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Land Surveying
Project Management

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MASTER DRAINAGE REPORT
FOR
ASANTE NORTH, Phase I
MARICOPA COUNTY, ARIZONA

Prepared for:

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REVISED: December 12, 2006
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DDR-0768

Master Drainage Report
For
Asante North, Phase I

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1. INTRODUCTION

1.1 Scope

DEI Professional Services, LLC (DEI) has been contracted by Lennar Communities Development to provide engineering services in support of master planning for a proposed residential development (the Site). The purpose of this report is to analyze stormwater and drainage requirements. In addition, this report is to present the proposed master drainage system that sets forth the drainage pattern and constraints that are to be used throughout the development of the project and in particular Asante North, Phase 1.

This report is focused on providing practical design information, evaluation, and calculations for statistical flood events up to and including the 100-year, 6-hour frequency flood. The procedures used herein are derived from, and performed with, currently accepted engineering methodologies and practices. Additionally, the criteria for this evaluation are designed to conform to currently applicable ordinances, regulations and policies affected by the appropriate jurisdictional regulatory authorities for the referenced site.

The analysis presented herein focuses on evaluation of stormwater runoff resulting from a statistical evaluation of storm events of a particular duration and frequency up to and including a 100-year, 6-hour storm event. Storm events exceeding the 100-year event may cause or create the risk of greater flood impact than is addressed and presented in this assessment. However, the scope of this assessment does not include evaluation of stormwater runoff resulting from storm events exceeding the 100-year, 6-hour frequency event. DEI assumes no responsibility for actual flood damage, increased risks of flood damage, or increased construction or development cost resulting from or related to any such events, nor shall DEI be responsible for any changes in, or additions to, regulatory requirements which may result from, or be related to, any such events or changes in hydrologic or hydraulic conditions within the watershed.

1.2 Site Description

The Asante North site is currently undeveloped desert approximately 2.5 miles southeast of Wittmann, Arizona. Asante North comprises approximately 2,100 acres within unincorporated Maricopa County, see Figure 1 – Vicinity Map at the end of the report text. The site includes portions of Sections 27, 28, 33, 34, and Section 35 of Township 5 North, Range 2 West and portions of Sections 2 and 3 of Township 4 North, Range 2 West of Gila and Salt River Meridian, Maricopa County, Arizona. The site may further be described as bounded by Grand Avenue on the Southwest and the Central Arizona Project canal to the Northwest. The Southeast boundary is bounded by the Northwest boundary of the Asante project.

Phase I is located on the southeastern end of the Planned Area Development. Phase I consists of 316-acres. The Phase I consists of single family residential, multi-family residential, commercial, public facilities, local streets, parks and schools, storm water retention and open space. Asante North is bordered by Jomax Road on the north, Asante on the southeast, Pat Tillman Boulevard on the southwest and future phases of Asante North (undeveloped land) to the northwest. See Figure 2 – Phase I Site Map at the end of the report text.

1.3 Proposed Development

The site will be a planned area development. The site will contain single family residential, multi-family residential, commercial, public facilities, local streets, parks and schools. Local streets and arterials will provide access to the site from Grand Avenue.

1.4 Project Phasing

The Asante North development will be developed in four phases. The first phase of the project that will be developed (Phase I) consists of an area of approximately 316-acres. The remainder of the property will be developed as part of later phases.

1.5 Regulatory Jurisdiction

The site will soon be annexed into the City of Surprise in Maricopa County, Arizona. Therefore, the site will be designed to meet the drainage requirements established by the City of Surprise (2004) and the Flood Control District of Maricopa County (FCDMC) (1996).

2. HYDROLOGIC SETTING

2.1 Topography

The site location can be found on the United States Geological Survey 7.5 minute Quadrangle map entitled MCMICKEN DAM. The elevations range from approximately 1540 feet to 1410 feet. Existing ground slopes generally from the Northwest to Southeast at approximately 0.7 percent.

2.1 Regional Hydrology

The regional topography slopes generally from the northwest to southeast. The regional hydrologic conditions impacting the proposed Asante North site have been modeled in the Wittmann Area Drainage Master Study (ADMS) (FCDMC, 1984). The Flood Control District of Maricopa County (FCDMC) has recently updated the Wittmann ADMS. District approved hydrology from the new study was used to evaluate off-site flows entering the site. Excerpts from the HEC-1 output file from the Wittmann AMDS Update hydrologic analysis are included in Appendix C. The regional drainage patterns in the vicinity of the site direct stormwater runoff generally to the southeast.

3. MANAGEMENT OF OFF-SITE RUNOFF

Evaluation of off-site drainage contributory watershed relies on the Wittmann Area Drainage Master Study update hydrology (FCDMC, 2005) that identifies significant stormwater runoff impacting the site. See **EXHIBIT D** for 404-wash locations, Wittmann ADMSU floodplain/floodway locations, and 50-cfs and 200-cfs wash locations.

The surrounding properties consist of undeveloped desert with the exception of the Asante project to the Southeast and Desert Oasis project to the Northeast. Drainage flows coming from the north, as identified in the latest Wittmann ADMS hydrology, will be passed through the site in drainage corridors following the existing channels, as determined as part of the USACE jurisdictional determination of 404 wash locations. This flow will be conveyed to the south and returned to the historical flow path at the existing channel at the site boundary. Box culverts are sized to allow the off-site flow to pass unimpeded under the major arterial crossings. See Appendix A for box culvert calculations.

Desert Oasis has relocated flows that originally entered their site to a channel located at 171st Avenue. The developers of Desert Oasis and Asante North have met to discuss the routing of this flow through Phase 1 of Asante North. As of the last meeting, it was decided that the developers of Desert Oasis would direct their channel along the north side of Jomax Road to the east. At a point along the expanded water plant site in Asante North, the developers of Desert Oasis will construct a culvert under Jomax Road. The flow will enter the channel that was initially constructed as part of Asante. The flows will be conveyed to the Railroad Right of Way and Grand Avenue as noted in the Asante Drainage Master Plan. Phase I has no off-site flows routing through the site or designated 404-washes. See **EXHIBIT D** for details.

4. PROPOSED MASTER DRAINAGE CONCEPT

The drainage concept to be employed by the project is to collect off-site flows and route them through the project to their historic flow paths. The areas identified as open spaces and parks will be utilized as both conveyance areas and/or retention areas. Roadway crossings and other drainage features will be analyzed for the impact of the 100-year, 6-hour storm. All flows routed through the site will be discharged at the south side of the project. Areas designated 404-washes will have setback areas and riparian corridors reserved for the conveyance of off-site flows through the site.

5. MANAGEMENT OF ON-SITE RUNOFF

On-site hydrology will be provided in the design report at the time the final grading plans are prepared. The on-site hydrology will be based on the rational method and in accordance with the FCDMC Drainage Design Manual, Volume I, Hydrology (1996). The drainage sub-basins will be delineated based on the final lot layout and the final grading plan. Times of concentration, runoff coefficients and the 10-year and 100-yr intensities will be based on the latest approved FCDMC standards.

The on-site drainage scheme proposed for the project is to provide retention basins at various locations to contain the 100-yr, 2-hour storm event. The site will be divided into several drainage areas based on the location of the retention basins and the drainage pattern of the streets and lots. The grading and retention basins will be designed such that any basin overflow will be conveyed by appropriate means to another basin or outfall point at a natural wash. Retention basins will be drained by means of dry wells, percolation, or bleeding off into an approved drainage way in accordance with current state and local drainage regulations. Percolation testing for percolation rates will be by City of Surprise approved methods only.

The streets within the development will be designed such that the 10-year flow is contained within the street curbs, the 100-year flow is limited to 100 cfs at 10 ft/s, and a maximum of 8 inches above the street centerline. In addition, finish floor elevations are to be above the calculated 100-year high water evaluation in adjacent streets and drainage paths. Surface runoff flow is generally from north to south and streets within the development will be designed to carry the flow to retention basins or routing channels for off-site drainage. If the capacity of the street is exceeded, a storm drain system will be provided such that the above requirements are met. Scuppers or storm drains will be used to take the flow from the street to the channels. The scuppers, catch basins and storm drains will be used to take the flow from the streets to the channels or retention. The scuppers, catch basins and storm drains design will intercept flows in the street in excess of the 10-year storm water runoff in the street. Culverts will be used to convey flow under the interior and arterial roads.

6. RETENTION

The City of Surprise requires retention for the 100-year, 2-hour event storm. Flows generated on-site will be directed to retention basins distributed throughout the site. Some of these retention facilities are also identified as parks and open space shown on **EXHIBIT A**. Other retention areas are not shown explicitly but will be included within the developed areas shown in **EXHIBIT A**, as appropriate. The retention volumes will be sized to meet the City of Surprise design standards. Retention requirement calculations are included in Appendix B.

7. FLOOD ZONE INFORMATION

The Asante North site is located on Flood Insurance Rate Maps (FIRMs) number 04013C1130G, dated September 30, 2005 and 04013C1135G, dated September 30, 2005. The FIRMs indicate that Asante North Phase I is primarily located within a designated Zone X with isolated areas of Zone A (See **EXHIBIT C**). FCDMC, the local

jurisdictional authority for floodplains and Floodplain Administrator for the City of Surprise, is currently working on updating the hydraulic analysis to a detailed analysis as part of the Wittmann ADMS Update. Once this work is complete, most of the Zone A's located on the Site will be designated Zone AE's with Floodways and Base Flood Elevations. DEI has reviewed early draft versions of the hydraulic analysis being done by the FCDMC in the area of the Site. DEI will monitor FCDMC progress in the hydraulic analysis being performed and will make adjustments to final drainage design based on the final and approved hydraulic analysis and FEMA map revisions where necessary. See **EXHIBIT D** for the last available release of the work maps available.

7.1 Floodplains in the City of Surprise

Development of flood prone areas within Asante North will be handled with care. It is a requirement of the developer to manage the runoff through this property in a safe and prudent manner. It is also recognized that much or the area designated as floodplain within the Wittmann Area Drainage Master Study Update floodplain maps represent areas of shallow flooding that can be recovered using proper engineering and development methods. The City of Surprise Municipal Code 16.20.050 states, "The city council may, when it deems it necessary for the health, safety or welfare of the present and future population of the area and necessary to the conservation of water, drainage and sanitary facilities, prohibit the subdivision of any portion of the property which lies within the one-hundred-year floodplain of any stream as determined in the zoning ordinance. These floodplain areas shall be preserved from any and all destruction or damage resulting from clearing, grading or dumping of earth, waste material or stumps, except at the discretion of the council." The Surprise General Plan 4.5.4 states, "Discourage development within the boundaries of the 100-year floodplain".

The concept drainage designs in this report meet City, County, State, and Federal guidelines associated with the management of Drainage and Floodplain issues; as such,

no specific individual code or regulation has been set above any other requirement. Generally accepted civil engineering practices and principles provide the necessary protection for the health, safety and welfare of potential residents. In summary, these required practices that will be incorporated into the planning and design of Asante North include, but are not limited to:

- Providing a managed corridor whereby the drainage flows expected at the 100-year 6-hour event level are allowed to pass through the development at historic rates as identified in the Flood Control District's Wittmann ADMS Update (latest version).
- Providing protection to Waters of the U.S. (404-washes) and their jurisdictionally determined locations by the U.S. Army Corps of Engineer's Federal Nationwide Permit process.
- Providing erosion setbacks from 404-washes and other areas designated erosion sensitive as required by State of Arizona regulations (not identified in this report).
- Providing flood protection by setting lot pad elevations and finished floor elevations to a height above the predicted developed water surface elevation of the 100-year event as required by City, County and Federal Flood Insurance regulations (addressed but not calculated for this report).
- Providing drainage corridors where the 100-year event is managed to a developed (encroached) water surface elevation not to exceed the regulated height over established or existing conditions as determined by the Flood Control District and/or FEMA (to be addressed in subsequent unit reports).
- Providing storm water retention facilities which mitigate encroachment into flood zones and the increase in runoff associated with an increase in impervious surfaces as required by City and County regulations.

Phase I includes no areas designated Waters of the U.S. (404-washes) and includes limited areas designated 100-year floodplain.

8. SUMMARY AND CONCLUSIONS

1. Off-site flows will be safely directed through or around the site.
2. On-site retention will be provided for the 100-year, 2-hour event in retention basins at various locations throughout the site. The retention basins will be designed to meet City of Surprise and FCDMC requirements.
3. The on-site 10-year flow will be conveyed within the street section between the curbs and the 100-year flow will be limited to 100-cfs in the street.
4. All finish floor evaluations are to be designed to be above the adjacent 100-year high water elevation in adjacent street and drain paths.
5. This site will be developed using generally accepted engineering practices and in accordance with the City of Surprise and FCDMC design standards.

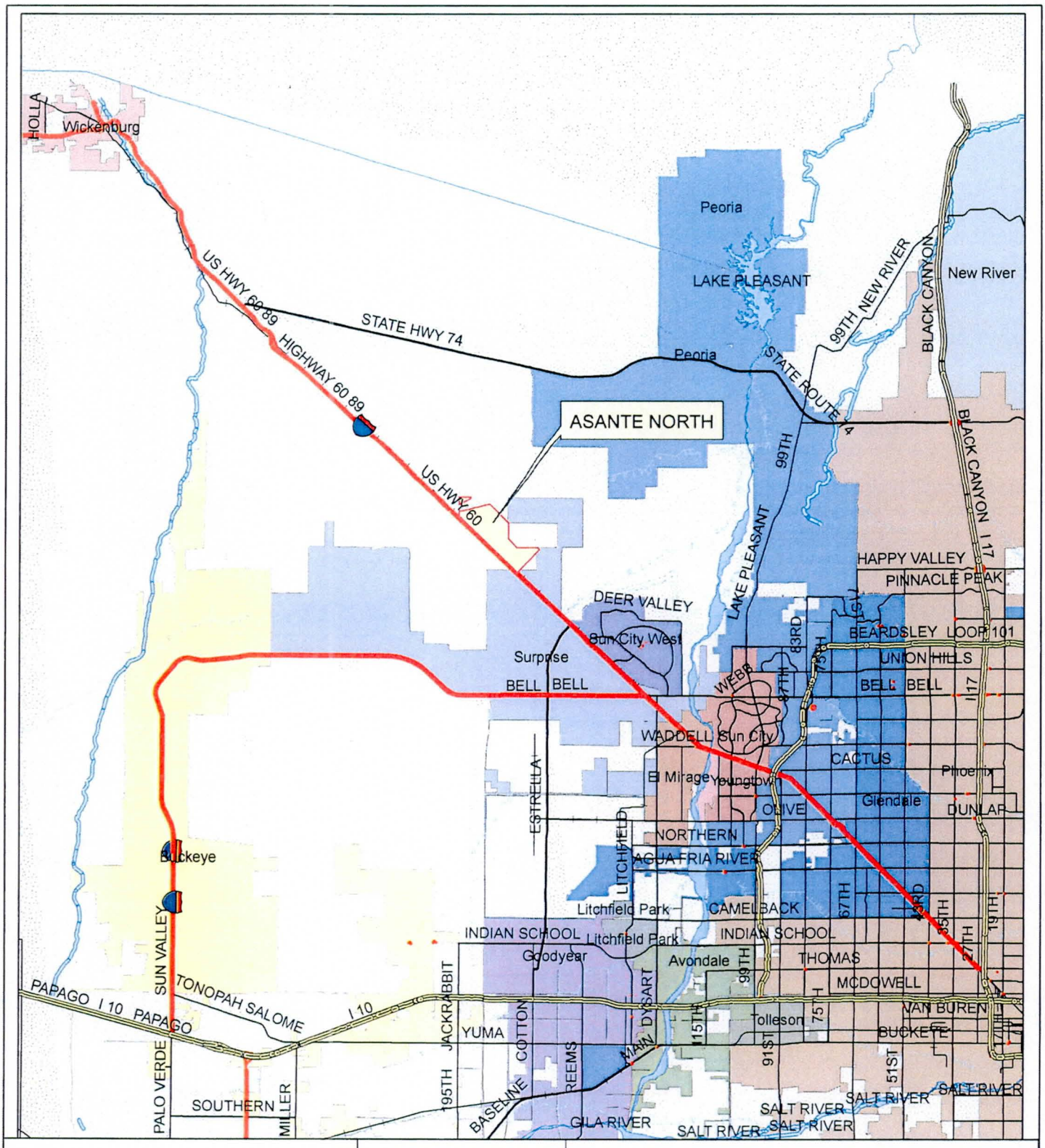
REFERENCES

1. Flood Control District of Maricopa County, *Wittmann ADMS, 2004 Hydrology, Maricopa County, Arizona*. 2004.

2. Federal Emergency Management Agency, Flood Insurance Rate Map (FIRM): Maricopa County, Arizona and Incorporated Areas, Panel 04013C1130G Revised September 30, 2005 and Panel 04013C1135G Revised September 30, 2005.

3. Flood Control District of Maricopa County, *Drainage Design Manual for Maricopa County, Volume I-Hydrology*, Revised January 1995.

4. City of Surprise, Arizona, *Preliminary and Final Drainage Report Guideline*, December 2004.



N
W E
S

0 1.252.5 5 7.5 10 Miles

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ASANTE NORTH VICINITY MAP

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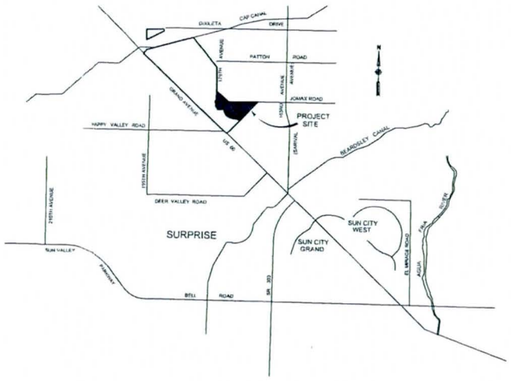
FIGURE 1

ASANTE NORTH

PHASE ONE

PRE PLAT



VICINITY MAP
N.T.S.

404 wash

MHDR
13 ac

PAT TILLMAN BLVD (NOT A PART)

MHDR
18 ac

DESERT OASIS
SINGLE FAMILY
RESIDENTIAL

DESERT OASIS
MDR

173rd AVE.

DESERT OASIS
COMM

171st AVE.

MHDR
16 ac

MHDR
12 ac

Comm.
5.0 ac

Fire
Station

Comm.
18.1ac

JOMAX ROAD (NOT A PART)

MDR
17.3 ac

COMMUNITY
FACILITY
4.3 ac

Water
Plant

Desert Oasis
Water
Plant

Desert Oasis
Single Family Residential

Asante
Water
Plant

MHDR
10.9ac

SCHOOL
15.7ac

Park
5.2 ac

60'x120'
93 Lots

80'x130'
78 Lots

ASANTE
LDR
80'x130'

Comm.
20 ac

173rd AVE. (NOT A PART)

ASANTE
LDR
70'x125'

MDR
22.8 ac

70'x125'
75 Lots

60'x120'
101 Lots

PAT TILLMAN BLVD (NOT A PART)

ASANTE
MDR

NORTH

0 200' 400' 600'

10.03.06

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FIGURE 1

Appendix A : BOX CULVERT CALCS

Appendix B : RETENTION REQUIREMENT CALCS

Appendix C : EXCERPTS FROM OTHER REPORTS

FCDMC, Wittmann ADMS Hydrology, July 2005

Appendix A : BOX CULVERT CALCS

Culvert Calculator Report
C1 - Wash 3 East

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	1,501.00 ft	Headwater Depth/Height	1.56
Computed Headwater Elevation	1,501.24 ft	Discharge	780.00 cfs
Inlet Control HW Elev.	1,501.24 ft	Tailwater Elevation	1,499.00 ft
Outlet Control HW Elev.	1,501.23 ft	Control Type	Inlet Control

Grades			
Upstream Invert	1,495.00 ft	Downstream Invert	1,494.00 ft
Length	100.00 ft	Constructed Slope	0.010000 ft/ft

Hydraulic Profile			
Profile	PressureProfile	Depth, Downstream	2.77 ft
Slope Type	N/A	Normal Depth	2.45 ft
Flow Regime	N/A	Critical Depth	3.62 ft
Velocity Downstream	14.08 ft/s	Critical Slope	0.003315 ft/ft

Section			
Section Shape	Box	Mannings Coefficient	0.013
Section Material	Concrete	Span	10.00 ft
Section Size	10 x 4 ft	Rise	4.00 ft
Number Sections	2		

Outlet Control Properties			
Outlet Control HW Elev.	1,501.23 ft	Upstream Velocity Head	1.81 ft
Ke	0.20	Entrance Loss	0.30 ft

Inlet Control Properties			
Inlet Control HW Elev.	1,501.24 ft	Flow Control	N/A
Inlet Type	90° headwall w 45° bevels	Area Full	80.0 ft²
K	0.49500	HDS 5 Chart	10
M	0.66700	HDS 5 Scale	2
C	0.03140	Equation Form	2
Y	0.82000		

Culvert Calculator Report
C2 - Wash 4 East

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	1,501.00	ft	Headwater Depth/Height	1.41	
Computed Headwater Elevation	1,500.64	ft	Discharge	670.00	cfs
Inlet Control HW Elev.	1,500.46	ft	Tailwater Elevation	1,499.00	ft
Outlet Control HW Elev.	1,500.64	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	1,495.00	ft	Downstream Invert	1,494.00	ft
Length	100.00	ft	Constructed Slope	0.010000	ft/ft

Hydraulic Profile					
Profile	PressureProfile		Depth, Downstream	5.00	ft
Slope Type	N/A		Normal Depth	2.21	ft
Flow Regime	N/A		Critical Depth	3.27	ft
Velocity Downstream	8.38	ft/s	Critical Slope	0.003245	ft/ft

Section					
Section Shape	Box		Mannings Coefficient	0.013	
Section Material	Concrete		Span	10.00	ft
Section Size	10 x 4 ft		Rise	4.00	ft
Number Sections	2				

Outlet Control Properties					
Outlet Control HW Elev.	1,500.64	ft	Upstream Velocity Head	1.09	ft
Ke	0.20		Entrance Loss	0.22	ft

Inlet Control Properties					
Inlet Control HW Elev.	1,500.46	ft	Flow Control	N/A	
Inlet Type	90° headwall w 45° bevels		Area Full	80.0	ft²
K	0.49500		HDS 5 Chart	10	
M	0.66700		HDS 5 Scale	2	
C	0.03140		Equation Form	2	
Y	0.82000				

Culvert Calculator Report
C3 - Wash 4 East

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	1,471.00 ft	Headwater Depth/Height	1.17
Computed Headwater Elevation	1,471.66 ft	Discharge	670.00 cfs
Inlet Control HW Elev.	1,471.56 ft	Tailwater Elevation	1,467.00 ft
Outlet Control HW Elev.	1,471.66 ft	Control Type	Outlet Control

Grades			
Upstream Invert	1,467.00 ft	Downstream Invert	1,466.90 ft
Length	100.00 ft	Constructed Slope	0.001000 ft/ft

Hydraulic Profile			
Profile	M2	Depth, Downstream	2.89 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	2.89 ft
Velocity Downstream	9.65 ft/s	Critical Slope	0.002921 ft/ft

Section			
Section Shape	Box	Mannings Coefficient	0.013
Section Material	Concrete	Span	12.00 ft
Section Size	12 x 4 ft	Rise	4.00 ft
Number Sections	2		

Outlet Control Properties			
Outlet Control HW Elev.	1,471.66 ft	Upstream Velocity Head	1.04 ft
Ke	0.20	Entrance Loss	0.21 ft

Inlet Control Properties			
Inlet Control HW Elev.	1,471.56 ft	Flow Control	N/A
Inlet Type	90° headwall w 45° bevels	Area Full	96.0 ft²
K	0.49500	HDS 5 Chart	10
M	0.66700	HDS 5 Scale	2
C	0.03140	Equation Form	2
Y	0.82000		

Culvert Calculator Report
C4 - Wash 3 East

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	1,452.00 ft	Headwater Depth/Height	1.35
Computed Headwater Elevation	1,452.74 ft	Discharge	1,650.00 cfs
Inlet Control HW Elev.	1,452.74 ft	Tailwater Elevation	1,448.00 ft
Outlet Control HW Elev.	1,452.47 ft	Control Type	Inlet Control

Grades			
Upstream Invert	1,446.00 ft	Downstream Invert	1,445.90 ft
Length	100.00 ft	Constructed Slope	0.001000 ft/ft

Hydraulic Profile			
Profile	M2	Depth, Downstream	4.03 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	4.03 ft
Velocity Downstream	11.38 ft/s	Critical Slope	0.003070 ft/ft

Section			
Section Shape	Box	Mannings Coefficient	0.013
Section Material	Concrete	Span	12.00 ft
Section Size	12 x 5 ft	Rise	5.00 ft
Number Sections	3		

Outlet Control Properties			
Outlet Control HW Elev.	1,452.47 ft	Upstream Velocity Head	1.49 ft
Ke	0.20	Entrance Loss	0.30 ft

Inlet Control Properties			
Inlet Control HW Elev.	1,452.74 ft	Flow Control	N/A
Inlet Type	90° headwall w 45° bevels	Area Full	180.0 ft²
K	0.49500	HDS 5 Chart	10
M	0.66700	HDS 5 Scale	2
C	0.03140	Equation Form	2
Y	0.82000		

Culvert Calculator Report
C5 - RWI526 + RDCP09 (Zone AO)

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	1,481.00	ft	Headwater Depth/Height	1.25	
Computed Headwater Elevation	1,480.00	ft	Discharge	828.00	cfs
Inlet Control HW Elev.	1,479.33	ft	Tailwater Elevation	1,479.00	ft
Outlet Control HW Elev.	1,480.00	ft	Control Type	Outlet Control	

Grades					
Upstream Invert	1,475.00	ft	Downstream Invert	1,474.00	ft
Length	100.00	ft	Constructed Slope	0.010000	ft/ft

Hydraulic Profile					
Profile	PressureProfile		Depth, Downstream	5.00	ft
Slope Type	N/A		Normal Depth	1.91	ft
Flow Regime	N/A		Critical Depth	2.75	ft
Velocity Downstream	6.47	ft/s	Critical Slope	0.003532	ft/ft

Section					
Section Shape	Box		Mannings Coefficient	0.013	
Section Material	Concrete		Span	8.00	ft
Section Size	8 x 4 ft		Rise	4.00	ft
Number Sections	4				

Outlet Control Properties					
Outlet Control HW Elev.	1,480.00	ft	Upstream Velocity Head	0.65	ft
Ke	0.20		Entrance Loss	0.13	ft

Inlet Control Properties					
Inlet Control HW Elev.	1,479.33	ft	Flow Control	N/A	
Inlet Type	90° headwall w 45° bevels		Area Full	128.0	ft²
K	0.49500		HDS 5 Chart	10	
M	0.66700		HDS 5 Scale	2	
C	0.03140		Equation Form	2	
Y	0.82000				

Culvert Calculator Report
C6 - Asante Channel

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	1,481.00	ft	Headwater Depth/Height	1.29	
Computed Headwater Elevation	1,481.43	ft	Discharge	1,047.00	cfs
Inlet Control HW Elev.	1,481.43	ft	Tailwater Elevation	1,479.00	ft
Outlet Control HW Elev.	1,481.27	ft	Control Type	Inlet Control	

Grades					
Upstream Invert	1,475.00	ft	Downstream Invert	1,474.90	ft
Length	100.00	ft	Constructed Slope	0.001000	ft/ft

Hydraulic Profile					
Profile	M2		Depth, Downstream	4.10	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	3.90	ft
Velocity Downstream	10.64	ft/s	Critical Slope	0.003050	ft/ft

Section					
Section Shape	Box		Mannings Coefficient	0.013	
Section Material	Concrete		Span	12.00	ft
Section Size	12 x 5 ft		Rise	5.00	ft
Number Sections	2				

Outlet Control Properties					
Outlet Control HW Elev.	1,481.27	ft	Upstream Velocity Head	1.42	ft
Ke	0.20		Entrance Loss	0.28	ft

Inlet Control Properties					
Inlet Control HW Elev.	1,481.43	ft	Flow Control	Transition	
Inlet Type	90° headwall w 45° bevels		Area Full	120.0	ft²
K	0.49500		HDS 5 Chart	10	
M	0.66700		HDS 5 Scale	2	
C	0.03140		Equation Form	2	
Y	0.82000				

Culvert Calculator Report
C7 - Asante Channel

Solve For: Headwater Elevation

Culvert Summary			
Allowable HW Elevation	1,476.00 ft	Headwater Depth/Height	1.33
Computed Headwater Elevation	1,476.65 ft	Discharge	1,082.00 cfs
Inlet Control HW Elev.	1,476.65 ft	Tailwater Elevation	1,474.00 ft
Outlet Control HW Elev.	1,476.40 ft	Control Type	Inlet Control

Grades			
Upstream Invert	1,470.00 ft	Downstream Invert	1,469.90 ft
Length	100.00 ft	Constructed Slope	0.001000 ft/ft

Hydraulic Profile			
Profile	M2	Depth, Downstream	4.10 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	3.98 ft
Velocity Downstream	11.00 ft/s	Critical Slope	0.003063 ft/ft

Section			
Section Shape	Box	Mannings Coefficient	0.013
Section Material	Concrete	Span	12.00 ft
Section Size	12 x 5 ft	Rise	5.00 ft
Number Sections	2		

Outlet Control Properties			
Outlet Control HW Elev.	1,476.40 ft	Upstream Velocity Head	1.47 ft
Ke	0.20	Entrance Loss	0.29 ft

Inlet Control Properties			
Inlet Control HW Elev.	1,476.65 ft	Flow Control	Submerged
Inlet Type	90° headwall w 45° bevels	Area Full	120.0 ft²
K	0.49500	HDS 5 Chart	10
M	0.66700	HDS 5 Scale	2
C	0.03140	Equation Form	2
Y	0.82000		

Appendix B : RETENTION REQUIREMENT CALCS

ASANTE NORTH SITE DATA
STORMWATER RETENTION REQUIREMENTS, 100-YR/2-HR PRECIP

SUBBASIN	RAINFALL DEPTH	DRAINAGE AREA			LAND USE ZONING	RUNOFF COEFF.	RETENTION VOLUME REQUIRED	
	P	A				C	V_r	
	(in)	(ft^2)	(acres)	(mi^2)			(ft^3)	(ac-ft)
A 1	2.8	130,680	3.00	0.0047	Water Plant	0.95	28,967	0.66
A 10	2.8	858,132	19.70	0.0308	MDR	0.75	150,173	3.45
A 11	2.8	1,611,720	37.00	0.0578	LDR	0.69	259,487	5.96
A 12	2.8	1,555,092	35.70	0.0558	LDR	0.69	250,370	5.75
A 13	2.8	1,502,820	34.50	0.0539	LDR	0.69	241,954	5.55
A 14	2.8	1,616,076	37.10	0.0580	LDR	0.69	260,188	5.97
A 15	2.8	1,851,300	42.50	0.0664	MDR	0.75	323,978	7.44
A 16	2.8	1,049,796	24.10	0.0377	MDR	0.75	183,714	4.22
A 17	2.8	1,014,948	23.30	0.0364	MDR	0.75	177,616	4.08
A 18	2.8	2,896,740	66.50	0.1039	COMM	0.95	642,111	14.74
A 19	2.8	1,672,704	38.40	0.0600	MDR	0.75	292,723	6.72
A 2	2.8	1,677,060	38.50	0.0602	MDR	0.75	293,486	6.74
A 20	2.8	1,598,652	36.70	0.0573	MDR	0.75	279,764	6.42
A 21	2.8	1,585,584	36.40	0.0569	MDR	0.75	277,477	6.37
A 22	2.8	805,860	18.50	0.0289	COMM	0.95	178,632	4.10
A 23	2.8	1,328,580	30.50	0.0477	MDR	0.75	232,502	5.34
A 24	2.8	2,042,964	46.90	0.0733	LDR	0.69	328,917	7.55
A 25	2.8	1,907,928	43.80	0.0684	LDR	0.69	307,176	7.05
A 26	2.8	1,877,436	43.10	0.0673	LDR	0.69	302,267	6.94
A 27	2.8	2,160,576	49.60	0.0775	LDR	0.69	347,853	7.99
A 28	2.8	2,430,648	55.80	0.0872	LDR	0.69	391,334	8.98
A 29	2.8	3,545,784	81.40	0.1272	VLDR	0.50	413,675	9.50
A 3	2.8	1,559,448	35.80	0.0559	LDR	0.69	251,071	5.76
A 30	2.8	1,332,936	30.60	0.0478	LDR	0.69	214,603	4.93
A 31	2.8	2,408,868	55.30	0.0864	VLDR	0.50	281,035	6.45
A 32	2.8	1,585,584	36.40	0.0569	LDR	0.69	255,279	5.86
A 33	2.8	1,393,920	32.00	0.0500	LDR	0.69	224,421	5.15
A 34	2.8	1,406,988	32.30	0.0505	LDR	0.69	226,525	5.20
A 35	2.8	1,707,552	39.20	0.0613	LDR	0.69	274,916	6.31
A 36	2.8	1,799,028	41.30	0.0645	LDR	0.69	289,644	6.65

SUBBASIN	RAINFALL DEPTH	DRAINAGE AREA			LAND USE ZONING	RUNOFF COEFF.	RETENTION VOLUME REQUIRED	
	P	A				C	V_r	
	(in)	(ft^2)	(acres)	(mi^2)			(ft^3)	(ac-ft)
A 37	2.8	984,456	22.60	0.0353	COMM	0.95	218,221	5.01
A 38	2.8	2,334,816	53.60	0.0838	LDR	0.69	375,905	8.63
A 39	2.8	1,616,076	37.10	0.0580	MDR	0.75	282,813	6.49
A 4	2.8	1,485,396	34.10	0.0533	MDR	0.75	259,944	5.97
A 40	2.8	1,611,720	37.00	0.0578	LDR	0.69	259,487	5.96
A 41	2.8	1,925,352	44.20	0.0691	MDR	0.75	336,937	7.74
A 42	2.8	2,143,152	49.20	0.0769	LDR	0.69	345,047	7.92
A 43	2.8	1,559,448	35.80	0.0559	LDR	0.69	251,071	5.76
A 44	2.8	1,581,228	36.30	0.0567	LDR	0.69	254,578	5.84
A 45	2.8	1,916,640	44.00	0.0688	LDR	0.69	308,579	7.08
A 46	2.8	962,676	22.10	0.0345	MDR	0.75	168,468	3.87
A 47	2.8	988,812	22.70	0.0355	MDR	0.75	173,042	3.97
A 48	2.8	2,234,628	51.30	0.0802	LDR	0.69	359,775	8.26
A 49	2.8	1,842,588	42.30	0.0661	MDR	0.75	322,453	7.40
A 5	2.8	801,504	18.40	0.0288	School/Park	0.50	93,509	2.15
A 50	2.8	448,668	10.30	0.0161	MDR	0.75	78,517	1.80
A 51	2.8	1,115,136	25.60	0.0400	COMM	0.95	247,188	5.67
A 52	2.8	243,936	5.60	0.0088	Fire Station	0.95	54,072	1.24
A 6	2.8	871,200	20.00	0.0313	MDR	0.75	152,460	3.50
A 7	2.8	1,184,832	27.20	0.0425	COMM	0.95	262,638	6.03
A 8	2.8	1,149,984	26.40	0.0413	MDR	0.75	201,247	4.62
A 9	2.8	1,167,408	26.80	0.0419	MDR	0.75	204,296	4.69
Buffer	2.8	3,667,752	84.20	0.1316	OPEN	0.25	213,952	4.91
Open Space	2.8	5,832,684	133.90	0.2092	OPEN	0.25	340,240	7.81
						TOTAL:	13,946,297	320.16

Appendix C : EXCERPTS FROM OTHER REPORTS

FCDMC, Wittmann ADMS Hydrology, July 2005

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1*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*               JUN  1998               *
*            VERSION 4.1                *
*                                       *
*  RUN DATE   01AUG05  TIME  16:38:50   *
*                                       *
*****************************************
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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


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LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
   1          ID   ------------------------------------------------------------------------------
   2          ID   03-30-2005
   3          ID   3 East
   4          ID   The following additional modifications were made to delineate 3 East:
   5          ID
   6          ID   1. Basin WI500 was moved to follow RWI506.
   7          ID   2. A CP called C500_1 was added after WI500 combining 2.
   8          ID   3. A CP called C500_2 was added after RD508 combining 2.
   9          ID   4. CP CWI500 was changed from combining 4 to 2.
  10          ID   ------------------------------------------------------------------------------
  11          ID
  12          ID   ------------------------------------------------------------------------------
  13          ID   03-25-2005
  14          ID   T5N-R3W-S24E
  15          ID   The following edits were made to model.
  16          ID
  17          ID   1. Concentration point C480_1 was commented out.
  18          ID   2. Concentration point C480_4 was added after RTW482 combining 2
  19          ID      [RTW482 & TW480].  No hard coding was needed because all flow is diverted
  20          ID      to CTW480.
  21          ID
  22          ID   T5N-R2W-19W
  23          ID   The following edits were made to the model.
  24          ID
  25          ID   1. Concentration point C560_1 was commented out.
  26          ID   2. D576 and RD576 were moved to follow RWI574.
  27          ID   3. WI560A and R560A were moved to follow RD576.
  28          ID   4. CP C5602A was added after RWI574 combining 2 [RWI574 & WI560].
  29          ID   5. CP C5602B was added after RD576 combining 2 [C5602A & RD576].
  30          ID   5. CP C5602C was added after R560A combining 2 [C5602B & WI560A].
  31          ID   6. CP CWI560 was changed from combining 5 to 3.
  32          ID
  33          ID   7. Commented out CP C554_1.
  34          ID   8. Moved basin WI554 to follow RWI560.
  35          ID   9. Added CP C554_9 to after WI554 combining 2 [WI554 & RWI560].
  36          ID   10. Moved WI556 and RWI556 to follow C554_9.
  37          ID   11. Added CP C5541B combining 2.
  38          ID   12. Changed CWI554 to combine 2.
  39          ID   ------------------------------------------------------------------------------
  40          ID
  41          ID   ------------------------------------------------------------------------------
  42          ID   03-19-2005
  43          ID   T5N-R2W-S07
  44          ID   A concentration point was added after WI576, called C576_1 combining 2
  45          ID   [RD576B & WI576] and CP CWI576 was changed from combining 3 to 2.
  46          ID
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   47          ID   Also, basin WI560 was moved to follow RD576 and concentration point C560_1
   48          ID   combining 2 [RD576 & WI560] was added after WI560. CP CWI560 was changed
   49          ID   from combining 6 to 5.
   50          ID
   51          ID   T5N-R3W-S01
   52          ID   The following modifications were made for the delineation of T5N-R3W-S01.
   53          ID
   54          ID   1. Basin WI576 was moved to follow RWI580.
   55          ID   2. A concentration point was added after WI576 called C576_2 combining 2.
1                                    HEC-1 INPUT                                        PAGE  2

