

MAPLE LEAF IRRIGATION WATER STORAGE AND STORM WATER STORAGE SYSTEM

ASSESSMENT MANAGEMENT COMMITTEE

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MAPLE LEAF IRRIGATION WATER STORAGE AND STORM WATER STORAGE SYSTEM

The above system is somewhat unique in that prior to the development of the Maple Leaf site, a natural drainage system existed running from the lands generally north of our site, through our property and continuing southwards outside our site to discharge generally into the community storm water drainage system.

We are legally obligated to allow this original natural drainage flow, that is before any development took place outside our property limits, to continue through our property in perpetuity. The impact of the development of housing, buildings, roads and parking lots drastically increases the flow intensity of storm water from such developments, which unless properly dealt with, can cause flooding of downstream properties.

STORM PATTERNS

The design of storm water systems is based on storm rainfall intensities, durations and frequency of occurrence. For the State of Florida, typical storm patterns have been identified by different zones throughout the State; we are in zone 8. Zone 8 has a data sheet (Figure C-13) showing such rainfall intensity and duration data for storm return frequencies ranging from once every 2 years to once every 100 years. It is interesting to note that records on rainfall intensities have only been kept since about the 1930's , some 70 years ago. The magnitude of a storm water system development therefore becomes a matter of cost, cost/benefit and the effect of the physical impact of flooding on the area involved. The protection and management of the general inland water systems of the State is carried out by various water management authorities which for our area is the South-West Florida Water Management District, known as "Swiftmud".

The design storm frequency set up by 'Swiftmud' for storm water systems entering the overall system is for a 25 year return frequency.

RUN-OFF COEFFICIENTS

The intensity of rainfall is one item in the storm water flow calculation, the other is the character of the land upon which the rain falls. The land characters are given coefficients, for example, grassland is 0.2 and paved areas 1.0 which suggests that 5 times as much rainfall flows from paved areas as from grassland.

Referring back then to the early statement regarding the natural storm drainage which it appears we are obligated to allow through our water system, the run-off coefficient of the agricultural lands to the north of us has been drastically changed by the development which has taken place. If not dealt with properly by others than ourselves, a considerable increase in storm flow through our property could occur possibly sufficient to cause flooding.

The generally required method of dealing with this problem is to build water storage lagoons to store sufficient storm water so that the outflow from these storage lagoons does not exceed the flow that would have occurred if these outside lands were still agricultural in nature.

We are obligated to follow the same rules since our Park was developed from original agricultural land to now include many paved areas and roofs and that is why our lake levels are reduced in the summertime to allow as much storage as possible limiting not only our outflow but also to reduce the possibility of flooding in our Park.

PARK OUTFLOW CONTROL.

In all developments involving changes to the character of the land being developed such as paving etc, designs for storm water management should be submitted for approval to the affected authorities. Such details were provided by Maple Leaf Estates.

The following is a copy of data submitted by Maple Leaf Estates inc. on 3/5/1978 under the title: "Development of Regional Impact- Application for Development Approval under Section 380.06(06), Florida Statutes."

The project will be designed for a minimum of a 25 year- 24hour storm.

Approximate drainage, retention and impervious surface areas are listed in Table 1.

Table 1. DRAINAGE PLANNING DATA

Description	Project Drainage Area (acres)	Project Retention Area (acres)	Project Impervious Surface (acres)	Drainage Area Outside Site (acres)
Uplands				468
Phase A	38	0	20	
Phase B	110	20.7	27	
Phase C	132	5.3	49	
Totals	280	26	96	468

This drainage system uses:-

- a) A five year design storm of project interior drainage structures exclusive of the drainage way at the center of the project subject to upland flow.
- b) Retention of a 3 year project storm on site for the interior lake system.
- c) A twenty five year-24 hour design storm for all weirs upstream and downstream control structures subject to upland flow or project discharge.

AS CONSTRUCTED

The outlet flow from the Park is controlled by a fixed weir which was a design requirement.

This mandatory outlet flow control weir is a reinforced concrete structure with a weir length of 18 feet and a crest elevation of 12.14 feet discharging on Suncoast Boulevard into four 4 feet X 6.5 feet reinforced concrete pipes which pass under the boulevard to discharge into the County system.

CONCERNS

Over the past 10 years or more there have been occasions of widespread flooding throughout the Park. One major incident was partly attributable to the failure by collapse and plugging of one of the two 36 inch diameter pipes passing under the Queensway and discharging into Lake No. 1 at the outlet from the Park. These pipes were considered in any case to be too small and were replaced, by permission of SWFMD by two ovoid pipes.

