SUGARHILL SURFACE WATER MANAGEMENT SYSTEM

This is a collection of documents and engineering report/s addressing the issues of drainage and flood potential in the confines of the 97 acre area containing Sugarhill Property Owners Association. The transcription of these documents is done through OCR (optical character recognition) software to allow for table-of-content indexing and other commentary to be included. This report was started in July 2020 by John Doty. Expect numerous updates.

Commentary by the current 2020 Board of Directors will be shown in this red type if it is in the report. Links to internet references will be shown in this blue. Copied sections of the Sugarhill Bylaws and/or Covenants will be shown in this grey. Some items will be highlighted in yellow to emphasize importance or indicate a commented-on item. All other text will be in this black and will have the document reference in the table of content.

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October 2020 updated commentary on the drainage problem

This update by John Doty was done on 10/10/20

In the last 3-1/2 weeks we have experienced 22” of rain. In the prior months we experienced an unprecedented amount of rain as well. It is a huge problem but we have now determined the pipe referenced later as a possible problem is **not** the problem. We had the area at both ends of the pipe cleared of dense jungle revealing the water level in the Savannas preserve to be **from 2-1/2 to 3 feet HIGHER** than the lower Sugarhill retention parcels.

There is a berm or dam holding back the flow between the lower Sugarhill areas and the Savannas Lake Eden. This is where the suspect pipe is located. At a time in the past the association plugged the pipe because, as we now understand, it was never going to flow water out of low lying Sugarhill into the Savannas and poised a threat of flowing water from the huge Lake Eden in the Savannas preserve into the low lying areas of Sugarhill. If the dam were to break, there’s a chance all areas in lower Sugarhill would flood and the area would possibly need to be evacuated. The dam is in good shape and has not topped over during this unbelievable wet summer.

Currently THE ONLY DRAIN for,

- Parcel C (that surrounds M-Carrie area and runs west to the tennis court lakes),
- Parcel B (the feeder canal from the dam/berm in the norther portion of Parcel B that runs north of the tennis court lakes and north of Stokes),
- Parcel A (the lakes and feeder swales that surround the tennis court),

is the 26” pipe behind Lot 89 in Parcel C that drains south to the Jensen Beach Blvd surface water drainage system. It was intended to be an emergency drain only but in the 40 years since the system was built something has changed dramatically in the Savannas preserve (Lake Eden). They are struggling to deal with all the water. Last week Walton Road was closed for the entire week. On one day last week the Savannas topped over into Jensen Beach Blvd closing it for a while then only opening 1 lane for the rest of the day.

Now this is my guess as to why things are changing and it’s only a guess based on my own experiences and events surrounding south Florida:

- When I lived on estuary water in North River Shores from 2006 to 2014 ocean water raised every year enough to top my seawall over a foot at king tides. This

had never been seen by my previous owner or any of the older neighbors. The seawall and the house was built in 1970. The water is still raising more every year.

- Homes in Sewalls Point are being raised up onto pilings and FEMA is assisting because of the ocean rise.
- Miami and Miami Beach are experiencing the same problem only more severely causing them to spend big money on pumping systems.
- Water tables have risen causing areas like Miami to begin to experience some brackish wells.
- It's very possible the water table is now high enough that Lake Eden in the Savannas is not receding as it did 35 years ago.

What ever is happening, there is virtually nothing we can do about it other than making sure the dam/berm separating lower Sugarhill and Lake Eden never fails and that the emergency outfall pipe behind Lot 89 in Parcel C never plugs up.

Before we discovered the Lake Eden water was so much higher than the retained lower Sugarhill water, I believed a big electric pump at the emergency outfall pipe in Parcel C canal that would come on in drier times when overflow was not happening and lower the retention areas so they could hold more water was a good idea. Unfortunately with Lake Eden's water so much higher, underground seepage would likely not allow the pump to lower the Parcels in Sugarhill.