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

   56          ID   3. CP C576_1 was commented out.
   57          ID   ------------------------------------------------------------------------
   58          ID
   59          ID   ------------------------------------------------------------------------
   60          ID   03-18-2005
   61          ID   T5N-R2W-19E
   62          ID   A concentration point was added after WI554, called C5554_1 combining 2
   63          ID   [RWI556 & WI554] and CP CWI554 was changed from combining 4 to 3.
   64          ID   ------------------------------------------------------------------------
   65          ID
   66          ID   ------------------------------------------------------------------------
   67          ID   03-17-2005
   68          ID   T4N-R3W-S08E
   69          ID   Concentration point C276_1 was added after SV276 to combine RSV294 and SV276.
   70          ID   in addition CSV276 was changed from combining 3 to 2 [C276_1 & RSV272].
   71          ID
   72          ID   3 West
   73          ID   The following modifications were made for the delineation of wash 3 West.
   74          ID
   75          ID    1. Basin SV272 was moved to follow RSV284.
   76          ID    2. Concentration point C272_2 was added after SV272 HC=2 [SV272 & RSV272].
   77          ID    3. CP CSV272 was changed from combining 3 to 2.
   78          ID    4. CP C276_1 was commented out.
   79          ID    5. Basin SV276 was moved to follow RSV272.
   80          ID    6. CP C276_2 was added after SV276, HC=2 [SV276 & RSV272].
   81          ID    7. CP C280_1 was added after SV280 HC=2 [RSV276 SV280].
   82          ID    8. CP CSV280 was changed from combining 3 to 2.
   83          ID    9. Basin SV260 was moved to come before SV268.
   84          ID   10. CP C260_1 was added after SV260 combining 2 [SV260 & RSV280].
   85          ID   11. CP CSV260 was changed from combining 4 to 3.
   86          ID   ------------------------------------------------------------------------
   87          ID
   88          ID   ------------------------------------------------------------------------
   89          ID   03-15-2005
   90          ID   7 EAST
   91          ID   The following modifications were made for the delineation of 7 East.
   92          ID
   93          ID   1. Basin PI645 was moved to follow RPI651.
   94          ID   2. A concentration point was added after PI645 called C645_1 combining 2
   95          ID      [RPI651 & PI645]
   96          ID   3. Concentration point CPI645 was changed from combining 4 to 3.
   97          ID   ------------------------------------------------------------------------
   98          ID
   99          ID   ------------------------------------------------------------------------
  100          ID   03-14-2005
  101          ID   IONA WASH (North of the CAP)
  102          ID   The model was delineated for the delineation of Iona Wash North of the CAP.
  103          ID   The following modifications were made.
  104          ID
  105          ID   1. A concentration point called C388_1 was added after Basin IW388.  This
  106          ID      concentration point combines 2 [IW388 & RIW390].  Concentration point
  107          ID      CIW388 was changed from combining 3 to 2 [C388_1 & RIW389].
  108          ID
  109          ID   2. Basin IW363 was moved to follow RD357.  A concentration point called
  110          ID      C363_2 was then added after basin IW363.
1                                    HEC-1 INPUT                                        PAGE  3

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

  111          ID
  112          ID   3. Concentration point CIW363 was changed from combining 5 to combine
  113          ID      4 [RIW312, RIW365, RIW369 & C363_2].
  114          ID
  115          ID   4. Concentration point C361_1 was added following basin IW361 combining
  116          ID      3 [IW361, D302 & RIW363].  This was hard coded for an area of 3.322 sq.mi.
  117          ID      Concentration point CIW361 was changed from combining 4 to 2.
  118          ID
  119          ID   T5N-R2W-S14 & T5N-R2W-S14N
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 120          ID   For the above delineation a basin PI648 was moved to follow PI651, a
 121          ID   concentration point was placed after PI651 to combine 2 [PI651 & RPI654].
 122          ID   concentration point CPI651 was changed fro combining 3 to 2.
 123          ID   ------------------------------------------------------------------------
 124          ID
 125          ID   ------------------------------------------------------------------------
 126          ID   03-11-2005
 127          ID   IONA ES-1
 128          ID   The model was modified for the delineation of Iona ES-1.  A concentration
 129          ID   point called C346_1 was added after IW346 to combine 2 [RIW351 & IW346].
 130          ID   This concentration point was hard coded for an area of 3.68.  In addition
 131          ID   concentration point CIW346 was changed from combining three (3) to
 132          ID   combine two (2): [C346_1 & CIW342].
 133          ID
 134          ID   2 West & 2 West Tributary-2
 135          ID   It was necessary to have basin TW430 combined solely with CTW434 for 2 West.
 136          ID   However, it was also necessary to combine TW430 solely with RTW436 for the
 137          ID   delineation of 2 West Tributary-2.  To accomplish this, TW430 was first
 138          ID   combined with RTW436, with a concentration point called C430_1.  This CP
 139          ID   was then commented out and basin TW430 was moved to follow CTW434.  A
 140          ID   concentration point was then added called C430_2 which combines TW430
 141          ID   and CTW434.
 142          ID
 143          ID   2 West Tributary-1
 144          ID   An additional concentration point was added following TW434 called C434_1
 145          ID   that combines C442* and TW434.
 146          ID   ------------------------------------------------------------------------
 147          ID
 148          ID   ------------------------------------------------------------------------
 149          ID   03-10-2005
 150          ID   2 WEST-TRIB and 2 EAST
 151          ID   The model has been modified for the delineation of washes 2 WEST-TRIB
 152          ID   and 2 EAST.  The following three (3) series of revisions, in order
 153          ID   have been made:
 154          ID
 155          ID   1.) A concentration point was added following basin WI530 called C530_1
 156          ID       to combine two (2): R530* and WI530.  Concentration point CWI530
 157          ID       was changed from combining four (4) [RWI538, R530*, WI530 & RD544]
 158          ID       to combine three (3) [RWI538, C530_1 & RD544].
 159          ID
 160          ID   2.) Concentration point C530_1 was commented out.  Basin WI530 was moved
 161          ID       to be follow RWI538.  A concentration point was added after basin
 162          ID       WI530 called C530_2 and combines two (2): RWI538 and WI530.
 163          ID
 164          ID   3.) A concentration point was added after R530* called C530_3 and combines
 165          ID       C530_2 and R530*.  Concentration point CWI530 was changed from
1                                      HEC-1 INPUT                                  PAGE  4

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

 166          ID       combining three (3) [C530_2, R530* & RD544] to combine two (2)
 167          ID       [C530_3 & RD544]
 168          ID   ------------------------------------------------------------------------
 169          ID
 170          ID   ------------------------------------------------------------------------
 171          ID   03-09-2005
 172          ID   10 EAST (EAST SPLIT-2)
 173          ID   Model was modified for the delineation of 10 EAST (EAST SPLIT-2).
 174          ID   Basin PI603 was moved to be before PD744.  Then a concentration
 175          ID   point was added that combines only RPI604, RPI606 and PI603.
 176          ID   Finally the HC card of CPI603 was adjusted to combine 3: RD600A,
 177          ID   PD744 and C603_1.
 178          ID
 179          ID   IONA EAST & IONA WEST
 180          ID   Model was modified for the delineation of IONA EAST & IONA WEST.
 181          ID   Basin SV202 and route RSV202 were moved from preceding C210* to
 182          ID   follow RIW300. An additional concentration point (C300_1) was added after
 183          ID   RSV202 to combine RIW300 and RSV202.  Concentration point C210*
 184          ID   was changed from combining three (3) to combining two (2). In addition
 185          ID   concentration point C302* changed the hard coding from
 186          ID   54.72 to 56.16 (54.72 + 1.44 [SV202]).
 187          ID   ------------------------------------------------------------------------
 188          ID
 189          ID   ------------------------------------------------------------------------
 190          ID   02-22-2005
 191          ID   7EAST
 192          ID   The model was modified for the delineation of Wash 7 East and 8 East.
 193          ID   Concentration point C618_1 was commented out and C6181a was added
 194          ID   after RD618 to combine RD618 and PI618.
 195          ID
 196          ID   Concentration point C615_1 was added to combine RD618 and PI615 in order
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197          ID   to develop an area vs flow relationship for the stretch of wash that does
198          ID   not include routed flow from RDCP13.
199          ID
200          ID   8 EAST
201          ID   Concentration point C615_1 was commented out and Concentration Point
202          ID   C6151A was added before DO618 to combine RDCAP13 and PI615.  This was
203          ID   done to get a Q/A relationship for 8 East, excluding the flow from DO618.
204          ID
205          ID   Concentration point C612_1 was commented out in order to determine the
206          ID   flows through Wash 8 East without the routed flow from RPI618.
207          ID   Concentration points C6121a was added after RPI615 in order to combine
208          ID   the flow from RPI615 and PI612.
209          ID   ----------------------------------------------------------------------
210          ID
211          ID   ----------------------------------------------------------------------
212          ID   02-21-2005
213          ID   The model was modified for the delineation of Wash 6 and 7 East. The split
214          ID   that was in the original model at CPI618 actually occurred further upstream.
215          ID   The split is better modeled directly after DCAP12. The diversion card was
216          ID   moved, but retained its original name: D618.
217          ID   ----------------------------------------------------------------------
218          ID
219          ID   ----------------------------------------------------------------------
220          ID   02-17-2005
1                                    HEC-1 INPUT                                PAGE  5

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

221          ID   Model was modified for the delineation of Wash 4 East, south of the CAP.
222          ID   The concentration point C525_1 was commented out, and C5251b was added
223          ID   after RDCP09 in order to determine the flow through Wash 4E without the
224          ID   flow from wash 3E.
225          ID   ----------------------------------------------------------------------
226          ID
227          ID   ----------------------------------------------------------------------
228          ID   02-16-2005
229          ID   Model was modified for the delineation of Wash 3 East, south of the CAP.
230          ID   The concentration point C525_1 was added before CWI525 to not include
231          ID   the routed flow from DCAP09 and RD527. The HC of CWI525 was changed to 2.
232          ID   C5251a was added to combine C525_1 and RDCP09 in order to determine the
233          ID   flow along the reach north of the 60.
234          ID   ----------------------------------------------------------------------
235          ID
236          ID   ----------------------------------------------------------------------
237          ID   02-15-2005
238          ID   Model was modified for the delineation of Wash 2 East, south of the CAP.
239          ID   The concentration point C506_1 was added before CWI506 to not include
240          ID   the routed flow from CWI524. The HC of CWI506 was changed to 2.WI506 was
241          ID   also moved before WI524 in order to achieve this.
242          ID   ----------------------------------------------------------------------
243          ID
244          ID   ----------------------------------------------------------------------
245          ID   02-14-2005
246          ID   Model was modified for the delineation of Wash 1 East, south of the CAP.
247          ID   The concentration point C516_1 was added before CWI516 to not include
248          ID   the routed flow from CWI514. The HC of CWI516 was changed to 2.
249          ID   In order to delineate wash 2 east, cards DOCP07 - RWI528 were moved to be
250          ID   directly before WI518. Concentration Point C518_1 was added in order to
251          ID   determine the flow through Wash 2 East (excludes RWI527). CWI518 HC was set
252          ID   to 2.
253          ID   D529 was moved before WI528 and DOCP07 and C528_1 was added in order to
254          ID   delineate Wash 2 East.
255          ID   ----------------------------------------------------------------------
256          ID
257          ID   ----------------------------------------------------------------------
258          ID   01-24-2005
259          ID   Model was modified for the delineation of Wittmann Wash, north of the CAP.
260          ID   The concentration point CTW485_1 was added before CTW485 to not include
261          ID   RD454 that does not contribute to the delineated reach. TW485 was moved to
262          ID   be after RD454 in order to estimate the flow at CTW485_1 without the
263          ID   routed flow RD454. Concentration point C480_1 was added before CTW480
264          ID   to not include flow from RTW482.
265          ID   The model was modified for the delineation of Wash 2 West. Concentration
266          ID   point C422_1 was added before CTW422 in order to delineate the reach
267          ID   without flows from RTW424.TW422 was moved before TW424 in order to achieve
268          ID   this. Concentration point C400_2 was added before CTW400 in order to
269          ID   delineate the reach without flows from RTW402.
270          ID   ----------------------------------------------------------------------
271          ID
272          ID   ----------------------------------------------------------------------
273          ID   01-20-2005
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 274          ID   Model was modified for the delineation of Wash 6E.
 275          ID   The concentration point C618_1 was added before CPI618 to not include
1                                    HEC-1 INPUT                                    PAGE  6

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

 276          ID   RDCP12. CPI618 HC was set to 2. The concentration point C612_1 was added
 277          ID   before CPI612 to not include RPI615. CPI612 HC was set to 2. The
 278          ID   concentration point C609_1 was added before CPI609 to not include RDCP14.
 279          ID   CPI609 HC was set to 2.
 280          ID   ------------------------------------------------------------------------
 281          ID
 282          ID
 283          ID   ************************************************************************
 284          ID   ************************************************************************
 285          ID   **                                                                    **
 286          ID   **    WITTMANN AREA DRAINAGE MASTER STUDY UPDATE-HYDROLOGY MODEL 2004 **
 287          ID   **                                                                    **
 288          ID   ************************************************************************
 289          ID   ************************************************************************
 290          ID
 291          ID   PROJECT:              Wittmann ADMS Update
 292          ID   CLIENT:               Flood Control District of Maricopa County
 293          ID   PREPARED BY:          Entellus, Inc.
 294          ID   PROJECT No:           FCD 2002C029              Entellus 310.032
 295          ID   FILE NAME: 6HourMod.hc1              CREATED DATE: JUL 01, 2004
 296          ID                                       MODIFIED DATE: JUL 30, 2005
 297          ID
 298          ID   STORM:
 299          ID                         100-year 6-hour Storm
 300          ID
 301          ID   DEVELOPMENT CONDITIONS:
 302          ID                         Existing Conditions
 303          ID
 304          ID   MODELING ASSUMPTIONS:
 305          ID                         It was assumed that the US60 did not have adequate
 306          ID                         storage to cause any significant attenuation.
 307          ID
 308          ID                         The assumption was made that the CAP Canal embankment
 309          ID                         would not be breached under a large flood event.
 310          ID
 311          ID                         The assumption was made that the Beardsley Canal would
 312          ID                         not fail under a large storm event (Per District
 313          ID                         Instruction).  In addition, the berm north of the
 314          ID                         Beardsley canal and east of US60 was assumed to fail
 315          ID                         (per district Instruction).
 316          ID
 317          ID                         For both the CAP and Beardsley Canals, once the berm
 318          ID                         elevation was reached weir flow was assumed.  It was
 319          ID                         also assumed that any weir flow over the canal that
 320          ID                         might enter the canal and be diverted out of the study
 321          ID                         area was insignificant, and thus was ignored.  In other
 322          ID                         words all weir flow over the canal embankment reaches
 323          ID                         the downstream concentration point.
 324          ID
 325          ID                         Typical X-sects were developed, and it was assumed
 326          ID                         that a typical x-sect could adequately represent
 327          ID                         various reaches.
 328          ID
 329          ID                         Time-Area Relations were used base on the District's
 330          ID                         Hydrology Manual criteria.  Two Time-Area Relation
1                                    HEC-1 INPUT                                    PAGE  7

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

 331          ID                         Curves were utilized:
 332          ID                                 -Urban
 333          ID                                 -Natural
 334          ID                         The Time-Area Relation Curves were taken directly
 335          ID                         from the manual
 336          ID
 337          ID   MODELING METHODS:
 338          ID                         This model utilizes QI cards to input the Padelford
 339          ID                         hydrographs from an HEC-1 model developed for 100-yr
 340          ID                         6-hr existing conditions based on the 100-yr 24-hr HEC-1
 341          ID                         model by A-N West Inc. for the Padelford Wash
 342          ID                         Floodplain Delineation Study.  The hydrograph was
 343          ID                         altered from its original form (2 minute interval to
 344          ID                         5-minute interval) through simple interpolation.
 345          ID
 346          ID                         Clark Unit Hydrographs were used for all subbasins
```

```
347          ID                    except the two subbasins directly upstream of the
348          ID                    Bonita Dam (PD726B and PD740 use S-graphs).  The UC
349          ID                    parameters were calculated using the WMS7.0 software.
350          ID
351          ID                    For Basins PD726B and PD740 S-Graphs were utilized per
352          ID                    the request of the FCDMC.  Limited details regarding
353          ID                    the calculations of the S-graphs can be found in the
354          ID                    model by the basin KK card.  For full details of the
355          ID                    S-graph calculations refer to the Appendix.
356          ID
357          ID                    Normal Depth routing was used for all routing reaches.
358          ID
359          ID                    Hard coding was used to account for the percentage of
360          ID                    area associated with a diversion.  Because of the use
361          ID                    of JD cards and aereal reduction, hard coding was
362          ID                    necessary to properly account for area.  For a given
363          ID                    diversion a percentage of the flow is routed to two
364          ID                    different locations.  The same percentage of area
365          ID                    follows that diverted flow.  In addition the area
366          ID                    downstream of the main path is reduced or increased and
367          ID                    is hard coded to account for the loss or gain of area.
368          ID                    Hard coding was performed based on the 6-hour existing
369          ID                    conditions model.
370          ID
371          ID                    Stage-storage was developed for all the structures
372          ID                    along the CAP Canal, as well as along the Beardsley
373          ID                    Canal.  In addition several stage-storage locations
374          ID                    were developed for areas with significant storage
375          ID                    along the SR74.  No storage was modeled along the US60
376          ID                    and railroad, but the culverts were analyzed for
377          ID                    diversion potential.  Diversions were placed in the
378          ID                    model where deemed appropriate.  See appendix for
379          ID                    details.
380          ID
381          ID                    FLO-2D was utilized to calculate the split flows at
382          ID                    concentration points CIW351. CIW357, CIW363 and CWI576.
383          ID                    See appendix for modeling details.
384          ID
385          ID   ********************************************************************************

1                                        HEC-1 INPUT                                        PAGE  8

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

386          ID   ********************************************************************************
387          ID
             *DIAGRAM
388          IT       5              0    1500
389          IO       5
390          IN      15              0
391          JD    3.40    0.01
             * 6-hour distribution
392          PC   0.000   0.008   0.016   0.025   0.033   0.041   0.050   0.058   0.066   0.074
393          PC   0.087   0.099   0.118   0.138   0.216   0.377   0.834   0.911   0.931   0.950
394          PC   0.962   0.972   0.983   0.991   1.000
             *
395          JD   3.378    0.50
396          JD   3.314    2.80
397          PC   0.000   0.009   0.016   0.025   0.034   0.042   0.051   0.059   0.067   0.076
398          PC   0.087   0.100   0.120   0.163   0.252   0.451   0.694   0.837   0.900   0.938
399          PC   0.950   0.963   0.975   0.988   1.000
             *
400          JD   3.135   16.00
401          PC   0.000   0.009   0.020   0.030   0.048   0.063   0.076   0.090   0.105   0.119
402          PC   0.135   0.152   0.175   0.222   0.304   0.472   0.670   0.796   0.868   0.912
403          PC   0.946   0.960   0.973   0.987   1.000
             *
404          JD   2.761   90.00
405          PC   0.000   0.021   0.035   0.051   0.071   0.087   0.105   0.125   0.143   0.160
406          PC   0.179   0.201   0.232   0.281   0.364   0.500   0.658   0.773   0.841   0.888
407          PC   0.927   0.945   0.964   0.982   1.000
             *
408          JD   1.938  500.00
409          PC   0.000   0.024   0.043   0.059   0.078   0.098   0.119   0.141   0.162   0.186
410          PC   0.212   0.239   0.271   0.321   0.408   0.515   0.627   0.735   0.814   0.864
411          PC   0.907   0.930   0.954   0.977   1.000
             *
             *
             *
             *
             * WESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWEST *
             * WESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWEST *
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* WESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWEST *
* ************************************************************************** *
* ************ BEGINNING OF WEST PORTION OF DETAILED MODEL ****************** *
* ************************************************************************** *
* WESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWEST *
* WESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWEST *
* WESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWESTWEST *
*
*
*
*
* ************************************************************************** *
* ************************************************************************** *
* ****************** BEGINNING OF WHITE TANKS SUBAREA ********************** *
* ************************************************************************** *
* ************************************************************************** *
*
```

1

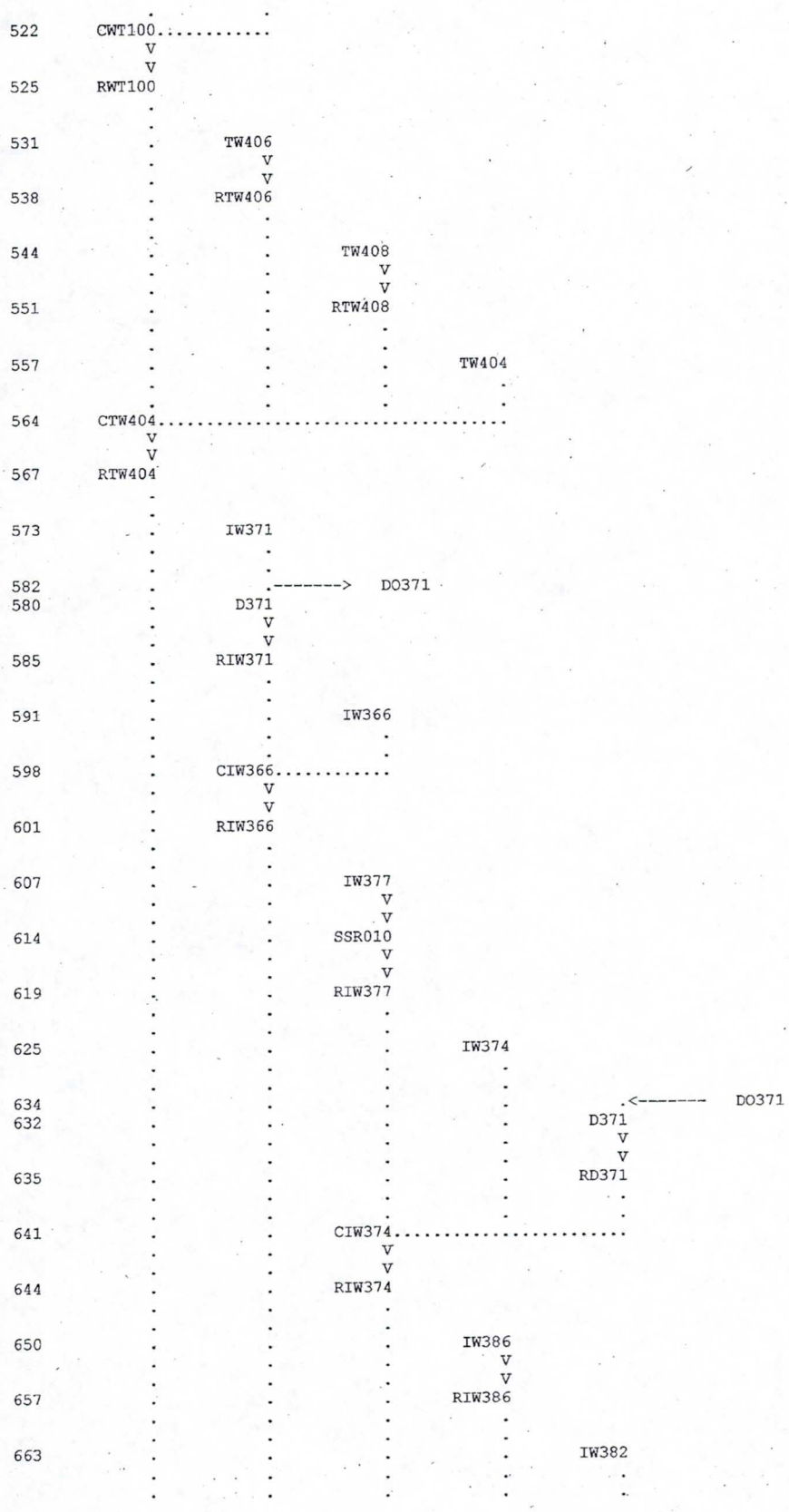
SCHEMATIC DIAGRAM OF STREAM NETWORK

INPUT LINE NO.

(V) ROUTING (---->) DIVERSION OR PUMP FLOW

(.) CONNECTOR (<----) RETURN OF DIVERTED OR PUMPED FLOW

