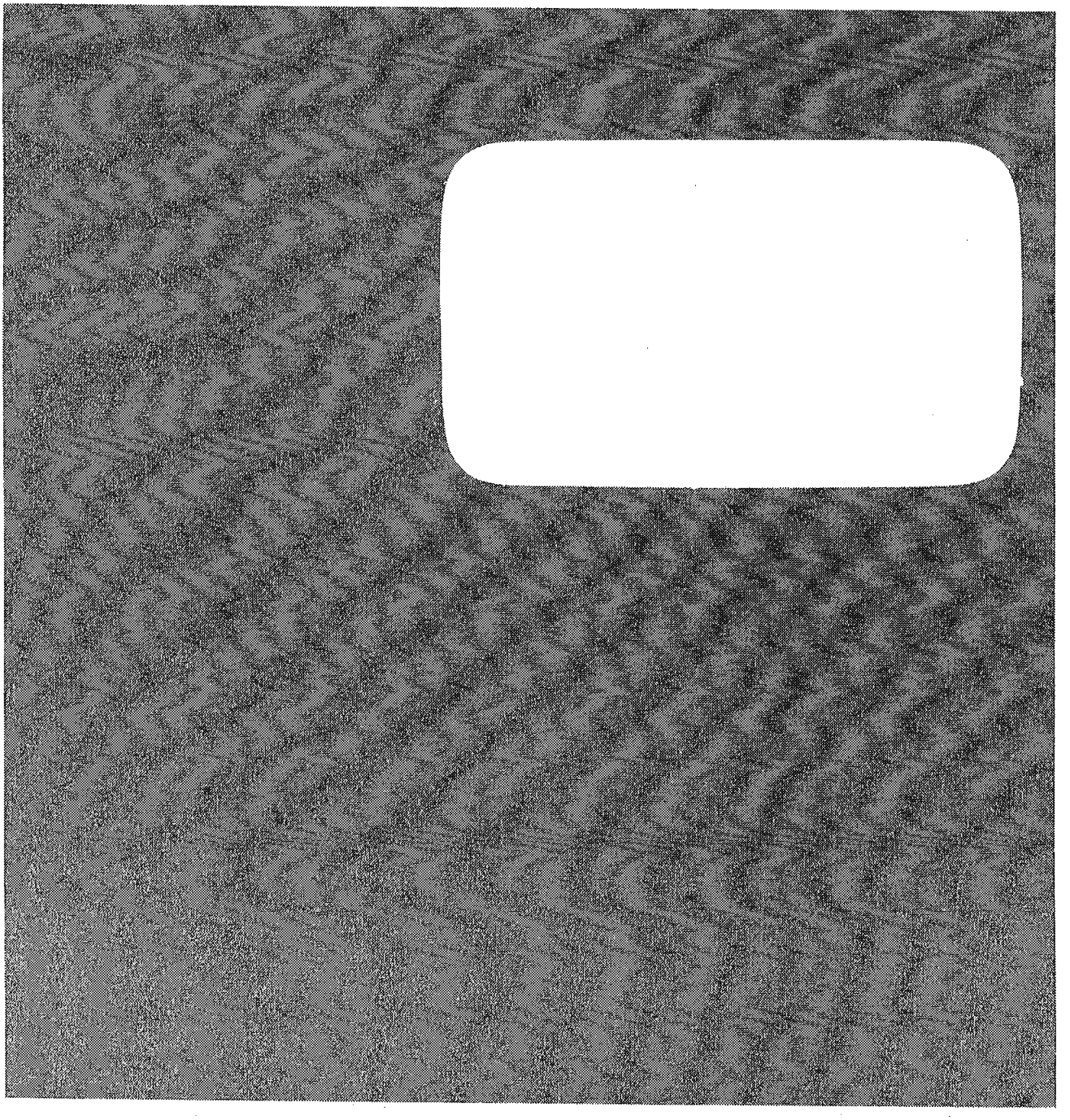
Kennedy/Jenks/Chilton



VOLUME II

VOLUME II
SUPPLEMENTAL ENGINEERING REPORT
FOR
PLUMAS/MOANA STORM DRAIN
ADDENDUM D

KENNEDY/JENKS/CHILTON
877041.00

MARCH 1989

APPENDIX D

PRELIMINARY ENGINEERING REPORT FOR PLUMAS/MOANA STORM DRAIN
DATED APRIL 1988
REVISED JUNE 1988

PRELIMINARY ENGINEERING REPORT
FOR
PLUMAS/MOANA STORM DRAIN

KENNEDY/JENKS/CHILTON
877041

APRIL 1988
Revised June 1988

** NOTE **

Due to the cost of the alternatives presented herein, it was determined that further study was required. Upstream storm water detention basins were to be studied along with HEC-1 hydrologic analysis of the storm runoff. The results of these studies are presented in the Supplemental Report prepared by Kennedy/Jenks/Chilton, dated March 1989.

PLUMAS/MOANA
STORM DRAIN PROJECT

FOR

CITY OF RENO
RENO, NEVADA

April 1988
Revised June 1988

KENNEDY/JENKS/CHILTON

877041.00

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EXECUTIVE SUMMARY

Kennedy/Jenks/Chilton analyzed several conceptual storm drain alternatives for the Plumas/Moana Storm Drain Project. The recommended alternative consists of a new 8'x6' box culvert connecting with the existing 7'x5' box culvert recently installed just west of Plumas Street at Glenda Way. This new box culvert will run east on Glenda to Lakeside Drive where it will then turn to the north and proceed down Lakeside in an 8'x6' box culvert to the outfall into Virginia Lake. This alternative is labeled as Option 2 in the text of this report.

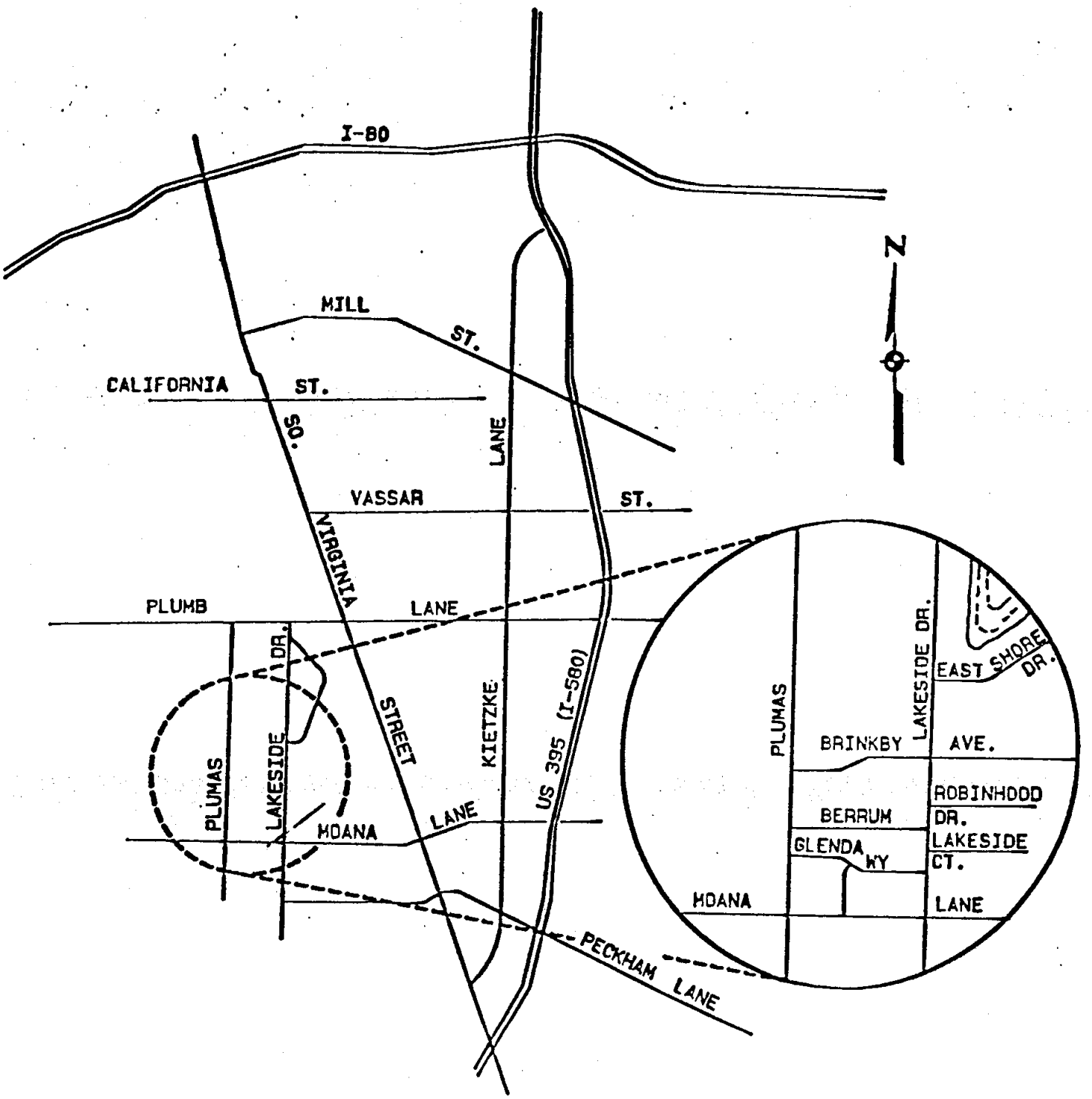
A 60-inch diameter pipe would be installed in Plumas Street to intercept runoff as it crosses Plumas approximately 700 feet south of Moana Lane. A defined drainage way exists at Plumas whereas runoff reaching Lakeside Drive will be widely dispersed and not as easily or conveniently intercepted. The 60-inch pipe will run to the north in Plumas Street and connect with the 8'x6' box culvert to be installed in Glenda Way. Runoff that travels onto Lakeside Drive and Moana Lane will be picked-up and conveyed north in Lakeside in a 42-inch diameter pipe and connected with the 8'x7' box culvert at the intersection of Glenda and Lakeside.

