w/annual inflation adjustment)	$6,459,633,510	$2,848,398,875	$2,884,185,302	$12,218,018,901

*Impacts expressed in 2001 dollars were converted to 2004 (inflation adjusted) dollars for the first project year (2004) using Implan's built-in Deflator. All impacts for 2005 to 2018 are expressed in inflation-adjusted dollars for each particular year using the average annual percentage increase in the CPI from 1998 to 2003.

TABLE E-10
CONSERVATION TRANSFER ALTERNATIVE – CONSTRUCTION COSTS

Land Use Category	Implan Sector Used	2004 Construction Cost*
Single Family Housing Units	33	$477,280,855
Multi-Family Housing Units	34	$155,291,999
Non-Residential	38	$140,153,152
Total		$772,726,006

*2004 Construction Costs were used as inputs into Implan, and were adjusted to 2001 dollars (the year of the Implan data for Clark County) using the built-in Implan Deflator option. The Implan model was run on an Industry basis, and assuming that 100% of the construction expenditure would be local (would occur in Clark County, NV.)

TABLE E-11
TOTAL OUTPUT*

Type of Impact	Direct	Indirect	Induced	Total
2004 dollars	$723,150,456	$221,939,256	$230,358,642	$1,175,448,353
Inflator	1.023003518	1.023003518	1.023003518	1.023003518
2005	$739,785,461	$227,044,640	$235,657,701	$1,202,487,800
2006	$753,392,474	$232,267,465	$241,078,657	$1,230,149,250
2007	$767,284,497	$236,550,313	$245,523,977	$1,252,832,330
2008	$781,468,054	$240,923,038	$250,062,585	$1,275,991,430
2009	$795,949,827	$245,387,703	$254,696,619	$1,299,637,463
2010	$810,736,666	$249,946,418	$259,428,271	$1,323,781,609
2011	$825,835,586	$254,601,346	$264,259,786	$1,348,435,327
2012	$841,253,777	$259,354,705	$269,193,466	$1,373,610,355
2013	$856,998,608	$264,208,764	$274,231,667	$1,399,318,725
2014	$873,077,629	$269,165,853	$279,376,805	$1,425,572,763
2015	$889,498,575	$274,228,356	$284,631,357	$1,452,385,103
2016	$906,310,387	$279,411,361	$290,010,982	$1,479,835,653
2017	$923,481,731	$284,705,208	$295,505,654	$1,507,873,252
2018	$941,020,986	$290,112,480	$301,118,054	$1,536,511,581
Planning Period Impact (2004 dollars)	$11,570,407,296	$3,551,028,096	$3,685,738,272	$18,807,173,648
Planning Period Impact (w/annual inflation adjustment)	$12,429,244,713	$3,829,846,906	$3,975,134,224	$20,283,870,995

*Impacts expressed in 2001 dollars were converted to 2004 (inflation adjusted) dollars for the first project year (2004) using Implan's built-in Deflator. All impacts for 2005 to 2018 are expressed in inflation-adjusted dollars for each particular year using the average annual percentage increase in the CPI from 1998 to 2003.

TABLE E-12
TOTAL OUTPUT
TOP 10 IMPLAN INDUSTRY SECTORS IMPACTED

Sector #	Sector Name	Total Impact (2004 $)
33	New residential 1-unit structures- nonfarm	$446,660,100
34	New multifamily housing structures- nonfarm	$145,329,000
38	Commercial and institutional buildings	$131,161,400
390	Wholesale trade	$32,474,950
439	Architectural and engineering services	$29,302,080
509	Owner-occupied dwellings	$21,556,230
481	Food services and drinking places	$17,535,180
431	Real estate	$17,393,920
405	Food and beverage stores	$17,147,730
465	Offices of physicians- dentists- and other health	$15,013,080

TABLE E-13
VALUE-ADDED*

Type of Impact	Direct	Indirect	Induced	Total
Impact in 2004 dollars	$316,457,568	$138,989,133	$139,750,888	$595,197,591
Inflator	1.023003518	1.023003518	1.023003518	1.023003518
2005	$323,737,205	$142,186,372	$142,965,650	$608,889,229
2006	$329,691,765	$145,457,159	$146,254,363	$622,895,824
2007	$335,771,047	$148,139,286	$148,951,190	$634,381,581
2008	$341,977,907	$150,877,699	$151,704,611	$646,108,375
2009	$348,315,270	$153,673,689	$154,515,925	$658,081,731
2010	$354,786,132	$156,528,577	$157,386,460	$670,307,311
2011	$361,393,565	$159,443,719	$160,317,579	$682,790,917
2012	$368,140,713	$162,420,503	$163,310,678	$695,538,492
2013	$375,030,802	$165,460,350	$166,367,186	$708,556,128
2014	$382,067,135	$168,564,720	$169,488,569	$721,850,069
2015	$389,253,099	$171,735,105	$172,676,330	$735,426,710
2016	$396,610,109	$174,980,954	$175,939,969	$749,326,513
2017	$404,124,453	$178,296,218	$179,273,403	$763,523,573
2018	$411,799,799	$181,682,515	$182,678,258	$778,024,818
Planning Period Impact (2004 dollars)	$5,063,321,088	$2,223,826,128	$2,236,014,208	$9,523,161,456
Planning Period Impact (w/annual inflation adjustment)	$5,439,156,570	$2,398,435,998	$2,411,581,059	$10,270,898,863

*Impacts expressed in 2001 dollars were converted to 2004 (inflation adjusted) dollars for the first project year (2004) using Implan's built-in Deflator. All impacts for 2005 to 2018 are expressed in inflation-adjusted dollars for each particular year using the average annual percentage increase in the CPI from 1998 to 2003.