```
412       WT140
              V
              V
419       RWT140
              .
              .
425           .       WT130
              .           .
              .           .
432       CWT130.............
              V
              V
435       RWT130
              .
              .
441           .       WT160
              .           V
              .           V
448           .       RWT160
              .           .
              .           .
454           .           .       WT150A
              .           .           V
              .           .           V
461           .           .        R150A
              .           .           .
              .           .           .
467           .           .           .       WT150
              .           .           .           .
              .           .           .           .
474           .           .       CWT150.............
              .           .           V
              .           .           V
477           .           .       RWT150
              .           .           .
              .           .           .
483           .           .           .       WT120
              .           .           .           .
              .           .           .           .
490       CWT120.....................................
              V
              V
493       RWT120
              .
              .
499           .       WT110
              .           .
              .           .
506       CWT110.............
              V
              V
509       RWT110
              .
              .
515           .       WT100
              .           .
```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544 TW408
551 RTW408
557 TW404
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567 RTW404
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582 DO371
580 D371
585 RIW371
591 IW366
598 CIW366
601 RIW366
607 IW377
614 SSR010
619 RIW377
625 IW374
634 DO371
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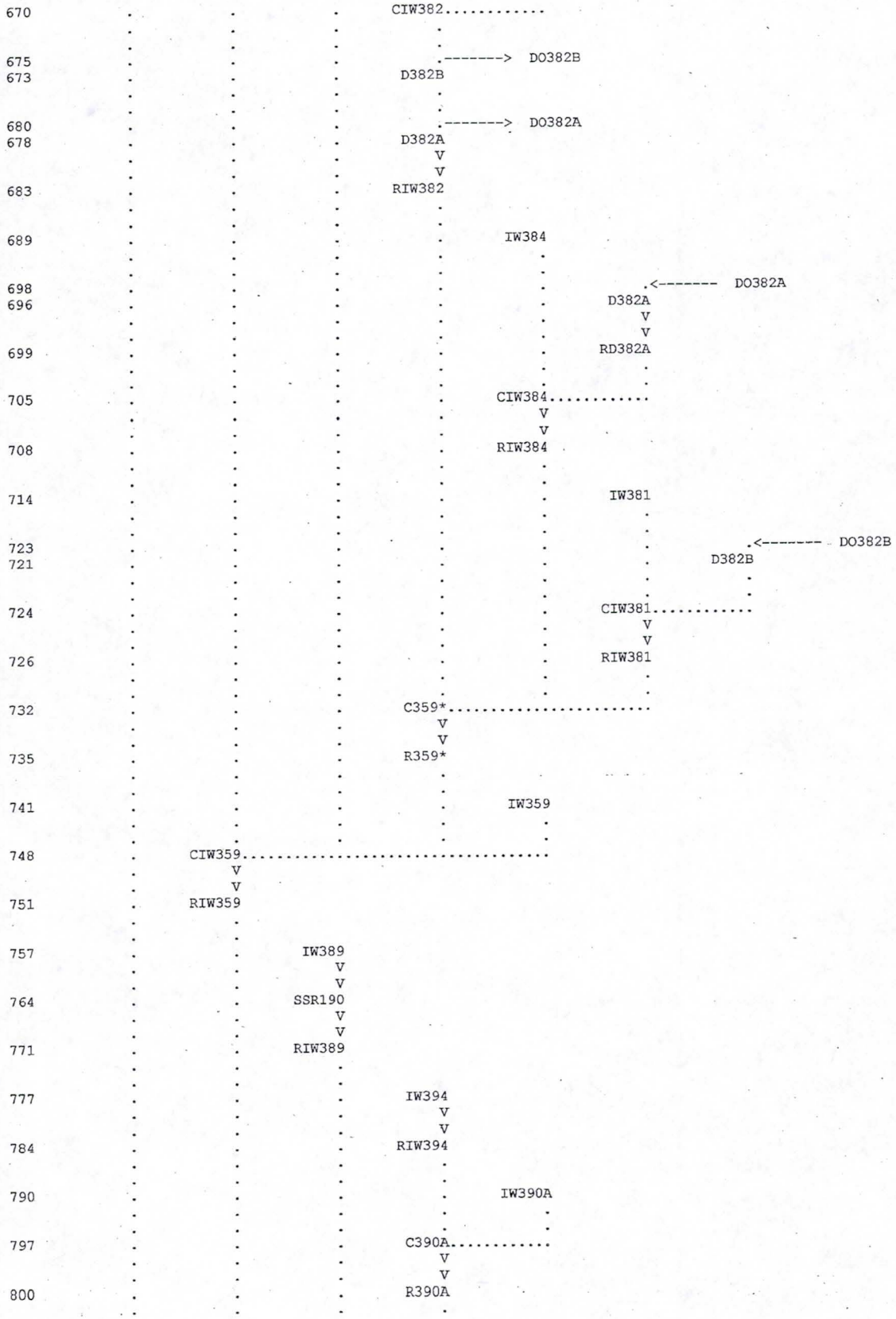
635 RD371
641 CIW374
644 RIW374
650 IW386
657 RIW386
663 IW382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675
DO382B
673
D382B
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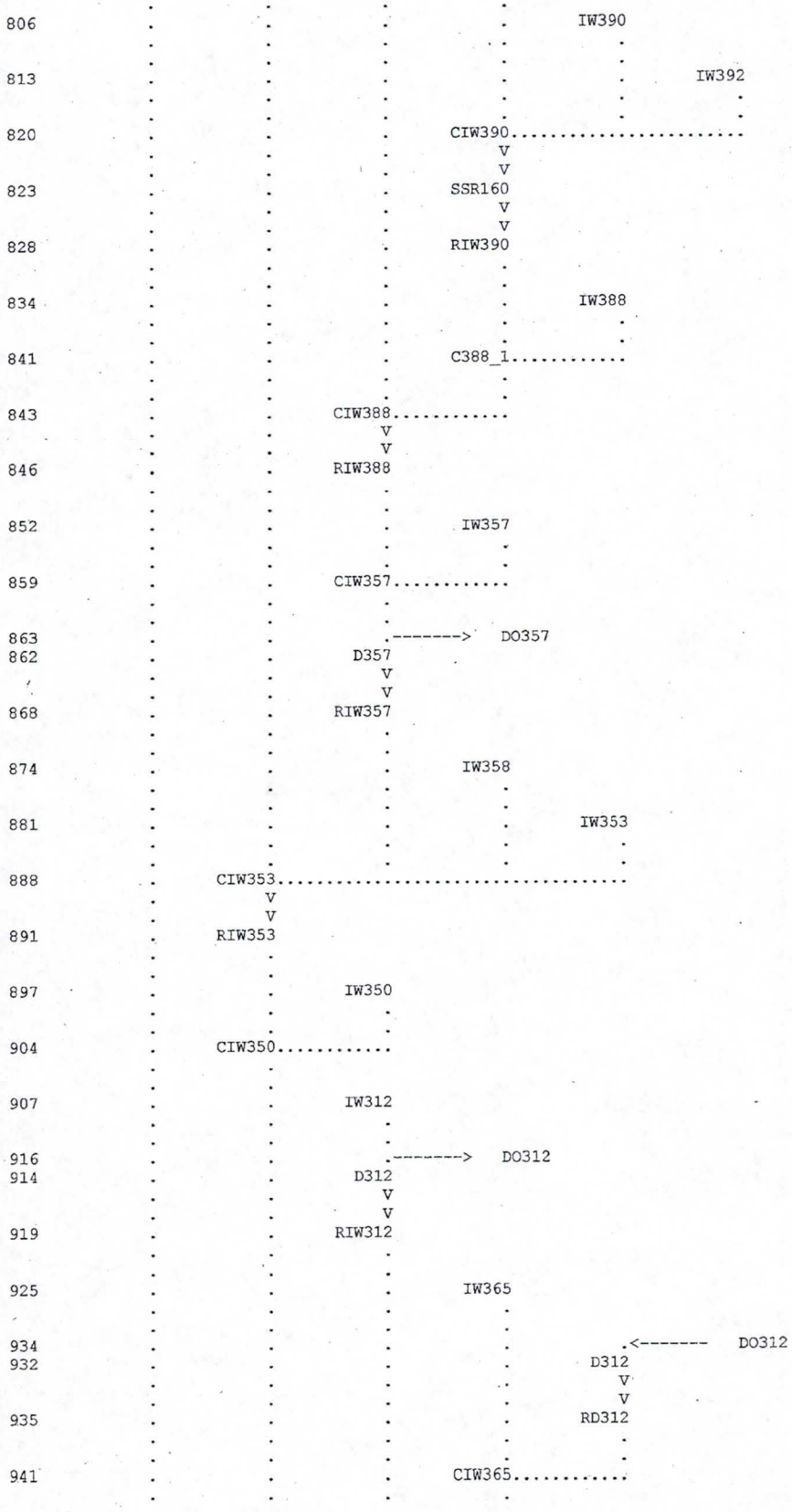
DO382A
678
D382A
683
RIW382
689
IW384
698
DO382A
696
D382A
699
RD382A
705
CIW384
708
RIW384
714
IW381
723
DO382B
721
D382B
724
CIW381
726
RIW381
732
C359*
735
R359*
741
IW359
748
CIW359
751
RIW359
757
IW389
764
SSR190
771
RIW389
777
IW394
784
RIW394
790
IW390A
797
C390A
800
R390A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813
IW392
820
CIW390
823
SSR160
828
RIW390
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IW388
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C388_1
843
CIW388
846
RIW388
852
IW357
859
CIW357
863
DO357
862
D357
868
RIW357
874
IW358
881
IW353
888
CIW353
891
RIW353
897
IW350
904
CIW350
907
IW312
916
DO312
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D312
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RD312
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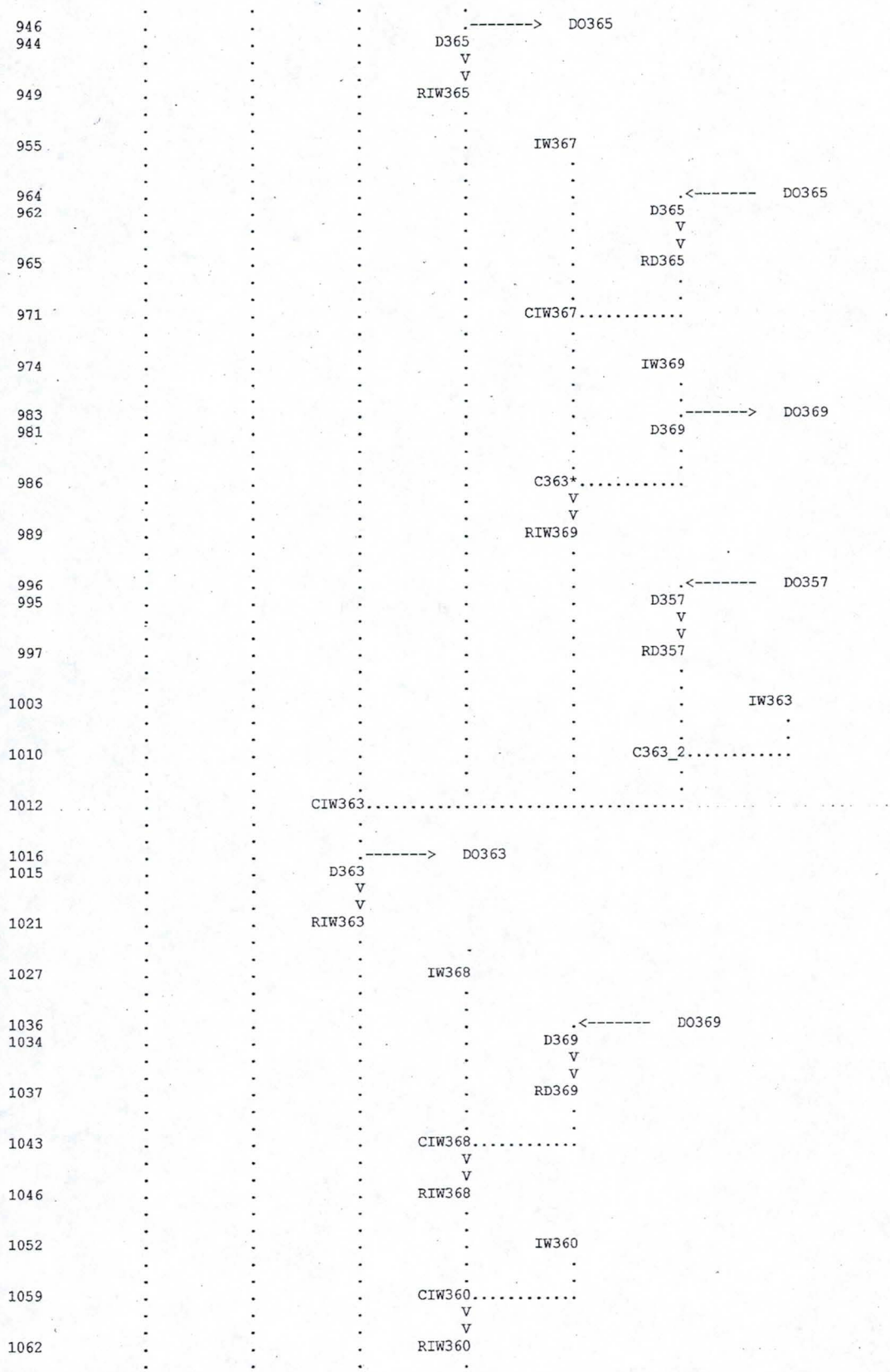
CIW365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V
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V
V
965 RD365
971 CIW367.....
974 IW369
983 .-------> DO369
981 D369
986 C363*.....
V
V
989 RIW369
996 .<------- DO357
995 D357
V
V
997 RD357
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1010 C363_2.....
1012 CIW363.....
1016 .-------> DO363
1015 D363
V
V
1021 RIW363
1027 IW368
1036 .<------- DO369
1034 D369
V
V
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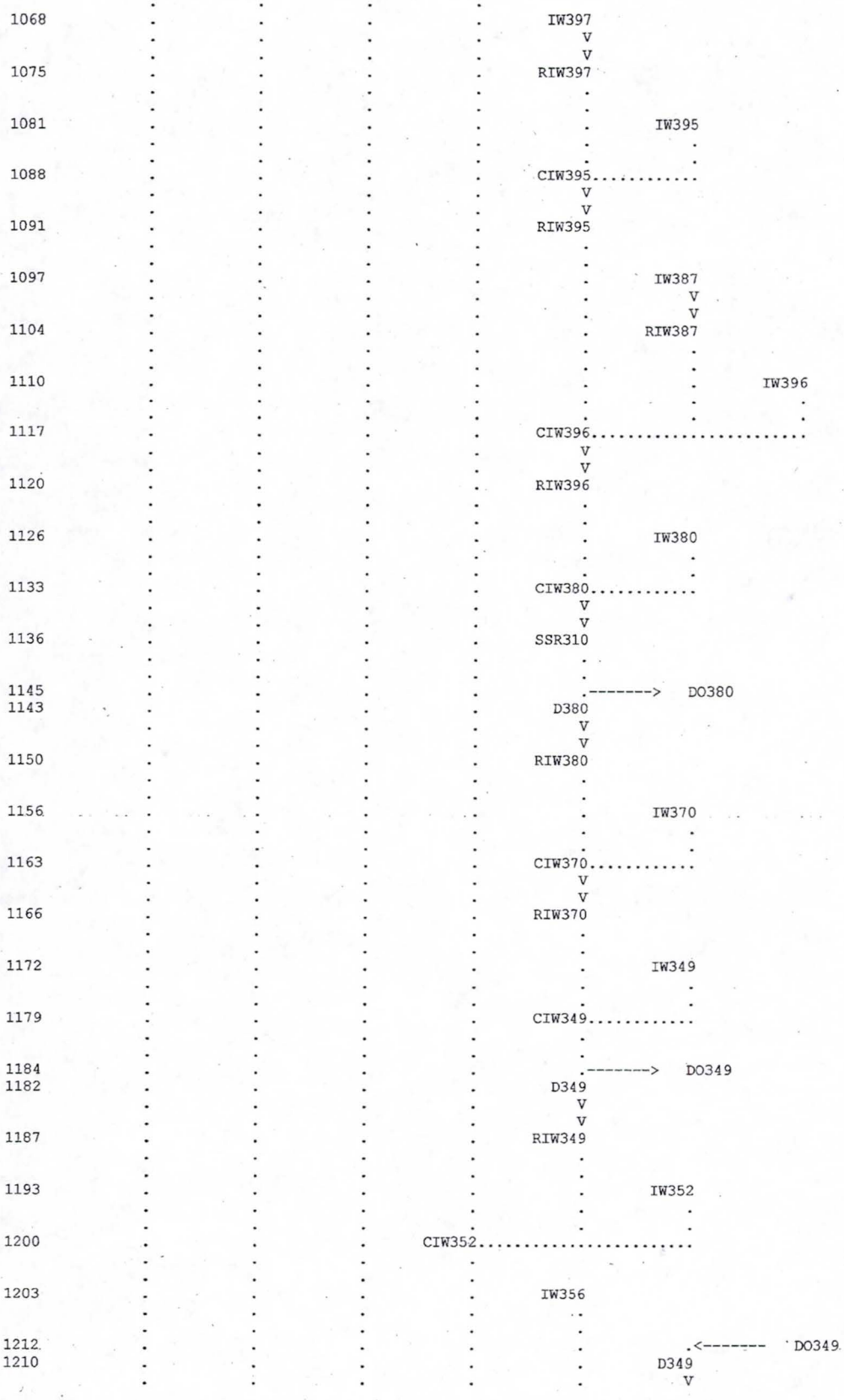
V
1062 RIW360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RIW395
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RIW387
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IW396
1117
CIW396
1120
RIW396
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CIW380
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SSR310
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DO380
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D380
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RIW380
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IW370
1163
CIW370
1166
RIW370
1172
IW349
1179
CIW349
1184
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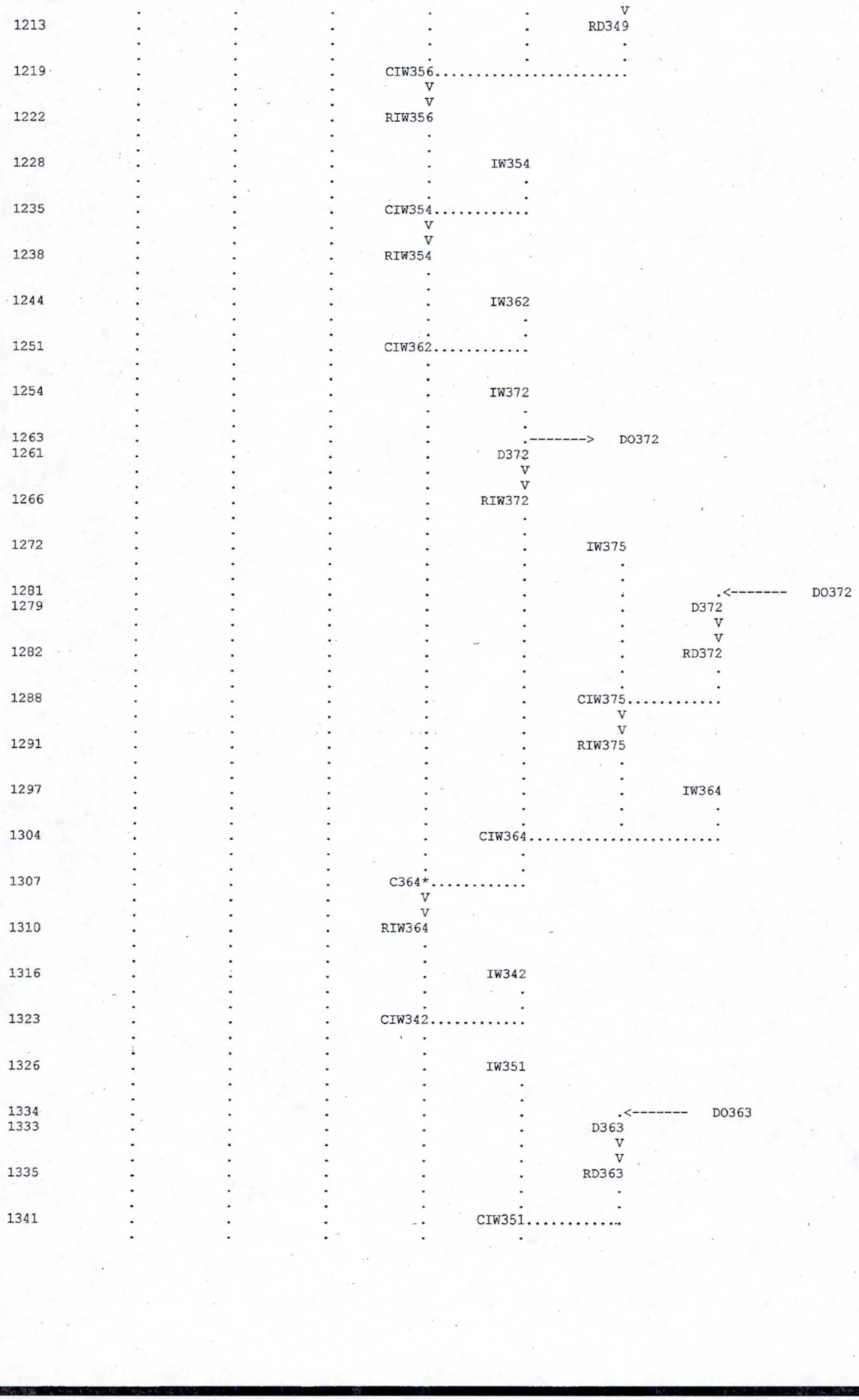
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DO372
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DO372
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D372
1282
RD372
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CIW375
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RIW375
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IW364
1304
CIW364
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C364*
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RIW364
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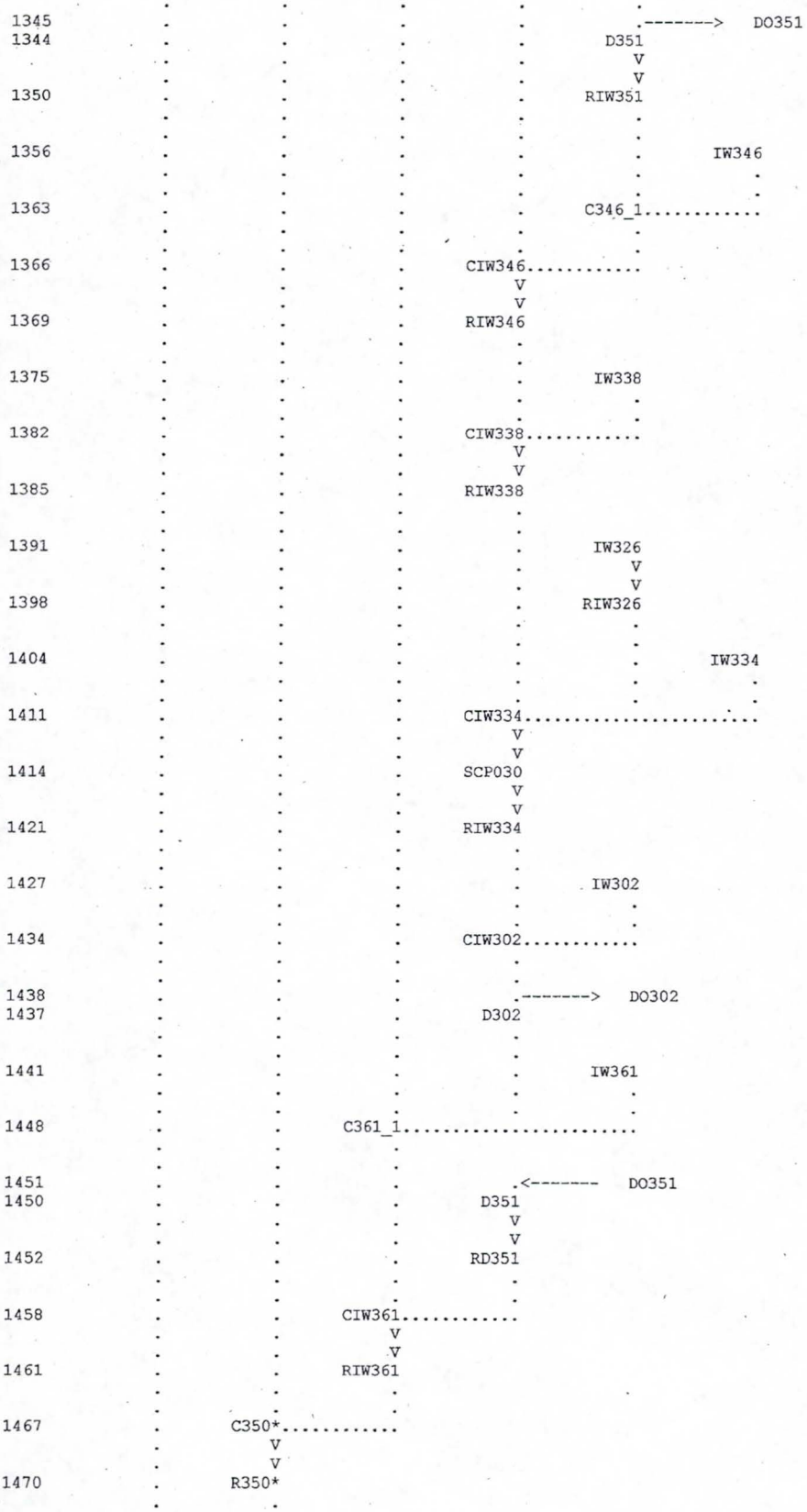
CIW351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IW338
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RIW338
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IW326
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IW334
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DO302
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C361_1
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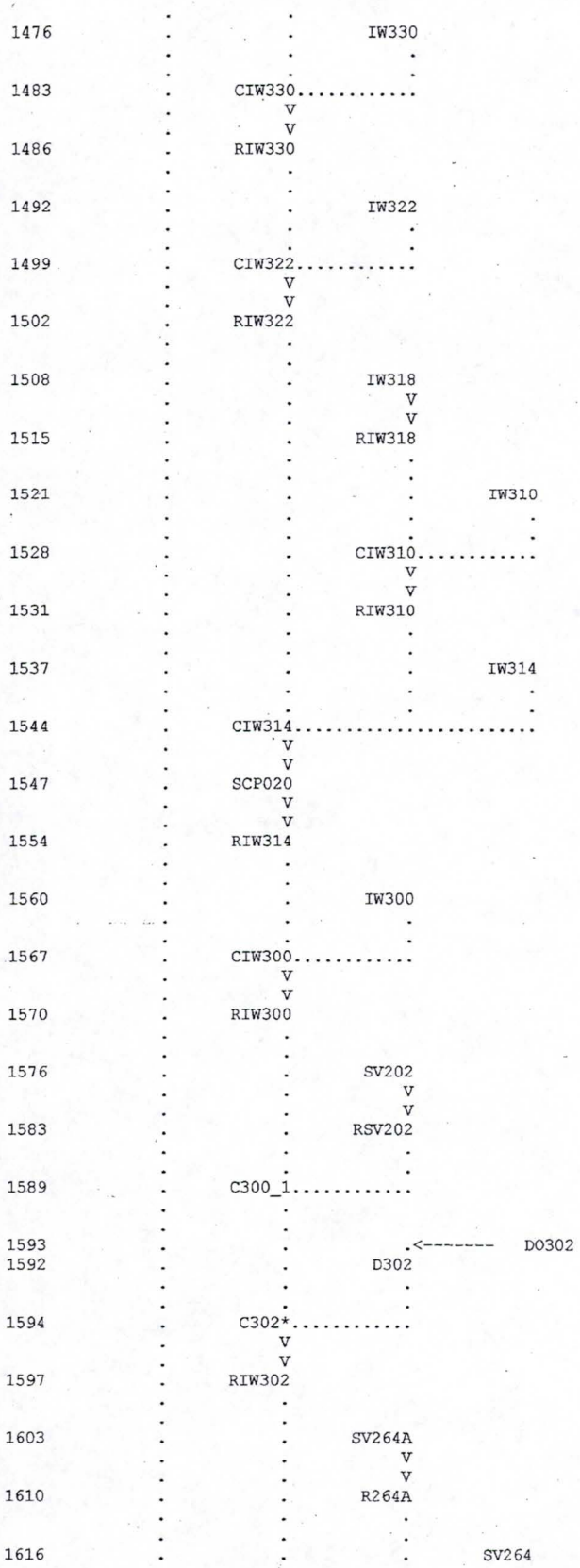
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RIW310
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CIW300
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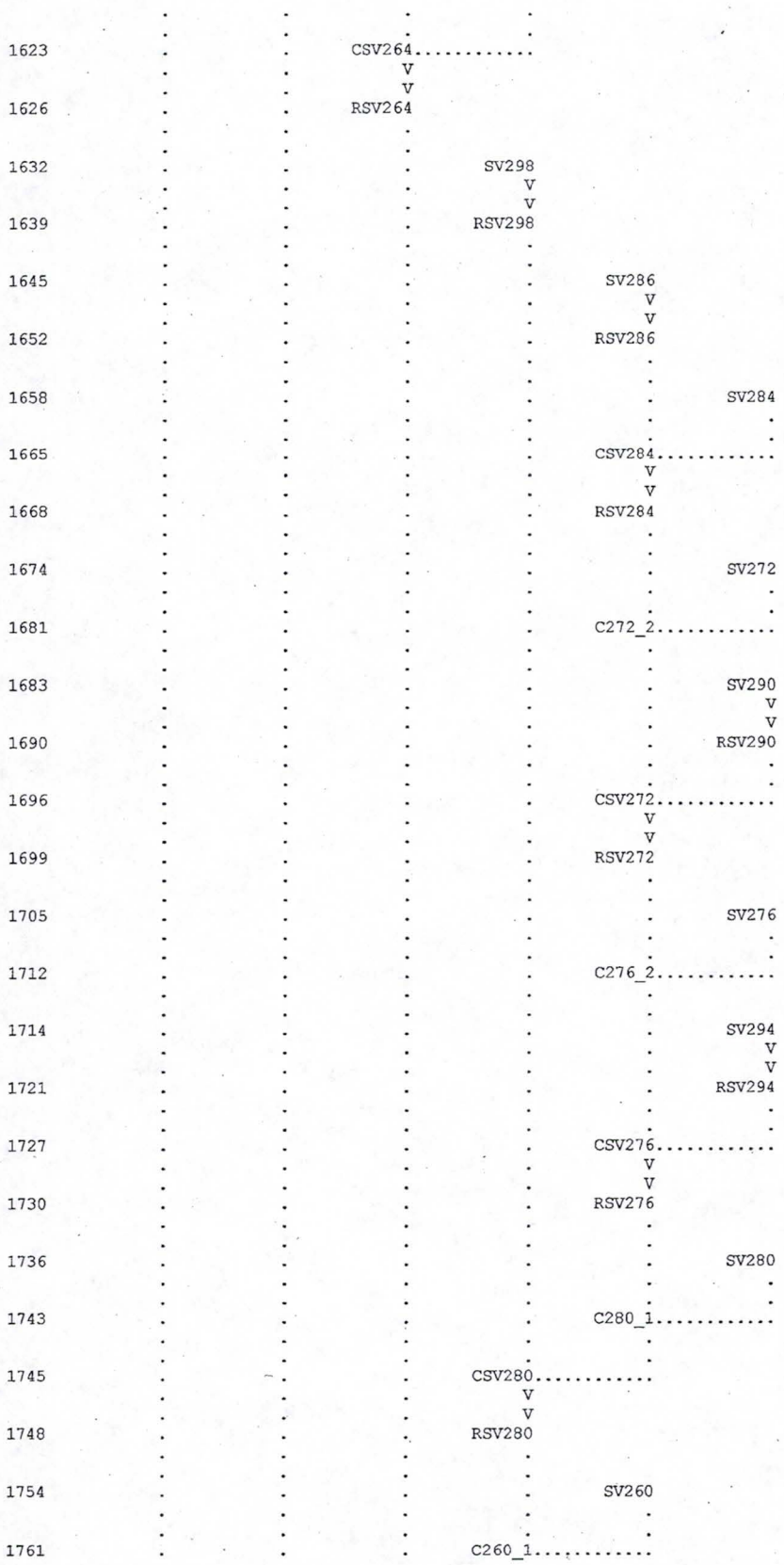
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1683 SV290
1690 RSV290
1696 CSV272
1699 RSV272
1705 SV276
1712 C276_2
1714 SV294
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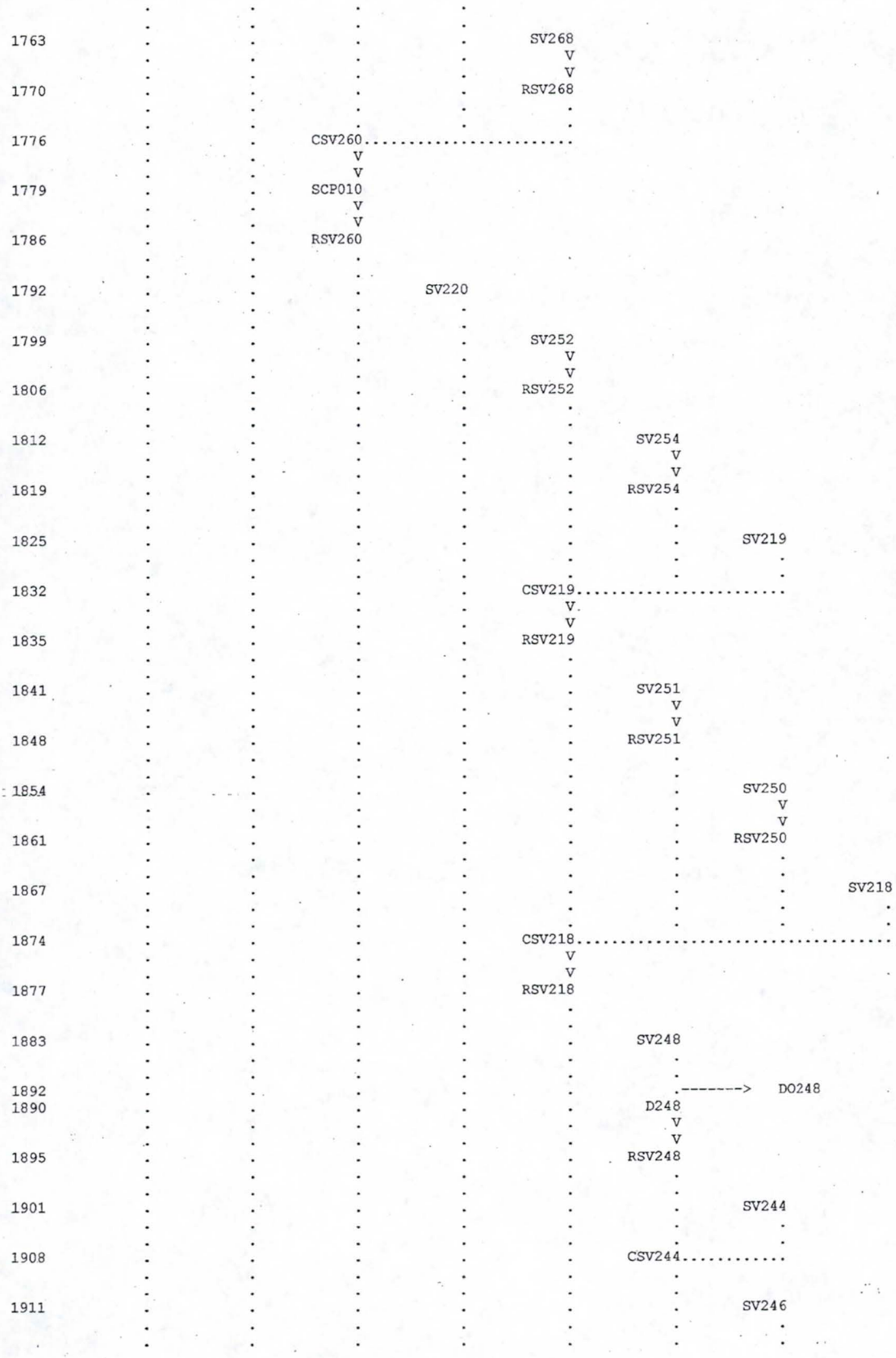
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SV254
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RSV254
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SV219
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RSV219
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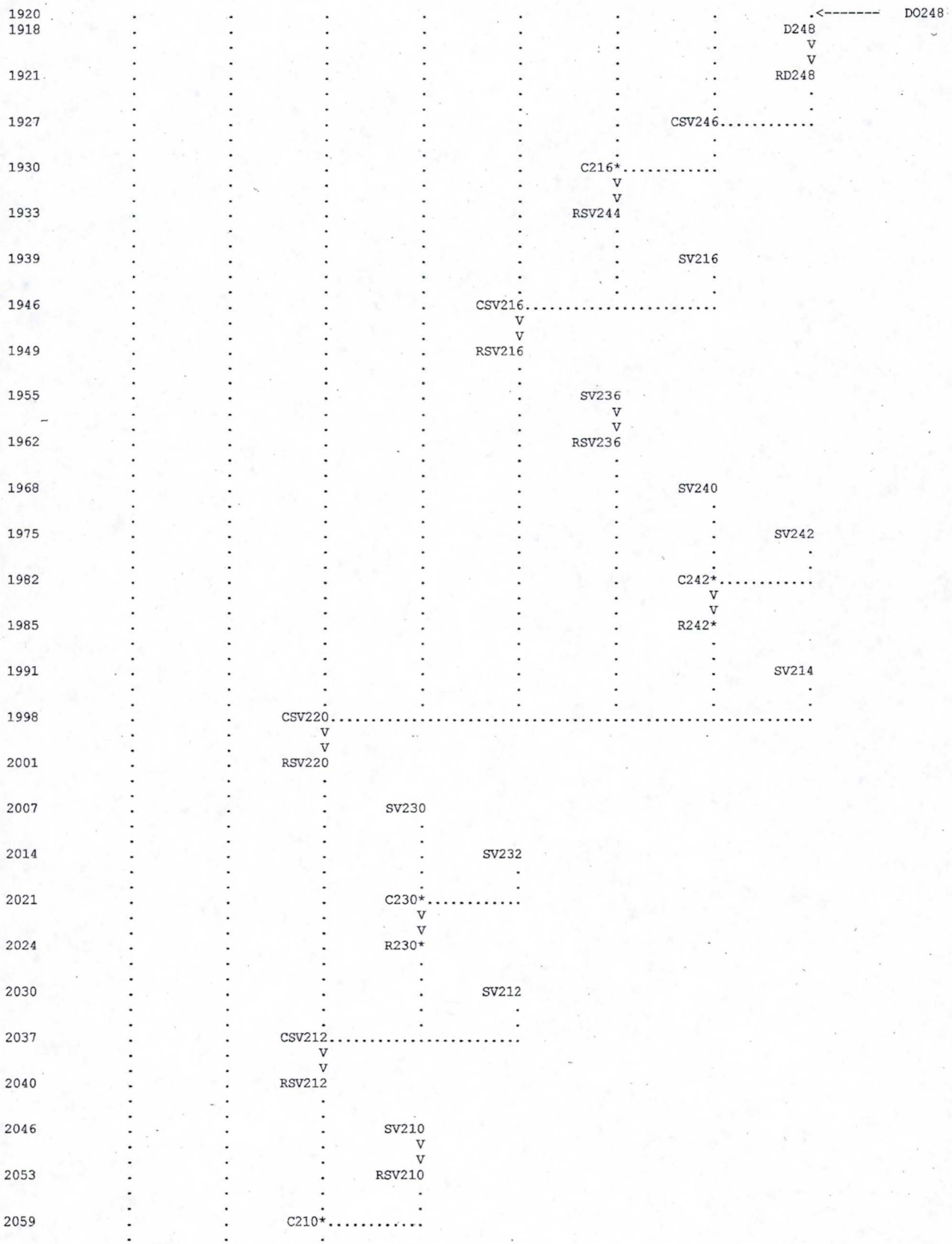
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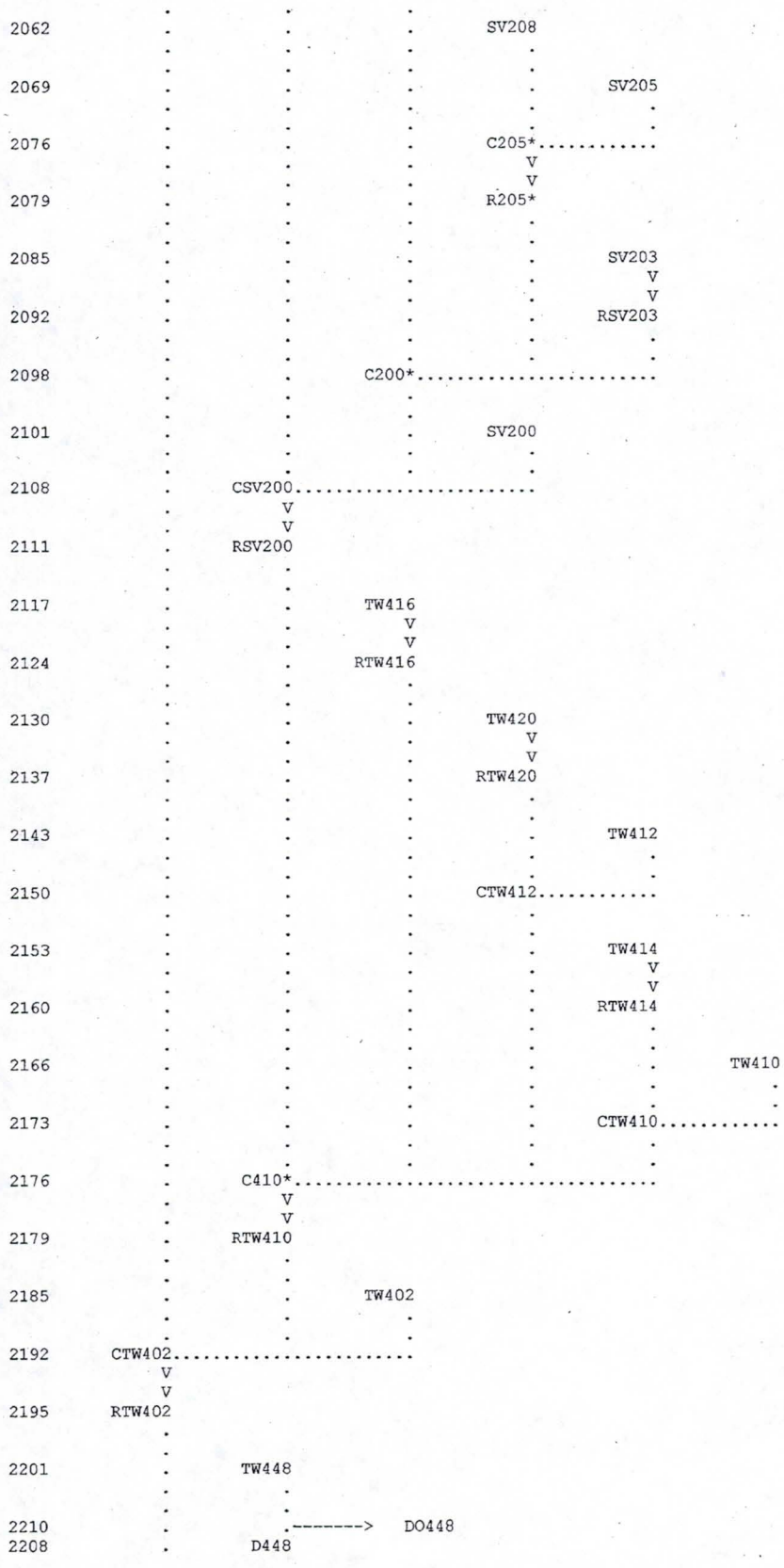
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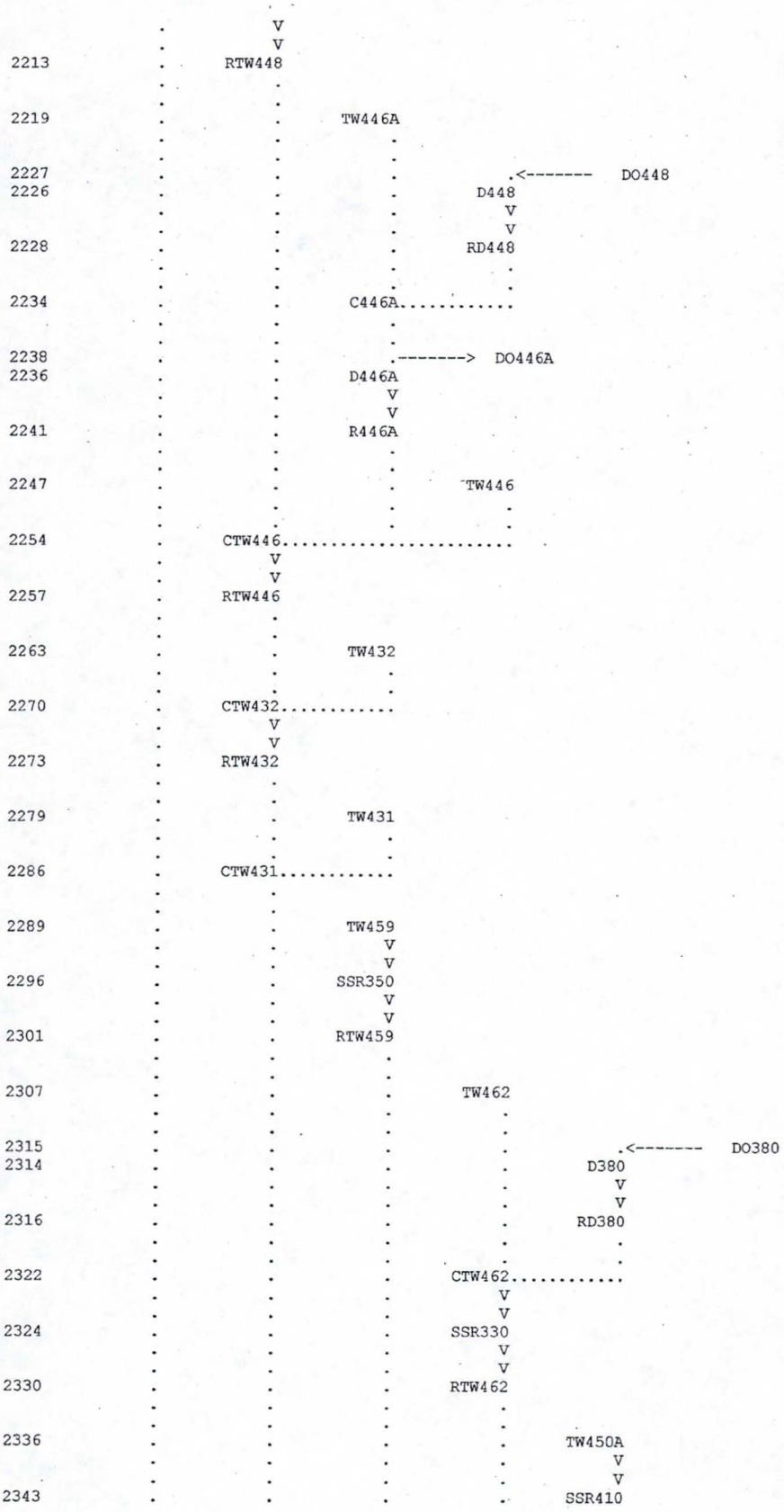
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2257 RTW446
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2270 CTW432
2273 RTW432
2279 TW431
2286 CTW431
2289 TW459
2296 SSR350
2301 RTW459
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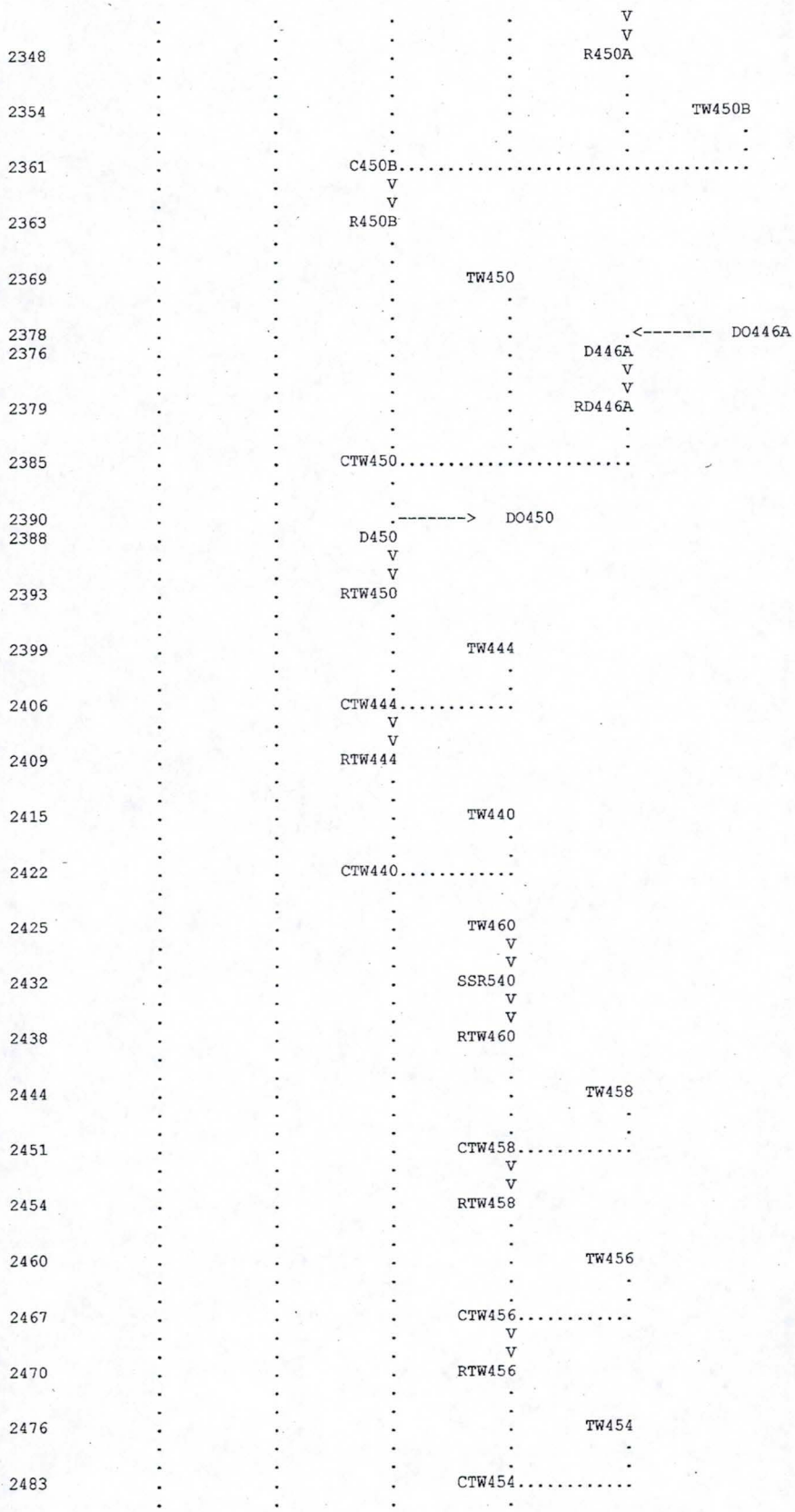
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DO450
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D450
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2409
RTW444
2415
TW440
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CTW440
2425
TW460
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SSR540
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RTW460
2444
TW458
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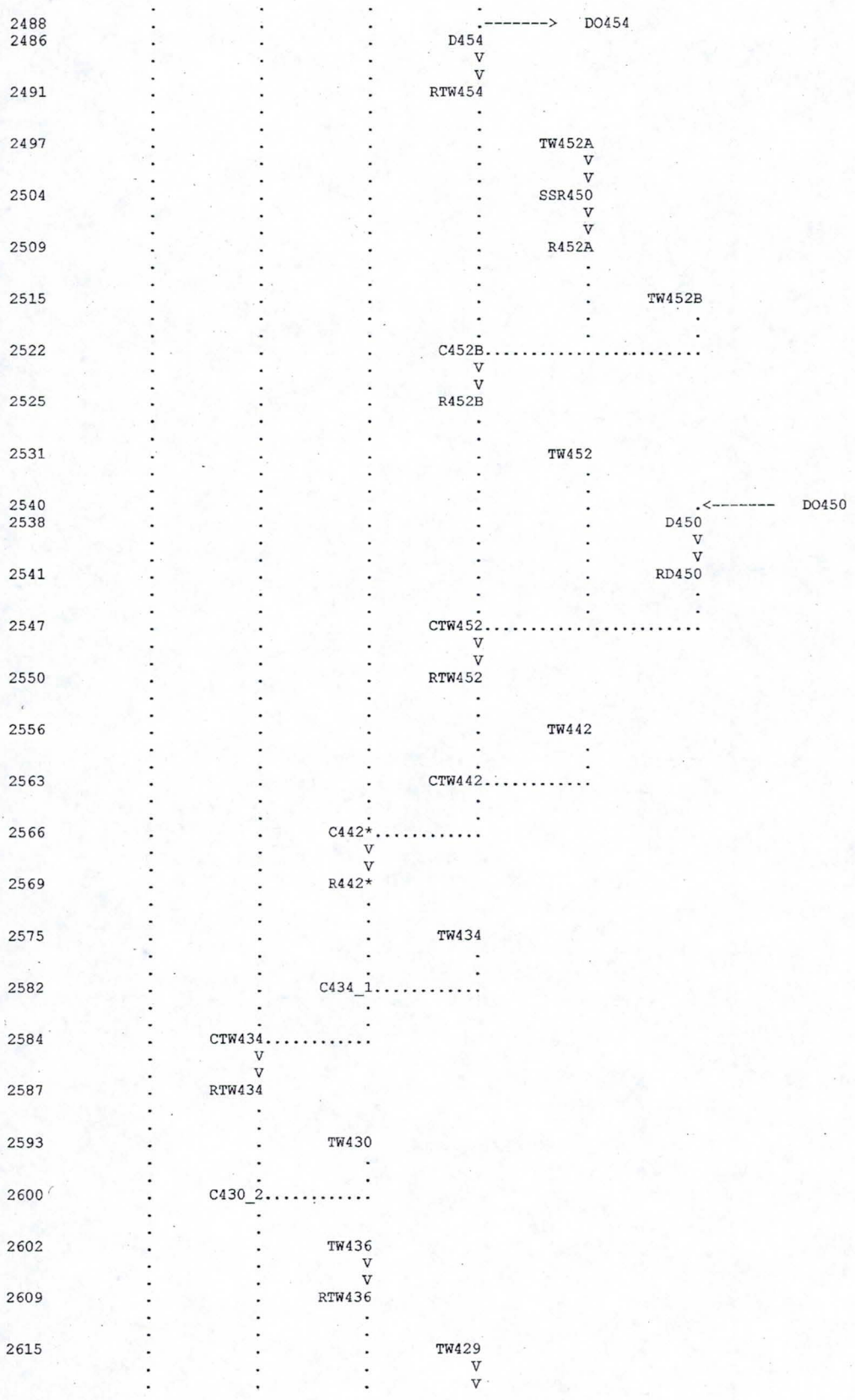
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C442*
R442*
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TW430
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TW436
RTW436
TW429
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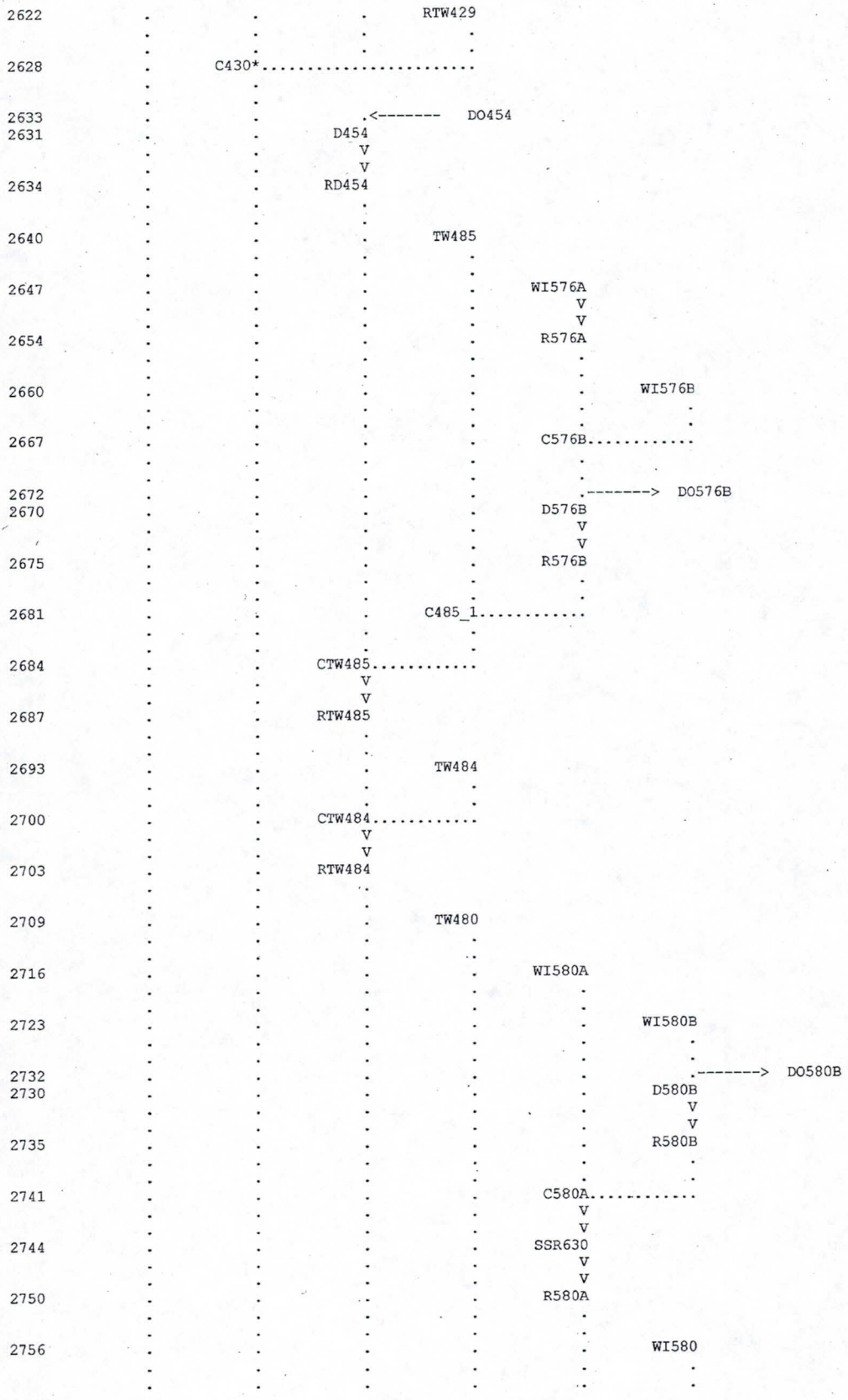
DO450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WI576B
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C576B
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DO576B
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D576B
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R576B
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C485_1
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CTW485
2687
RTW485
2693
TW484
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CTW484
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RTW484
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TW480
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WI580B
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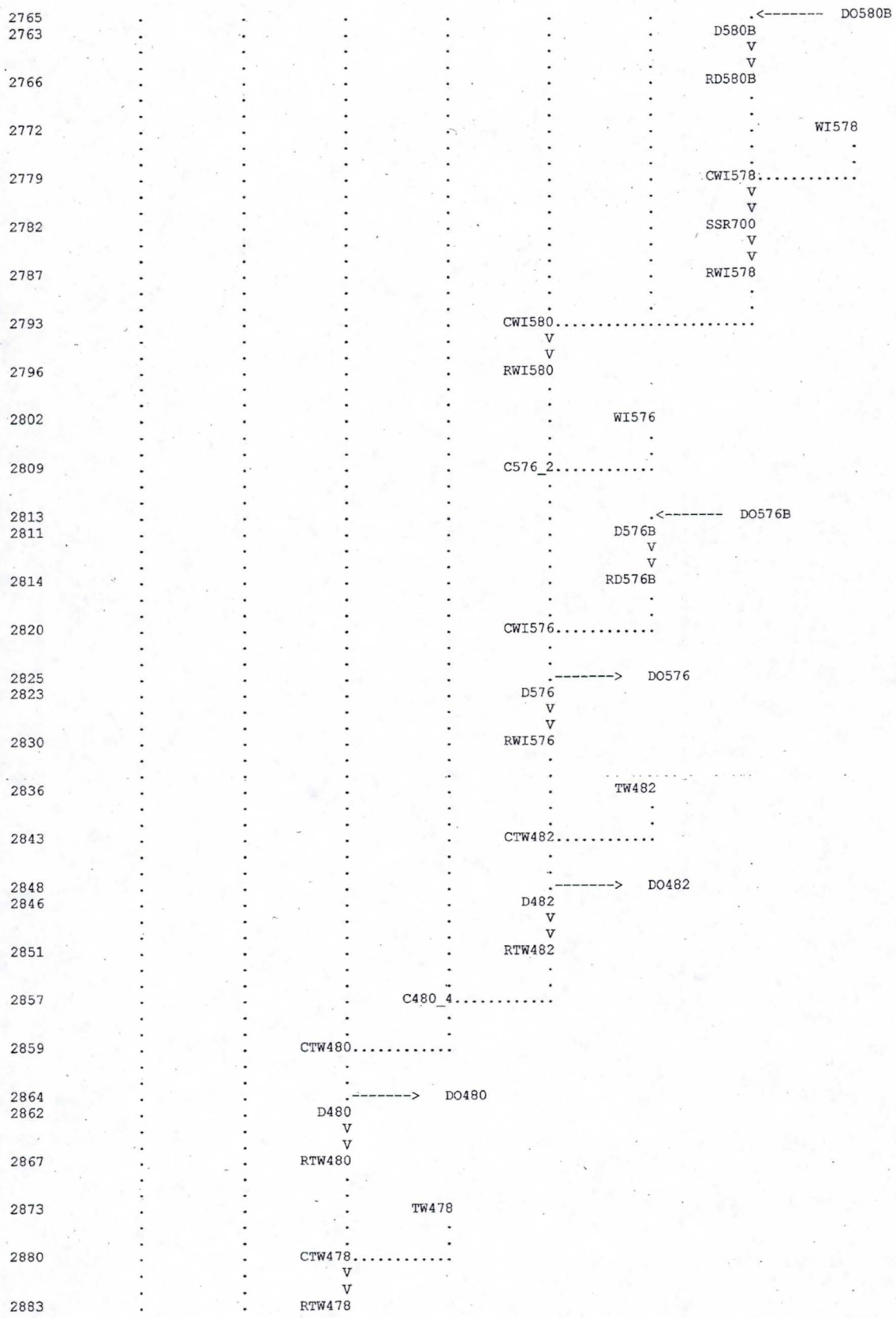
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D580B
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SSR700
RWI578
CWI580
RWI580
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DO576B
D576B
RD576B
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DO576
D576
RWI576
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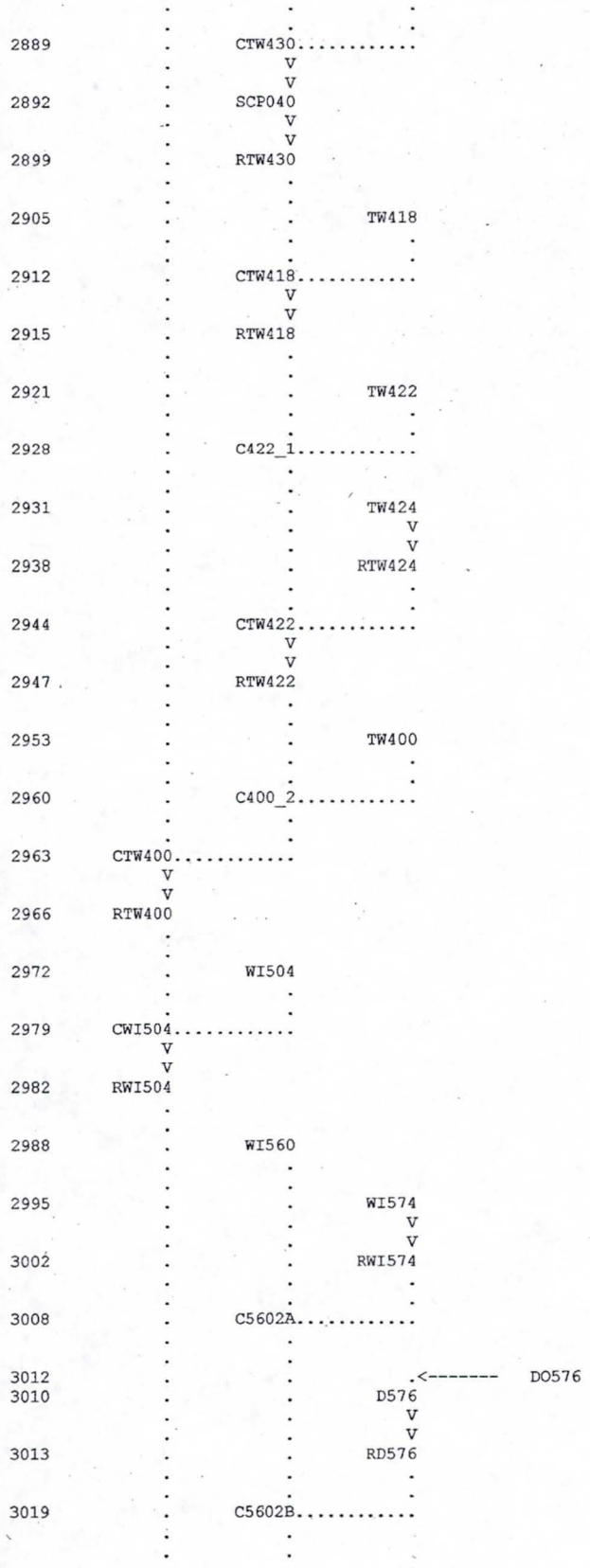
RTW478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2944 CTW422
2947 RTW422
2953 TW400
2960 C400_2
2963 CTW400
2966 RTW400
2972 WI504
2979 CWI504
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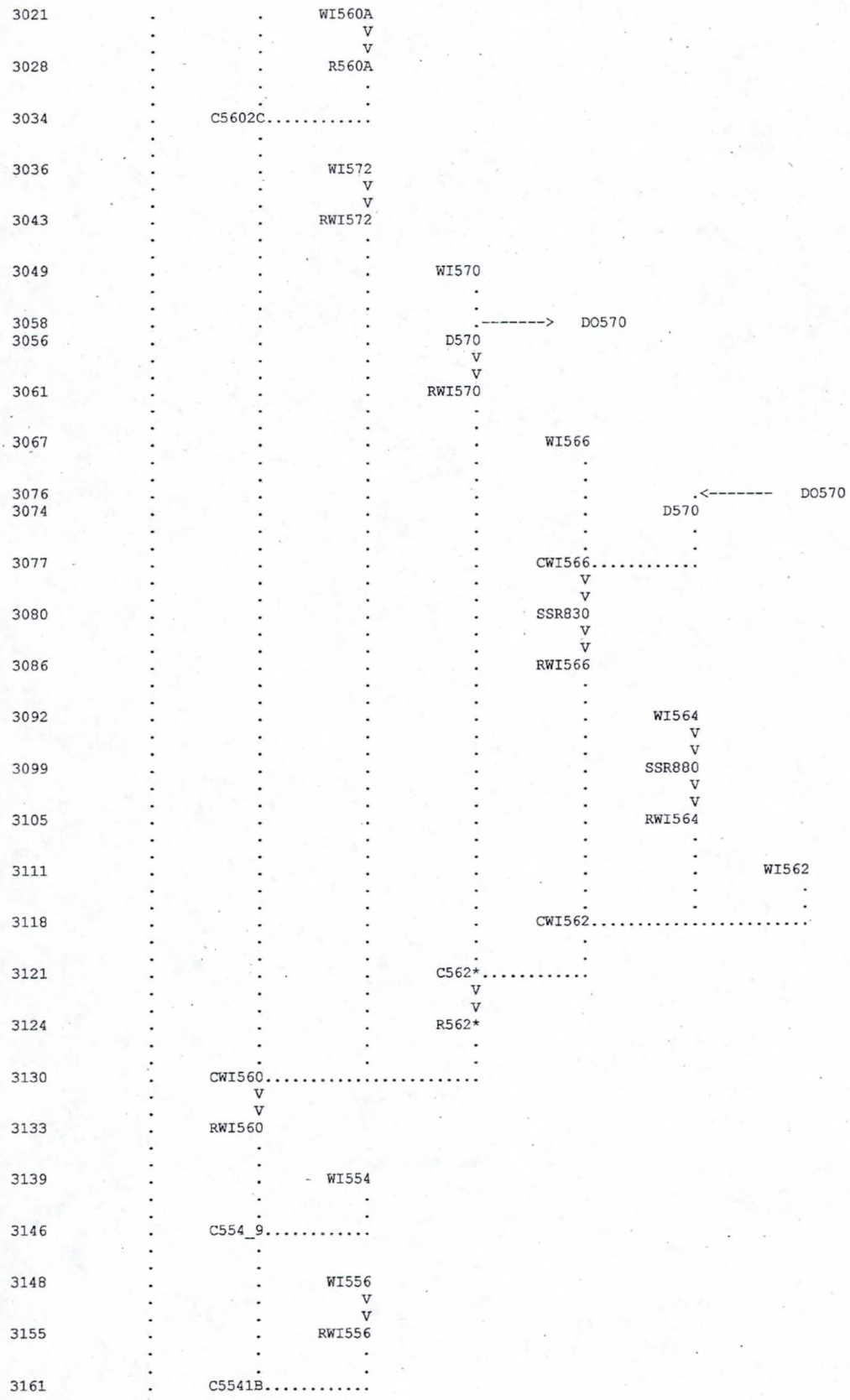
3019 C5602B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D570
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RWI570
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WI566
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DO570
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SSR830
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RWI564
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WI562
3118
CWI562
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C562*
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R562*
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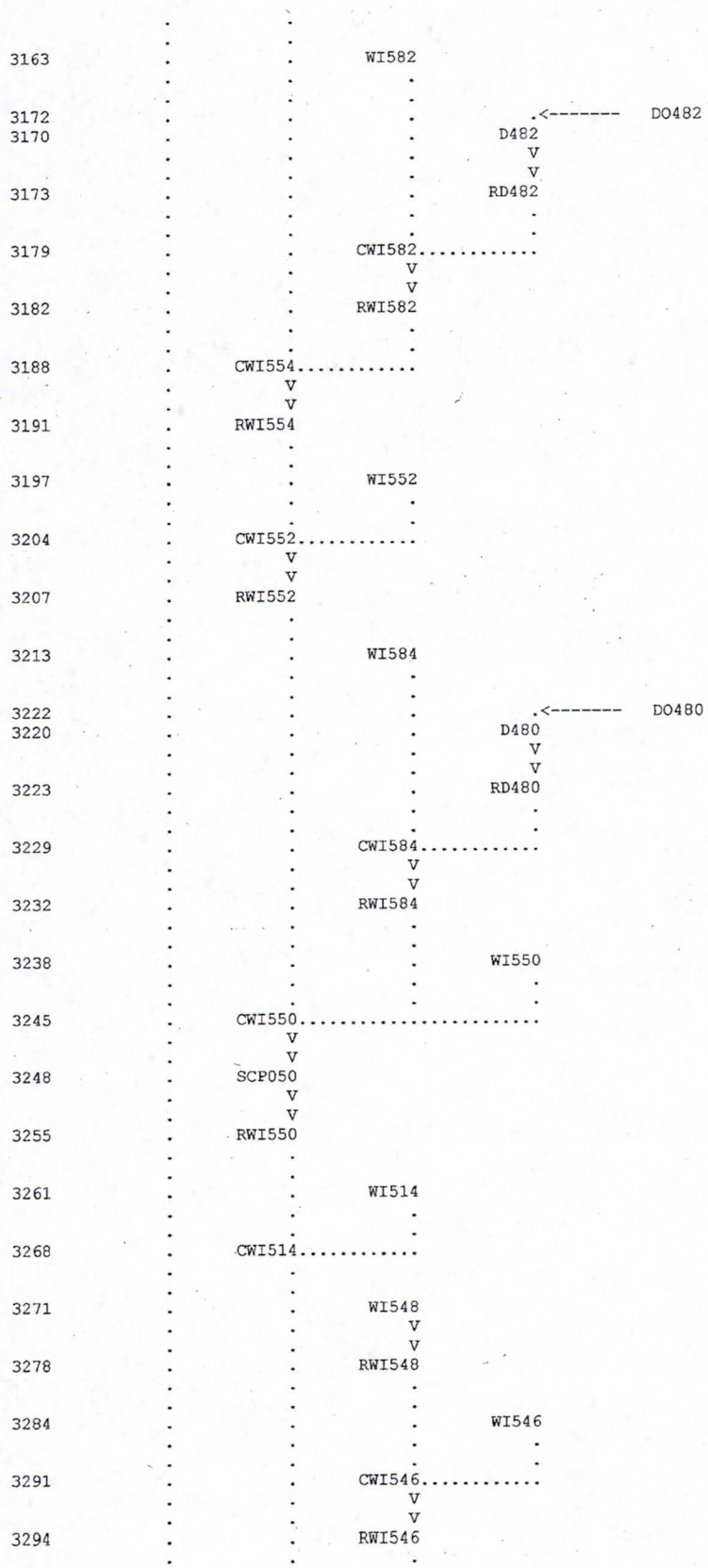
C5541B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3207 RWI552
3213 WI584
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3232 RWI584
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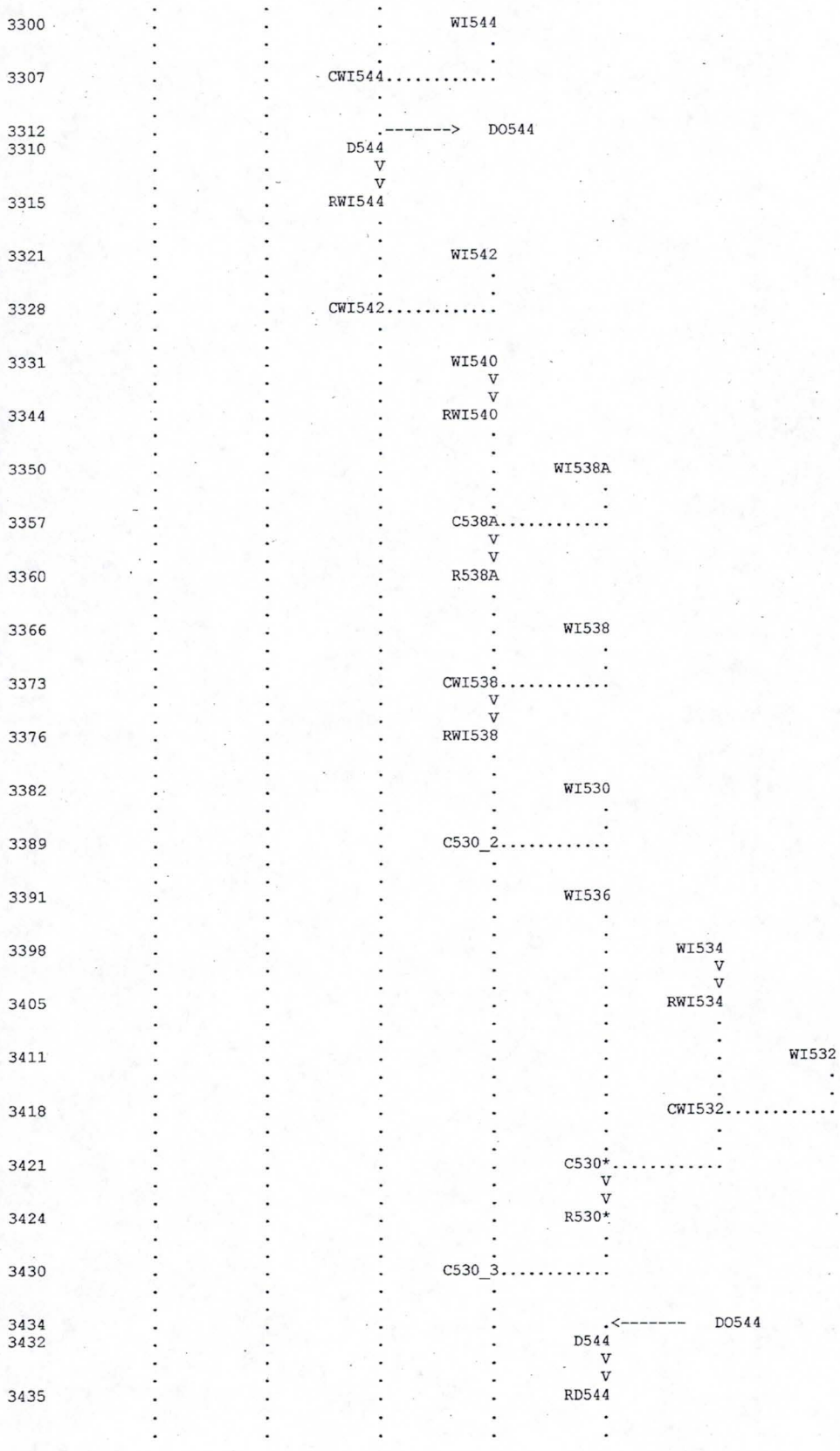
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RWI540
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WI538A
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C538A
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R538A
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CWI538
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RWI538
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WI530
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C530_2
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WI536
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WI534
3405
RWI534
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WI532
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C530_3
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D544
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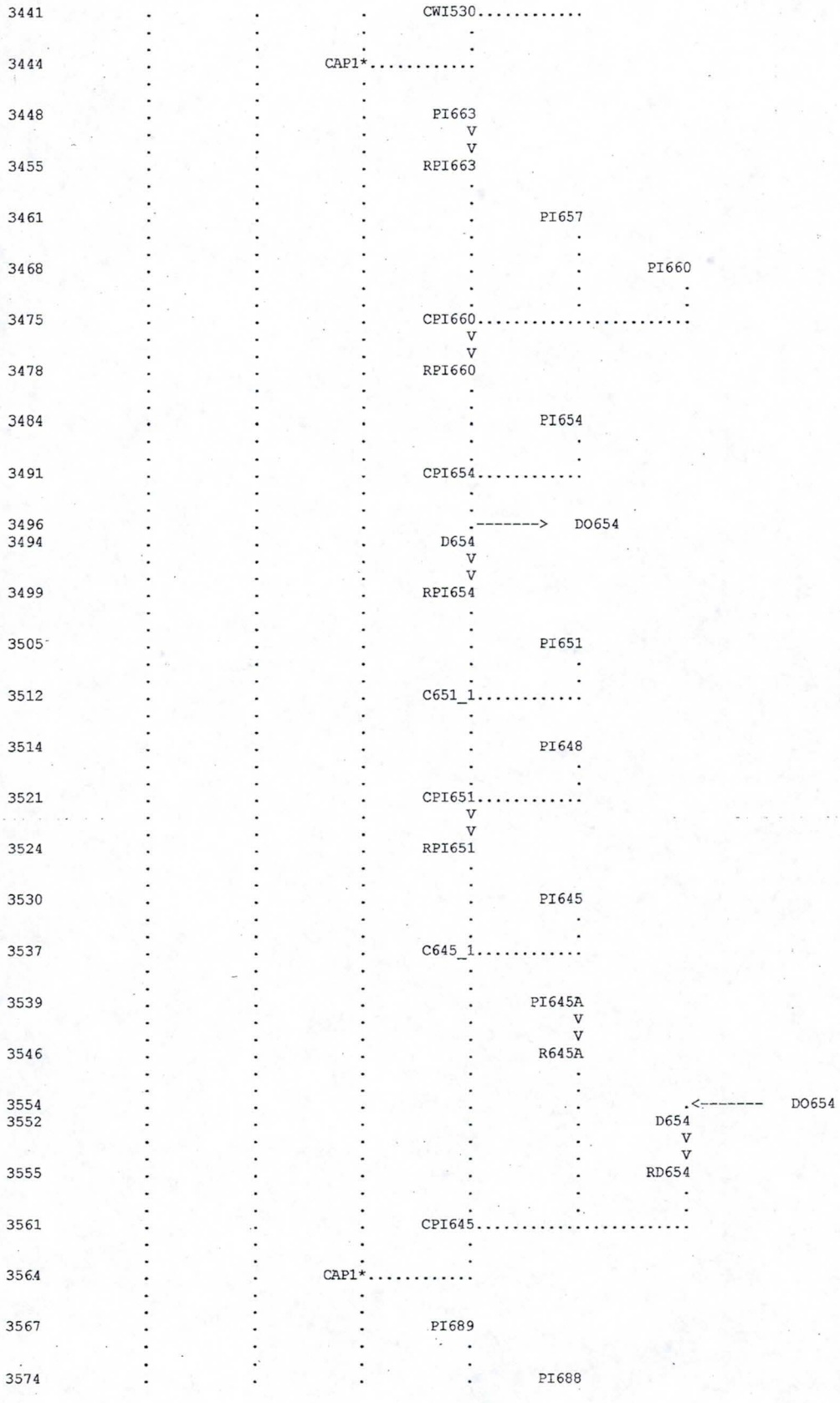
RD544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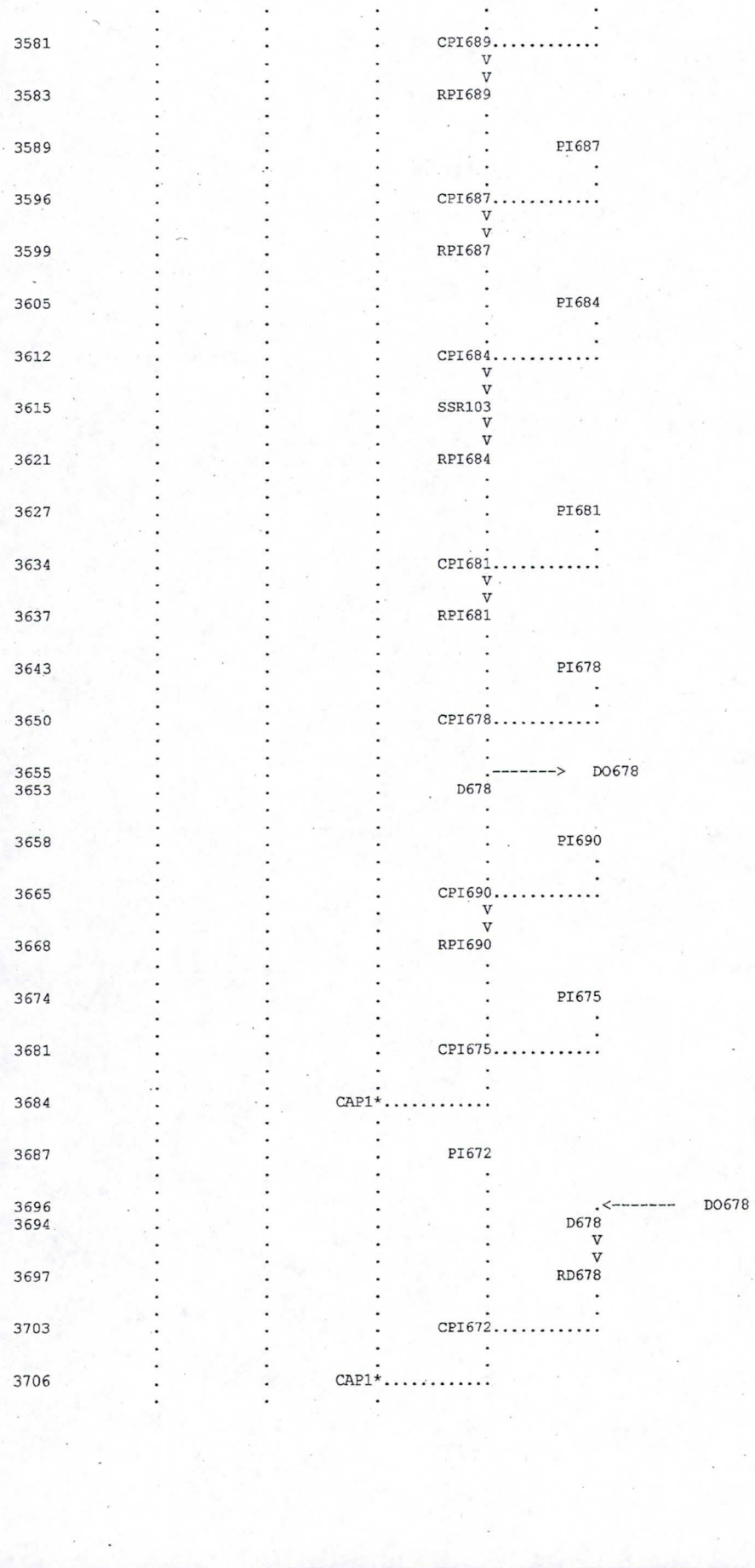
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3634 CPI681
3637 RPI681
3643 PI678
3650 CPI678
3655 DO678
3653 D678
3658 PI690
3665 CPI690
3668 RPI690
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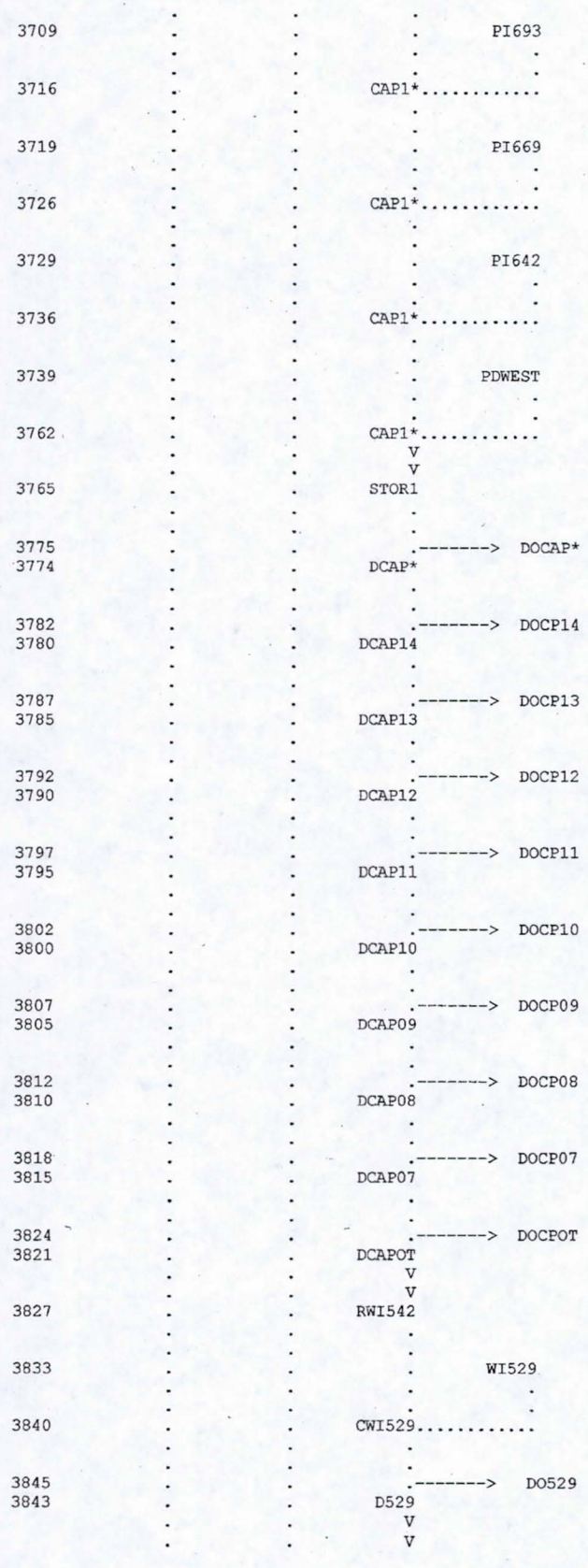
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CAP1*
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STOR1
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DOCAP*
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DCAP*
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DOCP14
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DCAP14
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DCAP13
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DOCP12
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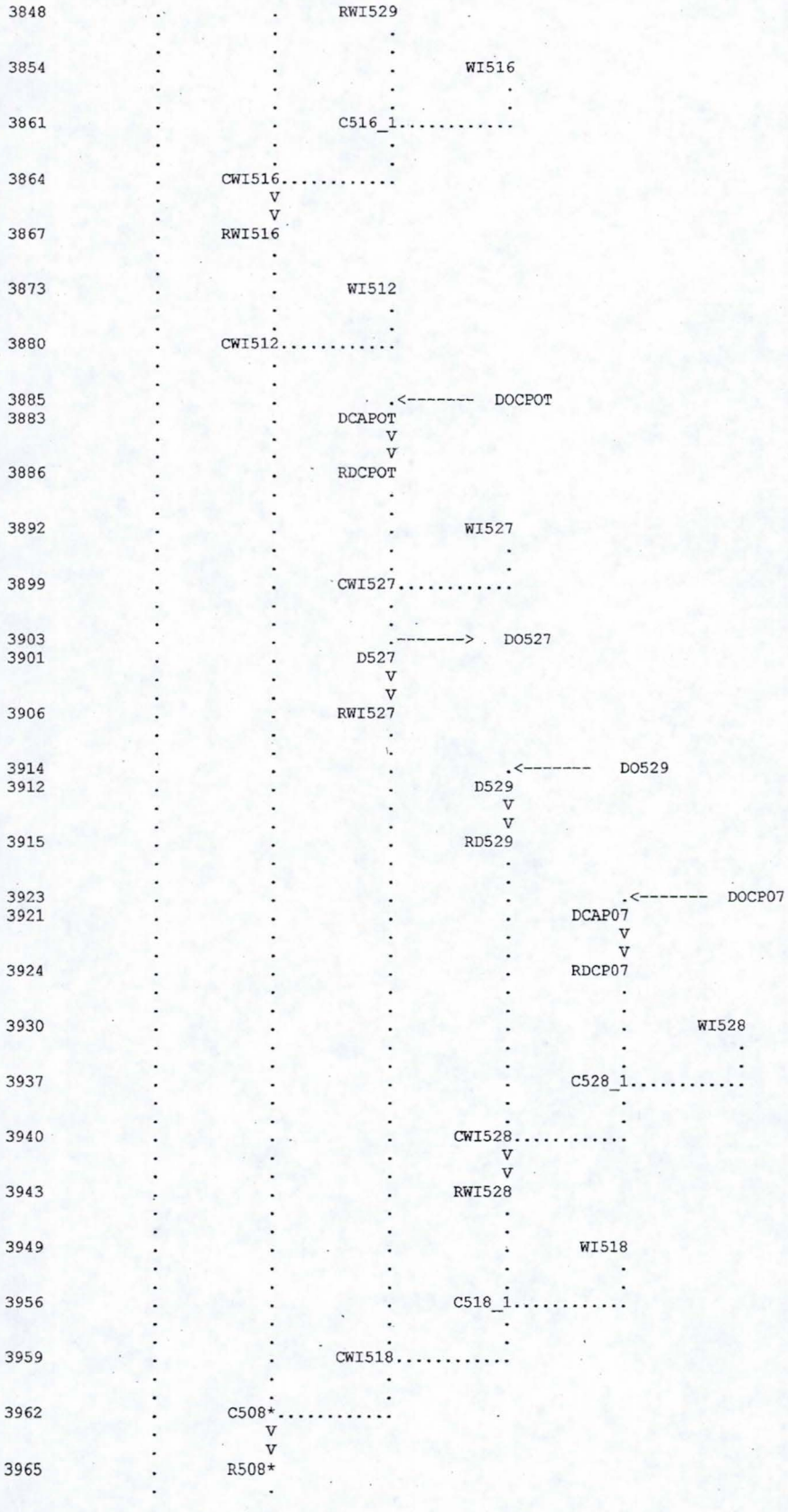
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3886 RDCPOT
3892 WI527
3899 CWI527
3903 DO527
3901 D527
3906 RWI527
3914 DO529
3912 D529
3915 RD529
3923 DOCP07
3921 DCAP07
3924 RDCP07
3930 WI528
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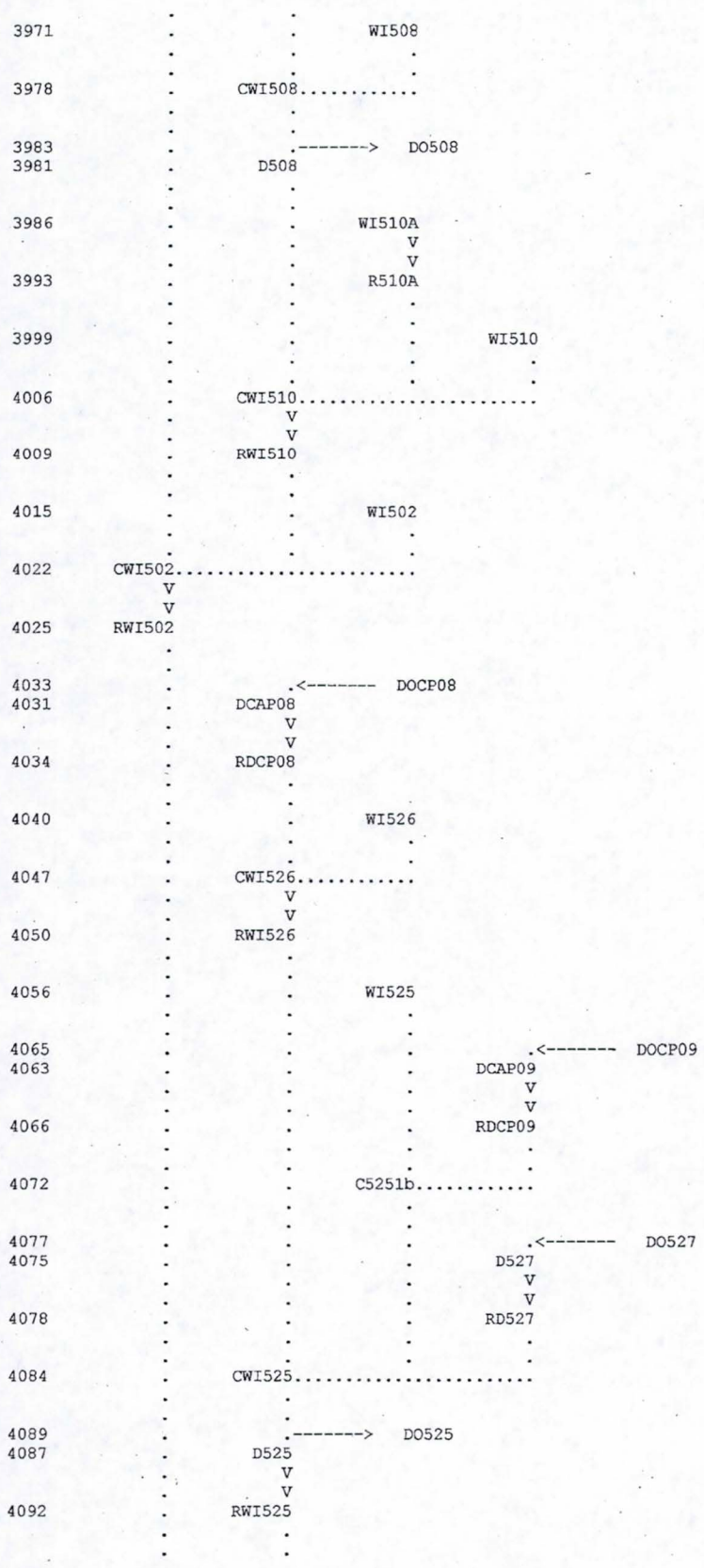
3965 R508*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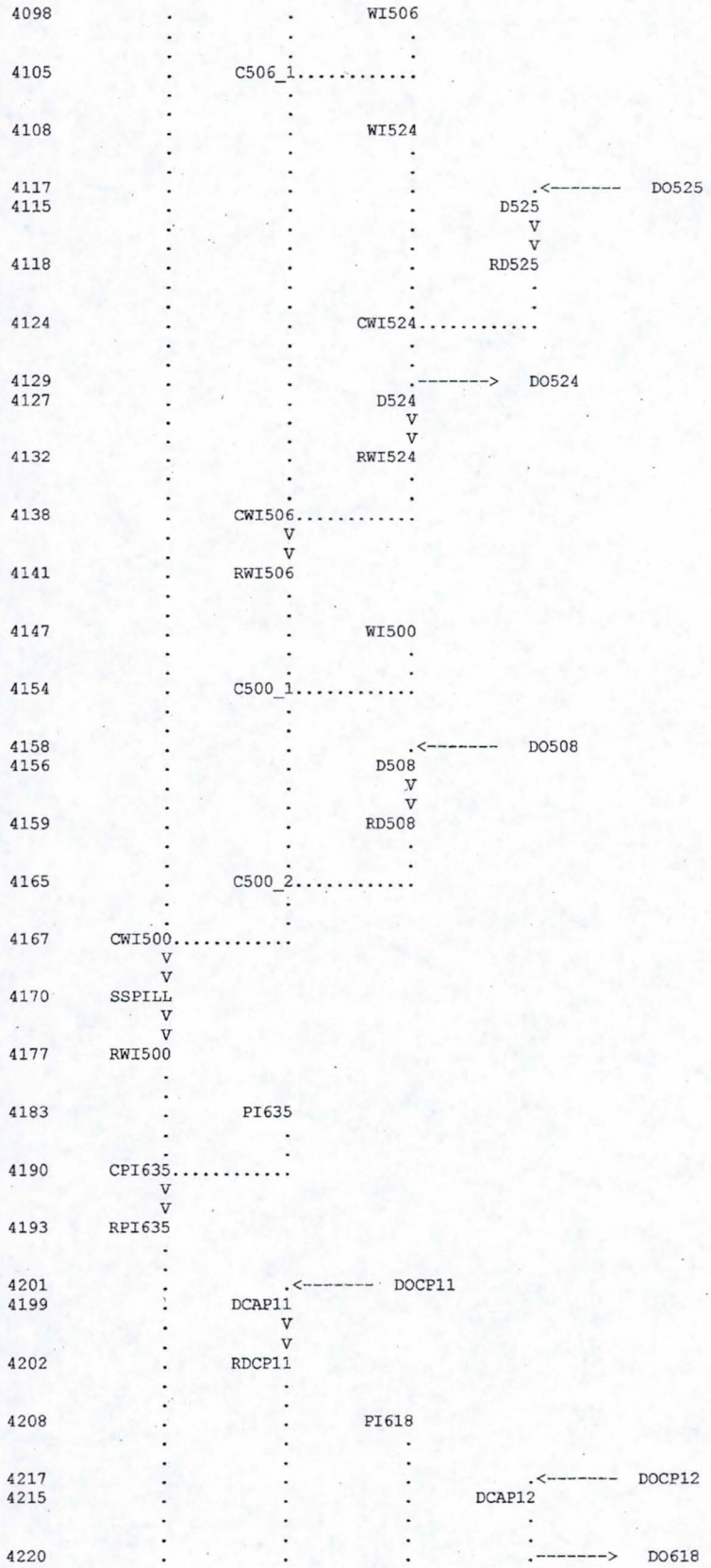
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4159 RD508
4165 C500_2
4167 CWI500
4170 SSPILL
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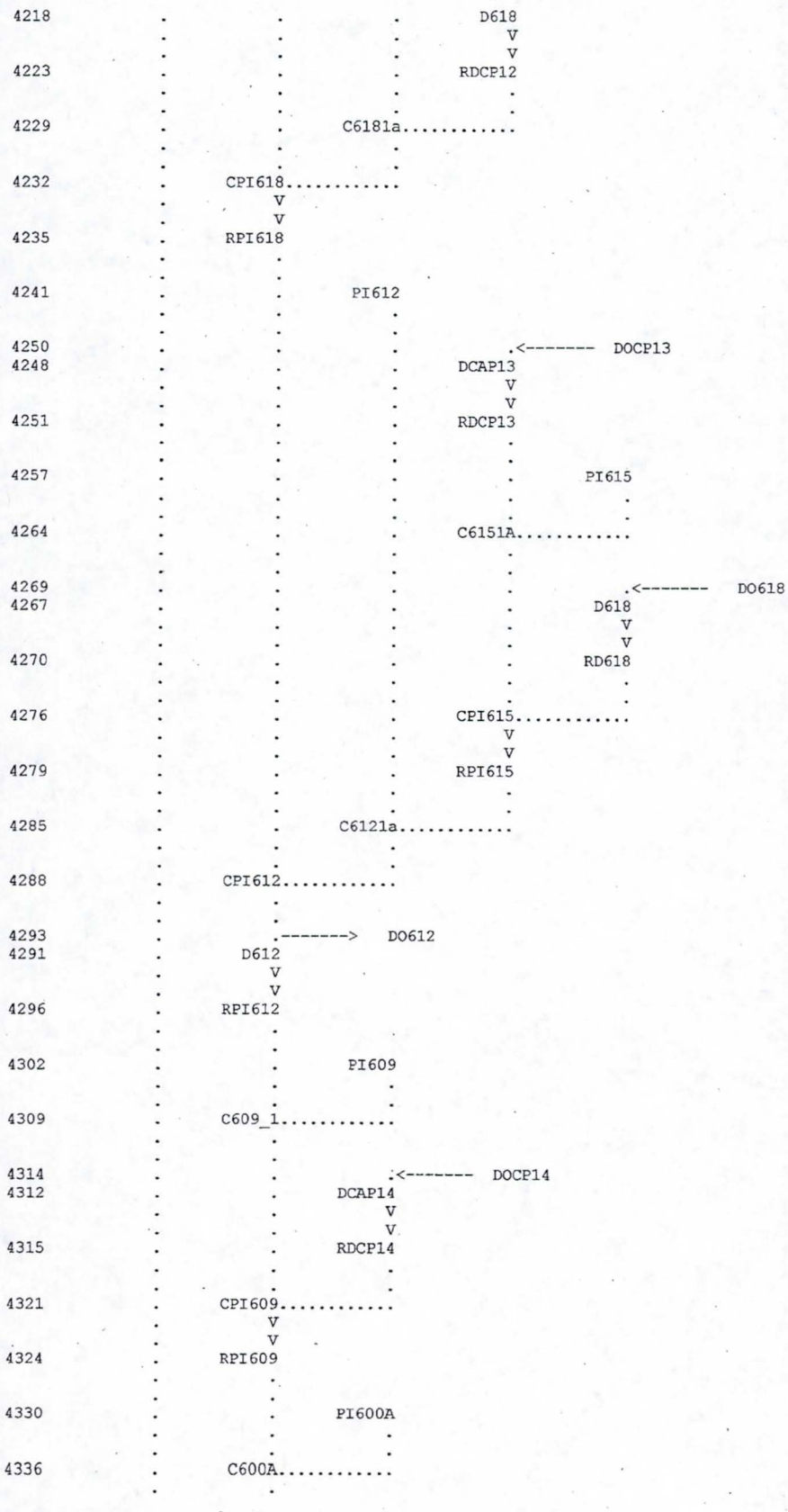
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DCAP13
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RD618
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C609_1
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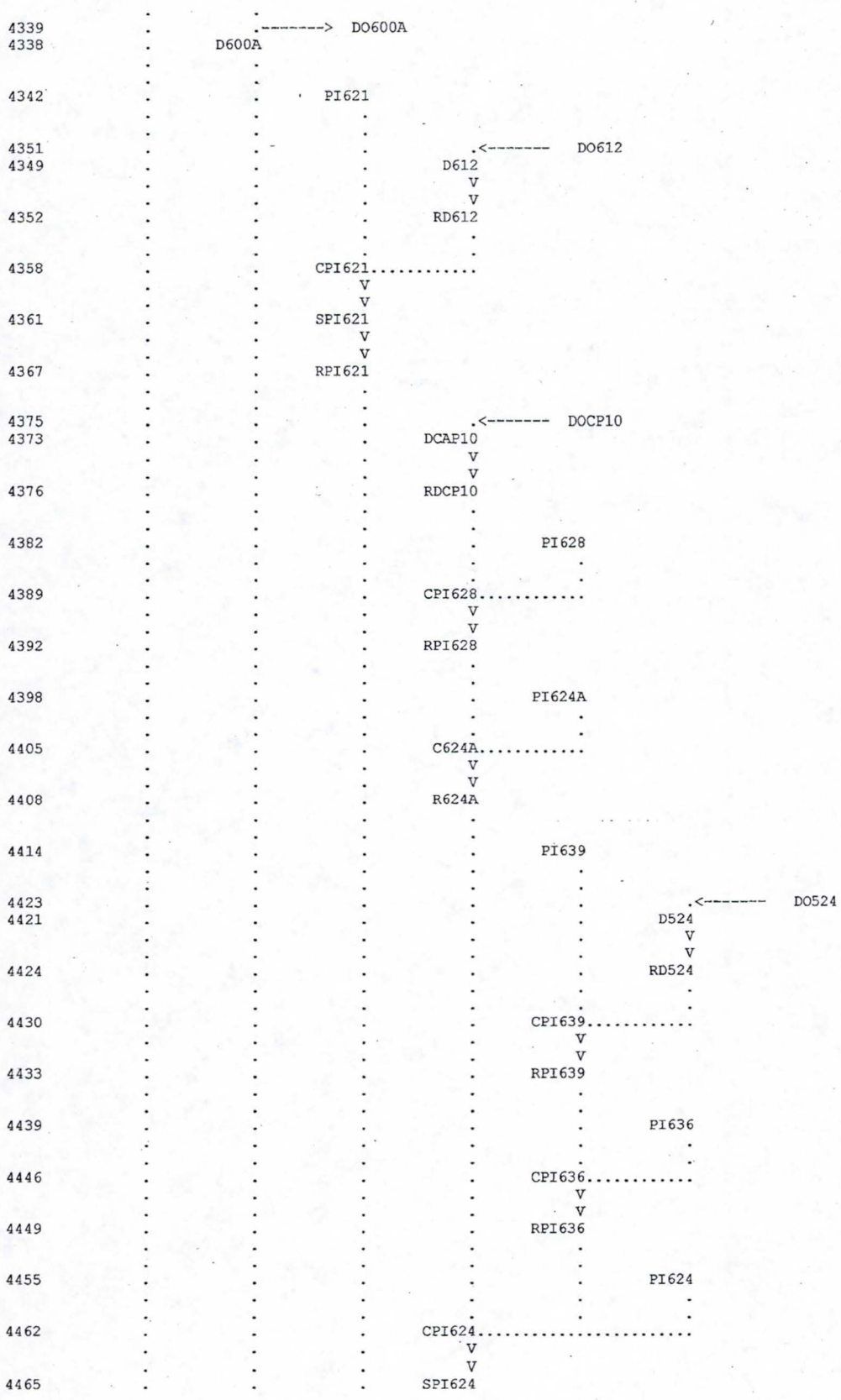
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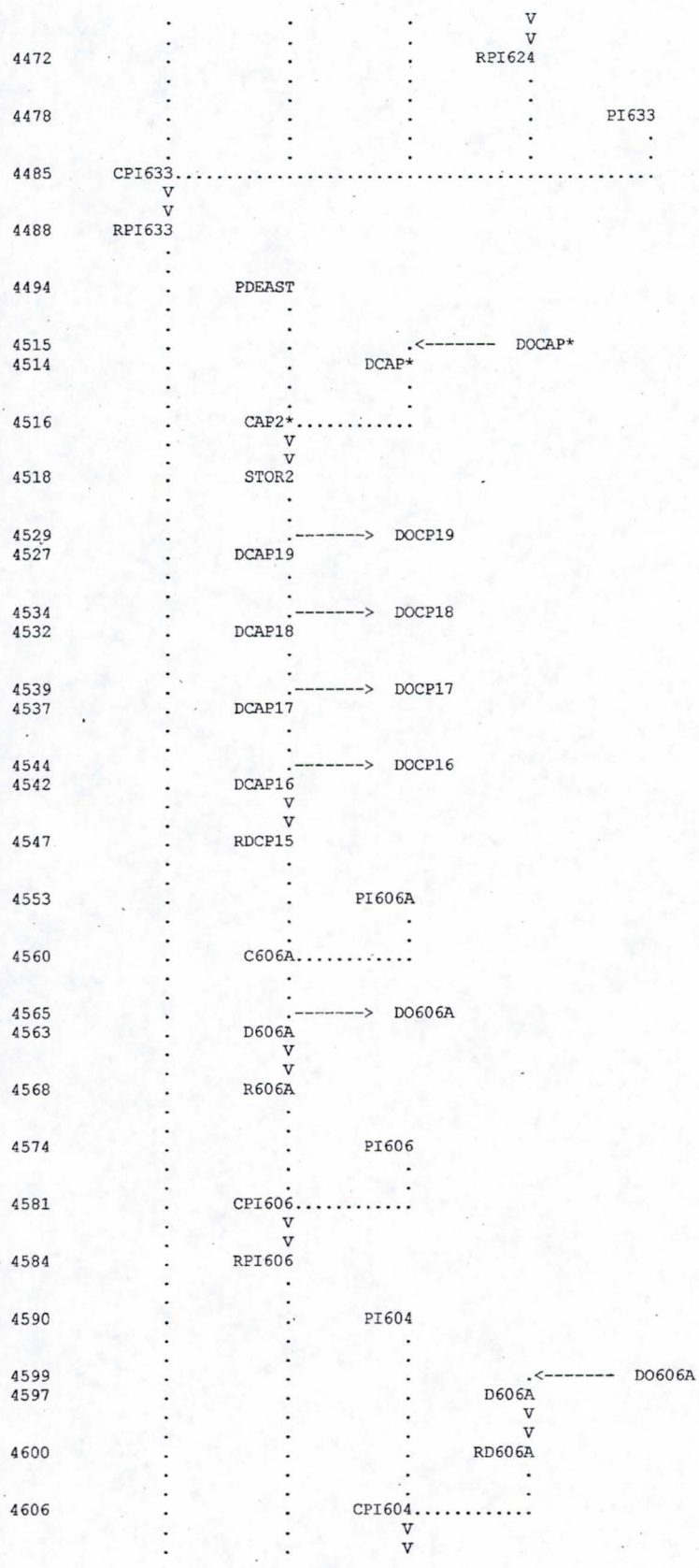
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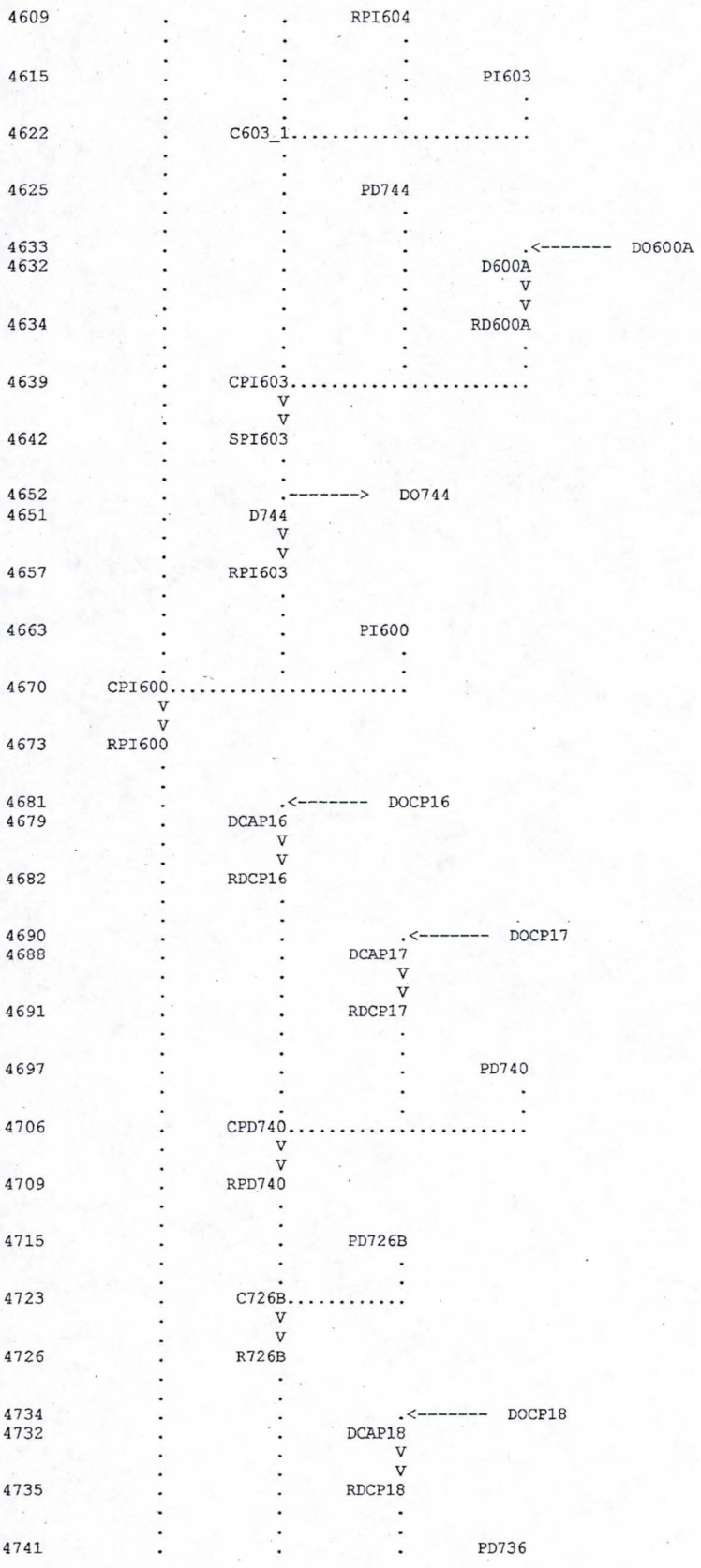
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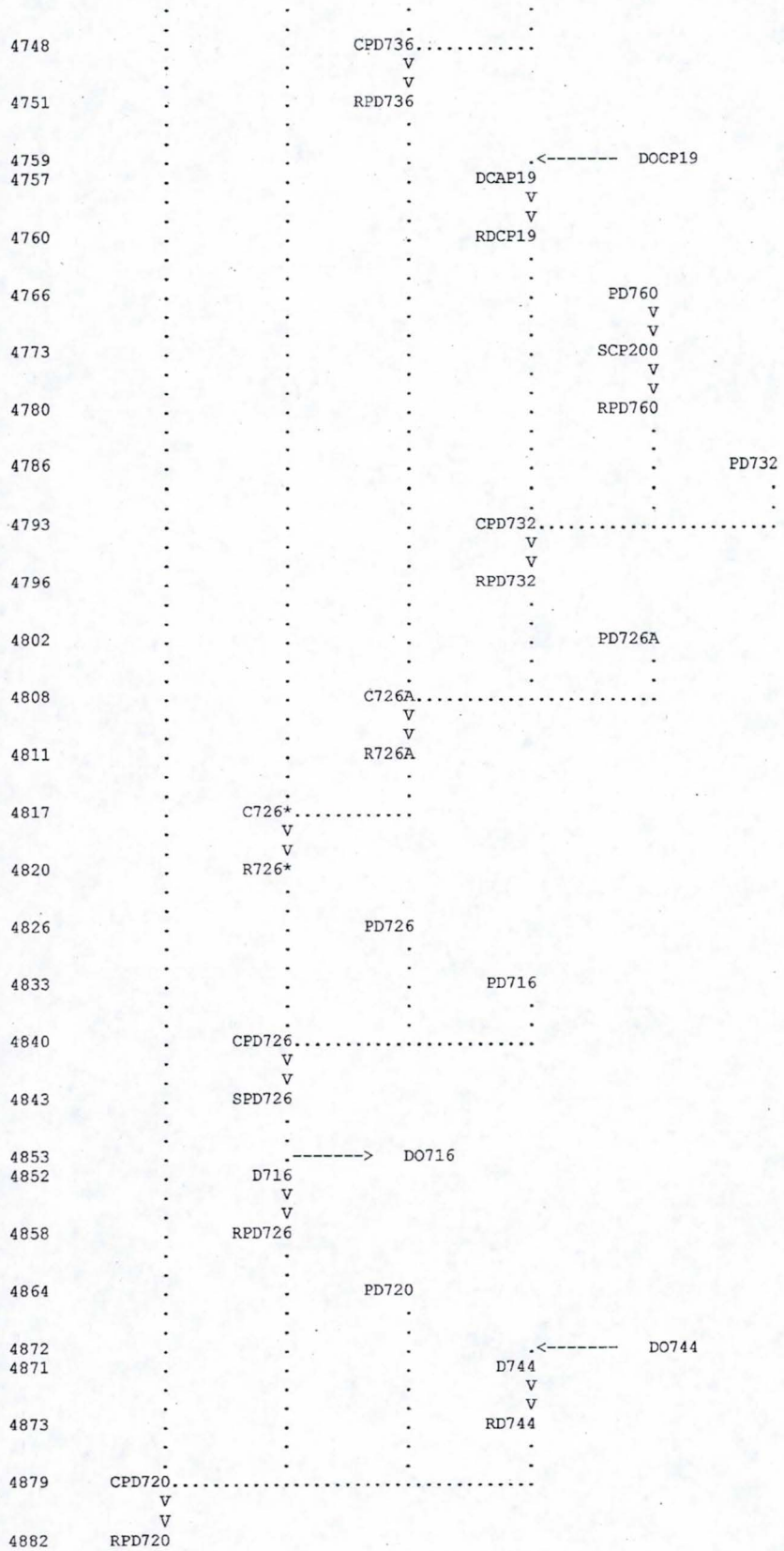
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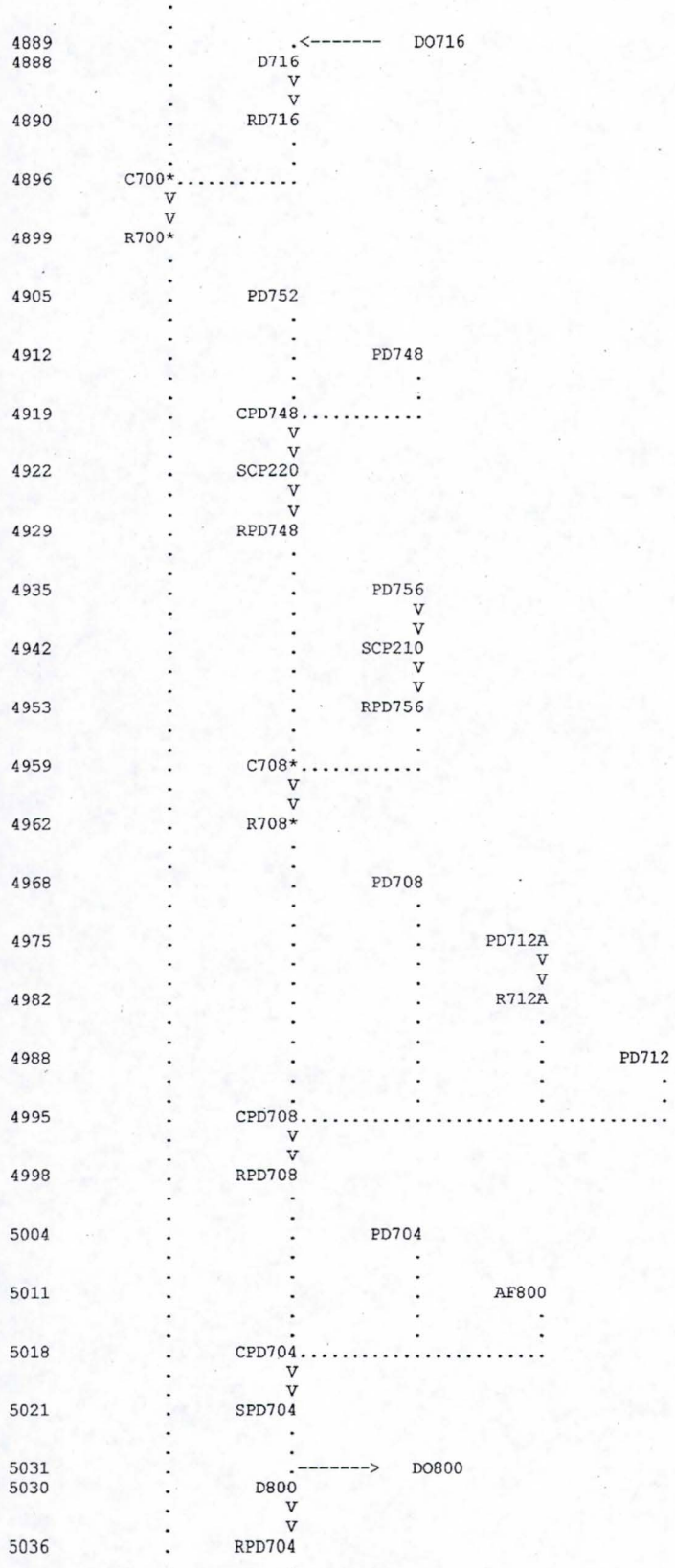
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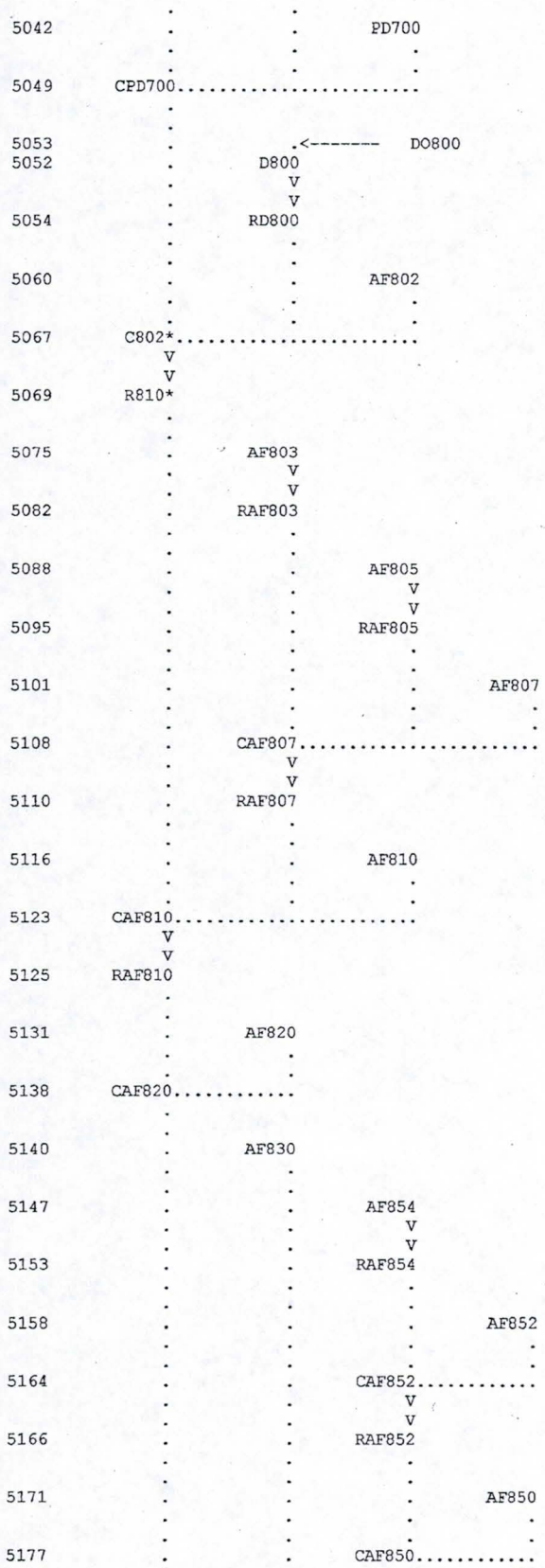
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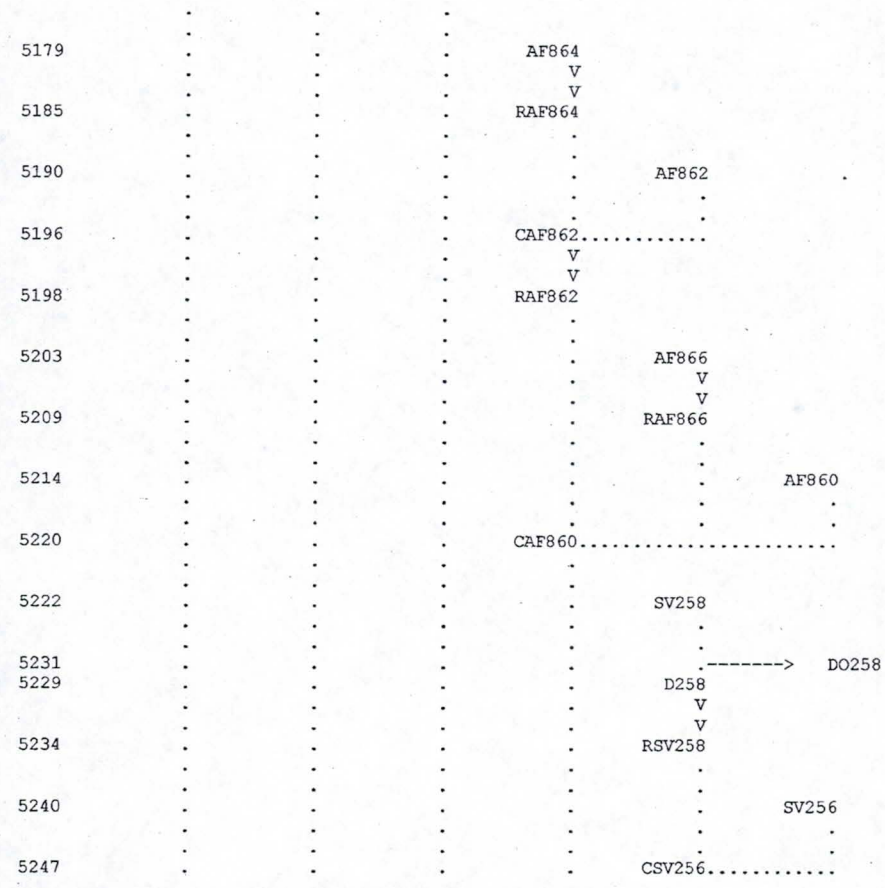

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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*            VERSION 4.1                *
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*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```

03-30-2005
3 East
The following additional modifications were made to delineate 3 East:

1. Basin WI500 was moved to follow RWI506.
2. A CP called C500_1 was added after WI500 combining 2.
3. A CP called C500_2 was added after RD508 combining 2.
4. CP CWI500 was changed from combining 4 to 2.

03-25-2005
T5N-R3W-S24E
The following edits were made to model.

1. Concentration point C480_1 was commented out.
2. Concentration point C480_4 was added after RTW482 combining 2 [RTW482 & TW480]. No hard coding was needed because all flow is diverted to CTW480.

T5N-R2W-19W

The following edits were made to the model.

1. Concentration point C560_1 was commented out.
2. D576 and RD576 were moved to follow RWI574.
3. WI560A and R560A were moved to follow RD576.
4. CP C5602A was added after RWI574 combining 2 [RWI574 & WI560].
5. CP C5602B was added after RD576 combining 2 [C5602A & RD576].
5. CP C5602C was added after R560A combining 2 [C5602B & WI560A].
6. CP CWI560 was changed from combining 5 to 3.

7. Commented out CP C554_1.
8. Moved basin WI554 to follow RWI560.
9. Added CP C554_9 to after WI554 combining 2 [WI554 & RWI560].
10. Moved WI556 and RWI556 to follow C554_9.
11. Added CP C5541B combining 2.
12. Changed CWI554 to combine 2.

03-19-2005
T5N-R2W-S07
A concentration point was added after WI576, called C576_1 combining 2 [RD576B & WI576] and CP CWI576 was changed from combining 3 to 2.