This alternative is recommended because of its superior hydraulic efficiencies, better runoff capture at Plumas Street and its lesser impact on existing underground utilities.

Localized runoff will be handled by installing collector mains off the major structure in Lakeside Drive. 24-inch diameter pipes will be installed in Berrum, Brinkby and Beck to intercept the local storm runoff. Combination inlet type (curb and gutter openings) catch basins will be located on the side streets to intercept the runoff without flooding adjacent street travel lanes. The local system would be designed to accommodate 100 year storm flows.

For planning purposes, the total costs for the recommended storm drain facilities will range between $2.5 and $3.0 million.

Kennedy/Jenks/Chilton



VICINITY MAP

NTS

FIGURE 1

CHAPTER 1

INTRODUCTION

The City of Reno contracted with Kennedy/Jenks/Chilton to provide hydrologic analyses and conceptual storm drainage designs for the project named "Plumas/ Moana Storm Drain", hereinafter referred to as the Project.

The scope of work entailed analyzing the Project site hydrology to determine peak runoff flows for the onsite collection system. Also based on peak runoff inflow values given by the City of Reno. Kennedy/Jenks/Chilton was required to provide conceptual designs of storm drainage systems to convey the offsite runoff through the Project area to an outfall into Virginia Lake. The following sections discuss Kennedy/Jenks/Chilton's hydrology studies conceptual designs, conclusions and recommendations.

CHAPTER 2

SITE LOCATION AND DESCRIPTION

The Project area is bordered south to north by Moana Lane and Mountain View Drive and west to east at Plumas Street and Lakeside Drive. The Project covers approximately 240 acres of highly developed land consisting primarily of multi-residential dwellings and commercial establishments with only a few single family residences. The Anderson Elementary School site and the pasture lying in the northeast corner of the Project (south of Mountain View Drive) are the largest "open" areas. The remainder of the Project area is predominated by apartment/condominium complexes with large paved parking areas and driveways and very little grassed or other vegetated open spaces.

The predominate slope is from west to east with generally about 30 feet of fall in the 1500 feet (2 percent average) between Plumas Street and Lakeside Drive. The ground continues to fall to the east of Lakeside Drive.

The grade on Lakeside Drive is rather flat, with only about 4 feet of elevation difference between Moana Lane and Eastshore Drive. The ground north of Eastshore Drive drops relatively steeply to Virginia Lake, about 20 feet of drop in 400 feet or 5 percent. The general slope of Lakeside Drive is a mild downward grade to the north with a maximum grade of approximately 0.5 percent and a small "hump" between Brinkby Avenue and Beck Court.

CHAPTER 3

EXISTING DRAINAGE SYSTEMS

The Project area does not have an extensive network of underground storm drainage facilities. Existing storm drains are located in Glenda Way, portions of Lakeside Drive, Brinkby Avenue, Beck Street and in Plumas Street. As depicted on Figure 2 "Existing Utility Map" an 18-inch diameter storm drain pipe system located in Plumas Street discharges into the Glenda Way 36-inch diameter system which then combines with the Lakeside system. The Lakeside Drive system collects runoff from the area south of Moana Lane and conveys it to the north, where it joins flows with the Glenda Way system. From the intersection at Glenda Way the Lakeside Drive storm drain runs north approximately 300 feet where it then turns to the east and crosses Lakeside Drive and eventually combines with the Lymberry Street system. The Lakeside Drive storm drain begins as an 18-inch diameter conduit south of Moana Lane increasing to 24-inches at Glenda Way. North of Glenda Way, the pipe is an oval shaped corrugated metal pipe, 22x36-inches in dimension. Another system is present in the northeast corner of the intersection of Moana Lane and Lakeside Drive. However, due to extensive silting the size and route of this system could not be determined. (Since the routing and capacity of this system was not critical to this study, the City was not asked to clean the lines.)

The Brinkby Avenue system picks up local runoff flows west of Lakeside Drive via a 12-inch diameter pipe. The collected runoff flows east and connects to a 60-inch diameter conduit at the intersection of Brinkby and Lakeside. The

60-inch pipe runs east on Brinkby approximately 300 feet to where it turns north and discharges into a concrete lined trapazoidal channel. The channel has a 4 foot wide bottom with 3/4 H. to 1 V. walls and a 4.5 foot depth. This open channel travels north and discharges into Virginia Lake after passing under Eastshore Drive via a triple barrel culvert of 42x27-inch oval pipes.

The Beck Street system collects runoff from the adjacent condominium complex through a series of drop inlets and catch basins. The runoff is directed to a sag portion of Beck Street approximately 200 feet west of Lakeside Drive. At this point, the run off is carried to the north a short distance and discharged onto the ground. presumably on private property. The route that this flow follows after discharge was not determined.

The other significant storm drainage facility within the Project is a 24-inch corrugated metal pipe which runs from Plumas Street just north of Glenda Way to a location northwest of Beck Street (the line could not be traced beyond this point). In between. the 24-inch pipe runs northeasterly from Plumas through the apartment complex situated between Glenda Way and Berrum Lane. At Berrum, the line turns and heads due north through the west side of the Anderson School yard to Brinkby Avenue. The line crosses Brinkby and continues northward to the open pasture south of Mountain View Drive. As stated above the alignment from this point on could not be determined. It is postulated that the 24-inch line eventually discharges into the existing underground storm drain line running in the City of Reno Soccer field and is carried to Virginia Lake via this system.

All onsite catch basins are of the City of Reno standard type 1 which are curb inlet types only (see Existing Utility Map).

CHAPTER 4

HYDROLOGY

A. DRAINAGE BASINS

There are two offsite drainage basins tributary to the Project area. The larger of the two basins enters the Project at the intersection of Plumas and Glenda (see Local Drainage Basins map) and is designated as the "Plumas Tributary Area". The Plumas basin encompasses a relatively large narrow area of approximately 1038 surface acres that extends to the southwest almost 4 miles.

As part of the Retirement Manor development just west of Plumas Street. (refer to Osgood Engineering Construction Plans for details), a 7 foot by 5 foot concrete box has been installed which conveys the Plumas Tributary Area runoff flows directly to Plumas Street. The new box culvert structure is approximately 440 feet in length and sloped at less than 1 percent.

Another smaller drainage basin, designated as the "Moana Tributary Area" lies to the south of the Project and encompasses approximately 183 acres and is about 1 mile long. This basin's drainage route crosses Plumas Street south of Moana Lane in a clearly defined area. East of Plumas. however, the flows do not travel in well defined routes. Eventually. the flows reach the intersection of Moana Lane and Lakeside Drive the southeast corner of the Project.