TABLE E-14
TOP 10 IMPLAN INDUSTRY SECTORS IMPACTED

Sector #	Sector Name	Total Impact (2004 $)
33	New residential 1-unit structures- nonfarm	$182,163,200
34	New multifamily housing structures- nonfarm	$69,829,470
38	Commercial and institutional buildings	$64,464,910
439	Architectural and engineering services	$21,854,840
390	Wholesale trade	$21,806,360
509	Owner-occupied dwellings	$16,746,540
431	Real estate	$11,954,260
465	Offices of physicians- dentists- and other health	$10,935,390
405	Food and beverage stores	$9,365,827
481	Food services and drinking places	$9,343,426

TABLE E-15
INDIRECT BUSINESS TAXES*

Type of Impact	Direct	Indirect	Induced	Total
Impact in 2004 dollars	$6,139,054	$14,293,950	$15,158,978	$35,591,981
Inflator	1.023003518	1.023003518	1.023003518	1.023003518
2005	$6,280,274	$14,622,761	$15,507,688	$36,410,722
2006	$6,395,788	$14,959,136	$15,864,419	$37,248,296
2007	$6,513,722	$15,234,972	$16,156,948	$37,935,129
2008	$6,634,131	$15,516,596	$16,455,615	$38,636,374
2009	$6,757,071	$15,804,142	$16,760,563	$39,352,364
2010	$6,882,601	$16,097,745	$17,071,934	$40,083,437
2011	$7,010,781	$16,397,545	$17,389,876	$40,829,939
2012	$7,141,671	$16,703,684	$17,714,542	$41,592,226
2013	$7,275,333	$17,016,309	$18,046,086	$42,370,663
2014	$7,411,833	$17,335,569	$18,384,667	$43,165,621
2015	$7,551,236	$17,661,618	$18,730,448	$43,977,486
2016	$7,693,957	$17,995,429	$19,084,459	$44,808,674
2017	$7,839,730	$18,336,378	$19,446,041	$45,657,639
2018	$7,988,626	$18,684,632	$19,815,371	$46,524,793
Planning Period Impact (2004 dollars)	$98,224,864	$228,703,200	$242,543,648	$569,471,696
Planning Period Impact (w/annual inflation adjustment)	$105,515,808	$246,660,465	$261,587,635	$614,185,344

*Impacts expressed in 2001 dollars were converted to 2004 (inflation adjusted) dollars for the first project year (2004) using Implan's built-in Deflator. All impacts for 2005 to 2018 are expressed in inflation-adjusted dollars for each particular year using the average annual percentage increase in the CPI from 1998 to 2003.

TABLE E-16
INDIRECT BUSINESS TAX
TOP 10 IMPLAN INDUSTRY SECTORS IMPACTED

Sector #	Sector Name	Total Impact (2004 $)
390	Wholesale trade	$6,263,429
33	New residential 1-unit structures- nonfarm	$4,040,034
509	Owner-occupied dwellings	$3,309,093
431	Real estate	$2,217,806
405	Food and beverage stores	$1,877,252
38	Commercial and institutional buildings	$1,403,290
401	Motor vehicle and parts dealers	$1,397,722
404	Building material and garden supply stores	$1,295,260
410	General merchandise stores	$1,211,202
481	Food services and drinking places	$1,135,912

TABLE E-17
EMPLOYMENT

Type of Impact	Employment	Planning Period Impact
Direct	6,111.7	91,675.5
Indirect	2,579.5	38,692.5
Induced	2,521.2	37,818.0
Total	11,212.4	168,186.0

TABLE E-18
TOP 10 IMPLAN INDUSTRY SECTORS IMPACTED

Sector #	Sector Name	# of Annual Jobs Created
33	New residential 1-unit structures- nonfarm	3,224.2
34	New multifamily housing structures- nonfarm	1,476.9
38	Commercial and institutional buildings	1,410.5
481	Food services and drinking places	389.1
405	Food and beverage stores	276.8
439	Architectural and engineering services	273.7
410	General merchandise stores	234.7
390	Wholesale trade	231.0
411	Miscellaneous store retailers	180.4
454	Employment services	160.5

TABLE E-19
NO ACTION – CONSTRUCTION COSTS

Land Use Category	Implan Sector Used	2004 Construction Cost*
Single Family Housing Units	33	$530,460,000
Multi-Family Housing Units	34	$172,594,800
Non-Residential	38	$155,769,167
Total		$858,823,967

*2004 Construction Costs were used as inputs into Implan, and were adjusted to 2001 dollars (the year of the Implan data for Clark County) using the built-in Implan Deflator option. The Implan model was run on an Industry basis, and assuming that 100% of the construction expenditure would be local (would occur in Clark County, NV.)

TABLE E-20
TOTAL OUTPUT*

Type of Impact	Direct	Indirect	Induced	Total
Impact 2004 dollars	$858,824,160	$263,262,542	$275,349,487	$1,397,436,189
Inflator	1.023003518	1.023003518	1.023003518	1.023003518
2005	$878,580,137	$269,318,507	$281,683,494	$1,429,582,138
2006	$894,740,027	$275,513,780	$288,163,205	$1,462,467,556
2007	$911,238,399	$280,594,059	$293,476,730	$1,489,434,421
2008	$928,083,000	$285,780,950	$298,901,764	$1,516,967,204
2009	$945,281,768	$291,076,900	$304,440,861	$1,545,078,879
2010	$962,842,836	$296,484,410	$310,096,642	$1,573,782,738
2011	$980,774,536	$302,006,048	$315,871,790	$1,603,092,403
2012	$999,085,408	$307,644,443	$321,769,056	$1,633,021,830
2013	$1,017,784,202	$313,402,289	$327,791,257	$1,663,585,321
2014	$0	$0	$0	$0
2015	$0	$0	$0	$0
2016	$0	$0	$0	$0
2017	$0	$0	$0	$0
2018	$0	$0	$0	$0
Planning Period Impact (2004 dollars)	$12,023,538,240	$3,685,675,588	$3,854,892,818	$19,564,106,646
Planning Period Impact (w/annual inflation adjustment)	$9,377,234,473	$2,885,083,927	$3,017,544,286	$15,314,448,678

*Impacts expressed in 2001 dollars were converted to 2004 (inflation adjusted) dollars for the first project year (2004) using Implan's built-in Deflator. All impacts for 2005 to 2018 are expressed in inflation-adjusted dollars for each particular year using the average annual percentage increase in the CPI from 1998 to 2003.