The following pages shows our first belief that the original drainage intent had an error. That was before we were able to have the area cleared so we could see the actual problem that the high water in the Savannas Lake Eden is causing.

Don't rely on that first assumption about the the pipe in the berm that separates lower Sugarhill from Lake Eden. Plugging the pipe, it would seem, is the most logical thing to do in today's situation. Relying on a flap valve on the Lake Eden side of the berm runs the risk of it failing. It is most likely water in Lake Eden will never get lower than the lower Sugarhill water allowing it to drain to Lake Eden as intended. One chunk of debris holding the flap valve open could flood the entire lower Sugarhill area.

This information supersedes any following opinions made on the drainage issue.

Sugar Hill Surface Water Management System Review

DENUZZIO HOPKINS PORTER & ASSOCIATES

September 24, 2010

Executive Summary

The Sugarhill Homeowners Association contracted Denuzzio Hopkins & Associates to review the surface water management system used by the community. The purpose being to determine the system's fitness for providing community surface water management, and to recommend modifications should analysis indicate they be required.

The review indicated the surface water management system was calculated and constructed to meet the needs of the community with respect to the management of surface water as required under the design parameters of the South Florida Water Management District (SFWMD). However, in the 30 yrs since commissioning, lack of maintenance has resulted in deterioration of the design characteristics of the system. The decay has led to occasions of standing water in the community caused by both backflow from the Savannah's State Preserve and large rainfall events allowed to stand in the community.

Recommendations to restore the design characteristics of the system include replacement of backflow prevention valves, removal of scrub brush and undergrowth throughout the system and regrading of lengths of ditches and detention areas to improve storm water transport.

In determination of these, research of the history of the community based on complaint actions made to Martin County Engineering and SFWMD by the residents of Sugar Hill was carried out. Research of the history of the water levels of the Savannahs Preserve was also done. Additionally, a review of the Survey made in 2009 for the community was used along with field review and analysis of the storm water system to develop recommendations.

It is important to note the age of this report and to credit previous Boards efforts to do much of the recommendations. Many of the major drainage ditches known as parcel A, B, and C were cleaned of debris that could clog the main out-fall pipe.

Section I

Sugarhill Surface Water Management System Concept and Design

The Surface Water Management System operating in Sugarhill was approved by SFWMD and issued August 10, 1978. The system was designed to manage surface water for a community of 100 acres and designed for individual residence lots numbering up to 99 homes. The original breakout of the use of the community land in Sugarhill is as shown:

Total Area :	100 Acres
Residential Development	97 Acres
Water Management area	9.5 Acres
Finished Floor areas	6.8 Acres
Other Impervious areas	12.6 Acres
Penurious Areas	68.1 Acres
Commercial Development	3.0 Acres
Water Management Area	.0 Acres
Finished Floor Area	0.4 Acres
Other Impervious Area	1.1 Acres
Pervious Area	1.5 Acres

The system was designed to include a 9.5 acre retention area with a control elevation of 12.5 feet ngvd and store runoff vertically from elevation 12.5 feet ngvd. The 80.7 acre residential area (97.0 acres minus the 9.5 water management area and 6.8 acre finished floor area) would store runoff linearly from elevation 12.5 feet ngvd to elevation 65.0 feet ngvd. The 2.6 acre commercial area (3.0 acres minus 0.4 acres finished floor area) stores runoff linearly from elevation 16.0 feet ngvd to elevation 19.0 feet ngvd.