B. TRIBUTARY FLOWS

The incoming runoff flows were selected by the City of Reno from an unpublished 1985 Hydrologic Study prepared by Winzler and Kelly, a consulting firm. The Project lies within a "drainage deficiency area" designated as Number 4. Winzler and Kelly utilized the Rational Method for computing peak runoff values for various critical locations (nodes) within the deficiency area. The reported 100 year peak flows at Plumas and Glenda. the Plumas Tributary Area (Winzler and Kelly node f). is 575 cubic feet per second (cfs). The 100 year flow at Moana and Lakeside, (node m). Moana Tributary Area is 230 cfs. A third 100 year inflow was given by the City via a letter dated 9 February 1988. This flow was 27 cfs entering from the west side of Plumas adjacent to Brinkby Avenue.

To hydraulically size the storm drain facilities through the study area. the Winzler and Kelly results needed to be modified to reflect the "proposed" installation of underground storm drainage conduits. Also, the Project area hydrology needed to be specifically analyzed to locate and size the onsite collection facilities.

C. PROJECT AREA FLOWS

Kennedy/Jenks/Chilton utilized the Rational Method to estimate the 5 year and 100 year peak flows that would be collected and conveyed by a storm drain system onsite. Of prime interest were the routing of flows to the point of confluence between the two offsite tributary areas and the anticipated flows at the outfall into Virginia Lake.

Table 4-1 below shows the results of the computations for the Project site hydrology. The estimated 100 year peak flow at the confluence of the two tributary areas is estimated to be 710 cfs. The peak flow entering Virginia Lake is 720 cfs. These values are higher than the values contained in the Winzler and Kelly report for the same locations. The differences are explained by the fact that Winzler and Kelly had kept the Plumas flow and the Moana/Lakeside flow separate and they assumed a longer time of concentration due to total overland flow for their computations of the peak runoff values at the onsite nodes. Kennedy/Jenks/Chilton computed the onsite peaks by taking the inflow (Winzler and Kelly Nodes F and M) and calculating velocities representative of closed conduits rather than normal overland velocities. This reduces the time of concentration at the downstream onsite nodes and thus increases the given rainfall intensities (see City of Reno Rainfall Intensity - Duration - Frequency Curves, Public Works Design Manual). The net effect is that the peak quantities increase.

TABLE 4-1

ESTIMATED DESIGN FLOWS AT DRAINAGE NODES

Location Drainage Node	Drainage Area (Acres)	Runoff Factor	Rainfall Intensities 5yr (in/hr)	100yr (in/hr)	Q5yr (cfs)	Q100yr (cfs)
1) Plumas & Glenda *	1052.3	0.33	0.68	1.68	235	585
2) Moana & Lakeside	182.5	0.46	1.14	3.11	95	260
3) Glenda & Lakeside	1254.9	0.35	0.67	1.62	295	710
4) Lakeside & Brinkby	1286.1	0.36	0.66	1.56	305	720
5) Eastshore @ Lake	1301.2	0.36	0.64	1.52	305	720

* Assumes that inflow (27 cfs) from Plumas at Brinkby included in Plumas and Glenda flows.

The Project area was divided into sub-drainage basins "A" through "T" and the onsite 5 year and 100 year storm flows computed using the Rational Method. The sub-basin boundaries were based on existing drainage patterns and existing storm drain facilities. The point of concentration of each sub-basin is located at the low point. The peak flows of the onsite sub-basins are listed in Table 4-2. An isopleth number of 1.5 has been included for wet season runoff. The sub-basins are shown delineated on Figure 3, Local Drainage Basins Map.

TABLE 4-2

ONSITE HYDROLOGY

ESTIMATED SUB-BASIN DESIGN FLOWS

Area	Drainage Area (Acres) "a"	Runoff Factor "c"	TC* tc (min)	Rainfall Intensities 5yr (in/hr) "i"	100yr (in/hr) "i"	Q5yr (cfs)	Q5yr (wet) (cfs)	Q100yr (cfs)	Q100yr (wet) (cfs)
A	8.1	0.70	18	0.98	2.70	5.6	8.4	15.3	23.0
B	0.2	0.95	12.5	1.35	3.40	0.3	0.5	0.6	0.9
C	5.5	0.70	15.5	1.10	2.90	4.2	6.3	11.2	16.8
D	1.3	0.85	14.7	1.15	3.00	1.3	2.0	3.3	5.0
E	1.0	0.95	17.8	0.98	2.70	0.9	1.4	2.6	3.8
F	5.2	0.70	20.5	0.88	2.45	3.2	4.8	8.9	13.4
G	1.5	0.70	13.4	1.15	3.15	1.2	1.8	3.3	5.0
H	6.7	0.70	16.5	1.05	2.80	4.9	7.4	13.1	19.7
I	0.4	0.95	17.9	0.98	2.70	0.4	0.6	1.1	1.7
J	7.3	0.70	18.4	0.96	2.55	4.9	7.4	13.0	19.5
K	2.0	0.30	12.0	1.25	3.40	0.8	1.2	2.1	3.2
L	1.6	0.55	13.9	1.15	3.10	1.0	1.5	2.7	4.1
M	4.5	0.60	15.2	1.10	2.90	3.0	4.5	7.8	11.7
N	1.2	0.70	13.7	1.15	3.15	1.0	1.5	2.6	3.9
O	0.5	0.95	20.3	0.88	2.45	0.4	0.6	1.2	1.8
P	10.3	0.70	19.0	0.94	2.50	6.8	10.2	18.1	27.2
Q	5.4	0.70	12.4	1.35	3.40	5.1	7.7	12.9	19.4
R	0.8	0.70	11.3	1.30	3.55	0.8	1.2	2.0	3.0
S	0.6	0.95	18.6	0.96	2.55	0.6	0.9	1.5	2.3
T	1.5	0.25	11.9	1.25	3.40	0.5	0.8	1.3	2.0

CHAPTER 5

STORM DRAIN CONCEPTUAL DESIGNS

A. APPROACH

Kennedy/Jenks/Chilton analyzed the existing storm drainage systems and found them to be substantially undersized to adequately convey the selected design flows for the two tributary areas. Therefore, Kennedy/Jenks/Chilton identified conceptual design options which provided for all new storm drainage facilities and combination systems. The combination systems looked at new drainage facilities coupled with and augmented by the existing systems.

B. ALTERNATIVES

After reviewing many different options and routes, Kennedy/Jenks/Chilton narrowed the analysis to three alternatives. Each of the three final alternatives consisted of all new facilities. The existing facilities proved to be much too small to carry enough flow to substantially reduce the size of the new system carrying the remaining storm waters. Coupled with the complex structures required to split the large design flows, Kennedy/Jenks/Chilton dropped the consideration of utilizing existing storm drain facilities to convey the 100 year storm flows. All three options connect to the new 7'x5' box culvert west of the Plumas and Glenda intersection. The existing 7'x5' box culvert does not have the capacity required to carry the expected 100 year flow. Therefore, all options will have a special hydraulic structure designed to carry the flows from the existing 7'x5' box culvert and intercept overland flows.

Extensive preliminary designs of the inlet, outfall and special hydraulic (benos, etc.) structures were not performed. The intake structure at Glenda and Plumas requires that the quantity of flow carried in the box and the overland flow be determined. The outfall structure configuration depends on the alternative selected.

The given inflows represent future flow conditions. The conduit sizes recommended herein will convey these future flows. No attempt was made to provide structural design for the addition of future conduits as the manner and sequence of future development in unknown at this time.

The three alternatives analyzed in depth are depicted on Figures 4, 5 and 6 and are briefly described below:

1. Option 1

Option 1 connects a new 6'x6' box culvert with the recently placed 7'x5' box culvert located west of the Plumas and Glenda intersection. The new 6'x6' box culvert conveys flows down Glenda Way to the intersection Lakeside. At this point, the 6'x6' box culvert turns to the north via a special hydraulic structure which makes the turn in two 45 degree bends. Also at this intersection. the Plumas tributary area flows are combined with the flows from the Moana tributary area carried via a 6'x4' box culvert. After combining the flows are carried north down Lakeside in an 8'x7' box culvert which continues to Virginia Lake. As with the following two alternatives, the local runoff is collected and discharged into the main trunk line. (See onsite collection Section 5C.)

2. Option 2

Option 2 is the same basic layout as Option 1 from the intersection of Glenda and Lakeside north. However, the Moana tributary flows are picked up on Plumas Street and conveyed to the north via a 60-inch diameter pipe. The 60-inch pipe discharges into an 8'x6' box culvert that runs down Glenda to Lakeside. The remaining runoff that collects at Moana and Lakeside is collected

and carried north in a 42-inch diameter pipe to convey with the Plumas/Glenda flows. From Glenda north, the storm flows are conveyed in an 8'x7' box culvert to Virginia Lake, as in Option 1.