Also, basin WI560 was moved to follow RD576 and concentration point C560_1 combining 2 [RD576 & WI560] was added after WI560. CP CWI560 was changed from combining 6 to 5.

T5N-R3W-S01
The following modifications were made for the delineation of T5N-R3W-S01.

1. Basin WI576 was moved to follow RWI580.
2. A concentration point was added after WI576 called C576_2 combining 2.
3. CP C576_1 was commented out.

03-18-2005
T5N-R2W-19E
A concentration point was added after WI554, called C5554_1 combining 2 [RWI556 & WI554] and CP CWI554 was changed from combining 4 to 3.

03-17-2005
T4N-R3W-S08E
Concentration point C276_1 was added after SV276 to combine RSV294 and SV276. in addition CSV276 was changed from combining 3 to 2 [C276_1 & RSV272].

3 West
The following modifications were made for the delineation of wash 3 West.

1. Basin SV272 was moved to follow RSV284.
2. Concentration point C272_2 was added after SV272 HC=2 [SV272 & RSV272].
3. CP CSV272 was changed from combining 3 to 2.
4. CP C276_1 was commented out.
5. Basin SV276 was moved to follow RSV272.
6. CP C276_2 was added after SV276, HC=2 [SV276 & RSV272].
7. CP C280_1 was added after SV280 HC=2 [RSV276 SV280].
8. CP CSV280 was changed from combining 3 to 2.
9. Basin SV260 was moved to come before SV268.
10. CP C260_1 was added after SV260 combining 2 [SV260 & RSV280].
11. CP CSV260 was changed from combining 4 to 3.

03-15-2005
7 EAST
The following modifications were made for the delineation of 7 East.

1. Basin PI645 was moved to follow RPI651.
2. A concentration point was added after PI645 called C645_1 combining 2 [RPI651 & PI645]
3. Concentration point CPI645 was changed from combining 4 to 3.

03-14-2005
IONA WASH (North of the CAP)
The model was delineated for the delineation of Iona Wash North of the CAP.
The following modifications were made.

1. A concentration point called C388_1 was added after Basin IW388. This concentration point combines 2 [IW388 & RIW390]. Concentration point CIW388 was changed from combining 3 to 2 [C388_1 & RIW389].

2. Basin IW363 was moved to follow RD357. A concentration point called C363_2 was then added after basin IW363.

3. Concentration point CIW363 was changed from combining 5 to combine 4 [RIW312, RIW365, RIW369 & C363_2].

4. Concentration point C361_1 was added following basin IW361 combining 3 [IW361, D302 & RIW363]. This was hard coded for an area of 3.322 sq.mi. Concentration point CIW361 was changed from combining 4 to 2.

T5N-R2W-S14 & T5N-R2W-S14N
For the above delineation a basin PI648 was moved to follow PI651, a concentration point was placed after PI651 to combine 2 [PI651 & RPI654]. concentration point CPI651 was changed fro combining 3 to 2.

03-11-2005
IONA ES-1
The model was modified for the delineation of Iona ES-1. A concentration point called C346_1 was added after IW346 to combine 2 [RIW351 & IW346]. This concentration point was hard coded for an area of 3.68. In addition concentration point CIW346 was changed from combining three (3) to combine two (2): [C346_1 & CIW342].

2 West & 2 West Tributary-2
It was necessary to have basin TW430 combined solely with CTW434 for 2 West. However, it was also necessary to combine TW430 solely with RTW436 for the delineation of 2 West Tributary-2. To accomplish this, TW430 was first combined with RTW436, with a concentration point called C430_1. This CP was then commented out and basin TW430 was moved to follow CTW434. A concentration point was then added called C430_2 which combines TW430 and CTW434.

2 West Tributary-1
An additional concentration point was added following TW434 called C434_1 that combines C442* and TW434.

03-10-2005
2 WEST-TRIB and 2 EAST
The model has been modified for the delineation of washes 2 WEST-TRIB and 2 EAST. The following three (3) series of revisions, in order have been made:

1.) A concentration point was added following basin WI530 called C530_1 to combine two (2): R530* and WI530. Concentration point CWI530 was changed from combining four (4) [RWI538, R530*, WI530 & RD544] to combine three (3) [RWI538, C530_1 & RD544].

2.) Concentration point C530_1 was commented out. Basin WI530 was moved to be follow RWI538. A concentration point was added after basin WI530 called C530_2 and combines two (2): RWI538 and WI530.

3.) A concentration point was added after R530* called C530_3 and combines C530_2 and R530*. Concentration point CWI530 was changed from combining three (3) [C530_2, R530* & RD544] to combine two (2) [C530_3 & RD544]

03-09-2005
10 EAST (EAST SPLIT-2)
Model was modified for the delineation of 10 EAST (EAST SPLIT-2). Basin PI603 was moved to be before PD744. Then a concentration point was added that combines only RPI604, RPI606 and PI603. Finally the HC card of CPI603 was adjusted to combine 3: RD600A, PD744 and C603_1.

IONA EAST & IONA WEST
Model was modified for the delineation of IONA EAST & IONA WEST. Basin SV202 and route RSV202 were moved from preceding C210* to follow RIW300. An additional concentration point (C300_1) was added after RSV202 to combine RIW300 and RSV202. Concentration point C210* was changed from combining three (3) to combining two (2). In addition

concentration point C302* changed the hard coding from
54.72 to 56.16 (54.72 + 1.44 [SV202]).

02-22-2005
7EAST
The model was modified for the delineation of Wash 7 East and 8 East.
Concentration point C618_1 was commented out and C6181a was added
after RD618 to combine RD618 and PI618.

Concentration point C615_1 was added to combine RD618 and PI615 in order
to develop an area vs flow relationship for the stretch of wash that does
not include routed flow from RDCP13.

8 EAST
Concentration point C615_1 was commented out and Concentration Point
C6151A was added before DO618 to combine RDCAP13 and PI615. This was
done to get a Q/A relationship for 8 East, excluding the flow from DO618.

Concentration point C612_1 was commented out in order to determine the
flows through Wash 8 East without the routed flow from RPI618.
Concentration points C6121a was added after RPI615 in order to combine
the flow from RPI615 and PI612.

02-21-2005
The model was modified for the delineation of Wash 6 and 7 East. The split
that was in the original model at CPI618 actually occurred further upstream.
The split is better modeled directly after DCAP12. The diversion card was
moved, but retained its original name: D618.

02-17-2005
Model was modified for the delineation of Wash 4 East, south of the CAP.
The concentration point C525_1 was commented out, and C5251b was added
after RDCP09 in order to determine the flow through Wash 4E without the
flow from wash 3E.

02-16-2005
Model was modified for the delineation of Wash 3 East, south of the CAP.
The concentration point C525_1 was added before CWI525 to not include
the routed flow from DCAP09 and RD527. The HC of CWI525 was changed to 2.
C5251a was added to combine C525_1 and RDCP09 in order to determine the
flow along the reach north of the 60.

02-15-2005
Model was modified for the delineation of Wash 2 East, south of the CAP.
The concentration point C506_1 was added before CWI506 to not include
the routed flow from CWI524. The HC of CWI506 was changed to 2.WI506 was
also moved before WI524 in order to achieve this.

02-14-2005
Model was modified for the delineation of Wash 1 East, south of the CAP.
The concentration point C516_1 was added before CWI516 to not include
the routed flow from CWI514. The HC of CWI516 was changed to 2.
In order to delineate wash 2 east, cards DOCP07 - RWI528 were moved to be
directly before WI518. Concentration Point C518_1 was added in order to
determine the flow through Wash 2 East (excludes RWI527). CWI518 HC was set
to 2.
D529 was moved before WI528 and DOCP07 and C528_1 was added in order to
delineate Wash 2 East.

01-24-2005
Model was modified for the delineation of Wittmann Wash, north of the CAP.
The concentration point CTW485_1 was added before CTW485 to not include
RD454 that does not contribute to the delineated reach. TW485 was moved to
be after RD454 in order to estimate the flow at CTW485_1 without the
routed flow RD454. Concentration point C480_1 was added before CTW480
to not include flow from RTW482.
The model was modified for the delineation of Wash 2 West. Concentration

point C422_1 was added before CTW422 in order to delineate the reach without flows from RTW424.TW422 was moved before TW424 in order to achieve this. Concentration point C400_2 was added before CTW400 in order to delineate the reach without flows from RTW402.

01-20-2005
Model was modified for the delineation of Wash 6E.
The concentration point C618_1 was added before CPI618 to not include RDCP12. CPI618 HC was set to 2. The concentration point C612_1 was added before CPI612 to not include RPI615. CPI612 HC was set to 2. The concentration point C609_1 was added before CPI609 to not include RDCP14. CPI609 HC was set to 2.

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** WITTMANN AREA DRAINAGE MASTER STUDY UPDATE-HYDROLOGY MODEL 2004 **
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PROJECT: Wittmann ADMS Update
CLIENT: Flood Control District of Maricopa County
PREPARED BY: Entellus, Inc.
PROJECT No: FCD 2002C029 Entellus 310.032
FILE NAME: 6HourMod.hc1 CREATED DATE: JUL 01, 2004
MODIFIED DATE: JUL 30, 2005

STORM:
100-year 6-hour Storm

DEVELOPMENT CONDITIONS:
Existing Conditions

MODELING ASSUMPTIONS:
It was assumed that the US60 did not have adequate storage to cause any significant attenuation.

The assumption was made that the CAP Canal embankment would not be breached under a large flood event.

The assumption was made that the Beardsley Canal would not fail under a large storm event (Per District Instruction). In addition, the berm north of the Beardsley canal and east of US60 was assumed to fail (per district Instruction).

For both the CAP and Beardsley Canals, once the berm elevation was reached weir flow was assumed. It was also assumed that any weir flow over the canal that might enter the canal and be diverted out of the study area was insignificant, and thus was ignored. In other words all weir flow over the canal embankment reaches the downstream concentration point.

Typical X-sects were developed, and it was assumed that a typical x-sect could adequately represent various reaches.

Time-Area Relations were used base on the District's Hydrology Manual criteria. Two Time-Area Relation Curves were utilized:
-Urban
-Natural
The Time-Area Relation Curves were taken directly from the manual

MODELING METHODS:

This model utilizes QI cards to input the Padelford hydrographs from an HEC-1 model developed for 100-yr 6-hr existing conditions based on the 100-yr 24-hr HEC-1 model by A-N West Inc. for the Padelford Wash Floodplain Delineation Study. The hydrograph was altered from its original form (2 minute interval to 5-minute interval) through simple interpolation.

Clark Unit Hydrographs were used for all subbasins

except the two subbasins directly upstream of the Bonita Dam (PD726B and PD740 use S-graphs). The UC parameters were calculated using the WMS7.0 software.

For Basins PD726B and PD740 S-Graphs were utilized per the request of the FCDMC. Limited details regarding the calculations of the S-graphs can be found in the model by the basin KK card. For full details of the S-graph calculations refer to the Appendix.

Normal Depth routing was used for all routing reaches.

Hard coding was used to account for the percentage of area associated with a diversion. Because of the use of JD cards and aereal reduction, hard coding was necessary to properly account for area. For a given diversion a percentage of the flow is routed to two different locations. The same percentage of area follows that diverted flow. In addition the area downstream of the main path is reduced or increased and is hard coded to account for the loss or gain of area. Hard coding was performed based on the 6-hour existing conditions model.

Stage-storage was developed for all the structures along the CAP Canal, as well as along the Beardsley Canal. In addition several stage-storage locations were developed for areas with significant storage along the SR74. No storage was modeled along the US60 and railroad, but the culverts were analyzed for diversion potential. Diversions were placed in the model where deemed appropriate. See appendix for details.

FLO-2D was utilized to calculate the split flows at concentration points CIW351. CIW357, CIW363 and CWI576. See appendix for modeling details.

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389 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		1500	NUMBER OF HYDROGRAPH ORDINATES
NDDATE	6	0	ENDING DATE
NDTIME		0455	ENDING TIME
ICENT		19	CENTURY MARK

COMPUTATION INTERVAL .08 HOURS
TOTAL TIME BASE 124.92 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

391 JD INDEX STORM NO. 1

STRM	3.40	PRECIPITATION DEPTH
TRDA	.01	TRANSPOSITION DRAINAGE AREA

392 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.01	.01	.01	.01	.01	.01	.03
.03	.03	.05	.05	.05	.15	.15	.15	.03	.03
.03	.01	.01	.01	.01	.01	.01	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00								

395 JD INDEX STORM NO. 2
STRM 3.38 PRECIPITATION DEPTH
TRDA .50 TRANSPOSITION DRAINAGE AREA

0 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.01	.01	.01	.01	.01	.01	.03
.03	.03	.05	.05	.05	.15	.15	.15	.03	.03
.03	.01	.01	.01	.01	.01	.01	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00								

396 JD INDEX STORM NO. 3
STRM 3.31 PRECIPITATION DEPTH
TRDA 2.80 TRANSPOSITION DRAINAGE AREA

397 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00	.00	.01	.01	.01	.01	.01	.01	.03
.03	.03	.07	.07	.07	.08	.08	.08	.05	.05
.05	.02	.02	.02	.01	.01	.01	.00	.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00								

400 JD INDEX STORM NO. 4
STRM 3.13 PRECIPITATION DEPTH
TRDA 16.00 TRANSPOSITION DRAINAGE AREA

401 PI PRECIPITATION PATTERN

.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
.01	.01	.00	.01	.00	.00	.00	.00	.00	.00
.00	.00	.01	.00	.00	.00	.00	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.03
.03	.03	.06	.06	.06	.07	.07	.07	.04	.04
.04	.02	.02	.02	.01	.01	.01	.01	.01	.01
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
.00	.00								

404 JD INDEX STORM NO. 5
STRM 2.76 PRECIPITATION DEPTH
TRDA 90.00 TRANSPOSITION DRAINAGE AREA

405 PI PRECIPITATION PATTERN

.01	.01	.01	.00	.00	.00	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.03
.03	.03	.05	.05	.05	.05	.05	.05	.04	.04
.04	.02	.02	.02	.02	.02	.02	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01								

408 JD INDEX STORM NO. 6
STRM 1.94 PRECIPITATION DEPTH
TRDA 500.00 TRANSPOSITION DRAINAGE AREA

409 PI PRECIPITATION PATTERN