TABLE E-21
TOTAL OUTPUT
TOP 10 IMPLAN INDUSTRY SECTORS IMPACTED

Sector #	Sector Name	Total Impact (2004 $)
33	New residential 1-unit structures- nonfarm	$530,460,128
34	New multifamily housing structures- nonfarm	$172,594,832
38	Commercial and institutional buildings	$155,769,200
390	Wholesale trade	$37,460,544
439	Architectural and engineering services	$35,303,468
509	Owner-occupied dwellings	$25,834,054
481	Food services and drinking places	$20,819,170
431	Real estate	$20,527,054
405	Food and beverage stores	$20,431,394
465	Offices of physicians- dentists- and other health	$18,329,182

TABLE E-22
VALUE-ADDED*

Type of Impact	Direct	Indirect	Induced	Total
Impact in 2004 dollars	$375,829,688	$165,064,122	$167,137,983	$708,031,796
Inflator	1.023003518	1.023003518	1.023003518	1.023003518
2005	$384,475,093	$168,861,178	$170,982,745	$724,319,018
2006	$391,546,816	$172,745,579	$174,915,949	$740,980,904
2007	$398,766,661	$175,930,885	$178,141,275	$754,644,066
2008	$406,138,021	$179,183,037	$181,434,287	$768,593,960
2009	$413,664,366	$182,503,567	$184,796,536	$782,837,157
2010	$421,349,258	$185,894,045	$188,229,613	$797,380,394
2011	$429,196,342	$189,356,081	$191,735,145	$812,230,571
2012	$437,209,355	$192,891,322	$195,314,804	$827,394,759
2013	$445,392,127	$196,501,459	$198,970,298	$842,880,206
2014	$0	$0	$0	$0
2015	$0	$0	$0	$0
2016	$0	$0	$0	$0
2017	$0	$0	$0	$0
2018	$0	$0	$0	$0
Planning Period Impact (2004 dollars)	$5,261,615,632	$2,310,897,708	$2,339,931,762	$9,912,445,144
Planning Period Impact (w/annual inflation adjustment)	$4,103,567,727	$1,808,931,274	$1,831,658,635	$7,759,292,831

*Impacts expressed in 2001 dollars were converted to 2004 (inflation adjusted) dollars for the first project year (2004) using Implan's built-in Deflator. All impacts for 2005 to 2018 are expressed in inflation-adjusted dollars for each particular year using the average annual percentage increase in the CPI from 1998 to 2003.

TABLE E-23
TOP 10 IMPLAN INDUSTRY SECTORS IMPACTED

Sector #	Sector Name	Total Impact (2004 $)
33	New residential 1-unit structures- nonfarm	$216,339,696
34	New multifamily housing structures- nonfarm	$82,930,512
38	Commercial and institutional buildings	$76,559,480
439	Architectural and engineering services	$26,330,950
390	Wholesale trade	$25,154,092
509	Owner-occupied dwellings	$20,069,882
431	Real estate	$14,310,102
465	Offices of physicians- dentists- and other health	$13,878,876
405	Food and beverage stores	$12,845,025
481	Food services and drinking places	$11,119,860

TABLE E-24
INDIRECT BUSINESS TAXES*

Type of Impact	Direct	Indirect	Induced	Total
Impact in 2004 dollars	$6,823,073	$15,886,596	$16,848,007	$39,557,677
Inflator	1.023003518	1.023003518	1.023003518	1.023003518
2005	$6,980,028	$16,252,044	$17,235,570	$40,467,643
2006	$7,108,413	$16,625,898	$17,632,049	$41,398,541
2007	$7,239,487	$16,932,468	$17,957,172	$42,161,901
2008	$7,373,312	$17,245,471	$18,289,117	$42,941,280
2009	$7,509,950	$17,565,055	$18,628,042	$43,737,046
2010	$7,649,467	$17,891,372	$18,974,106	$44,549,576
2011	$7,791,928	$18,224,576	$19,327,474	$45,379,254
2012	$7,937,402	$18,564,825	$19,688,315	$46,226,476
2013	$8,085,958	$18,912,282	$20,056,799	$47,091,646
2014	$0	$0	$0	$0
2015	$0	$0	$0	$0
2016	$0	$0	$0	$0
2017	$0	$0	$0	$0
2018	$0	$0	$0	$0
Planning Period Impact (2004 dollars)	$95,523,022	$222,412,344	$235,872,098	$553,807,478
Planning Period Impact (w/annual inflation adjustment)	$74,499,017	$174,100,586	$184,636,651	$433,511,039

*Impacts expressed in 2001 dollars were converted to 2004 (inflation adjusted) dollars for the first project year (2004) using Implan's built-in Deflator. All impacts for 2005 to 2018 are expressed in inflation-adjusted dollars for each particular year using the average annual percentage increase in the CPI from 1998 to 2003.

TABLE E-25
TOP 10 IMPLAN INDUSTRY SECTORS IMPACTED

Sector #	Sector Name	Total Impact (2004 $)
390	Wholesale trade	$6,961,307
33	New residential 1-unit structures- nonfarm	$4,490,179
509	Owner-occupied dwellings	$3,677,796
431	Real estate	$2,464,916
405	Food and beverage stores	$2,086,417
38	Commercial and institutional buildings	$1,559,647
401	Motor vehicle and parts dealers	$1,553,457
404	Building material and garden supply stores	$1,439,579
410	General merchandise stores	$1,346,156
481	Food services and drinking places	$1,262,477

TABLE E-26
EMPLOYMENT

Type of Impact	Employment	Planning Period Impact
Direct	6,792.7	67,927.0
Indirect	2,866.9	28,669.0
Induced	2,802.1	28,021.0
Total	12,461.7	124,617.0

TABLE E-27
TOP 10 IMPLAN INDUSTRY SECTORS IMPACTED

Sector #	Sector Name	# of Annual Jobs Created
33	New residential 1-unit structures- nonfarm	3,583.5
34	New multifamily housing structures- nonfarm	1,641.5
38	Commercial and institutional buildings	1,567.7
481	Food services and drinking places	432.4
405	Food and beverage stores	307.6
439	Architectural and engineering services	304.2
410	General merchandise stores	260.9
390	Wholesale trade	256.7
411	Miscellaneous store retailers	200.5
454	Employment services	178.4

TABLE E-28
PROPOSED ACTION – REAL PROPERTY TAX COLLECTION FROM LAND DISPOSAL BY LAND USE CATEGORY

Summary of Property Tax Impacts

Land Use Category	Total Property Tax Collected During Planning Period	Avg. Annual Property Tax Collected
Undeveloped Land	$1,521,539,143	$101,435,943
Single-Family Residential Units	$2,178,741,922	$145,249,461
Multi-Family Residential Units	$570,682,716	$38,045,514
Non-Residential Development	$273,139,349	$18,209,290
Total	$4,544,103,130	$302,940,209