The primary design characteristic of the surface water management system is a 20 foot wide continuous grassed berm with a top elevation of 16.0 feet through which an outfall pipe extends from the swale on the retention side of the berm to the existing pond area on the Savannas side of the berm. A flap gate on the Savannas end is designed to prevent drainage of the Savannas to the south into Sugarhill. Previous Boards plugged the pipe. We believe this is good because 10 years after this report the Savannas side has risen to the point where drainage back into the savannas is very unlikely. 10-10-20 Update

A control Structure on the south end provides the retention requirements of the permit. We assume this is the main outfall pipe going to Jensen Beach Blvd. drainage system

located South behind Lot 89. An 8 inch bleeder pipe at elevation 12.5 feet drains the retention area back down to normal level after the storm. This bleeder pipe may be plugged up and needs inspection. We assume this is in the Southern berm that contains the retention lake surrounding the tennis court. Once high water levels are lowered this pipe will be cleared of it's jungle and inspected 10-10-20 Update

The surface water management system is to be maintained by the residents of Sugarhill.

The general design of the surface water management system is that when water elevations in the surface water management system reach 12.5 feet the system discharge, after having been collected throughout the community from roadside swales and transported by graded swales and ditches to a retention lake, they are then discharged into the Savannah's Preserve through a tapper gate at the north end of the system. Should elevations reach 13.5 feet surface water is additionally discharged into the Martin County surface water management system ditches on the south end of Sugarhill. Where the main outfall pipe starts draining.

The South Florida Water Management District (SFWMD) surface water management permit for Sugarhill calls for minimum elevations within the community as follows:

> No development of lands below 15 feet msl and that a natural undisturbed 25 foot buffer zone separate all lots from the Savannahs water areas.
>
> Minimum road grade elevations of 16.0 feet msl
>
> Minimum finished floor elevations of 17.5 feet msl

The surface water management permit required that the system designed be capable of management of waters resulting from both a 10 yr storm (elevation of 14.4 feet msl) for elevations of minimum grade of 16 feet msl and for a 100 yr storm (elevation 16.3 feet msl) for minimum finished floor elevations of 17.5 feet msl.

As designed the surface water management system was capable of managing the collection and transport of surface water in amounts indicated through a series of swales, berms and discharge points in the community.

Section II

Practical Operation of the Sugarhill Surface Water Management System

As designed, the Sugarhill Surface Water management system is functional, and capable of servicing the community's objectives to store and remove surface water generated from rainfall events. The primary driving force used to transport the collected surface waters is gravity feed of these waters through a series of swales and ditches which are connected by under road culverts and catch basins that ultimately feed to a 9.5 acre retention lake at the south end of the community.

The actual operation of the Sugarhill Surface Water Management System, apart from design has though been noted to on occasion be lacking in capability to transport surface waters collected and also at times of high water in the Savannah Preserve to receive surface water backflow from there into the surface water management system for Sugarhill. Neither situation per design nor desirable.

There are on record several complaints by residents of the community to both Martin County Engineering and SFWMD concerning the functionality of the surface water management system in Sugarhill. The issues have dealt largely with standing water in resident's yards and appeared to be resulting from swales and ditches failing to transport surface water which had been collected during rainfall events. It was supposed by residents that this water could also be coming from backflow from the Savannah Preserve and resulting in if not the actual filling of swales and transport ditches throughout the community with standing water then certainly contributing to an artificially high level of water in the surface water management system for Sugarhill that would lead to rainfall events being unable to be transported via the systems swales and ditches to the systems retention lake as the original design envisioned.

There have over the past 10 yrs been several hurricane events that have caused both the Savannah Preserve and the Sugarhill Surface Water Management system to be stressed to their capacity limits for holding water. The combination of the two has led to residents being dissatisfied with their surface water management system during these occasions and inquiring as to the viability of the design intent as well as the functionality of the system's operation.

It is however noted that day to day rainfall events are managed adequately by the surface water management system **when the Savannah Preserve water level is kept relatively low so not to intrude into the Sugarhill Surface water management system**.

Section III

Present Conditions

Sugarhill Surface Water Management System Note this is a 10 year old report.