On two occasions the banks of the lagoons located along the north side of Rampart Boulevard have ruptured allowing a massive-flow of water into our

property causing damage to the banks of the main water channel and to bridges for which, to date, there has been no recompense to us for our repair expenses.

There have been frequent local flooding incidents in specific areas of the park which could result for different reasons to be discussed later.

There are now occasions of coloured water discharging into our drainage channel from the Rampart Boulevard drainage system which appears to be coming from or adjacent to the Church property just West of the overpass. The role of SWFWMD is to be responsible for water quality as well as quantity being discharged from properties into the general system as well as controlling the extraction rates and quantity of water removed from the storage systems. Further the Church property did not appear to have a storm water retention system although the property now has a large paved parking area.

There is also evidence of considerable construction activity on the north side of Rampart Boulevard east and adjacent to the Winn Dixie shopping plaza.

Without adequate storm water retention design and construction for existing and new development, our situation can only become more aggravated.

WHAT IS TO BE DONE?

Local flooding

In terms of local flooding, it should be borne in mind that the local drainage system is indicated to be designed for a 5 year storm return frequency only so that a storm of greater frequency could cause ponding or local flooding within the system. Any proposed changes to the piping, ditches or swale systems such as additions or replacements with larger pipes comes under the jurisdiction of SWFWMD which is concerned about larger volumes of storm water being released from our system to the outside as the result of such changes and therefore is unlikely to give approval.

It is very important to maintain the ditches, swales, gutters, catchbasin covers and the catchbasins themselves in a clean condition free of vegetation, debris and sand or topsoil which is washed out from the adjacent properties on to the streets and ending up in the sumps of the catchbasins which are there for that purpose.

It is understood that a TV camera inspection of the storm sewer system is to be carried out imminently from which it is likely that the need for cleaning out and repairs will be identified. A regular cleaning programme should be set up, the frequency of which might be identified by consultation with the County as to its experiences.

MAIN DRAINAGE SYSTEM FLOODING & QUALITY PROBLEMS

It is difficult to assess the performance of the main drainage system passing through the Park from north to south without adequate data.

Rainfall intensity and duration data is critical in making an assessment. For example some extracts from the Zone 8 rainfall intensity curves (Figure C-13) shows the following:-

Table 2: Accumulative Zone 8 Rainfall in Inches from Storms.

Time Interval (hours)	2 Year Storm	5 Year Storm	25 Year Storm
1.0	4.65	5.5	6.5
2.0		7.95	9.5
3.0	8.2	9.55	11.5
4.0		10.7	13.0
5.0	9.95	11.63	14.27
6.0		12.44	15.34
7.0	11.2		16.39
10.0	12.61	15.04	18.79
15.0	14.36	17.29	21.89
20.0	15.71		24.14
24.0	16.55	20.08	25.52

It is interesting to note that approximately 50% of the total rain fall occurs within the first 3.5 hour period. The data given us from our rain gauge in the park is as follows :-

Hurricane Henri period- 05 Sept. 2003 accumulative 7.0 inches and period-28 Sept. 2003 accumulative 3.75 inches, which is presumed to have been over a 24 hour period? Without the intensity duration data, it is virtually impossible to relate our data to a specific storm frequency.

We have attempted to obtain from the County, design inflow stormwater data entering our Park since any and all new development must submit design concepts for approval before any construction work proceeds, in this melange, SWFWMD has an important part to play.

A special Maple Leaf Corporation Board meeting was convened some 2 years ago to which Charlotte County Commissioners and their appropriate senior staff were invited to discuss with us many of our concerns related to the County operations. One concern raised with the Commissioner was the calculated volume of stormwater, under conditions of a 25 year-24 hour storm, designed to enter our Park with the outside proper retention devices in place and the overall storm water system ready to accept development changes. The Commissioner promised to provide us with such information with the assurance of his attendant hydraulics engineer. Despite several calls to the County by our General Manager, no such information has been provided. For us to measure the stormwater inflow to our Park is somewhat complex. A weir or control sluice gate would meet with opposition from the County and SWFWMD because of the backwater level created causing potential flooding upstream of our property. A current meter could be used but would require channel depth measurements coincident with the current meter to arrive at the flow. The outflow measurement, which is a vital piece of information, can be made by measuring the head or water level above the weir crest and using the weir flow table (Figure 1) enclosed herewith. It therefore appears necessary for us to have a full scale meeting with the SWFWMD authorities to discuss our present concerns and our growing concerns as the result of increased development on the inflow into our Park and what appears to be an increase in flow over the years as evidenced by the more frequent failures and washouts of our stream banks and the ingress of polluted waters into our property,