3. Option 3

This alternative is a variation of Option 2 in that the initial collection and conveyance system is the same. However, from the intersection of Glenda Way and Lakeside Drive north, the system is different. From the confluence of the two offsite tributary storm runoff flows at Glenda Way, the system is carried north down Lakeside via a 9'x6' box culvert to Brinkby Avenue. At Brinkby, the storm drain line turns to the east through a special structure which makes the transition by two 45 degree bends. The facility runs east on Brinkby Avenue approximately 300 feet in a 10'x6' box culvert to where the existing open channel lies. The flow will once again be turned to the north via a special hydraulic structure (two 45 degree bends) and directed towards Virginia Lake. The open channel will be replaced by a 12'x6' box culvert to provide discharge directly into Virginia Lake. The existing triple barrel at

culvert will be removed and the profile of East Shore Drive will be raised adjacent to the new box culvert.

C. ONSITE COLLECTION

The onsite runoff is collected by a series of catch basins located in the several streets of the Project. Berrum, Brinkby and Beck will have 24-inch storm drain conduits installed to connect the catch basin flows to the major storm drainage facility in Lakeside Drive. The 24-inch lines will extend up Berrum and Brinkby to allow connection with the existing 24-inch facility. This will convey flow carried by the existing facility to the new Lakeside box culvert.

The catch basins will be combination inlets, City of Reno Type 2A and sized to capture the 100 year local runoff flows, thus offering the most protection against localized flooding. The catch basin locations and sizes will prevent overtopping the curb during the 100 year event, or flooding more than 6 feet of a travel lane during the 5 year event.

Specific criteria used for the catch basins was weir and orifice flow with a 50 percent clogging factor for the horizontal grate and 0 percent clogging for the curb opening. The catch basins are located so that 70 percent of the 100 year flood flows are captured without overtopping the sidewalk.

At this time there are no substantial flows to intercept on the east side of Lakeside Drive between Moana and Brinkby. During the final design phase, it

may be advisable to place several inlets along the east gutter line of Lakeside as a precaution against flooding of the residential/commercial structures.

The local system is the same for all three options. (See Figure 4. 5. 6, Options 1, 2 and 3. Table A in the Appendix lists the curb opening length for the proposed catch basins.)

D. PRELIMINARY COSTS

Preliminary cost estimates for three alternatives were generated. These costs were developed based on very preliminary, conceptual designs. The cost estimates are shown in Tables B, C and D contained in the Appendix.

Unit costs were derived from City of Reno development costs, Nevada Department of Transportation Bid Tabulations, Manufacturer Quotes and in-house cost estimating guides. Not included in these estimates are utility relocation costs. After preliminary reviews by Sierra Pacific Power Company and Westpac. it appears that utility adjustments will be paid by the affected utility company. Construction quality control and project administration costs are not included.

It should also be noted that all three options will require that a parallel sanitary line be installed in Lakeside Drive between Glenda Way and Beck. The invert of the new storm drain will preclude connecting sanitary flows from the east with the existing sanitary sewer line running west of the Lakeside Drive

centerline. The cost generated for each alternative include the installation of this parallel collector sanitary sewer.

In summary, the preliminary costs of the three options are:

	Option 1	Option 2	Option 3
Removals	$ 15,100	$ 15,100	$ 31,000
New Construction	$1,849,645	$1,936,415	$1,967,678
Subtotal	$1,864,745	$1,951,515	$1,998.678
Contingency (20%)	$ 372,949	$ 390,303	$ 399.736
Engineering (15%)	$ 335,654	$ 351,273	$ 359.762
Total	$2,573,348	$2,693,091	$2,758.175
Use Total	$2,600,000	$2,700,000	$2,800,000

Note: Engineering costs include preliminary design. final design and construction engineering.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

1. General

The storm drainage options studied for the Plumas/Moana Storm Drain Project represent conservative designs that will adequately convey the 100 year storm flows through the Project area. The Rational Method of hydrology yields conservative peak flow values particularly for drainage areas greater than one square mile. Thus, facilities designed utilizing these peak flows are likewise conservative.

2. Utilities

The underground utility conflicts anticipated by the construction of the storm drain will be most pronounced in the intersection of Moana and Lakeside. Two large water mains run east-west through the intersection as well as gas mains and a trunk sanitary sewer line. Lakeside Drive north of Moana has a full range of underground utilities. However, sufficient clearance between the various underground utilities appears to be available to install the proposed storm drain facility in Lakeside Drive without major relocating. Trench shoring will be required in Lakeside due to the depth of trench and the proximity of the utility lines.

The major inflow at Glenda and Plumas will be carried down Glenda Way to Lakeside. Glenda was selected because of its utility configuration and the "straight shot" available between Plumas and Lakeside. The underground utilities in Glenda consist of gas and water in a common trench and the existing 36-inch diameter storm drain. There is no sanitary sewer in Glenda. Thus, utilizing the same basic alignment as the existing storm drain, there will be fewer utility adjustments than on any of the other east-west roads between Plumas and Lakeside. Glenda also offers the opportunity of convey flows with only one 90 degree bend, (two 45 degree bends) at the intersection of Glenda and Lakeside. Any other route would require a minimum of three 90 degree bends.

3. Existing Storm Drains

As stated above, the utilization of the existing storm drainage facilities does not offer many cost or hydraulic advantages. These systems are so small that appreciable flows cannot be diverted through them. The size of the facilities to convey the remaining flows will be large and will still be expensive to install. Also, the hydraulic efficiencies are difficult to assess and may not perform as anticipated. Kennedy/Jenks/Chilton concluded that only new facilities designed to accommodate the full peak flows should be considered.

4. Costs

The preliminary cost estimates of the three conceptual design alternatives yielded only about a ten percent difference between the three. It is Kennedy/Jenks/Chilton's preliminary estimate that a storm drain system to convey the 100 year storm flows will cost between $2.5 million to $3.0 million to construct.

B. RECOMMENDATIONS

As stated above, the preliminary cost estimates are within ten percent of each other. The construction cost estimates of the three alternatives do not yield a clear economical choice. Therefore, other criteria such as hydraulic efficiency, utility conflicts and traffic interuption became the primary parameters for the selection of the recommended storm drain alternative.

Kennedy/Jenks/Chilton recommends that Option 2 be the alternative selected as the design basis for the Plumas/Moana Storm Drain Project. It is our conclusion that Option 2 offers the most efficient hydraulic design due to fewer bends and pipe size transitions. Sharp 90 degree bends in a structure of this size should be avoided if at all possible from the hydraulic and maintenance standpoints. This is the primary reason that Option 2 is recommended over Option 3. Option 3 has three 90 degree bends along with four changes of conduit sizes in the main trunk line. By collecting the majority of the Moana tribu-

tary area runoff on Plumas Street, the potential severe utility conflicts in the Moana/Lakeside intersection can be reduced. The 42-inch diameter pipe offers more flexibility crossing the intersection than does a 6'x4' box culvert. Any work that can be avoided or hastened in the Moana/Lakeside intersection will save money and inconvenience to the public. Also, Plumas Street has a sag vertical curve, which provides a sump condition. This is ideal for intercepting flows of this magnitude (200 cfs).

The effects of the Plumas/Moana Storm Drain Project flows on the flood storage capacity of Virginia Lake have not been analyzed. The Project flows coupled with other inflows into Virginia Lake could exceed the flood storage volume and the discharge capabilities of the outlet structures. Kennedy/Jenks/Chilton recommends that a reservoir routing analysis be conducted on Virginia Lake to assure that storm runoff volumes do not jeopardize the structural integrity of the reservoir and dam.