The Sugarhill community is approximately 30 yrs old. As such the vegetation in the community is mature and has prospered and expanded since the communities development. During this time the natural vegetation has encroached upon the systems of swales and ditches that exist to transport surface water to the community's retention lake. While it is speculative to conclude the precise extent that this over growth has led to a reduction in the pace of transport of surface water to the retention lake from the community it is safe to say that this overgrowth was not the original design of the engineers that developed this system and that this overgrowth intrudes on the systems capability to perform as designed as a water transport system.

Secondarily, the system of swales, ditches, culverts and catch basins were designed with the single intent of moving water from the community to the retention lake. To do this there is a requirement that the swales and ditches be graded such that water transports regularly. And while collecting in swales and residing to obtain proper water quality is a design feature of the system, this same surface water remaining resident due to undulations in swale bottom levels which result in ponding areas is not.

In terms of discharge of surface water from the Sugarhill community to either the Preserve or in excessive rainfall events to the Martin County surface water system the design is sound. Water from the system's retention lake is able to be efficiently conveyed to the Savannah Preserve and discharged when water levels in the community reach greater than 12.5 feet ngvd. This aspect of discharge is sound and appears to be able to function adequately.

However, it is noted that the engineers that designed the discharge system to the Preserve were concerned during the design that there could be the eventuality of water from the Preserve back draining into the Sugarhill Surface Water Management System through the discharge pipe for the Sugarhill surface water management system that was in fact intended to allow discharge from the Sugarhill system to the Preserve. Correspondences circa 1980 indicate this concern was real and that this back flow drainage had been observed to occur. As a result of this, it was determined the course of action to be followed would be to set a flapper gate valve on the discharge end of the culvert that passed through the surface water management system berm that permitted discharge from the Sugarhill Surface Water Management System into the Preserve so that backflow from the Preserve into the Sugarhill Surface Water Management System could not occur.

While sound in principal and in engineering conclusion, it is noted that a flapper gate valve is a mechanical device and as such is in need of routine maintenance and upkeep. The valve on the discharge to the Preserve appears to be quite old, rusted, does not seal and quite likely could be the same valve placed at that location in or around the 1980's discussion on this issue. Having inspected the valve and its mechanism, it is clearly obvious to even a casual observer that this valve, while properly specified when purchased is in a state of repair that it is not water tight and will not prevent back flow from the preserve.