TABLE E-29
PROPOSED ACTION
UNDEVELOPED LAND – REAL PROPERTY TAX COLLECTED

	Acres Sold	Cumulative Acres Sold	Acres Developed	Cumulative Acres Developed	Cumulative Acres Undeveloped	Value per acre of undeveloped land*	Value of cumulative undeveloped land	Property tax rate per $100 of assessed value	Property Tax Collected for Cumulative Acres of Undeveloped Land
2004	4000	4000	1330	1330	2670	$94,000	$250,980,000	$2.950	$7,403,910
2005	4000	8000	1330	2660	5340	$100,580	$537,097,200	$2.950	$15,844,367
2006	4000	12000	1330	3990	8010	$107,621	$862,041,006	$2.950	$25,430,210
2007	4000	16000	1330	5320	10680	$115,154	$1,229,845,169	$2.950	$36,280,432
2008	4000	20000	1330	6650	13350	$123,215	$1,644,917,913	$2.950	$48,525,078
2009	4000	24000	1330	7980	16020	$131,840	$2,112,074,600	$2.950	$62,306,201
2010	4000	28000	1330	9310	18690	$141,069	$2,636,573,126	$2.950	$77,778,907
2011	4000	32000	1330	10640	21360	$150,943	$3,224,152,280	$2.950	$95,112,492
2012	4000	36000	1330	11970	24030	$161,510	$3,881,073,307	$2.950	$114,491,663
2013	4000	40000	1330	13300	26700	$172,815	$4,614,164,931	$2.950	$136,117,865
2014	4000	44000	1330	14630	29370	$184,912	$5,430,872,124	$2.950	$160,210,728
2015	2701	46701	1330	15960	30741	$197,856	$6,082,293,863	$2.950	$176,427,669
2016	0	46701	1330	17290	28081	$211,706	$6,266,485,411	$2.950	$183,681,321
2017	0	46701	1330	18620	26751	$226,525	$6,361,060,600	$2.950	$187,651,288
2018	0	46701	1330	19950	0	$242,382	$6,483,966,503	$2.950	$191,277,012
2019	0	0	0	0	0	0	$0	$0.0000	$0
Total for Planning Period (2004 dollars)									$1,521,539,143
Average Annual for Planning Period (2004 dollars)									$101,435,943

*Average value per acre based on BLM land sold in Clark County as of April 30, 2004. BLM, 2004. Land values were assumed to appreciate by 7.0% per year (a very conservative assumption for Clark County).

TABLE E-30
PROPOSED ACTION
SINGLE FAMILY RESIDENTIAL UNITS – REAL PROPERTY TAX COLLECTED

	# of Occupied SF Residential Units	Cumulative # of Occupied SF Residential Units	Average Value of SF Residential Units (assumes 7% apprec./year)	Cumulative Value of Occupied SF Residential Units	Taxable Amount of Cumulative SF Residential Property Value	Property tax rate per $100 of assessed value	Property Tax Collected for Cumulative # of Occupied SF Residential Units
2004	4,286	4,286	$212,000	$908,632,000	$318,021,200	$2.9500	$9,381,625
2005	4,286	8,572	$226,840	$1,944,472,480	$680,565,368	$2.9500	$20,076,678
2006	4,286	12,858	$242,719	$3,120,878,330	$1,092,307,416	$2.9500	$32,223,069
2007	4,286	17,144	$259,709	$4,452,453,085	$1,558,358,580	$2.9500	$45,971,578
2008	4,286	21,430	$277,889	$5,955,156,001	$2,084,304,600	$2.9500	$61,486,986
2009	4,286	25,716	$297,341	$7,646,420,305	$2,676,247,107	$2.9500	$78,949,290
2010	4,286	30,002	$318,155	$9,545,281,347	$3,340,848,472	$2.9500	$98,555,030
2011	4,286	34,288	$340,426	$11,672,515,476	$4,085,380,417	$2.9500	$120,518,722
2012	4,286	38,574	$364,255	$14,050,790,505	$4,917,776,677	$2.9500	$145,074,412
2013	4,286	42,860	$389,753	$16,704,828,711	$5,846,690,049	$2.9500	$172,477,356
2014	4,286	47,146	$417,036	$19,661,583,393	$6,881,554,187	$2.9500	$203,005,849
2015	4,286	51,432	$446,229	$22,950,430,069	$8,032,650,524	$2.9500	$236,963,190
2016	4,286	55,718	$477,465	$26,603,373,522	$9,311,180,733	$2.9500	$274,679,832
2017	4,286	60,004	$510,887	$30,655,271,951	$10,729,345,183	$2.9500	$316,515,683
2018	4,286	64,290	$546,649	$35,144,079,629	$12,300,427,870	$2.9500	$362,862,622
2019	0	0	$0	$0	$0	$0.0000	$0
Total for Planning Period (2004 $)							$2,178,741,922
Average Annual for Planning Period (2004 $)							$145,249,461