.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01	.01	.01	.01	.01	.02	.02	.02	.03
.03	.03	.04	.04	.04	.04	.04	.04	.04	.04
.04	.03	.03	.03	.02	.02	.02	.01	.01	.01
.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
.01	.01								

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
+	HYDROGRAPH AT	WT140	1939.	5.17	607.	156.	52.	3.79		
+	ROUTED TO	RWT140	1849.	5.42	605.	156.	52.	3.79		
+	HYDROGRAPH AT	WT130	1876.	4.75	430.	109.	36.	2.57		
+	2 COMBINED AT	CWT130	2655.	5.25	949.	245.	82.	6.36		
+	ROUTED TO	RWT130	2498.	5.83	946.	245.	82.	6.36		
+	HYDROGRAPH AT	WT160	767.	4.58	156.	40.	13.	.81		
+	ROUTED TO	RWT160	501.	6.25	155.	40.	13.	.81		
+	HYDROGRAPH AT	WT150A	2644.	5.08	747.	191.	64.	4.75		
+	ROUTED TO	R150A	2582.	5.25	746.	191.	64.	4.75		
+	HYDROGRAPH AT	WT150	1126.	4.50	203.	51.	17.	1.09		
+	2 COMBINED AT	CWT150	2868.	5.17	894.	229.	76.	5.84		
+	ROUTED TO	RWT150	2752.	5.58	892.	229.	76.	5.84		
+	HYDROGRAPH AT	WT120	1864.	4.83	452.	113.	38.	2.80		
+	4 COMBINED AT	CWT120	5370.	5.67	2082.	539.	180.	15.81		
+	ROUTED TO	RWT120	5198.	6.17	2081.	539.	180.	15.81		
+	HYDROGRAPH AT	WT110	2333.	4.67	472.	118.	39.	2.90		
+	2 COMBINED AT	CWT110	5207.	6.17	2358.	613.	204.	18.71		
+	ROUTED TO	RWT110	4924.	6.83	2347.	613.	204.	18.71		
+	HYDROGRAPH AT	WT100	2800.	4.75	662.	167.	56.	3.85		
+	2 COMBINED AT	CWT100	4921.	6.75	2739.	727.	242.	22.55		
+	ROUTED TO	RWT100	4614.	7.17	2710.	724.	241.	22.55		
+	HYDROGRAPH AT	TW406	521.	4.08	36.	9.	3.	.16		
+	ROUTED TO	RTW406	40.	8.42	30.	9.	3.	.16		
+	HYDROGRAPH AT	TW408	565.	4.83	176.	46.	15.	.91		
+	ROUTED TO	RTW408	298.	7.75	151.	46.	15.	.91		
	HYDROGRAPH AT									

+	TW404	2442.	4.42	370.	93.	31.	2.09
	4 COMBINED AT						
+	CTW404	4612.	7.17	2987.	817.	272.	25.72
	ROUTED TO						
+	RTW404	4499.	7.50	2941.	808.	269.	25.72
	HYDROGRAPH AT						
+	IW371	103.	4.08	12.	3.	1.	.05
	DIVERSION TO						
+	DO371	77.	4.08	6.	2.	1.	.05
	HYDROGRAPH AT						
+	D371	26.	4.08	5.	1.	0.	.05
	ROUTED TO						
+	RIW371	15.	6.50	5.	1.	0.	.05
	HYDROGRAPH AT						
+	IW366	1107.	4.58	209.	52.	17.	1.06
	2 COMBINED AT						
+	CIW366	1105.	4.58	213.	54.	18.	1.07
	ROUTED TO						
+	RIW366	957.	5.00	212.	54.	18.	1.07
	HYDROGRAPH AT						
+	IW377	153.	4.25	22.	6.	2.	.11
	ROUTED TO						
+	SSR010	121.	4.50	22.	6.	2.	.11
	ROUTED TO						
+	RIW377	98.	5.25	22.	6.	2.	.11
	HYDROGRAPH AT						
+	IW374	758.	4.25	97.	24.	8.	.39
	HYDROGRAPH AT						
+	D371	77.	4.08	6.	2.	1.	.05
	ROUTED TO						
+	RD371	40.	4.33	6.	2.	1.	.05
	3 COMBINED AT						
+	CIW374	784.	4.25	124.	31.	10.	.54
	ROUTED TO						
+	RIW374	404.	5.92	121.	31.	10.	.54
	HYDROGRAPH AT						
+	IW386	395.	4.58	90.	23.	8.	.37
	ROUTED TO						
+	RIW386	301.	5.42	89.	23.	8.	.37
	HYDROGRAPH AT						
+	IW382	738.	4.33	131.	33.	11.	.62
	2 COMBINED AT						
+	CIW382	685.	4.33	211.	54.	18.	.99
	DIVERSION TO						
+	DO382B	180.	3.92	112.	29.	10.	.99
	HYDROGRAPH AT						
+	D382B	505.	4.33	99.	25.	8.	.99
	DIVERSION TO						
+	DO382A	226.	4.33	20.	5.	2.	.99
	HYDROGRAPH AT						
+	D382A	279.	4.33	79.	20.	7.	.99
	ROUTED TO						
+	RIW382	253.	4.83	79.	20.	7.	.99
	HYDROGRAPH AT						

+	IW384	184.	4.17	21.	5.	2.	.08
	HYDROGRAPH AT						
+	D382A	226.	4.33	20.	5.	2.	.99
	ROUTED TO						
+	RD382A	196.	4.42	20.	5.	2.	.99
	2 COMBINED AT						
+	CIW384	390.	4.33	47.	12.	4.	.41
	ROUTED TO						
+	RIW384	310.	4.67	47.	12.	4.	.41
	HYDROGRAPH AT						
+	IW381	454.	4.50	98.	25.	8.	.38
	HYDROGRAPH AT						
+	D382B	180.	3.92	112.	29.	10.	.99
	2 COMBINED AT						
+	CIW381	619.	4.50	208.	54.	18.	.64
	ROUTED TO						
+	RIW381	574.	4.83	207.	54.	18.	.64
	3 COMBINED AT						
+	C359*	990.	4.83	320.	82.	27.	1.45
	ROUTED TO						
+	R359*	937.	5.17	317.	82.	27.	1.45
	HYDROGRAPH AT						
+	IW359	2496.	4.75	537.	135.	45.	2.91
	4 COMBINED AT						
+	CIW359	3423.	5.00	1059.	274.	91.	5.97
	ROUTED TO						
+	RIW359	3233.	5.33	1045.	274.	91.	5.97
	HYDROGRAPH AT						
+	IW389	168.	4.42	35.	9.	3.	.13
	ROUTED TO						
+	SSR190	166.	4.42	35.	9.	3.	.13
	ROUTED TO						
+	RIW389	102.	5.75	34.	9.	3.	.13
	HYDROGRAPH AT						
+	IW394	2700.	5.08	777.	198.	66.	4.17
	ROUTED TO						
+	RIW394	2613.	5.25	776.	198.	66.	4.17
	HYDROGRAPH AT						
+	IW390A	771.	4.75	197.	50.	17.	.90
	2 COMBINED AT						
+	C390A	3030.	5.25	936.	239.	80.	5.07
	ROUTED TO						
+	R390A	2925.	5.42	935.	239.	80.	5.07
	HYDROGRAPH AT						
+	IW390	221.	4.75	61.	16.	5.	.31
	HYDROGRAPH AT						
+	IW392	1985.	4.33	262.	66.	22.	1.11
	3 COMBINED AT						
+	CIW390	3093.	5.42	1193.	305.	102.	6.50
	ROUTED TO						
+	SSR160	3068.	5.50	1193.	305.	102.	6.50
	ROUTED TO						
+	RIW390	2969.	5.75	1183.	305.	102.	6.50
	HYDROGRAPH AT						

+	IW388	1107.	4.83	303.	76.	25.	1.23
+ 2 COMBINED AT	C388_1	3460.	5.67	1435.	371.	124.	7.72
+ 2 COMBINED AT	CIW388	3532.	5.67	1464.	378.	126.	7.85
+ ROUTED TO	RIW388	3450.	5.92	1457.	378.	126.	7.85
+ HYDROGRAPH AT	IW357	879.	4.50	184.	46.	15.	.75
+ 2 COMBINED AT	CIW357	3583.	5.92	1595.	416.	139.	8.60
+ DIVERSION TO	DO357	937.	5.92	416.	108.	36.	8.60
+ HYDROGRAPH AT	D357	2646.	5.92	1179.	308.	103.	8.60
+ ROUTED TO	RIW357	2608.	6.42	1169.	308.	103.	8.60
+ HYDROGRAPH AT	IW358	146.	4.50	31.	8.	3.	.16
+ HYDROGRAPH AT	IW353	2512.	4.83	629.	158.	53.	2.80
+ 4 COMBINED AT	CIW353	5494.	5.50	2574.	686.	229.	15.28
+ ROUTED TO	RIW353	5328.	5.75	2550.	686.	229.	15.28
+ HYDROGRAPH AT	IW350	1410.	5.08	457.	116.	39.	2.17
+ 2 COMBINED AT	CIW350	6037.	5.75	2870.	771.	257.	17.45
+ HYDROGRAPH AT	IW312	492.	4.75	147.	37.	12.	.57
+ DIVERSION TO	DO312	233.	4.75	31.	8.	3.	.57
+ HYDROGRAPH AT	D312	259.	4.75	116.	30.	10.	.57
+ ROUTED TO	RIW312	238.	5.83	114.	30.	10.	.57
+ HYDROGRAPH AT	IW365	394.	4.83	124.	32.	11.	.47
+ HYDROGRAPH AT	D312	233.	4.75	31.	8.	3.	.57
+ ROUTED TO	RD312	223.	4.92	31.	8.	3.	.57
+ 2 COMBINED AT	CIW365	583.	4.83	152.	39.	13.	.74
+ DIVERSION TO	DO365	282.	4.83	33.	8.	3.	.74
+ HYDROGRAPH AT	D365	301.	4.83	120.	31.	10.	.74
+ ROUTED TO	RIW365	298.	5.42	119.	31.	10.	.74
+ HYDROGRAPH AT	IW367	109.	4.25	14.	4.	1.	.05
HYDROGRAPH AT							

+	D365	282.	4.83	33.	8.	3.	.74
	ROUTED TO						
+	RD365	268.	5.00	33.	8.	3.	.74
	2 COMBINED AT						
+	CIW367	320.	5.00	50.	12.	4.	.43
	HYDROGRAPH AT						
+	IW369	590.	4.92	199.	51.	17.	.79
	DIVERSION TO						
+	DO369	372.	4.92	75.	19.	6.	.79
	HYDROGRAPH AT						
+	D369	218.	4.92	124.	32.	11.	.79
	2 COMBINED AT						
+	C363*	508.	5.00	170.	44.	15.	.72
	ROUTED TO						
+	RIW369	463.	5.33	169.	44.	15.	.72
	HYDROGRAPH AT						
+	D357	937.	5.92	416.	108.	36.	8.60
	ROUTED TO						
+	RD357	930.	6.00	416.	108.	36.	8.60
	HYDROGRAPH AT						
+	IW363	1112.	4.33	163.	41.	14.	.63
	2 COMBINED AT						
+	C363_2	1257.	4.42	657.	170.	57.	.63
	4 COMBINED AT						
+	CIW363	1903.	5.50	970.	254.	85.	4.26
	DIVERSION TO						
+	DO363	603.	5.50	288.	75.	25.	4.26
	HYDROGRAPH AT						
+	D363	1300.	5.50	682.	178.	59.	4.26
	ROUTED TO						
+	RIW363	1281.	6.08	674.	178.	59.	4.26
	HYDROGRAPH AT						
+	IW368	271.	4.50	51.	13.	4.	.29
	HYDROGRAPH AT						
+	D369	372.	4.92	75.	19.	6.	.79
	ROUTED TO						
+	RD369	344.	5.17	75.	19.	6.	.79
	2 COMBINED AT						
+	CIW368	479.	5.08	124.	31.	10.	.79
	ROUTED TO						
+	RIW368	438.	5.67	123.	31.	10.	.79
	HYDROGRAPH AT						
+	IW360	898.	4.25	148.	37.	12.	.83
	2 COMBINED AT						
+	CIW360	771.	4.33	248.	63.	21.	1.62
	ROUTED TO						
+	RIW360	751.	4.42	248.	63.	21.	1.62
	HYDROGRAPH AT						
+	IW397	3845.	4.92	1079.	276.	92.	4.81
	ROUTED TO						
+	RIW397	3662.	5.42	1071.	276.	92.	4.81
	HYDROGRAPH AT						
+	IW395	5796.	5.00	1509.	383.	128.	7.86
	2 COMBINED AT						

+	CIW395	7766.	5.25	2407.	624.	208.	12.68
	ROUTED TO						
+	RIW395	7558.	5.50	2402.	624.	208.	12.68
	HYDROGRAPH AT						
+	IW387	1332.	4.67	260.	65.	22.	1.35
	ROUTED TO						
+	RIW387	1332.	4.67	260.	65.	22.	1.35
	HYDROGRAPH AT						
+	IW396	390.	4.75	108.	27.	9.	.59
	3 COMBINED AT						
+	CIW396	8001.	5.42	2643.	686.	229.	14.61
	ROUTED TO						
+	RIW396	7911.	5.58	2640.	686.	229.	14.61
	HYDROGRAPH AT						
+	IW380	701.	4.42	118.	30.	10.	.50
	2 COMBINED AT						
+	CIW380	7995.	5.58	2726.	709.	236.	15.11
	ROUTED TO						
+	SSR310	7993.	5.58	2726.	709.	236.	15.11
	DIVERSION TO						
+	DO380	2100.	5.58	296.	74.	25.	15.11
	HYDROGRAPH AT						
+	D380	5893.	5.58	2430.	635.	212.	15.11
	ROUTED TO						
+	RIW380	5586.	6.67	2428.	635.	212.	15.11
	HYDROGRAPH AT						
+	IW370	588.	4.75	160.	41.	14.	.88
	2 COMBINED AT						
+	CIW370	5750.	6.58	2566.	670.	223.	12.02
	ROUTED TO						
+	RIW370	5504.	7.17	2563.	670.	223.	12.02
	HYDROGRAPH AT						
+	IW349	258.	4.42	51.	13.	4.	.25
	2 COMBINED AT						
+	CIW349	5506.	7.17	2589.	679.	226.	12.27
	DIVERSION TO						
+	DO349	3414.	7.17	1605.	421.	140.	12.27
	HYDROGRAPH AT						
+	D349	2092.	7.17	984.	258.	86.	12.27
	ROUTED TO						
+	RIW349	2088.	7.25	983.	258.	86.	12.27
	HYDROGRAPH AT						
+	IW352	148.	4.25	18.	4.	1.	.10
	3 COMBINED AT						
+	CIW352	2291.	7.17	1219.	322.	107.	6.39
	HYDROGRAPH AT						
+	IW356	395.	4.42	67.	17.	6.	.29
	HYDROGRAPH AT						
+	D349	3414.	7.17	1605.	421.	140.	12.27
	ROUTED TO						
+	RD349	3318.	7.42	1603.	421.	140.	12.27
	3 COMBINED AT						
+	CIW356	5452.	7.33	2781.	738.	246.	14.28
	ROUTED TO						

+		RIW356	5405.	7.42	2776.	738.	246.	14.28
	HYDROGRAPH AT							
+		IW354	596.	4.33	87.	22.	7.	.36
	2 COMBINED AT							
+		CIW354	5405.	7.42	2835.	756.	252.	14.64
	ROUTED TO							
+		RIW354	5317.	7.75	2823.	755.	252.	14.64
	HYDROGRAPH AT							
+		IW362	266.	4.33	42.	11.	4.	.18
	2 COMBINED AT							
+		CIW362	5316.	7.75	2846.	763.	254.	14.82
	HYDROGRAPH AT							
+		IW372	511.	4.33	65.	16.	5.	.32
	DIVERSION TO							
+		DO372	296.	4.33	25.	6.	2.	.32
	HYDROGRAPH AT							
+		D372	215.	4.33	40.	10.	3.	.32
	ROUTED TO							
+		RIW372	153.	5.50	40.	10.	3.	.32
	HYDROGRAPH AT							
+		IW375	384.	5.08	146.	38.	13.	.66
	HYDROGRAPH AT							
+		D372	296.	4.33	25.	6.	2.	.32
	ROUTED TO							
+		RD372	203.	4.50	25.	6.	2.	.32
	2 COMBINED AT							
+		CIW375	446.	4.92	166.	43.	14.	.85
	ROUTED TO							
+		RIW375	413.	5.58	164.	43.	14.	.85
	HYDROGRAPH AT							
+		IW364	1624.	4.50	295.	74.	25.	1.15
	3 COMBINED AT							
+		CIW364	1456.	4.50	472.	124.	41.	2.13
	2 COMBINED AT							
+		C364*	5401.	7.67	3186.	862.	287.	16.95
	ROUTED TO							
+		RIW364	5302.	8.33	3171.	862.	287.	16.95
	HYDROGRAPH AT							
+		IW342	279.	4.58	65.	16.	5.	.35
	2 COMBINED AT							
+		CIW342	5302.	8.33	3199.	871.	290.	17.30
	HYDROGRAPH AT							
+		IW351	354.	4.42	59.	15.	5.	.32
	HYDROGRAPH AT							
+		D363	603.	5.50	288.	75.	25.	4.26
	ROUTED TO							
+		RD363	598.	5.75	287.	75.	25.	4.26
	2 COMBINED AT							
+		CIW351	697.	5.42	352.	92.	31.	1.67
	DIVERSION TO							
+		DO351	600.	5.42	299.	78.	26.	1.67
	HYDROGRAPH AT							
+		D351	97.	5.42	53.	14.	5.	1.67
	ROUTED TO							

+		RIW351	80.	8.25	47.	14.	5.	1.67
+	HYDROGRAPH AT	IW346	2036.	5.00	546.	138.	46.	3.44
+	2 COMBINED AT	C346_1	2016.	5.00	569.	150.	50.	3.68
+	2 COMBINED AT	CIW346	5297.	8.25	3535.	969.	323.	20.98
+	ROUTED TO	RIW346	5250.	8.50	3520.	967.	322.	20.98
+	HYDROGRAPH AT	IW338	525.	4.33	71.	18.	6.	.34
+	2 COMBINED AT	CIW338	5248.	8.50	3541.	979.	326.	21.32
+	ROUTED TO	RIW338	5177.	8.92	3523.	977.	326.	21.32
+	HYDROGRAPH AT	IW326	478.	4.33	67.	17.	6.	.33
+	ROUTED TO	RIW326	355.	4.92	67.	17.	6.	.33
+	HYDROGRAPH AT	IW334	1392.	4.58	245.	61.	20.	1.26
+	3 COMBINED AT	CIW334	5175.	8.92	3636.	1032.	344.	22.91
+	ROUTED TO	SCP030	5130.	9.00	3602.	1022.	341.	22.91
+	ROUTED TO	RIW334	5042.	9.83	3514.	1022.	341.	22.91
+	HYDROGRAPH AT	IW302	746.	5.08	247.	64.	21.	1.33
+	2 COMBINED AT	CIW302	5042.	9.83	3562.	1062.	355.	24.24
+	DIVERSION TO	DO302	5023.	9.83	3546.	1058.	353.	24.24
+	HYDROGRAPH AT	D302	0.	.00	0.	0.	0.	24.24
+	HYDROGRAPH AT	IW361	334.	4.58	74.	19.	6.	.35
+	3 COMBINED AT	C361_1	1379.	5.92	744.	197.	66.	3.32
+	HYDROGRAPH AT	D351	600.	5.42	299.	78.	26.	1.67
+	ROUTED TO	RD351	595.	5.75	297.	78.	26.	1.67
+	2 COMBINED AT	CIW361	1886.	5.92	1001.	266.	89.	4.76
+	ROUTED TO	RIW361	1870.	6.58	987.	266.	89.	4.76
+	2 COMBINED AT	C350*	6985.	5.92	3586.	976.	325.	22.22
+	ROUTED TO	R350*	6886.	6.25	3562.	976.	325.	22.22
+	HYDROGRAPH AT	IW330	805.	4.75	199.	50.	17.	1.04
	2 COMBINED AT							

+	CIW330	6979.	6.17	3633.	1004.	335.	23.25
	ROUTED TO						
+	RIW330	6885.	6.33	3617.	1004.	335.	23.25
	HYDROGRAPH AT						
+	IW322	1161.	5.17	437.	113.	38.	1.89
	2 COMBINED AT						
+	CIW322	7314.	6.33	3887.	1086.	362.	25.14
	ROUTED TO						
+	RIW322	7151.	7.00	3842.	1086.	362.	25.14
	HYDROGRAPH AT						
+	IW318	585.	4.67	144.	36.	12.	.58
	ROUTED TO						
+	RIW318	415.	6.33	140.	36.	12.	.58
	HYDROGRAPH AT						
+	IW310	924.	4.92	277.	70.	23.	1.17
	2 COMBINED AT						
+	CIW310	885.	4.92	400.	104.	35.	1.75
	ROUTED TO						
+	RIW310	880.	5.00	399.	104.	35.	1.75
	HYDROGRAPH AT						
+	IW314	1305.	5.08	408.	103.	34.	2.18
	3 COMBINED AT						
+	CIW314	7566.	7.00	4158.	1221.	407.	29.07
	ROUTED TO						
+	SCP020	7214.	7.42	3764.	1215.	405.	29.07
	ROUTED TO						
+	RIW314	6625.	8.50	3756.	1214.	405.	29.07
	HYDROGRAPH AT						
+	IW300	948.	5.00	278.	70.	23.	1.48
	2 COMBINED AT						
+	CIW300	6611.	8.50	3753.	1255.	420.	30.55
	ROUTED TO						
+	RIW300	6532.	8.83	3733.	1250.	418.	30.55
	HYDROGRAPH AT						
+	SV202	1323.	4.75	323.	81.	27.	1.44
	ROUTED TO						
+	RSV202	1237.	5.17	323.	81.	27.	1.44
	2 COMBINED AT						
+	C300_1	6511.	8.83	3728.	1305.	437.	31.99
	HYDROGRAPH AT						
+	D302	5023.	9.83	3546.	1058.	353.	24.24
	2 COMBINED AT						
+	C302*	9826.	9.33	6276.	2113.	707.	56.16
	ROUTED TO						
+	RIW302	9772.	9.67	6267.	2113.	707.	56.16
	HYDROGRAPH AT						
+	SV264A	2000.	5.08	639.	162.	54.	2.90
	ROUTED TO						
+	R264A	1691.	5.50	628.	162.	54.	2.90
	HYDROGRAPH AT						
+	SV264	1603.	4.92	434.	109.	36.	1.92
	2 COMBINED AT						
+	CSV264	2714.	5.25	1010.	259.	86.	4.82
	ROUTED TO						

+		RSV264	2353.	5.75	986.	259.	86.	4.82
+	HYDROGRAPH AT	SV298	672.	5.00	249.	64.	21.	1.08
+	ROUTED TO	RSV298	591.	6.25	241.	64.	21.	1.08
+	HYDROGRAPH AT	SV286	1427.	4.75	340.	85.	28.	1.54
+	ROUTED TO	RSV286	1299.	5.00	339.	85.	28.	1.54
+	HYDROGRAPH AT	SV284	491.	4.33	69.	17.	6.	.28
+	2 COMBINED AT	CSV284	1449.	4.92	402.	101.	34.	1.82
+	ROUTED TO	RSV284	1213.	5.58	396.	101.	34.	1.82
+	HYDROGRAPH AT	SV272	1212.	4.67	253.	63.	21.	1.20
+	2 COMBINED AT	C272_2	1586.	5.50	620.	159.	53.	3.02
+	HYDROGRAPH AT	SV290	881.	4.58	168.	42.	14.	.81
+	ROUTED TO	RSV290	543.	5.67	166.	42.	14.	.81
+	2 COMBINED AT	CSV272	1966.	5.58	754.	194.	65.	3.84
+	ROUTED TO	RSV272	1949.	5.67	754.	194.	65.	3.84
+	HYDROGRAPH AT	SV276	905.	4.67	213.	54.	18.	.92
+	2 COMBINED AT	C276_2	2268.	5.58	934.	240.	80.	4.76
+	HYDROGRAPH AT	SV294	2100.	5.00	620.	156.	52.	2.65
+	ROUTED TO	RSV294	1815.	5.75	610.	156.	52.	2.65
+	2 COMBINED AT	CSV276	3738.	5.67	1460.	377.	126.	7.41
+	ROUTED TO	RSV276	3729.	5.75	1460.	377.	126.	7.41
+	HYDROGRAPH AT	SV280	925.	4.83	255.	64.	21.	1.06
+	2 COMBINED AT	C280_1	4109.	5.67	1670.	431.	144.	8.46
+	2 COMBINED AT	CSV280	4248.	5.83	1852.	484.	161.	9.54