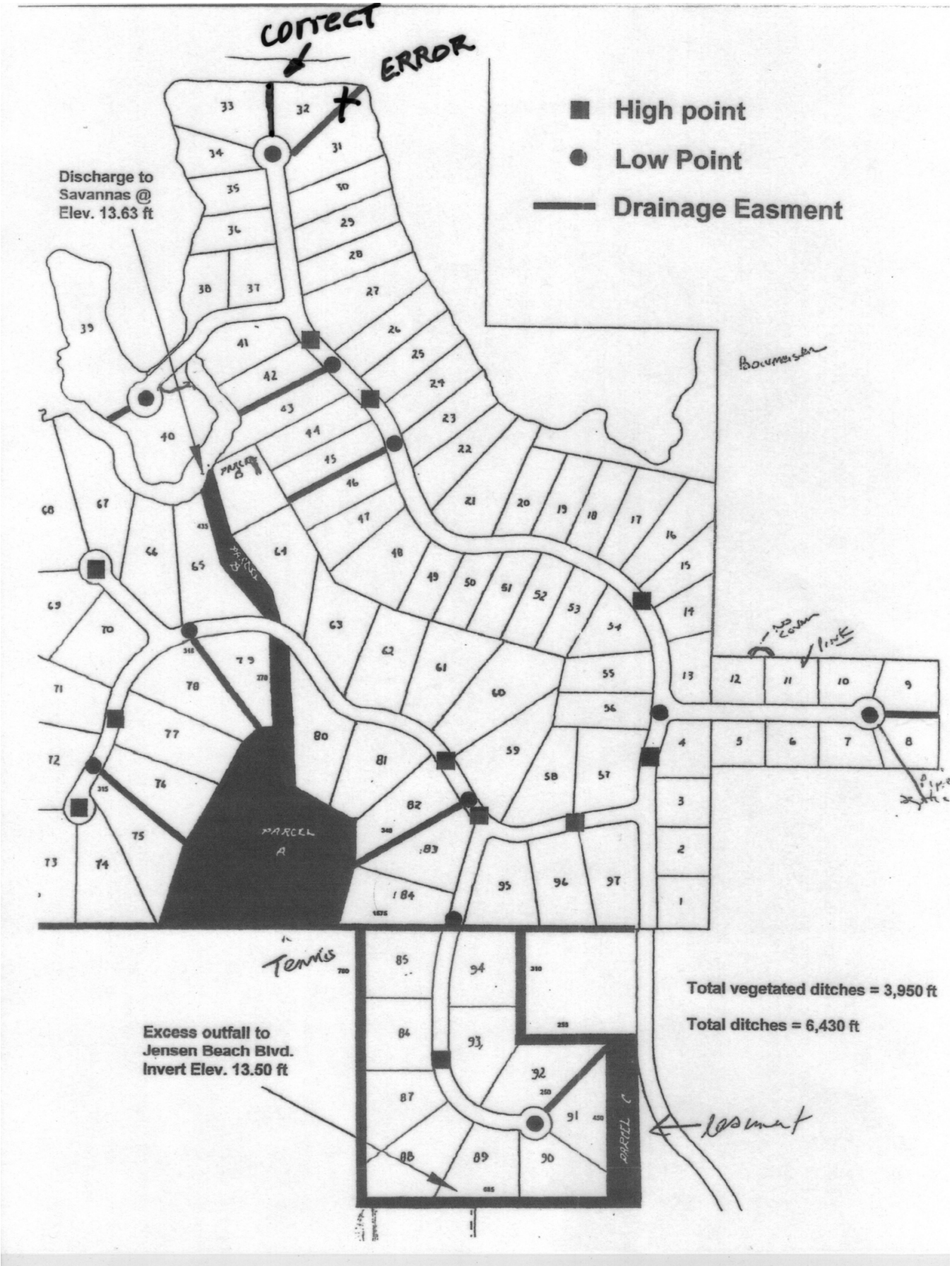
Further, review of rainfall and water level records for the Preserve from 2004 to present (2010) indicate that the Preserve has on several occasions had water levels above the 12.5 foot ngvd necessary for backflow into the Sugarhill Community Surface Water Management System to take place. Summary graphs of each year from 2004 to present are included in this report for further analysis, but however the interpretation may lead, it is apparent that there is a need to maintain a water tight seal on the discharge to the preserve to prevent backflow, and that presently there is not one.

It is presumed the 12.5 foot ngvd levels mentioned above are much worse in 2020.