TABLE E-31
PROPOSED ACTION
MULTI-FAMILY RESIDENTIAL UNITS – REAL PROPERTY TAX COLLECTED

	# of Occupied MF Residential Units	Cumulative # of Occupied MF Residential Units	Average Value of MF Residential Units (assumes 7% apprec./year)	Cumulative Value of Occupied MF Residential Units	Taxable Amount of Cumulative MF Residential Property Value	Property tax rate per $100 of assessed value	Property Tax Collected for Cumulative # of Occupied MF Residential Units
2004	2,800	2,800	$85,000	$238,000,000	$83,300,000	$2.950	$2,457,350
2005	2,800	5,600	$90,950	$509,320,000	$178,262,000	$2.950	$5,258,729
2006	2,800	8,400	$97,317	$817,458,600	$286,110,510	$2.950	$8,440,260
2007	2,800	11,200	$104,129	$1,166,240,936	$408,184,328	$2.950	$12,041,438
2008	2,800	14,000	$111,418	$1,559,847,252	$545,946,538	$2.950	$16,105,423
2009	2,800	16,800	$119,217	$2,002,843,871	$700,995,355	$2.950	$20,679,363
2010	2,800	19,600	$127,562	$2,500,216,766	$875,075,868	$2.950	$25,814,738
2011	2,800	22,400	$136,491	$3,057,407,931	$1,070,092,776	$2.950	$31,567,737
2012	2,800	25,200	$146,046	$3,680,354,797	$1,288,124,179	$2.950	$37,999,663
2013	2,800	28,000	$156,269	$4,375,532,926	$1,531,436,524	$2.950	$45,177,377
2014	2,800	30,800	$167,208	$5,150,002,253	$1,802,500,789	$2.950	$53,173,773
2015	2,800	33,600	$178,912	$6,011,457,176	$2,104,010,012	$2.950	$62,068,295
2016	2,800	36,400	$191,436	$6,968,280,776	$2,438,898,272	$2.950	$71,947,499
2017	2,800	39,200	$204,837	$8,029,603,541	$2,810,361,239	$2.950	$82,905,657
2018	2,800	42,000	$219,175	$9,205,366,916	$3,221,878,421	$2.950	$95,045,413
2019	0	0	$0	$0	$0	$2.950	$0
Total for Planning Period (2004 $)							$570,682,716
Average Annual for Planning Period (2004 $)							$38,045,514

TABLE E-32
PROPOSED ACTION
NON-RESIDENTIAL DEVELOPMENT - REAL PROPERTY TAX COLLECTED

	Property Value of Non-Residential Development (assumes property value = construction value + 7% appreciation/year)	Cumulative Property Value of Non-Residential Development	Taxable Amount of Cumulative MF Residential Property Value	Property tax rate per $100 of assessed value	Property Tax Collected for Cumulative Non-Residential Development
2004	$155,769,167	$155,769,167	$54,519,208	$2.9500	$1,608,317
2005	$166,673,009	$322,442,176	$112,854,761	$2.9500	$3,329,215
2006	$178,340,119	$500,782,295	$175,273,803	$2.9500	$5,170,577
2007	$190,823,928	$691,606,223	$242,062,178	$2.9500	$7,140,834
2008	$204,181,603	$895,787,825	$313,525,739	$2.9500	$9,249,009
2009	$218,474,315	$1,114,262,140	$389,991,749	$2.9500	$11,504,757
2010	$233,767,517	$1,348,029,657	$471,810,380	$2.9500	$13,918,406
2011	$250,131,243	$1,598,160,900	$559,356,315	$2.9500	$16,501,011
2012	$267,640,430	$1,865,801,330	$653,030,465	$2.9500	$19,264,399
2013	$286,375,260	$2,152,176,590	$753,261,806	$2.9500	$22,221,223
2014	$306,421,528	$2,458,598,118	$860,509,341	$2.9500	$25,385,026
2015	$327,871,035	$2,786,469,153	$975,264,204	$2.9500	$28,770,294
2016	$350,822,008	$3,137,291,161	$1,098,051,906	$2.9500	$32,392,531
2017	$375,379,548	$3,512,670,709	$1,229,434,748	$2.9500	$36,268,325
2018	$401,656,117	$3,914,326,826	$1,370,014,389	$2.9500	$40,415,424
2019	$0	$0	$0	$0.0000	$0
Total Planning Period (2004 $)					$273,139,349
Average Annual for Planning Period (2004 $)					$18,209,290

TABLE E-33
CONSERVATION TRANSFER ALTERNATIVE – REAL PROPERTY TAX COLLECTION FROM LAND DISPOSAL BY LAND USE CATEGORY

Summary of Property Tax Impacts

Land Use Category	Total Property Tax Collected During Planning Period	Avg. Annual Property Tax Collected
Undeveloped Land	$1,539,936,734	$102,662,449
Single-Family Residential Units	$1,960,156,055	$130,677,070
Multi-Family Residential Units	$513,410,629	$34,227,375
Non-Residential Development	$245,756,856	$16,383,790
Total	$4,259,260,274	$283,950,685

TABLE E-34
CONSERVATION TRANSFER
UNDEVELOPED LAND – REAL PROPERTY TAX COLLECTED

	Acres Sold	Cumulative Acres Sold	Acres Developed	Cumulative Acres Developed	Cumulative Acres Undeveloped	Value per acre of undeveloped land*	Value of cumulative undeveloped land	Property tax rate per $100 of assessed value	Property Tax Collected for Cumulative Acres of Undeveloped Land
2004	4000	4000	1330	1330	2670	$94,000	$250,980,000	$2.9500	$7,403,910
2005	4000	8000	1330	2660	5340	$100,580	$537,097,200	$2.9500	$15,844,367
2006	4000	12000	1330	3990	8010	$107,621	$862,041,006	$2.9500	$25,430,210
2007	4000	16000	1330	5320	10680	$115,154	$1,229,845,169	$2.9500	$36,280,432
2008	4000	20000	1330	6650	13350	$123,215	$1,644,917,913	$2.9500	$48,525,078
2009	4000	24000	1330	7980	16020	$131,840	$2,112,074,600	$2.9500	$62,306,201
2010	4000	28000	1330	9310	18690	$141,069	$2,636,573,126	$2.9500	$77,778,907
2011	4000	32000	1330	10640	21360	$150,943	$3,224,152,280	$2.9500	$95,112,492
2012	4000	36000	1330	11970	24030	$161,510	$3,881,073,307	$2.9500	$114,491,663
2013	4000	40000	1330	13300	26700	$172,815	$4,614,164,931	$2.9500	$136,117,865
2014	4000	44000	1330	14630	29370	$184,912	$5,430,872,124	$2.9500	$160,210,728
2015	2701	46,701	1330	15960	30741	$197,856	$6,082,293,863	$2.9500	$179,427,669
2016	0	46,701	1330	17290	29411	$211,706	$6,226,485,441	$2.9500	$183,681,321
2017	0	46,701	1330	17290	29411	$226,525	$6,662,339,422	$2.9500	$196,539,013
2018	0	46,701	1330	18620	28081	$242,382	$6,806,334,842	$2.9500	$200,786,878
2019	0	0	0	0	0	$0	$0	$0.0000	$0
Total for Planning Period (2004 $)									$1,539,936,734
Average Annual for Planning Period (2004 $)									$102,662,449

*Average value per acre based on BLM land sold in Clark County as of April 30, 2004. BLM, 2004. Land values were assumed to appreciate by 7.0% per year (a very conservative assumption for Clark County).