APPENDIX A

TABLE A

ONSITE COLLECTION SYSTEM

PROPOSED CATCH BASINS

	Catch Basin Number	Type	Curb Opening Length (Ft.)	Q 100 (cfs)	Q 5 (cfs)
	DI-1	2A	60	105.0	39.9
	DI-2	2A	60	105.0	39.9
	DI-3	2A	10	5.0	1.9
	DI-4	2A	10	5.0	1.9
	DI-5	2A	10	7.6	2.9
	DI-6	2A	10	7.6	2.9
	DI-7	2A	15	4.0	1.5
Option 1,	DI-8	2A	80	115.0	43.7
Option 2,	DI-8	2A	25	27.5	10.5
Option 3,	DI-8 (3)	2A	25	27.5	10.5
Option 1,	DI-9	2A	80	115.0	43.7
Option 2,	DI-9	2A	25	27.5	10.5
Option 3,	DI-9 (3)	2A	25	27.5	10.5
	DI-10	2A	20	10.0	3.8
	DI-11	2A	20	10.0	3.8
	DI-12	2A	20	10.0	3.8
	DI-13	2A	20	10.0	3.8
	DI-14	2A	20	6.8	2.6
	DI-15	2A	20	5.0	1.9
	DI-16	2A	15	6.5	2.5
	DI-17	2A	25	6.5	2.5
	DI-18	2A	20	6.5	2.5
	DI-19	2A	20	6.6	2.5
	DI-20	2A	20	2.0	0.8
	DI-20	2A	20	9.0	3.4
	DI-22	2A	20	9.0	3.4
	DI-23	2A	10	3.9	1.5
	DI-24	2A	10	3.9	1.5
	DI-25	2A	10	2.0	0.8
	DI-26	2A	10	6.5	2.5
	DI-27	2A	10	6.5	2.5

PRELIMINARY COST ESTIMATE — TABLE B — KENNEDY/JENKS/CHILTON

CLIENT: City of Reno

PROJECT: Plumas/Moana Storm Drain
OPTION 1

CURRENT COSTS
ESCALATE @ % / MONTH
ESCALATE COSTS FOR MONTHS

DATE:
K/J/C # 877041
REV DATE 03/14/89
EST. BY:

TYPE OF ESTIMATE : CONCEPTUAL TAKEOFF (W/PLANS)

ITEM NO	DESCRIPTION	QUANTITY	UNIT	MATERIAL UNIT COST	MATERIAL EXTENSION	LABOR & EQUIPMENT UNIT COST	LABOR & EQUIPMENT EXTENSION	MATERIAL, LABOR, OH, PROFIT UNIT COST	MATERIAL, LABOR, OH, PROFIT EXTENSION	TOTAL COST UNIT COST	TOTAL COST EXTENSION
1	Special Hydraulic Structure	3	LS	0.00	$0	0.00	$0	20,000.00	$60,000	20000.00	$60,000
2	6'x 4' Reinforced Concrete Box	1,030	LF	0.00	$0	0.00	$0	166.00	$170,980	166.00	$170,980
3	6'x 6' Reinforced Concrete Box	1,500	LF	0.00	$0	0.00	$0	187.00	$280,500	187.00	$280,500
4	8'x 6' Reinforced Concrete Box	0	LF	0.00	$0	0.00	$0	216.00	$0	216.00	$0
5	8'x 7' Reinforced Concrete Box	2,390	LF	0.00	$0	0.00	$0	216.00	$516,240	216.00	$516,240
6	9'x 6' Reinforced Concrete Box	0	LF	0.00	$0	0.00	$0	244.00	$0	244.00	$0
7	10'x 6' Reinforced Concrete Box	0	LF	0.00	$0	0.00	$0	272.00	$0	272.00	$0
8	12'x 6' Reinforced Concrete Box	0	LF	0.00	$0	0.00	$0	321.00	$0	321.00	$0
9	24" Reinforced Concrete Pipe	2,600	LF	0.00	$0	0.00	$0	22.00	$57,200	22.00	$57,200
10	42" Reinforced Concrete Pipe	0	LF	0.00	$0	0.00	$0	50.00	$0	50.00	$0
11	60" Reinforced Concrete Pipe	0	LF	0.00	$0	0.00	$0	75.00	$0	75.00	$0
12	RCB Manhole Access	11	EA	0.00	$0	0.00	$0	1,200.00	$13,200	1200.00	$13,200
13	Storm Drain Manholes, Type 1	6	EA	0.00	$0	0.00	$0	1,200.00	$7,200	1200.00	$7,200
14	Catch Basins, Type 2A	27	EA	0.00	$0	0.00	$0	2,500.00	$67,500	2500.00	$67,500
15	10" P.V.C. Sanitary Sewer	550	LF	0.00	$0	0.00	$0	16.00	$8,800	16.00	$8,800
16	12" P.V.C. Sanitary Sewer	1,100	LF	0.00	$0	0.00	$0	18.75	$20,625	18.75	$20,625
17	Sanitary Sewer Manholes, Type 1	6	EA	0.00	$0	0.00	$0	1,200.00	$7,200	1200.00	$7,200
18	Sawcut Existing Pavement	15,000	LF	0.00	$0	0.00	$0	1.00	$15,000	1.00	$15,000
19	Trench Excavation	34,000	CY	0.00	$0	0.00	$0	8.00	$272,000	8.00	$272,000
20	Trench Shoring	5,000	LF	0.00	$0	0.00	$0	10.00	$50,000	10.00	$50,000
21	Granular Backfill	12,400	CY	0.00	$0	0.00	$0	8.00	$99,200	8.00	$99,200
22	Pavement Patching 4"A.C., 6" A.B.	80,000	SF	0.00	$0	0.00	$0	1.20	$96,000	1.20	$96,000
23	Remove 36" Pipe	1,400	LF	0.00	$0	0.00	$0	2.00	$2,800	2.00	$2,800
24	Remove 24" Pipe	900	LF	0.00	$0	0.00	$0	2.00	$1,800	2.00	$1,800
25	Remove Existing S.D. Manholes	9	EA	0.00	$0	0.00	$0	500.00	$4,500	500.00	$4,500
26	Remove 60" Pipe	0	LF	0.00	$0	0.00	$0	3.00	$0	3.00	$0
27	Remove Existing Catch Basins	12	LF	0.00	$0	0.00	$0	500.00	$6,000	500.00	$6,000
28	Remove Concrete Lined Ditch and Culvert crossing	0	LS	0.00	$0	0.00	$0	15,000.00	$0	15000.00	$0
29	Gas Main Relocation at Moana And Lakeside	1	LS	0.00	$0	0.00	$0	0.00	$0	0.00	$0
30	Water Main Relocation at Moana And Lakeside	1	LF	0.00	$0	0.00	$0	0.00	$0	0.00	$0
31	Water Service Relocation	21	EA	0.00	$0	0.00	$0	0.00	$0	0.00	$0
32	Gas Service Relocation	8	EA	0.00	$0	0.00	$0	0.00	$0	0.00	$0
33	Traffic Control	1	EA	0.00	$0	0.00	$0	50,000.00	$50,000	50000.00	$50,000
34	Native Backfill	11,500	CY	0.00	$0	0.00	$0	4.00	$46,000	4.00	$46,000
35	A.C. Removal	80,000	SF	0.00	$0	0.00	$0	0.15	$12,000	0.15	$12,000

	COLUMN TOTALS		$0	$0	$1,864,745	$1,864,745
	CONTINGENCY %	20.00	$0	$0	$372,949	$372,949
	SUBTOTAL		$0	$0	$2,237,694	$2,237,694
	OH & PROFIT %	0.00	$0	$0	$0	$0
	TOTAL MARKED UP COST		$0	$0	$2,237,694	$2,237,694
					USE TOTAL -->	$2,230,000

PRELIMINARY COST ESTIMATE — TABLE C — KENNEDY/JENKS/CHILTON

CLIENT: City of Reno

PROJECT: Plumas/Moana Storm Drain
OPTION 2
(RECOMENDED OPTION)

DATE:
K/J/C # 877041
REV DATE 03/14/89
EST. BY:

CURRENT COSTS
ESCALATE @ % / MONTH
ESCALATE COSTS FOR MONTHS

TYPE OF ESTIMATE : CONCEPTUAL TAKEOFF (W/PLANS)