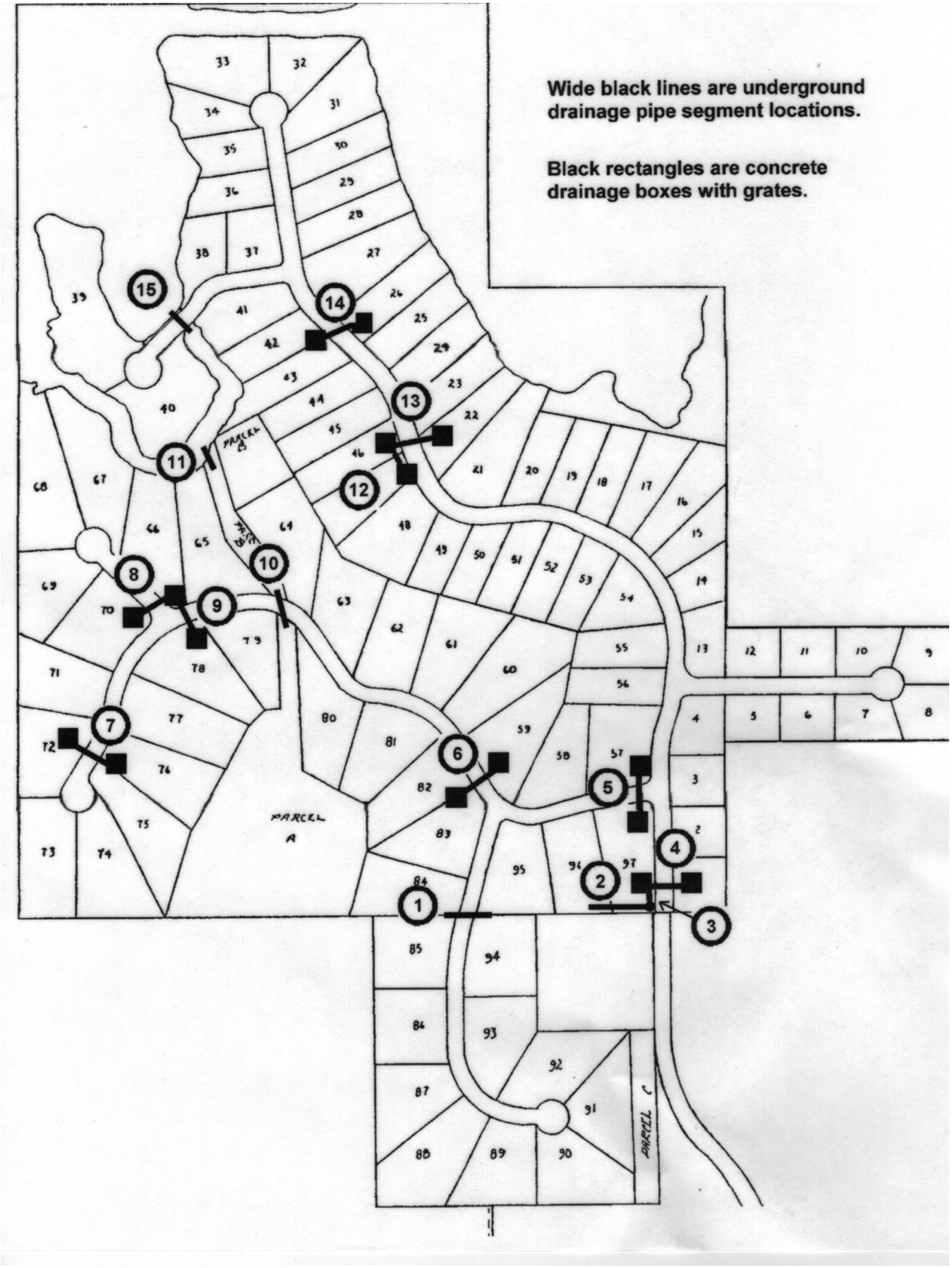
This ends the body of the 2010 report.

The next 2 maps came from that report.

Other dated water level tables have been omitted but are on file in the Association office.