+	ROUTED TO	RSV280	4153.	6.08	1847.	484.	161.	9.54
+	HYDROGRAPH AT	SV260	1404.	4.58	253.	63.	21.	1.26
+	2 COMBINED AT	C260_1	4217.	6.08	2025.	532.	177.	10.80
+	HYDROGRAPH AT	SV268	1628.	4.67	337.	84.	28.	1.38
	ROUTED TO							

+		RSV268	1363.	4.92	336.	84.	28.	1.38
+	3 COMBINED AT	CSV260	6422.	5.92	3107.	817.	272.	16.99
+	ROUTED TO	SCP010	4367.	6.92	3002.	815.	272.	16.99
+	ROUTED TO	RSV260	4358.	7.17	2994.	815.	272.	16.99
+	HYDROGRAPH AT	SV220	1114.	4.33	131.	33.	11.	.60
+	HYDROGRAPH AT	SV252	158.	4.33	26.	7.	2.	.15
+	ROUTED TO	RSV252	95.	5.25	26.	7.	2.	.15
+	HYDROGRAPH AT	SV254	150.	4.25	17.	4.	1.	.10
+	ROUTED TO	RSV254	71.	5.25	17.	4.	1.	.10
+	HYDROGRAPH AT	SV219	1167.	4.50	195.	49.	16.	.90
+	3 COMBINED AT	CSV219	1122.	4.50	230.	58.	19.	1.14
+	ROUTED TO	RSV219	903.	5.00	229.	58.	19.	1.14
+	HYDROGRAPH AT	SV251	313.	4.33	46.	11.	4.	.27
+	ROUTED TO	RSV251	196.	5.33	46.	11.	4.	.27
+	HYDROGRAPH AT	SV250	156.	4.33	23.	6.	2.	.12
+	ROUTED TO	RSV250	94.	5.33	23.	6.	2.	.12
+	HYDROGRAPH AT	SV218	1258.	4.58	242.	61.	20.	1.29
+	4 COMBINED AT	CSV218	1767.	4.83	494.	125.	42.	2.82
+	ROUTED TO	RSV218	1634.	5.25	493.	125.	42.	2.82
+	HYDROGRAPH AT	SV248	944.	4.67	236.	60.	20.	1.27
+	DIVERSION TO	DO248	444.	4.67	111.	28.	9.	1.27
+	HYDROGRAPH AT	D248	500.	4.67	125.	32.	11.	1.27
+	ROUTED TO	RSV248	423.	5.17	124.	32.	11.	1.27
+	HYDROGRAPH AT	SV244	576.	4.92	185.	47.	16.	.95
+	2 COMBINED AT	CSV244	917.	5.08	299.	76.	25.	1.62
+	HYDROGRAPH AT	SV246	287.	4.25	37.	9.	3.	.16
+	HYDROGRAPH AT	D248	444.	4.67	111.	28.	9.	1.27
	ROUTED TO							

+	RD248	407.	5.00	111.	28.	9.	1.27
+	2 COMBINED AT CSV246	514.	4.83	152.	38.	13.	.76
+	2 COMBINED AT C216*	1295.	5.08	428.	109.	36.	2.38
+	ROUTED TO RSV244	1194.	5.75	425.	109.	36.	2.38
+	HYDROGRAPH AT SV216	1787.	4.50	301.	75.	25.	1.63
+	3 COMBINED AT CSV216	2621.	5.33	1077.	276.	92.	6.82
+	ROUTED TO RSV216	2571.	5.83	1072.	276.	92.	6.82
+	HYDROGRAPH AT SV236	763.	4.33	97.	24.	8.	.59
+	ROUTED TO RSV236	386.	5.58	97.	24.	8.	.59
+	HYDROGRAPH AT SV240	2706.	4.75	593.	149.	50.	3.67
+	HYDROGRAPH AT SV242	93.	4.33	16.	4.	1.	.09
+	2 COMBINED AT C242*	2739.	4.75	602.	152.	51.	3.76
+	ROUTED TO R242*	2472.	5.33	601.	152.	51.	3.76
+	HYDROGRAPH AT SV214	2019.	4.50	333.	83.	28.	1.87
+	6 COMBINED AT CSV220	6403.	5.92	4234.	1168.	389.	30.63
+	ROUTED TO RSV220	6369.	6.42	4211.	1168.	389.	30.63
+	HYDROGRAPH AT SV230	1582.	4.25	181.	45.	15.	.85
+	HYDROGRAPH AT SV232	2720.	4.58	543.	136.	45.	3.06
+	2 COMBINED AT C230*	3331.	4.50	692.	174.	58.	3.91
+	ROUTED TO R230*	3153.	4.92	689.	174.	58.	3.91
+	HYDROGRAPH AT SV212	3072.	4.75	631.	158.	53.	4.14
+	3 COMBINED AT CSV212	6822.	6.08	4803.	1351.	451.	38.68
+	ROUTED TO RSV212	6708.	6.67	4703.	1351.	451.	38.68
+	HYDROGRAPH AT SV210	1553.	4.17	152.	38.	13.	.72
+	ROUTED TO RSV210	897.	5.08	152.	38.	13.	.72
+	2 COMBINED AT C210*	6719.	6.67	4755.	1371.	457.	39.40
+	HYDROGRAPH AT SV208	831.	4.67	203.	52.	17.	1.07
	HYDROGRAPH AT						

+		SV205	1102.	4.17	110.	27.	9.	.50
+	2 COMBINED AT	C205*	1114.	4.50	297.	76.	25.	1.57
+	ROUTED TO	R205*	760.	5.00	294.	76.	25.	1.57
+	HYDROGRAPH AT	SV203	182.	4.08	14.	3.	1.	.08
+	ROUTED TO	RSV203	111.	4.67	14.	3.	1.	.08
+	3 COMBINED AT	C200*	6875.	6.58	4842.	1411.	471.	41.04
+	HYDROGRAPH AT	SV200	2003.	4.67	371.	93.	31.	2.29
+	3 COMBINED AT	CSV200	11890.	9.50	9020.	3069.	1027.	99.49
+	ROUTED TO	RSV200	11839.	9.83	9009.	3069.	1027.	99.49
+	HYDROGRAPH AT	TW416	627.	4.42	164.	42.	14.	.59
+	ROUTED TO	RTW416	532.	5.58	163.	42.	14.	.59
+	HYDROGRAPH AT	TW420	778.	4.67	161.	41.	14.	.81
+	ROUTED TO	RTW420	647.	5.42	161.	41.	14.	.81
+	HYDROGRAPH AT	TW412	1453.	4.92	399.	101.	34.	2.06
+	2 COMBINED AT	CTW412	1661.	5.25	532.	135.	45.	2.87
+	HYDROGRAPH AT	TW414	2191.	4.17	219.	55.	18.	1.17
+	ROUTED TO	RTW414	1019.	5.17	215.	55.	18.	1.17
+	HYDROGRAPH AT	TW410	254.	4.58	57.	14.	5.	.31
+	2 COMBINED AT	CTW410	1107.	5.17	259.	66.	22.	1.48
+	4 COMBINED AT	C410*	11839.	9.75	9230.	3189.	1067.	104.43
+	ROUTED TO	RTW410	11560.	10.42	9071.	3147.	1054.	104.43
+	HYDROGRAPH AT	TW402	3158.	5.08	825.	209.	70.	4.91
+	3 COMBINED AT	CTW402	11560.	10.33	10207.	3663.	1228.	135.06
+	ROUTED TO	RTW402	10822.	10.42	9527.	3452.	1158.	135.06
+	HYDROGRAPH AT	TW448	291.	4.75	90.	23.	8.	.35
+	DIVERSION TO	DO448	134.	4.75	17.	4.	1.	.35
+	HYDROGRAPH AT	D448	157.	4.75	73.	19.	6.	.35
	ROUTED TO							

+		RTW448	155.	5.75	72.	19.	6.	.35
+	HYDROGRAPH AT	TW446A	322.	4.67	89.	23.	8.	.34
+	HYDROGRAPH AT	D448	134.	4.75	17.	4.	1.	.35
+	ROUTED TO	RD448	118.	4.92	17.	4.	1.	.35
+	2 COMBINED AT	C446A	420.	4.75	106.	27.	9.	.50
+	DIVERSION TO	DO446A	22.	4.75	1.	0.	0.	.50
+	HYDROGRAPH AT	D446A	398.	4.75	105.	27.	9.	.50
+	ROUTED TO	R446A	356.	5.33	105.	27.	9.	.50
+	HYDROGRAPH AT	TW446	522.	4.42	95.	24.	8.	.35
+	3 COMBINED AT	CTW446	634.	5.25	264.	68.	23.	1.01
+	ROUTED TO	RTW446	603.	5.67	262.	68.	23.	1.01
+	HYDROGRAPH AT	TW432	787.	4.58	157.	39.	13.	.86
+	2 COMBINED AT	CTW432	976.	4.83	400.	104.	35.	1.87
+	ROUTED TO	RTW432	925.	5.42	397.	104.	35.	1.87
+	HYDROGRAPH AT	TW431	940.	4.58	200.	50.	17.	.87
+	2 COMBINED AT	CTW431	1408.	5.08	573.	150.	50.	2.75
+	HYDROGRAPH AT	TW459	535.	5.08	199.	52.	17.	1.04
+	ROUTED TO	SSR350	533.	5.17	199.	52.	17.	1.04
+	ROUTED TO	RTW459	524.	5.33	199.	52.	17.	1.04
+	HYDROGRAPH AT	TW462	184.	4.17	21.	5.	2.	.08
+	HYDROGRAPH AT	D380	2100.	5.58	296.	74.	25.	15.11
+	ROUTED TO	RD380	1967.	5.75	296.	74.	25.	15.11
+	2 COMBINED AT	CTW462	3039.	5.67	504.	126.	42.	4.05
+	ROUTED TO	SSR330	3017.	5.67	504.	126.	42.	4.05
+	ROUTED TO	RTW462	2659.	6.00	504.	126.	42.	4.05
+	HYDROGRAPH AT	TW450A	937.	4.67	210.	53.	18.	.88
+	ROUTED TO	SSR410	878.	4.83	210.	53.	18.	.88
	ROUTED TO							

+		R450A	796.	5.08	209.	53.	18.	.88
	HYDROGRAPH AT							
+		TW450B	651.	4.42	103.	26.	9.	.40
	4 COMBINED AT							
+		C450B	3226.	5.92	885.	225.	75.	6.38
	ROUTED TO							
+		R450B	2994.	6.58	879.	225.	75.	6.38
	HYDROGRAPH AT							
+		TW450	857.	5.08	306.	79.	26.	1.25
	HYDROGRAPH AT							
+		D446A	22.	4.75	1.	0.	0.	.50
	ROUTED TO							
+		RD446A	7.	4.92	1.	0.	0.	.50
	3 COMBINED AT							
+		CTW450	3229.	6.50	1119.	290.	97.	7.62
	DIVERSION TO							
+		DO450	235.	6.50	32.	8.	3.	7.62
	HYDROGRAPH AT							
+		D450	2994.	6.50	1087.	282.	94.	7.62
	ROUTED TO							
+		RTW450	2904.	6.83	1083.	282.	94.	7.62
	HYDROGRAPH AT							
+		TW444	524.	4.25	84.	21.	7.	.35
	2 COMBINED AT							
+		CTW444	2931.	6.83	1137.	302.	101.	7.29
	ROUTED TO							
+		RTW444	2877.	6.92	1134.	302.	101.	7.29
	HYDROGRAPH AT							
+		TW440	191.	4.25	22.	5.	2.	.11
	2 COMBINED AT							
+		CTW440	2872.	6.92	1145.	306.	102.	7.40
	HYDROGRAPH AT							
+		TW460	1412.	5.00	439.	112.	37.	2.32
	ROUTED TO							
+		SSR540	1244.	4.83	396.	101.	34.	2.32
	ROUTED TO							
+		RTW460	1201.	5.25	396.	101.	34.	2.32
	HYDROGRAPH AT							
+		TW458	985.	4.50	168.	42.	14.	.67
	2 COMBINED AT							
+		CTW458	1686.	5.08	587.	150.	50.	2.99
	ROUTED TO							
+		RTW458	1670.	5.25	587.	150.	50.	2.99
	HYDROGRAPH AT							
+		TW456	172.	4.50	37.	9.	3.	.18
	2 COMBINED AT							
+		CTW456	1736.	5.25	615.	157.	52.	3.16
	ROUTED TO							
+		RTW456	1701.	5.42	614.	157.	52.	3.16
	HYDROGRAPH AT							
+		TW454	195.	4.92	68.	18.	6.	.36
	2 COMBINED AT							
+		CTW454	1811.	5.42	664.	170.	57.	3.52
	DIVERSION TO							

+	DO454	1159.	5.42	425.	109.	36.	3.52
+ HYDROGRAPH AT	D454	652.	5.42	239.	61.	20.	3.52
+ ROUTED TO	RTW454	611.	6.25	237.	61.	20.	3.52
+ HYDROGRAPH AT	TW452A	1062.	4.67	253.	64.	21.	1.08
+ ROUTED TO	SSR450	1047.	4.75	253.	64.	21.	1.08
+ ROUTED TO	R452A	907.	5.58	252.	64.	21.	1.08
+ HYDROGRAPH AT	TW452B	813.	4.92	240.	61.	20.	1.03
+ 3 COMBINED AT	C452B	1645.	5.92	699.	180.	60.	3.38
+ ROUTED TO	R452B	1578.	6.33	693.	180.	60.	3.38
+ HYDROGRAPH AT	TW452	466.	4.67	120.	30.	10.	.46
+ HYDROGRAPH AT	D450	235.	6.50	32.	8.	3.	7.62
+ ROUTED TO	RD450	206.	6.67	32.	8.	3.	7.62
+ 3 COMBINED AT	CTW452	1841.	6.42	824.	216.	72.	4.52
+ ROUTED TO	RTW452	1796.	6.92	820.	216.	72.	4.52
+ HYDROGRAPH AT	TW442	546.	4.25	86.	22.	7.	.38
+ 2 COMBINED AT	CTW442	1793.	6.92	860.	235.	78.	4.90
+ 2 COMBINED AT	C442*	4121.	6.92	1825.	494.	165.	12.29
+ ROUTED TO	R442*	3934.	7.50	1816.	494.	165.	12.29
+ HYDROGRAPH AT	TW434	657.	4.50	114.	29.	10.	.57
+ 2 COMBINED AT	C434_1	3928.	7.50	1862.	514.	171.	12.86
+ 2 COMBINED AT	CTW434	4103.	7.50	2271.	628.	209.	15.61
+ ROUTED TO	RTW434	3981.	7.92	2261.	628.	209.	15.61
+ HYDROGRAPH AT	TW430	2825.	4.58	505.	126.	42.	2.49
+ 2 COMBINED AT	C430_2	3981.	8.00	2571.	735.	245.	18.10
+ HYDROGRAPH AT	TW436	1001.	4.25	163.	41.	14.	.67
+ ROUTED TO	RTW436	775.	5.17	162.	41.	14.	.67
+ HYDROGRAPH AT	TW429	728.	4.33	138.	35.	12.	.56
ROUTED TO							

+	RTW429	450.	5.00	136.	35.	12.	.56
+ 3 COMBINED AT	C430*	3981.	7.92	2782.	788.	263.	19.33
+ HYDROGRAPH AT	D454	1159.	5.42	425.	109.	36.	3.52
+ ROUTED TO	RD454	1139.	5.58	424.	109.	36.	3.52
+ HYDROGRAPH AT	TW485	1746.	4.83	433.	109.	36.	2.37
+ HYDROGRAPH AT	WI576A	806.	4.83	240.	61.	20.	1.22
+ ROUTED TO	R576A	755.	5.33	239.	61.	20.	1.22
+ HYDROGRAPH AT	WI576B	522.	4.50	95.	24.	8.	.46
+ 2 COMBINED AT	C576B	919.	5.25	318.	81.	27.	1.69
+ DIVERSION TO	DO576B	368.	5.25	127.	33.	11.	1.69
+ HYDROGRAPH AT	D576B	552.	5.25	191.	49.	16.	1.69
+ ROUTED TO	R576B	420.	6.67	188.	49.	16.	1.69
+ 2 COMBINED AT	C485_1	1746.	4.83	610.	158.	53.	3.39
+ 2 COMBINED AT	CTW485	2200.	5.08	958.	248.	83.	5.64
+ ROUTED TO	RTW485	2168.	5.25	955.	248.	83.	5.64
+ HYDROGRAPH AT	TW484	365.	4.33	79.	20.	7.	.35
+ 2 COMBINED AT	CTW484	2286.	5.17	1011.	263.	88.	5.99
+ ROUTED TO	RTW484	2206.	5.92	999.	263.	88.	5.99
+ HYDROGRAPH AT	TW480	999.	4.33	181.	45.	15.	.75
+ HYDROGRAPH AT	WI580A	2197.	4.83	562.	142.	47.	2.79
+ HYDROGRAPH AT	WI580B	711.	4.42	136.	34.	11.	.63
+ DIVERSION TO	DO580B	327.	4.42	63.	16.	5.	.63
+ HYDROGRAPH AT	D580B	384.	4.42	74.	19.	6.	.63
+ ROUTED TO	R580B	336.	4.92	73.	19.	6.	.63
+ 2 COMBINED AT	C580A	2424.	4.83	622.	157.	52.	3.13
+ ROUTED TO	SSR630	2423.	4.83	622.	157.	52.	3.13
+ ROUTED TO	R580A	2131.	5.83	620.	157.	52.	3.13
HYDROGRAPH AT							

+	WI580	1574.	4.42	238.	60.	20.	1.32
	HYDROGRAPH AT						
+	D580B	327.	4.42	63.	16.	5.	.63
	ROUTED TO						
+	RD580B	288.	4.92	63.	16.	5.	.63
	HYDROGRAPH AT						
+	WI578	517.	4.58	106.	27.	9.	.48
	2 COMBINED AT						
+	CWI578	680.	4.75	165.	42.	14.	.77
	ROUTED TO						
+	SSR700	615.	5.00	165.	42.	14.	.77
	ROUTED TO						
+	RWI578	576.	5.50	164.	42.	14.	.77
	3 COMBINED AT						
+	CWI580	2520.	5.83	928.	238.	79.	5.22
	ROUTED TO						
+	RWI580	2408.	6.17	924.	238.	79.	5.22
	HYDROGRAPH AT						
+	WI576	915.	4.67	198.	50.	17.	1.18
	2 COMBINED AT						
+	C576_2	2474.	6.17	1056.	273.	91.	6.40
	HYDROGRAPH AT						
+	D576B	368.	5.25	127.	33.	11.	1.69
	ROUTED TO						
+	RD576B	304.	6.50	126.	33.	11.	1.69
	2 COMBINED AT						
+	CWI576	2695.	6.17	1152.	298.	99.	7.07
	DIVERSION TO						
+	DO576	1065.	6.17	455.	118.	39.	7.07
	HYDROGRAPH AT						
+	D576	1631.	6.17	697.	181.	60.	7.07
	ROUTED TO						
+	RWI576	1562.	6.67	693.	181.	60.	7.07
	HYDROGRAPH AT						
+	TW482	909.	4.50	149.	37.	12.	.76
	2 COMBINED AT						
+	CTW482	1655.	6.58	820.	218.	73.	5.04
	DIVERSION TO						
+	DO482	0.	.00	0.	0.	0.	5.04
	HYDROGRAPH AT						
+	D482	1655.	6.58	820.	218.	73.	5.04
	ROUTED TO						
+	RTW482	1596.	7.00	810.	218.	73.	5.04
	2 COMBINED AT						
+	C480_4	1574.	7.00	911.	256.	85.	5.79
	2 COMBINED AT						
+	CTW480	3071.	5.83	1747.	483.	161.	11.78
	DIVERSION TO						
+	DO480	2918.	5.83	1660.	458.	153.	11.78
	HYDROGRAPH AT						
+	D480	154.	5.83	87.	24.	8.	11.78
	ROUTED TO						
+	RTW480	141.	6.58	85.	24.	8.	11.78

HYDROGRAPH AT

+	TW478	465.	4.17	59.	15.	5.	.26
	2 COMBINED AT						
+	CTW478	422.	4.17	151.	43.	14.	.85
	ROUTED TO						
+	RTW478	167.	7.58	137.	43.	14.	.85
	2 COMBINED AT						
+	CTW430	3980.	7.92	2812.	804.	268.	20.18
	ROUTED TO						
+	SCP040	2936.	8.75	2266.	777.	259.	20.18
	ROUTED TO						
+	RTW430	2687.	9.42	2240.	776.	259.	20.18
	HYDROGRAPH AT						
+	TW418	1784.	4.58	353.	89.	30.	1.37
	2 COMBINED AT						
+	CTW418	2684.	9.42	2252.	847.	284.	21.55
	ROUTED TO						
+	RTW418	2616.	9.58	2218.	837.	281.	21.55
	HYDROGRAPH AT						
+	TW422	741.	4.58	161.	41.	14.	.70
	2 COMBINED AT						
+	C422_1	2609.	9.58	2223.	865.	291.	22.25
	HYDROGRAPH AT						
+	TW424	2266.	4.25	339.	85.	28.	1.50
	ROUTED TO						
+	RTW424	2063.	4.50	338.	85.	28.	1.50
	2 COMBINED AT						
+	CTW422	2603.	9.58	2225.	931.	313.	23.75
	ROUTED TO						
+	RTW422	2432.	12.50	2152.	919.	309.	23.75
	HYDROGRAPH AT						
+	TW400	2394.	4.83	778.	199.	66.	4.27
	2 COMBINED AT						
+	C400_2	3045.	5.75	2172.	1042.	352.	28.02
	2 COMBINED AT						
+	CTW400	11455.	10.50	9998.	3833.	1289.	163.08
	ROUTED TO						
+	RTW400	11377.	10.75	9969.	3832.	1289.	163.08
	HYDROGRAPH AT						
+	WI504	1645.	4.50	273.	68.	23.	1.35
	2 COMBINED AT						
+	CWI504	11361.	10.75	9955.	3856.	1297.	164.43
	ROUTED TO						
+	RWI504	11308.	10.83	9919.	3847.	1294.	164.43
	HYDROGRAPH AT						
+	WI560	2829.	4.75	692.	175.	58.	3.56
	HYDROGRAPH AT						
+	WI574	318.	4.33	43.	11.	4.	.22
	ROUTED TO						
+	RWI574	180.	5.33	42.	11.	4.	.22
	2 COMBINED AT						
+	C5602A	2828.	4.83	721.	183.	61.	3.78
	HYDROGRAPH AT						
+	D576	1065.	6.17	455.	118.	39.	7.07
	ROUTED TO						

+	RD576	1020.	6.50	452.	118.	39.	7.07
	2 COMBINED AT						
+	C5602B	2956.	4.92	1104.	292.	97.	6.57
	HYDROGRAPH AT						
+	WI560A	1098.	5.08	393.	102.	34.	2.04
	ROUTED TO						
+	R560A	994.	5.92	390.	102.	34.	2.04
	2 COMBINED AT						
+	C5602C	2956.	4.92	1425.	380.	127.	8.61
	HYDROGRAPH AT						
+	WI572	2021.	4.50	453.	114.	38.	2.06
	ROUTED TO						
+	RWI572	1732.	5.25	450.	114.	38.	2.06
	HYDROGRAPH AT						
+	WI570	1907.	4.83	530.	135.	45.	2.24
	DIVERSION TO						
+	DO570	400.	4.83	111.	28.	9.	2.24
	HYDROGRAPH AT						
+	D570	1507.	4.83	419.	107.	36.	2.24
	ROUTED TO						
+	RWI570	1439.	5.17	418.	107.	36.	2.24
	HYDROGRAPH AT						
+	WI566	170.	4.33	24.	6.	2.	.11
	HYDROGRAPH AT						
+	D570	400.	4.83	111.	28.	9.	2.24
	2 COMBINED AT						
+	CWI566	562.	4.75	141.	36.	12.	.58
	ROUTED TO						
+	SSR830	553.	4.83	141.	36.	12.	.58
	ROUTED TO						
+	RWI566	519.	5.25	140.	36.	12.	.58
	HYDROGRAPH AT						
+	WI564	1005.	5.25	370.	96.	32.	1.81
	ROUTED TO						
+	SSR880	1003.	5.25	370.	96.	32.	1.81
	ROUTED TO						
+	RWI564	970.	5.58	368.	96.	32.	1.81
	HYDROGRAPH AT						
+	WI562	768.	4.75	199.	50.	17.	.87
	3 COMBINED AT						
+	CWI562	1723.	5.50	667.	173.	58.	3.26
	2 COMBINED AT						
+	C562*	2896.	5.33	1040.	269.	90.	5.03
	ROUTED TO						
+	R562*	2748.	6.00	1032.	269.	90.	5.03
	3 COMBINED AT						
+	CWI560	5384.	5.92	2600.	693.	231.	15.70
	ROUTED TO						
+	RWI560	5269.	6.50	2586.	693.	231.	15.70
	HYDROGRAPH AT						
+	WI554	1054.	4.58	189.	48.	16.	1.04
	2 COMBINED AT						
+	C554_9	5268.	6.50	2658.	723.	241.	16.74
	HYDROGRAPH AT						

+		WI556	217.	4.08	16.	4.	1.	.08
+	ROUTED TO	RWI556	36.	5.58	15.	4.	1.	.08
+	2 COMBINED AT	C5541B	5267.	6.50	2660.	723.	241.	16.82
+	HYDROGRAPH AT	WI582	527.	4.33	75.	19.	6.	.38