ITEM NO	DESCRIPTION	QUANTITY	UNIT	MATERIAL UNIT COST	MATERIAL EXTENSION	LABOR & EQUIPMENT UNIT COST	LABOR & EQUIPMENT EXTENSION	MATERIAL, LABOR, OH, PROFIT UNIT COST	MATERIAL, LABOR, OH, PROFIT EXTENSION	TOTAL COST UNIT COST	TOTAL COST EXTENSION
1	Special Hydraulic Structure	3	LS	0.00	$0	0.00	$0	20,000.00	$60,000	20000.00	$60,000
2	6'x 4' Reinforced Concrete Box		LF	0.00	$0	0.00	$0	166.00	$0	166.00	$0
3	6'x 6' Reinforced Concrete Box		LF	0.00	$0	0.00	$0	187.00	$0	187.00	$0
4	8'x 6' Reinforced Concrete Box	1,500	LF	0.00	$0	0.00	$0	216.00	$324,000	216.00	$324,000
5	8'x 7' Reinforced Concrete Box	2,390	LF	0.00	$0	0.00	$0	216.00	$516,240	216.00	$516,240
6	9'x 6' Reinforced Concrete Box		LF	0.00	$0	0.00	$0	244.00	$0	244.00	$0
7	10'x 6' Reinforced Concrete Box		LF	0.00	$0	0.00	$0	272.00	$0	272.00	$0
8	12'x 6' Reinforced Concrete Box		LF	0.00	$0	0.00	$0	321.00	$0	321.00	$0
9	24" Reinforced Concrete Pipe	2,600	LF	0.00	$0	0.00	$0	22.00	$57,200	22.00	$57,200
10	42" Reinforced Concrete Pipe	962	LF	0.00	$0	0.00	$0	50.00	$48,100	50.00	$48,100
11	60" Reinforced Concrete Pipe	1,250	LF	0.00	$0	0.00	$0	75.00	$93,750	75.00	$93,750
12	RCB Manhole Access	9	EA	0.00	$0	0.00	$0	1,200.00	$10,800	1200.00	$10,800
13	Storm Drain Manholes, Type 1	13	EA	0.00	$0	0.00	$0	1,200.00	$15,600	1200.00	$15,600
14	Catch Basins, Type 2A	27	EA	0.00	$0	0.00	$0	2,500.00	$67,500	2500.00	$67,500
15	10" P.V.C. Sanitary Sewer	550	LF	0.00	$0	0.00	$0	16.00	$8,800	16.00	$8,800
16	12" P.V.C. Sanitary Sewer	1,100	LF	0.00	$0	0.00	$0	18.75	$20,625	18.75	$20,625
17	Sanitary Sewer Manholes, Type 1	6	EA	0.00	$0	0.00	$0	1,200.00	$7,200	1200.00	$7,200
18	Sawcut Existing Pavement	16,500	LF	0.00	$0	0.00	$0	1.00	$16,500	1.00	$16,500
19	Trench Excavation	39,600	CY	0.00	$0	0.00	$0	8.00	$316,800	8.00	$316,800
20	Trench Shoring	3,900	LF	0.00	$0	0.00	$0	10.00	$39,000	10.00	$39,000
21	Granular Backfill	11,200	CY	0.00	$0	0.00	$0	8.00	$89,600	8.00	$89,600
22	Pavement Patching 4"A.C., 6" A.B.	98,000	SF	0.00	$0	0.00	$0	1.20	$117,600	1.20	$117,600
23	Remove 36" Pipe	1,400	LF	0.00	$0	0.00	$0	2.00	$2,800	2.00	$2,800
24	Remove 24" Pipe	900	LF	0.00	$0	0.00	$0	2.00	$1,800	2.00	$1,800
25	Remove Existing S.D. Manholes	9	EA	0.00	$0	0.00	$0	500.00	$4,500	500.00	$4,500
26	Remove 60" Pipe		LF	0.00	$0	0.00	$0	3.00	$0	3.00	$0
27	Remove Existing Catch Basins	12	LF	0.00	$0	0.00	$0	500.00	$6,000	500.00	$6,000
28	Remove Concrete Lined Ditch and Culvert crossing		LS	0.00	$0	0.00	$0	15,000.00	$0	15000.00	$0
29	Gas Main Relocation at Moana And Lakeside		LS	0.00	$0	0.00	$0	0.00	$0	0.00	$0
30	Water Main Relocation at Moana And Lakeside		LF	0.00	$0	0.00	$0	0.00	$0	0.00	$0
31	Water Service Relocation		EA	0.00	$0	0.00	$0	0.00	$0	0.00	$0
32	Gas Service Relocation		EA	0.00	$0	0.00	$0	0.00	$0	0.00	$0
33	Traffic Control	1	EA	0.00	$0	0.00	$0	50,000.00	$50,000	50000.00	$50,000
34	Native Backfill	15,600	CY	0.00	$0	0.00	$0	4.00	$62,400	4.00	$62,400
35	A.C. Removal	98,000	SF	0.00	$0	0.00	$0	0.15	$14,700	0.15	$14,700

	COLUMN TOTALS	$0	$0	$1,951,515	$1,951,515
	CONTINGENCY % 20.00	$0	$0	$390,303	$390,303
	SUBTOTAL	$0	$0	$2,341,818	$2,341,818
	OH & PROFIT % 0.00	$0	$0	$0	$0
	TOTAL MARKED UP COST	$0	$0	$2,341,818	$2,341,818
				USE TOTAL -->	$2,350,000

PRELIMINARY COST ESTIMATE — TABLE D — KENNEDY/JENKS/CHILTON

CLIENT: City of Reno

PROJECT: Plumas/Moana Storm Drain
OPTION 3

CURRENT COSTS
ESCALATE @ % / MONTH
ESCALATE COSTS FOR MONTHS

DATE: _____
K/J/C # 877041
REV DATE 03/14/89
EST. BY: _____

TYPE OF ESTIMATE : CONCEPTUAL TAKEOFF (W/PLANS)

ITEM NO	DESCRIPTION	QUANTITY	UNIT	MATERIAL UNIT COST	MATERIAL EXTENSION	LABOR & EQUIPMENT UNIT COST	LABOR & EQUIPMENT EXTENSION	MATERIAL, LABOR, OH, PROFIT UNIT COST	MATERIAL, LABOR, OH, PROFIT EXTENSION	TOTAL COST UNIT COST	TOTAL COST EXTENSION
1	Special Hydraulic Structure	4	LS	0.00	$0	0.00	$0	20,000.00	$80,000	20000.00	$80,000
2	6'x 4' Reinforced Concrete Box		LF	0.00	$0	0.00	$0	166.00	$0	166.00	$0
3	6'x 6' Reinforced Concrete Box		LF	0.00	$0	0.00	$0	187.00	$0	187.00	$0
4	8'x 6' Reinforced Concrete Box	2,615	LF	0.00	$0	0.00	$0	216.00	$564,840	216.00	$564,840
5	8'x 7' Reinforced Concrete Box	0	LF	0.00	$0	0.00	$0	216.00	$0	216.00	$0
6	9'x 6' Reinforced Concrete Box		LF	0.00	$0	0.00	$0	244.00	$0	244.00	$0
7	10'x 6' Reinforced Concrete Box	300	LF	0.00	$0	0.00	$0	272.00	$81,600	272.00	$81,600
8	12'x 6' Reinforced Concrete Box	900	LF	0.00	$0	0.00	$0	321.00	$288,900	321.00	$288,900
9	24" Reinforced Concrete Pipe	3,450	LF	0.00	$0	0.00	$0	22.00	$75,900	22.00	$75,900
10	42" Reinforced Concrete Pipe	962	LF	0.00	$0	0.00	$0	50.00	$48,100	50.00	$48,100
11	60" Reinforced Concrete Pipe	1,250	LF	0.00	$0	0.00	$0	75.00	$93,750	75.00	$93,750
12	RCB Manhole Access	11	EA	0.00	$0	0.00	$0	1,200.00	$13,200	1200.00	$13,200
13	Storm Drain Manholes, Type 1	16	EA	0.00	$0	0.00	$0	1,200.00	$19,200	1200.00	$19,200
14	Catch Basins, Type 2A	27	EA	0.00	$0	0.00	$0	2,500.00	$67,500	2500.00	$67,500
15	10" P.V.C. Sanitary Sewer	550	LF	0.00	$0	0.00	$0	16.00	$8,800	16.00	$8,800
16	12" P.V.C. Sanitary Sewer	650	LF	0.00	$0	0.00	$0	18.75	$12,188	18.75	$12,188
17	Sanitary Sewer Manholes, Type 1	5	EA	0.00	$0	0.00	$0	1,200.00	$6,000	1200.00	$6,000
18	Sawcut Existing Pavement	18,000	LF	0.00	$0	0.00	$0	1.00	$18,000	1.00	$18,000
19	Trench Excavation	31,400	CY	0.00	$0	0.00	$0	8.00	$251,200	8.00	$251,200
20	Trench Shoring	2,950	LF	0.00	$0	0.00	$0	10.00	$29,500	10.00	$29,500
21	Granular Backfill	11,000	CY	0.00	$0	0.00	$0	8.00	$88,000	8.00	$88,000
22	Pavement Patching 4"A.C., 6" A.B.	92,000	SF	0.00	$0	0.00	$0	1.20	$110,400	1.20	$110,400
23	Remove 36" Pipe	1,400	LF	0.00	$0	0.00	$0	2.00	$2,800	2.00	$2,800
24	Remove 24" Pipe	900	LF	0.00	$0	0.00	$0	2.00	$1,800	2.00	$1,800
25	Remove Existing S.D. Manholes	9	EA	0.00	$0	0.00	$0	500.00	$4,500	500.00	$4,500
26	Remove 60" Pipe	300	LF	0.00	$0	0.00	$0	3.00	$900	3.00	$900
27	Remove Existing Catch Basins	12	LF	0.00	$0	0.00	$0	500.00	$6,000	500.00	$6,000
28	Remove Concrete Lined Ditch and Culvert crossing	1	LS	0.00	$0	0.00	$0	15,000.00	$15,000	15000.00	$15,000
29	Gas Main Relocation at Moana And Lakeside		LS	0.00	$0	0.00	$0	0.00	$0	0.00	$0
30	Water Main Relocation at Moana And Lakeside		LF	0.00	$0	0.00	$0	0.00	$0	0.00	$0
31	Water Service Relocation		EA	0.00	$0	0.00	$0	0.00	$0	0.00	$0
32	Gas Service Relocation		EA	0.00	$0	0.00	$0	0.00	$0	0.00	$0
33	Traffic Control	1	EA	0.00	$0	0.00	$0	50,000.00	$50,000	50000.00	$50,000
34	Native Backfill	11,700	CY	0.00	$0	0.00	$0	4.00	$46,800	4.00	$46,800
35	A.C. Removal	92,000	SF	0.00	$0	0.00	$0	0.15	$13,800	0.15	$13,800