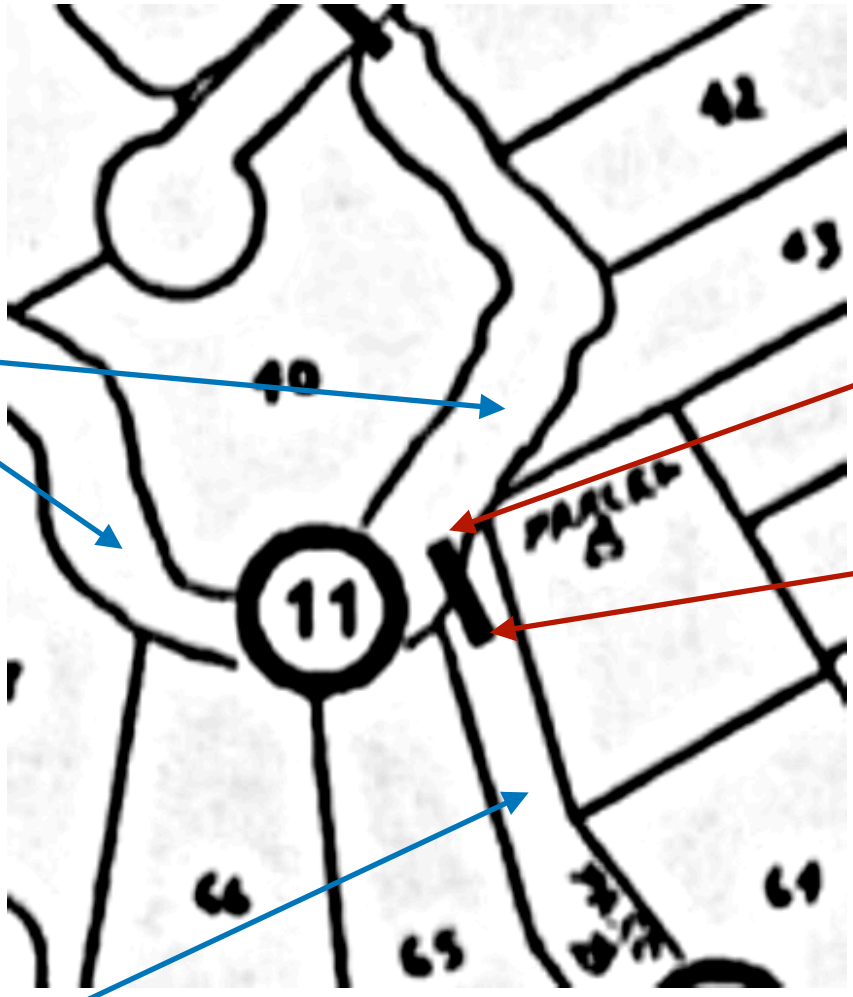
Arrow with note above indicates discharge to Savannas from parcel B.



The plugged pipe and the Savannas to Sugarhill berm is at 11 above 10-10-20 Update

August 2020 Board Information regarding the above Report

Below is a section of the above map produced in the report that we have annotated. Note the #11 pipe. The #11 pipe has a flap valve on what we perceive to be the wrong South end. The valve, if it was erroneously placed 40 years ago, complicated the original surface water flow design. An attempt to correct the oddity by cementing the flap valve shut only assured huge retention above the lake's intended hold capacity. While it may be that the original engineer/designers may have expected the Savannas Preserve Water to be consistently lower than the Sugarhill reserve lake level in high water situations, and we can only hope that is true, it has never been tested because of the assumed reverse installation of the valve. We are amazed that the first approvals and inspections missed this reversed valve and that the subsequent 2010 engineer report seems to have missed it as well. Hopefully we haven't made some gross error in our understanding but water flowing out of Sugarhill makes more sense than water flowing in. Most of this commentary was proven erroneous after it was determined the Savannas water stands way too high to allow drainage into it. 10-10-20 Update