+	HYDROGRAPH AT	D482	0.	.00	0.	0.	0.	5.04
+	ROUTED TO	RD482	0.	.00	0.	0.	0.	5.04
+	2 COMBINED AT	CWI582	527.	4.33	75.	19.	6.	.38
+	ROUTED TO	RWI582	321.	4.83	74.	19.	6.	.38
+	2 COMBINED AT	CWI554	5275.	6.50	2696.	733.	244.	17.20
+	ROUTED TO	RWI554	5262.	6.58	2695.	733.	244.	17.20
+	HYDROGRAPH AT	WI552	490.	4.42	80.	20.	7.	.41
+	2 COMBINED AT	CWI552	5260.	6.58	2726.	744.	248.	17.61
+	ROUTED TO	RWI552	5245.	6.67	2721.	743.	248.	17.61
+	HYDROGRAPH AT	WI584	1038.	4.50	235.	59.	20.	1.26
+	HYDROGRAPH AT	D480	2918.	5.83	1660.	458.	153.	11.78
+	ROUTED TO	RD480	2734.	6.42	1648.	458.	153.	11.78
+	2 COMBINED AT	CWI584	2798.	6.33	1778.	501.	167.	12.45
+	ROUTED TO	RWI584	2723.	6.92	1758.	501.	167.	12.45
+	HYDROGRAPH AT	WI550	321.	4.17	31.	8.	3.	.14
+	3 COMBINED AT	CWI550	6778.	6.92	3979.	1118.	373.	30.20
+	ROUTED TO	SCP050	6612.	6.92	3977.	1118.	373.	30.20
+	ROUTED TO	RWI550	6327.	7.50	3967.	1118.	373.	30.20
+	HYDROGRAPH AT	WI514	639.	4.25	71.	18.	6.	.35
+	2 COMBINED AT	CWI514	6311.	7.50	3967.	1127.	376.	30.56
+	HYDROGRAPH AT	WI548	486.	4.33	71.	18.	6.	.31
+	ROUTED TO	RWI548	324.	5.17	71.	18.	6.	.31
+	HYDROGRAPH AT	WI546	660.	4.33	156.	40.	13.	.61
	2 COMBINED AT							

+	CWI546	631.	5.00	220.	57.	19.	.91
	ROUTED TO						
+	RWI546	617.	5.17	220.	57.	19.	.91
	HYDROGRAPH AT						
+	WI544	1536.	4.50	394.	100.	33.	1.79
	2 COMBINED AT						
+	CWI544	1903.	4.58	588.	151.	50.	2.71
	DIVERSION TO						
+	DO544	1275.	4.58	394.	101.	34.	2.71
	HYDROGRAPH AT						
+	D544	628.	4.58	194.	50.	17.	2.71
	ROUTED TO						
+	RWI544	545.	5.33	192.	50.	17.	2.71
	HYDROGRAPH AT						
+	WI542	783.	4.75	192.	48.	16.	1.17
	2 COMBINED AT						
+	CWI542	1117.	5.08	374.	96.	32.	2.07
	HYDROGRAPH AT						
+	WI540	1072.	4.75	292.	75.	25.	1.25
	ROUTED TO						
+	RWI540	1025.	4.92	292.	75.	25.	1.25
	HYDROGRAPH AT						
+	WI538A	756.	4.67	187.	47.	16.	.78
	2 COMBINED AT						
+	C538A	1595.	4.92	468.	119.	40.	2.02
	ROUTED TO						
+	R538A	1462.	5.58	466.	119.	40.	2.02
	HYDROGRAPH AT						
+	WI538	915.	5.17	333.	86.	29.	1.43
	2 COMBINED AT						
+	CWI538	2143.	5.50	772.	199.	66.	3.45
	ROUTED TO						
+	RWI538	2041.	6.08	766.	199.	66.	3.45
	HYDROGRAPH AT						
+	WI530	1628.	4.75	349.	88.	29.	2.38
	2 COMBINED AT						
+	C530_2	2188.	6.08	1014.	269.	90.	5.83
	HYDROGRAPH AT						
+	WI536	868.	5.17	337.	88.	29.	1.37
	HYDROGRAPH AT						
+	WI534	596.	4.50	115.	29.	10.	.43
	ROUTED TO						
+	RWI534	544.	4.75	115.	29.	10.	.43
	HYDROGRAPH AT						
+	WI532	490.	4.33	63.	16.	5.	.32
	2 COMBINED AT						
+	CWI532	781.	4.58	174.	44.	15.	.76
	2 COMBINED AT						
+	C530*	1333.	4.92	496.	129.	43.	2.13
	ROUTED TO						
+	R530*	1279.	5.58	491.	129.	43.	2.13
	2 COMBINED AT						
+	C530_3	3122.	6.00	1431.	381.	127.	7.95
	HYDROGRAPH AT						

+	D544	1275.	4.58	394.	101.	34.	2.71
	ROUTED TO						
+	RD544	1182.	5.17	392.	101.	34.	2.71
	2 COMBINED AT						
+	CWI530	3730.	5.92	1750.	466.	155.	9.78
	2 COMBINED AT						
+	CAP1*	4214.	5.92	2022.	537.	179.	11.85
	HYDROGRAPH AT						
+	PI663	468.	4.83	150.	38.	13.	.60
	ROUTED TO						
+	RPI663	428.	5.58	148.	38.	13.	.60
	HYDROGRAPH AT						
+	PI657	607.	5.00	218.	56.	19.	.87
	HYDROGRAPH AT						
+	PI660	455.	5.17	196.	53.	18.	.84
	3 COMBINED AT						
+	CPI660	1270.	5.42	542.	143.	48.	2.31
	ROUTED TO						
+	RPI660	1231.	5.58	538.	143.	48.	2.31
	HYDROGRAPH AT						
+	PI654	2695.	5.25	942.	240.	80.	4.03
	2 COMBINED AT						
+	CPI654	3587.	5.33	1421.	369.	123.	6.34
	DIVERSION TO						
+	DO654	717.	5.33	284.	74.	25.	6.34
	HYDROGRAPH AT						
+	D654	2870.	5.33	1137.	296.	99.	6.34
	ROUTED TO						
+	RPI654	2828.	5.67	1134.	296.	99.	6.34
	HYDROGRAPH AT						
+	PI651	459.	4.67	104.	26.	9.	.46
	2 COMBINED AT						
+	C651_1	3035.	5.58	1229.	321.	107.	5.53
	HYDROGRAPH AT						
+	PI648	1286.	5.08	408.	103.	34.	1.73
	2 COMBINED AT						
+	CPI651	3894.	5.50	1582.	411.	137.	7.26
	ROUTED TO						
+	RPI651	3828.	5.75	1578.	411.	137.	7.26
	HYDROGRAPH AT						
+	PI645	1292.	4.58	229.	57.	19.	1.56
	2 COMBINED AT						
+	C645_1	3928.	5.75	1719.	450.	150.	8.82
	HYDROGRAPH AT						
+	PI645A	1162.	5.08	391.	100.	33.	1.63
	ROUTED TO						
+	R645A	1127.	5.42	390.	100.	33.	1.63
	HYDROGRAPH AT						
+	D654	717.	5.33	284.	74.	25.	6.34
	ROUTED TO						
+	RD654	692.	5.92	282.	74.	25.	6.34
	3 COMBINED AT						
+	CPI645	5320.	5.75	2294.	601.	200.	11.72
	2 COMBINED AT						

+	CAP1*	8564.	5.83	3966.	1051.	350.	23.57
	HYDROGRAPH AT						
+	PI689	4695.	5.08	1410.	362.	121.	6.78
	HYDROGRAPH AT						
+	PI688	2650.	4.83	675.	171.	57.	3.20
	2 COMBINED AT						
+	CPI689	6591.	5.00	1977.	508.	169.	9.98
	ROUTED TO						
+	RPI689	6362.	5.33	1968.	508.	169.	9.98
	HYDROGRAPH AT						
+	PI687	4123.	5.17	1281.	330.	110.	7.01
	2 COMBINED AT						
+	CPI687	9390.	5.33	3035.	787.	262.	16.99
	ROUTED TO						
+	RPI687	9166.	5.50	3027.	787.	262.	16.99
	HYDROGRAPH AT						
+	PI684	864.	4.58	176.	44.	15.	.74
	2 COMBINED AT						
+	CPI684	9384.	5.50	3154.	819.	273.	17.73
	ROUTED TO						
+	SSR103	9163.	5.67	3154.	819.	273.	17.73
	ROUTED TO						
+	RPI684	8893.	5.92	3148.	819.	273.	17.73
	HYDROGRAPH AT						
+	PI681	792.	4.92	241.	61.	20.	.99
	2 COMBINED AT						
+	CPI681	9152.	5.92	3323.	864.	288.	18.72
	ROUTED TO						
+	RPI681	8711.	6.50	3313.	864.	288.	18.72
	HYDROGRAPH AT						
+	PI678	556.	4.75	149.	38.	13.	.83
	2 COMBINED AT						
+	CPI678	8723.	6.50	3368.	884.	295.	19.55
	DIVERSION TO						
+	DO678	2442.	6.50	943.	248.	83.	19.55
	HYDROGRAPH AT						
+	D678	6280.	6.50	2425.	637.	212.	19.55
	HYDROGRAPH AT						
+	PI690	447.	4.67	109.	28.	9.	.63
	2 COMBINED AT						
+	CPI690	6659.	6.50	2578.	678.	226.	14.71
	ROUTED TO						
+	RPI690	6474.	6.67	2571.	678.	226.	14.71
	HYDROGRAPH AT						
+	PI675	106.	4.25	12.	3.	1.	.06
	2 COMBINED AT						
+	CPI675	6471.	6.67	2573.	679.	226.	14.77
	2 COMBINED AT						
+	CAP1*	11447.	6.42	5872.	1567.	522.	38.34
	HYDROGRAPH AT						
+	PI672	1342.	4.58	241.	60.	20.	1.51
	HYDROGRAPH AT						
+	D678	2442.	6.50	943.	248.	83.	19.55
	ROUTED TO						

+		RD678	2122.	6.92	934.	248.	83.	19.55
+	2 COMBINED AT	CPI672	2483.	6.83	1192.	323.	108.	6.98
+	2 COMBINED AT	CAP1*	12480.	6.58	6619.	1775.	592.	45.32
+	HYDROGRAPH AT	PI693	1003.	4.42	148.	37.	12.	.84
+	2 COMBINED AT	CAP1*	12442.	6.58	6661.	1789.	596.	46.16
+	HYDROGRAPH AT	PI669	219.	4.58	51.	13.	4.	.29
+	2 COMBINED AT	CAP1*	12441.	6.58	6676.	1793.	598.	46.44
+	HYDROGRAPH AT	PI642	247.	4.25	37.	9.	3.	.24
+	2 COMBINED AT	CAP1*	12429.	6.58	6680.	1795.	598.	46.68
+	HYDROGRAPH AT	PDWEST	3720.	5.25	1106.	284.	95.	7.08
+	2 COMBINED AT	CAP1*	13205.	6.33	7592.	2036.	679.	53.76
+	ROUTED TO	STOR1	5254.	8.17	4159.	2032.	679.	53.76
+	DIVERSION TO	DOCAP*	1689.	8.08	736.	184.	61.	53.76
+	HYDROGRAPH AT	DCAP*	3568.	8.33	3423.	1848.	617.	53.76
+	DIVERSION TO	DOCP14	353.	8.33	336.	161.	54.	53.76
+	HYDROGRAPH AT	DCAP14	3216.	8.33	3088.	1687.	564.	53.76
+	DIVERSION TO	DOCP13	410.	8.33	393.	220.	75.	53.76
+	HYDROGRAPH AT	DCAP13	2806.	8.33	2695.	1467.	489.	53.76
+	DIVERSION TO	DOCP12	400.	8.33	384.	215.	72.	53.76
+	HYDROGRAPH AT	DCAP12	2406.	8.33	2310.	1252.	417.	53.76
+	DIVERSION TO	DOCP11	416.	8.33	402.	224.	75.	53.76
+	HYDROGRAPH AT	DCAP11	1990.	8.33	1909.	1028.	343.	53.76
+	DIVERSION TO	DOCP10	410.	8.33	394.	220.	73.	53.76
+	HYDROGRAPH AT	DCAP10	1581.	8.33	1514.	808.	269.	53.76
+	DIVERSION TO	DOCP09	400.	8.33	384.	212.	71.	53.76
+	HYDROGRAPH AT	DCAP09	1181.	8.33	1130.	596.	199.	53.76
+	DIVERSION TO	DOCP08	397.	8.33	379.	202.	67.	53.76
	HYDROGRAPH AT							

+		DCAP08	784.	8.33	751.	394.	131.	53.76
+	DIVERSION TO	DOCP07	397.	8.33	379.	200.	67.	53.76
+	HYDROGRAPH AT	DCAP07	388.	8.33	371.	194.	65.	53.76
+	DIVERSION TO	DOCPOT	0.	.00	0.	0.	0.	53.76
+	HYDROGRAPH AT	DCAPOT	388.	8.33	371.	194.	65.	53.76
+	ROUTED TO	RWI542	388.	8.50	371.	194.	65.	53.76
+	HYDROGRAPH AT	WI529	302.	4.25	37.	9.	3.	.17
+	2 COMBINED AT	CWI529	466.	7.67	396.	220.	74.	4.13
+	DIVERSION TO	DO529	1.	7.67	0.	0.	0.	4.13
+	HYDROGRAPH AT	D529	465.	7.67	396.	220.	74.	4.13
+	ROUTED TO	RWI529	447.	7.75	395.	220.	74.	4.13
+	HYDROGRAPH AT	WI516	199.	4.33	26.	7.	2.	.14
+	2 COMBINED AT	C516_1	447.	7.75	395.	225.	75.	4.27
+	2 COMBINED AT	CWI516	6473.	7.50	4211.	1307.	436.	34.83
+	ROUTED TO	RWI516	6235.	8.08	4100.	1307.	436.	34.83
+	HYDROGRAPH AT	WI512	1256.	4.42	275.	69.	23.	1.36
+	2 COMBINED AT	CWI512	6187.	8.08	4097.	1347.	450.	36.18
+	HYDROGRAPH AT	DCAPOT	0.	.00	0.	0.	0.	53.76
+	ROUTED TO	RDCPOT	0.	.00	0.	0.	0.	53.76
+	HYDROGRAPH AT	WI527	886.	4.50	138.	35.	12.	.71
+	2 COMBINED AT	CWI527	886.	4.50	184.	47.	16.	.71
+	DIVERSION TO	DO527	132.	4.50	8.	2.	1.	.71
+	HYDROGRAPH AT	D527	753.	4.50	177.	45.	15.	.71
+	ROUTED TO	RWI527	651.	4.83	175.	45.	15.	.71
+	HYDROGRAPH AT	D529	1.	7.67	0.	0.	0.	4.13
+	ROUTED TO	RD529	0.	7.75	0.	0.	0.	4.13
+	HYDROGRAPH AT	DCAP07	397.	8.33	379.	200.	67.	53.76
	ROUTED TO							

+		RDCP07	396.	8.83	379.	200.	67.	53.76
+	HYDROGRAPH AT	WI528	469.	4.42	72.	18.	6.	.36
+	2 COMBINED AT	C528_1	458.	7.83	405.	234.	78.	4.41
+	2 COMBINED AT	CWI528	458.	7.83	405.	234.	78.	4.41
+	ROUTED TO	RWI528	437.	8.25	403.	233.	78.	4.41
+	HYDROGRAPH AT	WI518	718.	4.42	108.	27.	9.	.53
+	2 COMBINED AT	C518_1	588.	4.58	406.	254.	85.	4.94
+	2 COMBINED AT	CWI518	1019.	4.75	512.	281.	94.	5.54
+	2 COMBINED AT	C508*	6337.	8.25	4366.	1559.	521.	41.72
+	ROUTED TO	R508*	6248.	8.75	4355.	1558.	521.	41.72
+	HYDROGRAPH AT	WI508	581.	4.67	134.	34.	11.	.70
+	2 COMBINED AT	CWI508	6228.	8.75	4351.	1573.	526.	42.42
+	DIVERSION TO	DO508	1183.	8.75	827.	299.	100.	42.42
+	HYDROGRAPH AT	D508	5044.	8.75	3525.	1274.	426.	42.42
+	HYDROGRAPH AT	WI510A	1156.	4.58	194.	49.	16.	1.13
+	ROUTED TO	R510A	751.	5.67	193.	49.	16.	1.13
+	HYDROGRAPH AT	WI510	725.	5.00	229.	58.	19.	1.23
+	3 COMBINED AT	CWI510	5322.	8.67	3742.	1374.	460.	35.70
+	ROUTED TO	RWI510	4956.	9.33	3637.	1374.	460.	35.70
+	HYDROGRAPH AT	WI502	851.	4.92	228.	58.	19.	1.21
+	3 COMBINED AT	CWI502	12692.	10.75	11141.	4372.	1471.	201.34
+	ROUTED TO	RWI502	12678.	10.83	11134.	4372.	1471.	201.34
+	HYDROGRAPH AT	DCAP08	397.	8.33	379.	202.	67.	53.76
+	ROUTED TO	RDCP08	396.	8.58	379.	202.	67.	53.76
+	HYDROGRAPH AT	WI526	48.	4.33	9.	2.	1.	.05
+	2 COMBINED AT	CWI526	436.	7.67	403.	222.	74.	4.10
+	ROUTED TO	RWI526	429.	8.58	402.	222.	74.	4.10
	HYDROGRAPH AT							

+	WI525	1695.	4.67	325.	81.	27.	1.94
HYDROGRAPH AT							
+	DCAP09	400.	8.33	384.	212.	71.	53.76
ROUTED TO							
+	RDCP09	399.	9.25	384.	212.	71.	53.76
2 COMBINED AT							
+	C5251b	1695.	4.67	619.	319.	107.	6.01
HYDROGRAPH AT							
+	D527	132.	4.50	8.	2.	1.	.71
ROUTED TO							
+	RD527	31.	5.08	8.	2.	1.	.71
3 COMBINED AT							
+	CWI525	1695.	4.67	904.	546.	183.	10.23
DIVERSION TO							
+	DO525	71.	4.67	34.	18.	6.	10.23
HYDROGRAPH AT							
+	D525	1181.	4.67	766.	491.	164.	10.23
ROUTED TO							
+	RWI525	988.	5.42	765.	491.	164.	10.23
HYDROGRAPH AT							
+	WI506	1175.	4.58	296.	75.	25.	1.58
2 COMBINED AT							
+	C506_1	1507.	5.25	866.	548.	184.	11.13
HYDROGRAPH AT							
+	WI524	944.	4.58	178.	45.	15.	.95
HYDROGRAPH AT							
+	D525	71.	4.67	34.	18.	6.	10.23
ROUTED TO							
+	RD525	50.	5.50	34.	18.	6.	10.23
2 COMBINED AT							
+	CWI524	940.	4.58	217.	67.	22.	1.60
DIVERSION TO							
+	DO524	35.	4.58	2.	1.	0.	1.60
HYDROGRAPH AT							
+	D524	810.	4.58	201.	63.	21.	1.60
ROUTED TO							
+	RWI524	715.	4.92	199.	63.	21.	1.60
2 COMBINED AT							
+	CWI506	1951.	5.25	1005.	594.	200.	12.67
ROUTED TO							
+	RWI506	1886.	5.50	1001.	594.	200.	12.67
HYDROGRAPH AT							
+	WI500	985.	4.67	199.	50.	17.	1.05
2 COMBINED AT							
+	C500_1	2201.	5.42	1114.	629.	212.	13.72
HYDROGRAPH AT							
+	D508	1183.	8.75	827.	299.	100.	42.42
ROUTED TO							
+	RD508	1167.	9.00	825.	299.	100.	42.42
2 COMBINED AT							
+	C500_2	2283.	5.50	1839.	936.	315.	21.78
2 COMBINED AT							
+	CWI500	13196.	10.75	11598.	4714.	1586.	224.18
ROUTED TO							

+	SSPILL	1524.	18.75	1515.	1407.	1073.	224.18
	ROUTED TO						
+	RWI500	1524.	19.33	1515.	1407.	1073.	224.18
	HYDROGRAPH AT						
+	PI635	889.	4.42	132.	33.	11.	.61
	2 COMBINED AT						
+	CPI635	1523.	19.33	1515.	1407.	1073.	224.79
	ROUTED TO						
+	RPI635	1521.	20.08	1512.	1404.	1072.	224.79
	HYDROGRAPH AT						
+	DCAP11	416.	8.33	402.	224.	75.	53.76
	ROUTED TO						
+	RDCP11	416.	8.67	401.	224.	75.	53.76
	HYDROGRAPH AT						
+	PI618	470.	4.33	58.	15.	5.	.29
	HYDROGRAPH AT						
+	DCAP12	400.	8.33	384.	215.	72.	53.76
	DIVERSION TO						
+	DO618	212.	8.33	204.	114.	38.	53.76
	HYDROGRAPH AT						
+	D618	188.	8.33	181.	101.	34.	53.76
	ROUTED TO						
+	RDCP12	188.	8.58	181.	101.	34.	53.76
	2 COMBINED AT						
+	C6181a	470.	4.33	226.	128.	43.	2.21
	2 COMBINED AT						
+	CPI618	661.	7.83	609.	360.	120.	6.46
	ROUTED TO						
+	RPI618	647.	8.42	608.	359.	120.	6.46
	HYDROGRAPH AT						
+	PI612	656.	4.58	129.	32.	11.	.74
	HYDROGRAPH AT						
+	DCAP13	410.	8.33	393.	220.	75.	53.76
	ROUTED TO						
+	RDCP13	409.	9.00	393.	220.	75.	53.76
	HYDROGRAPH AT						
+	PI615	852.	4.33	151.	38.	13.	.84
	2 COMBINED AT						
+	C6151A	631.	4.42	435.	268.	91.	5.04
	HYDROGRAPH AT						
+	D618	212.	8.33	204.	114.	38.	53.76
	ROUTED TO						
+	RD618	212.	8.50	204.	114.	38.	53.76
	2 COMBINED AT						
+	CPI615	681.	8.08	628.	386.	131.	7.21
	ROUTED TO						
+	RPI615	676.	8.33	628.	386.	131.	7.21
	2 COMBINED AT						
+	C6121a	978.	4.67	681.	408.	138.	7.95
	2 COMBINED AT						
+	CPI612	1278.	8.58	1223.	753.	254.	14.41
	DIVERSION TO						
+	DO612	959.	8.58	917.	565.	190.	14.41
	HYDROGRAPH AT						

+	D612	320.	8.58	306.	188.	63.	14.41
	ROUTED TO						
+	RPI612	319.	8.83	306.	188.	63.	14.41
	HYDROGRAPH AT						
+	PI609	1135.	4.67	318.	81.	27.	1.94
	2 COMBINED AT						
+	C609_1	1217.	4.83	544.	262.	89.	5.55
	HYDROGRAPH AT						
+	DCAP14	353.	8.33	336.	161.	54.	53.76
	ROUTED TO						
+	RDCP14	352.	9.50	335.	161.	54.	53.76
	2 COMBINED AT						
+	CPI609	1215.	4.83	784.	440.	148.	9.15
	ROUTED TO						
+	RPI609	1105.	4.92	752.	430.	145.	9.15
	HYDROGRAPH AT						
+	PI600A	1191.	4.25	104.	26.	9.	.52
	2 COMBINED AT						
+	C600A	1225.	4.75	786.	447.	151.	9.67
	DIVERSION TO						
+	DO600A	1225.	4.75	786.	447.	151.	9.67
	HYDROGRAPH AT						
+	D600A	0.	.00	0.	0.	0.	9.67
	HYDROGRAPH AT						
+	PI621	865.	4.58	160.	40.	13.	.90
	HYDROGRAPH AT						
+	D612	959.	8.58	917.	565.	190.	14.41
	ROUTED TO						
+	RD612	957.	9.33	917.	564.	190.	14.41
	2 COMBINED AT						
+	CPI621	1040.	5.25	920.	595.	201.	11.70
	ROUTED TO						
+	SPI621	1039.	5.33	920.	587.	197.	11.70
	ROUTED TO						
+	RPI621	1023.	5.50	920.	586.	197.	11.70
	HYDROGRAPH AT						
+	DCAP10	410.	8.33	394.	220.	73.	53.76
	ROUTED TO						
+	RDCP10	409.	8.75	394.	220.	73.	53.76
	HYDROGRAPH AT						
+	PI628	1004.	4.33	111.	28.	9.	.57
	2 COMBINED AT						
+	CPI628	594.	4.33	419.	261.	87.	4.75
	ROUTED TO						
+	RPI628	468.	8.67	419.	260.	87.	4.75
	HYDROGRAPH AT						
+	PI624A	1577.	4.92	371.	93.	31.	2.81
	2 COMBINED AT						
+	C624A	1746.	5.00	674.	335.	112.	7.56
	ROUTED TO						