TABLE E-35
CONSERVATION TRANSFER
SINGLE FAMILY RESIDENTIAL UNITS – REAL PROPERTY TAX COLLECTED

	# of Occupied SF Residential Units	Cumulative # of Occupied SF Residential Units	Average Value of SF Residential Units (assumes 7% apprec./year)	Cumulative Value of Occupied SF Residential Units	Taxable Amount of Cumulative SF Residential Property Value	Property tax rate per $100 of assessed value	Property Tax Collected for Cumulative # of Occupied SF Residential Units
2004	3,856	3,856	$212,000	$817,472,000	$286,115,200	$2.9500	$8,440,398
2005	3,856	7,712	$226,840	$1,749,390,080	$612,286,528	$2.9500	$18,062,453
2006	3,856	11,568	$242,719	$2,807,771,078	$982,719,877	$2.9500	$28,990,236
2007	3,856	15,424	$259,709	$4,005,753,405	$1,402,013,692	$2.9500	$41,359,404
2008	3,856	19,280	$277,889	$5,357,695,179	$1,875,193,313	$2.9500	$55,318,203
2009	3,856	23,136	$297,341	$6,879,280,610	$2,407,748,214	$2.9500	$71,028,572
2010	3,856	26,992	$318,155	$8,587,635,295	$3,005,672,353	$2.9500	$88,667,334
2011	3,856	30,848	$340,426	$10,501,451,161	$3,675,507,906	$2.9500	$108,427,483
2012	3,856	34,704	$364,255	$12,641,121,835	$4,424,392,642	$2.9500	$130,519,583
2013	3,856	38,560	$389,753	$15,028,889,293	$5,260,111,253	$2.9500	$155,173,282
2014	3,856	42,416	$417,036	$17,689,002,698	$6,191,150,944	$2.9500	$182,638,953
2015	3,856	46,272	$446,229	$20,647,890,422	$7,226,761,648	$2.9500	$213,189,469
2016	3,856	50,128	$477,465	$23,934,346,314	$8,377,021,210	$2.9500	$247,122,126
2017	3,856	53,984	$510,887	$27,579,731,368	$9,652,905,979	$2.9500	$284,760,726
2018	3,856	57,840	$546,649	$31,618,192,032	$11,066,367,211	$2.9500	$326,457,833
2019	0	0	$0	$0	$0	$0.0000	$0
Total for Planning Period (2004 dollars)							$1,960,156,055
Average Annual for Planning Period (2004 dollars)							$130,677,070

TABLE E-36
CONSERVATION TRANSFER
MULTI-FAMILY RESIDENTIAL UNITS – REAL PROPERTY TAX COLLECTED

	# of Occupied MF Residential Units	Cumulative # of Occupied MF Residential Units	Average Value of MF Residential Units (assumes 7% apprec./year)	Cumulative Value of Occupied MF Residential Units	Taxable Amount of Cumulative MF Residential Property Value	Property tax rate per $100 of assessed value	Property Tax Collected for Cumulative # of Occupied MF Residential Units
2004	2,519	2,519	$85,000	$214,115,000	$74,940,250	$2.9500	$2,210,737
2005	2,519	5,038	$90,950	$458,206,100	$160,372,135	$2.9500	$4,730,978
2006	2,519	7,557	$97,317	$735,420,791	$257,397,277	$2.9500	$7,593,220
2007	2,519	10,076	$104,129	$1,049,200,328	$367,220,115	$2.9500	$10,832,993
2008	2,519	12,595	$111,418	$1,403,305,438	$491,156,903	$2.9500	$14,489,129
2009	2,519	15,114	$119,217	$1,801,844,183	$630,645,464	$2.9500	$18,604,041
2010	2,519	17,633	$127,562	$2,249,302,155	$787,255,754	$2.9500	$23,224,045
2011	2,519	20,152	$136,491	$2,750,575,207	$962,701,322	$2.9500	$28,399,689
2012	2,519	22,671	$146,046	$3,311,004,905	$1,158,851,717	$2.9500	$34,186,126
2013	2,519	25,190	$156,269	$3,936,416,943	$1,377,745,930	$2.9500	$40,643,505
2014	2,519	27,709	$167,208	$4,633,162,742	$1,621,606,960	$2.9500	$47,837,405
2015	2,519	30,228	$178,912	$5,408,164,509	$1,892,857,578	$2.9500	$55,839,299
2016	2,519	32,747	$191,436	$6,268,964,027	$2,194,137,409	$2.9500	$64,727,054
2017	2,519	35,266	$204,837	$7,223,775,471	$2,528,321,415	$2.9500	$74,585,482
2018	2,519	37,785	$219,175	$8,281,542,594	$2,898,539,908	$2.9500	$85,506,927
2019	0	0	$0	$0	$0	$0.0000	$0
Total for Planning Period (2004 dollars)							$513,410,629
Average Annual for Planning Period (2004 dollars)							$34,227,375

TABLE E-37
CONSERVATION TRANSFER
NON-RESIDENTIAL DEVELOPMENT – REAL PROPERTY TAX COLLECTED

	Property Value of Non-Residential Development (assumes property value = construction value + 7% appreciation/year)	Cumulative Property Value of Non-Residential Development	Taxable Amount of Cumulative MF Residential Property Value	Property tax rate per $100 of assessed value	Property Tax Collected for Cumulative Non-Residential Development
2004	$140,153,152	$140,153,152	$49,053,603	$2.9500	$1,447,081
2005	$149,963,873	$290,117,025	$101,540,959	$2.9500	$2,995,458
2006	$160,461,344	$450,578,368	$157,702,429	$2.9500	$4,652,222
2007	$171,693,638	$622,272,006	$217,795,202	$2.9500	$6,424,958
2008	$183,712,192	$805,984,199	$282,094,470	$2.9500	$8,321,787
2009	$196,572,046	$1,002,556,244	$350,894,686	$2.9500	$10,351,393
2010	$210,332,089	$1,212,888,334	$424,510,917	$2.9500	$12,523,072
2011	$225,055,335	$1,437,943,669	$503,280,284	$2.9500	$14,846,768
2012	$240,809,209	$1,678,752,878	$587,563,507	$2.9500	$17,333,123
2013	$257,665,853	$1,936,418,731	$677,746,556	$2.9500	$19,993,523
2014	$275,702,463	$2,212,121,194	$774,242,418	$2.9500	$22,840,151
2015	$295,001,636	$2,507,122,830	$877,492,991	$2.9500	$25,886,043
2016	$315,651,750	$2,822,774,580	$987,971,103	$2.9500	$29,145,148
2017	$337,747,373	$3,160,521,953	$1,106,182,683	$2.9500	$32,632,389
2018	$361,389,689	$3,521,911,641	$1,232,669,074	$2.9500	$36,363,738
2019	$0	$0	$0	$0.0000	$0
Total Planning Period (2004 $)					$245,756,856
Average Annual for Planning Period (2004 $)					$16,383,790