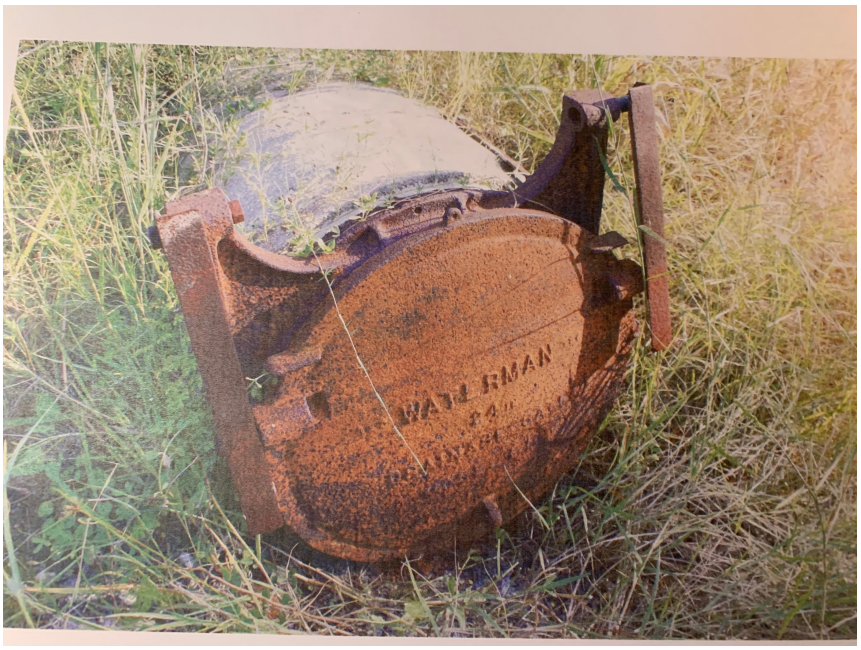


Savannas Preserve Water

North end of "retention lake to Savannas preserve" pipe intended to have flap valve that would only allow water to flow North into Savannas.

South end of "retention lake to Savannas preserve" pipe intended to have NO flap valve but now has FLOW SOUTH ONLY VALVE that has been cemented shut.

Sugarhill Retention Lake Water



WATERMAN VALVE

PF-25-W FLAP VALVE

SIZES 4" TO 14", COMPRESSION CONNECTION TO PVC PIPE, FOR DRAINAGE OR PUMP DISCHARGE

FEATURES

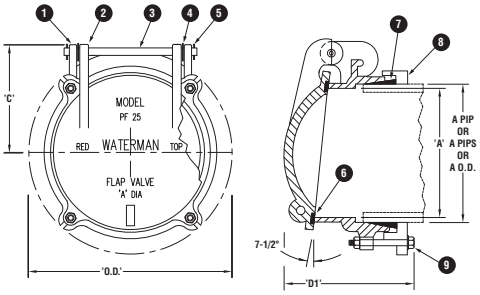
- Suitable for 25-feet seating head
- 7.5-degree angle ensures positive closure
- Easy-on compression connection for attaching to PVC pipe (specify when ordering IPS, PIP or SDR pipe)
- Iron cover with neoprene seat

OPTIONS

- Counterweight options – consult factory
- Cushioning options available – consult factory

GASKET SIZING

When ordering advise factory of desired gasket size to match your pipe: standard IPS size pipe (O.D. sizes 4½", 6⅝", 8 5/8", 10¾", 12¾", 14"), O.D. size pipe (O.D. size is nominal, i.e. 10" = 10") or SDR-35.



MATERIALS OF CONSTRUCTION

Number	Name	Material
1	Frame	Cast Iron ASTM A126 Class B
2	Cover	Cast Iron ASTM A126 Class B
3	Hinge Pin	Stainless Steel
4	Washer	Stainless Steel
5	Spring Pin	Stainless Steel
6	Seat	Neoprene Rubber
7	Gasket	Rubber
8	Ring	
9	Hex Bolt Nut Washer	Stainless Steel

DIMENSIONS (IN INCHES)

Size	A	C	D1	OD	A IPS	A PIP	A O.D.
4	4 1/16	5 1/4	5 1/4	6 1/2	4 1/2	4.13	4
6	6 1/8	6	6 1/4	9 3/8	6 5/8	6.14	6
8	8 1/4	7	6 1/4	11 3/4	8 5/8	8.16	8
10	10 1/8	8 1/4	6 1/2	13 7/8	10 3/4	10.2	10
12	12 1/8	9 1/2	7	15 7/8	12 3/4	12.24	12
14	14	10 1/2	7 1/2	17 5/8			14 1/16

Waterman
WATERMAN VALVE LLC
25500 Road 204, Exeter, CA 93221 www.WatermanUSA.com 800.331.0808
McWANE

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