	COLUMN TOTALS	$0	$0	$1,998,678	$1,998,678
	CONTINGENCY % 20.00	$0	$0	$399,736	$399,736
	SUBTOTAL	$0	$0	$2,398,413	$2,398,413
	OH & PROFIT % 0.00	$0	$0	$0	$0
	TOTAL MARKED UP COST	$0	$0	$2,398,413	$2,398,413

PLUMAS STREET

A
Q_5 = 5.6cfs
Q_{100} = 15.3cfs

H
Q_5 = 4.9cfs
Q_{100} = 13.1 cfs

J
Q_5 = 4.9cfs
Q_{100} = 13.0cfs

P
Q_5 = 6.8cfs
Q_{100} = 8.1 cfs

GLENDA WAY

SALEM PL.

BERRUM PL.

CLOVER WAY

B Q_5 = 0.3cfs Q_{100} = 0.6cfs

K
Q_5 = 0.8cfs
Q_{100} = 2.1 cfs

M
Q_5 = 3.0cfs
Q_{100} = 7.8 cfs

F
Q_5 = 3.2cfs
Q_{100} = 8.9cfs

T
Q_5 = 1.25cfs
Q_{100} = 3.40cfs

Q
Q_5 = 5.1 cfs
Q_{100} = 12.9cfs

D Q_5 = 1.3cfs Q_{100} = 3.3cfs

C
Q_5 = 4.2cfs
Q_{100} = 11.2cfs

BERRUM LANE

L
Q_5 = 1.0cfs
Q_{100} = 2.7cfs

MOANA LANE

GLENDA WAY

G
Q_5 = 1.2cfs
Q_{100} = 3.3cfs

CT.

N
Q_5 = 1.0cfs
Q_{100} = 2.6cfs

AVE.

BECK ST.

R
Q_5 = 0.8cfs
Q_{100} = 2.0cfs

MOUNTAIN VIEW DR.

LAKESIDE DRIVE

E Q_5 = 0.6cfs Q_{100} = 1.5cfs

I Q_5 = 0.4cfs Q_{100} = 1.1cfs

S Q_5 = 0.6cfs Q_{100} = 1.5cfs

O Q_5 = 0.4cfs Q_{100} = 1.2cfs

LAKESIDE COURT

ROBINHOOD DR.

BRINKBY

EASTSHORE DR.

VIRGINIA LAKE

0' 50' 100' 200'

Reference Information and Notes:

Revised	Description	Submit.	Appr'd.	Date

Refer to Tracing for Latest Revision

Designed
Drawn
Checked
Date

CITY OF RENO

Kennedy/Jenks/Chilton — Reno, Nevada

Submitted: Approved:

PLUMAS MOANA STORM DRAIN

LOCAL DRAINAGE BASINS

Scale 1"=100'
Job No. 877041
Figure 3 of

Revised	Description	Submit.	Appr'd.	Date
Refer to Tracing for Latest Revision				

Reference Information and Notes:

Designed
Drawn
Checked
Date

CITY OF RENO

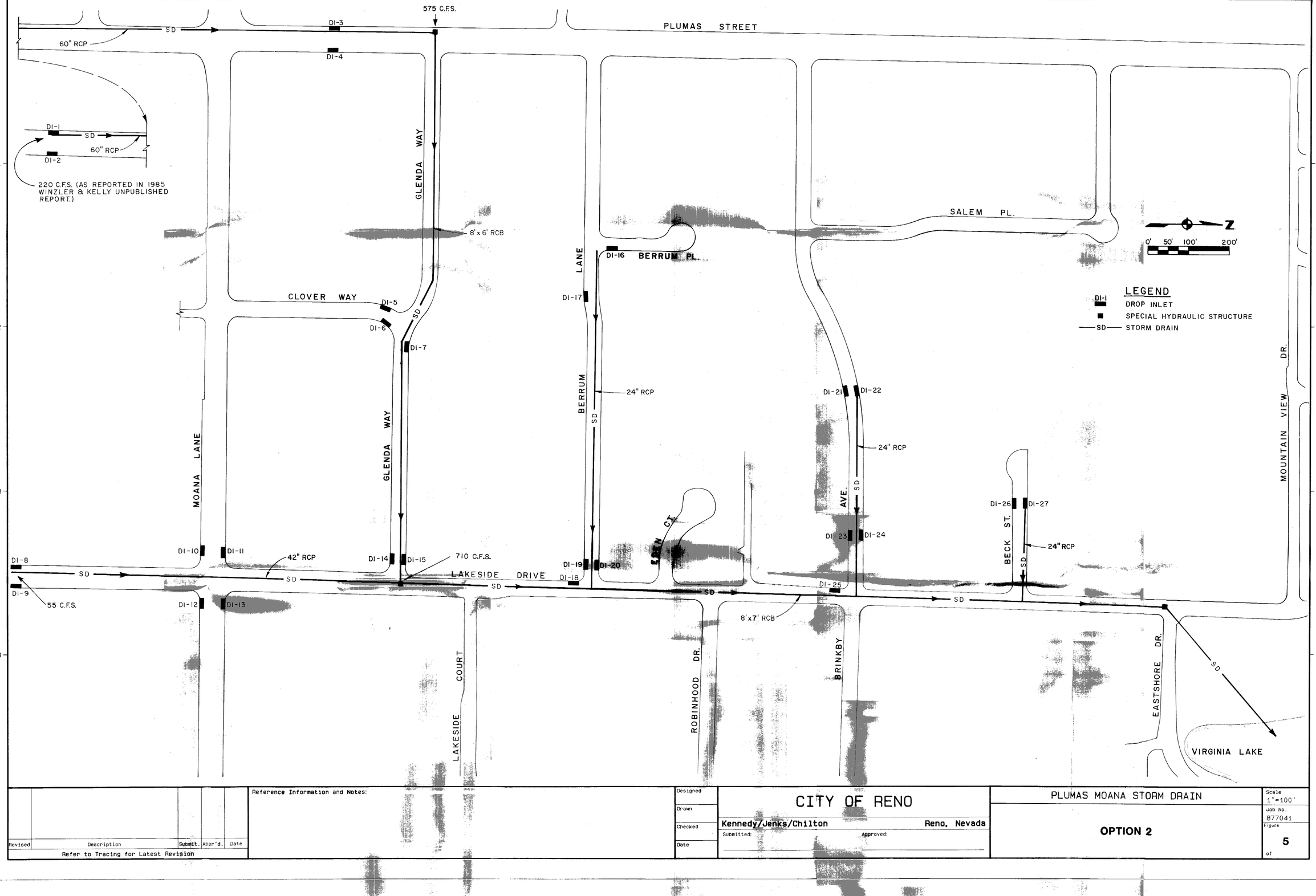
Kennedy/Jenks/Chilton — Reno, Nevada

Submitted: Approved:

PLUMAS MOANA STORM DRAIN

EXISTING UTILITIES

Scale 1"=100'
Job No. 877041
Figure 2 of



Revised	Description	Submit.	Appr'd.	Date

Refer to Tracing for Latest Revision

Reference Information and Notes:

Designed
Drawn
Checked
Date

CITY OF RENO

Kennedy/Jenks/Chilton — Reno, Nevada

Submitted: Approved:

PLUMAS MOANA STORM DRAIN

OPTION 2

Scale 1"=100'
Job No. 877041
Figure 5
of

PLUMAS STREET

575 C.F.S.

CLOVER WAY

DI-5

DI-6

SD

DI-7

6'x6' RCB

GLENDA WAY

MOANA LANE

BERRUM LANE

DI-16 BERRUM PL.