IN THE MEANTIME

A good diagnosis can only be made with adequate information. Since most of the heavy storms occur in the summertime when only the all year round residents are present in the Park, it would appear to present a golden opportunity for interested and able residents to volunteer to collect detailed data during such storms since they would hopefully benefit from any improvements which can be made to the storm water systems generally as the result of such information.

Such data would include:-

- a) Water level over the weir.
- b) Areas of ponding and flooding on a park map.
- c) Total rainfall every 24 hours using our rain gauge at the Sandbar area.
- d) Any obvious differences in water level between adjacent lakes or channels.

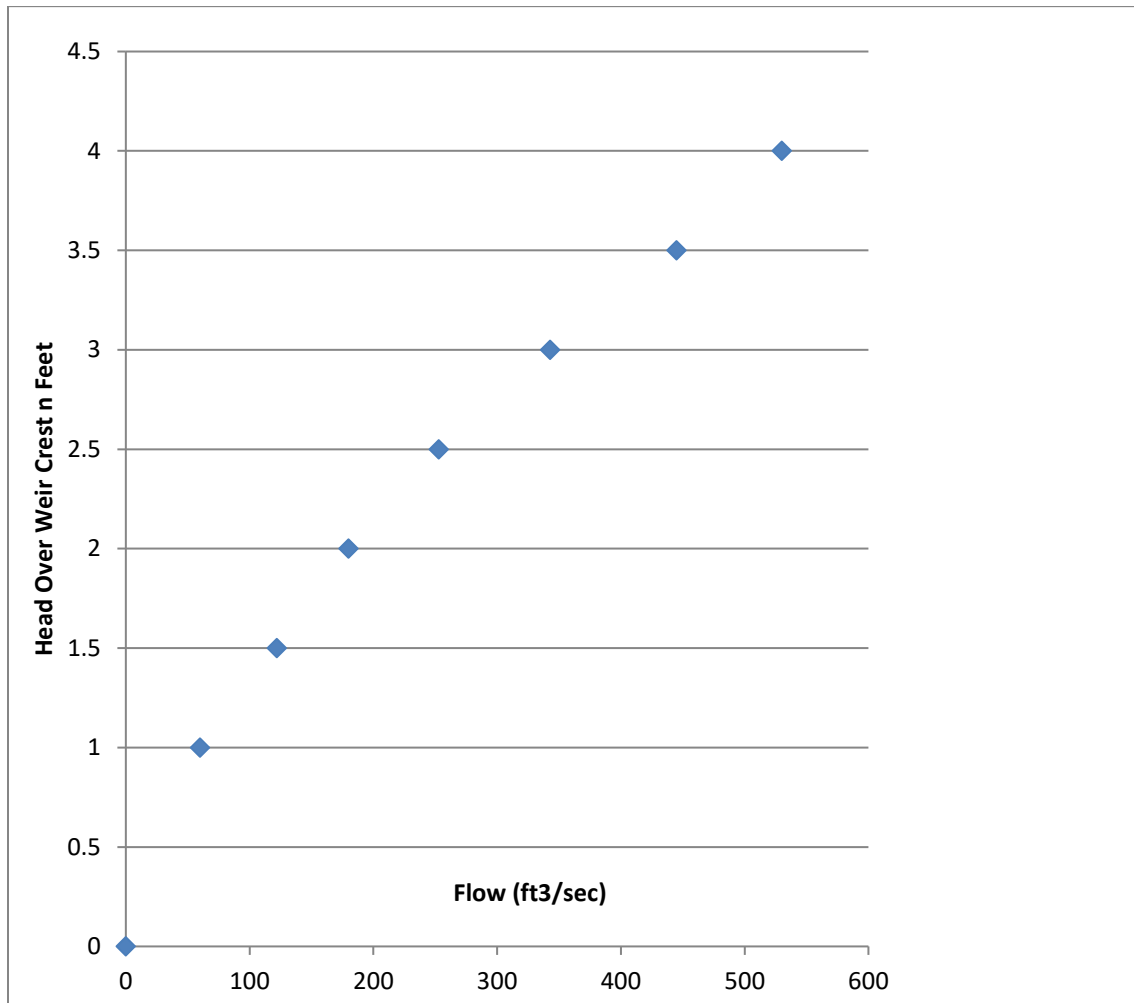


Figure 1. Maple Leaf Golf and Country Club Outlet Weir Stormwater Flow.