+	R624A	1342.	5.92	667.	335.	112.	7.56
	HYDROGRAPH AT						
+	PI639	261.	4.67	67.	17.	6.	.34
	HYDROGRAPH AT						

+	D524	35.	4.58	2.	1.	0.	1.60
	ROUTED TO						
+	RD524	16.	4.83	2.	1.	0.	1.60
	2 COMBINED AT						
+	CPI639	288.	4.67	71.	18.	6.	.43
	ROUTED TO						
+	RPI639	203.	5.33	71.	18.	6.	.43
	HYDROGRAPH AT						
+	PI636	576.	4.42	93.	23.	8.	.43
	2 COMBINED AT						
+	CPI636	546.	4.50	153.	39.	13.	.86
	ROUTED TO						
+	RPI636	544.	4.50	153.	39.	13.	.86
	HYDROGRAPH AT						
+	PI624	1112.	4.50	278.	71.	24.	1.23
	3 COMBINED AT						
+	CPI624	1662.	5.83	909.	415.	141.	9.64
	ROUTED TO						
+	SPI624	1657.	5.92	885.	398.	134.	9.64
	ROUTED TO						
+	RPI624	1595.	6.25	870.	398.	134.	9.64
	HYDROGRAPH AT						
+	PI633	383.	4.50	68.	17.	6.	.34
	5 COMBINED AT						
+	CPI633	2195.	14.42	2124.	1726.	1204.	246.48
	ROUTED TO						
+	RPI633	2196.	15.00	2122.	1725.	1204.	246.48
	HYDROGRAPH AT						
+	PDEAST	6672.	5.25	1746.	441.	147.	16.44
	HYDROGRAPH AT						
+	DCAP*	1689.	8.08	736.	184.	61.	53.76
	2 COMBINED AT						
+	CAP2*	6672.	5.25	2715.	722.	241.	33.74
	ROUTED TO						
+	STOR2	2451.	6.08	2151.	712.	237.	33.74
	DIVERSION TO						
+	DOCP19	862.	6.08	761.	269.	90.	33.74
	HYDROGRAPH AT						
+	DCAP19	1589.	6.08	1390.	444.	148.	33.74
	DIVERSION TO						
+	DOCP18	282.	6.08	248.	82.	27.	33.74
	HYDROGRAPH AT						
+	DCAP18	1307.	6.08	1142.	362.	121.	33.74
	DIVERSION TO						
+	DOCP17	273.	6.08	240.	78.	26.	33.74
	HYDROGRAPH AT						
+	DCAP17	1034.	6.08	902.	284.	95.	33.74
	DIVERSION TO						
+	DOCP16	819.	6.08	722.	230.	77.	33.74
	HYDROGRAPH AT						
+	DCAP16	215.	6.08	180.	54.	18.	33.74
	ROUTED TO						
+	RDCP15	213.	6.50	180.	54.	18.	33.74
	HYDROGRAPH AT						

+		PI606A	575.	4.42	89.	22.	7.	.46
+	2 COMBINED AT	C606A	368.	4.50	280.	110.	37.	3.55
+	DIVERSION TO	DO606A	151.	4.50	115.	45.	15.	3.55
+	HYDROGRAPH AT	D606A	217.	4.50	165.	65.	22.	3.55
+	ROUTED TO	R606A	192.	10.17	165.	65.	22.	3.55
+	HYDROGRAPH AT	PI606	921.	4.42	187.	47.	16.	1.08
+	2 COMBINED AT	CPI606	753.	4.50	285.	108.	36.	3.17
+	ROUTED TO	RPI606	668.	4.83	280.	108.	36.	3.17
+	HYDROGRAPH AT	PI604	469.	4.25	82.	21.	7.	.36
+	HYDROGRAPH AT	D606A	151.	4.50	115.	45.	15.	3.55
+	ROUTED TO	RD606A	142.	4.83	115.	45.	15.	3.55
+	2 COMBINED AT	CPI604	469.	4.58	179.	70.	23.	1.82
+	ROUTED TO	RPI604	414.	4.92	168.	67.	22.	1.82
+	HYDROGRAPH AT	PI603	623.	4.50	102.	25.	8.	.52
+	3 COMBINED AT	C603_1	1297.	4.75	483.	178.	59.	5.51
+	HYDROGRAPH AT	PD744	732.	4.58	143.	36.	12.	.80
+	HYDROGRAPH AT	D600A	1225.	4.75	786.	447.	151.	9.67
+	ROUTED TO	RD600A	1053.	5.33	767.	447.	151.	9.67
+	3 COMBINED AT	CPI603	2202.	4.92	1214.	606.	205.	15.98
+	ROUTED TO	SPI603	2089.	5.25	1212.	606.	205.	15.98
+	DIVERSION TO	DO744	0.	.00	0.	0.	0.	15.98
+	HYDROGRAPH AT	D744	2089.	5.25	1212.	606.	205.	15.98
+	ROUTED TO	RPI603	2036.	5.42	1197.	606.	205.	15.98
+	HYDROGRAPH AT	PI600	1023.	4.33	118.	29.	10.	.61
+	3 COMBINED AT	CPI600	2591.	13.17	2525.	1932.	1271.	263.07
+	ROUTED TO	RPI600	2591.	14.17	2524.	1932.	1271.	263.07
+	HYDROGRAPH AT	DCAP16	819.	6.08	722.	230.	77.	33.74
	ROUTED TO							

+	RDCP16	814.	6.50	720.	230.	77.	33.74
	HYDROGRAPH AT						
+	DCAP17	273.	6.08	240.	78.	26.	33.74
	ROUTED TO						
+	RDCP17	271.	6.50	240.	78.	26.	33.74
	HYDROGRAPH AT						
+	PD740	991.	4.75	215.	54.	18.	1.28
	3 COMBINED AT						
+	CPD740	1249.	9.42	1138.	413.	138.	16.31
	ROUTED TO						
+	RPD740	1248.	9.67	1137.	413.	138.	16.31
	HYDROGRAPH AT						
+	PD726B	832.	4.75	167.	42.	14.	.93
	2 COMBINED AT						
+	C726B	1229.	9.67	1147.	436.	145.	17.24
	ROUTED TO						
+	R726B	1227.	9.92	1147.	436.	145.	17.24
	HYDROGRAPH AT						
+	DCAP18	282.	6.08	248.	82.	27.	33.74
	ROUTED TO						
+	RDCP18	279.	6.67	248.	82.	27.	33.74
	HYDROGRAPH AT						
+	PD736	373.	5.17	136.	35.	12.	.78
	2 COMBINED AT						
+	CPD736	441.	6.17	387.	149.	50.	4.64
	ROUTED TO						
+	RPD736	439.	6.25	387.	149.	50.	4.64
	HYDROGRAPH AT						
+	DCAP19	862.	6.08	761.	269.	90.	33.74
	ROUTED TO						
+	RDCP19	859.	6.33	760.	269.	90.	33.74
	HYDROGRAPH AT						
+	PD760	1444.	4.33	156.	39.	13.	.87
	ROUTED TO						
+	SCP200	398.	4.83	155.	39.	13.	.87
	ROUTED TO						
+	RPD760	396.	5.00	155.	39.	13.	.87
	HYDROGRAPH AT						
+	PD732	681.	4.42	95.	24.	8.	.48
	3 COMBINED AT						
+	CPD732	1085.	5.75	963.	377.	126.	13.11
	ROUTED TO						
+	RPD732	1073.	6.33	960.	376.	126.	13.11
	HYDROGRAPH AT						
+	PD726A	605.	5.17	192.	49.	16.	1.10
	3 COMBINED AT						
+	C726A	1657.	6.08	1346.	504.	168.	18.85
	ROUTED TO						
+	R726A	1650.	6.33	1343.	504.	168.	18.85
	2 COMBINED AT						
+	C726*	2672.	6.58	2210.	785.	262.	36.10
	ROUTED TO						
+	R726*	2568.	7.25	2164.	784.	262.	36.10

HYDROGRAPH AT

+	PD726	1071.	4.58	229.	58.	19.	1.35
	HYDROGRAPH AT						
+	PD716	2644.	4.33	339.	85.	28.	1.75
	3 COMBINED AT						
+	CPD726	2581.	7.17	2159.	860.	287.	39.20
	ROUTED TO						
+	SPD726	2518.	7.67	2134.	855.	286.	39.20
	DIVERSION TO						
+	DO716	201.	7.67	92.	23.	8.	39.20
	HYDROGRAPH AT						
+	D716	2317.	7.67	2042.	832.	278.	39.20
	ROUTED TO						
+	RPD726	2306.	7.92	2040.	832.	278.	39.20
	HYDROGRAPH AT						
+	PD720	942.	4.33	115.	29.	10.	.59
	HYDROGRAPH AT						
+	D744	0.	.00	0.	0.	0.	15.98
	ROUTED TO						
+	RD744	0.	.00	0.	0.	0.	15.98
	4 COMBINED AT						
+	CPD720	4042.	9.17	3596.	2280.	1369.	296.13
	ROUTED TO						
+	RPD720	4043.	9.25	3595.	2280.	1369.	296.13
	HYDROGRAPH AT						
+	D716	201.	7.67	92.	23.	8.	39.20
	ROUTED TO						
+	RD716	198.	7.25	91.	23.	8.	39.20
	2 COMBINED AT						
+	C700*	4040.	9.25	3594.	2276.	1367.	302.88
	ROUTED TO						
+	R700*	3992.	9.92	3559.	2256.	1355.	302.88
	HYDROGRAPH AT						
+	PD752	354.	4.25	43.	11.	4.	.19
	HYDROGRAPH AT						
+	PD748	557.	4.25	66.	16.	5.	.28
	2 COMBINED AT						
+	CPD748	910.	4.25	108.	27.	9.	.47
	ROUTED TO						
+	SCP220	531.	4.50	108.	27.	9.	.47
	ROUTED TO						
+	RPD748	518.	4.75	108.	27.	9.	.47
	HYDROGRAPH AT						
+	PD756	1655.	5.17	560.	146.	49.	3.23
	ROUTED TO						
+	SCP210	1639.	5.25	560.	146.	49.	3.23
	ROUTED TO						
+	RPD756	1599.	5.58	560.	146.	49.	3.23
	2 COMBINED AT						
+	C708*	1685.	5.50	640.	167.	56.	3.70
	ROUTED TO						
+	R708*	1638.	5.92	639.	167.	56.	3.70
	HYDROGRAPH AT						
+	PD708	1840.	4.83	432.	109.	36.	2.40
	HYDROGRAPH AT						

+	PD712A	570.	4.83	155.	39.	13.	.77
	ROUTED TO						
+	R712A	551.	5.17	155.	39.	13.	.77
	HYDROGRAPH AT						
+	PD712	1003.	4.67	205.	52.	17.	.89
	4 COMBINED AT						
+	CPD708	2957.	5.00	1249.	327.	109.	7.76
	ROUTED TO						
+	RPD708	2911.	5.17	1249.	327.	109.	7.76
	HYDROGRAPH AT						
+	PD704	480.	4.42	65.	16.	5.	.36
	HYDROGRAPH AT						
+	AF800	945.	4.42	146.	37.	12.	.72
	3 COMBINED AT						
+	CPD704	3265.	5.08	1392.	364.	121.	8.84
	ROUTED TO						
+	SPD704	3181.	5.25	1392.	364.	121.	8.84
	DIVERSION TO						
+	DO800	0.	.00	0.	0.	0.	8.84
	HYDROGRAPH AT						
+	D800	3181.	5.25	1392.	364.	121.	8.84
	ROUTED TO						
+	RPD704	3146.	5.50	1391.	364.	121.	8.84
	HYDROGRAPH AT						
+	PD700	1703.	4.50	255.	64.	21.	1.40
	3 COMBINED AT						
+	CPD700	4072.	9.75	3633.	2327.	1379.	313.12
	HYDROGRAPH AT						
+	D800	0.	.00	0.	0.	0.	8.84
	ROUTED TO						
+	RD800	0.	.00	0.	0.	0.	8.84
	HYDROGRAPH AT						
+	AF802	618.	4.33	78.	20.	7.	.39
	3 COMBINED AT						
+	C802*	4071.	9.75	3632.	2327.	1379.	313.51
	ROUTED TO						
+	R810*	4067.	10.17	3626.	2322.	1378.	313.51
	HYDROGRAPH AT						
+	AF803	2044.	4.67	563.	143.	48.	2.84
	ROUTED TO						
+	RAF803	2001.	4.83	562.	143.	48.	2.84
	HYDROGRAPH AT						
+	AF805	810.	4.50	123.	31.	10.	.63
	ROUTED TO						
+	RAF805	618.	5.17	123.	31.	10.	.63
	HYDROGRAPH AT						
+	AF807	1789.	4.25	196.	49.	16.	1.02
	3 COMBINED AT						
+	CAF807	2926.	4.67	812.	206.	69.	4.49
	ROUTED TO						
+	RAF807	2904.	4.75	811.	206.	69.	4.49
	HYDROGRAPH AT						
+	AF810	1543.	4.83	350.	88.	29.	2.12
	3 COMBINED AT						

+	CAF810	4062.	10.17	3620.	2349.	1387.	320.12
	ROUTED TO						
+	RAF810	4053.	10.50	3610.	2345.	1386.	320.12
	HYDROGRAPH AT						
+	AF820	592.	4.58	119.	30.	10.	.70
	2 COMBINED AT						
+	CAF820	4051.	10.50	3608.	2345.	1386.	320.81
	HYDROGRAPH AT						
+	AF830	356.	4.42	61.	15.	5.	.27
	HYDROGRAPH AT						
+	AF854	863.	4.08	89.	22.	7.	.34
	ROUTED TO						
+	RAF854	792.	4.17	89.	22.	7.	.34
	HYDROGRAPH AT						
+	AF852	479.	4.08	47.	12.	4.	.17
	2 COMBINED AT						
+	CAF852	1174.	4.08	135.	34.	11.	.51
	ROUTED TO						
+	RAF852	1167.	4.17	135.	34.	11.	.51
	HYDROGRAPH AT						
+	AF850	585.	4.08	58.	14.	5.	.22
	2 COMBINED AT						
+	CAF850	1545.	4.17	190.	48.	16.	.72
	HYDROGRAPH AT						
+	AF864	116.	4.25	24.	6.	2.	.09
	ROUTED TO						
+	RAF864	74.	4.67	24.	6.	2.	.09
	HYDROGRAPH AT						
+	AF862	542.	4.00	38.	9.	3.	.18
	2 COMBINED AT						
+	CAF862	555.	4.00	60.	16.	5.	.26
	ROUTED TO						
+	RAF862	457.	4.08	60.	16.	5.	.26
	HYDROGRAPH AT						
+	AF866	896.	4.17	126.	32.	11.	.45
	ROUTED TO						
+	RAF866	616.	4.42	123.	32.	11.	.45
	HYDROGRAPH AT						
+	AF860	476.	4.25	84.	21.	7.	.36
	3 COMBINED AT						
+	CAF860	1151.	4.25	254.	66.	22.	1.08
	HYDROGRAPH AT						
+	SV258	888.	4.42	150.	38.	13.	.74
	DIVERSION TO						
+	DO258	435.	4.42	73.	18.	6.	.74
	HYDROGRAPH AT						
+	D258	453.	4.42	76.	19.	6.	.74
	ROUTED TO						
+	RSV258	420.	4.58	76.	19.	6.	.74
	HYDROGRAPH AT						
+	SV256	104.	4.17	10.	2.	1.	.06
	2 COMBINED AT						
+	CSV256	484.	4.50	88.	22.	7.	.44

1 SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION SSPILL
(PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED DURING BREACH FORMATION)

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1335.00	1360.70	1360.70
STORAGE	0.	39849.	39849.
OUTFLOW	0.	99300.	99300.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1353.47	.00	20286.	4286.	.00	16.50	.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1335.00	1360.70	1360.70
STORAGE	0.	39849.	39849.
OUTFLOW	0.	99300.	99300.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1353.40	.00	20093.	4272.	.00	16.58	.00

PLAN 3 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1335.00	1360.70	1360.70
STORAGE	0.	39849.	39849.
OUTFLOW	0.	99300.	99300.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1352.65	.00	17935.	4112.	.00	16.75	.00

PLAN 4 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1335.00	1360.70	1360.70
STORAGE	0.	39849.	39849.
OUTFLOW	0.	99300.	99300.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1351.08	.00	15228.	3460.	.00	17.33	.00

PLAN 5 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1335.00	1360.70	1360.70
STORAGE	0.	39849.	39849.
OUTFLOW	0.	99300.	99300.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1348.58	.00	11232.	2371.	.00	18.58	.00

PLAN 6 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1335.00	1360.70	1360.70
STORAGE	0.	39849.	39849.
OUTFLOW	0.	99300.	99300.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	1343.91	.00	4602.	781.	.00	20.75	.00

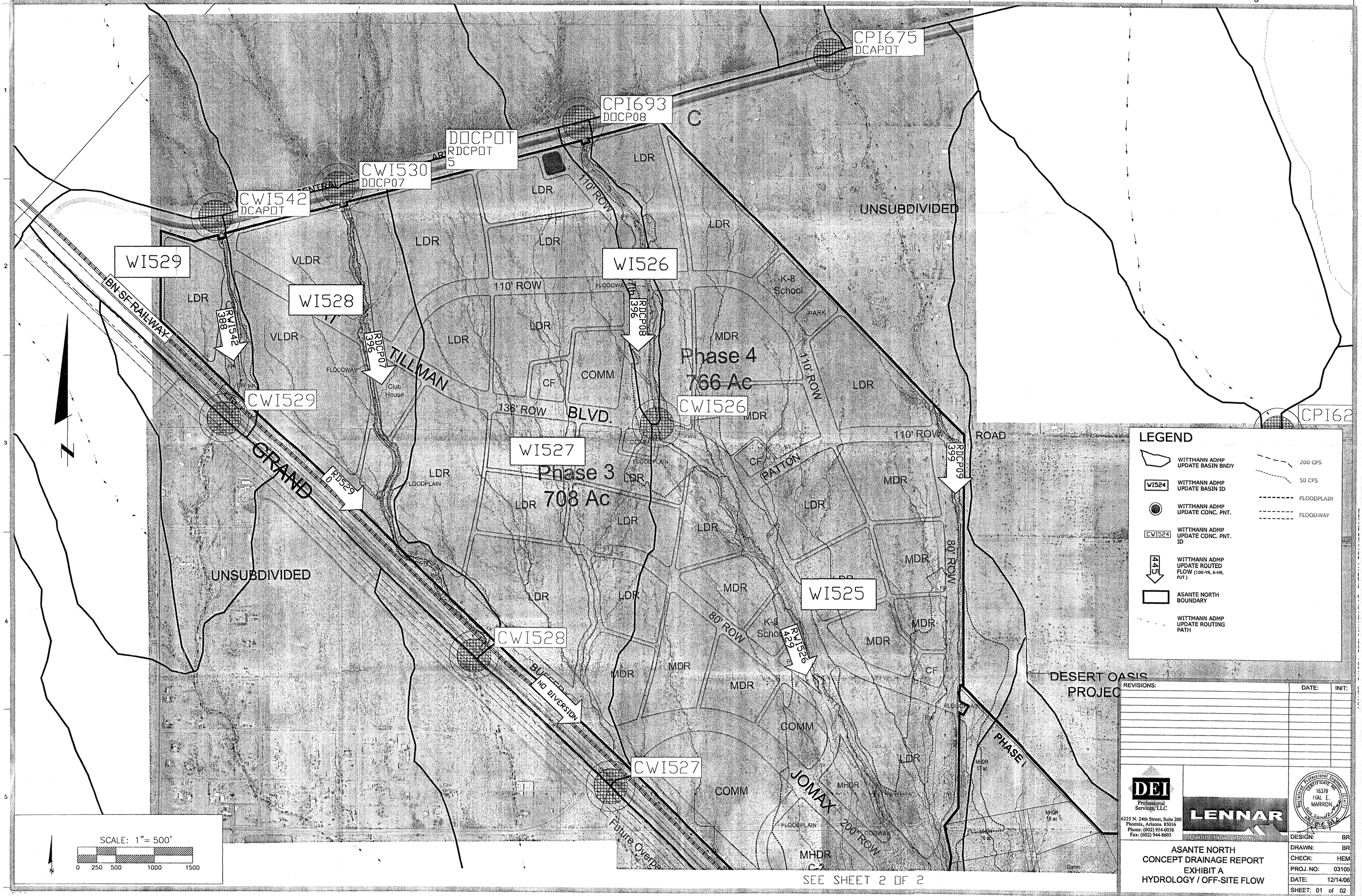
*** NORMAL END OF HEC-1 ***

Appendix A : BOX CULVERT CALCS

Appendix B : RETENTION REQUIREMENT CALCS

Appendix C : EXCERPTS FROM OTHER REPORTS

FCDMC, Wittmann ADMS Hydrology, July 2005



SCALE: 1"= 500'

0 250 500 1000 1500

LEGEND

- WITTMANN ADMP UPDATE BASIN BNDY
- WI524 WITTMANN ADMP UPDATE BASIN ID
- WITTMANN ADMP UPDATE CONC. PNT.
- CWI524 WITTMANN ADMP UPDATE CONC. PNT. ID
- 445 WITTMANN ADMP UPDATE ROUTED FLOW (100-YR, 6-HR, FUT.)
- ASANTE NORTH BOUNDARY
- WITTMANN ADMP UPDATE ROUTING PATH
- 200 CFS
- 50 CFS
- FLOODPLAIN
- FLOODWAY

REVISIONS:	DATE:	INIT:

DEI Professional Services LLC
6225 N. 24th Street, Suite 200
Phoenix, Arizona 85016
Phone: (602) 954-0038
Fax: (602) 944-8605

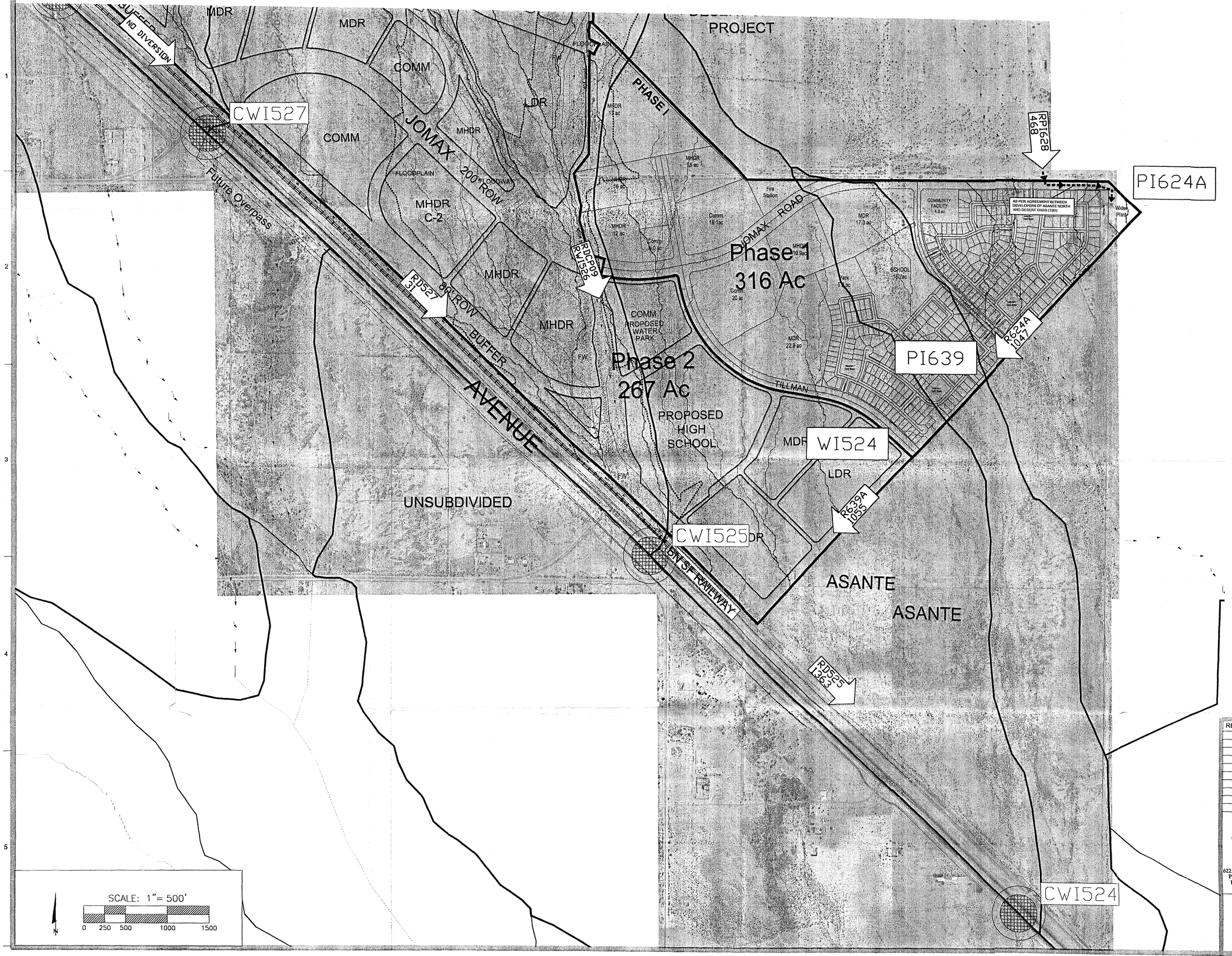
LENNAR
Quality, Value, Integrity

Registered Professional Engineer (Civil) CERTIFICATE NO. 16379 HAL E. MARRON Date Signed 12-15-06

ASANTE NORTH
CONCEPT DRAINAGE REPORT
EXHIBIT A
HYDROLOGY / OFF-SITE FLOW

DESIGN:	BR
DRAWN:	BR
CHECK:	HEM
PROJ. NO:	03105
DATE:	12/14/06
SHEET:	01 of 02

SEE SHEET 1 OF 2



LEGEND

- WITTMANN ADMP UPDATE BASIN BNDY
- W1524 — WITTMANN ADMP UPDATE BASIN ID
- WITTMANN ADMP UPDATE CONC. PNT.
- CWI524 — WITTMANN ADMP UPDATE CONC. PNT. ID
- 445 — WITTMANN ADMP UPDATE ROUTED FLOW (100-YR, 6-HR, FUT.)
- ASANTE NORTH BOUNDARY
- WITTMANN ADMP UPDATE ROUTING PATH
- 200 CFS
- 50 CFS
- FLOODPLAIN
- FLOODWAY

REVISIONS:	DATE:	INIT:

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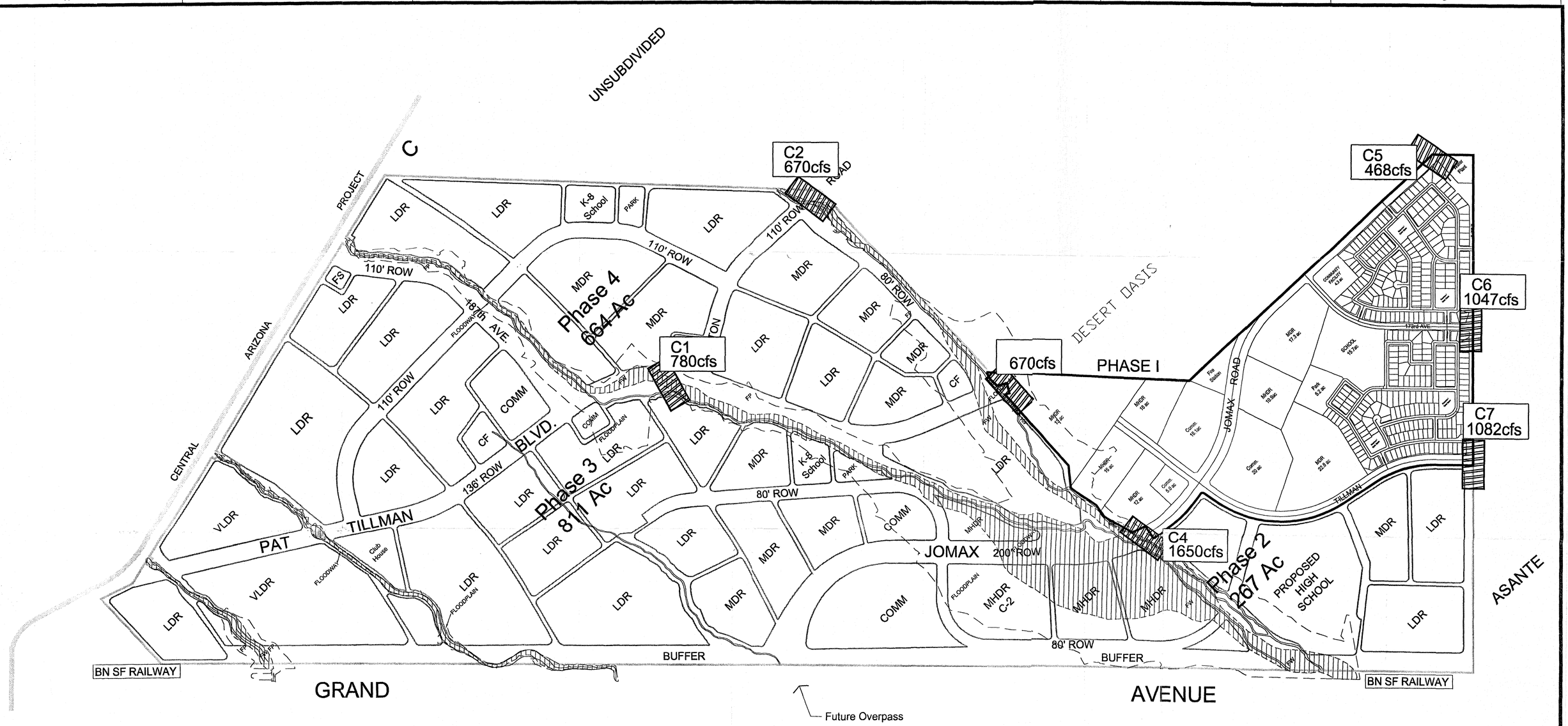
Registered Professional Engineer (Civil) CERTIFICATE NO. 16379 HAL E. MARRON Date Signed 12-14-06 ARIZONA U.S.A.

ASANTE NORTH
CONCEPT DRAINAGE REPORT
EXHIBIT A
HYDROLOGY / OFF-SITE FLOW

DESIGN:	BR
DRAWN:	BR
CHECK:	HEM
PROJ. NO:	03105
DATE:	12/14/06
SHEET:	02 of 02



LEGEND

- ASANTE NORTH BOUNDARY
- 404 WASH
- FLOODPLAIN
- FLOODWAY

SCALE: 1" = 600

REVISIONS:	DATE:	INIT:

DEI Professional Services, LLC
6225 N. 24th Street, Suite 200
Phoenix, Arizona 85016
Phone: (602) 954-0038
Fax: (602) 944-8605

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Registered Professional Surveyor
CERTIFICATE NO.
16379
HAL E. MARRON
State of Arizona

ASANTE NORTH
CONCEPT DRAINAGE REPORT
EXHIBIT B
CULVERT LOCATIONS

DESIGN:	BR
DRAWN:	BR
CHECK:	HEM
PROJ. NO:	03105
DATE:	12/13/06
SHEET:	01 of 01

ASANTE NORTH

PHASE I

FIRM PANEL 04013C1130G

FIRM PANEL 04013C1135G

NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 4 NORTH, RANGE 2 WEST AND TOWNSHIP 5 NORTH, RANGE 2 WEST

SCALE: 1"= 1000

0 500 1000 2000 3000

N

DEI Professional Services, LLC
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Phoenix, Arizona 85016
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LENNAR
Quality, Value, Integrity

Registered Professional Engineer
CERTIFICATE NO. 16379
HAL E. MARRON
Date Signed 12/12/06
ARIZONA U.S.A.

ASANTE NORTH
CONCEPT DRAINAGE REPORT
EXHIBIT C
FEMA FLOOD INSURANCE RATE MAPS

DESIGN:	BR
DRAWN:	BR
CHECK:	HEM
PROJ. NO:	03105
DATE:	12/12/06
SHEET:	01 of 01

ASANTE - PHASE I - PRELIMINARY PLAT - FEMA FLOODPLAINS

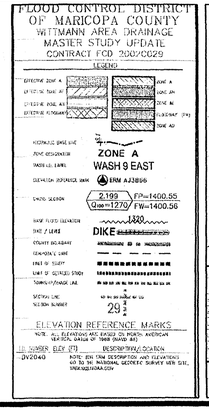
G:\Dwg\03105_Final\Master Drainage\Exhibits\03101N-FIRMS.dwg - 12/12/06

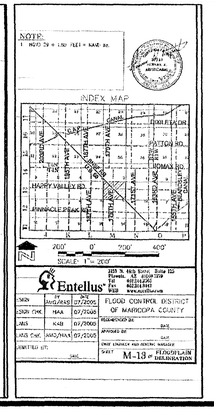
PHASE I BOUNDARY

WITTMANN ADMS UPDATE FLOODPLAIN DELINEATION STUDY MAPS TITLE BLOCK (TYPICAL)

SCALE: 1"= 600'

0 300 600 1200 1800





WITTMANN ADMS UPDATE FLOODPLAIN DELINEATION STUDY MAPS
DISTRICT FINAL - JULY, 2005
SUBMITTED TO FEMA - OCTOBER, 2005

LEGEND

- ASANTE NORTH BOUNDARY
- ASANTE NORTH - PHASE I BOUNDARY
- 404 WASH
- FLOODPLAIN
- FLOODWAY
- 200 CFS WASH
- 50 CFS WASH

REVISIONS:	DATE:	INIT:

DEI Professional Services, LLC
6225 N. 24th Street, Suite 200
Phoenix, Arizona 85016
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Fax: (602) 944-8605

LENNAR
Quality Value Integrity

Registered Professional Engineer
16378
HAL E. MARRON
Date Expires 12-31-06
ARIZONA, U.S.A.

ASANTE NORTH
CONCEPT DRAINAGE REPORT
EXHIBIT D
FCDMC PRELIMINARY FLOODPLAINS

DESIGN:	BR
DRAWN:	BR
CHECK:	HEM
PROJ. NO:	03105
DATE:	12/12/06
SHEET:	01 of 01