DI-17

24" RCP

SD

SALEM PL.

DI-21

DI-22

24" RCP

AVE.

SD

DI-23

DI-24

DI-25

DI-26

DI-27

24" RCP

BECK ST.

SD

MOUNTAIN VIEW DR.

DI-8

DI-9

DI-10

DI-11

DI-12

DI-13

LAKESIDE DRIVE

DI-14

DI-15

710 C.F.S.

DI-18

DI-19

DI-20

EDEN CT.

6'x4' RCB

230 C.F.S. (AS REPORTED IN 1985 WINZLER & KELLY UNPUBLISHED REPORT.)

LAKESIDE COURT

ROBINHOOD DR.

8'x7' RCB

BRINKBY

EASTSHORE DR.

SD

8'x7' RCB

VIRGINIA LAKE

0' 50' 100' 200'

LEGEND

DI-1 DROP INLET

SPECIAL HYDRAULIC STRUCTURE

SD STORM DRAIN

Revised	Description	Submit.	Appr'd.	Date

Refer to Tracing for Latest Revision

Reference Information and Notes:

Designed

Drawn

Checked

Date

CITY OF RENO

Kennedy/Jenks/Chilton — Reno, Nevada

Submitted: Approved:

PLUMAS MOANA STORM DRAIN

OPTION 1

Scale 1"=100'

Job No. 877041

Figure 4 of

PLUMAS STREET

575 C.F.S.

SD 60"RCP

DI-3

DI-4

DI-1 SD 60"RCP DI-2

220 C.F.S. (AS REPORTED IN 1985 WINZLER & KELLY UNPUBLISHED REPORT.)

GLENDA WAY

8'x6' RCB

SALEM PL.

0' 50' 100' 200'

N

DI-16 BERRUM PL.

LANE

DI-17

BERRUM

24"RCP

SD

CLOVER WAY

DI-5

DI-6

DI-7

SD

GLENDA WAY

MOANA LANE

DI-21 DI-22

AVE.

24"RCP

SD

DI-26 DI-27

BECK ST.

SD

24"RCP

MOUNTAIN VIEW DR.

DI-23 DI-24

DI-25

EDEN CT.

DI-10 DI-11 DI-14 DI-15 DI-19 DI-20

DI-18

DI-8(3)

55 C.F.S.

SD 42"RCP

DI-9(3)

LAKESIDE DRIVE

710 C.F.S.

SD

SD

DI-12 DI-13

8'x6' RCB

BRINKBY

10'x6' RCB

ROBINHOOD DR.

LAKESIDE COURT

EASTSHORE DR.

SD

12'x6' RCB

SD

VIRGINIA LAKE

LEGEND

DI-1 DROP INLET

SPECIAL HYDRAULIC STRUCTURE

—SD— STORM DRAIN

Revised	Description	Submit.	Appr'd.	Date

Refer to Tracing for Latest Revision

Reference Information and Notes:

Designed

Drawn

Checked

Date

CITY OF RENO

Kennedy/Jenks/Chilton — Reno, Nevada

Submitted: Approved:

PLUMAS MOANA STORM DRAIN

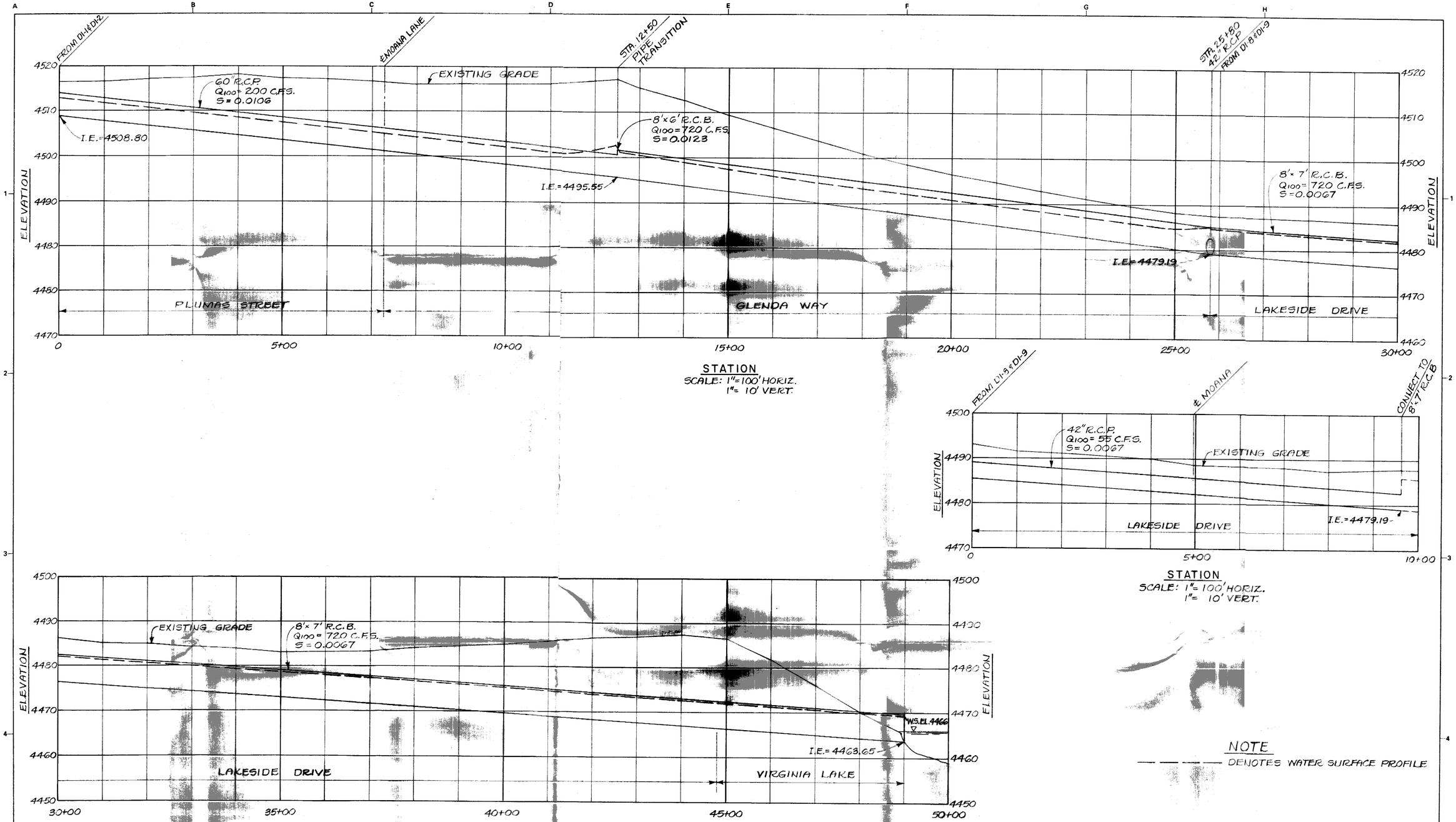
OPTION 3

Scale 1"=100'

Job No. 877041

Figure 6

of



Revised	Description	Submit.	Appr'd.	Date
Refer to Tracing for Latest Revision				

Reference Information and Notes:

Designed
Drawn
Checked
Date

CITY OF RENO

Kennedy/Jenks/Chilton — Reno, Nevada

Submitted: Approved:

PLUMAS MOANA STORM DRAIN

OPTION 2
STORM DRAIN PROFILE

Scale: 1"=100'
Job No.: 877041
Figure: 7
of