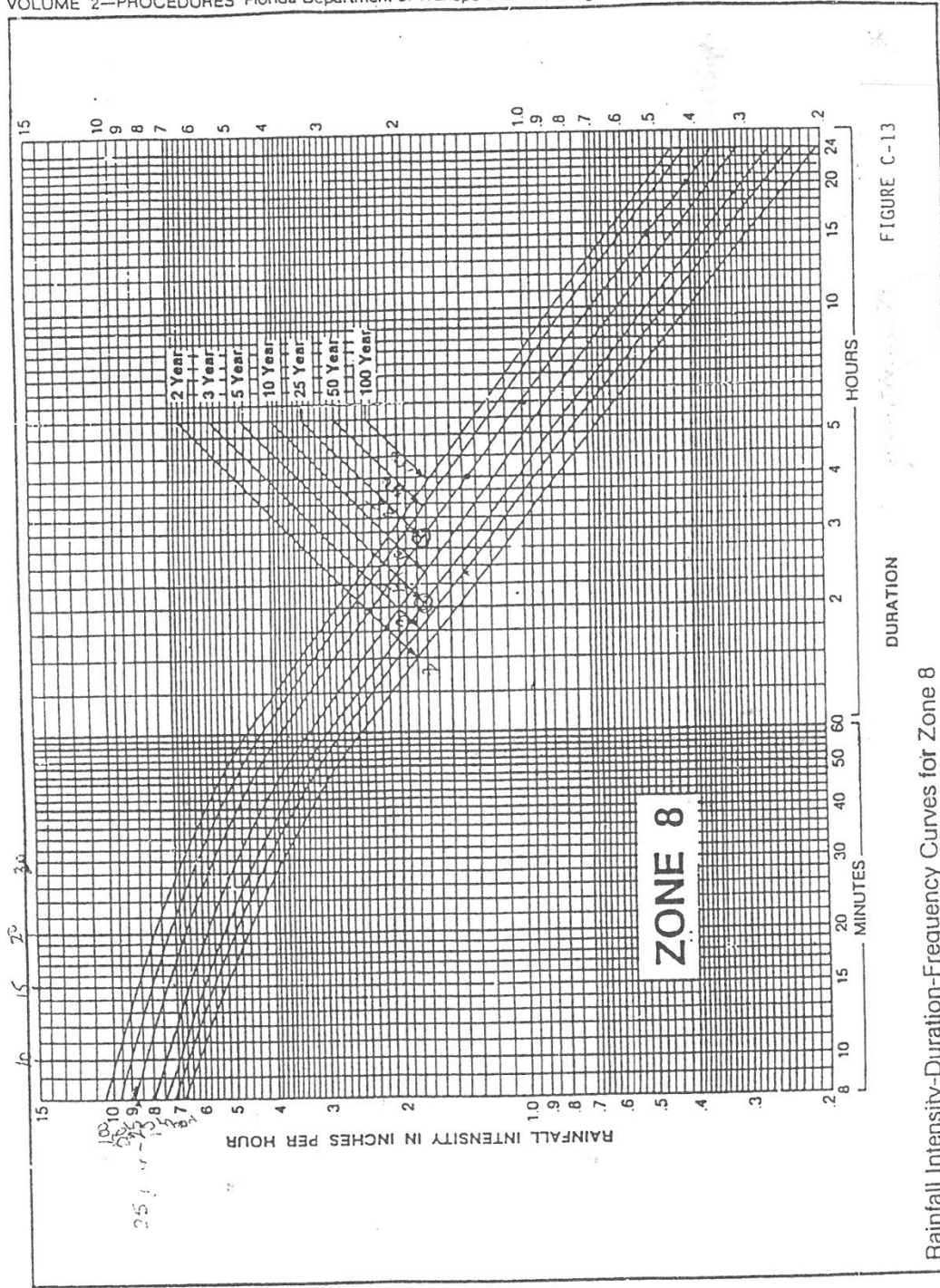


FIGURE C-13

DURATION

Rainfall Intensity-Duration-Frequency Curves for Zone 8