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RENO DRAINAGE STUDY

ANALYSIS OF THE  
CLOUGH ROAD DRAINAGE  
DEFICIENCY AREA

Area 11 of 21

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CLOUGH ROAD DRAINAGE  
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Area 11 of 21

August 1985

Prepared for:

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## A. INTRODUCTION

The Clough Road drainage deficiency area is a relatively small drainage basin of approximately 56 acres. It is a residential area located in southwest Reno just east of Hunter Lake Drive between Berkeley Drive to the south, Feather Way to the north, and Palisade Drive to the east. The Last Chance Ditch cuts through the middle of the basin flowing east and the Lake Ditch flows east along the lower boundary of the basin. (Refer to Figure 1.

## B. FIELD INVESTIGATION

The Clough Road drainage basin is located in southwest Reno. The Present Land Use Map shows the basin as 55% residential and 45% unimproved, while the Future Land Use Map shows the area to consist of 100% single family residential. This increase in development would cause an approximately 25% increase in storm water flows in the area.

The basin is divided into two subdrainages. The larger basin, approximately 45 acres is located south of Plumb Lane, with a small portion located on the north side of Plumb, east of Clough Road. Flows are generated near the intersection of Berkeley Drive and Hunter Lake Drive and flow north. There is no well defined channel and the majority of the flows probably end up in Last Chance Ditch. There is a weir gate near the north end of Palisade Drive that takes irrigation water from Last Chance to irrigate the pasture between Palisade and Somerset Pl. Occasionally over irrigation causes flooding problems on Clough Road due to increased runoff requiring the gate to be shut.

These irrigation flows and any storm flows from the south cross Plumb Lane via an 18-inch RCP that discharges to a ditch between Clough and Palisade behind the first row of houses on Clough.

In addition, a small 12-inch storm drain on Plumb Lane carrying flows from north Palisade and also east from Somerset discharge into this channel. This channel is narrow and heavily overgrown with brush. There is a private gravel road east off of Clough just south of Feather Way and south of Lake Ditch. The channel supposedly crosses the gravel road via a 12-inch CMP. There is little evidence of the pipe. Large rock riprap is located on both the upstream and downstream side of the gravel road. The water is stagnated on both sides of the road although there is good flow upstream of the pipe crossing. These flows must be getting across the road in some fashion.

Just downstream of the gravel road the flows intersect Lake Ditch at a bend where the ditch turns and flows north.

The second drainage, <sup>water</sup> consisting of approximately 11 acres, is located north of Plumb Lane, between Clough Road and Hunter Lake Drive. This area flows northeast to the intersection of Clough Road and Feather Way. There is a low point at this intersection where flows collect and pond. There is a drop inlet with an 8-inch RCP discharging to Lake Ditch. The outlet to this pipe is presently silted in almost completely.

#### C. ESTIMATED STORM RUNOFF

Estimated storm runoff is calculated for both the 5-year and the 100-year storm at selected nodes. These nodes are shown on Figure 1, the project boundary map. Table 1 summarizes these nodes, giving location, description of node, capacity of node, and estimated storm runoff at the node. The existing capacity assumes inlet control. Generally, a range is given. The lower value assumes no head at the inlet, while the higher value is at maximum head on the culvert.

It should be noted that the storm runoffs are based on winter storms, which give more conservative values than the summer storms (refer to the wet and dry isocleth maps in the Reno Drainage Study Preliminary Report: Deficiency Areas Within the City Limits, December, 1984.)

#### D. CONCLUSIONS

It is obvious from Table 1 that the existing storm drainage systems are significantly undersized. The 18-inch RCP crossing Plumb is not severely undersized though it is recommended that the pipe should pass the 5-year storm with no head, thus allowing additional capacity for more intense storms that may occur. Presently, the area that would flood is an open pasture which would not cause any major problems. However, there are houses bordering the field that are not much higher in elevation, and if the field flooded too deep it could spill over into the residential area and begin to flood.

The capacity of the 12-inch CMP at node b assumes good conditions and inlet control. It was not even found and is apparently covered by the rock slope protection, thus the existing capacity is much lower than what is given. This would cause the entire system to back up upstream of the gravel road and could cause serious flooding of the surrounding homes.

The natural drainage channel between Plumb Lane and node b is quite narrow and heavily overgrown with brush. This condition will help to limit flows from reaching node b. However, if the City is responsible for this drainage, it is suggested that it be cleared as it runs right behind existing homes and heavy runoff would probably exceed the present channel capacity causing flooding of homes or at least flooding of yards.

The low point at Clough and Feather tends to pond even with moderate rains. The easiest solution would be to enlarge the drop inlet and pipe discharging to Lake Ditch. However, the ditch may be relatively full during severe storm periods and flow elevations could easily exceed the outlet elevation of the pipe. This could cause severe restrictions in the pipe capacity. The City does have an arrangement with the irrigation districts to allow discharge to the canals. However, it may not always be feasible and perhaps alternatives should be investigated.

Another solution would be to run a storm drain west on Feather Way tying to the existing 24-inch to 30-inch storm drain in Hunter Lake Drive. The ground profile slopes up towards Hunter Lake. However, just north of the intersection of Hunter Lake and Feather Way, there is a drop manhole where the storm drain increases from 24-inch to 30-inch. The manhole is approximately 10-feet deep at this point so it is probable that a connection could be made.

TABLE 1. Clough Road Existing Storm Drainage Facilities

Node and Location	Existing Storm Drainage System	Existing Capacity (cfs)	Estimate Flows		Estimated Flows	
			Q <sub>5</sub> (cfs)	Q <sub>100</sub> (cfs)	Present Land Use Q <sub>5</sub> (cfs)	Future Land Use Q <sub>100</sub> (cfs)
a - Culvert crossing Plumb between Palisade and Clough	18" RCP culvert	6-13	18	49	23	63
b - Culvert crossing private road east of Clough & south of Feather	12" RCP storm 12" CMP	2-6	19	53	23	64
c - Intersection of Clough Road and Feather Way	D.I. & 8" RCP	~1	6	15	6	15



**LEGEND**

Drainage Boundary 

Sub-Drainage Boundary 

Drainage Node 

**STORM DRAIN DEFICIENCY MAP**

FIGURE 1  
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8/85

1" = 500'