TABLE E-38
NO ACTION – REAL PROPERTY TAX COLLECTION FROM LAND DISPOSAL BY LAND USE CATEGORY

Summary of Property Tax Impacts

Land Use Category	Total Property Tax Collected During Planning Period	Avg. Annual Property Tax Collected
Undeveloped Land	$168,925,110	$11,261,674
Single-Family Residential Units	$2,154,551,081	$143,636,739
Multi-Family Residential Units	$564,346,355	$37,623,090
Non-Residential Development	$268,992,250	$17,932,817
Total	$3,156,814,795	$210,454,320

TABLE E-39
NO ACTION – UNDEVELOPED LAND – REAL PROPERTY TAX COLLECTED

	Acres Sold	Cumulative Acres Sold	Acres Developed	Cumulative Acres Developed	Cumulative Acres Undeveloped	Value per acre of undeveloped land*	Value of cumulative undeveloped land	Property tax rate per $100 of assessed value	Property Tax Collected for Cumulative Acres of Undeveloped Land
2004	4,000	12,332	1330	1330	11,002	$94,000	$1,034,188,000	$2.9500	$30,508,546
2005	0	12,332	1330	2660	9,672	$100,580	$972,809,760	$2.9500	$28,697,888
2006	0	12,332	1330	3990	8,342	$107,621	$897,771,045	$2.9500	$26,484,246
2007	0	12,332	1330	5320	7,012	$115,154	$807,460,143	$2.9500	$23,820,074
2008	0	12,332	1330	6650	5,682	$123,215	$700,106,635	$2.9500	$20,653,146
2009	0	12,332	1330	7980	4,352	$131,840	$573,767,082	$2.9500	$16,926,129
2010	0	12,332	1330	9310	3,022	$141,069	$426,309,470	$2.9500	$12,576,129
2011	0	12,332	1330	10640	1,692	$150,943	$255,396,332	$2.9500	$7,534,192
2012	0	12,332	1330	11970	362	$161,510	$58,466,439	$2.9500	$1,724,760
2013	0	12,332	1330	13300	0	$0	$0	$2.9500	$0
2014	0	12,332	0	14630	0	$0	$0	$2.9500	$0
2015	0	12,332	0	15960	0	$0	$0	$2.9500	$0
2016	0	12,332	0	17290	0	$0	$0	$2.9500	$0
2017	0	12,332	0	17290	0	$0	$0	$2.9500	$0
2018	0	12,332	0	17290	0	$0	$0	$2.9500	$0
2019	0	0	0	0	0	$0	$0	$2.9500	$0
Total for Planning Period (2004 dollars)									$168,925,110
Average Annual for Planning Period (2004 dollars)									$11,261,674

*Average value per acre based on BLM land sold in Clark County as of April 30, 2004. BLM, 2004. Land values were assumed to appreciate by 7.0% per year (a very conservative assumption for Clark County).

TABLE E-40
NO ACTION – SINGLE FAMILY RESIDENTIAL UNITS – REAL PROPERTY TAX COLLECTED

	# of Occupied SF Residential Units	Cumulative # of Occupied SF Residential Units	Average Value of SF Residential Units (assumes 7% apprec./year)	Cumulative Value of Occupied SF Residential Units	Taxable Amount of Cumulative SF Residential Property Value	Property tax rate per $100 of assessed value	Property Tax Collected for Cumulative # of Occupied SF Residential Units
2004	4,286	4,286	$212,000	$908,632,000	$318,021,200	$2.9500	$9,381,625
2005	4,286	8,572	$226,840	$1,944,472,480	$680,565,368	$2.9500	$20,076,678
2006	4,286	12,858	$242,719	$3,120,878,330	$1,092,307,416	$2.9500	$32,223,069
2007	4,286	17,144	$259,709	$4,452,453,085	$1,558,358,580	$2.9500	$45,971,578
2008	4,286	21,430	$277,889	$5,955,156,001	$2,084,304,600	$2.9500	$61,486,986
2009	4,286	25,716	$297,341	$7,646,420,305	$2,676,247,107	$2.9500	$78,949,290
2010	4,286	30,002	$318,155	$9,545,281,347	$3,340,848,472	$2.9500	$98,555,030
2011	4,286	34,288	$340,426	$11,672,515,476	$4,085,380,417	$2.9500	$120,518,722
2012	4,286	38,574	$364,255	$14,050,790,505	$4,917,776,677	$2.9500	$145,074,412
2013	4,286	42,860	$389,753	$16,704,828,711	$5,846,690,049	$2.9500	$172,477,356
2014	4,286	47,146	$417,036	$19,661,583,393	$6,881,554,187	$2.9500	$203,005,849
2015	4,286	51,432	$446,229	$22,950,430,069	$8,032,650,524	$2.9500	$236,963,190
2016	4,286	55,718	$477,465	$26,603,373,522	$9,311,180,733	$2.9500	$274,679,832
2017	4,286	60,004	$510,887	$30,655,271,951	$10,729,345,183	$2.9500	$316,515,683
2018	0	60,004	$546,649	$32,801,140,988	$11,480,399,346	$2.9500	$338,671,781
2019	0	0	$0	$0	$0	$2.9500	$0
Total for Planning Period (2004 dollars)							$2,154,551,081
Average Annual for Planning Period (2004 dollars)							$143,636,739

TABLE E-41
NO ACTION – MULTI-FAMILY RESIDENTIAL UNITS - REAL PROPERTY TAX COLLECTED

	# of Occupied MF Residential Units	Cumulative # of Occupied MF Residential Units	Average Value of MF Residential Units (assumes 7% apprec./year)	Cumulative Value of Occupied MF Residential Units	Taxable Amount of Cumulative MF Residential Property Value	Property tax rate per $100 of assessed value	Property Tax Collected for Cumulative # of Occupied MF Residential Units
2004	2,800	2,800	$85,000	$238,000,000	$83,300,000	$2.9500	$2,457,350
2005	2,800	5,600	$90,950	$509,320,000	$178,262,000	$2.9500	$5,258,729
2006	2,800	8,400	$97,317	$817,458,600	$286,110,510	$2.9500	$8,440,260
2007	2,800	11,200	$104,129	$1,166,240,936	$408,184,328	$2.9500	$12,041,438
2008	2,800	14,000	$111,418	$1,559,847,252	$545,946,538	$2.9500	$16,105,423
2009	2,800	16,800	$119,217	$2,002,843,871	$700,995,355	$2.9500	$20,679,363
2010	2,800	19,600	$127,562	$2,500,216,766	$875,075,868	$2.9500	$25,814,738
2011	2,800	22,400	$136,491	$3,057,407,931	$1,070,092,776	$2.9500	$31,567,737
2012	2,800	25,200	$146,046	$3,680,354,797	$1,288,124,179	$2.9500	$37,999,663
2013	2,800	28,000	$156,269	$4,375,532,926	$1,531,436,524	$2.9500	$45,177,377
2014	2,800	30,800	$167,208	$5,150,002,253	$1,802,500,789	$2.9500	$53,173,773
2015	2,800	33,600	$178,912	$6,011,457,176	$2,104,010,012	$2.9500	$62,068,295
2016	2,800	36,400	$191,436	$6,968,280,776	$2,438,898,272	$2.9500	$71,947,499
2017	2,800	39,200	$204,837	$8,029,603,541	$2,810,361,239	$2.9500	$82,905,657
2018	0	39,200	$219,175	$8,591,675,788	$3,007,086,526	$2.9500	$88,709,053
2019	0	0	$0	$0	$0	$2.9500	$0
Total for Planning Period (2004 dollars)							$564,346,355
Average Annual for Planning Period (2004 dollars)							$37,623,090

TABLE E-42
NO ACTION – NON-RESIDENTIAL DEVELOPMENT – REAL PROPERTY TAX COLLECTED

	Property Value of Non-Residential Development (assumes property value = construction value + 7% appreciation/year)	Cumulative Property Value of Non-Residential Development	Taxable Amount of Cumulative MF Residential Property Value	Property tax rate per $100 of assessed value	Property Tax Collected for Cumulative Non-Residential Development
2004	$155,769,167	$155,769,167	$54,519,208	$2.9500	$1,608,317
2005	$166,673,009	$322,442,176	$112,854,761	$2.9500	$3,329,215
2006	$178,340,119	$500,782,295	$175,273,803	$2.9500	$5,170,577
2007	$190,823,928	$691,606,223	$242,062,178	$2.9500	$7,140,834
2008	$204,181,603	$895,787,825	$313,525,739	$2.9500	$9,249,009
2009	$218,474,315	$1,114,262,140	$389,991,749	$2.9500	$11,504,757
2010	$233,767,517	$1,348,029,657	$471,810,380	$2.9500	$13,918,406
2011	$250,131,243	$1,598,160,900	$559,356,315	$2.9500	$16,501,011
2012	$267,640,430	$1,865,801,330	$653,030,465	$2.9500	$19,264,399
2013	$286,375,260	$2,152,176,590	$753,261,806	$2.9500	$22,221,223
2014	$306,421,528	$2,458,598,118	$860,509,341	$2.9500	$25,385,026
2015	$327,871,035	$2,786,469,153	$975,264,204	$2.9500	$28,770,294
2016	$350,822,008	$3,137,291,161	$1,098,051,906	$2.9500	$32,392,531
2017	$375,379,548	$3,512,670,709	$1,229,434,748	$2.9500	$36,268,325
2018	$0	$3,512,670,709	$1,229,434,748	$2.9500	$36,268,325
2019	$0	$0	$0	$2.9500	$0
Total Planning Period (2004 $)					$268,992,250
Average Annual for Planning Period (2004 $)					$17,932,817

TABLE E-43
CLARK COUNTY HISTORICAL POPULATION

Year	Clark County Population	Year	Clark County Population
1990	770,280	1997	1,193,388
1991	835,080	1998	1,261,150
1992	873,730	1999	1,327,145
1993	916,837	2000	1,394,440
1994	990,564	2001	1,485,855
1995	1,055,435	2002	1,549,657
1996	1,119,052	2003	1,620,748

Source: Center for Business and Economic Research, UNLV, & Nevada State Demographer, 2003.

TABLE E-44
CLARK COUNTY PROJECTED POPULATION

Year	Total Population	Percentage Change
2004	1,686,827	4.1%
2005	1,751,608	3.8%
2006	1,815,303	3.6%
2007	1,877,843	3.4%
2008	1,939,097	3.3%
2009	1,999,250	3.1%
2010	2,058,063	2.9%
2011	2,115,551	2.8%
2012	2,171,538	2.6%
2013	2,225,668	2.5%
2014	2,277,967	2.3%
2015	2,328,564	2.2%
2016	2,378,317	2.1%
2017	2,427,325	2.1%
2018	2,475,641	2.0%

Source: Nevada State Demographer 2004

TABLE E-45
LABOR FORCE TRENDS, CLARK COUNTY, NEVADA, 1983 TO 2003

Year	Clark County Labor Force	Percent Change in Labor Force
1983	221367	N/A
1984	233425	5%
1985	246633	5%
1986	262183	5.9%
1987	284600	7.9%
1988	307600	7.5%
1989	340233	9.6%
1990	375142	9.3%
1991	383600	2.2%
1992	391983	2.1%
1993	410017	4.4%
1994	457311	10.3%
1995	494913	7.6%
1996	543117	8.9%
1997	584115	7.0%
1998	617275	5.4%
1999	667729	7.6%
2000	703742	5.1%
2001	725424	3.0%
2002	729511	0.6%
2003	759562	4.0%
Average Annual Percent Change		6.0%

Source: Center for Business and Economic Research 2003(b).